AlphaServer 1000A

Rackmount Owner's Guide

Order Number: EK–RMNOR–OG. A01

Information - Class A

FCC ID: AO9-PB70

FCC NOTICE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

Any changes or modifications made to this equipment may void the user's authority to operate this equipment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur to radio or television reception. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and receiver.

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

- Consult the dealer or an experienced radio/TV technician for help.

ACOUSTIC DECLARATION: Preliminary declared values per ISO 9296 and
ISO 7779:

Product	Sound Power Level L(WAd), B		Sound Pressure Level L(pAm), dBA (bystander positions)	
AlphaServer 1000A Model 2xx (PB7RT-A9) with:	Idle	Operate	Idle	Operate
1xRZ26/8	5.5	5.6	35	36
2xRZ26/8	5.6	5.6	36	36
3xRZ26/8	5.6	5.7	36	37

Current values for specific configurations are available from Digital representatives.

1 B = 10 dBA.

SCHALLEMISSIONSWERTE: Verläufige Werteangaben nach ISO
9296 und ISO 7779/DIN EN27779:

	Schalleistungspegel L(wAd)		Schalldruckpegel L(pAm), dBA (Zuschauerpositionen)	
Gerät PB7rt +:	**Leerlauf**	**Betrieb**	**Leerlauf**	**Betrieb**
1xRZ26/8	5,5	5,6	35	36
2xRZ26/8	5,6	5,6	36	36
3xRZ26/8	5,6	5,7	36	37

Aktuelle Werte für spezielle Ausrüstungsstufen sind über die Digital Equipment Vertretungen
erhältlich. 1B = 10 dBA.

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Preface

About This Guide

Purpose and Audience

This guide describes how to set up, operate, troubleshoot, and maintain your AlphaServer 1000A Rackmount system. This information is intended for users, system managers, and others who perform system management tasks.

Before You Use This Guide

If you have not already installed your system, refer to the installation sheet shipped with the system.

Some procedures in this guide refer you to your operating system documentation. You will use your operating system documentation along with this guide. Please note that this Owner's Guide is not contained on the CD-ROM *Read Me* documentation for the AlphaServer 1000A Rackmount system.

Reader's Comments

Digital welcomes comments on this or any other manual. You can send your comments to Digital in the following ways:

- Internet electronic mail to: *readers_comment@zk3.dec.com*

- Mail:

Digital Equipment Corporation

Shared Engineering Services

129 Parker Street (PK03-2/A9)

Maynard, MA 01754-2199

Please reference internal order number S3211 in your correspondence.

Organization

This guide is organized as follows:

The Preface provides an overview of this guide.

- Chapter 1, "System Overview," provides an overview of system features and capabilities.

- Chapter 2, "Installing Your Hardware," provides instructions for installing your system hardware.

- Chapter 3, "Preparing to Install Your Operating System," explains how to prepare your system for installation of an operating system.

- Chapter 4, "Basic Operation," describes how to turn the system on and off, interpret startup messages, use console mode, boot an operating system, and use storage devices.

- Chapter 5, "Installing and Removing Components," explains how to install and remove internal system components and options.

- Chapter 6, "Configuring Your System," describes how to configure the system.

- Chapter 7, "Upgrading Your System," describes how to plan for upgrading your system with additional memory, network connections, power supply, options, and firmware.

- Chapter 8, "Troubleshooting Your System," explains how to identify and solve system problems and how to perform diagnostics.

- Chapter 9, "Quick Reference" contains system messages, jumper settings, SCSI ID settings, specifications, and the system diagram.

- The Glossary defines technical terms related to the system.

- The Index locates main topics in this guide.

Conventions

The following table lists the typographical conventions used in this guide.

Convention	Meaning
Ctrl/*x*	You hold down the Ctrl key while you press another key, indicated here by *x*.
Warning:	Contains information to prevent personal injury.
Caution:	Provides information to prevent damage to equipment or software.
Note:	Important additional information you may need when you perform certain procedures.
boot	Commands you enter are shown in this special typeface. Commands in lowercase letters can be entered in either uppercase or lowercase. Commands in uppercase letters must be entered in uppercase.
show config	Console command abbreviations must be entered exactly as shown.
[ ]	In command descriptions, brackets indicate optional elements.
{ }	In command descriptions, braces containing items separated by commas indicate mutually exclusive items.
< >	In console mode on-line help, angle brackets enclose a placeholder for which you must specify a value.
italic type	Italic type in console command sections indicates a variable.
1	In figures, a numbered callout labels a part of a figure. In text, the numbered callout refers to a labeled part of a corresponding figure.

Related Documentation

This section lists related documents that you may find helpful when you are operating your system or adding options.

To Learn More About the System

Document	Part Number
Alpha Architecture Concepts (Digital UNIX)	EY-N389E
Alpha Architecture Concepts (OpenVMS Alpha)	EY-K725E

To Install the System

Document	Part Number
AlphaServer 1000 Rackmount Installation Guide	EK-RMALP-IN
Digital UNIX AXP Factory Installed Software User Information	EK-SFFIS-UG
OpenVMS Alpha Factory Installed Software User Information	EK-A0377-UG

To Install and Operate Options

Document	Part Number
RRD45 CD-ROM Disc Drive Operating Guide	EK-RRDDD-IN
TZK11 Tape Backup System User's Guide	EK-TZK11-UG

To Service the System

Document	Part Number
AlphaServer 1000 Service Guide	EK-ALPSV-SV

1
System Overview

Introduction

This chapter includes the following topics:

- System Overview

- Supported Operating Systems

- System Console Firmware

- System Features

- Front Panel Controls and Indicators

- Rear Panel Ports and Slots

- Internal System Options

- External Options

- Ordering Options

System Overview

This high-performance, single-processor system is intended for use as a local area network (LAN) server or commercial applications server. It is housed in a rackmount enclosure, which contains the system board, CPU card, other logic modules, fans, and the power supply.

The system uses the DECchip 21064 and DECchip 21064A, reduced instruction set computer (RISC) microprocessors, based on the Alpha architecture, and provides all the power of a 64-bit computing environment. The Alpha Privileged Architecture Library code (PALcode) supports multiple operating environments that offer a choice of applications.

System Overview

This system is intended for the following types of uses:

- As an applications server, running relational databases, electronic mail, communications, or other applications

- As a print server, providing common printing resources to PCs and other systems in a LAN

- As a file server, providing disk storage to PCs and other systems in a LAN

- As a compute server, displaying the output of applications you run remotely on the server

Supported Operating Systems

This system supports the following operating systems:

- Windows NT

- OpenVMS Alpha

- Digital UNIX

While the operating system is running, it controls the system, which is in program mode. When the operating system is *not* running, a second mode, console mode, allows *you* to control system management functions, described in the next section.

System Console Firmware

You perform many of the tasks for managing and configuring your server system in console mode, where the system is controlled by the console subsystem, rather than the operating system.

The console subsystem, located in read-only memory (ROM) on the system board, contains special software, called firmware, that interacts directly with hardware components and facilitates interaction between the system hardware and the operating system.

Because the system is designed to support multiple operating systems, it offers two separate interfaces to the console subsystem. The Windows NT operating system is supported by the Advanced RISC Computing (ARC) console. The OpenVMS Alpha and Digital UNIX operating systems are supported by the Alpha System Reference Manual (SRM) console. Regardless of the operating system you use, you need to access both consoles, depending on the particular task.

Console Firmware Tasks

The console firmware allows you to perform the tasks listed in Table 1-1 through either the ARC or the SRM console.

The Windows NT (ARC) console firmware has a menu-based interface designed to facilitate hardware interaction with the Windows NT operating system.

The OpenVMS Alpha and Digital UNIX (SRM) console firmware has a command line interface for hardware interaction with the Digital UNIX or OpenVMS Alpha operating systems.

Table 1–1: Console Firmware Tasks

If You Are Running...	And You Want to...	Use this Console...
Windows NT	Boot Windows NT	ARC
	Run the EISA Configuration Utility	ARC
	Run an Adapter Configuration Utility	ARC
	Update firmware	ARC
	Switch to the SRM console	ARC
	Run programs written to run within the ARC firmware	ARC
	List Windows NT device names	ARC
	Change Windows NT boot configurations and environment variables	ARC
	Initialize the system	ARC
	Display system configuration	ARC
	Perform diagnostic tests	SRM
Digital UNIX or OpenVMS Alpha	Boot Digital UNIX or OpenVMS Alpha	SRM
	Update firmware	SRM
	Switch to the Windows NT console	SRM
	Initialize the system	SRM
	Display system configuration	SRM
	Display system storage devices	SRM
	Set/display environment variables specific to Digital UNIX and OpenVMS Alpha	SRM
	Set and display environment variables common to Digital UNIX, OpenVMS Alpha, and Windows NT	SRM
	Set console security	SRM
	Perform diagnostic tests	SRM
	Run the RAID Configuration Utility	SRM command invokes ARC
	Run the EISA Configuration Utility	SRM command invokes ARC

System Features

The system provides a number of special features that enhance reliability, ensure availability, and improve expansion capabilities, as well as facilitate hardware management and improve security.

Reliability/Availability

64-bit Alpha RISC architecture	Provides significantly better performance than 32-bit architecture.
Error Correction Code (ECC) memory and CPU cache	Allows recovery from most cache and memory errors.
Variable fan speed	Adjusts fan speed according to system temperature.
Internal sensors	Monitor and detect internal system temperature, fan failure, and power supply temperature.

System Expansion

Flexible memory architecture	Provides a 128-bit data path with ECC protection. System memory can be upgraded from 16 MB to 1 GB using memory options.
Seven PCI expansion slots and two EISA expansion slots	Accommodates industry-standard option cards such as Ethernet, FDDI, SCSI, and modems.
Integrated Fast SCSI-2 controller	Supports tape, CD-ROM, and hard disk drives without use of an expansion slot.

Integrated SVGA controller	Supports management and configuration applications locally without use of an expansion slot.
Capacity for 5 internal storage devices	Accommodates three 3½-inch half-height drives, two 5¼-inch half-height drives (CD-ROM or tape), and one 3½-inch diskette drive.
External ports	Two serial ports and one parallel port support external options such as a printer, a modem, or a local terminal.
Wide ready SCSI backplane	Provides high-performance drive technology.

Server Management

System diagnostics	Allows local and remote diagnosis of system problems.
Hardware configuration	Allows local and remote system configuration.
Unique asset management	Unique system identifier in nonvolatile memory provides easy asset management.
RAM-based error log	Records startup error messages.
Firmware upgrade utility	Verifies firmware versions.

System Security

Key lock	Limits access to system components.
Security loop (on rear of system unit)	Allows system to be secured in place.
Interlock sensor switch	Automatically turns off system power if the top cover is removed while power is on.

Front Panel Controls and Indicators

The controls and indicators on the front panel of the system unit are shown in Figure 1-1 and described in Table 1-2.

Figure 1-1: Front Panel Indicators

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1. On/Off switch
2. On/Off indicator
3. Operator control panel
4. Reset switch
5. Halt switch
6. Diskette drive activity indicator
7. Diskette drive eject button
8. CD-ROM emergency eject hole
9. CD-ROM eject button
10. CD-ROM activity indicator
11. CD-ROM volume control
12. Headphone jack
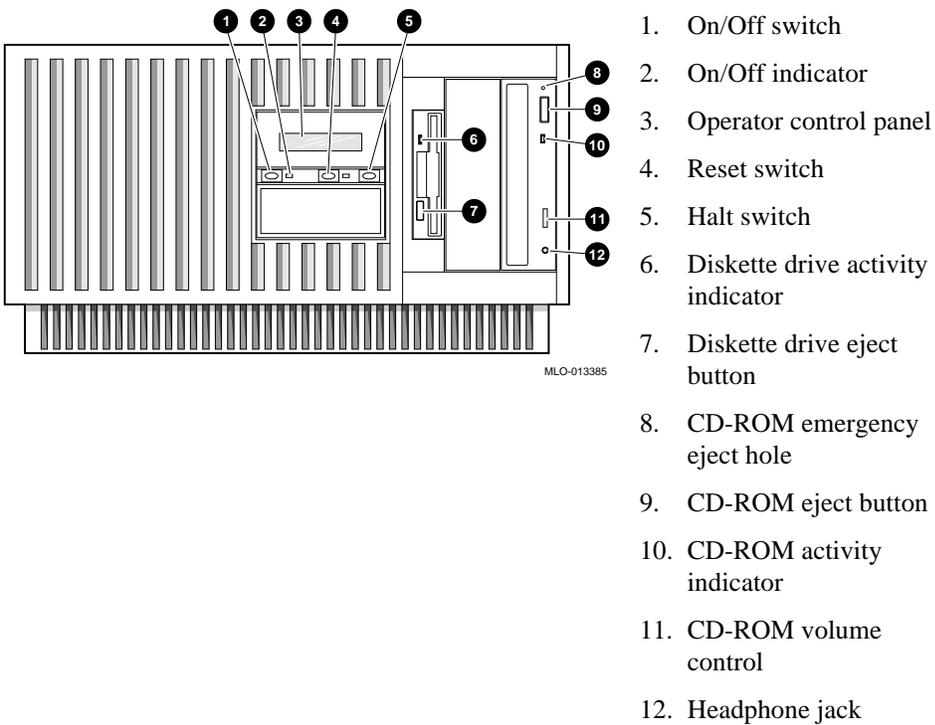
Table 1–2: Front Panel Controls and Indicators

Control or Indicator	Function
Halt switch	Halts an OpenVMS Alpha or Digital UNIX system, returning it to console mode control
	Does not affect a Windows NT system.
Reset switch	Reinitializes the system and performs startup tests
On/Off switch	Switches the system unit on and off
On/Off indicator	Lights when the system unit is turned on
Diskette drive activity indicator	Lights when the system is accessing the diskette drive
Diskette drive eject button	Ejects a diskette from the diskette drive
CD-ROM volume control	Adjusts headphone volume
CD-ROM drive activity indicator	Lights when the system is accessing the CD-ROM drive
CD-ROM eject button	Ejects disc from the CD-ROM drive
Operator control panel display	Displays diagnostic and error messages

Front Panel Switches

The On/Off, Reset, and Halt switches are located on the left side of the front panel. They are identified by the icons shown in Figure 1-2.

Figure 1-2: Front Panel Switches

1. On/Off switch
2. Reset switch
3. Halt switch

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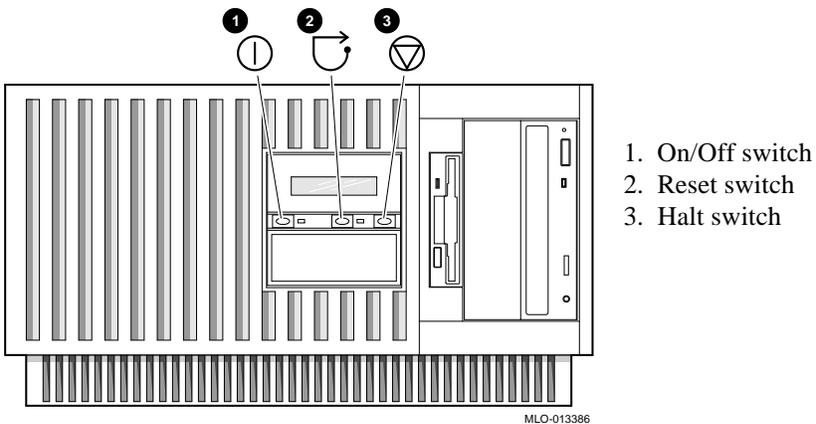
Rear Panel Ports and Slots

The ports and slots on the rear of the system unit are shown in Figure 1-3 and described in Table 1-3.

Figure 1-3: Rear Panel Ports and Slots

1. Four additional SCSI port knockouts
2. VGA port
3. Keyboard port
4. Serial port/terminal port (COM1)
5. Mouse port
6. Serial port/terminal port (COM2)
7. Parallel port
8. PCI/EISA
9. Power inlet

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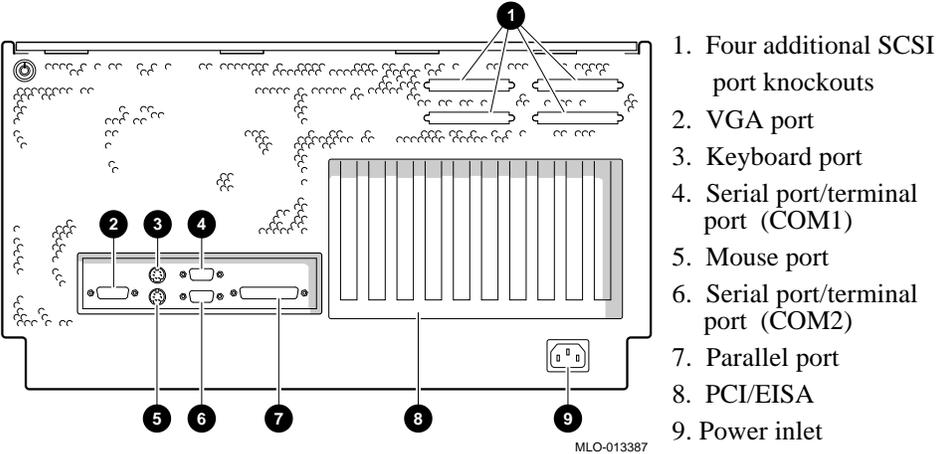
Table 1–3: Rear Panel Ports and Slots

Port or Slot	Used to connect....
Four additional SCSI port knockouts	External SCSI devices without using an adjacent slot
VGA port	VGA monitor
Keyboard port	PS/2-compatible keyboard
Serial port/terminal port (COM1)	Console terminal or serial-line peripheral such as a modem
External SCSI port	External SCSI devices
Mouse port	PS/2-compatible mouse
Serial port (COM2)	Serial-line peripheral such as a modem
Parallel port	Parallel device such as a printer
Up to seven PCI slots	Option cards for high-performance network, video, or disk controllers
Up to two EISA slots	Option cards for network, video, sound, or disk controllers
Power inlet	System unit to a power outlet

Internal System Options

Your system supports the following types of options:

- Storage options

- PCI and EISA/ISA options

- Memory options

Storage Options

Mass storage options are located in the three slots behind the bezel (Figure 1-4). The system accommodates the following types of storage options:

- One diskette drive

- Two removable-media storage devices, typically a CD-ROM drive, a digital audio tape (DAT) drive, or a quarter-inch cartridge (QIC) tape drive

- Up to three 3½-inch fixed drives

Figure 1-4 shows the locations of the storage option compartments.

Figure 1-4: Storage Option Compartments
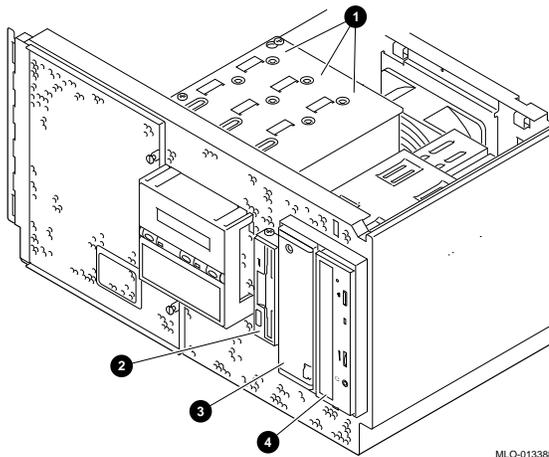
1. Fixed drives
2. Diskette drive compartment
3. Tape drive compartment
4. CD-ROM drive compartment

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EISA, ISA, and PCI Options

The system supports EISA, ISA, and PCI options, including those for:

- SCSI storage expansion
- Networking
- Communications
- Graphics

Memory Options

You can increase your system's memory to one gigabyte by using various combinations of memory options. Adding more memory allows your system to run memory-intensive software more quickly.

The system supports the following memory option sizes:

- 16 MB
- 32 MB
- 64 MB
- 128 MB
- 256 MB

Memory options consist of five single in-line memory modules (SIMMs): including one ECC module, a 16-MB option consisting of five 4-MB modules, a 32-MB option consisting of five 8-MB modules, a 64-MB option consisting of five 16-MB modules, a 128-MB option consisting of five 32-MB modules, and a 256 MB option consisting of 64-MB modules.

External Options

These external options can be added to your system:

- Monitor or terminal

- Expansion boxes

- Printers

- RAID controller

Ordering Options

The list of supported options is subject to change. Contact your sales representative for the current supported options and ordering information.

2
Installing Your Hardware

Introduction

This chapter includes:

- Hardware Setup Overview

- Verifying the Installation Site

- Selecting a System Location

- Identifying Accessories

- Connecting a Keyboard, Mouse, or Printer

- Connecting a Monitor or Terminal

- Connecting to Network Hardware

- Verifying Hardware Setup

- Locking Your System

For information on how to install the chassis into a cabinet and the cabinet into the site, please refer to the *AlphaServer 1000 Rackmount Installation Guide*, EK-RMALP-IN, shipped with your system.

Hardware Setup Overview

Perform these steps to set up your hardware. The steps can vary, depending on the options you use with your system.

1. Select a system location appropriate for service access, environmental conditions, and power requirements.

2. Confirm you have all the accessories that ship with the system and any other accessories you may want to add.

Installing Your Hardware

3. Connect the keyboard, mouse, printer, and monitor or terminal.

4. Connect to the network hardware.

5. Verify your hardware setup.

Verifying the Installation Site

_____**Caution**_____

Review your system warranty. It may require that a Digital service
representative install your system to prevent damage to equipment or software.

_____

Preinstallation Considerations

Before you install the rackmount server system, ensure:

- All cables you plan to connect to the rackmount system are in place and clearly
  labeled:

  Terminal data cables

  Telephone cables

  Network cables

- You meet the specifications and environmental conditions listed in the system owner's
  guide. For more information about planning and preparing the installation site for a
  computer network for free-standing system, refer to the *Site Environmental
  Preparation Guide,* EK-CSEPG-MA (not shipped with the system.)

- The system is located in an area (see Figure 2-1) that gives 61 cm (24 in) clearance
  from the rear of the cabinet and 91 cm (36 in) from the front of the cabinet for
  ventilation and servicing.

Figure 2-1: Workroom Area

48.3 cm
(19 in)

61 cm
(24 in)

61 cm
(24 in)

61 cm
(24 in)

66.04 cm
(26 in)

61 cm
(24 in)
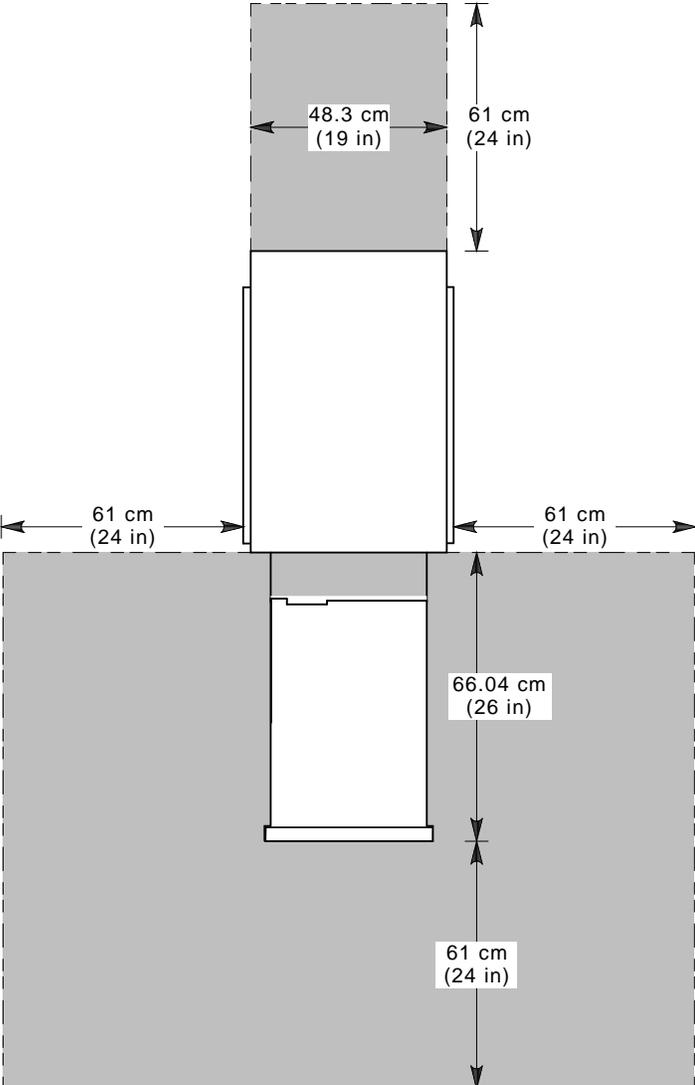
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Environmental Conditions

Table 2-1 lists the environmental conditions in which the system unit best operates.

Table 2–1: Optimal Environmental Conditions

Condition	Specification
Temperature range	The room temperature must be between 10° C and 40° C (50° F and 104° F).
Relative humidity	The relative humidity must be between 10% and 90% (20% to 80% with removable-media options).
Air circulation	Fans inside the system unit circulate the air to prevent excessive heat, which can damage system components.

Power Requirements

The power supply connects to an ac outlet. Voltage selection is not required. The system is intended for use at all rated ac input voltages. Table 2–2 lists power supply ratings.

Table 2–2: Power Supply Ratings

Specification	Range
Voltage	100-120/220-240 VAC
Frequency	50-60 Hz
Current	8.5/4.0 A (one power cord)

_____ **Note** _____

These ratings are the maximum with a fully loaded system enclosure and do not include a monitor or a terminal.

_____

System Accessories

Figure 2-2 shows the accessories that ship with the system. Table 2–3 describes the accessories.

Figure 2-2: System Accessories

1. Keyboard
2. Owner's guide
3. System unit keys (2)
4. EISA Configuration kit
5. Power cord
6. Mouse
7. MMJ serial connector

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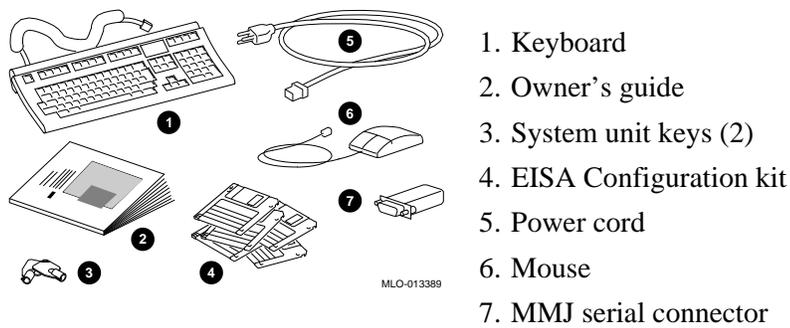
Table 2–3: System Accessories

Accessory	Description
Keyboard	PS/2-style
Owner's Guide	Installation, operation, and troubleshooting information
System unit keys (2)	Locks and unlocks the system unit
EISA Configuration Utility kit	Runs the EISA Configuration Utility
Power cord	Connects ac power to power supply
Mouse	PS/2-style
MMJ serial port connector (H8571-1)	Attaches Digital 423 DECconnect cables

Optional Accessories

Depending upon your system's configuration, you may want to order an optional VGA or SVGA monitor or terminal.

Connecting a Keyboard, a Mouse, or a Printer

If you are using a keyboard, a mouse, or a printer, connect each to the appropriate connector at the rear of the system. Refer to Figure 1-3 to locate the connectors.

Connecting a Monitor or a Terminal

Connect a VGA monitor, an SVGA monitor, or a terminal to your system unit, as shown in Figure 2-3.

Figure 2-3: Connecting a Monitor or a Terminal

1. Monitor port connection
2. Keyboard port connection
3. Mouse port connection
4. Terminal port (COM1) connection

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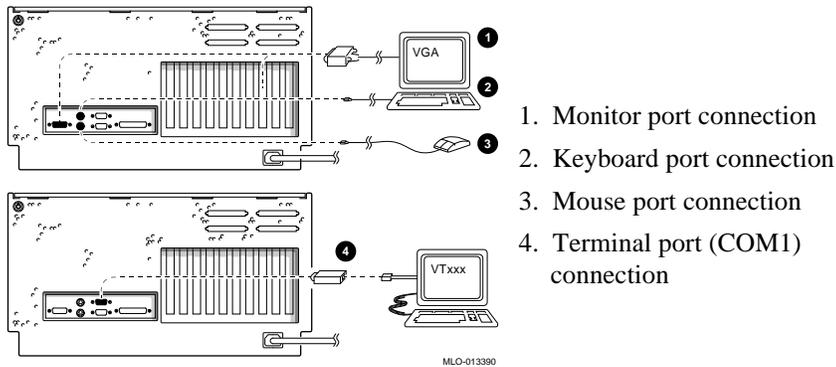
Connecting to Network Hardware

You can use network adapters to connect the EISA and PCI buses. Your system supports various network options. You can connect to ThinWire, AUI, or 10Base-T Ethernet networks as shown in Figure 2-4.

Figure 2-4: Network Connections

1. AUI cable
2. 10Base-T cable
3. ThinWire cable

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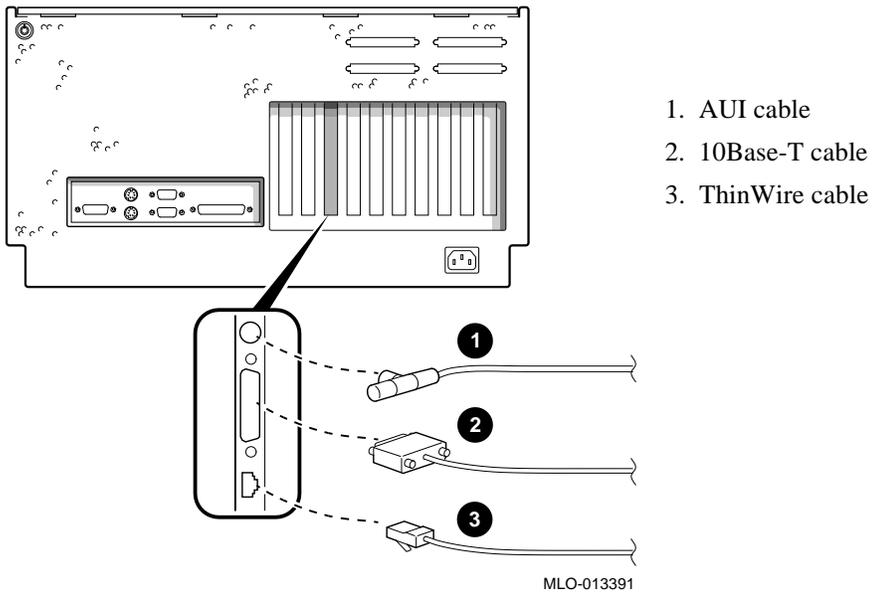
Verifying Hardware Setup

Before you turn on the system, check to ensure that you made all the proper cabling connections. Refer to Chapter 4, "Basic Operation," for information about turning on your system. Figure 2-5 shows the external system cabling.

Figure 2-5: External System Cabling

1. VGA monitor
2. Keyboard
3. Mouse
4. Printer
5. Terminal
6. Modem
7. Power cable

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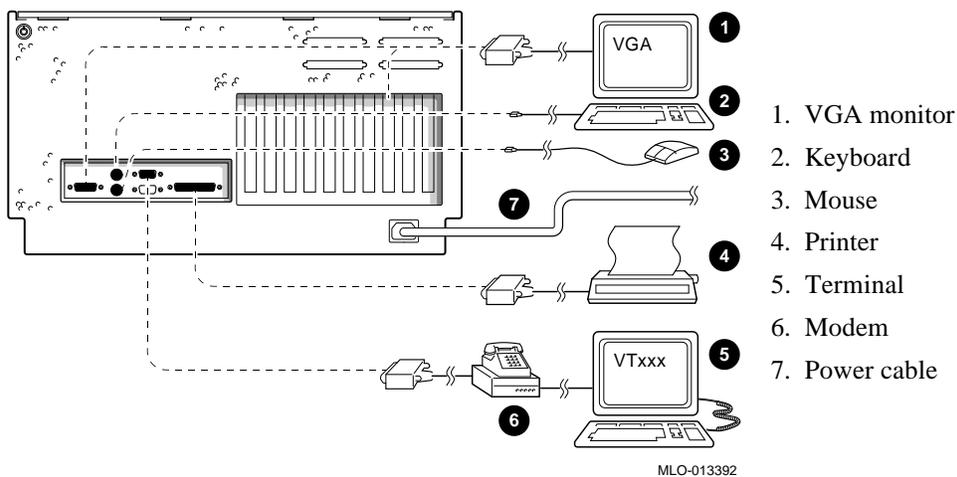
Locking Your System

The system unit is protected by a key lock on the top cover that prevents unauthorized access to the hardware inside the unit. Turning the key to the left unlocks the top cover. When the cover is locked, you cannot remove the top panel. Turning the key to the right locks the system unit and allows you access to install or remove system components. When the system unit is unlocked, push the top cover to open. Figure 2-6 shows the system lock in the unlocked position.

To remove the top cover, pull the cover off from the rear of the system. When you remove the top cover, the system cannot be turned on.

Figure 2-6: System Lock and Key

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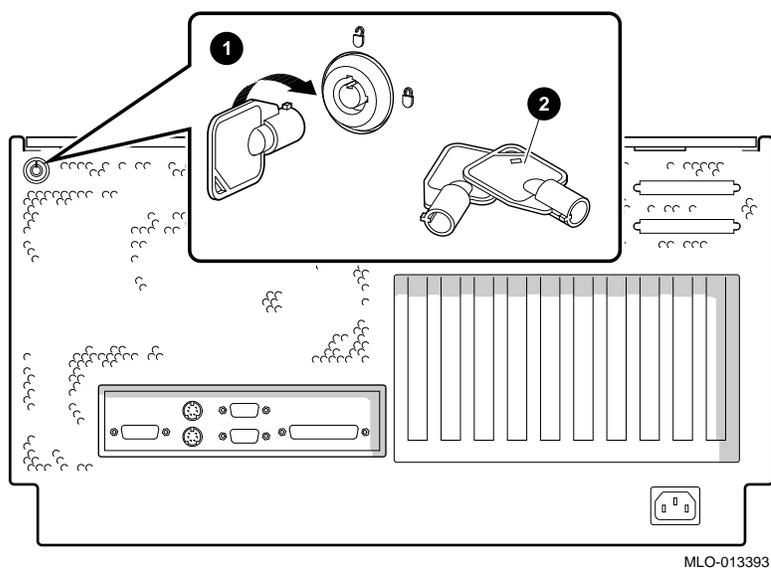
A latching loop on the rear panel of the system unit provides additional security and allows you to attach the system unit to a post or another fixed object.

Recording the System Unit Key Number

Record the number and letter of the system unit key and put it in a safe place in case you need to order a replacement key. In Figure 2-6, callout number 2 points to the location of the key number on the system unit key.

3

Preparing to Install Your Operating System

Introduction

This chapter includes the following topics:

- Preparing to Install Windows NT

- Preparing to Install Digital UNIX

- Preparing to Install OpenVMS Alpha

These sections explain how to prepare for installing or upgrading:

- Windows NT Server or Workstation Version 3.51 or later

- Digital UNIX Version 3.0B or later

- OpenVMS Alpha Version 6.2-1H2 or later

If your system was shipped with preinstalled software, proceed to "Booting the Operating System" in Chapter 4 "Basic Operation," and refer to the software documentation to start your operating system for the first time.

Preparing to Install MicroSoft Windows NT

Preparing the System

1. Before you install the MicroSoft Windows NT operating system, make sure you have the following items:

   - Microsoft Windows NT ARC firmware for the AlphaServer 1000A, Version 4.44 or later. The ARC firmware is a menu-driven utility to configure your system and Version 4.44 is required to run Windows NT 3.51.

   - Microsoft Windows NT Server or Workstation Version 3.51 or later.

   - The EISA Configuration Utility (ECU) diskette for Microsoft Windows NT, Version 1.8 or later.

   - A partitioned and formatted hard disk drive installed in your system. If your drive has not yet been prepared, follow the instructions in "Preparing Your Hard Disk" later in this section.

2. If a Microsoft Windows NT product announcement was included with your system, it contains important READ FIRST information.

3. Contact the administrator of your local area network to obtain the network information that you need. This information will vary depending on the type of network hardware and software installed at your location.

Setting the Operating System Type

1. Turn the system on by pressing the On/Off switch on the front of the system. After a short wait, the operator control panel on the front of the system displays the message "Model 4/2xx," and the screen displays initialization and testing information. Internal errors are indicated by audible "beep" codes. (Chapter 8, "Troubleshooting Your System.")

2. Press the Enter key. If your screen displays the ARC console Boot menu, your system has already been prepared for use with Microsoft Windows NT and you can proceed to the next section, "Updating the Firmware."

   If your screen displays a triple arrow (>>>) prompt instead of the ARC console Boot menu, your system has booted the SRM console. Proceed to step 3.

3. Type the following two commands at the SRM console prompt. Press the Enter key after each command:

   ```
   set console graphics

   set os_type nt
   ```

4. Turn off power to your system by pressing the On/Off switch on the front panel. Wait at least 10 seconds, then turn the power back on.

5. The system performs several diagnostics. If you see an ECU error message, you can ignore it, because the remainder of the configuration procedure will correct any configuration errors that display on the screen.

Updating the Firmware

When the ARC Boot menu displays, note the firmware version number at the top of the display. Compare this version number to the required version listed in "Installation Preparation." If no update is required, proceed to the section, "Setting Default Environment Variables." If an update is required, perform these steps:

1. From the Boot menu, use the arrow keys to highlight the Supplementary menu. Then press the Enter key.

2. Insert the Digital AlphaServer 1000A Drivers and Firmware Update diskette for Windows NT 3.51 into the diskette drive.

3. From the Supplementary menu, select "Install new firmware" and press the Enter key. The update process begins and the following prompt displays.

   ```
   Apu ->
   ```

4. Type Update and press the Enter key.

5. At the prompt, "Are you ready to program device?" type the letter y and press the Enter key.

6. If the update is successful, the screen displays the message, "ARC ROM update successful." If this message does not display, call your technical support representative for further assistance.

7. Turn off power to your system by pressing the On/Off switch on the front panel. Wait at least 10 seconds, then turn power back on.

Setting Default Environment Variables

After updating the firmware, verify that the system displays the correct firmware version number at the top of the ARC Boot menu. Then perform these steps to set the default environment variables:

1. From the ARC Boot menu, select the Supplementary menu and press the Enter key.

2. Select "Set up the System..." and press the Enter key.

3. Select "Set default environment variables" and press the Enter key.

4. When prompted to enter the system partition location, select "SCSI hard disk" and press the Enter key.

Preparing to Install Your Operating System

5. When prompted to enter SCSI bus and SCSI ID numbers, enter the SCSI bus and ID for the location of the system partition. These values are used to set an environment variable, from which Windows NT uses to determine the correct drive and partition to boot.

   If you are unsure about these values, simply accept the default values of 0. If these values are incorrect for your particular system (if, for example, your hard drives are on a secondary controller on SCSI bus 1), NT setup will prompt you to run the arcinst utility. The arcinst utility provides valid values to choose for setting this environment variable correctly.

6. When prompted to enter the partition number on the disk, verify that it is set to 1, and press the Enter key.

   If you are unsure about your disk configuration, select "Display hardware configuration" to view a summary of your system hardware.

7. Select "Set default configuration" and choose the diskette and keyboard settings that correspond to your system.

Setting the EISA Configuration

1. Insert the EISA Configuration Utility diskette for Microsoft Windows NT into the diskette drive on your server.

2. From the Setup menu, select "Run EISA Configuration Utility from floppy" and press the Enter key. After a few moments, the EISA Configuration Utility dialog box displays. Press the Enter key.

   If any of the EISA option cards in your computer have not yet been identified, the system displays a Caution dialog box. You can ignore this dialog box because your option cards will be identified in the following steps.

3. Press the Enter key to display the "Steps in Configuring your Computer" dialog box.

4. Select "Step 3: View or edit details" to verify your system's configuration (optional).

_____ **Note** _____

Your system supports two EISA option slots. Your ECU display may show more than two slots, but only the first two are valid.

_____

5. Select "Step 5: Save and Exit" and press the Enter key. At the confirmation prompt, select "Save the configuration" and press the Enter key. When a dialog box displays, indicating that the configuration has been saved, press the Enter key. Your system will restart with the updated information.

Preparing Your Hard Disk

If your first hard disk is already partitioned and formatted with either the FAT or NTFS file systems, you can omit the steps in the section "Partitioning and Formatting Your Hard Disk" and begin installation of the Microsoft Windows NT software. It is recommended that you partition and format your system's hard disk before you install Windows NT software, even if your hard disk has already been partitioned and formatted. Repartitioning and reformatting reduce the likelihood of operational problems due to conflicting versions of the operating system or disk-related problems.

_____ **Note** _____

 If the first hard disk in your system currently contains information you need, back that information up to another medium before you proceed.
_____

Partitioning and Formatting Your Hard Disk

_____ **Note** _____

Omit these steps if you want to maintain your current partitions.
_____

1. Insert the Microsoft Windows NT CD-ROM into your system's CD-ROM drive.

2. Turn on your system. After your system performs startup diagnostics, the system displays the Windows NT (ARC) console Boot menu.

3. From the Boot menu, select "Run a program" and press the Enter key. A "Program to run" prompt displays.

4. Type `cd: \alpha\arcinst` and press the Enter key. The ARC Installation Program screen displays.

5. Select "Configure Partitions" and press the Enter key. The available disk partitioning options displays.

6. Select "Delete Partition" and press the Enter key. If your system has only one hard disk, press the Enter key. If your system has more than one hard disk, select the disk to be prepared, and press the Enter key.

    Depending on the previous disk configuration, you might be notified that no partitions exist, or you may see a list of one or more partitions. Follow the on-screen prompts to delete all partitions on the disk.

7. Select "Create Partition" and press the Enter key. When the list of available disks displays, select the disk to be prepared and press the Enter key. You are prompted for the size of the partition.

8. Type 6 after the "Enter size" prompt, then press the Enter key. A 6-megabyte partition is created. This partition will be a file allocation table (FAT) system partition.

9. Press the Enter key to format the partition. When the formatting is complete, press the Enter key again.

10. Select "Create Partition" and press the Enter key. When the list of available disks displays, select the first disk again and press the Enter key. You are prompted for the size of the partition.

11. Type the larger of the two values at the "Enter size" prompt, then press the Enter key. The partition is created.

12. Press the Enter key to format the partition. When the formatting is complete, press the Enter key again.

13. Select "Make Existing Partition into a System Partition" and press the Enter key.

   - A message may display asking whether to overwrite an already defined system partition. Type y.

   - If the system displays the message, "Boot selections already exist", exit the ARCINST program, go to the Setup menu, choose "Manage boot selections," and delete all existing boot selections. Then return to the Boot menu to restart the ARCINST program and return to step 13 in these instructions.

14. When the system displays a list of available disks, select the same disk you just formatted and then press the Enter key. The list of available partitions displays.

15. Select "Partition 1" and press the Enter key. Your system is now prepared for installation of Microsoft Windows NT.

16. Select Exit and press the Enter key. Select Exit again and press the Enter key.

Installing Microsoft Windows NT

From the ARC Boot menu, select the Supplementary menu and press the Enter key. When the Supplementary menu displays, select "Install Windows NT from CD-ROM" and press the Enter key. At this point, installation of Windows NT begins. For further installation information, refer to your Windows NT documentation.

_____ **Note**_____

During installation, you are prompted for the location of the files for Microsoft Windows NT. Install the files into the larger of the two partitions you just created, and when prompted, format that partition with the NTFS file systems.

_____

Preparing to Install Digital UNIX

Before you install Digital UNIX on your system, make sure you have the following:

- Digital UNIX Version 3.0B, Version 3.2d or later

- SRM console firmware, Version 2.0-3 or later

- EISA Configuration Utility (ECU) diskette, Version 1.8 or later, for Digital UNIX and OpenVMS Alpha.

Before you start the installation, be sure to review the Digital UNIX release notes for "General Installation" and refer to the Digital UNIX installation guide for your version of the operating system.

Setting the Operating System Type

1. Turn the system on. After a short wait, the operator control panel on the front of the system displays the message "Model 4/2xx," and the screen displays initialization and testing information.

2. Press the Enter key. If the screen displays a triple arrow prompt (>>>) you booted the SRM console. Verify the value of the `set bus_probe_algorithm` environment variable. It should be set to "new." (See "Booting the Operating System" in Chapter 4, "Basic Operation.") Then, proceed to the next section, "Installing Digital UNIX. "

   If the system booted directly into the ARC Boot menu, and you do not see the >>> prompt, you must proceed to step 3 to switch to the SRM console.

3. From the ARC Boot menu, select the Supplementary menu.

4. From the Supplementary menu, select "Set up the system."

5. From the Setup menu, select "Switch to OpenVMS Alpha or Digital UNIX console." This allows you to select your operating system console.

6. Select your operating system, then select "Enter" on the Setup menu.

7. When the system displays the message, "Power-cycle the system to implement the change," press the Reset button.

These steps initiate loading of the firmware. Once the Digital UNIX and OpenVMS Alpha firmware is loaded and the system is initialized, the system displays the SRM console prompt (>>>).

8. Verify the value of the set bus_probe_algorithm environment variable. It should be set to "new." (See "Booting the Operating System" in Chapter 4, "Basic Operation. ")

Installing Digital UNIX

To install the Digital UNIX operating system from a CD-ROM, or to do a remote installation over a local network using Remote Installation Service (RIS), refer to your operating system documentation.

Preparing to Install OpenVMS Alpha

Preparing the System

Before you install the OpenVMS Alpha operating system on your system, make sure you have the following:

- OpenVMS Alpha operating system, Version 6.2-1H2 or later

- SRM console firmware, Version 2.0-3 or later

- EISA Configuration Utility (ECU) diskette for Digital UNIX and OpenVMS Alpha Version 1.8.

Before you begin the installation or upgrade, prepare the required hardware and software components, as described in this section. After preparation is complete, refer to the *OpenVMS Alpha Version 6.2 Upgrade and Installation Manual* to install the operating system.

Preparing Hardware Components

To prepare the hardware components, perform these steps:

1. Be sure the hardware has been installed and checked for proper operation.

2. Be sure you know how to turn on and operate your system components, including the system unit, console, monitor or terminal, drives, and printer. Refer to Chapter 4, "Basic Operation" in this guide, if necessary.

3. Set up your system to record the installation procedure on either a hardcopy terminal or a printer attached to the console terminal. If you do not do this, screen messages will be lost. You may want to record a transcript of screen messages to refer to during installation.

Preparing Software Components

To prepare the software components, perform these steps:

1. Be sure you have all the items listed on the bill of materials in the software distribution kit. If your distribution kit is incomplete, notify your service representative and request priority shipment of any missing items.

2. Review all cover letters and release notes.

Setting the Operating System Type

To set the operating system type, perform steps 1 through 7.

1. Turn the system on. After a short wait, the operator control panel on the front of the system displays the message "Model 4/2xx" and the screen displays initialization and testing information.

2. Press the Enter key. If the screen displays a triple arrow prompt (>>>), you booted the SRM console. Verify that the `bus_probe_algorithm` environment variable is set to "new." (See "Booting the Operating System" in Chapter 4, "Basic Operation.") Then, proceed to the section "Installing OpenVMS Alpha."

   If the system booted directly into the ARC Boot menu, and you do not see the >>> prompt, you must proceed to step 3 to switch to the SRM console.

3. From the ARC Boot menu, select the Supplementary menu.

4. From the Supplementary menu, select "Set up the system."

5. From the Setup menu, select "Switch to OpenVMS Alpha or Digital UNIX console." This allows you to select your operating system console.

6. Select your operating system, then select "Enter" on the Setup menu.

7. When the system displays the message, "Power-cycle the system to implement the change," press the Reset button.

   These steps initiate loading of the firmware. Once the Digital UNIX and OpenVMS Alpha firmware is loaded and the system is initialized, the system displays the SRM console prompt (>>>).

8. Verify the value of the `set bus_probe_algorithm` environment variable. It should be set to "new. " (See "Booting the Operating System" in Chapter 4, "Basic Operation. ")

Required PALcode

If your computer console does not have a specific minimum version of the privileged architecture library code (PALcode), you may not be able to boot your system during the installation or upgrade procedure. To ensure the correct version, perform these steps before you perform an installation or upgrade:

1. At the SRM console prompt (>>>) on your running system, enter the `show configuration` command. The system display indicates the PALcode version your system is using.

2. To determine whether your system is running the required or recommended version of PALcode, refer to the most recent OpenVMS Alpha operating system cover letter or release notes to check for new information that supplements the PALcode information in the *OpenVMS Alpha Version 6.2 Upgrade and Installation Manual*. You can also contact your service representative.

3. If the PALcode version is below the required or recommended minimum, upgrade your firmware either by following the directions in the section, "Firmware," in Upgrading, or by contacting your service representative.

Installing OpenVMS Alpha

Use the OpenVMS Alpha CD-ROM to install or upgrade the operating system, or to perform operations such as backing up the system disk. For installation information, refer to your operating system documentation.

4
Basic Operation

Introduction

This chapter explains how to start and stop your system, issue console commands, and operate other basic system functions. This chapter includes the following topics:

- Turning the System On

- Turning the System Off

- Accessing the System from a Remote Location

- Interpreting Startup Messages

- Using the Consoles

- Booting the Operating System

- Using Storage Drives

- Caring for Your System

This chapter assumes that you have set up the hardware and made all necessary connections, as described in Chapter 2, "Installing Your Hardware."

Basic Operation

Turning the System On

_____ **Note** _____

Your server may be equipped with preinstalled operating system software when
you receive it.

_____

To turn on a system that has the preinstalled operating system software, follow steps 1
through 5 below.

1. Connect any external options, such as monitors or terminals, or expansion boxes that
    house storage devices.

2. Make sure the top panel of the system unit enclosure is in place. The system will not
    start if the panel is not in place.

3. Plug the power cord into a wall outlet.

4. Turn on any external options that are connected to the system, such as monitors or
    terminals, or expansion boxes that house storage devices.

5. Press the On/Off switch on the front of the unit. The green On/Off indicator on the
    front of the system will light.

    Figure 4-1 shows the location of the On/Off switch. In the On position, the switch is
    depressed and remains depressed.

Figure 4-1: Location of the On/Off Switch
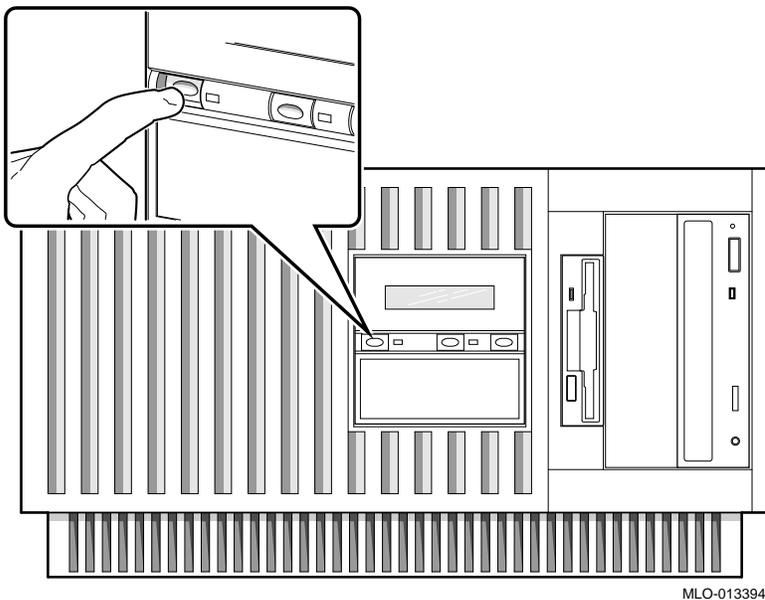
MLO-013394

The screen on your monitor or terminal will display test codes and initialization messages. When the startup procedure is complete, the operator control panel displays the message "Model 4/2xx." By default, the screen displays the SRM console prompt (>>>) or the ARC menu, depending on how the os_type environment variable has been set.

6. If you encounter a problem, verify that you correctly performed steps 1 through 5. Refer to Chapter 8, "Troubleshooting Your System" for additional information. If your operating system was preinstalled, proceed to the section, "Turning the System Off. "

7. At this point, if your operating system was not preinstalled, you may have to perform one or all of the following tasks, depending on the startup display messages and the operating system that you choose to run. Refer to the section "Booting the Operating System" in this chapter for more information on each of these tasks.

• Run the EISA Configuration Utility.

• Check the required environment variable settings.

• Change the way that your system powers up or boots.

Basic Operation

- Verify your configuration.

8. Install the operating system. (Refer to Chapter 3, "Preparing to Install Your Operating System" and then refer to your operating system documentation.)

9. Reboot the system by pressing the Reset button.

10. If you encounter a problem, verify that you correctly followed steps 1 through 9. Refer to Chapter 8, "Troubleshooting Your System" for more information.

Turning the System Off

You may not need to turn the system off to resolve system hangs or similar problems. You can often recover from hangs or other problems by pressing the Reset switch on the operator control panel shown in Figure 1-2.

_____**Caution**_____

If you press the Reset switch, the system reinitializes and you lose the applications you are running.

Within Windows NT, pressing the Ctrl, Alt, and Delete keys simultaneously allows you to shut down the operating system and bring up the ARC firmware with no loss of data.

_____

The following list summarizes the steps for turning the system off.

1. Shut down the operating system, following the instructions in the operating system documentation.

2. Press the On/Off switch on the front of the system unit.

Turning the System Off for an Extended Period

If you need to turn off your system for an extended period, first turn off power as described above. Next, unplug the power cord from the power outlet.

Accessing the System from a Remote Location

If you are running the Digital UNIX or OpenVMS Alpha operating systems, you can invoke console mode from a remote device that is connected to your system through one of the serial ports on the rear of the system. The default console port is COM1. (Figure 1-3 shows the rear panel ports and slots.)

To access the system from a remote location, follow these steps:

1. If you are running Digital UNIX or OpenVMS Alpha, shut down the operating system (refer to the operating system documentation, if necessary). When the shutdown has completed, press Return.

    The SRM console prompt (>>>) is displayed. Set the console to serial mode by turning the system off and then on, or by using the following commands at the console prompt.

    ```
    >>> set console serial
    >>> init
    ```

    _____ **Note** _____

    From a remote location, you cannot reset or initialize a system running Windows NT. If the system is running Windows NT when you try to access it from a remote location, attempts to access the system will fail.

    _____

2. Connect to your system from the remote location.

    If you want to run the EISA Configuration Utility (ECU) from a terminal connected to a serial line, refer to the section, "EISA Configuration Utility (ECU)" in Chapter 6 for more information.

    _____**Notes** _____

    The terminal must be set for 8-bit controls, the keyboard set so that the tilde (~) key sends the escape signal, and the console environment variable set to serial. Setting the tt_allow_login environment variable to 1 enables login to the SRM console firmware from alternative console ports. Setting it to 0 disables.

    _____

Interpreting Startup Messages

After you turn the system on, the operator control panel and your monitor or terminal screen display the following status information:

Basic Operation

- The countdown and ready message on the operator control panel

- The system startup display on your monitor or terminal screen

- The Boot menu (for Windows NT systems) or the console prompt (for Digital UNIX or OpenVMS Alpha systems) on your monitor or terminal screen

Audible beep codes indicate startup errors. See "Interpreting Error Beep Codes" in Chapter 8, "Troubleshooting Your System. "

While the system runs the startup tests, the operator control panel on the front of the system displays a series of codes. When the startup tests are complete, the panel displays the following message:

```
Model 4/2xx
```

During the startup sequence, the startup display scrolls on your monitor or terminal screen. The system startup display looks similar to the Example 4-1.

After the startup display, the operating system determines whether your system displays a Boot menu (for the Windows NT operating system) or a console prompt (for Digital UNIX and OpenVMS Alpha operating systems). If the system does not display either a menu or a console prompt, press the Return key several times. If there is no response, refer to Chapter 8, "Troubleshooting Your System" for more information.

Systems with Windows NT

If you are using the Windows NT operating system, the ARC firmware displays the Windows NT Boot menu after the system startup display. The following example shows the Windows NT Boot menu.

Example 4–1: Windows NT Boot Menu

```
Alpha FirmwareVersion n.nn

Copyright (c) 1993-1995 Microsoft Corporation

Copyright (c) 1993-1995 Digital Equipment Corporation


Boot menu:


    Boot the Windows NT operating system

    Boot an alternate operating system

    Run a program

    Supplementary menu . . .

Use the arrow keys to select, then press Enter.
```

Systems with Digital UNIX or OpenVMS Alpha

If you are using the Digital UNIX or OpenVMS Alpha operating systems, the SRM console prompt displays after the system startup display. The prompt looks like this:

```
>>>
```

To display any messages that scroll by, enter the cat el command or more el command at the console prompt. Either command lists the contents of the event log file, one screen at a time.

Example 4-2 shows a sample of the startup display and SRM console prompt for systems running Digital UNIX or OpenVMS Alpha. (The initial lines, related to copyright and patent information, remain on-screen for a few seconds only.)

Example 4–2: Digital UNIX or OpenVMS Alpha SRM Startup Display

```
BIOS Emulation V1.15a

Copyright (c) 1993-1995 Digital Equipment Corporation

All Rights Reserved

Patent Pending

initializing keyboard

eb.....ea.e9.e8.e7.e6.e5.e4.e3.e2.e1.e0.

n.n-nnnn, built on Oct  4  1996  at 14:48:51

>>>
```

Reading the Startup Test Results

The Windows NT startup test display looks similar to the Example 4-3. Test failures are indicated by an error list including errors that must be fixed before Windows NT may be booted.

Example 4–3: Windows NT Startup Display

```
BIOS Emulation V1.15a

Copyright (c) 1993-1995 Digital Equipment Corporation

All Rights Reserved

Patent Pending


Initializing firmware

Initializing EISA bus 0

Initializing device drivers: NCRC810, SWXCR, QLOGIC, KZPSA ...OK
```

The Digital UNIX or OpenVMS Alpha startup test display indicates successful tests with the word *OK.*

If the System Passes Startup Tests

If the system passes the startup tests, it either boots the selected operating system or emits audible beep codes and halts in console mode, depending on the system default settings.

If the System Fails Startup Tests

If the system fails the startup tests, perform these steps.

1. Turn the system unit off, wait approximately 15 seconds, then turn it on again.

2. If the system continues to fail the startup tests, or emits audible error beep codes and halts, refer to the Chapter 8 "Troubleshooting Your System."

Using the Consoles

You use the Windows NT (ARC) console and the Digital UNIX or OpenVMS Alpha (SRM) console to perform different tasks. For example, ROM-based diagnostics (such as the test command) run only from the Digital UNIX or OpenVMS Alpha console, regardless of the operating system that you are running.

Invoking Console Mode

To perform tasks from console mode you must first invoke console mode by shutting down the operating system according to the operating system shutdown procedure described in your operating system documentation. If you are running either the Digital UNIX or OpenVMS Alpha operating system, you can also invoke console mode by pressing the Halt switch on the operator control panel.

_____ **Caution** _____

If you are running Digital UNIX or OpenVMS Alpha operating systems, press the Halt switch only after you have shut down the operating system using the correct shutdown procedure.

_____

The Halt switch does not affect the Windows NT operating system. To invoke console mode in Windows NT, shut down the operating system following the procedure described in the operating system documentation. Turn the system off and then on, or press the Reset switch .

When to Switch Consoles

You can perform most console-related tasks from the interface designed to interact with your operating system. However, the console interfaces are designed so that you can easily switch between them. You will need to switch between the consoles in the following instances:

- If you are running Digital UNIX or OpenVMS Alpha and you need to run the EISA Configuration Utility or the RAID Configuration Utility (RCU), switch to the Windows NT (ARC) console.

- If you are running Windows NT and you want to perform any of the following tasks, switch to the Digital UNIX or OpenVMS Alpha (SRM) console:

    1. Test the system (other than self-tests at system startup).

    2. Examine and verify options that are recognized by the system.

    3. Set or change some environment variables, such as Ethernet device type and speed for Fast SCSI devices.

    4. Verify the versions of all firmware PALcode.

Switching to the Digital UNIX and OpenVMS Alpha (SRM) Console

Depending on the command that you used to invoke the Windows NT (ARC) console, you may be able to switch to the Digital UNIX and OpenVMS Alpha (SRM) console by

pressing the Reset switch on your system unit, or by turning the system off and then back on. If you typed `>>> arc` or `>>> runecu` at the SRM console prompt, you can use this method.

However, if you typed `>>> set os_type nt`, use the following procedure, which loads the firmware:

1. From the ARC Boot menu, select the Supplementary menu.

2. From the Supplementary menu, select "Set up the system."

3. From the Setup menu, select "Switch to OpenVMS Alpha or Digital UNIX console" to select your operating system console.

4. Press Enter on the Setup menu.

5. When the system displays the message, "Power-cycle the system to implement the change," press the Reset button.

Once the Digital UNIX or OpenVMS Alpha firmware is loaded and the system is initialized, the system displays the SRM console prompt (>>>).

Switching to the Windows NT (ARC) Console

To switch from the Digital UNIX or OpenVMS Alpha (SRM) console to the Windows NT (ARC) console, type the following command at the console prompt:

```
>>> set os_type nt
```

Then turn the system off and then back on. This procedure loads the firmware. Once the Windows NT firmware is loaded and the system is initialized, the system displays the Windows NT Boot menu.

_____ **Note** _____

If the screen display shows option device names flashing, see the "Troubleshooting Your System" chapter later in this guide.

_____

As an alternate method, to switch from the SRM to the ARC console in your current session but return to the SRM console if you turn off the system, you can use the following command:

```
>>> arc
```

Windows NT (ARC) Console Menus

The Windows NT (ARC) console has three primary menus: the Boot menu, the Supplementary menu, and the Setup menu.

Boot Menu Functions

The Boot menu items allow you to perform these tasks:

- Boot the default boot selection

- Boot an alternative boot selection

- Run a program

- Access the Supplementary menu

Supplementary Menu Functions

The Supplementary menu items allow you to perform these tasks:

- Install new firmware

- Install Windows NT from a compact disc

- Access the Setup menu

- List the ARC firmware device names for the installed devices

- Return to the Boot menu

Setup Menu Functions

The Setup menu items allow you to perform these tasks:

- Set the system time

- Set the default system partition

- Configure the system floppy drives and keyboard

- Manage the Windows NT (ARC) boot selections

- Set the system to boot automatically

- Run the EISA Configuration Utility

- Edit the system environment variables

- Reset the system to factory defaults

- Set the default operating system and system firmware

- Return to the Supplementary menu, with or without saving Setup menu changes

Digital UNIX or OpenVMS Alpha (SRM) Console Commands

There are two levels of Digital UNIX and OpenVMS Alpha (SRM) console commands:

- Basic
- Comprehensive

Basic Commands

Use basic commands to perform common tasks described in this guide. Table 4-1 lists each console task with their corresponding command and syntax.

Table 4–1: Basic SRM Console Commands

Task	Command	Syntax
Boot the Windows NT (ARC) console firmware.	arc	arc
Boot the operating system.	boot	boot [-flags [*longword*,]*longword* [-halt] [-filename][*boot_device*]
Display error logs.	cat el	cat el or more el
Resume program execution.	continue	continue
Invoke the EISA Configuration Utility.	ecu	ecu
Display online help on using console commands.	help	help [*command . . .*]
Initialize the system.	init	init
Halt system tests invoked by test command.	kill_diags	kill_diags
Display online help on using console commands.	man	man [*command . . .*]
Display status of all system processes.	ps	ps
Set an environment variable.	set	set [-default] *envar val*
Display the value of an environment variable or display configuration information.	show	show [*envar*][{config, device, memory, pal, version}]
Test the system and display results.	test	test

_____ **Note**_____

To limit the screen display to 23 lines at a time, use:
 >>> more [filename].   Example: >>> more el.

 Or use,

 >>> [command] | more Example: >>> show config | more

_____

_____ **Caution** _____

Environment variables must be entered *exactly* as shown, not abbreviated. The
system will not recognize an abbreviated form.

_____

Comprehensive Commands

Additional commands are available for system diagnosis and other complex tasks. These
commands require detailed knowledge of your system. Do not use them without fully
understanding how they can affect your system.

To see a list of additional commands, enter help or man at the SRM console prompt.

SRM Console Security Features

Console security features, which restrict access to certain console commands, are intended
to prevent unauthorized users from modifying system parameters or otherwise tampering
with the system from the console. The SRM console supports two modes:

- Secure mode allows access only to specific console commands: start,
  continue, boot (with stored parameters), and login.

- User mode allows access to all SRM console commands.

_____ **Note**_____

The security features work only if access to the system hardware is controlled.
Be sure to keep the front panel of the system locked and the key secure.

_____

Basic Operation

The set secure Command
Use the set secure command to enable the security features without restarting the
console. If the console password has already been set, access will be limited to the
`start, continue, boot` (using the stored parameters), and `login`
commands. For example: `>>> set secure`

```
Console is secure
```

If the password has not been set, the console will prompt you to set it. (See "The set
password Command" section.)

```
>>> set secure
Secure is not set.  Please set the password.
```

The set password Command
Use the `set password` command to set or change the console password. If the
password has already been set, the console prompts you for the new password and
verification, the for the old password.

```
>>> set password
Please enter the password:
Please enter the password again:
Now enter the old password:
>>>
```

_____ **Note** _____

The password length must be between 15 and 30 alphanumberic characters.
Any characters after the 30th are not stored.

_____

If the validation password does not match the one previously set, the password does not
change.

```
>>> set password
Please enter the password:
Please enter the password again:
Validation error
```

If the password has not been set, the console prompts you for the new password and verification.

```
>>> set password

Please enter the password:

Please enter the password again:

>>>
```

The set login Command

Use the `login` command to turn off the security features and gain access to all the SRM console commmands during a particular session. If a password has not been set when you enter the `login` command, you wil be prompted to set it, but you need not do so unless you wish to.

```
>>> login

Secure not set.  Please set the password:

>>>
```

When the console prompt is redisplayed, the console is no longer in secure mode. If a password has been set when you enter the `login` command, you must enter the pasword at the prompt:

```
>>> login

Please enter the password:
```

If the password you enter matches the currrent password, the secure mode is turned off and all console commands can be used. You can then return to secure mode by initializing the system or entering the `boot, continue` or `start` command.

If you forget the password, you can use the `login` command and the Halt switch to clear the password:

1. Check that the Halt switch is off.

2. Enter the `login` command.

3. When the `Enter Password`: prompt is displayed, press the Halt switch, then press Return.

4. Press the Halt switch off. The password is now cleared, and the secure mode cannot be reinstated until you set a new password.

_____ **Note** _____

If you leave the halt switch on after you clear the password, the system will not boot.

_____

The clear password Command

The `clear password` command clears the environment variable, *password*, setting it to zero. Use this command when you want access to all the SRM console commands, but the system is in secure mode. To use `clear password`, you must know the current password. If you do not know the password, see "The login Command."

```
>>> clear password
Please enter the password:
Password successfully cleared
```

Getting Help About the Windows NT (ARC) Console

The Windows NT (ARC) console provides general help about using the Setup menu, but it does not provide help about all menu items.

Table 4–2 lists the steps you perform to display the Setup menu help screen.

Table 4–2: Windows NT (ARC) Console Help

Step	Action	Result
1	If necessary, enter the Windows NT console by shutting down the operating system. (Follow the procedure described in the operating system documentation.) Turn the system off and then on.	The system displays the Windows NT console Boot menu.
2	Choose "Supplementary menu..."	The system displays the Supplementary menu.
3	Choose "Set up the system..."	The system displays the Setup menu.
4	Choose Help menu and press Enter.	The system displays the Setup menu help screen.

Setup Menu

Example 4-4 shows a partial Setup menu display with the help menu item selected (shown in bold).

Example 4–4: Setup Menu

```
Alpha Firmware Version  n.nn   Day,  M-DD-YYYY 9:49:50 PM
Copyright (c) 1993-1995 Microsoft Corporation
Copyright (c) 1993-1995 Digital Equipment Corporation

Setup menu:

            .

            .

            .

       Reset system to factory defaults

      Help
      Switch to OpenVMS Alpha or Digital UNIX console
       Supplementary menu, and do not save changes...

   Use the arrow keys to select, then press Enter.
```

Setup Menu Help

Example 4-5 shows the Setup menu help display.

Example 4–5: Setup Menu Help Display

```
Do the following steps, in this order, to set up the system:

1.  Set system time.
2.  Set default environment variables.
3.  Set default configuration.
4.  Create at least one boot selection.
5.  Set up autoboot, if desired.
6.  Run the EISA configuration utility.


-> An arrow next to a menu item means that something is wrong in this area
of the machine, and you should select this item to fix it.

"Reset system to factory defaults" does steps 2 -- 5 for a typical system.

The Escape key returns from a menu, and aborts a sequence.

The firmware automatically reboots if the configuration is changed.

  Press any key to continue. . .
```

Getting Help on the Digital UNIX and OpenVMS Alpha (SRM) Console

To get online help, enter `help` at the SRM console prompt. Example 4-6 shows the `help` command and the resulting display.

Example 4–6: The help Command

```
>>> help
NAME
    help
FUNCTION
    Display information about console commands.
SYNOPSIS
    help [<command>...]
        Command synopsis conventions:
        <item> Implies a placeholder for user specified item.
        <item>... Implies an item or list of items.
        [] Implies optional keyword or item.
        {a,b,c} Implies any one of a, b, c.
        {a|b|c} Implies any combination of a, b, c.
The following help topics are available:
alloc          boot        bpt          break        cat
check          chmod       clear        continue     crash
create         date        deposit      dynamic      echo
edit           eval        examine      exer         exit
false          find_field  fr_cmd       free         fw_cmd
grep           halt        hd           help         init
isp1020_edit   kill        kill_diags   line         ls
man            memtest     mem_more     net          nettest
ps             rm          sa           semaphore    set
set host       shell       show         show cluster show config
show hwrpb     show iobq   show map     show memory  show _status
sleep          sp          start        stop         true
update         wc          x
```

Booting the Operating System

You may need to perform these tasks before you boot your operating system:

- Run the EISA Configuration Utility.

- Check required environment variable settings.

- Change the way your system powers up or boots.

- Verify your configuration.

The remainder of this section contains more information about each of these tasks.

Running the EISA Configuration Utility

If you add, remove, or move an EISA or ISA card, you must run the EISA Configuration Utility before you boot the operating system. Refer to "EISA Configuration Utility" under "EISA and ISA Options" in Chapter 6 of this guide for more information.

Checking Required Environment Variable Settings

If you are the running Digital UNIX or OpenVMS Alpha operating system, verify the value of the set bus_probe_algorithm environment variable. It should be set to "new. "

You may also want to check that settings for the following variables match your configuration. The SRM console command to reset each variable is shown in parenthesis. To see a complete list of environment variables, type show * at the SRM console prompt.

Operating system (set os_type)

Ethernet device type (set ew*o_mode)

Speed for Fast SCSI devices (set pk*0_fast)

Boot device (set bootdef_dev)

Boot flags (set boot_osflags)

Device names (set bus_probe_algorithm)

Network protocols (set ew*0_protocols)

Changing Startup and Boot Defaults

You can change the way the system starts up or boots the operating system. For example, you can set the system to autoboot or you can change the default boot device. To make these kinds of changes you need to change default values for your system's environment variables.

- To change default values for Windows NT systems, which boot automatically, you can prevent autoboot by selecting one of the menu options.

- To change default values for Digital UNIX or OpenVMS Alpha systems, see "set" in Table 4-1, "Basic SRM Console Commands."

Startup and Boot Environment Variables

The following environment variables affect the way the system starts up or boots:

- `auto_action`

- `autoload`

- `countdown`

- `os_type`

Table 4–3 lists the boot environment variables and their values, and briefly describes their effects. Environment variables marked with an asterisk * in Table 4-3 require that you use the `init` command to initialize the firmware whenever you reset that particular variable.

Example : >>> set os_type NT

>>> init

Table 4–3: Startup and Boot Environment Variables

Operating System	Environment Variable	Value	Description
Digital UNIX OpenVMS Alpha	auto_action	Boot Halt Restart	Specifies the system default startup action. Applies only to the Digital UNIX and OpenVMS Alpha operating systems.
Digital UNIX OpenVMS Alpha	bus_probe_algorithm	New	Improves bus sizing and configuration on systems running the Digital UNIX and Open VMS Alpha operating systems. Failure to set this environment variable could result in errors.
Windows NT	autoload	YES or NO	Specifies whether the Windows NT operating system should boot. Does not affect the OpenVMS Alpha or Digital UNIX operating systems. If the value is YES, the Windows NT firmware boots the system after the COUNTDOWN time limit expires. If the value is NO, the system halts at the Windows NT firmware Boot menu.
Windows NT	countdown	10 seconds (default value)	Specifies the time limit within which you can stop the Windows NT operating system from booting if AUTOLOAD is set to YES. The time limit is specified in seconds. When you turn on the system or reinitialize the firmware, the system displays the seconds remaining before the operating system boots automatically. To stop the system from booting automatically, you must choose another menu item from the Boot menu.
Windows NT Digital UNIX OpenVMS Alpha	os_type	NT UNIX VMS	Specifies the system default operating system setting. Depending on the value, the system either boots or restarts the specified operating system, or halts in the specified console. You can modify the value from either the Windows NT (ARC) console or Digital UNIX or OpenVMS Alpha (SRM) console.

Entering the Windows NT Firmware

The system enters and remains in the Windows NT firmware under these conditions:

- When os_type is set to NT and autoload is set to NO

- When autoload is set to YES and you choose another menu item on the Boot menu before the countdown time limit expires.

Entering the Digital UNIX and OpenVMS Alpha Firmware

The system enters and remains in the Digital UNIX and OpenVMS Alpha firmware under these conditions:

- When auto_action is set to HALT and os_type is set either to Digital UNIX or OpenVMS Alpha.

- When the startup tests fail, the system ignores the os_type setting and enters the Digital UNIX and OpenVMS Alpha console automatically. If the os_type setting is NT when the system fails, it returns to the Windows NT firmware when you correct the error.

Verify Your Configuration

Windows NT Systems

To verify your Windows NT configuration, select the ARC console menu option "Display Hardware Configuration," which displays the configuration information in a sequence of four displays. The first display shows system information such as memory, CPU speed, NVRAM usage, the ARC version time-stamp, and the type of video detected. The second display lists the devices detected by the firmware, including the monitor, keyboard, serial ports, and devices on the SCSI bus. The third display contains PCI slot information: bus number, device number, function number, vendor ID, device ID, revision ID, interrupt vector, and device type. All PCI network cards are displayed. The fourth display contains EISA slot information: slot, device, and identifier. All EISA network cards are displayed.

You can also list options recognized by your system by entering the Digital UNIX and OpenVMS Alpha commands described in the section, "Viewing the System Configuration" in Chapter 6, "Configuring Your System." To enter these commands, you must switch from the Windows NT (ARC) console to the Digital UNIX and OpenVMS Alpha (SRM) console. For information about switching to the Digital UNIX and OpenVMS Alpha (SRM) console, refer to "Switching to the Digital UNIX and OpenVMS Alpha (SRM) Console" earlier in this chapter.

_____ **Note** _____

Switch back to the Windows NT (ARC) console before you boot the Windows
NT operating system

_____

Digital UNIX or OpenVMS Alpha Systems

Use these SRM console commands to verify system configuration for Digital UNIX or
OpenVMS Alpha systems.

`show config`	Displays the buses on the system and the devices found on those buses
`show device`	Displays the devices and controllers in the system
`show memory`	Displays main memory configuration
`set` and `show`	Set and display environment variable settings

Booting Windows NT

When the system ships with the Microsoft Windows NT operating system, the system
default settings cause the system to boot from the system disk automatically after it
successfully completes the startup tests. However, the system counts down for 10 seconds
after it displays the Boot menu before booting. You can stop the system from booting
before this time limit expires by choosing another menu item using the up or down arrow
key.

You can change these system default settings. For example, you can cause the system to
halt at the Windows NT firmware Boot menu after the startup tests, or you can increase
the countdown time limit.

Changing Windows NT Boot Selections

The Windows NT firmware uses boot selections to locate the operating system files. When the system is shipped, the default boot selection identifies the system disk as the location of the operating system files. Thus, the system boots from the system disk. You can set alternative boot selections if, for example, you want to boot the operating system from a different device.

Using the Windows NT Boot Menu

Example 4-7 shows the Windows NT Boot menu.

Example 4–7: Windows NT Boot Menu

```
Alpha Firmware Version n.nn
Copyright (c) 1993-1995 Microsoft Corporation
Copyright (c) 1993-1995 Digital Equipment Corporation

Boot menu:


        Boot the default operating system
        Boot an alternate operating system
        Run a program
        Supplementary menu...

Use the arrow keys to select, then press Enter.
```

Table 4–4 shows the steps you perform to boot Windows NT from the Boot menu.

Table 4–4: Booting Windows NT from the Boot Menu

Step	Action	Result
1	To boot the system using the default boot selection, choose "Boot Windows NT" on the Boot menu, and press Return.	The system boots from the system disk, using the default boot selection – Environment Variables.
2	To boot the system using an alternative boot selection, choose "Boot an alternative operating system" on the Boot menu and press Return.	The system displays the alternative boot selection names.
3	Choose the alternative boot selection name you want to boot and press Return.	The system boots from the boot selection that you choose.

Windows NT Boot Selection Menu

Use the Windows NT Boot selection menu to change boot selections for your system. Choose "Supplementary menu" from the Boot menu and then "Manage boot selection menu" to access the Boot selection menu. Example 4-8 shows the Windows NT Boot selection menu.

Example 4–8: Windows NT Boot Selection Menu

```
Alpha Firmware Version n.nn
Copyright (c) 1993-1995 Microsoft Corporation
Copyright (c) 1993-1995 Digital Equipment Corporation


Boot selection menu:

        Add a boot selection

        Change a boot selection

        Check boot selections

        Delete a boot selection

        Dump boot selections

        Rearrange boot selections

        Setup menu...

Use the arrow keys to select, then press Enter.
```

Booting Digital UNIX or OpenVMS Alpha Operating Systems

The operating system, if supplied, is installed on the system disk.

- For more information on preinstalled Digital UNIX software, see the Digital UNIX Factory Installed Software user information card.

- For more information on preinstalled OpenVMS Alpha software, see the OpenVMS Alpha Factory Installed Software user information card.

When the system is shipped with Digital UNIX or OpenVMS Alpha software installed, the system default settings cause the system to boot from the system disk automatically after it successfully completes the startup tests. You can change these settings if, for example, you want the system to halt at the console prompt (>>>) after it completes the startup tests.

Digital UNIX and OpenVMS Alpha System Defaults

The Digital UNIX and OpenVMS Alpha operating systems use default settings to tell the system where the operating system is located and how to boot the system. When the system is shipped, these default settings cause the system to boot from the system disk. You can set different default settings if, for example, you want to boot the operating system from a different device. See "set" in Table 4–1, "Basic SRM Console Commands."

Boot Command

Use the following command to boot either the Digital UNIX operating system or the OpenVMS Alpha operating system using the default settings.

```
...>>> boot
```

To change any default settings, see "Changing Startup and Boot Defaults" in the section, "Booting the Operating System," presented earlier in this chapter.

Using Storage Drives

Mass storage drives are devices that store large amounts of data for extended periods. The system accommodates the following types of storage devices:

- One 3½-inch diskette drive
- Two 5½-inch half-height drives (CD-ROM or tape)
- Up to three 3½-inch fixed hard-disk drives

The drives are located in compartments inside your system as shown in Figure 4-2.

Figure 4-2: Location of Storage Devices

1. Fixed drive
2. Diskette drive
3. Tape drive
4. CD-ROM drive

MLO-013388
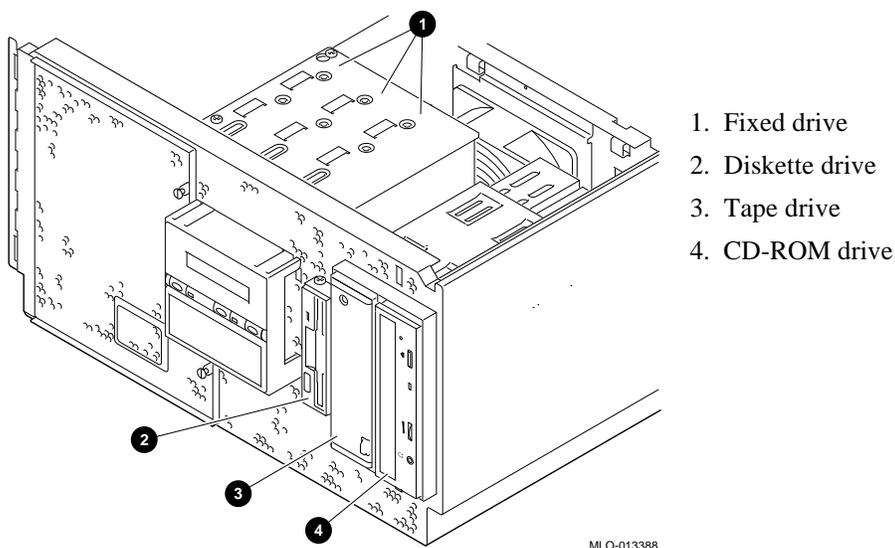
Using a Diskette Drive

Diskette drives read information from removable diskettes. One diskette drive is located to the left of the removable-media mass storage compartment, below the CD-ROM drive. The diskette drive components are shown in Figure 4-3.

To insert a diskette into a diskette drive:

1. Set the write-protect switch (1 in the figure) on the diskette to either the write-protected or write-enabled position.

2. Insert the diskette as shown in the figure.

   The activity indicator (2 in the figure) lights when the system reads the diskette.

Figure 4-3: Diskette Drive Components

1. Write-protect switch
2. Activity indicator
3. Eject button
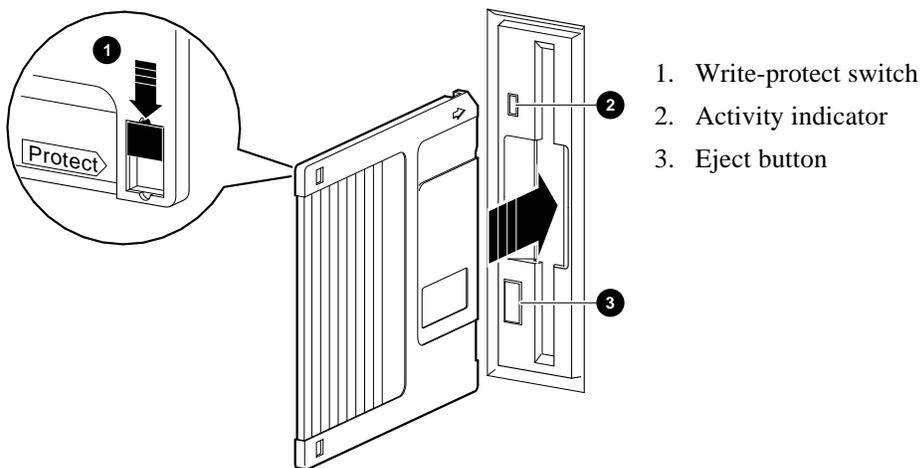
MLO-011553

To remove a diskette:

Press the Eject button (3 in the figure) on the diskette drive.

Using a CD-ROM Drive

CD-ROM drives read information from removable CDROMS (read-only compact discs).Your system uses a CD-ROM drive that has an automatic loading/ejection feature that functions only when power is supplied. Figure 4-4 shows the components of a CD-ROM drive.

_____ **Caution** _____

Handle a CD-ROM by its edges. Do not touch the surface. Fingerprints and dust can cause the CD-ROM to malfunction.

_____

Figure 4-4: CD-ROM Drive Components

1. Emergency eject hole
2. Eject button
3. Activity indicator
4. Volume control
5. Headphone jack
6. CD-ROM

MLO-013395
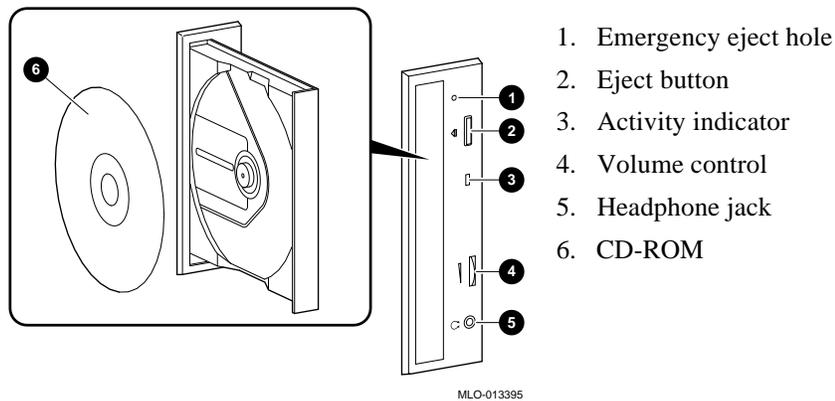
To insert a disc into the drive:

1. Press the CD-ROM drive eject button (item 2 in the figure). The CD caddy ejects.

2. Load the CD into a caddy (item 6 in the figure).

3. Push the caddy into the CD-ROM drive.

The activity indicator (item 3 in the figure) turns on. When the activity light turns off, the drive is ready to use. To operate the CD-ROM drive, follow the instructions provided with your system software.

To remove a CD from the drive:

1. Press the drive eject button (item 2 in the figure). The CD ejects.

2. Gently pull the caddy from the CD-ROM drive.

3. Remove the CD from the caddy.

4. Push the drawer back into the drive.

Emergency Procedure

If the CD caddy does not eject when you press the eject button:

Insert the end of a small bar, such as a paper clip,[1] into the emergency eject hole (item 1 in the figure) and push in gently. The CD caddy ejects.

Caring for Your System

Before doing any cleaning of your system, make sure you turn off the system and disconnect any external devices. When using a moistened cloth for cleaning, do not allow any excess fluid to leak into the system, keyboard, or monitor. Wait until the system is completely dry before you turn it on.

Cleaning Your System

Clean the outside of your system periodically with a soft cloth lightly moistened with a mild detergent solution. Do not use solvents or abrasive cleaners.

Cleaning Your Mouse

If your mouse does not move smoothly or if the pointer jumps across the screen, the ball inside the mouse may need cleaning. To clean the ball, do the following:

1. Turn the mouse over and remove the plate on the bottom.

2. Remove the rubber ball.

3. Clean the ball and rollers with a cotton swab lightly dampened with a mild detergent.

4. Replace the ball and plate.

---

[1]Use a bar less than 2.0 mm in diameter. To avoid damage to the CD-ROM drive, do not insert the bar more than 1 in (25 mm).

Cleaning Your Keyboard

Your keyboard keys may get dirty with use. Clean them with a clean cloth lightly dampened with a mild detergent solution.

Moving Your System

Before you move or ship the system:

1. Back up all files stored on the hard disk drive.

2. Turn off the external peripherals, the system, and the monitor or terminal.

3. Disconnect the power cord from the wall outlet and from the back of the system unit.

4. Disconnect the monitor or terminal, keyboard, mouse, and any other cables from the back of the system unit.

Ensure you have taken all safety precautions before you remove or deinstall equipment. Refer to the installation guide for more details.

Installing Your System at a New Location

After you move the system to a new location, perform the installation instructions that came with your system to unpack and install it. Ensure that the new location conforms to the recommendations listed in Chapter 2, "Installing Your Hardware."

5

Installing and Removing Components

Introduction

This chapter explains how to prepare for and perform installation and removal of your system's components. You need to perform these procedures in order to upgrade your system or replace defective components. This chapter includes the following topics:

- Preparing to Install or Remove Components

- Top Panels

- Memory Modules

- EISA, ISA, and PCI Option Cards

- Storage Devices

- Network Interface Card

- Power Supply

- CPU Card

- Removing/Replacing Other Options

_____ **Caution** _____

Be sure you follow appropriate antistatic precautions whenever you handle internal components. Components listed in the "Removing/Replacing Other Options" section in this chapter should only be handled by qualified service personnel.

_____

Preparing to Install or Remove Components

To prepare your system for installation and removal of components, you need to assemble the required equipment, be familiar with anti-static precautions, and remove the top of the system unit.

Required Equipment

You need the following equipment to perform the installation and removal procedures described in the following sections.

- Flat-head screwdriver

- Phillips-head screwdriver

- Antistatic wriststrap

- Replacement option board kit or device kit, if necessary

Antistatic Precautions

When you handle internal system components, use an antistatic wriststrap to avoid damaging the components.

_____**Caution**_____

Do not disconnect the system unit power cord or unplug the power cord from the power supply socket. The power cord grounds the system unit, and prevents damage to the internal components.

_____

Top Panel

You must remove the top panel before you install or remove any internal component.

Removing the Top Panel

To remove the top panel (reference Figure 5-1):

_____ **Caution** _____

Make sure the system unit On/Off switch is in the "off" position before you remove the system top and side panels.

_____

1. Shut down the operating system following the instructions in the operating system documentation.

2. Set the On/Off switches on all external options connected to the system to the off position.

3. Set the On/Off switch on the system unit to the off position. An interlocking sensor switch inside the system unit automatically turns off the system if you remove the top panel and do not turn off the system.

_____ **Warning** _____

Wait at least 15 seconds to allow time for the power supply capacitors to discharge safely.

_____

4. Turn the lock to the *left* to *unlock* the system unit.

5. Grasp the finger groove at the rear of the top panel and pull the top panel straight back (about four inches). Lift up on the panel.

Figure 5-1: Removing the Top Panel
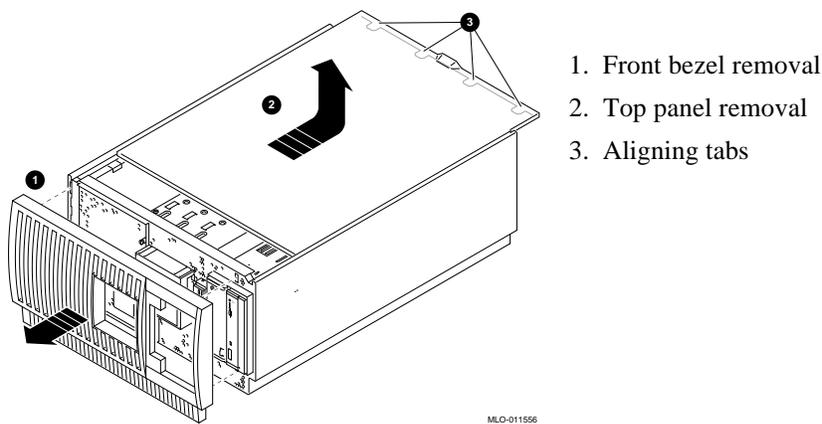
1. Front bezel removal
2. Top panel removal
3. Aligning tabs

MLO-011556

Replacing the Top Panel

To replace the top panel of the system unit (Figure 5-1):

1. Align the top panel with the top of the side panels and slide the panel gently onto the unit from the rear.

2. Lock the top panel by turning the system unit key to the *left*.

3. Set the On/Off switches on all external options connected to the system to the "on" position.

4. Set the On/Off switch on the system unit to the "on" position.

Memory Modules

The system unit supports 20 single in-line memory module (SIMM) connectors on the system board. The SIMM connectors are grouped in four memory banks consisting of five memory modules, including one for ECC (Error Correction Code). Figure 5-2 shows the four memory banks and their memory module connectors.

Remember these rules when you install memory modules:

- Bank 0 must contain a memory option.

- A memory option consists of five memory modules. When you install a memory option in a memory bank, you must install a memory module in all of the connectors in that bank.

- All memory modules within a bank must be of the same capacity.

- Larger SIMM groups must occupy the lower-numbered banks.

The system unit supports five sizes of memory options: 16-, 32-, 64-, 128- and 256-megabytes. Using combinations of these five memory options, the system supports between 16 MB and 1 GB of memory.

Figure 5-2: Memory Banks and Connectors

1. Bank 3
2. Bank 2
3. Bank 1
4. Bank 0
5. ECC banks

MLO-013401
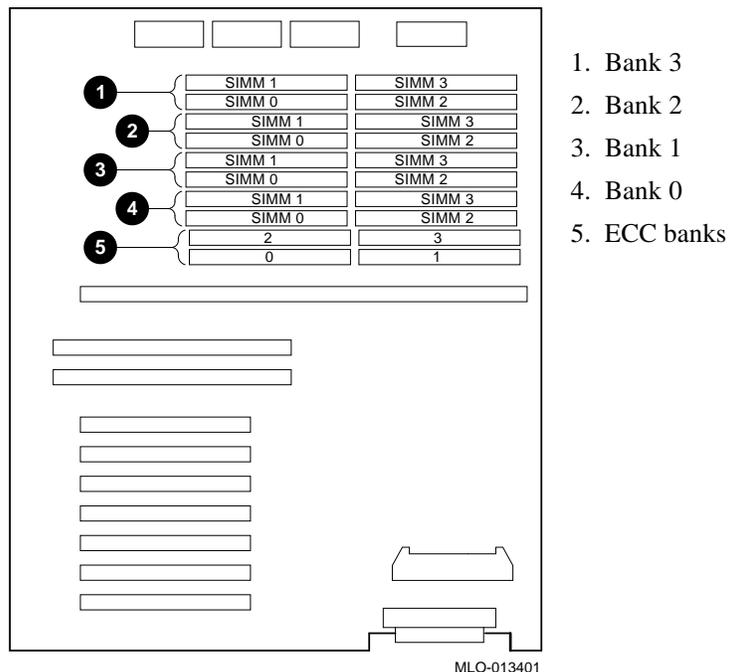
Removing Memory Modules

_____**Caution**_____

Static electricity can damage electronic components. Use an antistatic wriststrap
when you handle these components (see the section, "Antistatic Precautions").
_____

You may need to remove memory modules to either remove or install another memory
module. Note the position of any memory modules that you remove.

Figure 5-3 shows the removal procedure for a memory module. To remove a memory
module:

1. Remove the appropriate memory modules by pressing the metal clips (1) on each side
    of the memory module connector.

2. Tilt the memory module and lift it (2) out of its connector.

_____ **Note** _____

Memory modules can only be removed and installed in successive order. For
example, to remove a module at bank 0, you must first remove modules 0 and 1
for banks 3, 2, and 1.
_____

Figure 5-3: Removing a Memory Module

1. Metal clips

2. Memory module in connector

MLO-011575
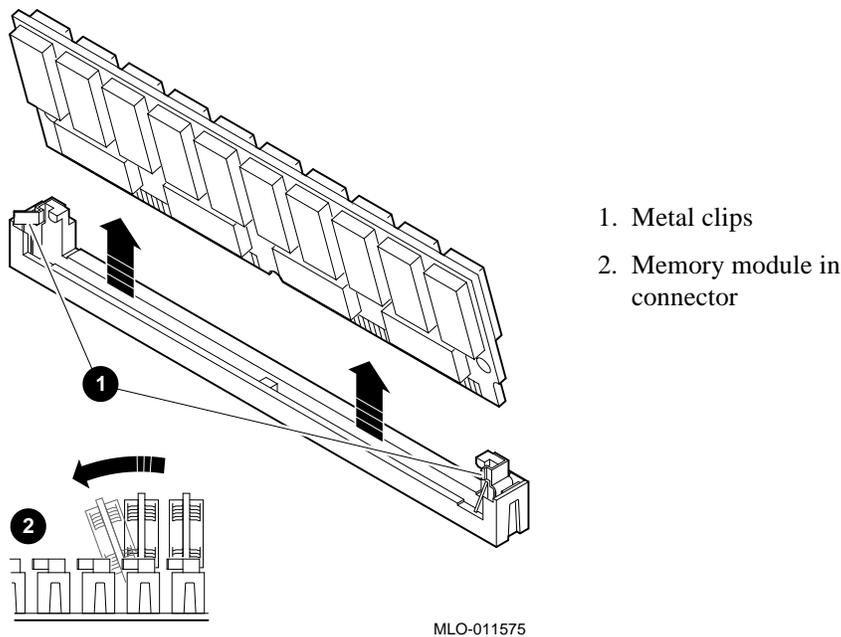
Installing Memory Modules

You need to install a new memory module to replace a faulty module or when you upgrade a memory bank. You may need to remove memory modules in order to access the memory slots for any new modules (see the earlier section, "Removing Memory Modules"). To install a memory module, refer to Figure 5-4 and perform these steps:

1. Tilt the connecting end of the module and press gently on the module so it slips over the two posts at each end of the slot (see Figure 5-4).

2. Reinstall any memory modules that you removed for access.

3. Replace the system panels following the procedures in "Replacing the System Unit Panels."

4. Test the memory configuration using these commands:

    ```
    >>> show memory
    ```

    >>> memory

For more information, refer to the section on "Memory" in Chapter 6.

Figure 5-4: Installing a Memory Module

MLO-011574
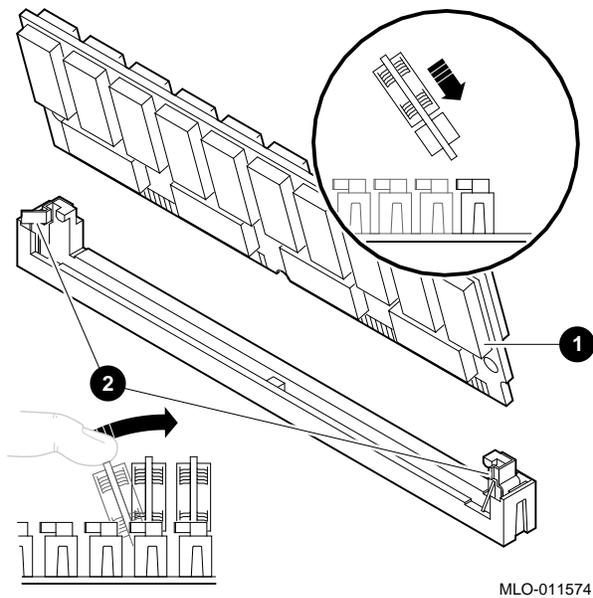
EISA, ISA, and PCI Option Cards

For a description of available system options, see Chapter 7, "Upgrading Your System."

Installing and removing EISA, ISA, and PCI option cards includes these tasks:

- Installing an Option Card
- Removing an Option Card
- Testing an Option Card Installation
- Configuring an Option Card

Figure 5-5 shows the option card slots on the system board.

Figure 5-5: EISA, ISA, and PCI Slots on the System Board

1. EISA/ISA option slots
2. PCI primary slots
3. PCI secondary slots

MLO-013399
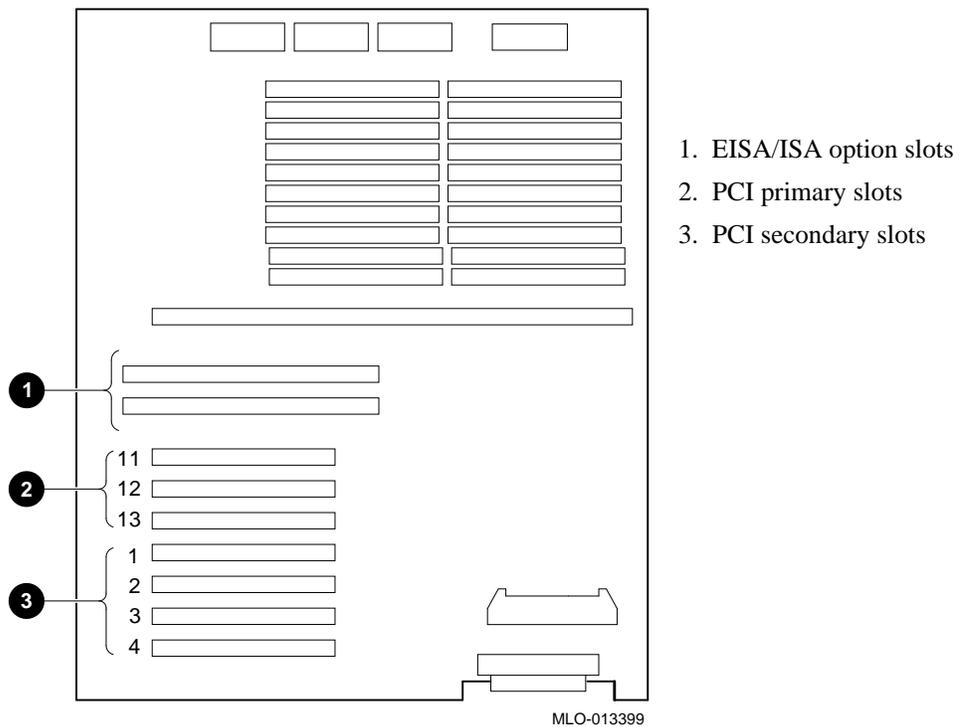
Installing an Option Card

To install an EISA, ISA, or PCI option card on the system board, refer to Figure 5-6 and Figure 5-7, and perform the steps below.

_____ **Note** _____

To install a high-performance graphics option card, you must disable the SVGA jumper (J27) on the system board. Figure 9-5 in Chapter 9, "Quick Reference" shows the jumper location.

_____

_____ **Caution** _____

Static electricity can damage electronic components. Use an antistatic wriststrap when you handle these components. (See the section "Antistatic Precautions.")

_____

1. Select a vacant option card slot on the system board. The top three slots are reserved for PCI options; the bottom eight are for EISA or ISA options. Figure 5-6 shows the three kinds of option cards.

Figure 5-6: EISA, ISA, and PCI Option Cards

MLO-011569
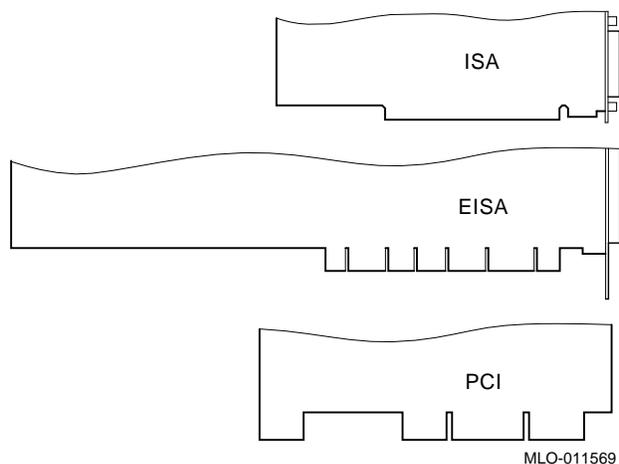
2. Remove the screw securing the slot cover to the chassis.

3. Remove the slot cover from the system unit and store it for future use.

4. Carefully install the option card into the appropriate connectors on the system board and press it firmly into place.

5. Secure the option card to the chassis using the screw you removed.

6. When you finish removing or installing internal options, reassemble the system following the procedure described in "Replacing the Top Panel" earlier in this chapter.

7. Test the option card installation (see the section, "Testing an Option Card Installation" later in this chapter).

Figure 5-7: Installing or Removing an Option Card

1 Option card
2 Slot cover screw

MLO-011585
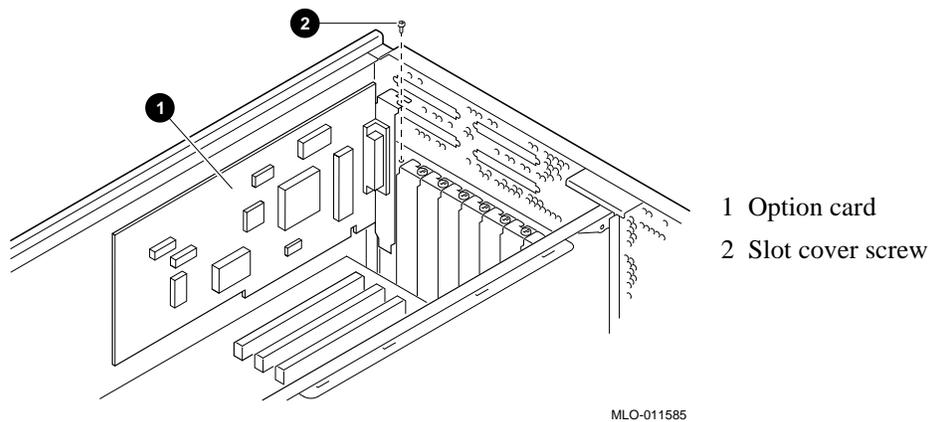
Removing an Option Card

To remove an EISA, ISA, or PCI option card from the system unit, refer to Figure 5-7 and perform these steps:

_____**Caution**_____

Static electricity can damage electronic components. Use an antistatic wriststrap when you handle these components. See the section "Antistatic Precautions."

_____

1. Disconnect any cables connected to the external or internal ports on the option card you want to remove.

2. Remove the slot cover screws (2) securing the option card to the chassis.

3. Carefully disconnect the option card (1) from the slot connectors on the system board and remove it from the system.

4. If you intend to leave the option slot vacant, install a slot cover and secure it to the chassis using the screw you removed.

5. When you finish removing or installing internal options, reassemble the system following the procedure described in "Replacing the Top Panel," earlier in this chapter.

Testing an Option Card Installation

To test an option card installation, perform the steps in Table 5–1 and refer to Example 5–1.

_____**Caution**_____

Reassemble the system following the procedures listed in "Replacing the Top Panel."

_____

Table 5–1: Testing with the show config Display

Step	Action	Result
1	Enter the show config command to display the system configuration.	The system responds with a display similar to Example 5–1.
2	Examine the PCI Bus or EISA bus information in the display to make sure the new option is listed.	If the option is not listed, see "Troubleshooting Your System."
3	Verify the device name of the new option.	You must know the device name to run diagnostic tests on the option. Enter the show device command to see the device name.
4	Run a self-test on the option by entering the test command followed by its device name.	If the self-test passes, the system displays the word OK (6) before it displays the console prompt (>>>).
		If the system displays a failure message, see "Troubleshooting Your System "

Example 5–1 shows the information that displays when you enter the show config command.

Installing and Removing Components

Example 5–1: The show config Display

```
>>> show config
Firmware
SRM Console:    X4.4-5365
ARC Console:    4.43p
PALcode:        VMS PALcode X5.48-115, OSF PALcode X1.35-84
Serial ROM:     X2.1


Processor
DECchip (tm)    21064A-6     266


MEMORY
    32 MB of System Memory
    Bank 0 = 32 MB (8 MB per SIMM) starting at 0x00000000


PCI BUS
    Bus 00  Slot 07:  INTEL   8275EB PCI to EISA Bridge
    Bus 00  Slot 08:  Digital  PCI to PCI Bridge Chip
    Bus 02  Slot 00:  ISP1020 SCSI Controller
                      pka0.7.0.2000.0     SCSI Bus ID 7
                      dka0.0.0.2000.0     RZ29B
                      dka400.4.0.2000.0   RRD45


    Bus 02  Slot 04:  DECchip 21040 Network Controller
                      ewa0.0.0.2004.0     08-00-2B-E5-6A-41


    Bus 00  Slot 11:  DECchip 21040 Network Controller
                      ewb0.0.0.11.0       08-00-2B-E1-03-19


    EISA Bus Modules  (installed)
    >>>
```

Configuring an Option Card

Depending on the type of option card you install, you may or may not need to configure it.

When you install EISA and ISA option cards, refer to the system startup display screen to see if configuration of the card is required. After you turn on the system, the system startup sequence examines the EISA option slots and reports whether you need to run the EISA Configuration Utility.

See the section, "EISA and ISA Options" in Chapter 6, "Configuring Your System" for more information.

When you install PCI option cards, you do not need to perform any configuration procedures. The system configures PCI cards automatically.

Network Interface Card

The system supports PCI or EISA network option cards. For information on installing network option cards in your system, refer to the section, "Installing an Option Card," earlier in this chapter. For information on cabling them to destinations outside the unit, refer to the documentation that accompanies the option.

Storage Devices

The system unit is designed to accommodate multiple SCSI devices, including a CD-ROM drive, a tape drive, and fixed drive device options. The diskette drive connects directly to the system board and is *not* a SCSI device.

Whenever you install a SCSI device, you must assign it a unique SCSI ID number. Otherwise, the system will not recognize the device. Depending on how many SCSI devices you are using or how you want them configured, you may need to alter the SCSI cabling to enable all of the devices (see Chapter 6, "Configuring Your System").

Identifying the Drive Bays

The system contains six storage drive bays, shown in Figure 5-8.

Figure 5-8: System Drive Bays

1. 3½-inch fixed disk drives (3)
2. 3½-inch diskette drive bay
3. 5¼-inch SCSI tape drive bay
4. 5¼-inch SCSI CD-ROM drive bay

MLO-013388
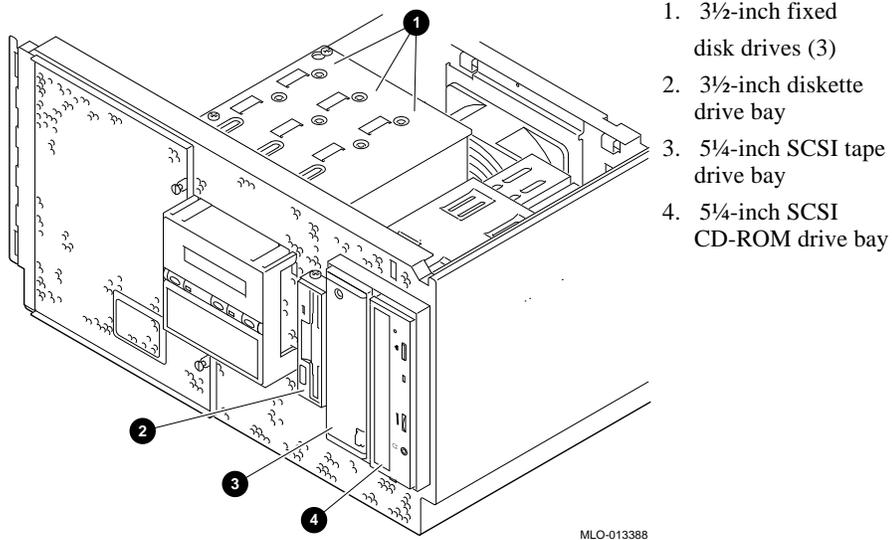
Installing Externally Accessible Devices

To install or a tape drive, reference Figure 5-9 and perform these steps:

1. If you have not done so already, remove the original drive you want to replace. To remove the tape drive, reverse the order of steps 3 through 7 in this installation procedure.

2. If you are replacing a drive, set the SCSI ID jumpers on the replacement drive to the same ID as the original drive. If you are installing a drive, set the SCSI ID to 5, the default ID for a CD-ROM drive. Se, "Determining SCSI Storage Device IDs" in Chapter 6, "Configuring Your System" for more information.

3. Remove the drive from the bay by loosening the retaining screws and pulling.

4. Remove the securing bracket on the right side by removing the screws.

5. Attach the securing bracket to the drive you want to install.

6. Slide the drive assembly into the back of the bay until its screw holes align with the drive bracket holes.

7. Tighten the retaining screws.

8. Connect the power cable and the data cable to the back of the drive.

Figure 5-9: Installing a Tape Drive

1. Tape drive screws
2. Data cable
3. Power cable
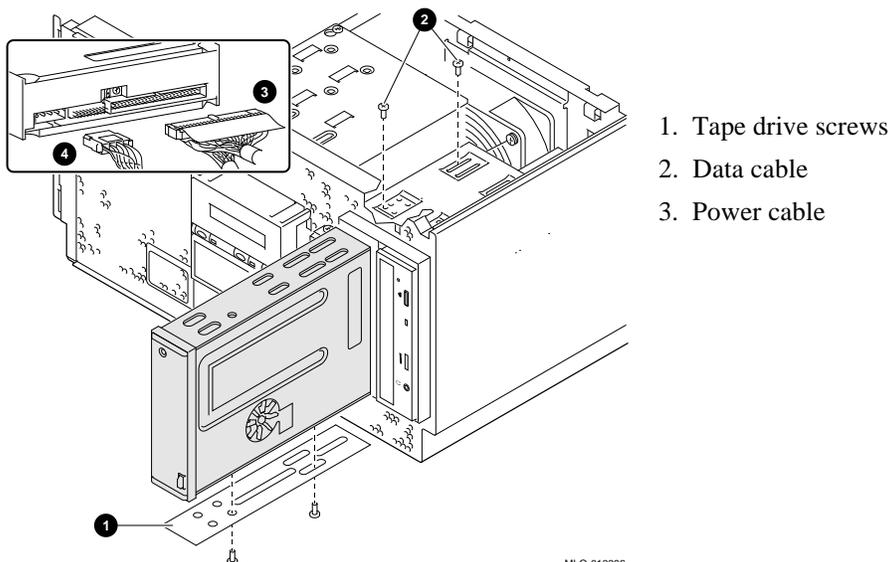
MLO-013396

Removing Externally Accessible Devices

To remove a tape drive, reverse steps 3 through 7 in the installation procedure, and refer to Figure 5-9: Installing a Tape Drive

Installing a Diskette Drive

To install a 31/2-inch diskette drive, refer to Figure 5-10 and perform these steps:

1. Remove the original diskette drive.

2. Locate the ID select switch toward the rear on the right-hand side of the replacement diskette drive. Set the switch to the 1 position.

3. Slide the diskette assembly into the front of the bay until the screw holes align with the holes on the bracket.

4. Attach the mounting bracket to the replacement diskette drive using the two screws you removed from the original diskette drive.

5. Connect the power cable and the data cable to the diskette drive.

Figure 5-10: Replacing or Installing a Diskette Drive

1. Screws (2)
2. Data cable
3. Power cable

MLO-013397
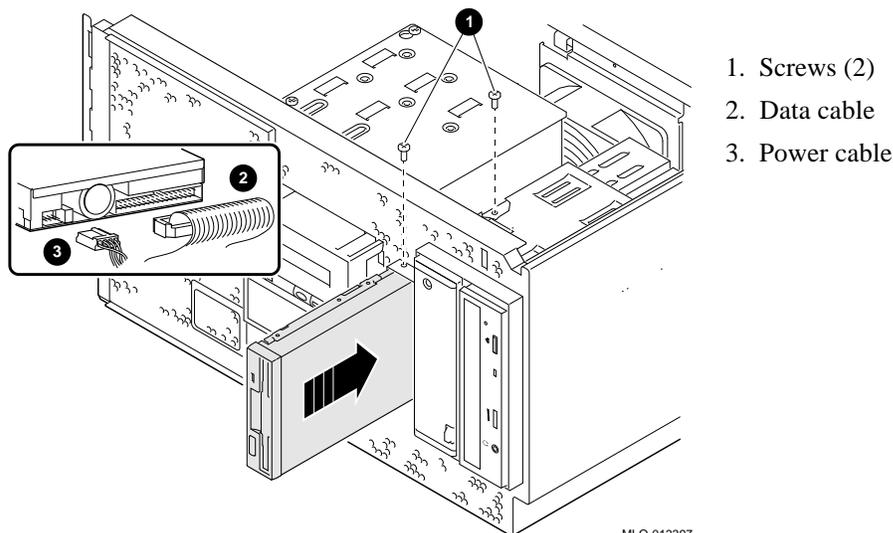
Removing a Diskette Drive

To remove a diskette drive, reverse steps 3 through 5 in the installation procedure, and refer to Figure 5-10.

Network Interface Card

The system supports PCI or EISA network option cards. For information on installing network option cards in your system, refer to the section, "Installing an Option Card" earlier in this chapter. For information on cabling them to destinations outside the unit, refer to the documentation that accompanies the option.

Power Supply

The following procedures describe how to install and remove the power supply.

Removing and Installing the Power Supply

To install the power supply refer to Figure 5-11 and perform there steps:

1. Power off the system.

2. Disconnect the ac power cords at the rear of the system.

3. Extend the shelf.

4. Unlock and remove the panel.

5. Remove the locking bracket at the back of the unit.

6. Push the unit back six to eight inches.

7. Remove the front bezel.

8. Remove the two captive screws on the power supply shield at the front of the unit.

9. Wing the power supply door to the left and lift the door away.

10. Disconnect the cables.

11. Using a Phillips-head screwdriver, remove one screw (item 3) at the rear of the power supply.

12. Using a short Phillips-head screwdriver, remove the two screws on the power supply mounting bracket located on the left front side of the power supply.

13. Remove the power supply mounting bracket and slide the power supply out about 2 inches.

14. Reach in behind the power supply from the top of the workstation and unplug the ac connector.

15. Install the replacement power supply by repeating the above steps in reverse order.

_____ **Note** _____

To ensure that the power supply is seated properly, slide it until it rests up against the center brace of the workstation.
_____

Figure 5-11: Installing the Power Supply

1. Protective shield screws

2. Internal screws (2)

3. Ground screw

4. Power supply position

MLO-011560
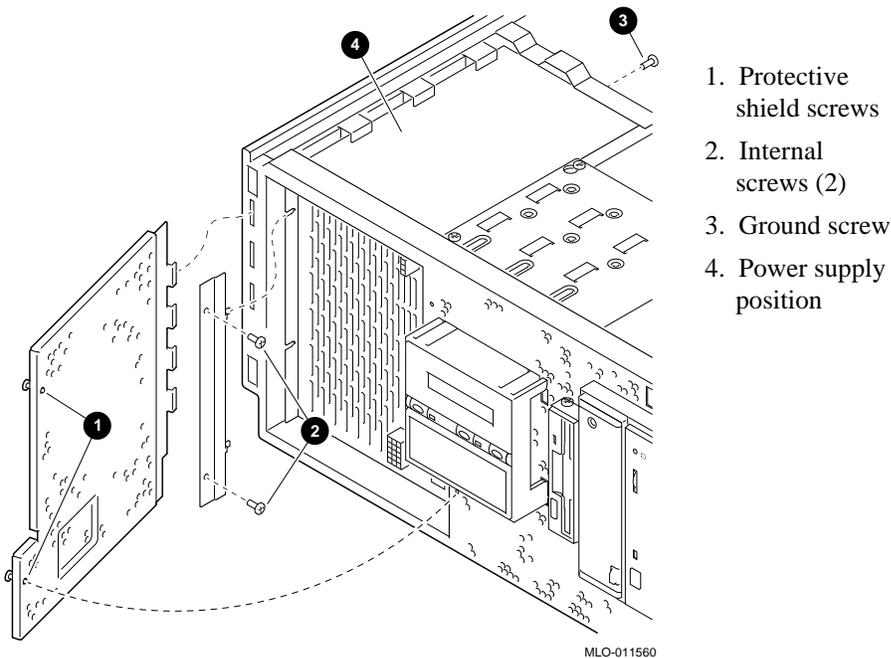
CPU Card

Your system comes with the CPU card already installed. On this system, the CPU resides on a card that connects to the system board. To upgrade to another CPU type, you need to replace the CPU card, as described below.

_____ **Caution** _____

Be sure that you follow appropriate antistatic precautions whenever you handle internal components

_____

Removing the CPU Card

To remove the CPU card, refer to Figure 5-12 and perform these steps:

1. Unscrew the crossbar that secures the outer edge of the CPU card.

2. Lift up on the other end of the bar. Release the card by extending the handle clip on each end outward.

3. Hold the outer edge of the card and gently pull it out of its system board slot.

Figure 5-12: Removing and Installing the CPU Card
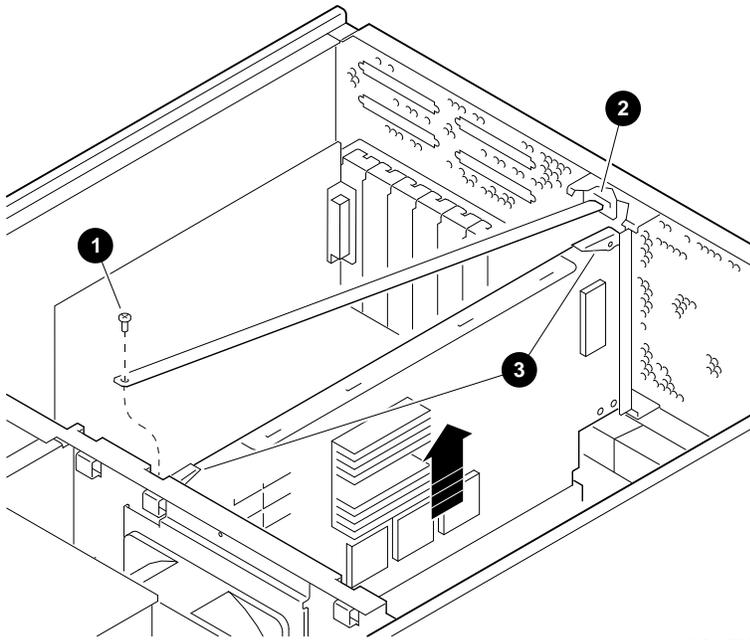
MLO-011561

1. Crossbar retaining screw

2. Crossbar

3. Handle clips

Installing the CPU Card

To install the CPU card, refer to Figure 5-12 and perform these steps:

1. Slide the card into its designated slot on the system board. Make sure it slips entirely into the slot.

2. Press inward on the handle clips on each end of the card until they catch in a closed position.

3. Place the crossbar in position and screw in the single retaining screw.

Removing/Replacing Other Options

The following components should be installed by a qualified service representative only:

*   System board

*   System fan

*   Interlocking sensor switch

*   Operator control panel

For assistance in removing or installing these components, contact your authorized service representative.

6
Configuring Your System

Introduction

This chapter includes the following topics:

- Viewing the System Configuration
- Memory
- Network Connections
- Keyboard Type
- EISA and ISA Option Cards
- PCI Option Cards
- Storage Devices

Viewing the System Configuration

Several SRM console commands or ARC console menu options allow you to examine your system configuration and environment variable settings.

To use these commands or menu options, you need to invoke console mode. For information about invoking console mode, refer to, "Using the Consoles," in Chapter 4, "Basic Operation."

Configuring Your System

ARC Console Configuration Options

On systems running the Windows NT operating system, the following Windows NT
(ARC) menu options are used to verify system configuration:

"Display Hardware Configuration"	Displays system information, devices detected by the firmware, and PCI and EISA slot information.
"Set Default Variables"	Allows you to select values for Windows NT firmware environment variables.

A sample of the "Display Hardware Configuration" display is shown in Example 6–1.

Example 6–1: Display Hardware Configuration

```
                           3/12/1996    9:06:23 AM
                           Tuesday


   Alpha Processor and System Information:
      Processor ID            21064

      Processor Revision      3

      System Revision         0x1

      Processor Speed         266.02 MHz

      Physical Memory         64 MB

      Backup Cache Size       2 MB


   Extended Firmware Information:
      Version:  4.45  (Proto)   951212.0949

      NVRAM Environment Usage:  75%

         (744 of 1024 bytes)


   Video Option detected:
      BIOS controlled video card
```

Press any key to continue. . .

                                3/12/1996   9:06:23 AM
                                Tuesday

Devices detected by the firmware:

eisa(0)video(0)monitor(0)

multi(0)key(0)keyboard(0)

eisa(0)disk(0)fdisk(0) (Removable)

multi(0)serial(0)

multi(0)serial(1)

scsi(0)disk(0)rdisk(0) (4 Partitions) DEC   RZ29B (C)DEC007

scsi(0)cdrom(4)fdisk(0)(Removable)   DEC   RRD45 (C)DEC 1084

Press any key to continue. . .

                                3/12/1996   9:06:23 AM
                                Tuesday

PCI slot information:

Bus Number	Device Number	Function Number	Vendor ID	Device ID	Revision ID	Interrupt Vector	Device Type
0	7	0	8986	482	4	0	EISA bridge
0	8	0	1011	1	2	0	PCI bridge
0	11	0	1011	2	23	0	Ethernet
1	1	0	1000	1	1	19	SCSI

Press any key to continue. . .

Configuring Your System

```
                                  3/12/1996      9:06:23 AM

                                  Tuesday


EISA slot information:
Slot                    Device      Identifier
0                       Other       DEC5000
0                       Disk        Floppy
```

_____**Notes** _____

For a more complete listing of the options recognized by your system, see the
next section, "SRM Console Configuration Commands."

To enter Digital UNIX and OpenVMS Alpha console commands, you must
switch to the SRM console (see, "When to Switch Consoles," in Chapter 4,
"Basic Operation").

Remember to switch back to the Windows NT (ARC) console before booting the
Windows NT operating system.

_____

SRM Console Configuration Commands

The following console commands are used to verify system configuration on systems
running either the Digital UNIX or OpenVMS Alpha operating system:

show config	Displays the buses on the system and the devices found on those buses.
show device	Displays the devices and controllers in the system.
show memory	Displays main memory configuration.
set and show	Set and display environment variables.

The show config Command

The `show config` command displays all devices found on the system bus, PCI bus, and EISA bus. (See Example 6-2) You can use the information in the display to identify target devices for commands such as `boot` and `test`, as well as to verify that the system sees all the devices that are installed. Figure 6-1 shows the system board connectors and slots.

The configuration display includes the following information:

1. Version numbers for the firmware code, PALcode, SROM chip, and CPU; CPU speed

2. Memory size and configuration for each bank of memory

3. PCI bus information:

    Bus 0, Slot 7 = PCI to EISA bridge chip

    Bus 0, Slot 8 = PCI to PCI bridge chip

    > Bus 2, Slot 0 = SCSI controller on backplane, along with storage drives on the bus.

    > Bus 2, Slots 1-4 = Correspond to physical PCI option module slots on the secondary PCI bus:

    > > Slot 1 = PCI1

    > > Slot 2 = PCI2

    > > Slot 3 = PCI3

    > > Slot 4 = PCI4

    In the case of storage controllers, the attached devices are also displayed.

    Bus 0, Slots 11-13 = Correspond to physical PCI option module slots on the

    primary PCI bus:

    > > Slot 11 = PCI11

    > > Slot 12 = PCI12

    > > Slot 13 = PCI13

    In the case of storage controllers, the attached devices are also displayed.

4. EISA bus information: Slot numbers correspond to EISA option module slots (1 and 2). For storage controllers, the attached devices are also displayed.

Configuring Your System

Example 6–2: The show config Command Display

```
>>> show config
Firmware
SRM Console:    X4.4-5365
ARC Console:    4.43p
PALcode:        VMS PALcode X5.48-115, OSF PALcode X1.35-84
Serial ROM:     X2.1


Processor
DECchip (tm)    21064A-6      266


MEMORY
    32 MB of System Memory
    Bank 0 = 32 MB (8 MB per SIMM) starting at 0x00000000


PCI BUS
    Bus 00  Slot 07:  Intel   8275EB PCI to EISA Bridge
    Bus 00  Slot 08:  Digital  PCI to PCI Bridge Chip
    Bus 02  Slot 00:  ISP1020 SCSI Controller
                      pka0.7.0.2000.0     SCSI Bus ID 7
                      dka0.0.0.2000.0     RZ29B
                      dka400.4.0.2000.0   RRD45


    Bus 02  Slot 04:  DECchip 21040 Network Controller
                      ewa0.0.0.2004.0     08-00-2B-E5-6A-41


    Bus 00  Slot 11:  DECchip 21040 Network Controller
                      ewb0.0.0.11.0       08-00-2B-E1-03-19


    EISA Bus Modules  (installed)
    >>>
```

Figure 6-1: System Board Connectors and Slots

1. PCI Secondary slots

2. PCI primary slots

3. EISA1/EISA2

4. CPU module connector

5-10. Memory module connectors (20)

11. Power connector

12. Power connector

13. Power connector

14. Diskette drive connector

15. Upper fan connector

16. Lower fan connector

17. TOY/NVRAM chip (E78 on board)

18. NVRAM chip (E14 on board)

19. Internal SCSI connector (narrow) (not used)

20. Speaker connector

21. Internal SCSI connector (wide)

22. OCP connector

MLO-013402

The show device Command

The `show device` command displays the devices and controllers in the system.

Synopsis:

show device [*device_name*]

Arguments:

device_name The device name or device abbreviation. When abbreviations or wildcards are used, all devices that match the type are displayed.

The command and resulting display are shown in Example 6–. The device name convention used in the display is shown in Figure 6-2.

Example 6–3: The show device Command

```
>>> show device
dka400.4.0.6.0    DKA400            RRD45  2893
dva0.0.0.0.1      DVA0
ewa0.0.0.2004.0   EWA0  08-00-2B-E5-6A-41
ewb0.0.0.11.0     EWB0  08-00-2B-E1-03-19
pka0.7.0.6.0      PKA0      SCSI Bus ID  7  2.10
```

Figure 6-2: Device Naming Convention

```
dka0.0.0.0.0
        └─Hose Number:   0 PCI_0 (32-bit PCI); 1 EISA

          Logical
          Slot Number:   For EISA options---Correspond to EISA option physical slot numbers (1 and 2)

                         For PCI options:
                           Slot 7 = PCI to EISA bridge chip
                           Slot 8 = PCI to PCI bridge chip
                             Slot 0 = SCSI controller on system backplane
                             Slots 1--4 = (Secondary bus) Correspond to physical PCI
                                         option slots: PCI1, PCI2, PCI3, and PCI4
                           Slots 11--13 = (Primary bus) Correspond to physical PCI
                                         option slots: PCI11, PCI12, and PCI13.

        └ Channel Number:   Used for multi-channel devices.

      └ Bus Node Number:   Bus Node ID

    └ Device Unit Number:   Unique device unit number
                            SCSI unit numbers are forced to 100 x Node ID

              Adapter ID:   One-letter adapter designator (A,B,C...)

              Driver ID:    Two-letter port or class driver designator:
                            DR--RAID-set device
                            DV--Floppy drive
                            ER--Ethernet port (LANCE chip, DEC 4220)
                            EW--Ethernet port (TULIP chip, DECchip 21040)
                            PK--SCSI port, DK--SCSI disk, MK--SCSI tape
                            PU--DSSI port, DU--DSSI disk, MU--DSSI tape      MA00921
```

The show memory Command

The show memory command displays information for each memory module in the system. The command and a sample display are shown in Example 6-4.

Example 6–4: The show memory Command

```
>>> show memory

   48 Meg of System Memory

   Bank 0 = 16 Mbytes  (4 MB Per SIMM)  Starting at 0x00000000

   Bank 1 = 16 Mbytes  (4 MB Per SIMM)  Starting at 0x01000000

   Bank 2 = 16 Mbytes  (4 MB Per SIMM)  Starting at 0x02000000

   Bank 3 = No Memory Detected
```

Configuring Your System

The set and show Commands

The `set` and `show` commands are used to set environment variables. Typically, you set environment variables when you configure a system.

_____**Caution**_____

Environment variables must be entered exactly as shown, not abbreviated. They will not be recognized by the system in abbreviated form.

_____

Synopsis:

set *envar value* [-default] [-integer] [-integer] -[string]

show *envar*

Arguments:

envar	The name of the environment variable to be modified (auto_action, bootdef_dev, boot_file, boot_osflags).
value	The value that is assigned to the environment variable.

Options:

-default	Restores variable to its default value.
-integer	Creates variable as an integer.
-string	Creates variable as a string (default).

_____ **Note** _____

Use the `init` command to initialize the firmware whenever you reset the following environment variables: `auto_action, console, language, os_type, bus_probe_algorithm.`

Example: >>> set os_type NT
            >>> init

_____

The set and show commands and a sample display are shown in Example 6-5..

Example 6–5: The set and show Commands

```
>>> set bootdef dev ewa0
>>> show bootdef_dev
ewa0
>>> show auto_action
boot
>>> set boot_osflags 0,1
>>>
```

_____ **Note**_____

Remember to switch back to the Windows NT (ARC) console before booting the
Windows NT operating system.

_____

Memory

The system unit supports 20 single in-line memory modules (SIMM) on the system board.
The SIMM modules are grouped in four memory banks consisting of five modules: four
memory modules plus one memory module in each bank for ECC (Error Correction Code).
Figure 6-13 shows the memory bank groupings on the system board.

A minimum of one memory bank (five modules) is required.

_____**Warning** _____

Before installing a memory module, turn off all power to the system. Refer to
"Turning the System Off" in Chapter 4, "Basic Operation" for information about
turning off power.

_____

Figure 6-13: Memory Banks

1. Bank 3
2. Bank 2
3. Bank 1
4. Bank 0
5. ECC banks

MLO-013401
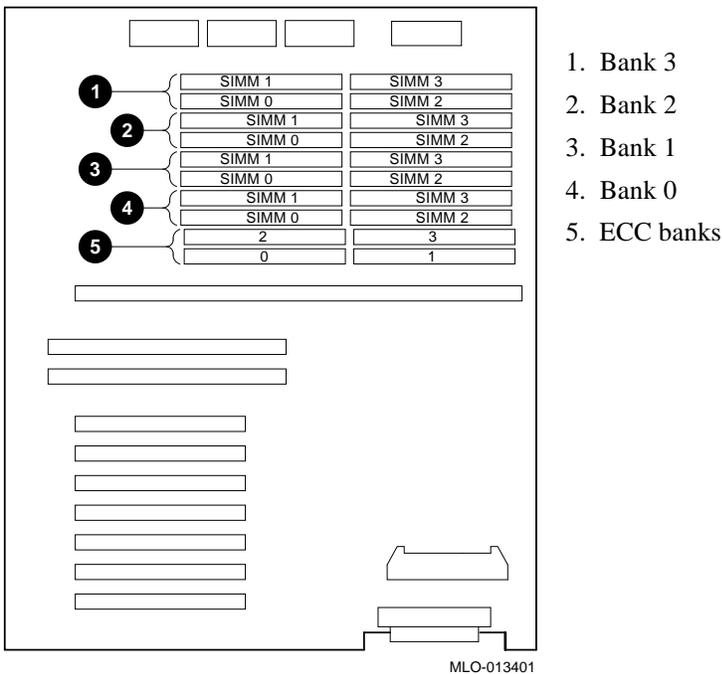
Memory requirements for operating systems differ. Requirements for each are shown in Table 6–1.

Table 6–1: Operating System Memory Requirements

Operating System	Memory Requirements
Digital UNIX and OpenVMS Alpha	32 MB minimum; 64 MB recommended
Windows NT	16 MB minimum; 32 MB recommended
Windows NT Server	32 MB minimum; 64 MB recommended

Network Connections

Your system supports various network options. You can connect to ThinWire, AUI, or 10Base-T Ethernet networks as shown in Figure 2-4. With the correct option, you can also connect to FDDI and token-ring networks.

Setting Network Configuration

Any network device is initially set to AUI mode, which is preserved in memory until the network type is changed using the following command:

```
>>> set ewx0_mode mode_name
```

In this command, *x* identifies the controller, and *mode_name* is the mode to be selected. To determine the controller ID, use the show config command (see Example 6-2) or the show device command (see Example 6-3). Refer to the following configuration command examples to set the network configuration for the network option card:

```
>>> set ewa0_mode twisted-pair (10BASE-T/twisted-pair network)

>>> set ewa0_mode full            (Full-duplex, twisted-pair network)

>>> set ewa0_mode aui             (AUI/standard network)

>>> set ewa0_mode bnc             (ThinWire network)
```

Mode names can be abbreviated; the system prompts you with correct names if you enter an invalid name. To verify the network setting, use the show command:

```
>>> show ew*
```

_____ **Caution** _____

Modes for *all* network devices should be reassigned whenever a network device is moved, installed, or removed because associations between devices and the device names and modes they are set to may be altered.

_____

Keyboard Type

Your system comes equipped with a 101-key enhanced keyboard that allows you to communicate with your system by entering data or commands. Note that some European language keyboards have 102 keys.

Use the ARC console Setup menu to change the keyboard configuration.

Refer to your operating system or application software documentation for software-specific key functions.

EISA and ISA Options

You can determine whether an option card is an EISA or ISA option by examining the contacts of the card (see Figure 6-14):

- EISA cards have two interlocking rows of gold contacts.

- ISA cards have a single row of gold contacts.

Figure 6-14: EISA and ISA Cards

MLO-011570
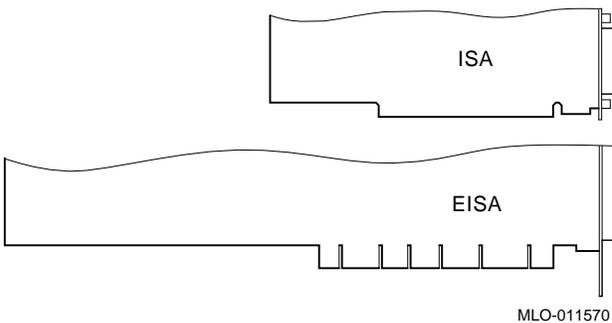
EISA Bus

The EISA (Extended Industry Standard Architecture) bus is a 32-bit industry standard input/output bus. EISA is a superset of the well-established 16-bit ISA bus. EISA was designed to accept newer 32-bit components, while still remaining compatible with older 8-bit and 16-bit cards.

EISA offers performance of up to 33 MB/sec for cards with bus mastering and DMA capabilities. Up to eight EISA or ISA modules can reside in the EISA bus portion of the system board. All EISA slots are bus master slots, and can be filled in any order.

Figure 6-15 shows the location of EISA and ISA option slots on the system board. To access the slots, you will need to remove the top and left panels of the system enclosure. Be sure to replace the panels before attempting to start the system again.

_____ **Caution** _____

Do not remove the system's top panel when the system is running. If you
remove the top panel without first properly turning off the system, the system
will shut down, with potential loss of data.

_____

Figure 6-15: EISA, ISA, and PCI Open Slots
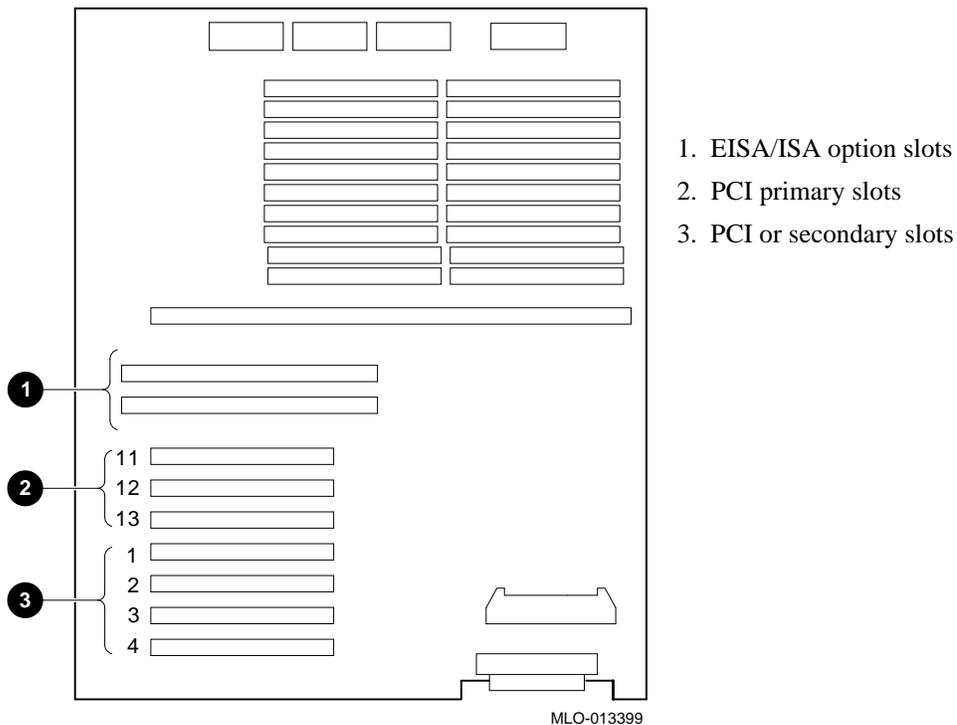
1. EISA/ISA option slots

2. PCI primary slots

3. PCI or secondary slots

MLO-013399

For information about installing a specific option, refer to the documentation for that
option. For information about configuring an EISA option, refer to the sections, "EISA
Configuration Utility (ECU)" and "Configuring EISA Options" later in this chapter.

Configuring Your System

_____ **Warning** _____

Before installing EISA bus options, turn off all power to the system. Refer to
"Turning the System Off" in Chapter 4, "Basic Operation" for information about
turning off power.

_____

ISA Bus

The ISA (Industry Standard Architecture) bus is an industry-standard, 16-bit I/O bus. The
EISA bus is a superset of the well-established ISA bus and has been designed to be
backward compatible with 16-bit and 8-bit architectures. Therefore, ISA modules can be
used in your system, provided the operating system supports the device.

Two EISA or ISA modules can reside in the EISA bus portion of the system board. Figure
6-15 shows the location of the ISA option slots on the system board.

To access the system board, you need to remove the top and left panels of the system
enclosure. Be sure to replace the panels before attempting to turn on the system again.

_____**Caution**_____

Do not remove the system's top panel when the system is running. If you do so
without first properly turning off the system, the system will shut down, with
potential loss of data.

_____

For information about installing a specific option, refer to the documentation for that
option. For information about configuring an ISA option, refer to the sections, "EISA
Configuration Utility (ECU)" and "Configuring ISA Options" later in this chapter.

_____ **Warning** _____

Before installing ISA bus options, turn off all power to the system. Refer to
"Turning the System Off" in the Chapter 4, "Basic Operations" for information
about turning off power.

_____

EISA Configuration Utility (ECU)

Whenever you add, remove, or move an EISA or ISA card to your system, the EISA
Configuration Utility (ECU) must be run. The ECU is a menu-based utility, run from the

Windows NT (ARC) firmware, that provides on-line help to guide you through the configuration process.

Each EISA or ISA card has a corresponding configuration (CFG) file, which describes the characteristics and the system resources required for that option. The ECU uses the CFG file to create a conflict-free configuration.

The ECU is supplied on the System Configuration Diskette that was shipped with your system. Make copies of the System Configuration Diskette and keep the original in a safe place. Use the backup copy when you are configuring the system. The System Configuration Diskette must have the volume label SYSTEMCFG.

_____ **Note** _____

The CFG files supplied with the option you want to install may not work if the option is not supported on your system. Before you install an option, check your system's product literature to verify that your system supports the option. Refer to Chapter 7, "Upgrading Your System" for instructions on obtaining information on options.

_____

_____ **Caution** _____

Turn the system off before you install EISA options

_____

Before You Run the ECU

_____ **Note** _____

To run the ECU from a terminal connected to a serial line, you must use a VT320 or VTxxx terminal running in 320 mode. From the ARC console, you must also create the environment variable TERM with a value of VT320. For example: TERM=VT320. If you later want to run the ECU on a video monitor, you must delete this environment variable first.

_____

Before you run the ECU, follow these steps:

1. Refer to the documentation that comes with your option card to determine if it is an EISA or ISA option.

2. Install EISA option card(s). (Install ISA option cards after you run the ECU.)

Configuring Your System

For information about installing a specific option, refer to the documentation for that option.

_____ **Note** _____

Your system supports two EISA option slots. Your ECU display may show more than two slots, but only the first two are valid.

_____

3. Familiarize yourself with the utility.

    You can find more information about the ECU by reading the ECU online help. To read the online help, start the ECU (refer to "Configuring EISA Options" later in this chapter). Online help for the ECU is located under step 1, "Important EISA Configuration Information."

4. Familiarize yourself with the configuration procedure for your system:

    • If you are installing, moving, or removing an EISA option, refer to "Configuring EISA Options" later in this chapter.

    • If you are installing, moving, or removing an ISA option, refer to "Configuring ISA Options" later in this chapter.

5. Locate the ECU diskette for your operating system. It is shipped in the accessories box with your system. Make a copy of the diskette and keep the original in a safe place. Use the backup copy for configuring options.

    • ECU Diskette DECpc Alpha for Windows NT

    • ECU Diskette DECpc Alpha for Digital UNIX and OpenVMS Alpha

Configuring EISA Options

EISA options are recognized and configured automatically. To configure an EISA bus that contains no ISA options, follow these steps:

1. Install, move, or remove the EISA option card. See Chapter 5, "Installing and Removing Components".)

        Use the instructions provided with the EISA option.

2. Invoke the console firmware.

    • **For systems running Windows NT:**

    Shut down the operating system or power up to the console Boot menu.

- **For systems running Digital UNIX or OpenVMS Alpha:**

  Shut down the operating system and press the Halt switch. When the console prompt >>> is displayed, press the Halt switch to the "out" position.

3. Start the ECU as follows:

   - **For systems running Windows NT:**

     a. From the Boot menu, select "Supplementary menu."

     b. From the Supplementary menu, select "Setup menu." Insert the ECU diskette for Windows NT into the diskette drive.

     c. From the Setup menu, select "Run EISA Configuration Utility from floppy." This boots the ECU program. There may be a 10 to 20 second delay in system activity while the system recognizes the ECU.

   - **For systems running Digital UNIX or OpenVMS Alpha:**

     a. Insert the ECU diskette for Digital UNIX or OpenVMS Alpha into the diskette drive.

     b. At the SRM prompt, enter the `ecu` command.

        The message "loading ARC firmware" is displayed. There may be a 10 to 20 second delay in system activity while the system recognizes the ECU. When the firmware has finished loading, the ECU program is booted.

        If the ECU locates the required CFG configuration files, it displays the main menu. The CFG file for the option may reside on a configuration diskette packaged with the option or may be included on the system configuration diskette.

     _____ **Note** _____

     It is not necessary to run step 2 of the ECU, "Add or remove boards." (EISA boards are recognized and configured automatically.)
     _____

4. Change settings or resources (optional).

   This step is not required when you are using the card's default settings.

Configuring Your System

The "View or Edit Details" ECU option is used to change user-selectable settings or to change the resources allocated for these functions (IRQs, DMA channels, I/O ports, and so on).

_____ **Note** _____

Your system supports two EISA option slots. Your ECU display may show more than two slots, but only the first two are valid.

_____

5. Save your configuration.

    The "Save and Exit" ECU option saves your configuration information to the system's nonvolatile memory.

6. Return to the SRM console (Digital UNIX and OpenVMS Alpha systems only) and restart the system.

    - **For systems running Windows NT:**

      Remove the ECU diskette from the diskette drive and boot the operating system.

    - **For systems running Digital UNIX or OpenVMS Alpha:**

      To return to the SRM console, press the Reset switch on your system unit, or turn the system off, then back on. Alternatively, you can use the following procedure:

      a. From the Boot menu, select the Supplementary menu.

      b. From the Supplementary menu, select the "Set up the system" menu.

      c. From the Setup menu, select "Switch to OpenVMS Alpha or Digital UNIX console." This allows you to select your operating system console.

      d. Select your operating system, then press enter on "Setup menu."

      e. When the message "Power-cycle the system to implement the change" is displayed, press the Reset button. (Do not press the On/Off switch.) Once the console firmware is loaded and device drivers are initialized, you can boot the operating system.

Configuring ISA Options

To configure ISA options, follow these steps:

_____**Note**_____

Do not install ISA cards until after you start the EISA Configuration Utility.

_____

1. Start up the system and run the ECU, as follows:

   - **For systems running Windows NT:**

     a. From the Boot menu, select "Supplementary menu."

     b. From the Supplementary menu, select "Setup menu." Insert the ECU diskette for Windows NT into the diskette drive.

     c. From the Setup menu, select "Run EISA Configuration Utility from floppy." This boots the ECU program. There may be a 10 to 20 second delay in system activity while the system recognizes the ECU.

   - **For systems running Digital UNIX or OpenVMS Alpha:**

     a. Insert the ECU diskette for Digital UNIX or OpenVMS Alpha into the diskette drive.

     b. At the SRM prompt, enter the ecu command.

     The message "loading ARC firmware" is displayed. There may be a 10 to 20 second delay in system activity while the system recognizes the ECU. When the firmware has finished loading, the ECU program is booted.

     If the ECU locates the required CFG configuration files, it displays the main menu. The CFG file for the option is included on a configuration diskette.

2. Add the ISA card configuration file to the configuration list.

   Use the "Add or Remove Boards" ECU option to add the configuration (CFG) file for the ISA option and to select an acceptable slot for the option.

In some cases, the CFG file for the ISA option may reside on a configuration diskette packaged with the option. If so, insert that diskette and follow its directions.

For most ISA options, the configuration (CFG) file is not on a diskette. If it is not, you need to use the Generic ISA Adapter Definition option on the ECU diskette.

3. Change settings or resources as needed.

Be sure that the default settings and the user-selectable settings do not conflict with the EISA card and the system board settings. For example, an ISA option might default to the setting reserved on the system board or one used by and EISA network card.

The "View or Edit Details" ECU option is used to change user-selectable settings or to change the resources allocated for these functions (IRQs, DMA channels, I/O ports, and so on).

4. Examine and set required switches to match the displayed settings.

The "Examine Required Switches" ECU option displays the correct switch and jumper settings that you must physically set for each ISA option. Although the ECU cannot detect or change the settings of ISA cards, it uses the information from the previous step to determine the correct switch settings for these options.

Physically set the card's jumpers and switches to match the required settings.

5. Save your configuration.

The "Save and Exit" ECU option saves your configuration information to the system's nonvolatile memory.

6. Return to the SRM console (Digital UNIX and OpenVMS Alpha systems only) and restart the system.

- **For systems running Windows NT:** Remove the ECU diskette from the diskette drive and boot the operating system.

- **For systems running Digital UNIX or OpenVMS Alpha:**

  Return to the SRM console as follows:

  a. From the Supplementary menu, select the Setup menu.

  b   From the Setup menu, select "Switch to OpenVMS Alpha or Digital UNIX console." This option allows you to select your operating system console.

  c. Select your operating system; then press Enter on the Setup menu.

      d.   When the message "Power-cycle the system to implement the change" is displayed, press the Reset button. (Do not press the On/Off switch.) Once the console firmware is loaded and device drivers are initialized, you can boot the operating system.

7.   Install the ISA card using the instructions provided with the ISA option, and turn on the system.

PCI Option Cards

PCI (Peripheral Component Interconnect) is an industry-standard expansion I/O bus that is the preferred bus for high-performance I/O options. The system supports 32-bit PCI options.

The PCI bus is shown in Figure 6-15. The system has seven dedicated PCI slots.

A PCI card is shown in Figure 6-16.

Figure 6-16: PCI Option Card

PCI

MLO-011571
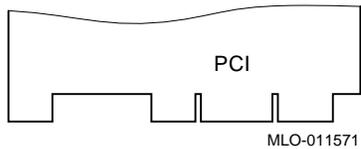
Install PCI cards according to the instructions supplied with the option.

_____**Warning** _____

Before installing a PCI option, turn off all power to the system. Refer to "Turning the System Off" in Chapter 4, "Basic Operation" for information about turning off power.

_____

PCI cards require no additional configuration procedures; the system automatically recognizes the cards and assigns the appropriate system resources.

Storage Devices

Configuring the storage devices on your system requires assigning the correct SCSI IDs according to the type of configuration you choose: single-controller, single-controller with jumper, dual-controller, or triple controller.

Determining SCSI Storage Device IDs

When you add or remove a CD-ROM drive, a tape drive, or fixed disk drives, you may want to consider how these are configured and whether you want to reconfigure them. These storage devices all reside on one or more SCSI buses that connect to the system board and to the StorageWorks backplane. The system configuration determines a unique ID for each device. (The diskette drive has its own dedicated bus and is not included in the SCSI configuration.)

When adding or changing devices, be careful to avoid assigning device IDs (SCSI IDs) already in use. Duplicate IDs result in one or more devices not being recognized by the system.

To determine the available SCSI IDs for all SCSI storage devices, follow the steps in Table 6–2 and refer to Example 6-6 and Table 6-3.

Table 6–2: Determining Available SCSI IDs

Step	Action	Result
1	Enter the show device command to display the SCSI configuration.	The system responds with a display similar to that shown in Example 6-6.
2	Examine the ADDR column in the display.	The ADDR column lists the SCSI address of each device connected to the SCSI bus. The first number in the SCSI address is the SCSI ID. It must be a unique number in the range 0 to 7. Any unused SCSI IDs in this range are available for use by the devices that you want to connect to the system.
3	Write down the list of unused SCSI IDs.	

Example 6–6: The show device Display

```
>>> show device

dka400.4.0.6.0      DKA400           RRD45   2893

dva0.0.0.0.1        DVA0

ewa0.0.0.2004.0     EWA0    08-00-2B-E5-6A-41

ewb0.0.0.11.0       EWB0    08-00-2B-E1-03-19

pka0.7.0.2001.0     PKA0      SCSI Bus ID 7   2.10
```

On-Board SCSI Bus Configuration

A fast-wide SCSI-2 controller chip connects directly to the PCI bus to support 16-bit SCSI devices.   The connector is a 68-pin wide connector to the internal fixed drives and to the 5 1/4-inch removable-media devices.

Rules for Configuring SCSI Controller Option Cards

All SCSI-2 devices are supported via EISA- or PCI-based SCSI controller cards. Use the following rules to determine if a SCSI controller or SCSI device can be used on your system.

- The controller/device must be supported by the operating system. Consult the software product description or hardware vendor.

- In general, when configuring an 8-bit SCSI bus (narrow), up to 7 devices total are allowed. The entire SCSI bus length, from terminator to terminator, must not exceed 6 meters for single-ended SCSI-2 at 5 MB per second, or 3 meters for single-ended SCSI-2 at 10 MB per second.

- When configuring a 16-bit SCSI bus (wide), up to 15 devices are allowed on Windows NT systems and 7 devices on Digital UNIX or OpenVMS Alpha systems. Bus length must not exceed 3 meters.

- For systems running Windows NT, no more than 15 devices can be on any one wide SCSI-2 controller, for systems running Digital UNIX or OpenVMS Alpha, no more than 7devices are allowed. Each device must have a unique SCSI ID.

- If you have two or more controllers on the same bus, you need to change the bus node ID of the second controller by setting the pk*0_host_id environment variable to a value different from that of the first. Whenever you change the value of this environment variable, you must initialize the firmware with the init command.

SCSI Bus Backplane Configurations

Storage devices are configured in a single-bus configuration. There can be up to four devices on the same bus as the 5 1/4-inch removable-media device. The bus is driven by a native Wide SCSI-2 controller on the system board.

Configuring the Backplane with One Controller

The following procedure describes how to connect the three fixed drives to the on-board controller, which is the same controller that runs the CD-ROM drive and the tape drive, if one is installed.

_____**Caution**_____

   Avoid bending the SCSI cable when folding it.
_____

1. Insert the end of the SCSI cable (17-04378-01) in its system board connector.

2. Connect the SCSI cable CD-ROM drive connector to the rear of the CD-ROM drive
    using a 50-pin adapter cable (17-04009-01).

3. Connect the cable to the rear of the tape drive using a 50-pin adapter cable
    (17-04009-01), if one is installed.

4. Connect the cable to the fixed hard drives. A maximum of three drives can be
    installed.

Single-Controller SCSI Configuration

In the single-controller configuration shown in Figure 6-17, the three fixed hard drives are
run from the system board SCSI controller. The system reserves SCSI ID numbers for the
CD-ROM drive (ID 4) and the tape drive (ID 5).

Figure 6-17: Single-Controller SCSI Configuration

MLO-013398
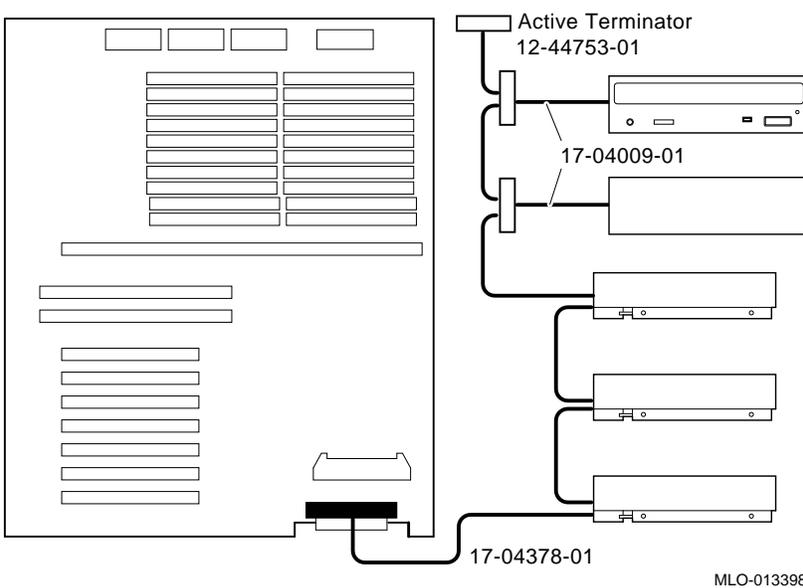
Table 6-3: SCSI IDs for Configuration

SCSI Device	SCSI ID
CD-ROM Drive	4
Tape Drive	5
Slot 0	0
Slot 1	1
Slot 2	2

_____ **Note** _____

The system does not recognize two drives with the same ID number. Five drives is the maximum number that this configuration can recognize.
_____

7

Upgrading Your System

Introduction

This chapter includes the following topics:

- Planning Your Upgrade
- Upgrade Options

Planning Your Upgrade

The information in this section describes how to plan for upgrading your server. Once you decide which options to add, refer to Chapter 5, "Installing and Removing Components" for information about how to install new options or replace existing ones.

The following list of tasks will help you plan an upgrade:

- Determine your current configuration
- Determine your new configuration
- Determine whether you can install the new option yourself
- Order the option
- Install the option
- Configure the option

Upgrading Your System

1. **Determine your current configuration.**

   Refer to your operating system documentation to find out how to get configuration information by using an operating system command.

   You can also obtain configuration information about your system when the server is in console mode. Once the server is in console mode, you can find configuration information as follows:

   • If you are running the Windows NT operating system, obtain list of your system's modules and devices by accessing the Windows NT (ARC) console and the Supplementary menu. Choose the "Display Hardware Configuration" menu item to see the "Devices detected by the Firmware" display. Note that this display lists tape drives as unsupported. Installed PCI and EISA devices are listed on separate screen displays.

   • If you are running the Digital UNIX or OpenVMS Alpha operating systems, obtain list of your system modules and devices by entering the show config command at the console prompt.

2. **Determine your new configuration.**

   You can obtain a current list of supported options from several sources, including:

   • The Digital FTP archive on the Internet

   • CompuServe

   • *Digital Systems and Options Catalog*

3. **Determine whether you can install the new option yourself, or whether you need to contact a qualified service person.**

4. **Order the option(s).**

5. **Install the option**

   To install an option, refer to the documentation that is shipped with the option, and to Chapter 5, "Installing and Removing Components."

6. **Configure the option.**

   To configure an option, refer to Chapter 6, "Configuring Your System."

Access from the Internet

If you are an Internet participant, you can obtain information about the AlphaServer 1000A Pedestal version:

From the Digital FTP archive:

```
ftp.digital.com:    /pub/DEC/Alpha/systems/as1000/docs
```

From the Digital World Wide Web server:

```
http://www.service.digital.com/alpha/server/1000.html
```

For specific information on the AlphaServer 1000A Rackmount version, contact your service representative.

Digital Systems and Options Catalog

You can obtain information about hardware configurations for your server from the *Digital Systems and Options Catalog.* The catalog is regularly published to assist customers in ordering and configuring systems and hardware options. Each printing of the catalog presents all of the products that are announced, actively marketed, and available for ordering. You can also obtain information from this sources:

Call 1-800-DIGITAL to talk with a consultant about your server's configuration.

Retrieve printable PostScript files of any section of the *Digital Systems and Options Catalog* from the Digital FTP archive on the Internet:

```
ftp.digital.com  cd /pub/digital/info/soc
```

Users of the Windows NT operating system can access the Microsoft hardware compatibility list (HCL) of officially supported devices:

```
http://www.windowsnt.digital.com/support/hcl/hcl.htm
```

When searching for information, be sure to note that your AlphaServer 1000A is the rackmount version.

Upgrade Options

This section lists the types of upgrade options that you may want to choose for your server. Before you attempt to install third-party devices inside your system unit, first check with the third-party vendor to ensure that your system hardware and operating system software support the device.

- Storage devices

- Memory modules

- CPU card

    − EISA, ISA, and PCI options

    − Network interface cards

    − Graphics cards

    − SCSI controller cards

    − Video cards

    − Communications cards

- Operating systems

- RAID controller

- Firmware

Firmware

You may want to update your system firmware as later versions become available. The Windows NT (SRM) firmware and the Digital UNIX and OpenVMS Alpha (SRM) firmware reside in the four Flash ROM chips located on the system board. This section describes how to update to a later version of firmware. You may also need to recopy firmware onto the system if the Flash ROM ever becomes corrupted. To do this, you use a different procedure. (See "Using the Fail-Safe Loader" in Chapter 8, "Troubleshooting Your System").

You can load firmware into the Flash ROM from any of these sources:

- CD-ROM

- Network

- Diskette

Updating Firmware Using the CD-ROM Drive

To update an OpenVMS Alpha or Digital UNIX system:

1. At the console prompt (>>>), enter the show device command:

```
>>> show device
dka0.0.0.6.0        DKA0                          RZ26L        440C
dka400.4.0.6.0      DKA400        TOSHIBA CD-ROM    XM-4101TA  0064
dva0.0.0.0.1        DVA0
ewa0.0.0.2004.0     EWA0               08-00-2B-E5-6A-41
ewb0.0.0.11.0       EWB0               08-00-2B-E1-03-19
pka0.7.0.2001.0     PKA0                      SCSI Bus  ID  7  2.10
```

In the above example, the CD-ROM drive has a device ID of dka400.

2. Load the Firmware Update compact disc into the drive.
3. Boot the system from the Firmware Update utility disc, using the device ID determined in step 1 (in this case, dka400) and the file name given in the Firmware Update document on the compact disc. For example:

```
>>> boot  -f1  0,A0  dka400
Bootfile:  [alpha1000]as1000_v4_0.exe
```

4. Update the system, entering the following command at the update prompt:

```
APU- >  update
```

5. Confirm the update:

```
APU->  verify
```

A successful update will produce the following display:

```
ARC Rom Verify Successful
SRM Rom Verify Successful
```

6. Exit from the Firmware Update utility by pressing the Reset button or turning the system off and on.

To update a Windows NT system:

_____ **Note** _____

The latest version of the firmware is available on the World Wide Web:
`http://www.windowsnt.digital.com`

_____

1. Shut down the Windows NT operating system. Turn the system off and them on.

2. Load the Firmware Update media into the drive.

3. From the Boot menu, select "Supplementary." From the Supplementary menu, select "Install new firmware. "

4. Update the system, entering the following command at the update prompt:

```
APU->  update
```

5. Confirm the update:

```
APU->  verify
```

A successful update will produce the following display:

```
ARC Rom Verify Successful

SRM Rom Verify Successful
```

6. Exit from the Firmware Update utility by pressing the Reset button or turning the system off and on.

Updating Firmware Using the Network

To update the firmware using the network, refer to the Read Me instructions on the Web server.

Updating Firmware Using the Diskette Drive

To update the firmware using the diskette drive, perform these steps:

1. Insert the diskette with the new firmware version into the diskette drive.

2. Enter this command at the SRM console prompt:
```
>>> boot dva0
```

3. Load and execute the Update utility:
```
APU-> update
```

4. Turn the system off and on.

5. Confirm the update:
```
>>> show version
```

_____ **Note** _____

To update your system using the SRM console, use a diskette formatted with the Alpha boot block. To update using the ARC console, use an FAT formatted diskette.

_____

8
Troubleshooting Your System

Introduction

This chapter describes procedures for resolving problems with the system. The first section provides an overview and a general guide to determining the type of problem that exists. The next two sections describe diagnostic procedures you can use to identify the source of a particular problem.

To correct a problem, refer to Table 8-1, and follow the guidelines provided. If you cannot correct the problem, contact your service representative.

This chapter includes the following topics:

- Troubleshooting Overview
- System Diagnostics
- Power Problems
- Console Problems
- Boot Problems
- Problems Detected by the Operating System
- Storage Problems
- Option Card Problems
- Monitor and Terminal Problems
- Keyboard, Mouse, and Printer Problems
- Overheating Problems
- Using the Fail-Safe Loader

Troubleshooting Overview

Before you begin to troubleshoot your system, consult the service agreement for your system. Your agreement will help you determine how much troubleshooting and repair you should undertake yourself.

- If you plan to maintain the system yourself, use the information in this guide to help identify and resolve the problem.

- If you have a service agreement with a service provider, contact your representative for assistance.

Table 8–1 lists possible problems and the relevant sections in this chapter.

Table 8–1: Determining Where to Look

Task or Problem	Relevant Section
To confirm that EISA cards or memory modules are properly configured.	Option Card Problems
To run a diagnostic test of the whole system, show its status, or terminate the testing.	System Diagnostics
No startup display appears when you turn on the system.	System Diagnostics (Interpreting Error Beep Codes)
	Power Problems
	Console Problems
	Problems Detected by the Operating System
Startup tests do not complete.	Console Problems
The system cannot boot the operating system.	Boot Problems or System Diagnostics
The operating system reports errors, is hung, or crashes.	Problems Detected by the Operating System
The system cannot access a mass storage device.	Storage Problems
Storage devices are missing from the show device display.	
The system indicates network problems, an EISA card is not configured, or a PCI card is unseen by the system.	Option Card Problems
The monitor or the terminal is not working.	Monitor and Terminal Problems
The keyboard and mouse are not working.	Keyboard and Mouse Problems
The system repeatedly shuts down after 10 seconds.	Overheating Problems
The Flash ROM is corrupted, and the system cannot access console mode.	Using the Fail-Safe Loader

System Diagnostics

This section describes three sources of error information that can help you diagnose and troubleshoot system problems. Beep codes are audible error codes emitted by the system for specific problems. The console event log is a record of startup status messages which may contain helpful diagnostic information. Console command displays, such as the test command display, are another source of diagnostic information.

Interpreting Error Beep Codes

Table 8–2 describes error beep codes you may encounter while using your system. For example, if the serial read only memory (SROM) code could not find any good memory, you would a 1-3-3 beep code (one beep, a pause, a burst of three beeps, a pause, and another burst of three beeps).

Table 8–2: Error Beep Codes

Beep Code	Meaning	Action
1-1-2	A ROM data path error was detected while loading ARC/SRM console code.	Refer to the section, "Using the Fail-Safe Loader."
1-1-4	The SROM code could not read the Flash ROM headers, or there was a checksum failure.	Refer to the section, "Using the Fail-Safe Loader."
1-2-1	TOY NVRAM failure.	Call your service representative.
1-3-3	The SROM code could not find at least 2 MB of good memory, or there was no memory available.	Verify that the memory modules are properly seated. Replace faulty memory modules. If replacement does not solve the problem, call your service representative.
3-1-2	The J1 jumper on the CPU card was set incorrectly or the on-board SCSI controller failed.	Check that the J1 jumper is set at bank 1. (SeeFigure 9-8) If the jumper is not the problem, call your service representative.
3-3-1	Generic system failure.	Call your service representative.
3-3-2	The J1 jumper on the CPU card was set incorrectly or the PCI-to-PCI controller failed.	Check that the J1 is set at bank 1. (See Figure 9-8). If the jumper is not the problem, Call your service representative.
3-3-3	Internal Qlogic controller failure.	Call your service representative.

Reading the Console Event Log

The system maintains a console event log consisting of status messages received during startup testing. If problems occur during startup, standard error messages may be embedded in the console event log. To display the console event log, use the `cat el` command or, to display the log screen by screen, use the `more el` command.

The test Command

The `test` command runs firmware diagnostics for the entire core system. The tests are run sequentially, and the status of each subsystem test displays on the console terminal as the tests progress. If a particular device is not available to test, a message displays.

The test script is made up of several exercisers that can test subsystems. The `test` command runs these exercisers sequentially and the status of each subsystem test displays on the console terminal as the tests progress. If a device is not available to test, a message displays. The test script does no destructive testing, that is, it does not write to disk drives.

To run a complete diagnostic test using the `test` command, the system configuration must include:

- Serial loopback connected to the COM2 port

- Parallel loopback (12-27351-01) connected to the parallel port

- Connection to a network or a terminator connected to the Ethernet port

- A diskette with files installed

- A trial CD-ROM with files installed

The test script tests devices in the following order:

1. Console loopback tests if `lb` argument is specified: COM2 serial port and parallel port

2. Network external loopback tests for EW: this test is run if a Digital Ethernet controller (EW) is present. The test requires that the Ethernet port be terminated or connected to a live network; otherwise, the test will fail.

3. Memory tests

4. Read-only tests: DK, DR, and DU disks,; MK tapes and DV diskettes

5. VGA console tests: these tests are run only if the console environment variable is set to "serial." The VGA console test displays rows of the letter "H."

_____ **Note** _____

By default, no write tests are performed on disk and tape drives. Media must be installed to test the diskette drive and tape drives.

_____

Example 8–1 shows a sample of the `test` command display.

Example 8–1: The test Command

```
>>> test

Requires diskette and loopback connectors on COM2 and
parallel port

type kill_diags to halt testing

type show_status to display testing progress

type cat el to redisplay recent errors

Testing COM2 port

Setting up network test, this will take about 20 seconds

Testing the network

     80 Meg of System Memory

     Bank 0 = 32 Mbytes(8 MB Per Simm) Starting at 0x00000000

     Bank 1 = 32 Mbytes(8 MB Per Simm) Starting at 0x02000000

     Bank 2 = 16 Mbytes(4 MB Per Simm) Starting at 0x04000000

     Bank 3 = No Memory Detected

Testing the memory

Testing parallel port

Testing the SCSI Disks

Non-destructive Test of the Floppy started

serial port not used as main console - VGA test bypassed

Printer offline

file open failed for para
```

The kill and kill_diags Commands

The `kill` and `kill_diags` commands terminate diagnostics that are currently executing.

The `kill` command terminates a specified process.

The `kill_diags` command terminates all diagnostics.

_____ **Note** _____

A serial loopback connector (12-27351-01) must be installed on the COM2
serial port for the kill_diags command to successfully terminate system
tests.

_____

The show_status Command

The show_status command reports one line of information per executing diagnostic.
Many of the diagnostic tests run in the background and provide information only if an
error occurs. Use the show_status command to display the progress of diagnostics.

Power Problems

Table 8–3 describes how to troubleshoot the system when there is no power at the system
enclosure.

Table 8–3: Troubleshooting Power Problems

Symptom	Action
No ac power	Check the power source and power cord.
	Check that the system cover is properly secured. A safety interlock switch shuts off power to the system if the cover is removed.
There is ac power present, but system does not power on.	Check the On/Off switch on the operator control panel.
	Check that the ambient room temperature is within environmental specifications (10–40°C, 50–140°F).
	Check that cable connectors on the system board are properly connected.
	Check that the internal power supply cables are plugged in at the right place on both the power supply and system backplane.
	Check the power supply fuse and replace, if necessary.
Power supply shuts down after approximately 10 seconds (fan failure).	Using a flashlight, look through the front (under the OCP) to check if the fan is spinning at startup. If the fan does not spin, replace it. If the replacement fan does not spin, replace the power supply.

Console Problems

Table 8–4 describes how to troubleshoot the system when, at startup, the console terminal
does not display the startup screen, or the startup screen displays error messages.

Table 8–4: Troubleshooting Console Problems

Symptom	Action
Startup screen does not display.	Refer to the table "Error Beep Codes" earlier in this chapter to interpret the startup beep codes.
	Check that the keyboard and monitor are properly connected and power is on.
	If the startup screen does not display, yet the system enters console mode when you press the Return key, check that the `console` environment variable is set correctly. If you are using a VGA console terminal, the variable should be set to "graphics." If you are using a serial terminal, the variable should be set to "serial."
	If you are using other than the standard on-board VGA controller, the on-board CIRRUS VGA options must be set to "disabled" through the ECU, the VGA jumper (J27) on the upper-left corner of the system board disabled (off), and the `console` environment variable set to "graphics." Combining multiple VGA controllers will produce unpredictable results. Use of multiple VGA controllers is not recommended or supported.
	Try connecting a console terminal to the COM1 serial communication port. If necessary use a 9-pin connector. Check the baud rate setting for the console terminal and system. The system baud rate setting is 9600. When using the COM1 serial port, set the `console` environment variable to "serial."
	If you have verified that there are no monitor or terminal problems, the problem may be with the firmware. Refer to the section, "Using the Fail-Safe Loader."
Startup screen displays error messages.	If startup screens or the console event log indicate problems with mass storage devices, or if storage devices are missing from the `show config` display, use the troubleshooting tables in the section, "Storage Problems" to determine the problem.
	If startup screens or the console event log indicate problems with EISA or PCI devices, or if EISA or PCI devices are missing from the `show config` display, use the troubleshooting table in the section, "Option Card Problems" to determine the problem.

Boot Problems

Table 8–5 describes how to troubleshoot problems that occur while the system is booting operating system software.

Table 8–5: Troubleshooting Boot Problems

Symptom	Action
The system cannot find the boot device.	Verify that your system recognizes the boot device, using the `show device` command.
	Check that the boot device environment variable correctly identifies the boot device:
	Digital UNIX and OpenVMS Alpha: use the `show bootdef_dev` command to display the boot device.
	Windows NT: Select the ARC console menu option "Display Hardware configuration" and "Set Default Environment Variables."
	Check system configuration for the correct environment variable settings:
	For Digital UNIX and OpenVMS Alpha, examine the `auto_action bootdef_dev`,`boot_osflags`, and `os_type` environment variables. Make sure that the bus_probe_algorithm environment variable is set to "new. "
	For problems booting over a network, check the `ew*0_protocols` or `er*0_protocols` environment variable settings: Systems booting from a Digital UNIX server should be set to `bootp`; systems booting from an OpenVMS Alpha server should be set to `mop`.
	For Windows NT, examine the FWSEARCHPATH, AUTOLOAD, and COUNTDOWN environment variables.

Symptom	Action
System does not boot.	Check that the Halt switch is set to the "off" position.
	Verify that you have not installed an unsupported graphics module or another type of unsupported adapter.
	For problems booting over a network, check the `ew*0_protocols` or `er*0_protocols` environment variable settings: Systems booting from a Digital UNIX server should be set to `bootp`; systems booting from an OpenVMS Alpha server should be set to `mop`.
	Run the `test` command to check that the boot device is operating. See the "Troubleshooting Console" table in the section, "Console Problems."
There is a software problem or the operating system is not installed correctly.	Refer to your operating system software information.
	Verify that you have the correct firmware revision for your system. See Chapter 3, "Preparing to Install Your Operating System."

Problems Detected by the Operating System

Table 8–6 describes possible operating system problems and their solutions.

Table 8–6: Troubleshooting Problems Detected by the Operating System

Symptom	Action
System is hung or has crashed	Examine the crash dump file.
	Refer to the *OpenVMS Alpha System Dump Analyzer Utility Manual* (AA-PV6UB-TE) for information about how to interpret OpenVMS Alpha crash dump files.
	Refer to the *Guide to Kernel Debugging* (AA-PS2TA-TE) for information about using the Digital UNIX Crash utility.
No startup display	The console environment is set to "serial;" thus, the startup screen is routed to the COM1 serial communication port and cannot be viewed from the VGA monitor.
	If you are using a VGA monitor, set the console environment variable to "graphics." (Use the `set console graphics` command). See "Console Problems."
Errors have been logged, and the operating system is up	Have your service provider examine the operating system error log files to isolate the problem.
	If the problem occurs intermittently, have your service provider run an operating system exerciser, such as DEC VET, to stress the system.
	Refer to the *DEC Verifier and Exerciser Tool User's Guide* (AA-PTTMA-TE) for instructions about running DEC VET.

Storage Problems

Mass storage device problems at startup are usually indicated by read fail messages. Problems are also indicated by storage devices missing from the `show config` display. Use the following tables to diagnose the likely cause of the problem.

- Table 8–7 provides information about troubleshooting fixed-media mass storage problems indicated at startup.

- Table 8–8 provides information about troubleshooting removable-media storage problems indicated at startup.

Table 8–7: Troubleshooting Fixed-Media Problems

Symptom	Problem	Action
Fault indicator for drive is on (amber).	Drive has failed.	Replace the drive.
Drives with duplicate SCSI IDs are missing from the show config display.	Duplicate SCSI IDs (when removable-media bus is extended to StorageWorks shelf).	Correct removable-media SCSI device IDs.
Drives appear intermittently in show config display.	SCSI bus length exceeded.	Check cabling.
Valid drives are missing from the show config display.	SCSI ID is set to 7 (reserved for host ID).	Correct the SCSI IDs.
One drive may appear seven times on the configuration screen display.	Duplicate host Ids on a shared bus.	Change host ID through the pk*0 host id environment variable (set pk*0_host_id).
		For systems using Windows NT, choose "Set default configuration" from the Setup menu to select the host ID.
You cannot access the software or data on the drive.	The SCSI ID of the drive is not unique or the SCSI drive cables are connected incorrectly.	See Chapter 6, "Configuring Your System" for information on SCSI device configuration display. If the device is not listed in the display, check the SCSI cabling and the drive's SCSI ID.
	The SCSI drive is faulty.	Contact your service representative.
Activity indicators do not come on.	Missing or loose cables.	Remove device and inspect cable connections.
Drive is missing from the show config display.	Drive is not properly seated.	Reseat drive.

Table 8–8 lists suggestions for troubleshooting fixed-media mass storage problems at startup or when storage devices are missing from the show config display.

Table 8–8: Troubleshooting Removable-Media Problems

Problem	Symptom	Action
Drive failure	Drive fault indicator is lit.	Replace the drive.
Duplicate SCSI IDs	Valid drives are missing from the show config display.	Correct the removable-media SCSI IDs.
SCSI ID is set to 7 (reserved for host ID)	Valid drives are missing from the show config display. One drive may appear seven times on the configuration display.	Correct the SCSI IDs.
Duplicate host IDs on a shared bus	Valid drives are missing from the show config display. One drive may appear seven times on the configuration display.	Change host ID using the set pk*0_host_id command.
Faulty cable termination missing or loose cables	Activity indicators do not light. Drive missing from the show config display.	Check cable termination. Remove device and inspect cable connections.
Cable length	Activity indicators do not light.	Check cable length: on an 8-bit SCSI bus (narrow), the entire bus length must not exceed 6 meters for single-ended SCSI-2 at 5 MB per second, or 3 meters for single-ended SCSI-2 at 10 MB per second. On a 16-bit SCSI bus (wide), bus length must not exceed 3 meters.
Missing terminator	Drive missing from the show config or show device display. Read/write errors in the console event log; storage adapter port failure.	Attach terminators as needed: internal SCSI terminator or external SCSI terminator. (See Chapter 6, "Configuring Your System)"
Extra terminator	Devices produce errors or device IDs are dropped.	Check that SCSI bus is terminated only at beginning and end. Remove unnecessary terminators.

Option Card Problems

Option card problems can include problems related to network options, EISA/ISA bus options, and PCI options.

Network Problems

Network problems can vary depending on the type of network option card you installed. See the option card documentation for information on troubleshooting network problems. Make sure you correctly set the network type for the network interface card. See Chapter 6, "Configuring Your System" for more information.

EISA/ISA Bus Problems

EISA bus problems at startup are usually indicated by the following display during startup. Run the EISA Configuration Utility (ECU) if this message displays. Table 8–9 describes the steps for troubleshooting EISA problems.

```
EISA Configuration Error. Run the EISA Configuration Utility.
```

Table 8–9: Troubleshooting EISA/ISA Bus Problems

Step	Action
1.	Confirm that the option is supported, and confirm firmware and software versions.
2.	Check that the EISA card and any cabling are properly seated.
3.	Run the ECU as described in Chapter 6, "Configuring Your System" to: • Confirm that the system has been configured with the most recently installed controller. • See what the hardware jumper and switch settings should be for each ISA controller. • See what the software setting should be for each ISA and EISA controller. • See if the ECU deactivated (< >) any controllers to prevent conflict. • See if any controllers are locked, which limits the ECU's ability to change resource assignments. • Ensure that IRQs are set correctly.
4.	Confirm that hardware jumpers and switches on ISA controllers reflect the settings indicated by the ECU. Start with the last ISA module installed.
5.	Check for a bad slot by moving the last installed controller to a different slot.
6.	Call the option manufacturer or your service representative for help.

PCI Bus Problems

PCI bus problems at startup are usually indicated when the system cannot detect the PCI device. Use Table 8–10 to diagnose the likely cause of the problem.

PCI Parity

Some PCI devices do not implement PCI parity, and some have a parity-generating scheme that may not comply with the PCI Specification. In such cases, the device functions properly as long as parity is not checked. The `pci_parity` environment variable for the SRM console allows you to turn off parity checking so that false PCI parity errors do not result in machine check errors. The ARC environment variable, ENABLEPCIPARITYCHECKING, has a default setting of FALSE, so that parity is not checked unless you change the value to TRUE. When PCI parity is disabled, no parity checking is implemented for any PCI device, even those that produce correct, compliant parity.

Table 8–10: Troubleshooting PCI Bus Problems

Step	Action
1.	Confirm that the option is supported, and confirm firmware and software versions.
2.	Confirm that the PCI module and any cabling are properly seated.
3.	Check for a bad slot by moving the last installed controller to a different slot.
4.	Call the option manufacturer or your service representative for help.

Monitor and Terminal Problems

If the system starts up but has no startup display when you turn on the system, refer to Table 8–11.

Table 8–11: Troubleshooting Monitor and Terminal Problems

Possible Cause	Action
The monitor or terminal are not turned on.	Check that the monitor or terminal is turned on. Make sure all cables are connected at both ends.
The monitor or terminal brightness and contrast controls are incorrectly set.	Adjust the monitor or terminal contrast and brightness controls.
Incorrect graphics configuration.	See Chapter 6, "Configuring Your System."
The terminal cable is not connected to the correct serial port.	Check the serial port to which the terminal cable is connected. Make sure it is connected to the left-hand serial port (COM1).
If you are using a console terminal, check the baud rate setting for the terminal and system. The system default baud rate setting is 9600.	Connect the console terminal to the COM1 serial communication port and set the console environment variable to serial (`set console serial` command).
The power cord is not connected. The power cord may be faulty. The power cord socket may not be working.	Make sure all power cords are connected correctly at both ends. Try a power cord that works or test the power socket with an appliance that works.
If you are using other than the standard on-board VGA controller, settings may be incorrect.	Make sure that on-board CIRRUS VGA options are set to "disabled" through the ECU, the VGA jumper (J27) on the upper-left corner of the system board is disabled (off), and the `console` environment variable is set to "graphics."
	Combining multiple VGA controllers will produce unpredictable results, and use of multiple VGA controllers is not recommended or supported.
The terminal or monitor fuse may have blown.	Replace the blown terminal or monitor fuse. Refer to the terminal or monitor documentation.

Possible Cause	Action
The port to which the terminal or monitor connects may not be the correct one. The port to which the terminal or monitor connects may be faulty.	Ensure that your monitor cable is plugged into the correct graphics port if you have an optional graphics card installed. You should plug the cable into the connector of your option card, not the connector on the system board. Try connecting the terminal or monitor to another system using the same terminal or monitor cable. If the terminal or monitor works, the port to which the terminal or monitor was connected is faulty. Contact your service representative.

Keyboard and Mouse Problems

Table 8–12 lists problems that may occur with the keyboard or mouse.

Table 8–12: Troubleshooting Keyboard and Mouse Problems

Symptom	Possible Cause	Action
The monitor does not display the character you type.	The keyboard cable is connected incorrectly.	Make sure that the keyboard cable is connected correctly in the keyboard connector.
	The keyboard has failed.	Replace the keyboard. If the problem persists, contact your Digital service representative.
The monitor displays a message indicating a keyboard error.	The keyboard is connected incorrectly.	Make sure the keyboard is connected to the keyboard port.
The mouse pointer displays on the monitor, but does not move correctly.	The mouse is connected incorrectly.	Make sure the mouse cable is connected correctly in the mouse connector.
	The mouse ball is dirty.	Remove the ball from the mouse and clean it in a lukewarm, mild-soap solution. Dry the ball and replace it in the mouse.

Symptom	Possible Cause	Action
The mouse pointer does not display on the monitor.	The mouse is connected incorrectly or the mouse cable is loose.	Make sure the mouse cable is connected correctly in the mouse connector.
	The system is in console mode.	The mouse pointer displays only when the operating system is running. Boot the operating system.
	The mouse is faulty.	Replace the mouse.

Printer Problems

Verify that the printer is correctly cabled to the system (see Figure 1-3 to verify the connection) and refer to the printer's documentation if necessary.

Overheating Problems

The system contains internal sensors that monitor system and power supply temperature and shut down the system if maximum temperature limits are exceeded. If the system shuts down unexpectedly:

- Ensure that the top panel is properly in place. Refer to "Top Panel" in Chapter 5, "Installing and Removing Components" for information on removing and replacing the panel.

- Verify that the ambient temperature does not exceed the limits specified in Table 2-1, "Optimal Environmental Conditions."

- Refer to Table 8–3, "Power Problems" to troubleshoot power supply problems and fan failure.

Using the Fail-Safe Loader

The fail-safe loader (FSL) allows you to boot an Update Utility diskette in an attempt to repair corrupted console files that reside within the Flash ROMs on the system board. Use the FSL only when a failure at startup prevents you from accessing the console mode and you have checked the operator control panel for progress messages.

Using the Update Utility

To activate FSL:

1. Turn off the system.

2. Install the Update utility diskette into the diskette drive.

3. Remove the top panel (see "Removing the Top Panel" in Chapter 5, "Installing and Removing Components").

4. Enable FSL by moving the J1 jumper on the CPU card from the normal position (see Figure 8-1) to the position nearest the system board (position 7).

5. Replace the top panel.

6. Turn on the system and check the operator control panel for progress messages. Respond `yes` to the update prompt.

7. After the Update utility has completed, turn off the system.

8. Remove the top panel.

9. Disable the FSL and set the SROM jumpers to their normal operating position.

10. Replace the top panel and turn the system back on.

11. Check to make sure that the appropriate console prompt appears.

Figure 8-1: Fail-Safe Jumper on the CPU Card (Normal Position)

MA00926
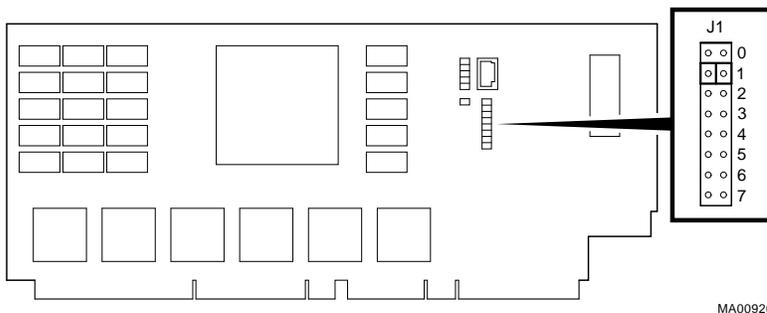
9
Quick Reference

Introduction

This chapter includes the following reference information:

- Messages

- Hardware Overview

- Indicator lights

- System Board and CPU Card Jumper Settings

- SCSI ID Settings

- Specifications

- Architecture Diagram

Messages

The system maintains a console event log consisting of status messages received during startup testing. If problems occur during startup, standard error messages may be embedded in the console event log. To display the messages in the console event log, use the `cat el` command, or to display the log screen by screen, use the `more el` command.

Hardware Overview

This section includes front, rear, and side views of the system unit.

System Front View

Figure 9-1 shows system components on the front panel.

Figure 9-1: System Front View

MLO-013385

1. On/Off switch
2. On/Off indicator
3. Operator control panel
4. Reset switch
5. Halt switch
6. Diskette drive activity indicator
7. Diskette drive eject button
8. CD-ROM emergency eject hole
9. CD-ROM eject button
10. CD-ROM activity indicator
11. CD-ROM volume control
12. Headphone jack
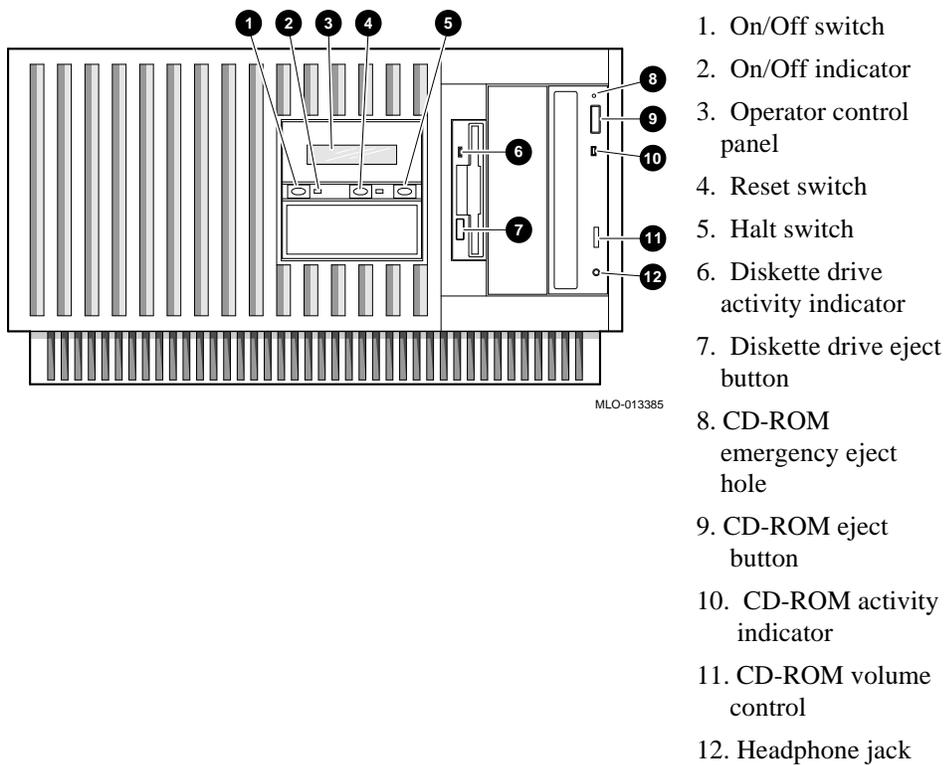
System Rear View

Figure 9-2 shows system ports and slots on the rear panel.

Figure 9-2: System Rear View
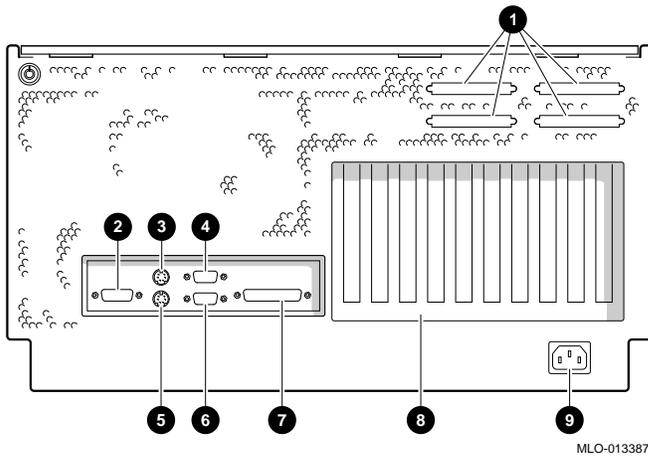
1. Four additional SCSI port knockouts
2. VGA port
3. Keyboard port
4. Serial port/terminal (COM1)
5. Mouse port
6. Serial port/terminal (COM2)
7. Parallel port
8. PCI/EISA slots
9. Power inlet

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System Top View

Figure 9-3 shows system components through the top view with the panel removed.

Figure 9-3: System Top View

1. CD-ROM drive
2. Tape drive
3. Diskette drive
4. OCP panel
5. Power supply
6. Hard drives
7. System board
8. PCI card
9. CPU card
10. Fan
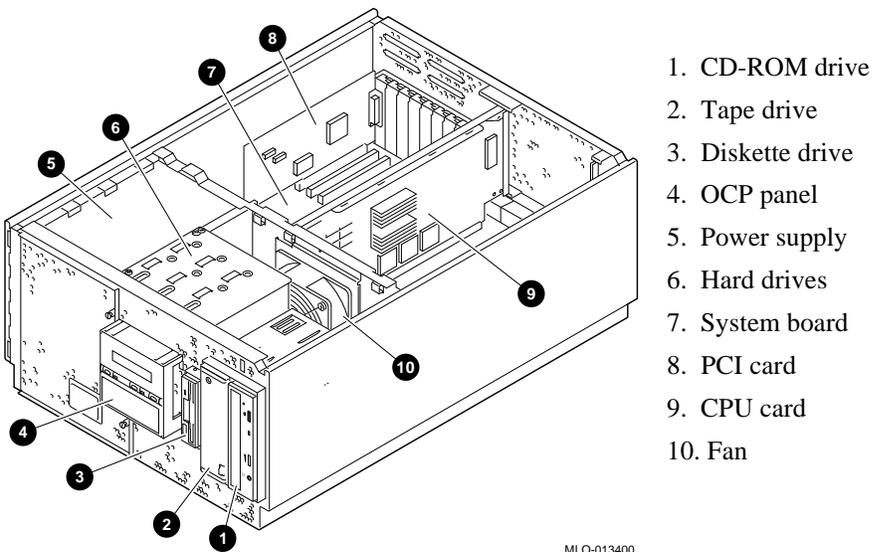
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System Board Connectors, Chips, and Slots

Figure 9-4 shows the location of the system board connectors, chips, and expansion slots.

Figure 9-4: System Board Connectors, Chips, and Slots

MLO-013402

1. PCI Secondary slots

2. PCI primary slots

3. EISA1/EISA2

4. CPU module connector

5-10. Memory module connectors (20)

11. Power connector

12. Power connector

13. Power connector

14. Diskette drive connector

15. Upper fan connector

16. Lower fan connector

17. TOY/NVRAM chip (E78 on board)

18. NVRAM chip (E14 on board)

19. Internal SCSI connector (narrow) (not used)

20. Speaker connector

21. Internal SCSI connector (wide)

22. OCP Connector
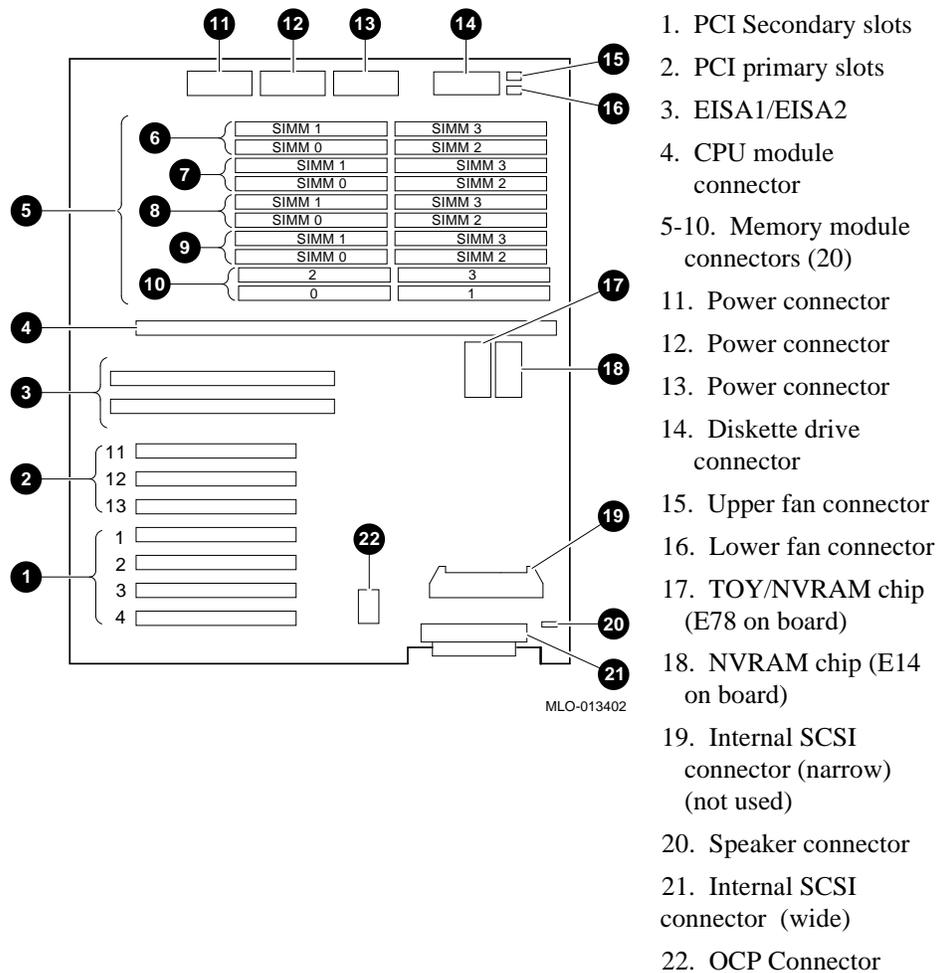
Port Pinouts

This section describes pin functions for port connectors on the rear of the system.

VGA Port Connector

The VGA port provides an interface to a VGA terminal. Table 9–1 lists pin assignments for the VGA port.

Table 9–1: VGA Port Pinouts

Pin	Signal	Function
1	Red	Red color driver
2	Green	Green color driver
3	Blue	Blue color driver
4	NC	Not connected
5	GNDB	Video ground
6	GNDB	Video ground
7	GNDB	Video ground
8	GNDB	Video ground
9	NC	Not connected
10	GNDB	Video ground
11	NC	Not connected
12	NC	Not connected
13	HSYNC	Horizontal synch
14	VSYNC	Vertical synch
15	NC	Not connected

Parallel Port Connector

The parallel port provides an interface to a printer or other parallel devices. Table 9–2 lists pin assignments for the parallel port. An asterisk (*) after a signal name indicates an active low signal.

Table 9–2: Parallel Port Pinouts

Pin	Signal	Function
1	STB-R*	Strobe
2	PRTD0	Printer data bit 0
3	PRTD1	Printer data bit 1
4	PRTD2	Printer data bit 2
5	PRTD3	Printer data bit 3
6	PRTD4	Printer data bit 4
7	PRTD5	Printer data bit 5
8	PRTD6	Printer data bit 6
9	PRTD7	Printer data bit 7
10	ACK*	Acknowledge
11	BUSY	Busy
12	PE	Paper end
13	SLCT	Select
14	AUTOFDXT*	Autofeed
15	ERR*	Error
16	INIT*	Initialize printer
17	SLCTIN*	Select input
18 to 25	CHAS	Chassis ground

Quick Reference

Serial Port Connectors

The serial port connectors consist of two 9-pin D-submini connectors. Table 9–3 lists their pin assignments.

Table 9–3: Serial Port Pinouts

Pin	Signal	Function
1	DCD	Data carrier detect
2	RXD	Receive data
3	TXD	Transmit data
4	DTR	Data terminal ready
5	GND	Ground
6	DSR	Data set ready
7	RTS	Request to send
8	CTS	Clear to send
9	RI	Ring indicator

Keyboard and Mouse Port Connectors

The keyboard and mouse connectors consist of two 6-pin mini-DIN connectors. Table 9–4 lists their pin assignments.

Table 9–4: Keyboard and Mouse Port Pinouts

Pin	Signal
1	Data
2	Reserved
3	Ground
4	+5 VDC (fused)
5	Clock
6	Reserved

SCSI Port Connector

The external SCSI connector is a 50-pin high-density connector. Table 9–5 lists the pin assignments.

Table 9–5: SCSI Port Pinouts

Pin	Signal	Pin	Signal
1	GND	26	-DB (0)
2	GND	27	-DB (1)
3	GND	28	-DB (2)
4	GND	29	-DB (3)
5	GND	30	-DB (4)
6	GND	31	-DB (5)
7	GND	32	-DB (6)
8	GND	33	-DB (7)
9	GND	34	-DB (P)
10	GND	35	GND
11	GND	36	GND
12	RESERVED	37	RESERVED
13	OPEN	38	TERMPWR
14	RESERVED	39	RESERVED
15	GND	40	GND
16	GND	41	-ATN
17	GND	42	GND
18	GND	43	-BSY
19	GND	44	-ACK
20	GND	45	-RST
21	GND	46	-MSG
22	GND	47	-SEL
23	GND	48	-CD
24	GND	49	-REQ
25	GND	50	-I/O

LEDs

Table 9–6 describes system LEDs and their function.

Table 9–6: LEDs

LED	Function
On/Off indicator (green)	Lights when the system unit is turned on.
Diskette drive activity indicator (green)	Lights when the system is accessing the diskette drive.
CD-ROM drive activity indicator (green)	Lights when the system is accessing the CD-ROM drive.

System Board Jumper Settings

Table 9–7 lists the default jumper settings for the system board.

Table 9–7: System Board Default Jumper Settings

Number	Name	Description and Default
J16	Large fan	Allows the large fan to be disabled. Enabled.
J27	VGA enable	Enables the on-board VGA logic. Enabled. Set to disabled position (pins 2 and 3) when using a graphics option card
J50	FROM VPP enable	Permits the 12 volts needed to update the Flash ROMs. Enabled.
J51	SCSI terminator	Enables the on-board SCSI terminators. The system specification requires that the SCSI bus be terminated at both ends. Enabled.
J52	Temperature shutdown	Allows the temperature chips to shut down the system in an orderly sequence. Enabled.
J53	Fan shut down	Allows the software to shut down the system in an orderly sequence. Enabled.
J55	Fan-2 fault	Allows hardware to detect Fan-2 fault and to shutdown the system in an orderly sequence. Disabled.
J56	Fan fault	Allows hardware to detect a fan fault and shut down the system in an orderly sequence. Enabled. Set to disable if testing the system board or CPU card outside the enclosure.

Figure 9-5 shows the system board jumper settings for normal operation.

Figure 9-5: System Board Jumper Positions for Normal Operation

1. Flash ROM VPP
   enable (J50)

2. VGA enable (J27)

3. Large fan (J16)

4. Small fan (J55)

5. Temperature
   shutdown (J52)

6. Fan fault (J56)

7. Force shutdown
   (J53)

8. SCSI termination
   (J51)

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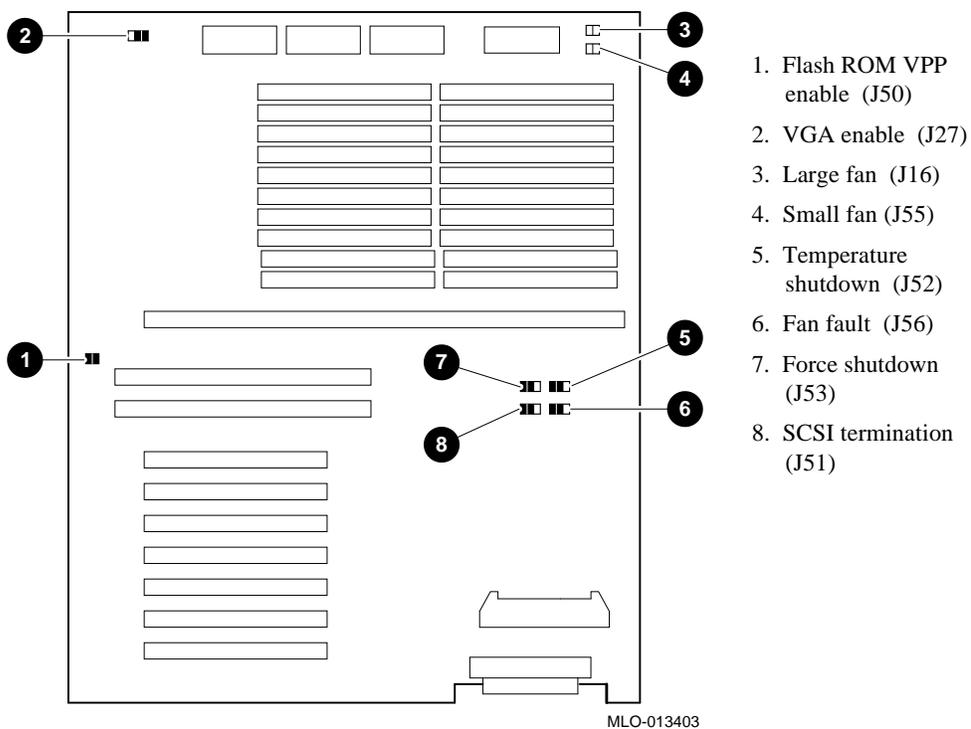
Figure 9-6 shows the default jumper settings on the CPU card for normal operation. The
J1 jumper on the CPU card activates the SROM tests and the fail-safe loader. The J3 and
J4 settings affect the clock speed and other critical settings for the AlphaServer 1000A
system. The J3 and J4 settings differ according to model.

Quick Reference

Figure 9-6: CPU Card Jumper Positions for Normal Operation

MA00926

Model 4/266

MA00951

Model 4/233

MA00791
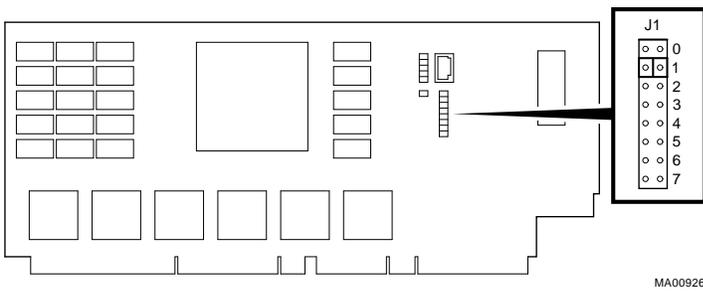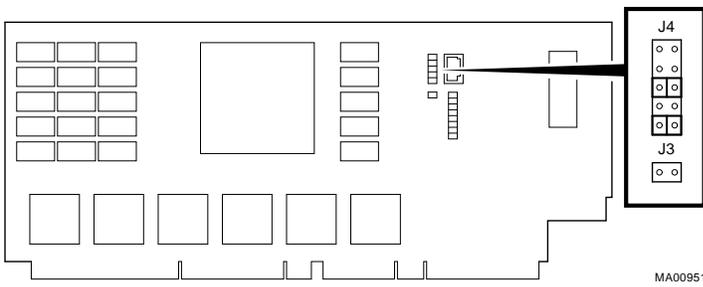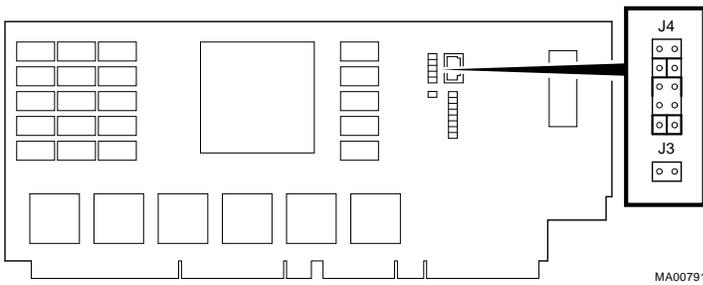
Figure 9-7 shows jumper locations for the CD-ROM drive.

Figure 9-7: RRD45 CD-ROM Jumper Locations

MA01425
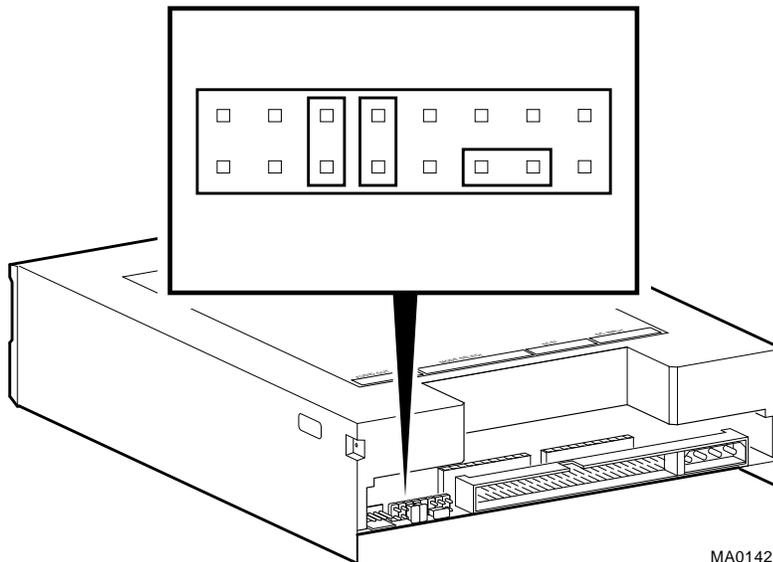
SCSI ID Settings

For each configuration, the CD-ROM drive and tape drive IDs are manually set at address 4 and 5, respectively. Fixed-drive IDs are set automatically by the backplane.

Single-Controller Configuration Jumper Options

Table 9–8 shows the SCSI ID settings for a system with a single-controller configuration.

Table 9–8: Single-Controller Configuration Jumper Options

Device or Slot	None
Bus A	
Tape	4
CD-ROM	5
Slot 0	0
Slot 1	1
Slot 2	2

_____ **Note** _____

The system does not recognize two drives with the same ID number. Five drives
is the maximum number that this configuration can recognize.

_____

Specifications

Refer to Tables 9-9 through 9-B for system specification information.

Table 9–9: System Specifications

Attributes	Specification
PCI clock	233 Mhz (Model 233)
	266 Mhz (Model 266)
Data I/O	32-bit PCI
System board RAM	Expandable up to 1 GB

Table 9–10: System Dimensions

Dimension	Specification
Width	442 mm (17.4 in)
Length	645.2 mm (25.4 in)
Height	238.8 mm (9.4 in)
Weight	32 kg (70 lbs)

Table 9–11: System Environmental Specifications

Condition	Specification
Temperature	The room temperature must be between 10° C and 40°C (50° F and 104°F).
Humidity	The relative humidity must be between 10% and 90% (20% to 80% with removable-media options).

Table 9–12: Power Supply Ratings

Specification	Range
Voltage	100-120/220-240 VAC
Frequency	50-60 Hz
Current	8.5/4.0 A

Note: These are the maximum ratings with a fully-loaded system enclosure.

These ratings do not include those for a monitor or terminal.

Table 9–13: Acoustics-Declared Values Per ISO 9296 and ISO 7779

Product	Sound Power Level LwAd, B		Sound Pressure Level LpAm, dBA (bystander positions)	
AlphaServer 1000A Model 2xx (PB7RT-A9) with:	Idle	Operate	Idle	Operate
1xRZ26/8	5.5	5.6	35	36
2xRZ26/8	5.6	5.6	36	36
3xRZ26/8	5.6	5.7	36	37

Current values for specific configurations are available from Digital representatives. 1 B = 10 dBA.

System Architecture

Figure 9-8 illustrates the server system architecture.

Figure 9-8: System Architecture
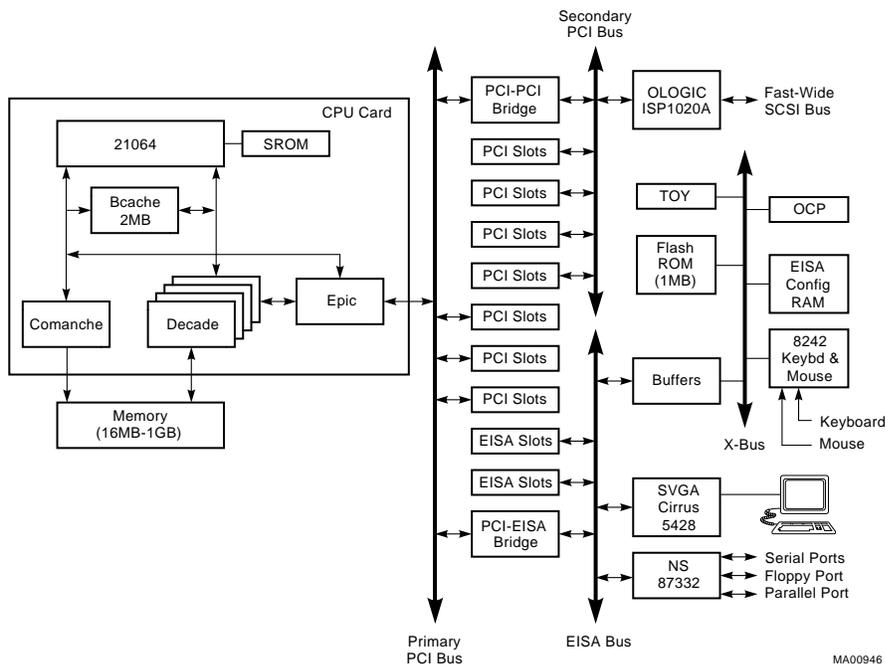
Glossary

10Base-T Ethernet network

IEEE standard 802.3-compliant Ethernet products used for local distribution of data. These networking products characteristically use twisted-pair cable.

AlphaGeneration

Identifies products and services that take advantage of Digital's Alpha 64-bit computing environments.

AlphaServer

Digital's new generation of server systems based on the Alpha 64-bit computing architecture

ARC

User interface to the console firmware for operating systems that expect firmware compliance with the *Windows NT Portable Boot Loader Specification.* ARC stands for Advanced RISC Computing.

AUI Ethernet network

Attachment unit interface. An IEEE standard 802.3-compliant Ethernet network made of standard Ethernet cable.

autoboot

A system boot initiated automatically by software when the system is powered up or reset.

Glossary

availability

The amount of scheduled time that a computing system provides application service during the year. Availability is typically measured as a percentage of up time per year; or, if measured as system unavailability, as the number of hours of down time per year.

backplane

The main board or panel that connects all of the modules in a computer system.

bandwidth

The rate of data transfer in a bus or I/O channel. It is expressed as the amount of data that can be transferred in a given time, for example, as megabytes per second.

boot

Short for bootstrap. To load an operating system into memory.

boot device

The device from which the system bootstrap software is acquired.

boot flags

A flag is a system parameter set by the user. Boot flags contain information that is read and used by the bootstrap software during a system bootstrap procedure.

bootp

A load host protocol for UNIX host systems.

bootstrap

The process of loading an operating system into memory.

bus

A collection of many transmission lines or wires. The bus interconnects computer system components, providing a communications path for addresses, data, and control information or external terminals and systems in a communications network.

byte

A group of eight contiguous bits starting on an addressable byte boundary. The bits are numbered right to left, 0 through 7.

cache memory

A small, high-speed memory placed between slower main memory and the processor. A cache increases effective memory transfer rates and processor speed. It contains copies of data recently used by the processor and fetches several bytes of data from memory in anticipation that the processor will access the next sequential series of bytes.

CD-ROM

A read-only compact disc. The optical removable media used in a compact disc reader.

central processing unit (CPU)

The unit of the computer that is responsible for interpreting and executing instructions.

client-server computing

An approach to computing whereby a computer – the "server" – provides a set of services across a network to a group of computers requesting those services – the "clients."

command line interface

One of two interfaces in the AlphaServer operator interface. The command line interface supports the OpenVMS Alpha and Digital UNIX operating systems. It allows you to configure and test the system, examine and alter system state, and boot the operating system.

console mode

The state in which the system and the console terminal operate under the control of the console program.

console program

The code that firmware executes during console mode.

console subsystem

The subsystem that provides the user interface for a computer system when the operating system is not running.

console terminal

The terminal connected to the console subsystem. It is used to start the system and to direct activities between the user and the computer system.

data bus

A bus used to carry data between two or more components of the system.

Glossary

data cache

A high-speed cache memory reserved for data storage.

DEC VET

Digital Verifier and Exerciser Tool. A multipurpose system diagnostic tool that performs exerciser-oriented maintenance testing.

DECchip 21064 processor

The CMOS, single-chip processor based on the Alpha architecture and used on many AlphaGeneration computers.

diagnostic program

A program that finds and corrects problems with a computer system.

Digital UNIX operating system

A general-purpose operating system based on the Open Software Foundation OSF/1 2.0 technology. Digital UNIX V2.0 runs on the range of AlphaGeneration systems, from workstations to servers.

direct memory access (DMA)

Access to memory by an I/O device that does not require processor intervention.

DSSI

Digital's proprietary data bus that uses the System Communication Architecture (SCA) protocols for direct host-to-storage communications.

DSSI cluster

A cluster system that uses the DSSI bus as the interconnect between DSSI disks and systems.

DUP server

Diagnostic Utility Program server. A firmware program on-board DSSI device that allows a user to set host to a specified device in order to run internal tests or modify device parameters.

ECC

Error Correction Code. Code and algorithms used by logic to facilitate error detection and correction.

EISA bus

Extended Industry Standard Architecture bus. A 32-bit industry-standard I/O bus used primarily in high-end PCs and servers.

EISA Configuration Utility (ECU)

A feature of the EISA bus that helps you select a conflict-free system configuration and perform other system services. The ECU must be run whenever you change, add, or remove an EISA or ISA controller.

environment variables

Global data structures that can be accessed from console mode. The setting of these data structures determines how a system powers up, boots the operating system, and operates.

ERF/UERF

Error Report Formatter. ERF is used to present error log information for OpenVMS Alpha. UERF is used to present error log information for Digital UNIX.

Ethernet

IEEE 802.3 standard local area network.

fail-safe loader (FSL)

A program that allows users to power up without initiating drivers or running startup diagnostics. From the fail-safe loader users can perform limited console functions.

Fast SCSI

An optional mode of SCSI-2 that allows transmission rates of up to 10 megabytes per second.

FAT

File allocation table file type. All MS-DOS Windows files are of this type.

firmware

Software code stored in hardware.

Flash ROM

Flash-erasable programmable read-only memory. Flash ROMs can be bank- or bulk-erased.

Glossary

full-height device

Standard form factor for 5 1/4-inch storage devices.

half-height device

Standard form factor for storage devices that are not the height of full-height devices.

halt

The action of transferring control of the computer system to the console program.

hot swap

The process of removing a device from the system without shutting down the operating system or powering down the hardware.

initialization

The sequence of steps that prepare the computer system to start. Occurs after a system has been powered up.

Interrupt request lines (IRQs)

Bus signals that connect an EISA or ISA module (for example, a disk controller) to the system so that the module can get the system's attention via an interrupt.

ISA

Industry Standard Architecture. An 8-bit or 16-bit industry-standard I/O bus, widely used in personal computer products. The EISA bus is a superset of the ISA bus.

LAN

Local area network. A high-speed network that supports computers that are connected over limited distances.

loopback test

Internal and external tests that are used to isolate a failure by testing segments of a particular control or data path. A subset of ROM-based diagnostics.

machine check/interrupts

An operating system action triggered by certain system hardware-detected errors that can be fatal to system operation. Once triggered, machine check handler software analyzes the error.

mass storage device

An input/output device on which data is stored. Typical mass storage devices include disks, magnetic tapes, and CD-ROM.

MAU

Medium attachment unit. On an Ethernet LAN, a device that converts the encoded data signals from various cabling media (for example, fiber optic, coaxial, or ThinWire) to permit connection to a networking station.

memory interleaving

The process of assigning consecutive physical memory addresses across multiple memory controllers. Improves total memory bandwidth by overlapping system bus command execution across two or four memory modules.

menu interface

One of two interfaces in the AlphaServer operator interface. The menu interface allows users to boot and configure the Windows NT operating system by selecting choices from a simple menu. The EISA Configuration Utility is also run from the menu interface.

MOP

Maintenance Operations Protocol. A transport protocol for network bootstraps and other network operations.

NFS

Network File System protocol that allows a user to remotely access a host file system as if it were the user's local file system.

node

A device that has an address on, is connected to, and is able to communicate with other devices on a bus. Also, an individual computer system connected to the network that can communicate with other systems on the network.

NTFS

Windows NT file system, a high-performance file system.

NVRAM

Nonvolatile random-access memory. Memory that retains its information in the absence of power.

Glossary

OCP

See operator control panel.

OpenVMS Alpha operating system

A general-purpose multiuser operating system that supports AlphaGeneration computers in both production and development environments. OpenVMS Alpha software supports industry standards, facilitating application portability and interoperability.

operating system mode

The state in which the system console terminal is under the control of the operating system. Also called program mode.

operator control panel

The panel that contains the startup/diagnostic display, dc On/Off switch, Halt switch, and Reset switch.

PALcode

Alpha Privileged Architecture Library code, written to support Alpha processors. PALcode implements architecturally defined behavior.

PCI

Peripheral Component Interconnect. An industry-standard expansion I/O bus that is the preferred bus for high-performance I/O options. Available in a 32-bit and a 64-bit version.

PCI-to-EISA bridge

The capability to transfer commonly available EISA and ISA options to the PCI bus.

powercycle

A process initiated by pressing the reset switch, that causes the system to reinitialize and redisplay its startup display.

power-up

The sequence of events that starts the flow of electricity to a system or its components.

RAID

Redundant array of inexpensive disks. Technique that organizes disk data to improve performance and reliability. RAID has three attributes:

- It is a set of physical disks viewed by the user as a single logical device.

- The user's data is distributed across the physical set of drives in a defined manner.

- Redundant disk capacity is added so that the user's data can be recovered even if a drive fails.

redundant

Describes duplicate or extra computing components that protect a computing system from failure.

reliability

The probability that a device or system will not fail to perform its intended functions during a specified time.

Remote Installation Service (RIS)

A tool that allows remote installation of Digital UNIX to Alpha systems through a local area network.

RISC

Reduced instruction set computer. A processor with an instruction set that is reduced in complexity.

ROM-based diagnostics

Diagnostic programs resident in read-only memory.

SCSI

Small computer system interface. An ANSI-standard interface for connecting disks and other peripheral devices to computer systems. Some devices are supported under the SCSI-1 specification; others are supported under the SCSI-2 specification.

self-test

A test that is invoked automatically when power is supplied to the system.

serial ROM

In the context of the CPU module, ROM read by the DECchip microprocessor after reset that contains low-level diagnostic and initialization routines.

SIMM

Single in-line memory module.

Glossary

SRM

User interface to console firmware for operating systems that expect firmware compliance with the *Alpha System Reference Manual (SRM)*.

StorageWorks

Digital's modular storage subsystem (MSS), which is the core technology of the Alpha SCSI-2 mass storage solution. Consists of a family of low-cost mass storage products that can be configured to meet current and future storage needs.

system board

The main circuit board of a computer. The motherboard contains the base electronics for the system (for example, base I/O, CPU, ROM, and console serial line unit) and has connectors where options (such as I/O and memories) can be plugged in.

system bus

The hardware structure that interconnects the CPUs and memory modules. Data processed by the CPU is transferred throughout the system via the system bus.

system disk

The device on which the operating system resides.

ThinWire

Ethernet cabling and technology used for local distribution of data communications. ThinWire cabling is thinner than thick wire cabling.

twisted-pair cable

Cable made by twisting together two insulated conductors that have no common covering.

uninterruptible power supply (UPS)

A battery-backup option that maintains ac power to a computer system if a power failure occurs.

wide area network

A high-speed network that connects a server to a distant host computer, PC, or other server, or that connects numerous computers in numerous distant locations.

Windows NT

"New technology" operating system owned by Microsoft Corporation.

write-enabled

Describes a device onto which data can be written.

write-protected

Describes a device onto which data cannot be written.

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