



AlphaServer DS20

User's Guide

Order Number: EK-AS140-UG. A01

This manual is for anyone who manages, operates, or services the Compaq AlphaServer DS20 system. It covers operation, firmware, initial troubleshooting, and component installation.

Compaq Computer Corporation

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Preface

Intended Audience

This manual is for anyone who manages, operates, or services an AlphaServer DS20 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.

This manual has eight chapters and one appendix as follows:

- **Chapter 1, Overview**, describes the system components.
- **Chapter 2, Installing the System**, provides environmental and power requirements, and set-up instructions.
- **Chapter 3, Operation**, gives instructions for powering up the system, booting the operating system, and updating firmware.
- **Chapter 4, SRM Console**, describes commands in the SRM console, for DIGITAL UNIX and OpenVMS systems.
- **Chapter 5, AlphaBIOS Console**, describes menu selections in the AlphaBIOS console, for Windows NT systems.
- **Chapter 6, Managing the System Remotely**, provides information on the Remote Console Manager (RCM).
- **Chapter 7, Installing Components**, gives instructions for adding CPU, memory, PCI, and ISA cards to the system.
- **Chapter 8, Troubleshooting**, provides basic troubleshooting information.
- **Appendix A, SCSI Bus Configurations**, provides information on single-bus and split-bus SCSI configurations.

Documentation Titles

Table 1 lists the books in the AlphaServer DS20 documentation set.

Table 1 AlphaServer DS20 Documentation

Title	Order Number
User and Installation Documentation Kit	QZ-014AA-GZ
<i>User's Guide</i>	EK-AS140-UG
<i>Basic Installation</i>	EK-AS140-IN
Service Information	
<i>Service Manual</i>	EK-AS140-SV

Chapter 1

Overview

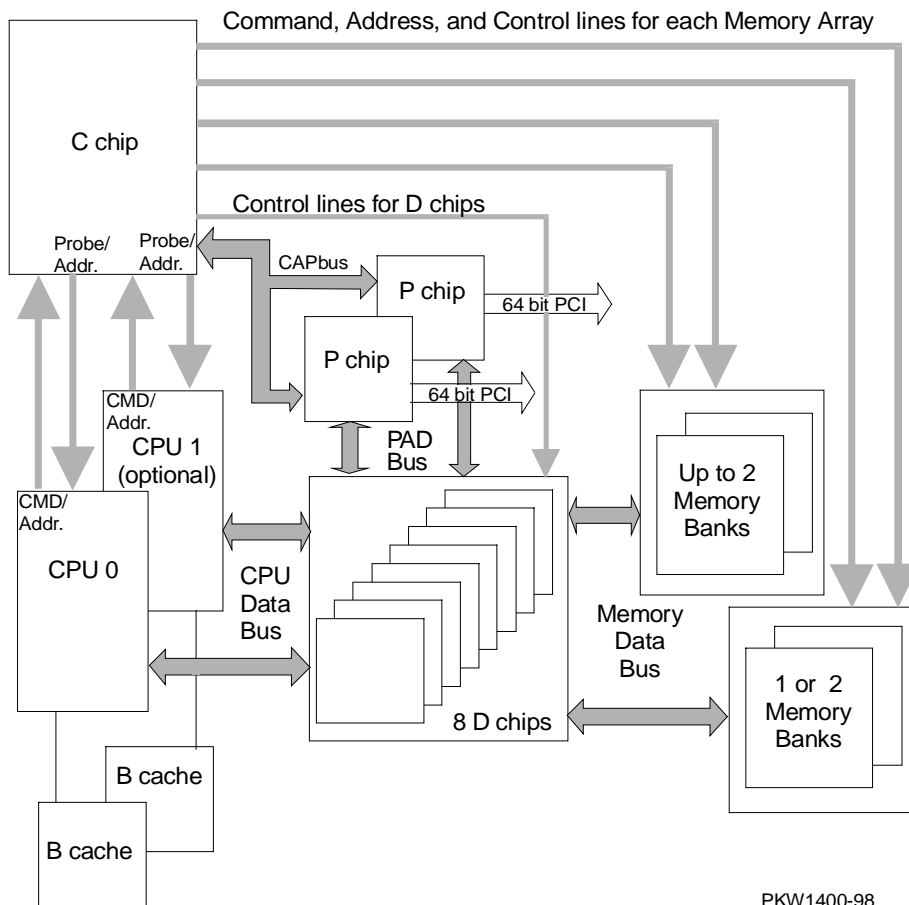
This chapter provides an overview of the AlphaServer DS20 system features and capabilities. The following topics are covered:

- System Architecture
- System Features
- Front Panel Controls and Indicators
- Rear Panel Ports and Slots
- Console Terminal
- System Options

1.1 System Architecture

The AlphaServer DS20 is a high-performance system. Figure 1-1 shows the system architecture.

Figure 1-1 System Architecture



The AlphaServer DS20 is a switch-based interconnect system using a cross-bar switch chipset that allows data to move directly from place to place in the system. Figure 1-1 is a block diagram showing the various data paths through the switch. The pedestal enclosure contains the system and allows for up to ten internal storage devices: one dedicated diskette drive slot, two removable media slots, and seven 3.5-inch hard disk drives. All CPUs, memory and I/O components are on a single board that contains the memory subsystem, two PCI buses, the ISA bus, the integrated I/O controllers. The remote console manager (RCM) is on a separate server feature module.

The control panel includes Halt, Reset, and On/Off buttons.

Supported Operating Systems

This system supports the following minimum revisions of these operating systems:

- Microsoft Windows NT 4.0 with service pack 3 or later
- OpenVMS 7.1-2
- DIGITAL UNIX 4.0E

The system runs in two modes. In program mode, the operating system controls the system and manages the execution of application programs. In console mode, the console program controls the system allowing control of system management functions.

System Console Firmware

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

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

1.2 System Features

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

Reliability

- 64-bit Alpha architecture Provides significantly better performance than 32-bit architecture.
- Error correction code (ECC) on memory and CPU cache Allows recovery from most cache and memory errors.
- Variable fan speed Adjusts fan speed according to system temperature.
- Integral Remote Console Management (RCM) function Enables remote access to system.
- Internal sensors Monitor and detect internal system temperature, fan failure, power supply temperature.
- Hot swap disk capability Allows replacement of StorageWorks disk drives while the system continues to operate.
- Redundant power A single power supply can run a fully configured system. An optional second power supply can be added to provide sufficient power for the system to continue to run even if one supply should fail.

System Expansion

- Flexible memory architecture. System memory can be expanded from 128 MB to 4 GB.
- Six PCI expansion slots. One PCI slot can be used as an ISA slot instead. Accommodates industry-standard option cards such as Ethernet, FDDI, and SCSI devices.
- Dual-ported integrated UltraSCSI controller Supports tape, disks, and CD-ROM without use of an expansion slot.

- Capacity for 10 internal storage devices
Accommodates one StorageWorks modular storage system, which supports up to seven 3½-inch UltraSCSI drives. Also supports up to two 5½-inch, half-height drives (CD-ROM or tape), and one 3½-inch diskette.
- External ports
Two serial ports and one parallel port support external options such as a printer, modem, or local terminal.
- UltraSCSI storage drive
Supports up to 7 high-performance drive technology.

System Management

- System diagnostics
Allow local and remote diagnosis of system problems.
- Hardware configuration
Allows local and remote system configuration.
- Unique asset management
Unique system identifier in nonvolatile memory provides easy asset management.
- RAM-based error log
Records startup error messages.
- Firmware upgrade utility
Provides loading and verification of firmware versions.
- Environmental failure events logged in NVRAM
Provides troubleshooting information for system shutdowns.
- Hard drive indicator lights
Provide immediate status information on hard drive activity or fault indication.

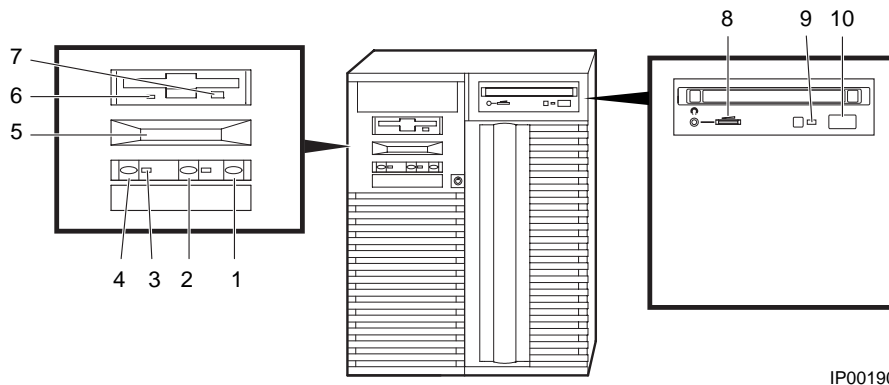
System Security

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

1.3 Front Panel Controls and Indicators

The controls and indicators on the front panel of the system unit are shown in Figure 1-2 and described in Table 1-1. The control panel display shows start-up messages during power-up.

Figure 1-2 Front Panel Controls and Indicators



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Table 1-1 Front Panel Controls and Indicators

Control or Indicator	Function
(1) Halt button	Halts an OpenVMS or DIGITAL UNIX system, returning it to console mode control. Does not affect a Windows NT system.
(2) Reset button	Reinitializes the system and performs startup tests. Can be used with the Halt button to bring up the SRM console while in AlphaBIOS.
(3) On/Off indicator	Lights when the system is turned on.
(4) On/Off button	Turns system on and off.
(5) Control panel display	Displays startup messages.
(6) Diskette drive activity indicator	Lights when the system is accessing the diskette drive.
(7) Diskette drive eject button	Ejects a diskette from the diskette drive.
(8) CD-ROM volume control	Adjusts headphone volume.
(9) CD-ROM activity indicator	Lights when the system is accessing the CD-ROM drive.
(10) CD-ROM eject button	Ejects disk from CD-ROM drive.

1.4 Rear Panel Ports and Slots

The ports and slots on the rear of the system unit are shown in Figure 1-3 and described in Table 1-2.

Figure 1-3 Rear Panel Ports and Slots

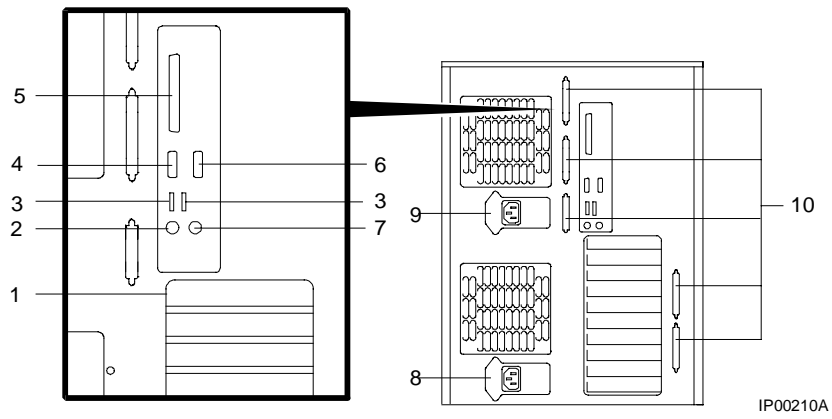


Table 1-2 Rear Panel Ports and Slots

Port or Slot	Used to connect...
(1) Up to six PCI slots, or up to five PCI slots and one ISA slot	Option cards for network, video, or disk controllers
(2) Keyboard port	PS/2-compatible keyboard
(3) USB ports	Universal serial bus ports – not supported
(4) Serial port (COM2)	Serial-line peripheral such as a modem
(5) Parallel port	Parallel device such as a printer
(6) Serial port/terminal port (COM1)	Console terminal or serial-line peripheral such as a modem
(7) Mouse port	PS/2-compatible mouse
(8) Power inlet for required power supply	System unit to power outlet
(9) Power inlet for redundant optional power supply	System unit to power outlet
(10) Five SCSI connector knockouts (16-bit, wide)	Unused

1.5 Console Terminal

The console terminal can be either a serial terminal or a graphics monitor. The power-up display prints to this terminal.

Table 1-3 Comparison of Console Terminals

Condition	Serial Terminal	Graphics Monitor
Does the SRM console power-up display print?	Yes	Yes
Is it supported by the SRM console?	Yes	Yes
Is it supported by the AlphaBIOS console?	Yes	Yes
Is it supported by the DIGITAL UNIX operating system?	Yes	Yes
Is it supported by the OpenVMS operating system?	Yes	Yes
Is it required by the Windows NT operating system?	No	Yes

The console terminal can be a serial (character cell) terminal connected to the COM1 port or a graphics monitor connected to a VGA adapter on PCI 0. If the console terminal is connected to COM1, the entire power-up display prints. (See Section 3.2 for information about the power-up display.)

The **console** environment variable is set to **serial** when the console terminal is a serial terminal; it is set to **graphics** when the console terminal is a graphics monitor. (See Section 4.18 for information about environment variables.)

If the **console** environment variable is set to **serial**, **os_type** is set to **unix** or **openvms**, and no terminal is attached to COM1, pressing a carriage return on a graphics terminal attached to the keyboard port (after power-up testing has completed) makes it the console device and the console prompt is sent to it.

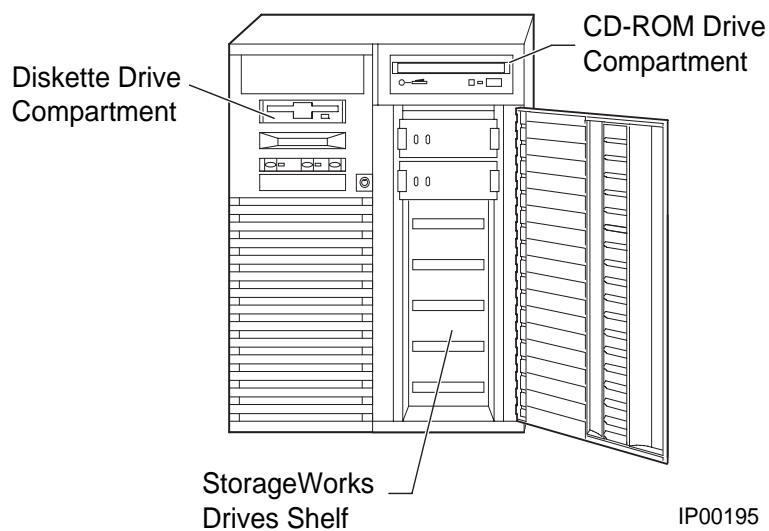
If the **console** environment variable is set to **graphics** and no graphic adapter or keyboard is present, pressing a carriage return on a serial terminal attached to COM1 (after power-up testing has completed) makes it the console device and the console prompt is displayed.

NOTE: The console prompt displays only after the entire power-up sequence is complete. This can take up to several minutes if the memory is very large.

1.6 Options

Options include storage, PCI and ISA I/O cards, redundant power, and additional memory cards. Figure 1-4 shows storage option compartments.

Figure 1-4 Storage Option Compartments



Storage Options

Storage options are located in several compartments inside the system as shown in Figure 1-4. The system accommodates the following types of storage options:

- One diskette drive
- One CD-ROM drive
- Up to seven 3½-inch StorageWorks drives or two 5½-inch drives

PCI and ISA Options

The system supports PCI options and ISA options for:

- SCSI storage expansion
- Networking and communications
- Graphics
- Sound

Memory Options

You can increase your system's memory to 4 gigabytes. More memory allows your system to run memory-intensive software more quickly.

The system supports the following memory option sizes: 128 MB, 256 MB, 512 MB, and 1 GB. Each option is made up of four 200-pin DIMM modules.

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 Compaq AlphaServer DS20 system through the DIGITAL FTP archive:

<ftp.digital.com:/pub/DEC/Alpha/systems/asds20/docs/>

For access through the DIGITAL worldwide web server:

<http://www.service.digital.com/alpha/server/ds20.html>

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

<http://www.windowsnt.digital.com/support/hcl/hcl.htm>

Chapter 2

Installing the System

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

- System Setup Overview
- Selecting a Location
- Environmental Requirements
- Power Requirements
- Acoustical Data
- System Accessories
- Connecting the System
- Connecting to Network Hardware
- Locking the System

2.1 System Setup Overview

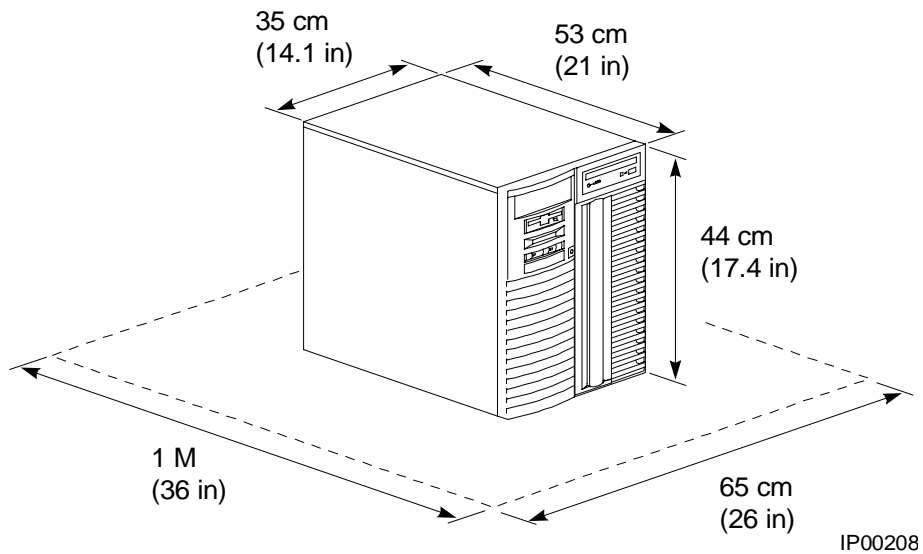
The following list summarizes the steps for setting up your system. The steps may vary depending on the options in your system.

1. Select a location for the system, giving consideration to service access, environmental requirements, and power requirements.
2. Confirm that you have all the desired accessories that ship with the system and any 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.

2.2 Selecting a Location

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

Figure 2-1 System Dimensions and Service Area



2.3 Environmental Requirements

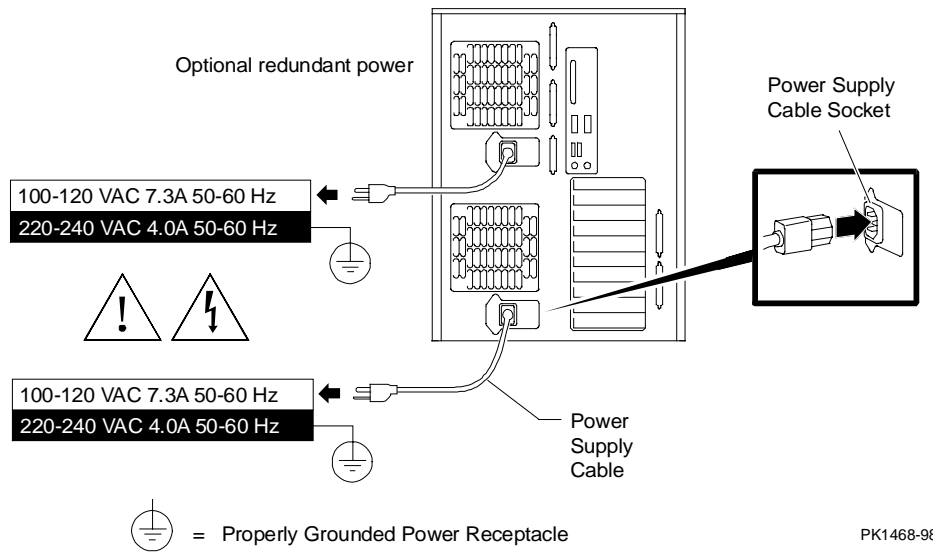
Table 2-1 Environmental Requirements

Condition	Specification
Temperature range	Room temperature: Between 10° C and 40° C (50° F and 104° F).
Relative humidity	Between 10% and 90% (20% to 80% with removable media options).
Air circulation	Allow a minimum clearance of 8 cm (3 inches) on all sides of the system unit to allow sufficient air circulation. Fans inside the system unit circulate the air to prevent excessive heat, which can damage the system components.

2.4 Power Requirements

Your system ships with a single power supply unless the customer chose a second optional power supply for redundancy. Power supplies connect to an AC outlet.

Figure 2-2 Power Supply Requirements



NOTE: Current ratings are maximum with a fully loaded system.

2.5 Acoustical Data

Table 2-2 Acoustics - Declared Values per ISO 9296 and ISO 7779

	Sound Power Level		Sound Pressure Level	
	L_{WAd} B	B	L_{pAm} dBA	(bystander positions)
AlphaServer DS 20 Systems	Idle	Operate	Idle	Operate
without hard drives	5.7	5.7	38	38
with 1 x RZ1CB	5.7	5.7	38	39
with 7 x RZ1CB disks	5.8	6.0	40	42

[Current values for specific configurations are available from Compaq Computer Corporation representatives. 1 B = 10 dBA.]

Table 2-3 Schallemissionswerte - Werteangaben nach ISO 9296 und ISO 7779/DIN EN27779

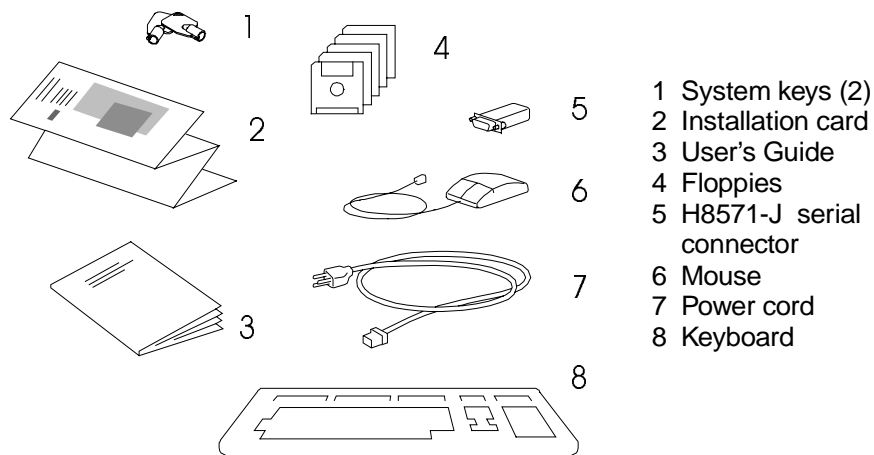
	Schalleistungspegel		Schalldruckpegel	
	L_{WAd} B	B	L_{pAm} dBA	(Zuschauerpositionen)
AlphaServer DS20 Systeme	Leerlauf	Betrieb	Leerlauf	Betrieb
Ohne Plattenlaufwerke	5,7	5,7	38	38
Mit 1 x RZ1CB	5,7	5,8	38	39
Mit 7 x RZ1CB	5,8	6,0	40	42

[Aktuelle Werte für spezielle Ausrüstungsstufen sind über die Compaq Computer Vertretungen erhältlich. 1 B = 10 dBA.]

2.6 System Accessories

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

Figure 2-3 System Accessories

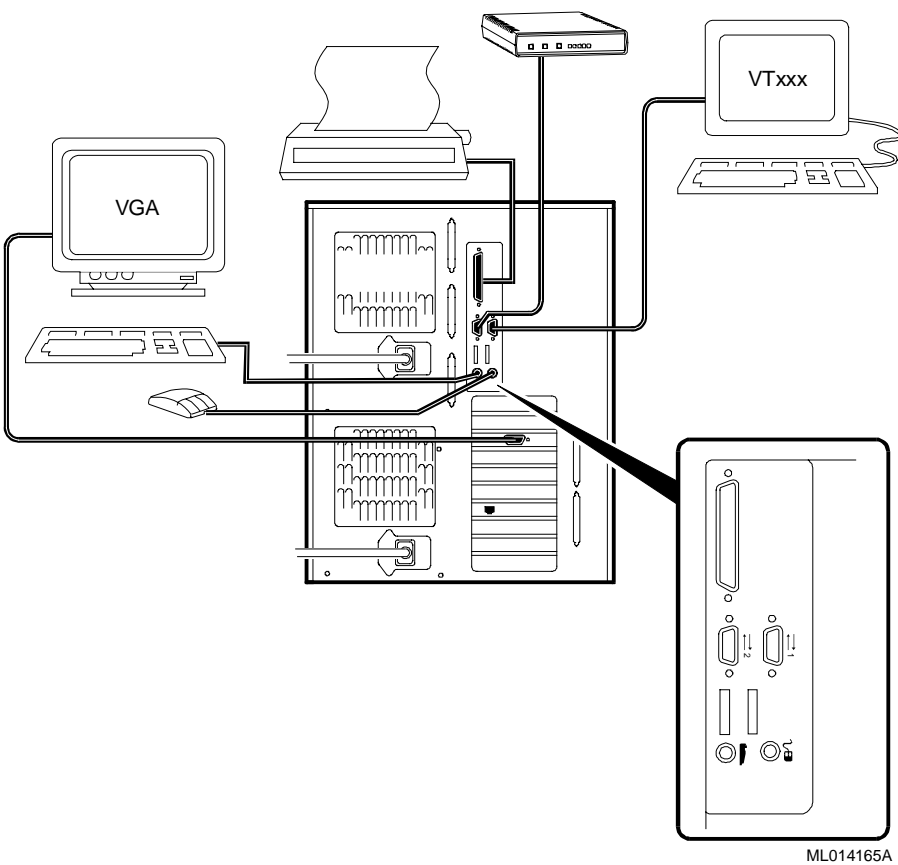


PK1484-98

2.7 Connecting the System

Connect the system components as shown in Figure 2-4.

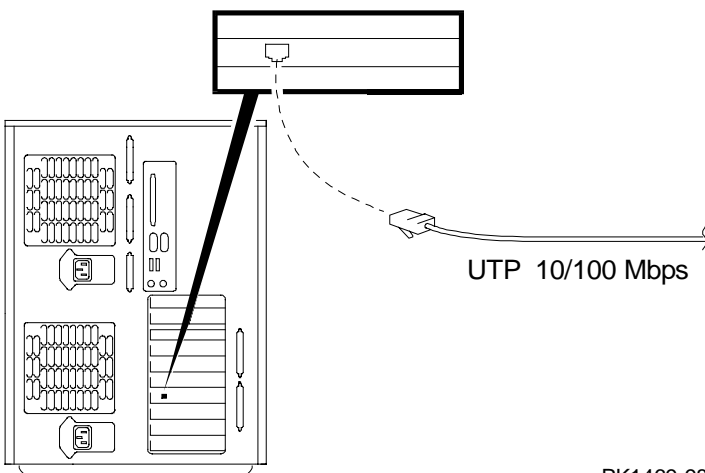
Figure 2-4 System Connections



2.8 Connecting to Network Hardware

The system supports various network options. You can connect to ThinWire, as shown in Figure 2-5. With appropriate options, you can also connect to FDDI and token ring networks.

Figure 2-5 Network Connections

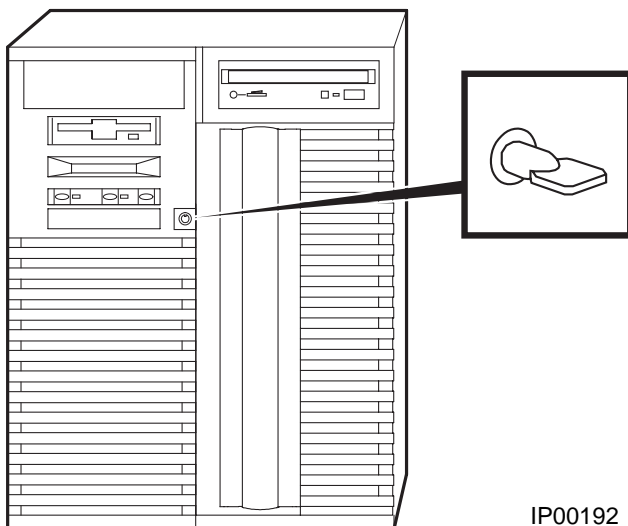


PK1469-98

2.9 Locking the System

Pedestal systems are protected by a key lock located on the front. Turning the key to the left locks the front door. When the front door is locked, the top cover and side panel latch cannot be accessed.

Figure 2-6 System Lock and Key



IP00192

Turning the key to the right unlocks the system unit and allows you access to install or remove system components. When the system unit is unlocked, push the lock to open the door. Figure 2-6 shows the system lock in the unlocked position.

Additional security is provided by a latching loop on the rear panel of the system unit that allows you to attach the system unit to a post or other fixed object.

Chapter 3

Operation

This chapter provides basic operating instructions, including powering up the system, booting, and operating system installation. Note that your choice of operating system has already been installed at the factory; this information is provided so that should you decide to change operating systems, you may. It also provides information about updating firmware.

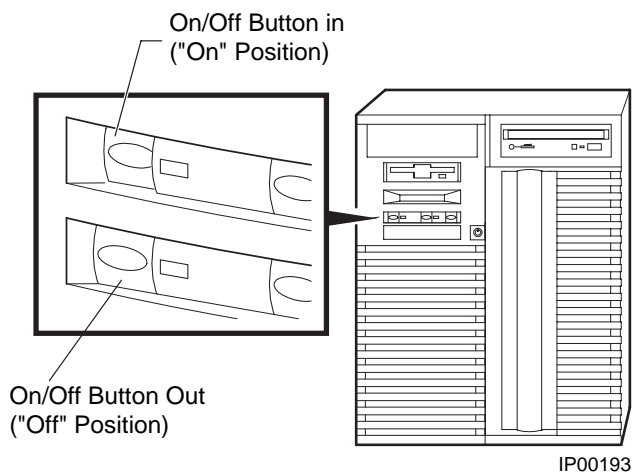
Sections in this chapter are:

- Powering Up the System
- Power-Up Display
- Booting DIGITAL UNIX
- Installing DIGITAL UNIX
- Booting OpenVMS
- Installing OpenVMS
- Booting Windows NT
- Installing Windows NT
- Switching Between Operating Systems
- Updating Firmware
- Hard Disk Partitioning
- Using the Halt Button
- Halt Assertion

3.1 Powering Up the System

To power up the system, press the On/Off button to the On position.

Figure 3-1 Location of On/Off Button



Power up the system by pressing in the On/Off button (see Figure 3-1). Testing begins, and screen text similar to that in Example 3-1 displays (if the console terminal is a serial terminal connected to the COM1 port), along with status messages in the control panel display. If the console terminal is a graphics monitor, only the last few lines of the power-up display print. See Section 3.2 for more information.

3.2 Power-Up Display

The entire power-up display prints to a serial terminal (if the console environment variable is set to serial); the last several lines print to either a serial terminal or a graphics monitor. Power-up status also displays on the control panel display.

Example 3-1 Power-Up Display

```
512 Meg of system memory                               ❶
probing hose 1, PCI                                  ❷
bus 0, slot 7 -- pka -- QLogic ISP1020
bus 0, slot 8 -- ewa -- DECchip 21140-AA
probing hose 0, PCI
probing PCI-to-ISA bridge, bus 1
bus 0, slot 5, function 1 -- dqa -- Cypress 82C693 IDE
bus 0, slot 5, function 2 -- dqb -- Cypress 82C693 IDE
bus 0, slot 6, function 0 -- pkb -- Adaptec AIC-7895
bus 0, slot 6, function 1 -- pkc -- Adaptec AIC-7895
bus 0, slot 7 -- vga -- DEC PowerStorm
bus 0, slot 8 -- ewa -- DECchip 21040-AA
Testing the System
Testing the Disks (read only)
Testing the Network
System Temperature is 22 degrees C

Compaq AlphaServer DS20 Console V5.4-x, Aug 26 1998 16:07:57 ❸

P00>>>
```

- ❶ Memory size is determined.
- ❷ The PCI bridges and attendant buses (indicated as IOD n by the console) are probed and the devices are reported. I/O adapters are configured.
- ❸ The SRM console banner and prompt are printed. (The SRM prompt is shown in this manual as P00>>>. It can, however, be P01>>>. The number indicates the primary processor.) 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.

Refer to Chapter 4 for information about the SRM console and to Chapter 5 for AlphaBIOS.

3.3 Booting DIGITAL UNIX

DIGITAL UNIX® can be booted from a local disk or a remote disk through an Ethernet connection. Refer to the documentation shipped with the operating system for booting instructions. Example 3-2 shows booting a local disk from a desktop system.

Example 3-2 Booting DIGITAL UNIX from a Local Disk

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

```
P00>>> boot -file vmunix -flags a dkc0      ❸
(boot dkc0.0.0.9.0 -file vmunix -flags a)
block 0 of dkc0.0.0.9.0 is a valid boot block
reading 16 blocks from dkc0.0.0.9.0
bootstrap code read in
base = 1ee000, image_start = 0, image_bytes = 2000
initializing HWRPB at 2000
initializing page table at 1fff0000
initializing machine state
setting affinity to the primary CPU
jumping to bootstrap code

DIGITAL UNIX boot - Fri Aug 7 20:30:19 EDT 1998

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

DIGITAL UNIX Version V4.0E (sabl28.eng.pko.dec.com) console

login:
```

Continued on next page

Example 3-2 Booting DIGITAL UNIX from a Local Disk (Continued)

```
*****
*
* Starting Desktop Login on display :0...
*
* Wait for the Desktop Login screen before logging in.
*
*****
```

DIGITAL UNIX Version V4.0E (sabl28.eng.pko.dec.com) console ④

login:

- ① The **show device** command displays device information, including name and type of connection to the system. See Section 4.3 for a description of the **show device** command and the device naming convention.
- ② The operating system is on the third disk connected to the system through the controller in slot 3 of PCI1. The name of this device, `dkc0`, is used as an argument to the **boot** command.
- ③ This command loads DIGITAL UNIX from the disk `dkc0`, using the boot file `vmunix` and autobooting to multiuser mode. See Section 4.5 for a description of the **boot** command.

The **boot** command accepts the name of a boot device, a boot file name through the **-file** option, and boot flags through the **-flags** option. The environment variables **bootdef_dev**, **boot_file**, and **boot_osflags** can also be used to specify the default boot device or device list, the default boot file, and flag information. When an option and the corresponding environment variable are both in a command string, the option overrides the environment variable. The value of the environment variable, however, is not changed. See Section 4.18 for information about environment variables.

- ④ The operating system banner displays.

Example 3-3 Booting DIGITAL UNIX from a Remote Disk

```
P00>>> show device ❶
dka0.0.0.7.1          DKA0    RZ28D  0010
dka100.1.0.7.1       DKA100  SEAGATE ST32155W  0596
dka200.2.0.7.1       DKA200  RZ28D  0010
dka400.4.0.7.1       DKA400  PLEXTOR CD-ROM PX-12TS  1.02
dva0.0.0.0.0         DVA0
ewa0.0.0.8.0         EWA0    08-00-2B-E2-9C-60 ❷
pka0.7.0.7.1         PKA0    SCSI Bus ID 7  5.54
pkb0.7.0.6.0         PKB0    SCSI Bus ID 7
P00>>>
P00>>> boot -flags an -protocols bootp ewa ❸
      (boot ewa0.0.0.4.1 -flags an)
Building FRU table

Trying BOOTP boot.

Broadcasting BOOTP Request...
Received BOOTP Packet File Name: /var/adm/ris/ris0.alpha/hvmunix
local inet address: 16.122.128.26
remote inet address: 16.122.128.59
TFTP Read File Name: /var/adm/ris/ris0.alpha/hvmunix
.....
bootstrap code read in
base = 200000, image_start = 0, image_bytes = 9a0fa0
initializing HWRPB at 2000
initializing page table at 1f2000
initializing machine state
setting affinity to the primary CPU
jumping to bootstrap code

Secondary boot program - Thu Aug 1 22:33:13 EST 1996

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

DIGITAL UNIX Version V4.0E (sabl28.eng.pko.dec.com) console ❹
```

- ❶ The **show device** command displays device information, including name and type of connection to the system. See Section 4.3 for a description of the **show device** command and the device naming convention.
- ❷ The operating system is on a remote disk accessed through the Ethernet controller in slot 4 of PCI1. The name of this device, ewa0, is used as an argument to the **boot** command.
- ❸ This command loads DIGITAL UNIX from ewa0, autobooting to multiuser mode. See Section 4.5 for a description of the **boot** command.

The **boot** command accepts the name of a boot device, a boot file name through the **-file** option, and boot flags through the **-flags** option. The environment variables **bootdef_dev**, **boot_file**, and **boot_osflags** can also be used to specify the default boot device or device list, the default boot file, and flag information. When an option and the corresponding environment variable are both in a command string, the option overrides the environment variable. The value of the environment variable, however, is not changed. See Section 4.18 for information about environment variables.

- ❹ The operating system banner displays.

3.4 Installing DIGITAL UNIX

DIGITAL UNIX is installed from the CD-ROM. Refer to the documentation shipped with the CD-ROM for installation instructions.

Example 3-4 Installing DIGITAL UNIX

```
P00>>> show device
dka0.0.0.7.1          DKA0          RZ1DB-BA  LYG0
dka100.1.0.7.1       DKA100        RZ1CB-CA  LYJ0
dka200.2.0.7.1       DKA200        RZ1CB-CA  LYJ0
dka300.3.0.7.1       DKA300        RZ1CB-CA  LYJ0
dka500.5.0.7.1       DKA500        RRD47     1337 ❶
dva0.0.0.0.0         DVA0
ewa0.0.0.8.1         EWA0          00-00-F8-00-0E-3B
pka0.7.0.7.1         PKA0          SCSI Bus ID 7  5.54
P00>>>
```

```
P00>>> boot dka500 ❶
(boot dka500.5.0.7.1 -flags A)
block 0 of dka500.5.0.7.1 is a valid boot block
reading 16 blocks from dka500.5.0.7.1
bootstrap code read in
base = 1ee000, image_start = 0, image_bytes = 2000
initializing HWRPB at 2000
initializing page table at 1fff0000
initializing machine state
setting affinity to the primary CPU
jumping to bootstrap code

DIGITAL UNIX boot - Thu Jul 16 16:59:31 EDT 1998

Loading vmunix ...
.
.
.
INIT: SINGLE-USER MODE

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

*** Performing CDROM Installation

Loading installation process and scanning system hardware.

The " Welcome to the DIGITAL UNIX Installation Procedure" appears. ❷
```

Continued on next page

- ❶ Use the **boot** command to install the operating system from the CD-ROM, which is always dka500.
- ❷ See your operating system documentation for further installation instructions.

3.5 Booting OpenVMS

OpenVMS can be booted from a local disk, a disk connected through a cluster, or a remote disk through an Ethernet connection. Refer to the documentation shipped with the operating system for booting instructions.

Example 3-5 Booting OpenVMS from a Local Disk

```
P00>>> show device ❶
dka0.0.0.7.1          DKA0              RZ1DB-BA  LYG0
dka100.1.0.7.1       DKA100            RZ1CB-CA  LYJ0
dka200.2.0.7.1       DKA200            RZ1CB-CA  LYJ0
dka300.3.0.7.1       DKA300            RZ1CB-CA  LYJ0
dka500.5.0.7.1       DKA500            RRD47    1337
dva0.0.0.0.0         DVA0
ewa0.0.0.8.1         EWA0              00-00-F8-00-0E-3B
pka0.7.0.7.1         PKA0              SCSI Bus ID 7  5.54
P00>>>

P00>>> show boot_reset ❷
boot_reset           ON
P00>>> show bootdef_dev ❸
bootdef_dev          dka200.2.0.7.1

P00>>> boot ❹
(boot dka200.2.0.7.1 -flags 0,0)
block 0 of dka200.2.0.7.1 is a valid boot block
reading 893 blocks from dka200.2.0.7.1
bootstrap code read in
base = 1fa000, image_start = 0, image_bytes = 6fa00
initializing HWRPB at 2000
initializing page table at 1fff0000
initializing machine state
setting affinity to the primary CPU
jumping to bootstrap code
```

```
OpenVMS (TM) Alpha Operating System, Version 7.1-2
$!Copyright(c) 1998 Digital Equipment Corporation. All rights reserved.
%STDRV-I-STARTUP, OpenVMS startup begun at 30-JUL-1998 11:47:11.04
```

Continued on next page

Example 3-5 Booting OpenVMS from a Local Disk (Continued)

```
.  
. .  
.
```

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

```
.  
. .  
.
```

Welcome to OpenVMS (TM) Alpha Operating System, Version V7.1-2 ⑤

Username:

- ① The **show device** command displays device information. See Section 4.3 for a description of the **show device** command and the device naming convention.
- ② The **boot_reset** environment variable was previously set to “on,” causing the power-up trace to display when the system initializes (see Section 3.2). See Section 4.18 for commands used with environment variables.
- ③ The **bootdef_dev** environment variable specifies the default boot device. In this example, the default boot device was previously set to dka200.2.0.7.1.
- ④ No boot device is specified in the **boot** command; the default boot device was set with the environment variable. See Section 4.5 for a description of the **boot** command.

The **boot** command accepts the name of a boot device, a boot file name through the **-file** option, and boot flags through the **-flags** option. The environment variables **bootdef_dev**, **boot_file**, and **boot_osflags** can also be used to specify the default boot device or device list, the default boot file, and flag information. When an option and the corresponding environment variable are both in a command string, the option overrides the environment variable. The value of the environment variable, however, is not changed. See Section 4.18 for information about environment variables.

- ⑤ The operating system banner displays.

Example 3-6 Booting OpenVMS from a Disk on a Cluster

```
P00>>> show bootdef_dev ❶
bootdef_dev          dual10.0.0.8.0
P00>>> show device ❷
dka0.0.0.7.1         DKA0           RZ1CB-CS 0844
dka100.1.0.7.1       DKA100        RZ28 D41C
dka200.2.0.7.1       DKA200        RZ28 441C
dka300.3.0.7.1       DKA300        RZ1EF-AB 0370
dka500.5.0.7.1       DKA500        RRD47 0557
dkb0.0.0.2000.1      DKB0          RZ1DB-BA LYG0
dkb200.2.0.2000.1    DKB200        RZ1DB-BA LYG0
dkb400.4.0.2000.1    DKB400        RZ1CB-BA LYG0
dkc100.1.0.2001.1    DKC100        RZ1DB-BA LYG0
dkc300.3.0.2001.1    DKC300        RZ1DB-BA LYG0
dua101.3.0.8.0       $1$DIA101 (RF0700) RF35
dua103.1.0.8.0       $1$DIA103 (RF0701) RF36
dua10.0.0.8.0        $1$DIA110 (DENVER) RF74 ❸
dua240.2.0.8.0       $1$DIA240 (E1ILMO) EF52
dva0.0.0.0.0         DVA0
ewa0.0.0.0.2002.1    EWA0          00-06-2B-00-0A-59
pka0.7.0.7.1         PKA0          SCSI Bus ID 7 5.57
pkb0.7.0.2000.1      PKB0          SCSI Bus ID 7
pkc0.7.0.2001.1      PKC0          SCSI Bus ID 7
pua0.7.0.8.0         PUA0          DSSI Bus ID 7

P00>>> boot ❹
(boot dual10.0.0.8.0 -flags 0)
Building FRU table
.
.
.
Welcome to OpenVMS Alpha (TM) Operating System, Version V7.1-2 ❺
```


- ❶ The **bootdef_dev** environment variable specifies the default boot device.
- ❷ The **show device** command displays device information, including name and type of connection to the system. See Section 4.3 for a description of the **show device** command and the device naming convention.
- ❸ The disk dual10.0.0.8.0 is on the cluster that includes this system.
- ❹ No boot device is specified in the **boot** command; the default boot device was set with the environment variable. See Section 4.5 for a description of the **boot** command.

The **boot** command accepts the name of a boot device, a boot file name through the **-file** option, and boot flags through the **-flags** option. The environment variables **bootdef_dev**, **boot_file**, and **boot_osflags** can also be used to specify the default boot device or device list, the default boot file, and flag information. When an option and the corresponding environment variable are both in a command string, the option overrides the environment variable. The value of the environment variable, however, is not changed. See Section 4.18 for information about environment variables.

- ❺ The operating system banner prints.

Example 3-7 Booting OpenVMS from a Remote Disk

```
P00>>> show device ❶
dka0.0.0.7.1          DKA0    RZ28D  0010
dka100.1.0.7.1       DKA100  SEAGATE ST32155W  0596
dka200.2.0.7.1       DKA200  RZ28D  0010
dka500.5.0.7.1       DKA500  PLEXTOR CD-ROM PX-12TS  1.02
dva0.0.0.0.0         DVA0
ewa0.0.0.8.0         EWA0    08-00-2B-E2-9C-60 ❶
pka0.7.0.7.1         PKA0    SCSI Bus ID 7  5.54
pkb0.7.0.6.0         PKB0    SCSI Bus ID 7
P00>>
P00>>> boot ewa0 -flags 0 ❷
      (boot ewa0.0.0.2.0 -flags 0)
Building FRU table

Trying MOP boot.
.....

Network load complete.
.
.
.
Welcome to OpenVMS Alpha (TM) Operating System, Version V7.1-2 ❸
```

- ❶ The **show device** command displays device information, including name and type of connection to the system. In this example the Ethernet connection is ewa0. See Section 4.3 for a description of the **show device** command and the device naming convention.
- ❷ The **boot** command specifies ewa0 as the boot device. See Section 4.5 for a description of the **boot** command.

The **boot** command accepts the name of a boot device, a boot file name through the **-file** option, and boot flags through the **-flags** option. The environment variables **bootdef_dev**, **boot_file**, and **boot_osflags** can also be used to specify the default boot device or device list, the default boot file, and flag information. When an option and the corresponding environment variable are both in a command string, the option overrides the environment variable. The value of the environment variable, however, is not changed. See Section 4.18 for information about environment variables.

- ❸ The operating system banner prints.

3.6 Installing OpenVMS

OpenVMS is installed from the CD-ROM. Refer to the documentation shipped with the OpenVMS kit for complete installation instructions.

Example 3-8 Installing OpenVMS

```
P00>>> boot -flags 0,0 dka500 ❶
Initializing...
SROM V3.0 on cpu0
.
. [The initialization display prints. See Section 3.2.]
.

AlphaServer DS20 Console V5.4-x, 2-APR-1998 15:17:48

CPU 0 booting

(boot dka500.5.0.1.1 -flags 0,0)
Building FRU table
block 0 of dka500.5.0.1.1 is a valid boot block
reading 1002 blocks from dka500.5.0.1.1
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) Alpha Operating System, Version 7.1x ❷

%SMP-I-SECMSG, CPU #01 message:  P01>>>START
%SMP-I-CPUBOOTED, CPU #01 has joined the PRIMARY CPU in
multiprocessor operation
```

Continued on next page

Example 3-8 Installing OpenVMS (Continued)

Installing required known files...

Configuring devices...

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

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

Please choose one of the following:

- 1) Install or upgrade OpenVMS Alpha Version 7.1x
- 2) List layered product kits that this procedure can install
- 3) Install or upgrade layered product(s)
- 4) Execute DCL commands and procedures
- 5) Shut down this system

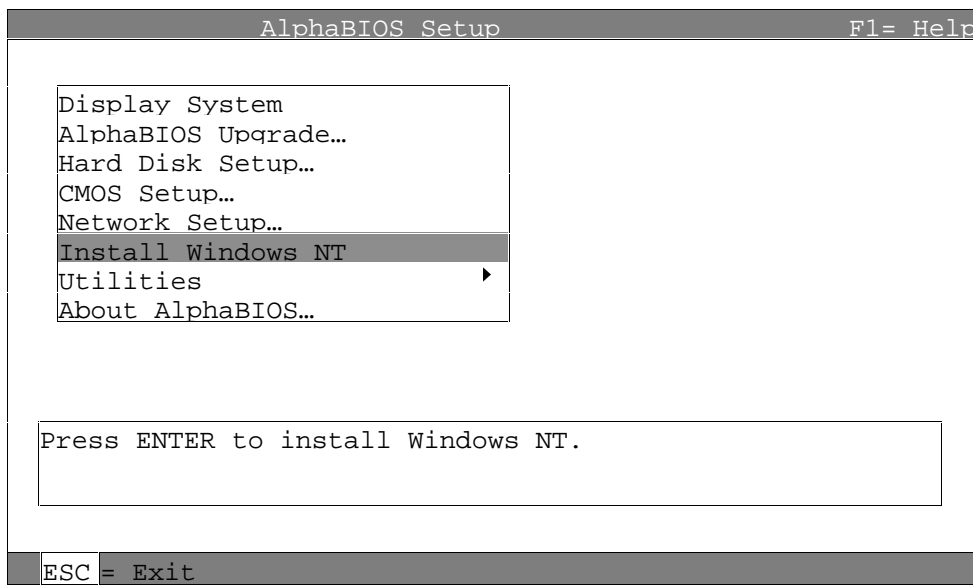
Enter CHOICE or ? to repeat menu: (1/2/3/4/5/?)

- ❶ Use the **boot** command to install the operating system from the CD-ROM, which is always dka500.
- ❷ See your operating system documentation for installation instructions.

3.7 Booting Windows NT

Microsoft Windows NT is started from the AlphaBIOS Boot screen.

Figure 3-2 AlphaBIOS Boot Screen



Two SRM environment variables must be set properly for Windows NT to boot. 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. Windows NT requires a graphics monitor as its console. Setting the SRM console environment variable to **graphics** and having a graphics monitor attached to your system meets this requirement. After setting these two variables, you have to power-down and power-up your system for them to take effect.

The method used for booting Windows NT is determined by the setting of **Auto Start** in the AlphaBIOS **Standard CMOS Setup** screen (see Chapter 5).

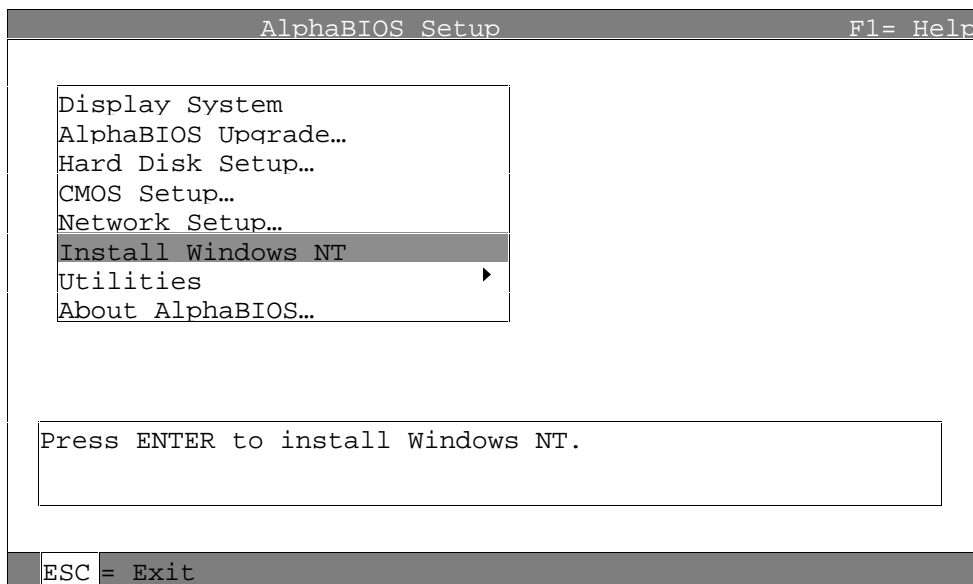
- If **Auto Start** is enabled, the primary version of Windows NT starts automatically.
- If **Auto Start** is disabled, use the arrow keys to select the Windows NT version to start. Press Enter to boot Windows NT.

*NOTE: The SRM **console** environment variable must be set to **graphics** before booting Windows NT, though this setting is not necessary to run AlphaBIOS.*

3.8 Installing Windows NT

Windows NT is installed from the CD-ROM. Insert the CD-ROM into the drive, start AlphaBIOS Setup, select the menu item **Install Windows NT**, and follow the prompts.

Figure 3-3 Installing Windows NT



Windows NT requires a partitioned and formatted hard disk drive. If your drive is not partitioned or formatted, follow the instructions in Section 3.10 before installing the Windows NT operating system.

Up to three versions of Windows NT can be resident in a system at one time.

If this is a new Windows NT installation, start with this procedure:

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. Perform an express hard disk setup by pressing F7 to enter **Express Setup**.
4. Continue the setup by pressing the F10 key.
5. Go to the procedure below.

This procedure is for all Windows NT installations:

Read these instructions carefully paying particular attention to step 5.

1. Put the Windows NT CD into the CD-ROM drive.
2. Start **AlphaBIOS Setup**, select **Install Windows NT**, and press Enter.
3. Windows NT 4.0 Setup incorrectly believes that it recognizes and supports the unused onboard AIC-7895 SCSI controller and will load its driver unless it is prevented from doing so. Your system's CD-ROM is connected to a SCSI controller on the PCI bus and its driver must be loaded. To prevent the loading of the **WRONG** driver **quickly** press F6 when the Windows NT banner displays (blue screen). If Windows NT autodetects the AIC-78xx and F6 was not pressed at the right time, start over again. For further information, see the Windows NT 4.0 readme.txt file.
4. To select the appropriate driver:
 - a. Insert the AlphaServer DS20 Windows NT floppy into the floppy drive.
 - b. If step 3 was successful, Windows NT Setup will announce that it cannot determine the type of one or more mass storage controllers, press 'S' to specify an additional controller.
 - c. From the list, choose "Other." The floppy's list will appear.
 - d. Choose the "Adaptec AIC-78xx PCI SCSI Controller (NT4.0)."

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.

3.9 Switching Between Operating Systems

The system supports the use of multiple operating systems on different system and data disks not in the machine at the same time; that is you can have a set of disks for each operating system.

CAUTION: *This operation is not for the faint hearted especially if you have a shadow system disk and shadow arrays. **The file structures of the three operating systems are incompatible. Therefore all disks used by one operating system must be removed when another is put in its place. Upon reinstallation all disks must be placed in the same physical locations. It is therefore necessary to keep track of the location of each disk in the system.***

3.9.1 Switching to Windows NT

Use the following procedure.

1. Shut down the operating system and power off the system.
2. Remove and mark the physical location of each disk in the system.
3. Either place blank disks or your Windows NT disk set into the system. (If you are placing a Windows NT disk set into the system, be sure that each disk is replaced in the same physical location from which it was removed.)
4. Power on the system.
5. Enter the following commands at the SRM console prompt:

```
P00>>> set os_type nt
P00>>> init
```
6. Either install Windows NT, see Section 3.8, or at the AlphaBIOS boot screen, start AlphaBIOS setup (F2), select **CMOS Setup**, and press Enter.
7. Set the system date and time.
8. In CMOS Setup, check that the setup for the floppy and other basic parameters are accurate. Set system-specific parameters, such as the memory test and password, in Advanced CMOS Setup as needed. Press **F10** to save the changes.
9. From the AlphaBIOS Setup screen select **Utilities**. In the selection box, choose **OS Selection Setup**. Make sure the selections (boot name, boot file, and so on) are what you want. Press **F10** to save the changes.
10. Return to the boot screen and boot Windows NT.

3.9.2 Switching to DIGITAL UNIX or OpenVMS

Use the following procedure.

1. Shut down the operating system and power off the system.
2. Remove and mark the physical location of each disk in the system.
3. Either place blank disks or your DIGITAL UNIX or OpenVMS disk set into the system. **No matter which disk set you are placing into the system, be sure that each disk is placed in the same physical location from which it was removed.**
4. Power on the system.
5. In AlphaBIOS, access the Advanced CMOS Setup screen and change the Console Selection to DIGITAL UNIX (SRM) or OpenVMS (SRM) as appropriate. Press **F10** to save the change. This menu selection changes the **os_type** environment variable to either UNIX or VMS so that the SRM console does not load AlphaBIOS but remains in the system when you reset the system.
6. Press the Reset button to reset the system.
7. Either install DIGITAL UNIX (see Section 3.4) or OpenVMS (see Section 3.6) or boot the operating system.

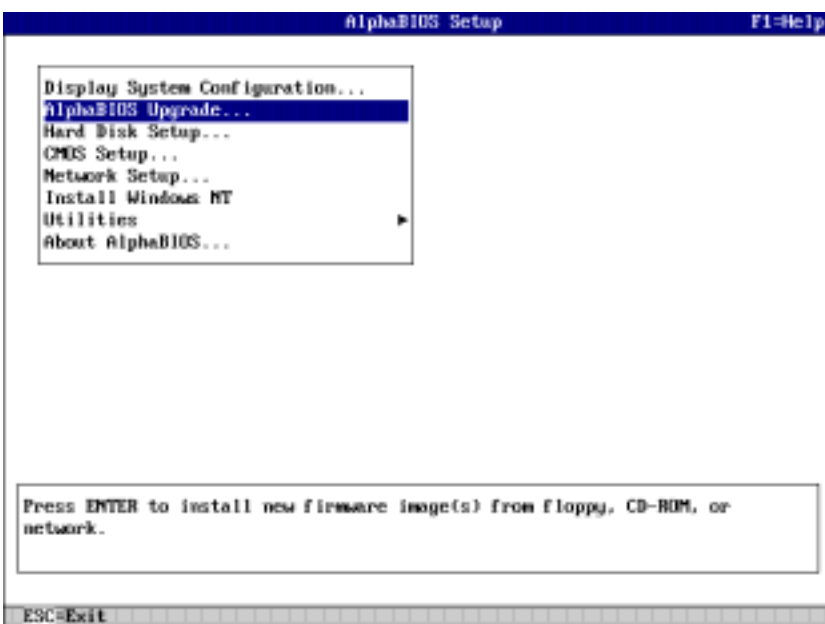
3.10 Updating Firmware

Start the Loadable Firmware Update (LFU) utility by issuing the `lfu` command at the SRM console prompt, booting it from the CD-ROM while in the SRM console, or selecting Update AlphaBIOS in the AlphaBIOS Setup screen.

Example 3-9 Starting LFU from the SRM Console

```
P00>>> lfu
***** Loadable Firmware Update Utility *****
Select firmware load device (cda0, dva0, ewa0), or
Press <return> to bypass loading and proceed to LFU: cda0
.
.
.
UPD>
```

Figure 3-4 Starting LFU from the AlphaBIOS Console



PK1461-98

Use the Loadable Firmware Update (LFU) utility to update system firmware.

You can start LFU from either the SRM console or the AlphaBIOS console.

- From the SRM console, start LFU by issuing the **lfu** command (see Example 3–9). Also from the SRM console, LFU can be booted from the Alpha CD-ROM (V5.4 or later), as shown in Example 3–10.
- From the AlphaBIOS console, select **Update AlphaBIOS** from the **AlphaBIOS Setup** screen (see Figure 3–4).

A typical update procedure is:

1. Start LFU.
2. Use the LFU **list** command to show the revisions of modules that LFU can update and the revisions of update firmware.
3. Use the LFU **update** command to write the new firmware.
4. Use the LFU **exit** command to go back to the console.

Examples of updating firmware from CD-ROM, floppy, and the network follow.

Example 3–10 Booting LFU from the CD-ROM

```
P00>>> show device ❶
dka0.0.0.7.1          DKA0          RZ1DB-BA  LYG0
dka100.1.0.7.1       DKA100        RZ1CB-CA  LYJ0
dka500.5.0.7.1       DKA500        RRD47    1645
dva0.0.0.0.0         DVA0
ewa0.0.0.8.1         EWA0          00-00-F8-00-0E-3B
pka0.7.0.7.1         PKA0          SCSI Bus ID 7  5.54
P00>>> boot dka500
(boot dka500.5.0.7.1 -flags 0,0)
block 0 of dka500.5.0.7.1 is a valid boot block
.
.
jumping to bootstrap code
The default bootfile for this platform is
      [AS1400]AS1400_LFU.EXE
Hit <RETURN> at the prompt to use the default bootfile.
Bootfile: <CR>
Starting Firmware Update Utility

      ***** Loadable Firmware Update Utility *****
.
UPD>
```

3.10.1 Updating Firmware from the CD-ROM

Insert the Alpha CD-ROM, start LFU, and select cda0 as the load device.

Example 3-11 Updating Firmware from the CD-ROM

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

Select firmware load device (cda0, dva0, ewa0), or
Press <return> to bypass loading and proceed to LFU: cda0 ①

Please enter the name of the options firmware files list, or
Press <return> to use the default filename [AS1400FW]: AS1400CP ②

Copying AS1400CP from DKA500.5.0.1.1 .
Copying [AS1400]TCREADME from DKA500.5.0.1.1 .
Copying [AS1400]TCSRMRROM from DKA500.5.0.1.1 .....
Copying [AS1400]TCARCROM from DKA500.5.0.1.1 .....

-----
Function      Description ③
-----
Display      Displays the system's configuration table.
Exit         Done exit LFU (reset).
List         Lists the device, revision, firmware name, and
             update revision.
Lfu          Restarts LFU.
Readme       Lists important release information.
Update       Replaces current firmware with loadable data image.
Verify       Compares loadable and hardware images.
? or Help    Scrolls this function table.
-----

UPD> list ④

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

- ❶ Select the device from which firmware will be loaded. The choices are the internal CD-ROM, the internal floppy disk, or a network device. In this example, the internal CD-ROM is selected.
- ❷ Select the file that has the firmware update, or press Enter to select the default file. The file options are:

AS1400FW (default)	SRM console, AlphaBIOS console, and I/O adapter firmware.
-----------------------	--

AS1400CP	SRM console and AlphaBIOS console firmware only.
----------	--

AS1400IO	I/O adapter firmware only.
----------	----------------------------

In this example the file for console firmware (AlphaBIOS and SRM) is selected.

- ❸ The LFU function table and prompt (UPD>) display.
- ❹ Use the LFU **list** command to determine the revision of firmware in a device and the most recent revision of that firmware available in the selected file. In this example, the resident firmware for each console (SRM and AlphaBIOS) is at an earlier revision than the firmware in the update file.

Continued on next page

Example 3-11 Updating Firmware from the CD-ROM (Continued)

```
UPD> update * ⑤
WARNING: updates may take several minutes to complete for each
device.

Confirm update on: AlphaBIOS      [Y/(N)] y ⑥

                DO NOT ABORT!
AlphaBIOS      Updating to V6.40-1... Verifying V6.40-1... PASSED.

Confirm update on: srmflash      [Y/(N)] y

                DO NOT ABORT!
srmflash      Updating to V6.0-3... Verifying V6.0-3...
PASSED.

UPD> exit ⑦
```


- ⑤ The **update** command updates the device specified or all devices. In this example, the wildcard indicates that all devices supported by the selected update file will be updated.
- ⑥ For each device, you are asked to confirm that you want to update the firmware. The default is no. Once the update begins, do not abort the operation. Doing so will corrupt the firmware on the module.
- ⑦ The **exit** command returns you to the console from which you entered LFU (either SRM or AlphaBIOS).

3.10.2 Updating Firmware from Floppy Disk — Creating the Diskettes

Create the update diskettes before starting LFU. See Section 3.10.3 for an example of the update procedure.

Table 3–1 File Locations for Creating Update Diskettes on a PC

Console Update Diskette	I/O Update Diskette
AS1400FW.TXT	AS1400IO.TXT
AS1400CP.TXT	TCREADME.SYS
TCREADME.SYS	CIPCA315.SYS
TCSRMRROM.SYS	DFPAA310.SYS
TCARCROM.SYS	KZPAAA11.SYS

To update system firmware from floppy disk, you first must create the firmware update diskettes. You will need to create two diskettes: one for console updates, and one for I/O.

1. Download the update files from the Internet.
2. On a PC, copy files onto two FAT-formatted diskettes as shown in Table 3–1.
3. From an OpenVMS system, copy files onto two ODS2-formatted diskettes as shown in Example 3–12.

Example 3-12 Creating Update Diskettes on an OpenVMS System

Console update diskette

```
$ inquire ignore "Insert blank HD floppy in DVA0, then continue"
$ set verify
$ set proc/priv=all
$ init /density=hd/index=begin dva0: tcods2cp
$ mount dva0: tcods2cp
$ create /directory dva0:[as1400]
$ copy tcreadme.sys dva0:[as1400]tcreadme.sys
$ copy AS1400fw.txt dva0:[as1400]as1400fw.txt
$ copy AS1400cp.txt dva0:[as1400]as1400cp.txt
$ copy tcsrmrom.sys dva0:[as1400]tcsrmrom.sys
$ copy tcarcrom.sys dva0:[as1400]tcarcrom.sys
$ dismount dva0:
$ set noverify
$ exit
```

I/O update diskette

```
$ inquire ignore "Insert blank HD floppy in DVA0, then continue"
$ set verify
$ set proc/priv=all
$ init /density=hd/index=begin dva0: tcods2io
$ mount dva0: tcods2io
$ create /directory dva0:[as1400]
$ create /directory dva0:[options]
$ copy tcreadme.sys dva0:[as1400]tcreadme.sys
$ copy AS1400fw.txt dva0:[as1400]as1400fw.txt
$ copy AS1400io.txt dva0:[as1400]as1400io.txt
$ copy cipca214.sys dva0:[options]cipca214.sys
$ copy dfpaa246.sys dva0:[options]dfpaa246.sys
$ copy kzpsaA10.sys dva0:[options]kzpsaa10.sys
$ dismount dva0:
$ set noverify
$ exit
```

3.10.3 Updating Firmware from Floppy Disk — Performing the Update

Insert an update diskette (see Section 3.10.2) into the floppy drive. Start LFU and select dva0 as the load device.

Example 3-13 Updating Firmware from the Floppy Disk

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

Select firmware load device (cda0, dva0, ewa0), or
Press <return> to bypass loading and proceed to LFU: dva0 ❶

Please enter the name of the options firmware files list, or
Press <return> to use the default filename [AS1400IO,(AS1400CP)]:
AS1400IO ❷

Copying AS1400IO from DVA0 .
Copying TCREADME from DVA0 .
Copying CIPCA214 from DVA0 .
Copying DFPAA252 from DVA0 ...
Copying KZPSAA11 from DVA0 ...

. [The function table displays, followed by the UPD> prompt, as
. shown in Example 3-11.]

UPD> list ❸
```

Device	Current Revision	Filename	Update Revision
Fsb	3.1-x	fsb_fw	3.x
Nt	5.68	nt_fw	5.xxx
Plxx0	A11	kzpsa_fw	A11
Srm	5.4-x	srm_fw	5.4-xx
Pua	A214	cipca_fw	A2xx

- ❶ Select the device from which firmware will be loaded. The choices are the internal CD-ROM, the internal floppy disk, or a network device. In this example, the internal floppy disk is selected.
- ❷ Select the file that has the firmware update, or press Enter to select the default file. When the internal floppy disk is the load device, the file options are:

AS1400CP (default) SRM console and AlphaBIOS console firmware only.

AS1400IO I/O adapter firmware only.

The default option in Example 3–11 (AS1400FW) is not available, since the file is too large to fit on a 1.44 MB diskette. This means that when a floppy disk is the load device, you can update either console firmware or I/O adapter firmware, but not both in the same LFU session. If you need to update both, after finishing the first update, restart LFU with the **lfu** command and insert the diskette with the other file.

In this example the file for I/O adapter firmware is selected.

- ❸ Use the LFU **list** command to determine the revision of firmware in a device and the most recent revision of that firmware available in the selected file. In this example, the update revision for console firmware displays as “Missing file” because only the I/O firmware files are available on the floppy disk.

Continued on next page

Example 3-13 Updating Firmware from the Floppy Disk (Continued)

```
UPD> update pfi0 ④
WARNING: updates may take several minutes to complete for each device.

Confirm update on: pfi0 [Y/(N)] y ⑤

                DO NOT ABORT!
pfi0           Updating to 3.10... Verifying to 3.10... PASSED.

UPD> lfu ⑥

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

Select firmware load device (cda0, dva0, ewa0), or
Press <return> to bypass loading and proceed to LFU: dva0

Please enter the name of the options firmware files list, or
Press <return> to use the default filename [AS1400IO,(AS1400CP)]: ⑦

.
. (The function table displays, followed by the UPD> prompt.
. Console firmware can now be updated.)

UPD> exit ⑧
```

- ④ The **update** command updates the device specified or all devices.
- ⑤ For each device, you are asked to confirm that you want to update the firmware. The default is no. Once the update begins, do not abort the operation. Doing so will corrupt the firmware on the module.
- ⑥ The **lfu** command restarts the utility so that console firmware can be updated. (Another method is shown in Example 3–14, where the user specifies the file AS1400FW and is prompted to insert the second diskette.)
- ⑦ The default update file, AS1400CP, is selected. The console firmware can now be updated, using the same procedure as for the I/O firmware.
- ⑧ The **exit** command returns you to the console from which you entered LFU (either SRM or AlphaBIOS).

Example 3–14 Selecting AS1400FW to Update Firmware from the Internal Floppy Disk

```
P00>>> lfu

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

Select firmware load device (cda0, dva0, ewa0), or
Press <return> to bypass loading and proceed to LFU: dva0

Please enter the name of the firmware files list, or
Press <return> to use the default filename [AS1400IO,(AS1400CP)]: AS1400fw

Copying AS1400FW from DVA0 .
Copying TCREADME from DVA0 .
Copying TCSRMRROM from DVA0 .....
Copying TCARCROM from DVA0 .....
Copying CIPCA214 from DVA0
Please insert next floppy containing the firmware,
Press <return> when ready. Or type DONE to abort.
Copying CIPCA214 from DVA0 .
Copying DFPAA246 from DVA0 ...
Copying KZPSAA10 from DVA0 ...
.
.
.
```

3.10.4 Updating Firmware from a Network Device

Copy files to the local MOP server's MOP load area, start LFU, and select ewa0 as the load device.

Example 3-15 Updating Firmware from a Network Device

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

Select firmware load device (cda0, dva0, ewa0), or
Press <return> to bypass loading and proceed to LFU: ewa0 ❶

Please enter the name of the options firmware files list, or
Press <return> to use the default filename [AS1400FW]: ❷

Copying AS1400FW from EWA0 .
Copying TCREADME from EWA0 .
Copying TCSRROM from EWA0 .....
Copying TCARCROM from EWA0 .....
Copying CIPCA214 from EWA0 .
Copying DFPAA246 from EWA0 ...
Copying KZPSAA11 from EWA0 ...

.
. [The function table displays, followed by the UPD> prompt, as
. shown in Example 3-11.]

UPD> list ❸

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

Continued on next page

Before starting LFU, download the update files from the Internet. You will need the files with the extension .SYS. Copy these files to your local MOP server's MOP load area.

- ❶ Select the device from which firmware will be loaded. The choices are the CD-ROM, the internal floppy disk, or a network device. In this example, a network device is selected.

- ❷ Select the file that has the firmware update, or press Enter to select the default file. The file options are:

AS1400FW (default)	SRM console, AlphaBIOS console, and I/O adapter firmware.
-----------------------	--

AS1400CP	SRM console and AlphaBIOS console firmware only.
----------	--

AS1400IO	I/O adapter firmware only.
----------	----------------------------

In this example the default file, which has both console firmware (AlphaBIOS and SRM) and I/O adapter firmware, is selected.

- ❸ Use the LFU **list** command to determine the revision of firmware in a device and the most recent revision of that firmware available in the selected file. In this example, the resident firmware for each console (SRM and AlphaBIOS) and I/O adapter is at an earlier revision than the firmware in the update file.

Continued on next page

Example 3-15 Updating Firmware from a Network Device (Continued)

```
UPD> update * -all ④
WARNING: updates may take several minutes to complete for each
device.

                DO NOT ABORT!
AlphaBIOS      Updating to V6.40-1... Verifying V6.40-1... PASSED.

                DO NOT ABORT!
kzpsa0         Updating to All    ... Verifying All... PASSED.

                DO NOT ABORT!
kzpsa1         Updating to All    ... Verifying All... PASSED.

                DO NOT ABORT!
srmflash       Updating to V6.0-3... Verifying V6.0-3... PASSED.

UPD> exit ⑤
```

- ④ The **update** command updates the device specified or all devices. In this example, the wildcard indicates that all devices supported by the selected update file will be updated. Typically LFU requests confirmation before updating each console's or device's firmware. The **-all** option eliminates the update confirmation requests.
- ⑤ The **exit** command returns you to the console from which you entered LFU (either SRM or AlphaBIOS).

3.10.5 LFU Commands

The commands summarized in Table 3–2 are used to update system firmware.

Table 3–2 LFU Command Summary

Command	Function
display	Shows the physical configuration of the system.
exit	Terminates the LFU program.
help	Displays the LFU command list.
lfu	Restarts the LFU program.
list	Displays the inventory of update firmware on the selected device.
readme	Lists release notes for the LFU program.
update	Writes new firmware to the module.
verify	Reads the firmware from the module into memory and compares it with the update firmware.

These commands are described in the following pages.

display

The **display** command shows the physical configuration of the system. **Display** is equivalent to issuing the SRM console command **show configuration**. Because it shows the slot for each module, **display** can help you identify the location of a device.

exit

The **exit** command terminates the LFU program, causes system initialization and testing, and returns the system to the console from which LFU was called.

help

The **help** (or **?**) command displays the LFU command list, shown below.

Function	Description
Display	Displays the system's configuration table.
Exit	Done exit LFU (reset).
List	Lists the device, revision, firmware name, and update revision.
Lfu	Restarts LFU.
Readme	Lists important release information.
Update	Replaces current firmware with loadable data image.
Verify	Compares loadable and hardware images.
? or Help	Scrolls this function table.

lfu

The **lfu** command restarts the LFU program. This command is used when the update files are on a floppy disk. The files for updating both console firmware and I/O firmware are too large to fit on a 1.44 MB disk, so only one type of firmware can be updated at a time. Restarting LFU enables you to specify another update file.

list

The **list** command displays the inventory of update firmware on the CD-ROM, network, or floppy. Only the devices listed at your terminal are supported for firmware updates.

The **list** command shows three pieces of information for each device:

- Current Revision — The revision of the device's current firmware
- Filename — The name of the file used to update that firmware
- Update Revision — The revision of the firmware update image

readme

The **readme** command lists release notes for the LFU program.

update

The **update** command writes new firmware to the module. Then LFU automatically verifies the update by reading the new firmware image from the module into memory and comparing it with the source image.

To update more than one device, you may use a wildcard but not a list. For example, **update k*** updates all devices with names beginning with k, and **update *** updates all devices. When you do not specify a device name, LFU tries to update all devices; it lists the selected devices to update and prompts before devices are updated. (The default is no.) The **-all** option eliminates the update confirmation requests, enabling the update to proceed without operator intervention.

*CAUTION: Never abort an **update** operation. Aborting corrupts the firmware on the module.*

verify

The **verify** command reads the firmware from the module into memory and compares it with the update firmware. If a module already verified successfully when you updated it, but later failed tests, you can use **verify** to tell whether the firmware has become corrupted.

3.11 Hard Disk Partitioning for Windows NT

The recommended hard disk partition on the first hard disk in your system is: partition 1 should be 6 megabytes less than the total size of the drive (this large partition holds the operating system and the application and data files) and partition 2 should be the remaining 6 megabytes (this small partition holds only the few files necessary for your computer to boot).

This arrangement provides two benefits:

- AlphaBIOS requires that a boot partition be formatted with the FAT file system. However, the Windows NT file system (NTFS) provides advantages over FAT, such as additional security and more efficient use of disk space. By keeping the FAT boot partition as small as possible, the maximum amount of space is left available for use as an NTFS partition.
- Most applications install themselves onto drive C by default. Although the program installation drive is usually configurable by the user, many people accept the default of drive C. By making the first partition large, drive C becomes the larger drive. This arrangement makes program installation easier and avoids time-consuming insufficient disk space mistakes.

3.11.1 Hard Disk Error Conditions

Disk Initialization Failed

When you start hard disk setup, if you receive an “Internal error occurred” message, it means that a disk was found, but there was an error in communicating with the disk. The likely conditions that can cause this error are:

- Incompatible or failed disk cables. You may not have the correct cable installed, or the cable might have a broken lead or connector. Try another cable known to be good.
- Disk controller not configured. You may have to run a configuration utility to set up your hard disk controller. Check your controller documentation.
- Disk controller malfunction. Most controllers come with a diagnostic utility to test controller functioning. If a controller error is found, call the manufacturer for a replacement.
- Improper SCSI termination. Many SCSI controllers require that the terminating resistor packs be removed from all drives between the controller and last drive. Only the controller itself, and the last drive connected to the controller (the ends of the “chain”), should have terminating resistor packs left on.

No Hard Disks Found

When you start hard disk setup, if you receive a “No hard drives were found connected to your computer” message, it means that AlphaBIOS could not locate a hard drive. The likely conditions that cause this error are:

- Cable not connected to either the disk or controller. The cable may have worked loose from the connector on the controller or disk drive. Check the cable connections, making sure the cable connectors are fully seated.
- No power to the drive. The power connector may have worked loose from the receptacle on the drive, or the power cable itself may be malfunctioning. Check the cable connections, making sure the cable connectors are fully seated. Try connecting the drive to a different power connector.
- Disk drive malfunction. The disk drive itself may be malfunctioning and not responding to requests from the controller. If this is the problem, then it would appear as though the disk were absent. Replace the drive with a drive known to be good. If the known good drive is correctly detected, then your hard drive is defective. Contact the manufacturer for a replacement.

No Partitions on Disk

If hard disk 0 does not have any partitions defined, then a message will appear when you start hard disk setup, asking if you want to perform an express disk setup. Express disk setup automatically creates the default disk partition arrangement on hard disk 0.

For more information on express setup, see Chapter 5.

3.11.2 System Partitions

To install Windows NT, a system partition must be defined. If no system partition is found, the user is asked to choose from the available FAT partitions.

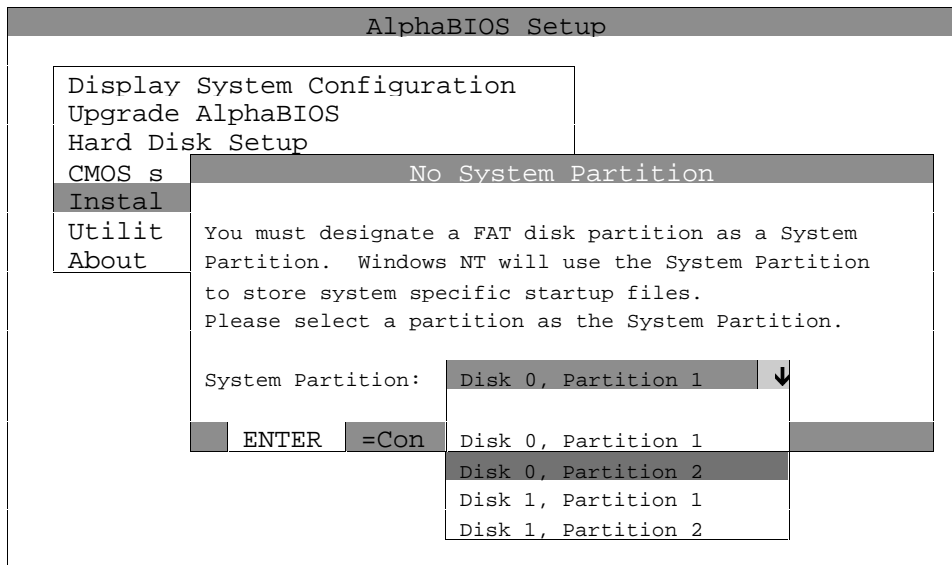
The purpose of the system partition is twofold. First, it tells the Windows NT installation program where to place the OS Loader and hardware support files. Second, upon subsequent restarts of Windows NT, the system partition definition tells AlphaBIOS where the OSLOADER.EXE file is so it can successfully hand off control to the OS Loader and continue the boot process.

The system partition can be the same partition into which Windows NT is installed, or it can be separate. However, the system partition must be formatted with the FAT file system. Because the default recommended partition arrangement on Alpha calls for the partition into which Windows NT is installed to be an NTFS partition, the system partition will almost always be a small FAT partition on the same disk onto which Windows NT is installed.

3.11.3 How AlphaBIOS Works with System Partitions

If you are installing Windows NT for the first time, AlphaBIOS will determine that a system partition has not been defined when you select **Install Windows NT** in the **AlphaBIOS Setup** screen (see Figure 3-5). When this occurs, AlphaBIOS searches for all FAT partitions on the system. If only one FAT partition exists, AlphaBIOS designates that FAT partition as the system partition and continues with the Windows NT installation. If more than one FAT partition exists on your system, AlphaBIOS displays the list of FAT partitions from which you can choose the system partition. After choosing the system partition, the installation process continues.

Figure 3-5 System Partition Not Defined



3.12 Using the Halt Button

Use the Halt button to halt the DIGITAL UNIX or OpenVMS operating system when it hangs, clear the SRM console password, or force a halt assertion, as described in Section 3.12.

Using Halt to Shut Down the Operating System

You can use the Halt button if the DIGITAL UNIX or OpenVMS operating system hangs. Pressing the Halt button halts the operating system back to the SRM console firmware. From the console, you can use the **crash** command to force a crash dump at the operating system level. See Section 4.11 for an example.

The Windows NT operating system does not support halts on this system. Pressing the Halt button during a Windows NT session has no effect.

Using Halt to Clear the Console Password

The SRM console firmware allows you to set a password to prevent unauthorized access to the console. If you forget the password, the Halt button, with the **login** command, lets you clear the password and regain control of the console. Section 4.8 describes the procedure (page 4-29).

3.13 Halt Assertion

A halt assertion allows you to disable automatic boots of the operating system so that you can perform tasks from the SRM console.

Under certain conditions, you might want to force a “halt assertion.” A halt assertion differs from a simple halt in that the SRM console “remembers” the halt. The next time you power up, the system ignores the SRM power-up script (nvram) and ignores any environment variables that you have set to cause an automatic boot of the operating system. The SRM console displays this message:

```
Halt assertion detected
NVRAM power-up script not executed
AUTO_ACTION=BOOT/RESTART and OS_TYPE=NT ignored, if applicable
```

Halt assertion is useful for disabling automatic boots of the operating system when you want to perform tasks from the SRM console. It is also useful for disabling the SRM power-up script if you have accidentally inserted a command in the script that will cause a system problem. These conditions are described in the sections “Disabling Autoboot” and “Disabling the SRM Power-Up Script.”

You can force a halt assertion using the Halt button, the RCM **halt** command, or the RCM **haltin** command. Observe the following guidelines for forcing a halt assertion.

Halt Assertion with Halt Button or RCM Halt Command

Press the Halt button on the local system (or enter the RCM **halt** command from a remote system) approximately five seconds after starting power up or when the SRM console is running. The system halts at the SRM console, and the halt status is saved. The next time the system powers up, the saved halt status is checked.

*NOTE: Wait 5 seconds after the system begins powering up before pressing the Halt button or remotely entering the RCM **halt** command. Press the button for several seconds.*

Halt Assertion with RCM Haltin Command

Enter the RCM **haltin** command at any time except during power-up. For example, enter **haltin** during an operating system session or when the AlphaBIOS console is running.

If you enter the RCM **haltin** command during a DIGITAL UNIX or OpenVMS session, the system halts back to the SRM console, and the halt status is saved. The next time the system powers up, the saved halt status is checked.

If you enter the RCM **haltin** command when Windows NT or AlphaBIOS is running, the interrupt is ignored. However, you can enter the RCM **haltin** command followed by the RCM **reset** command to force a halt assertion. Upon reset, the system powers up to the SRM console, but the SRM console does not load the AlphaBIOS console.

Clearing a Halt Assertion

Clear a halt assertion as follows:

- If the halt assertion was caused by pressing the Halt button or remotely entering the RCM **halt** command, the console uses the halt assertion once, then clears it.
- If the halt assertion was caused by entering the RCM **haltin** command, enter the RCM **haltout** command or cycle power on the local system.

Disabling Autoboot

The system automatically boots the selected operating system at power-up or reset if the following environment variables are set:

- For DIGITAL UNIX and OpenVMS, the SRM environment variables **os_type**, **auto_action**, **bootdef_dev**, **boot_file**, and **boot_osflags**
- For Windows NT, the SRM **os_type** environment variable and the **Auto Start** selection in the AlphaBIOS **Standard CMOS Setup** screen

You might want to prevent the system from autobooting so you can perform tasks from the SRM console. Use one of the methods described previously to force a halt assertion. When the SRM console prompt is displayed, you can enter commands to configure or test the system. Chapter 4 describes the SRM console commands and environment variables.

Disabling the SRM Power-Up Script

The system has a power-up script (file) named “nvram” that runs every time the system powers up. If you accidentally insert a command in the script that will cause a system problem, disable the script by using one of the methods described previously to force a halt assertion. When the SRM console prompt is displayed, edit the script to delete the offending command. See Section 4.4 for more information on editing the nvram script.

Chapter 4

SRM Console

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

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

- Invoking the SRM Console
- Command Summary
- Displaying the System Configuration
- Creating a Power-Up Script
- Booting the Operating System
- Configuring the System
- Testing the System
- Making the System Secure
- Stopping and Starting CPUs
- Updating Firmware
- Forcing a System Crash Dump
- Using Environment Variables
- Depositing and Examining Data
- Reading a File
- Initializing the System
- Finding Help
- Switching from SRM to AlphaBIOS Console
- Environment Variable Summary

4.1 Invoking the SRM Console

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

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. The SRM console prompt, P00>>>, will be displayed.
- Press the Halt button on the control panel, if your system is running either OpenVMS or DIGITAL UNIX. The console prompt, P00>>>, will be displayed.

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

- Select either **OpenVMS console (SRM)** or **DIGITAL UNIX console (SRM)** from the **Console Selection** in the **Advanced CMOS Setup** screen. Save the setting by pressing the F10 key and reset the system to start the SRM console.
- Press the Reset button, wait 5 seconds, and then press the Halt button. The SRM console will boot.

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

4.2 Command Summary

The SRM (*Alpha System Reference Manual*) console is a command line interface used when the operating system is either DIGITAL UNIX or OpenVMS. Console commands enable the user to examine and modify the system state.

Table 4-1 gives the most commonly used SRM console commands.

Table 4-2 gives the syntax for the console commands.

Table 4-3 gives special characters you can use in console mode.

Table 4-1 Summary of SRM Console Commands

Command	Function
alphabios	Loads and starts the AlphaBIOS console.
boot	Loads and starts the operating system.
clear <i>envar</i>	Resets an environment variable to its default value.
clear password	Sets the password to zero.
continue	Resumes program execution.
crash	Forces a crash dump at the operating system level.
deposit	Writes data to the specified address.
edit	Invokes the console line editor on a RAM file or on the nvrnm file (power-up script).
examine	Displays the contents of a memory location, register, or device.
halt	Halts the specified processor. (Same as stop .)
help	Displays information about the specified console command.
initialize	Resets the system to a known state.
isacfg	Displays or modifies parameters for ISA devices.
lfu	Runs the Loadable Firmware Update Utility.
login	Turns off secure mode, enabling access to all SRM console commands during the current session.

Continued on next page

Table 4-1 Summary of SRM Console Commands (Continued)

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

Table 4-2 Syntax for SRM Console Commands

Parameter	Attribute or Action
Length	Up to 255 characters, not including the terminating carriage return or any characters deleted as the command is entered. A command longer than 80 characters and without the backslash character (see Table 4-3) 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. The console program ignores leading and trailing spaces.

Table 4-3 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.
Help	By itself, displays first-level help. When pressed after part of a command, displays options available.
Ctrl/A or F14	Toggles between insert and overstrike modes. The default is overstrike.
Ctrl/B or up-arrow	Recalls previous command or commands. The last 16 commands are stored in the recall buffer.
Ctrl/C 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 4-3 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.

4.3 Displaying the System Configuration

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

Example 4-1 Show Config Command

```
P00>>> show config
                                AlphaPC 264DP 500 MHz
SRM Console:      V5.4-x
PALcode:         OpenVMS PALcode V1.42-32, Digital UNIX PALcode V1.40-35
Processors
CPU 0            Alpha 21264-3 500 MHz   SROM Revision: V1.82
                Bcache size: 4 MB
CPU 1            Alpha 21264-4 500 MHz   SROM Revision: V1.82
                Bcache size: 4 MB
Core Logic
Cchip           DECchip 21272-CA Rev 2
Dchip           DECchip 21272-DA Rev 2
Pchip 0        DECchip 21272-EA Rev 2
Pchip 1        DECchip 21272-EA Rev 2
TIG             Rev 4.11
Arbiter         Rev 2.8 (0x1)
MEMORY
Array #         Size      Base Addr
  1             128 MB    000000000
Total Bad Pages = 0
Total Good Memory = 128 MBytes
PCI Hose 00
  Bus 00 Slot 05/0: Cypress 82C693
                                Bridge to Bus 1, ISA
  Bus 00 Slot 05/1: Cypress 82C693 IDE
                                dqa.0.0.105.0
  Bus 00 Slot 05/2: Cypress 82C693 IDE
                                dqb.0.1.205.0
```

Continued on next page

```

Bus 00 Slot 05/3: Cypress 82C693 USB

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

PCI Hose 01
    Bus 00 Slot 07: DECchip 21152-AA
                                                Bridge to Bus 2,
PCI
    Bus 02 Slot 00: NCR 53C875
                                                pka0.7.0.2000.1   SCSI Bus ID 7
                                                dka0.0.0.2000.1   RZ1CB-CS
    Bus 02 Slot 01: NCR 53C875
                                                pkb0.7.0.2001.1   SCSI Bus ID 7
                                                dkb500.5.0.2001.1 RRD47
    Bus 02 Slot 02: DE500-AA Network Controller
                                                ewa0.0.0.2002.1   00-06-2B-00-13-47

ISA
Slot   Device Name           Type           Enabled BaseAddr  IRQ
DMA
0
      0      MOUSE           Embedded      Yes      60      12
      1      KBD             Embedded      Yes      60      1
      2      COM1            Embedded      Yes      3f8     4
      3      COM2            Embedded      Yes      2f8     3
      4      LPT1             Embedded      Yes      3bc     7
      5      FLOPPY           Embedded      Yes      3f0     6      2

```

P00>>>

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

show config

Example 4-2 Show CPU Command

```

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

```

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

show cpu

Example 4-3 Show Device Command

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

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

show device [*controller_name*]

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

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

Table 4-4 Device Naming Convention

Category	Description
dk Driver ID	Two-letter designator of port or class driver
	dk SCSI device fw FDDI device
	dq ATAPI CD-ROM mk SCSI tape
	dr RAID set device mu DSSI tape
	du DSSI disk pk SCSI port
	dv Diskette drive pu DSSI port
	ew Ethernet port
a Storage adapter ID	One-letter designator of storage adapter (a, b, c...).
200 Device unit number	Unique number (MSCP unit number). SCSI unit numbers are forced to 100 X node ID.
2 Bus node number	Bus node ID.
0 Channel number	Used for multi-channel devices.
7 Logical slot number	Corresponds to PCI slot number, as shown in Table 4-5.
1 Hose number	0 — PCI 0 1 — PCI 1

Table 4-5 PCI Address Assignments

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

Example 4-4 Show Memory Command

```
P00>>> show memory
```

Array #	Size	Base Addr
0	128 MB	000000000
1	128 MB	008000000
2	128 MB	010000000
3	128 MB	018000000

```
Total Bad Pages = 0
```

```
Total Good Memory = 512 MBytes
```

```
P00>>>
```

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

show memory

Example 4-5 Show PAL Command

```
P00>>> show pal
```

```
pal OpenVMS PALcode V1.31-27, DIGITAL UNIX PALcode V1.27-31
```

```
P00>>>
```

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 4-6 Show Power Command

```
P00>>> show power
```

	Status
Power Supply 0	good
Power Supply 1/Fan Tray	good
System Fans	good
CPU Fans	good
Temperature	good

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

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

```
Total Environmental Events: 2 (2 logged)
```

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

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

```
P00>>>
```

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

The syntax is:

show power

Example 4-7 Show Version Command

```
P00>>> show version
version                V5.4-x NOV 20 1998 13:59:28
P00>>>
```

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

show version

4.4 Creating a Power-Up Script

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

Example 4-8 Editing the nvram Script

```
P00>>> edit nvram          #Modify user power-up script, nvram
editing 'nvram'
0 bytes read in
*10 set ewa0_protocols bootp
*list                      #List current file with line numbers
10 set ewa0_protocols bootp
*exit                      #Close file and save changes
27 bytes written out to nvram
P00>>> nvram              #Execute the script.
```

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

Example 4-9 Clearing the nvram Script

```
P00>>> edit nvram
editing 'nvram'
20 bytes read in
*10
*exit
0 bytes written out to nvram
P00>>>
```

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

Editing the Nvram Script

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

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

The syntax is:

edit *file*

file is the name of the file to be edited.

The editing commands are:

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

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

4.5 Booting the Operating System

The boot command is used to boot the operating system.

Example 4-10 Boot Command

```
P00>>> b dka200
(boot dka200.2.0.7.1 -flags 0,0)
block 0 of dka200.2.0.7.1 is a valid boot block
reading 893 blocks from dka200.2.0.7.1
bootstrap code read in
base = 1fa000, image_start = 0, image_bytes = 6fa00
initializing HWRPB at 2000
initializing page table at 1fff0000
initializing machine state
setting affinity to the primary CPU
jumping to bootstrap code
```

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

```
%SYSINIT-I- waiting to form or join an OpenVMS Cluster
%VMScluster-I-LOADSECDB, loading the cluster security
database
%EWA0, Fast(100baseTX) mode set by console
%MSCPLOAD-I-CONFIGSCAN, enabled automatic disk serving
.
.
.
```

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

```
.
.
.
```

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

Username:

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 <i>filename</i> | The boot file. |
| -flags [<i>value</i>] | 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
<i>enet_protocol</i> | Either mop (default) or bootp . This qualifier overrides the setting of the ew*0_protocols environment variable. |
| <i>boot_dev</i> | 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. |

4.6 Configuring the System

4.6.1 Configuring DSSI

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

Example 4-11 Set Host Command

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

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

```
Copyright (C) 1990, 1991, 1992 Digital Equipment Corporation
PRFMON V1.0 D 10-MAR-1994 17:45:43
DRVEXR V2.1 D 10-MAR-1994 17:45:43
DRVST V2.1 D 10-MAR-1994 17:45:43
HISTORY V1.2 D 10-MAR-1994 17:45:43
```

```
DIRECT V1.0  D 10-MAR-1994 17:45:43
ERASE  V2.1  D 10-MAR-1994 17:45:43
VERIFY V1.1  D 10-MAR-1994 17:45:43
DKUTIL V1.1  D 10-MAR-1994 17:45:43
PARAMS V3.0  D 10-MAR-1994 17:45:43
```

Total of 9 programs.

Task? params

starting PARAMS on pua0.3.0.8.0 (RF0700)

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

PARAMS> show allclass

Parameter	Current	Default	Type	Radix	
ALLCLASS	1	0	Byte	Dec	B

PARAMS> exit

Exiting...

Task?

P00>>>

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

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

-dup Connect to an MSCP DUP server. The DUP service may be used to examine and modify parameters of a DSSI device.

-task *task_name* Specifies the DUP utility to invoke. If **-task** is not specified, a directory of utilities displays.

device The device to attach to the console program.

4.6.2 Configuring a PCI NVRAM Module

The **prcache** command is used for system configuration when a PCI NVRAM module is in the system. The command is used only with DIGITAL UNIX systems.

Example 4-12 Prcache Command

```
P00>>> prcache -f
PCI NVRAM Disk Cache: passed
Size: 4MB
PCI Memory Address: 40000000
System ID: 12000000
State: - not valid
Battery Status: good (Charging)
Battery Disconnect Circuit Status: enabled

P00>>> prcache -z
This command will zero the PCI NVRAM Disk Cache
Do you really want to continue [Y/N] ? : y
clearing disk cache
P00>>>
```

The **prcache** command is used to check PCI NVRAM configuration information and battery status, to clear data from the NVRAM module, and to set the date of the next battery replacement. This command is used only with DIGITAL UNIX systems. The syntax is:

prcache **-{f,z,b}**

- f** Checks configuration information and battery status.
- z** Clears valid data; writes zeros to memory.
- b** Sets the date (month and year) for battery replacement.

4.6.3 Configuring the ISA Bus

The isacfg command is used to configure the ISA bus.

Example 4-13 Isacfg Command

```
P00>>> isacfg -s 0
```

```
=====
handle: MOUSE
etyp: 2
slot: 0
dev: 0
enadev: 1
totdev: 6
iobase0: 60 iobase1: 8000000000000000
iobase2: 8000000000000000 iobase3: 8000000000000000
iobase4: 8000000000000000 iobase5: 8000000000000000
membase0: 8000000000000000 memlen0: 8000000000000000
membase1: 8000000000000000 memlen1: 8000000000000000
membase2: 8000000000000000 memlen2: 8000000000000000
rombase: 8000000000000000 romlen: 8000000000000000
dma0: 80000000 irq0: c
dma1: 80000000 irq1: 80000000
dma2: 80000000 irq2: 80000000
dma3: 80000000 irq3: 80000000
=====
handle: KBD
.
dev: 1
.
iobase0: 60 iobase1: 8000000000000000
.
dma0: 80000000 irq0: 1
.
=====
handle: COM1
.
dev: 2
.
iobase0: 3f8 iobase1: 8000000000000000
.
dma0: 80000000 irq0: 4
.
=====
```

Continued next page

```

=====
handle: COM2
.
dev: 3
.
iobase0: 2f8   iobase1: 8000000000000000
.
dma0: 80000000      irq0: 3
.
=====
handle: LPT1
.
dev: 4
.
iobase0: 3bc   iobase1: 8000000000000000
.
dma0: 80000000      irq0: 7
.
=====
handle: FLOPPY
.
dev: 5
.
iobase0: 3f0   iobase1: 8000000000000000
.
dma0: 2        irq0: 6
.
=====
P00>>>

```

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

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

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

4.7 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 4-14 Test Command

```
P00>>> test

System test, runtime 1200 seconds

Type ^C if you wish to abort testing once it has started

Default zone extended at the expense of memzone.

Use INIT before booting

Testing Ethernet device(s)

Testing VGA

Testing Memory

Testing IDE/ATAPI disks (read-only)

Testing SCSI disks (read-only)

Testing floppy drive (dva0, read-only)

Test time has expired...

System test complete

P00>>>
```

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

Testing can be aborted by Ctrl/C.

*NOTE: If you are running the Microsoft Windows NT operating system, switch from AlphaBIOS to the SRM console in order to enter the **test** command. Select **DIGITAL UNIX Console (SRM)** or **OpenVMS Console (SRM)** from the **Advanced CMOS Setup** of the AlphaBIOS console screen, save the setting by pressing the F10 key, and then reset the system. Or, from the AlphaBIOS console, press the Reset button, wait 5 seconds, then press the Halt button.*

The syntax is:

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

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

4.8 Making the System Secure

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

Example 4-15 Set Password Command

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

P00>>> set password                # Changing a password.
Please enter the password:
Please enter the password again:
Now enter the old password:
P00>>>

P00>>> set password                # Password entered is
Please enter the password:          # too short.
Password length must be between 15 and 30 characters
P00>>>
```

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

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

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

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

The syntax is:

set password

Example 4-16 Set Secure Command

```
P00>>> set secure          # In this example a password
                           # has been set.
Console is secure. Please login.
P00>>> b dkb0
Console is secure - parameters are not allowed.
P00>>> login
Please enter the password:   # Password is not echoed.
P00>>> b dkb0
(boot dkb0.0.0.3.1)
.
.

P00>>> set secure          # Password has not been set.
Secure not set. Please set the password.
P00>>>
```

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

The syntax is:

set secure

Secure Mode Functions

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

The **boot** command does not accept command line parameters in secure mode. The console boots using the environment variables stored in NVRAM (**boot_file**, **bootdef_dev**, **boot_flags**). After a successful boot, the console is secured if there is a valid password.

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

Example 4-17 Login Command

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

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

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

Invalid password
P00>>>
```

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

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

```
Please enter the password:
```

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

*NOTE: If you enter the **login** command when a halt assertion exists, the command fails, even if you enter the correct password. See Section 3.13 for information on halt assertion.*

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

- From the Local Console Terminal

1. Enter the **login** command:

```
P00>>> login
```

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

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

- From the RCM

1. Enter the **login** command:

```
P00>>> login
```

2. At the `Enter Password:` prompt, enter the RCM escape sequence.

3. At the `RCM>>>` prompt, enter the **halt** command and then the **quit** command:

```
RCM>>> halt
```

```
RCM>>> quit
```

4. At the SRM console, clear the password:

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

Example 4-18 Clear Password Command

```
P00>>> clear password
Please enter the password:      # Password is not echoed.
Password successfully cleared.
P00>>>
```

```
P00>>> clear password
Please enter the password:      # Invalid password entered.
Console is secure
P00>>>
```

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

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

4.9 Stopping and Starting CPUs

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

Example 4-19 Halt and Continue Commands

```
P00>>> halt 1
```

```
halted CPU 1
```

```
halt code = 1
```

```
operator initiated halt
```

```
PC = ffffffff8007cc68
```

```
P00>>> continue &p1
```

```
continuing CPU 1
```

halt (or stop)

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

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

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

continue

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

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

continue [**&pn**] [*address*]

&pn Specifies the processor. *n* is 0 or 1.

address The starting address of the program.

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

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

4.10 Updating Firmware

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

Example 4-20 Lfu Command

```
P00>>> lfu
```

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

```
Select firmware load device (cda0, dva0, ewa0), or  
Press <return> to bypass loading and proceed to LFU: cda0
```

```
Please enter the name of the options firmware files list, or  
Press <return> to use the default filename [AS1400FW]: AS1400CP
```

```
Copying AS1200CP from DKA500.5.0.1.1 .  
Copying [as1200]TCREADME from DKA500.5.0.1.1 .  
Copying [as1200]TCSRMRROM from DKA500.5.0.1.1 .....  
Copying [as1200]TCARCROM from DKA500.5.0.1.1 .....
```

```
-----  
Function   Description  
-----  
Display    Displays the system's configuration table.  
Exit       Done exit LFU (reset).  
List       Lists the device, revision, firmware name, and update  
           revision.  
Lfu        Restarts LFU.  
Readme     Lists important release information.  
Update     Replaces current firmware with loadable data image.  
Verify     Compares loadable and hardware images.  
? or Help  Scrolls this function table.  
-----
```

Continued on next page

Example 4-20 Lfu Command (Continued)

```
UPD> list
```

Device	Current Revision	Filename	Update Revision
Fsb	3.1-x	fsb_fw	3.x
Nt	5.68	nt_fw	5.xx
Plx0	A11	kzpsa_fw	A11
Srm	5.4-x	srm_fw	5.4-xx
Pua	A214	cipca_fw	A2xx

```
UPD> update *
```

```
WARNING: updates may take several minutes to complete for each device.
```

```
Confirm update on: AlphaBIOS      [Y/(N)] y
```

```
DO NOT ABORT!
```

```
AlphaBIOS      Updating to V6.40-1...  Verifying V6.40-1...  PASSED.
```

```
Confirm update on: srmflash      [Y/(N)] y
```

```
DO NOT ABORT!
```

```
srmflash      Updating to V6.0-3...  Verifying V6.0-3...  PASSED.
```

```
UPD> exit
```

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

lfu

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

See Chapter 3 for more information about LFU.

4.11 Forcing a System Crash Dump

The crash command forces a crash dump to the selected device on running DIGITAL UNIX and OpenVMS systems. The command has no effect on systems running Windows NT.

Example 4-21 Crash Command

```
P00>>> 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
P00>>>
```

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 with 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.

4.12 Using Environment Variables

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

Example 4-22 Set *envar* and Show *envar* Commands

```
P00>>> show console
console                graphics
P00>>> set console serial
P00>>> show console
console                serial
P00>>> init
```

Environment variables are set or changed with the `set envar` command and set to default values with the `set -default envar` command. Their values are viewed with the `show envar` command. User-defined nonvolatile environment variables are created with the `edit` command described in Section 4.4. Section 4.18 describes the environment variables in detail.

set *envar*

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

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

-default Restores an environment variable to its default setting.

envar The name of the environment variable to be modified.

value The new value of the environment variable.

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

- console**
- kbd_hardware_type**
- language**
- ocp_text**
- os_type**

show *envar*

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

show *envar*

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

Example 4-23 Creating a User-Defined Environment Variable

```
P00>>> edit nvram
editing 'nvram'
0 bytes read in
*10 set mopv3_boot 1
*exit
17 bytes written out to nvram

P00>>>
```

In Example 4-23 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.

4.13 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 4-24 Deposit Command

```
P00>>> dep -b -n 1ff pmem:0 0 # Clear first 512 bytes of
                                # physical memory.
P00>>> d -l -n 3 vmem:1234 5 # Deposit 5 into four
                                # longwords starting at
                                # virtual memory address
                                # 1234.
P00>>> d -n 8 r0 ffffffff # Load GPRs R0 through R8
                                # with -1.
P00>>> d -l -n 10 -s 200 pmem:0 8
                                # Deposit 8 in the first
                                # longword of the first 17
                                # pages in physical memory.
P00>>> d -l pmem:0 0 # Deposit 0 to physical
                                # memory address 0.
P00>>> d + ff # Deposit FF to physical
                                # memory address 4.
P00>>> d scbb 820000 # Deposit 820000 to SCBB.
```

Example 4-25 Examine Command

```
P00>>> examine pc # Examine the program
                                # counter.
PC psr: 0 ( PC) 0000000000001170

P00>>> examine sp # Examine the stack pointer.
gpr: F0 ( R30) 000000000072A60

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

Continued on next page

Example 4-25 Examine Command (Continued)

```
grp: 20 ( R4) 0000000000005000
grp: 28 ( R5) 00000000FFFE000
grp: 30 ( R6) 00000003F8000C00
grp: 38 ( R7) 0000000053F761AE
grp: 40 ( R8) 0000010000000000
grp: 48 ( R9) 00000003F7800100
grp: 50 ( R10) 00000000000C7FFC
```

```
P00>>> examine pmem:400EC      # Examine physical memory.
pmem:  400EC A49D0078A47D0070
```

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.
space:	Device name (or address space) of the device to access.
address	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; <i>name</i> is F0 to F31.
gpr- name	The general register set; <i>name</i> is R0 to R31.
ipr- name	The internal processor registers.
pt- name	The PALtemp register set; <i>name</i> is PT0 to PT23.
pmem	Physical memory (default).
vmem	Virtual memory.
data	Data to be deposited.

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

- pc** The program counter. The address space is set to GPR.
- +** The location immediately following the last location referenced in a **deposit** or **examine** command. For physical and virtual memory, the referenced location is the last location plus the size of the reference (1 for byte, 2 for word, 4 for longword). For other address spaces, the address is the last referenced address plus 1.
- The location immediately preceding the last location referenced in a **deposit** or **examine** command. Memory and other address spaces are handled as above.
- *** The last location referenced in a **deposit** or **examine** command.
- @** The location addressed by the last location referenced in a **deposit** or **examine** command.

4.14 Reading a File

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

Example 4-26 More Command

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

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

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

more [*file...*]

file is the name of the file to be displayed.

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

4.15 Initializing the System

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

Example 4-27 Initialize Command

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

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

```
Total Bad Pages = 0
Total Good Memory = 1408 MBytes
```

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

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

initialize

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

- A halt assertion condition exists (see Section 3.12).
- The **auto_action** environment variable is set to **halt**.

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

4.16 Finding Help

The **help** command displays basic information about a command.

Example 4-28 Help Command

```
P00>>> help set
NAME
    set
FUNCTION
    Set an option or modify the value of an environment
    variable.
SYNOPSIS
    set <option> <value> or <envar> [-] <value>
      where
      <option>={host,mode}
      where
      <envar>={auto_action,bootdef_dev,boot_osflags,...}
      [-default]
```

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

help [*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.

4.17 Switching from SRM to 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 4-29 Switching to the AlphaBIOS Console

```
P00>>> alphabios
```

The **alphabios** command loads and starts the AlphaBIOS console. This is necessary for running AlphaBIOS-based utilities (such as the RAID configuration utility). 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**, select **DIGITAL UNIX console (SRM)** or **OpenVMS console (SRM)** from the **Advanced CMOS Setup** screen, save the setting by pressing key F10 and then reset the system. Alternatively, press the Reset button, wait 5 seconds, and then press the Halt button.

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 **initialize** command, the Reset button, or by power cycling.

4.18 Environment Variable Summary

Environment variables pass configuration information between the console and the operating system. Their settings determine how the system powers up, boots the operating system, and operates. Environment variables are set or changed with the *set envar* command and returned to their default values with the *clear envar* command. Their values are viewed with the *show envar* command.

Table 4-6 lists the environment variables. Detailed descriptions follow. The environment variables are specific to the SRM console.

Table 4-6 Environment Variable Summary

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

Table 4-6 Environment Variable Summary (Continued)

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

auto_action

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

set auto_action *value*

The options for *value* are:

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

NOTE: If a halt assertion exists, the console ignores the auto_action setting and halts at the SRM console. See Section 3.12 for information on halt assertion.

bootdef_dev

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

set bootdef_dev *boot_device*

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

boot_osflags

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

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

When the operating system is OpenVMS, the syntax is:

set boot_osflags *root_number,boot_flags*

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

<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 4-7.

Table 4-7 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.

com*_baud

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

NOTE: Disable the RCM to select a baud rate other than 9600. See Chapter 6.

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

```
P00>>> set com1_baud 19200
Embedded Remote Console only supports 9600 baud. Continue?
(Y/[N]) n
bad value - com1_baud not modified
P00>>>
```

The syntax is:

set com*_baud *baud_value*

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

console

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

set console *output_device*

The options for *output_device* are:

graphics 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.

cpu_enabled

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

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

NOTE: The primary CPU cannot be disabled.

The syntax is:

set cpu_enabled *hex_digit*

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

ew*0_mode

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

The syntax is:

set ew*0_mode *value*

The options for *value* are:

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

ew*0_protocols

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

set ew*0_protocols *protocol_value*

The options for *protocol_value* are:

mop (default)	Sets the network protocol to mop (Maintenance Operations Protocol), the setting typically used with the OpenVMS operating system.
bootp	Sets the network protocol to bootp, the setting typically used with the 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

Used only on systems with the language variant 3C (Français), this environment variable sets the keyboard hardware type as either PCXAL or LK411 and enables the system to interpret the terminal keyboard layout correctly.

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

The syntax is:

set kbd_hardware_type *keyboard_type*

The options for *keyboard_type* are:

pcxal (default) Selects the default keyboard hardware type.

lk411 Selects the LK411 keyboard layout for use with language variant 3C (Français).

language

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

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

The syntax is:

set language *language_code*

The options for *language_code* are:

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

ocp_text

Specifies a message to display on the control panel after self-tests and diagnostics have completed.

The value of **ocp_text** takes effect only after you reset the system by pressing the Reset button or issuing the **initialize** command.

The syntax is:

set ocp_text *message*

The variable *message* can be up to 16 characters and must be enclosed in quotation marks.

os_type

The **os_type** environment variable specifies the default operating system. This variable is set at the factory to the setting for the operating system purchased. Use this command to change the factory default setting.

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

The syntax is:

set os_type *os_type*

The options for *os_type* are:

- unix** 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 a halt assertion condition exists, this environment variable is overridden, and the SRM firmware does not load and start the AlphaBIOS console.)

password

Sets or clears the console password stored in NVRAM.

The syntax is:

set password

The password is not an argument to the **set password** command; the console prompts the user for the string, which must be between 15 and 30 characters.

pci_parity

Disables or enables parity checking on the PCI bus.

Some PCI devices do not implement PCI parity checking, and some have a parity-generating scheme in which the parity is sometimes incorrect or is not fully compliant with the PCI specification. A side effect of this aberrant behavior is that superfluous PCI parity errors are reported by the host PCI bridge. In such cases, the device can be used as long as parity is not checked; disabling PCI parity checking prevents false parity errors that can cause system problems.

The syntax is:

set pci_parity *value*

The options for *value* are:

- on** (default) Enables PCI parity checking.
- off** Disables PCI parity checking.

pk*0_fast

Enables fast SCSI to perform in either standard or fast mode. If the system has at least one fast SCSI device, set the default controller speed to fast SCSI (1). Devices on a controller that connects to both standard and fast SCSI devices will perform at the appropriate rate for the device. If the system has no fast SCSI devices, set the default controller speed to standard SCSI (0). If a fast SCSI device is on a controller set to standard, it will perform in standard mode.

The syntax is:

set pk*0_fast *scsi_speed*

The options for *scsi_speed* are:

- 0** The controller is in standard SCSI mode.
- 1** (default) The controller is in fast SCSI mode.

pk*0_host_id

Sets the controller host bus node ID to a value between 0 and 7.

Each SCSI bus in the system requires a controller. Buses can theoretically support up to eight devices; however, the eighth device must always be a controller. Each device on the bus, including the controller, must have a unique ID, which is a number between 0 and 7. This is the bus node ID number.

On each bus, the default bus node ID for the controller is set to 7. You do not need to change the controller bus node ID unless you place two or more controllers on the same bus.

To list the controllers on your system, enter the command **show device**. SCSI devices begin with the letters “pk” (for example, pka0). The third letter is the adapter ID for the controller. When entering the command **set pk*0_host_id**, replace the asterisk with the adapter ID letter.

The syntax is:

```
set pk*_host_id scsi_node_id
```

The value for *scsi_node_id* is the bus node ID, a number from 0 to 7.

pk*0_soft_term

Enables or disables SCSI terminators. This command applies to systems that use the QLogic ISP1040 SCSI controller.

The QLogic ISP1040 SCSI controller implements the 16-bit wide SCSI bus. The QLogic module has two terminators, one for the low eight bits and one for the high eight bits.

The syntax is:

```
set pk*0_soft_term value
```

The options for *value* are:

- | | |
|----------------------|--|
| off | Disables termination of all 16 bits. |
| low (default) | Enables low eight bits and disables high eight bits. |
| high | Enables high eight bits and disables low eight bits. |
| on | Enables all 16 bits. |
| diff | Places the bus in differential mode. |

tt_allow_login

Enables or disables login to the SRM console firmware on alternate console ports. If the environment variable **console** is set to serial, the primary console device is the terminal connected through the COM1 port. The command **set tt_allow_login 1** enables logins through either the COM2 port or a graphics monitor.

The syntax is:

set tt_allow_login *value*

The options for *value* are:

- 0** Disables login through the COM2 port or a graphics monitor.
- 1 (default)** Enables login through the COM2 port or a graphics monitor.

Chapter 5

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.

Sections in this chapter are:

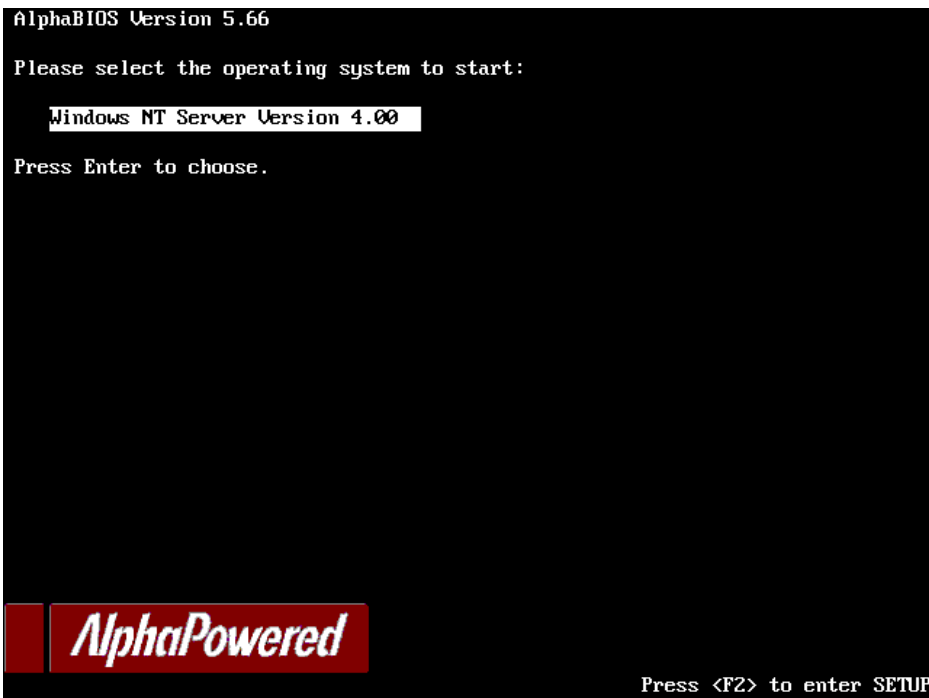
- Starting AlphaBIOS
- Keyboard Conventions and Help
- Displaying the System Configuration
- Updating Firmware
- Setting Up the Hard Disk
- Performing Setup Tasks
- Installing Windows NT
- Selecting the Version of Windows NT
- Switching from AlphaBIOS to SRM Console
- Running Utility Programs

*NOTE: To run firmware tests on a Windows NT system, switch to the SRM console and issue the **test** command. See Section 5.9.*

5.1 Starting AlphaBIOS

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

Figure 5-1 Boot Screen

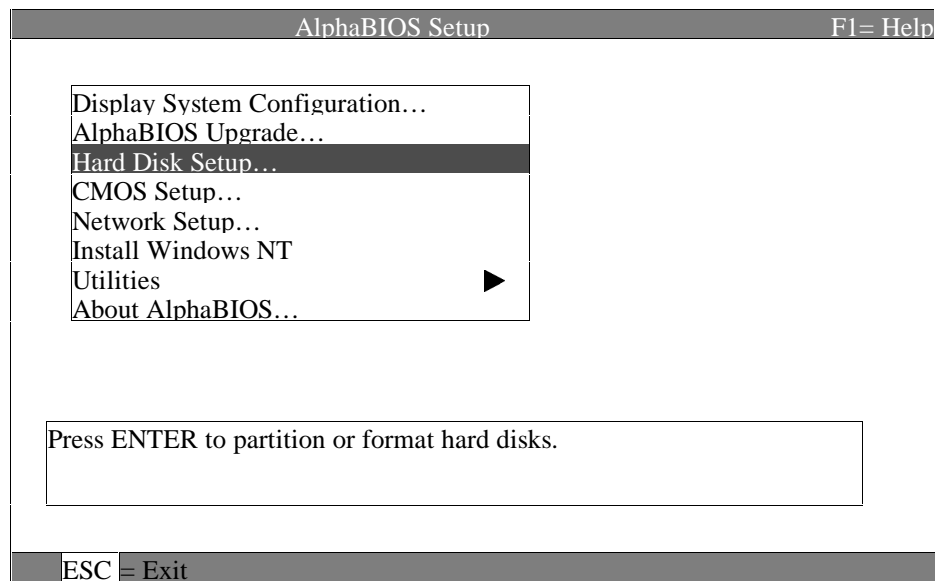


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The **Boot** screen shown in Figure 5-1 is displayed at power-up and reset. Press F2 at this screen to enter the setup program.

The **AlphaBIOS Setup** screen (Figure 5-2) is displayed. From this screen you can select the tasks to perform. Use the arrow keys to select the menu item you want and press Enter. (Refer to Section 5.2 for information on navigating the AlphaBIOS screens.)

Figure 5-2 AlphaBIOS Setup Screen



5.2 Keyboard Conventions and Help

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

Figure 5-3 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		

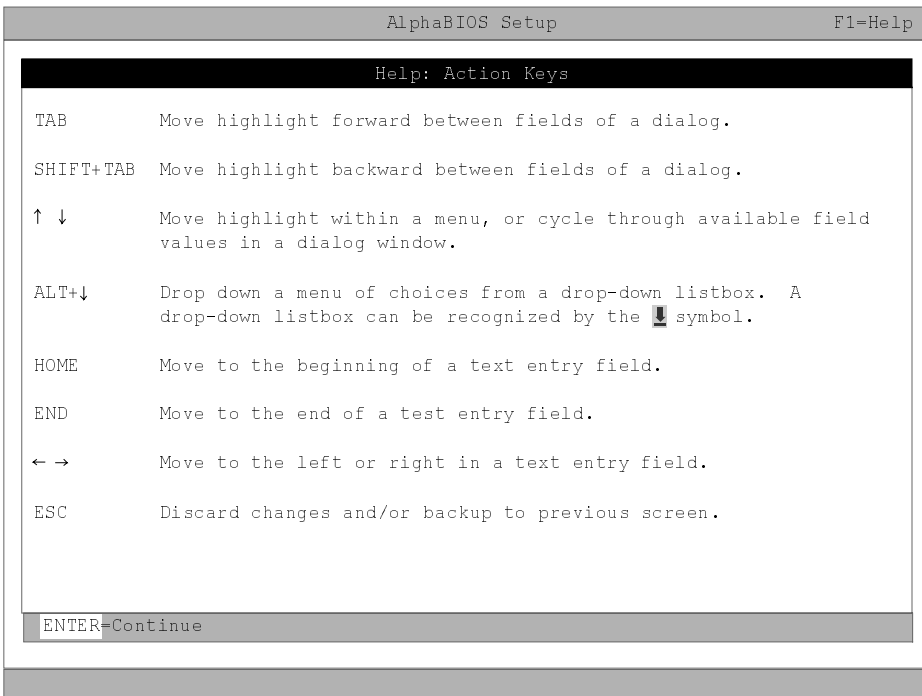
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AlphaBIOS uses DOS and Windows keyboard conventions for navigating the interface and selecting items. The valid keystrokes are listed in the keyboard help screens.

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 5-3.

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 5-4).

Figure 5-4 Second-Level Help Screen

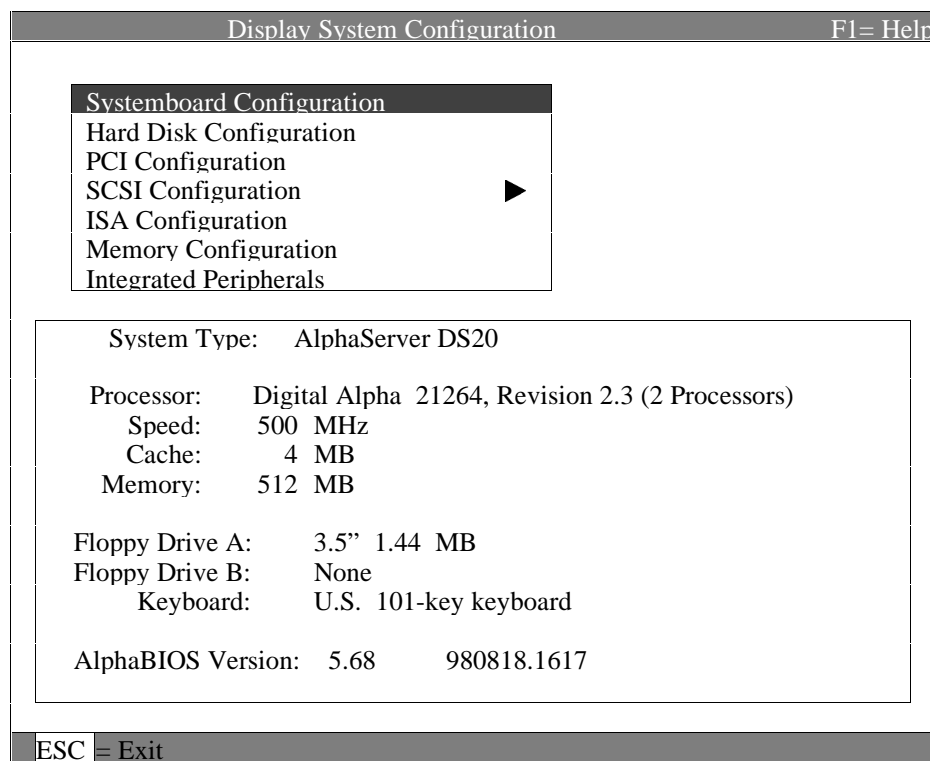


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5.3 Displaying the System Configuration

The Display System Configuration screen gives 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 information you need.

Figure 5-5 Display System Configuration Screen



Display the system configuration as follows:

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.

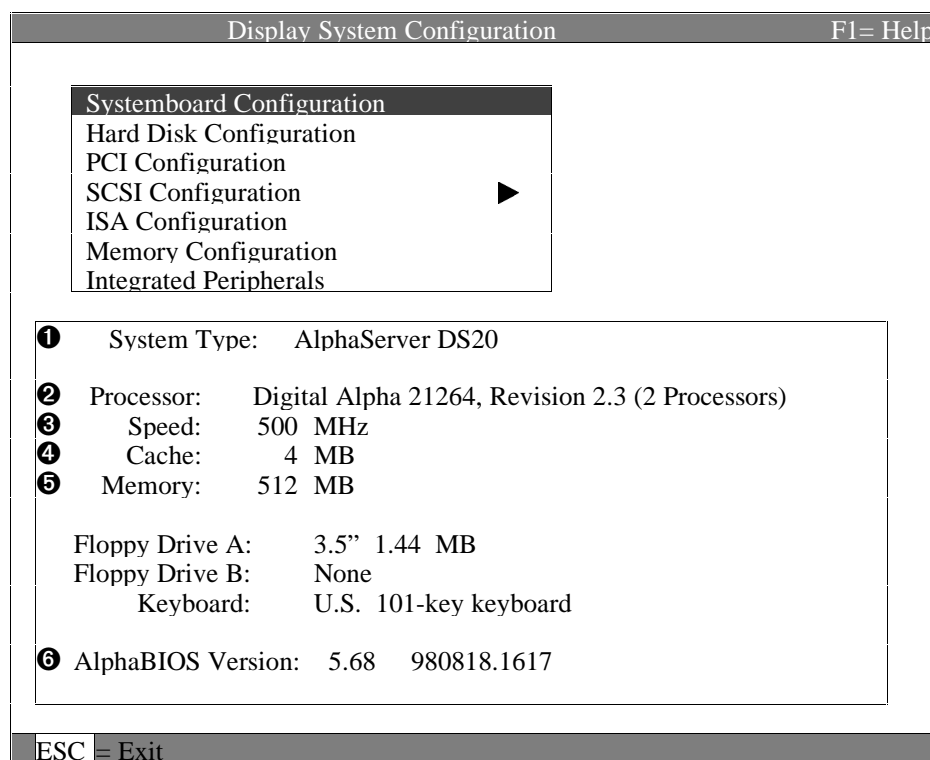
From this screen, you can view configuration information about these system components:

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

The sections that follow explain the display for each component.

5.3.1 System Board Configuration

Figure 5-6 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 of the processor.
- ❹ Cache — The amount of static RAM cache memory installed.
- ❺ Memory — The amount of main memory in the system.
- ❻ Firmware version — The version of AlphaBIOS currently running on the system.

5.3.2 Hard Disk Configuration

Figure 5-7 Hard Disk Configuration

Display System Configuration		F1= Help	
<div style="border: 1px solid black; padding: 5px;"> Systemboard Configuration Hard Disk Configuration PCI Configuration SCSI Configuration ▶ ISA Configuration Memory Configuration Integrated Peripherals </div>			
1	2	3	4
Disk 0	AIC78XX #0. SCSI ID 0 DEC RZ1CB-CS (C)		5 4091 MB
	Partition 1		4085 MB FAT
	Partition 2	6	7 6 MB 8 FAT
Disk 1	AIC78XX #0, SCSI ID 1 DEC RZ1CB-CS (C)		4091 MB
	Partition 1		4091 MB NTFS
Disk 2	AIC78XX #0. SCSI ID 2 DEC RZ1CB-CS (C)		4091 MB
	Partition 1		4091 MB NTFS
ENTER = Select ESC = Exit			

*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.*

- 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 the 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, FAT or NTFS, may result in different usable capacity because of the differences in storage management 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, 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, 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.
- ❽ Partition format – The file system (if any) used on a partition. This field displays FAT, NTFS, or unrecognized (if the partition is unformatted).

5.3.3 PCI Configuration

Figure 5-8 PCI Configuration

Display System Configuration F1= Help

Systemboard Configuration

Hard Disk Configuration

PCI Configuration

SCSI Configuration ▶

ISA Configuration

Memory Configuration

Integrated Peripherals

① Device Name	② Device Type	③ Revision	④ Physical Slot
Cypress CY82c693	ISA bridge	0	PCI0-Embedded
Cypress CY82c693	IDE	0	PCI0-Embedded
Cypress CY82c693	IDE	0	PCI0-Embedded
Cypress CY82c693	USB	0	PCI0-Embedded
Adaptec AIC-7895	SCSI	3	PCI0-Embedded
Adaptec AIC-7895	SCSI	3	PCI0-Embedded
Matrox Millennium	VGA	1	PCI0-Slot 0
DIGITAL 21140	Ethernet	32	PCI0-Slot 2
DIGITAL DEFPA	FDDI	0	PCI1-Slot 1

ENTER = Select ESC = Exit

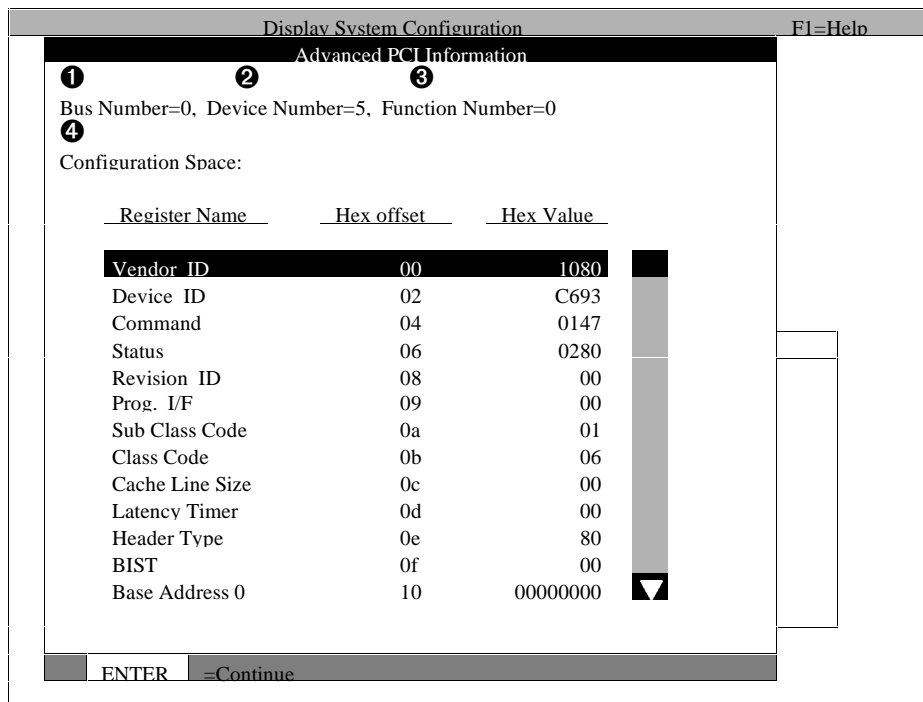
- ❶ Device name — The name and model of the device as recorded in the device's firmware.
- ❷ Device type — Lists the function of the device in the system.
- ❸ Revision — The revision level of the device signifies the number of times it has been updated by the manufacturer.
- ❹ Physical slot — Lists the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

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 5-9 on the next page.

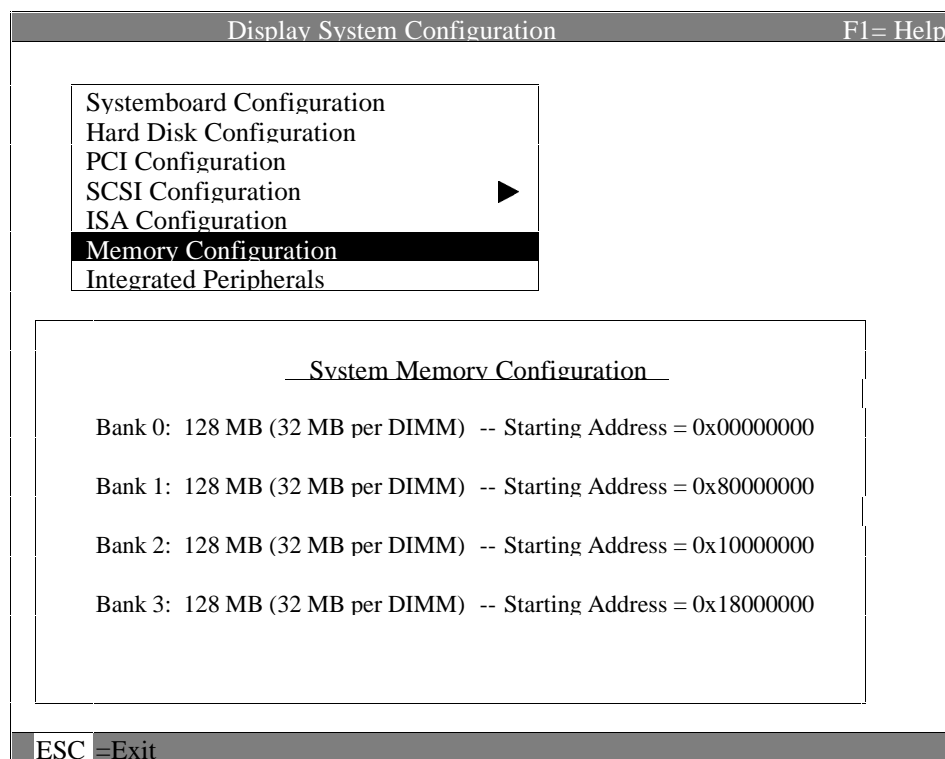
Figure 5-9 Advanced PCI Information



- ❶ Bus number — The virtual PCI bus number.
- ❷ Device number — The PCI bus device number.
- ❸ 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.
- ❹ Configuration header space — Displays the information in the selected device's PCI configuration space.

5.3.4 Memory Configuration

Figure 5-10 Memory Configuration



5.3.5 SCSI Configuration

Figure 5-11 SCSI Configuration

The screenshot shows the 'Display System Configuration' utility with the 'SCSI Configuration' option selected. A sub-menu is open for 'AIC78XX #0' and 'AIC78XX #1'. Below this, a table lists SCSI devices with columns for SCSI ID, Device, Size, and Description. The table is annotated with circled numbers 1 through 5. At the bottom, a legend indicates 'ENTER = Select' and 'ESC = Exit'.

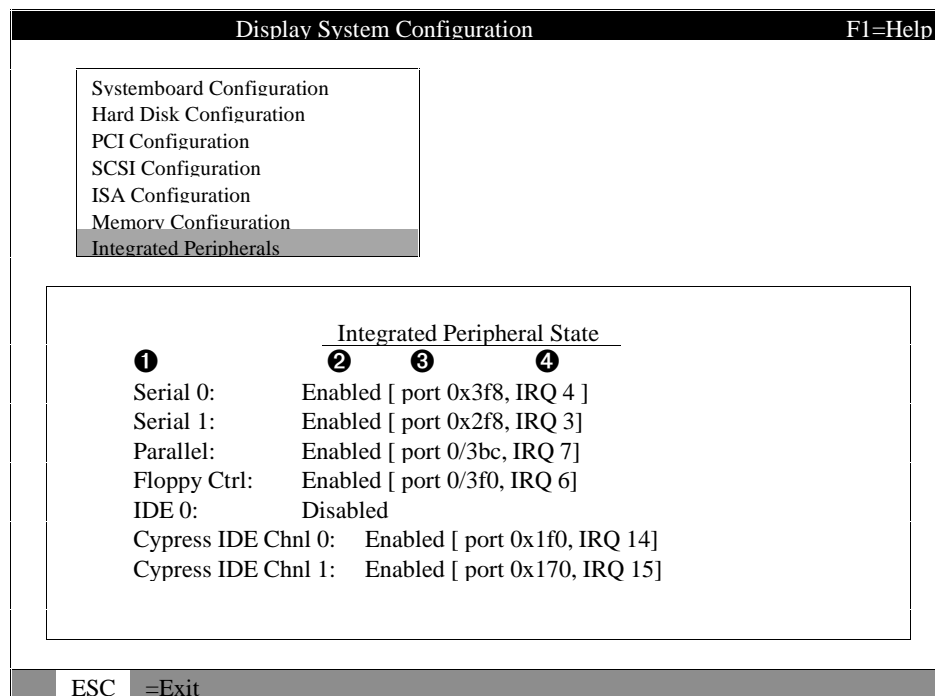
1 AIC78XX #0, SCSI ID 7, SCSI Bus 0			
2 SCSI ID	3 Device	4 Size	5 Description
0	Disk 0	4091 MB	DEC RZ1CB-CS (C) DEC0656
1	Disk 1	4091 MB	DEC RZ1CB-CS (C) DEC0656
2	Disk 2	4091 MB	DEC RZ29B (C) DEC0016
5	CD- ROM		DEC RRD47 (C) DEC 1337

ENTER = Select ESC = Exit

- 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 scheme in numbering controllers 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 controlled by the controller. 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.
- 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 field 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.

5.3.6 Integrated Peripherals

Figure 5-12 Integrated Peripherals

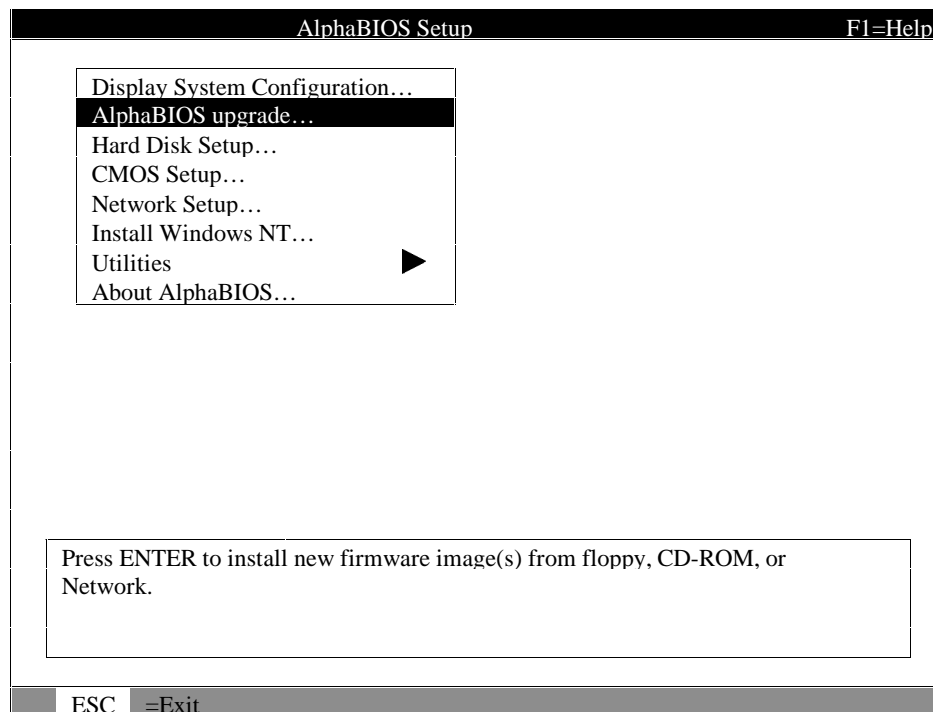


- ❶ Device type — The physical device as it exists on the system board.
- ❷ MS-DOS name — Shows if the device is enabled, and if it is enabled, the addressable MS-DOS name for the device.
- ❸ Port address — The physical memory location for data received into the device, and sent from the device, respectively.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

5.4 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 Utility (LFU) to perform the update. The LFU exit command causes a system reset.

Figure 5-13 Updating Firmware



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

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

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

5.5 Setting Up the Hard Disk

Either execute an express or a custom hard disk setup. An express setup, described here, creates the recommended partitions on the first hard disk, but it does not map bad sectors. Custom hard disk setup is described in Sections 5.5.1 and 5.5.2.

Figure 5-14 Hard Disk Setup Screen

Hard Disk Setup					F1= Help
①	②	③	④	⑤	
Disk 0	AIC78XX DEC	#0. SCSI ID 0 RZ1CB-CS (C) DEC0656		4091 MB	
		Partition 1		4085 MB	FAT
		Partition 2	⑥	⑦ 6 MB	⑧ FAT
Disk 1	AIC78XX DEC	#0, SCSI ID 1 RZ1CB-CS (C) DEC0656		4091 MB	
		Partition 1		4091 MB	NTFS
Disk 2	AIC78XX DEC	#0. SCSI ID 2 RZ1CB-CS (C) DEC0656		4091 MB	
		Partition 1		4091 MB	NTFS
⑨	INSER =New DEL = Delete F6 =Format F7 =Express ESC =Exit				

CAUTION: Hard disk changes are immediate; unintended data loss could occur, use care when changing your hard disk arrangement.

- ① 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.
- ② Controller — Brand and model of SCSI chip used on the SCSI controller.
- ③ 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.
- ④ SCSI ID number — A unique number you assign each SCSI device in the system. This is usually done by jumpers or a thumb wheel attached to the drive.
- ⑤ 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.

- ⑥ 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 necessary for the NTFS file system, since it uses disk space very efficiently at all partition sizes.
- ⑦ 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.
- ⑧ Partition format — The file system (if any) used on a partition. This field displays FAT, NTFS, or unrecognized (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 to back up any data you want to save on the partition. 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.

5.5.1 Creating and Deleting Partitions Manually

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 5-15 Create New Partition Dialog Box

Hard Disk Setup				
Disk 0	QLISP1040 #0, SCSI ID 3	510 MB		
	Partition 1	200 MB	NTFS	
	Unused	310 MB		
Disk 1	Create new partition, Disk 0 Partition 2			
	Available space:	310 MB	NTFS	FAT
	New Partition Size:	<input type="text" value="200"/> MB		
	<input type="button" value="ENTER"/>	= Continue	<input type="button" value="ESC"/>	= Cancel

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 is displayed, similar to Figure 5-15.
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 5-16).
3. Press Delete. A dialog box is displayed (see ❷).
4. Press F10 to confirm the deletion.

Figure 5-16 Delete Partition Dialog Box

Hard Disk Setup				
Disk 0	QLISP1040 #0, SCSI ID 3	510 MB		
	Partition 1	200 MB		NTFS
❶	Partition 2	200 MB		FAT
	Unused	100 MB		
Disk 1	NCRC810 #0, SCSI ID 5	1001 MB		
	Partition 1	995 MB		NTFS
	Partiti			FAT
	Delete Disk 0, Partition 2			
❷	The delete operation will destroy all data on partition 2 of Disk 0.			
	Press F10 to continue. Press ESC to Cancel.			
	F10	=Continue	ESC	=Cancel

5.5.2 Formatting a FAT Partition

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

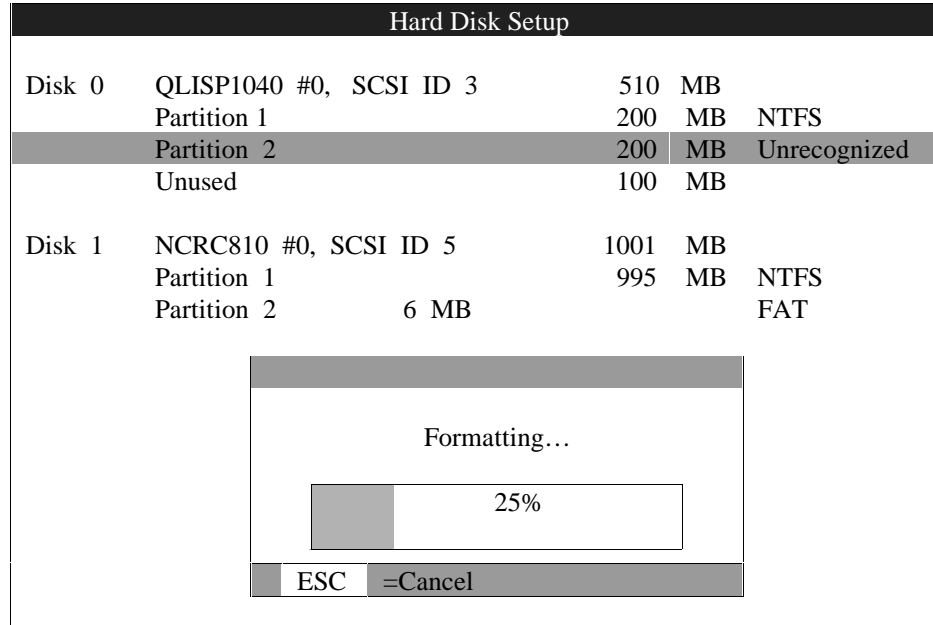
Figure 5-17 Formatting a FAT Partition

Hard Disk Setup				
Disk 0	QLISP1040 #0, SCSI ID 3	510	MB	
	Partition 1	200	MB	NTFS
	① Partition 2	200	MB	Unrecognized
	Unused	100	MB	
Disk 1	NCRC810 #0, SCSI ID 5	1001	MB	
	Partition 1	995	MB	NTFS
	Partiti			FAT
	② Choose Format Method:			
	Format Method:	<div style="border: 1px solid black; padding: 2px;"> Standard Format Standard Format Quick Format </div>		
	F10	=Continue	ES C	=Cancel

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 5-17).
3. Press F6. A dialog box is displayed, 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 5-18 is displayed while the drive is formatted, showing the progress of the formatting. Standard formatting maps bad sectors.
4. Select a format method, and press Enter.

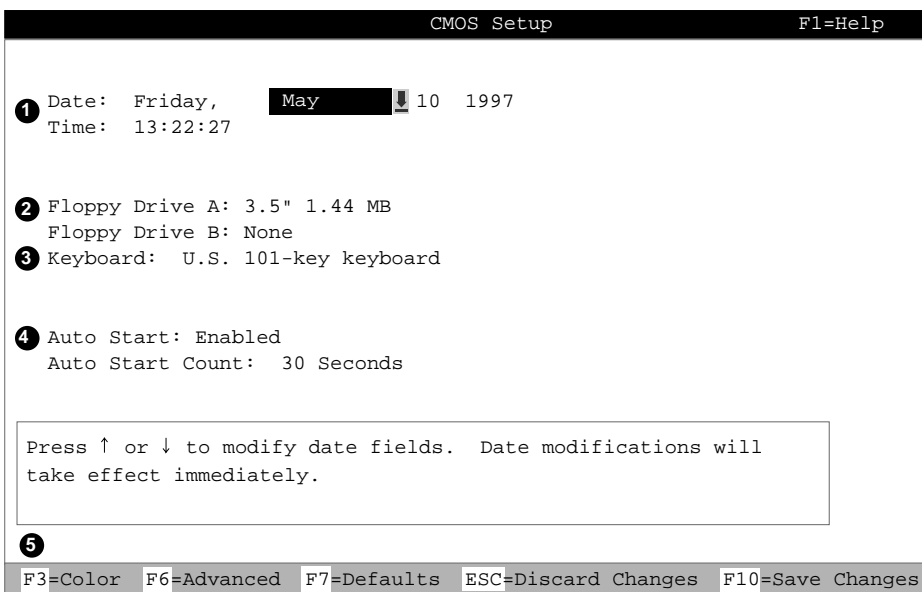
Figure 5-18 Standard Formatting



5.6 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 5-19 Standard CMOS Setup Screen



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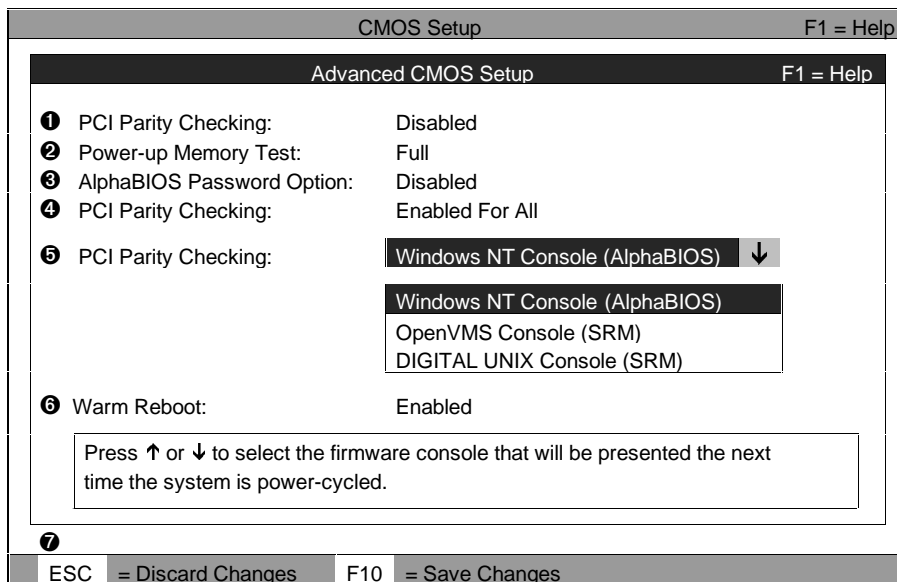
To enter Standard CMOS Setup

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 key) — Saves changes made in both the standard and advanced modes of **CMOS Setup**.

Continued on next page

Figure 5-20 Advanced CMOS Setup Screen



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 Warm Reboot — Enable (the default) results in the system restarting normally on a shutdown and restart from the operating system. Disable results in the necessity to restart the machine by pressing reset or power-cycling.
- ❼ **Advanced CMOS Setup** options

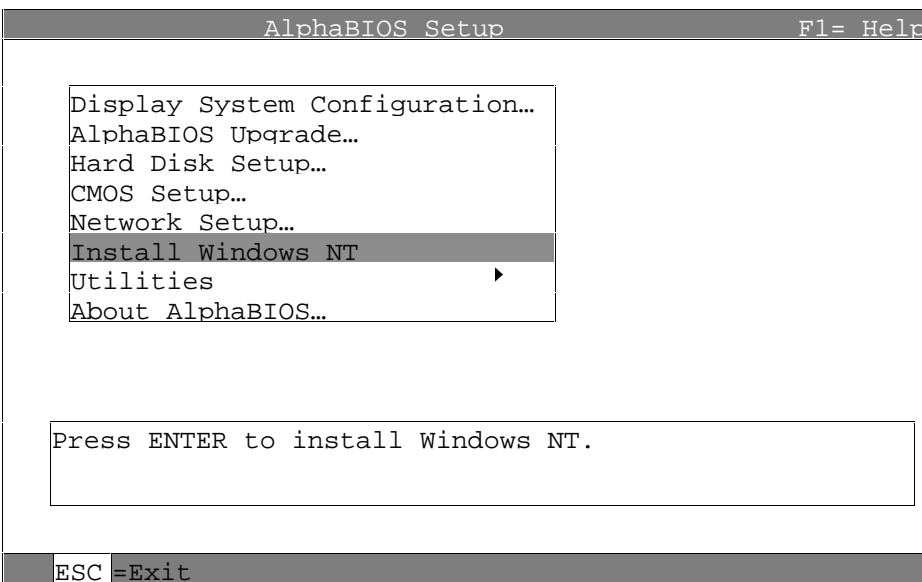
Discard changes (Escape key) — Restores those settings in effect when you started **Advanced CMOS Setup**. This does not discard changes made to **Standard CMOS Setup**.

Save Changes (F10 key) — Saves changes made in **Advanced CMOS Setup**. When exiting **CMOS Setup**, you must also save your changes at the **Standard CMOS Setup** screen for the changes to be stored permanently.

5.7 Installing Windows NT

Install Windows NT from the CD-ROM. Up to three versions of the operating system can be resident in the system at one time. Read the instructions carefully; it is easy to install the wrong CD-ROM driver.

Figure 5-21 Installing Windows NT



If Windows NT was installed at the factory, Windows NT setup will start automatically the first time the system powers up.

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.

Read these instructions carefully paying particular attention to step 5.

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. Windows NT 4.0 Setup incorrectly believes that it recognizes and supports the unused onboard AIC-7895 SCSI controller and will load its driver unless it is prevented from doing so. Your system's CD-ROM is connected to a SCSI controller on the PCI bus and its driver must be loaded. To prevent the loading of the **WRONG** driver, **quickly** press F6 when the Windows NT banner displays (blue screen). If Windows NT autodetects the AIC-78xx and F6 was not pressed at the right time, start over again. For further information, see the Windows NT 4.0 readme.txt file.
6. To select the appropriate driver:
 - a. Insert the AlphaServer DS20 Windows NT floppy into the floppy drive.
 - b. If step 5 was successful, Windows NT Setup will announce that it cannot determine the type of one or more mass storage controllers, press 'S' to specify an additional controller.
 - c. From the list, choose "Other." The floppy's list will appear.
 - d. Choose the "Adaptec AIC-78xx PCI SCSI Controller (NT4.0)."

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.

5.8 Selecting the Version of Windows NT

Up to three versions of Windows NT can reside on the system at one time. Select the version that will be started from the Operating System Selection Setup screen.

Figure 5-22 Operating System Selections

Operating System Selection Setup							
Windows NT Server 4.0				Primary Operating System			
Windows NT Server 5.0							
Boot Name:	Windows NT Server 4.0						
Boot File:	Disk 0, partition 2	\os\winnt4\osloader.exe					
OS Path:	Disk 0, partition 1	\WINNT4					
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 5.0				Primary Operating System			
Windows NT Server 4.0							
Boot Name:	Windows NT Server 5.0						
Boot File:	Disk 0, partition 2	\os\winnt5\osloader.exe					
OS Path:	Disk 0, partition 1	\WINNT5					
OS Options:							
INSERT	= New	F6	= Edit	F8	= Primary	ESC	= Discard Changes
DEL	= Delete	F7	= Copy	F9	= Validate	F10	= Save Changes

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 is displayed on the **AlphaBIOS Boot** screen for each operating system installed on the system. It is not normally necessary to modify operating system selections, since the Windows NT installation creates and modifies operating system selections as needed. If you add SCSI controllers after the installation of Windows NT, it may be necessary to modify operating system selections. Depending on what kind of SCSI controller is added, in which slot it is placed, and where its driver is in the startup order relative to other existing controllers, the disk numbering may change and modification of operating system selections may be required.

5.8.1 Designating a Primary Operating System

Figure 5-23 Primary Operating System



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. Up to three operating systems can be resident on the system.

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 that you select as the primary operating system is the one that automatically starts if the **Auto Start** option is enabled in AlphaBIOS.

Figure 5-23 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.

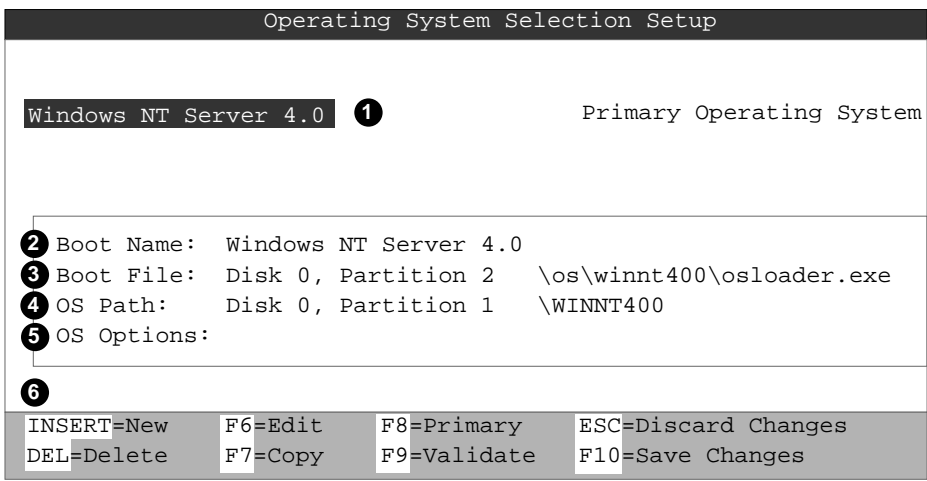
Follow this procedure to designate a new primary operating system:

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

5.8.2 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 5-24 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. The OS Loader program is named OSLOADER.EXE. The selection for the operating system must describe the path where AlphaBIOS will find the OS Loader program. 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. 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 the user does not usually modify it. 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 is displayed, 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.

- ❹ 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 is displayed, 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.

Continued on next page

- 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 is displayed 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.

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 is displayed 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. Select the OS selection you want to copy and press F7. A dialog box is displayed with the values of your OS selection. You can then edit the OS selection fields. 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 is displayed 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.

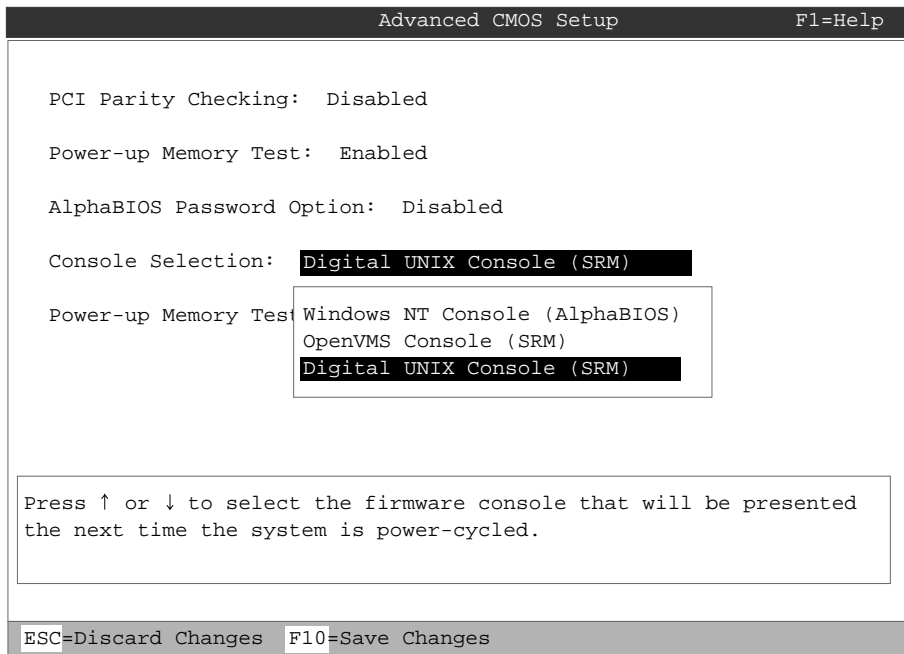
Discard changes (Escape key) — Returns to the **AlphaBIOS Setup** screen without saving changes.

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

5.9 Switching from AlphaBIOS to 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 the **Reset** button on the control panel, wait 5 seconds, and press the **Halt** button. Alternatively, select **DIGITAL UNIX (SRM)** or **OpenVMS (SRM)** from the **Advanced CMOS Setup** screen and reset the system.

Figure 5-25 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 is displayed.
3. Select **DIGITAL UNIX console (SRM)** or **OpenVMS console (SRM)** and press F10.
4. The **CMOS Setup** screen is displayed. Press F10 to save the change.
5. Reset the system.

Alternatively, you can press the Reset button, wait 5 seconds, and then press the Halt button.

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

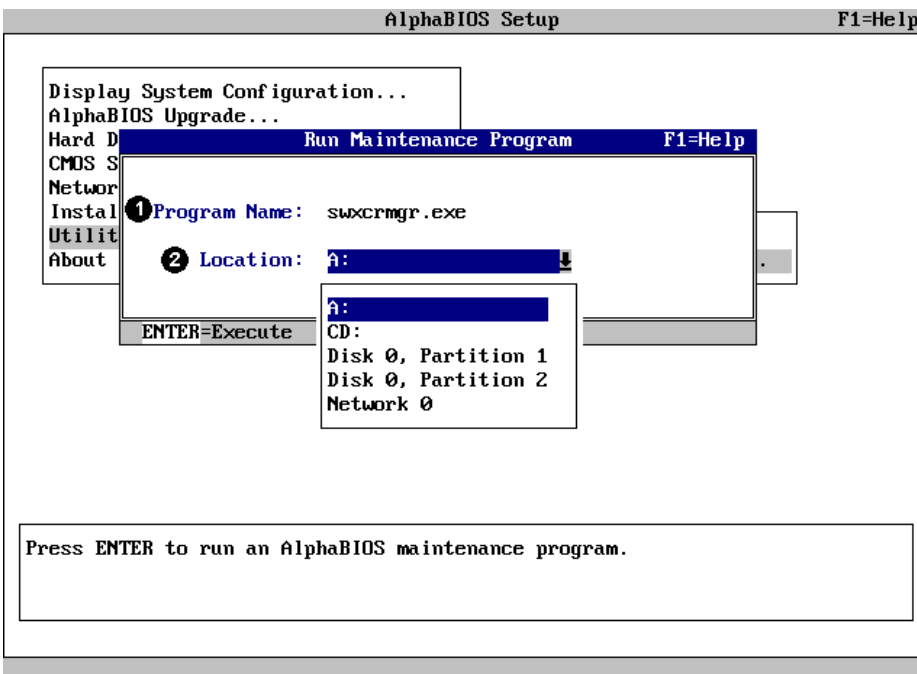
- If you make the selection in the **Advanced CMOS Setup** screen, the system will stop in the SRM console whenever it is powered up, reset, or initialized until the Windows NT operating system is again specified.
- If you press the Reset button, followed by the Halt button, no system setup information is changed, and AlphaBIOS will start the next time the system is powered up, reset, or initialized.

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

5.10 Running Utility Programs

Maintenance programs such as RAID configuration utilities are run from the AlphaBIOS Utilities menu.

Figure 5-26 Run Maintenance Program Dialog Box



PK14656-98

- 1 Program name — The program to be run. It must be an executable program with an .EXE extension. It is not necessary to type the extension.

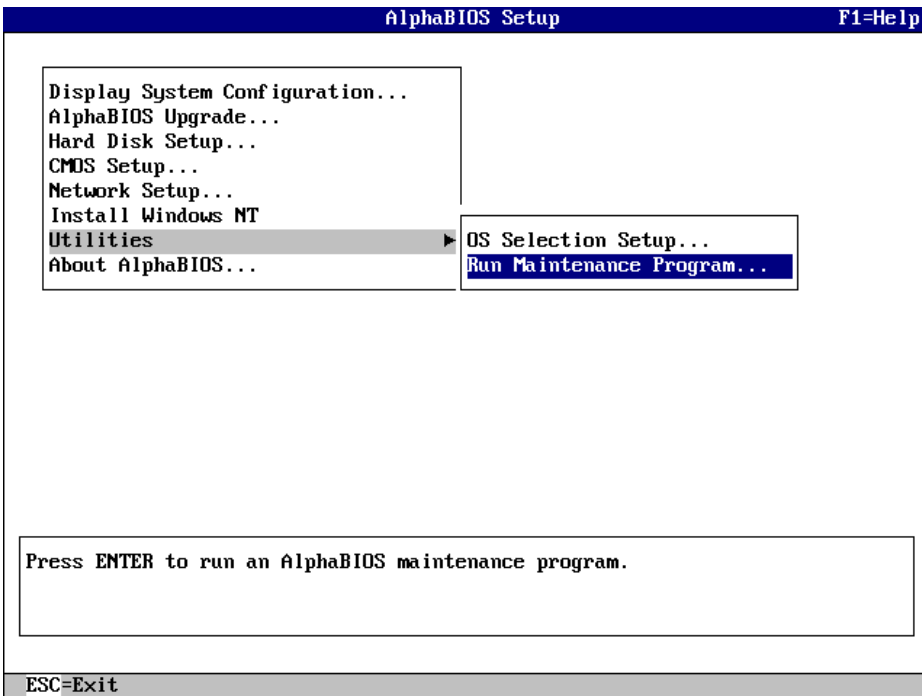
Programs run from AlphaBIOS must be written as ARC compatible images.

- 2 Location — The location from which the program in the Program Name field will be run if no path is entered along with the program name. To display a list of available disks and partitions, press the Alt and down arrow keys at the same time. Once the list is displayed, use the arrow keys to cycle through the selections.

5.10.1 Running Utilities from a Graphics Monitor

1. Start AlphaBIOS Setup. If the system is in the SRM console, set the SRM **console** environment variable to **graphics** and issue the command **alphabios**.
2. From **AlphaBIOS Setup**, select **Utilities**, then select **Run Maintenance Program** from the submenu that is displayed, and press Enter. See Figure 5-27.
3. In the **Run Maintenance Program** dialog box (Figure 5-26), 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, floppy disk, or CD-ROM drive from which to run the program.
4. Press Enter to execute the program.

Figure 5-27 AlphaBIOS Utilities Menu



PK1467-98

5.10.2 Running Utilities from a Serial Terminal

Utilities are run from a serial terminal in the same way as from a graphics monitor. The menus are the same, but some keys are different.

Table 5-1 AlphaBIOS Option Key Mapping

AlphaBIOS Key	VTxxx Key
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
Escape	Ctrl/[

1. Start **AlphaBIOS Setup** by issuing the command **alphabios**.
2. Press F2 in the **AlphaBIOS Boot** screen.
3. From **AlphaBIOS Setup**, select **Utilities**, and select **Run Maintenance Program** from the submenu that is displayed. Press Enter.
4. 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, floppy disk, or CD-ROM drive from which to run the program.

Press Enter to execute the program.

Chapter 6

Managing the System Remotely

This chapter describes how to manage the system from a remote location using the Remote Console Manager (RCM). You can use the RCM from a console terminal at a remote location or from a local console terminal connected to the COM1 port.

Sections in this chapter are:

- RCM Overview
- First-Time Setup
- RCM Commands
- Using the RCM Switchpack
- Troubleshooting Guide
- Modem Dialog Details

6.1 RCM Overview

The remote console manager (RCM) monitors and controls the system remotely. The control logic resides on the system board.

The RCM is a separate console from the SRM and AlphaBIOS consoles. The SRM and AlphaBIOS firmware reside on the system board. The RCM firmware resides on the server feature module and can only be accessed through COM 1. The RCM is run from a serial console terminal or terminal emulator. A command interface lets you reset, halt, and power the system on or off, regardless of the state of the operating system or hardware. You can also use RCM to monitor system power and temperature.

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

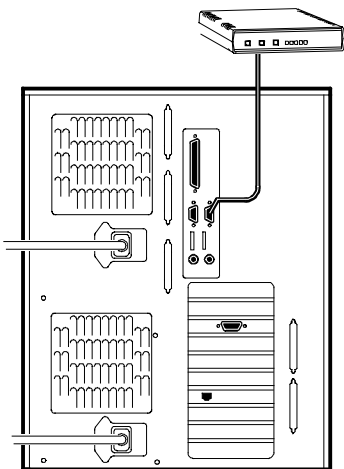
- To connect to the RCM remotely, you dial in through a modem, enter a password, and then type an escape sequence that invokes RCM command mode. You must set up the modem before you can dial in remotely.
- To connect to the RCM locally, the console terminal has to be connected to COM 1 and then you type the escape sequence at the SRM console prompt on the local serial console terminal to enter RCM mode.

*CAUTION: Do not issue RCM commands until the system has powered up. If you enter certain RCM commands during power-up or reset, the system may hang. In that case you would have to disconnect the power cord at the power outlet. You can, however, use the RCM **halt** command during power-up to force a halt assertion. Refer to Section 3.12 for information on halt assertion.*

6.2 First-Time Setup

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

Figure 6-1 RCM Connections



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6.2.1 Dialing In and Invoking RCM

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

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

Example 6-1 Sample Remote Dial-In Dialog

```
ATQ0V1E1S0=0      ❶  
OK  
ATDT30167  
CONNECT 9600  
#                  ❷  
RCM V2.0           ❸  
RCM>
```

Dialing In and Invoking RCM

1. Dial the number for the modem connected to the modem port. See ❶ in Example 6-1 for an example.

The RCM prompts for a password with a “#” character. See ❷.

2. Enter the password that you set with the **setpass** command.

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

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

3. Type the RCM escape sequence (not echoed).

```
^]^[rcm  
RCM>
```

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

4. To terminate the modem connection, enter the RCM **hangup** command.

```
RCM> hangup
```

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

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

6.2.2 Using RCM Locally or with a Modem On COM1

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

1. To invoke the RCM locally, type the RCM escape sequence. See ❶ in Example 6-2 for the default sequence.

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

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

Example 6-2 Invoking and Leaving RCM Locally

```
P00>>> ^]^[rcm    ❶  
RCM>
```

```
RCM> quit          ❷  
Focus returned to COM port
```

6.3 RCM Commands

The RCM commands given in Table 6-1 are used to control and monitor a system remotely.

Table 6-1 RCM Command Summary

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

Command Conventions

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

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

halt

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

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

The **halt** command can be used to force a halt assertion. See Section 3.12 for information on halt assertion.

*NOTE: If you are running Windows NT, the **halt** command has no effect.*

haltin

The **haltin** command halts a managed system and forces a halt assertion. The **haltin** command is equivalent to pressing the Halt button on the control panel and holding it in. This command can be used at any time after system power-up to allow you to perform system management tasks. See Section 3.12 for information on halt assertion.

*NOTE: If you are running Windows NT, the **haltin** command does not affect the operating system session, but it does cause a halt assertion.*

haltout

The **haltout** command terminates a halt assertion that was done with the **haltin** command. It is equivalent to releasing the Halt button on the control panel after holding it in (rather than pressing it once and releasing it immediately). This command can be used at any time after system power-up. See Section 3.12 for information on halt assertion.

help or ?

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

poweroff

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

```
RCM>poweroff
```

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

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

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

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

poweron

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

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

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

```
RCM>poweron
```

```
Focus returned to COM port
```

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

quit

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

```
Focus returned to COM port
```

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

reset

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

```
RCM>reset
```

```
Focus returned to COM port
```

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

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

setesc

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

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

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

```
RCM>setesc
^o^o^o^o^o
RCM>
```

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

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

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

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

status

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

```
RCM>status

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

RCM>
```

The status fields are explained in Table 6-2.

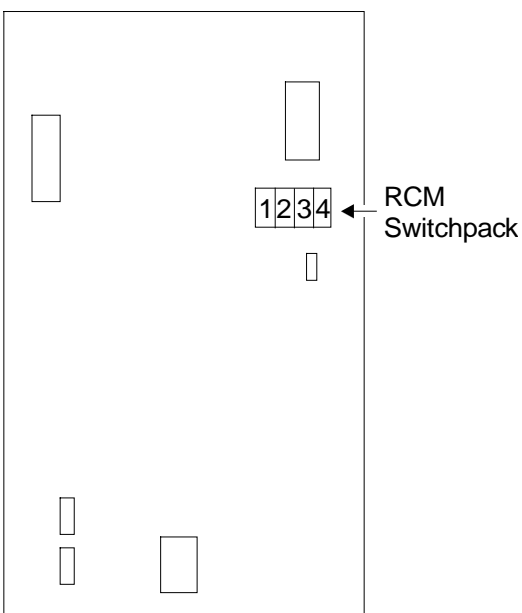
Table 6-2 RCM Status Command Fields

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

6.4 Using the RCM Switchpack

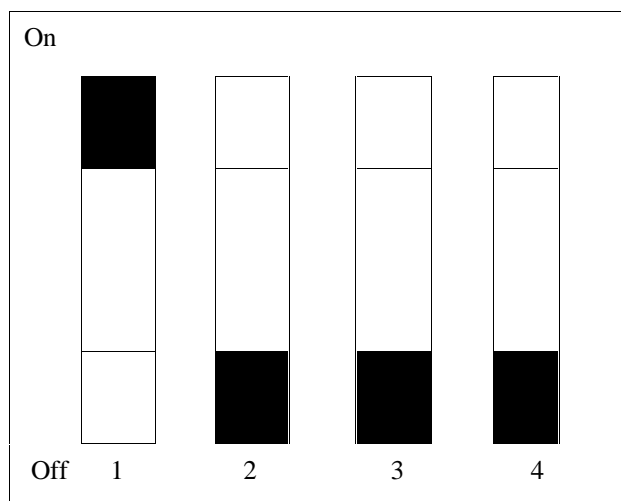
The RCM operating mode is controlled by a switchpack on the server feature module located in the fan area between the system card cage and the front of the system. Use the switches to enable or disable certain RCM functions, if desired.

Figure 6-2 Location of RCM Switchpack on Server Control Module



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Figure 6-3 RCM Switches (Factory Settings)



Switch	Name	Description
1	EN RCM	Enables or disables the RCM. The default is ON (RCM enabled). The OFF setting disables RCM.
2	Reserved	Reserved
3	RPD DIS	Enables or disables remote poweroff. The default is OFF (remote poweroff enabled).
4	SET DEF	Sets the RCM to the factory defaults. The default is OFF (reset to defaults disabled).

Uses of the Switchpack

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

- Switch 1 (EN RCM)—Set this switch to OFF (disable) if you want to reset the baud rate of the COM1 port to a value other than the system default of 9600. You must disable RCM to select a baud rate other than 9600.
- Switch 2 (Reserved) —Reserved.
- Switch 3 (RPD DIS). Set this switch to ON (disable) if you want to disable the **poweroff** command. With **poweroff** disabled, the monitored system cannot be powered down from the RCM.
- Switch 4 (SET DEF). Set this switch to ON (enable) if you want to reset the RCM to the factory settings. See the section “Resetting the RCM to Factory Defaults.”

Changing a Switch Setting

The RCM switches are numbered on the server feature module. The default positions are shown in Figure 6-3. To change a switch setting:

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

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

3. Remove the system covers. See Section 7.2.
4. Locate the RCM switchpack on the server feature module and change the switch setting as desired.
5. Replace the system covers and plug in the power cords.
6. Power up the system to the SRM console prompt and type the escape sequence to enter RCM command mode, if desired.

Resetting the RCM to Factory Defaults

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

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

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

3. Remove the system covers. See Section 7.2.
4. Locate the RCM switchpack on the server feature module and set switch 4 to ON.
5. Replace the system covers and plug in the power cords.
6. Power up the system to the SRM console prompt.

Powering up with switch 4 set to ON resets the escape sequence, password, and modem enable states to the factory defaults.

7. Power down the system, unplug the AC power cords, and remove the system covers.
8. Set switch 4 to OFF.
9. Replace the system covers and plug in the power cords.
10. Power up the system to the SRM console prompt, and type the default escape sequence to invoke RCM command mode:

```
^ ] ^ ] RCM
```

6.5 Troubleshooting Guide

Table 6-3 is a list of possible causes and suggested solutions for symptoms you might see.

Table 6-3 RCM Troubleshooting

Symptom	Possible Cause	Suggested Solution
The local console terminal is not accepting input.	Cables not correctly installed.	Check external cable installation.
	Switch 1 on switchpack set to disable.	Set switch 1 to ON.
The console terminal is displaying garbage.	System and terminal baud rate set incorrectly.	Disable RCM and set the system and terminal baud rates to 9600 baud.
After the system and RCM are powered up, the COM port seems to hang briefly.	This delay is normal behavior.	Wait a few seconds for the COM port to start working.
RCM installation is complete, but system does not power up.	RCM Power Control: is set to DISABLE.	Invoke RCM and issue poweron command.
	Cables not correctly installed.	Reseat the cables.
You reset the system to factory defaults, but the factory settings did not take effect.	AC power cords were not removed before you reset switch 4 on the RCM switchpack.	Refer to Section 6.4.
The message “unknown command” is displayed when the user enters a carriage return by itself.	The terminal or terminal emulator is including a linefeed character with the carriage return.	Change the terminal or terminal emulator setting so that “new line” is not selected.

6.6 Modem Dialog Details

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

Default Initialization and Answer Strings

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

Initialization string: AT&F0EVS0=0S12=50<cr>

Answer string ATXA<cr>

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

Modifying Initialization and Answer Strings

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

To replace the initialization string:

```
P00>>> set rcm_init "new_init_string"
```

To replace the answer string:

```
P00>>> set rcm_answer "new_answer_string"
```

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

```
P00>>> show rcm*
rcm_answer  ATXA
rcm_dialout
rcm_init    AT&F0EVS0=0S12=50
P00>>>
```

Initialization String Substitutions

The following modems require modified initialization strings.

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

Chapter 7

Installing Components

This chapter provides system component removal and replacement procedures. Sections include:

- Preparing to Install or Remove Components
- Top Cover and Side Panel Removal and Replacement
- Installing a CPU Module
- Installing a Memory DIMM Option
- Installing a PCI or ISA Card

CAUTION: Be sure to follow the appropriate antistatic precautions whenever handling internal components.

7.1 Preparing to Install or Remove Components

To prepare your system for installation and removal of components, you will need to assemble the required equipment, familiarize yourself with antistatic precautions, and remove the top and side panels of the system unit.

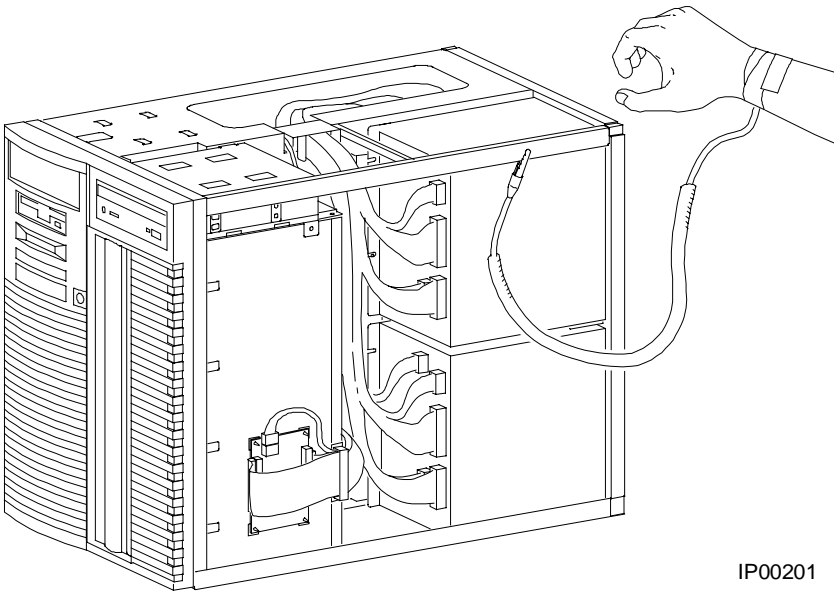
Required Equipment

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

- Flat-head screwdriver
- Phillips screwdriver
- Antistatic wrist strap
- Replacement option board kit or device kit, if necessary

When handling internal system components, use an antistatic wrist strap to avoid damaging the components. Figure 7-1 shows how to attach the antistatic wrist strap to your wrist and to the system unit.

Figure 7-1 Attaching the Antistatic Wrist Strap

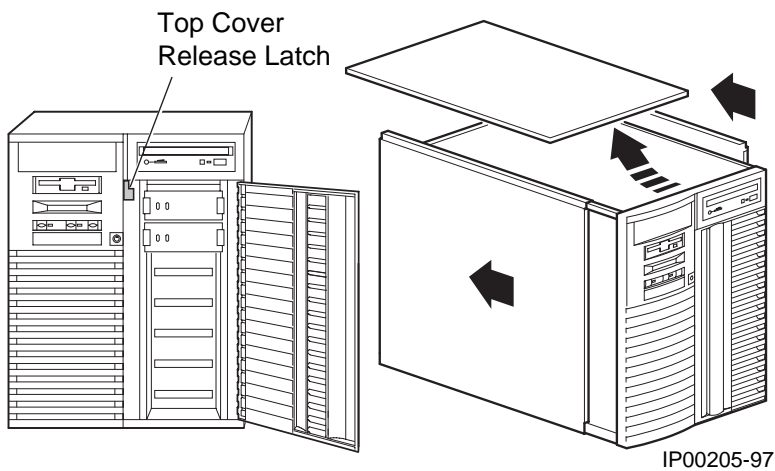


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7.2 Top Cover and Side Panel Removal and Replacement

Depending on the components involved, you may not need to remove all panels from the system unit. The top cover and left side panel must be removed to install or remove any internal component; the right side panel, to open the power compartment or get to the SCSI backplane.

Figure 7-2 Removing Top Cover and Side Panels



Top Cover and Side Panel Removal

CAUTION: Make sure the system unit On/Off button is in the "off" position before removing the system cover and panels.

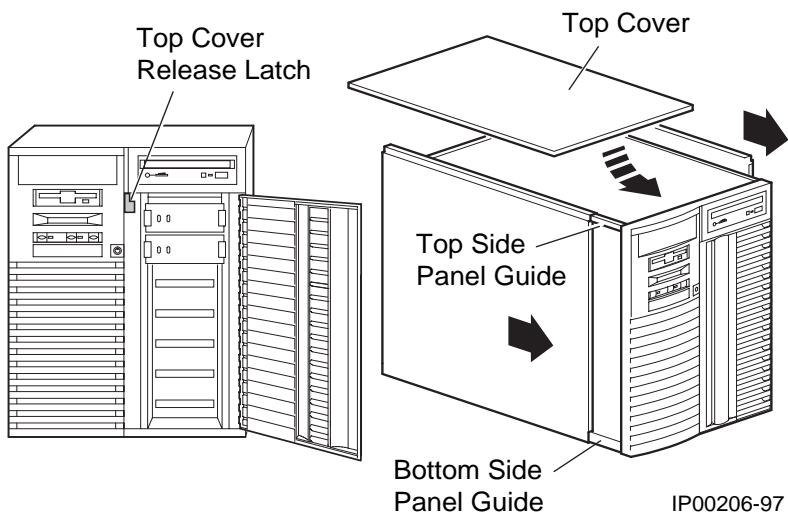
To remove the top cover and side panels, refer to Figure 7–2 and follow these steps:

1. Shut down the operating system following the instructions listed in the operating system documentation.
2. Press the On/Off switches on all external options connected to the system to the off position.
3. Press the On/Off button on the system unit to the off position. An interlocking sensor switch inside the system unit will automatically turn off the system if you remove the top cover and have not turned off the system.
4. Turn the front door lock to the right to unlock the door.
5. Pull down the top cover release latch on the front of the system until it catches in the down position.
6. Grasp the finger groove at the rear of the top cover and pull the top cover straight back no farther than 2 inches, and lift up on the cover.
7. Pull the top of the side panel back, then up and away from the unit to remove it. (Repeat this step for the other panel.)

Top Cover and Side Panel Replacement

Refer to Figure 7-3 to replace the top cover and side panels of the system unit.

Figure 7-3 Replacing Top Cover and Side Panels



1. Align the guides on the top and bottom inside of the side panel with the lip of the system unit frame.
2. Tilt the side panel top toward the unit and lift the flange at the top of the panel over the system unit frame.
3. Slide the panel forward into position. (Repeat steps 1 to 3 for the other panel.)
4. Align the top cover with the top of the side panels and slide the cover gently onto the unit from the rear.

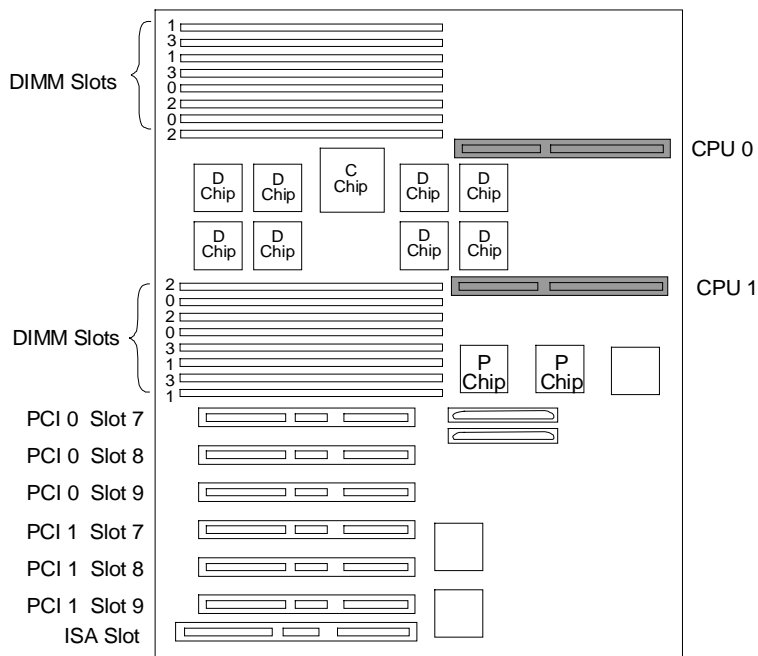
*CAUTION: The top cover has a tab on the underside. Make sure to place this tab in the area **immediately behind** the microswitch. Do not hit the microswitch with the tab.*

5. Hold down the top cover release latch until the top cover is in place, and then release it to secure the cover and panels.
6. Lock the door to secure the top cover and side panels.
7. Set the On/Off switches on all external options connected to the system to the on position.
8. Press the On/Off button on the system unit to the on position.

7.3 Installing a CPU Module

Remove the top cover and left side panel to access the system board. Verify the installation by issuing the show cpu command from the SRM console or display the system configuration from the AlphaBIOS console.

Figure 7-4 CPU Module Slots



PKW1401A-98

WARNING: CPU modules and memory modules have parts that operate at high temperatures. Wait 2 minutes after power is removed before touching any module.

CAUTION: Wear an antistatic wrist strap when working on this system.

Removal

1. Shut down the operating system and power down the system.
2. Remove the top cover and left side panel.

3. Unscrew the edge of the module that secures the module to the card cage.
4. Grasp the edge of the module and gently but firmly pull it from the slot.
5. Once the module is released, gently pull it out of the cage.

Installation

1. Slide the CPU module into the CPU slot. Be sure the edges of the module are in both guides so that it correctly lines up with the slot on the system board.
2. Firmly press the module into the connector.
3. Secure the module to the card cage frame with the two screws.
4. Plug the power cord in.

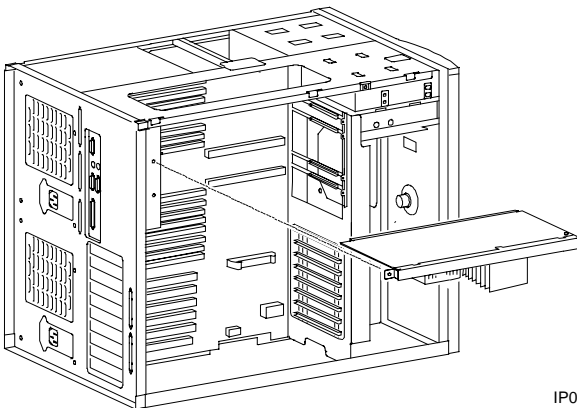
Verification - DIGITAL UNIX and OpenVMS Systems

- Issue the **show cpu** command to display the status of the new module.

Verification - Windows NT Systems

1. Start AlphaBIOS Setup, select Display System Configuration, and press Enter.
2. Using the arrow keys, select Systemboard Configuration to display the status of the new module.

Figure 7-5 CPU Module Installation



IP00215A

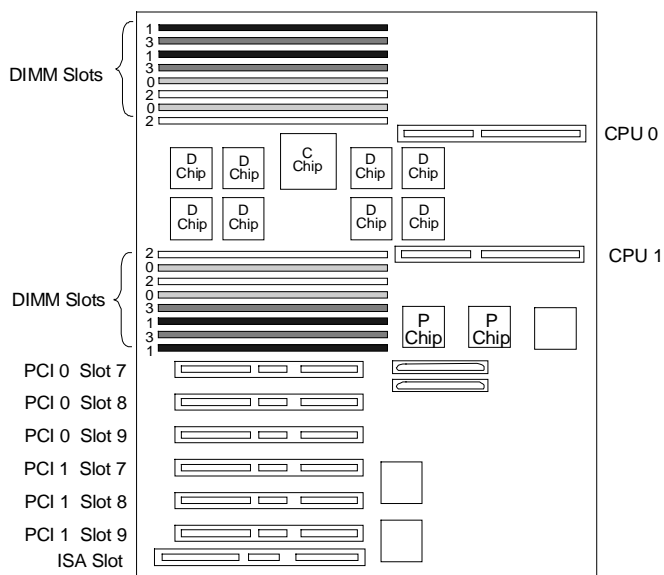
7.4 Installing a Memory DIMM Option

Remove the top cover and side panel to access the system board. Install a memory option by following the procedure discussed. Figure 7-6 shows the memory slots on the system board.

Configuration Rules

- A memory option consists of four DIMMs all of which must be the same size.
- Convention places the largest memory option in slots marked 0 on the system board. See Figure 7-6.
- Other memory options can be the same size or smaller than the first memory option.
- Memory options must be installed in slots designated for each bank. The first bank goes into slots marked 0, the second bank into slots marked 1, and so on.

Figure 7-6 Memory Slots on System Board

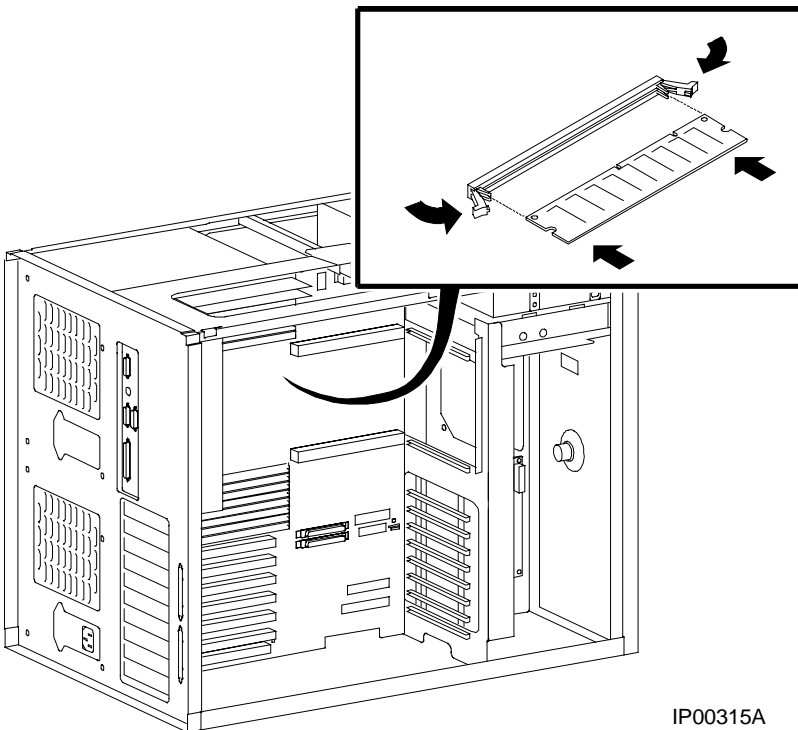


PKW1401B-98

Memory Option Installation

1. Shut down the operating system and power down the system.
2. Remove the top cover and left side panel.
3. If necessary, remove either CPU to access the DIMM slots necessary for the installation.
4. Open each memory connector for the option by pushing the levers on the connector ends outward. See Figure 7-6 for the locations of the connectors.
5. Align each DIMM in the connector and press down to close the connector levers.

Figure 7-7 Memory Card Installation



IP00315A

WARNING: CPU modules and memory modules have parts that operate at high temperatures. Wait 2 minutes after power is removed before touching any module.

CAUTION: Wear an antistatic wrist strap when working on this system.

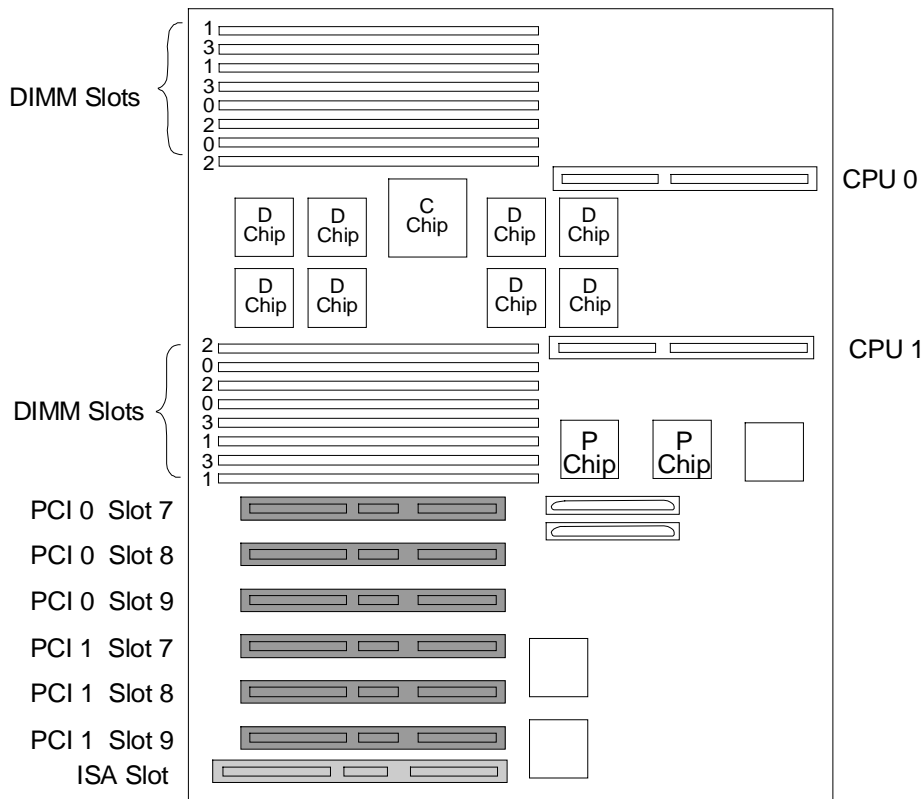
7.5 Installing a PCI or ISA Card

Remove the top cover and left side panel to access the system board. After you have installed the new module, verify the installation by issuing the show config and show device commands from the SRM console or display the PCI configuration from the AlphaBIOS console.

Configuration Rules

- A graphics card can be installed on PCI0.

Figure 7-8 PCI and ISA Slots



PKW1401C-98

Option Card Installation

1. Shut down the operating system and power down the system.
2. Remove the top cover and left side panel.
3. Select the I/O slot you wish to use and remove the screw that secures the slot cover to the chassis.
4. Install the option card by pressing it into the connector on the system board.
5. Secure the option card with the screw you removed from the slot cover.

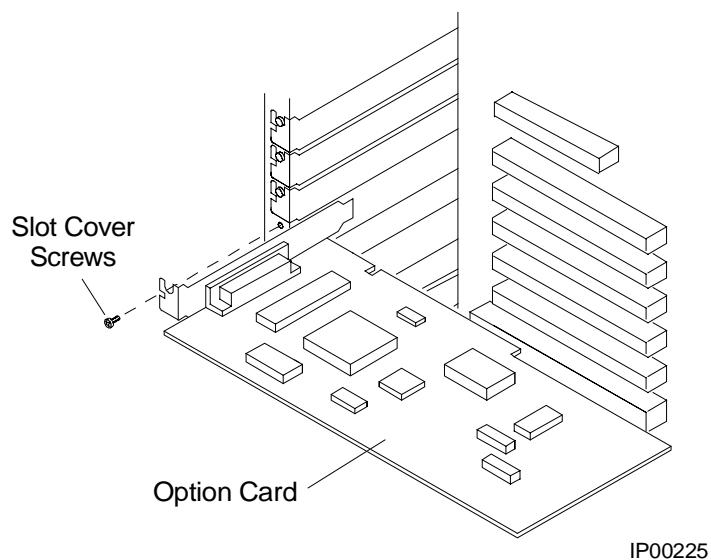
Verification - DIGITAL UNIX and OpenVMS Systems

- Issue the SRM commands **show configuration** and **show device** to determine that the new option is listed.

Verification - Windows NT Systems

1. Start **AlphaBIOS Setup**, select **Display System Configuration**, and press Enter.
2. Using the arrow keys, select **PCI Configuration** to determine that the new option is listed.

Figure 7-9 PCI/ISA Card Installation



Chapter 8

Troubleshooting

This chapter contains basic troubleshooting information. For more about troubleshooting, see the *AlphaServer DS20 Service Manual*.

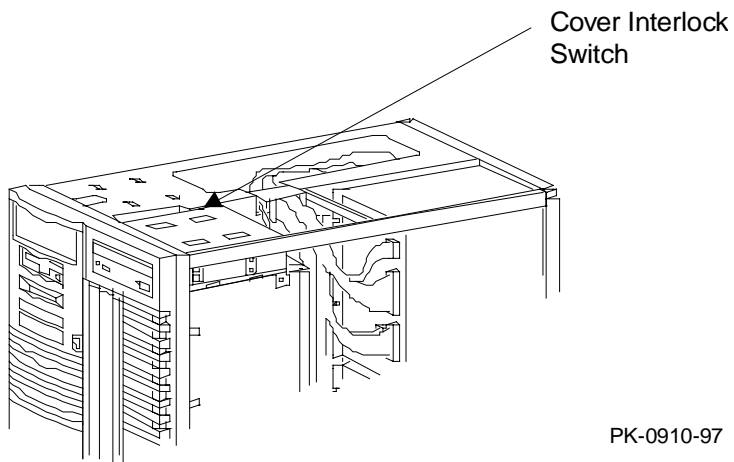
Sections in this chapter are:

- System Does Not Power Up

8.1 System Does Not Power Up

When the system does not power up, the problem may be a disconnected power cord, a loose cable, a faulty fan, a firmware problem, a memory problem, or a disengaged cover interlock.

Figure 8-1 Location of Cover Interlock



PK-0910-97

If the system does not power up

- Are the power cords plugged in?
- Are the cover and side panels closed and the interlock engaged?
The cover interlock must be engaged to enable power-up. See Figure 8–1 for the interlock location.

If the system comes up and approximately 30 seconds later goes down, possible failures are:

- CPU fan failure
- System fan failure
- Power supply fan failure
- Overtemperature condition

If you hear a single beep

A single beep indicates that the firmware in flash ROM is corrupt: The fail-safe loader will load and run immediately if you have a serial console terminal. Press **reset** if you have a graphics console monitor. The following prompt will appear:

```
DP264>
```

Either place a floppy with the most recent firmware on it in the floppy drive (should have come with the system) or place the AlphaServer Firmware CD-ROM in the CD drive and at the prompt type:

```
DP264>fwupdate
```

Two things will happen:

- You will hear a single beep, followed by two beeps, followed by three beeps.
- And either
 - UPD> will appear if you placed a floppy in the floppy drive
 - Or AlphaBIOS will appear.

In either case refer to Section 3.9 and update the firmware.

If you hear four beeps

The header in the ROM is not valid, and the system will not boot.

If you hear six beeps

Six beeps indicate a checksum error occurred after the ROM image was copied into memory. Either memory is misconfigured or a memory DIMM needs to be reseated.

Appendix A

SCSI Bus Configurations

This appendix shows the possible configurations of the SCSI bus in the Storageworks shelf in the AlphaServer DS20 systems. The following topics are covered:

- Single-Bus Configuration
- Split-Bus Configuration

A.1 Single-Bus Configurations

The AlphaServer DS20 is shipped with a single SCSI bus configuration. The type of controller determines the bus configuration.

Figure A-1 Single-Bus Configuration (One Multi-Channel Controller)

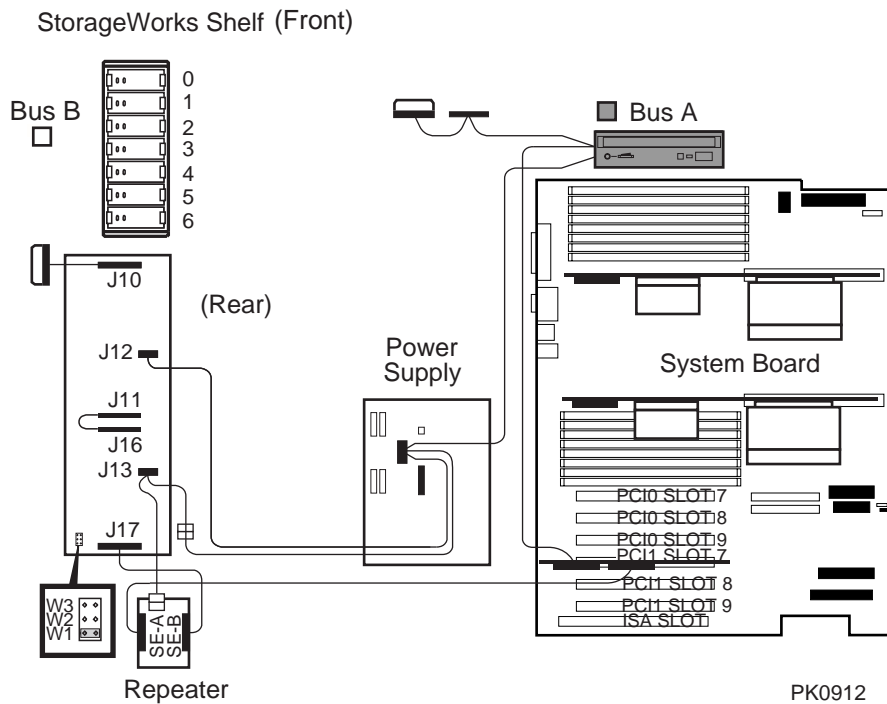
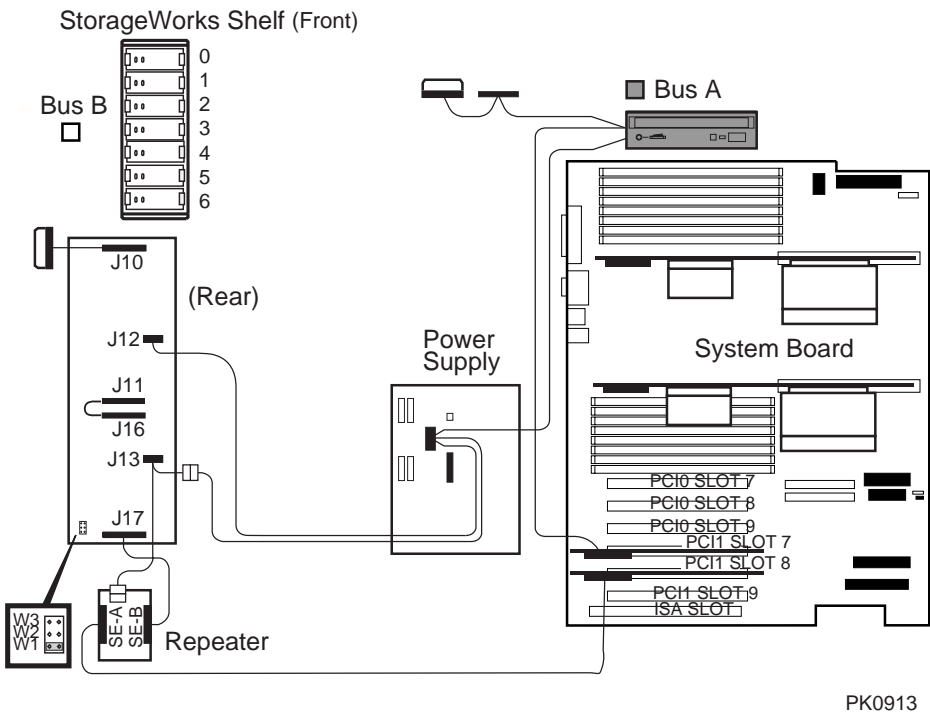


Figure A-2 Single-Bus Configuration (Two Single-Channel Controllers)



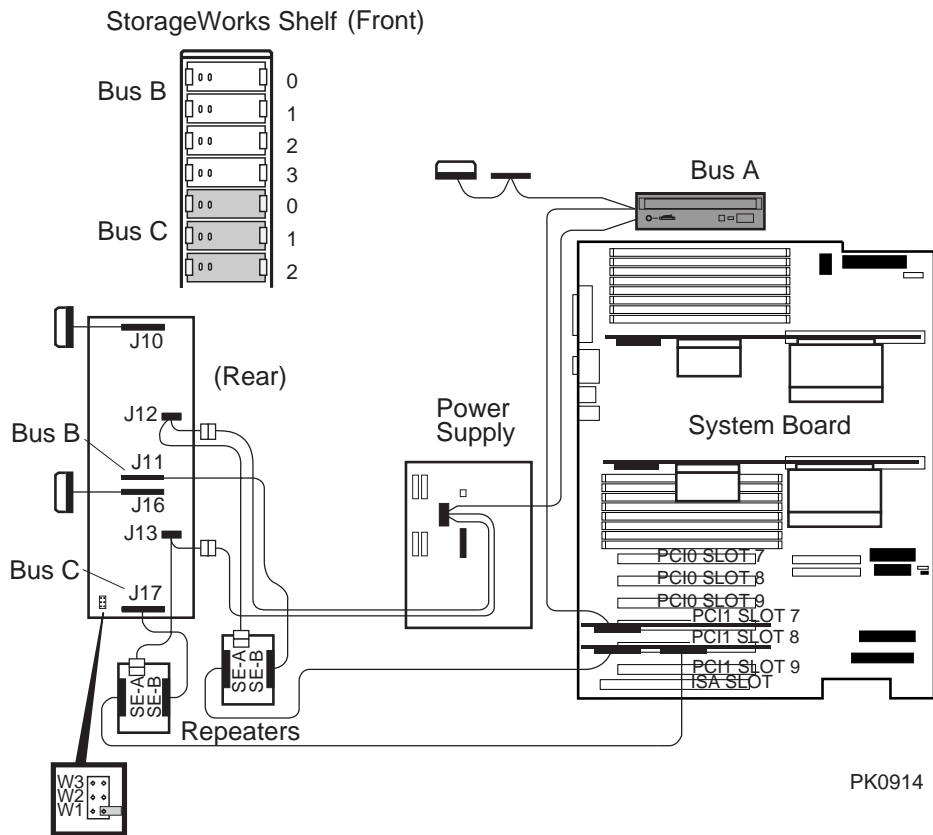
PK0913

Figure A-1 is a diagram of a single SCSI bus configuration with a single multi-channel PCI SCSI controller. Figure A-2 is a diagram of a single SCSI bus configuration with two single-channel PCI SCSI controllers. Note that in each case one channel connects the SCSI bus and the other connects the CD-ROM.

A.2 Split-Bus Configuration

The H8253-AA kit allows you to convert a single bus to a split-bus. Three SCSI controllers are required along with a second repeater.

Figure A-3 Split-Bus Configuration



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