COMPAQ

AlphaServer DS20E
AlphaStation DS20E

Reference Guide

Order Number: ER–K8F6W–UA. B01

This manual is for anyone who manages, operates, or services the Compaq AlphaServer DS20E or AlphaStation DS20E system. It covers operation, firmware, initial troubleshooting, and component installation.

Compaq Computer Corporation

Notice

The information in this publication is subject to change without notice.

COMPAQ COMPUTER CORPORATION SHALL NOT BE LIABLE FOR TECHNICAL OR EDITORIAL ERRORS OR OMISSIONS CONTAINED HEREIN, NOR FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM THE FURNISHING, PERFORMANCE, OR USE OF THIS MATERIAL. THIS INFORMATION IS PROVIDED "AS IS" AND COMPAQ COMPUTER CORPORATION DISCLAIMS ANY WARRANTIES, EXPRESS, IMPLIED OR STATUTORY AND EXPRESSLY DISCLAIMS THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR PARTICULAR PURPOSE, GOOD TITLE AND AGAINST INFRINGEMENT.

DS20E Reference Guide

Second Revision (September 1999)

Part Number ER-K8F6W-UA. B01

Contents

Chapter 4
Booting and Installing an Operating System

Chapter 5
Reconfiguring the System

Chapter 6
Using the AlphaBIOS

Chapter 7
Using the Storage Subsystems

List of Figures and Examples

List of Tables

About This Guide

Intended Audience

This guide is for the person who installs, administers, and repairs servers or workstations. Compaq assumes you are qualified in the servicing of computer equipment and trained in recognizing hazards in products with hazardous energy levels.

Text Conventions

This document uses the following conventions to distinguish elements of text:

Keys	Keys appear in boldface. A plus sign (+) between two keys indicates that they should be pressed simultaneously.
USER INPUT	User input appears in a different typeface and in uppercase.
FILENAMES	File names appear in uppercase italics.
Menu Options, Command Names, Dialog Box Names	These elements appear in initial capital letters.
COMMANDS, DIRECTORY NAMES, and DRIVE NAMES	These elements appear in uppercase.
Type	When you are instructed to *type* information, type

	the information **without** pressing the **Enter** key.
Enter	When you are instructed to *enter* information, type the information and then press the **Enter** key.

Symbols in Text

These symbols may be found in the text of this guide. They have the following meanings.

WARNING: Text set off in this manner indicates that failure to follow directions in the warning could result in bodily harm or loss of life.

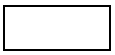
CAUTION: Text set off in this manner indicates that failure to follow directions could result in damage to equipment or loss of information.

IMPORTANT: Text set off in this manner presents clarifying information or specific instructions.

NOTE: Text set off in this manner presents commentary, sidelights, or interesting points of information.

Symbols on Equipment

These icons may be located on equipment in areas where hazardous conditions may exist.



Any surface or area of the equipment marked with these symbols indicates the presence of electrical shock hazards. Enclosed area contains no operator serviceable parts.
WARNING: To reduce the risk of injury from electrical shock hazards, do not open this enclosure.

Any RJ-45 receptacle marked with these symbols indicates a Network Interface Connection.
WARNING: To reduce the risk of electrical shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into this receptacle.

Any surface or area of the equipment marked with these symbols indicates the presence of a hot surface or hot component. If this surface is contacted, the potential for injury exists.

WARNING: To reduce the risk of injury from a hot component, allow the surface to cool before touching.

Power Supplies or Systems marked with these symbols indicate the equipment is supplied by multiple sources of power.

WARNING: To reduce the risk of injury from electrical shock, remove all power cords to completely disconnect power from the system.

Rack Stability

WARNING: To reduce the risk of personal injury or damage to the equipment, be sure that:

- The leveling jacks are extended to the floor.
- The full weight of the rack rests on the leveling jacks.
- The stabilizing feet are attached to the rack if it is a single rack installation.
- The racks are coupled together in multiple rack installations.
- A rack may become unstable if more than one component is extended for any reason. Extend only one component at a time.

Getting Help

If you have a problem and have exhausted the information in this guide, you can get further information and other help in the following locations.

Compaq Technical Support

You are entitled to free hardware technical telephone support for your product for as long you own the product. A technical support specialist will help you diagnose the problem or guide you to the next step in the warranty process.

In North America, call the Compaq Technical Phone Support Center at 1-800-OK-COMPAQ[1]. This service is available 24 hours a day, 7 days a week.

Outside North America, call the nearest Compaq Technical Support Phone Center. Telephone numbers for world wide Technical Support Centers are listed on the Compaq website. Access the Compaq website by logging on to the Internet at http://www.compaq.com.

Be sure to have the following information available before you call Compaq:

- Technical support registration number (if applicable)
- Product serial number(s)
- Product model name(s) and numbers(s)
- Applicable error messages
- Add-on boards or hardware
- Third-party hardware or software
- Operating system type and revision level
- Detailed, specific questions

Compaq Website

The Compaq website has information on this product as well as the latest drivers and flash ROM images. You can access the Compaq website by logging on to the Internet at http://ftp.digital.com/pub/DEC/Alpha/firmware or http://www.compaq.com.

Compaq Authorized Reseller

For the name of your nearest Compaq authorized reseller:

In the United States, call 1-800-345-1518.

In Canada, call 1-800-263-5868.

Elsewhere, see the Compaq website for locations and telephone numbers.

---

[1] For continuous quality improvement, calls may be recorded or monitored.

Chapter 1

System Overview

Introduction

This chapter describes features of the system. The following are discussed:

- System introduction
- System architecture
- System features
- System components
- System features module
- Processor module
- Memory
- PCI Backplane
- Hard disk drive storage
- Power supplies
- 2-way combination module
- Control panel
- Rear panel
- Storage device LEDs
- Combination drive and removable bay

- User interface
- System options

System Introduction

The system is a high-performance system that comes with one processor and can be upgraded to a dual-processor system. Ideal uses of this system include the following:

- Run applications such as relational databases, electronic mail, and communications.
- Provide printing resources to PCs and other systems in a LAN.
- Provide disk storage to PCs and other systems in a LAN.
- Enable PCs to remotely run computation intensive applications.
- Operate in a commercial application due to remote management features.
- Operate as a workstation.

The rackmount and pedestal systems are shown in Figure 1–1.

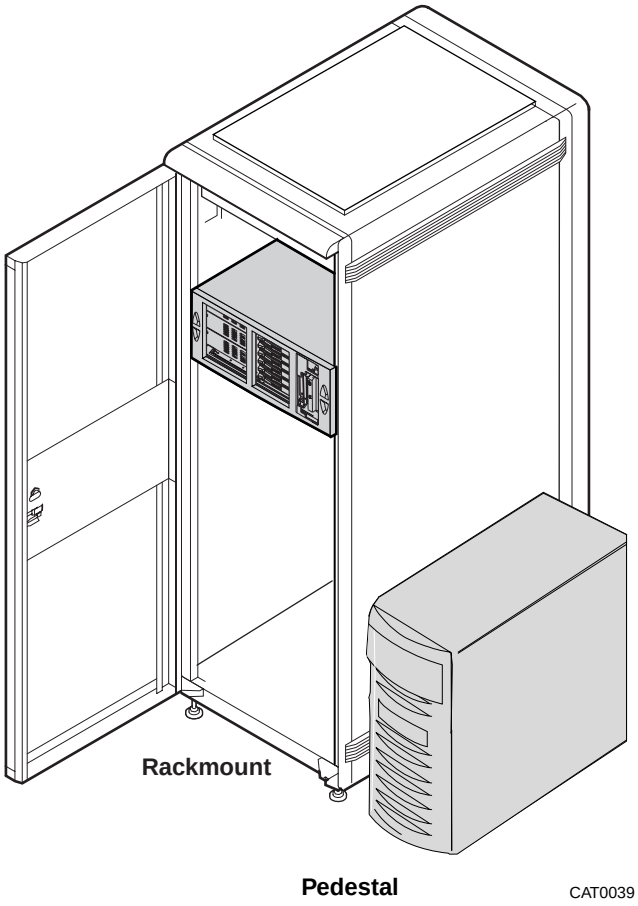


Figure 1-1. Rackmount and Pedestal System

System Architecture

The system is a departmental system provided as a pedestal or rackmount and offers Peripheral Component Interconnect (PCI) and Industry Standard Architecture (ISA) bus options on a single system board. The system utilizes Alpha symmetric multi-processing technology. Figure 1–2 shows the architecture of the system.

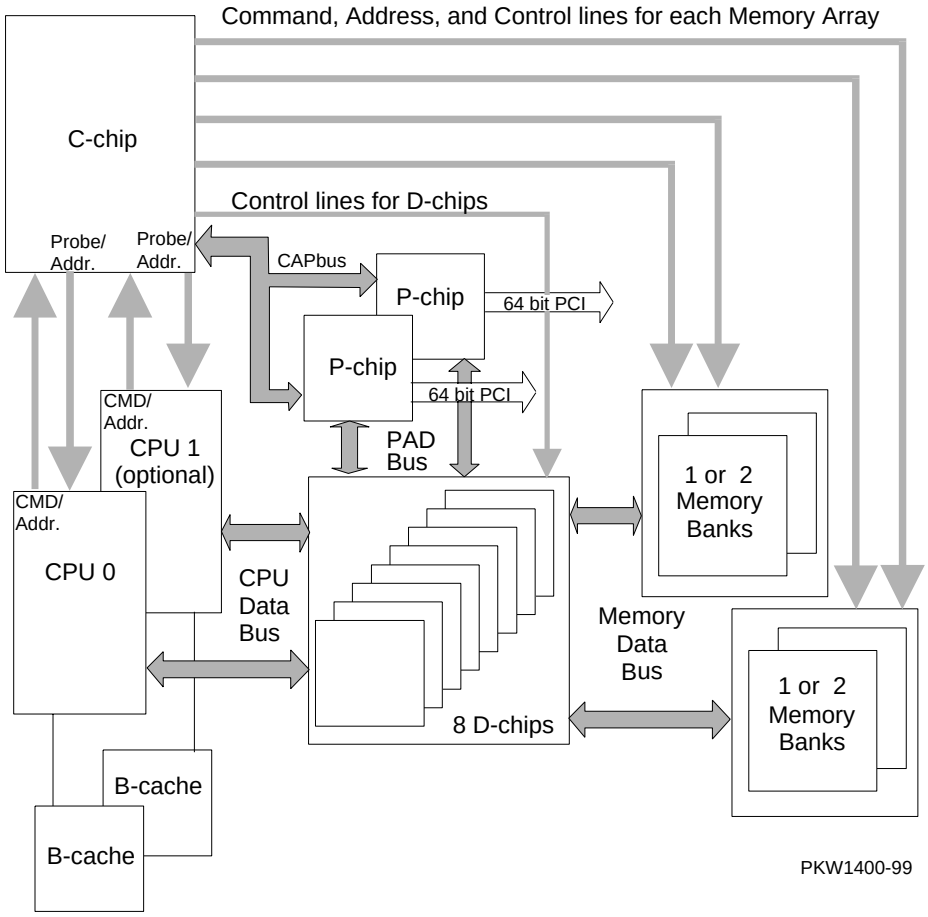


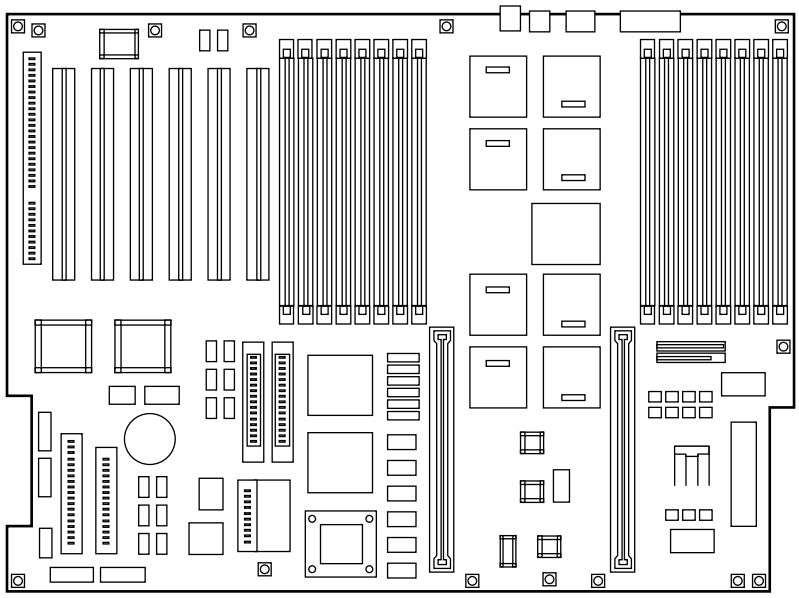
Figure 1- 2. System Architecture

The system is housed in an enclosure containing the system board, other logic modules, and two power supplies (maximum of 3) with internal fans. The enclosure allows for internal mass-storage devices which includes a combination IDE CD-ROM/floppy disk drive, one available half-height removable bay, and four 1.6-inch hot-swap drive bays. The control panel includes **On/Standby** and **Reset, and Halt** buttons**.** The system can be used as a desk-side pedestal in the vertical position, or with the addition of brackets, may be mounted in the horizontal position in a standard rack.

All memory and I/O components are on a single system board that contains a memory subsystem, PCI bus, ISA bus, integrated SCSI F/W/U I/O controllers, and option slots for PCI-based and ISA-based option modules. A separate system management module serves to monitor and control the system remotely.

The 21264 microprocessor is a superscalar, super-pipelined implementation of the Alpha architecture and runs at an optimized price/performance speed of 500 MHz and above. The chip contains a 64 KB I set associative cache and a 64 KB D set associative cache. Support for a larger L2 Cache is provided by a private cache (Bcache). 4 MB are standard with upgrade.

Figure 1–3 shows the basic system board.



CAT0030

Figure 1- 3. Basic System Board

System Features

The system offers a number of features that ensure high performance, expandability, enhanced reliability, high availability, remote server management, and improved security. Table 1-1 lists these features.

Table 1-1
System Features

Feature	Description
64-bit Alpha architecture	Enables large memory operations and high performance for VMS, Tru64 UNIX, and Linux.
Third Generation Alpha Microprocessor	Fast microprocessor for enhanced system performance.
4-MB second-level cache	Reduces memory transaction times significantly.
Compaq Insight Manager Compaq ServerWorks	Easy to manage the system and lower cost of ownership.
Integrated fast wide SCSI controller	Supports tape and hard disk devices without use of an expansion slot (option).
4 -slot storage subsystems	The system is pre-configured with a 4-slot storage subsystem that accommodates 1.6-inch drives.
Hot-swap	Allows replacement of disk drives, fans, and power supplies while the system continues to operate.
Ultra2 SCSI-ready backplane	Provides high-performance drive technology. (Ultra2 - ready) (LVD/SE SCSI)
Operating system	Tru64 UNIX, OpenVMS, or Linux (boot support).

continued

Table 1-1
System Features *continued*

Feature	Description
Flexible packaging	Single enclosure available as free-standing pedestal or rack-mountable box.
100MHz ECC SDRAM memory architecture	Allows incremental memory expansion from 256MB to 4GB.
Five 64-bit PCI slots and one shared 32-bit ISA or PCI 64-bit slot.	Accommodates industry-standard option modules such as Ethernet, FDDI, SCSI, and modems.
PCI combination module with 2D/3D graphics and 10/100 Ethernet.	Base system includes networking capability and enhanced graphics.
Internal storage devices.	A modular storage system accommodates one 5.25-inch slim height CD/FDD combination drive and one 5.25-inch half height tape device.
External ports	Two serial ports and one parallel port support external options such as printer, modem, or local terminal. One 10/100 Mb/s Ethernet port.
Internal sensors	Monitor and detect internal system temperature, fan failure, and power supply.
System diagnostics	Allows local and remote diagnosis of system failures.
Hardware configuration	Allows local and remote system configuration.
Firmware utility	Enables loading and verification of latest firmware versions.
Remote management console	Enables monitoring of system conditions and manipulating of the control panel from a remote terminal.
Key lock (pedestal only)	Limits access to system components.

System Components

Figure 1-4 identifies the main components of the system in a pedestal version.

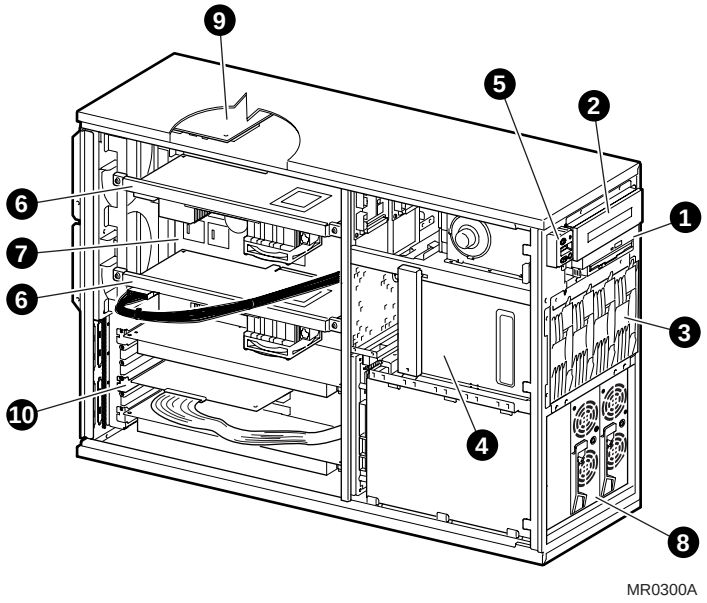


Figure 1-4. System Parts

The main components of the system are listed in Table 1-2.

Table 1-2
System Parts

Figure Legend	Component
❶	Floppy disk drive.
❷	CD-ROM.
❸	Storage subsystem.
❹	Hard disk drives.
❺	Operator control panel (OCP).
❻	CPUs.
❼	System board.
❽	Power supplies (2 minimum).
❾	System features module.
❿	SymBios Adapter 895 SCSI Card

System Features Module

The system features module (SFM) monitors environmental conditions in the system. The SFM supports the two system fans and three power supplies. The SFM also monitors the state of the CPU fans on the system board. Switch 1 on the switch pack enables the Remote Management Console (RMC). Figure 1-5 shows the SFM key features.

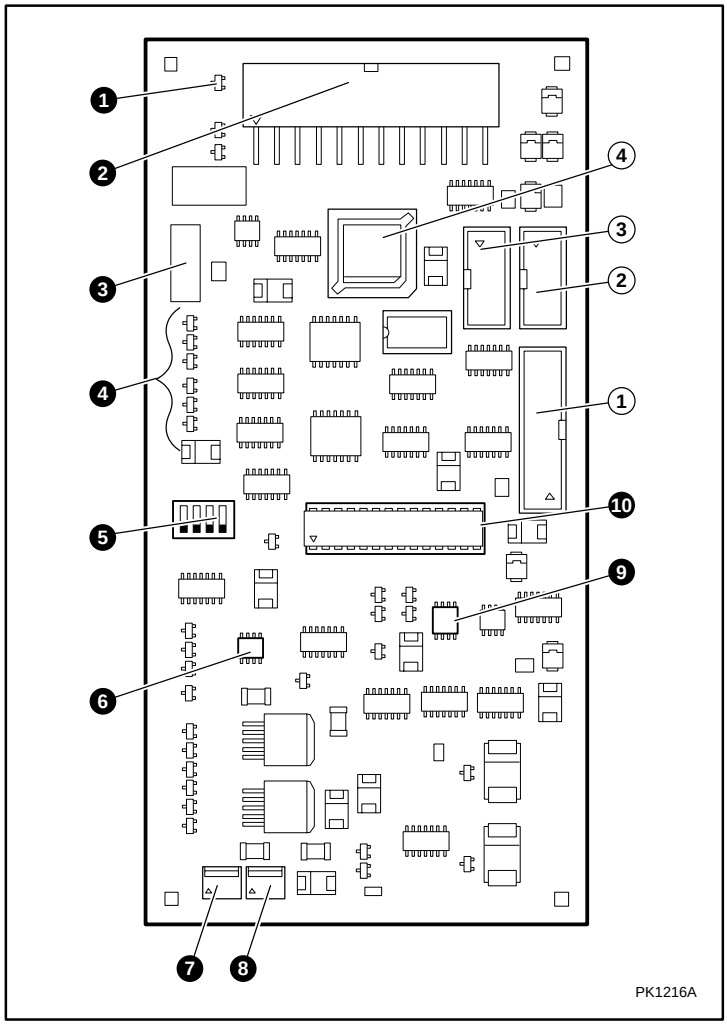


Figure 1-5. System Features Module

Table 1-3 describes the main features of the SFM module.

Table 1-3
SFM Key Features

#	Connection	Description
❶		Vaux5 LED- lit when AC power present in system.
❷	J1	Power supply connector, 24-pin
❸	J2	Door connector, 6-pin
❹		Status LEDs
❺		Switch pack
❻		Fan control thermostat
❼	J7	Fan1 connector, 3-pin, connection to outboard system fan
❽	J6	Fan0 connector, 3-pin, connection to inboard system fan
❾		Temperature sensor
❿		PIC16C73 Microcontroller for RMC (Remote Management Console)
①	J5	DP264 system board connector, 20-pin
②	J3	Control panel connector, 10-pin
③	J4	Unused, 10-pin
④		22V10 PAL chip

SFM Switch Pack

The SFM switch pack is shown in Figure 1-5 at ❺, and again in Figure 1-6 below. The default position for the switches is on for RMC and off (open. towards the words “Default all open”) for the other three switches.

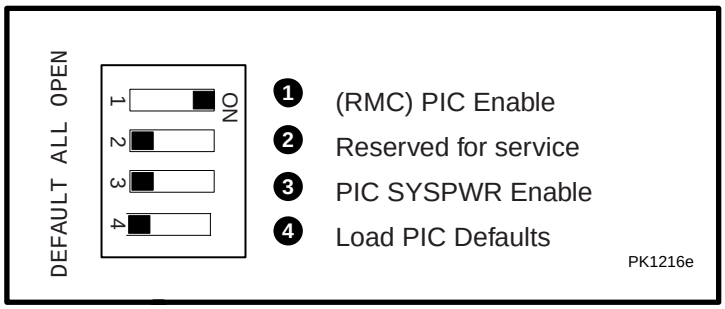


Figure 1-6. SFM Switches

#	Function
❶	(RMC) PIC ENABLE enables/disables the Remote Management Console (RMC). When this switch is on (closed- its default position), the Remote Management Console (RMC) communicates with the device connected to the COM1 port. This switch redirects the system COM1 port’s transmit and receive serial lines to the SFM module. Note that the hardware flow control lines are not passed to the SFM from the system board. In the off (open) position, RMC is not enabled.
❷	Reserved for Service
❸	PIC SYSPWR ENABLE BYPASS bypasses the control signal from the PIC that enables the system to operate. With this switch on (closed, not in the default position), software cannot shut the system down. For example, with the switch on, the RMC power-off command will not shut the system down. Use this switch to prevent remote shutdown. In the default position of off (open), the system can be shut down remotely, or by software.
❹	LOAD PIC DEFAULTS when on (closed), forces the PIC to its default settings, acting like a reset or refresh to the PIC.

SFM Status LEDs

The SFM has 7 status LEDs. The VAUX5 LED is located at ❶ in Figure 1-5. The other 6 LEDs are located at ❺ in Figure 1-5, and are shown in close-up in Figure 1-6. The VAUX5 LED is lit whenever AC power is supplied to the system.

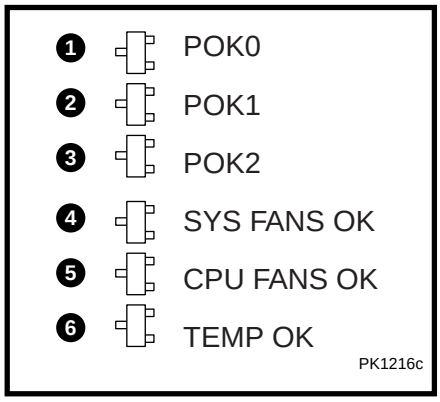


Figure 1-7. SFM Status LEDs

Table 1-4
SFM Status LEDs

#	On SFM Module	Description
❶	POK0	When lit, indicates power supply 0 has passed its self-test and is running okay.
❷	POK1	When lit, indicates power supply 1 has passed its self-test and is running okay.
❸	POK2	When lit, indicates power supply 2 has passed its self-test and is running okay.
❹	SYS FANS OK	When lit, indicates both system fans (fans 0 and 1) are operating.
❺	CPU FANS OK	When lit, indicates CPU fans are operating. If a CPU fan fails, it will result in a fatal system error and the system will shut down in 30 seconds or less.
❻	TEMP OK	Indicates the system temperature is below 55 ºC.

System Fan Configuration

N+1 Configuration

The system has two fans; for optimal cooling, both fans are running. If one of the fans were to fail or were removed for servicing (hot-swapping), the system will continue to function with the other fan running.

As system temperature rises, the fan speed increases to increase cooling. If the system temperature rises above 50ºC (due to high system loads or high ambient temperature), the system software will receive an I/O interrupt and the system will shut down within 30 seconds.

Thermostatic System Fan Control

The fan control thermostat is located at ❻ in Figure 1-5. The thermostat is set to drive the fans at their minimum speed in normal computer room environments below 26 degrees C to keep noise levels low. At higher temperatures, the fans run faster to provide more air flow.

As an ultimate backup, system shutdown will be initiated if the internal temperature reaches 50-55ºC. Firmware or software sets this value.

N+1 Hot-Swap Power Supply Configuration

The SFM enforces the system requirement to have two functional power supplies in order to operate. Using the ≤ 30 second shutdown timer, the SFM shuts down the system if the number of working power supplies ever falls below two. In a three power supply configuration, a power supply may be removed for servicing without interrupting system operation. An I/O interrupt will be generated whenever the number of power supplies in operation changes, and the status LEDs will indicate the change also.

Cover Interlock

The system does not operate with the system enclosure open. System power cannot be turned on until the cover is closed. If the cover is opened while the system is running, power will shut off immediately.

The cover connector is found on the SFM at J2, and ❸ in Figure 1-5.

Processor Modules

The system supports up to two processor modules that can be installed on the system board. Each processor module contains a 21264 microprocessor. The 21264 microprocessor is a superscalar chip with out-of-order execution and speculative execution to maximize speed and performance. It contains four integer execution units and dedicated execution units for floating-point add, multiply, and divide. The chip also has an integrated instruction cache and a data cache. Each cache consists of a 64 KB two-way set associative, virtually addressed cache divided into 64-byte blocks. The data cache is a physically tagged, write-back cache.

Each processor module contains 4 MB secondary B-cache consisting of late-write synchronous SDRAMs (synchronous dynamic random access memory) that provide low latency and high bandwidth. Refer to Chapter 8, “Installing Components,” for instructions on installing additional processors.

Memory

The system supports up to four banks of memory on the system board. Each bank contains four slots with a total of 16 slots on the system board. The system uses 200 pin buffered synchronous Dual In-Line Memory Module (DIMMs).

Table 1-5 illustrates an example of typical SDRAM configurations.

Table 1-5
Typical SDRAM Configurations

Array 0	Array 1	Array 2	Array 3	Total
32MB x 4	32MB x 4			256MB
32MB x 4	32MB x 4	32MB x 4	32MB x 4	512MB
32 MB x 4	64 MB x 4	64 MB x4		640 MB
64MB x 4	64MB x 4			512MB
64MB x 4	64MB x 4	64MB x 4	64MB x 4	1GB
128MB x 4	128MB x 4			1GB
128MB x 4	128MB x 4	128MB x 4	128MB x 4	2GB
256 MB x 4	128 MB x 4			1.5 GB
256MB x 4	256MB x 4			2GB
256MB x 4	256MB x 4	256MB x 4	256MB x 4	4GB

Peripheral Component Interconnect (PCI) Backplane

The system board has two P-Chips which create two 3-slot 64-bit PCI buses running at 33 MHz. There are 6 PCI slots with slot-6 being shared for an ISA slot. When slot-6 is in use by ISA, the sixth PCI slot cannot be used.

The system uses a Cypress South Bridge (CY82C698), which is a highly integrated peripheral solution for PCI-based motherboards. It provides a bridge between the PCI bus, ISA bus, and the IDE peripherals. Support for six PCI slots is provided when one of the slots is used for the optional 2-way combination module (Enet and Video). Information for installing PCI options is provided in Chapter 8.

Hard Disk Drive Storage

The system comes with a storage subsystem that holds four 1.6-inch drives. The 4-slot storage subsystem is available now, and the 6-slot will be offered in the future. See Figure 1-8.

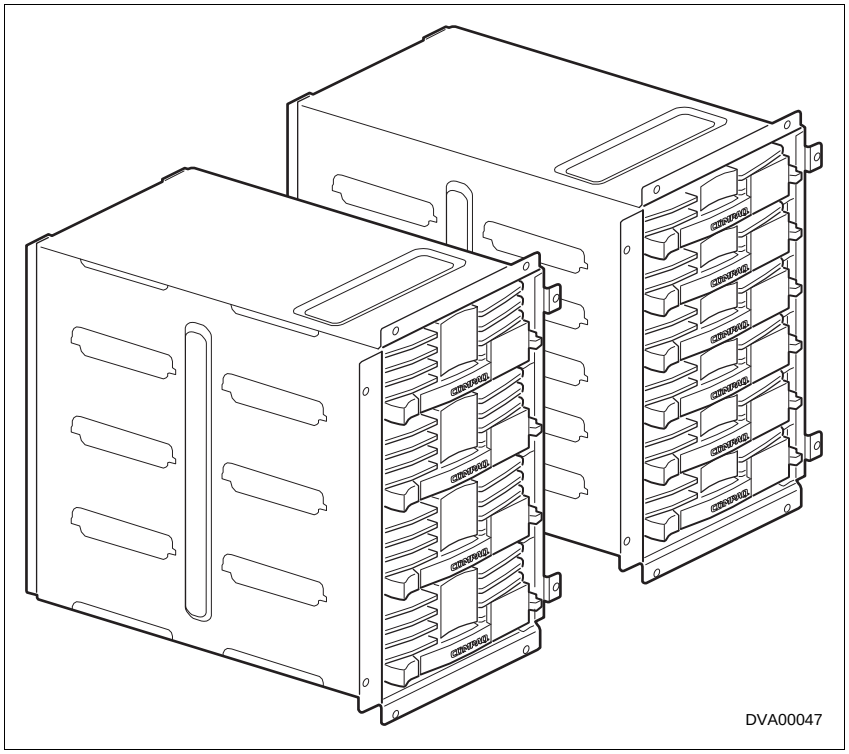


Figure 1-8. 4-slot and 6-slot Storage Subsystems

Power Supplies

The system comes standard with two 375 watt power supplies that are connected in parallel and can accommodate a third power supply, for redundancy. A power backplane integrates the three supplies for power distribution, monitoring and control. All three supplies are removable and accessible through the front of the enclosure. The following voltages are provided: +3.3, +5.0, +12.0, –12.0, +5.0 Aux, and fan power, with the +5 Aux always powered. Voltages, fans, and thermals are monitored for safety by the I^2C bus interface. Two internal fans with a linear fan speed control ramp cool the power supply. Figure 1-9 shows the power supplies.

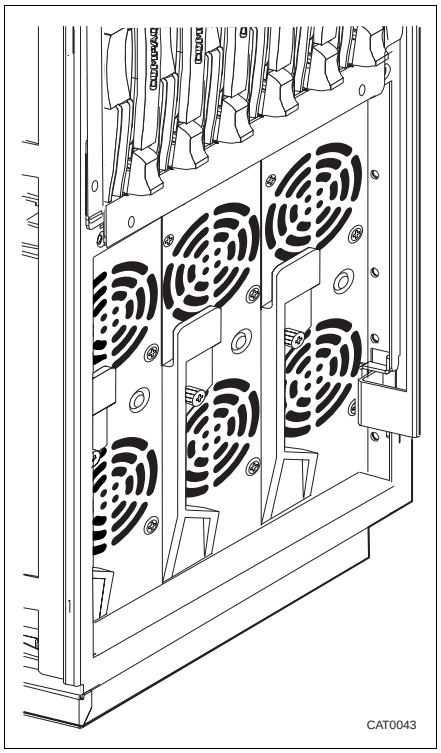


Figure 1-9. Power Supplies

NOTE: With two power supplies, a power supply blank is needed to maintain the proper air flow.

2-Way Combination Module

The system has an optional two-way combination module that is installed in PCI slot 1. The combination module features 2D/3D video (with 4 MB VRAM), along with 10/100 MB Fast Ethernet. The module provides connections for the VGA (Video Permedia 2) and the Ethernet (NIC functions).

The combination board saves a PCI slot by sharing VGA and Ethernet functions. The Ethernet portion of the combination board utilizes the Intel 82558 chip. Figure 1-10 shows the combination module installed in the system.

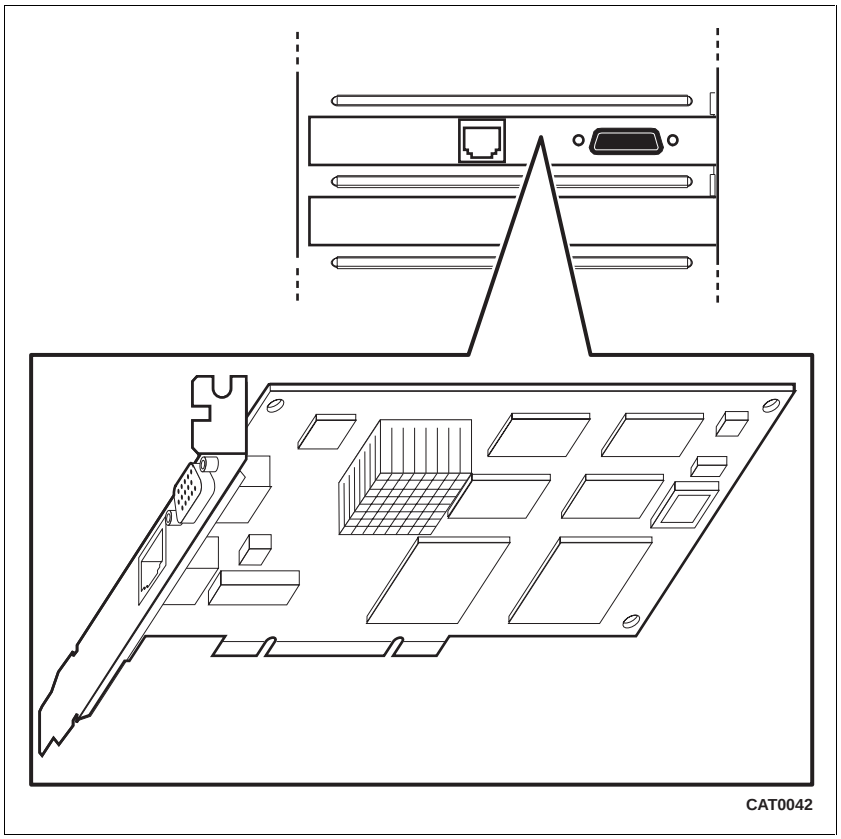


Figure 1-10. Combination Module

Operator Control Panel

The operator control panel (OCP) provides system controls and console activity indicators (Figure 1-11) on the front of the system enclosure.

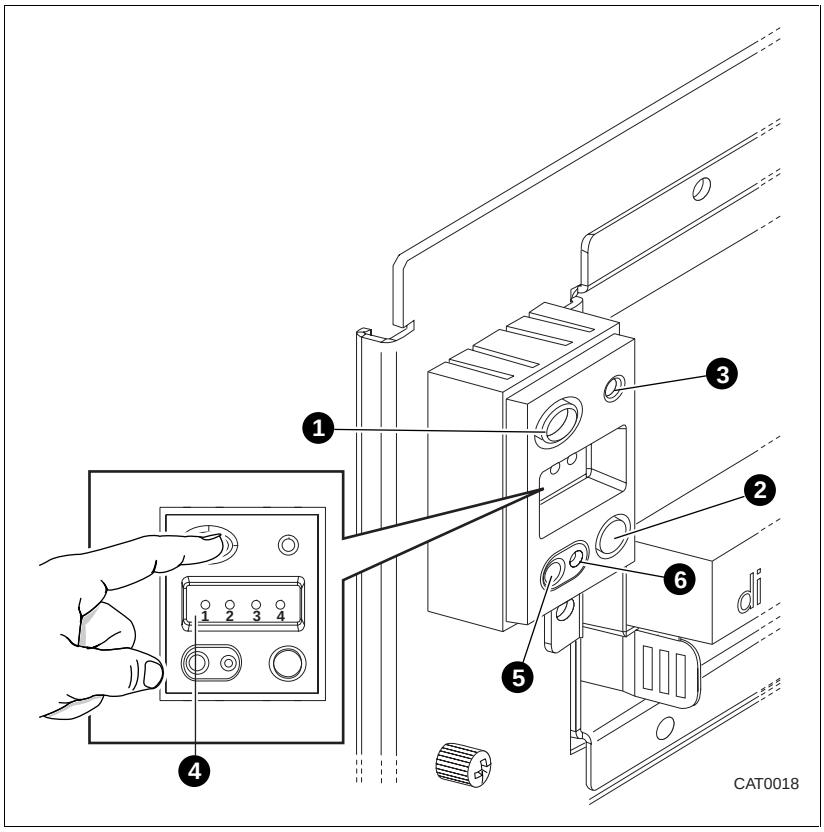


Figure 1-11. Operator Control Panel (OCP)

The control panel consists of three pushbutton controls, one green LED indicator for power, a yellow HALT LED, and four LED indicators for diagnostic faults.

The functions provided by these pushbutton controls and indicators are listed in Table 1-6.

Table 1-6
Control Panel Functions

Figure Legend	Function	Description
❶	Power On/Standby	When plugged in to a power source and the system is powered on, pressing the button On allows power to the OCP. Pressing the button to Standby turns off all DC voltages except Aux 5 volts. This button is a latching switch.
❷	Reset button	A momentary contact switch that initializes the system.
❸	Power Indicator LED	Green power OK indicator. See Table 1-7.
❹	Fault LEDs	Programmable by software. Blink at various console states. See Table 1-7 for details.
❺	Halt Switch	Terminates system operation. This button is a momentary type button.
❻	Halt LED	Halt condition (yellow).

Table 1-7
System Power LED Indicator

Green LED	Status
Off	■ The system is not powered On.
On	■ System is powered On.

The four diagnostic LEDs are shown at ❹ in Figure 1-11. They light up during power-up, indicating the internal process of the system and console. Figure 1-12 shows the LED patterns and system functions.

● indicates the LED is lit/on.
❍ indicates the LED is not lit/off.
In a rackmount system, LED 1 is at the top.
In a pedestal system LED 1 is to the left.

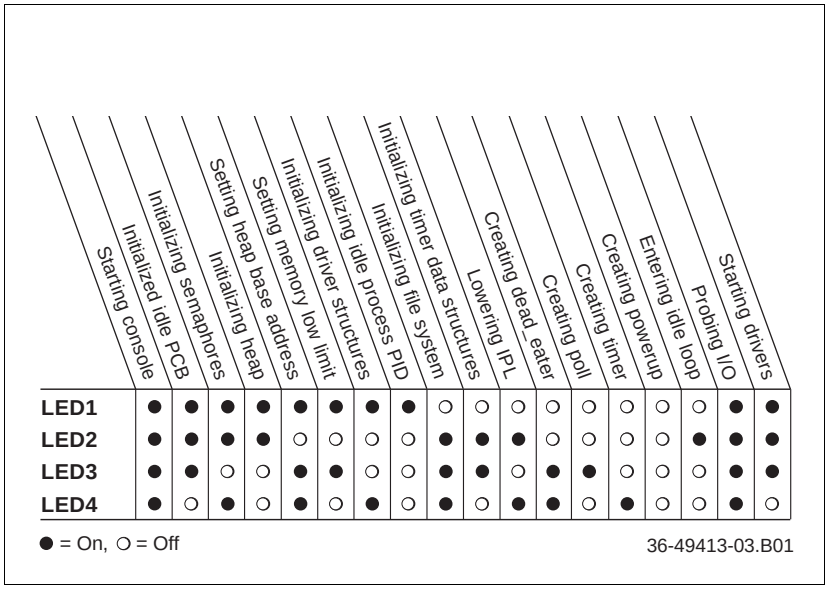


Figure 1-12. Diagnostic LEDs

Rear Panel

The rear panel provides system ports and connections. Figure 1-13 displays a view of the rear panel.

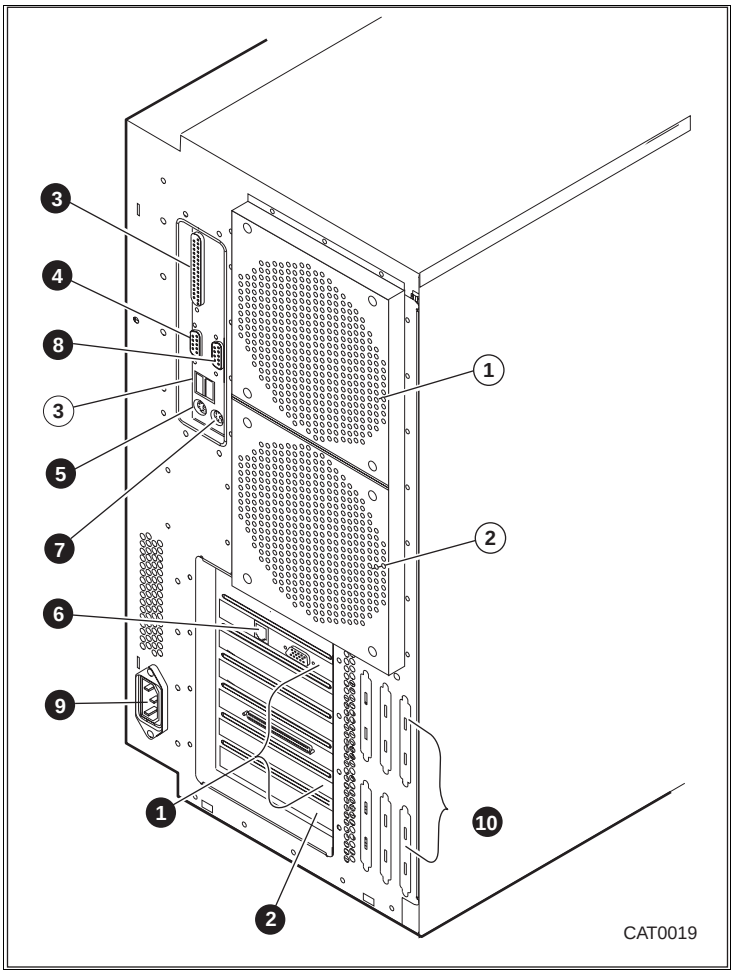


Figure 1-13. Rear Panel

Table 1-8 lists all rear panel ports and connections for the system.

Table 1-8
Rear Panel

Figure Legend	Connector/Port	Description
❶	Five 64-bit PCI slots	For option modules such as high performance network, video, or disk controllers.
❷	One shared 64-bit PCI /16-bit ISA slot	For option modules such as high performance network, video, or disk controllers.
❸	Parallel port	To parallel devices such as a printer.
❹	Serial port (COM2)	Extra port to modem or any serial device.
❺	Keyboard port	To PS/2-compatible keyboard.
❻	Ethernet port	To network.
❼	Mouse Port	To PS/2-compatible mouse.
❽	Serial port (COM1)	Standard port to modem or any serial device.
❾	AC Power inlet	To power outlet.
❿	SCSI breakouts	For SCSI options.
①	System fan 0	System fan.
②	System fan 1	System fan.
③	Universal Serial Bus (USB)	Not supported at this time.

Storage Device LEDs

Storage device LEDs indicate the status of the device. The hard disks in the storage subsystem has three LEDs that are channeled from the drive to the front of the carrier with fiber optic light pipes. The LEDs display activity, power, and fault. Figure 1-14 shows the LEDs and their positions on the drive carrier and Table 1-9 explains the status of each. The combination CD-ROM/FDD shown in Figure 1-15 provides activity LEDs.

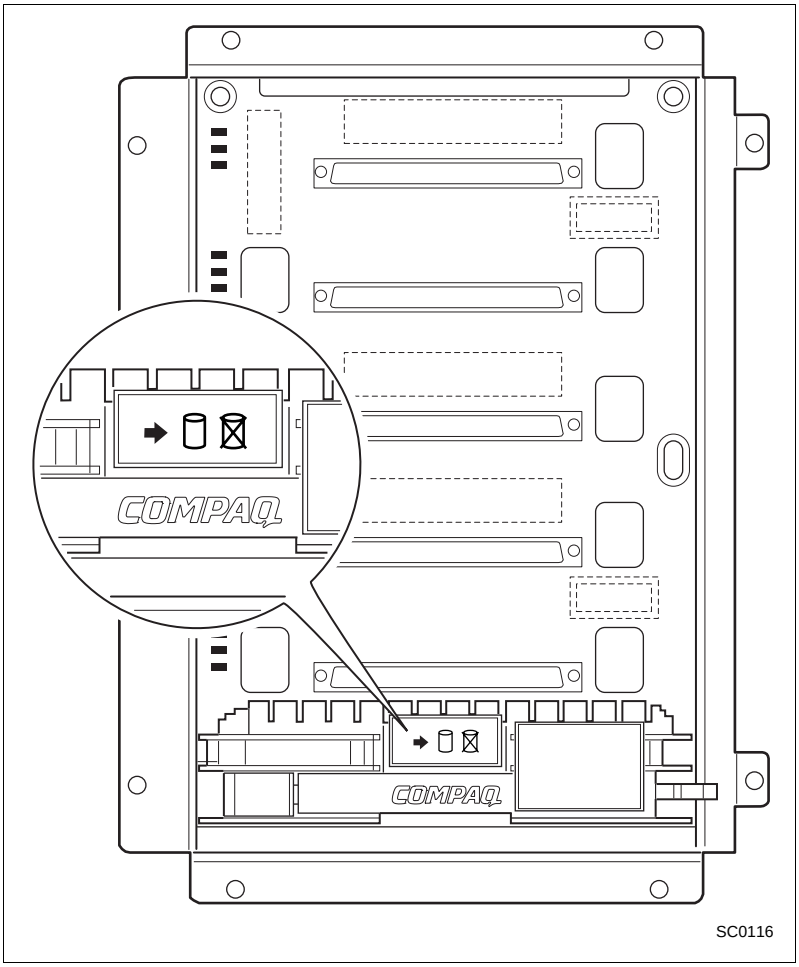


Figure 1-14. Hard Disk Drive Status LED Location

Table 1-9
LED Status

LED	Status
	Green indicates activity.
	Green indicates power on.
	Amber indicates fault.

Combination Drive and Removable Bay

Figure 1-15 shows the location of the removable media bay ❶ and the combination CD-ROM ❷ and FDD drive ❸.

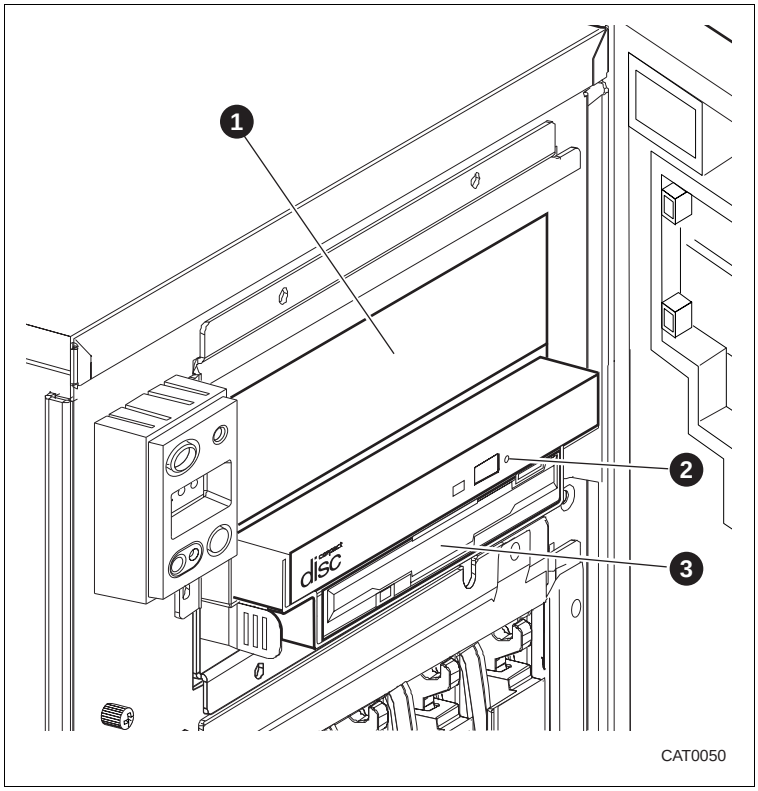


Figure 1-15. Removable Media Bay and Combination Drive

User Interface

The system offers two separate interfaces to the console program: SRM and AlphaBIOS. The system can operate in one of the following three modes:

- Operating system mode
- Console mode
- Remote manager mode

The console firmware is located in a flash ROM (read-only memory) on the system board. It boots the operating system, runs configuration utilities, displays the system configuration, and runs diagnostic tests.

Remote management mode can be entered through an escape sequence at the local terminal or modem port. This allows remote access to the control panel functions. It also allows maintenance of system environmental conditions and the setup of alerts for changes in certain operating conditions.

The system offers an AlphaBIOS as an interface to the console program. The AlphaBIOS console firmware has a menu-based interface and is used to configure the system. The operator selects an item from the menu displayed on a screen.

Console Terminal

The console terminal can be a serial (character cell) terminal connected to the COM1 port, or a VGA monitor connected to a VGA adapter on PCI slot-1. When a VGA monitor is connected, a keyboard and mouse must also be connected.

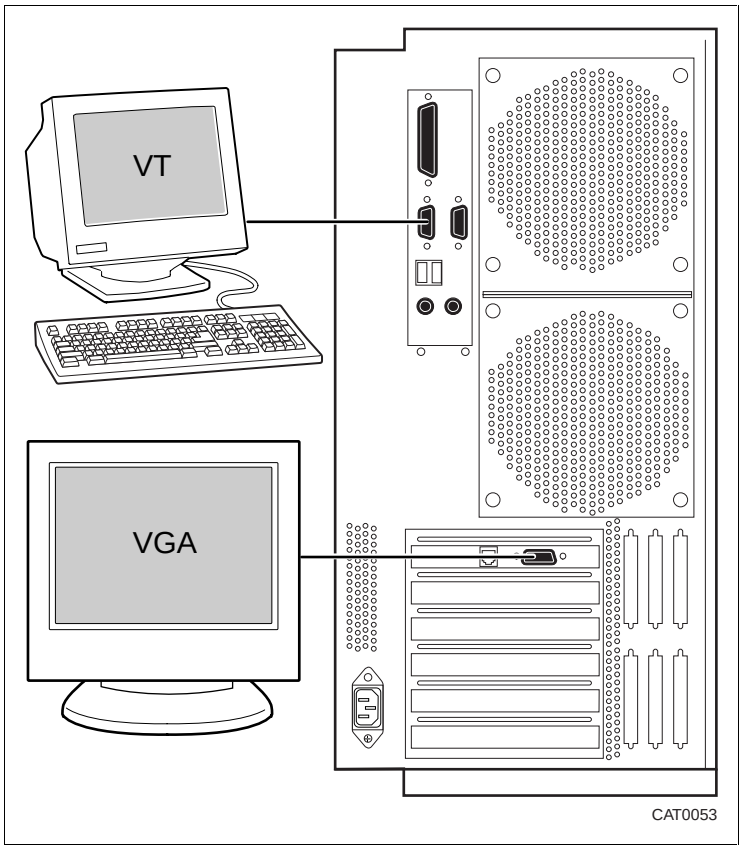


Figure 1-16. Console Terminal Connections

System Options

The system supports storage options, PCI/ISA options, and memory options. The following sections provide information about internal and external options.

Internal Options

The following types of internal options are supported:

- Storage
  - One combination CD-ROM and FDD
  - One removable media drive
  - Up to six 1-inch SCSI HDDs
- PCI/ISA
  - SCSI storage expansion
  - RAID controller
  - Networking and communication
  - Graphics
- Memory
  - 200-pin, 3.3 volt DIMM

External Options

The following types of external options are supported:

- Monitor or terminal
- Expansion boxes
- Printers
- RAID arrays
- Uninterruptible power supply (UPS)
- Modem

Ordering Options

The list of supported options is subject to change. Contact your sales representative for information on the current list of supported options and for information on ordering. If you are an Internet participant, you can obtain information related to the system through the Compaq Web site:

http://www.compaq.com

Chapter **2**

Installing the Pedestal

Introduction

This chapter provides installation procedures for setting up your system. The following is an overview of the contents of this chapter.

- Selecting a system location
- Power requirements
- Shipment box
- Installing the system
- Locking your system

CAUTION: Because of heavy lifting and maneuvering involved, two people are needed to handle the installation. A single person should NOT attempt to install the system.

Selecting a System Location

When choosing a system location, keep in mind the environmental conditions and power requirements for the system. Figure 2-1 shows the system dimensions and the clearance needed to access the system for servicing.

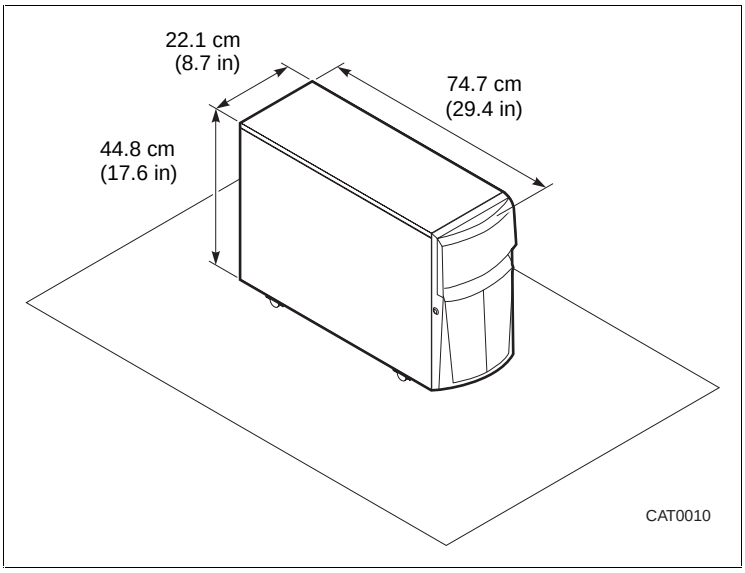


Figure 2-1. System Dimensions and Service Area

NOTE: See Appendix D for information on environmental conditions.

Power Requirements

Your system automatically detects the voltage source when you power up the system, and adjusts the power supply input to accept that voltage. Figure 2-2 shows the power supply requirements.

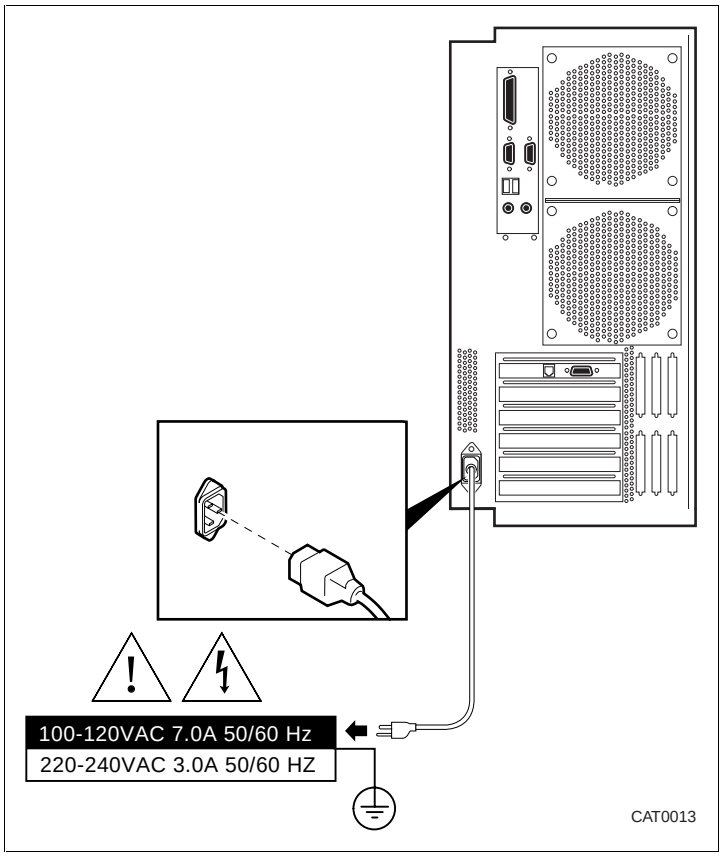


Figure 2-2. Power Supply Requirements

NOTE:

1. Current ratings are maximum with a fully loaded system and do not include a monitor or terminal.
2. See Appendix D for information on specific power supply ratings.

Shipment Box

The system is shipped in a single box. Figure 2-3 shows the hardware shipped with the system.

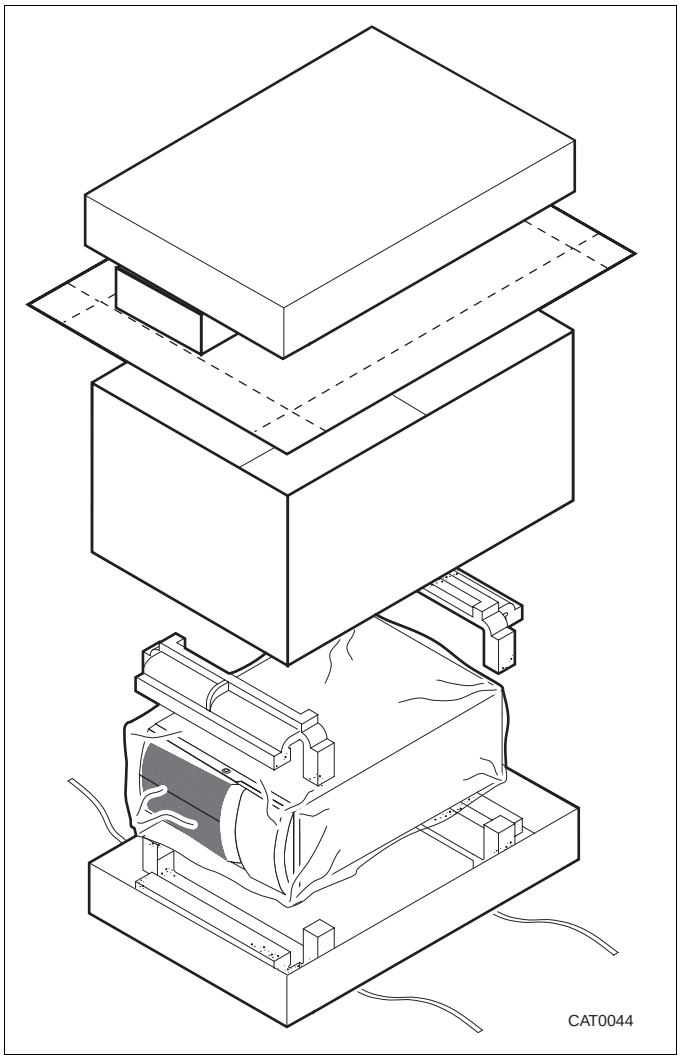


Figure 2-3. Unpacking a System

Installing the System

The system is shipped fully assembled. Perform each connection in Table 2-1 for installing your system. See Figure 2-4 for a view of the cable connections.

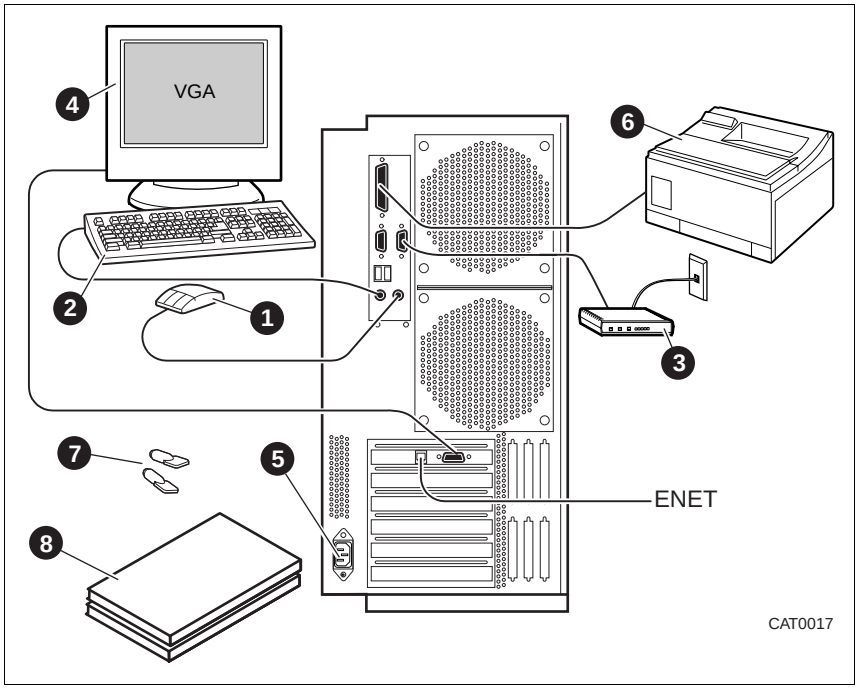


Figure 2-4. System Cable Connections

Table 2-1 lists system cable connections.

Table 2-1
System Cable Connections

Figure Reference	Connection
❶	Mouse
❷	Keyboard
❸	Modem with 10/100Base-T network cable connection
❹	Monitor
❺	AC power connector
❻	Printer
❼	Keys
❽	A Reference Guide and Basic Installation are provided with your system.

NOTE: Your system supports various network options. Typically, the system is configured in 10/100Base-T Ethernet networks as used in this connection example. With appropriate options, you can also connect to ThinWire, FDDI, AUI Ethernet, and token ring networks.

Locking Your System

Systems have a key lock that is located on the front door to prevent unauthorized access. The removable media devices and the system control panel are accessible through the upper front door that opens by sliding down the lock latch shown in Figure 2-5.

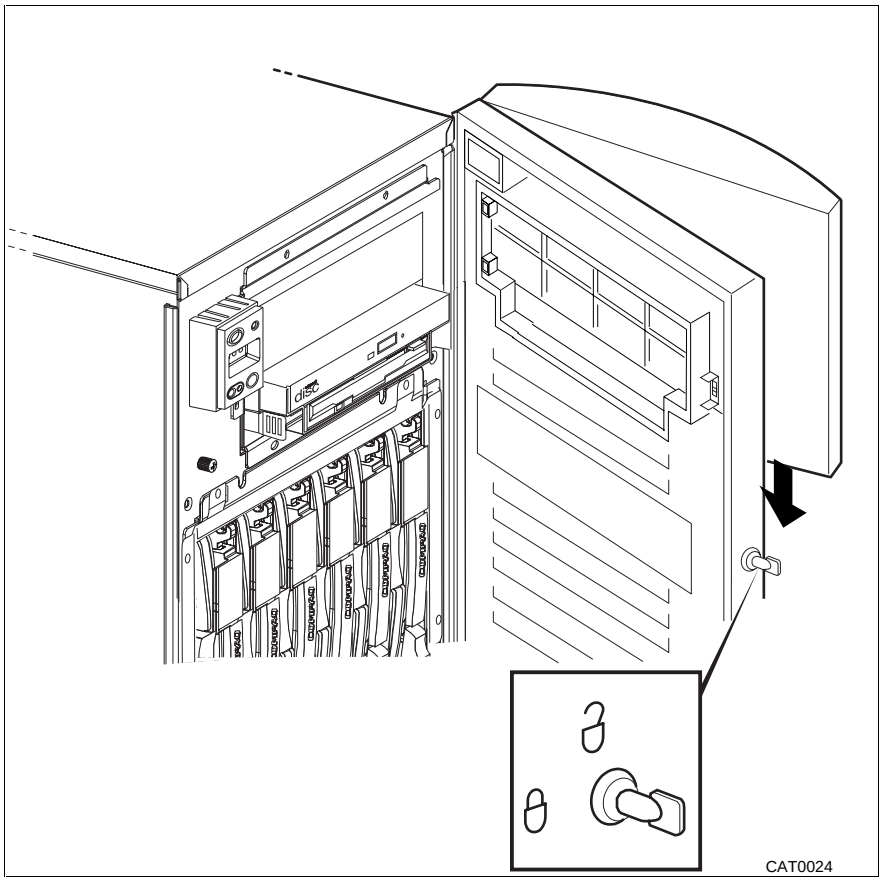


Figure 2-5. System Lock and Key

Chapter **3**

Installing the Rackmount Server

Introduction

There are two rack types that the AlphaServer DS20E may be installed into: the H9A10 or H9A15 rack. This chapter discusses both racks.

This chapter provides installation procedures for setting up your rack mountable server. The following is an overview of the contents of this chapter.

- Shipment box
- Power requirements
- Marking the rack installation area
- Preparing the rackmount system

CAUTION: Because of heavy lifting and maneuvering involved, two people are needed to handle the installation. A single person should NOT attempt to install the system.

Shipment Box

The system is shipped in a single box with each part shown not assembled. Figure 3-1 shows the hardware shipped with the system.

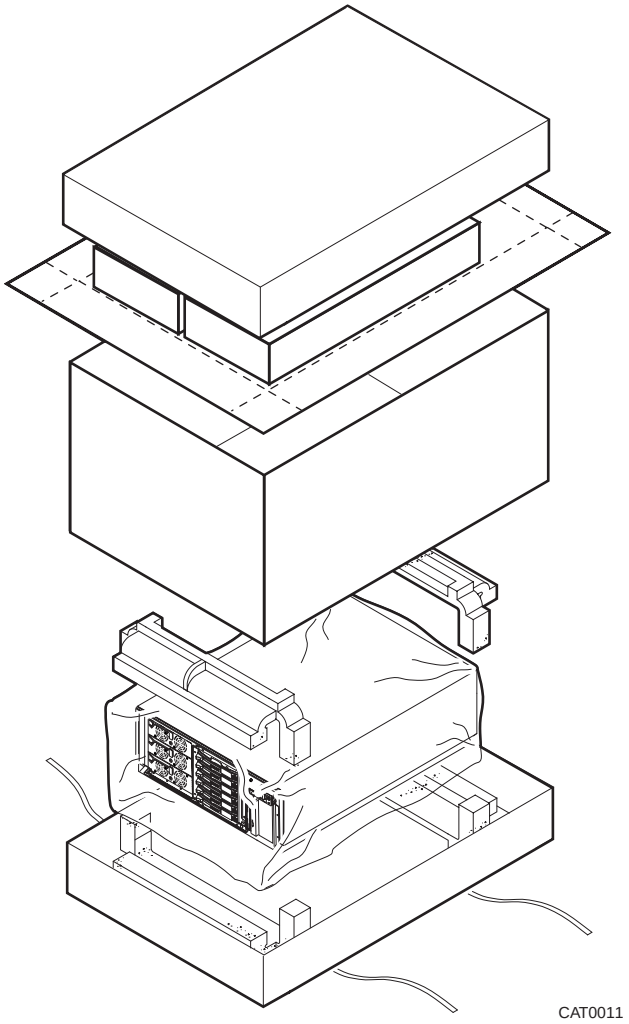


Figure 3-1. Rackmount Server Shipment Box

Power Requirements

Your rack system automatically detects the voltage source when you plug in the rack power and then adjusts the power supply input to accept that voltage. Figure 3-2 shows the power supply connections.

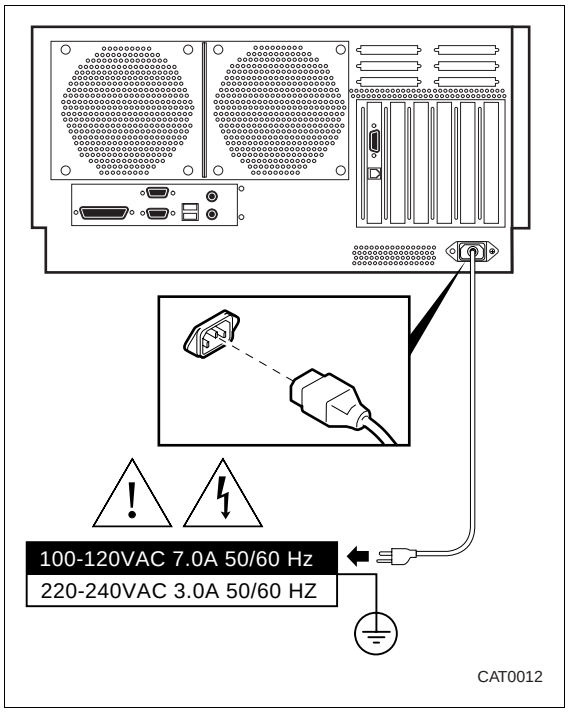


Figure 3-2. Power Supply Connections

NOTES:

1. Current ratings are maximum with a fully loaded system and do not include a monitor or terminal.
2. See Appendix D for information on specific power supply ratings.

Marking the Installation Area in the Rack

Determine the installation area as shown in Figure 3-3.

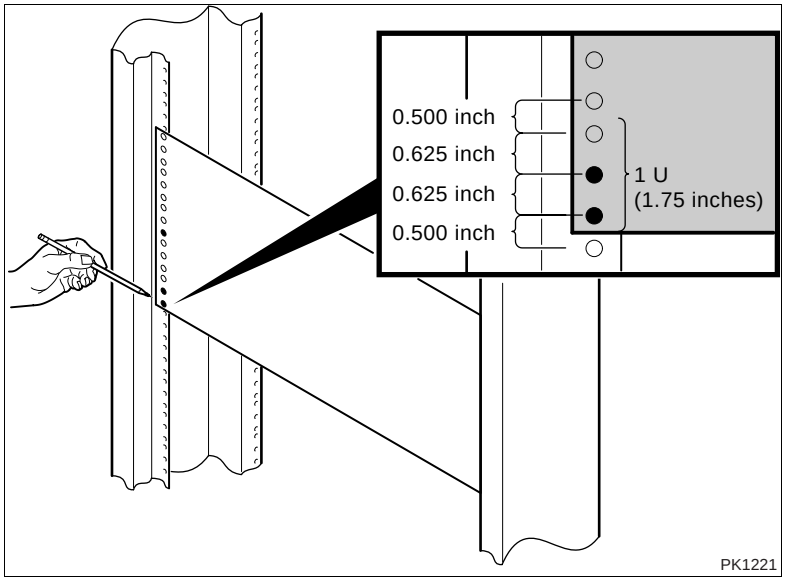


Figure 3-3. Rackmount Installation Area

The installation of the rackmount system requires 8.75 inches (5U) of vertical height in the rack.

1. Mark the midpoint hole on the vertical rail as shown in Figure 3-3. The midpoint hole must be selected so that the holes immediately above and immediately below are equidistant (.625 inches).
2. Mark the corresponding hole on the other three rails.

Preparing the Rackmount System for the Compaq Rack

The system is shipped unassembled. Perform the following procedure for preparing the system for rack installation.

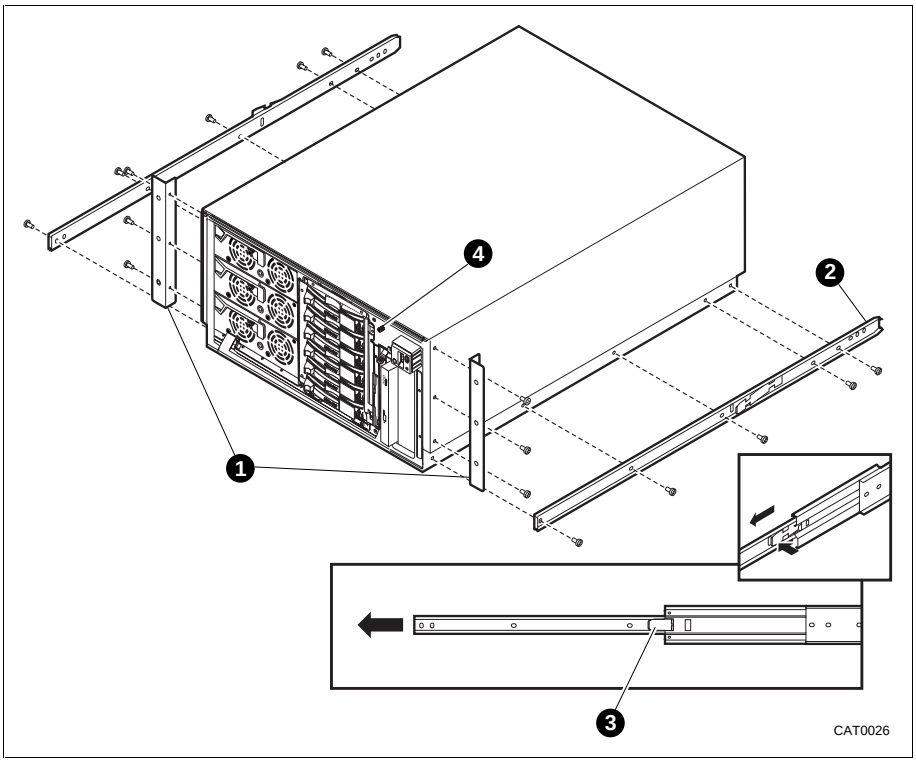


Figure 3-4. Preparing the Rackmount System

Prepare the system as follows:

1. Attach a front mounting bracket ❶ to each side of the system using three M3 x 6 mm screws per bracket.
2. Pull the narrow segment (slide mounting bracket) ❷ of the chassis slide out of a chassis slide and detach it completely by pressing down the retainer spring ❸ and continuing to pull. Position the chassis slide track so that the end of the chassis slide with three holes will stick out past the system. Secure the chassis slide track to the system with five M4 x 6 mm screws.
3. Repeat the step for the other chassis slide.

CAUTION: The chassis slides are lightly greased. Handle them carefully to avoid soiling clothing.

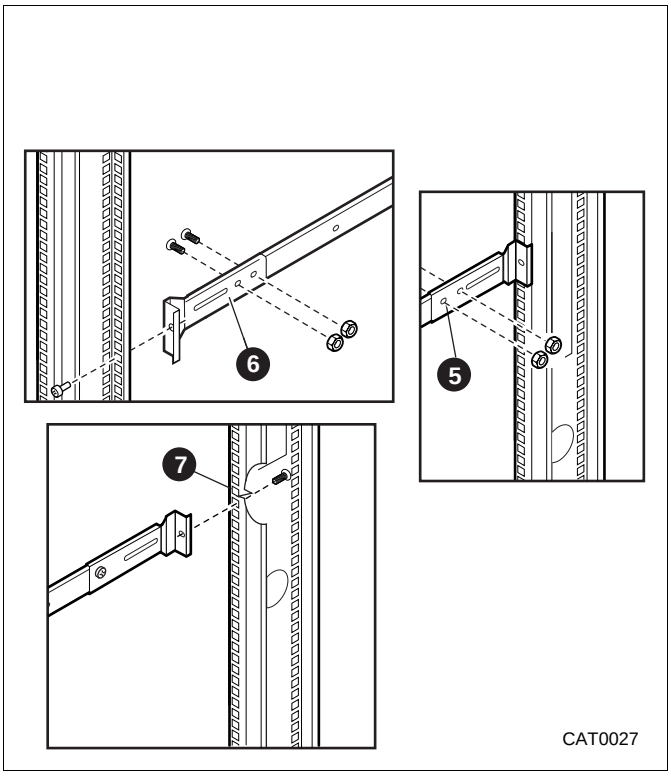


Figure 3-5. Installing Chassis Slides (Rittal VR Rack)

4. Install the adjustable end rail brackets to the front and back of both chassis slides with two M4 screws on each end ❺. To attach the front end brackets, place the two screws (one at a time) through the hole in the chassis slide ❻ (Do not tighten at this time).
5. Adjust the adjustable end rail brackets so that the slides fit the rack and secure with one M6 screw on the front and back of the rack ❼.

Installing the System

Install the system as described in the following procedure. Use Figure 3-6 as a guide.

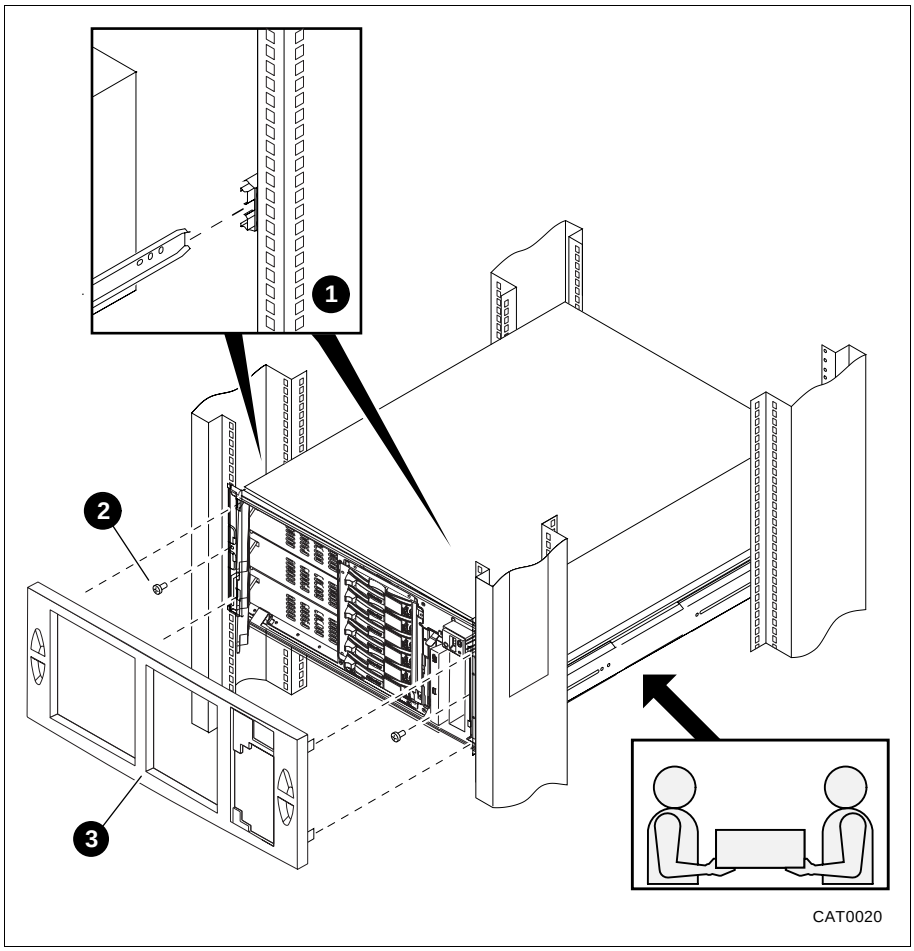


Figure 3-6. Installing the System

Observe the following precautions before you begin to install the system into the rack:

CAUTION:

1. Make sure that all devices are pushed into the rack and no device is disengaged.
2. Activate the stabilizer foot of the rack (if the rack is so equipped), or provide other means to stabilize the rack before installation of the system.
3. The system is heavy and must be lifted by two persons.

1. Lift the system, align the narrow segment of the chassis slides attached to the system with the chassis slides attached to the rack ❶. Slide the system into the rack. Depress the retainer spring on both slides to slide the system completely into the rack. Tighten the system to the rack rails with two M6 screws ❷ one on each side.
2. Align the front bezel ❸ with the front of the system and snap it in place.

Installing the Cable Management Bracket

Install the cable management bracket to the rear rails of the rack as described in the following procedure. Use figure as a guide.

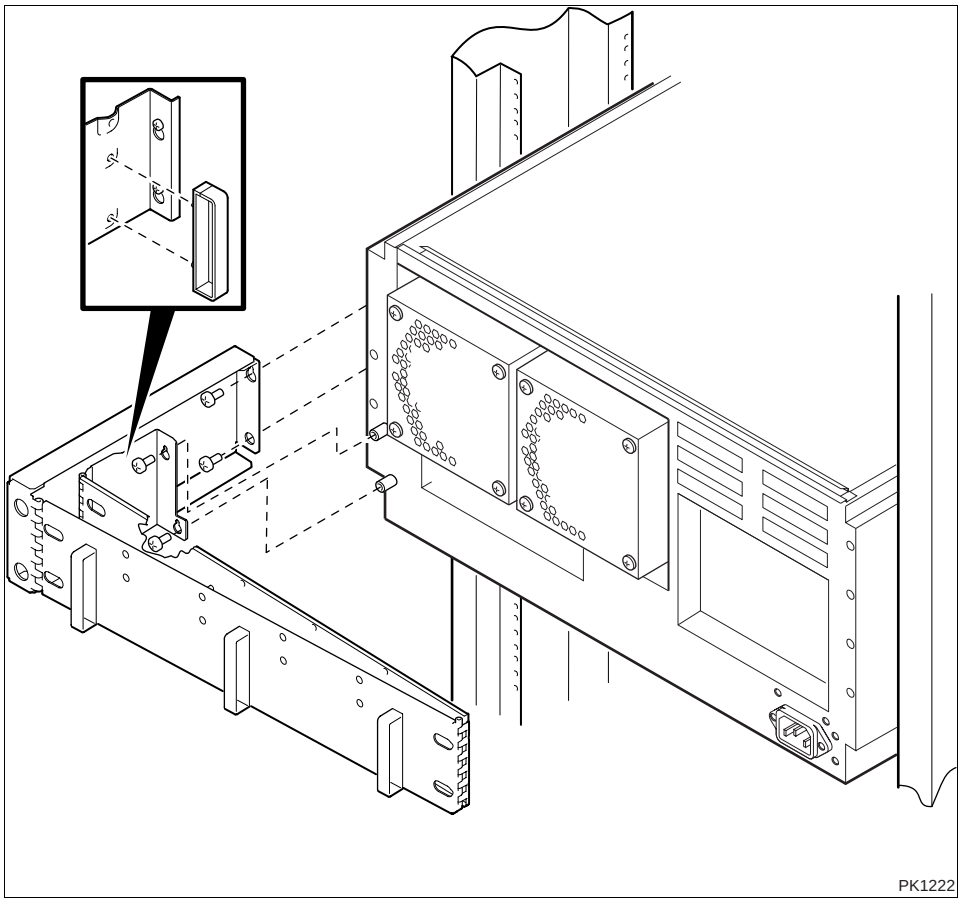


Figure 3-7. Installing the Cable Management Bracket

3. Clip U-nuts over the holes in the vertical rail corresponding to the holes in the cable management bracket ❶.
4. Attach the cable management bracket to the rack with two M6 screws ❷.

Connecting the Cables

See Figure 3-8 for routing rackmount cables.

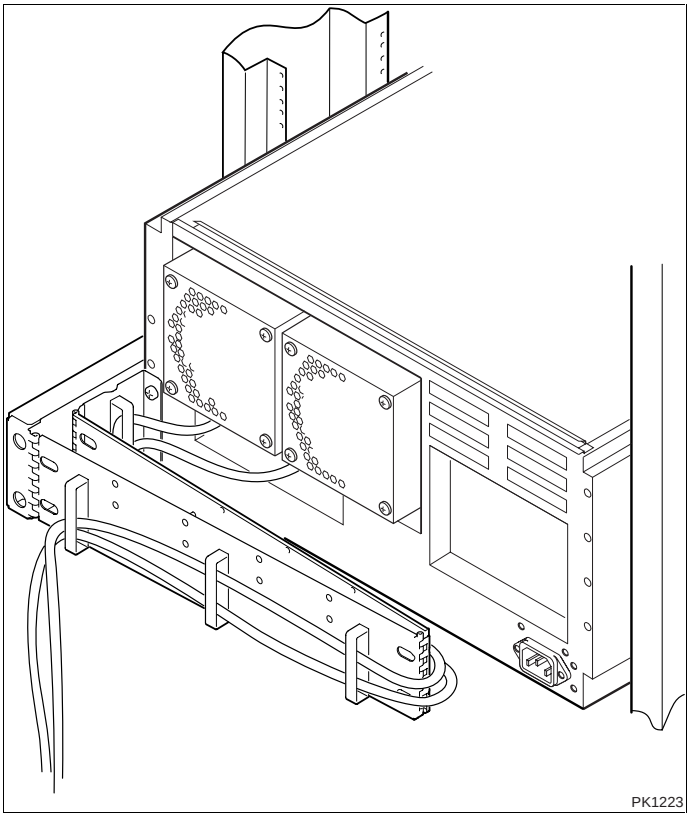


Figure 3-8. Cable Loop at the Rear of the System

Make the rack rear connections as follows:

1. Attach a rear cable first to the rack management bracket with a tie-wrap making sure that a segment of at least 30 inches of cable is available for extension so that the rackmount system can be pulled out of the rack.
2. Plug in the following connectors:
   - Keyboard
   - Mouse
   - Video
   - Enet

Preparing the Rackmount System for the Rack

This section contains information for installing the DS20E server into the H9A10/H9A15 rack.

Reference Information for the M-series Rack Installation

Table 3-1
Compaq AlphaServer DS20E Documentation

Title	Order Number
Rackmount Installation Template	EK-DS20E-TP
H9A10 M-Series Cabinet Interconnect	B-IC-H9A10-5-DBM
H9A10 M-Series Cabinet Configurations	B-IB-H9A10-5-DBM
H9A10 M-Series Illustrated Parts Breakdown	EK-H9A10-IP
H9A15 M-Series Interconnect	B-IC-H9A15-3-DBM
H9A15 M-Series Configurations	B-IB-H9A15-3-DBM
H9A15 M-Series Illustrated Parts Breakdown	EK-H9A15-IP

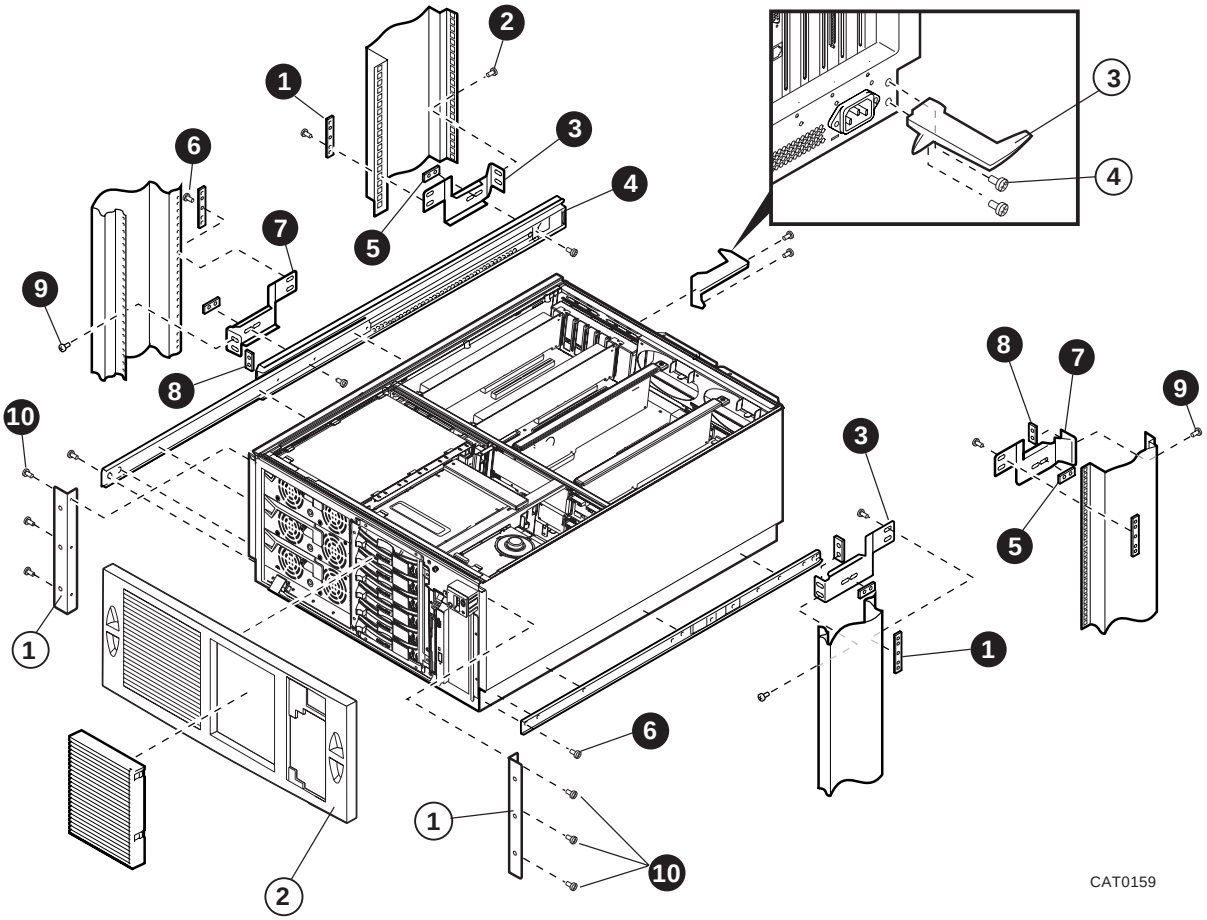

1
2
3
4
5
6
7
8
9
10
CAT0159

Table 3-2
Accessories List

Reference Number	Mounting Hardware
❶	Nutplate, vertical rail
❷	Bracket, stabilizer pivot rod (in Figure 3-16)
❸	Bracket slide, right
❹	Chassis slide
❺	Nutplate, horizontal slide bracket
❻	Screw, M4 x 10mm, Bossard 1593-M4 x 10
❼	Bracket slide, left. Interlock cam (in Figure 3-16)
❽	Barnut
❾	Screw, sems, hex head, square cone washer, 10-32 x 0.375 lg
❿	Screw, flat head, M3 x 6mm
①	Mounting rail, EIA (bars)
②	Bezel, Marquee rack
③	Actuator, bracket, interlock
④	Screw, sems, phillips, pan head, square cone washer, M3x6

To prepare the system for installation, attach the mounting brackets as shown below.

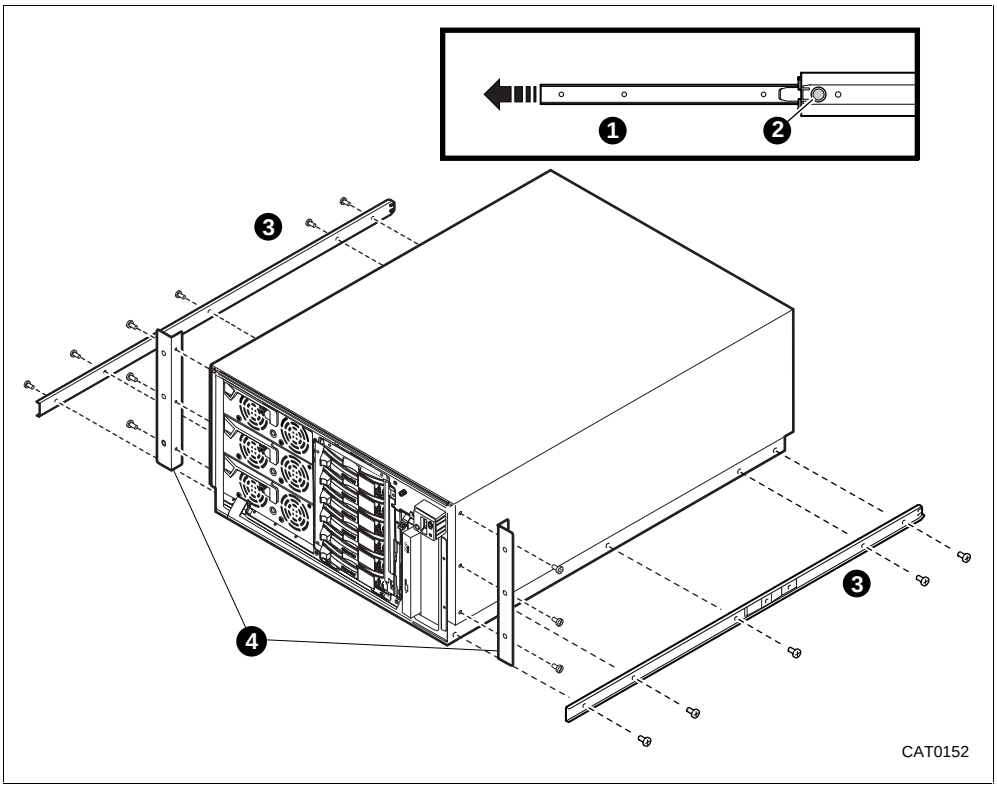


Figure 3-10. Attaching Mounting Brackets and Slides

CAUTION: The slides are lightly greased. Handle them carefully to avoid soiling your clothing.

1. Attach the front mounting brackets ❹ along each edge, using three flat head Phillips screws per bracket.
2. Pull the narrow segment of the slide ❶ out and detach it completely by pressing the green release button ❷ and continuing to pull.
3. Attach the narrow segment of the slide ❸ to the system with five cap screws.
4. Repeat the procedure for the other slide.

Figure 3-11 provides steps for attaching the slide brackets to the slides.

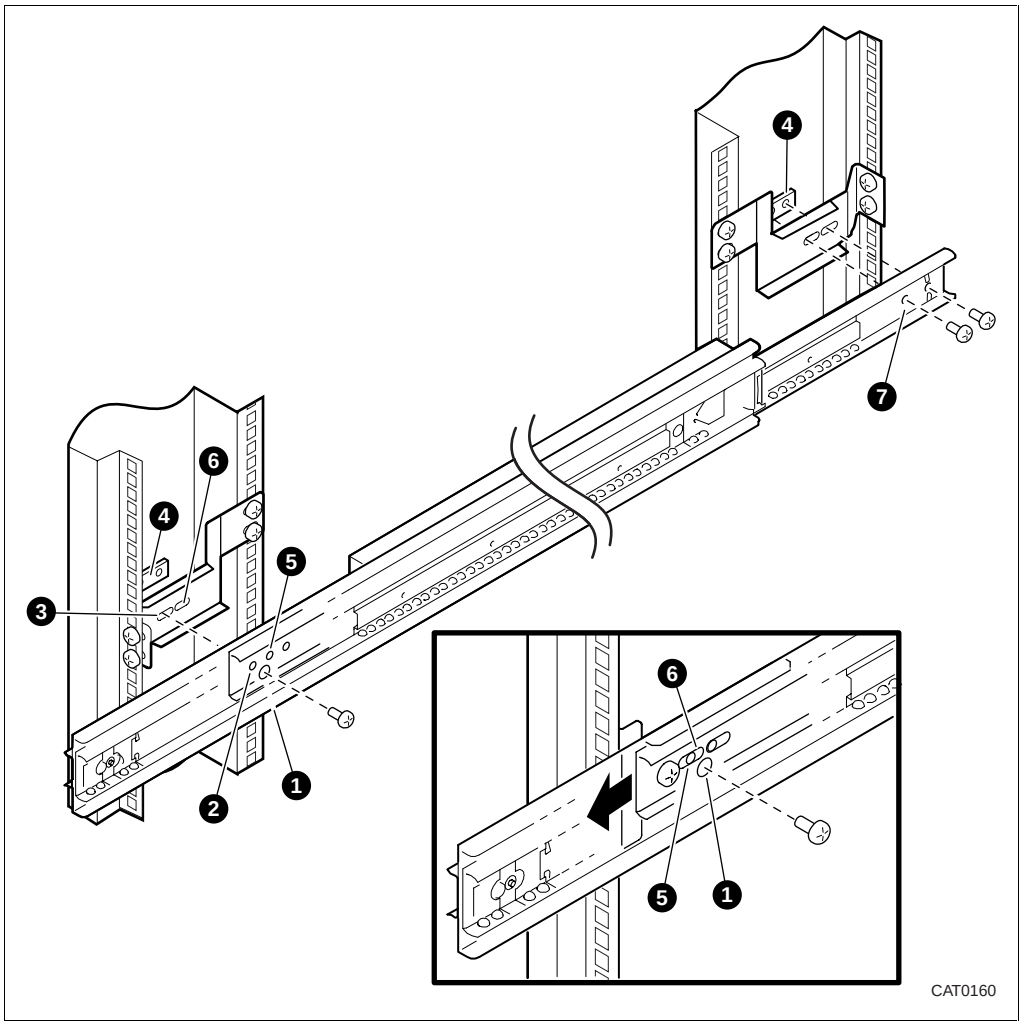


Figure 3-11 Attaching Slide Brackets to Slides.

The sliding segment of the slide has an access hole ❶ that provides access to three mounting holes in the stationary segment. You use two of the mounting holes.

Front

1. Insert a cap screw through the access hole ❶ and the first (forward-most) mounting hole ❷ in the slide and through the hole ❸ in the slide bracket. Fasten with one two-hole nut bar ❹ on and tighten.
2. Align the access hole with the third mounting hole ❺ in the slide.
3. Insert a cap screw through the access hole and the third hole ❹ in the slide and through the slot ❺ in the slide bracket. Fasten through the nutbar and tighten.

Back

1. Insert a screw through the two holes ❼ in the stationary segment of the slide and through a slot in the slide bracket. Attach to a two-hole nut bar ❹.

Repeat the entire procedure for the other slide.

Preparing the Rack

Prepare the rack by attaching the slides to the rack rails.

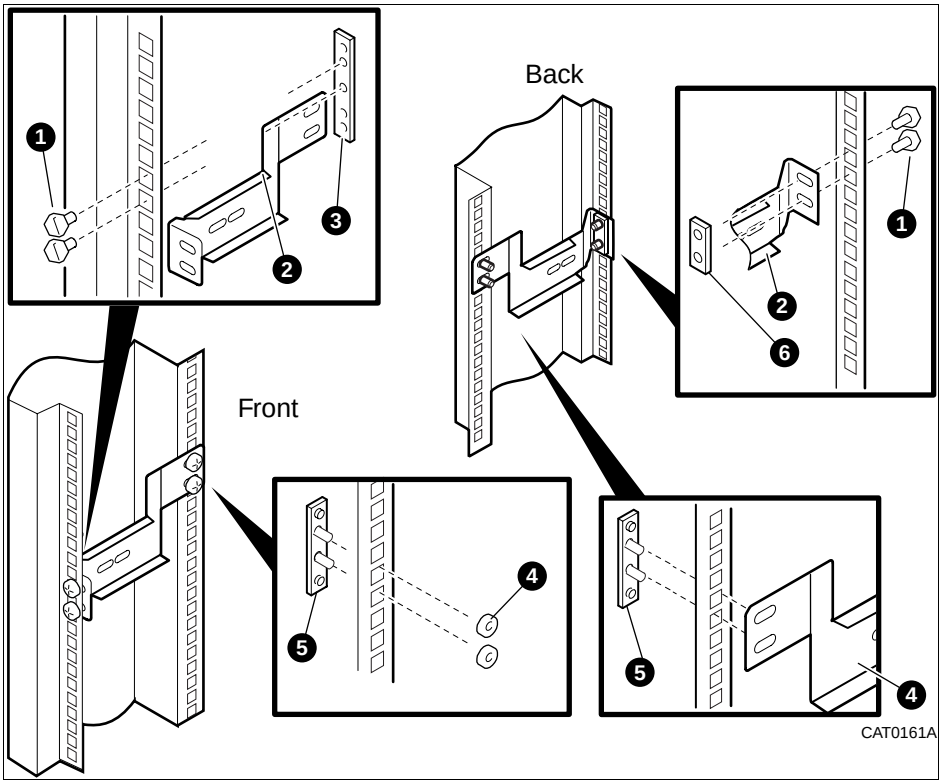


Figure 3-12. Attaching Slide Brackets

Attaching Slides Brackets

Front

1. Starting at the top marked hole put two hex screws ❶ through the rack rail and the slide bracket ❷. Fasten with a 2-hole nut bar ❸.
2. Fit the posts of a 2-post nut bar ❹ into the holes in the cabinet rail and fasten with nuts. ❺
3. Repeat the procedure for the other rail.

Back

1. Starting at the top marked hole put two hex screws ❶ through the rack tail and the slide bracket ❷. Fasten with a 2-hole nut bar ❻.
2. Fit the posts of a 2-post nut bar ❹ into the holes in the cabinet rail and fasten with nuts. ❺.
3. Repeat the procedure for the other rail.

Stabilizing the Rack

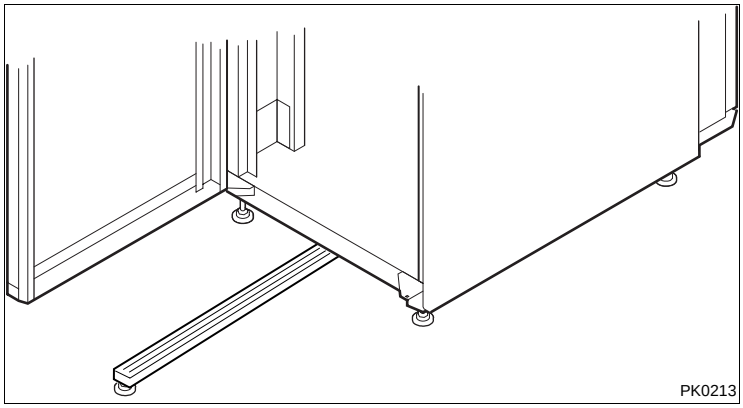


Figure 3-13. Activating the Stabilizer Foot

The system is intended for installation in one of the following racks, which are equipped with a stabilizer bar;

- H9A10 M-Series Medium Rack
- H9A15 M-Series Tall Rack

Pull out the stabilizer bar and extend the leveler foot to the floor before installing the system.

If you are using a rack other than those listed above, install rack stabilizing feet or provide other means to stabilize the rack before installing the system.

Installing the System

Use a material lift or other mechanical device to install the system.

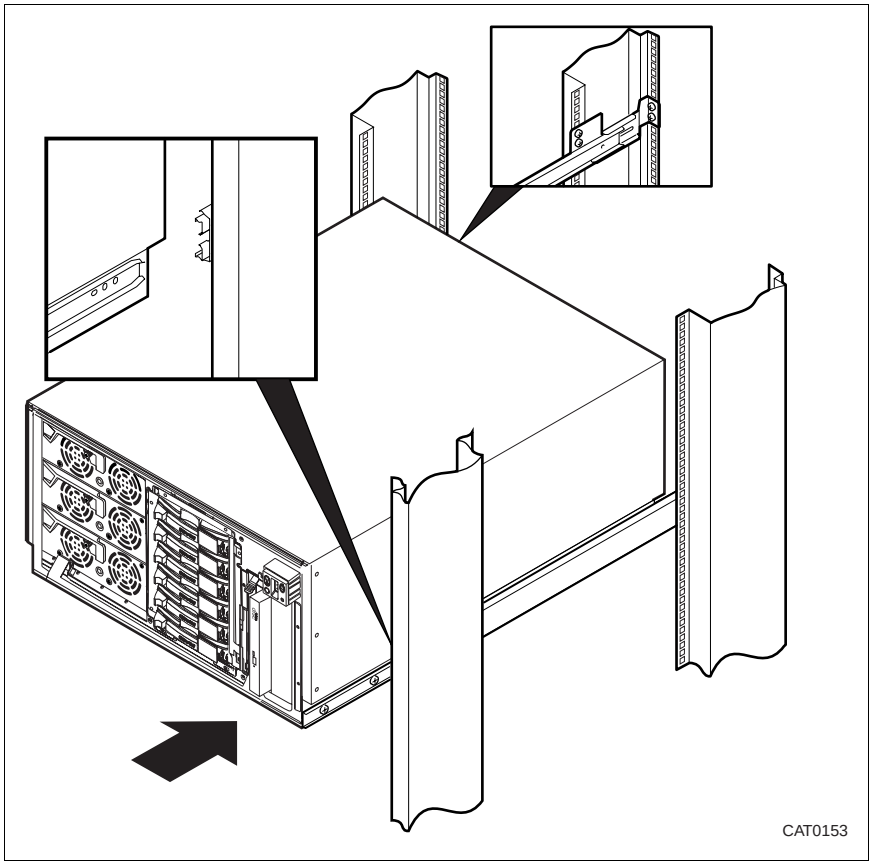


Figure 3-14. Installing the System into the M-series Rack

1. Align the narrow segment of the slides attached to the system with the slides attached to the rack.
2. Depress the green release button on each side and slide the system completely into the rack.

WARNING: Make sure that all other hardware in the rack is pushed in and attached.

The system is very heavy. Do not attempt to lift it manually. Use a material lift or other mechanical device.

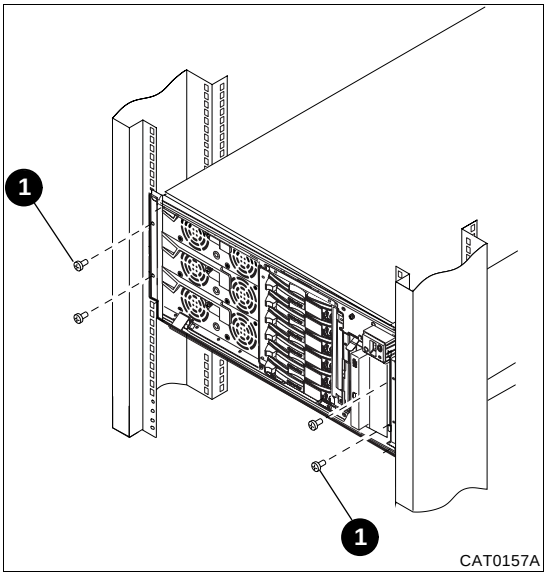


Figure 3-15. Attaching the System to the Rack

3. Install U-nuts at marked locations for two shipping screws.
4. Install 6-32 hex head shipping screws ❶ and tighten.

Installing the Interlock System

The interlock system ensures rack stability by allowing only one rackmount server at a time to be pulled out of the rack. The stabilizer bracket and actuator latch only work in a rack equipped with the interlock system.

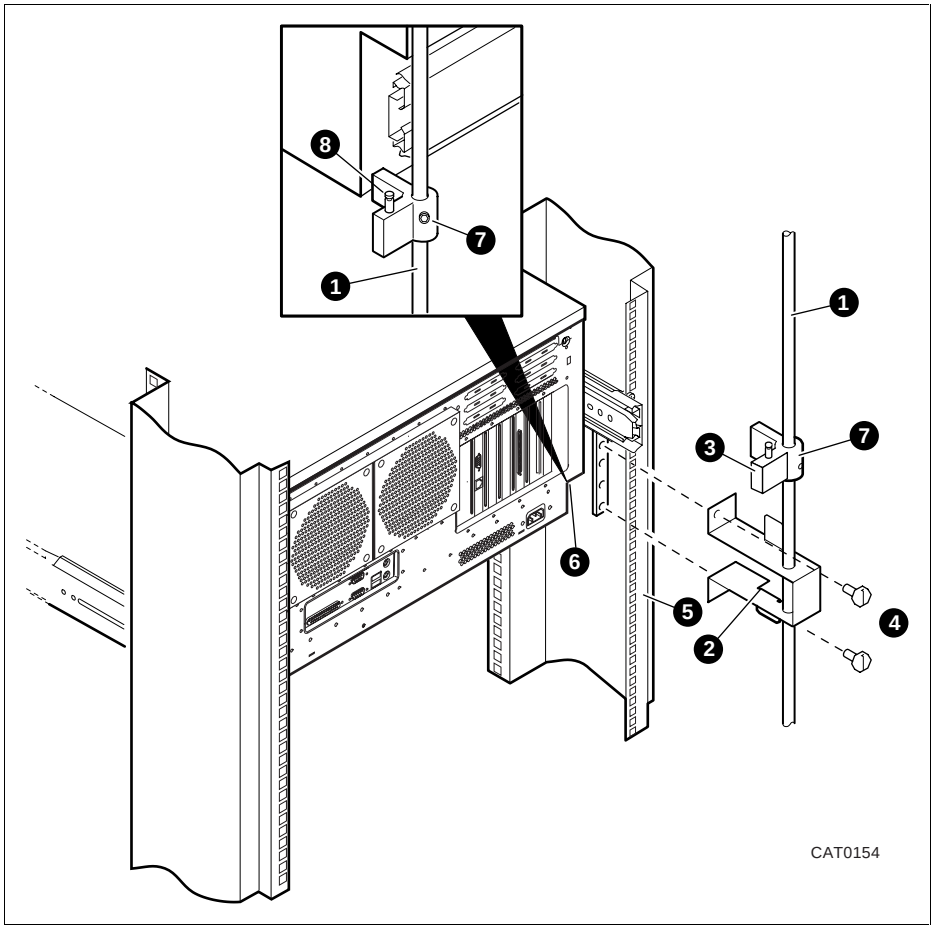


Figure 3-16. Installing the Interlock System

CAUTION: If you are installing a rack that does not have the interlock system, you must ensure rack stability by installing rack stabilizing feet or by some other means.

1. At the back of the rack, release the vertical bar ❶ of the interlock system.
2. Insert the stabilizer bracket ❷ and the actuator latch ❸ into the vertical bar so that the actuator latch is above the stabilizer bracket.
3. Reinstall the vertical bar.
4. Secure the stabilizer bracket to the two remaining marked holes on the right rack rail with two hex screws ❹. Tighten into the u-nuts.
5. Vertically position the actuator latch ❸ such that the trip mechanism ❻ on the system aligns with the actuator latch.
6. Rotate the actuator latch to orient it like the other actuator latches on the vertical bar.
7. Tighten the Allen screws ❼ on the actuator latch.

Installing the Cable Management Arm

Attach the cable management arm to the rear rails of the rack as shown below.

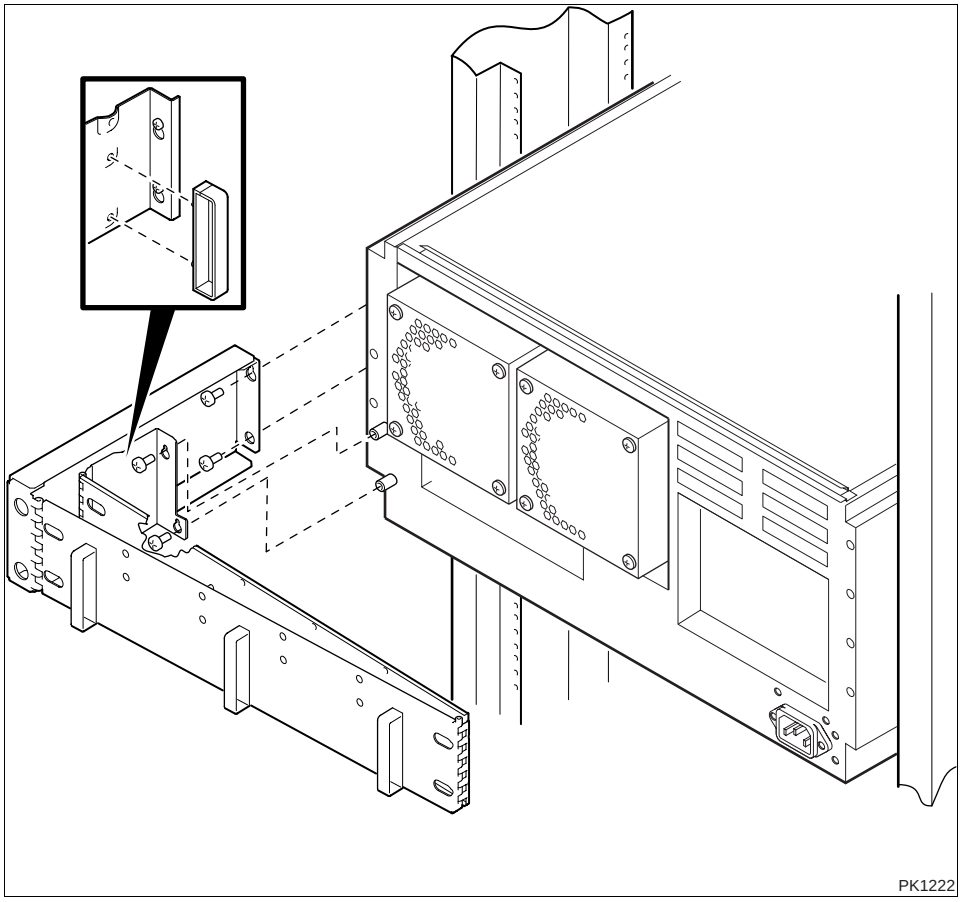


Figure 3-17. Installing the Cable Management Arm

NOTE: Be sure that you have attached all cables to the rear of the unit before installing the cable management arm.

1. Clip U-nuts over the holes in the vertical rail corresponding to the holes in the cable management bracket.
2. Attach the cable management bracket to the rack with two M6 screws.

Dressing the Cables

Dress the cables through the cable clamps on the cable retractor assembly at the rear of the system.

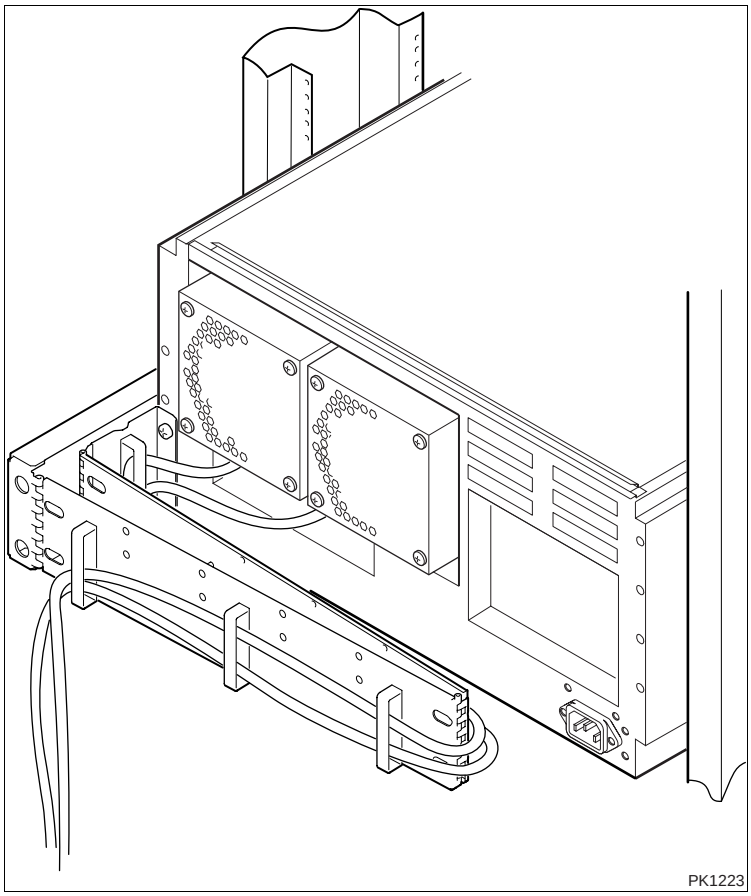


Figure 3-18. Dressing the Cables

1. Dress the cables through the cable clamps ❶ or tie wrap them to the cable retractor assembly.
2. Attach all cables to the member of the cable management arm that is attached to the system.

CAUTION: Failure to attach the cables to the attached member of the management arm may cause cables to become disconnected.

Attaching the Front Bezel

To complete the installation, attach the front bezel as shown below.

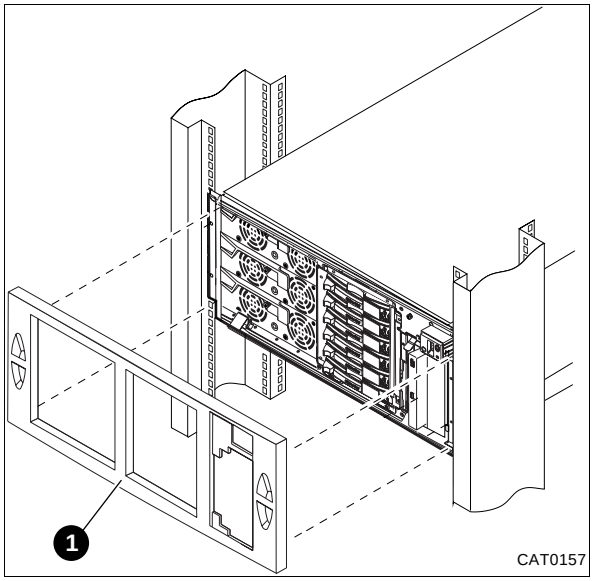


Figure 3-19. Attaching the Front Bezel

1. Align the front bezel ❶ with the front of the system and snap it into place.

Chapter **4**

Booting and Installing an Operating System

This chapter gives instructions for booting the Tru64 UNIX, OpenVMS, and Linux operating systems and for starting an operating system installation. It also describes how to switch from one operating system to another. Refer to your operating system documentation for complete instructions on booting or starting an installation.

The following topics are included:

- Setting Boot Options for Tru64 UNIX or OpenVMS
- Booting Tru64 UNIX
- Starting a Tru64 UNIX Installation
- Booting OpenVMS
- Booting Linux
- Switching Between Operating Systems

NOTE: Your system may have been delivered to you with factory-installed software (FIS); that is, with a version of the operating system already installed. If so, refer to the FIS documentation included with your system to boot your operating system for the first time.

Setting Boot Options for Tru64 UNIX or OpenVMS

You can set a default boot device, boot flags, and network boot protocols for Tru64 UNIX or OpenVMS using the SRM **set** command with environment variables. Once these environment variables are set, the boot command defaults to the stored values. You can override the stored values for the current boot session by entering parameters on the boot command line.

The SRM boot-related environment variables are listed below and described in the following sections:

bootdef_dev	Defines a default boot device.
boot_file	Specifies a default file name to be used for booting when no file name is specified by the boot command.
boot_osflags	Defines parameters to enable specific functions during the boot process.
ei*0_inet_init or ew*0_inet_init	Determines whether the interface's internal Internet database is initialized from nvram or from a network server (through the bootp protocol). Set this environment variable if you are booting UNIX from a RIS server.
ei*0_protocols or ew*0_protocols	Defines a default network boot protocol (bootp or mop).

bootdef_dev

The bootdef_dev environment variable specifies one or more devices from which to boot the operating system. When more than one device is specified, the system searches in the order listed and boots from the first device.

Enter the **show bootdef_dev** command to display the current default boot device. Enter the **show device** command for a list of all devices in the system.

The syntax is:

set bootdef_dev *boot_device*

boot_device	The name of the device on which the system software has been loaded. To specify more than one device, separate the names with commas.

Example

In this example, two boot devices are specified. The system will try booting from dkb0 and, if unsuccessful, will boot from dka0.

```
P00>>> set bootdef_dev dkb0, dka0
```

NOTE: When you set the ***bootdef_dev*** environment variable, it is recommended that you set the operating system boot parameters as well, using the ***set boot_osflags*** command.

boot_file

The boot_file environment variable specifies the default file name to be used for booting when no file name is specified by the boot command.

The syntax is:

set boot_file *filename*

Example

In this example, a boot file is specified for booting OpenVMS from the InfoServer. APB_0712 is the file name of the APB program used for the initial system load (ISL) boot program.

```
P00>>> set boot_file apb_0712
```

boot_osflags

The boot_osflags environment variable sets the default boot flags and, for OpenVMS, a root number.

Boot flags contain information used by the operating system to determine some aspects of a system bootstrap. Under normal circumstances, you can use the default boot flag settings.

To change the boot flags for the current boot only, use the *flags_value* argument with the **boot** command.

The syntax is:

set boot_osflags *flags_value*

The *flags_value* argument is specific to the operating system.

Tru64 UNIX Systems

UNIX systems take a single ASCII character as the *flags_value* argument.

a	Load operating system software from the specified boot device (autoboot). Boot to multiuser mode.
i	Prompt for the name of a file to load and other options (boot interactively). Boot to single-user mode.
s	Stop in single-user mode. Boots /vmunix to single-user mode and stops at the # (root) prompt.
D	Full dump; implies “s” as well. By default, if UNIX crashes, it completes a partial memory dump. Specifying “D” forces a full dump at system crash.

OpenVMS Systems

OpenVMS systems require an ordered pair as the *flags_value* argument: *root_number* and *boot_flags*.

Root_number — Directory number of the system disk on which OpenVMS files are located. For example:

Root_number	Root Directory
0 (default)	[SYS0.SYSEXE]
1	[SYS1.SYSEXE]
2	[SYS2.SYSEXE]
3	[SYS3.SYSEXE]

boot_flags — The hexadecimal value of the bit number or numbers set. To specify multiple boot flags, add the flag values (logical OR). For example, the flag value 10080 executes both the 80 and 10000 flag settings. See Table 4-1.

Table 4-1
OpenVMS Boot Flag Settings

Flags_Value	Bit Number	Meaning
1	0	Bootstrap conversationally (enables you to modify SYSGEN parameters in SYSBOOT).
2	1	Map XDELTA to a running system.
4	2	Stop at initial system breakpoint.
8	3	Perform diagnostic bootstrap.
10	4	Stop at the bootstrap breakpoints.
20	5	Omit header from secondary bootstrap image.
80	7	Prompt for the name of the secondary bootstrap file.
100	8	Halt before secondary bootstrap.
10000	16	Display debug messages during booting.
20000	17	Display user messages during booting.

Example

In the following UNIX example, the boot flags are set to autoboot the system to multiuser mode when you enter the **boot** command.

```
P00>>> set boot_osflags a
```

In the following OpenVMS example, *root_number* is set to 2 and *boot_flags* is set to 1. With this setting, the system will boot from root directory SYS2.SYSEXE to the SYSBOOT prompt when you enter the **boot** command.

```
P00>>> set boot_osflags 2,1
```

In the following OpenVMS example, root_number is set to 0 and boot_flags is set to 80. With this setting, you are prompted for the name of the secondary bootstrap file when you enter the **boot** command.

```
P00>>> set boot_osflags 0,80
```

ei*0_inet_init or ew*0_inet_init

The ei*0_inet_init or ew*0_inet_init environment variable determines whether the interface's internal Internet database is initialized from nvram or from a network server (through the bootp protocol).

Legal values are **nvram** and **bootp**. The default value is **bootp**. Set this environment variable if you are booting UNIX from a RIS server.

To list the network devices on your system, enter the **show device** command. The Ethernet controllers start with the letters "ei" or "ew," for example, ewa0. The third letter is the adapter ID for the specific Ethernet controller. Replace the asterisk (*) with the adapter ID letter when entering the command.

The syntax is:

set ei*0_inet_init *value* or
set ew*0_inet_init *value*

Example

```
P00>>> set ewa0_inet_init bootp
```

ei*0_protocols or ew*0_protocols

The ei*0_protocols or ew*0_protocols environment variable sets network protocols for booting and other functions.

To list the network devices on your system, enter the **show device** command. The Ethernet controllers start with the letters "ei" or "ew," for example, ewa0. The third letter is the adapter ID for the specific Ethernet controller. Replace the asterisk (*) with the adapter ID letter when entering the command.

The syntax is:

set ei*0_protocols *protocol_value* or
set ew*0_protocols *protocol_value*

The options for *protocol_value* are:

mop (default)	Sets the network protocol to mop (Maintenance Operations Protocol), the setting typically used with the OpenVMS operating system.
bootp	Sets the network protocol to bootp, the setting typically used with the UNIX operating system.
bootp,mop	When both are listed, the system attempts to use the mop protocol first, regardless of which is listed first. If not successful, it then attempts the bootp protocol.

Example

```
P00>>> show device
.
.
.
ewa0.0.0.1001.0     EWA0          08-00-2B-3E-BC-B5

ewb0.0.0.12.0       EWB0          00-00-C0-33-E0-0D

ewc0.0.0.13.0       EWC0          08-00-2B-E6-4B-F3

.
.
.
P00>>> set ewa0_protocols bootp
P00>>> show ewa0_protocols
ewa0_protocols        bootp
```

Booting Tru64 UNIX

UNIX can be booted from a CD-ROM on a local drive (a CD-ROM drive connected to the system), from a local SCSI disk, or from a UNIX RIS server.

Example 4-1 Booting UNIX from a Local SCSI Disk.

```
P00>>> sho dev ❶

dka0.0.0.1.1    DKA0    RZ2ED-LS                 0306
dka100.1.0.1.1  DKA100  RZ2ED-LS                 0306
dka200.2.0.1.1  DKA200  RZ2DD-LS                 0306
dka300.3.0.1.1  DKA300  RZ2DD-LS                 0306
dkc0.0.0.1.0    DKC0    RZ2DD-LS                 0306
dkc100.1.0.1.0  DKC100  RZ2DD-LS                 0306
dkc200.2.0.1.0  DKC200  RZ2DD-LS                 0306
dkc300.3.0.1.0  DKC300  RZ2DD-LS                 0306
dqa0.0.0.15.0   DQA0    TOSHIBA CD-ROM XM-6202B  1110
dva0.0.0.1000.0 DVA0
ewa0.0.0.4.1    EWA0    00-00-F8-10-67-97
pka0.7.0.1.1    PKA0    SCSI Bus ID 7



P00>>> boot  ❷

(boot dka0.0.0.1.1 -flags a) ❸
block 0 of dka0.0.0.1.1 is a valid boot block
reading 13 blocks from dka0.0.0.1.1
bootstrap code read in
base = 200000, image_start = 0, image_bytes = 1a00
initializing HWRPB at 2000
initializing page table at 1fff0000
initializing machine state
setting affinity to the primary CPU
jumping to bootstrap code

Tru64 UNIX boot - Thu Jan 14 15:03:19 EST 1999

Loading vmunix ...
Loading at 0xfffffc0000230000

Current PAL Revision <0x4000500010130>
Switching to OSF PALcode Succeeded
New PAL Revision <0x400050002012d>

Sizes:

text = 4836176
data = 1045600
bss  = 1603520
Starting at 0xfffffc00005671e0
```

```
Loading vmunix symbol table ... [1333528 bytes]
sysconfigtab: attribute Per-proc-address-space not in subsystem proc
Alpha boot: available memory from 0x134c000 to 0x1ffee000


Tru64 UNIX V4.0F-4  (Rev. 1180); Tue Feb  2 13:00:04 EST 1999
physical memory = 512.00 megabytes.
available memory = 492.64 megabytes.
using 1958 buffers containing 15.29 megabytes of memory
Master cpu at slot 0.
Firmware revision: 5.4-5160
PALcode: Tru64 UNIX version 1.45-5
Compaq AlphaServer DS40E
.
.
.
Tru64 UNIX Version V4.0F

             Login:
```

Example 4-1 shows a boot from a local SCSI drive. The example is abbreviated. For complete instructions on booting UNIX, see the *Tru64 UNIX Installation Guide*.

Perform the following tasks to boot a UNIX system:

1. Power up the system. The system stops at the SRM console prompt, P00>>>.
2. Set boot environment variables, if desired.
3. Install the boot medium.
4. Enter the **show device** command ❶ to determine the unit number of the drive for your device.
5. Enter the **boot** command ❷ and command-line parameters (if you have not set the associated environment variables). In Example 4-1, boot flags ❸ have already been set.

Booting Tru64 UNIX over the Network

To boot your Tru64 UNIX system over the network, make sure the system is registered on a Remote Installation Services (RIS) server. See the UNIX document entitled *Sharing Software on a Local Area Network* for registration information.

Example 4-2 RIS Boot

```
P00>>> show device  ❶


dka0.0.0.1.1    DKA0    RZ2DD-LS                0306
dka100.1.0.1.1  DKA100  RZ2DD-LS                0306
dka200.2.0.1.1  DKA200  RZ1CB-CS                0844
dkb0.0.0.3.1    DKB0    RZ25                    0900
dqa0.0.0.15.0   DQA0   TOSHIBA CD-ROM XM-6302B  1012
dva0.0.0.1000.0 DVA0
ewa0.0.0.4.1    EWA0   00-00-F8-09-90-FF
ewb0.0.0.2002.1 EWB0   00-06-2B-00-25-5B
pka0.7.0.1.1    PKA0   SCSI Bus ID 7
pkb0.7.0.3.1    PKB0   SCSI Bus ID 7

P00>>> set ewa0_protocols bootp  ❷
P00>>> set ewa0_inet_init bootp  ❸
P00>>> boot ewa0 Da              ❹
.
.
.
```

Systems running Tru64 UNIX support network adapters designated ew*0 or ei*0. The asterisk stands for the adapter ID (a, b, c, and so on).

1. Power up the system. The system stops at the SRM console prompt, P00>>>.
2. Set boot environment variables, if desired.
3. Enter the **show device** command ❶ to determine the unit number of the drive for your device.
4. Enter the following commands. Example 4-2 assumes you are booting from ewa0. If you are booting from another drive, enter that device name instead.

   ```
   P00>>> set ewa0_protocols bootp
   P00>>> set ewa0_inet_init bootp
   ```

   The first command ❷ enables the bootp network protocol for booting over the Ethernet controller. The second command ❸ sets the internal Internet database to initialize from the network server through the bootp protocol.
5. Enter the **boot** command ❹ and command-line parameters (if you have not set the associated environment variables). In Example 4-3 the **boot** command sets the system to boot automatically from ewa0 and specifies a full memory dump (Da) in case of a system shutdown.
6. For complete instructions on booting Tru64 UNIX over the network, see the *Tru64 UNIX Installation Guide*.

Starting a Tru64 UNIX Installation

Tru64 UNIX is installed from the CD-ROM drive connected to the system. The display that you see after you boot the CD depends on whether your system console is a VGA monitor or a serial terminal.

Example 4-3 Text-Based Installation Display

```
P00>>> b dqa0

(boot dqa0.0.0.15.0 -flags a
block 0 of dqa0.0.0.15.0 is a valid boot block
reading 16 blocks from dqa0.0.0.15.0
bootstrap code read in
base = 200000, image_start = 0, image_bytes = 2000
initializing HWRPB at 2000
initializing page table at 1fff0000
initializing machine state
setting affinity to the primary CPU
jumping to bootstrap code

Tru64 UNIX boot - Thu Jan 14 15:03:19 EST 1999

Loading vmunix ...
.
.

Initializing system for Tru64 UNIX installation.
Please wait...

*** Performing CDROM Installation

Loading installation process and scanning system hardware.

Welcome to the UNIX Installation Procedure

This procedure installs UNIX onto your system.  You will
be asked a series of system configuration questions.
Until you answer all questions, your system is not changed
in any way.

During the question and answer session, you can go back to
any previous question and change your answer by entering:
history

You can get more information about a question by entering:
help

There are two types of installations:

o  The Default Installation installs a mandatory set of
software subsets on a predetermined file system layout.
```

```
o  The Custom Installation installs a mandatory set of
software subsets plus optional software subsets that you
select.  You can customize the file system layout.

The UNIX Shell option puts your system in single-user mode
with superuser privileges.  This option is provided for
experienced UNIX system administrators who want to perform
file system or disk maintenance tasks before the
installation.

The Installation Guide contains more information about
installing UNIX.

1) Default Installation
2) Custom Installation
3) UNIX Shell

Enter your choice:
```

1. Boot the operating system from the CD-ROM drive connected to the system.
2. Follow the Tru64 UNIX installation procedure that is displayed after the installation process is loaded.

- If your system console is a VGA monitor, the X Server is started and an Installation Setup window is displayed. Click on the fields in the Installation Setup window to enter your responses to the installation procedure.
- If your system console is a serial terminal, a text-based installation procedure is displayed, as shown in Example 4-3. Enter the choices appropriate for your system.
- See the *Tru64 UNIX Installation Guide* for complete installation instructions.

Booting OpenVMS

OpenVMS can be booted from a CD-ROM on a local drive (the CD-ROM drive connected to the system) or from a CD-ROM drive on the InfoServer.

Example 4-4 Booting OpenVMS from the Local CD-ROM Drive.

```
P00>>> show device  ❶

dka0.0.0.1.1    DKA0      RZ2CA-LA  N1H0
dka100.1.0.1.1  DKA100    RZ2CA-LA  N1H0
dqa0.0.0.15.0   DQA0   TOSHIBA CD-ROM XM-6302B  1012
dva0.0.0.1000.0 DVA0
ewa0.0.0.6.1    EWA0     00-00-F8-10-D6-03
pka0.7.0.1.1    PKA0     SCSI Bus ID 7

P00>>>
.
.

P00>>> boot -flags 0,0 dka0       ❷

(boot dka0.0.0.1.1 -flags 0,0)
block 0 of dka0.0.0.1.1 is a valid boot block
reading 898 blocks from dka0.0.0.1.1
bootstrap code read in
base = 200000, image_start = 0, image_bytes = 70400
initializing HWRPB at 2000
initializing page table at 3ffee000
initializing machine state
setting affinity to the primary CPU
jumping to bootstrap code


OpenVMS (TM) Alpha Operating System, Version V7.1-2
```

Example 4-6 shows a boot from a CD-ROM on a local drive. The example is abbreviated. For complete instructions on booting OpenVMS, see the OpenVMS installation document.

3. Power up the system. The system stops at the SRM console prompt, P00>>>.
4. Set boot environment variables, if desired.
5. Install the boot medium.
6. Enter the **show device** command ❶ to determine the unit number of the drive for your device.
7. Enter the **boot** command and command-line parameters (if you have not set the associated environment variables.) In this example, the **boot** command with the **-flags** option ❷ causes the system to boot from [SYS0.EXE] on device DKA0.

Booting OpenVMS from the InfoServer

You can boot OpenVMS from a LAN device on the InfoServer. The devices are designated EW*0 or EI*0. The asterisk stands for the adapter ID (a, b, c, and so on).

Example 4-5 InfoServer Boot.

```
P00>>> show device  ❶

dka0.0.0.1.1    DKA0     RZ2CA-LA  N1H0
dka100.1.0.1.1  DKA100   RZ2CA-LA  N1H0
dqa0.0.0.15.0   DQA0   TOSHIBA CD-ROM XM-6302B  1012
dva0.0.0.1000.0 DVA0
ewa0.0.0.6.1    EWA0    00-00-F8-10-D6-03
pka0.7.0.1.1    PKA0    SCSI Bus ID 7

P00>>>
. . .

P00>>> boot -flags 0,0 -file apb_0712 ewa0     ❷

(boot ewa0.0.0.6.1 -file APB_0712 -flags 0,0)


Trying MOP boot
.............

Network load complete.
Host name: CALSUN
Host address: aa-00-04-00-a4-4e

bootstrap code read in
base = 200000, image_start = 0, image_bytes = 70400
initializing HWRPB at 2000
initializing page table at 3ffee000
initializing machine state
setting affinity to the primary CPU
jumping to bootstrap code

Network Initial System Load Function  ❸
Version 1.2

Function ID         Function
1                   Display menu
2                   Help
3                   Choose service
4                   Select options
5                   Stop
```

```
      Enter a function ID Value:  3     ❹

OPTION       OPTION
  ID
1      -     Find Services
2      -     Enter known Service Name

      Enter an Option ID value: 2
      Enter a Known Service Name: ALPHA_V71-2_SSB

OpenVMS (TM) Alpha Operating System, Version V7.1-2
```

1. Power up the system. The system stops at the P00>>> console prompt.
2. Insert the operating system CD-ROM into the CD-ROM drive connected to the InfoServer.
3. Enter the **show device** command ❶ to determine the unit number of the drive for your device.
4. Enter the boot command and any command-line parameters ❷.
5. The device is EWA0. APB_0712 is the file name of the APB program used for the initial system load (ISL) boot program. The ISL program displays a menu ❸.
6. Respond to the menu prompts ❹, using the selections shown in this example.
7. For complete instructions on booting OpenVMS from the InfoServer, see the OpenVMS installation document.

Starting an OpenVMS Installation

After you boot the operating system CD-ROM, an installation menu is displayed on the screen. Choose item 1 (Install or upgrade OpenVMS Alpha). Refer to the OpenVMS installation document for information on creating the system disk.

Example 4-6. OpenVMS Installation Menu

```
OpenVMS (TM) Alpha Operating System, Version V7.1-2

Copyright © 1999 Digital Equipment Corporation.  All
rights reserved.

Installing required known files...

Configuring devices...

    ************************************************

You can install or upgrade the OpenVMS Alpha operating
system or you can install or upgrade layered products that
are included on the OpenVMS Alpha operating system CD-ROM.

You can also execute DCL commands and procedures to
perform "standalone" tasks, such as backing up the system
disk.

Please choose one of the following:

1)  Install or upgrade OpenVMS Alpha Version V7.1-2
2)  Display products that this procedure can install
3)  Install or upgrade layered products
4)  Show installed products
5)  Reconfigure installed products
6)  Remove installed products
7)  Execute DCL commands and procedures
8)  Shut down this system
Enter CHOICE or ? for help: (1/2/3/4/5/6/7/8/?) 1
```

1. Boot the OpenVMS operating system CD-ROM.
2. Choose option 1 (Install or upgrade OpenVMS Alpha). To create the system disk, see the OpenVMS installation document.

Powering Off the System

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 button on the operator control panel or by issuing a **reset** command at the remote management console prompt.

CAUTION: Pressing the Reset button reinitializes the system and causes you to lose the applications you are running.

Do the following steps to turn the system off:

1. Shut down the operating system by following the instructions in the operating system documentation.
2. Press the On/Off button on the front of the system unit or issue a **reset** command at the remote management console prompt.

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

Booting Linux

The procedure for installing Linux on a DS20E is documented in the *Linux Installation and Configuration Guide for AlphaServer DS10, DS20, and AlphaStation XP1000 Computers.* You can obtain the installation document from the following URL:

http://www.digital.com/alphaserver/linux/install_guide.html

1. Power up the system to the SRM console and enter the **show version** command.

```
P00>> show version
version                 V5.4-2 May  19  1999 14:53:22
P00>>
```

You need V5.4-2 or higher of the SRM console to install Linux. If you have a lower version of the firmware, you will need to upgrade. For instructions, see the following URL. You can also download the latest images from this URL.

http://ftp.digital.com/pub/DEC/Alpha/firmware/

Before booting Linux, enter the **show device** command to determine the unit number of the drive for your boot device. In the following example DKA300 is a hard disk, DKA500 is a CD, and DVA0 is a floppy drive.

```
P00>>>show device

dka300.3.0.7.1   DKA300    RZ1CF-CF  1614
dka500.5.0.7.1   DKA500   TOSHIBA CD-ROM XM-5701TA  0557
dva0.0.0.0.0     DVA0
pka0.7.0.7.1     PKA0     SCSI Bus ID 7  5.57
.   .   .
```

2. Set the following SRM environment variables to configure boot parameters. This example shows configuration commands to boot the floppy created by the Linux installation.

```
P00>>>set bootdef_dev dva0
P00>>>set boot_file vmlinux.gz
P00>>>set boot_osflags "root=/dev/hda"
P00>>>show boot*

boot_dev            dva0.0.0.0.0
boot_file           vmlinux.gz
boot_osflags        root=/dev/hda

boot_reset          OFF
bootdef_dev         dva0.0.0.0.0
```

```
booted_dev
booted_file
booted_osflags
```

3. Insert the boot floppy and enter the **boot** command. The following example shows abbreviated **boot** output:

```
P00>>>b

(boot dkb0.0.0.3000.0 -file boot/vmlinux.gz -flags root=/dev/hda)
block 0 of dkb0.0.0.3000.0 is a valid boot block
reading 152 blocks from dkb0.0.0.3000.0
bootstrap code read in
base = 200000, image_start = 0, image_bytes = 13000
initializing HWRPB at 2000
initializing page table at 3ff8e000
initializing machine state
setting affinity to the primary CPU
jumping to bootstrap code

Linux version 2.2.12 (jestabro@linux04.mro.dec.com) (gcc version egcs-
2.90.29 980515 (egcs-1.0.3 release)) #21 Fri Sep 10 16:55:01 EDT 1999

Booting on Tsunami variation Clipper using machine vector Brick
Command line: root=/dev/hda bootdevice=scd0  bootfile=boot/vmlinux.gz

setup_smp: 2 CPUs probed, cpu_present_map 0x3, boot_cpu_id 0
Console: colour VGA+ 80x25
Calibrating delay loop... 996.15 BogoMIPS
Memory: 1033720k available
POSIX conformance testing by UNIFIX

Entering SMP Mode.

secondary_console_message: on 0 from 1 HALT_REASON 0x0 FLAGS 0x1ee
secondary_console_message: on 0 message is 'P01>>>START  P01>>>'
smp_boot_cpus: Total of 2 Processors activated (1992.29 BogoMIPS).
start_secondary: commencing CPU 1 current fffffc003ffe0000

Alpha PCI BIOS32 revision 0.04
PCI: Probing PCI hardware
Linux NET4.0 for Linux 2.2
.   .   .
  General self-test: passed.
  Serial sub-system self-test: passed.
  Internal registers self-test: passed.
  ROM checksum self-test: passed (0x24c9f043)
.   .   .
  Red Hat Linux release 6.0 (Hedwig)
  Kernel 2.2.12 on an alpha


peng1 login:
```

Switching Between Operating Systems

The system supports three operating systems: Tru64 UNIX, Linux, and OpenVMS. You can switch from one operating system to another by removing the disk for the operating system that is currently installed and installing the disk for the operating system you want to run.

WARNING: To prevent injury, access is limited to persons who have appropriate technical training and experience. Such persons are expected to understand the hazards of working within this equipment and take measures to minimize danger to themselves or others. These measures include:

1. Remove any jewelry that may conduct electricity.
2. If accessing the system card cage, power down the system and wait two minutes to allow components to cool.
3. Wear an anti-static wrist strap when handling internal components.

CAUTION: The file structures of the three operating systems are incompatible. When you switch between operating systems, you cannot read the data off disks associated with the operating system that was running previously.

When you switch between operating systems, be sure to pull out the system and data disks for the operating system you will not be using. Otherwise, you risk corrupting data on the system disk.

Chapter 5

Reconfiguring the System

Introduction

Use the AlphaBIOS Setup menu to change the keyboard configuration. Refer to your operating system or application software documentation for software-specific key functions.

AlphaBIOS 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. Refer to Chapter 6 on how to invoke console mode.

This chapter covers the following topics:

- AlphaBIOS console configuration options
- Memory configuration
- Network configuration
- ISA options
- Verifying the system configuration
- PCI option cards
- Determining SCSI storage device IDs
- Updating firmware

AlphaBIOS Console Configuration Options

Menu options are used to obtain information about the system. The following AlphaBIOS menu display contains options that are available to verify the system configuration.

```
Display System Configuration    ←
AlphaBIOS Upgrade
Hard Disk Setup
CMOS Setup
Network Setup
Install Windows NT
Utilities
About AlphaBIOS
```

1. Select **Display System Configuration** to view the system configuration and press return. The following display appears.

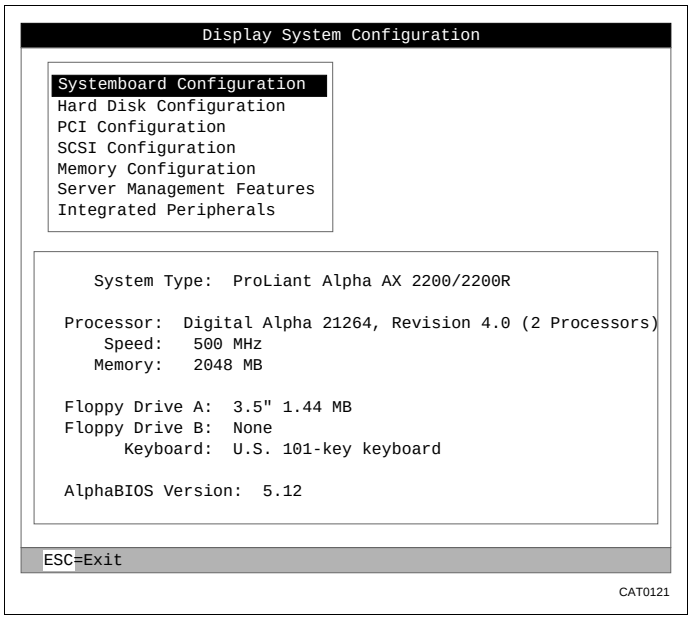


Figure 5-1. System Configuration Display

2. To exit System configuration, press **Esc.**

Going through each item of the System Configuration Display menu, you can examine how each part of your system is configured. Note that Windows NT is not supported on this system, even though it appears as a menu choice in the console. Refer to Chapter 6 for further details on “Displaying the System Configuration.”

Memory Configuration

The system supports 3.3 volt, dual-in-line memory modules (DIMM) on the motherboard, providing from a minimum system requirement of 128 MB to a maximum of 4 GB.

There are 16-200 pin buffered DIMM slots that are organized with four slots in each of the four memory banks (banks 0-3). Banks must be populated in order and starting with bank 0. Bank 0 must always be populated. Figure 5-2 shows the organization of memory banks. Refer to Table 5-1 to see the memory bank and connector numbering.

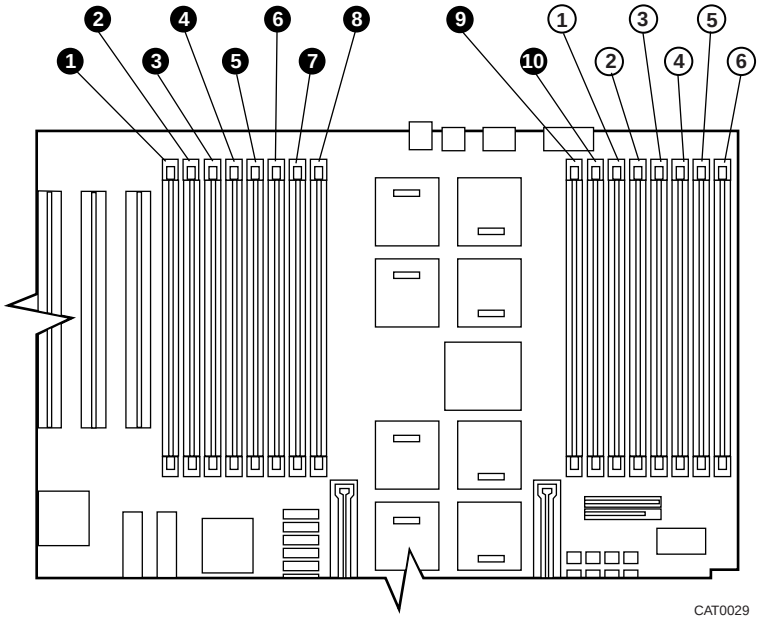


Figure 5-2. Memory Banks

WARNING: Before installing a memory module, turn off all power to the system.

Table 5-1
Memory Bank and Connector Numbering

Reference Number	Connector Number	Bank Number
❶	J32	1
❷	J31	3
❸	J30	1
❹	J29	3
❺	J28	0
❻	J27	2
❼	J26	0
❽	J25	2
❾	J16	2
❿	J14	0
①	J13	2
②	J11	0
③	J9	3
④	J6	1
⑤	J5	3
⑥	J1	1

Network Configuration

Connect your system to the network as explained in this section. Figure 5-3 shows the network connection.

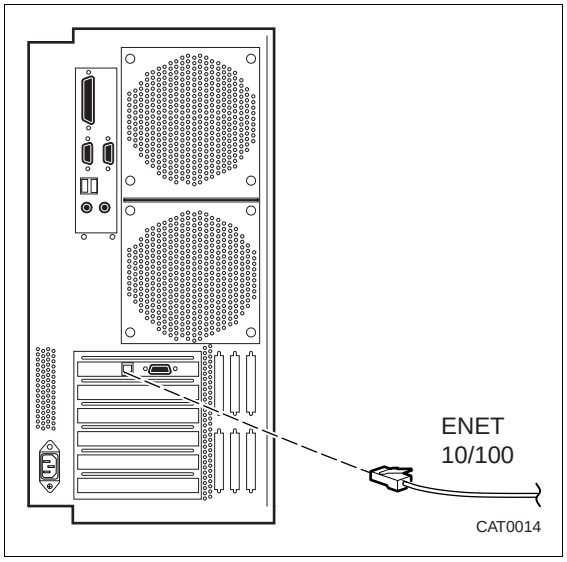


Figure 5-3. Network Connection

Your system supports various Ethernet network options. Generally, the system is configured with 10/100 Enet. Supported options are also offered to connect to Fiber Distributed Data Interface (FDDI) and token ring networks.

A new network device is initially set to Attachment User Interface (AUI) mode, which is preserved in memory until the network type is changed.

ISA Options

Follow the discussions and procedures given in this section to configure ISA option cards.

Figure 5-4 shows an ISA card. ISA cards have a single row of gold contacts and may differ in size.

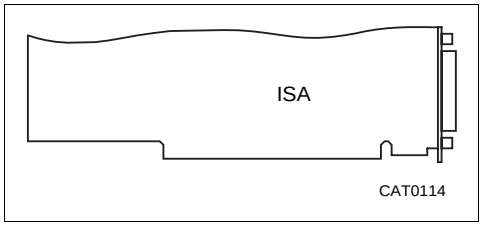


Figure 5-4. ISA Card

The ISA bus is an industry-standard, 16-bit I/O bus. Figure 5-5 shows the location of the ISA option slot on the system board. To access the slot, you will need to remove the side panel of the system enclosure. Be sure to replace the panel before attempting to start the system again.

CAUTION: To access the option slots, remove the side panel. An attempt to remove the side panel while the system is running will shut down the system, with potential loss of data.

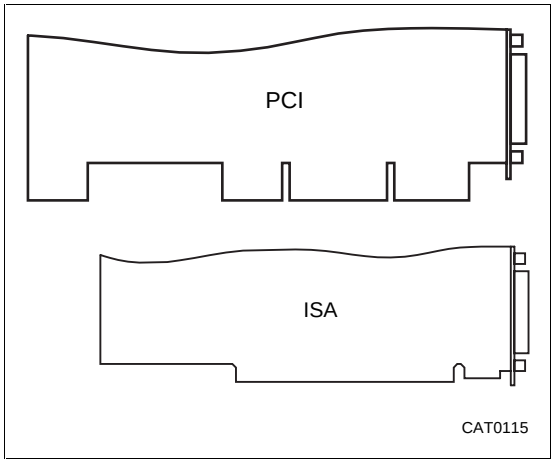


Figure 5-5. ISA and PCI Option Slots

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

WARNING: Before installing ISA bus options, turn off all power to the system.

Verifying the System Configuration

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

PCI Option Modules

No configuration is required for the PCI option as shown in Figure 5-6. Install the PCI option following the instructions supplied with the option.

The PCI bus is an industry-standard I/O bus that is the preferred connection for high-performance I/O options. The system supports five 64-bit PCI and one shared PCI and ISA slot.

NOTE: A 32-bit PCI option can be installed in a 64-bit slot.

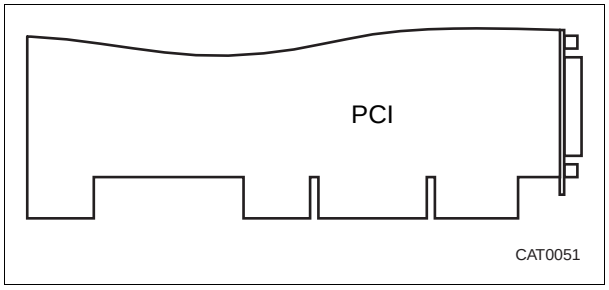


Figure 5-6. PCI Option Card

Install PCI cards according to the instructions supplied with the option.

CAUTION: Before installing a PCI option, turn off all power to the system.

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

Determining the SCSI Storage Device ID

The system is designed for plug and play which offers a jumperless configuration of SCSI ID, automatic SCSI termination, and automatic system recognition. The storage cage has a capacity of four 1.6-inch disk drives or six 1.0-inch disk drives which is pre-configured at the factory.

The SCSI ID for disk drives is preset on the backplane with the lowest ID to the left for a vertically installed storage cage and from the bottom of a horizontally installed cage. Table 5-2 shows the orientation of the SCSI IDs for a vertically installed storage cage (both the 4-slot and 6-slot storage subsystems).

Table 5-2
4 or 6-Slot SCSI ID Orientation

Slot	SCSI ID
1	0
2	1
3	2
4	3
5	4
6	5

NOTE: Tape devices added to the spare removable media bay must have their SCSI ID set on the device to avoid conflict with other drives.

Updating the Firmware

You can use any one of three sources to update the firmware of your system: CD-ROM, network, or diskette.

You may want to update your system firmware as later versions become available. The AlphaBIOS firmware resides in the flash ROM located on the system board. This section describes how to update to a later version of firmware. You may also need to recopy firmware onto the system if the flash ROM should ever become corrupted. To do this, you would use a different procedure. (See "Using the Fail-Safe Loader" in Chapter 9.)

Updating Firmware Using the CD-ROM Drive

NOTE: The latest version of the firmware is available on the World Wide Web at location ***http://www.compaq.com***.

1. Shut down the operating system. Turn the system off and then on.
2. Load the Firmware Update media into the drive (CD-ROM or floppy).
3. At the Boot screen, press **F2** to get to the *AlphaBIOS Setup* menu.
4. Press **F10** to update the firmware.
5. When done, press **Enter** to restart the system with the new firmware.

Updating Firmware Using the Network

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

Chapter **6**

Using the AlphaBIOS

Introduction

AlphaBIOS is the graphical interface that supports utility programs. This chapter explains how to perform common system management tasks with the AlphaBIOS, and it provides a reference for the AlphaBIOS screens.

> **NOTE:** AlphaBIOS contains features and menus that support multiple operating systems. Only the features applicable to AlphaServer DS20E and AlphaStation DS20E systems running the Tru64 UNIX and OpenVMS operating systems are discussed in this chapter.

Sections in this chapter are:

- Starting AlphaBIOS
- Keyboard conventions and help
- Running AlphaBIOS from a serial terminal
- Upgrading AlphaBIOS (updating firmware)
- Utilities - Running a configuration utility

Starting AlphaBIOS

Start the AlphaBIOS Setup by pressing F2 from the Boot screen displayed at power-up or reset. Figure 6-1 shows an AlphaBIOS Boot screen.

CAT0100

Figure 6-1. AlphaBIOS Boot Screen

The *Boot* screen shown in Figure 6-1 displays upon power-up and reset. Press **F2** on this screen to enter the setup program.

The *AlphaBIOS Setup screen* shown in Figure 6-2 is displayed. From this screen you can select the tasks to perform. Use the arrow keys to select the menu item you want and press **Enter**.

Note: Only the following choices are applicable for the Tru64 UNIX and OpenVMS operating systems:

Upgrade AlphaBIOS
Utilities
About AlphaBIOS

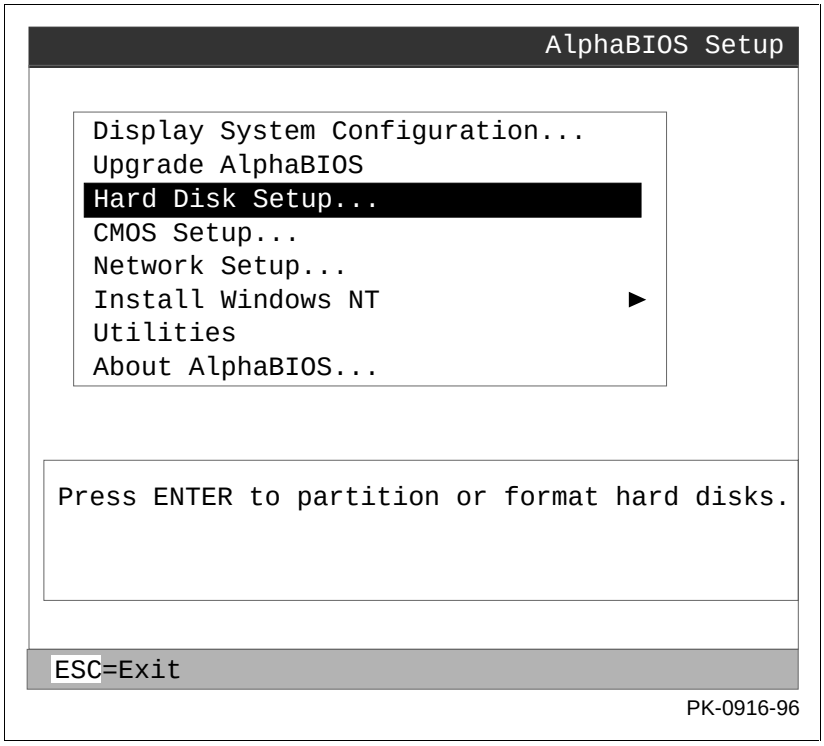


Figure 6-2. AlphaBIOS Setup Screen

Keyboard Conventions and Help

AlphaBIOS uses DOS and Windows keyboard conventions for navigating the interface and selecting items. The valid keystrokes are listed in the keyboard help screens.

Two levels of keyboard help are available. The first level, reached by pressing **F1** once, shows explanations of the keystrokes available for the specific part of AlphaBIOS currently displayed.

The second level of keyboard help, reached by pressing **F1** from the first help screen, shows explanations of the keystrokes available for navigating the interface throughout AlphaBIOS (see Figure 6-3).

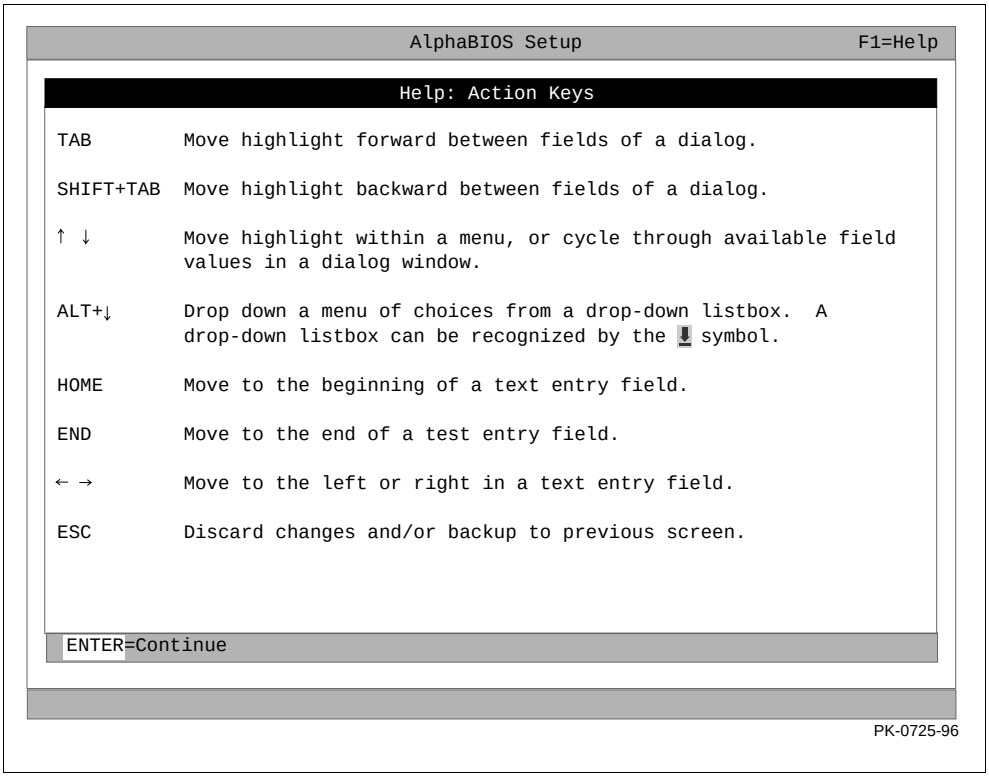


Figure 6-3. Second-Level Help Screen

Running AlphaBIOS from a Serial Terminal

You can set up and interface with the AlphaBIOS console using a serial terminal (VT200 or higher, or equivalent). Table 6-1 gives the serial terminal key equivalents of the graphics monitor keyboard commands.

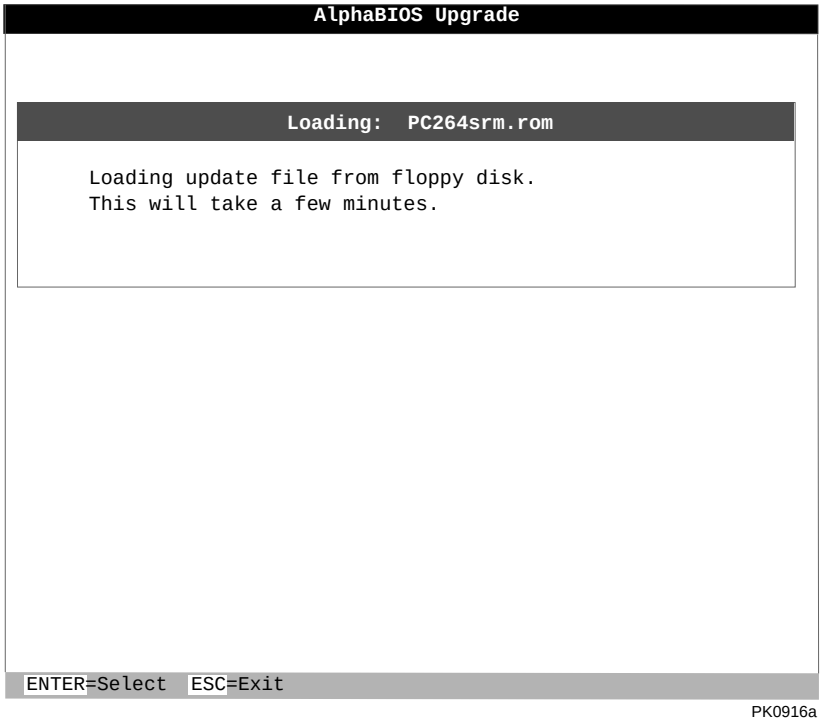
Table 6-1
Serial Terminal Key Commands for AlphaBIOS

Graphics Terminal Command	Serial Terminal Key Equivalent
F1	Ctrl + A
F2	Ctrl + B
F3	Ctrl + C
F4	Ctrl + D
F5	Ctrl + E
F6	Ctrl + F
F7	Ctrl + P
F8	Ctrl + R
F9	Ctrl + T
F10	Ctrl + U
Insert	Ctrl + V
Delete	Ctrl + W
Backspace	Ctrl + H
Esc	Ctrl + [

Upgrading AlphaBIOS (Updating Firmware)

As improvements are made to AlphaBIOS, it might be desirable to upgrade to take advantage of new features. Use the following procedure to upgrade from an earlier version of the AlphaBIOS:

1. Insert the diskette or CD-ROM containing the AlphaBIOS upgrade.
2. If you are not already running *AlphaBIOS Setup*, start it by restarting your system and pressing **F2** when the *Boot* screen is displayed.
3. In the main *AlphaBIOS Setup* screen, select *Upgrade AlphaBIOS* and press **Enter**.



PK0916a

Figure 6-4. Loading Dialogue Box

The following dialogue box appears.

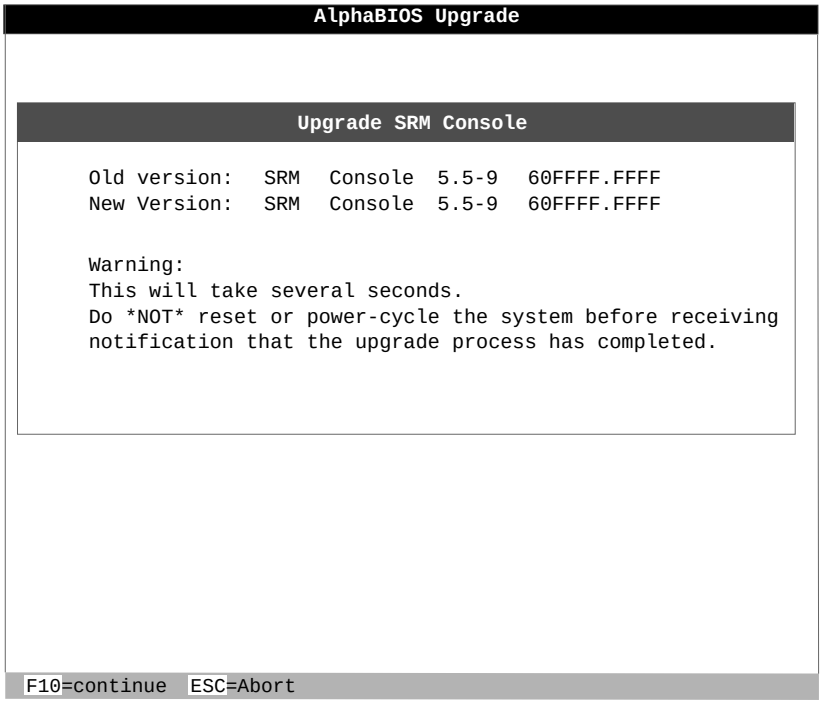


Figure 6-5. Upgrading SRM Console Dialogue Box

4. Press **F10** to Continue or **ESC**. to Abort.

The following dialogue box appears.

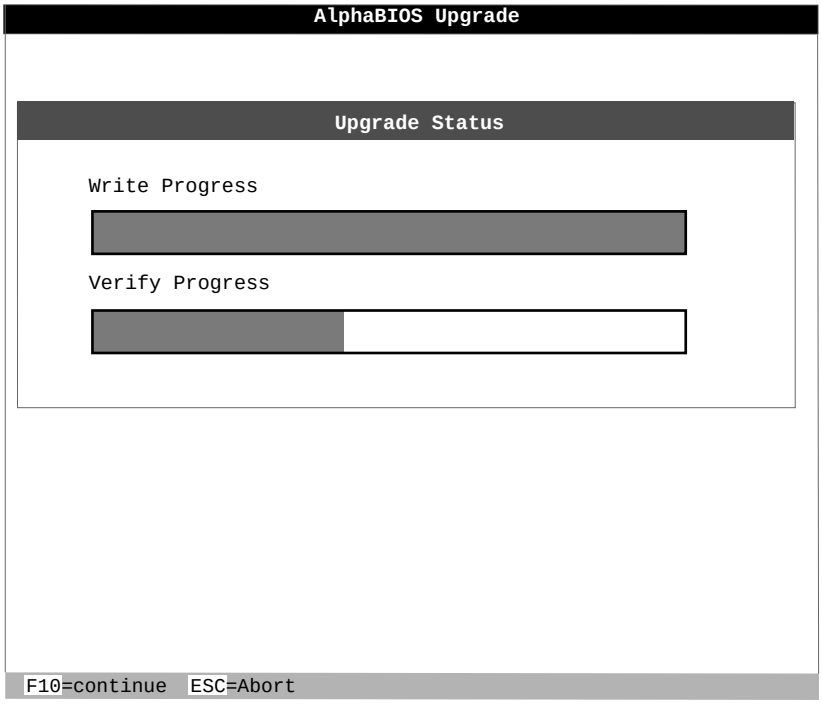


Figure 6-6. Upgrading Status Dialogue Box

After the upgrade has completed, the following dialogue box appears.

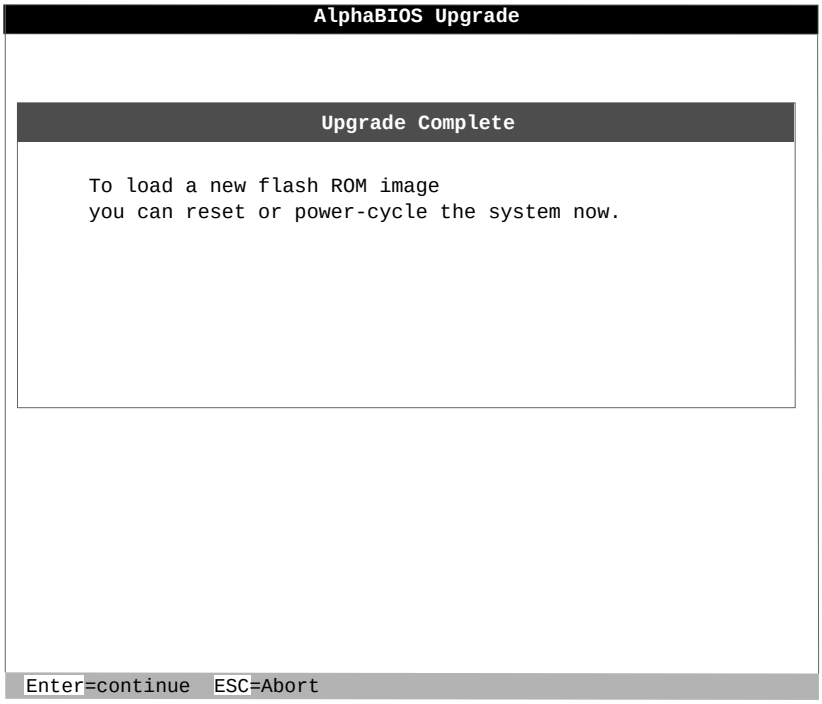


Figure 6-7. Upgrade Complete Dialogue Box

5. Press **Enter** to Continue or **ESC** to Abort.

Utilities

Configuration utilities are run directly from the AlphaBIOS Utilities menu as shown in Figure 6-8.

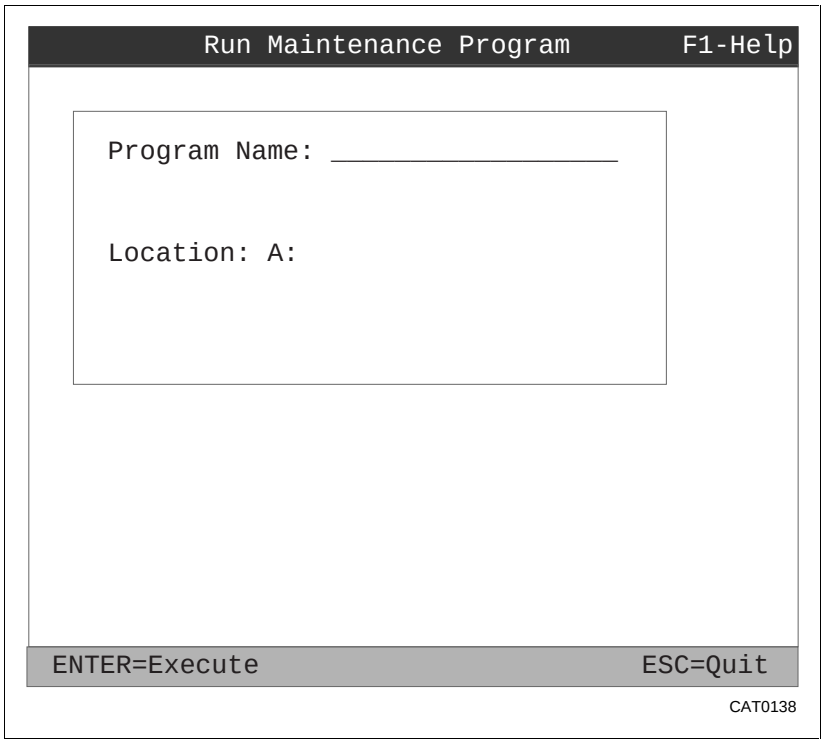


Figure 6-8. Run Maintenance Program Dialog Box

If you change your system configuration, for example, by adding another RAID drive, you will have to run the RAID configuration utility. As you modify your system, you might be required to run other types of configuration utilities as well. Configuration utilities (also called maintenance programs) are run directly from the *AlphaBIOS Utility* menu.

To Run a Configuration Utility

1. From *AlphaBIOS Setup*, select *Utilities*. From the submenu that is displayed, select *Run Maintenance Program* and press **Enter**.
2. In the *Run Maintenance Program* dialog box, type the name of the program to be run in the Program Name field. Then tab to the Location list box, and select the hard disk partition, diskette, or CD-ROM drive from which to run the program.
3. Press **Enter** to execute the program.

NOTE: If you are running a utility from a diskette, you can simply type the utility's name into the Program Name field, and press **Enter**. The diskette drive is the default selection in the Location field. Use **Alt+Down** arrow when a list box is selected to open the list.

Chapter 7

Using the Storage Subsystems

The internal storage subsystem is the primary source of storage for the system. The system also comes with a combination IDE CD-ROM and floppy drive. A spare bay can house a tape drive and is located to the left of the combination CD-ROM and floppy drive in a rackmount system and above in a pedestal system. The storage subsystem has two versions: one cage version supports four 1.6 inch disk drives and the other supports six 1.0 inch disk drives.

The system is designed for hot-swap disk drives and plug and play, which offers a jumperless configuration of SCSI ID, automatic SCSI termination, and automatic system recognition.

This chapter contains the following information:

- Comparing the two storage subsystems
- SCSI bus controller
- Disk drive configuration
- Hot swap
- Drive carriers
- Drive status LEDs
- Installing drive carriers
- Configuring and expanding your storage system
- Multimode SCSI termination
- Combination CD-ROM and floppy dirve

- External SCSI expansion

Storage Subsystem Overview

Figure 7-1 shows fully populated 4- and 6-slot storage subsystems.

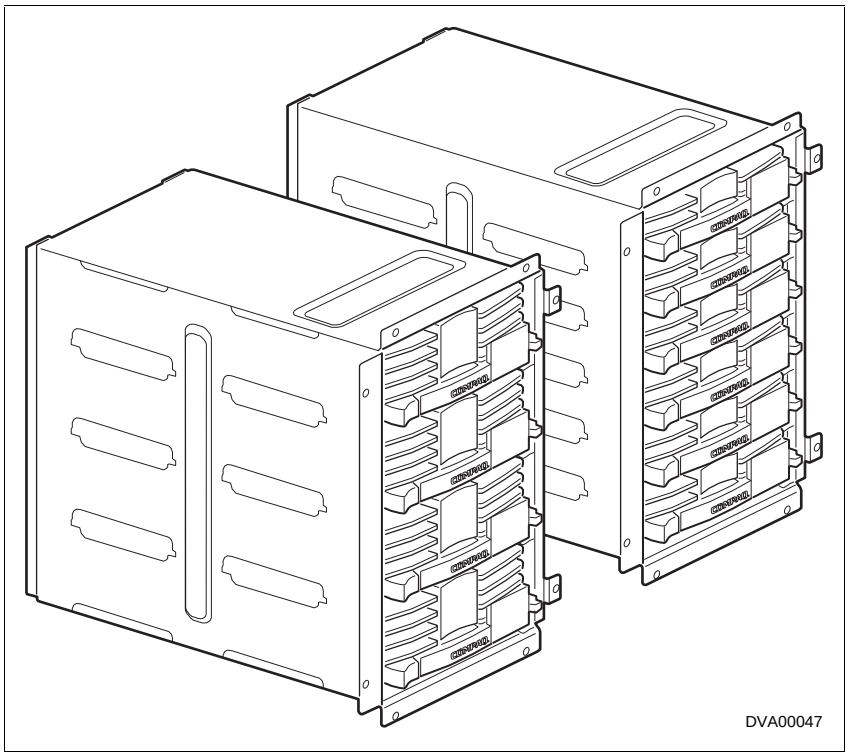


Figure 7-1. 4-Slot and 6-Slot Storage Subsystems

Table 7–1 contains information on the capabilities of the storage subsystems.

Table 7-1
Storage Subsystem Specification Overview

Feature	Specs/Capabilities
Four Slot Backplane	Uses 1.6 inch drives.
Six Slot Backplane	Uses 1.0 inch drives.
Backplane	Supports up to 12 slots per channel
SCSI	Single Ended (SE) and Low Voltage Differential (LVD) supported for SCSI.
Three LEDs (per drive)	Activity, Fault, and Status
Termination	On-board multimode termination
SCA2 connector	Direct-connect SCSI and power
Maximum watts per drive	• 1.6 inch 30W • 1.0 inch 25W

NOTE: LVD is only implemented through a plug-in SCSI LVD controller option card.

Comparing the Two Storage Subsystems

Both the four-slot and six-slot system support: hot-swap, I^2C system monitoring, temperature sensing, and drive detection. SCSI connections from system to system are completed with 68-pin connectors, and drive-to-backplane connections are made with the SCSI SCA2 connector type.

Table 7-2 compares the four- and six-slot storage subsystems for specifications and capabilities.

Table 7-2
Storage Backplane Specifications

Function	Specs/Capabilities	
	Four-Slot Backplane	**Six-Slot Backplane**
Drive-to-backplane Connections	Four SCSI connections to 1.6-inch drive carriers (SCA2)	Six SCSI connections to 1.0-inch drive carriers (SCA2)
Disk Drives	Supports hot-swap	
I^2C	System monitoring	
Temperature monitoring	Contains temperature sensor	
EEPROM	For non-volatile system information storage	
LEDs	■ Disk activity for each slot ■ Status Per Slot	
Drive Present	Contains power on detection	
Power connector	+12V and + 5V	
Subsystem-to-Subsystem SCSI connection	Two 68-pin connectors (In/Out)	

SCSI Bus Controller

The SCSI controller is a Symbios 895 module. It utilizes the Symbios chip technology and is plugged into the second PCI slot. It supports up to six drives in the system and up to 12 drives chained to a second external storage subsystem. This includes 8-bit fast narrow SCSI and 16-bit wide Ultra SCSI.

The SCSI bus can be configured with any mix of wide, narrow, fast, or Ultra devices. In a mixed configuration, wide devices run in wide mode and narrow devices run in narrow mode.

Figure 7-1 shows the SCSI connection to the Symbios controller module. The other end of the SCSI cable goes to the storage backplane which is shown in the following sections of this chapter.

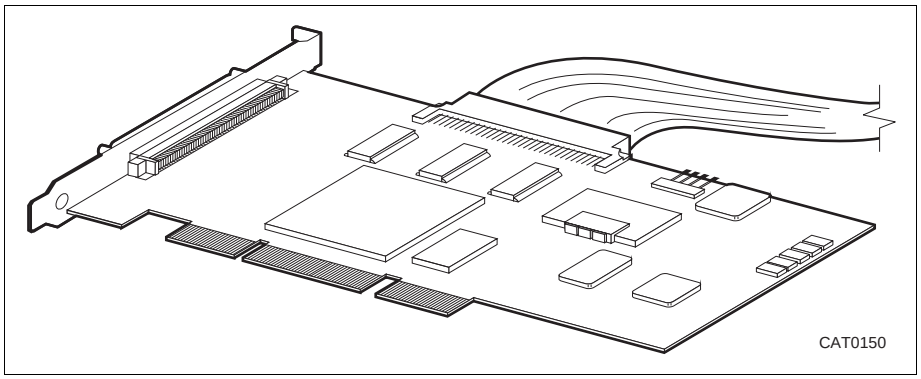


Figure 7-2. SCSI Cable Connections

Disk Drive Configuration

The system is designed for plug and play which offers a jumperless configuration of SCSI ID, automatic SCSI termination, and automatic system recognition. The following identifies the backplane drive connectors with their relationship to the SCSI ID orientation.

Backplane Drive Connectors

The 4-slot and 6-slot backplane provide SCA-2 connector type for direct connection of the disk carrier.

Table 7-3 and Table 7-4 how the slot numbering for the 4-slot and 6-slot backplanes. The SCSI ID for disk drives is preset on the backplane with the lowest ID to the left for a vertically installed storage cage and from the bottom of a horizontally installed cage. Table 7-5 shows the orientation of the SCSI IDs for a vertically installed storage cage for the storage subsystems.

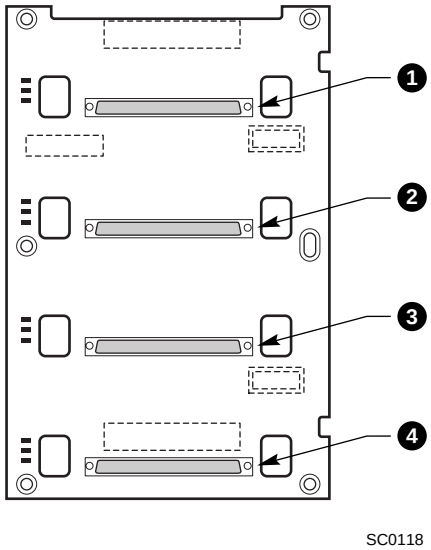


Figure 7-3 4-Slot Backplane Drive Connectors

Table 7-2
4-Slot SCSI ID Orientation

Backplane Connector No.	Slot No.	SCSI ID
J4	❶	0
J5	❷	1
J6	❸	2
J7	❹	3

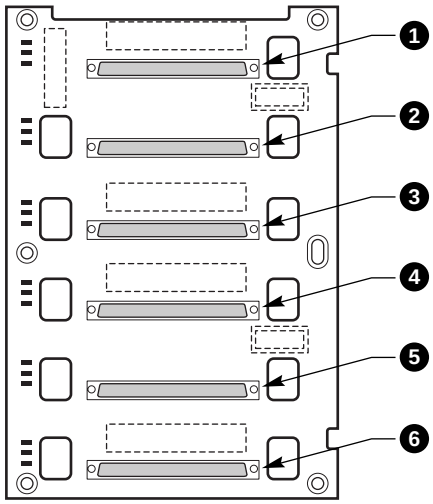


Figure 7-4 6-Slot Backplane Drive Connectors

Table 7-3
6-Slot SCSI ID Orientation

Backplane Connector No.	Slot No.	SCSI ID
J4	❶	0
J5	❷	1
J6	❸	2
J7	❹	3
J8	❺	4
J9	❻	5

Hot Swap

The storage subsystem backplane is designed to support hot-swap. This allows you to install or remove drives while the backplane is powered and operating.

Hot-swap uses the high profile SCA-2 connector type which have long and short pin lengths. The long pin lengths make connection first and provide a ground connection to the drive and a current limited connection to the power precharge pins. This allows for a removal or installation of non-operating drives and does not affect the power for the drives that are in operation.

CAUTION: It is not recommended that a drive be removed when that drive is in operation. A drive should only be removed when the Activity LED is off.

Drive Carriers

There are two drive carrier types, one for the 1.0-inch drive and the other for the 1.6-inch drive. Drives will come pre-installed in the carrier. This chapter contains information for removing drives from the carrier and LED status information.

Figure 7-5 displays both drive carrier types.

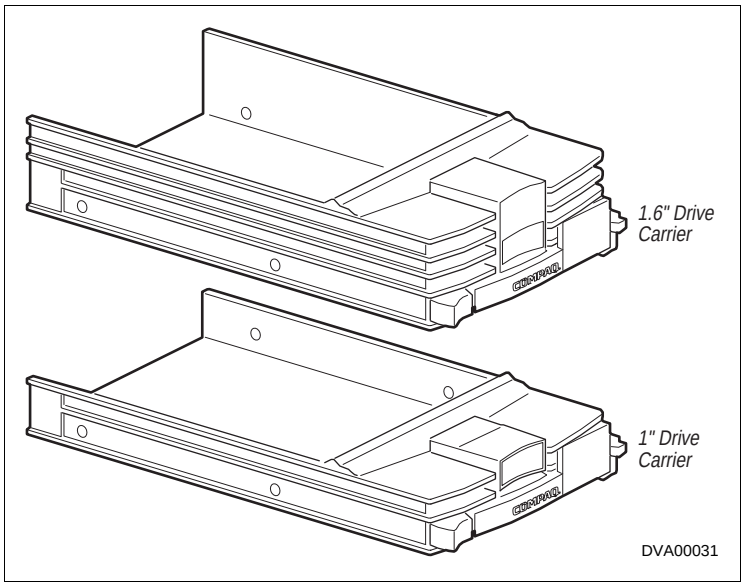


Figure 7-5. 1.0 and 1.6-Inch Drive Carriers

Removing the Drive Carriers

The following is the procedure for removing a drive from the carrier (as shown in Figure 7-6).

1. Turn the four screws counter clockwise.
2. Lift the drive out of the carrier.

NOTE: To install a drive, reverse the procedure.

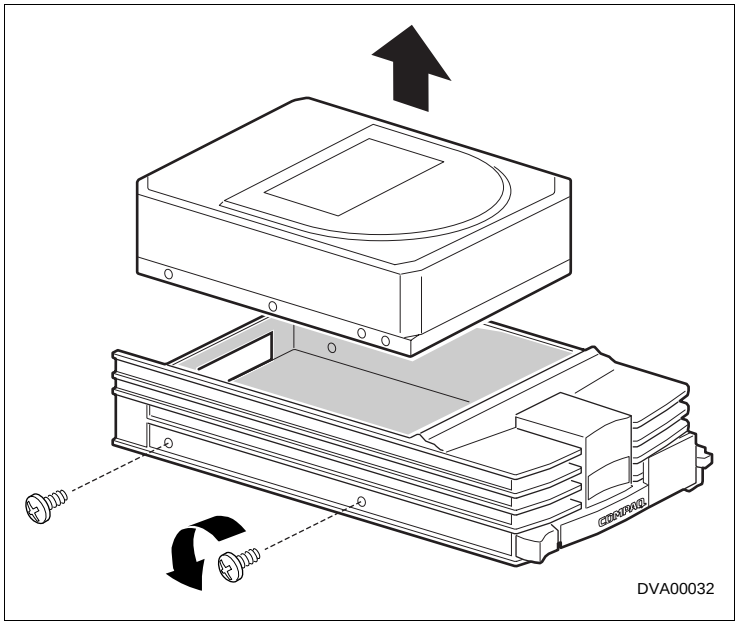


Figure 7-6. Removing a Drive from a Carrier

Drive Status LEDs

There are three LEDs that are channeled from the drive to the front of the carrier with fiber optic light pipes. The LEDs display activity, power, and fault.

Figure 7-7 shows the LEDs and their positions on the carrier, and Table 7-5 explains the status of each.

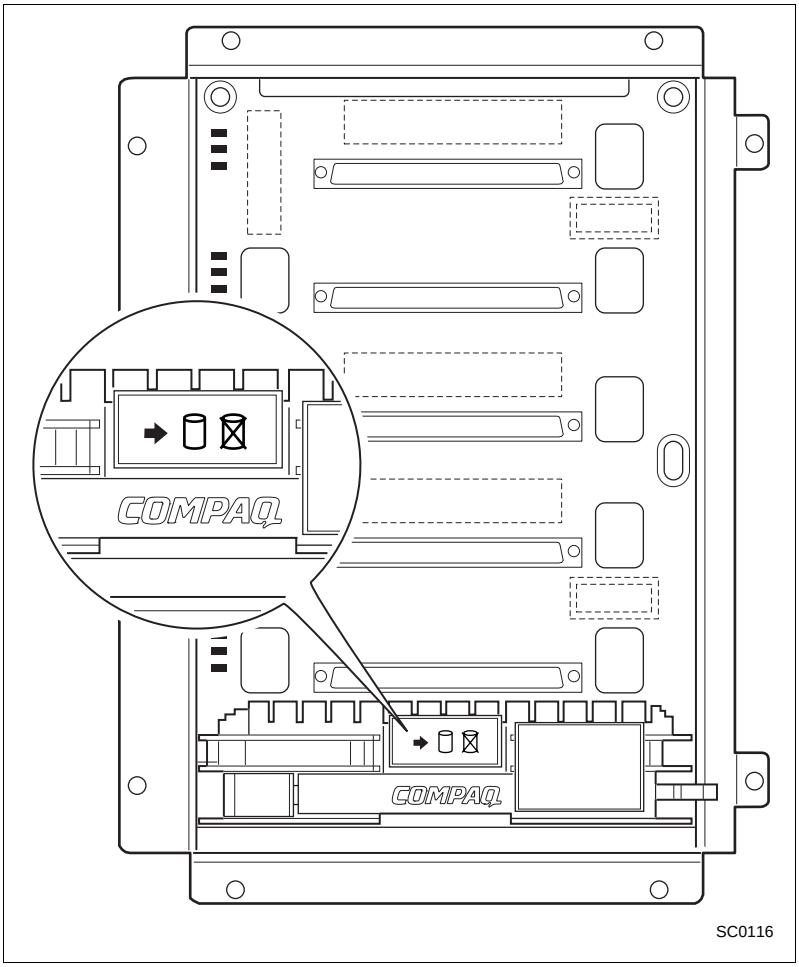


Figure 7-7. Drive Status LED Location

Table 7- 5
LED Status

LED	Status
(A) ➡	Green indicates activity.
(B)	Green indicates drive state.
(C)	Amber indicates drive state fault.

Installing Drive Carriers

Both the 1.0 inch and 1.6 inch drives install identically into the storage cage. To install (see Figure 7-8) and to remove (see Figure 7-9) a drive carrier, perform the following procedures:

Installing

1. Insert the drive carrier into the cage with the front handle fully open and toward the front. With the carrier resting on top of the rail guides of the cage, slide the carrier in until it stops.
2. Push the handle in to make the backplane connection and to secure it into the cage.

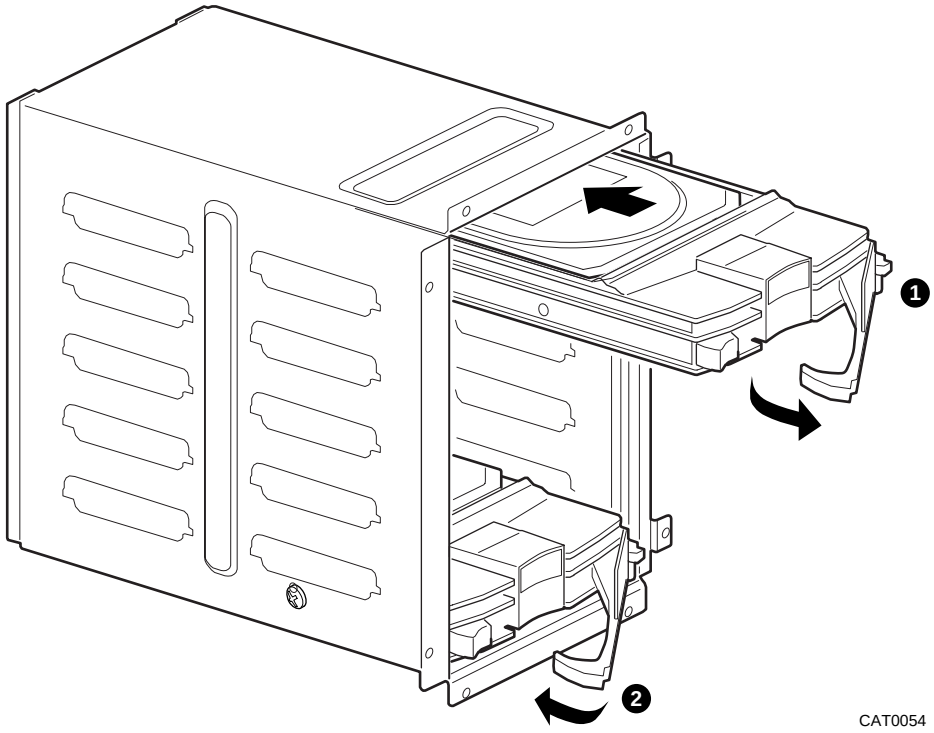


Figure 7-8. Installing the Drive Carrier

Removing

1. To remove the carrier, press the portwine colored rubber button in to release the handle.
2. Pull the handle forward to release the SCSI connection and then pull the drive out of the cage.

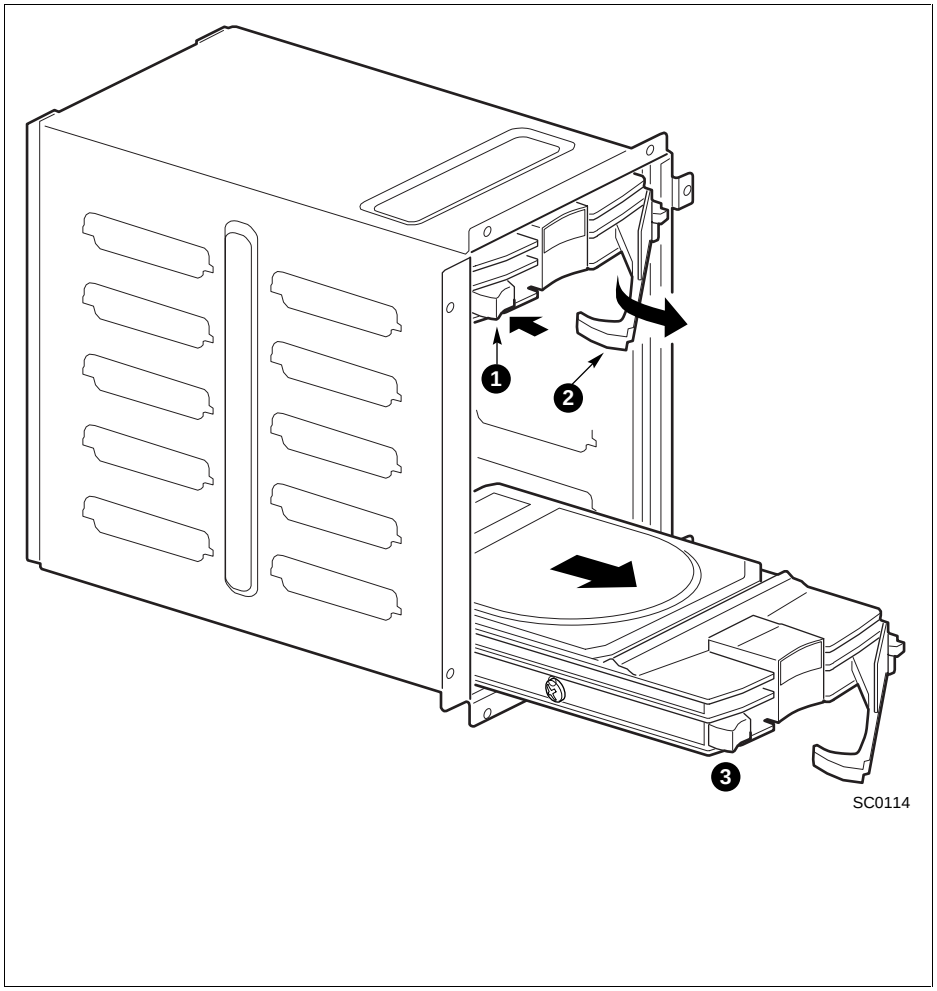


Figure 7-9. Removing the Drive Carrier

Configuring and Expanding Your Storage System

The storage subsystem is installed in the system and may be expanded by using an expansion box that is installed into a rack. The following information is provided for configuring and expanding your storage subsystem:

- SCSI system board connection
- Single 4-slot subsystem
- Single 6-slot subsystem

Connecting a Single 4-Slot Subsystem

Figure 7-10 displays the connections for a single 4-slot storage subsystem. Perform the following procedure to connect the storage subsystem:

1. Connect the power source cable ❶ to J1 on the subsystem and the other end to the power source.
2. Connect the end of the SCSI cable ❷ to one of the SCSI connectors on the SCSI controller.
3. Connect the other end of the SCSI cable ❷ to J3 (SCSI IN) on the storage backplane.
4. Terminate the connection at J8 ❸.

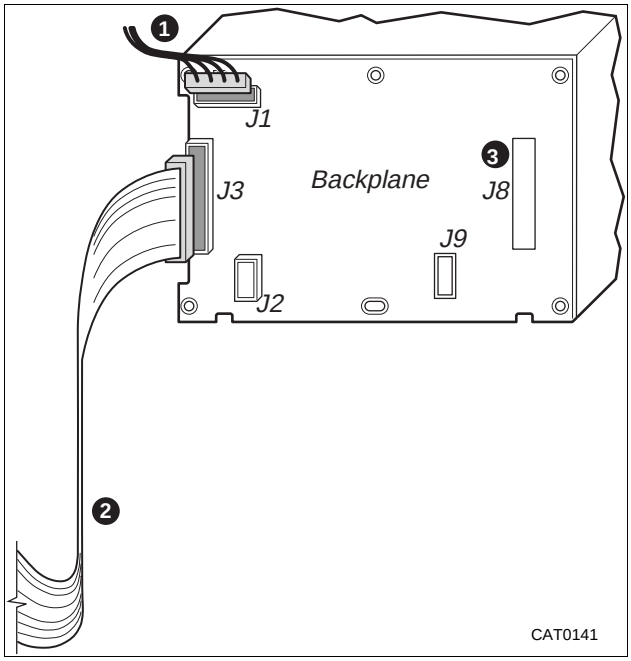


Figure 7-10. Connections for a Single 4-Slot Subsystem

Connecting a Single 6-Slot Subsystem

Figure 7-11 displays the connections for a single 6-slot storage subsystem. Perform the following procedure to connect the storage subsystem:

1. Connect the power source cable ❶ to J13 on the subsystem and the other end to the power source.
2. Connect an end of the SCSI cable to one of the SCSI connectors on the SCSI controller ❷.
3. Connect the other end of the SCSI cable ❸ to J10 (SCSI IN) on the storage backplane.
4. Terminate the connection at J7 ❹.

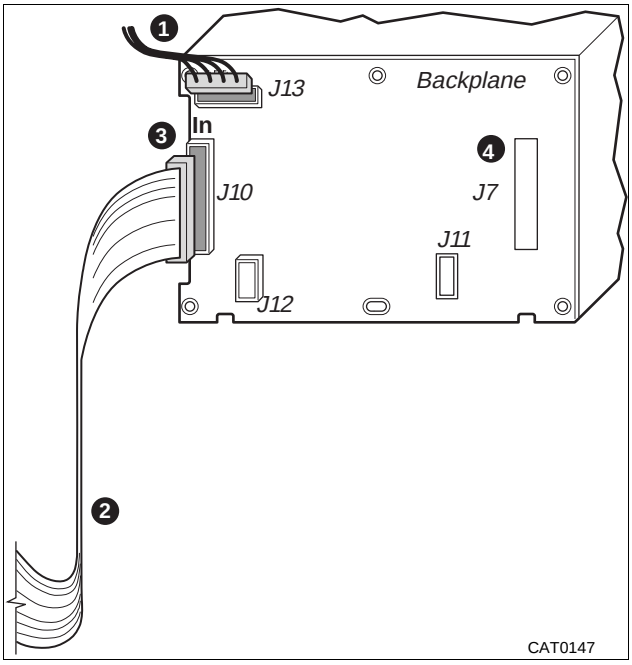


Figure 7-11. Connections for a Single 6-Slot Subsystem

Multimode SCSI Termination

The storage system backplane contains on-board multimode terminators. These devices provide LVD (Low Voltage Differential) termination to the bus when all devices are LVD. If a SE (Single Ended) device is installed in the backplane, the terminators will automatically switch to SE mode termination. This causes all devices on the bus to operate in SE mode, and restrict all transactions to SE speed and length limitations.

If a dual controller system is constructed, the second controller may be connected to the last backplane in the chain. In this mode, the termination is provided by the second controller and all backplane terminators are disabled.

Combination CD-ROM and Floppy Drive

The combination IDE CD-ROM and floppy drive is located to the right of the storage subsystem in a rack system, and is under the top spare drive bay in a pedestal system. Figure 7-12 shows the location of the activity LEDs for the CD-ROM and floppy drives.

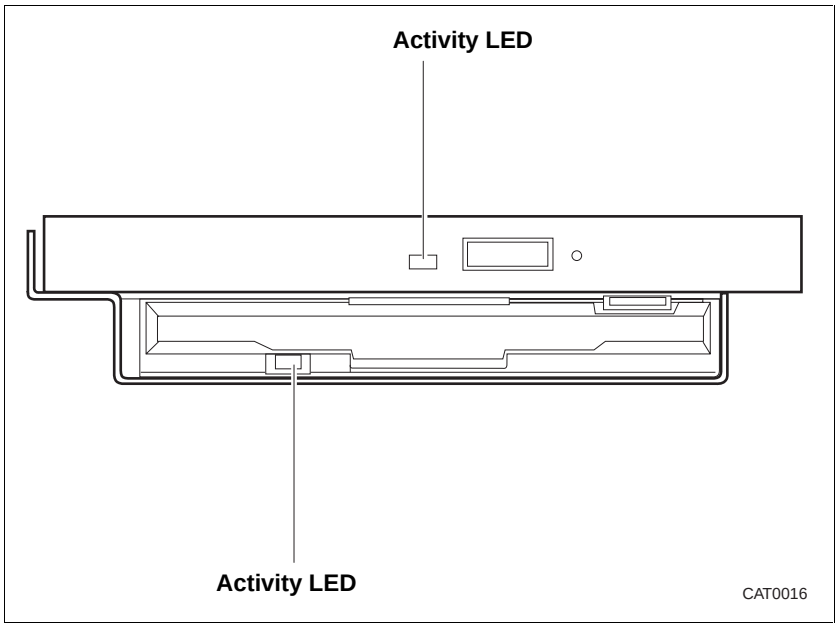


Figure 7-12. Combination Drive LED Locations

Removing and Replacing a Combination Drive

Press in both latches simultaneously and pull out to remove the combination drive. See Figure 7-13 for removing and replacing the combination drive.

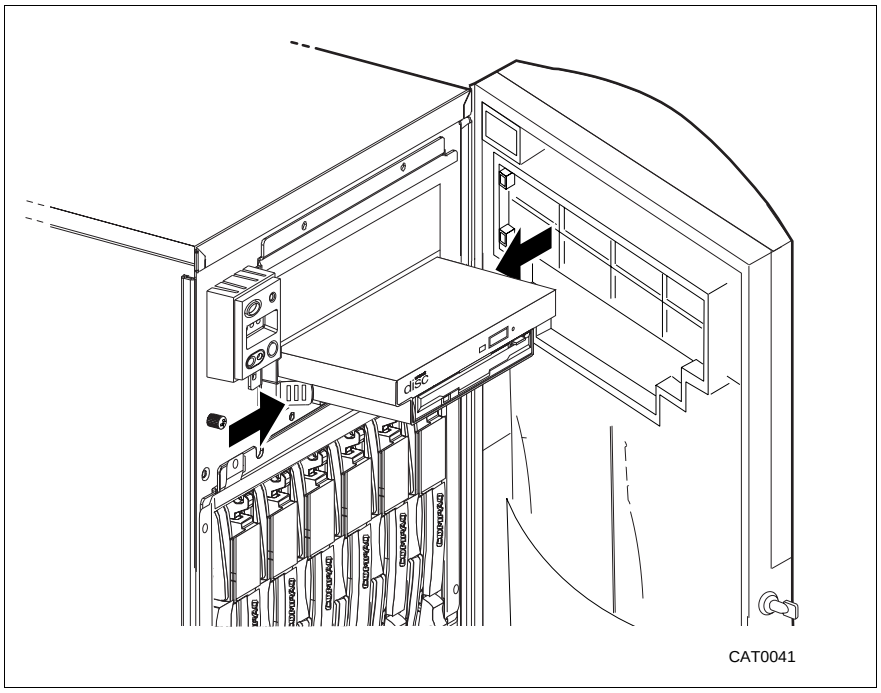


Figure 7-13. Removing the Combination Drive

Spare Removable Media Bay

The system contains one 5.25-inch removable bay that may be used for a tape device. The bay is located just above the combination drive in a pedestal system and to the left in a rack system as shown in Figure 7-14.

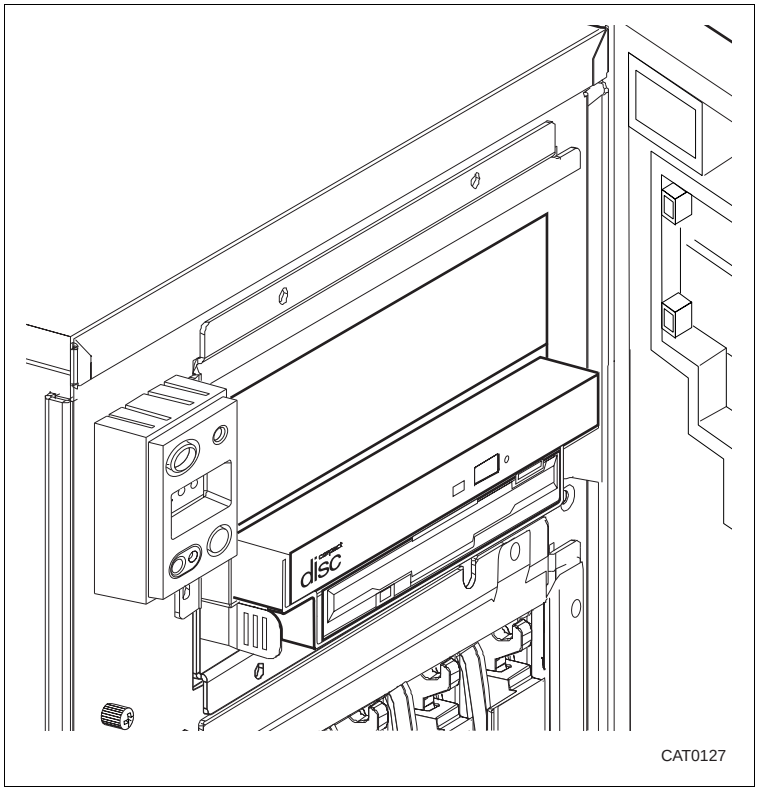


Figure 7-14. Spare Removable Media Bay

Installing a Drive in the Spare Removable Media Bay

To install a tape drive in the spare bay, complete the following procedure.

1. Install the drive into the drive holder and secure it with four screws (two on each side).
2. Install the drive holder into the system and secure it with four screws (two on the top and two on the bottom).
3. Plug in one end of the SCSI cable to SCSI B on the system board (the cable must be 3 meters).
4. Plug in the other end of the SCSI cable to the SCSI connection on the rear of the drive.

Figure 7-15 shows how to install a drive in the removable media bay.

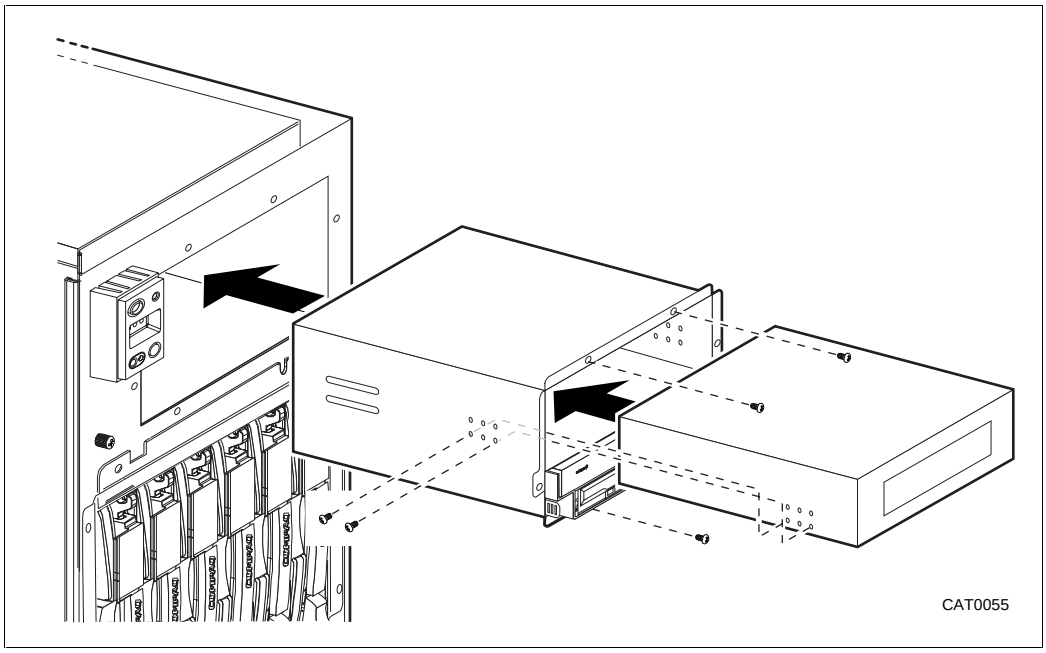


Figure 7-15. Installing a Drive in the Removable Media Bay

External SCSI Expansion

External SCSI devices, such as tabletop or rackmounted storage devices, can be connected to the system using PCI-based SCSI adapters. Use the following rules to determine if a particular device can be used:

- The device must be supported by the operating system. Consult the software product description for the device or contact the hardware vendor.
- A maximum of seven devices can be attached on any one SCSI controller.
- Each device on the bus must have a unique SCSI ID. You may need to change a device's default SCSI ID in order to make it unique. For information about setting a device's ID, refer to the guide for that device.
- The entire SCSI bus length, from terminator to terminator, must not exceed 6 meters for fast-differential connection to SCSI, or 3 meters for fast single-ended connection.
- Ensure that the SCSI bus is properly terminated and that no devices in the middle of the bus are terminated.
- For best performance, wide devices should be operated in wide SCSI mode.

Chapter **8**

Installing Components

Introduction

This chapter explains how to prepare and perform installation and removal of your system's components. You need to perform these procedures to upgrade your system.

Topics covered in this chapter are:

- Preparing to install or remove components
- Removing and installing processor modules
- Removing and installing memory DIMMs
- Installing and removing option modules
- Installing storage devices
- Removing and replacing other components

CAUTION: Be sure to follow the appropriate antistatic precautions whenever handling internal components. Components listed in "Removing and Replacing Other Components" should be handled by qualified service personnel only.

Preparing to Install or Remove Components

To prepare your system for installation and removal of components, you will need to assemble the required equipment and familiarize yourself with antistatic precautions. You only need to remove the left side panel (top panel on a rackmount) to access the user-replaceable internal components and controllers as shown in Figure 8-1.

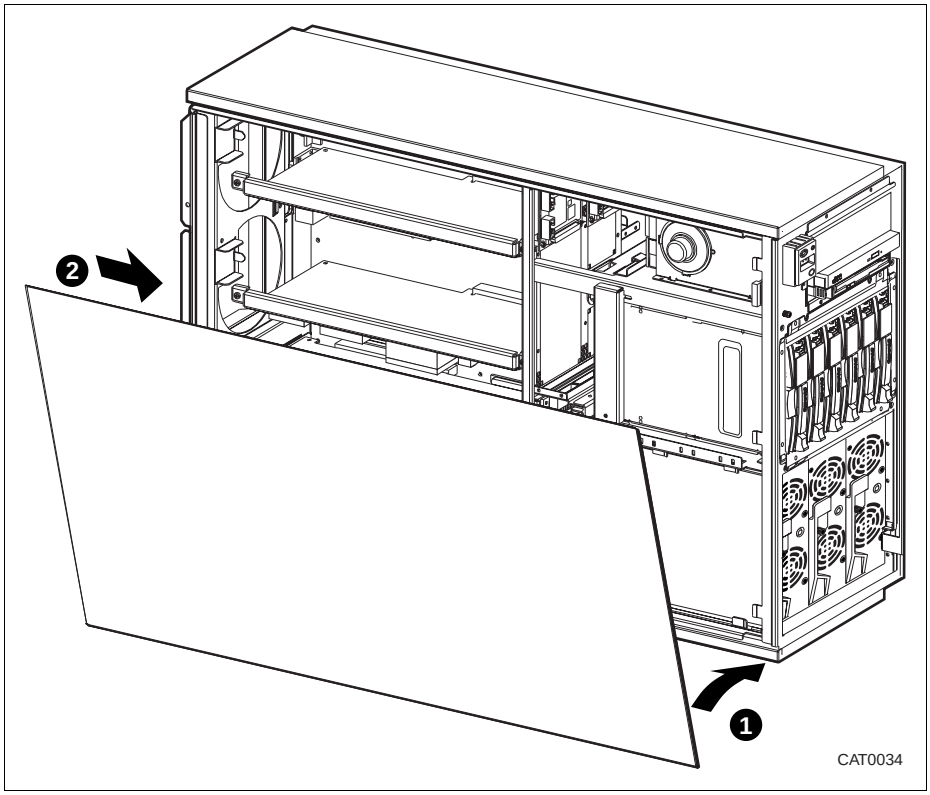


Figure 8-1. Removing and Replacing the Side Panel on a Pedestal System

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

- Phillips screwdriver
- Antistatic wrist strap
- Option board kit or device kit, if necessary

Before You Begin Removal

1. Shut down the operating system following the instructions listed in the operating system documentation.
2. Set the **On/Standby** buttons on all external options connected to the system to the off position.
3. Set the **On/Standby** button on the system unit to the off position.
4. Unplug the power cord.

To Remove the Side Panel on a Pedestal

5. Open the front bezel.
6. Remove the screw attaching the side panel to the chassis (see Figure 8-1).
7. Remove the panel with a rearward motion.
8. Attach antistatic wrist strap as shown in Figure 8-2.

To Replace the Side Panel on a Pedestal

Refer to Figure 8-1 and replace the side panel of the pedestal as follows:

1. Place the side panel on the chassis and align the engagement tabs.
2. Slide the panel forward.
3. Replace the screw.

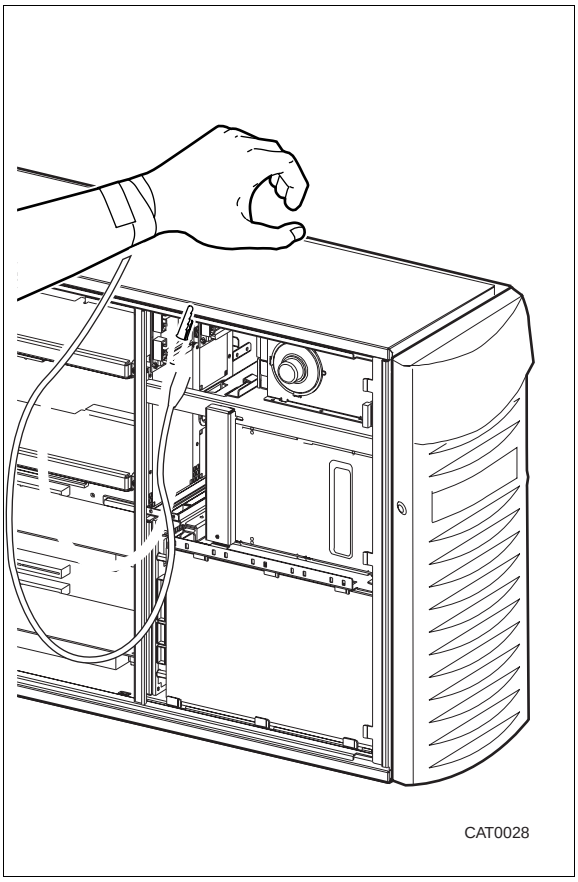


Figure 8-2. Attaching the Antistatic Wrist Strap

To Remove the Top Cover on a Rackmount

1. Remove the bezel.
2. Remove the top cover from the chassis by turning the thumb screw.
3. Remove the panel.
4. Attach the antistatic wrist strap as shown in Figure 8-2.

To Replace the Top Cover on a Rackmount

1. Place the panel on top of the unit and align the fastening hooks.
2. Slide the panel forward.
3. Replace the screw.

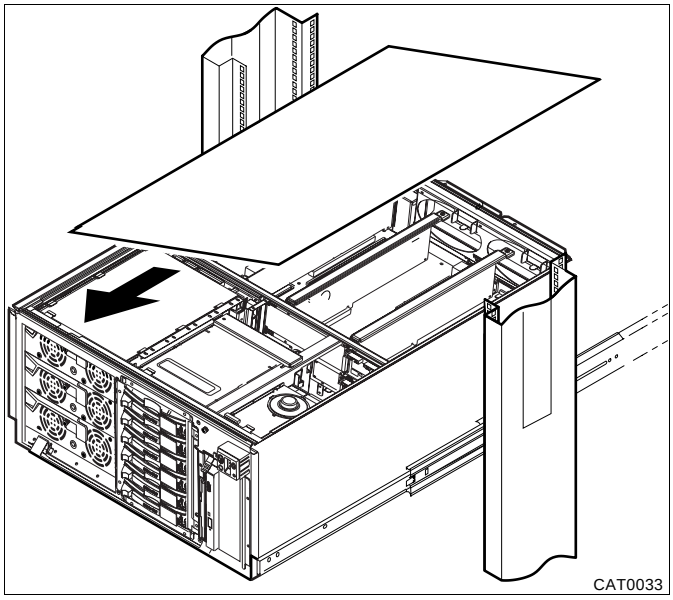


Figure 8-3. Removing/Replacing the Top Cover on a Rackmount

Removing and Installing Processor Modules

Your system comes with a single Alpha 21264 processor installed. You can upgrade your system's capabilities by installing a second Alpha 21264 processor. This section describes the configuration guidelines you must follow to perform a processor upgrade. In addition, a detailed procedure for removing and installing a second processor is provided.

Processor Configuration Guidelines

To upgrade to a dual Alpha 21264 processor configuration, you must purchase and install an Alpha 21264 processor upgrade kit. Contact your authorized Compaq sales representative for more information.

Apply the following guidelines to your processor upgrade:

- A single processor configuration can be installed in either processor socket.
- A single processor configuration does not require termination in the empty socket.
- Dual processors must be the same speed and same cache size.
- Compaq recommends that dual processor configurations use Alpha 21264 processors with the same revisions.
- Use an anti-static wrist strap when servicing any part of the system.

Installing a Processor Module

To upgrade from a single Alpha 21264 processor configuration to a dual Alpha 21264 processor configuration:

1. Shut down the operating system software.
2. Power down the system.
3. Disconnect all external devices, ac power, and monitor power.
4. If you have a rack mounted server and it is installed in the upper section of the rack, you will need to use a stepladder to acquire access.
5. Remove the side cover from the pedestal system or the top cover from a rack system (see Figure 8-4).
6. Remove the processor from its shipping container.
7. Insert the processor into the empty socket.

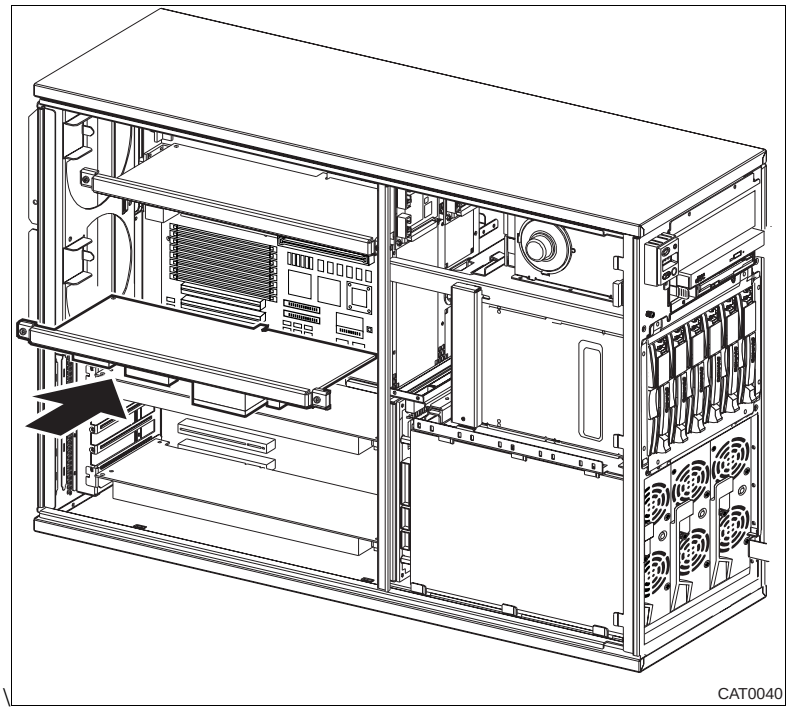


Figure 8-4. Installing the Second Processor

1. Screw down the retainer screws.
2. Replace the side panel cover (top cover for rack system). See Figure 8-1 for replacing the system cover.
3. Push server back in the rack. If you need more information see Chapter 3 for the installation procedure.
4. Connect all external devices and restore power. Afterwards, your server automatically recognizes both processors.

Dual Processor System Power-Up

If a processor fails to correctly initialize on a system power-up, perform the following procedure:

1. Verify that both processors are present by using the **Show CPU** command.
2. If only one processor is present, press the Reset button.

NOTE: Allow 30 seconds following a power-down before you re-power the system to avoid a rapid cycle. If a rapid cycle occurs, check that both processors are present. If they are not present, press the Reset button.

Removing and Installing Memory DIMMs

There are sixteen slots for memory DIMMs with four slots per bank. A memory bank must be populated with four DIMMs of the same size. Always populate starting with bank 0 through bank 3. All four DIMMs must be populated for each bank. See Figure 8-5 for memory connector layout. Figure 8-6 shows how to remove a memory DIMM and Figure 8-7 shows how to install a memory DIMM.

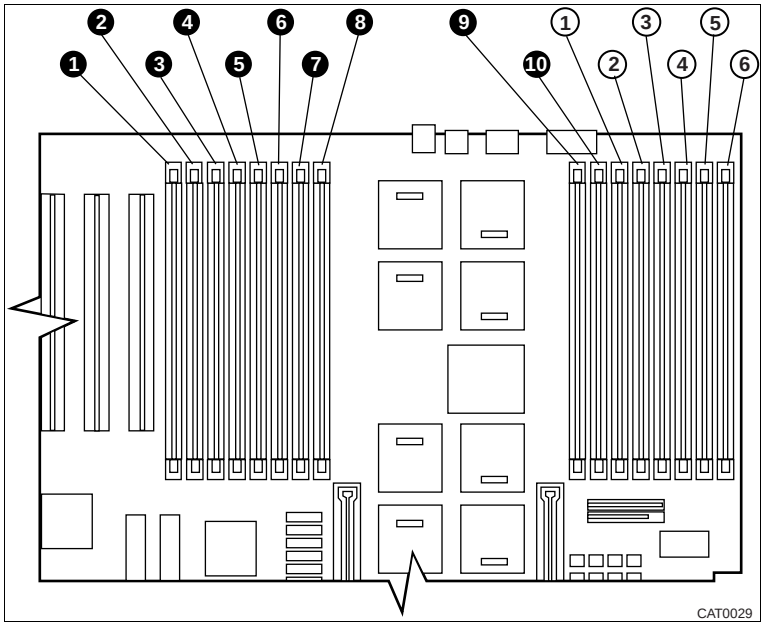


Figure 8-5. Memory Connector Layout

NOTE: A maximum of 4 GB of memory may be used with the system.

Table 8-1
Memory Bank Location

Reference Number	Connector Number	Bank Number
❶	J32	1
❷	J31	3
❸	J30	1
❹	J29	3
❺	J28	0
❻	J27	2
❼	J26	0
❽	J25	2
❾	J16	2
❿	J14	0
①	J13	2
②	J11	0
③	J9	3
④	J6	1
⑤	J5	3
⑥	J1	1

To Remove a Memory DIMM

Remove the side panel (or top cover for a rackmount) as described in "Preparing to Install or Remove Components."

NOTE: Use an antistatic strap when installing or removing memory.

1. Push the clips on the system board memory connector to the side in order to unlatch the memory module.
2. Pull the memory DIMM out.

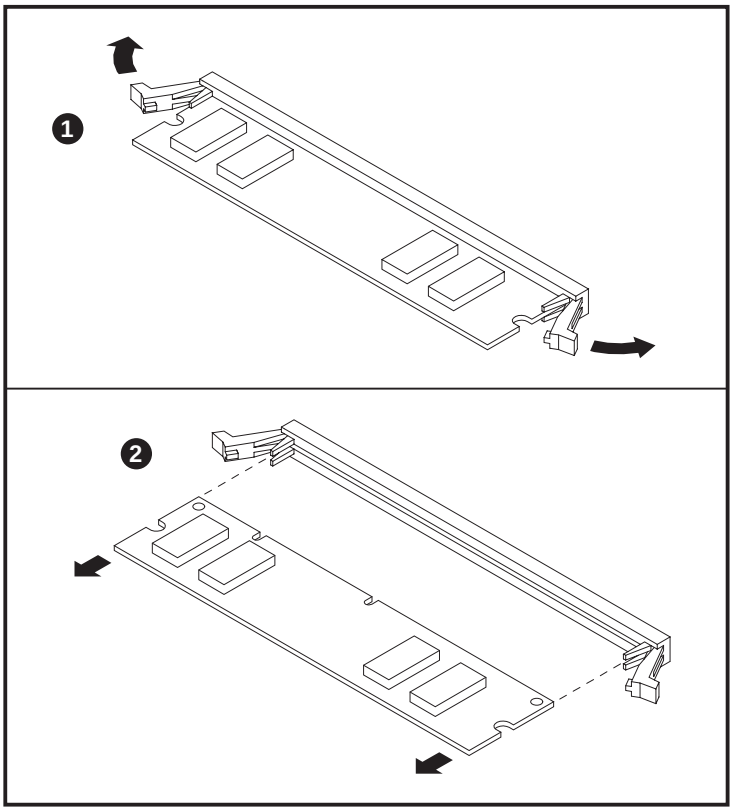


Figure 8-6. Removing a Memory DIMM

To Install a Memory DIMM

1. With the latching clips open, align the pins of the memory DIMM with the connector on the system board and press until it is seated firmly in the connector and the side clips are latched.
2. Replace the side panel (or top cover for a rackmount) as described in "Preparing to Install or Remove Components," earlier in this chapter.

   NOTE: Use an antistatic strap when installing or removing memory.

The system will test memory during initialization.

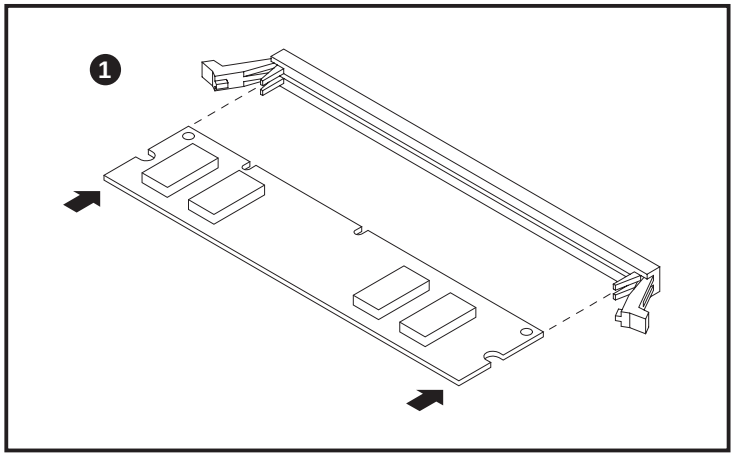


Figure 8-7. Installing a Memory DIMM

Removing and Installing Option Modules

The system supports five 64-bit PCI slots, and one shared 64-bit PCI slot or 32-bit ISA slot.

Configuring an Option Module

Depending on the type of option module you install, you may or may not need to configure it. When installing an ISA option module, refer to the SYSTEM STARTUP display screen to see if configuration of the module is required. After you turn on the system, the system startup sequence examines the ISA option slot and reports whether you need to run the AlphaBIOS.

When installing PCI option modules, you do not normally need to perform any configuration procedures. The system configures PCI modules automatically. But because some PCI option modules require configuration utility diskettes, refer to the option documentation.

Network Interface Module

The system supports PCI or ISA network option modules. For information on cabling them to destinations outside the unit, refer to the documentation that accompanies the option.

Installing and Removing an Option Module

Figure 8-8 shows the system board with numbered PCI slots. To install or remove a PCI or ISA option module on the system board, refer to and follow the steps outlined in this section. Each callout represents the PCI slot number with ❻ representing the combination PCI (slot 6) and ISA slot.

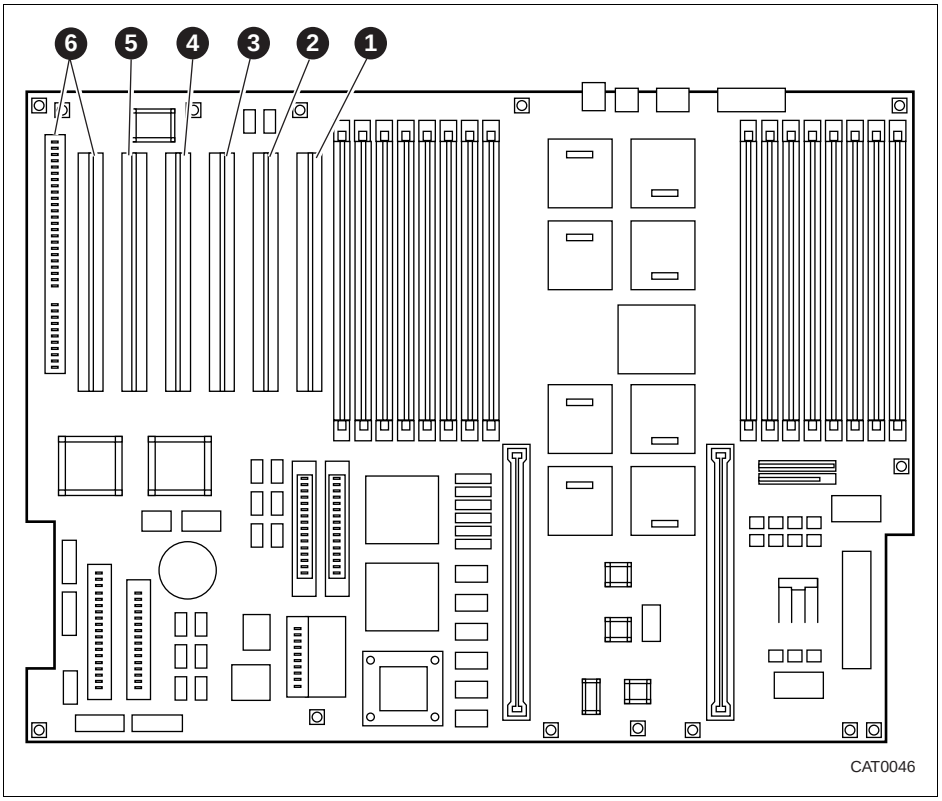


Figure 8-8. System Board with Numbered Slots

To Install an Option Module

1. Remove the side panel (or top cover for a rackmount) as described in "Preparing to Install or Remove Components" at the beginning of this chapter.
2. Remove the screw securing the slot cover to the chassis and the remove the slot cover from the system and store it for future use.
3. Carefully install the option module into the appropriate connectors on the system board and press it firmly into place and secure using the screw that you removed.
4. Remove a knockout for the PCI cable.
5. Connect one end of the PCI cable to the option module and then the other to where you removed the knockout.
6. Replace the side panel (or top cover for a rackmount) as described in "Preparing to Install or Remove Components."

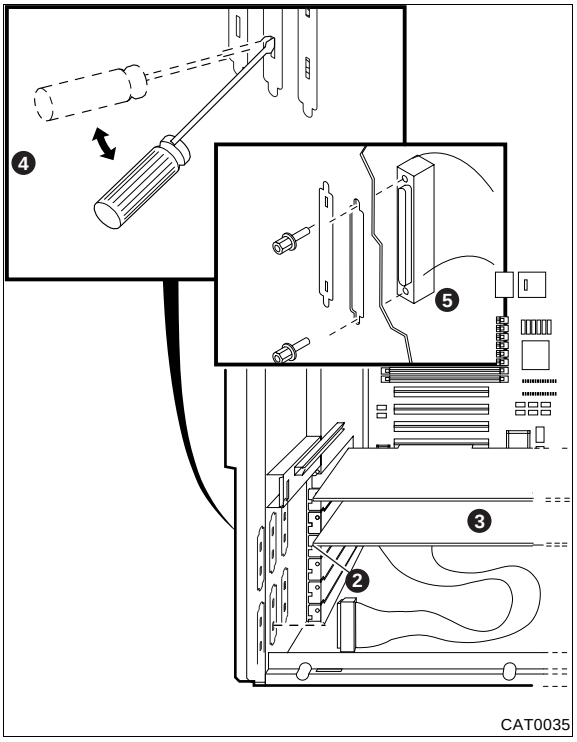


Figure 8-9. PCI Module Cable Connection

To Remove an Option Module

1. Remove the side panel (or top cover for a rackmount) as described in "Preparing to Install or Remove Components."
2. Disconnect any cables connected to the external (rear) or internal ports on the option module you want to remove.
3. Remove the slot cover screw securing the option module to the chassis.
4. Carefully disconnect the option module from the slot connectors on the system board and remove it from the system.
5. If you intend leaving the option slot vacant, install a slot cover and secure it to the chassis using the screw that you removed.
6. Replace the side panel (or top cover for a rackmount) as described in "Preparing to Install or Remove Components."

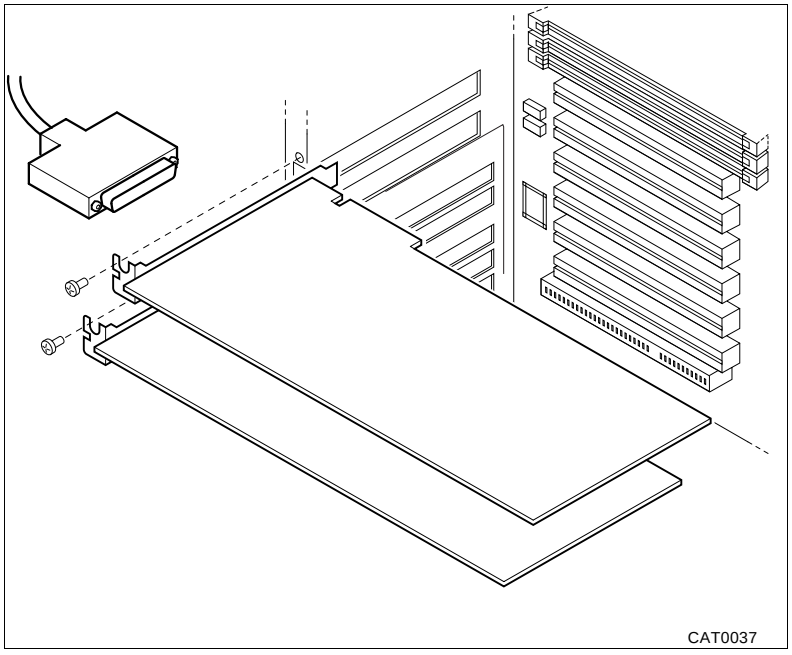


Figure 8-10. Installing or Removing an Option Module

Installing Storage Devices

The system unit is designed to accommodate up to four 1.6-inch or six 1.0-inch hot swappable drives, one combination 3.5-inch floppy and IDE CD-ROM, and one 5.25-inch half height removable media bay. The combination CD-ROM and diskette drive connect to the SAF-TE transition module attached on the system just to the rear of the combination unit. For more information about the storage subsystem, refer to Chapter 7, "Using the Storage Subsystems".

Removable Bay SCSI Device

Whenever you install another SCSI device in the removable media bay area, you must assign it a unique SCSI ID number. Otherwise, the system will not recognize the device. Use the SCSI cable for connecting the drive to the SCSI controller.

To install a drive in the spare bay, complete the following procedure.

1. Install the drive into the drive holder and secure it with four screws (two on each side).
2. Install the drive holder into the system and secure it with four screws (two on the top and two on the bottom).
3. Plug in one end of the SCSI cable to the SymBIOS adapter 895 card located in PCI slot 2 (the cable must be 3 Meters).
4. Plug in the other end of the SCSI cable to the SCSI connection on the rear of the storage backplane.

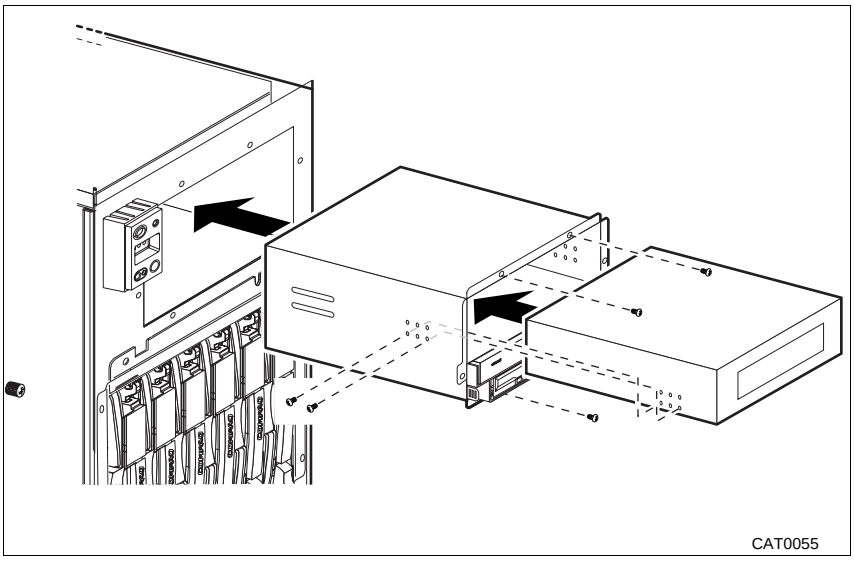


Figure 8-11 Installing a Tape Drive In to the Removable Media Bay

Removing and Replacing Other Components

You may require assistance for the removal and replacement of the following components:

- System board
- System management board
- System backplane
- System fans
- Processor
- Power supplies
- Combination CD-ROM/floppy disk drive
- Operator control panel

Contact your authorized service representative for assistance.

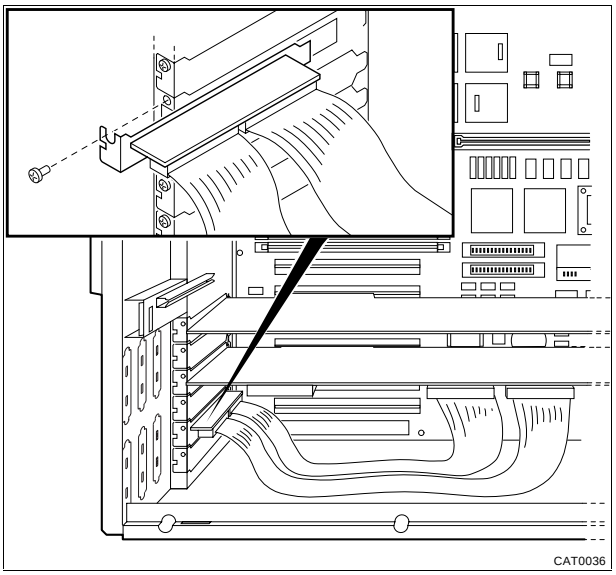


Figure 8-12. Wide SCSI Dual Connector Cable for Standard Bulkhead Connector

Chapter **9**

Troubleshooting

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 that 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 error beep codes
- Power problems
- Overheating problems
- Boot problems
- PCI bus problems
- Monitor and terminal problems
- Keyboard and mouse problems
- Printer problems

Troubleshooting Overview

This section refers you to relevant sections in this chapter for information on how to perform certain tasks and resolve some problems that you may encounter.

Before you begin troubleshooting your system, consult your service agreement to 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 9-1 lists possible problems and the relevant sections in this chapter.

Table 9-1
Determining Where to Look

Task or Problem	Relevant Section
To run a diagnostic test of the whole system, show its status, or terminate the testing.	System error beep codes.
No startup display appears when you turn on the system.	System error beep codes. Power problems. Problems detected by the operating system.
The system cannot boot the operating system.	Boot problems or system error beep codes.
The system cannot access a mass storage device.	Storage problems.
Storage devices are missing from the show device display.	Storage 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.

System Error Beep Codes

Beep codes help you diagnose and troubleshoot system problems. Beep codes are audible error codes emitted by the system for specific problems. Table 9-2 describes error beep codes. For example, if the SROM (serial read-only memory) code could not find any usable memory, you would hear a 1-3-3 beep code (one beep, a pause, a burst of three beeps, a pause, and another burst of three beeps).

Table 9-2
Error Beep Codes

Beep Code	Meaning	Action
1	No error.	
1-3	VGA monitor not plugged in.	Plug in the monitor.
	Graphics option card different from the one shipped with the system.	Reposition jumper J27 from 1-2 to 2-3.
1-1-2	A ROM data path error was detected while loading console code.	The system will automatically use the fail-safe loader to load new console firmware from the diskette.
		Call your service representative.
1-1-4	The SROM code is unable to load the console code; FROM header area or checksum error detected.	The system will automatically use the fail-safe loader to load new console firmware from the diskette.
		Call your service representative.
1-1-7	No boot block on floppy device.	Replace the floppy boot device.
1-2-1	TOY NVRAM failure.	Call your service representative.
1-2-4	B-cache error.	Call your service representative.
1-3-3	No usable memory detected.	Verify that the memory modules are properly seated.
		Replace faulty memory modules.
		If replacement does not solve the problem, call your service representative.
3-3-1	Generic system failure.	Call your service representative.
3-3-3	Failure of onboard SCSI controller.	Call your service representative.

Power Problems

Table 9-3 describes how to troubleshoot the system when there is no power at the system enclosure.

Table 9-3
Troubleshooting Power Problems

Symptom	Action
No AC power.	Check the power source and power cord. Check that the system cover is properly secured. An interlocking sensor switch shuts off power to the system if the cover is removed. Unplug the power cord for 15 seconds, then reconnect.
AC power is present, but system does not power on.	Check the On/Off button on the control panel. Check that the ambient room temperature is within environmental specifications (10-40ºC, 50-104ºF). Check the remote management console using the STATUS command. Look for fan status, system temperature, or power supply failure. System requires two good power supplies to power on. Check that cable connectors on the system board are properly connected. Check that the internal power supply cables are plugged in at the right place on both the power supply and system board. Check that the side panel (or top panel for rackmounts) is closed.
Power supply shuts down after approximately 10 seconds (fan failure).	Listen to hear if the fan is spinning at power-up. A failure of the fan causes the system to shut down after a few seconds.

Overheating Problems

Internal sensors monitor system and power supply temperature and shut down the system if maximum limits are exceeded. If the system shuts down unexpectedly:

- Ensure that the top cover and side panel are properly in place.
- Verify that the ambient temperature does not exceed the limits specified in Table 1-8 in Chapter 1, “Environmental Characteristics .”

Refer to Table 9-3, “Troubleshooting Power Problems” to troubleshoot power supply problems and fan failure.

Boot Problems

Table 9-4 describes how to troubleshoot problems that occur while the system is booting operating system software.

Table 9-4
Troubleshooting Boot Problems

Symptom	Action
The system cannot find the boot device.	Check system configuration for the correct environment variable settings: examine the *fwsearchpath*, *autoload*, and *countdown* environment variables.
System does not boot.	Verify that you have not installed an unsupported graphics adapter or another type of unsupported adapter.
There is a software problem or the operating system is not installed correctly.	Refer to your operating system software information. Verify that you have the correct firmware revision for your system.

Table 9-5
Hot-Swap Drive Status LEDs

Activity Status (Green)	Drive Power On (Green)	Fault Status (Amber)	Priority	Indication
Off	X	X	-	No drive activity.
On	X	X	-	Drive being accessed.
X	Off	Off	0	Default.
X	On	On	1	Ready for removal.
X	Slow	Off	2	Prepared for operation.
X	Off	On	3	Device faulty.
X	Fast	Off	4	Device rebuilding.
X	On	Fast	5	In failed array.
X	Off	Slow	6	In critical array.
X	Off	On	7	Parity check.
X	Off	Fast	8	Predicted fault.
X	Fast	On	9	Unconfigured.
X	Fast	Fast	10	Hot spare.
X	On	Off	11	Rebuild stopped.
X	Fast	Slow	12	Identify.

NOTE: The highest number priority is displayed when multiple conditions exist.

PCI Bus Problems

PCI bus problems at startup are usually indicated by the inability of the system to detect the PCI device. Use Table 9-6 to diagnose the likely cause of the problem.

Table 9-6
Troubleshooting PCI Bus Problems

Step	Action
1	Confirm that the PCI option card is supported, and confirm firmware and software versions.
2	Confirm that the PCI option card and any cabling are properly seated.
3	Check for a bad slot by moving the last installed PCI controller to a different slot.
4	Call the option manufacturer or your service representative for help.

Some PCI devices do not implement PCI parity, and some have a parity-generating scheme that may not comply with the PCI specification. In such cases, the device functions properly as long as parity is not checked.

Monitor and Terminal Problems

If the system starts up but has no startup display when you turn on the system, refer to Table 9-7.

Table 9-7
Troubleshooting Monitor and Terminal Problems

Possible Cause	Action
The monitor or terminal is not turned on.	Check that the monitor or terminal is turned on. Make sure that 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.
The power cord is not connected. The power cord may be faulty. The power cord socket may not be working.	Make sure that all the power cords are connected correctly at both ends. Try a power cord that works or test the power socket with an appliance that works.
VGA controller settings may be incorrect.	Combining multiple VGA controllers will produce unpredictable results, and use of multiple VGA controllers is not recommended or supported.
The terminal or monitor fuse may have blown.	Replace the blown terminal or monitor fuse. Refer to the terminal or monitor documentation.
The port to which the terminal or monitor connects may not be the correct one.	Ensure that your monitor cable is plugged into the connector of your VGA 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 9-8 lists problems that may occur with the keyboard or mouse.

Table 9-8
Troubleshooting Keyboard and Mouse Problems

Symptom	Possible Cause	Action
The monitor does not display the character that you type.	The keyboard cable is incorrectly connected or keyboard language is set wrong.	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 service representative.
The monitor displays a message indicating a keyboard error.	The keyboard is not connected correctly.	Make sure that the keyboard is connected to the keyboard port.
The mouse pointer is displayed on the monitor, but does not move correctly.	The mouse is connected incorrectly.	Make sure that the mouse cable is inserted 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 place it back inside the mouse.
The mouse pointer does not show on the monitor.	The mouse is connected incorrectly or the mouse cable is loose.	Make sure that the mouse cable is connected correctly in the mouse connector.
	The system is in console mode.	The mouse pointer is displayed only when the operating system is running.
		Boot the operating system.
	The mouse is faulty.	Replace the mouse.

Printer Problems

Verify that the printer is correctly cabled to the system and refer to the printer's documentation if necessary.

Chapter 10

Managing the System Remotely

This chapter describes how to manage the system from a remote location using the Remote Management Console (RMC). The RMC circuitry is powered from 5 volt standby. The power is provided to the RMC circuitry as long as the DS20E is plugged into live AC power. This is true even if the DS20E power switch is off. You can use the RMC from a console terminal at a remote location or from a local console terminal connected to the COM1 port.

Sections in this chapter are:

- RMC overview
- First-time setup
- RMC commands
- Using the RMC switch pack
- Troubleshooting guide
- Modem dialog details

RMC Overview

The remote console manager (RMC) monitors and controls the system remotely. The control logic resides on the system board. The RMC is a separate console from the SRM console. The SRM firmware resides on the system board. The RMC firmware resides on the server feature module and can only be accessed through COM1. The RMC is run from a serial console terminal or terminal emulator. A command interface lets you reset, halt, and power the system on or off, regardless of the state of the operating system or hardware. You can also use RMC to monitor system power and temperature.

You can invoke the RMC either remotely or through the local serial console terminal. Once in RMC command mode, you can enter commands to control and monitor the system. Only one RMC session can be active at a time.

- To connect to the RMC remotely, you dial in through a modem, enter a password, and then type an escape sequence that invokes RMC command mode. You must set up the modem before you can dial in remotely.
- To connect to the RMC locally, the console terminal has to be connected to COM1 and then you type the escape sequence at the SRM console prompt on the local serial console terminal to enter RMC mode.

CAUTION: Do not issue RMC commands until the system has powered up. If you enter certain RMC commands during power-up or reset, the system may hang. In that case you would have to disconnect the power cord at the power outlet. You can, however, use the RMC **halt** command during power-up to force a halt assertion.

First-Time Setup

To set up the RMC to monitor a system remotely, connect the modem ❸ to the COM1 port at the back of the system, configure the modem port for dial-in, and dial in.

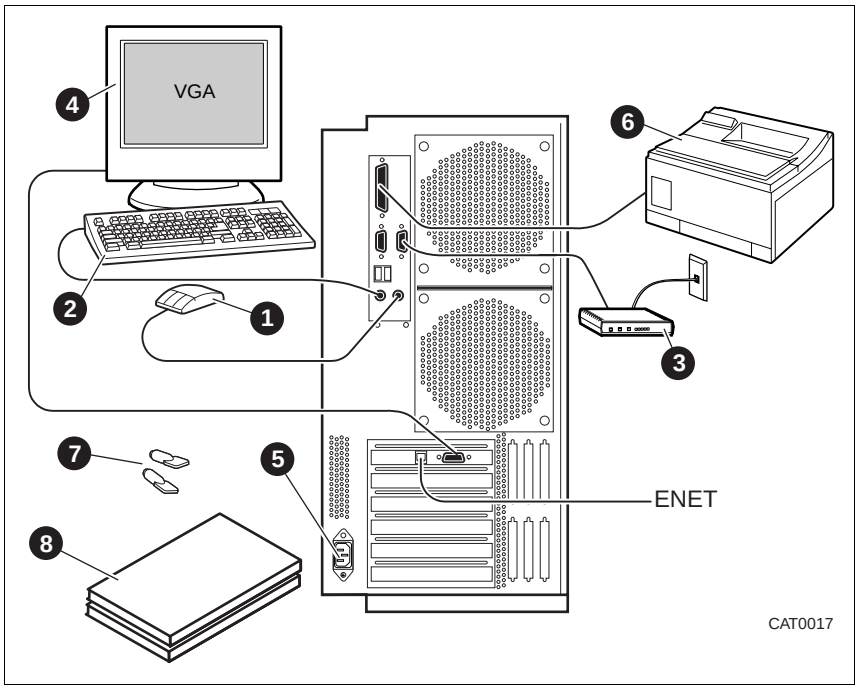


Figure 10-1. RMC Connections

Dialing In and Invoking RMC

To dial in to the modem on COM1, dial the modem, and type the escape sequence to bring up the RMC. Use the hangup command to terminate the session.

A sample dial-in dialog would look similar to the following:

```
ATQ0V1E1S0=0          ❶
OK
ATDT30167
CONNECT 9600

#                     ❷

RMC V2.0              ❸

RMC>
```

Example 10-2. Sample Remote Dial-In Dialog

Dialing In and Invoking RMC

1. Dial the number for the modem connected to the modem port. See ❶ in t he above example. The RMC prompts for a password with a "#" character. See ❷.
2. Enter the password that you set with the **setpass** command.

You have three tries to correctly enter the password. After three incorrect tries, the connection is terminated, and the modem is not answered again for 5 minutes. When you successfully enter the password, the RMC banner is displayed. See ❸. You are connected to the system COM1 port, and you have control of the SRM console.

NOTE: At this point no one at the local terminal can perform any tasks except for typing the RMC escape sequence. The local terminal displays any SRM console output entered remotely.

1. Type the RMC escape sequence (not echoed).

```
^]^]RMC
RMC>
```

NOTE: From RMC command mode, you can change the escape sequence for invoking RMC, if desired. Use the **setesc** command to change the sequence. Be sure to record the new escape sequence.

2. To terminate the modem connection, enter the RMC **hangup** command.

RMC> hangup

If the modem connection is terminated without using the **hangup** command or if the line is dropped due to phone-line problems, the RMC will detect carrier loss and initiate an internal **hangup** command. If the modem link is idle for more than 20 minutes, the RMC initiates an auto hangup.

NOTE: Auto hangup can take a minute or more, and the local terminal is locked out until the auto hangup is completed.

Using RMC Locally or with a Modem on COM1

Use the default escape sequence to invoke the RMC mode locally for the first time. You can invoke RMC from the SRM console, the operating system, or an application. The RMC quit command reconnects the terminal to the system console port.

1. To invoke the RMC locally, type the RMC escape sequence. See ❶ in Example 10-3 for the default sequence.

   The escape sequence is not echoed on the terminal or sent to the system. At the RMC> prompt, you can enter RMC commands.

2. To exit RMC and reconnect to the system console port, enter the **quit** command (see ❷). Press Return to get a prompt from the operating system or system console.

```
P00>>> ^]^]RMC      ❶

RMC>

RMC> quit           ❷

Focus returned to COM port
```

Example 10-3. Invoking and Leaving RMC Locally

RMC Commands

The RMC commands given in Table 10-1 are used to control and monitor a system remotely.

Table 10-1
RMC Command Summary

Command	Function
halt	Halts the system. Emulates pressing the Halt button and immediately releasing it.
haltin	Causes a halt assertion. Emulates pressing the Halt button and holding it in.
haltout	Terminates a halt assertion created with haltin. Emulates releasing the Halt button after holding it in.
help or **?**	Displays the list of commands.
poweroff	Turns off power. Emulates pressing the On/Off button to the off position.
poweron	Turns on power. Emulates pressing the On/Off button to the on position.
quit	Exits console mode and returns to system console port.
reset	Resets the system. Emulates pressing the Reset button.
setesc	Changes the escape sequence for invoking command mode.
status	Displays system status and sensors.

Command Conventions

- The commands are not case sensitive.
- A command must be entered in full.
- You can delete an incorrect command with the Backspace key before you press Enter.
- If you type a valid RMC command, followed by extra characters, and press Enter, the RMC accepts the correct command and ignores the extra characters.
- If you type an incorrect command and press Enter, the command fails with the message:

```
*** ERROR - unknown command ***
```

halt

The **halt** command halts the managed system. The **halt** command is equivalent to pressing the Halt button on the control panel and then immediately releasing it. The RMC firmware exits command mode and reconnects the user's terminal to the system COM1 serial port.

```
RMC>halt
Focus returned to COM port
```

*The **halt** command can be used to force a halt assertion.*

haltin

The **haltin** command halts a managed system and forces a halt assertion. The **haltin** command is equivalent to pressing the Halt button on the control panel and holding it in. This command can be used at any time after system power-up to allow you to perform system management tasks.

haltout

The **haltout** command terminates a halt assertion that was done with the **haltin** command. It is equivalent to releasing the Halt button on the control panel after holding it in (rather than pressing it once and releasing it immediately). This command can be used at any time after system power-up.

help or ?

The **help** or **?** command displays the RMC firmware commands.

poweroff

The **poweroff** command requests the RMC to power off the system. The **poweroff** command is equivalent to pressing the On/Off button on the control panel to the off position.

```
RMC>poweroff
```

If the system is already powered off or if switch 3 (RPD DIS) on the switch pack has been set to the on setting (disabled), this command has no immediate effect.

To power the system on again after using the **poweroff** command, you must issue the **poweron** command.

If, for some reason, it is not possible to issue the **poweron** command, the local operator can start the system as follows:

1. Press the On/Off button to the off position and disconnect the power cord.
2. Reconnect the power cord and press the On/Off button to the on position.

poweron

The **poweron** command requests the RMC to power on the system. The **poweron** command is equivalent to pressing the On/Off button on the control panel to the on position. For the system power to come on, the following conditions must be met:

- AC power must be present at the power supply inputs.
- The On/Off button must be in the on position.
- All system interlocks must be set correctly.

The RMC exits command mode and reconnects the user's terminal to the system console port.

```
RMC>poweron
Focus returned to COM port
```

NOTE: If the system is powered off with the On/Off button, the system will not power up. The RMC will not override the "off" state of the On/Off button. If the system is already powered on, the **poweron** command has no effect.

quit

The **quit** command exits the user from command mode and reconnects the serial terminal to the system console port. The following message is displayed:

```
Focus returned to COM port
```

The next display depends on what the system was doing when the RMC was invoked. For example, if the RMC was invoked from the SRM console prompt, the console prompt will be displayed when you enter a carriage return. Or, if the RMC was invoked from the operating system prompt, the operating system prompt will be displayed when you enter a carriage return.

reset

The **reset** command requests the RMC to reset the hardware. The **reset** command is equivalent to pressing the Reset button on the control panel.

```
RMC>reset
Focus returned to COM port
```

The following events occur when the **reset** command is executed:

- The system restarts and the system console firmware reinitializes.
- The console exits RMC command mode and reconnects the serial terminal to the system COM1 serial port.
- The power-up messages are displayed, and then the console prompt is displayed or the operating system boot messages are displayed, depending on how the startup sequence has been defined.

setesc

The **setesc** command resets the default escape sequence for invoking RMC. The escape sequence can be any character string. A typical sequence consists of 2 or more characters, to a maximum of 15 characters. The escape sequence is stored in the module's on-board NVRAM.

> **NOTE:** Be sure to record the new escape sequence. Although the factory defaults can be restored if you forget the escape sequence, this requires resetting the EN RMC switch on the RMC switch pack.

The following sample escape sequence consists of 5 iterations of the Ctrl key and the letter "o".

```
RMC>setesc
^o^o^o^o^o
RMC>
```

If the escape sequence entered exceeds 15 characters, the command fails with the message:

```
*** ERROR ***
```

When changing the default escape sequence, avoid using special characters that are used by the system's terminal emulator or applications.

Control characters are not echoed when entering the escape sequence. Use the **status** command to verify the complete escape sequence.

status

The **status** command displays the current state of the system sensors, as well as the current escape sequence and alarm information. The following is an example of the display.

```
RMC>status

Firmware Rev: V2.0
Escape Sequence: ^]^]RMC
Remote Access: ENABLE
Temp (C): 26.0
RMC Power Control: ON
RMC Halt: Deasserted
External Power: ON
Server Power: ON

RMC>
```

Table 10-2
RMC Status Command Fields

Item	Description
Firmware Rev:	Revision of RMC firmware.
Escape Sequence:	Current escape sequence to invoke RMC.
Remote Access:	Modem remote access state. (ENABLE/DISABLE)
Temp (C):	Current system temperature in degrees Celsius.
RMC Power Control:	Current state of RMC system power control. (ON/OFF)
RMC Halt:	Asserted indicates that halt has been asserted with the **haltin** command. Deasserted indicates that halt has been deasserted with the **haltout** command or by cycling power with the On/Off button on the control panel. The RMC Halt: field does not report halts caused by pressing the Halt button.
External Power:	Current state of power to RMC. Always on.
Server Power:	Indicates whether power to the system is on or off.

Using the RMC Switch Pack

The RMC operating mode is controlled by a switch pack on the server feature module located in the fan area between the system card care and the front of the system. Use the switches to enable or disable certain RMC functions, if desired.

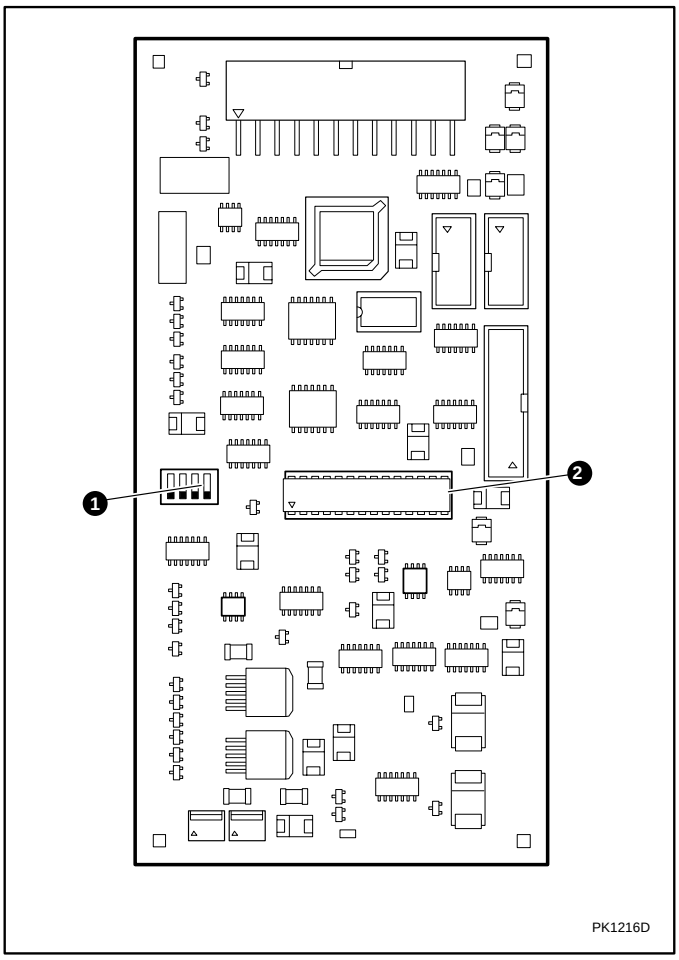


Figure 10-4. Location of RMC Switch Pack and PIC on System Features Module (SFM)

RMC is implemented by the PIC16C73 Microcontroller ❷. The SFM switch pack is shown in at ❶, and again in Figure 10-5 below. The default position

for the RMC switch is on (closed) and for the other three switches is the off (open) position, toward the words “Default all open.”

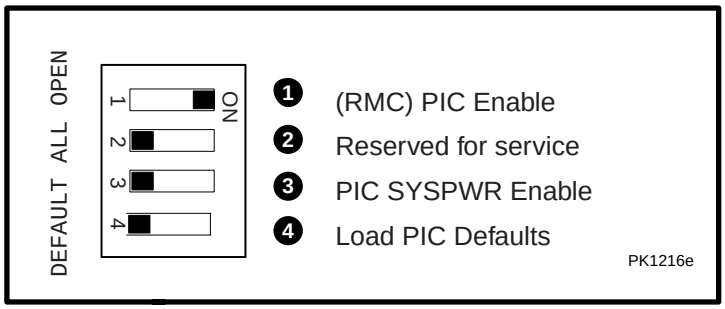


Figure 10-5. RMC Switches

#	Function
❶	(RMC) PIC ENABLE enables/disables the Remote Management Console (RMC). When this switch is in its default position of on (closed), the Remote Management Console (RMC) communicates with the device connected to the COM1 port. This switch redirects the system COM1 port’s transmit and receive serial lines to the SFM module. Note that the hardware flow control lines are not passed to the SFM from the system board. In the off (open) position, RMC is not enabled.
❷	Reserved for Service
❸	PIC SYSPWR ENABLE BYPASS bypasses the control signal from the PIC that enables the system to operate. With this switch on (closed, not in the default position), software cannot shut the system down. For example, with the switch on, the RMC power-off command will not shut the system down. Use this switch to prevent remote shutdown. In the default position of off (open), the system can be shut down remotely, or by software.
❹	LOAD PIC DEFAULTS when on (closed), forces the PIC to its default settings, acting like a reset or refresh to the PIC.

Uses of the Switch Pack

You can use the RMC switch pack to change the RMC operating mode or disable the RMC altogether. The following are conditions when you might want to change the factory settings.

- Switch 1 (EN RMC)—Set this switch to OFF (disable) if you want to reset the baud rate of the COM1 port to a value other than the system default of 9600. You must disable RMC to select a baud rate other than 9600.
- Switch 3 (RPD DIS). Set this switch to ON (disable) if you want to disable the **poweroff** command. With **poweroff** disabled, the monitored system cannot be powered down from the RMC.
- Switch 4 (SET DEF). Set this switch to ON (enable) if you want to reset the RMC to the factory settings. See the section "Resetting the RMC to Factory Defaults."

Changing a Switch Setting

The RMC switches are numbered on the server feature module. The default positions are shown in Figure 10-5. To change a switch setting:

Turn off the system.

1. Unplug the AC power cords.

NOTE: If you do not unplug the power cords, the new setting will not take effect when you power up the system.

2. Remove the system covers.
3. Locate the RMC switch pack on the server feature module and change the switch setting as desired.
4. Replace the system covers and plug in the power cords.
5. Power up the system to the SRM console prompt and type the escape sequence to enter RMC command mode, if desired.

Resetting the RMC to Factory Defaults

You can reset the RMC to factory settings, if desired. You would need to do this if you forgot the escape sequence for the RMC. Follow the steps below.

1. Turn off the system.
2. Unplug the AC power cords.

   NOTE: If you do not unplug the power cords, the reset will not take effect when you power up the system.

3. Remove the system covers.
4. Locate the RMC switch pack on the server feature module and set switch 4 to ON.
5. Replace the system covers and plug in the power cords.
6. Power up the system to the SRM console prompt. Powering up with switch 4 set to ON resets the escape sequence, password, and modem enable states to the factory defaults.
7. Power down the system, unplug the AC power cords, and remove the system covers.
8. Set switch 4 to OFF.
9. Replace the system covers and plug in the power cords.
10. Power up the system to the SRM console prompt, and type the default escape sequence to invoke RMC command mode:

    ```
    ^]^]RMC
    ```

Troubleshooting Guide

Table 10-3 is a list of possible causes and suggested solutions for symptoms you might see.

Table 10-3
RMC Troubleshooting

Symptom	Possible Cause	Suggested Solution
The local console terminal is not accepting input.	Cables not correctly installed.	Check external cable installation.
	Switch 1 on switch pack set to disable.	Set switch 1 to ON.
The console terminal is displaying garbage.	System and terminal baud rate set incorrectly.	Disable RMC and set the system and terminal baud rates to 9600 baud.
After the system and RMC are powered up, the COM port seems to hang briefly.	This delay is normal behavior.	Wait a few seconds for the COM port to start working.
RMC installation is complete, but system does not power up.	RMC Power Control: is set to DISABLE.	Invoke RMC and issue **poweron** command.
	Cables not correctly installed.	Reseat the cables.
You reset the system to factory defaults, but the factory settings did not take effect.	AC power cords were not removed before you reset switch 4 on the RMC switch pack.	Refer to RMC switching.
The message “unknown command” is displayed when the user enters a carriage return by itself.	The terminal or terminal emulator is including a linefeed character with the carriage return.	Change the terminal or terminal emulator setting so that “new line” is not selected.

Modem Dialog Details

This section is intended to help you reprogram your modem if necessary.

`Default Initialization and Answer Strings`

The modem initialization and answer command strings set at the factory for the RMC are:

Initialization String:	`AT&F0EVS0=0S12=50<cr>`
Answer String	`ATXA<cr>`

NOTE: All modem commands must be terminated with a <cr> character (0x0d hex).

Modifying Initialization and Answer Strings

The initialization and answer strings are stored in the RMC's NVRAM. They come pre-programmed to support a wide selection of modems. With some modems, however, you may need to modify the initialization string, answer string, or both. The following SRM **set** and **show** commands are provided for this purpose.

To replace the initialization string:

```
P00>>> set RMC_init "new_init_string"
```

To replace the answer string:

```
P00>>> set RMC_answer "new_answer_string"
```

To display all the RMC strings that can be set by the user:

```
P00>>> show RMC*
RMC_answer  ATXA
RMC_dialout
RMC_init    AT&F0EVS0=0S12=50
P00>>>
```

Initialization String Substitutions

The following modems require modified initialization strings.

Modem Model	Initialization String
Motorola 3400 Lifestyle 28.8	`at&f0e0v0x0s0=2`
AT&T Dataport 14.4/FAX	`at&f0e0v0x0s0=2`
Hayes Smartmodem Optima 288 V-34/V.FC + FAX	`at&fe0v0x0s0=2`

Chapter 11

Using the SRM Console

The SRM console is the command line interface that supports the Compaq Tru64 UNIX and OpenVMS operating systems. The SRM console is used to bootstrap the operating system, configure and test the system hardware, examine system options for errors, and set or change environment variables.

This chapter describes the SRM commands and environment variables. Sections in this chapter are:

- Invoking the SRM console
- Command summary
- Displaying the system configuration
- Creating a power-up script
- Booting the operating system
- Configuring the system
- Testing the system
- Making the system secure
- Stopping and starting CPUs
- Updating irmware
- Forcing a system crash dump
- Using environment variables
- Depositing and examining data

- Reading a file
- Initializing the system
- Finding help
- Environment variable summary

Invoking the SRM Console

When a system is powered up, the SRM console runs and either remains running or passes control to another console or an operating system. If the system is already running, invoke the SRM console by shutting down the operating system or by pressing the Halt button on the control panel.

Do one of the following steps to invoke the SRM console mode:

- Shut down the operating system according to the procedure described in your operating system documentation. The SRM console prompt, P00>>>, will be displayed.
- Press the Halt button on the control panel, if your system is running either OpenVMS, Tru64 UNIX, or Linux. The console prompt, P00>>>, will be displayed.

After you have performed tasks in the console mode, you must boot the operating system with the **boot** command to go back to the operating mode.

Command Summary

The SRM console is a command line interface whose console commands enable the user to examine and modify the system state.

Table 11-1 gives the most commonly used SRM console commands.

Table 11-2 gives the syntax for the console commands.

Table 11-3 gives special characters you can use in console mode.

Table 11-1
Summary of SRM Console Commands

Command	Function
boot	Loads and starts the operating system.
clear *envar*	Resets an environment variable to its default value.
clear password	Sets the password to zero.
continue	Resumes program execution.
crash	Forces a crash dump at the operating system level.
deposit	Writes data to the specified address.
edit	Invokes the console line editor on a RAM file or on the nvram file (power-up script).
examine	Displays the contents of a memory location, register, or device.
halt	Halts the specified processor. (Same as **stop**.)
help	Displays information about the specified console command.
initialize	Resets the system to a known state.
isacfg	Displays or modifies parameters for ISA devices.
lfu	Runs the Loadable Firmware Update Utility.

continued

Table 11-1
Summary of SRM Console Commands *continued*

Command	Function
login	Turns off secure mode, enabling access to all SRM console commands during the current session.
more	Displays a file one screen at a time.
prcache	Utility that initializes and displays status of the optional PCI NVRAM device.
set *envar*	Sets or modifies the value of an environment variable.
set host	Connects to an MSCP DUP server on a DSSI device.
set password	Sets the console password for the first time or changes an existing password.
set secure	Enables secure mode without requiring a restart of the console.
show *envar*	Displays the state of the specified environment variable.
show config	Displays the configuration at the last system initialization.
show cpu	Displays the state of each processor in the system.
show device	Displays a list of controllers and their devices in the system.
show memory	Displays memory module information.
show pal	Displays the version of the privileged architecture library code (PALcode).
show power	Displays information about the power supplies, system fans, CPU fans, and temperature.
show version	Displays the version of the console program.
stop	Halts the specified processor. (Same as **halt**.)
test	Runs firmware diagnostics for the system.

Table 11-2
Syntax for SRM Console Commands

Parameter	Attribute or Action
Length	Up to 255 characters, not including the terminating carriage return or any characters deleted as the command is entered. A command longer than 80 characters and without the backslash character causes display of an error message.
Case	Upper- or lowercase characters can be used for input. Characters are displayed in the case in which they are entered.
Abbreviation	Only by dropping characters from the end of words. You must enter the minimum number of characters to identify the keyword unambiguously. Abbreviation of environment variables is allowed with the **show** command.
Options	You can use command options, to modify the environment, after the command keyword or after any symbol or number in the command. See individual command descriptions for examples.
Numbers	Most numbers in console commands are in decimal notation. Two exceptions, both of which use hexadecimal notation, are addresses and numbers used in the **deposit** command. The default radix can be overridden by inserting %d before numbers you want to express in decimal, %b before binary, %o before octal, or %x before hexadecimal. Register names (for example, R0) are not considered numbers and use decimal notation.
No characters	A command line with no characters is a null command. The console program takes no action and does not issue an error message; it returns the console prompt. The console supports command line recall and editing.
Spaces or tabs	Multiple adjacent spaces and tabs are compressed and treated as a single space. The console program ignores leading and trailing spaces.

Table 11-3
Special Characters for SRM Console

Character	Function
Return or Enter	Terminates a command line. No action is taken on a command until it is terminated. If no characters are entered and this key is pressed, the console just redisplays the prompt.
Backslash (\)	Continues a command on the next line. Must be the last character on the line to be continued.
Delete	Deletes the previous character.
Help	By itself, displays first-level help. When pressed after part of a command, displays options available.
Ctrl/A or F14	Toggles between insert and overstrike modes. The default is overstrike.
Ctrl/B or up-arrow	Recalls previous command or commands. The last 16 commands are stored in the recall buffer.
Ctrl/C	Terminates the process that is running. Clears Ctrl/S; resumes output suspended by Ctrl/O. When entered as part of a command line, deletes the current line. Ctrl/C has no effect as part of a binary data stream.
left-arrow	Moves the cursor left one position.
Ctrl/E	Moves the cursor to the end of the line.
Ctrl/F or right-arrow	Moves the cursor right one position.
Ctrl/H	Moves the cursor to the beginning of the line.
Backspace	Deletes one character
Ctrl/J	Deletes the previous word.
Ctrl/O	Stops output to the console terminal for the current command. Toggles between enable and disable. The output can be reenabled by other means as well: when the console prompts for a command, issues an error message, or enters program mode, or when Ctrl/P is entered.
Ctrl/Q	Resumes output to the console terminal that was suspended by Ctrl/S.

continued

Table 11-3
Special Characters for SRM Console *continued*

Character	Function
Ctrl/R	Redisplays the current line. Deleted characters are omitted. This command is useful for hardcopy terminals.
Ctrl/S	Suspends output to the console terminal until Ctrl/Q is entered. Cleared by Ctrl/C.
Ctrl/U	Deletes the current line.
*	Wildcarding for commands such as **show**.
" "	Double quotes enable you to denote a string for environment variable assignment.
#	Specifies that all text between it and the end of the line is a comment. Control characters are not considered part of a comment.

Displaying the System Configuration

Several commands are used to display the system configuration: s**how config, show cpu, show device, show memory, show pal, show power,** and **show version**.

```
P00>>> show config

                        AlphaPC 264DP 500 MHz

SRM Console:    V5.4-x

PALcode:    OpenVMS PALcode V1.42-32, Tru64 UNIX PALcode V1.40-35

Processors

CPU 0           Alpha 21264-3 500 MHz   SROM Revision: V1.82

                Bcache size: 4 MB

CPU 1           Alpha 21264-4 500 MHz   SROM Revision: V1.82

                Bcache size: 4 MB

Core Logic

Cchip           DECchip 21272-CA Rev 2

Dchip           DECchip 21272-DA Rev 2

Pchip 0         DECchip 21272-EA Rev 2

Pchip 1         DECchip 21272-EA Rev 2


TIG             Rev 4.11

Arbiter         Rev 2.8 (0x1)


MEMORY

Array #       Size     Base Addr

   1         128 MB    000000000


Total Bad Pages = 0

Total Good Memory = 128 MBytes

PCI Hose 00
```

```
    Bus 00  Slot 05/0: Cypress 82C693
                                              Bridge to Bus 1, ISA
     Bus 00  Slot 05/1: Cypress 82C693 IDE
                                     dqa.0.0.105.0
     Bus 00  Slot 05/2: Cypress 82C693 IDE
                                     dqb.0.1.205.0
 Bus 00  Slot 05/3: Cypress 82C693 USB


     Bus 00  Slot 06/0: Adaptec AIC-7895
     Bus 00  Slot 06/1: Adaptec AIC-7895
     Bus 00  Slot 08: 00E31091
     Bus 00  Slot 09: Cirrus CL-GD5430


PCI Hose 01
     Bus 00  Slot 07: DECchip 21152-AA
                                            Bridge to Bus 2, PCI
     Bus 02  Slot 00: NCR 53C875
                               pka0.7.0.2000.1       SCSI Bus ID 7
                                  dka0.0.0.2000.1        RZ1CB-CS
     Bus 02  Slot 01: NCR 53C875
                               pkb0.7.0.2001.1       SCSI Bus ID 7
                                    dkb500.5.0.2001.1      RRD47
     Bus 02  Slot 02: DE500-AA Network Controller
                           ewa0.0.0.2002.1       00-06-2B-00-13-47
ISA
Slot    Device  Name       Type     Enabled  BaseAddr  IRQ    DMA
0
0       MOUSE           Embedded       Yes      60      12
1       KBD             Embedded        Yes     60      1
```

```
2       COM1            Embedded        Yes     3f8     4
3       COM2            Embedded        Yes     2f8     3
4       LPT1            Embedded        Yes     3bc     7
5       FLOPPY          Embedded        Yes     3f0     6       2

P00>>>
```

Example 11-1. Show Config Command

The **show config** command displays a list of devices found on the system interconnect and I/O buses. This is the configuration at the most recent initialization. The syntax is:

show config

```
P00>>> show cpu
Primary CPU:      00
Active CPUs:      00    01
Configured CPUs:  00    01
SROM Revision:    X1.82  X1.82
P00>>>
```

Example 11-2. Show CPU Command

The **show cpu** command displays the status of each CPU. The syntax is:

show cpu

```
P00>>> show device
dkc0.0.0.9.0               DKC0                  RZ1DB-BA  LYG0
dkc100.1.0.9.0             DKC100                RZ1CB-CA  LYJ0
dkc200.2.0.9.0             DKC200                RZ1CB-CA  LYJ0
dkc300.3.0.9.0             DKC300                RZ1CB-CA  LYJ0
dkc500.5.0.9.0             DKC500                   RRD47  1337
dva0.0.0.0.0               DVA0
ewa0.0.0.8.1               EWA0               00-00-F8-00-0E-3B
pkc0.7.0.9.0               PKC0             SCSI Bus ID 7  5.54
P00>>>
```

Example 11-3. Show Device Command

The **show device** command displays status for devices and controllers in the system: SCSI and MSCP devices, the internal floppy drive, and the network. The syntax is:

show device [*controller_name*]

controller _name	The controller name or abbreviation. When abbreviations or wildcards are used, all controllers that match the type are displayed. If no name is given, the display is a list of all devices and controllers in the system.

An example of a device name is **dka200.2.0.7.1**. Table 11-4 shows the interpretation of this device name.

Table 11-4
Device Naming convention

	Category	Description			
dk	Driver ID	Two-letter designator of port or class driver			
		dk	SCSI device	fw	FDDI device
		dq	ATAPI CD-ROM	mk	SCSI tape
		dr	RAID set device	mu	DSSI tape
		du	DSSI disk	pk	SCSI port
		dv	Diskette drive	pu	DSSI port
		ew	Ethernet port	ew	Ethernet port
a	Storage adapter ID	One-letter designator of storage adapter (a, b, c...).			
200	Device unit number	Unique number (MSCP unit number). SCSI unit numbers are forced to 100 X node ID.			
2	Bus node number	Bus node ID.			
0	Channel number	Used for multi-channel devices.			
7	Logical slot number	Corresponds to PCI slot number, as shown in Table 11-5.			
1	Hose number	0 - PCI 0 1 - PCI 1			

Table 11-5
PCI Address Assignments

Slot	PCI 0	PCI 1	ISA
5	ISA bridge (on board)		ISA device
6	Adaptec SCSI (on board)		
7	PCI device	PCI device	
8	PCI device	PCI device	
9	PCI device	PCI device	

```
P00>>> show memory

Array #       Size     Base Addr

-------    ----------  ---------

   0         128 MB    000000000

   1         128 MB    008000000

   2         128 MB    010000000

   3         128 MB    018000000

Total Bad Pages = 0

Total Good Memory = 512 MBytes

P00>>>
```

Example 11-4. Show Memory Command

The **show memory** command displays information about each memory bank: slot number, size in megabytes, and the starting address. The syntax is:

show memory

```
P00>>> show pal

pal  OpenVMS PALcode V1.31-27, Tru64 UNIX PALcode V1.27-31

P00>>>
```

Example 11-5. ShowPAL Command

The **show pal** command displays the versions of Tru64 UNIX and OpenVMS PALcode. PALcode is the Alpha Privileged Architecture Library code, written to support Alpha processors. It implements architecturally defined processor behavior. The syntax is:

show pal

```
P00>>> show power
                         Status
Power Supply 0           good
Power Supply 1/Fan Tray  good
System Fans              good
CPU Fans                 good
Temperature              good

Current ambient temperature is 27 degrees C
System shutdown temperature is set to 55 degrees C

2 Environmental events are logged in nvram
Do you want to view the events? (Y/<N>) y

Total Environmental Events: 2 (2 logged)

1  000  0  0:00  Temperature, Fans, Power Supplies Normal
2  000  0  0:00  Temperature, Fans, Power Supplies Normal

Do you want to clear all events from nvram? (Y/<N>) y

P00>>>
```

Example 11-6. Show Power Command

The **show power** command displays status information about the power supplies, system fans, CPU fans, and temperature. This command is useful for displaying the error state of a Tru64 UNIX or OpenVMS system that shuts down because of a fan, temperature, or power supply failure. If the system can be restarted, use this command. (If it cannot, use the RMC **status** command. See Chapter 6.)

The syntax is:

show power

```
P00>>> show version

version                V5.4-x NOV 20 1998 13:59:28

P00>>>
```

Example 11-7. Show Version Command

The **show version** command displays the version of the SRM console program that is installed on the system. The syntax is:

show version

Creating a Power-Up Script

The system comes with a special nonvolatile file named “nvram” that is stored in EEROM. Nvram is a user-created power-up script (set of commands) that is always invoked during the power-up sequence. Use the SRM edit command to create or alter the nvram script.

```
P00>>> edit nvram             #Modify user power-up script, nvram

editing ‘nvram’

0 bytes read in

*10 set ewa0_protocols bootp

*list                  #List current file with line numbers

10  set ewa0_protocols bootp

*exit                         #Close file and save changes

27 bytes written out to nvram

P00>>> nvram                  #Execute the script.
```

Example 11-8. Editing the nvram Script

This example shows how to modify the user-created power-up script, “nvram.” The pound sign (#) indicates explanatory comments. In this example the script is edited to include a command that allows you to boot the Tru64 UNIX operating system over the network.

```
P00>>> edit nvram

editing ‘nvram’

20 bytes read in

*10

*exit

0 bytes written out to nvram

P00>>>
```

Example 11-9. Clearing the nvram Script

To clear the script, enter line numbers without any text. This deletes the lines.

Editing the Nvram Script

You can create an nvram script to include any commands you want the system to execute at power-up.

You create and edit the nvram script using the SRM **edit** command. With **edit**, lines may be added, overwritten, or deleted.

The syntax is:

edit *file*

file is the name of the file to be edited.

The editing commands are:

help	Displays the brief help file.
list	Lists the current file prefixed with line numbers.
renumber	Renumbers the lines of the file in increments of 10.
exit	Leaves the editor and closes the file, saving all changes.
quit	Leaves the editor and closes the file without saving changes.
nn	Deletes line number *nn*.
nn text	Adds or overwrites line number *nn* with *text*.

NOTE: *It is possible to disable the system by editing the nvram script. For example, if you include the* ***initialize*** *command in the script, the system will go into an endless loop. To fix this, press the Halt button while the system is powering up. You can then edit the script to delete the offending command.*

Booting the Operating System

The **boot** command is used to boot the operating system.

```
P00>>> b dka200

(boot dka200.2.0.7.1 -flags 0,0)

block 0 of dka200.2.0.7.1 is a valid boot block

reading 893 blocks from dka200.2.0.7.1

bootstrap code read in

base = 1fa000, image_start = 0, image_bytes = 6fa00

initializing HWRPB at 2000

initializing page table at 1fff0000

initializing machine state

setting affinity to the primary CPU

jumping to bootstrap code

    OpenVMS (TM) Alpha Operating System, Version 7.1-2

%SYSINIT-I- waiting to form or join an OpenVMS Cluster

%VMScluster-I-LOADSECDB, loading the cluster security database

%EWA0, Fast(100baseTX) mode set by console

%MSCPLOAD-I-CONFIGSCAN, enabled automatic disk serving

.
.
.

The OpenVMS system is now executing the site-specific startup
commands.

.
.
.

Welcome to OpenVMS (TM) Alpha Operating System, Version 7.1-2

Username:
```

Example 11-10. Boot Command

The **boot** command initializes the processor, loads a program image from the specified boot device, and transfers control to that image. The syntax is:

boot [-file *filename***] [-flags [***value***]] [-halt] [-protocols** *enet_protocol***] [***boot_dev***]**

-file *filename*	The boot file.
-flags [*value*]	Specifies additional information to the loaded image or operating system. In Tru64 UNIX, specifies boot flags. In OpenVMS, specifies system root number and boot flags. This qualifier overrides the setting of the **boot_osflags** environment variable. See the **boot_osflags** environment variable for a list of settings and their meanings.
-halt	Forces the bootstrap operation to halt and invoke the console program once the bootstrap image is loaded and page tables and other data structures are set up. Console device drivers are not shut down. Transfer control to the image by entering the **continue** command.
-protocols *enet_protocol*	Either **mop** (default) or **bootp**. This qualifier overrides the setting of the **ew*0_protocols** environment variable.
boot_dev	A device path or list of devices from which the console program attempts to boot, or a saved boot specification in the form of an environment variable. This qualifier overrides the setting of the **bootdef_dev** environment variable. Use the **bootdef_dev** environment variable to define the default boot device string.

Configuring the System

Configuring DSSI

The **set host** command is used for system configuration when a DSSI device is in the system.

```
P00>>> show device
dka0.0.0.7.1         DKA0                 RZ1CB-CS  0844
dka100.1.0.7.1       DKA100                   RZ28  D41C
dka200.2.0.7.1       DKA200                   RZ28  441C
dka300.3.0.7.1       DKA300               RZ1EF-AB  0370
dka500.5.0.7.1       DKA500                  RRD47  0557
dkb0.0.0.2000.1      DKB0                 RZ1DB-BA  LYG0
dkb200.2.0.2000.1    DKB200               RZ1DB-BA  LYG0
dkb400.4.0.2000.1    DKB400               RZ1CB-BA  LYG0
dkc100.1.0.2001.1    DKC100               RZ1DB-BA  LYG0
dkc300.3.0.2001.1    DKC300               RZ1DB-BA  LYG0
dua101.3.0.8.0       $1$DIA101 (RF0700)             RF35
dua103.1.0.8.0       $1$DIA103 (RF0701)             RF36
dua110.0.0.8.0       $1$DIA110 (DENVER)             RF74
dua240.2.0.8.0       $1$DIA240 (E1ILMO)             EF52
dva0.0.0.0.0         DVA0
ewa0.0.0.2002.1      EWA0              00-06-2B-00-0A-59
pka0.7.0.7.1         PKA0            SCSI Bus ID 7  5.57
pkb0.7.0.2000.1      PKB0            SCSI Bus ID 7
pkc0.7.0.2001.1      PKC0            SCSI Bus ID 7
pua0.7.0.8.0         PIA0            DSSI Bus ID 7


P00>>> set host -dup dua101
starting DIRECT on pua0.3.0.8.0 (RF0700)
```

```
Copyright (C) 1990, 1991, 1992  Digital Equipment Corporation
PRFMON V1.0  D 10-MAR-1994 17:45:43
DRVEXR V2.1  D 10-MAR-1994 17:45:43
DRVTST V2.1  D 10-MAR-1994 17:45:43
HISTRY V1.2  D 10-MAR-1994 17:45:43
DIRECT V1.0  D 10-MAR-1994 17:45:43
ERASE  V2.1  D 10-MAR-1994 17:45:43
VERIFY V1.1  D 10-MAR-1994 17:45:43
DKUTIL V1.1  D 10-MAR-1994 17:45:43
PARAMS V3.0  D 10-MAR-1994 17:45:43
Total of 9 programs.
Task? params
starting PARAMS on pua0.3.0.8.0 (RF0700)

Copyright (C) 1990, 1991, 1992  Digital Equipment Corporation

PARAMS> show allclass
Parameter    Current       Default        Type   Radix
---------  ------------  --------------  --------  -----
ALLCLASS        1              0      Byte    Dec   B

PARAMS> exit
Exiting...
Task?
P00>>>
```

Example 11-11. Set Host Command

The **set host** command connects the console program to another DUP server on an MSCP DSSI device. You can use the DUP protocol to examine and modify parameters of a DSSI device. The syntax is:

set host -dup [**-task** *task_name*] *device*

-dup	Connect to an MSCP DUP server. The DUP service may be used to examine and modify parameters of a DSSI device.
-task *task_name*	Specifies the DUP utility to invoke. If **-task** is not specified, a directory of utilities displays.
device	The device to attach to the console program.

Configuring the ISA Bus

The **isacfg** command is used to configure the ISA bus.

```
P00>>> isacfg -s 0


================================================================
handle: MOUSE
etyp: 2
slot: 0
dev: 0
enadev: 1
totdev: 6
iobase0: 60   iobase1: 8000000000000000
iobase2: 8000000000000000   iobase3: 8000000000000000
iobase4: 8000000000000000   iobase5: 8000000000000000
membase0: 8000000000000000   memlen0: 8000000000000000
membase1: 8000000000000000   memlen1: 8000000000000000
membase2: 8000000000000000   memlen2: 8000000000000000
rombase: 8000000000000000   romlen:   8000000000000000
dma0: 80000000          irq0: c
dma1: 80000000          irq1: 80000000
dma2: 80000000          irq2: 80000000
dma3: 80000000          irq3: 80000000
================================================================
handle: KBD
.
dev: 1
.
```

```
iobase0: 60   iobase1: 8000000000000000

.

dma0: 80000000          irq0: 1

.

================================================================

handle: COM1

.

dev: 2

.

iobase0: 3f8   iobase1: 8000000000000000

.

dma0: 80000000          irq0: 4

.

================================================================

handle: COM2

.

dev: 3

.

iobase0: 2f8   iobase1: 8000000000000000

.

dma0: 80000000          irq0: 3

.

================================================================

handle: LPT1

.

dev: 4

.

iobase0: 3bc   iobase1: 8000000000000000

.
```

```
dma0: 80000000          irq0: 7

.

================================================================

handle: FLOPPY

.

dev: 5

.

iobase0: 3f0   iobase1: 8000000000000000

.

dma0: 2         irq0: 6

.

================================================================

P00>>>
```

Example 11-12. Isacfg Command

The **isacfg** command is used to display or modify the ISA bus configuration data. The syntax is:

isacfg [-slot *slot #*] [**-dev** *device #*] [{**-all** | **-rm** | **-mk** | **-mod** | **-init** }] [**-field** *value*]

-slot *slot #*	The PCI slot allocated to the ISA bus (0).
-dev *device #*	The ISA device number allocated to the device upon which the **isacfg** command is to operate.
-all	Sets the default parameters to all devices on the ISA bus.
-rm	Removes an ISA device from the ISA bus.
-mk	Removes an ISA device from the ISA bus.
-init	Initializes the device(s) indicated by the **-dev** or **-all** switches.
-field *value*	The name of the field followed by the value to be deposited in it.

Testing the System

The **test** command runs firmware diagnostics for components of the system.

```
P00>>> test

System test, runtime 1200 seconds
Type ^C if you wish to abort testing once it has started
Default zone extended at the expense of memzone.

Use INIT before booting


Testing Ethernet device(s)


Testing VGA


Testing Memory


Testing IDE/ATAPI disks (read-only)


Testing SCSI disks (read-only)


Testing floppy drive (dva0, read-only)


Test time has expired...


System test complete
P00>>>
```

Example 11-13. Test Command

The **test** command runs console-based exercisers for devices in the system.

Testing can be aborted by Ctrl/C.

The syntax is:

test [**-t** *time*] [**-q**] [*option*]

-t *time*	Specifies the run time in seconds. The default for system test is 1200 seconds (20 minutes).
-q	Disables the display of status messages as exerciser processes are started and stopped during testing. Sets the environment variable **d_verbose** to zero.

Making the System Secure

Placing the console in secure mode ensures that unauthorized persons cannot gain access to the system. The commands for console security are **set password, clear password**, and **set secure**. The login command turns off security features during the current console session.

```
P00>>> set password

Please enter the password:           # Password is not
                                     # echoed.

Please enter the password again:     # Validation is not
P00>>>                               # echoed.


P00>>> set password                  # Changing a password.

Please enter the password:

Please enter the password again:

Now enter the old password:

P00>>>

P00>>> set password                  # Password entered is

Please enter the password:           # too short.

Password length must be between 15 and 30 characters

P00>>>
```

Example 11-14. Set Password Command

The **set password** command sets the console password for the first time or changes an existing password. It is necessary to set the password only if the system is going to operate in secure mode.

If a password has not been set and the **set password** command is issued, the console prompts for a password and verification.

If a password has been set and the **set password** command is issued, the console prompts for the new password and verification, then prompts for the old password. The password is unchanged if the validation password entered does not match the existing password in the NVRAM.

The password length must be between 15 and 30 alphanumeric characters.

The syntax is:

set password

```
P00>>> set secure                    # In this example a password
                                     # has been set.

Console is secure. Please login.

P00>>> b dkb0

Console is secure - parameters are not allowed.

P00>>> login

Please enter the password:    # Password is not echoed.

P00>>> b dkb0

(boot dkb0.0.0.3.1)

.

.

P00>>> set secure                    # Password has not been set.

Secure not set. Please set the password.

P00>>>
```

Example 11-15. Set Secure Command

The **set secure** command enables secure mode without requiring a restart of the console. If the password has been set, the console will be secured and only a small subset of commands can be performed. If a password has not been set, you are prompted to do so.

The syntax is:

set secure

Secure Mode Functions

When the console is in secure mode, the only commands recognized are **boot**, **login**, **continue**, and **start**.

The **boot** command does not accept command line parameters in secure mode. The console boots using the environment variables stored in NVRAM

(**boot_file**, **bootdef_dev**, **boot_flags**). After a successful boot, the console is secured if there is a valid password.

The **start** and **continue** commands are valid on a secure console. After either command is executed, the console is secured if there is a valid password. This prevents an intruder from accessing the system.

```
P00>>> login                  # System is not in secure mode.
Secure not set. Please set the password.
P00>>>

P00>>> login                  # System is in secure mode.
Please enter the password:    # Password is not echoed.
P00>>>

P00>>> login                  # System is in secure mode.
Please enter the password:    # Incorrect password is entered.
Invalid password
P00>>>
```

Example 11-16. Login Command

The **login** command turns off the security features, enabling access to all SRM console commands during the current session. The system automatically returns to secure mode as soon as the **boot**, **continue**, or **start** command is entered or when the system is initialized.

When the **login** command is entered, the user is prompted for the current system password. If a password has not been set, a message is displayed indicating that there is no password in NVRAM. If a password has been set, this prompt is displayed:

```
Please enter the password:
```

If the password entered matches the password in NVRAM when the prompt is redisplayed, the console is no longer in secure mode and all console commands can be performed.

NOTE: If you enter the **login** command when a halt assertion exists, the command fails, even if you enter the correct password. See RMC Commands for information on halt assertion.

If you have forgotten the current password, clear the password as follows:

■ From the Local Console Terminal

1. Enter the **login** command:

   ```
   P00>>> login
   ```

2. At the `Enter Password:` prompt, press the Halt button, then press the Return key.

   The password is now cleared and the console cannot be put into secure mode unless a new password is set.

■ From the RMC

1. Enter the **login** command:
   ```
   P00>>> login
   ```
2. At the `Enter Password:` prompt, enter the RMC escape sequence.
3. At the `RMC>>>` prompt, enter the **halt** command and then the **quit** command:

   ```
   RMC>>> halt
   RMC>>> quit
   ```

4. At the SRM console, clear the password:

   ```
   P00>>> clear password
   ```

```
P00>>> clear password

Please enter the password:    # Password is not echoed.

Password successfully cleared.

P00>>>


P00>>> clear password

Please enter the password:    # Invalid password entered.

Console is secure

P00>>>
```

Example 11-17. Clear Password Command

The **clear password** command clears the **password** environment variable, setting it to zero. This command is used when you want access to all the SRM console commands, but the system is in secure mode. In order to use **clear password**, you must know the current password.

To clear the password without knowing the current password, use the **login** command, with the Halt button or RMC **halt** command, as described in the section on the **login** command.

Stopping and Starting CPUs

The **halt** and **continue** commands are used to stop and continue a program on the specified CPU.

```
P00>>> halt 1


halted CPU 1


halt code = 1

operator initiated halt

PC = ffffffff8007cc68

P00>>> continue &p1


continuing CPU 1
```

Example 11-18. Halt and Continue Commands

halt (or stop)

The **halt** (or **stop**) command stops program execution on a secondary CPU that is still running a booted program. The syntax is:

halt (or **stop**) *processor_number*

processor_number is the logical CPU number displayed by the **show cpu** command.

continue

The **continue** command resumes program execution on the specified processor or on the primary processor if none is specified. The processor begins executing instructions at the address that is currently in the program counter (PC). The processor is not initialized.

The **continue** command is valid only if you have not disturbed the system state and if you halted the system by pressing the Halt button on the control panel or, for OpenVMS systems only, by entering Ctrl/P on the console terminal. The syntax is:

continue [**&p***n*] [*address*]

&p*n*	Specifies the processor. *n* is 0 or 1.
address	The starting address of the program.

NOTE: Some console commands, for example, **boot**, can alter the machine state so that program mode cannot be successfully resumed (unless you include **-halt** in the **boot** command). If program mode cannot be resumed, reboot the operating system.

NOTE: Other commands that alter machine state are **lfu**, **show device**, and **test**.

Updating Firmware

The **lfu** command is used to update firmware from the SRM console prompt.

```
P00>>> lfu

          ***** Loadable Firmware Update Utility *****

Select firmware load device (cda0, dva0, ewa0), or

Press <return> to bypass loading and proceed to LFU: cda0


Please enter the name of the options firmware files list, or

Press <return> to use the default filename [AS1400FW]: AS1400CP


Copying AS1200CP from DKA500.5.0.1.1 .

Copying [as1200]TCREADME from DKA500.5.0.1.1 .

Copying [as1200]TCSRMROM from DKA500.5.0.1.1

Copying [as1200]TCARCROM from DKA500.5.0.1.1

------------------------------------------------------------------

 Function    Description

------------------------------------------------------------------

Display     Displays the system’s configuration table.

Exit        Done exit LFU (reset).

List        Lists the device, revision, firmware name, and update
            revision.

Lfu         Restarts LFU.

Readme      Lists important release information.

Update      Replaces current firmware with loadable data image.

Verify      Compares loadable and hardware images.

? or Help   Scrolls this function table.

------------------------------------------------------------------
```

```
UPD> list
Device          Current Revision    Filename       Update Revision
Fsb                3.1-x            fsb_fw                3.x
Nt                 5.68             nt_fw                 5.xx
Pkx0               A11              kzpsa_fw              A11
Srm                5.4-x            srm_fw                5.4-xx
Pua                A214             cipca_fw              A2xx

UPD> update *
WARNING: updates may take several minutes to complete for each device.
Confirm update on: AlphaBIOS       [Y/(N)] y
                           DO NOT ABORT!
AlphaBIOS   Updating to V6.40-1...  Verifying V6.40-1...  PASSED.
Confirm update on: srmflash        [Y/(N)] y
                           DO NOT ABORT!
srmflash      Updating to V6.0-3...  Verifying V6.0-3...  PASSED.

UPD> exit
```

Example 11-19. Lfu Command

The **lfu** command starts the Loadable Firmware Update (LFU) Utility. The syntax is:

lfu

NOTE: If the system has been shut down from a booted program (most commonly, the operating system) or in some other way halted back to the SRM console, the system must be reset before running LFU.

Forcing a System Crash Dump

The **crash** command forces a crash dump to the selected device.

```
P00>>> crash

CPU 0 restarting

DUMP: 401408 blocks available for dumping.

DUMP: 38535 required for a partial dump.

DUMP:0x805001is the primary swap with 401407,start our last 38534

of dump at 362873, going to end (real end is one more,for header)

DUMP.prom: dev SCSI 1 3 0 4 400 0 0, block 131072

DUMP: Header to 0x805001 at 401407 (0x61fff)

DUMP.prom: dev SCSI 1 3 0 4 400 0 0, block 131072

DUMP: Dump to 0x805001: ..................: End 0x805001

DUMP.prom: dev SCSI 1 3 0 4 400 0 0, block 131072

DUMP: Header to 0x805001 at 401407 (0x61fff)

succeeded

halted CPU 0

halt code = 5

HALT instruction executed

PC = fffffc00004e2d64

P00>>>
```

Example 11-20. Crash Command

The crash command forces a crash dump at the operating system level. This command is used when an error has caused the system to hang and can be halted with the Halt button or the RMC halt command. This command restarts the operating system and forces a crash dump to the selected device. The syntax is:

crash *[device]*
device is the name of the device to which the crash dump is written.

Using Environment Variables

Environment variables pass configuration information between the console and the operating system. Their settings determine how the system powers up, boots the operating system, and operates. You issue an **init** command to activate a new environment variable.

```
P00>>> show console

console                 graphics

P00>>> set console serial

P00>>> show console

console                 serial

P00>>> init
```

Example 11-21. Set envar and Show envar Commands

Environment variables are set or changed with the **set *envar*** command and set to default values with the **set -default *envar*** command. Their values are viewed with the **show *envar*** command. User-defined nonvolatile environment variables are created with the **edit** command described in Table 11-1. Environment Variable Summary describes the environment variables in detail.

set *envar*

The **set** command sets or modifies the value of an environment variable. It can also be used to create a new environment variable if the name used is unique. Environment variables are used to pass configuration information between the console and the operating system. The setting of these variables determines how the system powers up, boots the operating system, and operates. The syntax is:

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

-default	Restores an environment variable to its default setting.
envar	The name of the environment variable to be modified.
value	The new value of the environment variable.

Whenever you modify the value of any of the following environment variables, the new value takes effect only after you reset the system by pressing the Reset button or issuing the **initialize** command:

console
kbd_hardware_type
language
ocp_text
os_type

show *envar*

The **show *envar*** command displays the current value (or setting) of an environment variable. The syntax is:

show *envar*

envar	The name of the environment variable to be displayed. The wildcard * displays all environment variables.

```
P00>>> edit nvram

editing ‘nvram’

0 bytes read in

*10  set mopv3_boot 1

*exit

17 bytes written out to nvram


P00>>>
```

Example 11-22. Creating a User-Defined Environment Variable

In Example 11-22 the nvram script is edited so that an environment variable called “mop3_boot” is created and set to 1 on each power-up. By default, MOP boots send four MOP V4 requests before defaulting to MOP V3. This user-created environment variable forces the SRM console to bypass MOP V4 requests. This speeds up MOP booting on networks with MOP V3 software.

Depositing and Examining Data

The **deposit** command stores data in a specified location. The **examine** command displays the contents of a memory location, a register, or a device.

```
P00>>> dep -b -n 1ff pmem:0 0 # Clear first 512 bytes of
                                      # physical memory.

P00>>> d -l -n 3 vmem:1234 5  # Deposit 5 into four
                                      # longwords starting at
                                      # virtual memory address
                                      # 1234.

P00>>> d -n 8 r0 ffffffff     # Load GPRs R0 through R8
                                      # with -1.

P00>>> d -l -n 10 -s 200 pmem:0 8

                                      # Deposit 8 in the first
                                      # longword of the first 17
                                      # pages in physical memory.

P00>>> d -l pmem:0 0          # Deposit 0 to physical
                                      # memory address 0.

P00>>> d + ff                 # Deposit FF to physical
                                      # memory address 4.

P00>>> d scbb 820000          # Deposit 820000 to SCBB.
```

Example 11-23. Deposit Command

```
P00>>> examine pc                     # Examine the program
                                      # counter.

PC psr: 0 (    PC)  0000000000001170


P00>>> examine sp                     # Examine the stack pointer.

gpr:   F0 (   R30)  0000000000072A60


P00>>> e -n 6 r4                      # Examine register R4 and
                                      # the next six registers.

grp: 20 (    R4) 0000000000005000

grp: 28 (    R5) 000000000FFFE000

grp: 30 (    R6) 00000003F8000C00
```

```
grp: 38 (    R7) 0000000053F761AE

grp: 40 (    R8) 0000010000000000

grp: 48 (    R9) 00000003F7800100

grp: 50 (   R10) 00000000000C7FFC


P00>>> examine pmem:400EC     # Examine physical memory.

pmem:  400EC A49D0078A47D0070
```

Example 11-24. Examine Command

deposit

The **deposit** command stores data in the location specified. If no options are given with a **deposit** command, the system uses the options from the preceding **deposit** command.

If the specified value is too large to fit in the data size listed, the console ignores the command and issues an error response. If the data is smaller than the data size, the higher order bits are filled with zeros. The syntax is shown below.

examine

The **examine** command displays the contents of a memory location, a register, or a device.

If no options are given with an **examine** command, the system uses the options from the preceding **examine** command. If conflicting address space or data sizes are specified, the console ignores the command and issues an error.

For data lengths longer than a longword, each longword of data should be separated by a space.

The syntax for both commands is:

deposit [-{b,w,l,q,o,h}] [-{n *value***, s** *value*}**] [**space**:]** *address data*

examine [-{b,w,l,q,o,h}] [-{n *value*, **s** *value*}**] [**space**:]** *address*

-b	Defines data size as byte.	
-w	Defines data size as word.	
-l (default)	Defines data size as longword.	
-q	Defines data size as quadword.	
-o	Defines data size as octaword.	
-h	Defines data size as hexword.	
-d	Instruction decode (**examine** command only)	
-n *value*	The number of consecutive locations to modify.	
-s *value*	The address increment size. The default is the data size.	
*space***:**	Device name (or address space) of the device to access.	
address	Offset within a device to which data is deposited. Can be:	
	dev_name	A device name.
	fpr- *name*	The floating-point register set; *name* is F0 to F31.
	gpr- *name*	The general register set; *name* is R0 to R31.
	ipr- *name*	The internal processor registers.
	pt- *name*	The PALtemp register set; *name* is PT0 to PT23.
	pmem	Physical memory (default).
	vmem	Virtual memory.
data	Data to be deposited.	

Symbolic forms can be used for the address. They are:

pc The program counter. The address space is set to GPR.

+ The location immediately following the last location referenced in a **deposit** or **examine** command. For physical and virtual memory, the referenced location is the last location plus the size of the reference (1 for byte, 2 for word, 4 for longword). For other address spaces, the address is the last referenced address plus 1.

- The location immediately preceding the last location referenced in a **deposit** or **examine** command. Memory and other address spaces are handled as above.

***** The last location referenced in a **deposit** or **examine** command.

@ The location addressed by the last location referenced in a **deposit** or **examine** command.

Reading a File

The **more** command displays a file one screen at a time.

```
P00>>> more el         #Display the contents of the
                               #SRM console's event log one
                               #screen at a time.


P00>>> help * | more   #Display the contents of online
                               #help one screen at a time.
```

Example 11-25. More Command

The **more** command is similar to that used in the MS-DOS and UNIX operating systems. It is useful for displaying output that scrolls too quickly to be viewed. For example, when you power up the system, the system startup messages scroll, and the messages are logged to an event log. When the P00>>> prompt displays, you can use the **more** command to display the contents of the event log file. The syntax is:

more [*file*...]

file is the name of the file to be displayed.

NOTE: If you misspell the word more, the console hangs. Enter Ctrl/x to remove the hang condition.

Initializing the System

The **initialize** command resets the system and executes the power-up tests.

```
P00>>> init
Initializing...
1408 Meg of system memory
probing hose 1, PCI
probing PCI-to-PCI bridge, bus 2
bus 0, slot 7 -- pka -- QLogic ISP1040
bus 2, slot 0 -- pkb -- NCR 53C875
bus 2, slot 1 -- pkc -- NCR 53C875
bus 2, slot 2 -- ewa -- DE500-AA Network Controller
probing hose 0, PCI
probing PCI-to-ISA bridge, bus 1
bus 0, slot 5, function 1 -- dqa -- Cypress 82C693 IDE
bus 0, slot 5, function 2 -- dqb -- Cypress 82C693 IDE
bus 0, slot 5, function 3 -- usba -- Cypress 82C693 USB
bus 0, slot 6, function 0 -- pkd -- Adaptec AIC-7895
bus 0, slot 6, function 1 -- pke -- Adaptec AIC-7895
bus 0, slot 7 -- vga -- DEC PowerStorm
bus 0, slot 8 -- pua -- DEC KFPSA
Testing the System
Testing the Disks (read only)
Testing the Network
System Temperature is 27 degrees C
CPU 0       Alpha 21264-4 500 MHz   SROM Revision: V1.82
CPU 1       Alpha 21264-4 500 MHz   SROM Revision: V1.82
TIG         Rev 4.14
Arbiter     Rev 2.10 (0x1)
```

```
Array #       Size     Base Addr
-------    ----------  ---------
   0         512 MB    000000000
   1         512 MB    020000000
   2         128 MB    050000000
   3         256 MB    040000000

Total Bad Pages = 0
Total Good Memory = 1408 MBytes

AlphaServer DS20 500 MHz Console V5.4-xx, Nov  5 1998 11:18:30
P00>>>
```

Example 11-26. Initialize Command

The **initialize** command resets the system. Issuing this command is equivalent to pressing the Reset button. The syntax is:

initialize

After self-tests are executed, the system autoboots unless one of the following is true:

- A halt assertion condition exists (see RMC Commands).
- The **auto_action** environment variable is set to **halt**.

If the **auto_action** environment variable is set to **boot** or **restart** and no halt assertion condition exists, the system autoboots. In all other cases, the system stops in console mode and does not attempt to boot.

Finding Help

The help command displays basic information about a command.

```
P00>>> help set

NAME

        set

FUNCTION

        Set an option or modify the value of an environment
variable.

SYNOPSIS

        set <option> <value> or <envar> [-] <value>

                where

                <option>={host,mode}

                where

                <envar>={auto_action,bootdef_dev,boot_osflags,...}

                [-default]
```

Example 11-27. Help Command

The **help** command displays basic information about the use of console commands when the system is in console mode. The syntax is:

help [*command* **. . .**]

command . . . Command or topic for which help is requested. The options are:

none	Displays the complete list of commands for which you can receive help.
command_name	Displays information about the console command.
argument_string (such as “sh”)	Displays information about all commands that begin with that string.

Environment Variable Summary

Environment variables pass configuration information between the console and the operating system. Their settings determine how the system powers up, boots the operating system, and operates. Environment variables are set or changed with the set *envar* command and returned to their default values with the clear *envar* command. Their values are viewed with the show *envar* command. The environment variables are specific to the SRM console. Table 11-6 lists the environment variables. Detailed descriptions follow.

Table 11-6
Environment Variable Summary

Environment Variable	Function
auto_action	Specifies the console's action at power-up, a failure, or a reset.
bootdef_dev	Specifies the default boot device string.
boot_osflags	Specifies the default operating system boot flags.
com*_baud	Changes the default baud rate of the COM1 or COM2 serial port.
console	Specifies the device on which power-up output is displayed (serial terminal or graphics monitor).
cpu_enabled	Enables or disables a specific secondary CPU.
ew*0_mode	Specifies the connection type of the default Ethernet controller.
ew*0_protocols	Specifies network protocols for booting over the Ethernet controller.
kbd_hardware_ type	Specifies the default console keyboard type.

continued

Table 11-6
Environment Variable Summary *continued*

Environment Variable	Function
language	Specifies the console keyboard layout.
ocp_text	Overrides the default OCP display text with specified text.
os_type	Specifies the operating system. Valid entries are: openvms and unix.
password	A password stored in the NVRAM used to secure the console.
pci_parity	Disables or enables parity checking on the PCI bus.
pk*0_fast	Enables fast SCSI mode.
pk*0_host_id	Specifies the default value for a controller host bus node ID.
pk*0_soft_term	Enables or disables SCSI terminators on systems that use the QLogic ISP1040 SCSI controller.
tt_allow_login	Enables or disables login to the SRM console firmware on other console ports.

auto_action

Specifies the action the console takes any time the system powers up, fails, or resets. When the setting involves autoboot, the system boots from the default boot device specified by the value of the bootdef_dev environment variable. The syntax is:

set auto_action *value*

The options for *value* are:

halt	The system remains in console mode after power-up or a system crash.
boot	The system boots automatically when it is turned on and halts after a system failure.
restart	The system boots automatically when it is turned on or after it fails.

bootdef_dev

The **bootdef_dev** environment variable specifies one or more devices for booting the operating system. When more than one device is listed, the system searches in the order listed and boots from the first device with operating system software. The syntax is:

set bootdef_dev *boot_device*

boot_device	The name of the device on which the system software has been loaded. To specify more than one device, separate the names with commas. Enter the command **show bootdef_dev** to display the current default boot device. Enter the command **show device** for a list of all devices in the system.

boot_osflags

The **boot_osflags** environment variable passes information to the **boot** command. That information is dependent on the operating system to be booted.

When the operating system is Tru64 UNIX, the syntax is:

set boot_osflags *flags_value*

The options for *flags_value* are:

a Load operating system software from the specified boot device (autoboot). Boot to multi-user mode.

i Prompt for the name of a file to load and other options (boot interactively). Boot to single-user mode.

s Stop in single-user mode. Boots /vmunix to single-user mode and stops at the # (root) prompt.

D Full dump; implies "**s**" as well. By default, if Tru64 UNIX crashes, it completes a partial memory dump. Specifying "**D**" forces a full dump if the system crashes.

When the operating system is OpenVMS, the syntax is:

set boot_osflags *root_number,boot_flags*

root_number Directory number of the system disk on which OpenVMS files are located. For example:

root_number	Root Directory
0 (default)	[SYS0.SYSEXE]
1	[SYS1.SYSEXE]
2	[SYS2.SYSEXE]
3	[SYS3.SYSEXE]

boot_flags The hexadecimal value of the bit number or numbers set. To specify multiple boot flags, add the flag values (logical OR). See Table 11-7.

Table 11-7
Settings for Boot_osflags Bootflags (OpenVMS)

Flag_Value	Bit Number	Meaning
1	0	Bootstrap conversationally (enables you to modify SYSGEN parameters in SYSBOOT).
2	1	Map XDELTA to running system.
4	2	Stop at initial system breakpoint.
8	3	Perform diagnostic bootstrap.
10	4	Stop at the bootstrap breakpoints.
20	5	Omit header from secondary bootstrap image.
80	7	Prompt for the name of the secondary bootstrap file.
100	8	Halt before secondary bootstrap.
10000	16	Display debug messages during booting.
20000	17	Display user messages during booting.

com*_baud

The default baud rate for the system is 9600. With the **com*_baud** environment variable, you can set the baud rate to match that of the device connected to the port.

You will be asked to confirm the change, as shown here:

```
P00>>> set com1_baud 19200

Embedded Remote Console only supports 9600 baud. Continue?
(Y/[N]) n

bad value - com1_baud not modified

P00>>>
```

The syntax is:

set com*_baud *baud_value*

baud_value The new baud rate. A list of possible values is displayed by attempting to set this environment variable to an unacceptable value (for example, **set com2_baud xxx**).

console

The console terminal can be either a graphics monitor or a serial terminal. The **console** environment variable specifies which is used. The syntax is:

set console *output_device*

The options for *output_device* are:

graphics (default)	The console terminal is a graphics monitor or a device connected to the VGA or TGA module.
serial	The console terminal is the device connected to the COM1 port.

Whenever you change the value of **console**, you must reset the system by pressing the Reset button or issuing the **initialize** command.

cpu_enabled

Sets a bit mask that enables or disables specific CPUs on a multiprocessor system.

Disabled CPUs are prevented from running the console or the operating system. Bit 0 of the mask corresponds to CPU 0, and bit 1 to CPU 1. A zero in the bit mask prevents the corresponding CPU from running; a one allows it to run. The bit mask is expressed as a hexadecimal value.

NOTE: The primary CPU cannot be disabled

The syntax is:

set cpu_enabled *hex_digit*

The options for *hex_digit* are 0 and 1 (hexadecimal).

ew*0_mode

Sets an Ethernet controller to run an AUI, ThinWire, or twisted-pair Ethernet network. The default is **auto-sense**. For the fast setting, the device defaults to fast.

The syntax is:

set ew*0_mode *value*

The options for *value* are:

aui	Device type is AUI.
auto-sense	Device type is sensed by the console.
twisted-pair	Device type is 10BaseT (twisted pair).
fast duplex, twisted-pair	Device type is duplex 10BaseT
fast	Device type is fast SCSI
fast FD	Device type is fast full duplex SCSI
BNC	Device type is BNC
auto-negotiate	DE500-BA

ew*0_protocols

Enables network protocols for booting and other functions. The syntax is:

set ew*0_protocols *protocol_value*

The options for *protocol_value* are:

mop (default)	Sets the network protocol to mop (Maintenance Operations Protocol), the setting typically used with the OpenVMS operating system.
bootp	Sets the network protocol to bootp, the setting typically used with the Tru64 UNIX operating system.
bootp,mop	When both are listed, the system attempts to use the mop protocol first, regardless of which is listed first. If not successful, it then attempts the bootp protocol.

kbd_hardware_type

Used only on systems with the language variant 3C (Français), this environment variable sets the keyboard hardware type as either PCXAL or LK411 and enables the system to interpret the terminal keyboard layout correctly.

Whenever you change the value of **kbd_hardware_type**, you must reset the system by pressing the Reset button or issuing the **initialize** command.

The syntax is:

set kbd_hardware_type *keyboard_type*

The options for *keyboard_type* are:

pcxal (default)	Selects the default keyboard hardware type.
lk411	Selects the LK411 keyboard layout for use with language variant 3C (Français).

language

Specifies the keyboard layout, which is language dependent. The setting of the **language** environment variable must match the language of the keyboard variant.

Whenever you change the value of **language**, you must reset the system by pressing the Reset button or issuing the **initialize** command.

The syntax is:

set language *language_code*

The options for *language_code* are:

0	No language (cryptic)	**40**	Français (Suisse Romande)
30	Dansk (Danish)	**42**	Italiano (Italian)
32	Deutsch (German)	**44**	Nederlands (Netherlands)
34	Deutsch (Schweiz) (Swiss)	**46**	Norsk (Norwegian)
36	English (American)	**48**	Portuguese (Portuguese)
38	English (British/Irish)	**4A**	Suomi (Finnish)
3A	Español (Spanish)	**4C**	Svenska (Swedish)
3C	Français (French)	**4E**	Belgisch-Nederlands (Dutch)
3E	Français (Canadian)		

ocp_text

Specifies a message to display on the control panel after self-tests and diagnostics have completed.

The value of **ocp_text** takes effect only after you reset the system by pressing the Reset button or issuing the **initialize** command.

The syntax is:

set ocp_text *message*

The variable *message* can be up to 16 characters and must be enclosed in quotation marks.

os_type

The **os_type** environment variable specifies the default operating system. This variable is set at the factory to the setting for the operating system purchased. Use this command to change the factory default setting.

Whenever you change the value of **os_type**, you must reset the system by pressing the Reset button or issuing the **initialize** command.

The syntax is:

set os_type *os_type*

The options for *os_type* are:

unix Tru64 UNIX is the default operating system, and the SRM firmware is started during power-up or reset.

openvms OpenVMS is the default operating system, and the SRM firmware is started during power-up or reset.

password

Sets or clears the console password stored in NVRAM.

The syntax is:

set password

The password is not an argument to the **set password** command; the console prompts the user for the string, which must be between 15 and 30 characters.

pci_parity

Disables or enables parity checking on the PCI bus.

Some PCI devices do not implement PCI parity checking, and some have a parity-generating scheme in which the parity is sometimes incorrect or is not fully compliant with the PCI specification. A side effect of this aberrant behavior is that superfluous PCI parity errors are reported by the host PCI bridge. In such cases, the device can be used as long as parity is not checked; disabling PCI parity checking prevents false parity errors that can cause system problems.

The syntax is:

set pci_parity *value*

The options for *value* are:

on (default)	Enables PCI parity checking.
off	Disables PCI parity checking.

pk*0_fast

Enables fast SCSI to perform in either standard or fast mode. If the system has at least one fast SCSI device, set the default controller speed to fast SCSI (1). Devices on a controller that connects to both standard and fast SCSI devices will perform at the appropriate rate for the device. If the system has no fast SCSI devices, set the default controller speed to standard SCSI (0). If a fast SCSI device is on a controller set to standard, it will perform in standard mode.

The syntax is:

set pk*0_fast *scsi_speed*

The options for *scsi_speed* are:

0	The controller is in standard SCSI mode.
1 (default)	The controller is in fast SCSI mode.

pk*0_host_id

Sets the controller host bus node ID to a value between 0 and 7.

Each SCSI bus in the system requires a controller. Buses can theoretically support up to eight devices; however, the eighth device must always be a controller. Each device on the bus, including the controller, must have a unique ID, which is a number between 0 and 7. This is the bus node ID number.

On each bus, the default bus node ID for the controller is set to 7. You do not need to change the controller bus node ID unless you place two or more controllers on the same bus.

To list the controllers on your system, enter the command **show device**. SCSI devices begin with the letters “pk” (for example, pka0). The third letter is the adapter ID for the controller. When entering the command **set pk*0_host_id**, replace the asterisk with the adapter ID letter.

The syntax is:

set pk*_host_id *scsi_node_id*

The value for scsi_node_id is the bus node ID, a number from 0 to 7.

pk*0_soft_term

Enables or disables SCSI terminators. This command applies to systems that use the QLogic ISP1040 SCSI controller.

The QLogic ISP1040 SCSI controller implements the 16-bit wide SCSI bus. The QLogic module has two terminators, one for the low eight bits and one for the high eight bits.

The syntax is:

set pk*0_soft_term *value*

The options for *value* are:

off	Disables termination of all 16 bits.
low (default)	Enables low eight bits and disables high eight bits.
high	Enables high eight bits and disables low eight bits.
on	Enables all 16 bits.
diff	Places the bus in differential mode.

tt_allow_login

Enables or disables login to the SRM console firmware on alternate console ports. If the environment variable **console** is set to serial, the primary console device is the terminal connected through the COM1 port. The command **set tt_allow_login 1** enables logins through either the COM2 port or a graphics monitor.

The syntax is:

set tt_allow_login *value*

The options for *value* are:

0	Disables login through the COM2 port or a graphics monitor.
1 (default)	Enables login through the COM2 port or a graphics monitor.

Appendix **A**

Regulatory Compliance Notices

Federal Communications Commission Notice

Part 15 of the Federal Communications Commission (FCC) Rules and Regulations has established Radio Frequency (RF) emission limits to provide an interference-free radio frequency spectrum. Many electronic devices, including computers, generate RF energy incidental to their intended function and are, therefore, covered by these rules. These rules place computers and related peripheral devices into two classes, A and B, depending upon their intended installation. Class A devices are those that may reasonably be expected to be installed in a business or commercial environment. Class B devices are those that may reasonably be expected to be installed in a residential environment (i.e., personal computers). The FCC requires devices in both classes to bear a label indicating the interference potential of the device as well as additional operating instructions for the user.

The rating label on the device shows which class (A or B) the equipment falls into. Class B devices have a FCC logo or FCC ID on the label. Class A devices do not have a FCC logo or ID on the label. Once the class of the device is determined, refer to the following corresponding statement.

Class A Equipment

Warning!

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Achtung!

Dieses ist ein Gerät der Funkstörgrenzwertklasse A. In Wohnbereichen können bei Betrieb dieses Gerätes Rundfunkstörungen auftreten, in welchen Fällen der Benutzer für entsprechende Gegenmaßnahmen verantwortlich ist.

Attention!

Ceci est un produit de Classe A. Dans un environnement domestique, ce produit risque de créer des interférences radioélectriques, il appartiendra alors à l'utilisateur de prendre les mesures spécifiques appropriées.

Avertissement!

Cet appareil est un appareil de Classe A. Dans un environnement résidentiel cet appareil peut provoquer des brouillages radioélectriques. Dans ce cas, il peut être demandé à l'utilisateur de prendre les mesures appropriées.

[BCIQ]:

警告使用者:

這是甲類的資訊產品，在居住的
環境中使用時，可能會造成射頻
干擾，在這種情況下，使用者會
被要求採取某些適當的對策。

[VCCI]:

に基づくクラスＡ情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

[FCC]:

This equipment generates, uses, and may emit radio frequency energy. The equipment has been type tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of FCC rules, which are designed to provide reasonable protection against such radio frequency interference.

Operation of this equipment in a residential area may cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

Any modifications to this device - unless expressly approved by the manufacturer - can void the user's authority to operate this equipment under part 15 of the FCC rules.

NOTE: *Additional information on the need to interconnect the device with shielded (data) cables or the need for special devices, such as ferrite beads on cables, is required if such means of interference suppression was used in the qualification test for the device. This information will vary from device to device and needs to be obtained from the EMC group or product manager.*

Declaration of Conformity for Products Marked with FCC Logo, United States Only

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. For questions regarding this declaration, contact:

Compaq Computer Corporation
P. O. Box 629
Marlboro, Massachusetts 01752

To identify this product, refer to the Series number found on the product.

Modifications

The FCC requires the user to be notified that any changes or modifications made to this device that are not expressly approved by Compaq Computer Corporation may void the user's authority to operate the equipment.

Cables

Connections to this device must be made with shielded cables with metallic RFI/EMI connector hoods in order to maintain compliance with FCC Rules and Regulations.

Canadian Notice (Avis Canadien)

Class A Equipment

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Warning!

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Achtung!

Dieses ist ein Gerät der Funkstörgrenzwertklasse A. In Wohnbereichen können bei Betrieb dieses Gerätes Rundfunkstörungen auftreten, in welchen Fällen der Benutzer für entsprechende Gegenmaßnahmen verantwortlich ist.

Attention!

Ceci est un produit de Classe A. Dans un environnement domestique, ce produit risque de créer des interférences radioélectriques, il appartiendra alors à l'utilisateur de prendre les mesures spécifiques appropriées.

European Union Notice

Products with the CE Marking comply with both the EMC Directive (89/336/EEC) and the Low Voltage Directive (73/23/EEC) issued by the Commission of the European Community.

Compliance with these directives implies conformity to the following European Norms (in brackets are the equivalent international standards):

- EN55022 (CISPR 22) - Electromagnetic Interference
- EN50082-1 (IEC801-2, IEC801-3, IEC801-4) - Electromagnetic Immunity
- EN60950 (IEC950) - Product Safety

Safety Interlocks

WARNING: These products are capable of producing energy levels that are considered hazardous. Users should not remove enclosures nor should they bypass the interlocks provided for removal of these hazardous conditions.

Installation of accessories and options in areas other than front hot-plug bays should be performed by individuals who are both qualified in the servicing of computer equipment and trained in the hazards associated with the products capable of producing hazardous energy levels.

WARNING: To reduce the risk of personal injury from contact with hazardous energy, the equipment is provided with safety interlock. Do not attempt to defeat this safety interlock. When the access cover is removed, the power supply is disabled until the cover is properly replaced

Australian Notice

This customer equipment is to be installed and maintained by service personnel as defined by AS/NZS 3260 Clause 1.2.14.3. Service Personnel. Incorrect connection of connected equipment to the General Purpose Outlet could result in a hazardous situation. Safety requirements are not fulfilled unless the equipment is connected to a wall socket outlet with protective earth contact.

Laser Devices

The CD-ROM drive contains a laser device. All Compaq systems equipped with a laser device comply with safety standards, including International Electrotechnical Commission (IEC) 825. With specific regard to the laser, the equipment complies with laser product performance standards set by government agencies as a Class 1 laser product. The product does not emit hazardous light; the beam is totally enclosed during all modes of customer operation and maintenance.

Laser Safety Warnings

WARNING: To reduce the risk of fire, bodily injury, and damage to the equipment, observe the following precautions:

Do not operate controls, make adjustments, or perform procedures to a laser device other than those specified herein or in the CD-ROM drive installation guide.

Allow only Compaq Authorized Service Technicians to repair the laser equipment.

Compliance with CDRH Regulations

The Center for Devices and Radiological Health (CDRH) of the U.S. Food and Drug Administration implemented regulations for laser products on August 2, 1976. These regulations apply to laser products manufactured from August 1, 1976. Compliance is mandatory for products marketed in the United States.

Compliance with International Regulations

All Compaq systems equipped with CD-ROM drives comply with appropriate safety standards including IEC 825.

Laser Product Label

The following label or equivalent is located on the surface of your CD-ROM drive.

This label indicates that the product is classified as a CLASS 1 LASER PRODUCT. This label appears on a laser device installed in your product.

Laser Information

Laser Type	Semiconductor GaAlAs
Wave Length	780 nm +/- 35 nm
Divergence Angle	53.5 degrees +/- 0.5 degrees
Output Power	Less than 0.2 mW /10,869 $W \cdot m^{-2}$ sr^{-1}
Polarization	Circular 0.25
Numerical Aperture	0.45 inches +/- 0.04 inches

Battery Replacement Notice

WARNING: Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

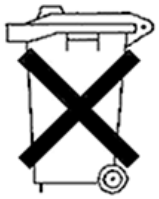
Your computer is provided with a battery powered Real-Time Clock circuit. There is a danger of explosion and risk of personal injury if the battery is incorrectly replaced or mistreated. Replacement is to be done by a Compaq Authorized Service Provider using the Compaq spare designated for this product. For more information about Real-Time Clock battery replacement or proper disposal, contact your Compaq Authorized Reseller or your Authorized Service Provider.

IMPORTANT: Recycle or dispose of batteries promptly in accordance with local regulations.

WARNING: To reduce the risk of personal injury, do not attempt to recharge the battery, disassemble it, immerse it in water, or dispose of it in fire.

Your computer contains an internal Lithium Manganese battery pack. There is risk of fire and burns if the battery pack is not handled properly. Replace only with the Compaq spare designated for this product.

WARNING: To reduce the risk of personal injury, do not disassemble, crush, puncture, short external contacts, or dispose of in fire or water.
Do not expose to temperatures higher than 60° C.



Batteries, battery packs, and accumulators should not be disposed of together with the general household waste. In order to forward them to recycling or proper disposal, please use the public collection system or return them to Compaq, your authorized Compaq Partners, or their agents.

Mouse Compliance Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Appendix **B**

Electrostatic Discharge Information

To prevent damaging the system, be aware of the precautions you need to follow when setting up the system or handling parts. A discharge of static electricity from a finger or other conductor may damage system boards or other static-sensitive devices. This type of damage may reduce the life expectancy of the device.

To prevent electrostatic damage, observe the following precautions:

- Avoid hand contact by transporting and storing products in static-safe containers.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free systems.
- Place parts on a grounded surface before removing them from their containers.
- Avoid touching pins, leads, or circuitry.
- Always be properly grounded when touching a static-sensitive component or assembly.

Grounding Methods

There are several methods for grounding. Use one or more of the following methods when handling or installing electrostatic-sensitive parts:

- Use a wrist strap connected by a ground cord to a grounded system chassis. Wrist straps are flexible straps with a minimum of 1 megohm ± 10 percent resistance in the ground cords. To provide proper ground, wear the strap snug against the skin.
- Use heel straps, toe straps, or boot straps at standing servers. Wear the straps on both feet when standing on conductive floors or dissipating floor mats.
- Use conductive field service tools.
- Use a portable field service kit with a folding static-dissipating work mat.

If you do not have any of the suggested equipment for proper grounding, have an Authorized Compaq Reseller install the part.

NOTE: For more information on static electricity, or assistance with product installation, contact your Authorized Compaq Reseller.

Appendix **C**

Power Cord Requirements

The power cord set meets the requirements for use in the country where you purchased your equipment. Power cord sets for use in other countries must meet the requirements of the country where you use the system. For more information on power cord set requirements, contact your Authorized Compaq Dealer.

General Requirements

The requirements listed below are applicable to all countries:

- The length of the power cord must be at least 6.0 feet (1.8 m) and a maximum of 12 feet (3.7 m).
- The power cord set must be approved by an acceptable accredited agency responsible for evaluation in the country where the power cord will be used.
- The power cord set must have a minimum current capacity and nominal voltage rating of 10 A/125 volts AC, or 10A/250 volts AC, as required by each country's power system.
- The appliance coupler must meet the mechanical configuration of an EN60320/IEC 320 Standard Sheet C13 Connector, for mating with the appliance outlet on the system.

Country-Specific Requirements

Use the information in Table C-1 to identify the appropriate accredited agency in your country.

Table C-1
Power Cord Set Requirements - By Country

Country	Accredited Agency	Applicable Note Numbers
Australia	EANSW	1
Austria	OVE	1
Belgium	CEBC	1
Canada	CSA	2
Denmark	DEMKO	1
Finland	SETI	1
France	UTE	1
Germany	VDE	1
Italy	IMQ	1
Japan	JIS	3
Norway	NEMKO	1
Sweden	SEMKO	1
Switzerland	SEV	1
United Kingdom	BSI	1
United States	UL	2

NOTES:

1. Flexible cord must be <HAR> Type HO5VV-F, 3-conductor, 1.0 mm^2 conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country where it will be used.
2. Flexible cord must be Type SVT or equivalent, No. 18 AWG, 3-conductor. Wall plug must be a two-pole grounding type with a NEMA 5-15P (15A, 125V).
3. Appliance coupler, flexible cord, and wall plug must bear a "T" mark and registration number in accordance with the Japanese Dentori Law. Flexible cord must be Type VCT or VCTF, 3-conductor, 1.0 mm^2 conductor size. Wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7A, 125V) configuration.

Appendix ***D***

System Specifications

Physical Specifications

Table D-1
Physical Characteristics

	Pedestal	
Dimensions (HxWxD)	18.5 x 8.85 x 27.5 in / 47.0 x 22.5 x 69.9 cm	
Shipping Dimensions	24 x 26.25 x 40 in / 61.0 x 66.0 x 101.6 cm	
Weight		
Typical Configuration	80 lbs / 36 kg	
Maximum Configuration	88 lbs / 40 kg	
Shipping Weight		
Nominal	100 lbs / 45 kg	
Maximum	110 lbs / 50 kg	
Clearances	**Operating**	**Service**
Front	15 in / 38.1 cm	15 in / 38.1 cm
Rear	6 in / 15 cm	29.5 in / 75 cm
Left Side	None	None
Right Side	None	None

(continued)

Rackmount		
Dimensions (HxWxD	8.75 x 17.5 x 26 in / 22.2 x 44.5 x 66.0 cm (5U)	
Shipping Dimensions	24 x 26.25 x 40 in / 61.0 x 66.0 x 101.6 cm	
Weight		
When lifting:	Nominal 80 lbs / 36 kg	Maximum 86 lbs / 39 kg
Total added to cabinet (brackets, slides, cables):	Nominal 84 lbs / 38 kg	Maximum 88 lbs / 40 kg
Shipping Weight	Nominal 100 lbs / 45 kg	Maximum 110 lbs / 50 kg
Clearance for Service	Minimum 4 ft / 121.9 cm, 28 in / 71 cm withdrawal on rails	

Rackmount Cabinet		
	H9A10 M-Series	**H9A15 M-Series**
Dimensions (HxWxD)	67 x 23.6 x 43.27 in/ 170 x 60 x 110 cm	79 x 23.6 x 35.4 in 200 x 60 x 90 cm
Shipping Dimensions	73 x 36 x 48 in / 185.5 x 91.5 x 122 cm	85 x 36 x 48 in / 216 x 91.5 x 122 cm
Weight	Configuration dependent	1000 lbs / 450 kg
Shipping Weight	Configuration dependent, maximum payload 1,000 lbs	1056 lbs / 550 kg (normal) 1,408 lbs / 640 kg (maximum))

Environmental Specifications

Table D-2
Environmental Specifications

Temperature		
Operating (Pedestal, Rackmount)	50° to 95°F / 10° to 35°C	
Storage (60 days)	-40 ° to -151 °F / -40 to -66 °C	
Rate of change	20°F/hr / 11°C/hr	
Relative Humidity		
Operating	20% to 80%	
Non-operating	20% to 80%	
Storage (60 days)	10% to 95%	
Rate of change	20% hr	
Maximum Wet Bulb Temperature	Operating 82°F / 28°C	Storage (60 days) 115°F / 46°C
Maximum Dew Point Temperature	Operating 36°F / 2°C	Storage (60 days) Not tested
Heat Dissipation	**Nominal**	**Maximum**
Pedestal	550W, 1,878 BTU/hr	780W, 2,664 BTU/hr
H9A10/H9A15 Cabinets	Configuration dependent	
Airflow and Quality		
Intake location	Front	
Exhaust location	Rear Pedestal, Rack; Rear/top H9A10/H9A15	
Altitude	Operating 10,000 ft / 3,037m	Non-operating 40,000 ft / 12,192m
Vibration	Operating	10-500 Hz .1 G peak
Mechanical shock	Pedestal	M-series cabinet
Operating	7.5 G, 1 0+/- 3 ms	5.0 G, 10 +/- 3 ms

Electrical Specifications

Table D-3
Electrical Specifications

Nominal Voltage (Vac)	100	120	200-240
Voltage Range (Vac) **temporary condition**	90-100	110-128	180-250
Power Source Phase	Single	Single	Single
Nominal Frequency (Hz)	50/60	50/60	50/60
Frequency Range (Hz)	49-51 / 59-61	49-51 / 59-61	49-51 / 59-61
RMS Current (maximum steady state)			
Pedestal and Rackmount			
Single power cord	6.6A	5.5A	3.0A
Maximum VA	780	765	730
M-series Cabinet (configuration dependent)			
Nominal voltage (Vac)	100	120	220-240
Each Nominal voltage (Vac)	24A	24A	16A
Power Cords			
Pedestal	1 (75 in / 190 cm)	EC 320 C13 to NEMA 5-15 (N. America) or IEC 320 C13 to country-specific	
Rackmount	1 (14 ft 10 in / 452 cm)	IEC 320 C13 to NEMA 5-15 (N. America) or IEC 320 C13 to IEC 320 C14 (other countries)	
Cabinet	2 (10 ft 10 in / 330 cm)	120V non-removable NEMA L5-30P or 200-240V non-removable IEC 309	

Regulatory	
Agency Approvals	UL: Listed to UL1950 (3rd edition)
	CSA: Certified to CAN/CSA-C22.2 No. 950-M95
	TUV: EN 60950/A4: 1997 VDE 0805 GS marked
	FCC: Part 15.B Class A
	CE: EN55022, EN50082
	VCCI Class II ITE
	BCIQ: CISPR22, CNS13438
	C-Tick: CISPR22, AS/NZS 3548
Reviewed to	AS/NZ 3260:1993 Australian/New Zealand Standard
	EN 60950/A4: 1997 European Norm
	IEC 950 (2^{nd} edition, 3^{rd} amend)

Note: Power supplies are universal, PFC, auto ranging, 100/240 Vac

Acoustical Data

Table D-2 lists the noise declaration for the AlphaServer DS20E and AlphaStation DS20E systems.

Table D-2 DS20E Acoustical Data

Acoustics -Declared Values per ISO 9296 and ISO 7779

	Sound Power L_{WAd}, (bels)		Sound Pressure L_{pAm}, (dBA) (bystander positions)	
	Idle	Operate	Idle	Operate
with 0 x HDD	6.2	6.2	44	44
with 1 x HDD	6.2	6.4	44	46

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

Schallemissionswerte -
Vorläufige Werteangaben nach ISO 9296 und ISO 7779/DIN EN27779:

	Schalleistungspegel L_{WAd}, B		Schalldruckpegel L_{pAm}, dBA (Zuschauerpositionen)	
	Leerlauf	Betrieb	Leerlauf	Betrieb
mit 0xHDD	6,2	6,2	44	44
mit 1xHDD	6,2	6,4	44	46

Aktuelle Werte für speziele Ausrüstungsstufen sind uber die Compaq Computer Vertretungen erhältelich. 1 B = 10 dBA.

Index

C

D

E

F

G

H

I

K

L

M

N

O

P

Q

R

S

T

U