

AlphaServer 800

User's Guide

Order Number: EK-ASV80-UG. B01

This manual is intended for the user of the DIGITAL AlphaServer 800 server system. It describes the operation of the system, explains the use of the SRM and the AlphaBIOS consoles, gives procedures for component replacements, and discusses troubleshooting.

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Preface

Intended Audience

This manual is intended for the operator of the AlphaServer 800 system.

Document Structure

This manual uses a structured documentation design. Topics are organized into small sections for efficient online and printed reference. Each topic begins with an abstract. You can quickly gain a comprehensive overview by reading only the abstracts. Next is an illustration or example, which also provides quick reference. Last in the structure are descriptive text and syntax definitions.

The material is presented in 11 chapters.

- **Chapter 1, Overview**, describes the features and the major parts of the system.
- **Chapter 2, Installing a System into a Cabinet**, explains how to install a unit in a system cabinet.
- **Chapter 3, Installing the System**, explains how to set up and interconnect the hardware components of the system.
- **Chapter 4, Operating the System**, tells how to power the system on and off, discusses booting of the three operating systems, and operating the system remotely.
- **Chapter 5, Reconfiguring the System**, tells how to use console commands to reconfigure the system and describes how to run configuration utilities.
- **Chapter 6, Using the SRM Console**, tells how to invoke the SRM console and describes how to perform certain SRM console tasks.
- **Chapter 7, Using the AlphaBIOS Console**, tells how to start AlphaBIOS and perform common system management tasks.
- **Chapter 8, Server Management Console**, describes the integrated server management console and explains how to operate the system remotely.

- **Chapter 9, Using the Hard Disks**, describes the operation of the hard disks.
- **Chapter 10, Installing Components**, discusses how to remove and install system components and add new options.
- **Chapter 11, Troubleshooting**, provides basic troubleshooting information for the system.

Documentation Titles

Table 1 lists the books in the AlphaServer 800 documentation set.

Table 1 AlphaServer 800 Documentation

Title	Order Number
AlphaServer 800 System Info Kit	QZ-00XAA-GW
<i>AlphaServer 800 User's Guide</i>	EK-ASV80-UG
<i>AlphaServer 800 Basic Installation</i>	EK-ASV80-IG
<i>AlphaServer 800 Local Language Doc CD</i>	AG-R5DUA-BE
AlphaServer 800 System Maintenance Kit	QZ-00XAB -GZ
<i>AlphaServer 800 Service Guide</i>	EK-ASV80-SG
<i>AlphaServer 800 Service Information (help file)</i>	AK-R2MAA-CA
<i>AlphaServer 800 Illustrated Parts Breakdown</i>	EK-ASV80-IP

Chapter 1

Overview

The AlphaServer 800 system is a high-performance, uniprocessor system intended for use as a local area network (LAN) server or commercial applications server.

Ideal uses for the AlphaServer 800 system include the following:

- Application server—To run applications such as relational databases, electronic mail, and communications
- Print server—To provide printing resources to PCs and other systems in a LAN
- File server—To provide disk storage to PCs and other systems in a LAN
- Compute server—To enable PCs to remotely run computation-intensive applications
- Replicated site server—To operate in commercial applications due to remote management features

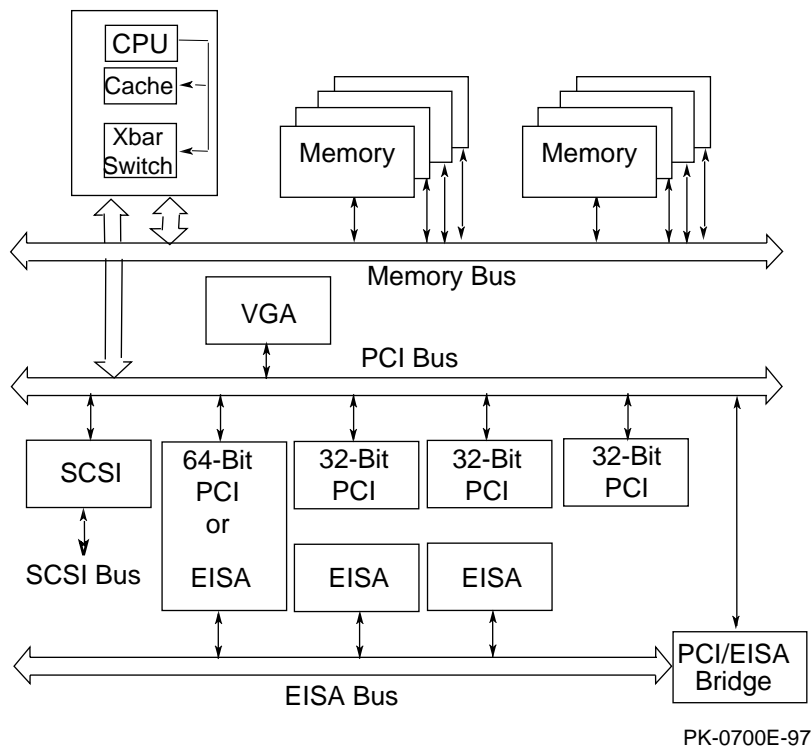
This chapter provides an overview of the system. Sections are:

- System Architecture
- System Features
- System Parts
- Control Panel
- Rear Panel Connections
- Storage Device LEDs
- Console
- System Options
- System Specifications
- Acoustical Data

1.1 System Architecture

The AlphaServer 800 system is a low-end server that offers PCI and EISA bus options on a single system board. Figure 1-1 shows the architecture of the system.

Figure 1-1 Block Diagram of the AlphaServer 800 Server System



The AlphaServer 800 system is housed in an enclosure containing the motherboard, CPU daughter card, other logic modules, and power supply with internal fans. The enclosure allows for up to four internal mass-storage devices, with up to four removable media devices, one of which is a 3.5-inch floppy drive. The control panel includes Halt, Reset, and On/Off 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 19-inch rack.

All memory and I/O components are on a single system board that contains the memory subsystem, the PCI bus, the EISA I/O bus, the integrated system I/O controllers, and option slots for PCI-based and EISA-based option cards. A server management corner on the system board serves to monitor/control the system remotely.

The CPU daughter card interfaces to the motherboard with a 600-pin connector. It is based on a 21164 microprocessor that is a superscalar, super-pipelined implementation of the Alpha architecture and runs at an optimized price/performance speed of 300 to 500 MHz. The chip contains two 8-Kbyte, direct-mapped primary caches and a 96-Kbyte, 3-way set-associative secondary cache. The CPU card uses a 2-Mbyte, direct-mapped, writeback B-cache. The B-cache is 16 bytes wide with a block size of 64 bytes.

1.2 System Features

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

High Performance

- 64-bit Alpha architecture Provides significantly better performance than 32-bit architecture.
- Microprocessor Fast microprocessor for enhanced system performance.
- 2-Mbyte third-level cache Reduces significantly memory transaction times.
- Integrated fast wide SCSI controller Supports tape, CD-ROM, and hard disk devices without use of an expansion slot.
- Integrated PCI graphics controller Makes an additional expansion slot available for other applications.
- Warm-swapping of 3.5-inch full-height devices Allows replacement of disk drives while the system continues to operate.
- Ultra SCSI-ready backplane Provides high-performance drive technology.

Operating Systems

DIGITAL UNIX
OpenVMS
Windows NT

Flexible Packaging

Single enclosure available as free-standing pedestal or rack-mountable box.

System Expansion

- Flexible memory architecture Provides a 256-bit memory data path. Allows incremental memory expansion from 32 Mbytes to 2 Gbytes.

- Three 32-bit PCI slots, one shared 64-bit PCI/EISA slot, and two dedicated EISA slots
Accommodates industry-standard option cards such as Ethernet, FDDI, SCSI, and modems.
- Capacity for eight internal storage devices
A modular storage system accommodates up to four 3.5-inch full-height SCSI devices. The system also supports up to three 5.25-inch half-height devices (CD-ROM or tape) and one 3.5-inch high-density diskette drive.
- External ports
Two serial ports and one parallel port support external options such as printer, modem, or local terminal.

Reliability/Availability

- Error correction code (ECC)
Allows recovery from most cache and memory errors.
- Internal sensors
Monitor and detect internal system temperature, fan failure, power supply, status, system watchdog timer.
- Variable fan speed
Adjusts fan speed according to system temperature.

Server Management

- 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. Provides operator paging on “alert” conditions.

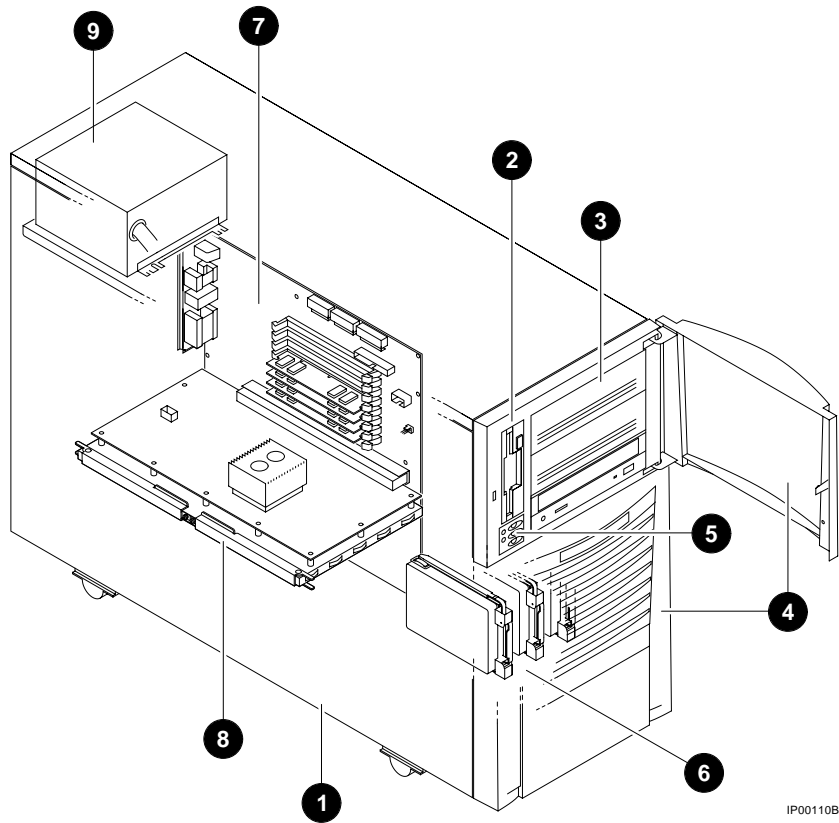
System Security

- Key lock (pedestal only)
Limits access to system components.
- Security hole (on rear of system unit)
Allows system to be secured in place.

1.3 System Parts

Figure 1-2 identifies the main parts of the system in a pedestal version. The enclosure has a top cover and a side panel.

Figure 1-2 AlphaServer 800 System Parts



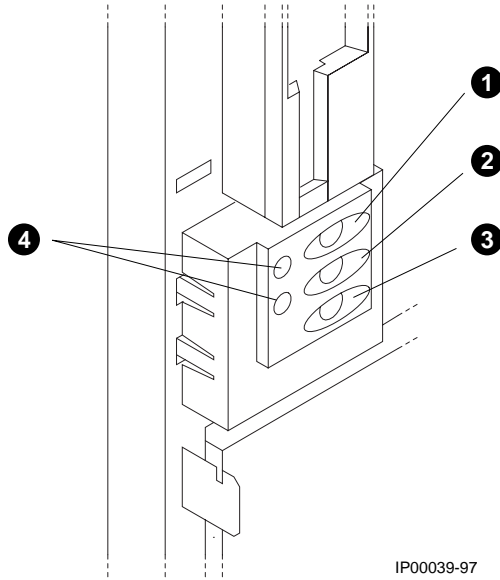
The main components of an AlphaServer 800 system are:

- ① Removable side cover of system enclosure
- ② Floppy diskette drive
- ③ Removable media drives
- ④ Lower and upper doors
- ⑤ Control panel
- ⑥ Hard disk drives
- ⑦ System board
- ⑧ CPU daughter card
- ⑨ Power supply

1.4 Control Panel

The control panel provides system controls and status indicators on the front of the AlphaServer 800 enclosure.

Figure 1-3 Control Panel



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The control panel consists of three pushbutton controls and two LED indicators:

- Power On/Off button
- Halt button
- Reset button
- Green Power OK indicator
- Amber Halt indicator

The functions provided by these pushbutton controls and indicators are discussed next.

- ❶ Power On/Off — Powers the system on or off. When the LED is lit, the power is on. Turning the power off and then on clears the shutdown condition and attempts to power the system back on. Failure conditions that prevent the system from powering on can be determined from the remote management console using the Status command. The remote management console is powered separately from the rest of the system and is functional as long as AC power is present.

The Power On/Off button overrides the remote management console. Thus, a system that has been powered off or halted remotely can be restarted from the control panel without the need to access the remote management console. This becomes important in systems without a local character cell terminal for a system console where no local access to the remote management console is possible.

- ❷ Halt button — When the button is in the In position, a single halt interrupt is provided to the CPU. On OpenVMS and DIGITAL UNIX this halt interrupt causes a return to the SRM console. Also, when the Halt button is In at power-up, the system comes up with the SRM console.
- ❸ Reset button — A momentary contact switch that initializes the system.
- ❹ Indicator lights — The control panel has two lights for indicating the basic system state. One is a green Power OK indicator and the other is an amber Halt indicator. The system state is described in Table 1-1.

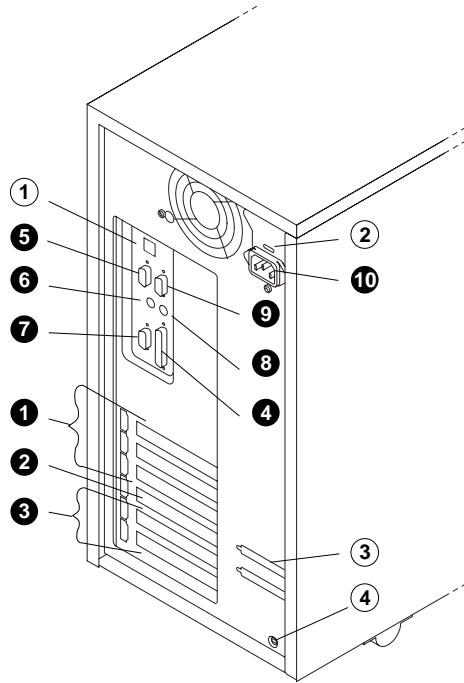
Table 1-1 System Status Indicated by the Control Panel LEDs

Green LED	Yellow LED	Status
Off	Off	System is powered off or no AC power is present.
Off	On	Power is enabled, but system has been powered off by: <ul style="list-style-type: none">• Remote console command• System software• Fan failure• Overtemperature failure• Power supply failure
On	Off	System is powered on.
On	On	System power is on and Halt button is pressed in or a halt in command has been issued at the remote management console.

1.5 Rear Panel Connections

Rear panel ports and slots are shown in Figure 1-4.

Figure 1-4 Rear Panel Connections



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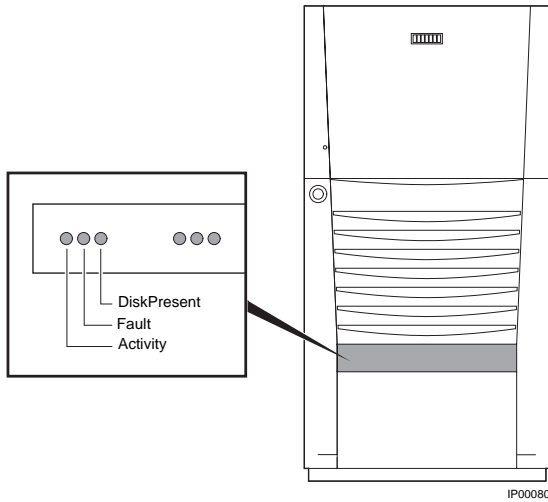
The following list describes the rear panel connections:

- ❶ Three 32-bit PCI slots — For option cards for high-performance network, video, or disk controllers
- ❷ One 64-bit slot — For either a PCI card or an EISA card
- ❸ Two EISA slots — For option cards for network, video, sound, or disk controllers
- ❹ Parallel port — To parallel device such as a printer
- ❺ Serial port (COM2) — Extra port to modem or any serial device
- ❻ Mouse port — To PS/2-compatible mouse
- ❼ VGA port — To VGA monitor
- ❽ Keyboard port — To PS/2-compatible keyboard
- ❾ Remote console modem port — Dedicated 9-pin port for connection to remote management console and system COM1 through modem. Provides full modem control.
- ❿ Power inlet — To power outlet
- ① Serial port/terminal port (COM1) — To console terminal. This is an M MJ with data leads only.
- ② AC switch 115V/220VKey — Should be pointing to the correct input AC voltage.
- ③ SCSI breakouts — To SCSI devices
- ④ Security hole — To secure the system

1.6 Storage Device LEDs

Storage device LEDs indicate the status of the device. Figure 1-5 shows the hard disk drive LEDs.

Figure 1-5 Hard Disk Drive LEDs



LED	Function
Activity (green)	When lit indicates disk activity.
Fault (amber)	Reserved for future use. Has no function at product introduction.
Disk Present (green)	When lit, indicates that a drive is installed in that slot.

Figure 1-6 shows the Activity LED of the floppy drive. When lit, it indicates that the drive is active.

Figure 1-6 Floppy Drive Activity LED

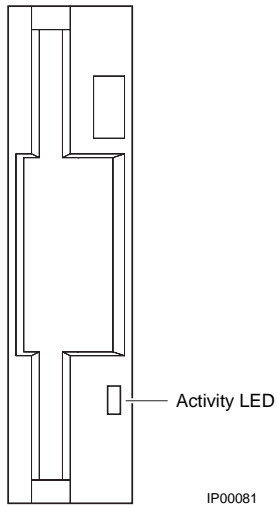
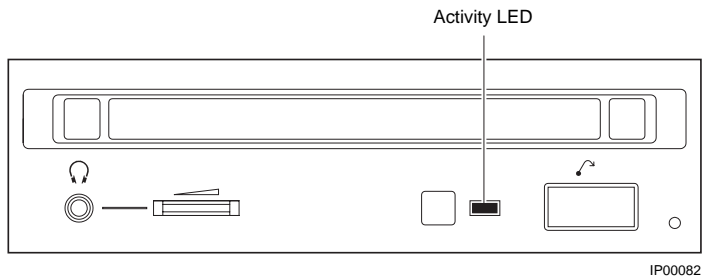


Figure 1-7 shows the Activity LED of the CD-ROM drive. When lit, it indicates that the drive is active.

Figure 1-7 CD-ROM Drive Activity LED



1.7 Console

The system offers two separate interfaces to the console program: SRM for DIGITAL UNIX and OpenVMS; and AlphaBIOS for Windows NT.

The system runs in one of three modes:

- Operating system mode
- Console mode
- Remote management mode

In operating system mode, the system is under the control of the operating system. When the operating system is halted, the system reverts to console mode. In this mode, the system operates under the control of the console firmware and the commands entered or selected by the operator.

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.

Because the AlphaServer 800 system supports multiple operating systems, it offers two separate interfaces to the console program:

- SRM—For the OpenVMS and DIGITAL UNIX operating systems
- AlphaBIOS—For the Windows NT operating system

The SRM console firmware has a command-line interface. The operator enters commands at the console prompt. Environment variables are used to control system behavior.

The AlphaBIOS console firmware has a menu-based interface. The operator selects an item from the menu displayed on a screen.

Refer to Chapter 6 for the operations of the SRM console and to Chapter 7 for the operations of the AlphaBIOS console.

1.8 System Options

The AlphaServer 800 system supports storage options, PCI/EISA/ISA options, and memory options.

Internal Options

The AlphaServer 800 system supports the following types of internal options:

- Storage
- PCI/EISA/ISA
- Memory

Storage devices include:

- One diskette drive
- Up to three removable-media storage devices, one of which is typically a CD-ROM drive
- Up to four 3.5-inch full-height SCSI hard disks

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

- SCSI storage expansion
- Networking and communication
- Graphics

The memory cards are inserted on eight 168-pin, 3.3 volt DIMM sockets on the system board. Memory is configured in banksets of four to form the databus width of 256 data bits and 32 bits of ECC. Possible memory capacities range from 32 Mbytes (using a single bankset of 1Mx72 DIMMs) to 2 Gbytes (using 32Mx72 DIMMs). Each DIMM in a bankset must be of the same capacity. Each bankset is separately configurable as to base address and size.

External Options

Other options that can be added to the system externally include the following:

- Monitor or terminal
- Expansion boxes
- Printers
- RAID controller
- 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 AlphaServer 800 system through the DIGITAL FTP archive:

`ftp://ftp.digital.com/pub/Digital/Alpha/systems/as800/`

The WWW site for technical documentation and supply lists is:

`http://www.digital.com/alphaserver/tech_docs/alphasrv800/`

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

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

1.9 System Specifications

Table 1-2 gives the AlphaServer 800 system specifications.

Table 1-2 System Specifications

Physical Characteristics		
Pedestal		
Height	45 cm (17.7 in.)	
Width	22.6 cm (8.9 in.)	
Depth	65.8 cm (25.9 in.)	
Weight	Typical: 24.5 kg (54 lb)	Max: 28 kg (62 lb)
Rackmount		
Height	22 cm (8.6 in.)	Fits 8 ¾ in. [5U] standard EIA 310D (RETMA) cabinets
Width	Standard EIA 310D (RETMA)	
Depth	63.8 cm (25.1 in.)	
Weight		
1. When lifting	Typical: 24.5 kg (54 lb)	Max: 28 kg (62 lb)
2. Total added to cabinet (includes brackets, slides, and cables)	Typical: 30 kg (66 lb)	Max: 35 kg (77 lb)
Shipping Container (Pedestal and Rackmount)		
Height	47 cm (18.5 in.)	
Width	60 cm (23.6 in.)	
Depth	77.5 cm (30.5 in.)	
Weight		
Pedestal	Typical: 33 kg (73 lb)	Max: 37 kg (82 lb)
Rackmount	Typical: 39 kg (85 lb)	Max: 44 kg (96 lb)
Max Heat Dissipation	380 Watts, 1297 Btu/hr	
Acoustics	Operating	LNPEc (BELs) 6.0 max per ISO 7779

Table 1-2 System Specifications (Continued)

Clearances		
	Operating	Service
Pedestal		
Front	75 cm (29.5 in.)	75 cm (29.5 in.)
Rear	15 cm (5.9 in.)	75 cm (29.5 in.)
Left side	None	75 cm (29.5 in.)
Right side	None	5 cm (2 in.)
Rackmount	See requirements of specific cabinet	Slides forward 68.6 cm (27 in.), then accessible from the top
Environmental Characteristics		
Temperature	Operating	
	Pedestal	10 to 40° C (50 to 104° F)
	Rackmount	10 to 35° C (50 to 95° F)
	Nonoperating	Not tested
	Storage (60 days)	-40 to 66° C (-40 to 151° F)
	Rate of change	11° C/hr (20° F/hr)
Relative Humidity	Operating	20 to 80%
	Nonoperating	20 to 80%
	Storage (60 days)	10 to 95%
	Rate of change	20%/hr
Max Wet Bulb Temp	Operating	28° C (82° F)
	Storage (60 days)	46° C (115° F)
Min Dew Point Temp	Operating	2° C (36 th F)
	Storage (60 days)	Not tested
Airflow and Quality	Intake location	Front
	Exhaust location	Rear
	Particle size	N/A
	Concentration	N/A
Altitude	Operating	3037 m (10,000 ft)
	Nonoperating	12190 m (40,000 ft)
Vibration	Operating	10-500 Hz .1 G peak

Table 1-2 System Specifications (Continued)

Electrical Characteristics	
Nominal AC Voltage	100 to 120 Vac/220 to 240 Vac
Voltage Range (Vac temporary condition)	88 to 132 Vac/176 to 264 Vac
Power Supply Phase	Single/Single
Nominal Frequency	60 Hz/50 Hz
Frequency Range	57-63 Hz/47-53 Hz
RMS Current (steady state) at Nominal Voltage	7.0 amps/3.0 amps
Max Power Consumption	380 Watts

1.10 Acoustical Data

Table 1-3 gives the noise declaration for an AlphaServer 800 system with diskless, 1-Gbyte or 2-Gbyte RZ28M configurations.

Table 1-3 AlphaServer 800 Acoustical Data

Product	Sound Power Level		Sound Pressure Level	
	L_{wAd} B		L_{pAm} dBA	
	Idle	Operate	(bystander positions)	
	Idle	Operate	Idle	Operate
PB80A-A9 (AlphaServer 800) [with 0 x HDD]	5.7	5.7	39	39
PB80A-A9 + RZ26N	5.7	6.0	39	42
PB80A-A9 + RZ28M	5.7	6.0	39	42

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

Schallemissionswerte — Werteangaben nach ISO 9296 und ISO 7779/DIN EN27779

Gerät	Schalleistungspegel		Schalldruckpegel	
	L_{wAd} B		L_{pAm} dBA	
	Leerlauf	Betrieb	(Zuschauerpositionen)	
	Leerlauf	Betrieb	Leerlauf	Betrieb
PB80A-A9 (AlphaServer 800) [mit 0 x HDD]	5.7	5.7	39	39
PB80A-A9 + RZ26N	5.7	6.0	39	42
PB80A-A9 + RZ28M	5.7	6.0	39	42

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

Chapter 2

Installing a System into a Cabinet

This chapter gives installation procedures for a rackmount system. Sections are:

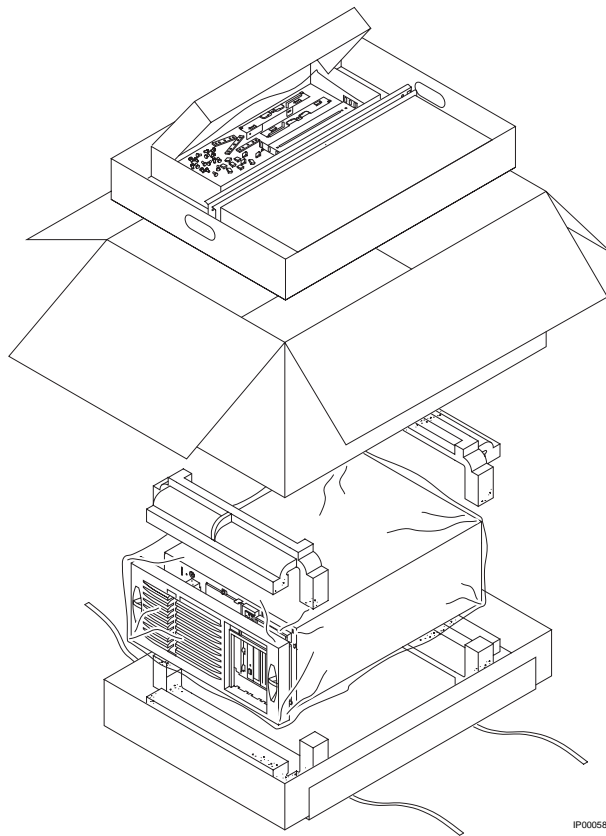
- Shipment Box
- Preparing the System
- Marking the Installation Area in the Cabinet
- Preparing the Cabinet
- Installing the System
- Installing the Cable Management Bracket
- Installing the Interlock Mechanism
- Connecting the Cables

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.

2.1 Shipment Box

The rackmount system is shipped in a single box. Figure 2-1 shows the hardware shipped with the system.

Figure 2-1 Unpacking the Rackmount System



The rackmount system is shipped in a single box that contains the following items:

- The AlphaServer 800 system already assembled
- Front bezel assembly—P/N 70-33178-01
- Poly bag containing mounting hardware

The mounting hardware consists of the following items:

Mounting Hardware	Part Number
Four slide brackets	74-51454-01
Two front mounting brackets	74-51572-01
One actuator trip bracket	74-51571-01
Four nut bars	74-51531-01
Six M4 x 6 mm pan head screws	N/A
Eleven M4 x 10 mm pan head screws	90-40005-06
Sixteen 10-32 X 0.5 truss head screws	90-00063-39
Six 10-32 U-nuts	90-07786-00
Four M4 kepnuts	90-40203-02

In addition, the shipping box includes the following items to be secured to the cabinet or mounted on the system:

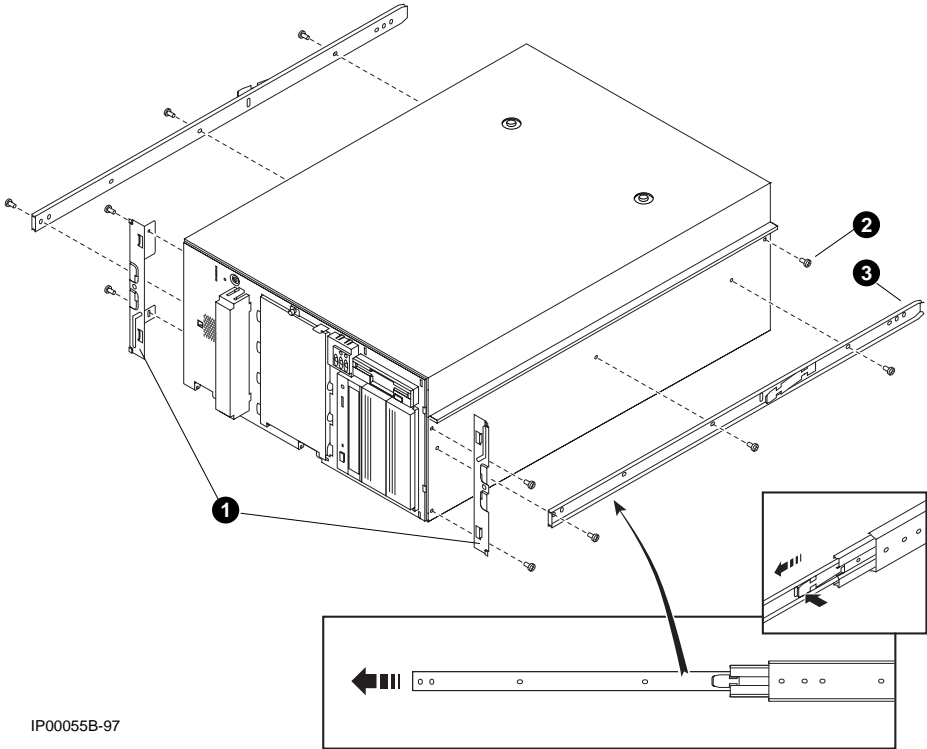
- One front bezel
- Two chassis slides
- One cable management bracket
- One actuator stabilizer bracket
- One actuator latch

You need to do preinstallation work to prepare the system for mounting into the cabinet.

2.2 Preparing the System

Prepare the system as described in the following procedure. Use Figure 2-2 as a guide.

Figure 2-2 Preparing the System for Rackmount



Prepare the system as follows:

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

1. Attach a front mounting bracket ❶ to each side of the system using two M4 x 10 mm screws per bracket.
2. Tighten an M4 x 10 mm screw at the back end of the right side of the system. ❷
3. Pull the narrow segment ❸ of the chassis slide out of a chassis slide and detach it completely by pressing down the retainer spring ❹ and continuing to pull. Position the chassis slide track so that the end of the chassis slide with three holes ❺ will stick out past the system. Secure the chassis slide track to the system with three M4 x 6 mm screws. ❻

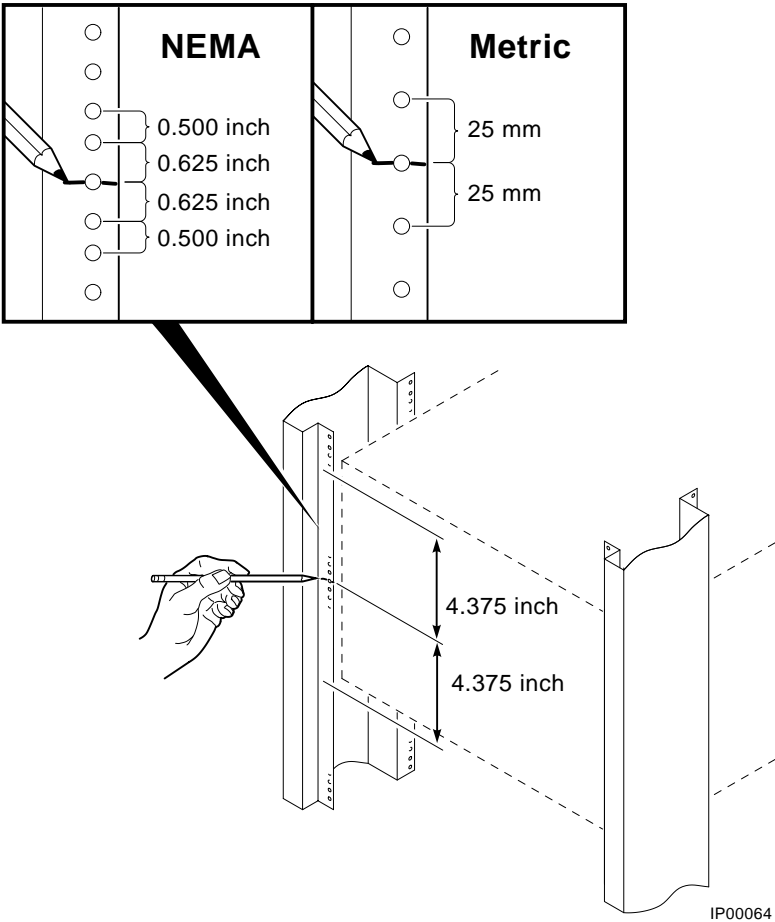
Repeat the step for the other chassis slide.

The system is now ready for installation.

2.3 Marking the Installation Area in the Cabinet

Determine the installation area as shown in Figure 2-3.

Figure 2-3 Rackmount Installation Area



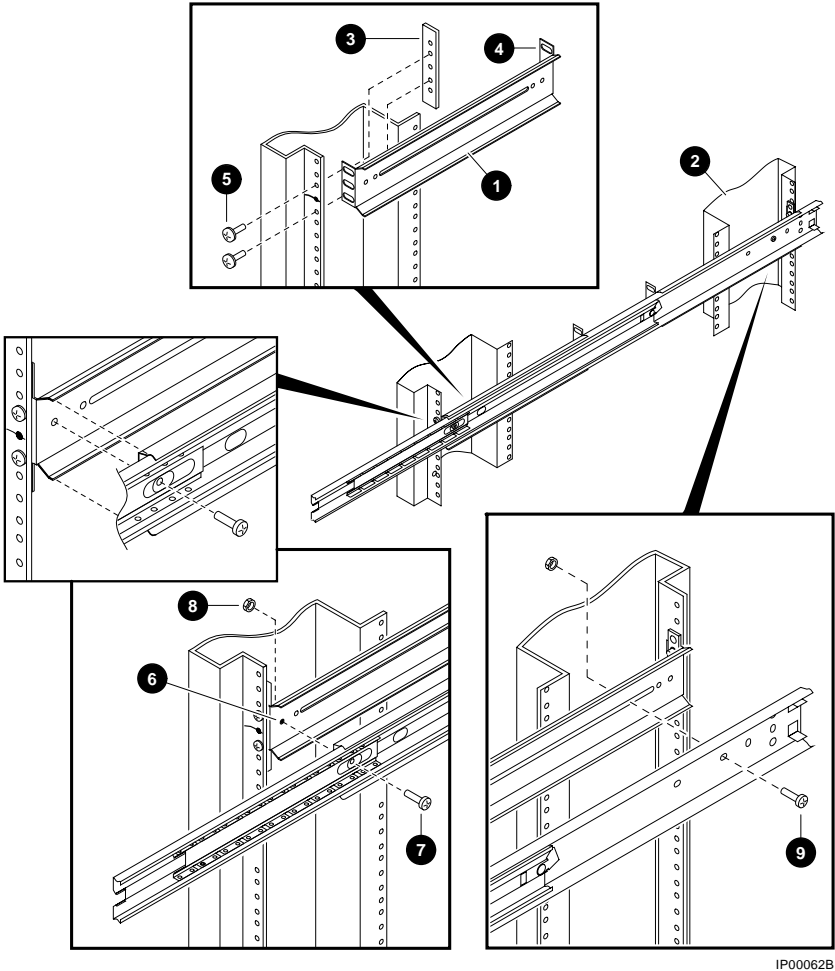
The installation of the rackmount system requires 8.75 inches (5U) of vertical height in the cabinet.

1. Mark the midpoint hole on the vertical rail as shown in Figure 2-3. 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.

2.4 Preparing the Cabinet

Prepare the cabinet as described in the following procedure. Use Figure 2-4 as a guide.

Figure 2-4 Preparing the Cabinet for Rackmount



Prepare the cabinet as follows:

1. Attach slide brackets to the cabinet rails.

Attach slide bracket ❶ to each of the four vertical rails of the cabinet ❷ using two 10-32 screws and one nut bar ❸ per slide bracket. The slide bracket installs behind the vertical rail of the cabinet and the nut bar installs behind the slide bracket, as shown in Figure 2-4.

NOTE: The chassis slide bracket has two dissimilar ends. Flip the bracket and use the other end for larger hole spacing of 25 mm. ❹

Locate the middle hole of the slide bracket and nut bar to the midpoint hole marked on the vertical rail of the cabinet in Section 2.3. Tighten 10-32 screws ❺ in the hole above and below the marked midpoint hole, leaving the midpoint hole empty.

Attach the other three brackets to the rails in the same manner.

2. Attach chassis slides to the slide brackets.

Place the chassis slide into two brackets. Pull the inner slide out until the forwardmost hole in the stationary segment of the chassis slide is exposed. Aligns this hole with the forwardmost hole in the chassis slide bracket ❻. Note that this happens when the stationary segment, the front of the slide bracket, and the mounting surface of the vertical rail are vertically aligned. Fasten one M4 x 10 mm screw ❼ and kepnut ❸. Place another M4 x 10 mm screw ❽ through a hole in the stationary segment of the chassis slide and the slot in the rear mounted slide bracket, and attach with a kepnut.

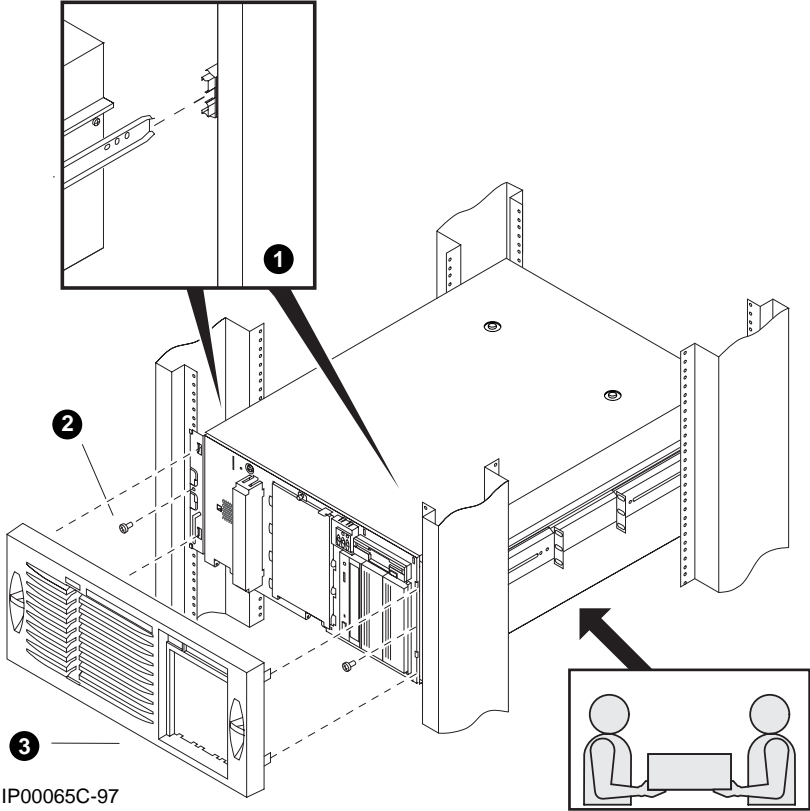
3. Repeat the procedure for the other slide

The cabinet is now ready for the installation of the system.

2.5 Installing the System

Install the system as described in the following procedure. Use Figure 2-5 as a guide.

Figure 2-5 Installing the System



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

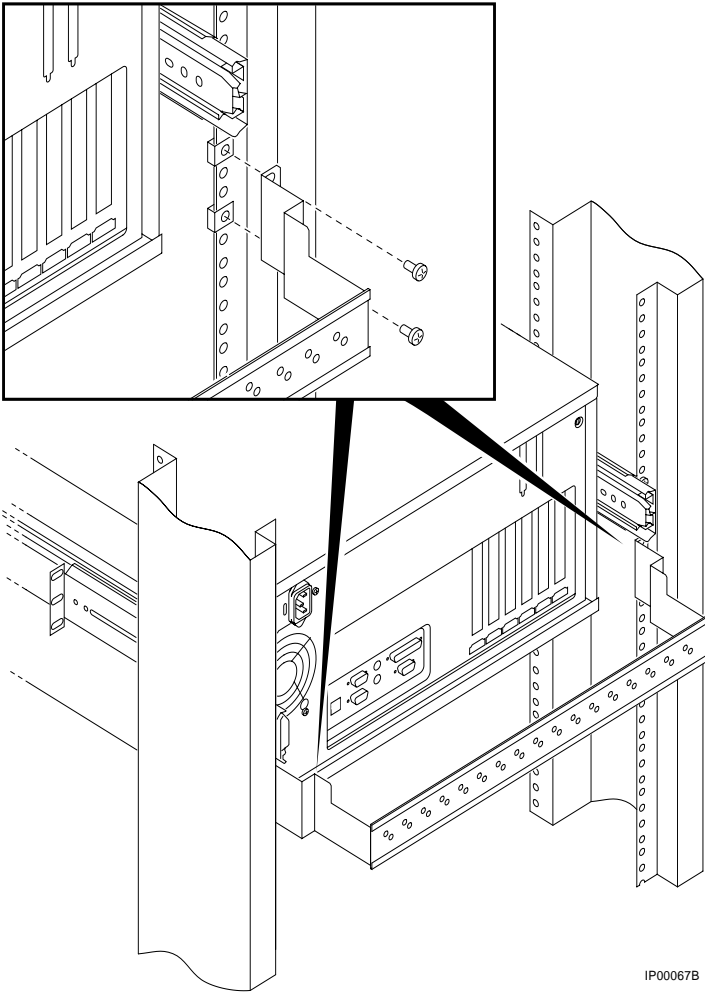
CAUTION:

- 1. Make sure that all devices are pushed into the cabinet and no device is disengaged.*
 - 2. Activate the stabilizer foot of the cabinet, if the cabinet is so equipped, or provide other means to stabilize the cabinet before installation of the system.*
 - 3. The system is heavy. It should 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 cabinet ❶. Slide the system into the cabinet. Depress the retainer spring on both slides to slide the system completely into the cabinet. Tighten the system to the chassis slides with two 10-32 screws ❷ one on each side.
 2. Align the front bezel ❸ with the front of the system and snap it in place.

2.6 Installing the Cable Management Bracket

Install the cable management bracket to the rear rails of the cabinet as described in the following procedure. Use Figure 2-6 as a guide.

Figure 2-6 Installing the Cable Management Bracket



IP00067B

The cable management bracket has 1.75-inch (1U) spacing (bottom hole to top hole) and 25 mm spacing (bottom hole to middle hole).

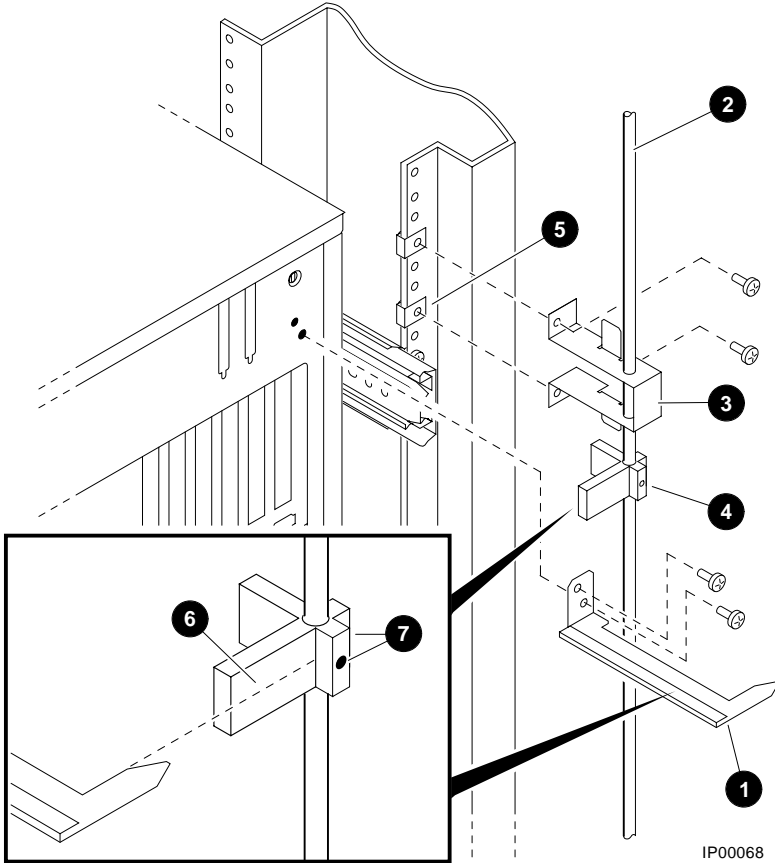
Install the cable management bracket to the rear of the cabinet with four 10-32 U-nuts and four 10-32 screws.as follows:

1. Clip U-nuts over the holes in the vertical rail corresponding to the holes in the cable management bracket (two per vertical rail).
2. Attach the cable management bracket to the cabinet with four 10-32 screws.

2.7 Installing the Interlock Mechanism

The interlock system helps prevent cabinet instability by allowing only one system drawer at a time to be pulled out of the cabinet. These parts only work in a DIGITAL cabinet equipped with the interlock system. If another type of cabinet is used, the installer must ensure cabinet stability. Install the interlock mechanism as described in the following procedure, using Figure 2-7 as a guide.

Figure 2-7 Installing the Interlock Mechanism



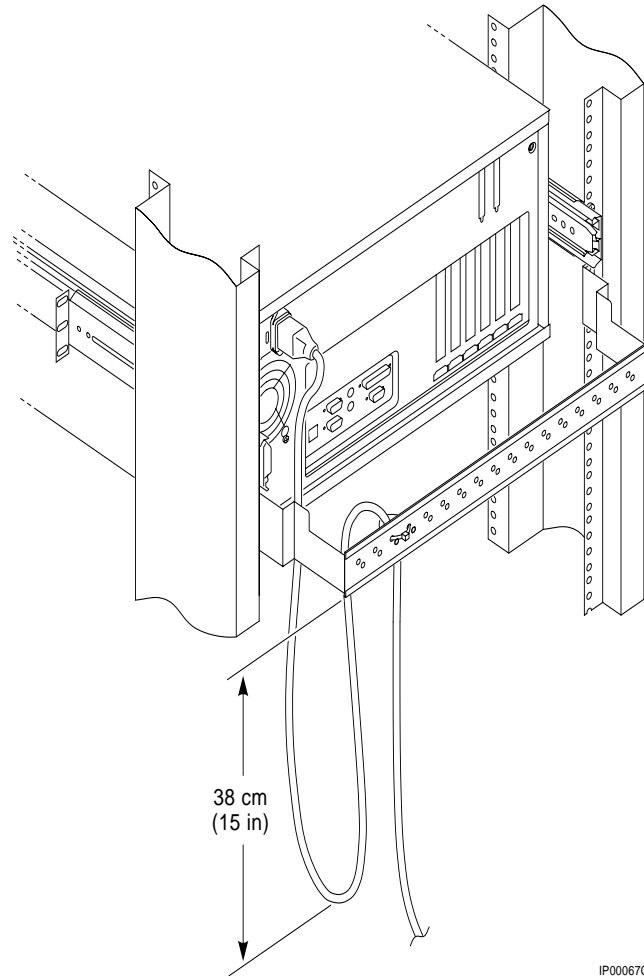
Install the system into the interlock mechanism of the cabinet as follows:

1. Install the actuator trip bracket ❶ on the rear of the system with two M4x10 mm screws.
2. Free up the vertical bar ❷ of the interlock mechanism.
3. Insert the stabilizer bracket ❸ and the actuator ❹ latch onto the vertical bar so that the actuator latch is below the stabilizer bracket.
4. Insert the vertical bar back in place.
5. Install a U-nut ❺ onto the vertical rail in the second hole above the screw attaching the slide bracket to the cabinet rail.
6. Install a second U-nut three holes above the first.
7. Secure the stabilizer bracket to the cabinet rail with two 10-32 screws.
8. Vertically position the actuator latch such that the trip bracket aligns with the center of the actuator latch. ❻
9. Rotationally orient the actuator latch like all the other actuator latches on the vertical bar
10. Tighten the Allen screws ❼ on the actuator latch.

2.8 Connecting the Cables

When making the cable connections, make sure to leave approximately a 76-cm (30-inch) long segment of cable free so that the system can slide forward. See Figure 2-8.

Figure 2-8 Cable Loop at the Rear of the System



IP00067C

Make the cabinet rear connections as follows:

1. Attach a rear cable first to the cabinet 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 cabinet.
2. Plug in the connectors.

Chapter 3

Installing the System

This chapter explains how to set up and install your system. The following topics are discussed:

- System Setup Overview
- Selecting a System Location
- Identifying Accessories
- Connecting the System
- Connecting to Network Hardware
- Locking Your System

3.1 System Setup Overview

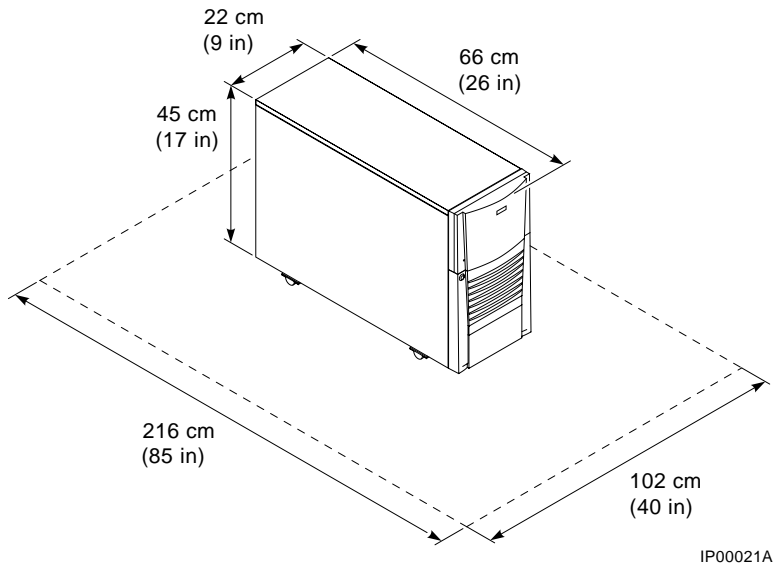
The following list summarizes the steps for setting up your system. The steps may vary depending on the options in your system.

1. Select a location for the system, giving consideration to service access, environmental conditions, and power requirements.
2. Confirm that you have all the desired accessories that ship with the system and any additional accessories you may want to add.
3. Connect the keyboard, mouse, printer, and monitor or terminal.
4. Connect to the network hardware.
5. Verify your hardware setup.

3.2 Selecting a System Location

When choosing a system location, keep in mind the environmental conditions and power requirements for the system. Figure 3-1 shows the system dimensions and the clearance needed to access the system for servicing.

Figure 3-1 System Dimensions and Service Area



3.2.1 Environmental Conditions

Table 3-1 lists the environmental conditions in which the system operates.

Table 3-1 Environmental Conditions

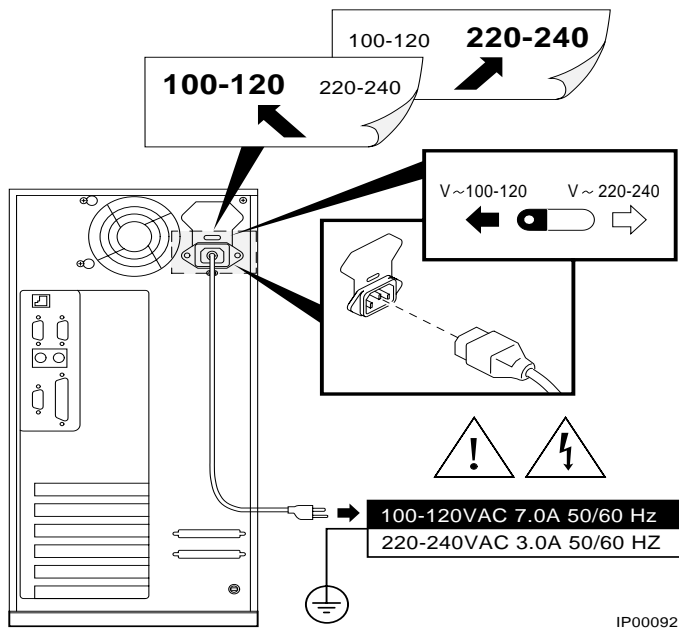
Condition	Specification
Temperature range (pedestal systems)	Room temperature: Between 10° C and 40° C (50° F and 104° F).
Temperature range (rackmount systems)	Room temperature: Between 10° C and 35° C (50° F and 95° F).
Relative humidity	Between 10% and 90% (20% to 80% with removable media options).
Air circulation	Allow a minimum clearance of 15 cm (6 inches) at the rear of the system to allow for air exhaust and cable egress. Allow 70 cm (27 inches) at the front for system access and air intake.

3.2.2 Power Requirements

Your system is factory-set to the voltage indicated on the yellow label over the receptacle. After removing the label, verify that the voltage setting is correct for this installation. Figure 3-2 shows the power supply requirements and connection.

CAUTION: Powering the system on with the wrong power setting may cause damage to the power supply.

Figure 3-2 Power Supply Requirements



NOTE: Current ratings are maximum with a fully loaded system and do not include a monitor or terminal.

3.3 Identifying Accessories

Standard Accessories

Figure 3-3 shows the accessories that are included with the system. Table 3-2 describes the accessories.

Optional Accessory

An optional accessory that you may need for your modem is the 9-pin to 25-pin PC to modem cable.

Figure 3-3 System Accessories

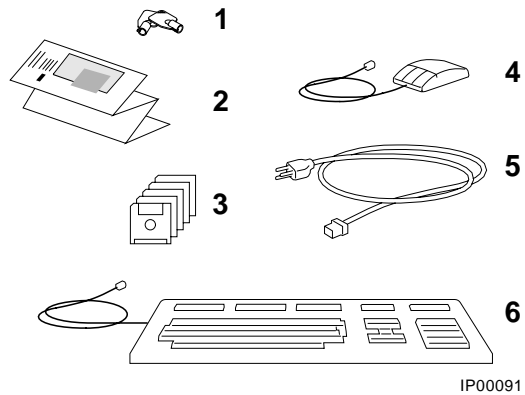


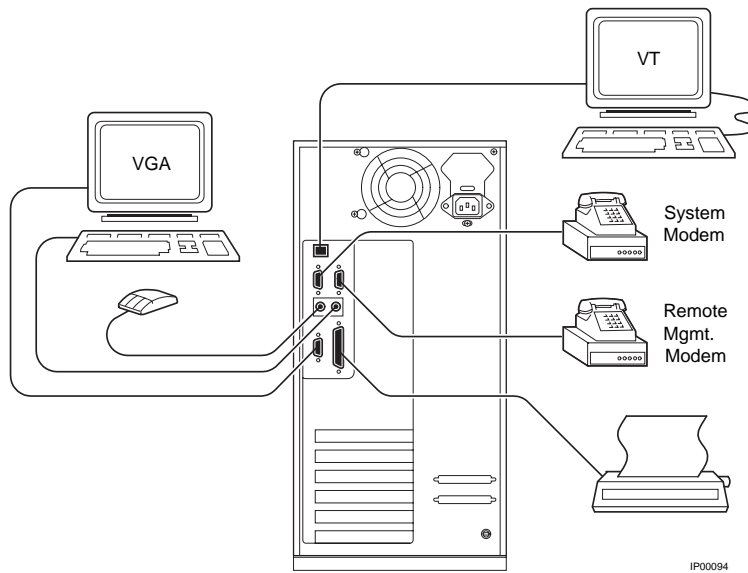
Table 3-2 System Accessories

Accessory	Description
① Pedestal system unit keys (2)	Locks and unlocks the pedestal lower door
② <i>User's Guide and Installation Card</i>	Installation and operation information
③ EISA Configuration Utility kit	Runs the EISA Configuration Utility
④ Mouse	PS/2-style, 3-button mouse
⑤ Power cord	Connects AC power to power supply
⑥ Keyboard	104 key keyboard (for DIGITAL UNIX and Windows NT systems); 108 key keyboard (for OpenVMS systems)

3.4 Connecting the System

Connect the parts of the system as shown in Figure 3-4.

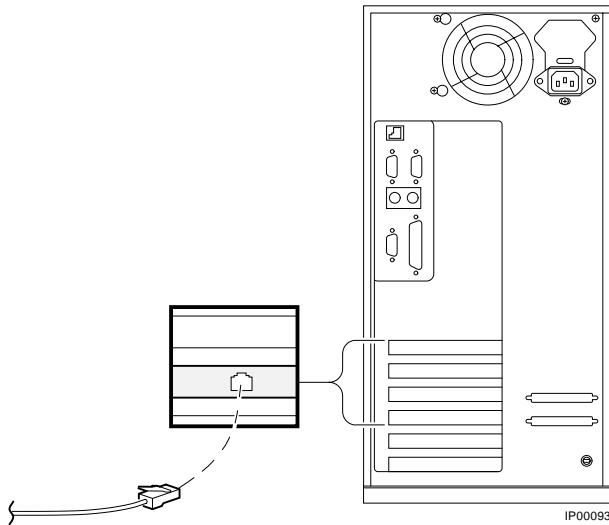
Figure 3-4 System Connections



3.5 Connecting to Network Hardware

Your system supports various network options. Generally, the system is configured with 10/100Base-T Ethernet networks as shown in Figure 3-5. With appropriate options, you can also connect to ThinWire, FDDI, and AUI Ethernet, and token ring networks.

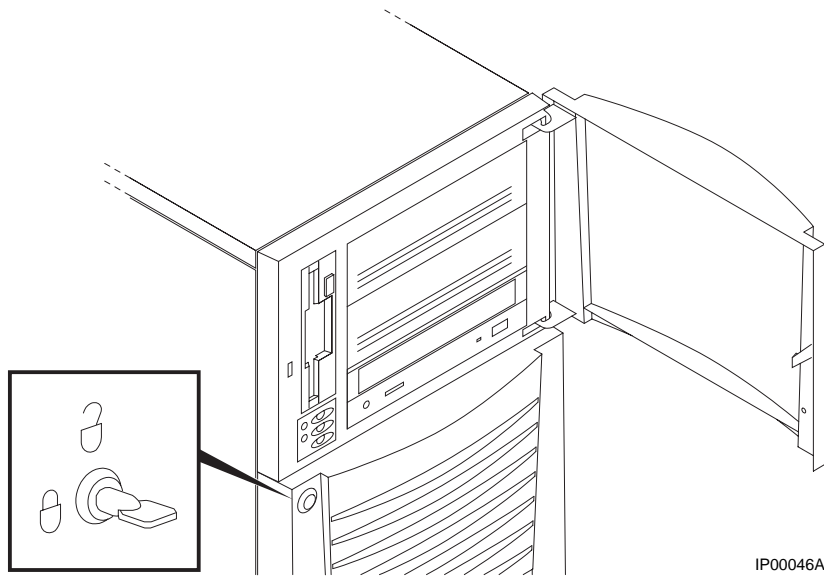
Figure 3-5 Network Connections



3.6 Locking Your System

Pedestal systems are protected by a key lock located on the lower front door that prevents unauthorized access. The removable media devices and the system control panel are always accessible through the upper front door as show in Figure 3-6. The figure shows the door in the locked position.

Figure 3-6 System Lock and Key



A hole in the back provides additional security by allowing you to attach the system unit to a post or other fixed object using a Kensington lock.

Chapter 4

Operating the System

This chapter explains how to start and stop your system. It assumes that you have set up the hardware and made all necessary connections. Sections in this chapter are:

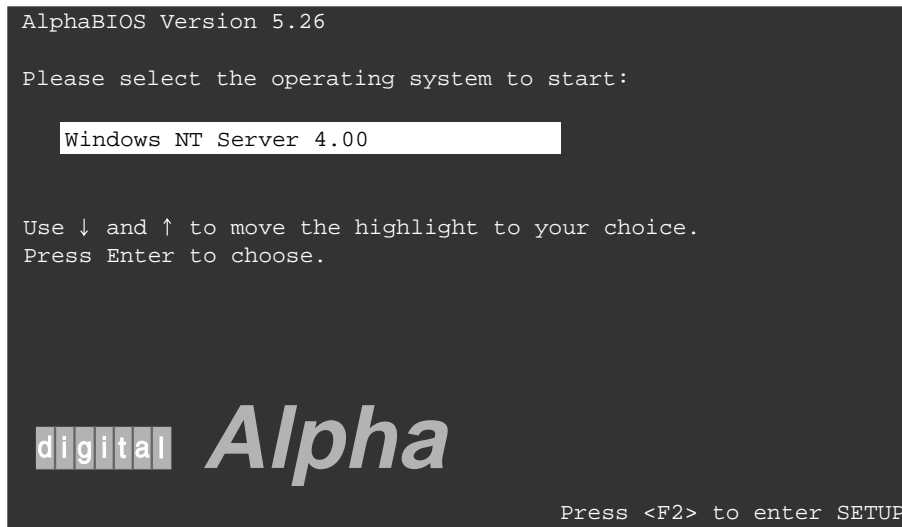
- Powering Up the System
- Booting DIGITAL UNIX
- Booting OpenVMS
- Booting Windows NT
- Booting the Operating System for the First Time
- Powering Off the System

An integrated server management console allows the user to monitor and control the system remotely. The operation of the remote management console is discussed in Chapter 8.

4.1 Powering Up the System

Press the On/Off button on the control panel. The button stays depressed in the "On" position and the green On/Off indicator on the front of the system lights.

Figure 4-1 Windows NT Power-Up Display



PK-0728A-96

Example 4-1 DIGITAL UNIX and OpenVMS Power-Up Display

```
ff.fe.fd.fc.fb.fa.f9.f8.f7.f6.f5.ef.df.ee.f4.  
probing hose 0, PCI  
probing PCI-to-EISA bridge, bus 1  
bus 0, slot 5 -- pka -- QLogic ISP1020  
bus 0, slot 6 -- vga -- S3 Trio64/Trio32  
bus 0, slot 11 -- ewa -- DECchip 21041-AA  
bus 0, slot 12 -- pkb -- DEC KZPSA  
bus 0, slot 13 -- dra -- Mylex DAC960  
ed.ec.eb.....ea.e9.e8.e7.e6.e5.e4.e3.e2.e1.e0.  
X4.7-3046, built on Dec 4 1996 at 01:56:52  
Memory Testing and Configuration Status  
128 Meg of System Memory  
Bank 0 = 64 Mbytes(16 MB Per DIMM) Starting at 0x00000000  
Bank 1 = 64 Mbytes(16 MB Per DIMM) Starting at 0x04000000  
  
Testing the System  
Testing the Disks (read only)  
Testing the Network  
Change mode to Internal loopback.  
Change to Normal Operating Mode.
```

First Time Power On

Make sure to do the following before you power on the system for the first time:

1. Connect any external options, such as monitors or terminals, or expansion boxes that house storage devices.
2. Ensure that the voltage switch in the back of the unit is set to the outlet voltage.
3. Plug the power cord into the outlet.
4. Turn on any external options that are connected to the system.

Power On

Press the control panel On/Off button to the “On” position. The green LED lights.

The screen on your monitor or terminal displays test codes and initialization messages. When the startup procedure is complete, the screen displays the SRM console prompt or the AlphaBIOS Boot menu, depending on how the **os_type** environment variable has been set.

To display any messages that may have scrolled by during the SRM start-up procedure, enter the **cat el** command or **more el** command at the console prompt. The **more el** command lists the contents of the event log file one screen at a time.

A normal power-up gives a single beep. A sequence of beeps during start-up indicates errors.

Boot Sequence

If the **auto_action** environment variable is set to **boot** or **restart** and the **os_type** environment variable is set to **unix** or **openvms**, the DIGITAL UNIX or OpenVMS operating system boots.

If the system is running the Windows NT operating system (the **os_type** environment variable is set to **nt**), the SRM console loads and starts the AlphaBIOS console.

Startup Test Fail

If the system fails the startup tests, do the following:

1. Turn the system unit off, wait approximately 15 seconds, and then turn it on again.
2. If the system continues to fail the startup tests, or emits error beep codes and halts, refer to Chapter 11, Troubleshooting, for possible reasons.

4.2 Booting DIGITAL UNIX

DIGITAL UNIX® can be booted from a local disk, a disk connected through a cluster, or a remote disk through an Ethernet connection.

Example 4-2 Booting DIGITAL UNIX from a Local Device

```
>>> show device ❶
dka200.2.0.5.0          DKA200          RZ28M-S  0526
dka400.5.0.5.0          DKA400          RRD45   1645
dkc0.0.0.2003.0         DKC0            RZ25    0900
dva0.0.0.1000.0         DVA0
ewa0.0.0.2000.0         EWA0            08-00-2B-E5-CC-B1
ewb0.0.0.12.0           EWB0            00-00-F8-02-5C-D9
pka0.7.0.5.0            PKA0            SCSI Bus ID 7  2.10
pkb0.7.0.2002.0         PKB0            SCSI Bus ID 7  2.10
pkc0.7.0.2003.0         PKC0            SCSI Bus ID 7  2.10
pkd0.7.0.13.0           PKD0            SCSI Bus ID 7

>>>boot dka400 ❷
(boot dka400.5.0.5.0 -flags A)
Building FRU table
block 0 of dka400.5.0.5.0 is a valid boot block
reading 16 blocks from dka100.1.0.5.0
bootstrap code read in
base = 1c8000, image_start = 0, image_bytes = 2000
initializing HWRPB at 2000
initializing page table at 13ff0000
initializing machine state
setting affinity to the primary CPU
jumping to bootstrap code

Digital UNIX boot - Mon Jan 27 19:35:15 EST 1997 ❸

Loading vmunix ...
.
.
.
The system is ready.

Digital UNIX Version V4.0 (les058.dec.com) console
login:
```

- ❶ The **show device** command displays device information. For some device types, the full device name is required. (These are devices that have bus node numbers and channel numbers that are other than 0.) See Section 6.2 for a description of the **show device** command and the device naming convention.
- ❷ In Example 4–2, **dk** is the device code of the boot device, **a** is the boot device controller designation, and **400** specifies the unit number of the boot device.
- ❸ The operating system banner displays.

The **boot** command accepts the name of a boot device, a file name through the **-file** qualifier, and boot flags through the **-flags** qualifier. The environment variables **bootdef_dev**, **boot_osflags**, and **boot_file** can also be used to specify the default boot device or device list, flag information, and the default boot file. If the qualifiers and the environment variables are both used, the qualifiers in the command string override the environment variables.

4.3 Booting OpenVMS

OpenVMS can be booted from a local disk, a disk connected through a cluster, or a remote disk through an Ethernet connection.

Example 4-3 Booting OpenVMS

```
>>> show device
dka200.2.0.5.0          DKA200          RZ28M-S  0526
dka400.4.0.5.0          DKA400          RRD45   1645
dkc0.0.0.2003.0        DKC0            0900
dva0.0.0.1000.0        DVA0
ewa0.0.0.2000.0        EWA0           08-00-2B-E5-CC-B1
ewb0.0.0.12.0          EWB0           00-00-F8-02-5C-D9
pka0.7.0.5.0           PKA0           SCSI Bus ID 7  2.10
pkb0.7.0.2002.0        PKB0           SCSI Bus ID 7  2.10
pkc0.7.0.2003.0        PKC0           SCSI Bus ID 7  2.10
pkd0.7.0.13.0          PKD0           SCSI Bus ID 7
>>> sho boot *
boot_arg0              0
boot_arg1
boot_dev                dka200.2.0.5.0
boot_file
boot_osflags            0
boot_reset              ON
bootdef_dev             dka4000.4.0.5.0
booted_dev
booted_file
booted_osflags
```

Continued on next page

Example 4-3 Booting OpenVMS (Continued)

```
>>> boot ❸
.
.
.

CPU 0 booting ❹

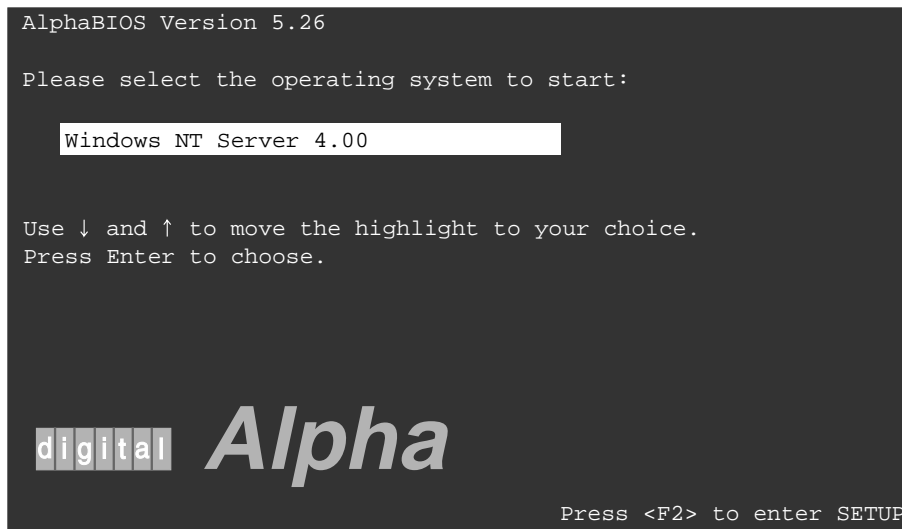
(boot dka4.4.0.5.0 -flags 0)
Building FRU table
block 0 of dka4.4.0.5.0 is a valid boot block
reading 1002 blocks from dka4.4.0.5.0
bootstrap code read in
base = 200000, image_start = 0, image_bytes = 7d400
initializing HWRPB at 2000
initializing page table at 1f2000
initializing machine state
setting affinity to the primary CPU
jumping to bootstrap code
.
.
.
OpenVMS (TM) Alpha Operating System, Version V7.1 ❺
$
```

- ❶ The **show device** command displays device information. For some device types, the full device name is required. (These are devices that have bus node numbers and channel numbers that are other than 0.) See Section 6.2 for a description of the **show device** command and the device naming convention.
- ❷ The **show boot *** command lists all environment variables that begin with the string “boot.” In this example, a default boot device, dka4.4.05.0, has already been set.
- ❸ The **boot** command needs no device specified, since a default boot device has been set.
- ❹ In this example the **boot_reset** environment variable is set to “on,” so when the system initializes, it displays the power-up/initialization trace.
- ❺ The operating system banner displays.

4.4 Booting Windows NT

Microsoft Windows NT is started from the AlphaBIOS Boot screen.

Figure 4-2 AlphaBIOS Boot Screen



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The setting of the SRM **os_type** environment variable determines if AlphaBIOS is loaded and started on reset and power-up. If **os_type** is set to **nt**, after the power-up display the SRM console is loaded and started, and it then loads and starts the AlphaBIOS console. AlphaBIOS must be running before Windows NT can be booted.

The method used for booting Windows NT is determined by the setting of **Auto Start** in the AlphaBIOS **Standard CMOS Setup** screen (Chapter 7).

- If **Auto Start** is enabled, the primary version of Windows NT starts automatically.
- If **Auto Start** is disabled, use the arrow keys to select the Windows NT version to start. Press Enter to boot Windows NT.

*NOTE: The SRM **console** environment variable must be set to **graphics** before booting Windows NT. (This setting is not necessary to run AlphaBIOS.) If the Halt button is in (the LED on the button is lit), the SRM console will not load AlphaBIOS. This is true even when the **os_type** environment variable is set to **nt**.*

4.5 Booting the Operating System for the First Time

Depending on your particular situation, you may need to perform some of the tasks listed below before booting the operating system.

- Run the EISA Configuration Utility.
- Check required environment variable settings.
- Change the way your system powers up or boots.
- Verify the system configuration.

Running the EISA Configuration Utility

If you have added, removed, or moved an EISA or ISA card, you must run the EISA Configuration Utility before booting the operating system. Refer to Chapter 7 on how to run a configuration utility.

Checking Required Environment Variable Settings

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

Operating system	set os_type
Ethernet device type	set ew*0_mode
Speed for Fast SCSI devices	set pk*0_fast
Boot device	set bootdef_dev
Boot flags	set boot_osflags
Network protocols	set ew*0_protocols

Verifying the System Configuration

Use the following SRM console commands to verify system configuration for DIGITAL UNIX and OpenVMS systems.

show config	Displays the buses on the system and the devices found on those buses.
show device	Displays the bootable devices and controllers in the system.
show memory	Displays main memory configuration.
set and show	Sets and displays environment variable settings.

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

You can also list options recognized by your system by entering SRM commands described in Chapter 6. To enter these commands, you must switch from the Windows NT (AlphaBIOS) console to the DIGITAL UNIX and OpenVMS (SRM) console. See Chapter 7 on switching to the DIGITAL UNIX and OpenVMS console.

NOTE: Switch back to the Windows NT (AlphaBIOS) console before booting the Windows NT operating system.

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

Do the following steps to turn the system off:

1. Shut down the operating system, 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.

Reconfiguring the System

This chapter covers the following topics:

- AlphaBIOS Console Configuration Options
- SRM Console Configuration Commands
- Memory Configuration
- Network Configuration
- EISA and ISA Options
- EISA Configuration Utility (ECU)
- Running ECU
- Configuring EISA and ISA Options
- PCI Option Cards
- Determining SCSI Storage Device IDs
- Onboard SCSI Bus Configuration
- Updating Firmware

Your system comes equipped with a 101-key enhanced keyboard that allows you to communicate with your system by entering data or commands. Note that some European language keyboards have 102 keys. Use the AlphaBIOS Setup menu to change the keyboard configuration. Refer to your operating system or application software documentation for software-specific key functions.

Several SRM console commands or 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.

5.1 AlphaBIOS Console Configuration Options

Menu options are used to obtain information about the system.

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

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

Example 5-1 shows a sample of the Display System Configuration display.

Example 5-1 System Configuration Display

```
Systemboard Configuration
Hard Disk Configuration
PCI Configuration
Eisa Configuration
SCSI Configuration
MC Bus Configuration
Memory Configuration
Integrated Peripherals

System Type:  AlphaServer 800 Family

Processor:  Digital Alpha 21164, Revision 4.0 (1 Processor)
Speed:     400 MHz
Memory:    256 MB

Floppy Drive A:  3.5" 1.44 MB
Floppy Drive B:  None
Keyboard:       U.S. 101-key keyboard

AlphaBIOS Version:  5.26

ESC=Exit
```

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Going through each item of the System Configuration Display menu, you can examine how each part of your system is configured. Refer to Chapter 7 for details of system configuration displays.

NOTE: You can also list options recognized by your system by entering the DIGITAL UNIX and OpenVMS commands described in the next section, SRM Console Configuration Commands. To enter these commands, you must switch from the Windows NT (AlphaBIOS) console to the DIGITAL UNIX and OpenVMS (SRM) console. Refer to Chapter 7 for information about switching to the DIGITAL UNIX and OpenVMS (SRM) console.

Remember to switch back to the AlphaBIOS console before booting the Windows NT operating system.

5.2 SRM Console Configuration Commands

SRM console commands are used to obtain information about the system.

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

show config	Displays the buses on the system and the devices found on those buses.
show device	Displays the bootable devices and controllers in the system.
show memory	Displays main memory configuration.
set and show	Sets and displays environment variable setting.

Example 5-2 Show Config Command

```
>>> show config
                                     Digital Equipment Corporation
                                     AlphaServer 800 5/400
                                     ❶

Firmware
SRM Console:  V4.8
ARC Console:  5.26
PALcode:     VMS PALcode V1.19-2, OSF PALcode V1.21-4
Serial Rom:   X0.4

Processor
DECchip (tm) 21164A-1 400MHz

System
Motherboard Revision: 0
                                     ❷

Memory
128 Meg of System Memory
Bank 0 = 64 Mbytes(16 MB Per DIMM) Starting at 0x00000000
Bank 1 = 64 Mbytes(16 MB Per DIMM) Starting at 0x04000000
                                     ❸

Slot  Option                               Hose 0, Bus 0, PCI
 5    QLogic ISP1020                        pka0.7.0.5.0      SCSI Bus ID 7
                                           dka100.1.0.5.0    RZ28M-S
                                           dka200.2.0.5.0    RZ28M-S
                                           dka500.5.0.5.0    RRD45

 6    S3 Trio64/Trio32
 7    Intel 82375EB                          Bridge to Bus 1,
```

Example 5-2 Show Config Command (Continued)

```
EISA
 11  DECchip 21041-AA      ewa0.0.0.11.0      00-00-F8-02-5C-D2
 12  DEC KZPSA            pkb0.7.0.12.0      SCSI Bus ID 7
                                dkb100.1.0.12.0    RZ28
                                dkb400.4.0.12.0    RZ28D
                                dkb600.6.0.12.0    RZ28
 13  Mylex DAC960        dra0.0.0.13.0
                                dra0.0.0.13.0      1 Member JBOD
                                dra1.0.0.13.0      1 Member JBOD

Slot  Option                Hose 0, Bus 1, EISA      4
>>>
```

The **show config** command displays all devices found on the system bus, PCI bus, and EISA bus. You can use the information in the display to identify target devices for commands such as **boot** and **test**, as well as to verify that the system sees all the devices that are installed.

The configuration display includes the following information:

- ❶ Version numbers for the firmware code, PALcode, SROM chip, and CPU
- ❷ Memory size and configuration for each bank of memory
- ❸ PCI bus information:
 - PCI slot 1—SCSI controller on backplane, along with storage drives on the bus
 - PCI slot 2—PCI option module
 - PCI slot 3—PCI option module
 - PCI slot 4 or EISA slot 1—PCI or EISA option module

For storage controllers, the attached devices are also displayed.

- ❹ EISA bus information:
 - EISA slot 1 or PCI slot 4—EISA or PCI option module
 - EISA slot 2
 - EISA slot 3

For storage controllers, the attached devices are also displayed.

Example 5-3 Show Device Command

```
>>> show device
dka100.1.0.5.0      DKA100      RZ28M-S      ❶
dka200.2.0.5.0      DKA200      RZ28M-S
dka500.5.0.5.0      DKA500      RRD45  1645
dva0.0.0.1000.0     DVA0        ❷
ewa0.0.0.1001.0     EWA0        08-00-2B-3E-BC-B5  ❸
ewb0.0.0.11.0       EWB0        00-00-C0-33-E0-0D  ❹
ewc0.0.0.13.0       EWC0        08-00-2B-E6-4B-F3
pka0.7.0.5.0        PKA0        SCSI Bus ID 7  2.10  ❺
>>>
```

The **show device** command displays status for the devices and controllers in the system. 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.

The devices displayed are:

- ❶ SCSI drive
- ❷ CD-ROM drive
- ❸ Diskette drive
- ❹ Ethernet port
- ❺ SCSI bus

Device naming follows certain conventions. See Displaying System Configuration, Chapter 6, for the interpretation of device names.

Example 5-4 Show Memory Command

```
>>> show memory
64 Meg of System Memory
Bank 0 = 64 Mbytes (16 MB Per Dimm) Starting at 0x00000000
Bank 1 = No Memory Detected
```

The **show memory** command displays information for each memory card.

Example 5-5 Set and Show Commands

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

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

CAUTION: Environment variables must be entered exactly as shown, not abbreviated, to be recognized by the system.

The syntax is:

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

```
show envar
```

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

value The value that is assigned to the environment variable.

Options:

-default Restores variable to its default value.

-integer Creates variable as an integer.

-string Creates variable as a string (default).

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

Example:

```
>>> set os_type NT
```

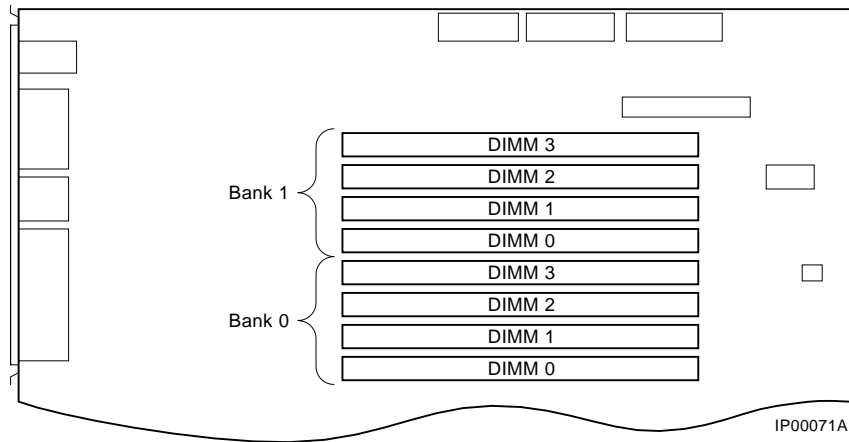
```
>>> init
```

Remember to switch back to the AlphaBIOS console to boot the Windows NT operating system.

5.3 Memory Configuration

The AlphaServer 800 system supports 3.3 volt, dual-in-line memory modules (DIMM) on the motherboard, providing from 32 Mbytes to 2 Gbytes of ECC-protected RAM.

Figure 5-1 Memory Banks



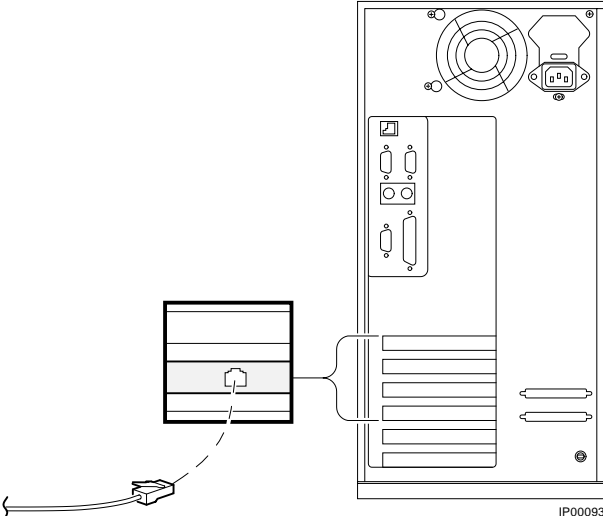
WARNING: Before installing a memory module, turn off all power to the system.

The DIMM modules are grouped in two memory banks, each consisting of four modules. Figure 5-1 shows the memory bank groupings on the system board. A minimum of one memory bank (4 modules) is required.

5.4 Network Configuration

Connect your system to networks as explained in this section.

Figure 5-2 Network Connections



Your system supports various Ethernet network options. Generally, the system is configured with 10/100 Fast ThinWire, AUI, or 10/100Base-T 100Base-T Ethernet networks as shown in Figure 5-2. With the correct option, you can also connect to FDDI and token ring networks.

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

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

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

```
>>> set ewa0_mode twisted-pair    (10BASE-T/twisted-pair network)
>>> set ewa0_mode full           (full duplex, twisted-pair network)
>>> set ewa0_mode aui            (AUI/standard network)
>>> set ewa0_mode bnc           (ThinWire network)
>>> set ewa0_mode fast
>>> set ewa0_mode fastFD        (full duplex)
>>> set ewa0_mode auto-negotiate
```

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

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

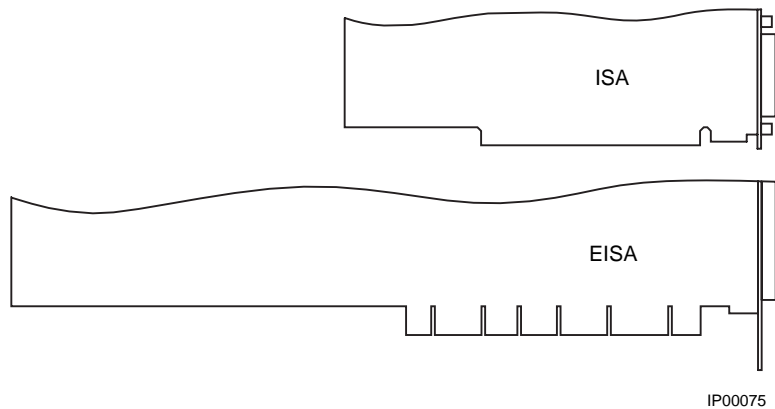
CAUTION: Modes for all network devices should be reassigned whenever a network device is moved, installed, or removed because associations between devices and the device names and modes they are set to may be altered.

5.5 EISA and ISA Options

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

Figure 5-3 shows EISA and ISA cards. The EISA cards have two interlocking rows of gold contacts, whereas ISA cards have a single row of gold contacts. The cards also differ in size.

Figure 5-3 EISA and ISA Cards



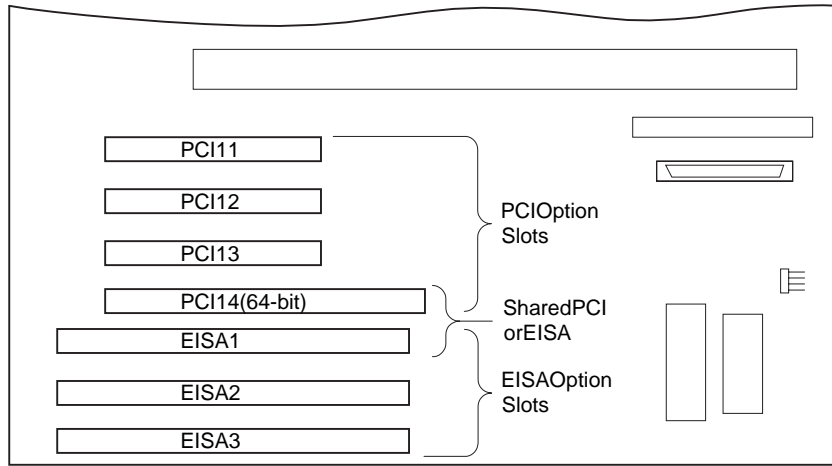
The EISA (Extended Industry Standard Architecture) bus is a 32-bit industry standard input/output bus. EISA is a superset of the well-established 16-bit ISA bus. EISA was designed to accept newer 32-bit components while maintaining compatibility with older 8-bit and 16-bit cards. EISA offers performance of up to 33 MB/sec for cards with bus mastering and DMA capabilities. The motherboard has two dedicated slots for EISA or ISA modules and one EISA/PCI interchangeable slot. EISA slots are bus master slots and can be filled in any order.

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

Figure 5-4 shows the location of EISA and ISA option slots on the system board. To access the slots, 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 top cover while the system is running will shut down the system, with potential loss of data.

Figure 5-4 EISA, ISA, and PCI Option Slots



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For information about installing a specific option, refer to the documentation for that option. For information about configuring an EISA option or an ISA option, refer to later subsections.

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

5.6 EISA Configuration Utility (ECU)

The EISA Configuration Utility updates the configuration of the EISA and ISA cards in your system.

Whenever you add, remove, or move an EISA or ISA card, the EISA Configuration Utility (ECU) must be run. The ECU is a menu-based utility, run from the AlphaBIOS firmware, that provides online help to guide you through the configuration process.

NOTE: The ECU is operating system-specific. Two common causes of system problems are: (1) running the wrong ECU for your operating system; (2) neglecting to rerun the appropriate ECU when changing operating systems.

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

The ECU is supplied on the System Configuration Diskettes shipped with your system. Make copies of these diskettes and keep the originals in a safe place. Use the backup copies when you are configuring the system. The system configuration diskettes must have the volume label SYSTEMCFG.

NOTE: The CFG files supplied with the option you want to install may not work if the option is not supported on your system. Before you install an option, check your system's product literature to verify that your system supports the option.

CAUTION: Turn the system off before you install EISA options.

5.7 Configuring EISA and ISA Options

Configure the EISA options and then the ISA options following the instructions given in this section and subsections.

EISA options are recognized and configured automatically.

NOTE: Do not install ISA cards until after you have run the EISA Configuration Utility for all EISA cards.

To configure an EISA bus that contains no ISA options, follow these steps:

1. Install, move, or remove the EISA option card using the instructions provided with the EISA option.
2. Invoke the console firmware.

For systems running Windows NT:

- a) Insert the ECU diskette into the diskette drive.
- b) From the **Boot** menu, select **Utilities**.
- c) From **Utilities**, select **Run ECU from floppy**.

For systems running DIGITAL UNIX or OpenVMS:

- a) Insert the ECU diskette into the diskette drive.
- b) At the SRM prompt, enter the **ecu** command.

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

Configure the ISA options in the same manner after you have configured the EISA options.

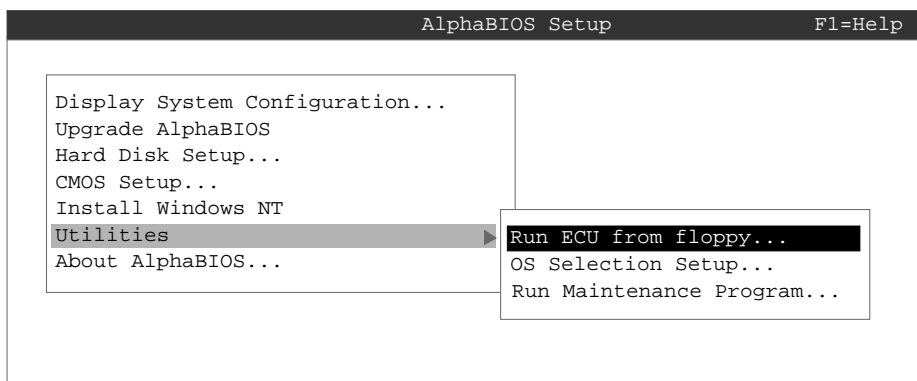
5.7.1 Running ECU

Configuration utilities are run directly from the AlphaBIOS Utility menu. You can also run configuration utilities from the SRM console with the `ecu` command.

To run a configuration utility:

From **AlphaBIOS Setup**, select **Utilities**. From the submenu that is displayed, select **Run ECU from floppy** and press Enter.

Figure 5-5 Run ECU from Floppy Dialog Box



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

5.7.2 Checking Required Environment Variable Settings

Check the environment variables if you are running DIGITAL UNIX or OpenVMS.

You may also want to check that settings for the various elements of the system match your configuration. Table 5-1 gives the SRM console command to reset the environment variable for each element. To see a complete list of environment variables, type **show *** at the SRM console prompt.

Table 5-1 Resetting Environment Variables

Element	Reset Environment Variable
Operating system	set os_type
Ethernet device type	set ew*0_mode
Speed for fast SCSI devices	set pk*0_fast
Boot device	set bootdef_dev
Boot flags	set boot_osflags
Network protocols	set ew*0_protocols

5.7.3 Verifying the System Configuration

Verify system configuration for DIGITAL UNIX and OpenVMS Alpha systems using SRM commands. Use the AlphaBIOS console to verify Windows NT configuration.

Use the following SRM console commands to verify system configuration for DIGITAL UNIX or OpenVMS Alpha systems.

show config	Displays the buses on the system and the devices found on those buses.
show device	Displays the bootable devices and controllers in the system.
show memory	Displays main memory configuration.
set and show	Sets and displays environment variable setting.

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

You can also list options recognized by your system by entering SRM commands described in Chapter 6. To enter these commands, you must switch from the Windows NT (AlphaBIOS) console to the DIGITAL UNIX and OpenVMS Alpha (SRM) console. See Chapter 7 on switching to the DIGITAL UNIX and OpenVMS Alpha console.

NOTE: Switch back to the Windows NT (AlphaBIOS) console before booting the Windows NT operating system.

5.8 PCI Option Cards

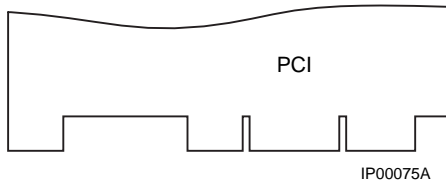
No configuration is required for the PCI option. Install the PCI option following the instructions supplied with the option.

The PCI (Peripheral Component Interconnect) bus is an industry-standard I/O bus that is the preferred connection for high-performance I/O options. The system supports three 32-bit and one EISA/PCI interchangeable 64-bit PCI options.

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

Figure 5-6 shows a PCI option card.

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.

5.9 Determining SCSI Storage Device IDs

Configuring the storage devices on your system requires assigning the correct SCSI IDs according to the type of configuration you choose: single-controller, dual-controller, or triple-controller. Determine SCSI device IDs as explained in this section.

When you add or remove a drive, a tape drive, or hard drives in the removable drive area, you may want to consider how these storage devices are configured and whether you want to reconfigure them. They all reside on one SCSI bus that connects to the system board and to the SCSI backplane. The system configuration determines a unique ID for each device. (The diskette drive has its own dedicated bus and is not included in the SCSI configuration.)

Hard disk drives have their SCSI IDs set automatically according to the slot they are installed in. Devices added to the removable media bus must have their SCSI IDs set to avoid conflict with the hard drives. Table 5–2 gives the ID numbers assigned by the system to the hard drives.

Table 5–2 Hard Drive SCSI ID Numbers

Slot Number Starting from the Left	SCSI Device ID Number
0	0
1	1
2	2
3	3

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

To determine the available SCSI IDs for all SCSI storage devices from the AlphaBIOS console, select **Display System Configuration** from the AlphaBIOS Boot menu, then the **SCSI Configuration**.

To determine the available SCSI IDs for all SCSI storage devices from the SRM console, follow the steps in Table 5–3 and refer to Example 5–6.

Table 5-3 Determining Available SCSI IDs (SRM Console)

Step	Action	Result
1	Enter the show device command to display the SCSI configuration.	The system responds with a display similar to Example 5-6.
2	Examine the ADDR column in the display.	The ADDR column lists the SCSI address of each device connected to the SCSI bus. The first number in the SCSI address is the SCSI ID. It must be a unique number in the range 0 to 6. Any unused SCSI IDs in this range are available for use by the devices that you want to connect to the system.
3	Write down the list of unused SCSI IDs.	

Example 5-6 Determining Device IDs

```
>>> show device
dka400.4.0.6.0      DKA400      RRD46  2893
dva0.0.0.0.1      DVA0
ewa0.0.0.2004.0    EWA0      08-00-2B-E5-6A-41
ewb0.0.0.11.0     EWB0      08-00-2B-E1-03-19
pka0.7.0.2001.0    PKA0      SCSI Bus ID 7  2.10
```

5.10 Updating Firmware

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

You may want to update your system firmware as later versions become available. The Windows NT (AlphaBIOS) firmware and the DIGITAL UNIX and OpenVMS (SRM) firmware reside 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 11, Troubleshooting.)

You can load firmware into the flash ROM from any of the following sources:

- CD-ROM
- Network
- Diskette

5.10.1 Updating Firmware Using the CD-ROM Drive

OpenVMS or DIGITAL UNIX Systems

1. Enter the **show device** command:

```
>>> show device
dka0.0.0.6.0      DKA0          RZ26N-S      440C
dka400.4.0.6.0   DKA400        RRD46
dva0.0.0.0.1     DVA0
ewa0.0.0.2004.0  EWA0          08-00-2B-E5-6A-41
ewb0.0.0.11.0   EWB0          08-00-2B-E1-03-19
pka0.7.0.2001.0  PKA0          SCSI Bus ID 7 2.10
```

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

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

```
>>> boot dka400
```

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

```
UPD> update
```

5. Exit from the Firmware Update Utility.

```
UPD> exit
```

Windows NT System

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

1. Shut down the Windows NT operating system. Turn the system off and 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. Select **Upgrade AlphaBIOS**.
4. Press F10 to update the firmware.
5. When done, press Enter to restart the system with the new firmware.

5.10.2 Updating Firmware Using the Network

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

5.10.3 Updating Firmware Using the Diskette Drive

To update the firmware using the diskette drive:

1. Insert the diskette with the new firmware version in the diskette drive.
2. Enter the following command at the SRM console prompt:

```
>>> boot dva0
```
3. Update the system, entering the following command at the update prompt:

```
UPD> update
```
4. Exit from the Firmware Update Utility.

```
UPD> exit
```

NOTE: To update your system using the SRM console, use a diskette formatted with the Alpha boot block. To update using the AlphaBIOS console, use a FAT formatted diskette.

Chapter 6

Using the SRM Console

The SRM console is the command-line interface that supports the DIGITAL UNIX and OpenVMS operating systems. Sections in this chapter are:

- Invoking the SRM Console
- SRM Console Tasks
- SRM Console Security Features
- SRM Commands
- Environment Variables

The console terminal can be either a graphics monitor or a serial terminal. The graphics monitor is connected to the VGA or TGA module. The serial terminal is connected to the COM1 (MMJ) port.

6.1 Invoking the SRM Console

In a system running the DIGITAL UNIX or OpenVMS Alpha operating system, 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.
- Press the Halt button on the control panel until it engages.

If you are in AlphaBIOS and want to switch to the SRM console, do one of the following steps:

- Press the Halt button on the control panel until it engages.
- Select **SRM** from the **Console Selection** in the Advanced CMOS Setup screen.

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

6.2 SRM Console Tasks

This section describes typical tasks performed by the SRM console commands. They include:

- Displaying the System Configuration
- Booting the Operating System
- Testing the System
- Forcing a System Crash Dump
- Changing Environment Variables
- Depositing and Examining Data
- Reading a File
- Initializing the System
- Finding Help
- Switching from SRM to the AlphaBIOS Console

6.2.1 Displaying the System Configuration

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

Example 6-1 Show Config Command

```
>>> show config

                Digital Equipment Corporation
                AlphaServer 800 5/400

Firmware
SRM Console:      T4.8-29
ARC Console:      5.28
PALcode:          VMS PALcode V1.19-3, OSF PALcode V1.21-5
Serial ROM: X0.4
Processor
DECchip (tm) 21164A-1 400MHz
System
Motherboard Revision: 0
Memory
  64 Meg of System Memory
  Bank 0 = 64 Mbytes(16 MB Per DIMM) Starting at 0x00000000
  Bank 1 = No Memory Detected
Slot Option      Hose 0, Bus 0, PCI
  5 QLogic ISP1020 pka0.7.0.5.0      SCSI Bus ID 7
                   dka100.1.0.5.0      RZ28M-S
                   dka200.2.0.5.0      RZ28M-S
                   dka400.4.0.5.0      RRD45
  6 S3 Trio64/Trio32
  7 Intel 82375EB      Bridge to Bus 1, EISA
  11 DECchip 21050-AA      Bridge to Bus 2, PCI
  12 DECchip 21040-AA ewb0.0.0.12.0  00-00-C0-33-E0-0D
  13 NCR 53C825      pkd0.7.0.13.0  SCSI Bus ID 7
Slot Option      Hose 0, Bus 1, EISA
  1 DE425      ewa0.0.0.1001.0  08-00-2B-3E-BC-B5
Slot Option      Hose 0, Bus 2, PCI
  0 DECchip 21040-AA ewa0.0.0.2000.0  08-00-2B-E5-CC-B1
  2 Qlogic ISP1020 pkb0.7.0.2002.0  SCSI Bus ID 7
  3 Qlogic ISP1020 pkc0.7.0.2003.0  SCSI Bus ID 7
                   dkc0.0.0.2003.0  RZ25

>>>
```

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

show config

Example 6-2 Show Device Command

```
>>> show device
dka100.1.0.5.0      DKA100              RZ28M-S
dka200.2.0.5.0      DKA200              RZ28M-S
dka400.4.0.5.0      DKA400              RRD45  1645
dkc0.0.0.2003       DKC9                RZ25   0900
dva0.0.0.1000.0     DVA0
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
pka0.7.0.5.0        PKA0                SCSI Bus ID 7  2.10
pka0.7.0.2002.0     PKB0                SCSI Bus ID 7  2.10
pka0.7.0.2003.0     PKC0                SCSI Bus ID 7  2.10

>>>
```

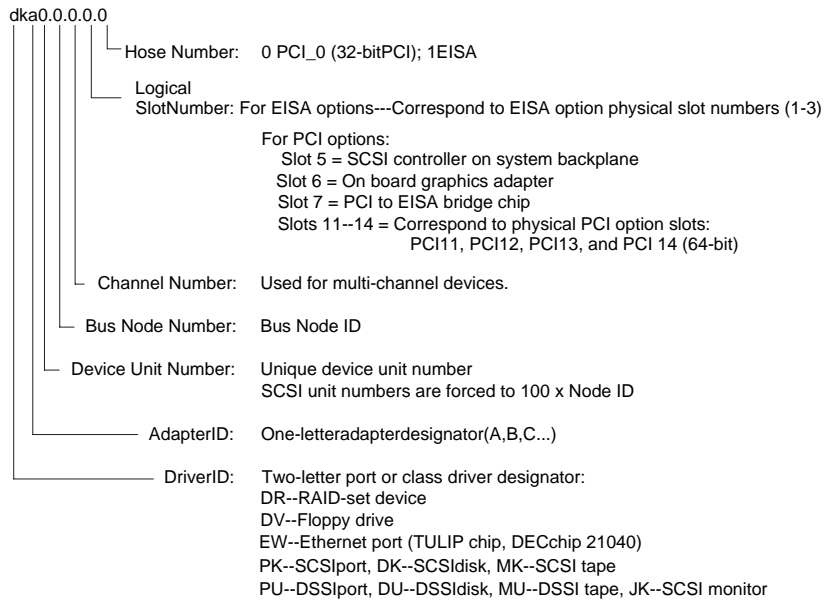
The **show device** command displays status for devices and controllers in the system: SCSI and MSCP devices, the internal floppy drive, and the network. The syntax is:

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 **dka400.4.0.5.0**. Figure 6-1 shows the interpretation of this device name.

Figure 6-1 Device Naming Convention



IP00090A

Example 6-3 Show Memory Command

```
>>> show memory
      128 Meg of System Memory
      Bank 0 = 64 Mbytes(16 MB Per DIMM) Starting at 0x00000000
      Bank 1 = 64 Mbytes(16 MB Per DIMM) Starting at 0x04000000

>>>
```

The **show memory** command displays information about the capacity of each memory bank, the size of DIMMs used in the memory bank, and the starting address of each bank.

The syntax is:

show memory

Example 6-4 Show PAL Command

```
>>> show pal
pal                VMS PALcode V1.19-2, OSF PALcode V1.21-4
>>>
```

The **show pal** command displays the versions of DIGITAL 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

Example 6-5 Show Version Command

```
>>> show version
version            V4.8-1249 Jan 16 1997 01:56:52
>>>
```

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

show version

6.2.2 Booting the Operating System

The boot command is used to boot the operating system. In Example 6-6, the operating system is booted from the SCSI drive b, unit 0.

Example 6-6 Boot Command

```
>>> boot dkb0
(boot dkb0.0.0.2.1 -flags 0)
Building FRU table
block 0 of dkb0.0.0.2.1 is a valid boot block
reading 1002 blocks from dkb0.0.0.2.1
bootstrap code read in
base = 200000, image_start = 0, image_bytes = 7d400
initializing HWRPB at 2000
initializing page table at 1f2000
initializing machine state
setting affinity to the primary CPU
jumping to bootstrap code
```

OpenVMS (TM) Operating System, Version 7.1

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*

-flags [*value*] Specifies additional information to the loaded image or operating system. In DIGITAL 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.

6.2.3 Testing the System

The test command runs firmware diagnostics for components of the system. This command is used to test Windows NT systems as well as DIGITAL UNIX and OpenVMS systems.

Example 6-7 Test Command

```
>>> test
Testing the Memory
Testing the DK* Disks(read only)
No DU* Disks available for testing
Testing the DR* Disks(read only)
No MK* Tapes available for testing
No MU* Tapes available for testing
Testing the DV* Floppy Disks(read only)
file open failed for dva0.0.0.1000.0
Testing the VGA (Alphanumeric Mode only)
Testing the EWA0 Network
>>>
```


The **test** command runs firmware diagnostics for the entire core system. The tests are run concurrently in the background. Fatal errors are reported on the console terminal. The **test** command runs one pass of tests.

When using the **test** command after shutting down an operating system, you must first initialize the system to a quiescent state. Enter the following commands:

```
>>> init  
[testing]  
>>> test
```

After testing is completed, set the `auto_action` environment variable to its previous value (normally `boot`) and press the Reset button.

See the *AlphaServer 800 Service Guide* for a more detailed discussion of the **test** command.

*NOTE: If you are running the Windows NT operating system, switch from AlphaBIOS to the SRM console to enter the **test** command. From the AlphaBIOS console, press in the Halt button (the LED on the button lights) and reset the system, or select **DIGITAL UNIX console (SRM)** or **OpenVMS console (SRM)** from the **Advanced CMOS Setup** screen and reset the system.*

The syntax is:

test

6.2.4 Forcing a System Crash Dump

The crash command forces a crash dump to the selected device on DIGITAL UNIX and OpenVMS systems.

Example 6-8 Crash Command

```
>>> crash

CPU 0 restarting

DUMP: 401408 blocks available for dumping.
DUMP: 38535 required for a partial dump.
DUMP: 0x805001 is 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
>>>
```

The **crash** command forces a crash dump at the operating system level (DIGITAL UNIX or OpenVMS). This command is used when an error has caused the system to hang and can be halted by the Halt button or the RCM **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.

6.2.5 Changing Environment Variables

The `set envar` and `show envar` commands are used to set and view environment variables. The `edit` command can be used to create a user-defined nonvolatile environment variable.

Example 6–9 Set *envar* and Show *envar* Commands

```
>>> show console
console                graphics
>>> set console serial
>>> show console
console                serial
>>>
```

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 set to default values with the `set -default envar` command. Their values are viewed with the `show envar` command.

set *envvar*

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] *envvar value*

-default Restores an environment variable to its default setting.

envvar 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

os_type

show *envvar*

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

show *envvar*

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

Example 6–10 Edit Command

```
>>> edit nvram
editing 'nvram'
0 bytes read in
*10 set mopv3_boot 1
*exit
17 bytes written out to nvram
>>>
```

The **edit** command invokes a console editor that behaves much like the line editor for BASIC. Used to add, insert, or delete lines in a RAM file or the “nvram” power-up script or to create a new environment variable.

In Example 6–10, 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.

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	Rennumbers 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, including the command **initialize** in the script will put the system into an endless loop.*

6.2.6 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.

Example 6-11 Deposit Command

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

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

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

>>> d -l -n 10 -s 200 pmem:0 8
                           # Deposit 8 in the first
                           # longword of the first 17
                           # pages in physical memory.

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

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

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

Example 6-12 Examine Command

```
>>> examine pc # Examine the program
                # counter.
PC psr: 0 ( PC) 0000000000001170

>>> examine sp # Examine the stack pointer.
gpr: F0 ( R30) 000000000072A60
```

Continued on next page

Example 6–12 Examine Command (Continued)

```
>>> e -n 6 r4                                # Examine register R4 and
                                                # the next six registers.
grp: 20 (   R4) 0000000000005000
grp: 28 (   R5) 00000000FFFE0000
grp: 30 (   R6) 00000003F8000C00
grp: 38 (   R7) 0000000053F761AE
grp: 40 (   R8) 0000010000000000
grp: 48 (   R9) 00000003F7800100
grp: 50 (  R10) 00000000000C7FFC

>>> examine pmem:400EC                        # Examine physical memory.
pmem: 400EC A49D0078A47D0070
```

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.

Continued on next page

-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.
<i>space:</i>	Device name (or address space) of the device to access.
<i>address</i>	Offset within a device to which data is deposited. Can be:
<i>dev_name</i>	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.
<i>data</i>	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.

6.2.7 Reading a File

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

Example 6-13 More Command

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

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

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 >>> 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.

6.2.8 Initializing the System

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

Example 6-14 Initialize Command

```
>>> init
ff.fe.fd.fc.fb.fa.f9.f8.f7.f6.f5.ef.df.ee.f4.
probing hose 0, PCI
probing PCI-to-EISA bridge, bus 1
bus 0, slot 5 -- pka -- QLogic ISP1020
bus 0, slot 6 -- vga -- S3 Trio64/Trio32
bus 0, slot 11 -- ewa -- DECchip 21041-AA
bus 0, slot 12 -- pkb -- DEC KZPSA
bus 0, slot 13 -- dra -- Mylex DAC960
ed.ec.eb.....ea.e9.e8.e7.e6.e5.e4.e3.e2.e1.e0.
X4.7-3046, built on Dec 4 1996 at 01:56:52
Memory Testing and Configuration Status
    128 Meg of System Memory
        Bank 0 = 64 Mbytes(16 MB Per DIMM) Starting at 0x00000000
        Bank 1 = 64 Mbytes(16 MB Per DIMM) Starting at 0x04000000
Testing the System
Testing the Disks (read only)
Testing the Network
Change mode to Internal loopback.
Change to Normal Operating Mode.
>>>
```

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:

- The Halt button on the control panel is pushed in.
- The auto_action environment variable is set to **halt**.
- If the auto_action environment variable is set to **boot** or **restart** and the Halt button is not pushed in, the system autoboots. In all other cases, the system stops in console mode and does not attempt to boot.

6.2.9 Finding Help

The help (or man) command displays basic information about a command.

Example 6-15 Help (or Man) Command

```
>>> help set          # or man 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]
```

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

help (or **man**) [*command* . . .]

<i>command</i> . . .	Command or topic for which help is requested. The options are:
<i>none</i>	Displays the complete list of commands for which you can receive help.
<i>command_name</i>	Displays information about the console command.
<i>argument_string</i> (such as "sh")	Displays information about all commands that begin with that string.

6.2.10 Switching from SRM to the AlphaBIOS Console

It is necessary to switch to the AlphaBIOS console to run configuration utilities. To switch from SRM to AlphaBIOS, issue the `alphabios` command.

Example 6-16 Switching to the AlphaBIOS Console

```
>>> alphabios
Loading Arc Firmware From Flash
resetting all I/O buses
Arc Firmware Loaded
>>>
```

The **alphabios** command loads and starts the AlphaBIOS console. This is necessary for running AlphaBIOS-based utilities (such as the RAID and EISA configuration utilities). The syntax is:

alphabios

To return to the SRM console, do one of the following:

If the **os_type** environment variable is set to **unix** or **openvms**, reset the system by pressing the Reset button.

If the **os_type** environment variable is set to **nt**, press the Halt button in (the LED on the button lights) and reset the system by pressing the Reset button. Alternatively, select **DIGITAL UNIX console (SRM)** or **OpenVMS console (SRM)** from the **Advanced CMOS Setup** screen and reset the system.

To switch permanently to the AlphaBIOS console (that is, if the permanent operating system is changed to Windows NT), do the following:

1. Set the SRM **os_type** environment variable to **nt**.
2. Set the SRM **console** environment variable to **graphics**.
3. Reset the system with the Reset button or by issuing the **initialize** command.
4. Run the EISA Configuration Utility, using the ECU program for Windows NT.

6.3 SRM Console Security Features

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

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

User mode allows access to all SRM console commands.

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

6.3.1 The Set Secure Command

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

```
>>> set secure
Console is secure
```

If the password has not been set, the console will prompt you to set it. (See the **set password** command.)

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

6.3.2 The Set Password Command

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

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

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

6.3.3 The Login Command

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

```
>>> login
Secure not set. Please set the password:
>>>
```

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

```
>>> login
Please enter the password:
```

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

If you forget the password, you can use the **login** command and the Halt button to clear the password:

1. Check that the Halt button is in the “Off” position.
2. Enter the **login** command.
3. When the Enter Password: prompt is displayed, press the Halt button, then press Return.
4. Press the Halt button to the “Off” position. The password is now cleared, and secure mode cannot be reinstated until you set a new password.

NOTE: If you leave the Halt button in after you clear the password, the system will not boot.

6.3.4 The Clear Password Command

The **clear password** command clears the environment variable, **password**, setting it to zero. You can use this command after you issue the **login** command to enter user mode, which allows you access to all the SRM console commands. You must know the current password to enter user mode from the secure mode. If you do not know the password, see Section 6.3.3.

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

6.4 SRM Commands

Table 6–1 lists the most frequently used SRM console commands; Table 6–2 gives the command notation formats; and Table 6–3 shows special characters.

Table 6–1 Summary of SRM Console Commands

Command	Function
alphabios	Loads and starts the AlphaBIOS console.
boot	Loads and starts the operating system.
cat [filename]	Displays a file by scrolling.
clear <i>envar</i>	Resets an environment variable to its default value.
crash	Forces a crash dump at the operating system level.
deposit	Writes data to the specified address.
ecu	Runs the EISA Configuration Utility.
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.
help	Displays information about the specified console command.
initialize	Resets the system.
man	Displays information about the specified console command.
more [filename]	Displays a file one screen at a time.
memexer	Exercises memory.
memtest	Runs firmware diagnostics for memory.
ps	Displays the processor status.
set <i>envar</i>	Sets or modifies the value of an environment variable.
set host	Connects to a MSCP DUP server on a DSSI device.

Table 6–1 Summary of SRM Console Commands (Continued)

Command	Function
show <i>envar</i>	Displays the state of the specified environment variable.
show config	Displays the configuration at the last system initialization.
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 PALcode.
show status	Shows system status during diagnostics.
show version	Displays the version of the console program.
test	Runs firmware diagnostics for the system.

Table 6–2 Notation Formats for SRM Console Commands

Attribute	Conditions
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 (see Table 6–3) 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. Leading and trailing spaces are ignored.

Table 6–3 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 redisplay 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.
Ctrl/A	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 or Ctrl/P	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.
Ctrl/D or 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 or Backspace or F12	Moves the cursor to the beginning of the line.
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.

Table 6-3 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.

6.5 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. 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.

Table 6-4 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.
com1_baud	Sets the default baud rate of the internal COM1 serial interface.
com2_baud	Sets the default baud rate of the COM2 serial port.
com1_flow or com2_flow	Indicate the flow control on the serial ports
com1_modem or com2_modem	Used by the operating system to determine if a modem is present.

Continued on next page

Table 6–4 Environment Variable Summary (Continued)

Environment Variable	Function
console	Specifies the device on which power-up output is displayed (serial terminal or graphics monitor).
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.
language	Specifies the console keyboard layout.
os_type	Specifies the operating system and sets the appropriate console interface.
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 ISP1020 SCSI controller.
tga_sync_green	Specifies the location of the SYNC signal generated by the DIGITAL ZLXp-E PCI (PBXGA) graphics accelerator option.
tt_allow_login	Enables or disables login to the SRM console firmware on other console ports.

These environment variables are described in the following pages.

auto_action

Specifies the action the console takes any time the system powers up, fails, or resets. When the setting involves autobooting, 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

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*

- | | |
|--------------------|---|
| <i>boot_device</i> | 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

Passes information to the **boot** command. That information is dependent on the operating system to be booted.

When the operating system is DIGITAL 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 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 DIGITAL UNIX crashes, it completes a partial memory dump. Specifying “**D**” forces a full dump at system crash.

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:

<i>root_number</i>	Root Directory
0 (default)	[SYS0.SYSEXEXE]
1	[SYS1.SYSEXEXE]
2	[SYS2.SYSEXEXE]
3	[SYS3.SYSEXEXE]

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 6-5.

Table 6-5 Settings for boot_osflags Bootflags (OpenVMS)

Flags_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.

com1_baud and com2_baud

The default baud rate for the AlphaServer 800 system is 9600.

The **com1_baud** environment variable sets the baud rate for the internal COM1 serial interface. The local console connected to the COM1 (MMJ) always operates at the default baud rate of 9600. So, if you change **com1_baud**, communication with the system is broken. At this point you will not be able to use your serial connection through the MMJ or your modem through the modem port. You must change the modem baud under RCM> to match the new environment variable and log into the system through the modem. An alternate solution is to simply use the VGA monitor.

With the **com2_baud** environment variable you can set the baud rate to match that of the device connected to the port.

The syntax is:

set comx_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 comx_baud xxx**).

com1_flow and com2_flow

Indicate the flow control on the serial ports.

The syntax is:

set comx_flow *flow_value*

flow_value Defined values are:

none—No flow control.

software—Use XON/XOFF (default value).

hardware—Use modem signals CTS/RTS.

both—Use SOFTWARE and HARDWARE.

com1_modem and com2_modem

Used by the operating system to determine if a modem is present.

The syntax is:

set comx_modem *modem_value*

modem_value Defined values are:

on—Modem is present.

off—Modem is not present (default value).

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 The console terminal is a graphics monitor or a device connected to the
(default) 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.

ew*0_mode

Sets an Ethernet controller to run an AUI, ThinWire, or twisted-pair Ethernet network. For the fast setting, the device defaults to fast.

The syntax is:

set ew*0_mode *value*

The options for *value* are:

au	Device type is AUI.
bnc	Device type is ThinWire.
fast	Device type is fast 100BaseT.
fastfd	Device type is fast full duplex 100BaseT.
full	Device type is full duplex twisted pair.
twisted-pair	Device type is 10BaseT (twisted pair).

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 DIGITAL 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

Sets the keyboard hardware type as either PCXAL or LK411 and enables the system to interpret the terminal keyboard layout correctly.

The syntax is:

set kbd_hardware_type *keyboard_type*

The options for *keyboard_type* are:

- pcxal** (default) Selects the 102-type keyboard layout.
- lk411** Selects the LK411 keyboard layout.

language

Specifies the keyboard layout, which is language dependent. The setting of the **language** environment variable must match the language of the keyboard variant.

The syntax is:

set language *language_code*

The options for *language_code* are:

- | | | | |
|-----------|---------------------------|-----------|-----------------------------|
| 0 | No language (cryptic) | 42 | Italiano (Italian) |
| 30 | Dansk (Danish) | 50 | Japanese (JIS) |
| 32 | Deutsch (German) | 52 | Japanese (ANSI) |
| 34 | Deutsch (Schweiz) (Swiss) | 44 | Nederlands (Netherlands) |
| 36 | English (American) | 46 | Norsk (Norwegian) |
| 38 | English (British/Irish) | 48 | Portuguese (Portuguese) |
| 3A | Español (Spanish) | 4A | Suomi (Finnish) |
| 3C | Français (French) | 4C | Svenska (Swedish) |
| 3E | Français (Canadian) | 4E | Belgisch-Nederlands (Dutch) |
| 40 | Français (Suisse Romande) | | |

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** DIGITAL 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.
- nt** Windows NT is the default operating system. The SRM firmware is started, and it loads and starts the AlphaBIOS firmware during power-up or reset. (If the Halt button is pushed in so that the LED on the button lights, this environment variable is overridden, and the SRM firmware does not load and start the AlphaBIOS console.)

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** Enables PCI parity checking.
- off** (default) 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 for optional SCSI controllers. This environment variable applies to systems that use the QLogic SCSI controller, though it does not affect the onboard controller.

The QLogic ISP1020 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** Enables low eight bits and disables high eight bits.
- high** Enables high eight bits and disables low eight bits.
- on** (default) Enables all 16 bits.
- diff** Places the bus in differential mode.

tga_sync_green

Sets the location of the SYNC signal generated by the optional ZLXp-E PCI graphics accelerator (PBXGA). The parameter is a bit mask, where the least significant bit sets the vertical SYNC for the first graphics card found, the second for the second found, and so on.

The default for this environment variable is **ff**. The default must be reset to 00 so the graphics monitor on a system with a ZLXp-E PCI graphics accelerator will synchronize.

The syntax is:

set tga_sync_green *value*

The options for *value* are:

- ff** Synchronizes the graphics monitor on systems that do not use a ZLXp-E PCI graphics accelerator.
- 00** (default) Synchronizes the graphics monitor on systems with a ZLXp-E PCI graphics accelerator.

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.

Using the AlphaBIOS Console

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

Sections in this chapter are:

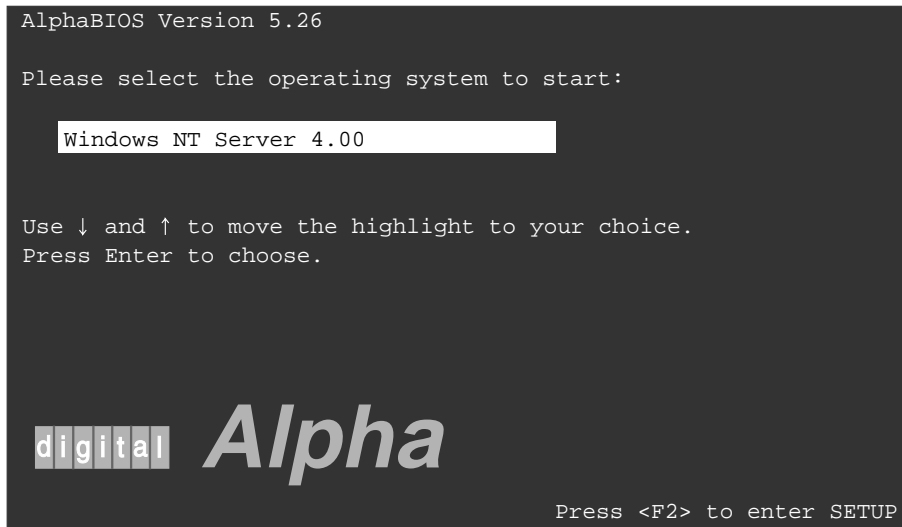
- Starting AlphaBIOS
- Keyboard Conventions and Help
- Displaying the System Configuration
- Updating Firmware
- Setting Up the Hard Disk
- Performing Setup Tasks
- Installing Windows NT
- Running a Configuration Utility
- Selecting the Version of Windows NT
- Switching from AlphaBIOS to the SRM Console
- Setting Up Password Protection
- Running AlphaBIOS from a Serial Terminal

*NOTE: To run firmware tests on a Windows NT system, switch to the SRM console and issue the **test** command.*

7.1 Starting AlphaBIOS

Start AlphaBIOS Setup by pressing F2 from the Boot screen displayed at power-up or reset.

Figure 7-1 Boot Screen

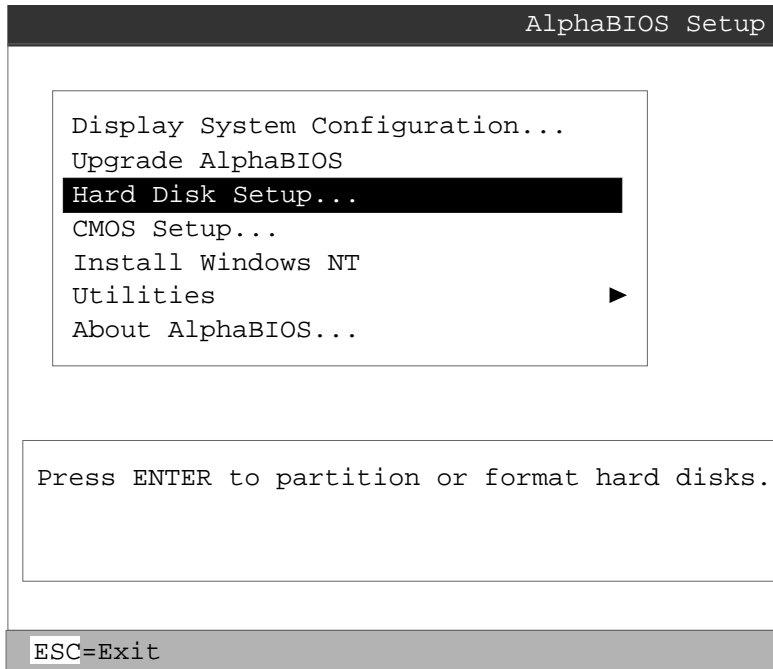


PK-0728A-96

The **Boot** screen shown in Figure 7-1 displays at power-up and reset. Press F2 at this screen to enter the setup program.

The **AlphaBIOS Setup** screen (Figure 7-2) displays. From this screen you can select the tasks to perform. Use the arrow keys to select the menu item you want and press Enter.

Figure 7-2 AlphaBIOS Setup Screen



PK-0726-96

7.2 Keyboard Conventions and Help

AlphaBIOS uses universally accepted keys and key combinations for navigating the interface and selecting items.

Figure 7-3 Typical First-Level Help Screen

Help: CMOS Setup		F1=Key Help
F3	Change color scheme.	
F6	Enter Advanced CMOS Setup.	
F7	Set factory default CMOS settings.	
ESC	Exit CMOS Setup and discard any changes.	
F10	Exit CMOS Setup and save changes, including changes from Advanced CMOS Setup.	
ENTER=Continue		

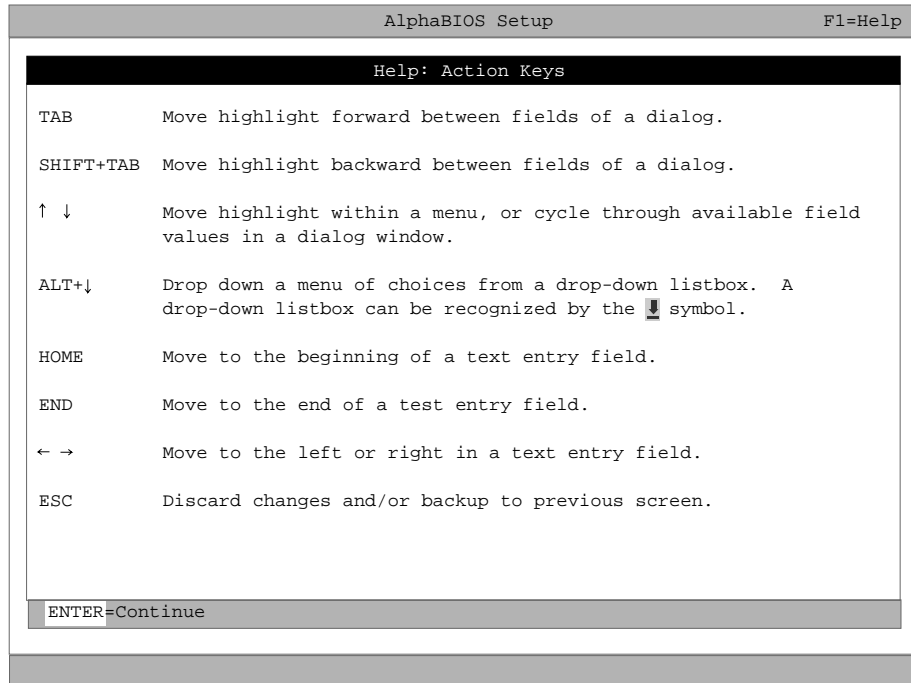
PK-0724-96

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. An example of the help displayed by pressing F1 once, in this case from the **CMOS Setup** screen, is shown in Figure 7-3.

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 7-4).

Figure 7-4 Second-Level Help Screen

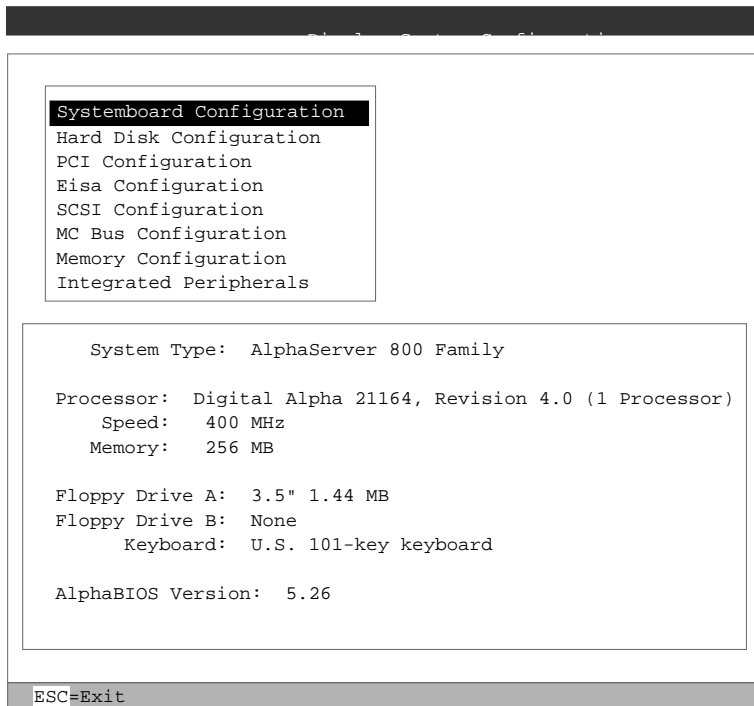


PK-0725-96

7.3 Displaying the System Configuration

The Display System Configuration screen provides information about the system's installed processor, memory, attached devices, and option boards. From the AlphaBIOS Setup screen select Display System Configuration., then the category for the requisite information.

Figure 7-5 Display System Configuration Screen



PK-0731B-96

Use this procedure to display the system configuration.

1. Start AlphaBIOS, select **Display System Configuration**, and press Enter.
2. In the **Display System Configuration** screen, use the arrow keys to select the configuration category you want to see.

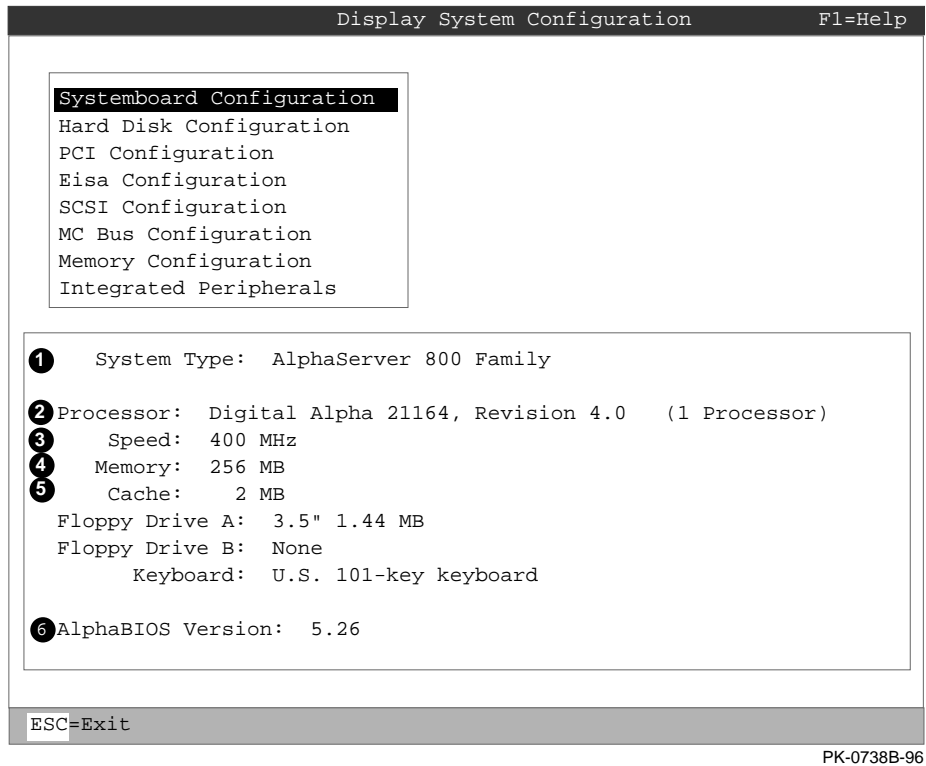
From this screen, you can view configuration information about these system components:

- System board
- Hard disk
- PCI bus
- EISA bus
- SCSI devices
- Memory
- Integrated peripherals

The sections that follow explain the display for each component.

7.3.1 System Board Configuration

Figure 7-6 System Board Configuration



- ❶ System type — The model number of the system.
- ❷ Processor — The model and revision of the processor chip. Revision level information can be useful in troubleshooting problems with technical support personnel.
- ❸ Speed — The speed at which the processor runs.
- ❹ Memory — The amount, in megabytes, of main memory in the system.
- ❺ Cache — The amount, in kilobytes, of static RAM cache memory installed.
- ❻ AlphaBIOS version — The version of AlphaBIOS currently running on the system. This field has three parts: major version number is the major revision of the BIOS; minor version number signifies enhancements that have been made since the last major revision; build date shows when the BIOS was compiled.

7.3.2 Hard Disk Configuration

Figure 7-7 Hard Disk Configuration

Display System Configuration					
Systemboard Configuration					
Hard Disk Configuration					
PCI Configuration					
Eisa Configuration					
SCSI Configuration					
MC Bus Configuration					
Memory Configuration					
Integrated Peripherals					
1	2	3	4	5	
Disk 0	QLISP1020 #0, SCSI ID 0			510 MB	
	Partition 1			200 MB	NTFS
	Partition 2			200 MB	FAT
	Unused	6		110 MB	7 8
Disk 1	QLISP1020 #0, SCSI ID 1			1001 MB	
	DEC RZ26 (C) DECT386				
	Partition 1			995 MB	NTFS
	Partition 2			6 MB	FAT

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NOTE: This screen is for information only; it cannot be edited. To make changes to the hard disk setup, use the Hard Disk Setup screen (Section 7.5).

- ❶ Physical disk ID — Based on the SCSI ID. The disk with the lowest SCSI ID is disk 0, the disk with the next lowest SCSI ID is disk 1, and so on.
- ❷ Controller — The brand and model of SCSI chip used on the SCSI controller.
- ❸ Controller number — Based on how many SCSI controllers of a particular type are installed in the system. The first controller of a type is always numbered 0.
- ❹ SCSI ID number — A unique number you assign to each SCSI device installed in the system. This is usually done with jumpers or a thumb wheel attached to the drive housing.
- ❺ Size — The raw capacity of the drive. Formatting the drive with different file systems (for example, FAT and NTFS) may result in different usable sizes because of the differences in how storage is managed under those file systems.
- ❻ Partition number — Within a single drive, partition numbers are assigned in sequential order: 1, 2, 3, and so on. The partitions populate the drive from the innermost cylinders to the outermost cylinders. If you have a large hard disk (over 800 MB) and plan to use the FAT file system, it is a good idea to break the disk into several smaller partitions because the FAT file system uses disk space more efficiently at smaller partition sizes. This is not a concern for the NTFS file system, however, as it uses disk space very efficiently at all partition sizes.
- ❼ Partition size — The raw (unformatted) storage capacity of the partition. Actual storage space will differ based on the file system with which the partition is formatted.
- ❽ Partition format — The file system (if any) used on a partition. This field displays FAT, NTFS, or unknown (if the partition is unformatted).

7.3.3 PCI Configuration

Figure 7-8 PCI Configuration

The screenshot shows the 'Display System Configuration' utility. A menu on the left lists various configuration options, with 'PCI Configuration' highlighted. Below the menu is a table of installed devices. The table has four columns: Device Name, Device Type, Revision, and Physical Slot. The 'Intel 82375 PCEB' device is highlighted in the table. At the bottom of the screen, there are instructions: 'ENTER=Select' and 'ESC=Exit'.

1	2	3	4
Device Name	Device Type	Revision	Physical Slot
QLogic ISP1020	SCSI	2	Embedded
Intel 82375 PCEB	EISA bridge	5	PCI0-Embedded
Digital KZPSX	SCSI	0	1
S3 Trio32/64	VGA	84	2
Digital DevID=13	MM Video	0	3
Digital 21140	Ethernet	32	4

ENTER=Select ESC=Exit

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- ❶ Device name — The name and model of the device as recorded in the device's firmware.
- ❷ Device type — Lists the function of the device in the system.
- ❸ Revision — The revision level of the device signifies the number of times it has been updated by the manufacturer.
- ❹ Physical slot — Lists the actual PCI slot number to which the device is attached. Refer to your system manual for information on the physical location of PCI slot locations on your particular system board.

You can find additional detail about any of the PCI devices listed in the **Advanced PCI Information** screen. Follow this procedure to view this screen:

1. Press Enter to enable selection in the device list.
2. Use the arrow keys to select the device for which you want additional detail.
3. Press Enter, and the detail is displayed.
4. Press Escape to return to the table of PCI devices.

The **Advanced PCI Information** screen is shown in Figure 7-9 on the next page.

Figure 7-9 Advanced PCI Information

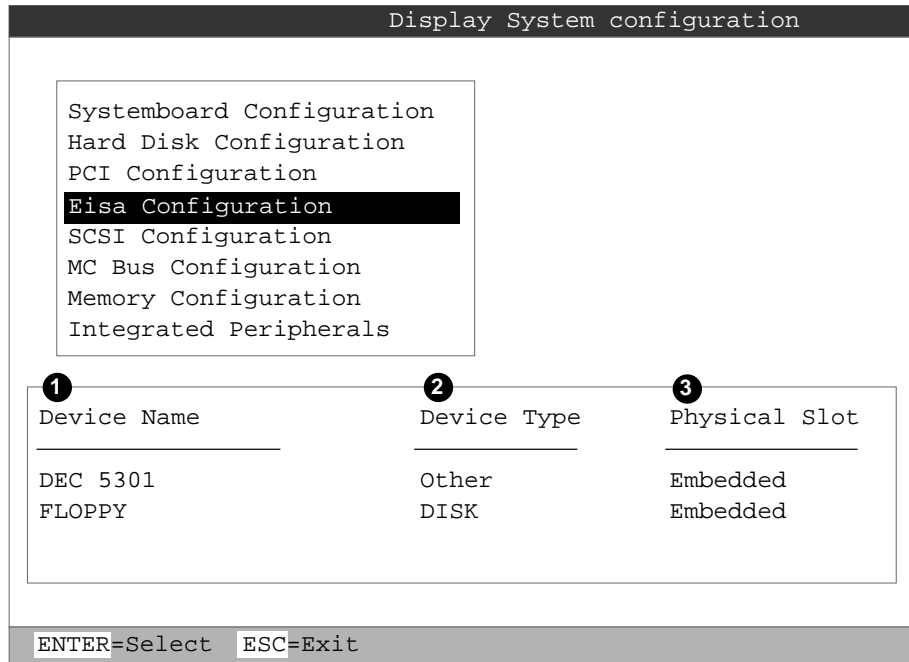
Advanced PCI Information			
1	2	3	Bus Number=0, Device Number=7, Function Number=0
4	Configuration Space:		
Register Name	Hex Offset	Hex	Value
Vendor ID	00	8086	
Device ID	02	0482	
Command	04	0047	
Status	06	0200	
Revision ID	08	05	
Prog. I/F	09	00	
Sub Class Code	0A	00	
Class Code	0B	00	
Cache Line Size	0C	00	
Latency Timer	0D	20	
Header Type	0E	00	
BIST	0F	00	
Base Address 0	10	00000000	
ENTER=Continue			

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- 1 Bus number — The virtual PCI bus number.
- 2 Device number — The PCI bus device number.
- 3 Function number — Represents the number assigned to a particular function on a multifunction device. For example, a combination Ethernet/SCSI controller would be listed twice, with the first function listed as 0 and the other as 1.
- 4 Configuration header space— Displays the information in the selected device's PCI configuration space.

7.3.4 EISA Configuration

Figure 7-10 EISA Configuration



PK-0742A-96

- 1 Device name — Includes a three-character manufacturer code, followed by a three-digit board type, followed by a one-digit revision number.
- 2 Device type — Identifies the board type (for example, network).
- 3 Physical slot — Lists the actual EISA slot number to which the device is attached. The embedded EISA system controller is always first on this list.

7.3.5 SCSI Configuration

Figure 7-11 SCSI Configuration

The screenshot shows the 'Display System Configuration' window. A menu on the left lists various configuration options, with 'SCSI Configuration' selected. A sub-menu on the right shows 'QLISP1020 #0' and 'KZPSX #0'. Below the menu, a table displays SCSI device information for 'QLISP1020 #0, SCSI ID 7, SCSI Bus 0'. The table has columns for SCSI ID, Device, Size, and Description. The devices listed are Disk 0, Disk 1, and CD-ROM.

Display System Configuration

Systemboard Configuration
Hard Disk Configuration
PCI Configuration
Eisa Configuration
SCSI Configuration ▶
MC Bus Configuration
Memory Configuration
Integrated Peripherals

QLISP1020 #0
KZPSX #0

① QLISP1020 #0, SCSI ID 7, SCSI Bus 0

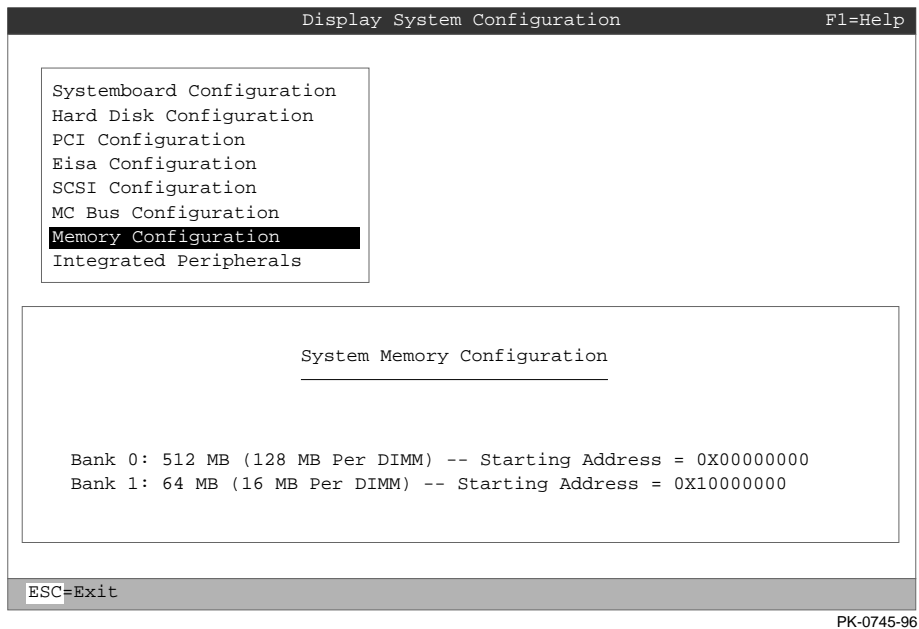
② SCSI ID	③ Device	④ Size	⑤ Description
0	Disk 0	4091 MB	DEC RZ29L-CA (C) DECLXTA
1	Disk 1	4091 MB	DEC RZ29L-CA (C) DECLXTA
4	CD-ROM		DEC RRD46 (C) DEC1645

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- ❶ SCSI controller information — Describes the physical characteristics of the selected SCSI controller. This line includes:
 - Controller — Brand and model of SCSI chip used on the SCSI controller.
 - Controller number — Based on the number of SCSI controllers of a particular type in the system. The first controller of a type is always numbered 0.
 - SCSI ID number — A unique number assigned to the SCSI controller. The standard controller numbering scheme is for controllers to be SCSI ID 7.
 - SCSI bus number — Indicates if the controller is first or second in the system. The first controller is tied to SCSI bus 0, and the second to SCSI bus 1.
- ❷ SCSI ID — A unique number you assign to each SCSI device in the system. This is usually done with jumpers or a thumb wheel attached to the drive housing.
- ❸ Device type — Displays whether the device is a hard disk, CD-ROM, scanner, or other type of device.
- ❹ Size — The raw capacity of the drive. Formatting the drive with different file systems (for example, FAT and NTFS) may result in different usable sizes because of differences in the way those file systems manage storage. This is left blank if it is not applicable to a device (for example, a scanner).
- ❺ Description — The name and model of the device as recorded in the device's firmware.

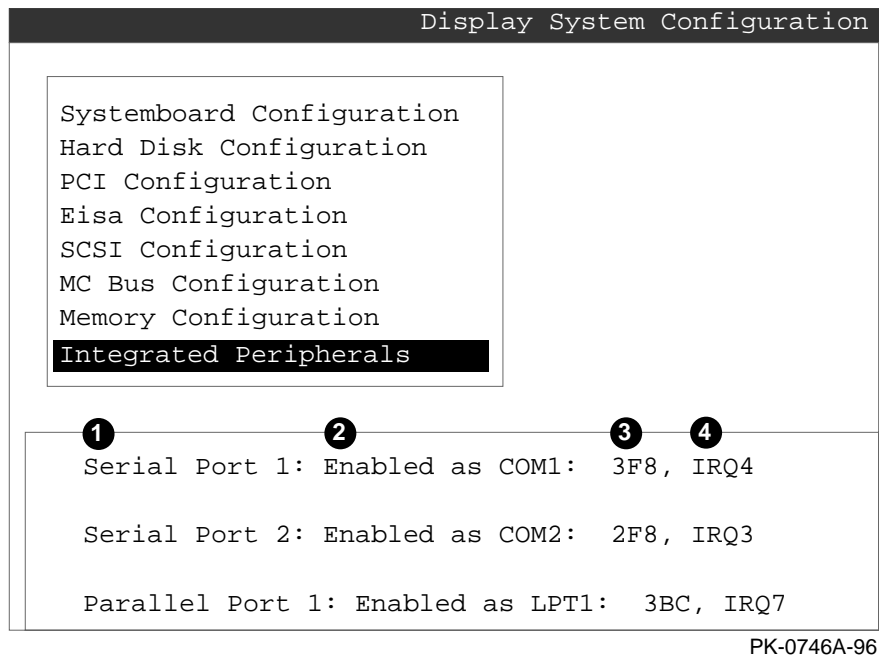
7.3.6 Memory Configuration

Figure 7-12 Memory Configuration



7.3.7 Integrated Peripherals

Figure 7-13 Integrated Peripherals

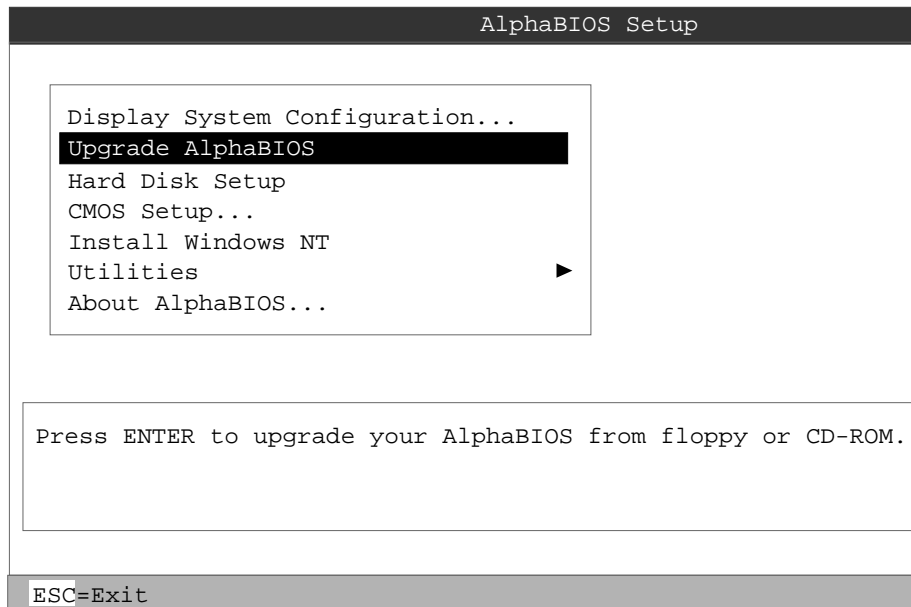


- ① Device type — The physical device as it exists on the system board.
- ② MS-DOS name — Shows if the device is enabled, and if it is enabled, the addressable MS-DOS name for the device.
- ③ Port address — The physical memory location from and to which data travels as it is received into the device, and sent from the device, respectively.
- ④ Interrupt — The interrupt request line (IRQ) used by the device to get the CPU's attention.

7.4 Updating Firmware

Insert the CD-ROM or diskette with the updated firmware and select Upgrade AlphaBIOS from the main AlphaBIOS Setup screen. Use the Loadable Firmware Update (LFU) utility to perform the update. The LFU exit command causes a system reset.

Figure 7-14 Updating Firmware



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As new versions of Windows NT are released, it might be necessary to upgrade AlphaBIOS to the latest version. Additionally, as improvements are made to AlphaBIOS, it might be desirable to upgrade to take advantage of new AlphaBIOS features.

Use this procedure to upgrade from an earlier version of AlphaBIOS:

NOTE: If jumper J50 is removed, make sure it is reinserted before you start the upgrade procedure. Otherwise the firmware will not be upgraded.

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. The system is reset and the Loadable Firmware Update (LFU) utility is started.
4. When the upgrade is complete, issue the LFU **exit** command. The system is reset and you are returned to AlphaBIOS. If you press the Reset button instead of issuing the LFU **exit** command, the system is reset and you are returned to LFU.

7.5 Setting Up the Hard Disk

You can perform either an express or a custom hard disk setup. An express setup, described in this section, creates the recommended partition arrangement on the first hard disk, but it does not map bad sectors.

Figure 7-15 Hard Disk Setup Screen

Hard Disk Setup						
1	Disk 0	2 QLISP1020 #0, SCSI ID 0	5	510 MB		
		6 Partition 1	7	200 MB	8	NTFS
		Unused		310 MB		
	Disk 1	QLISP1020 #0, SCSI ID 1		1001 MB		
		Partition 1		995 MB		NTFS
		Partition 2		6 MB		FAT
9	INSERT=New DEL=Delete F6=Format F7=Express ESC=Exit					

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CAUTION: Hard disk changes are made as soon as they are entered. So, be careful as you change your hard disk environment to prevent unintended data loss.

- ❶ Physical disk ID — Based on the SCSI ID. The disk with the lowest SCSI ID is disk 0, the disk with the next lowest SCSI ID is disk 1, and so on.
- ❷ Controller — Brand and model of SCSI chip used on the SCSI controller.
- ❸ Controller number — Based on how many SCSI controllers of a particular type are installed in the system. The first controller of a type is always numbered 0.
- ❹ SCSI ID number — A unique number you assign to each SCSI device in the system. This is usually done with jumpers or a thumb wheel attached to the drive housing.
- ❺ Size — The raw capacity of the drive. Formatting the drive with different file systems (for example, FAT and NTFS) may result in different usable sizes because of the differences in how storage is managed under those file systems.
- ❻ Partition number — Within a single drive, partition numbers are assigned in sequential order: 1, 2, 3, and so on. The partitions populate the drive from the innermost cylinders to the outermost. If you have a large hard disk (over 800 MB) and plan to use the FAT file system, it is a good idea to break the disk into several smaller partitions because the FAT file system uses disk space more efficiently at smaller partition sizes. This is not a concern for the NTFS file system, since it uses disk space very efficiently at all partition sizes.
- ❼ Partition size — The raw (unformatted) storage capacity of the partition. Actual storage space will differ based on the file system with which the partition is formatted.

Continued on next page

- ⑧ Partition format — The file system (if any) used on a partition. This field displays FAT, NTFS, or unknown (if the partition is unformatted).
- ⑨ Disk setup options
 - Insert partition (Insert key) — Use this option to create new partitions. Before creating a new partition, be sure to select an unpartitioned space. Pressing the Insert key while an already partitioned space is selected causes an informational error to be displayed.
 - Delete partition (Delete key) — Use this option to delete existing partitions. Before deleting a partition, be sure any data you want to save on the partition has been backed up. Deleting a partition deletes all data on that partition but leaves the rest of the disk unaffected. Pressing the Delete key while an unpartitioned space is selected displays an informational error.
 - Format partition (F6 key) — Format a partitioned space with the FAT file system.
 - Express setup (F7 key) — Create the default recommended partition arrangement for Windows NT.
 - Exit (Escape key) — Return to the AlphaBIOS Setup screen.

An express hard disk setup creates the recommended partition arrangement on the first hard disk (disk 0). It does not, however, format the large partition with NTFS, and it does not map bad sectors on the disk. The NTFS formatting can be done during Windows NT installation.

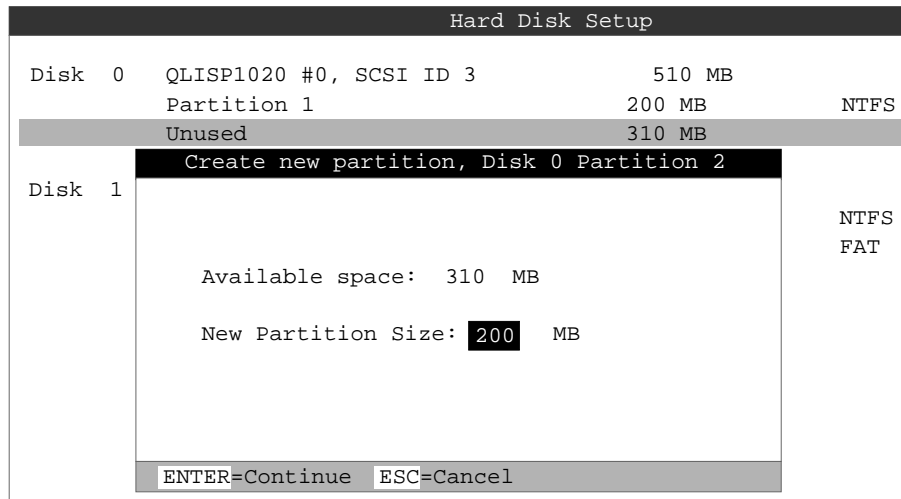
To perform an express hard disk setup

1. If you have any needed information on your disk, back it up before proceeding.
2. Start **AlphaBIOS Setup**, select **Hard Disk Setup**, and press Enter.
3. Press F7 to enter **Express Setup**.
4. Press F10 to continue with the setup.

7.5.1 Manually Creating and Deleting Partitions

Use the **Create Partition** and **Delete Partition** options if you need to create a custom hard disk partition arrangement or otherwise manually manage your hard disk partitions.

Figure 7-16 Create New Partition Dialog Box



PK-0733-96

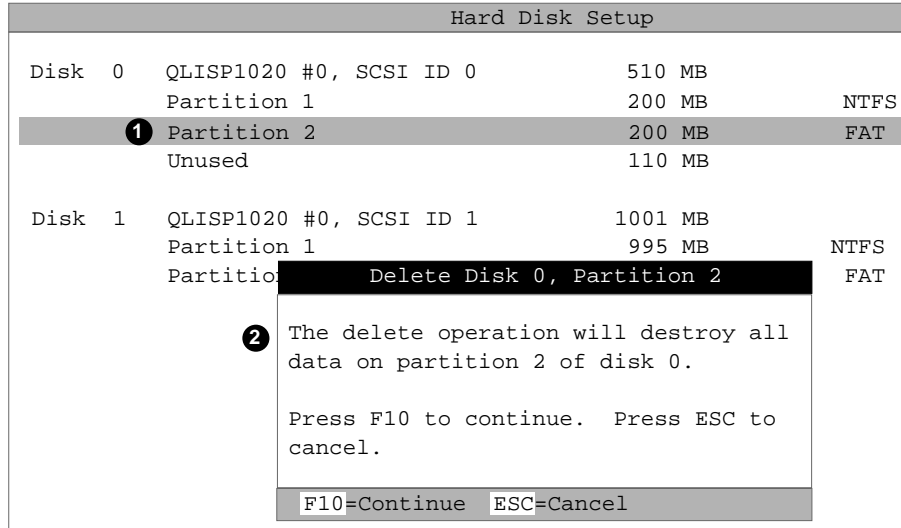
To create a partition

1. Start AlphaBIOS and select **Hard Disk Setup**. Press Enter.
2. Select the disk on which to create the partition.
3. If one or more partitions already exist on the disk, select the unpartitioned space.
4. Press Insert. A dialog box displays, similar to Figure 7-16.
5. Type the size of the partition to create and press Enter.

To delete a partition

1. Start AlphaBIOS and select **Hard Disk Setup**. Press Enter.
2. Select the partition to be deleted (see ❶ in Figure 7-17).
3. Press Delete. A dialog box displays (see ❷).
4. Press F10 to confirm the deletion.

Figure 7-17 Delete Partition Dialog Box

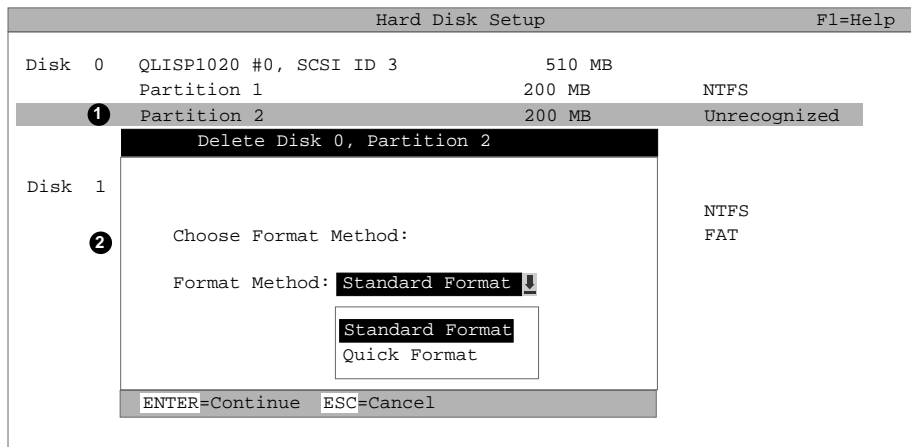


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7.5.2 Formatting a FAT Partition

AlphaBIOS can format partitions with the FAT file system. Use Windows NT to format a partition using NTFS.

Figure 7-18 Formatting a FAT Partition

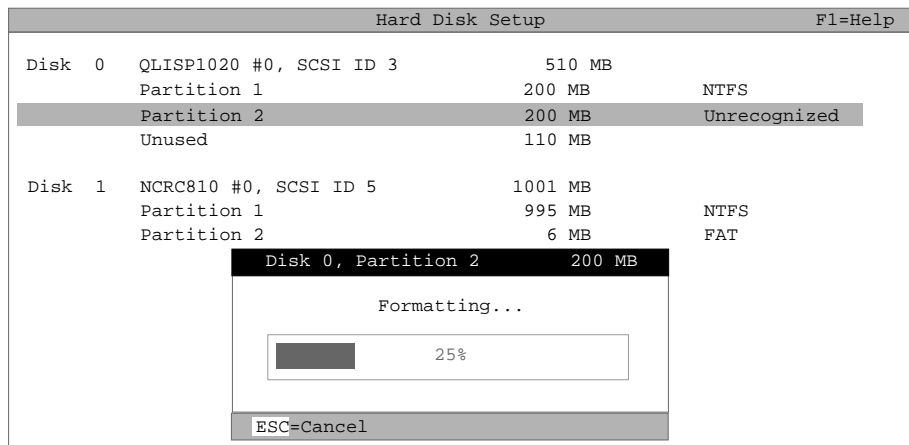


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To format a FAT partition

1. Start AlphaBIOS and select **Hard Disk Setup**. Press Enter.
2. Select the partition to be formatted (see ❶ in Figure 7–18).
3. Press F6. A dialog box displays, asking whether to perform a quick or standard format (see ❷). If you select **Quick Format**, the formatting is completed immediately, but no bad sectors are mapped. If you select **Standard Format**, a dialog box similar to that in Figure 7–19 displays while the drive is formatted, showing the progress of the formatting. Standard formatting maps bad sectors.
4. Select a format method, and press Enter.

Figure 7–19 Standard Formatting

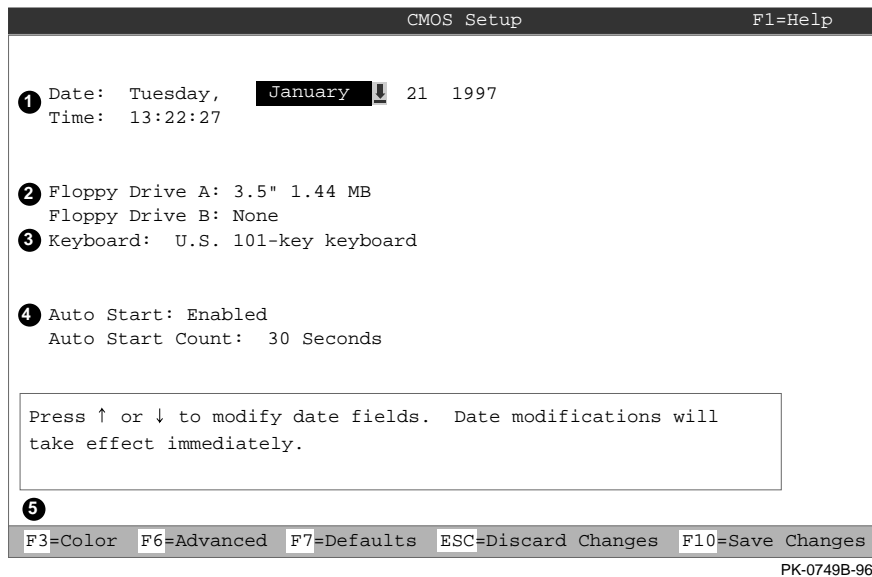


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7.6 Performing Setup Tasks

CMOS Setup is used to configure several system parameters. CMOS Setup has two modes: Standard CMOS Setup is used to configure basic system parameters; Advanced CMOS Setup is used for system-specific parameters and password protection.

Figure 7-20 Standard CMOS Setup Screen



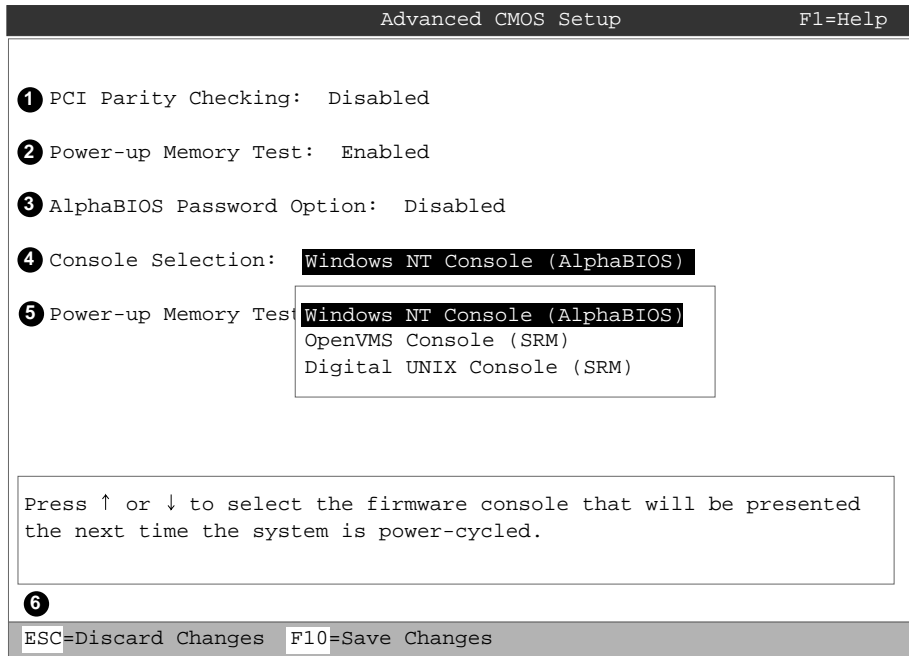
To enter Standard CMOS Setup

Start AlphaBIOS, select **CMOS Setup**, and press Enter.

- ❶ Date and time — When setting the time, use the 24-hour format. (For example, 10:00 p.m. is 22:00:00.)
- ❷ Floppy drive — The only drive type supported is 3.5 inch, 1.44 MB.
- ❸ Keyboard — The keyboard setting makes it possible to use most language keyboards. To ensure correct character mappings, the language of your keyboard, Windows NT, and the keyboard language selection in **CMOS Setup** should all match.
- ❹ Auto start and auto start count — The **Auto Start** setting determines whether the primary operating system is automatically started after the system is reset or power-cycled. The **Auto Start Count** setting is the amount of time the **Boot** screen is displayed before the default system is automatically started. This delay gives you the opportunity, after resetting or power-cycling the system, to select another version of Windows NT to start or to enter **AlphaBIOS Setup**.
- ❺ **Standard CMOS Setup** options
 - Color (F3 key) — Repeatedly cycles through the available AlphaBIOS color schemes.
 - Advanced (F6 key) — Displays the **Advanced CMOS Setup** screen.
 - Defaults (F7 key) — Restores the default **Standard CMOS Setup** values without affecting the **Advanced CMOS Setup** values.
 - Discard changes (Escape key) — Restores the settings in effect when you started CMOS Setup. This option also discards changes made in **Advanced CMOS Setup**.
 - Save changes (F10) — Saves changes made in both the standard and advanced modes of **CMOS Setup**.

Continued on next page

Figure 7-21 Advanced CMOS Setup Screen



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To enter Advanced CMOS Setup

1. Start AlphaBIOS, select **CMOS Setup**, and press Enter.
2. In the **Standard CMOS Setup** screen, press F6.

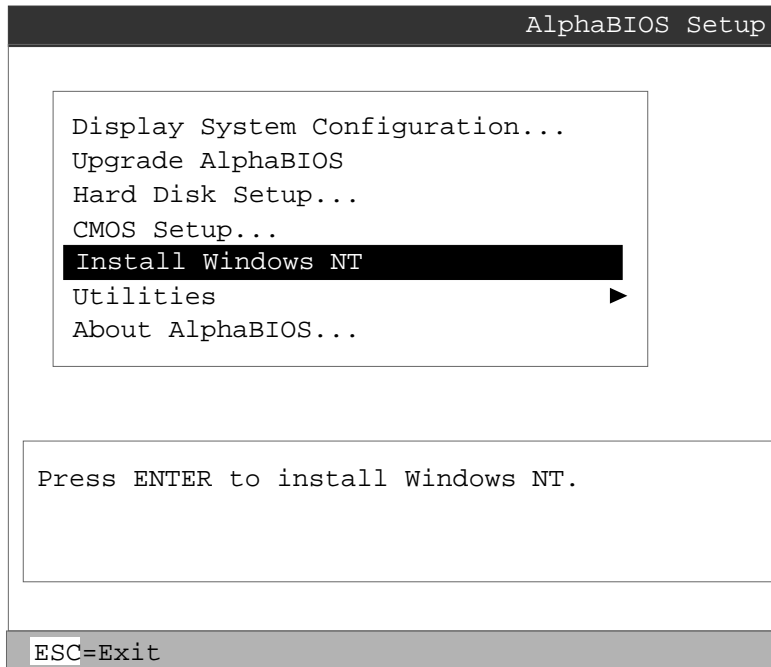
- ❶ PCI parity checking — Enables and disables settings for PCI parity checking, which ensures data integrity across the PCI bus. Because some third-party PCI options do not correctly implement PCI parity generation, the default is Disabled.
- ❷ Power-up memory test — Enables and disables settings for the power-up memory test.
- ❸ Password setup — Enables and disables settings for password setup.

Password protection provides two levels of security for your system: setup, which requires a password to start **AlphaBIOS Setup**, and startup, which requires a password before the system initializes. Startup protection provides more comprehensive protection than setup protection because the system cannot be used at all until the correct password is entered.
- ❹ Console selection — Switches from AlphaBIOS to SRM firmware. If you select OpenVMS (SRM) or DIGITAL UNIX (SRM), the next time you reset your system, the SRM firmware will be loaded instead of AlphaBIOS. This menu selection changes the setting of the **os_type** environment variable in the SRM console.
- ❺ Memory test length — Selects the length of memory testing that will be done the next time the system is power-cycled.
- ❻ **Advanced CMOS Setup** options
 - Discard changes (Escape key) — Restores those settings in effect when you started **Advanced CMOS Setup**. This does not discard changes made to **Standard CMOS Setup**.
 - Save Changes (F10 key) — Saves changes made in **Advanced CMOS Setup**. Note that, when exiting **CMOS Setup**, you must also save your changes at the **Standard CMOS Setup** screen for the changes to be stored permanently.

7.7 Installing Windows NT

Install Windows NT from CD-ROM. Up to four versions of the operating system can be resident in the system at one time.

Figure 7-22 Installing Windows NT



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If Windows NT was installed at the factory, Windows NT setup will start automatically the first time the system powers up. If it was not installed, or if you are installing another version, you must have a CD-ROM drive attached to your system.

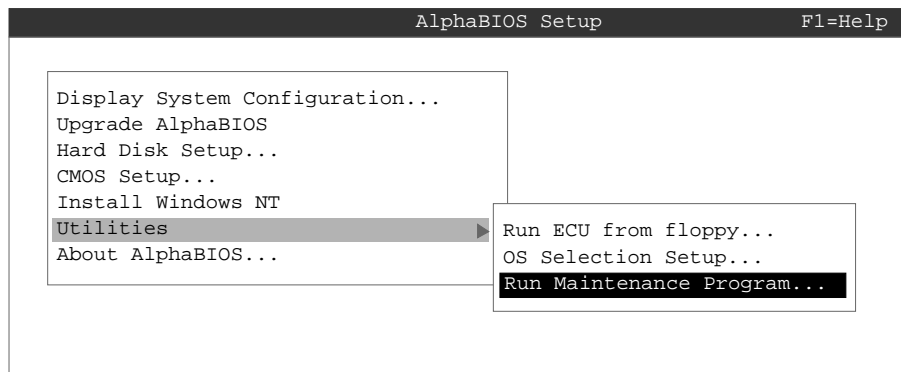
NOTE: Steps 1 and 2 in the following procedure are necessary only when you are first setting up your system. On subsequent installations and upgrades, begin at step 3.

1. Use **CMOS Setup** to set the system date and time: start **AlphaBIOS Setup**, select **CMOS Setup**, and press Enter.
2. Perform an express hard disk setup: return to the main **AlphaBIOS Setup** screen, select **Hard Disk Setup**, and press Enter.
3. Put the Windows NT CD into the CD-ROM drive.
4. Start **AlphaBIOS Setup**, select **Install Windows NT**, and press Enter.
5. Follow the prompts to complete the installation. For more information on installing Windows NT, refer to the *Installation Guide* in your Windows NT software package.

7.8 Running a Configuration Utility

Configuration utilities are run directly from the AlphaBIOS Utilities menu.

Figure 7-23 Run Maintenance Program Dialog Box



PK-0729-96

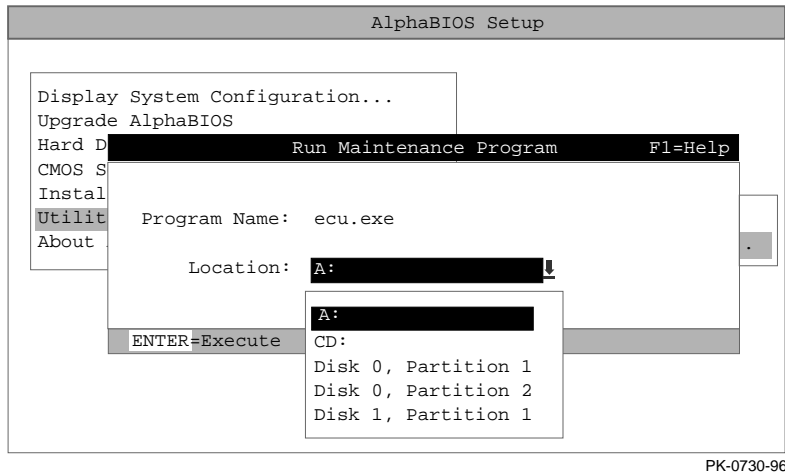
If you change your system configuration—for example, by adding a new EISA adapter or another RAID drive, you will have to run an EISA or RAID configuration utility. As you modify your system, you might be required to run other types of configuration utilities as well. Configuration utilities (also called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

Users of the OpenVMS Alpha and DIGITAL UNIX operating systems need to switch from the SRM console to the AlphaBIOS console to run a configuration utility. To switch, type either of the following commands at the SRM console prompt: **alphabios** or **ecu**. These commands will access the **AlphaBIOS Boot** menu. To access the Setup menu from the Boot menu, press F2.

To run a configuration utility:

1. From **AlphaBIOS Setup**, select **Utilities**. From the submenu that is displayed, select **Run Maintenance Program** and press Enter. See Figure 7-23.
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. See Figure 7-24.

Figure 7-24 Execute Run Maintenance 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.

7.9 Selecting the Version of Windows NT

Up to four images of Windows NT can be resident on the system at one time. It is necessary to select the version that will be started.

Figure 7-25 Operating System Selections

The figure consists of two screenshots of the 'Operating System Selection Setup' screen. Each screen has a title bar 'Operating System Selection Setup' and a list of operating systems. The first screenshot shows 'Windows NT Server 4.0' selected as the 'Primary Operating System' and 'Windows NT Server 3.51' as an alternative. The second screenshot shows 'Windows NT Server 3.51' selected as the 'Primary Operating System' and 'Windows NT Server 4.0' as an alternative. Both screens display boot configuration details in a box, including 'Boot Name', 'Boot File', 'OS Path', and 'OS Options'. A keyboard legend is shown at the bottom of each screen.

Operating System Selection Setup			
Windows NT Server 4.0	Primary Operating System		
Windows NT Server 3.51			
Boot Name: Windows NT Server 4.0			
Boot File: Disk 0, Partition 2 \os\winnt351\osloader.exe			
OS Path: Disk 0, Partition 1 \WINNT351			
OS Options:			
INSERT=New	F6=Edit	F8=Primary	ESC=Discard Changes
DEL=Delete	F7=Copy	F9=Validate	F10=Save Changes

Operating System Selection Setup			
Windows NT Server 3.51	Primary Operating System		
Windows NT Server 4.0			
Boot Name: Windows NT Server 3.51			
Boot File: Disk 0, Partition 2 \os\winnt400\osloader.exe			
OS Path: Disk 0, Partition 1 \WINNT400			
OS Options:			
INSERT=New	F6=Edit	F8=Primary	ESC=Discard Changes
DEL=Delete	F7=Copy	F9=Validate	F10=Save Changes

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NOTE: The term “operating system selection,” as it is used in this context, refers to a version of Windows NT. It does not pertain to the DIGITAL UNIX and OpenVMS operating systems.

Each operating system selection is a set of information for a version of Windows NT. It describes the disk and partition containing the OSLOADER.EXE file associated with a particular operating system installation, as well as the path to the operating system itself. In addition, the operating system selection contains any options passed to the operating system during boot.

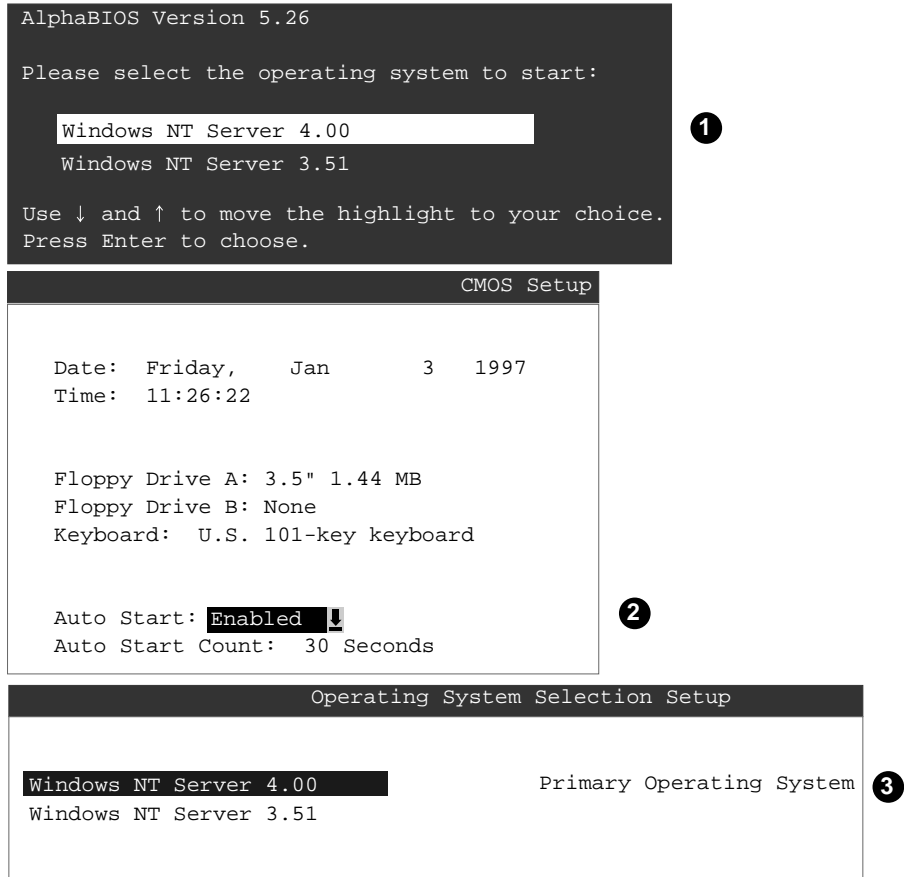
By default, one operating system selection displays on the **AlphaBIOS Boot** screen for each operating system installed on the system. It is not normally necessary to modify operating system selections, as the Windows NT installation creates and modifies operating system selections as needed.

Figure 7–25 shows how operating system selections appear in AlphaBIOS.

7.9.1 Designating a Primary Operating System

Multiple versions of Windows NT can be installed at the same time. Each time you install a separate version of Windows NT a new operating system is created. You can designate any version as the current operating system.

Figure 7-26 Primary Operating System



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Multiple versions of Windows NT can be installed at the same time. This can be very useful in a variety of circumstances—for example, when testing application compatibility across different versions of Windows NT.

Each time you install a separate version of Windows NT, a new operating system selection is created. Although you can start any of the installed versions of Windows NT, one of them must be the primary operating system. The version of Windows NT you select as the primary operating system is the one that automatically starts if the **Auto Start** option is enabled in AlphaBIOS.

Figure 7–26 illustrates the relationship between multiple-operating-system installations, **Auto Start**, and the primary operating system.

- ❶ The primary operating system is listed first on the **Boot** screen.
- ❷ The primary operating system starts automatically if the **Auto Start** option is enabled in **CMOS Setup**.
- ❸ The primary operating system can be selected in **the Operating System Selection Setup** screen.

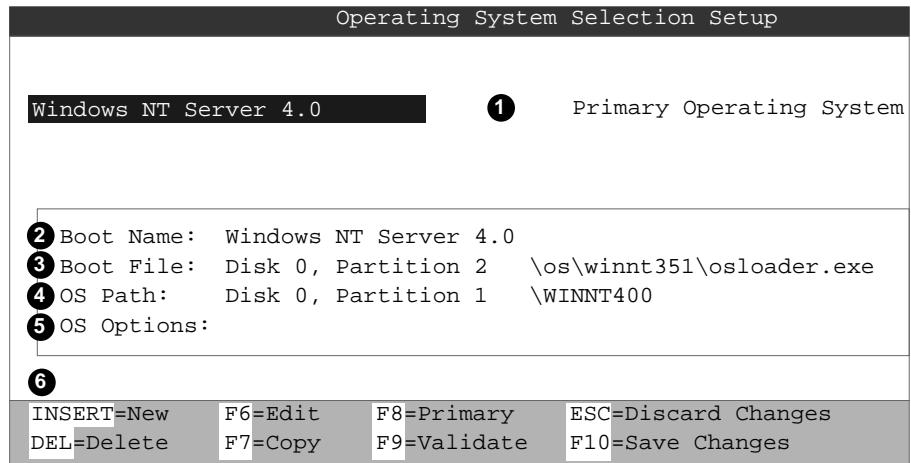
Follow this procedure to designate a new primary operating system:

1. From the **AlphaBIOS Setup** screen select **Utilities**. In the selection box that displays, choose **OS Selection Setup**.
2. The **Operating System Selections Setup** screen displays. Select the primary operating system from the list displayed.

7.9.2 Primary Operating System and the Auto Start Option

The process of setting up your operating system selections is similar to using an editor. You can make changes to your operating system selections and then either save your changes or exit without saving.

Figure 7-27 Operating System Selection Setup



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AlphaBIOS boots Windows NT in two stages. The first stage involves reading an OS Loader program from a disk. As of Windows NT version 4.0, the name of the OS Loader program is OSLOADER.EXE. The selection for the operating system must describe the path where AlphaBIOS will find the OS Loader program. Note that the OS Loader program *must* be located on a partition formatted with the FAT file system.

Once the OS Loader program executes, it uses the services provided by AlphaBIOS to load the operating system components. After the operating system is loaded, the OS Loader starts execution of the operating system.

- ❶ Primary operating system — The OS that appears first on the **AlphaBIOS Boot** screen. It is also the version of the OS that automatically starts if **Auto Start** is selected. Any of the operating system selections can be the primary operating system.
- ❷ Boot name — Each boot name is associated with an operating system selection. Windows NT setup automatically creates a boot name each time you install the operating system. Because the boot name is only a name, you can modify it at any time without affecting the rest of the operating system selection. Note that the boot name must have at least one character.
- ❸ Boot file — Describes the disk, partition, path, and name of the file that AlphaBIOS passes control to during the process of starting the operating system. This setting is created along with the operating system selection during Windows NT setup, and it is usually not modified by the user. However, this setting can be modified if necessary. For example, a developer testing different versions of OSLOADER.EXE can store the different versions in different locations and modify this line to start the operating system with the different versions as needed.

During **Operating System Selection Setup**, you can select the disk and partition for the location of the boot file from a list of choices presented in a list box. To open a list of values for the field, press the Alt and down arrow keys together. When you select a boot file location and name, AlphaBIOS searches for the specified program on the specified partition. If the search fails, a warning displays, saying that the file does not exist. You are given the choice to continue with the changes anyway or to cancel the operation and fix the problem.

Note that because the boot file must be located in a FAT partition, only FAT partitions are available as the boot partition within the list box.

Continued on next page

- ④ OS path — Describes the disk, partition, and path to the operating system root directory for an operating system selection.

During **Operating System Selection Setup**, you can select the disk and partition for the location of the boot file from a list of choices presented in a list box. To open a list of possible values for the field, press the Alt and down arrow keys at the same time. When you select or enter an OS path, AlphaBIOS searches for the directory. If the search fails, a warning displays, saying that the directory does not exist. You are given the choice to continue with the changes anyway or to cancel the operation and fix the problem.

- ⑤ OS options — Lists the startup parameters passed to the operating system for an operating system selection. One example of a startup parameter is whether to start the operating system in debug mode. By default, Windows NT does not add any entries to this field. This field can be modified.

- ⑥ **Operating System Selection Setup** options — You can use the options listed at the bottom of the screen to edit operating system selections. When you edit an OS selection, the fields of the OS selection are validated when you exit the OS Selection Setup screen. Depending on the option you choose, one of the following dialog boxes will display.

New OS selection (Insert key) — Displays the **Insert New Operating System Selection** dialog box, with default values for the new OS selection already filled in. You can change these values as necessary.

Delete OS selection (Delete key) — Tags the currently selected OS selection for deletion. Although the OS selection is removed from the screen, it is not actually deleted until you save changes.

You can also delete all of your OS selections at once by pressing the Control and Delete keys at the same time while in the **Operating System Selection Setup** screen.

NOTE: If you delete all the OS selections, a dialog box displays informing you that no OS selections exist and offering three options. You can create a new OS selection, exit without saving changes, or exit and save changes.

Continued on next page

Edit OS selection (F6 key) — Edit all values of an OS selection by selecting the OS selection to edit and pressing F6. A dialog box displays with current information. You can then edit the OS selection fields.

Copy OS selection (F7 key) — Create a new OS selection by using an existing OS selection as a template. To do this, select the OS selection you want to copy and press F7. A dialog box displays with the values of your OS selection. You can then edit the OS selection fields. Note that if you do not make any changes, a duplicate copy of the OS selection you copied is made.

Primary operating system (F8 key) — Sets the selected OS selection as the primary operating system. When you make an OS selection primary, it is displayed first on the **Operating System Selection Setup** screen with the text “Primary Operating System.” In addition, the primary operating system is displayed first on the **AlphaBIOS Boot** screen and is automatically started if Auto Start is enabled.

Validate OS selection (F9 key) — Validates the fields in the currently selected OS selection. The validation routine checks that the OS loader file and OS directory fields contain valid paths, and that the OSLOADER.EXE file exists in the directory specified. At the end of the validation, a dialog box displays describing the results of the validation. If there is an error in an OS selection, the validation routine displays a dialog box describing the component of the OS selection that is in error. At this point you can choose to edit the OS selection to correct the error, or delete the OS selection altogether.

You can also validate all OS selections at once by pressing the Control and F9 keys at the same time. All OS selections are validated in the order they are listed on screen.

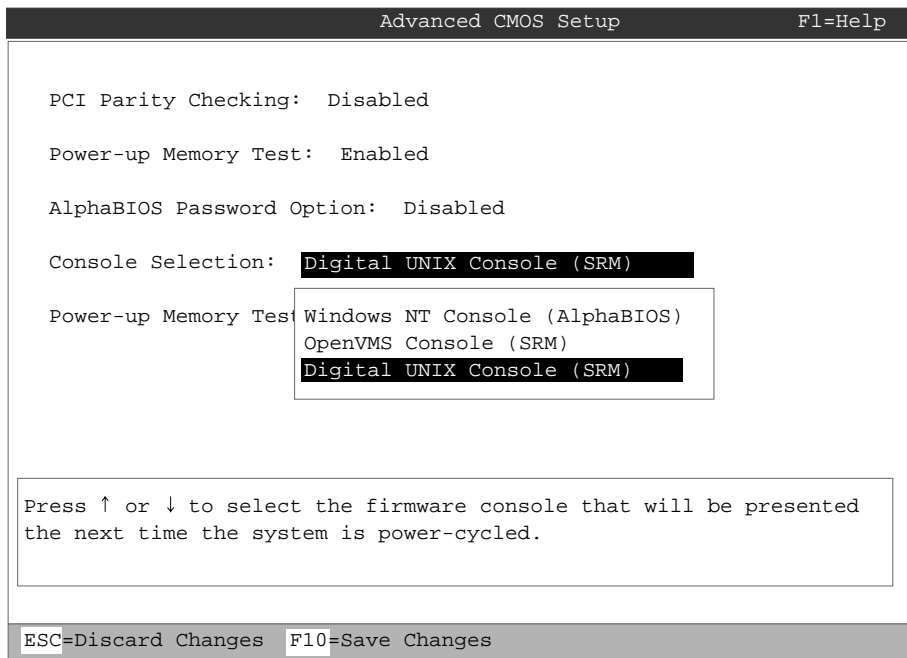
Discard changes (Escape key) — Returns to the **AlphaBIOS Setup** screen without saving changes.

Save changes (F10 key) — Saves changes and returns to the **AlphaBIOS Setup** screen.

7.10 Switching from AlphaBIOS to the SRM Console

It is necessary to switch to the SRM console to boot DIGITAL UNIX or OpenVMS or to run firmware-based diagnostics. To switch from AlphaBIOS to the SRM console, press in the Halt button (the amber LED lights) and reset the system, or select DIGITAL UNIX (SRM) or OpenVMS (SRM) from the Advanced CMOS Setup screen and reset the system.

Figure 7-28 Switching to the SRM Console



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DIGITAL UNIX and OpenVMS are booted and firmware-based diagnostics are run from the SRM console. Follow this procedure to switch from AlphaBIOS to SRM:

1. Select CMOS Setup and press Enter.
2. In the CMOS Setup screen press F6. The **Advanced CMOS Setup** screen displays.
3. Select **DIGITAL UNIX console (SRM)** or **OpenVMS console (SRM)** and press F10.
4. The CMOS Setup screen displays. Press F10 to save the change.
5. Run the EISA Configuration Utility, using the ECU diskette for DIGITAL UNIX and OpenVMS.

NOTE: ECU must be run before booting DIGITAL UNIX or OpenVMS.

6. Reset the system.

Alternatively, you can press the Halt button (the LED on the button lights) and reset the system.

The method you choose depends on how you want the system to function on subsequent resets:

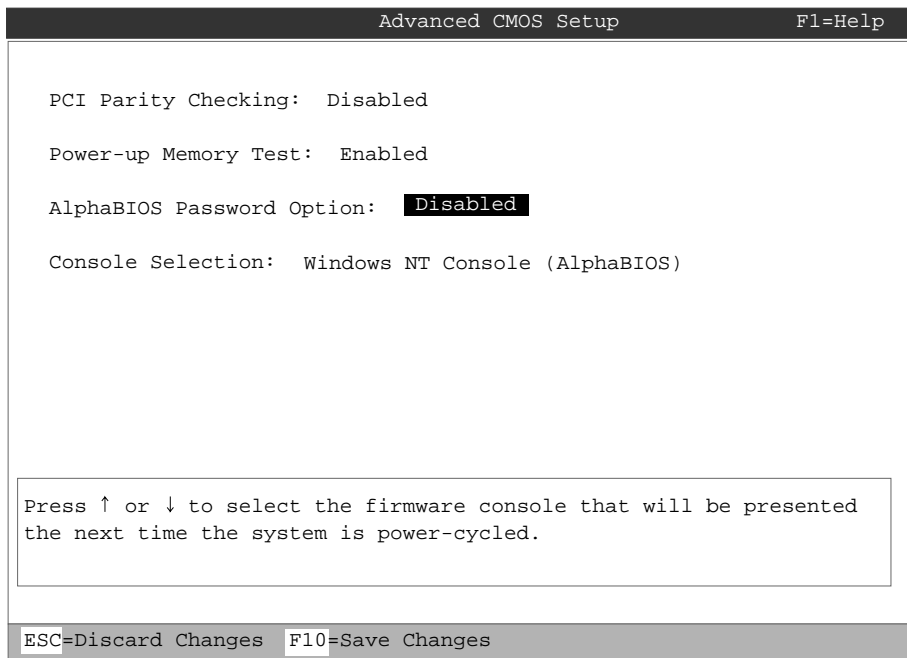
- If you make the selection in the **Advanced CMOS Setup** screen, the system will continue to stop in the SRM console whenever it is powered-up, reset, or initialized until the Windows NT operating system is again specified.
- If you press the Halt button and reset, no system setup information is changed, and AlphaBIOS will start the next time the system is powered-up, reset, or initialized with the Halt button out (the amber LED is off).

To return to the AlphaBIOS console, issue the command **alphabios** at the SRM console prompt.

7.11 Setting Up Password Protection

Password protection provides two levels of security for your system: setup protection and startup protection.

Figure 7-29 Advanced CMOS Setup Menu



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Password protection provides two levels of security for your system: setup protection and startup protection. When system setup protection is enabled, a password is required to start AlphaBIOS setup. When startup password protection is enabled, a password is required before the system initializes.

To enable password protection:

1. From the **AlphaBIOS Setup** screen, select **CMOS Setup** and press Enter.
2. In the **CMOS Setup** screen, press F6 to enter **Advanced CMOS Setup** mode.
3. In the **Advanced CMOS Setup** screen, shown in Figure 7–29, select **AlphaBIOS Password Option**. Use the arrow keys to select the type of protection you want. An explanatory dialog box appears. Read the dialog box and press Enter to continue.
4. Enter your password in the **Enter New Password** dialog box then press Enter.
5. Enter your password in the **Confirm New Password** dialog box then press Enter.
6. Press F10 to save your changes.

NOTE: If you want to change your password, simply set up your password again.

7.12 Running AlphaBIOS from a Serial Terminal

You can set up a serial terminal to run the AlphaBIOS console and the ECU.

You can interface with the AlphaBIOS console and run the ECU from a serial terminal (VT200 or higher, or equivalent). Table 7-1 gives the serial terminal key equivalents of the graphics monitor keyboard commands.

Table 7-1 Serial Terminal Key Commands for AlphaBIOS and ECU

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 + [

To use a serial terminal with AlphaBIOS or ECU:

1. Invoke the terminal setup utility as described in the documentation for the serial terminal and change settings as follows:
 - From the General menu, set the terminal mode to VTxxx, 8-bit controls.
 - From the Comm menu, set the character format to 8 bits, no parity, and set receive to 128 or greater.
 - From the Keyboard menu, set the keyboard so that the tilde (~) key sends the escape (ESC) signal.
2. Enter the following commands at the SRM console prompt to set the console terminal to receive input in serial mode:

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

```
>>> init
```

```
.
```

```
. ! Now switch to the serial terminal
```

```
>>> show console
```

```
console      serial
```


Chapter 8

Server Management Console

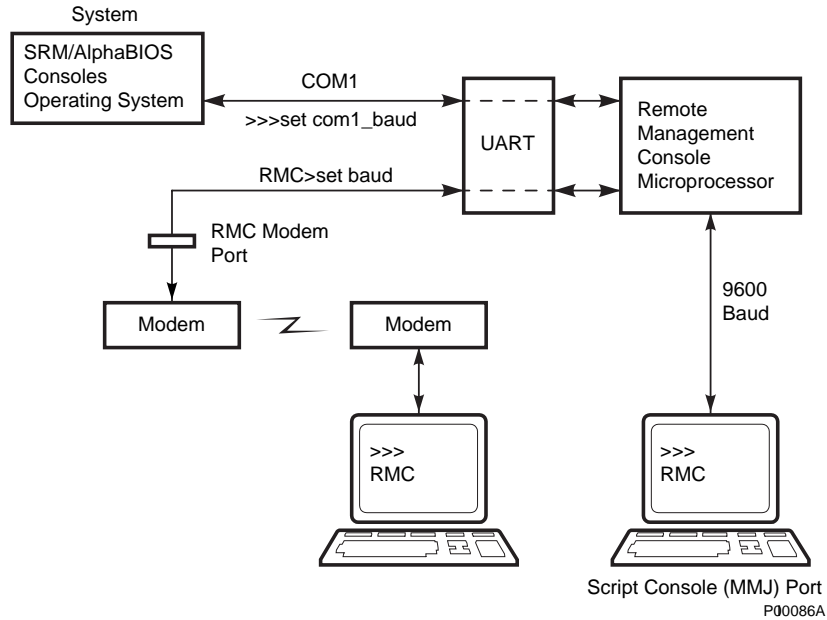
This chapter describes the function and operation of the integrated server management console. Sections are:

- Operating the System Remotely
- RMC Functions
- First Time Setup
- Resetting the RMC to Factory Defaults
- Remote Management Commands

8.1 Operating the System Remotely

The remote management console (RMC) enables the user to monitor and control the system remotely. The RMC resides on the system backplane and allows a remote operator to connect to the system through a modem, using a serial terminal or terminal emulator.

Figure 8-1 Remote Management Console Block Diagram



8.2 RMC Functions

This remote management console (RMC) is accessible to the operator through either of two serial lines: the standard console terminal COM1 (MMJ) port or the RMC modem port.

You can access RMC through one of two serial lines: the standard console terminal COM1 (MMJ) port or the RMC modem port (9-pin DIN).

- To enter the RMC console remotely, dial in through a modem, enter a password, and then type a special escape sequence that invokes the RMC command mode. The default escape sequence is either `^[^rmc`, or `^[^rcm`. These are equivalent to `<Esc><Esc>rmc` and `<Esc><Esc>rcm`, where `<Esc>` is the escape key on a PC keyboard. Some AlphaServer 800 units respond to `^[^rmc` and others to `^[^rcm`. So, if you cannot invoke the RMC command mode using one default sequence, use the alternate default sequence. The default string can be changed using the **set escape** command. Before you can dial in remotely, you must set up the RMC initialization and dial strings. Refer to Section 8.3 for first time setup instructions.
- To enter the RMC console locally, type the escape sequence at the SRM console prompt on the local serial console terminal (MMJ).

You can also enter the RMC console from the local graphics monitor by entering the RMC command at the SRM console prompt, and then entering the escape sequence. When finished accessing the RMC console from the graphics monitor, enter the reset command to restore the RMC and SRM consoles.

Once connected to the RMC, you can use a special set of remote console commands, distinct from the standard SRM and AlphaBIOS consoles. The RMC commands allow the operator to remotely monitor power supply status, system temperature, and fan status. They also allow the remote operator to exercise control over the system equivalent to using the system control panel: Power off/on, Reset, and Halt (in/out).

The RMC logic can dial a preset telephone number when it detects system alarm conditions. A typical scenario might be:

1. RMC detects an alarm condition due to excessive temperature.
2. RMC dials the operator's pager and sends a message identifying the system.
3. Operator dials the system from a remote serial terminal.
4. Logging into the RMC, the operator checks system status and powers down the system.
5. Later the operator powers up the system and reboots.

The remote operator can disconnect (using the **quit** command) from the RMC and connect to the system's COM1 port. This allows the operator to use the remote terminal to communicate with the software and firmware that normally use the local serial terminal:

- SRM and AlphaBIOS firmware consoles
- ECU and RCU configuration utilities
- Operating systems

The RMC also provides a watchdog timer, whose interval is set using the RMC **set wdt** command. If the system fails to respond within the watchdog timer interval, the RMC recognizes an alert and dials the remote operator. (This assumes that dial-out alerts have been set up using the commands **enable remote**, **set dial**, and **enable alert**). The watchdog timer alert also causes the RMC to reboot the system automatically, if the **enable reboot** command has been issued.

8.3 First Time Setup

Use the procedure described below to be able to dial in remotely through the RMC modem port.

Before you can dial in remotely through the RMC modem port or enable the system to call out to a remote operator in response to system alerts, a modem must be connected and several RMC strings and parameters must be set. Use the following procedure to set up RMC strings, password and parameters; and to send out a test alert to verify that the modem strings are set correctly.

1. From the local console terminal, enter the RMC escape sequence at the SRM prompt.

You can also enter the RMC console from the local graphics monitor by entering the **rmc** command at the SRM console prompt, and then entering the escape sequence. When finished accessing the RMC from the graphics monitor, enter the **reset** command to restore the RMC and SRM consoles.

2. Using the RMC command **set init**, assign the modem initialization string appropriate for your modem. Some typical initialization strings are:

Modem	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

Refer to your modem documentation for more information on its initialization strings.

3. Using the RMC commands **set dial** and **set alert**, assign a dial string to be called when the RMC detects an alert condition, as well as a string to be used with a paging service, usually a call-back number for the paging service.

When an alert is sent, the dial string and alert string are concatenated and sent to the modem. Note that the dial and alert strings must be in the correct string format for the attached modem. If a paging service is to be contacted, then the dial and alert strings must include the appropriate modem commands to dial the number, wait for the line to connect, and send the appropriate touch tones to leave a pager message. Elements of a dial and alert strings are provided in Table 8-1.

Table 8-1 Dial and Alert String Elements

String Elements	Description
Dial String	
ATXDT	(Enter characters either in all upper case or all lower case). AT = Attention X = Forces the modem to dial “blindly” (not look for the dial tone). Enter this character if the dial-out line modifies its dial tone when used for services such as voice mail. D = Dial T = Tone (for touch-tone) , = Pause for 2 seconds.
9,	In the example, “9” gets an outside line. Enter the number for an outside line if your system requires it.
15085553333	Dial the paging service.
Alert String	
,,,,,	Pause for 12 seconds for paging service to answer (each comma (,) provides a 2-second delay).
5085553332#	“Message,” usually a call-back number for the paging service. The alert string must be terminated by the # character.
;	Return to console command (;) character must be used to terminate the string.

4. Using the RMC command **set password**, assign a password of up to 14 characters that will be stored in nonvolatile memory. This password must be set before access through the modem port can be enabled.
5. Use the RMC command **set user** to write a system Id or any message of your choice (up to 63 characters) to appear in the User String line of the platform status.
6. Using the RMC command **enable remote**, enable access to the to RMC modem port. This also allows the RMC to automatically dial the phone number set by

the dial string upon detection of an alert condition and to send the modem initialization string to the modem.

7. Using the RMC command **enable alert**, enable alert condition to page an external operator.
8. Using the RMC command **send alert**, force an alert condition in order to test the dial out function and verify proper setup of the modem initialization, dial, and alert strings.
9. Once the alert is received successfully, use the RMC command **clear alert** to clear the current alert condition and cause the RMC to stop paging the remote operator. If the alert is not cleared, the RMC continues to page the remote operator approximately every 30 minutes.

Example First Time Setup:

```
RMC> status
```

PLATFORM STATUS:

```
Firmware Revision: V2.0  
Server Power: ON  
Fan state: OK  
System Halt: Deasserted  
Temperature: 29.0°C (warnings at 46°C, power-off at 52°C)  
RMC Power Control: ON  
Escape sequence: ^^[RMC  
Remote Access: Disabled  
Alert Enable: Disabled  
Alert Pending: NO  
Init String:  
Dial String:  
Alert String:  
Modem and COM1 baud: 9600  
Last Alert:  
Watchdog Timer: 60 seconds  
Autoreboot : OFF  
User String:
```

```
RMC> set init
```

```
init> at&f0e0v0x0s0=2
```

```
RMC> set dial
```

```
dial> atxdt9,15085553333
```

```
RMC> set alert
```

```
alert> ,,,,,,5085553332#;
```

```
RMC> set password
```

```
new pass> *****  
RMC> set user  
user> System 1  
RMC> enable remote  
RMC> enable alert  
RMC> send alert  
RMC> clear alert  
RMC> status
```

PLATFORM STATUS:

```
Firmware Revision: V2.0  
Server Power: ON  
Fanstate: OK  
System Halt: Deasserted  
Temperature: 29.0°C (warnings at 46°C, power-off at 52°C)  
RMC Power Control: ON  
Escape sequence: ^^[RMC  
Remote Access: Enabled  
Modem Password: Set  
Alert Enable: Enabled  
Alert Pending: NO  
Init String: at&f0e0v0x0s0=2  
Dial String: atxdt9,15085553333  
Alert String: ,,,,,,5085553332#;  
Modem and COM1 baud: 9600  
Last Alert: RMC User Requested  
Watchdog Timer: 60 seconds  
Autoreboot : OFF  
User String: System 1
```

8.4 Resetting the RMC to Factory Defaults

Use the procedure below to restore factory default settings.

If you have forgotten the password, or have changed and forgotten the RMC escape sequence, you can reset the RMC to its factory settings. Use the following procedure to restore the default settings:

1. Unplug the system line cord from the AC power line.
2. Open the system side panel.
3. Install jumper J22 on the system board.
4. Plug the system line cord into the AC power line for approximately 15 seconds.
5. Unplug the system line cord from the AC power line.
6. Remove jumper J22.
7. Close the system side panel.
8. Plug the system line cord into the AC power line.

NOTE: After resetting to default settings, you should complete the first time setup procedures to enable remote dial in and call out alerts.

This process:

1. Clears the password
2. Clears the dial string
3. Clears the init string
4. Clears the user string
5. Sets the escape sequence to `^[^RMC`
6. Clears the alert string
7. Resets the baud rates to 9600

8.5 Remote Management Console Commands

The remote management console commands are listed and explained below.

The remote management console supports the following commands:

- clear** {alert, port}
- disable** {alert, reboot, remote}
- enable** {alert, reboot, remote}
- halt** {in, out}
- hangup**
- help** or ?
- power** {off, on}
- quit**
- reset**
- send alert**
- set** {alert, baud, dial, escape, init, password, user, wdt}
- status**

Explanations and examples of the RMC command set follow. For each command, the minimal abbreviation is given in parentheses.

clear alert (clear a)

The **clear alert** command clears the current alert condition and causes the RMC to stop paging the remote operator. If the alert is not cleared, the RMC continues to page the remote operator every 30 minutes, assuming both remote access and alerts are enabled.

Example:

```
RMC> clear alert
```

```
RMC>
```

clear port (clear p)

The **clear port** command uses the console port modem control signals to clear any “stuck” conditions on the system’s COM1 port. The object is to attempt to free the port using the COM1 port modem control lines if it is currently locked by some application program without resetting the entire system.

Example:

```
RMC> clear port
```

```
RMC>
```

disable alert (disable a)

The **disable alert** command disables alert conditions from paging an external operator. Monitoring continues and alerts are still logged in the “last alert” field; however, alerts are not sent to the remote user.

Example:

```
RMC> disable alert
```

```
RMC>
```

disable reboot (disable reb)

The **disable reboot** command disables automatic reboot of the system when the watchdog timer expires.

Example:

```
RMC> disable reboot
```

```
RMC>
```

disable remote (disable rem)

The **disable remote** command disables the remote access to RMC modem port and disables the automatic dialing on alert condition detection.

Example:

```
RMC>disable remote
```

```
RMC>
```

enable alert (enable alert)

The **enable alert** command enables alert conditions to page an external operator.

Example:

```
RMC> enable alert
```

```
RMC>
```

enable reboot (enable reb)

The **enable reboot** command enables automatic reboot of the system when the watchdog timer expires. The watchdog timer is enabled and operated by the operating system.

Example:

```
RMC> enable reboot
```

```
RMC>
```

enable remote (enable rem)

The **enable remote** command enables access to the RMC modem port. This command also allows the RMC to automatically dial the phone number set with the **set dial** command upon detection of alert conditions. The **enable remote** command causes the modem initialization string to be sent to the modem (see **set init** command).

*NOTE: The RMC password must be set for the **enable remote** command to succeed.*

Example:

```
RMC>enable remote
```

```
RMC>
```

halt in (halt I)

The **halt in** command is the equivalent of setting the Halt button on the server front panel to the latching “in” position. After executing the **halt in** command, the user is switched from the RMC monitor to the server’s COM1 port. Note that a local operator physically powering off the system through the system front panel will override this command and reset the **halt** command to the “out” condition.

Example:

```
RMC>>halt in
```

Returning to COM port.

halt out (halt o)

The **halt out** command is the equivalent of setting the Halt button on the server front panel to the “out” position. After executing the **halt out** command, the user is switched from the RMC monitor to the server’s COM1 port. Note that a local operator physically placing the front panel Halt button to the “In” position takes precedence over the setting of this command.

Example:

```
RMC>>halt out
```

Returning to COM port.

Hangup (han)

The **hangup** command terminates the modem session. Once issued, the user will no longer be connected to the server.

Example:

```
RMC>>hangup
```

```
RMC>
```

help or ? (he)

The **help or ?** command displays the command set.

Example:

```
RMC>>help
```

```
clear {alert, port}  
disable {alert, reboot, remote}  
enable {alert, reboot, remote}  
halt {in, out}  
hangup  
help or ?
```

```
power {off, on}
quit
reset
send alert
set {alert, baud, dial, escape, init, password, user, wdt}
status
```

power off (power of)

The **power off** command is the equivalent of turning off the system power from the operator control panel. If the system is already powered off, this command will have no effect. The system can be powered back on by either issuing a **power on** command or by toggling the power button on the system front panel.

Example:

```
RMC>>power off
RMC>
```

power on (power on)

The **power on** command is the equivalent of turning on the system power from the operator control panel. If the system is already powered on or if the system is powered off through the system power button, this command has no effect. After executing the **power on** command from the RMC monitor, the user is switched back to the server's COM1 port.

Example:

```
RMC>>power on
Returning to COM port.
```

Quit (quit)

The **quit** command is used to exit console monitor mode and return to pass-through mode.

Example:

```
RMC>>quit
```

Returning to COM port.

reset (reset)

The **reset** command is the equivalent of pushing the Reset button on the operator control panel. It causes a full re-initialization of the system firmware. When the **reset** command is executed, the user's terminal exits console monitor mode and reconnects to the server's COM1 port.

Example:

```
RMC>>reset
```

Returning to COM port.

send alert (send a)

The **send alert** command forces an alert condition. This command can be used to test the setup of the alert dial out function or to send an alert condition when a system application program is connected to the RMC monitor program.

Example:

```
RMC> send alert
```

```
RMC>
```

set alert (set a)

The **set alert** command sets the alert string that is transmitted through the modem when an alert condition is detected. This string should be set to some meaningful value such as the system remote access phone number. An application on the remote system could monitor incoming alert strings and take appropriate action. The maximum string length is 47 characters. When the alert is sent, the dial string and alert string are concatenated and sent to the modem.

Example:

```
RMC> set alert
alert> ,,,,,,,5085551212#;
RMC>
```

“,” is used to cause a 2-second delay, which may be helpful when sending data to numeric paging services.

“#,” must be used to terminate the alert string.

set baud (set b)

The **set baud** command sets the baud rate on the RMC modem port and on the internal COM1 serial interface. Allowed values are 1, 2, and 3. Note that the microcontroller port that is connected to the 6-pin MMJ connector for the local console terminal is not affected. This port is fixed at 9600 baud.

It is important that the baud rate being used by the operating system or console (`com1_baud`) be changed before using this command; otherwise the remote operator will not be able to communicate with the system.

Consider the following before changing the baud rate:

- The value of the SRM **com1_baud** environment variable is saved in nonvolatile memory, while the value of the RMC **set baud** command is not. If you have changed the baud rate and the power fails, the RMC modem baud rate will return to the default value (9600) and the `com1_baud` rate would have to be changed locally before a remote dial in could be reestablished.
- The ECU and RCU configuration utilities only run at the 9600 baud rate setting.
- DIGITAL UNIX requires that a file be edited to match the new baud rate, or the operating system will not reboot successfully.

The following example uses the SRM console.

*NOTE: If a modem is being used, the **enable remote** command must be issued following the **set baud** command in order to set the modem to the new baud rate. Note also, that the RMC monitor does not allow the **set baud** command to be executed from the modem connection. For example:*

```
RMC> set baud
* Error-command not allowed from modem connection *
RMC>
```

Example:

```
>>> show com1_baud
com1_baud          9600
>>> set com1_baud 38400
^^{RMC
RMC> set baud
baud (1=9600, 2=19200, 3=38400)>3
RMC> quit
```

Returning to COM port

```
>>> show com1_baud
com1_baud          38400
>>>
```

set dial (set d)

The **set dial** command sets the dial string to be used when the RMC detects an alert condition. Note that this string must be in the correct dial string format for the attached modem. If a paging service is to be contacted, then the dial string must include the appropriate modem commands to dial the number, wait for the line to connect, and send the appropriate touch tones to leave a pager message. The dial string is limited to 31 characters.

Example:

```
RMC> set dial
dial> ATXDT15085551234
RMC>
```

set escape (set e)

The **set escape** command allows the user to change the escape sequence. The escape sequence can be any character string. A typical sequence consists of two or more control characters for a maximum of 14 characters. It is recommended that control characters be used in preference to ASCII characters.

Example:

```
RMC> set escape  
new esc> ^[^rmc  
RMC>
```

set init (set i)

The **set init** command sets the modem initialization string. This string is limited to 31 characters and may be modified depending on the type of modem used. Some typical initialization strings are:

Modem	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

Example:

```
RMC> set init  
init> at&f0e0v0x0s0=2  
RMC>
```

set password (set p)

The **set password** command allows the user to change the password that is prompted at the beginning of a modem session. The password is stored in nonvolatile memory. The maximum password length is 14 characters. The password is not echoed on the user's terminal. The password must be set before access through the modem can be enabled.

Example:

```
RMC> set pass  
new pass> *****  
RMC>
```

set user (set u)

The **set user** command allows the user to set a string of up to 63 characters for system identification or any desired message.

Example:

```
RMC> set user  
user> System last serviced on 08/15/98  
RMC>
```

set wdt (set w)

The **set wdt** command sets the time-out period for the system watchdog timer. Allowable values are:

- 0 (disabled)
- 1 (10 seconds)
- 2 (20 seconds)
- .
- 9 (90 seconds)

Example:

```
RMC> set wdt  
time (0-9 tens of seconds)> 3  
RMC>
```

status (sta)

The **status** command displays the current state of the server's sensors, as well as the current escape sequence and alarm information.

Example:

```
RMC> status
```

PLATFORM STATUS:

```
Firmware Revision: V2.0  
Server Power: ON  
Fanstate: OK  
System Halt: Deasserted  
Temperature: 29.0°C (warnings at 46°C, power-off at 52°C)  
RMC Power Control: ON  
Escape sequence: ^^[RMC  
Remote Access: Enabled and connected  
Alert Enable: Disabled  
Alert Pending: NO  
Init String: At&f0e0v0x0s0=2  
Dial String: atxdt815085551212  
Alert String: ,,,,,,,5085551234#;  
Modem and COM1 baud: 9600  
Last Alert:  
Watchdog Timer: 60 seconds  
Autoreboot : ON  
User String: System last serviced on 08/15/98  
RMC>
```

8.6 RMC Troubleshooting Tips

Table 8-2 lists a number of possible causes and suggested solutions for symptoms you might see.

Table 8-2 RMC Troubleshooting

Symptom	Possible Cause	Suggested Solution
The local terminal will not communicate with the system or RMC.	System, terminal, or RMC baud rate set incorrectly.	Set the baud rates for the system, RMC, and terminal to 9600 baud. For first-time setup, suspect the console terminal, since the RMC and system default is 9600.
RMC will not answer when the modem is called.	Modem cables may be incorrectly installed.	Check modem phone lines and connections.
	RMC remote access is disabled.	Enable remote access.
	RMC does not have a valid password set.	Set password and enable remote access.
	On power-up, the RMC defers initializing the modem for 30 seconds to allow the modem to complete its internal diagnostics and initializations.	Wait 30 seconds after powering up the system and RMC before attempting to dial in.
	Modem may have had power cycled since last being initialized or modem is not set up correctly.	Enter enable remote command from RMC console.

Table 8-2 RMC Troubleshooting (Continued)

Symptom	Possible Cause	Suggested Solution
After the system is powered up, the COM1 port seems to hang and then starts working after a few seconds.	This delay is normal behavior due to initialization.	Wait a few seconds for the COM1 port to start working.
New password and escape sequence are forgotten.		Reset the RMC console to its factory default settings. Refer to Section 8.4.
The remote user sees a “+++” string on the screen.	The modem is confirming whether the modem has really lost carrier. This occurs when the modem sees an idle time, followed by a “3,” followed by a carriage return, with no subsequent traffic. If the modem is still connected, it will remain so.	This is normal behavior.
The message “unknown command” is displayed when the user enters a carriage return by itself.	The terminal or terminal emulator is including a line feed character with the carriage return.	Change the terminal or terminal emulator setting so that “new line” is not selected.
Cannot enable modem or modem will not answer.	The modem is not configured correctly to work with the RMC.	Modify the modem initialization string according to your modem documentation.
Status command displays “Last alert: AC power failure.”	The system lost power due to a main power loss or AC power failure during the previous run.	Disable alerts before powering off or unplugging the system.

Using the Hard Disks

The AlphaServer 800 system supports four SCSI hard disk storage devices located in the cage right below the CD-ROM drive. The cage is accessed from the front door of the unit. The system is shipped with at least one drive. Additional drives can be easily installed following the procedures given in Chapter 10.

9.1 SCSI Bus Controller

The embedded SCSI controller on the system board:

- Supports up to seven drives.
- Provides 8-bit fast narrow SCSI support for up to three 5.25-inch internal, half-height removable-media devices.
- Provides 16-bit wide ULTRA SCSI support for up to four 3.5-inch, internal hard disk drives.

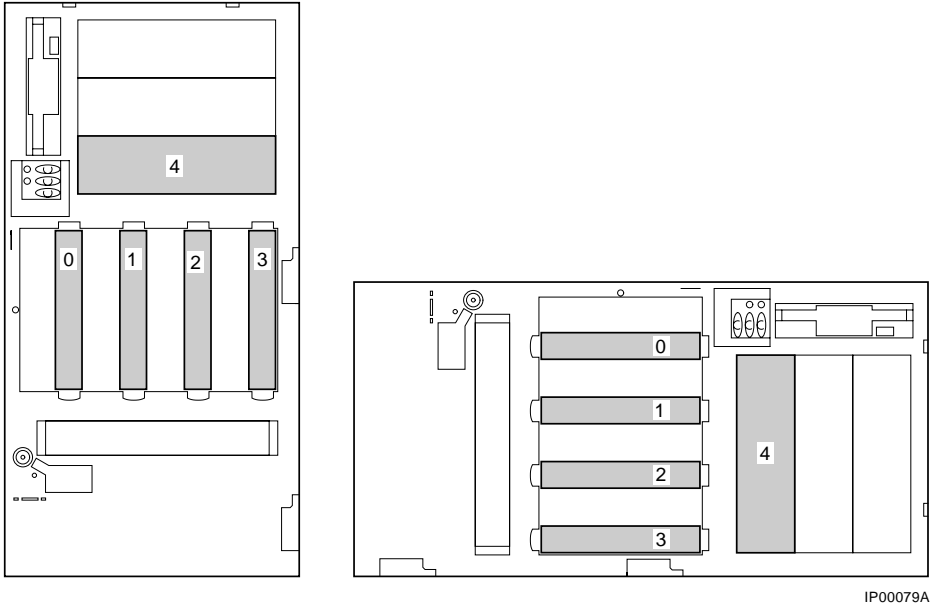
9.2 Configuration

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.

The IDs of the hard drives are automatically assigned by the backplane from 0 to 3, as shown in Figure 9-1. The drive ID is identical to the slot ID.

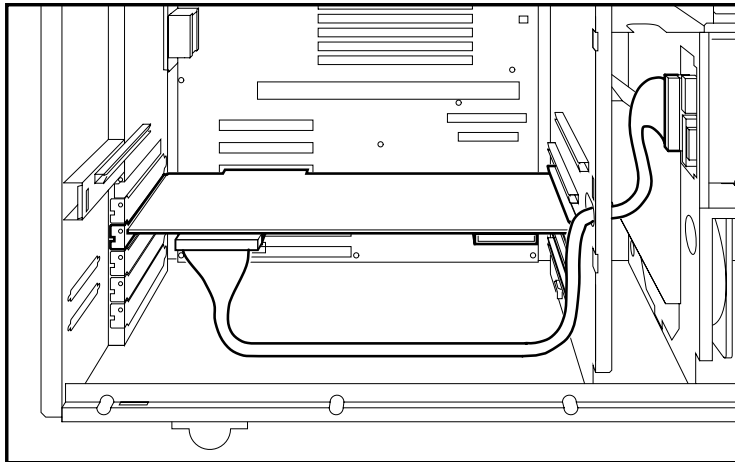
NOTE: The CD-ROM drive is assigned SCSI ID 4 at the factor and SCSI ID 14 is reserved for the SCSI monitor device on the backplane.

Figure 9-1 SCSI Drive IDs



If you plan to connect the internal hard disk drives to a RAID controller option, you may need to use the cable provided in the cable kit. This cable provides additional length needed to reach the connector on the option card. Figure 9-2 shows the cable routing from the hard disk backplane to the storage controller option.

Figure 9-2 RAID Cable for Hard Disk Drives



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*NOTE: If you replace the internal SCSI controller with a RAID controller, **you must disable Fault Management** when you run the RAID configuration utility (RCU). If there are no “hot spare” drives configured in your system and a failure occurs on a redundant RAID set, you must use either the online management utilities or the RCU to do a manual rebuild of the redundant set when you insert a new drive in the slot of the failed drive. If a hot spare is configured and a failure occurs on a redundant RAID set, the hot spare will be used in place of the failed drive. When you replace the failed drive, use the RCU to make the drive a hot spare.*

9.3 External SCSI Expansion

External SCSI devices, such as tabletop or rackmounted storage devices, can be connected to the system using EISA- or 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 10

Installing Components

This chapter explains how to prepare for 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:

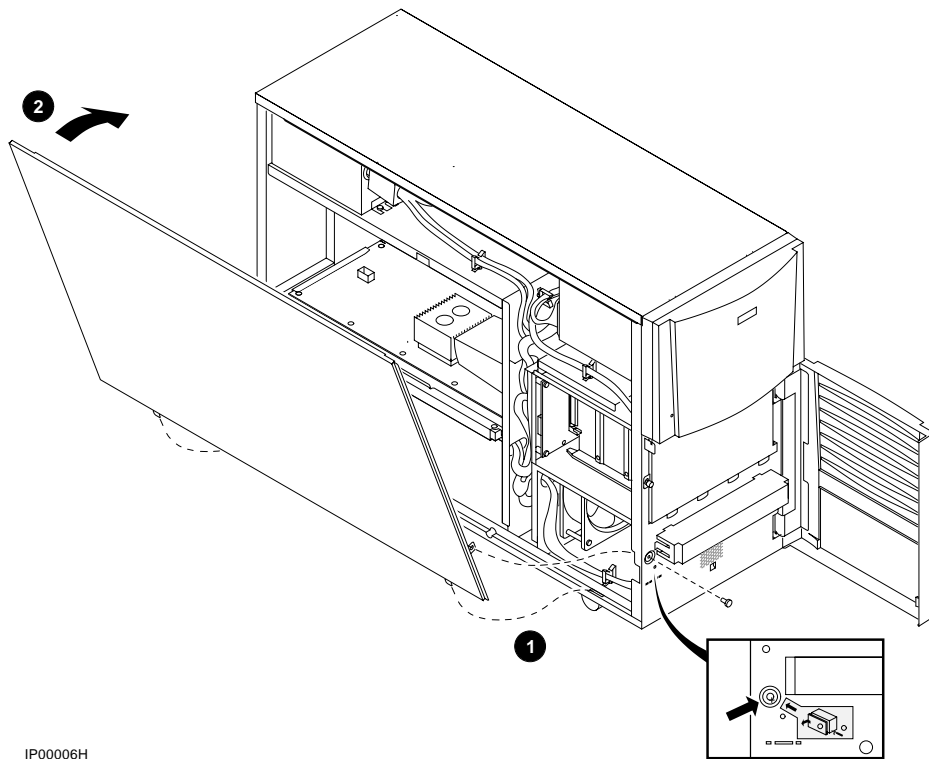
- Preparing to Install or Remove Components
- Removing and Installing Memory DIMMs
- Removing and Installing Option Cards
- Installing Storage Devices
- Removing/Replacing Other Options

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

10.1 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.

Figure 10-1 Removing/Replacing Side Panel on a Pedestal



IP00006H

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/Off buttons on all external options connected to the system to the off position.
3. Set the On/Off button on the system unit to the off position.
4. Unplug the power cord.

To remove the side panel on a pedestal

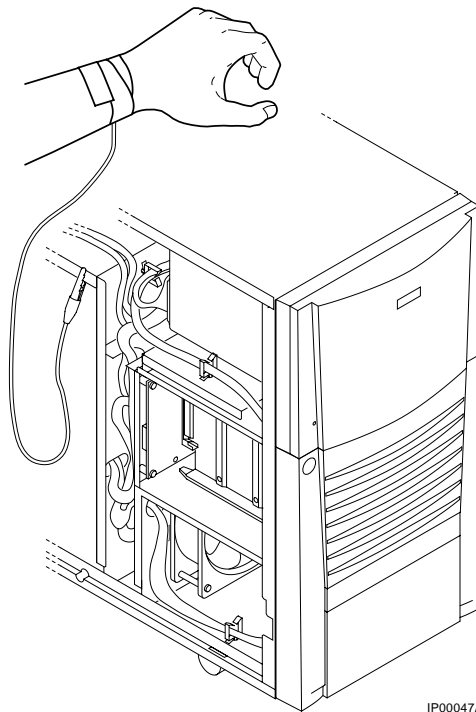
1. Remove the screw attaching the side panel to the chassis. See Figure 10-1.
2. Remove the panel with an upward and forward motion.
3. Attach antistatic wrist strap as shown in Figure 10-2.

To replace the side panel on a pedestal

Refer to Figure 10-1 and replace the side panel of the pedestal as follows:

1. Align and lower the two bottom tabs into the chassis **❶**.
2. Swing the top of the panel up to the chassis **❷**.
3. Slide the panel forward.
4. Replace the screw.

Figure 10-2 Attaching the Antistatic Wrist Strap



IP00047A

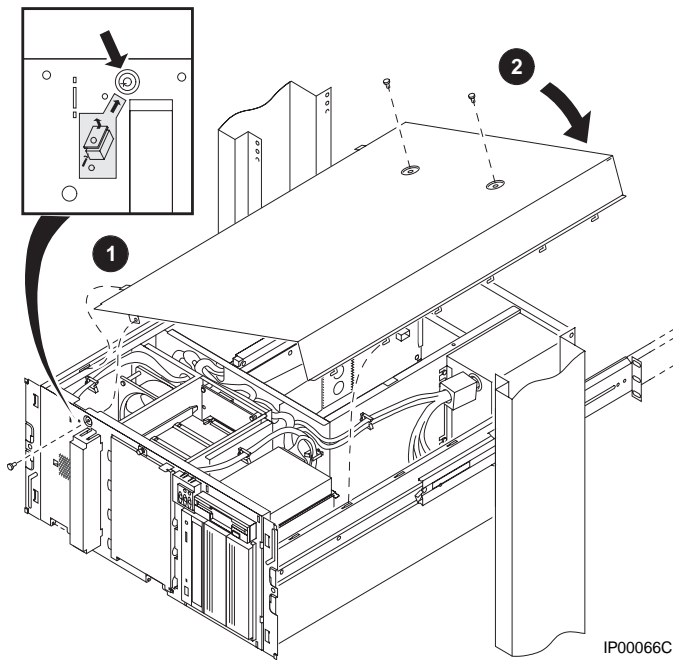
To remove the top cover on a rackmount

1. Remove the screws attaching the top cover to the chassis. See Figure 10-3.
2. Remove the panel.
3. Attach antistatic wrist strap as shown in Figure 10-2.

To replace the top cover on a rackmount

1. Align and insert in place the two tabs along the left edge.
2. Lower the panel aligning the hooks along the right side.
3. Slide the panel forward.
4. Replace the screw.

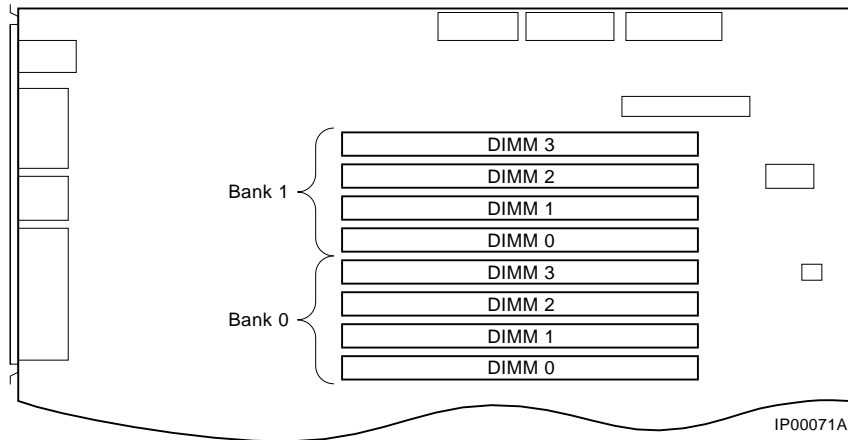
Figure 10-3 Removing/Replacing Top Cover on a Rackmount



10.2 Removing and Installing Memory DIMMs

There are eight slots for memory DIMMs. The lower four slots are used for Bank 0, the upper four slots are used for Bank 1 (Figure 10-4). Each bank can be configured with up to 1 Gbyte. A memory bank must be populated with 4 DIMMs of the same capacity. Figure 10-5 shows how to remove a memory DIMM. Figure 10-6 shows how to install a memory DIMM.

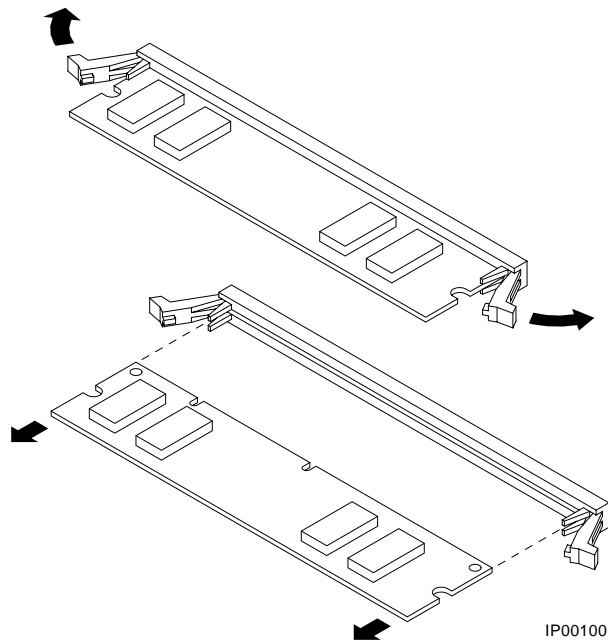
Figure 10-4 Memory Connector Layout



To remove a memory DIMM

1. Remove the side panel (or top cover for a rackmount) as described in Section 10.1, Preparing to Install or Remove Components.
2. Push the clips on the system board memory connector to the side to unlatch the memory card.
3. Pull the memory DIMM out.

Figure 10-5 Removing a Memory DIMM



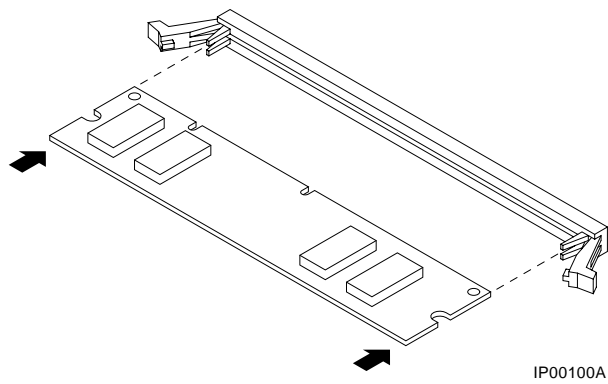
To install a memory DIMM

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 Section 10.1, Preparing to Install or Remove Components.

Test the memory configuration using the following commands:

```
>>> show memory  
>>> memexer
```

Figure 10-6 Installing a Memory DIMM



10.3 Removing and Installing Option Cards

The AlphaServer 800 system supports three 32-bit PCI option slots, one shared 64-bit PCI/EISA slot, and two EISA slots.

Configuring an option card

Depending on the type of option card you install, you may or may not need to configure it. When installing EISA and ISA option cards, refer to the system startup display screen to see if configuration of the card is required. After you turn on the system, the system startup sequence examines the EISA option slots and reports whether you need to run the EISA Configuration Utility.

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

Network interface card

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

10.3.1 Installing and Removing an Option Card

Figure 10-7 shows outlines of option cards. To install or remove a PCI, EISA, or ISA option card on the system board, refer to and follow the steps outlined next.

Figure 10-7 PCI, EISA, and ISA Option Cards

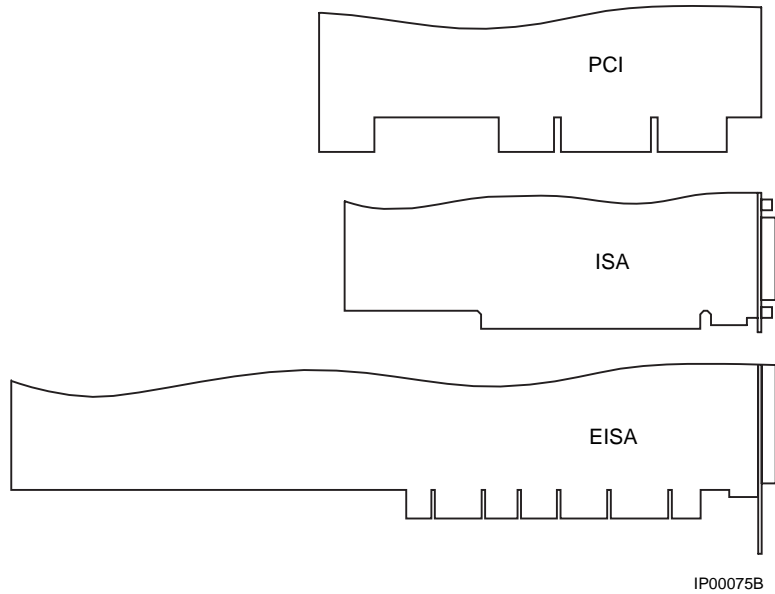
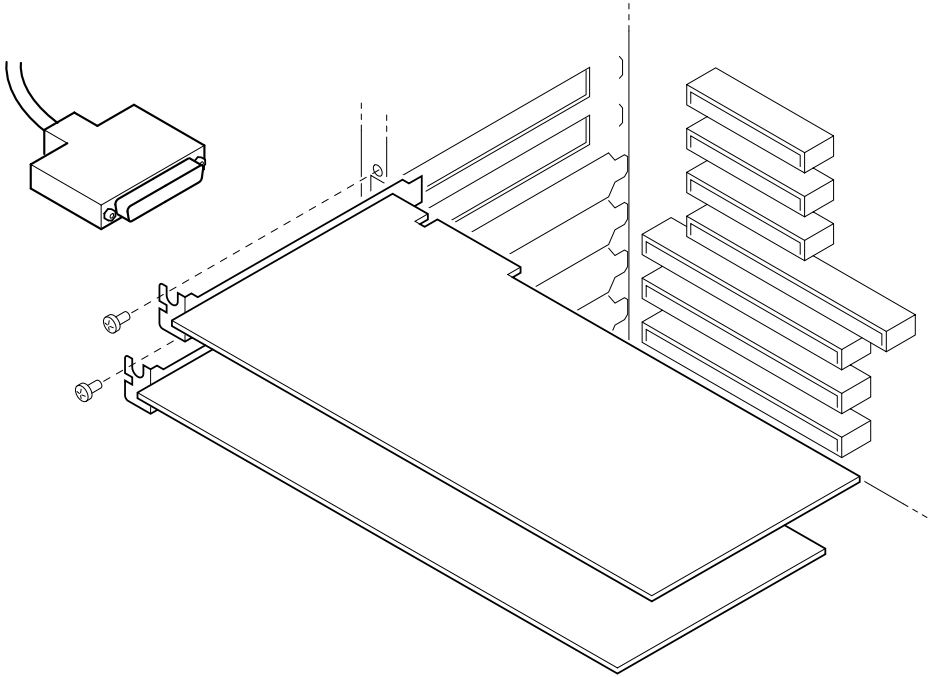


Figure 10-8 Installing or Removing an Option Card



IP00049

To install an option card

NOTE: If you want to install a high-performance graphics option card, you must disable the SVGA jumper (J27) on the system board.

1. Remove the side panel (or top cover for a rackmount) as described in Section 10.1, Preparing to Install or Remove Components.
2. Remove the screw securing the slot cover to the chassis.
3. Remove the slot cover from the system unit and store it for future use.
4. Carefully install the option card into the appropriate connectors on the system board and press it firmly into place.
5. Secure the option card to the chassis using the screw you removed.
6. Replace the side panel (or top cover for a rackmount) as described in Section 10.1, Preparing to Install or Remove Components.

To remove an option card

1. Remove the side panel (or top cover for a rackmount) as described in Section 10.1, Preparing to Install or Remove Components.
2. Disconnect any cables connected to the external (rear) or internal ports on the option card you want to remove.
3. Remove the slot cover screw securing the option card to the chassis as shown in Figure 10-8.
4. Carefully disconnect the option card 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 Section 10.1, Preparing to Install or Remove Components.

10.3.2 Testing an Option Card Installation

To test an option card installation, first reassemble the system, then follow the steps in Table 10–1. Refer to Example 10-1.

Table 10–1 Testing with the show config Display

Step	Action	Result
1	Enter the show config command.	System configuration is displayed.
2	Examine the PCI bus or EISA bus information in the display to make sure that the new option is listed.	If the option is not listed, see Chapter 11.
3	Determine the device name of the new option.	You must know the device name to run diagnostic tests on the option. Enter the show device command to see the device name.

Example 10-1 The show config Command Display

```
>>> show config
Firmware
SRM Console:      V4.8
ARC Console:      5.28
PALcode:          VMS PALcode V1.19-2, OSF PALcode V1.21-4
Serial ROM:       X2.1
Processor
DECchip (tm) 21164A-1 400MHz
MEMORY
  64 Meg of System Memory
  Bank 0 = 64 Mbytes (16 MB Per \Dimm) Starting at
0x00000000
PCI Bus
  Bus 00 Slot 07: Intel 8275EB PCI to Eisa Bridge
  Bus 00 Slot 08: Digital PCI to PCI Bridge Chip
  Bus 02 Slot 00: ISP1020 Scsi Controller
                    pka0.7.0.2000.0 Scsi Bus ID 7
                    dka0.0.0.2000.0 RZ29B
                    dka400.4.0.2000.0 RRD45

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

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

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

10.4 Installing Storage Devices

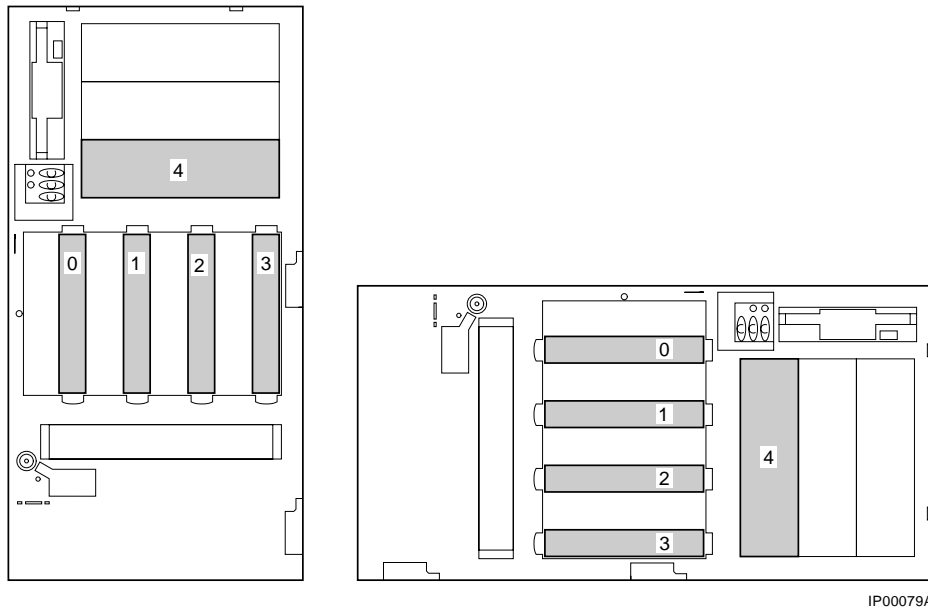
The system unit is designed to accommodate up to four 3.5-inch full-height devices, up to three 5.25-inch half-height devices (or one half-height and one full-height device) and a high-density floppy diskette drive. The diskette drive connects directly to the motherboard and is *not* a SCSI device. Figure 10-9 shows the drive bays and SCSI bus IDs.

Identifying the drive bays

The system contains a four-slot storage drive cage. The drive cage backplane presets the SCSI IDs as shown in Figure 10-9. The CD-ROM is factory-set to SCSI ID 4.

Whenever you install another SCSI device in the 5.25-inch device area, you must assign it a unique SCSI ID number. Otherwise, the system will not recognize the device.

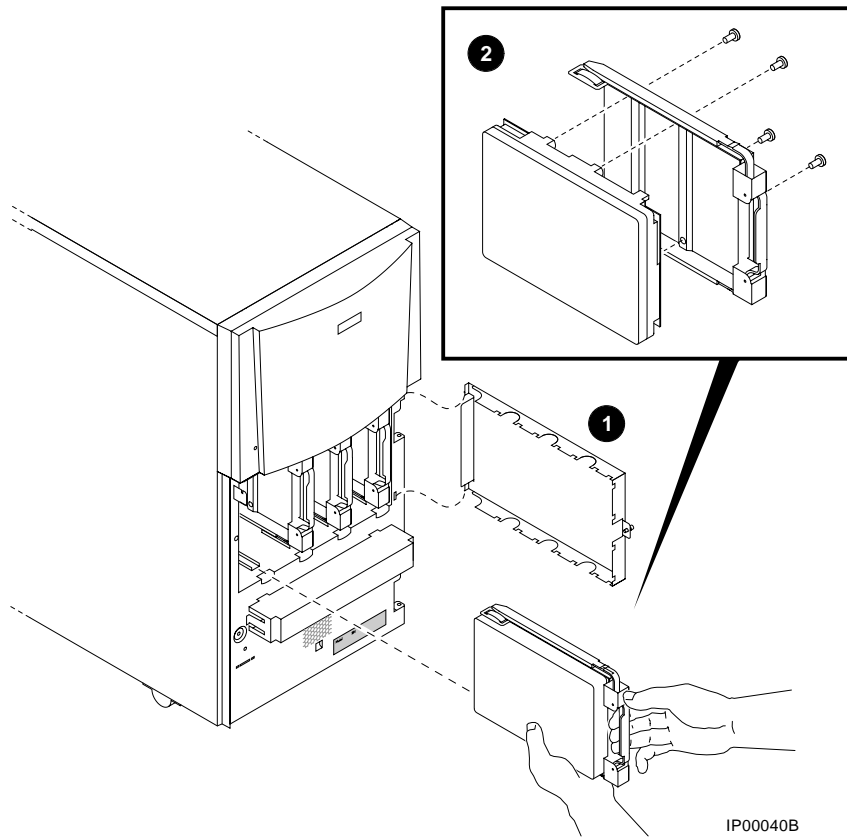
Figure 10-9 SCSI Bus IDs



10.4.1 Installing and Removing a Hard Drive

To install or remove a hard drive, refer to Figure 10-10 and follow the steps outlined next.

Figure 10-10 Installing a Hard Drive



To install a hard drive

1. Release and remove the hard drive cage cover. ❶
2. Remove a carrier plate.
3. Attach the carrier plate to the hard drive with the four screws provided, as shown in Figure 10-10. ❷
4. Align the hard drive in the appropriate slot and push on the two forward metal ends until you hear a click, indicating the drive is fully seated on the backplane.
5. Reinstall the cage cover.

To remove a hard drive

1. Release and remove the hard drive cage cover.
2. Grasp the plastic handle firmly and pull the hard drive out.
3. Reinstall the cage cover.

10.4.2 Installing a 5.25-Inch Device

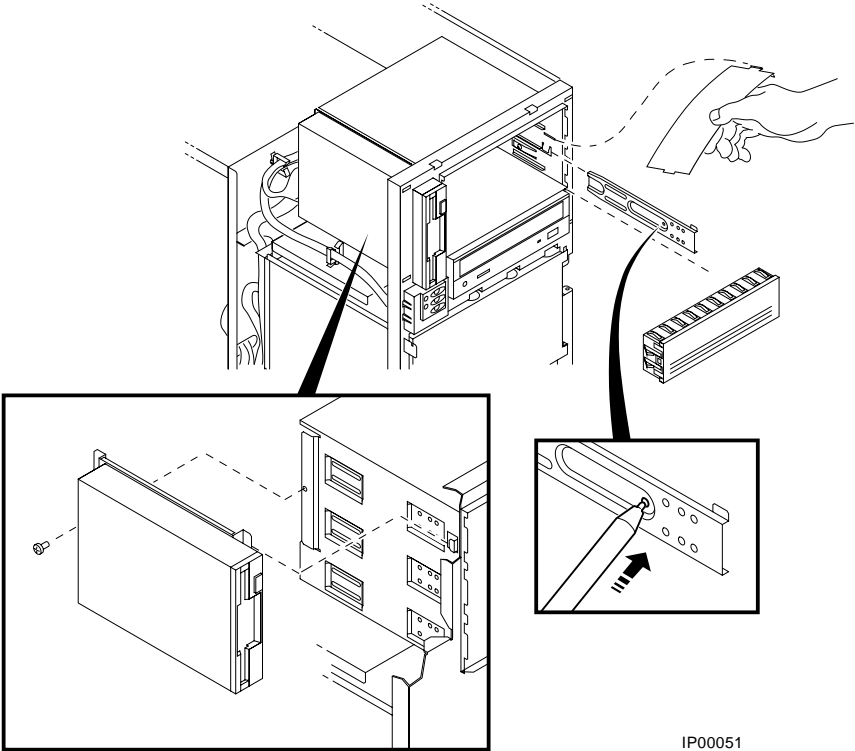
To install a 5.25-inch device, refer to Figure 10-11 and Figure 10-12, and use the following procedure.

To install a 5.25-Inch storage device

1. Remove the side panel (or top cover for a rackmount) as described in Section 10.1, Preparing to Install or Remove Components.
2. Remove a blank storage panel for the desired storage slot by pushing from behind the panel. If you are installing a full-height device, remove two blank storage panels.

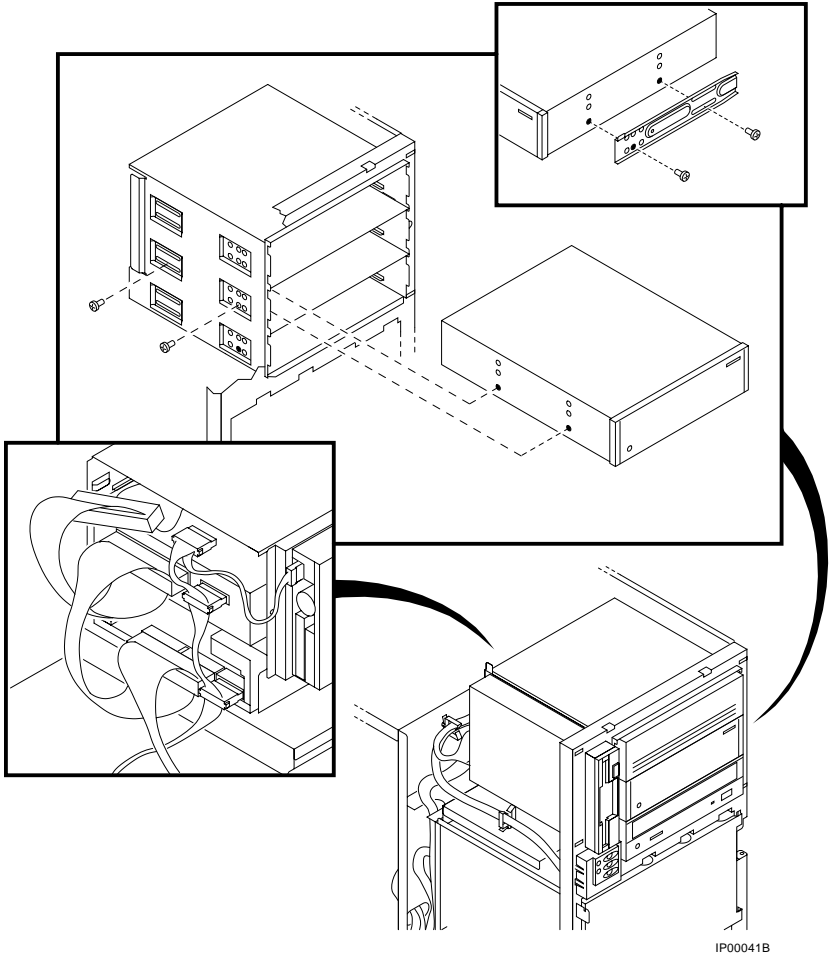
If you are installing a full-height device, you must also remove the divider plate between the top two slots by pressing the center of the plate and bending it sufficiently to free it from the slots as shown in Figure 10-11.
3. Remove the slide bracket from inside the storage device area by depressing the spring tab with a pen or screwdriver, as shown in Figure 10-11.
4. Remove the screw holding the diskette drive and carefully move the drive aside as shown in Figure 10-11.
5. Attach the slide bracket to the storage device using two of the four screws provided with the slide bracket as shown in Figure 10-12.
6. Set the SCSI ID on the device to an available SCSI ID number. Refer to the instructions provided with the storage device.
7. Slide the storage device into the desired storage slot and secure the device to the unit using the two remaining screws provided with the slide bracket, as shown in Figure 10-12.
8. Re-install the diskette drive and secure it with the screw removed in Step 3.
9. Attach the signal cable (50-pin) and power cable to the storage device, as shown in Figure 10-12.

Figure 10-11 Installing a 5.25-Inch Device



IP00051

Figure 10-12 Continuing Installation of a 5.25-Inch Device



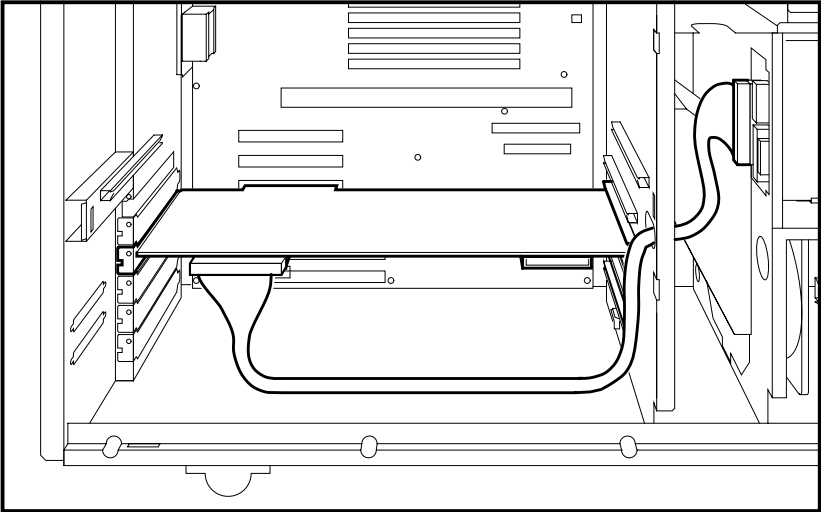
10.4.3 Installing SCSI Controller Options

When installing additional SCSI controller or RAID controller options, certain cables are required to connect to the SCSI hard disk backplane, or to extend a SCSI bus externally through the standard bulkhead connector or through the two wide SCSI breakouts at the rear of the enclosure.

When installing SCSI controller option:

- If you plan to connect the internal hard disk drives to a RAID controller option or a SCSI controller other than the onboard controller, you need to use cable PB8HA-DA. This cable provides additional length needed to reach the connector on the controller option. Figure 10-13 shows the cable routing from the hard disk backplane to the storage controller option.
- If you plan to extend a SCSI bus from a controller through either of the wide SCSI breakouts at the rear of the enclosure, cable BC25V-1H provides a wide 68-pin connector, as shown in Figure 10-14.
- If you plan to extend a SCSI bus from a multi-channel controller to external devices through a vacant PCI/EISA slot bulkhead connector, cable KZPAC-SB provides two 68-pin (Honda miniature) connectors on a bulkhead connector, as shown in Figure 10-15.

Figure 10-13 RAID/SCSI Cable for Internal Disk Drive Backplane



IP00015A

Figure 10-14 Wide SCSI Cable for Breakouts at Rear of Enclosure

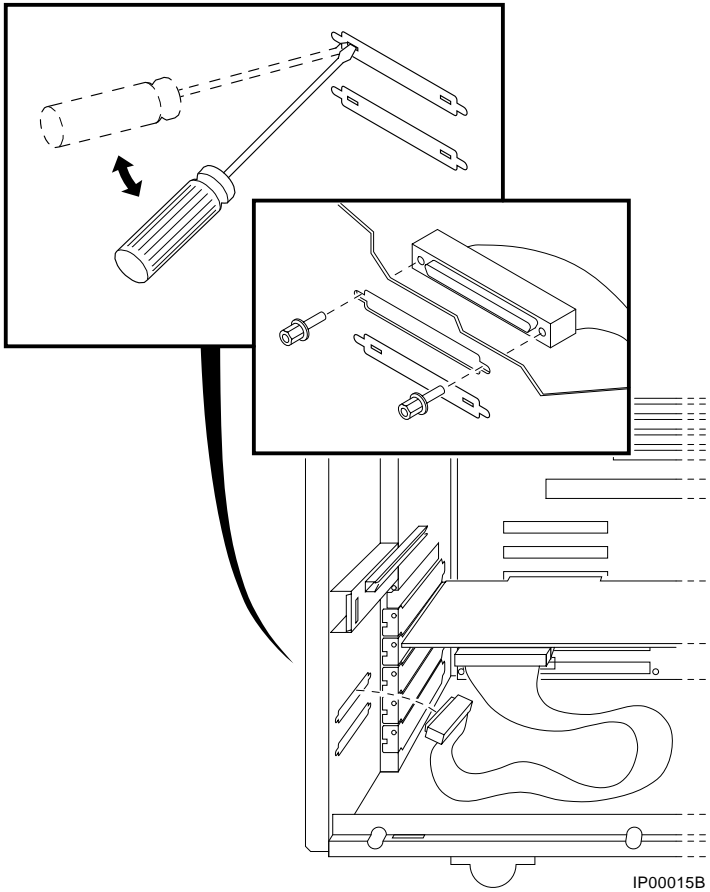
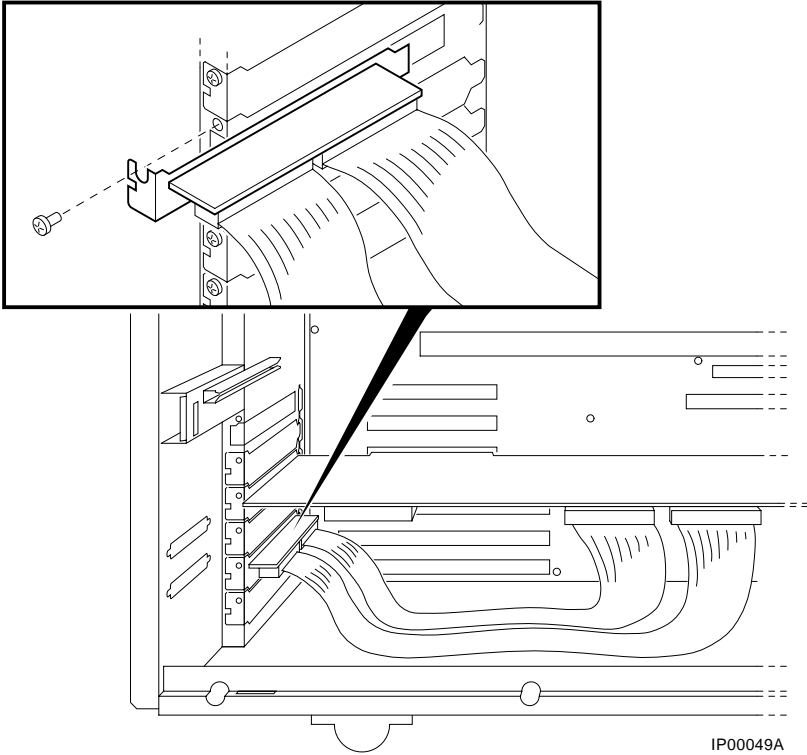


Figure 10-15 Wide SCSI Dual Connector Cable for Standard Bulkhead Connector



External SCSI Expansion

External SCSI devices, such as tabletop or rackmounted storage devices, can be connected to the system using EISA- or 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 double-ended SCSI, or 3 meters for fast single-ended SCSI.
- 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.

10.5 Removing/Replacing Other Options

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

- System board
- System backplane
- System fan
- CPU module
- Power supply
- Diskette drive
- Operator control panel

Contact your authorized service representative for assistance.

Chapter 11

Troubleshooting

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

11.1 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 11–1 lists possible problems and the relevant sections in this chapter.

Table 11–1 Determining Where to Look

Task or Problem	Relevant Section
To confirm that EISA cards or memory modules are properly configured.	Option Card Problems. Section 11.8.
To run a diagnostic test of the whole system, show its status, or terminate the testing.	System Diagnostics. Section 11.2.
No startup display appears when you turn on the system.	Error Beep Codes. Section 11.2.1. Power Problems. Section 11.3. Console Problems. Section 11.4. Problems Detected by the Operating System. Section 11.6.
Startup tests do not complete.	Console Problems. Section 11.4.
The system cannot boot the operating system.	Boot Problems or System Diagnostics. Sections 11.2 and 11.5.
The operating system reports errors, is hung, or crashes.	Problems Detected by the Operating System. Section 11.6.
The system cannot access a mass storage device.	Storage Problems. Section 11.7.
Storage devices are missing from the show device display.	Storage Problems. Section 11.7.
The system indicates network problems, an EISA card is not configured, or a PCI card is unseen by the system.	Option Card Problems. Section 11.8.
The monitor or the terminal is not working.	Monitor and Terminal Problems. Section 11.9.
The keyboard and mouse are not working.	Keyboard and Mouse Problems. Section 11.10.
The system repeatedly shuts down after 10 seconds.	Overheating Problems. Section 11.12.
The flash ROM is corrupted, and the system cannot access console mode.	Using the Fail-Safe Loader. Section 11.13.

11.2 System Diagnostics

Beep codes, console event logs, and console command displays help you diagnose and troubleshoot system problems.

This section describes three sources of error information that can help you diagnose and troubleshoot system problems:

- Beep codes
- Console event log
- Console command displays

Beep codes are audible error codes emitted by the system for specific problems. The console event log is a record of startup status messages, which may contain helpful diagnostic information. Console command displays, such as the **test** command display, are another source of diagnostic information.

11.2.1 Interpreting Error Beep Codes

Table 11–2 describes error beep codes. For example, if the SROM (serial read-only memory) code could not find any good 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 11-2 Error Beep Codes

Beep Code	Meaning	Action
1	No error.	Jump to console.
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 SRM/AlphaBIOS console code.	The system will automatically use the fail-safe loader to load new SRM/AlphaBIOS console firmware from the diskette. If successfully loading new console firmware does not solve the problem, replace the system board.
1-1-4	The SRAM 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 SRM/AlphaBIOS console firmware from the diskette. If successfully loading new console firmware does not solve the problem, replace the system board.
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.	Replace the CPU card.
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.

11.2.2 Reading the Console Event Log

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

11.2.3 The test Command

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

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

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

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

The test script tests devices in the following order:

1. Memory tests (one pass)
2. Read-only tests: DK* disks, DR* disks, DU* disks, MK* tapes, DV* floppy.
3. Console loopback tests if **-lb** argument is specified: COM2 serial port and parallel port.
4. VGA/TGA console tests: these tests are run only if the console environment variable is set to **serial**. The VGA/TGA console test displays rows of the word *digital*.
5. Network external loopback tests for E*A0. The test requires that the Ethernet port be terminated or connected to a live network; otherwise, the test will fail.

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

Example 11-1 shows a sample of the **test** command display.

Example 11-1 Test Command

```
>>> test
Requires diskette and loopback connectors on COM2 and parallel port
type kill_diags to halt testing
type show_status to display testing progress
type cat el to redisplay recent errors
Testing COM2 port
Setting up network test, this will take about 20 seconds
Testing the network
    128 Meg of System Memory
        Bank 0 = 64 Mbytes(16 MB Per Dimm) Starting at 0x00000000
        Bank 1 = 64 Mbytes(16 MB Per Dimm) Starting at 0x10000000
Testing the memory
Testing parallel port
Testing the SCSI Disks
Non-destructive Test of the Floppy started
serial port not used as main console - VGA test bypassed
Printer offline
file open failed for para
```

11.2.4 The show_status Command

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

11.3 Power Problems

Table 11–3 describes how to troubleshoot the system when there is no power at the system enclosure.

Table 11–3 Troubleshooting Power Problems

Symptom	Action
No AC power	<p>Check the power source and power cord.</p> <p>Check seating of E26.</p> <p>Check that the system cover is properly secured. An interlocking sensor switch shuts off power to the system if the cover is removed.</p> <p>Unplug the power cord for 15 seconds, then replug.</p>
AC power is present, but system does not power on.	<p>Check the On/Off button on the control panel.</p> <p>Check that the ambient room temperature is within environmental specifications (10–40°C, 50–104°F).</p> <p>Check the remote management console using the status command. Look for fan status, system temperature, power supply failure.</p> <p>Check that cable connectors on the system board are properly connected.</p> <p>Check that the internal power supply cables are plugged in at the right place on both the power supply and system board.</p>
Power supply shuts down after approximately 10 seconds (fan failure).	<p>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.</p>

11.4 Console Problems

Table 11–4 describes how to troubleshoot the system when, at startup, the console terminal does not display the startup screen, or the startup screen displays error messages.

Table 11–4 Troubleshooting Console Problems

Symptom	Action
Startup screen is not displayed.	<p>Refer to Table 11–2 to interpret the startup beep codes.</p> <p>Check that keyboard and monitor are connected and functioning properly. Check that power is on.</p> <p>If the startup screen is not displayed, yet the system enters console mode when you press the Return key, check that the console environment variable is set correctly: graphics for a VGA terminal, and serial for serial terminal.</p> <p>If you are using other than the standard onboard VGA controller, the onboard S3 TRIO64 VGA options must be set to disabled by grounding (GND) the VGA jumper (J27) on the right side of the system board, and the console environment variable set to graphics. Combining multiple VGA controllers produces unpredictable results.</p> <p>Try connecting a console terminal to the COM1 MMJ port. Check baud rate setting for console terminal and system. The system baud rate setting is 9600. When using the COM1 MMJ port, set the console environment variable to serial.</p> <p>If you have verified that there are no monitor, terminal, or keyboard problems, the problem may be with the firmware. Refer to Section 11.13.</p>
Startup screen displays error messages.	<p>If startup screens or the console event log indicate problems with mass storage devices, or if storage devices are missing from the show config display, use the tables in Section 11.7 to determine the problem.</p> <p>If startup screens or the console event log indicate problems with EISA or PCI devices, or if EISA or PCI devices are missing from the show config display, use the tables in Section 11.8 to determine the problem.</p>

11.5 Boot Problems

Table 11–5 describes how to troubleshoot problems that occur while the system is booting operating system software.

Table 11–5 Troubleshooting Boot Problems

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

Continued on next page

Table 11–5 Troubleshooting Boot Problems (Continued)

Symptom	Action
System does not boot.	<p>Check that the Halt button is set to the "Off" position (out).</p> <p>Verify that you have not installed an unsupported graphics module or another type of unsupported adapter.</p> <p>For problems booting over a network, check the ew*0_protocols or er*0_protocols environment variable settings: Systems booting from a DIGITAL UNIX server should be set to bootp; systems booting from an OpenVMS server should be set to mop.</p> <p>Run the test command to check that the boot device is operating. See Section 11.4, Console Problems.</p>
There is a software problem or the operating system is not installed correctly.	<p>Refer to your operating system software information.</p> <p>Verify that you have the correct firmware revision for your system.</p>

11.6 Problems Detected by the Operating System

Table 11–6 describes possible operating system problems and their solutions.

Table 11–6 Problems Detected by the Operating System

Symptom	Action
System is hung or has crashed.	Examine the crash dump file. Refer to the <i>OpenVMS Alpha System Dump Analyzer Utility Manual</i> (AA-PV6UB-TE) for information on how to interpret OpenVMS Alpha crash dump files. Refer to the <i>Guide to Kernel Debugging</i> (AA-PS2TD-TE) for information on using the DIGITAL UNIX Crash Utility.
No startup display.	The console environment is set to serial ; thus, the startup screen is routed to the COM1 serial communication port and cannot be viewed from the VGA monitor. If you are using a VGA monitor, set the console environment variable to graphics (set console graphics) . See Section 11.4, Troubleshooting Console Problems.
Errors have been logged, and the operating system is up.	Have your service provider examine the operating system error log files to isolate the problem. If the problem occurs intermittently, have your service provider run an operating system exerciser, such as DEC VET, to stress the system. Refer to the <i>DEC Verifier and Exerciser Tool User's Guide</i> (AA-PTTMD-TE) for instructions on running DEC VET.

11.7 Storage Problems

Mass storage device problems at startup are usually indicated by read fail messages or by the omission of storage devices from the show config display. Table 11–7 lists suggestions for troubleshooting storage problems.

Table 11–7 Troubleshooting Mass Storage Problems

Symptom	Problem	Corrective Action
Drives are missing from the show config display.	Drives have duplicate SCSI IDs.	Correct SCSI IDs. <i>NOTE: Internal hard disk drives are automatically assigned SCSI IDs 0, 1, 2, and 3 (from left to right for pedestal systems; and bottom to top for rackmount systems). The onboard controller is assigned SCSI ID 7, and the CD-ROM, SCSI ID 4.</i>
Drives are missing from the show config display/One drive appears seven times on the show config display.	Drive SCSI ID set to 7 (reserved for host ID) or Duplicate host IDs on a shared bus.	Correct SCSI IDs or change host ID through the pk*0_host_id environment variable (set pk*0_host_id) using the SRM console.
LEDs do not come on. Drive missing from the show config display.	Missing or loose cables. Drives not properly seated on the hard disk backplane.	Remove device and inspect cable connections. Reseat drive.

Continued on next page

Table 11-7 Troubleshooting Mass Storage Problems (Continued)

Symptom	Problem	Corrective Action
Drives disappear intermittently from the show config and show device displays.	SCSI bus length exceeded.	The entire SCSI bus length, from terminator to terminator, must not exceed 6 meters for fast differential SCSI connections, or 3 meters for fast single-ended SCSI connections.
Problems persist after eliminating the problem sources.	SCSI storage controller failure or terminator(s) missing.	Call your service representative.

11.8 Option Card Problems

Option card problems can include problems related to network options, EISA/ISA bus options, and PCI options.

Network Problems

Network problems can vary depending on the type of network option card that you have installed. See the option card documentation for information on troubleshooting network problems. Make sure you have correctly set the network type for the network interface card.

EISA/ISA Bus Problems

EISA bus problems at startup may be indicated by the following display:

```
EISA Configuration Error. Run the EISA Configuration
Utility.
```

Table 11-8 describes the steps for troubleshooting EISA problems.

Table 11–8 Troubleshooting EISA/ISA Bus Problems

Step	Action
1	Confirm that the option is supported. Check firmware and software versions.
2	Check that the EISA card and any cabling are properly seated.
3	Run the ECU to: <ul style="list-style-type: none">• Confirm that the system has been configured with the most recently installed controller.• Check the hardware jumper and switch settings for each ISA controller.• Check the software setting for each ISA and EISA controller. See if the ECU deactivated (< >) any controllers to prevent conflict.• See if any controllers are locked, which limits the ECU's ability to change resource assignments.• Ensure that IRQs are set correctly.
4	Confirm that hardware jumpers and switches on ISA controllers reflect the settings indicated by the ECU. Start with the last ISA module installed.
5	Check for a bad slot by moving the last installed controller to a different slot.
6	Call the option manufacturer or your service representative for help.

PCI Bus Problems

PCI bus problems at startup are usually indicated by the inability of the system to detect the PCI device. Use Table 11–9 to diagnose the likely cause of the problem.

Table 11–9 Troubleshooting PCI Bus Problems

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

Some PCI devices do not implement PCI parity, and some have a parity-generating scheme that may not comply with the PCI Specification. In such cases, the device functions properly as long as parity is not checked. The **pci_parity** environment variable for the SRM console allows you to turn off parity checking so that false PCI parity errors do not result in machine check errors. When PCI parity is disabled, no parity checking is implemented for any PCI device, even those that produce correct, compliant parity.

11.9 Monitor and Terminal Problems

If the system starts up but has no startup display when you turn on the system, refer to Table 11–10.

Table 11–10 Troubleshooting Monitor and Terminal Problems

Possible Cause	Action
The monitor or terminal are not turned on.	Check that the monitor or terminal is turned on. Make sure 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.
Incorrect graphics configuration.	See Chapter 5.
The terminal cable is not connected to the correct serial port.	Check the serial port to which the terminal cable is connected. Make sure that it is connected to the left-hand serial port (COM1).
If you are using a console terminal, check the baud rate setting for the terminal and system. The system default baud rate setting is 9600.	Connect the console terminal to the COM1 serial communication port and set the console environment variable to serial (set console serial).

**Table 11–10 Troubleshooting Monitor and Terminal Problems
(Continued)**

Possible Cause	Action
<p>The power cord is not connected. The power cord may be faulty. The power cord socket may not be working.</p>	<p>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.</p>
<p>If you are using other than the standard onboard VGA controller, settings may be incorrect.</p>	<p>Make sure that onboard S3 TRIO64 VGA options are set to disabled through the ECU, the VGA jumper (J27) on the right side of the system board is disabled (GND), and the console environment variable is set to graphics.</p> <p>Combining multiple VGA controllers will produce unpredictable results, and use of multiple VGA controllers is not recommended or supported.</p>
<p>The terminal or monitor fuse may have blown.</p>	<p>Replace the blown terminal or monitor fuse. Refer to the terminal or monitor documentation.</p>
<p>The port to which the terminal or monitor connects may not be the correct one.</p>	<p>Ensure that your monitor cable is plugged into the correct graphics port if you have an optional graphics card installed. You should plug the cable into the connector of your option card, not the connector on the system board.</p>
<p>The port to which the terminal or monitor connects may be faulty.</p>	<p>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.</p>

11.10 Keyboard and Mouse Problems

Table 11–11 lists problems that may occur with the keyboard or mouse.

Table 11–11 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.

**Table 11–11 Troubleshooting Keyboard and Mouse Problems
(Continued)**

Symptom	Possible Cause	Action
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 connected correctly in the mouse connector.
	The mouse ball is dirty.	Remove the ball from the mouse and clean it in a lukewarm, mild-soap solution. Dry the ball and replace it in the mouse.
The mouse pointer does not 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.

11.11 Printer Problems

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

11.12 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 3-1, Environmental Conditions.

Refer to Table 11-3, Power Problems, to troubleshoot power supply problems and fan failure.

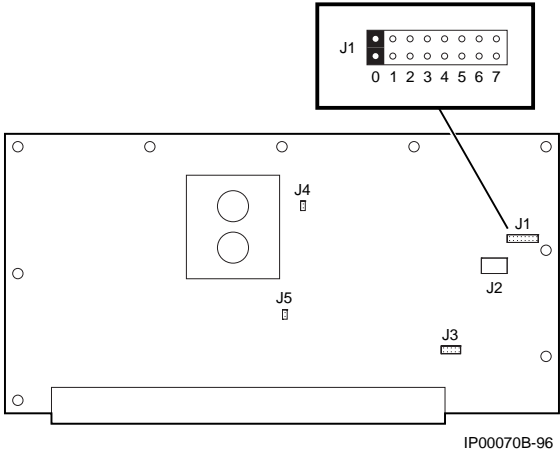
11.13 Using the Fail-Safe Loader

The fail-safe loader (FSL) allows you to boot an Update Utility diskette in an attempt to repair corrupted console files that reside within the flash ROMs on the system board. Use the FSL only when a failure at startup prevents you from accessing the console mode and you have checked the control panel for progress messages.

To activate the fail-safe loader:

1. Turn off the system.
2. Install the Update Utility diskette in the diskette drive.
3. Remove the top cover and side panels.
4. Enable the fail-safe loader by moving the J1 jumper on the CPU card from the normal position to the position nearest the system edge. See Figure 11-1.
5. Replace the top cover and side panels.
6. Turn on the system, and check the control panel for progress messages. Respond "yes" to the update prompt.
7. After the update utility has completed, turn off the system.
8. Remove the top and side panels.
9. Replace the SRAM jumper to position 0.
10. Replace the top cover and side panels, and turn the system back on.
11. Check to make sure that the appropriate console prompt appears.

Figure 11-1 J1 Jumper on the CPU Card (Normal Position)



11.14 Hard Disk Troubleshooting Suggestions

Table 11–12 gives AlphaBIOS error messages that indicate hard disk problems and suggests possible causes and solutions.

Table 11–12 Troubleshooting the Hard Disk

Error Message	Possible Cause	Corrective Action
“Internal error occurred”	Incompatible or failed disk cables.	Try another cable known to be good.
	Disk controller not configured.	Check your hard disk controller documentation to see if you have to run a configuration utility to set up your hard disk.
	Disk controller malfunction.	Test controller functioning using the controller’s diagnostic utility. If an error is found, contact your service representative for a replacement.
	Improper SCSI termination.	Check to see that terminating resistor packs are removed from all drives except the controller itself and the last drive connected to it.
“No hard drives were found connected to your computer”	No hard disk installed.	Install hard disk.
	Cable not connected to either the disk or controller.	Check the cable connections to ensure that cable connectors are fully seated.

Table 11–12 Troubleshooting the Hard Disk (Continued)

Error Message	Possible Cause	Corrective Action
	No power to drive.	Check cable connections. If problem persists, try connecting the drive to a different power connector.
	Disk drive malfunction.	Try replacing the drive with a drive known to be good. If problem persists, hard drive is defective. Contact your service representative.
“Perform an express disk setup?”	Hard disk 0 does not have any partitions defined.	Perform an express disk setup to automatically create default disk partition arrangement on hard disk 0.

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