

AlphaServer 1000

---

## Rackmount Owner's Guide

Order Number: EK-RMALP-OG. A01

**Revision/Update Information:** This is a new document.

**Digital Equipment Corporation  
Maynard, Massachusetts**

## **February 1995**

Digital Equipment Corporation makes no representations that the use of its products in the manner described in this publication will not infringe on existing or future patent rights, nor do the descriptions contained in this publication imply the granting of licenses to make, use, or sell equipment or software in accordance with the description.

Possession, use, or copying of the software described in this publication is authorized only pursuant to a valid written license from Digital or an authorized sublicensor.

Copyright © Digital Equipment Corporation, 1995. All Rights Reserved.

The following are trademarks of Digital Equipment Corporation:

OpenVMS Alpha, AlphaGeneration, DECchip, Digital, OpenVMS, ThinWire, ULTRIX, and the DIGITAL logo.

The following are third party trademarks:

Microsoft is a registered trademark, and Microsoft Windows and Microsoft Windows NT are trademarks of Microsoft Corporation. OSF/1 is a trademark of the Open Software Foundation, Inc. PostScript is a trademark of Adobe Systems, Inc.

All other trademarks and registered trademarks are the property of their respective holders.

**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)	
	Idle	Operate	Idle	Operate
<b>AlphaServer 1000 Model 200 (PB7RT-A9) with:</b>				
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:

Gerät	Schalleistungspegel L(wAd)		Schalldruckpegel L(pAm), dBA (Zuschauerpositionen)	
	Leerlauf	Betrieb	Leerlauf	Betrieb
<b>PB7rt +:</b>				
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.

---

# Contents

<b>1 System Overview .....</b>	<b>1-1</b>
Introduction.....	1-1
System Overview .....	1-1
Supported Operating Systems.....	1-2
System Console Firmware.....	1-2
Console Firmware Tasks.....	1-2
System Features .....	1-4
Reliability/Availability .....	1-4
System Expansion .....	1-4
Server Management.....	1-5
System Security.....	1-5
Front Panel Controls and Indicators.....	1-6
Front Panel Switches .....	1-8
Rear Panel Ports and Slots.....	1-9
Internal System Options .....	1-10
Storage Options .....	1-10
EISA, ISA, and PCI Options.....	1-11
Memory Options.....	1-11
External Options.....	1-12
Ordering Options.....	1-12
<b>2 Installing Your Hardware.....</b>	<b>2-1</b>
Hardware Setup Overview.....	2-1
Verifying the Installation Site.....	2-2
Preinstallation Considerations .....	2-2
Environmental Conditions .....	2-4
Power Requirements.....	2-4

## Contents

System Accessories.....	2-5
Optional Accessories .....	2-6
Connecting a Keyboard, a Mouse, or a Printer .....	2-6
Connecting a Monitor or a Terminal .....	2-6
Connecting to Network Hardware .....	2-7
Verifying Hardware Setup.....	2-8
Locking Your System .....	2-9
Recording the System Unit Key Number.....	2-10

## **3 Preparing to Install Your Operating System.....3-1**

Introduction .....	3-1
Preparing to Install Windows NT .....	3-2
Preparing the System.....	3-2
Setting the Operating System Type.....	3-2
Updating the Firmware.....	3-3
Setting Default Environment Variables .....	3-3
Setting the EISA Configuration .....	3-4
Preparing Your Hard Disk .....	3-4
Partitioning and Formatting Your Hard Disk .....	3-5
Installing Microsoft Windows NT .....	3-6
Preparing to Install DEC OSF/1 .....	3-7
Setting the Operating System Type .....	3-7
Installing DEC OSF/1 .....	3-8
Installing DEC OSF/1 with Remote Installation Service.....	3-8
Disk Space Requirements .....	3-9
Products to Install.....	3-9
Setting Up a RIS Area on a DEC OSF/1 Server .....	3-9
Setting Up a RIS Area on an ULTRIX Server.....	3-10
Updating the Boot File for New Clients.....	3-11
Before Starting the Boot Procedure .....	3-11
Booting over a Network .....	3-12
Booting from a DEC OSF/1 Server.....	3-12
Booting from an ULTRIX Server .....	3-13
Verifying the Installation.....	3-13
Preparing to Install OpenVMS .....	3-14
Preparing the System.....	3-14
Preparing Hardware Components .....	3-14
Preparing Software Components.....	3-14
Setting the Operating System Type.....	3-14
Required PALcode .....	3-15
Installing OpenVMS.....	3-15

<b>4 Basic Operation .....</b>	<b>4-1</b>
Introduction.....	4-1
Turning the System On.....	4-2
Systems with Preinstalled Software .....	4-2
Systems without Preinstalled Software .....	4-3
Turning the System Off.....	4-5
Turning the System Off for an Extended Period.....	4-5
Accessing the System from a Remote Location.....	4-5
Interpreting Startup Messages .....	4-6
Systems with Windows NT.....	4-7
Systems with DEC OSF/1 or OpenVMS .....	4-7
Reading the Startup Test Results .....	4-8
If the System Passes Startup Tests .....	4-8
If the System Fails Startup Tests.....	4-8
Using the Consoles.....	4-9
Invoking Console Mode .....	4-9
When to Switch Consoles.....	4-9
Switching to the DEC OSF/1 and OpenVMS (SRM) Console.....	4-10
Switching to the Windows NT (ARC) Console.....	4-10
Windows NT (ARC) Console Menus.....	4-10
Boot Menu Functions .....	4-11
Supplementary Menu Functions.....	4-11
Setup Menu Functions .....	4-11
DEC OSF/1 or OpenVMS (SRM) Console Commands .....	4-12
Basic Commands.....	4-12
Comprehensive Commands .....	4-12
Getting Help About the Windows NT (ARC) Console.....	4-13
Setup Menu .....	4-14
Setup Menu Help.....	4-15
Getting Help About the DEC OSF/1 and OpenVMS (SRM) Console.....	4-15
Booting the Operating System.....	4-16
Running the EISA Configuration Utility.....	4-17
Checking Required Environment Variable Settings .....	4-17
Changing Startup and Boot Defaults.....	4-17
Startup and Boot Environment Variables .....	4-17
Entering the Windows NT Firmware .....	4-19
Entering the DEC OSF/1 and OpenVMS Firmware .....	4-19
Verify Your Configuration.....	4-19
Windows NT Systems .....	4-19
DEC OSF/1 or OpenVMS Systems .....	4-20
Booting Windows NT.....	4-20
Changing Windows NT Boot Selections .....	4-21

## Contents

Using the Windows NT Boot Menu.....	4-21
Windows NT Boot Selection Menu .....	4-22
Booting DEC OSF/1 or OpenVMS Operating Systems.....	4-23
DEC OSF/1 and OpenVMS System Defaults.....	4-23
Boot Command .....	4-24
Using Storage Drives .....	4-24
Using a Diskette Drive .....	4-25
Using a CDROM Drive .....	4-25
Caring for Your System .....	4-27
Cleaning Your Mouse .....	4-27
Cleaning Your Keyboard.....	4-27
Moving Your System .....	4-27
Installing Your System at a New Location .....	4-28

## **5 Installing and Removing Components.....5-1**

Introduction .....	5-1
Preparing to Install or Remove Components .....	5-2
Required Equipment.....	5-2
Antistatic Precautions.....	5-2
Top Cover.....	5-3
Removing the Top Cover .....	5-3
Replacing the Top Cover.....	5-4
Memory Modules.....	5-4
Removing Memory Modules .....	5-6
Installing Memory Modules .....	5-7
EISA, ISA, and PCI Option Cards.....	5-9
Installing an Option Card .....	5-10
Removing an Option Card.....	5-12
Testing an Option Card Installation.....	5-12
Configuring an Option Card.....	5-14
Storage Devices .....	5-14
Identifying the Drive Bays .....	5-15
Installing Externally Accessible Devices.....	5-16
Removing Externally Accessible Devices .....	5-17
Installing a Diskette Drive.....	5-17
Removing a Diskette Drive .....	5-18
Network Interface Card.....	5-18
Power Supply.....	5-18
Removing and Installing the Power Supply .....	5-18
CPU Card.....	5-20
Removing the CPU Card.....	5-20



## Contents

Installing the CPU Card.....	5-22
Removing/Replacing Other Options .....	5-22

### **6 Configuring Your System..... 6-1**

Introduction.....	6-1
Viewing the System Configuration.....	6-1
ARC Console Configuration Options.....	6-2
SRM Console Configuration Commands .....	6-3
The show config Command.....	6-3
The show device Command.....	6-4
The show memory Command.....	6-6
The set and show Commands.....	6-6
Memory .....	6-8
Network Connections.....	6-9
Setting Network Configuration.....	6-9
Keyboard Type.....	6-10
EISA and ISA Options .....	6-10
EISA Bus .....	6-10
ISA Bus.....	6-12
EISA Configuration Utility (ECU) .....	6-12
Before You Run the ECU .....	6-13
Configuring EISA Options .....	6-14
Configuring ISA Options.....	6-16
PCI Option Cards .....	6-18
Storage Devices .....	6-19
Determining SCSI Storage Device IDs .....	6-19
On-board SCSI Bus Configuration.....	6-21
Internal Configuration .....	6-21
External Configuration .....	6-22
SCSI Controller Option Cards .....	6-22
SCSI Bus Backplane Configurations.....	6-23
Configuring the Backplane with One Controller .....	6-23
Single-Controller SCSI Configuration .....	6-24

### **7 Upgrading Your System ..... 7-1**

Introduction.....	7-1
Planning Your Upgrade.....	7-1
Digital Systems and Options Catalog.....	7-3
Upgrade Options .....	7-4
Firmware.....	7-4

## Contents

Updating Firmware Using the CDROM Drive .....	7-5
Updating Firmware Using the Network .....	7-5
Updating Firmware Using the Diskette Drive .....	7-5

## **8 Troubleshooting Your System .....8-1**

Introduction .....	8-1
Troubleshooting Overview .....	8-2
System Diagnostics .....	8-3
Interpreting Error Beep Codes .....	8-3
Reading the Console Event Log .....	8-3
The test Command .....	8-4
The kill and kill_diags Commands .....	8-6
The show_status Command .....	8-6
Power Problems .....	8-7
Console Problems .....	8-8
Boot Problems .....	8-9
Problems Detected by the Operating System .....	8-10
Storage Problems .....	8-11
Option Card Problems .....	8-12
Network Problems .....	8-13
EISA/ISA Bus Problems .....	8-13
PCI Bus Problems .....	8-13
Monitor and Terminal Problems .....	8-14
Keyboard and Mouse Problems .....	8-15
Printer Problems .....	8-16
Overheating Problems .....	8-16
Using the Fail-Safe Loader .....	8-17
Using the Update Utility .....	8-17

## **9 Quick Reference .....9-1**

Introduction .....	9-1
Messages .....	9-1
Hardware Overview .....	9-2
System Front View .....	9-2
System Rear View .....	9-3
System Top View .....	9-4
System Board Connectors, Chips, and Slots .....	9-5
Port Pinouts .....	9-6
VGA Port Connector .....	9-6
Parallel Port Connector .....	9-7

## Contents

Serial Port Connectors .....	9-8
Keyboard and Mouse Port Connectors .....	9-8
SCSI Port Connector.....	9-9
LEDs.....	9-10
System Board Jumper Settings .....	9-11
SCSI ID Settings .....	9-14
Single-Controller Configuration Jumper Options.....	9-14
Specifications.....	9-15
System Architecture.....	9-17

<b>Glossary.....</b>	<b>Glossary-1</b>
----------------------	-------------------

<b>Index.....</b>	<b>Index-1</b>
-------------------	----------------



---

# Preface

## About This Guide

### Purpose and Audience

This guide describes how to set up, operate, troubleshoot, and maintain your AlphaServer 1000 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.

## Preface

### 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/ <i>x</i>	You hold down the Ctrl key while you press another key, indicated here by <i>x</i> .
<b>Warning:</b>	Contains information to prevent personal injury.
<b>Caution:</b>	Provides information to prevent damage to equipment or software.
<b>Note:</b>	Important additional information you may need when you perform certain procedures.
<code>boot</code>	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.
<code>show config</code>	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 online help, angle brackets enclose a placeholder for which you must specify a value.
<i>italic type</i>	Italic type in console command sections indicates a variable.
<b>1</b>	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.

## Preface

## Related Documentation

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

### To Learn More about the System

<b>Document</b>	<b>Part Number</b>
<i>Alpha Architecture Concepts (DEC OSF/1)</i>	EY-N389E
<i>Alpha Architecture Concepts (OpenVMS)</i>	EY-K725E

### To Install the System

<b>Document</b>	<b>Part Number</b>
<i>AlphaServer 1000 Rackmount Installation Guide</i>	EK-RMALP-IN
<i>DEC OSF/1 AXP Factory Installed Software User Information</i>	EK-SFFIS-UG
<i>OpenVMS Factory Installed Software User Information</i>	EK-A0377-UG

### To Install and Operate Options

<b>Document</b>	<b>Part Number</b>
<i>RRD43 CDROM Disc Drive Operating Guide</i>	EK-RRDDD-IN
<i>TZK11 Tape Backup System User's Guide</i>	EK-TZK11-UG

### To Service the System

<b>Document</b>	<b>Part Number</b>
<i>AlphaServer 1000 Service Guide</i>	EK-DTLSV-SV
<i>AlphaServer 1000 Hardware Reference Manual</i>	EK-DTLSV-RM



# 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, a reduced instruction set computer (RISC) microprocessor 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
- DEC OSF/1

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 and DEC OSF/1 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.

## System Overview

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

The OpenVMS and DEC OSF/1 (SRM) console firmware has a command line interface designed to facilitate hardware interaction with the DEC OSF/1 or OpenVMS operating systems.

**Table 1–1: Console Firmware Tasks**

<b>If You Are Running...</b>	<b>And You Want to...</b>	<b>Use this Console...</b>
Windows NT	Boot Windows NT	ARC
	Run the EISA Configuration Utility	ARC
	Update firmware	ARC
	Switch to the SRM console	ARC
	Run programs specifically 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	SRM
	Perform diagnostic tests	SRM
DEC OSF/1 or OpenVMS	Boot DEC OSF/1 or OpenVMS	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 and display environment variables specific to DEC OSF/1 and OpenVMS	SRM
	Set and display environment variables common to DEC OSF/1, OpenVMS, and Windows NT	SRM
	Perform diagnostic tests	SRM
	Run the EISA Configuration Utility	ARC

## System Overview

### 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.
Dual SCSI backplanes	One SCSI controller for each backplane allows fully redundant disk subsystems.
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 512 MB using memory options.
Seven EISA expansion slots, two PCI expansion slots, and one PCI or EISA expansion slot	Accommodates industry-standard option cards such as Ethernet, FDDI, SCSI, and modems.
Integrated Fast SCSI-2 controller with external SCSI-2 connector	Supports tape, CDROM, and hard disk drives without use of an expansion slot.

## System Overview

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 (CDROM 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.

### 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.
Error information display	Identifies CPU, bus, PCI, and system errors.
Hard drive indicators	Provide immediate status information on hard drive activity or failure.
Operator control panel (OCP)	Provides a 16-character display for diagnostic and error messages.

### System Security

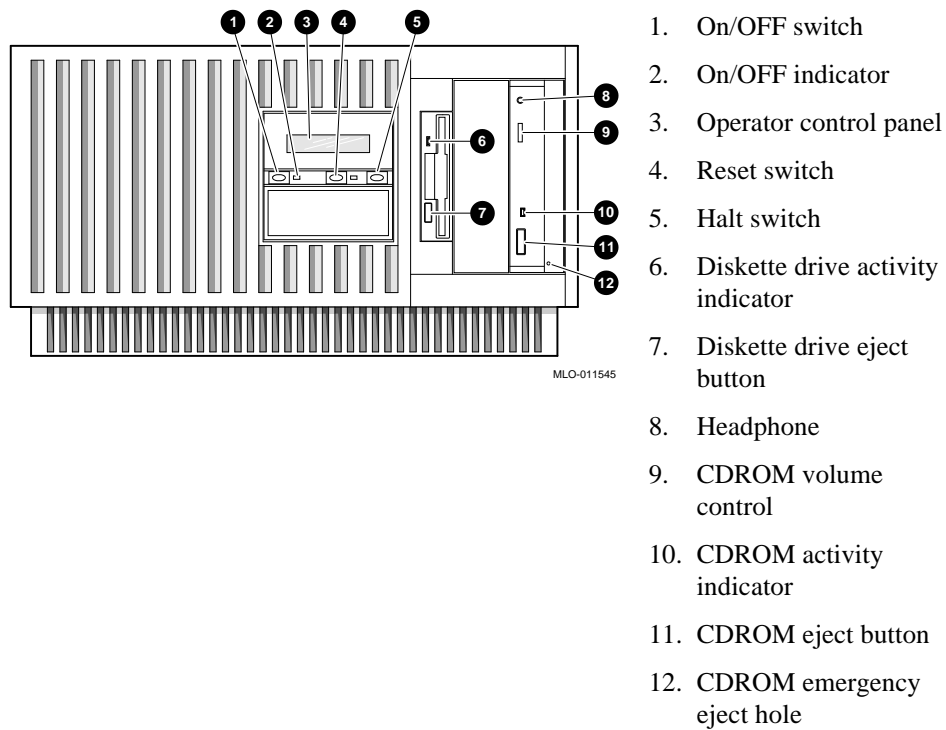
Key lock	Limits access to system components.
Security loop (on rear of system unit)	Allows system to be secured in place.
Interlock sensor switch	Automatically turns off system power if the top cover is removed while power is on.

## System Overview

### 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**



MLO-011545

**Table 1–2: Front Panel Controls and Indicators**

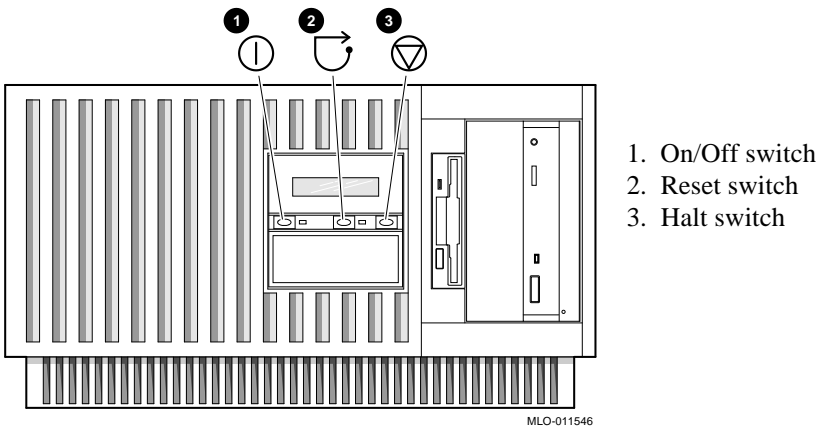
<b>Control or Indicator</b>	<b>Function</b>
Halt switch	Halts an OpenVMS or DEC OSF/1 system, returning it to console mode control  Halts a Windows NT system, but you must press the Reset switch to completely reboot the firmware
Reset switch	Reinitializes the system and performs startup tests
On/Off 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
CDROM volume control	Adjusts headphone volume
CDROM drive activity indicator	Lights when the system is accessing the CDROM drive
CDROM eject button	Ejects disc from the CDROM drive
Operator control panel display	Displays diagnostic and error messages

## System Overview

### 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**

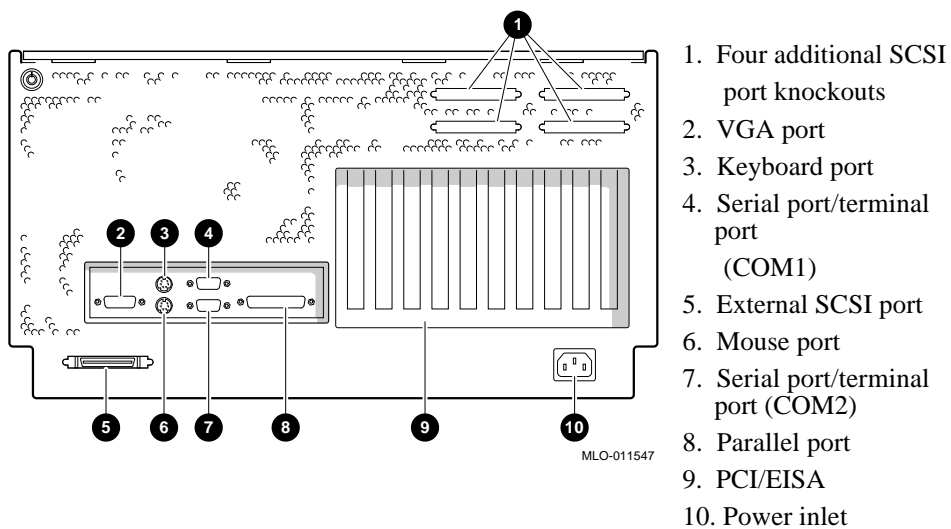




## Rear Panel Ports and Slots

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**



## System Overview

**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 three PCI slots	Option cards for high-performance network, video, or disk controllers
Up to eight 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
- EISA, ISA, and PCI options
- Memory options

### Storage Options

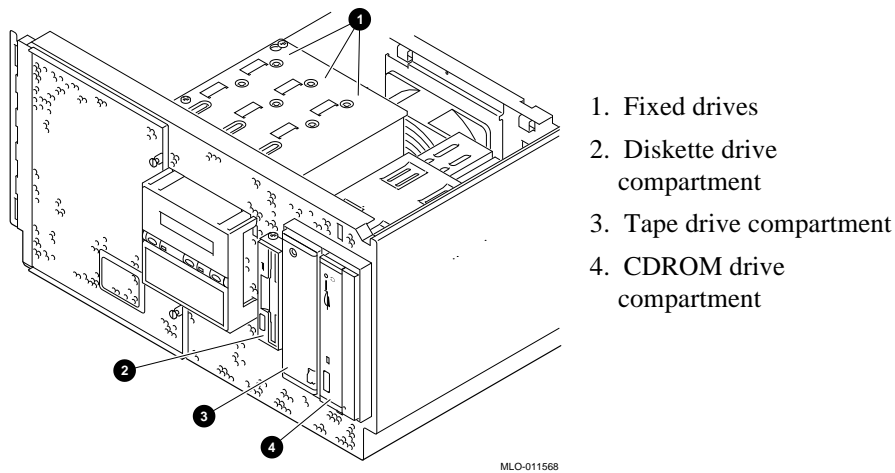
Mass storage options are located in the three slots behind the bezel (Figure 1-4). The system accommodates the following types of storage options:

- One diskette drive
- Two removable-media storage devices, typically a CDROM drive, a digital audio tape (DAT) drive, or a quarter-inch cartridge (QIC) tape drive
- Up to three 3½-inch fixed drives

## System Overview

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

**Figure 1-4: Storage Option Compartments**



### 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 512 megabytes 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

## System Overview

Memory options consist of five single in-line memory modules: 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, or a 128-MB option consisting of five 32-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

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

## Installing Your Hardware

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.

---

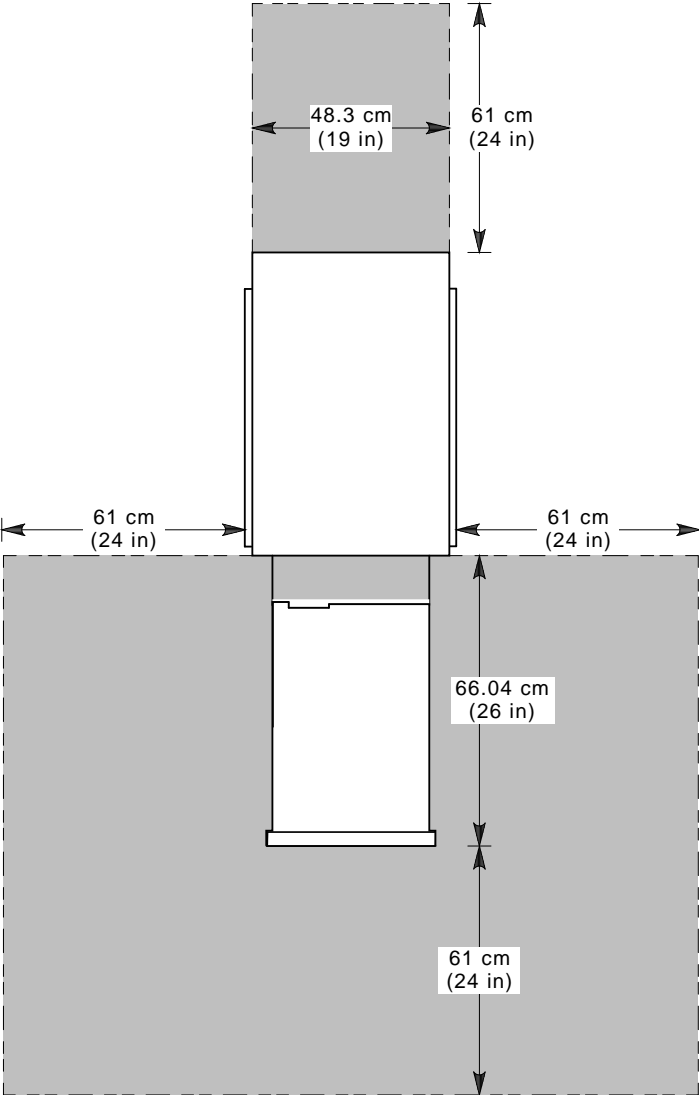
## Preinstallation Considerations

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.

Installing Your Hardware

Figure 2-1 Workroom Area



MLO-011590

## Installing Your Hardware

### 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 V ac
Frequency	50-60 Hz
Current	8.0/4.0 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.

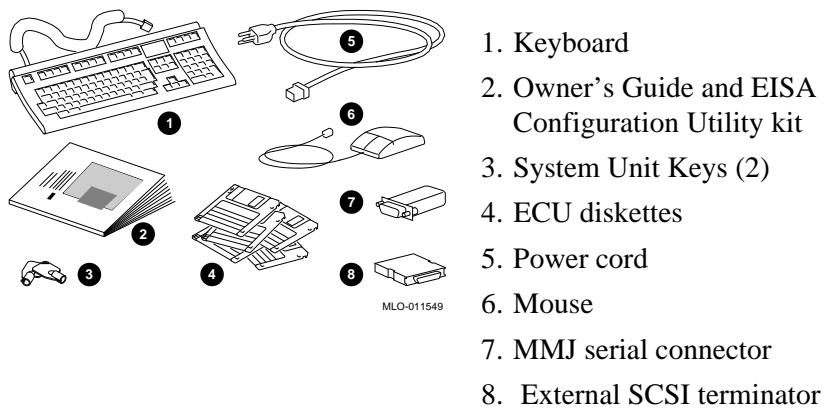
---



## System Accessories

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

**Figure 2-2: System Accessories**



## Installing Your Hardware

**Table 2–3: System Accessories**

<b>Accessory</b>	<b>Description</b>
Keyboard	PS/2-style
<i>Owner's Guide</i>	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
External SCSI terminator	Terminates the SCSI bus at system rear

### **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**

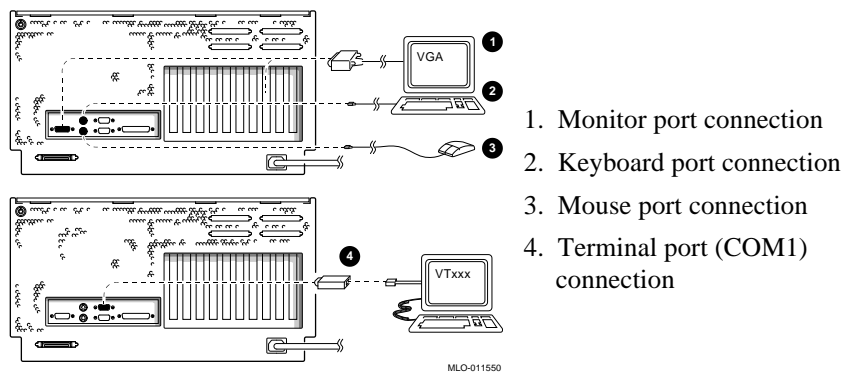
If you are using a keyboard, a mouse, or a printer, connect each to the appropriate connector at the rear of the system. Refer to Figure 1-3 to locate the connectors.

## **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.

## Installing Your Hardware

**Figure 2–3: Connecting a Monitor or a Terminal**

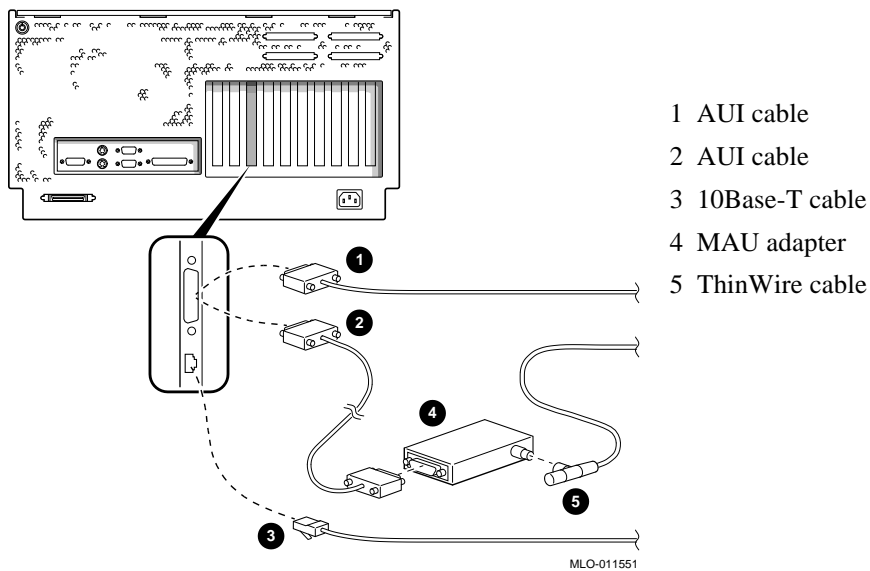


## Connecting to Network Hardware

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.

## Installing Your Hardware

**Figure 2–4 Network Connections**

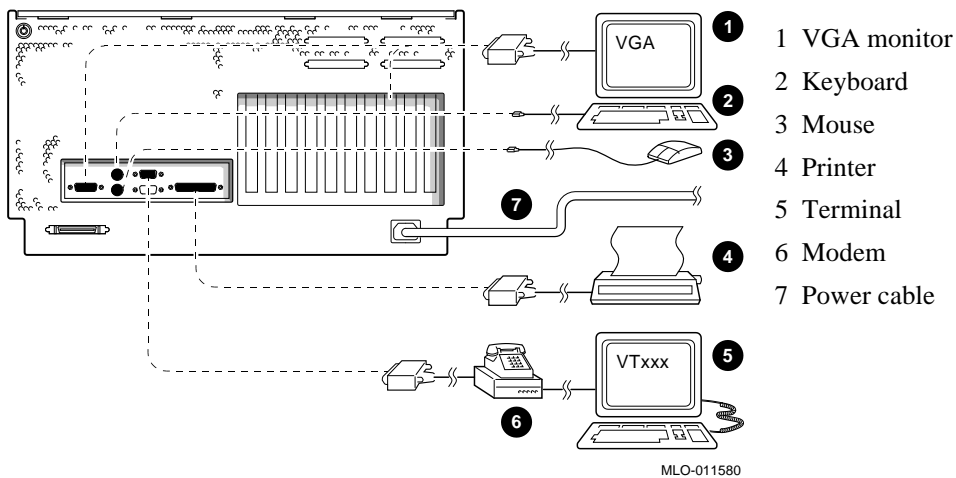


## Verifying Hardware Setup

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

## Installing Your Hardware

**Figure 2-5 External System Cabling**



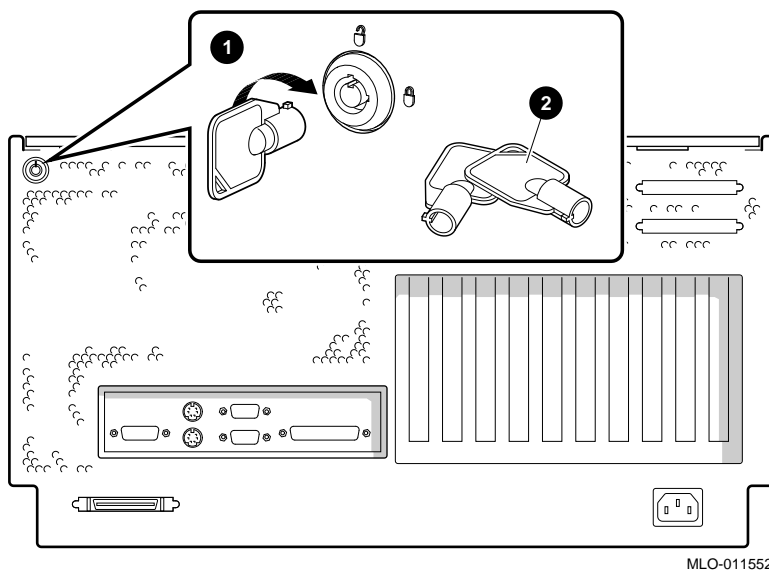
## Locking Your System

The system unit is protected by a key lock on the top cover which 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 cover and back 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.

## Installing Your Hardware

**Figure 2–6 System Lock and Key**

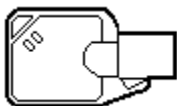


A latching loop on the rear panel of the system unit provides additional security and allows you to attach the system unit to a post or another fixed object.

### 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. Figure 2–7 shows the location of the key number on the system unit key.

**Figure 2–7 System Unit Key Number Location**



# 3

---

## Preparing to Install Your Operating System

### Introduction

This chapter covers the following topics:

- Preparing to Install Windows NT
- Preparing to Install DEC OSF/1
- Preparing to Install OpenVMS

These sections explain how to prepare for installing or upgrading:

- Windows NT Server or Workstation Version 3.5 or later
- DEC OSF/1 Version 3.0B or later
- OpenVMS Version 6.1-1H2 or later

If your system was shipped with preinstalled software, refer to the software documentation to start your operating system for the first time.

## Preparing to Install Your Operating System

# Preparing to Install Windows NT

### Preparing the System

1. Before you install the Windows NT operating system, make sure you have the following items:
  - Microsoft Windows NT ARC firmware for the AlphaServer 1000, Version 3.5-12 or later. The ARC firmware is a menu-driven utility to configure your system.
  - Microsoft Windows NT Server or Workstation Version 3.5 or later.
  - The EISA Configuration Utility (ECU) diskette for Microsoft Windows NT, Version 1.5 or later.
  - Digital Rackmount AlphaServer 1000 4/200 Cirrus Logic 542x Linear Installation Diskette for Windows NT, Version 3.5.
  - 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 your LAN administrator for the network information 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 4/200," and the screen displays initialization and testing information.
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
```



## Preparing to Install Your Operating System

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 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 1000 4/200 Drivers and Firmware Update diskette for Windows NT 3.5 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, which Windows NT uses to determine the correct drive and partition to boot from.

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).
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 the First 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.

## Preparing to Install Your Operating System

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 CDROM into your system's CDROM 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.
7. 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.
8. 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.

## Preparing to Install Your Operating System

9. 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.
10. Press the Enter key to format the partition. When the formatting is complete, press the Enter key again.
11. 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.
12. Type the larger of the two values at the "Enter size" prompt, then press the Enter key. The partition is created.
13. Press the Enter key to format the partition. When the formatting is complete, press the Enter key again.
14. 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.
15. 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.
16. Select "Partition 1" and press the Enter key. Your system is now prepared for installation of Microsoft Windows NT.
17. Select Exit and press the Enter key. Select Exit again and press the Enter key.

## Installing Microsoft Windows NT

---

### 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.

---

1. From the ARC Boot menu, select the Supplementary menu and press the Enter key. When the Supplementary menu displays, select "Install Windows NT from CDROM" and press the Enter key. At this point, installation of Windows NT begins.

## Preparing to Install Your Operating System

2. When prompted to select an Express or Custom installation, select "Custom installation."
3. Select "Fresh copy of Windows NT."
4. When prompted to identify the system type, select "Other." On the next screen, select "AlphaServer 1000."
5. When prompted, elect to change the display driver. Insert the Digital AlphaServer 1000 4/200 Cirrus Logic 542x Linear Installation diskette for Windows NT Server into the diskette drive, then select "Other."
6. Select "Cirrus Logic 542x Linear" and press Enter.
7. From this point, installation proceeds normally. Follow the prompts on the screen to complete the installation.

## Preparing to Install DEC OSF/1

Before you install DEC OSF/1 on your system, make sure you have the following:

- DEC OSF/1 Version T3.0B-2 or later
- SRM console firmware, Version 1.0 or later
- EISA Configuration Utility (ECU) diskette for DEC OSF/1 and OpenVMS.

Before you start the installation, be sure to review the DEC OSF/1 release notes for Version 3.0 ("General Installation") and refer to the DEC OSF/1 installation guide for Version 3.0 for further information.

## 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 4/200," 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 and you can proceed to the next section, "Installing DEC OSF/1."  
  
If the system booted directly into the ARC Boot menu, and you do not see the >>> prompt, you must 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 or OSF console." This allows you to select your operating system console.
6. Select your operating system, then select "Enter" on the Setup menu.

## Preparing to Install Your Operating System

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 DEC OSF/1 and OpenVMS firmware is loaded and the system is initialized, the system displays the SRM console prompt (>>>).

### Installing DEC OSF/1

To install the DEC OSF/1 operating system from a CDROM, perform these steps:

1. Place the CDROM containing the operating system into the CDROM drive on your server.
2. Enter the following command at the DEC OSF/1 and OpenVMS (SRM) console prompt to determine the unit number of the drive for your device:

```
>>> show device
```

3. The `show device` command displays output similar to this example:

#### Example 3-1: The `show device` Command Display

```
dka400.4.0.6.0      DKA400      RRD43  2893
dva0.0.0.1         DVA0
ewa0.0.0.13.0     EWA0        08-00-2B-3E-B6-C8
pka0.7.0.6.0      PKA0        SCSI Bus ID 7
```

4. When the system displays the device table, look for the line with the CDROM device string, RRD43, which indicates the CDROM device. The device boot string for your system, which begins with the letters DKA, appears in that line. In the example, the device boot string is DKA400.
5. Enter the `boot` command and the appropriate boot device string for your system. For example:

```
>>> boot DKA400
```

### Installing DEC OSF/1 with Remote Installation Service

Remote Installation Service (RIS) is a tool that allows remote installation of DEC OSF/1 to Alpha systems over a local area network. Before you attempt to install the DEC OSF/1

## Preparing to Install Your Operating System

operating system using Remote Installation Service, be sure to refer to the DEC OSF/1 Version 3.0 manual, *Sharing Software on a Local Area Network*, for information about how to set up a RIS area.

---

### NOTE

---

#### Restriction for ULTRIX Systems

You should be aware of the following restriction when considering installation of DEC OSF/1 with Remote Installation Service.

DEC OSF/1 Version T3.0B-2 does not support RIS installation through the LANCE Ethernet (1n) interface from an ULTRIX server. However, you can install DEC OSF/1 Version T3.0B-2 from a DEC OSF/1 server through the LANCE Ethernet interface.

---

### Disk Space Requirements

The RIS area for DEC OSF/1 Version T3.0B-2 requires approximately 387 megabytes of disk space.

### Products to Install

You must install the ALPHA/BASE product in the RIS area from the DEC OSF/1 Version T3.0B-2 kit for the software to work correctly.

### Setting Up a RIS Area on a DEC OSF/1 Server

In addition to the information provided in the *Sharing Software on a Local Area Network* manual for the DEC OSF/1 operating system, the following notes apply specifically to setting up a RIS area on a DEC OSF/1 server.

If you are using a RIS server that is running DEC OSF/1 Version 1.2, 1.2A, 1.3, 1.3A, or 1.3B, you must perform the following step before you install DEC OSF/1 Version T3.0B-2 on a client. Because DEC OSF/1 Version T3.0B-2 client systems access part of the kit from the server using NFS, you must make sure that the appropriate NFS server capabilities are enabled on the RIS server. (See the `nfssetup(8)` reference page.)

Before you install clients, add the following line to the client `/etc/exports` file for each RIS area that your server is serving to DEC OSF/1 clients. The `/etc/exports` entry includes a path name to the kit directory in the RIS area; there must be no symbolic links in this path name. Entries in the `/etc/exports` file can have either of the following formats:

## Preparing to Install Your Operating System

- If your server's `var` area is separate from the `usr` area, there will be a symbolic link to it at `/usr/var`. In this case, add a line similar to the following to the `/etc/exports` file:

```
/var/adm/ris/ris2.zips/kit -r=0 -o
```

In the previous example, `ris2.zips` is the product area where the RIS DEC OSF/1 Version T3.0B-2 is installed.

- If your `var` area is part of your `usr` area, add a line similar to the following to the `/etc/exports` file:

```
/usr/var/adm/ris/ris2.zips/kit -r=0 -o
```

In the previous example, `ris2.zips` is the product area where the RIS DEC OSF/1 Version T3.0B-2 kit is installed.

### Setting Up a RIS Area on an ULTRIX Server

The information in this section applies specifically to setting up a RIS area on an ULTRIX server. Refer to the instructions for setting up such a RIS area in the *Sharing Software on a Local Area Network* manual.

When you use an ULTRIX RIS server for DEC OSF/1 Version T3.0B-2, you must issue some additional commands before clients can boot the software. Use the RIS install software option to extract or link to the DEC OSF/1 Version T3.0B-2 kit. Then, perform the following steps.

---

#### Note

---

In the following command lines, *n* is the number of the directory where the product is installed on the ULTRIX server, for example, `ris0.mips`.

---

1. Move to the directory where the product was installed:  

```
# cd /var/adm/risn.mips
```
2. Extract the ROOT files and create the directory structure required for DEC OSF/1 clients:

```
# restore xf */ROOT ./RisFiles
```

```
# /usr/bin/sh5 RisFiles Extract */ROOT
```

You must also add the following line to the client `/etc/exports` file before you can install DEC OSF/1 Version T3.0B-2 on a client. Because DEC OSF/1 Version T3.0B-2 client systems access part of the kit from the server using NFS, you must make sure that the appropriate NFS server capabilities are enabled on the RIS server. (See the `nfsssetup(8)` reference page.)



## Preparing to Install Your Operating System

Before you install clients, add the following line to the client `/etc/exports` file for each RIS area that your ULTRIX server is serving to DEC OSF/1 clients. The `/etc/exports` file can have either of the following formats.

- If your server `var` area is separate from the `usr` area, there will be a symbolic link to it at `/usr/var`. In this case, add a line similar to the following to the `/etc/exports` file:

```
/var/adm/ris/ris2.zips/kit -r=0 -o
```

In the previous example, `ris2.zips` is the product area where the RIS DEC OSF/1 Version T3.0B-2 is installed.

- If your `var` area is part of your `usr` area, add a line similar to the following to the `/etc/exports` file:

```
/usr/var/adm/ris/ris2.zips/kit -r=0 -o
```

In the previous example, `ris2.zips` is the product area where the RIS DEC OSF/1 Version T3.0B-2 kit is installed.

### Updating the Boot File for New Clients

After you have registered each client, you must add the appropriate node for each one. Use the following `addnode` command for ULTRIX servers:

```
# addnode <hostname> -t /user/var/adm/ris/risn.mips
```

The `ris0.mips` location is the area into which the product was installed in "Setting Up a RIS Area on an ULTRIX Server."

### Before Starting the Boot Procedure

Before you start the boot procedure, perform the following steps:

1. Clear the `boot_osflags` variable. This ensures that the correct kernel file boots automatically.  

```
>>> set boot_osflags
```
2. Set the `auto_action` variable to `halt`. This halts the system at the SRM console prompt each time it is turned on, when it crashes, or when you press the Halt switch.  

```
>>> set auto_action halt
```
3. Set the `boot_file` variable. This ensures that an alternate boot file is not set.  

```
>>> set boot_file
```

## Preparing to Install Your Operating System

### Booting over a Network

To boot your server over a network, make sure it is registered as a client on a RIS server. See the *Sharing Software on a Local Area Network* manual for information about registering a client. Note that the client must be on the same subnet as the server.

Set your device protocols to allow booting from either a DEC OSF/1 server or an ULTRIX server.

To boot from a DEC OSF/1 server, see the next section, "Booting from a DEC OSF/1 Server." To boot from an ULTRIX server, see the section, "Booting from an ULTRIX Server."

### Booting from a DEC OSF/1 Server

Use the `show device` command at the SRM console prompt to determine which network adapter your server is using. The network adapter will have a value such as `ewa0` or `era0`.

```
>>> show device
```

The `show device` command displays output similar to Example 3-2:

#### Example 3-2: The `show device` Command Display

```
dka400.4.0.6.0          DKA400      RRD43  2893
dva0.0.0.1             DVA0
ewa0.0.0.13.0         EWA0        08-00-2B-3E-B6-C8
pka0.7.0.6.0          PKA0        SCSI Bus ID 7
```

Use the following command syntax to boot your system over the network:

```
set device_protocols bootp
```

For example, if the device you are booting from with the bootp protocol is `ewa0`, enter the commands in Example 3-3:

## Preparing to Install Your Operating System

### Example 3–3: Bootp Protocol ewa0

```
>>> set ewa0_inet_init
>>> set ewa0_protocols bootp
>>> boot -fi "" ewa0
```

### Booting from an ULTRIX Server

Use the `show device` command at the SRM console prompt to determine which network adapter your server is using. The network adapter will have a value such as `ewa0` or `era0`.

```
>>> show device
```

The `show device` command displays output similar to Example 3–4:

### Example 3–4: The show device Command Display

```
dka400.4.0.6.0      DKA400      RRD43  2893
dva0.0.0.1         DVA0
ewa0.0.0.13.0      EWA0        08-00-2B-3E-B6-C8
pka0.7.0.6.0      PKA0        SCSI Bus ID 7
```

Use the following command syntax to boot your system over the network:

```
set device_protocols mop
```

For example, if the device you are booting from with the mop protocol is `ewa0`, enter the commands in Example 3–5:

### Example 3–5: Mop Protocol ewa0

```
>>> set ewa0_protocols mop
>>> boot "" ewa0
```

### Verifying the Installation

To verify that you installed all the correct elements from the DEC OSF/1 Version T3.0B-2 kit, check the DEC OSF/1 revision level in the `/etc/motd` file. The correct version strings are as follows:

```
DEC OSF/1 T3.0B-2(Rev.347.45); Fri Sept 16 11:07:49 EDT 1994
```

## Preparing to Install Your Operating System

# Preparing to Install OpenVMS

## Preparing the System

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

- OpenVMS operating system, Version 6.1-1H2 or later
- SRM console firmware, Version 1.0 or later
- EISA Configuration Utility (ECU) diskette for DEC OSF/1 and OpenVMS.

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 AXP Version 6.1 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 the section, "Basic Operation" in this guide, if necessary.
3. Set up your system to record the installation procedure on either a terminal or a printer attached to the console terminal. If you do not do this, screen messages will be lost. You should record a transcript of screen messages to refer to in case there is a problem 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 4/200" and the system displays initialization and testing information.

## Preparing to Install Your Operating System

2. Press the Enter key. If the screen displays a triple arrow prompt (>>>), you booted the SRM console and you can proceed to the next section.

If the system booted directly into the ARC Boot menu, and you do not see the >>> prompt, you must 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 or OSF 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 DEC OSF/1 and OpenVMS firmware is loaded and the system is initialized, the system displays the SRM console prompt (>>>).

### 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. Refer to the most recent OpenVMS operating system cover letter or release notes, or contact your service representative to determine whether your system is running the required or recommended version of PALcode.
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

Use the OpenVMS CDROM to install or upgrade the operating system, or to perform operations such as backing up the system disk.



# 4

---

## Basic Operation

### Introduction

This chapter explains how to start and stop your system, issue console commands, and operate other basic system functions. It 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 you set up the hardware and made all necessary connections, as described in the Hardware Installation chapter.

## Basic Operation

# Turning the System On

### Systems with Preinstalled Software

Your server may be shipped with preinstalled operating system software. If your system displays the SRM console prompt (>>>) after starting up, you can verify which operating system is installed by typing this command:

```
>>> show os_type
```

If operating system software is preinstalled, the resulting display indicates one of three operating systems: Microsoft Windows NT, DEC OSF/1, or OpenVMS.

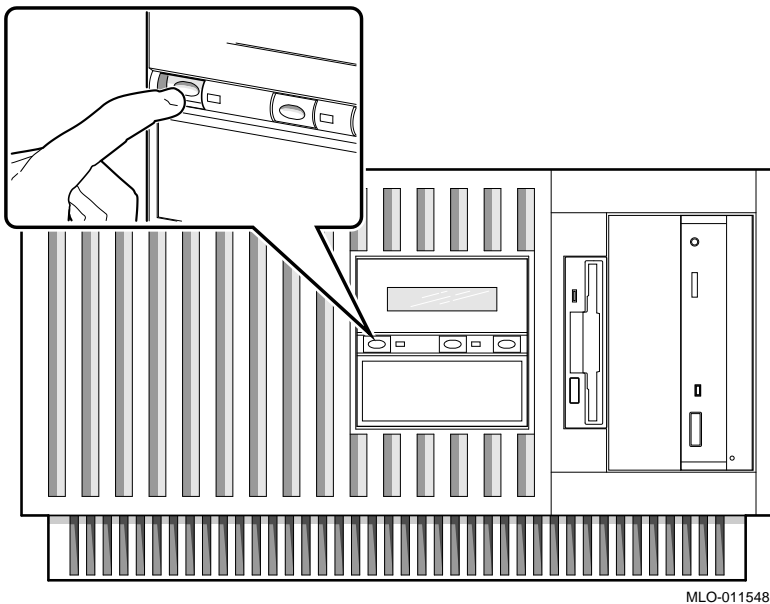
If your system displays the Windows NT (ARC) console instead after starting up, you can verify which operating system was installed by switching to the SRM console and entering the `show os_type` command. Refer to "Switching to the DEC OSF/1 and OpenVMS (SRM) Console" in this section.

To turn on a system that has the operating system already installed, perform these steps:

1. Make sure the top cover of the system unit enclosure is in place. The system will not start if the cover is not in place.
2. Plug the power cord into a wall outlet.
3. Turn on any external options that are connected to the system, such as monitors or terminals, or expansion boxes that house storage devices.
4. Press the On/Off switch on the front of the unit. The green On/Off indicator on the front of the system will light.
5. 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**



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 4/200." By default, the screen displays the SRM console prompt (>>>).

6. If you encounter a problem, verify that you correctly performed steps 1 through 4. Refer to Chapter 8, "Troubleshooting" for additional information.

### **Systems without Preinstalled Software**

To turn on a system that has no operating system installed, perform these steps:

1. Connect any external options, such as monitors or terminals or expansion boxes that house storage devices.
2. Make sure the top cover of the system unit enclosure is in place. The system will not start if the cover is not in place.
3. Plug the power cord into a wall outlet.

## Basic Operation

4. Turn on any external options that are connected to the system.
5. Press the On/Off switch on the front of the system unit. The switch stays depressed in the "on" position. The green On/Off indicator on the front of the system lights.

The screen on your monitor or terminal displays test codes and initialization messages. When the startup procedure completes, the operator control panel displays the message "Model 4/200." By default, the screen displays the SRM console prompt (>>>).

6. At this point you may have to perform one or all of the following tasks, depending on the startup display messages and the operating system you choose to run:
  - Run the EISA Configuration Utility.
  - Check required environment variable settings.
  - Change the way your system powers up or boots.
  - Verify your configuration.

Refer to the section "Booting the Operating System" in this chapter for more information on each of these tasks.

7. Install the operating system. (Refer first to Chapter 3, "Preparing to Install an Operating System" and then refer to your operating system documentation.)
8. Reboot the system by pressing the Reset button.
9. If you encounter a problem, verify that you correctly performed steps 1 through 8. Refer to Chapter 8, "Troubleshooting" 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 reset a window without losing an application.

---

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.
3. Turn off all external options that are connected to 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 controller.

## Accessing the System from a Remote Location

If you are running the DEC OSF/1 or OpenVMS 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:

1. Connect to your system from the remote location.
2. Shut down the operating system. (Refer to the operating system documentation, if necessary.)
3. When the shutdown has completed, press Return.

The system displays the SRM console prompt (>>>).

## Basic Operation

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.

---

### Note

---

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

---

## Interpreting Startup Messages

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

- 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 DEC OSF/1 or OpenVMS systems) on your monitor or terminal screen

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 4/200
```

During the startup sequence, the startup display scrolls on your monitor or terminal screen. To stop the display from scrolling, press Ctrl/S. To resume scrolling, press Ctrl/Q. The system startup display looks similar to the following example:

The operating system determines whether your system displays a Boot menu (for the Windows NT operating system) or a console prompt (for DEC OSF/1 and OpenVMS operating systems) after the startup display. 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 the "Troubleshooting" section of this guide 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

```
ARC Multiboot Alpha AXP Version n.nn
Copyright (c) 1993 Microsoft Corporation
Copyright (c) 1993 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.

### Systems with DEC OSF/1 or OpenVMS

If you are using the DEC OSF/1 or OpenVMS operating systems, the SRM console prompt displays after the system startup display. The prompt looks like this:

```
>>>
```

To display any messages that scrolls by, enter the `cat e1` command at the prompt. To stop scrolling, press `Ctrl/S`. To resume scrolling, press `Ctrl/Q`.

The following example shows the startup display and SRM console prompt for systems running DEC OSF/1 or Open VMS.

## Basic Operation

### Example 4–2: DEC OSF/1 or Open VMS SRM Startup Display

```
BIOS Emulation V1.07
Copyright (c) 1993-1994 Digital Equipment Corporation
All Rights Reserved
Patent Pending
eb.....ea.e9.e8.e7.e6.e5.e4.e3.e2.e1.e0.
X3.3-1476, built on Oct  4 1994  at 14:48:51
>>>
```

### Reading the Startup Test Results

The Windows NT startup test display indicates successful tests with the word *passed*. It indicates tests that fail with the word *failed* and an error code.

The DEC OSF/1 or OpenVMS startup test display indicates successful tests with the word *OK*. It indicates tests that fail with double question marks (??) and an error code.

#### If the System Passes Startup Tests

If the system passes the startup tests, it either boots the selected operating system or 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, refer to the Troubleshooting section of this guide.

---

#### Note

---

When the startup tests fail, the system ignores the `os_type` setting and enters the DEC OSF/1 or OpenVMS console automatically. If the `os_type` setting is set to NT when the system fails, it returns to the Windows NT firmware when you correct the error.

---

## Using the Consoles

You use the Windows NT (ARC) console and the DEC OSF/1 or OpenVMS (SRM) console to perform different tasks. For example, the EISA Configuration Utility (ECU) runs only from the Windows NT console, and ROM-based diagnostics (such as the `test` command) run only from the DEC OSF/1 or OpenVMS console, regardless of the operating system 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 DEC OSF/1 or OpenVMS operating system, you can also invoke console mode by pressing the Halt switch on the operator control panel.

---

#### Caution

---

If you are running DEC OSF/1 or OpenVMS operating systems, press the Halt switch only after you have shut down the operating system using the correct shutdown procedure.

---

The Halt switch halts the Windows NT operating system; you must then press the Reset switch to completely reboot the firmware.

### 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 DEC OSF/1 or OpenVMS 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 DEC OSF/1 or OpenVMS (SRM) console:
  - Test the system (other than self-tests at system startup)
  - Examine and verify options that are recognized by the system
  - Set or change some environment variables, such as Ethernet device type and speed for Fast SCSI devices

## Basic Operation

### Switching to the DEC OSF/1 and OpenVMS (SRM) Console

To switch from the Windows NT (ARC) console to the DEC OSF/1 and OpenVMS (SRM) console, perform these steps:

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 or OSF console." This allows you to select your operating system console.
4. Select your operating system, then 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.

These steps load the firmware. Once the DEC OSF/1 or OpenVMS 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 DEC OSF/1 or OpenVMS (SRM) console to the Windows NT (ARC) console, type the following command at the console prompt:

```
>>> arc
```

This command loads the firmware. Once the Windows NT firmware loads and the system initializes, the system displays the Windows NT Boot menu.

### 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

## Basic Operation

### DEC OSF/1 or OpenVMS (SRM) Console Commands

There are two levels of DEC OSF/1 and OpenVMS (SRM) console commands:

- Basic
- Comprehensive

#### Basic Commands

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

#### 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.

---

#### Note

---

When you enter a command that results in a lengthy screen display, you can use this format to limit the screen display to 23 lines at a time:

```
>>> cat el | more
```

---

**Table 4–1: Basic SRM Console Commands**

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

## 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.

## Basic Operation

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 4-3 shows a partial Setup menu display with the help menu item selected (shown in bold).

#### Example 4–3: Setup Menu

```
ARC Multiboot DEC Version  n.nn      Thursday, 6-10-
                                1994 9:49:50 PM
    Copyright (c) 1991, 1992 Microsoft Corporation
    Copyright (c) 1993  Digital Equipment Corporation

                                Setup menu:
                                .
                                .
                                .
                                Reset system to factory defaults
                                Help
                                Switch to OpenVMS or OSF console
                                Supplementary menu, and do not save changes...
                                Use the arrow keys to select, then press Enter.
```

## Setup Menu Help

Example 4-4 shows the Setup menu help display.

### Example 4-4: 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. Setup 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 About the DEC OSF/1 and OpenVMS (SRM) Console

To get online help, enter `help` at the SRM console prompt. Example 4-5 shows the help command and the resulting display.

### Example 4-5: The help Command

```
>>> help
```

```
NAME
```

```
help or man
```

```
FUNCTION
```

```
Display information about console commands.
```

```
SYNOPSIS
```

## Basic Operation

help or man [<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	create
date	deposit	dynamic	echo	edit
eval	examine	exer	exit	false
find_field	fr_cmd	free	grep	hd
help or man	init	kill	line	ls
more	net	ps	rm	sa
semaphore	set	set host	shell	show
show cluster	show config	show hwrpb	show map	show me
show_iobq	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 the EISA Configuration Utility section of this guide for more information.

### Checking Required Environment Variable Settings

If you are running DEC OSF/1 or OpenVMS, you may 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`)

### 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 DEC OSF/1 or OpenVMS 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`

## Basic Operation

Table 4–3 lists the boot environment variables and their values, and briefly describes their effects.

**Table 4–3: Startup and Boot Environment Variables**

Operating System	Environment Variable	Value	Description
DEC OSF/1 OpenVMS	auto_action	Boot Halt Restart	Specifies the system default startup action. Applies only to the DEC OSF/1 and OpenVMS operating systems.
Windows NT	autoload	YES or NO	Specifies whether the Windows NT operating system should boot. Does not affect the OpenVMS or DEC OSF/1 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 DEC OSF/1 OpenVMS	os_type	NT OSF 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 DEC OSF/1 or Open VMS (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 DEC OSF/1 and OpenVMS Firmware

The system enters and remains in the DEC OSF/1 and OpenVMS firmware under these conditions:

- When `auto_action` is set to HALT and `os_type` is set either to OSF or VMS.
- When the startup tests fail, the system ignores the `os_type` setting and enters the DEC OSF/1 and OpenVMS 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 lists the ARC boot device names for devices installed in the system. For a more complete listing of the options that are recognized by your system, you may want to enter the DEC OSF/1 and OpenVMS commands described in the section "Viewing the System Configuration" in Chapter 6, "Configuring." To enter these commands, you must switch from the Windows NT (ARC) console to the DEC OSF/1 and OpenVMS (SRM) console. For information about switching to the DEC OSF/1 and OpenVMS (SRM) console, refer to "Switching to the DEC OSF/1 and OpenVMS (SRM) Console" earlier in this section.

---

### Note

---

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

---

## Basic Operation

### DEC OSF/1 or OpenVMS Systems

Use these SRM console commands to verify system configuration for DEC OSF/1 or OpenVMS systems.

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

### Booting Windows NT

When the system ships with the Microsoft Windows NT operating system installed, 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 4–6 shows the Windows NT Boot menu.

#### Example 4–6: Windows NT Boot Menu

```
ARC Multiboot Alpha AXP Version n.nn  
Copyright (c) 1993 Microsoft Corporation  
Copyright (c) 1993 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.

## Basic Operation

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. You choose "Supplementary menu" from the Boot menu and then "Manage boot selection menu" to access the Boot selection menu. The following example shows the Windows NT Boot selection menu.

**Example 4–7: Windows NT Boot Selection Menu**

```
ARC Multiboot Alpha AXP Version n.nn
Copyright (c) 1993 Microsoft Corporation
Copyright (c) 1993 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 DEC OSF/1 or OpenVMS Operating Systems**

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

- For more information on preinstalled DEC OSF/1 software, see the DEC OSF/1 AXP Factory Installed Software user information card.
- For more information on preinstalled OpenVMS software, see the OpenVMS Factory Installed Software user information card.

When the system is shipped with DEC OSF/1 or OpenVMS 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.

**DEC OSF/1 and OpenVMS System Defaults**

The DEC OSF/1 and OpenVMS 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."

## Basic Operation

### Boot Command

Use this command to boot either the DEC OSF/1 operating system or the OpenVMS 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" earlier in this chapter.

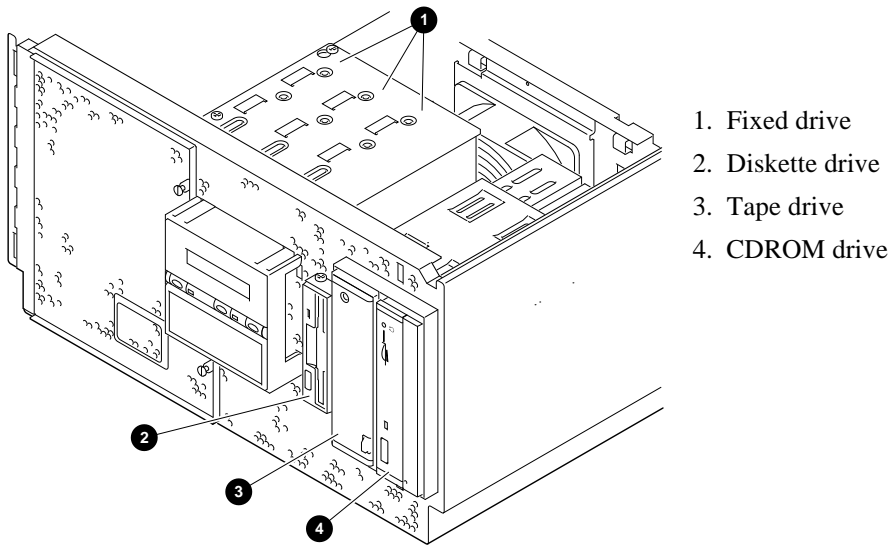
## Using Storage Drives

Mass storage drives are devices that store large amounts of data for extended periods. The system accommodates the following types of storage devices, shown in Figure 4-2:

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

The drives are located in compartments inside your system as shown in Figure 4-3.

**Figure 4-2: Location of Storage Devices**



MLO-011568

## Using a Diskette Drive

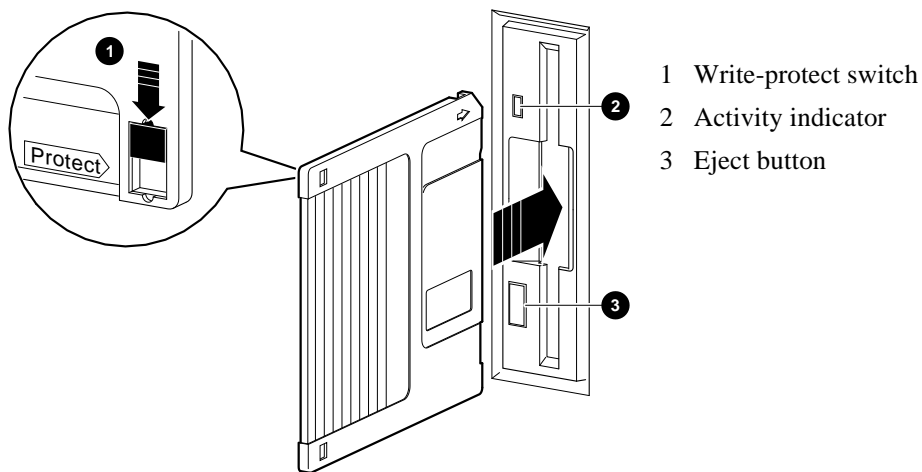
Diskette drives read information from removable diskettes. One diskette drive is located to the left of the removable-media mass storage compartment, below the CDROM drive. The diskette drive components are shown in Figure 4-3.

### 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**



MLO-011553

### To remove a diskette:

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

## Using a CDROM Drive

CDROM drives read information from removable CDROMs (read-only compact discs). Your system uses a CDROM drive that has an automatic loading/ejection feature

## Basic Operation

that functions only when power is supplied. Figure 4-4 shows the components of a CDROM drive.

---

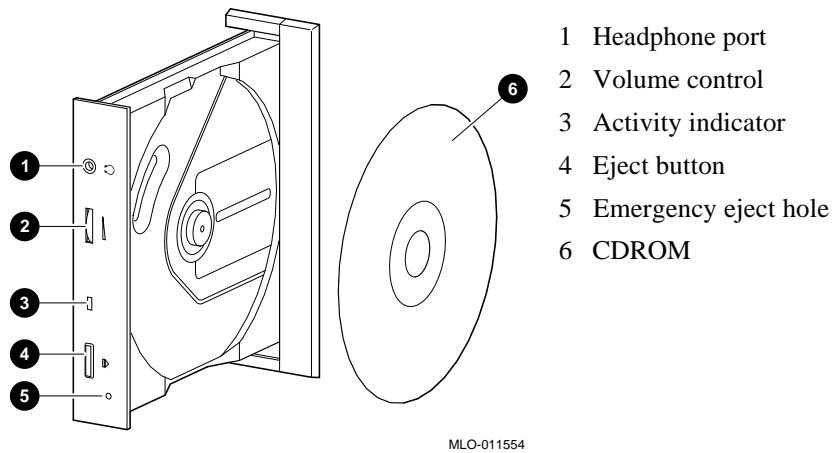
### Caution

---

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

---

**Figure 4-4: CDROM Drive Components**



### To insert a disc into the drive:

1. Press the CDROM drive Eject button (4 in the figure). The CD caddy ejects.
2. Load the CD into a caddy (6 in the figure).
3. Push the caddy into the CDROM drive.

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



### To remove a CD from the drive:

1. Press the drive Eject button (4 in the figure). The CD ejects.
2. Gently pull the caddy from the CDROM 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,<sup>1</sup> into the Emergency Eject hole (5 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 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.

### 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.

---

<sup>1</sup>Use a bar less than 2.0 mm in diameter. To avoid damage to the CDROM drive, do not insert the bar more than 1 in (25 mm).

## Basic Operation

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. Topics covered in this chapter are listed below:

- 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 "Removing/Replacing Other Options" should be handled by qualified service personnel only.

---

## Installing and Removing Components

### 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 antistatic 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 screwdriver
- Antistatic wrist strap
- Replacement option board kit or device kit, if necessary

#### Antistatic Precautions

When you handle internal system components, use an antistatic wrist strap 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 Cover

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

### Removing the Top Cover

To remove the top cover (Figure 5-5):

---

#### Caution

---

Make sure the system unit On/Off switch is in the "off" position before you remove the system cover and 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 cover and do not turn off the system.

---

#### Note

---

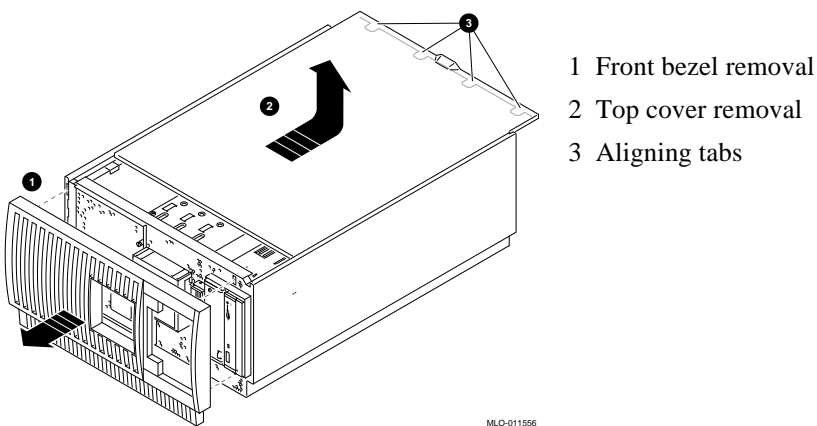
Wait at least 15 seconds to allow time for the power supply capacitors to discharge safely.

---

4. Turn the lock to the *left* to *unlock* the system unit.
5. Grasp the finger groove at the rear of the top cover and pull the top cover straight back (about four inches). Lift up on the cover.

## Installing and Removing Components

**Figure 5-5: Removing the Top Cover**



## Replacing the Top Cover

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

1. Align the top cover with the top of the side panels and slide the cover gently onto the unit from the rear.
2. Lock the top cover 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 5-6 shows the four memory banks and their memory module connectors.

## Installing and Removing Components

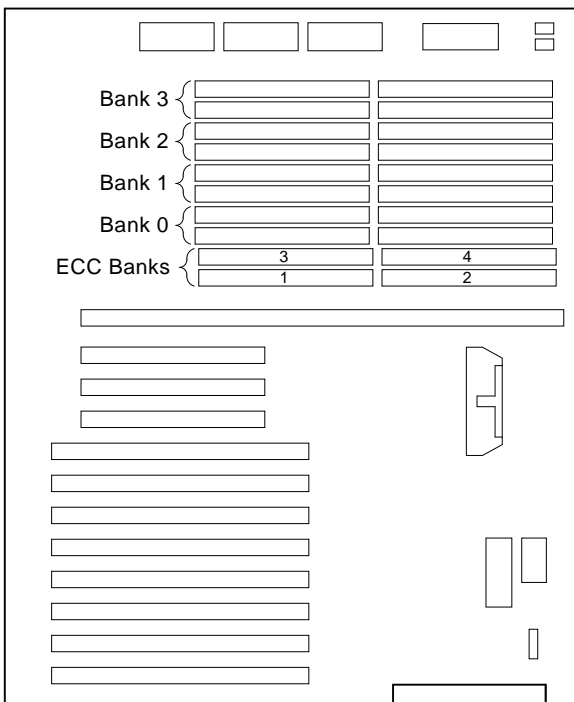
Remember these rules when you install memory modules:

- 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 four sizes of memory options: 16-, 32-, 64-, and 128-megabytes. Using combinations of these four memory options, the system supports between 16 to 512 megabytes of memory.

## Installing and Removing Components

**Figure 5–6: Memory Banks and Connectors**



MLO-011558

## Removing Memory Modules

---

### Caution

---

Static electricity can damage electronic components. Use an antistatic wrist strap 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 you remove.

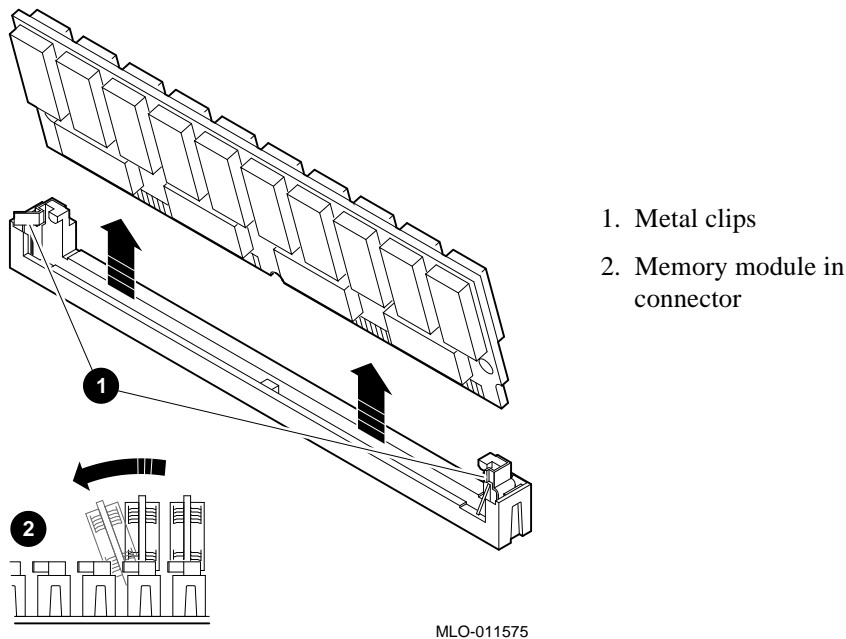


## Installing and Removing Components

Figure 5–7 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. You may want to use a screwdriver to press back on the metal clips.

**Figure 5–7: Removing a Memory Module**



### 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 5–8 and perform these steps:

## Installing and Removing Components

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 5–8).
2. Reinstall any memory modules you removed for access.
3. Replace the system covers following the procedures in "Replacing the System Unit Covers."
4. Test the memory configuration using these commands:  

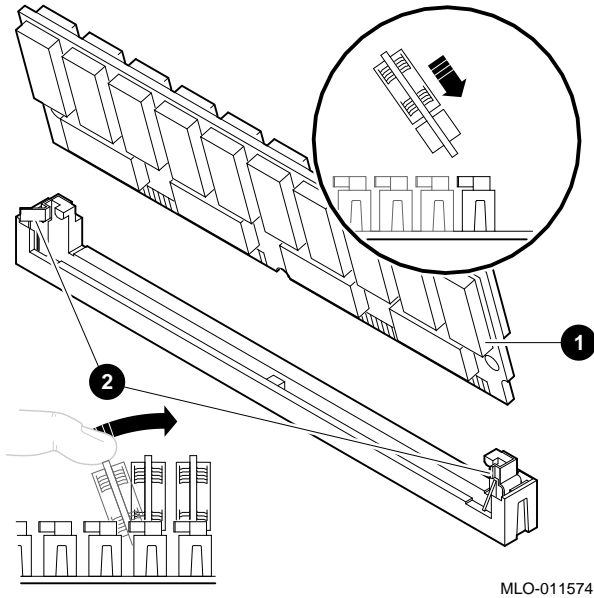
```
>>> show memory
```

```
>>> test memory
```

For more information, see the section, "Configuring Memory" in Chapter 6, "Configuring."

**Figure 5–8: Installing a Memory Module**



## EISA, ISA, and PCI Option Cards

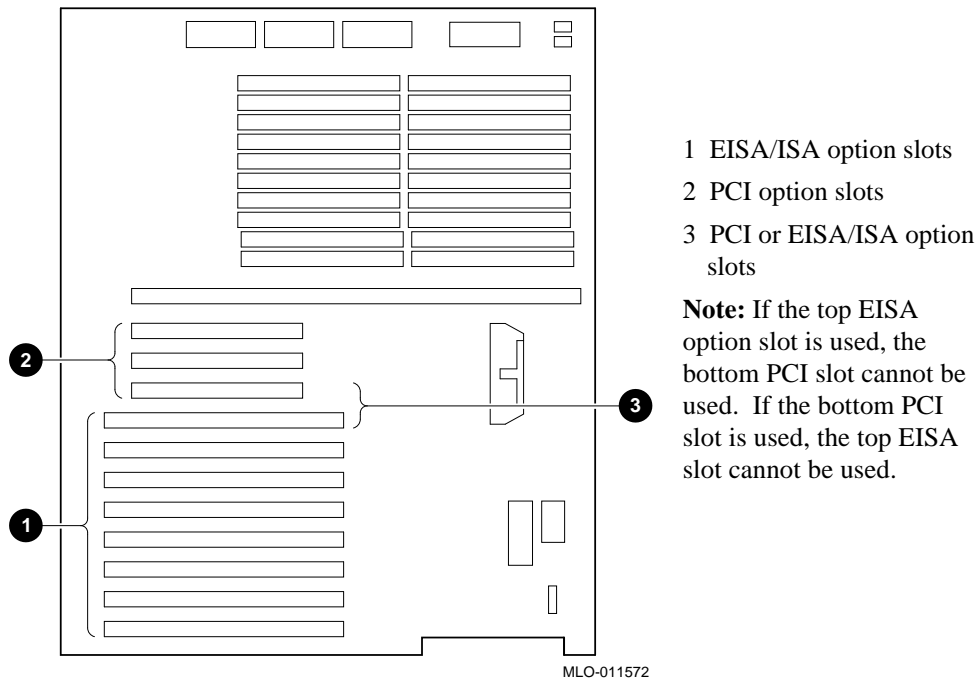
For a description of available system options, see the section, "Upgrade Options," in Chapter 7, "Upgrading."

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 5–9 shows the option card slots on the system board.

**Figure 5–9: EISA, ISA, and PCI Slots on the System Board**



## Installing and Removing Components

### Installing an Option Card

To install an EISA, ISA, or PCI option card on the system board, refer to Figure 5–10 and Figure 5–11, 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

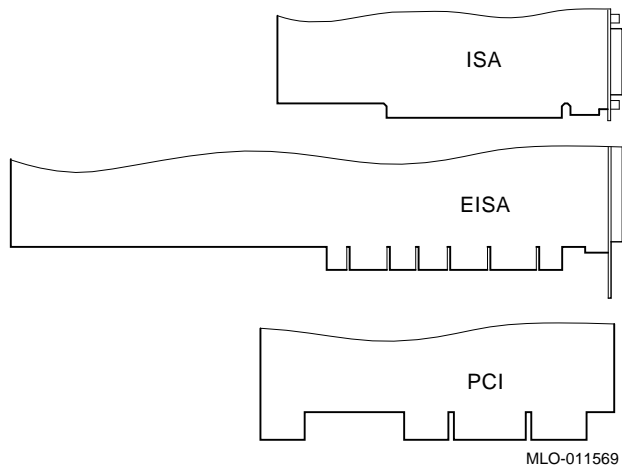
---

Static electricity can damage electronic components. Use an antistatic wrist strap when you handle these components. (See "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 5–10 shows the three kinds of option cards.

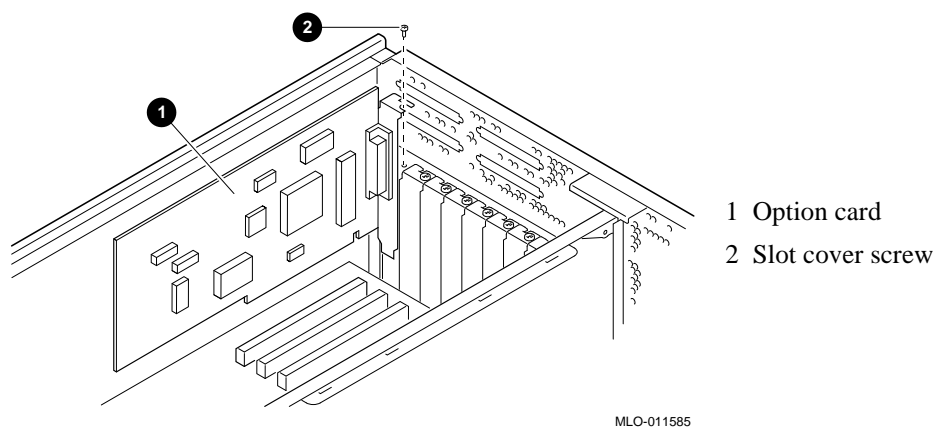
**Figure 5–10: EISA, ISA, and PCI Option Cards**



## Installing and Removing Components

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

**Figure 5–11: Installing or Removing an Option Card**



## Installing and Removing Components

### Removing an Option Card

To remove an EISA, ISA, or PCI option card from the system unit, refer to Figure 5–11 and perform these steps:

---

**Caution**

---

Static electricity can damage electronic components. Use an antistatic wrist strap when you handle these components.

---

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 Cover," 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 Cover."

---

## Installing and Removing Components

**Table 5–1: Testing with the show config Display**

Step	Action	Result
1	Enter the <code>show config</code> 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."
3	Verify the device name of the new option.	You must know the device name to run diagnostic tests on the option. Enter the <code>show device</code> command to see the device name.
4	Run a self-test on the option by entering the <code>test</code> command followed by its device name.	If the self-test passes, the system displays the word OK (6) before it displays the console prompt ( <code>&gt;&gt;&gt;</code> ). If the system displays a failure message, see "Troubleshooting."

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

### Example 5–1: The show config Display

```
Digital Equipment Corporation
```

```
Alpha AXP (tm) Server
```

```
SRM Console x3.7-239 VMS PALcode x5.48-49, OSF PALcode x1.35-34
```

#### MEMORY

```
64 MB of System Memory
```

```
Bank 0 = 32 MB (8 MB per SIMM) starting at 0x00000000
```

```
Bank 1 = 32 MB (8 MB per SIMM) starting at 0x20000000
```

```
Bank 2 = No Memory Detected
```

```
Bank 3 = No Memory Detected
```

## Installing and Removing Components

```
AlphaServer 1000 Serial ROM version:    x0.6
```

### PCI BUS

```
Bus 00 Slot 06:  NCR    810 SCSI  Controller
Bus 00 Slot 07:  INTEL  8275EB PCI to EISA Bridge
Bus 00 Slot 11:  Digital DE435 Network Controller
```

### EISA BUS

```
Slot 3    DEC4220      era0.0.0.3.1  08-00-2B-35-F5-24
Slot 6    CPQ30110
```

## 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" for more information.

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

## Storage Devices

The system unit is designed to accommodate multiple SCSI devices, including a CDROM 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").

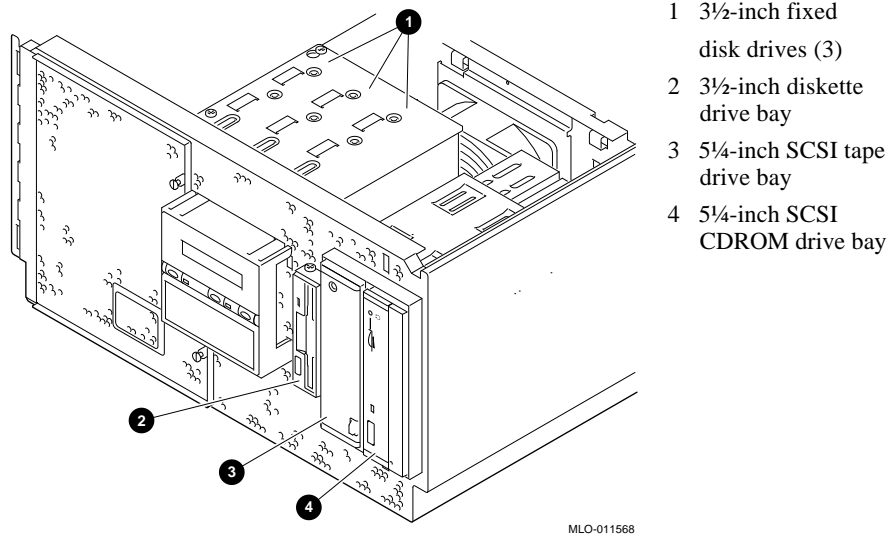


## Installing and Removing Components

### Identifying the Drive Bays

The system contains six storage drive bays, shown in Figure 5-12.

**Figure 5-12: System Drive Bays**



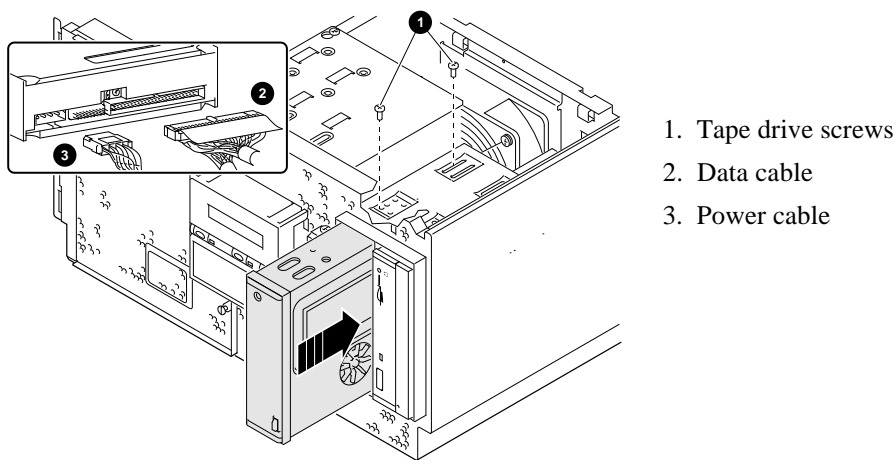
## Installing and Removing Components

### Installing Externally Accessible Devices

To install or replace a tape drive (Figure 5–13), 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 CDROM drive. See the section, "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 5–13: Installing a Tape Drive**



MLO-011579

## Installing and Removing Components

### Removing Externally Accessible Devices

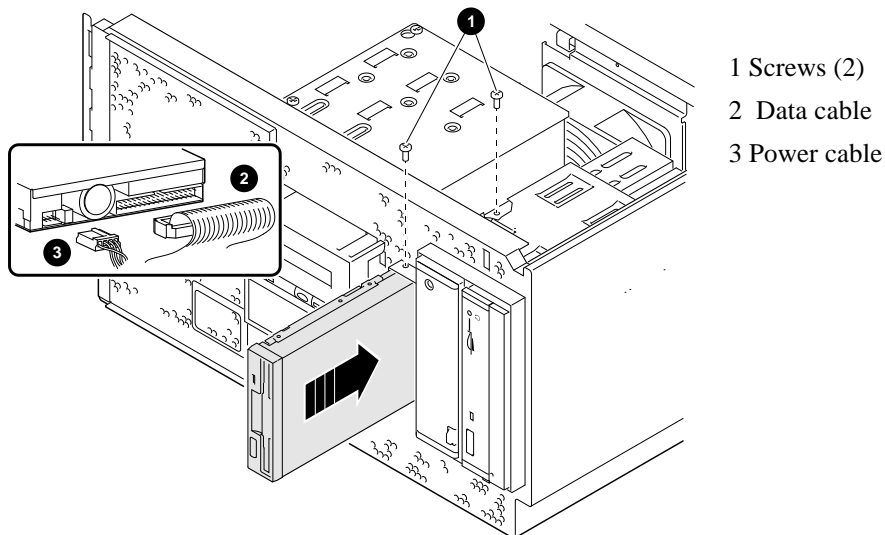
To remove a tape drive, reverse the order of steps 3 through 7 in the installation procedure.

### Installing a Diskette Drive

To replace a 3 1/2-inch diskette drive, refer to Figure 5-14 and perform these steps:

1. Remove the original diskette drive.
2. Locate the ID select switch toward the rear on the righthand 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 5-14: Replacing or Installing a Diskette Drive**



MLO-011581

## Installing and Removing Components

### Removing a Diskette Drive

To remove the diskette drive, reverse steps 3 through 5 in the installation procedure, and refer to Figure 5-14.

### 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.

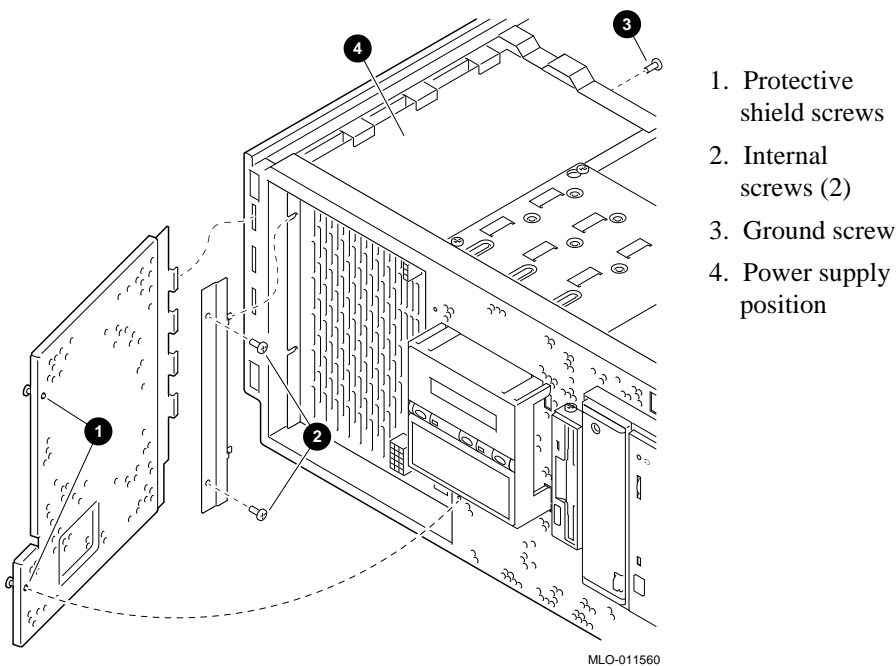
### Power Supply

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

#### Removing and Installing the Power Supply

To install the power supply (Figure 5-15), perform these steps:

**Figure 5-15: Installing the Power Supply**



MLO-011560

## Installing and Removing Components

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 cover.
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.

---

## Installing and Removing Components

### 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 you follow appropriate antistatic precautions whenever you handle internal components

---

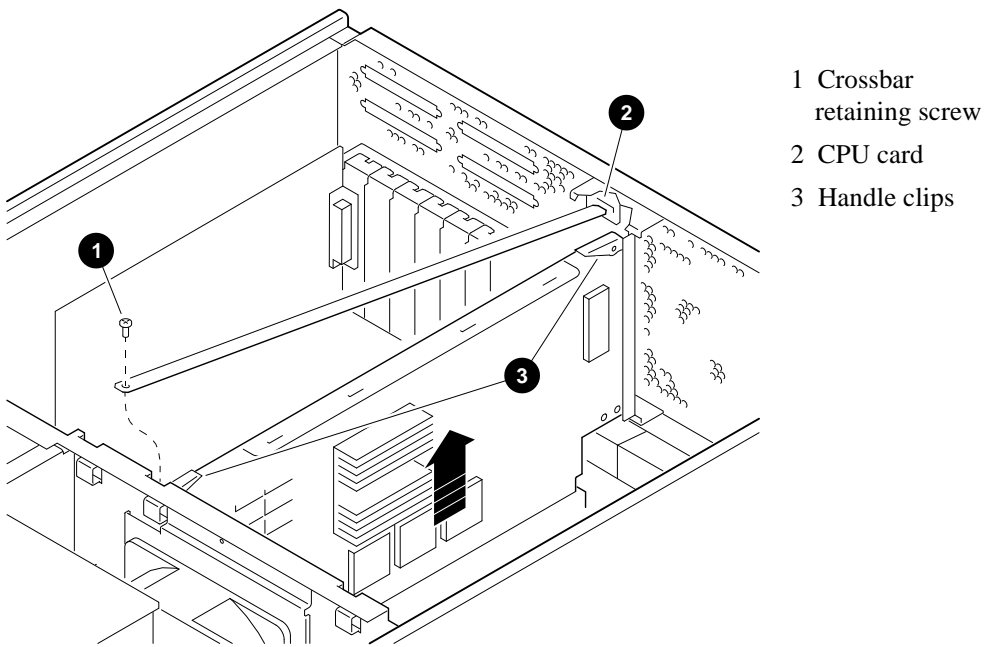
### Removing the CPU Card

To remove the CPU card, refer to Figure 5-16 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.

## Installing and Removing Components

**Figure 5-16: Removing and Installing the CPU Card**



MLO-011561

## Installing and Removing Components

### Installing the CPU Card

To install the CPU card, refer to Figure 5-16 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 covers 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 the section, "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"	Lists the Windows NT boot device names for devices installed in the system.
"Set Default Variables"	Allows you to select values for Windows NT firmware environment variables.

---

#### Note

---

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

---

To enter DEC OSF/1 and OpenVMS console commands, you must switch to the SRM console (see the section, "Switching between Consoles," in Chapter 4, "Basic Operation").

---

#### Note

---

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 DEC OSF/1 or OpenVMS operating system:

<code>show config</code>	Displays the buses on the system and the devices found on those buses.
<code>show device</code>	Displays the devices and controllers in the system.
<code>show memory</code>	Displays main memory configuration.
<code>set and show</code>	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. 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.

The configuration display looks similar to that in Example 6-1:

#### Example 6-1: The show config Command

```
>>> show config
          Digital Equipment Corporation
          Alpha AXP (tm) Server

SRM Console X3.3-1476  VMS PALcode X5.48-71, OSF PALcode
X1.35-49

MEMORY

  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
```

## Configuring Your System

```
Serial Rom Version:      0.8

PCI Bus
Bus 00 Slot 06: NCR      810 Scsi Controller
Bus 00 Slot 07: Intel    8275EB PCI to Eisa Bridge

EISA Bus
Slot 1 CPQ3011
Slot 3 DEC4220      era0.0.0.3.1      08-00-2B-BC-F
Slot 8 DEC2E00
```

For more information on device names, refer to the next section, "The show device Command."

### The show device Command

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

#### Synopsis:

```
show device [device_name]
```

#### Arguments:

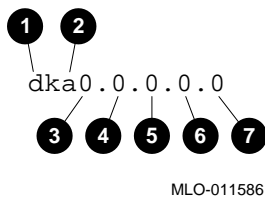
*device\_name* The device name or device abbreviation. When abbreviations or wild cards are used, all devices that match the type are displayed.

The command and resulting display are shown Example 6-2. The device name convention used in the display is shown in Figure 6-1 and is explained in the text that follows.

### Example 6-2: The show device Command

```
>>> show device
dka400.4.0.6.0      DKA400      RRD43  2893
dva0.0.0.0.1       DVA0
era0.0.0.3.1       ERA0      08-00-2B-BC-F6-CC
pka0.7.0.6.0       PKA0      SCSI Bus ID 7
```

**Figure 6–1: Device Naming Convention**



**Elements of Device Name Convention in Figure 6–1**

**1 Driver ID**

Two-letter port or class driver designator

- DR-RAID set device
- DV-Floppy drive
- ER-Ethernet port (EISA)
- EW-Ethernet port (PCI)
- PK-SCSI port, DK-SCSI disk, MK-SCSI tape
- PU-DSSI port, DU-DSSI disk, MU-DSSI tape

**2 Storage Adapter ID: One-letter storage adapter designator (a,b,c. . .)**

**3 Device Unit Number: Unique device unit number (MSCP Unit Number)  
SCSI unit numbers are forced to 100 X Node ID**

**4 Bus Node ID Number**

**5 Channel Number: Used for multi-channel devices**

**6 Slot Number:**

For EISA options, corresponds to EISA slot numbers (1-8)

For PCI options, slot = Ethernet adapter (EWA0)

-Slot 1=SCSI controller on standard I/O

-Slot 2=EISA to PCI bridge chip

-Slots 3-5=Reserved

-Slots 6-8=Corresponds to PCI slots: PCI0, PCI1, and PCI2

**7 Hose Number: 0 PCI\_0 (32-bit PCI\_); 1 EISA; 2 PCI\_1)**

## Configuring Your System

### 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 6–3.

#### Example 6–3: The show memory Command

```
POO>>> show memory
  ①      ②      ③      ④      ⑤      ⑥
Module  Size  Base Addr  Intlv Mode  Intlv Unit  Status
-----  ---  -
0       64MB  00000000  1-Way      0           Passed
                               1
                               Not Installed
                               2
                               Not Installed
                               3
  ⑦
Total Bad Pages 0
```

MLO-011587

#### Elements of show memory Command in Example 6–3

- 1 Module slot number
- 2 Size of memory module
- 3 Base or starting address of memory module
- 4 Interleave mode: number of modules interleaved (1 to 4-way interleaving)
- 5 Interleave unit number
- 6 Status (passed, failed, or not installed)
- 7 Number of bad pages in memory (8 KB/page)

### 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.

#### Synopsis:

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

## Configuring Your System

show *envar*

### Arguments:

<i>envar</i>	The name of the environment variable to be modified.
<i>value</i>	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).

The set and show commands and a sample display are shown in Example 6–4.

### Example 6–4: 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

---

## Configuring Your System

### Memory

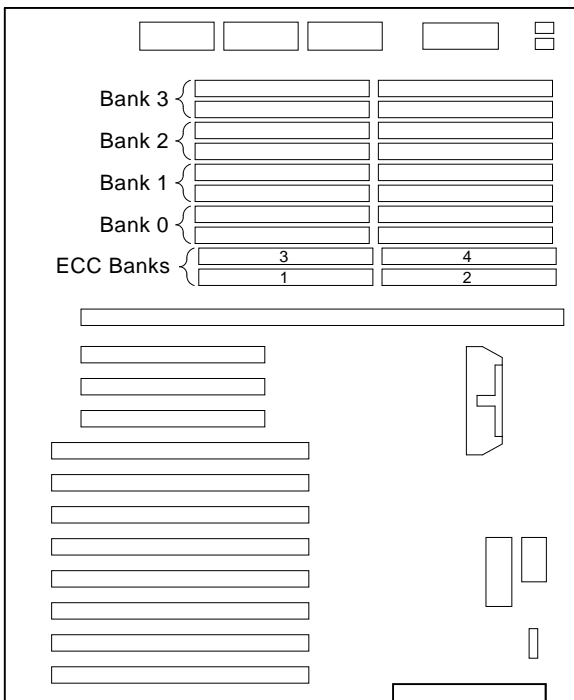
The system unit supports 20 single in-line memory modules (SIMM) on the system board. The SIMM modules are grouped in four memory banks consisting of five modules: four memory modules plus one memory module in each bank for ECC (Error Correction Code). Figure 6–2 shows the memory bank groupings on the 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 6–2: Memory Banks**



MLO-011558



## Configuring Your System

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
DEC OSF/1 and OpenVMS	32 MB minimum; 64 MB recommended for DEC OSF/1
Windows NT	16 MB minimum; 32 MB recommended
Windows NT Server	32 MB memory; 64 MB recommended

## Network Connections

Using network adapters, you can connect to 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 2-5.

### Setting Network Configuration

Use the following configuration commands to set the network configuration for the DE435 network option card:

```
>>> set ewa0_mode twisted    (10BASE-T or twisted-pair)
>>> set ewa0_mode aui       (AUI or standard)
>>> set ewa0_mode auto      (ThinWire)
```

## Configuring Your System

### 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.

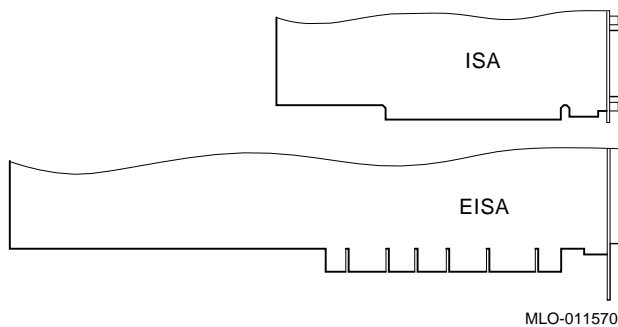
Refer to your operating system or application software documentation for software-specific key functions.

### 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 6-3):

- EISA cards have two interlocking rows of gold contacts.
- ISA cards have a single row of gold contacts.

**Figure 6-3: EISA and ISA Cards**



### 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.

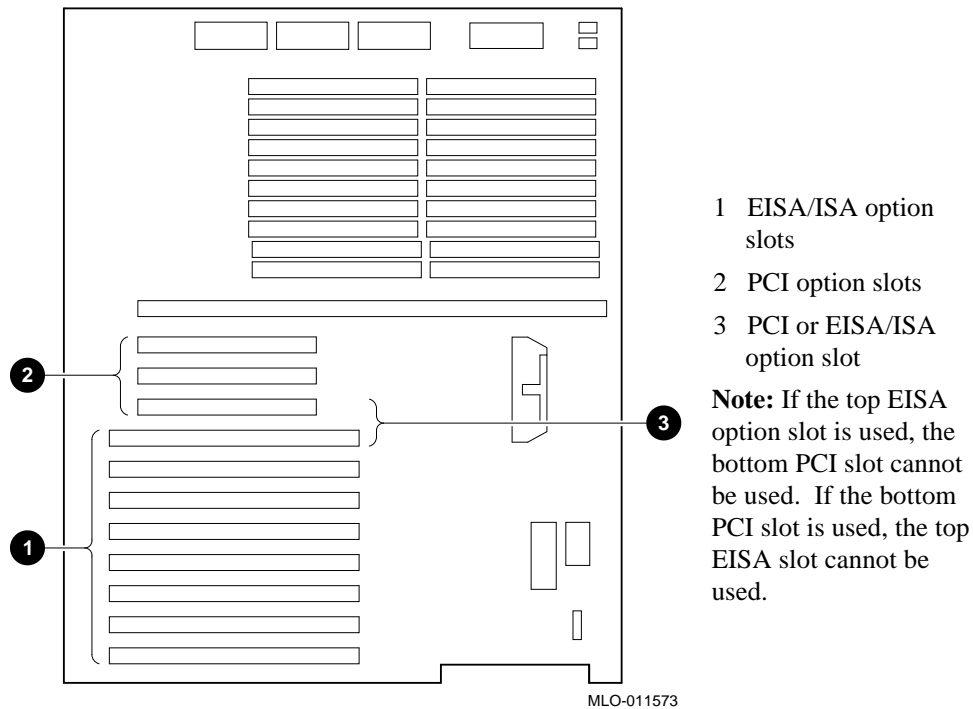
## Configuring Your System

Figure 6-4 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 cover when the system is running. If you remove the top cover without first properly turning off the system, the system will shut down, with potential loss of data.

**Figure 6-4: EISA, ISA, and PCI Open Slots**



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."

---

## 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.

Up to eight EISA or ISA modules can reside in the EISA bus portion of the system board. Figure 6-4 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 cover 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" 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".

---

## 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 online help to guide you through the configuration process.

## Configuring Your System

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" 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.)

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

## Configuring Your System

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 AXP for Windows NT
  - ECU Diskette DECpc AXP for DEC OSF/1 and OpenVMS

## 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 DEC OSF/1 or OpenVMS:**

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."

## Configuring Your System

- 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 DEC OSF/1 or OpenVMS:**
  - a. Insert the ECU diskette for DEC OSF/1 or OpenVMS into the diskette drive.
  - b. 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.

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).

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 (DEC OSF/1 and OpenVMS systems only) and restart the system.

- **For systems running Windows NT:**

## Configuring Your System

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

- **For systems running DEC OSF/1 or OpenVMS:**

Return to the SRM console as follows:

- 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 or OSF 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 DEC OSF/1 or OpenVMS:**



## Configuring Your System

- a. Insert the ECU diskette for DEC OSF/1 or OpenVMS into the diskette drive.
- b. 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.

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 (optional)

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).

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

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.

## Configuring Your System

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

- Return to the SRM console (DEC OSF/1 and OpenVMS 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 DEC OSF/1 or Open VMS:**

Return to the SRM console as follows:

- From the Supplementary menu, select the Setup menu.
  - From the Setup menu, select "Switch to OpenVMS or OSF console." This option allows you to select your operating system console.
  - Select your operating system; then press Enter on the Setup menu.
  - 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.
- Install the ISA card using the instructions provided with the ISA option, and turn on the system.

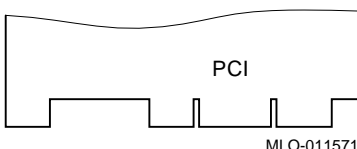
## PCI Option Cards

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 6-4. The system has two dedicated PCI slots and one slot that can be if the top EISA slot is not used.

A PCI card is shown in Figure 6-5

**Figure 6-5: PCI Option Card**



## Configuring Your System

Install PCI cards according to the instructions supplied with the option. PCI cards require no additional configuration procedures; the system automatically recognizes the cards and assigns the appropriate system resources.

### **For systems running DEC OSF/1 or OpenVMS:**

Return to the SRM console as follows:

From the Boot menu, select the Supplementary menu.

- a. From the Supplementary menu, select the "Set up the system" menu.
- b. From the Setup menu, select "Switch to OpenVMS or OSF console." This allows you to select your operating system console.

---

### **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.

---

## 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 CDROM 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.

## Configuring Your System

To determine the available SCSI IDs for all SCSI storage devices, follow the steps in Table 6–2 and refer to Example 6–5.

**Table 6–2: Determining Available SCSI IDs**

Step	Action	Result
1	Enter the <code>show device</code> command to display the SCSI configuration.	The system responds with a display similar to that shown in Example 6-5.
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 6–5: The show device Display

```
>>> show device
dka400.4.0.6.0      DKA400          RRD43   2893
dva0.0.0.0.1       DVA0
era0.0.0.3.1       ERA0    08-00-2B-BC-F6-CC
pka0.7.0.6.0       PKA0          SCSI Bus ID
```

### On-board SCSI Bus Configuration

A Fast SCSI-2 controller on the system board supports the two 5¼-inch removable media devices (typically a CDROM drive and a tape drive) and internal fixed drives. This controller provides a narrow (8-bit) single-ended SCSI bus for the system.

You can configure this bus to be purely an internal bus, or to support a restricted set set of internal SCSI devices and a single external SCSI device. You can also configure this bus to support only the 5¼-inch removable media devices, and up to five external SCSI devices, when an alternative SCSI controller option is connected to the StorageWorks shelf.

### Internal Configuration

When you configure the SCSI bus to be a purely internal bus (Figure 6-7), you must terminate the bus with an external SCSI terminator (12-41667-01) at the bulkhead connector. Expanding externally from the back of the enclosure is not permitted in this configuration because doing so would violate SCSI bus length rules.

## Configuring Your System

### External Configuration

When the SCSI bus is configured to permit a single external SCSI device (see Figure 6-8), the bus is connected to the two 5¼-inch removable media devices and the fixed drives. A cable connects the bus to an external bulkhead connector. At this point, you can terminate the bus with an external SCSI terminator (12-41667-01), or you can attach an external SCSI cable for connection to an external SCSI device. Note that the maximum length of the external SCSI bus must be less than one meter to meet SCSI bus length restrictions.

If an additional SCSI controller option is plugged into the system, the integrated controller can be connected to only the 5¼-inch removable media devices and then routed to an external bulkhead connector (see Figures 6-9 and 6-10). The bus can be terminated at this point using an external SCSI terminator (12-41667-01), or an external SCSI cable can be attached to connect to external SCSI devices. To meet SCSI bus length restrictions, the total external bus length must be less than 1.5 meters.

### 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.
- No more than seven devices can be on any one SCSI-2 controller, and each must have a unique SCSI ID.
- The entire SCSI bus length, from terminator to terminator, must not exceed 3 meters for single-ended SCSI-2.

## 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 devices. The bus is driven by a native Fast 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 CDROM drive and the tape drive, if one is installed.

---

#### Caution

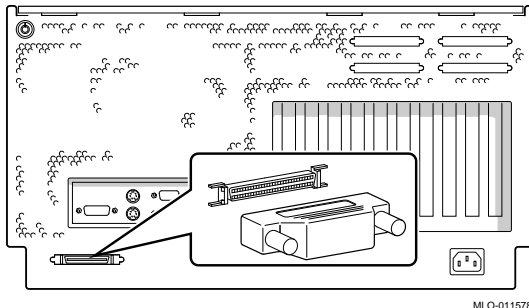
---

Avoid bending the SCSI cable when folding it.

---

1. Insert the end of the SCSI cable (17-04153-01) in its system board connector.
2. Connect the SCSI cable CDROM drive connector to the rear of the CDROM drive.
3. Connect the cable to the rear of the tape drive, if one is installed.
4. Connect the cable to the fixed hard drives. A maximum of three drives can be installed.
5. Connect the end of the SCSI cable (17-04153-01) to the lowest of the cutouts on the rear of the system.
7. Terminate the bus connecting an external SCSI terminator (12-41667-01). See Figure 6-6.

**Figure 6-6: SCSI Cable Termination**



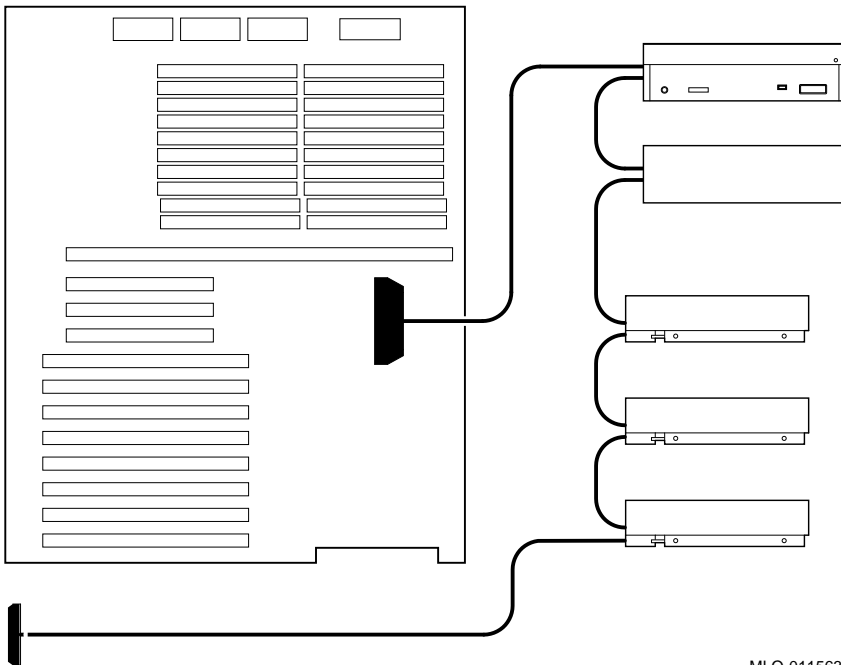
1. Optional SCSI ports
2. SCSI terminator

## Configuring Your System

### Single-Controller SCSI Configuration

In the single-controller configuration shown in Figure 6–7, the three fixed hard drives are run from the system board SCSI controller. The system reserves SCSI ID numbers for the CDROM drive (ID 4) and the tape drive (ID 5).

**Figure 6–7: Single-Controller SCSI Configuration**



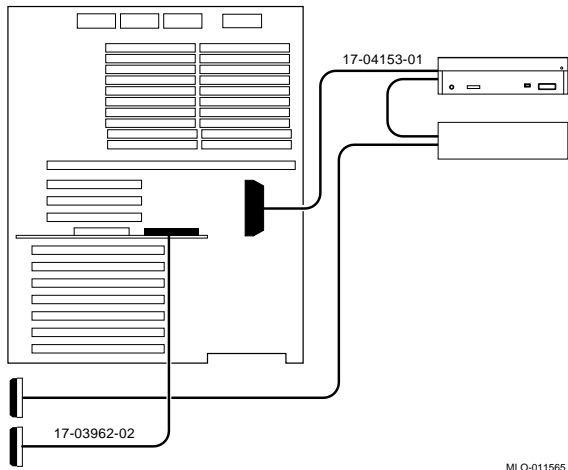
MLO-011563



## Configuring Your System

**Figure 6–8 SCSI Cables**

The following figure shows the correct cabling for the SCSI Configuration:



MLO-011565



# 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, get a list of your system's modules and devices by accessing the Windows NT (ARC) console and accessing the Supplementary menu. Choose the "List available boot devices" menu item to see the "Available boot devices" display. Note that this display does not list tape drives or network devices.
- If you are running the DEC OSF/1 or OpenVMS operating systems, get a 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.

---

#### Caution

---

Internal Storage Works shelves should be installed only by a qualified service person.

---

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

### 5. Install the option

## Upgrading Your System

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."

## **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 source:

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

## Upgrading Your System

### 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
- SCSI bus backplane cabling
- Memory modules
- CPU card
  - EISA, ISA, and PCI options
  - Network interface cards
  - Graphics cards
  - SCSI controller cards
  - Video 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 DEC OSF/1 and OpenVMS (SRM) firmware reside in the four FlashROM 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 FlashROM ever becomes corrupted. To do this, you use a different procedure. (See "Using the Fail-Safe Loader" in Chapter 8, "Troubleshooting").

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

- CDROM
- Network
- Diskette

### Updating Firmware Using the CDROM Drive

To update the firmware using a CDROM, perform these steps:

1. Insert the CDROM with the new firmware version into the CDROM drive.
2. Enter the following command at the SRM console prompt:  
`>>> boot dka400`
3. Load and execute the update utility:  
`APU-> update`
4. Turn the system off and on.
5. Confirm the update:  
`>>> show version`

### 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`





# 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, locate the troubleshooting table for that problem type and follow the guidelines provided. If you cannot correct the problem, report it to your service representative.

This chapter covers 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 and Mouse Problems
- Printer Problems
- Overheating Problems

## Troubleshooting Your System

- RAID Device 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**

<b>Task or Problem</b>	<b>Relevant Section</b>
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. The power supply has shut down.	Power Problems
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 devices are missing from the show device display.	Storage Problems
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 system does not see or cannot access RAID drives.	RAID Device Problems
The FlashROM 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
1-1-4	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."
3-3-1	Generic system failure.	Call your service representative.
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.

### 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.

## Troubleshooting Your System

---

### Note

---

To stop the screen display from scrolling, press Ctrl/S. To resume scrolling, press Ctrl/Q.

---

### 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.

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

- Serial loopback connected to the COM2 port
- Parallel loopback connected to the parallel port
- Connection to a network or a terminator connected to the Ethernet port
- A diskette with files installed
- A CDROM with files installed

The test script tests devices in the following order:

1. Memory tests
2. Read-only tests: DK and DR disks, MK tapes, DV diskettes
3. Console loopback tests if `1b` argument is specified: COM2 serial port and parallel port
4. 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."
5. 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 or the test will fail.

## Troubleshooting Your System

---

### 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 e1 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
```

## Troubleshooting Your System

### **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.

### **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	<p>Check the power source and power cord.</p> <p>Check that the system cover is properly secured. A safety interlock switch shuts off power to the system if the cover is removed.</p> <p>If there are two power supplies, make sure both power supplies are plugged in.</p>
There is ac power present, but system does not power on.	<p>Check the On/Off switch on the operator control panel.</p> <p>Check that the ambient room temperature is within environmental specifications (10–40°C, 50–140°F).</p> <p>Check that cable connectors on the system board are properly connected.</p> <p>Check that the internal power supply cables are plugged in at the right place on both the power supply and system backplane.</p> <p>Check the power supply fuse and replace, if necessary.</p>
Power supply shuts down after approximately 10 seconds (fan failure).	<p>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.</p>

## 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**

Symptom	Action
Startup screen does not display.	<p>Check that the keyboard and monitor are properly connected and power is on.</p> <p>If the startup screen does not display, yet the system enters console mode when you press the Return key, check that the <code>console</code> 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."</p> <p>If <code>console</code> is set to "serial," the startup screen is routed to the COM1 serial communication port and cannot be viewed from the VGA monitor.</p> <p>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 <code>console</code> environment variable to "serial."</p> <p>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."</p>
Startup screen displays error messages.	<p>If startup screens or the console event log indicate problems with mass storage devices, or if storage devices are missing from the <code>show config</code> display, use the troubleshooting tables in the section, "Storage Problems" to determine the problem.</p> <p>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 <code>show config</code> display, use the troubleshooting table in the section, "Option Card Problems" to determine the problem.</p>



## 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.	<p>Verify that your system recognizes the boot device, using the <code>show device</code> command.</p> <p>Check that the boot device environment variable correctly identifies the boot device:</p> <p>DEC OSF/1 and OpenVMS: use the <code>show bootdef_dev</code> command to display the boot device.</p> <p>Windows NT: Select the ARC console menu option "Display Hardware configuration." Use the Setup menu to change the environment variable.</p>
System does not boot.	<p>Check that the Halt switch is set to the "off" position.</p> <p>Verify that you have not installed an unsupported graphics module or another type of unsupported adapter.</p> <p>Run the <code>test</code> command. See the table in the section, "Console Problems."</p>
There is a software problem or the operating system is not installed correctly.	<p>Refer to your operating system software information.</p> <p>Verify that you have the correct firmware revision for your system. See Chapter 3, "Preparing to Install an Operating System."</p>

## 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 <i>OpenVMS AXP Alpha System Dump Analyzer Utility Manual</i> for information about how to interpret OpenVMS crash dump files. Refer to the <i>Guide to Kernel Debugging (AA-PS2TA-TE)</i> for information about using the DEC OSF/1 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 <code>set console graphics</code> command).
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 <i>DEC Verifier and Exerciser Tool User's Guide (AA-PTTMA-TE)</i> 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 <code>show config</code> display.	Duplicate SCSI IDs (when removable-media bus is extended to StorageWorks shelf).	Correct removable-media SCSI device IDs.
Valid drives are missing from the <code>show config</code> display. One drive may appear seven times on the configuration screen display.	SCSI ID is set to 7 (reserved for host ID).	Correct the SCSI IDs.
The SCSI ID of the drive is not unique or the SCSI drive cables are connected incorrectly.	You cannot access the software or data on the drive.	See Chapter 6, "Configuring" for information on displaying SCSI device configuration. If the device is not listed in the display, check the SCSI cabling and the drive's SCSI ID.
The SCSI drive is faulty.	You cannot access the software or data on the drive.	Contact your service representative.

## Troubleshooting Your System

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**

<b>Problem</b>	<b>Symptom</b>	<b>Action</b>
Drive failure	Drive fault indicator is lit.	Replace the drive.
Duplicate SCSI IDs	Drives with duplicate SCSI IDs are missing from the <code>show config</code> display.	Correct the removable-media SCSI IDs.
SCSI ID is set to 7 (reserved for host ID)	Valid drives are missing from the <code>show config</code> 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 <code>show config</code> display. One drive may appear seven times on the configuration display.	Change host ID using the <code>set pk*0_host_id</code> command.
Faulty cable termination Missing or loose cables	Activity indicators do not light. Drive missing from the <code>show config</code> display.	Check cable termination. Remove device and inspect cable connections.
Cable length	Activity indicators do not light.	Check cable length: maximum cable length is 3 m for external expansion boxes.
Missing terminator	Read/write errors in the console event log; storage adapter port may failure.	Attach terminators as needed: internal SCSI terminator or external SCSI terminator.
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" 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.	Check that the EISA card and any cabling are properly seated.
2.	Run the ECU as described in Chapter 6, "Configuring" to: <ul style="list-style-type: none"> <li>• Confirm that the system has been configured with the most recently installed controller.</li> <li>• See what the hardware jumper and switch settings should be for each ISA controller.</li> <li>• See what the software setting should be for each ISA and EISA controller.</li> <li>• See if the ECU deactivated (&lt;&gt;) any controllers to prevent conflict.</li> <li>• See if any controllers are locked, which limits the ECU's ability to change resource assignments.</li> </ul>
3.	Confirm that hardware jumpers and switches on ISA controllers reflect the settings indicated by the ECU. Start with the last ISA module installed.
4.	Check for a bad slot by moving the last installed controller to a different slot.
5.	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.

**Table 8–10: Troubleshooting PCI Bus Problems**

Step	Action
1.	Confirm that the PCI module and any cabling are properly seated.
2.	Check for a bad slot by moving the last installed controller to a different slot.
3.	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."
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.
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 ( <code>set console serial</code> 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.
The terminal or monitor fuse may have blown.	Replace the blown terminal or monitor fuse. Refer to the terminal or monitor documentation.
The port to which the terminal or monitor connects may not be the correct one.	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.
The port to which the terminal or monitor connects may be faulty.	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.
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.

## Troubleshooting Your System

### 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:

- 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 FlashROMs on the system board. Use the FSL only when a failure at startup prevents you from accessing the console mode.

### Using the Update Utility

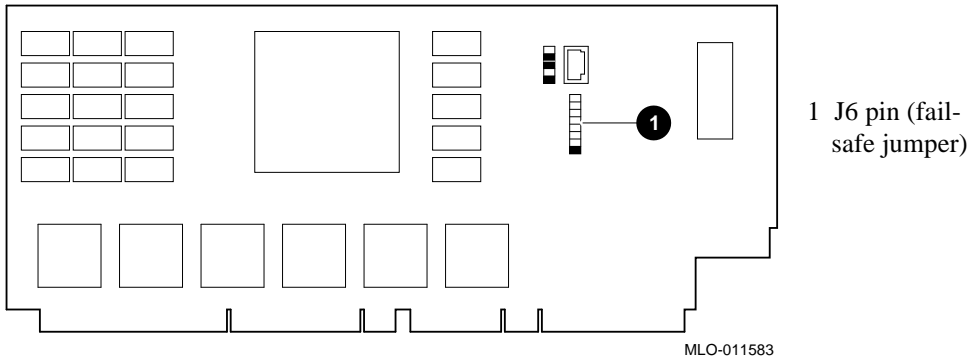
If a checksum error is detected when loading the console at startup, the system automatically loads the Update Utility from diskette into memory.

To activate FSL:

1. Turn off the system.
2. Install the update utility diskette into the diskette drive.
3. Remove the top cover (See "Removing Top and Side Panels" in Chapter 5, "Installing and Removing Components").
4. Enable FSL by moving the jumper on the CPU card to the position nearest the system board (see Figure 8-1).
5. Replace the top cover and side panels.
6. Turn on the system and confirm the update:  

```
>>> show version
```
7. Turn off the system.
8. Remove the top and side panels.
9. Disable the FSL and set the SROM jumpers to their normal operating position.
10. Replace the top cover and side panels.

**Figure 8–1: Fail-Safe Jumper on the CPU Card**



# 9

---

## Quick Reference

### Introduction

This chapter contains the following reference information:

- Messages
- Hardware Overview
- LEDs
- System Board Jumper Settings
- SCSI ID Settings
- Specifications
- Block 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.

## Quick Reference

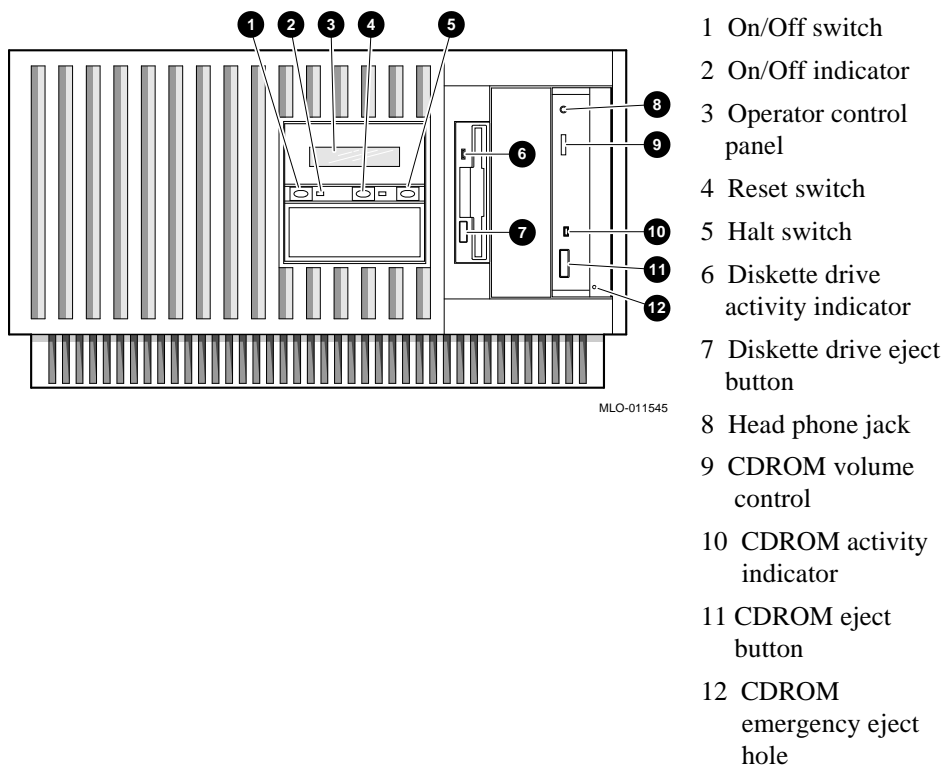
## Hardware Overview

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.

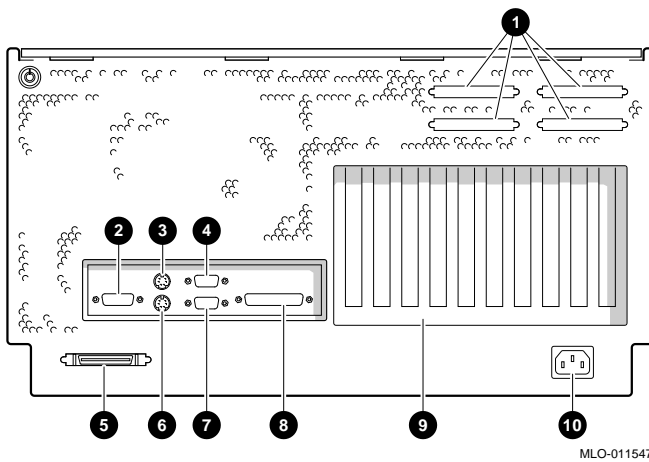
**Figure 9-1: System Front View**



## System Rear View

Figure 9-2 shows system ports and slots on the rear panel.

**Figure 9-2: System Rear View**



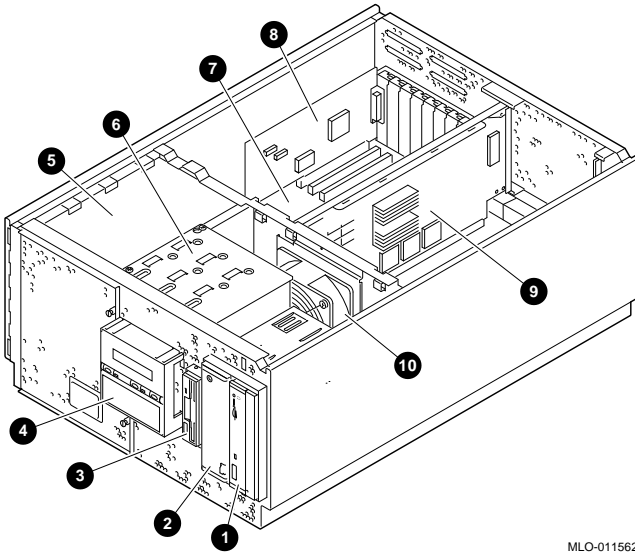
- 1 Four additional SCSI port knockouts
2. VGA port
3. Keyboard port
4. Serial port/terminal (COM1)
5. External SCSI port
6. Mouse port
7. Serial port/terminal (COM2)
8. Parallel port
9. PCI/EISA slots
10. Power inlet

## Quick Reference

### System Top View

Figure 9-3 shows system components through the top view with the panel removed.

**Figure 9-3: System Top View**



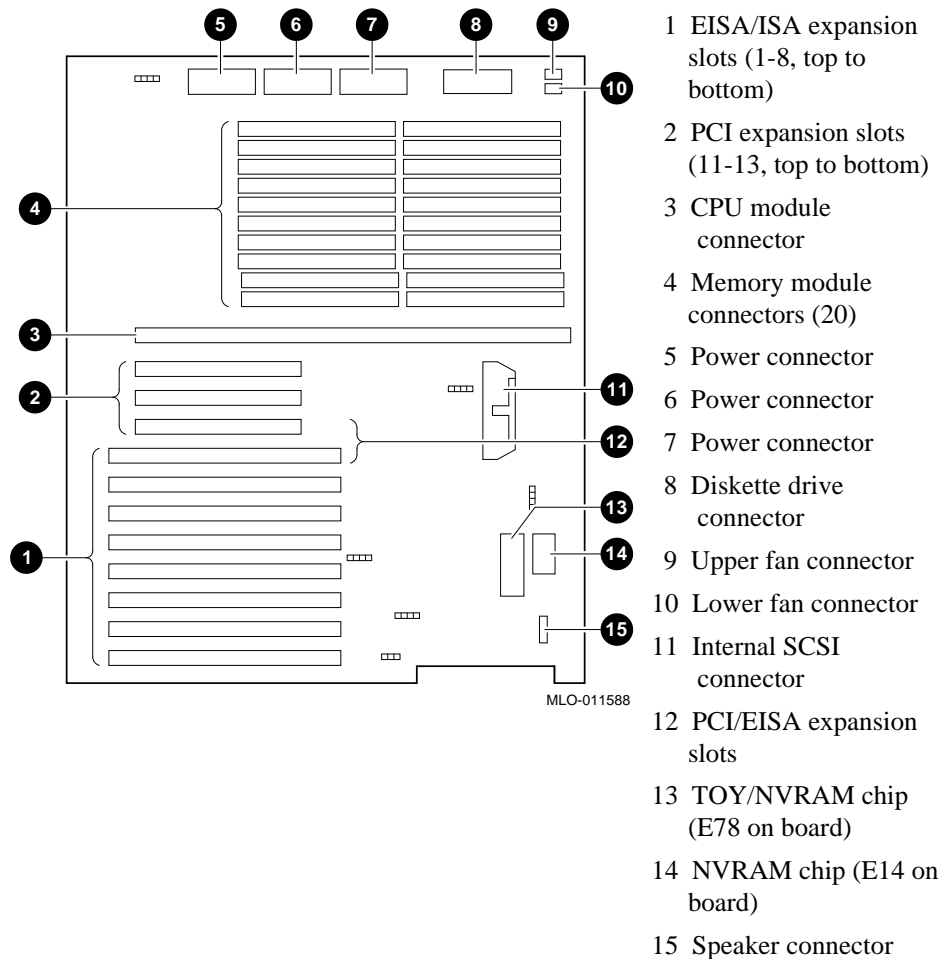
1. CDROM drive
2. Tape drive
3. Diskette Drive
4. OCP panel
5. Power supply
6. Hard drives
7. System board
8. EISA card
9. CPU card
10. Fan.

MLO-011562

## 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**



## Quick Reference

### 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 V dc (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

## Quick Reference

### LEDs

Table 9–6 describes system LEDs and their function.

**Table 9–6: LEDs**

<b>LED</b>	<b>Function</b>
On/Off LED (green)	Lights when the system unit is turned on.
Diskette drive activity LED (green)	Lights when the system is accessing the diskette drive.
CDROM drive activity LED (green)	Lights when the system is accessing the CDROM drive.
StorageWorks Disk Drive (green)	Blinks when reading or writing to disk.
StorageWorks Disk Drive (amber)	Lights when the disk has a problem.

## System Board Jumper Settings

Table 9–7 lists the default jumper settings for the system board.

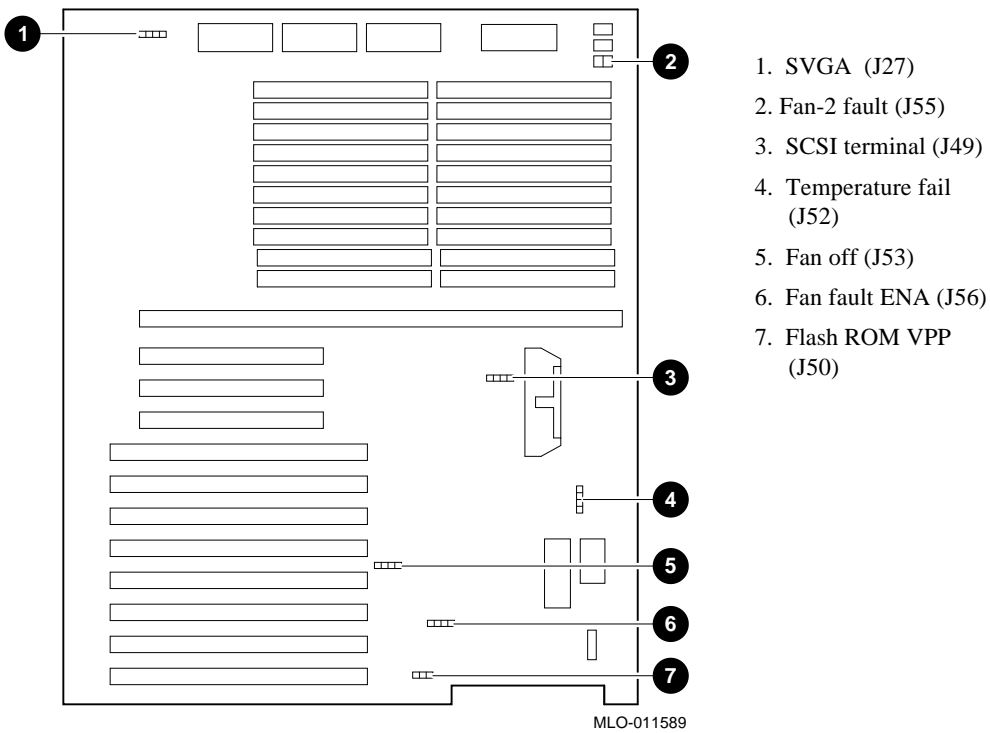
**Table 9–7: System Board Default Jumper Settings**

Number	Name	Description and Default
J49	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.
J50	FROM VPP enable	Connects 12 volts from the power supply to the VPP pins of the Flash ROMs. Enabled.
J27	VGA enable	Enables the on-board VGA logic. Enabled. Set to the disabled position (pins 2 and 3) when using a graphics option card.
J53	Fan shut	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.

## Quick Reference

Figure 9–5 shows the system board jumper settings for normal operation.

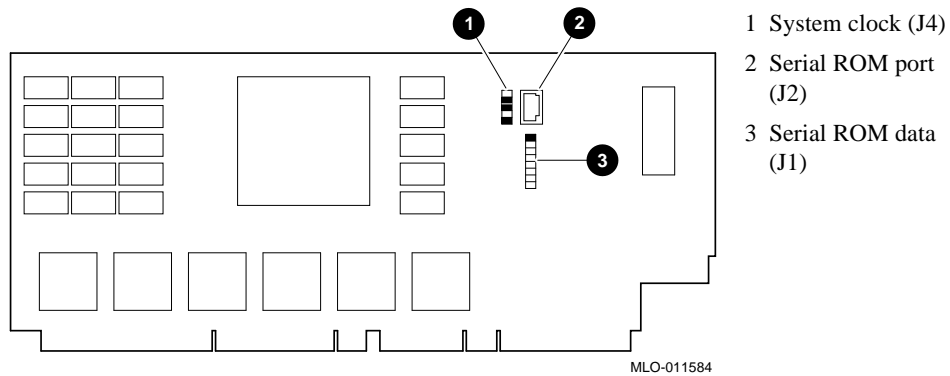
**Figure 9–5: System Board Jumper Positions for Normal Operation**



## Quick Reference

Figure 9–6 shows CPU card jumper settings for normal operation.

**Figure 9–6: CPU Card Jumper Positions for Normal Operation**



## Quick Reference

### SCSI ID Settings

For each configuration, the CDROM drive and tape drive IDs are manually set at address 4 and 5, respectively. StorageWorks drive IDs are set automatically by the backplane using a combination of three jumper settings on 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	J1	J2	J3	J1/J2	J1/J3	J2/J3	J1/J2/J3
<b>Bus A</b>								
Tape	4	4*	4	4	4	4	4	4
CDROM	5	5*	5	5	5	5	5	5
Slot 0	0	0	0	8	0	8	8	8
Slot 1	1	1	1	9	1	9	9	9
Slot 2	2	2	2	10	2	10	10	10
Slot 3	3	3	3	11	3	11	11	11

---

#### Note

---

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

---



## Specifications

**Table 9–9: System Specifications**

Attributes	Specification
PCI clock	33 MHz
Data I/O	32-bit PCI
Motherboard RAM	Expandable up to 512 MB

**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).

## Quick Reference

**Table 9–12: Power Supply Ratings**

Specification	Range
Voltage	100-120/220-240 V ac
Frequency	50-60 Hz
Current	8.0/4.0 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**

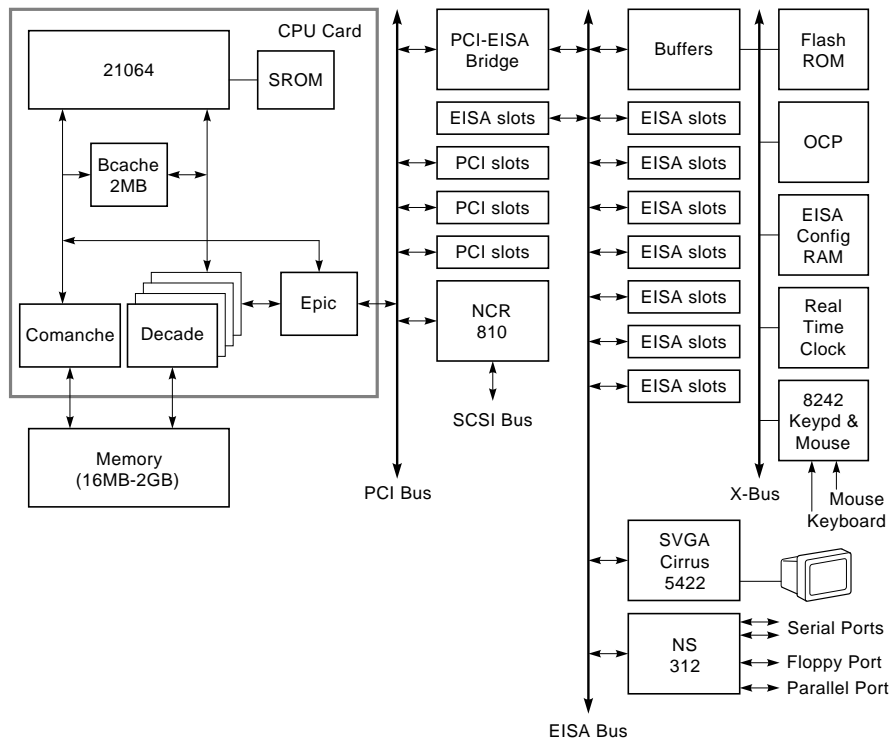
Product	Sound Power Level LwAd, B		Sound Pressure Level LpAm, dBA (bystander positions)	
	Idle	Operate	Idle	Operate
<b>AlphaServer 1000 Model 200 (PB7RT-A9) with:</b>				
1xRZ26/8	5.5	5.6	35	36
2xRZ26/8	5.6	5.6	36	36
3xRZ26/8	5.6	5.7	36	37

Current values for specific configurations are available from Digital representatives. 1 B = 10 dBA.

## System Architecture

Figure 9-7 illustrates the server system architecture.

**Figure 9-7: System Architecture**



MLO-011557



---

# 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 uptime per year; or, if measured as system unavailability, as the number of hours of downtime 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 device**

The device from which the system bootstrap software is acquired.

### **boot**

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.

## Glossary

### **CDROM**

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 and DEC OSF/1 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.

### **data cache**

A high-speed cache memory reserved for data storage.

## Glossary

### **DEC OSF/1 operating system**

A general-purpose operating system based on the Open Software Foundation OSF/1 2.0 technology. DEC OSF/1 V2.0 runs on the range of AlphaGeneration systems, from workstations to servers.

### **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.

### **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.



## Glossary

### **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. UERF is used to present error log information for DEC OSF/1.

### **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.

### **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.

## Glossary

### **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 CDROM.

## Glossary

### **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.

### **OCP**

*See* operator control panel.

## Glossary

### **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..

### **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.

## Glossary

### **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 DEC OSF/1 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.

### **SRM**

User interface to console firmware for operating systems that expect firmware compliance with the *Alpha System Reference Manual (SRM)*.

## Glossary

### **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.

## Glossary

### **write-protected**

Describes a device onto which data cannot be written.





---

# Index

## A

---

- Accessories
  - identifying, 2-5
- Acoustics-declared values, 9-16
- Antistatic precautions, 5-2
- ARC console, 1-2
  - help, 4-13
  - menus, 4-10
  - switching to, 4-10
  - verifying configuration, 6-2
- Architecture
  - system, 9-17
- ARCINST utility, 3-4

## B

---

- Beep codes
  - interpreting, 8-3
- Boot
  - automatic, 4-11
- Boot defaults
  - changing, 4-17
- Boot device names
  - ARC firmware, 4-19
- Boot menu (ARC console)
  - functions, 4-11
  - steps, 4-22
  - Windows NT, 4-7

- Boot problems
  - troubleshooting, 8-9
- Boot procedures, 3-11
- Boot selection menu (ARC console), 4-22
- Boot selections
  - changing, 4-22
  - Windows NT, 4-21

## C

---

- Cabling
  - external, 2-8
- cat el command, 4-7
- CDROM drive, 4-25, 5-14
- CFG file, 6-13. See also EISA Configuration Utility (ECU)
- Checksum error, 8-17
- Commands
  - basic, 4-12
  - comprehensive, 4-12
  - console, 4-12
  - limiting display, 4-12
- Configuration. See also EISA Configuration Utility (ECU)
  - determining current, 7-2
  - verifying, 4-19
  - viewing, 6-1
- Console commands, 4-12
- Console event log, 8-3

## Index

- Console mode, 1-2
  - invoking, 4-9
- Console problems
  - troubleshooting, 8-8
- Console subsystem, 1-2
- Console tests, 8-4
- Consoles
  - switching between, 4-9
- Controls
  - front panel, 1-6
- Countdown
  - changing, 4-20
- CPU card
  - installing, 5-22
  - jumper positions for, 9-13
  - removing, 5-20

## D

---

- DEC OSF/1
  - booting, 4-23
  - installing, 3-8
  - preparing to install, 3-7
  - verifying configuration for, 6-3
  - verifying version, 3-13
- DEC OSF/1 servers, 3-9
  - booting from, 3-12
- Default settings
  - changing, 4-22
  - DEC OSF/1, 4-23
  - OpenVMS, 4-23
  - resetting, 4-11
  - Windows NT, 4-20
- Diagnostic tests, 8-4
  - halting, 8-6
- Digital Systems and Options Catalog*, 7-3
- Disk space requirements
  - DEC OSF/1, 3-9
- Diskette drive, 4-25
  - configuring, 4-11

- Drive problems
  - troubleshooting, 8-11

## E

---

- EISA bus, 6-10
- EISA bus problems
  - troubleshooting, 8-13
- EISA Configuration Utility (ECU), 6-12
  - error messages, 8-13
  - running from serial line, 4-6
  - using with DEC OSF/1, 6-15
  - using with OpenVMS, 6-15
  - using with Windows NT, 3-4
  - when to use, 4-17
- EISA option card
  - identifying, 6-10
- EISA option slots
  - location, 6-11
- EISA options, 1-11
  - configuring, 6-14
- Environment variables
  - boot, 4-17
  - changing default, 4-17
  - editing, 4-11
  - setting, 4-17
  - setting for Windows NT, 3-3
- Environmental specifications, 2-4
- Equipment
  - installation and removal, 5-2
- Error beep codes, 8-3
- Error Correction Code (ECC), 5-4
- Error messages
  - EISA Configuration Utility (ECU), 8-13
  - startup, 8-8
- Expansion
  - system, 1-4

## F

---

- Fail-safe jumper

- location of, 8-18
- Fail-safe loader
  - using, 8-17
- Fan problems
  - troubleshooting, 8-7
- Fast SCSI-2 controller, 6-21
- Firmware
  - description, 1-2
  - setting default, 4-11
  - tasks, 1-2
  - updating, 7-4
  - updating for Windows NT, 3-3
  - verifying version, 3-3
- Fixed drive, 5-14
- Fixed drives, 6-21

## G

---

- Graphics option
  - cabling, 2-8
  - installation, 5-10
- Graphics option slot, 2-7
- Graphics options
  - environment variable, 8-8

## H

---

- Halt switch, 4-9
- Hard disk
  - formatting, 3-5
  - partitioning, 3-5
  - preparing for Windows NT, 3-4
- help command, 4-15

## I

---

- Indicators
  - front panel, 1-6
  - functions, 9-10
- Interlock switch, 5-3
- ISA bus, 6-12
- ISA option card

- identifying, 6-10
- ISA option slots
  - location, 6-11
- ISA options, 1-11
  - configuring, 6-16

## J

---

- Jumper settings, 9-14
  - single controller configuration, 9-14
  - system board, 9-11

## K

---

- Key, 2-9
  - identification number, 2-10
- Keyboard, 6-10
  - cleaning, 4-27
  - configuring, 4-11
  - connecting, 2-6
  - connector, 9-8
- Keyboard port
  - pin assignments, 9-8
- Keyboard problems
  - troubleshooting, 8-15
- kill command, 8-6
- kill\_diags command, 8-6

## L

---

- Lock
  - system, 2-9

## M

---

- Memory banks, 5-4
- Memory modules, 5-4
  - installation rules, 5-4
  - installing, 5-7
  - removing, 5-7
- Memory options, 1-11
  - sizes, 5-5
- Messages

## Index

- displaying, 4-7
- Monitor. See also SVGA, VGA monitor
  - connecting, 2-6
- Monitor problems
  - troubleshooting, 8-14
- Mouse
  - cleaning, 4-27
  - connecting, 2-6
  - connector, 9-8
- Mouse port
  - pin assignments, 9-8
- Mouse problems
  - troubleshooting, 8-15

## N

---

- Network
  - booting over a, 3-12
  - external loopback tests, 8-4
- Network configuration
  - setting, 6-9
- Network hardware
  - connecting, 2-7, 6-9
- Network interface cards, 5-18
- Network options, 2-7, 6-9
- Network problems
  - troubleshooting, 8-13
- Network tests, 8-4

## O

---

- On/Off switch
  - location, 4-2
- OpenVMS
  - booting, 4-23
  - installing, 3-15
  - preparing to install, 3-14
  - verifying configuration, 6-3
  - verifying version, 3-14
- Operating system defaults
  - changing, 4-17

- Operating system problems
  - troubleshooting, 8-10
- Operating system type
  - setting for DEC OSF/1, 3-7
  - setting for Windows NT, 3-2
- Operating systems
  - installation, 3-1
  - memory requirements, 6-9
  - pre-boot tasks, 4-16
  - pre-installed, 4-2
  - setting default, 4-11
  - supported, 1-2
- Operator control panel (OCP)
  - display, 4-6
- Option card problems
  - troubleshooting, 8-12
- Option cards
  - configuring, 5-14
  - installing, 5-10
  - removing, 5-12
  - testing installation, 5-12
- Options
  - EISA, 1-11
  - external, 1-12
  - ISA, 1-11
  - memory, 1-11
  - ordering, 1-12, 7-2
  - PCI, 1-11
  - storage, 1-10
  - system, 1-10
  - upgrade, 7-4
- Overheating problems
  - troubleshooting, 8-16

## P

---

- PALcode, 1-1, 3-15
- Parallel port
  - pin assignments, 9-7
- PCI bus problems

- troubleshooting, 8-13
- PCI options, 1-11
  - configuring, 6-18
  - identifying, 6-18
- Pin assignments
  - keyboard port, 9-8
  - mouse port, 9-8
  - parallel port, 9-7
  - SCSI port, 9-9
  - serial port, 9-8
  - VGA port, 9-6
- Port pinouts
  - rear panel, 9-6
- Power supply
  - installing, 5-18
- Power supply problems
  - troubleshooting, 8-7
- Pre-installed software, 4-2
- Printer
  - connecting, 2-6
- Printer problems
  - troubleshooting, 8-16
- Program mode, 1-2

## R

---

- Reliability, 1-4
- Remote Installation Service (RIS), 3-8
- Remote location
  - accessing system from, 4-5
- Reset switch, 4-5

## S

---

- SCSI bus
  - maximum length, 6-22
- SCSI bus configuration, 6-21
  - external, 6-22
  - internal, 6-21
- SCSI cable
  - terminating, 6-23

- SCSI configuration
  - rules, 6-22
  - single controller, 6-24
- SCSI devices
  - configuring, 6-22
- SCSI IDs
  - assigning, 5-14, 6-20
  - duplicate, 8-11
  - storage drive, 6-19
- SCSI port
  - pin assignments, 9-9
- Security, 1-5, 2-9
- Serial port
  - pin assignments, 9-8
- Server management, 1-5
- Servers
  - DEC OSF/1, 3-9
  - ULTRIX, 3-10
- set command, 4-20
  - example, 6-6
- set console graphics command, 3-2
- set device\_protocols bootp command, 3-12
- set device\_protocols mop command, 3-13
- set ewa0\_protocols mop command, 3-13
- Setup
  - overview, 2-1
  - verifying, 2-8
- Setup menu (ARC console)
  - example, 4-14
  - functions, 4-11
  - help display, 4-15
- show command, 4-20
  - example, 6-6
- show config command, 4-19
  - example, 6-3
- show device command, 4-20
  - example, 6-4
- show device command example, 6-21
- show memory command, 4-20

## Index

- example, 6-6
- show os\_type command, 4-2
- show\_status command, 8-6
- Side panels
  - removing, 5-3
- Specifications
  - system, 9-15
- SRM console, 1-2
  - commands, 4-12
  - help, 4-15
  - switching to, 4-10
  - verifying configuration from, 6-3
- Startup display, 4-6
  - DEC OSF/1, 4-7
  - OpenVMS, 4-7
  - Windows NT, 4-7
- Startup screen display problems
  - troubleshooting, 8-8
- Startup tests
  - results, 4-8
- Storage drive problems
  - troubleshooting, 8-11
- Storage drives
  - determining SCSI IDs, 6-19
  - location, 4-24, 5-15
  - types, 4-24
- Storage options, 1-10
- Supplementary menu (ARC console)
  - functions, 4-11
- SVGA jumper
  - disabling, 5-10
- SVGA monitor
  - connecting, 2-6
- System
  - architecture, 9-17
  - features, 1-1, 1-4
  - front panel view (figure), 9-2
  - moving, 4-27
  - rear panel view (figure), 9-3

- remote access to, 4-5
- setting up, 2-1
- side view (figure), 9-4
- upgrading, 7-1
- uses, 1-2

- System board (figure), 9-5
- System board jumpers
  - location (figure), 9-12
  - settings, 9-12
- System partition
  - setting default, 4-11

## T

---

- Tape drive, 5-14
  - installing, 5-16
  - removing, 5-17
- Temperature sensor, 8-16
- Terminal
  - connecting, 2-6
- Terminal problems
  - troubleshooting, 8-14
- test command, 8-4
  - script, 8-4
- Tests
  - halting, 8-6
  - startup, 4-8
- Time
  - setting system, 4-11
- Top cover
  - interlock switch, 5-3
  - removing, 5-3
  - replacing, 5-4
- Troubleshooting
  - overview, 8-2

## U

---

- ULTRIX servers, 3-10
  - booting from, 3-13
- Upgrading

## Index

options, 7-4  
Utility update diskette  
using, 8-17

### V

---

VGA console tests, 8-4  
VGA monitor  
connecting, 2-6  
VGA port  
pin assignments, 9-6

Voltage  
power supply, 2-4

### W

---

Windows NT  
boot menu, 4-7  
installing, 3-6  
preparing to install, 3-2  
verifying configuration, 6-2  
verifying version, 3-2