

DIGITAL Server 5300

User's Guide

Part Number: ER-K8FWW-UA. A01

December 1997

This manual is for anyone who manages, operates, or services the DIGITAL Server 5300 system. It covers operation, firmware, initial troubleshooting, and component installation.

December 1997

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Preface

Intended Audience

This manual is for anyone who manages, operates, or services an DIGITAL Server 5300 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 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 drawer, booting the operating system, updating firmware.
- **Chapter 4, SRM Console**, describes commands in the SRM console.
- **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 EISA/ISA cards to the system.

- **Chapter 8, Troubleshooting**, provides basic troubleshooting information.

Documentation Titles

The following table lists the books in the DIGITAL Server 5300 documentation set.

DIGITAL Server 5300 Documentation

Title	Order Number
User and Installation Documentation Kit	QC-06CAB-H8
<i>User's Guide</i>	ER-K8FWW-UA
<i>Basic Installation</i>	ER-K8FWW-IM
Service Information	
<i>Service Guide</i>	ER-K8FWW-SG

1

Overview

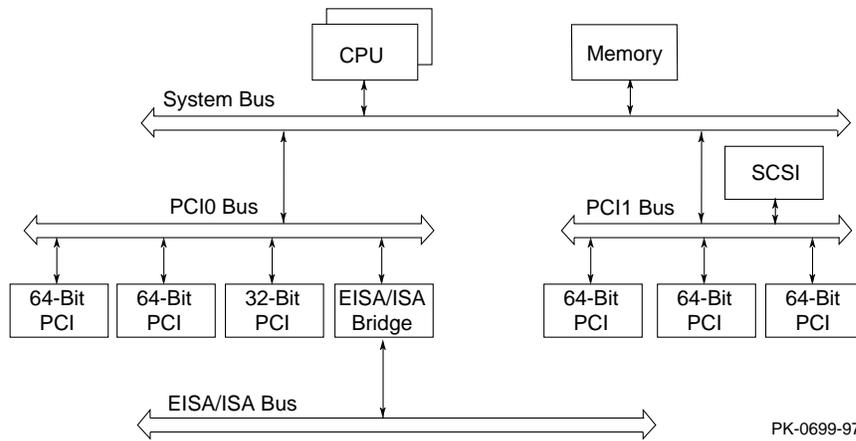
This chapter provides an overview of the DIGITAL Server 5300 system features and capabilities. The following topics are covered:

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

System Architecture

The DIGITAL Server 5300 is a high-performance system. Figure 1-1 shows the system architecture.

Figure 1-1 System Architecture



Overview

The DIGITAL Server 5300 pedestal system is housed in an enclosure containing the motherboard, CPU cards, memory modules, and power supplies. This enclosure 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.

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

All memory and I/O components are on a single board that contains the memory subsystem, the PCI bus, the EISA/ISA bus, the integrated I/O controllers, and the remote console manager (RCM).

Supported Operating Systems

This system supports the Microsoft Windows NT operating system:

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

System Console Firmware

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

The console subsystem, located in 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.

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.

System Expansion

- Flexible memory architecture Provides a 128-bit data path with ECC protection. System memory can be upgraded from 64 MB to 2 GB using memory options.
- Six PCI expansion slots and one PCI/EISA expansion slot Accommodates industry-standard option cards such as Ethernet, FDDI, SCSI, and modems.
- Integrated UltraSCSI controller Supports tape 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.

Overview

- External ports Two serial ports and one parallel port support external options such as a printer, modem, or local terminal.
- UltraSCSI backplane Supports high-performance drive technology.
- Hot swap disk capability Allows replacement of StorageWorks disk drives while the system continues to operate.

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 failure.

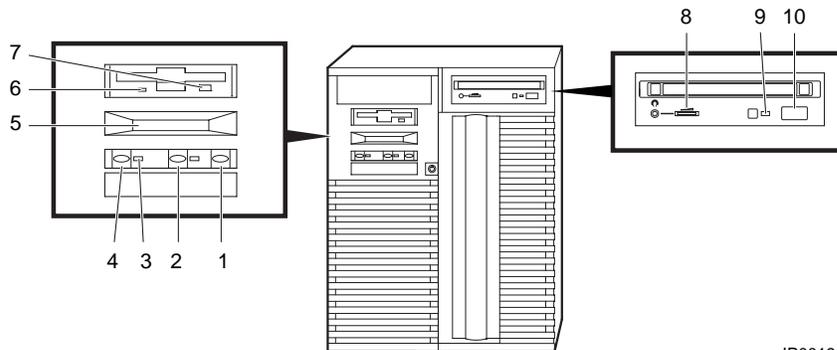
System Security

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

Front Panel Controls and Indicators

The controls and indicators on the front panel of the system unit are shown in Figure 1-1 and described in Table 1-2. 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	Used to bring system to SRM console on power-up or reset.
(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.

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

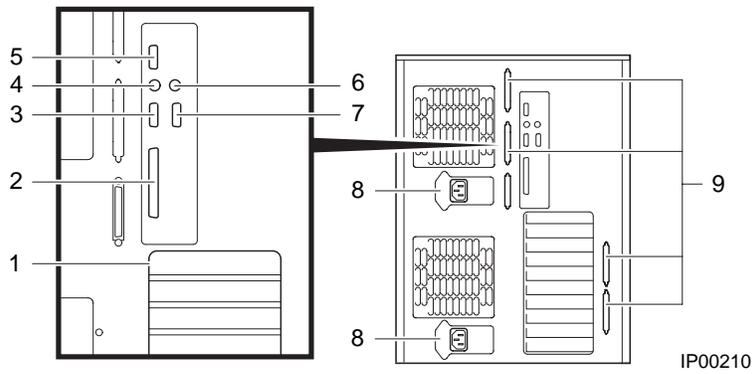


Table 1-2 Rear Panel Ports and Slots

Port or Slot	Used to connect....
(1) Up to six PCI slots and one PCI/EISA slot	Option cards for network, video, or disk controllers
(2) Parallel port	Parallel device such as a printer
(3) Serial port/terminal port (COM2)	Console terminal or serial-line peripheral such as a modem
(4) Mouse port	PS/2-compatible mouse
(5) RCM modem port	External modem for RCM dial-out/access
(6) Keyboard port	PS/2-compatible keyboard
(7) Serial port (COM1)	Serial-line peripheral such as a modem
(8) Power inlets	System unit to power outlets
(9) Four additional SCSI connector knockouts (16-bit, wide)	External SCSI devices without using an adjacent slot

Overview

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 Terminals	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 required by the Windows NT operating system?	No	Yes

Overview

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.) If the console terminal is a VGA monitor, console power-up messages are sent to those devices but SRAM and XSRAM power-up messages are lost.

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 “Environment Variable Summary” in Chapter 4 for information about environment variables.)

If the **console** environment variable is set to **serial** 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.

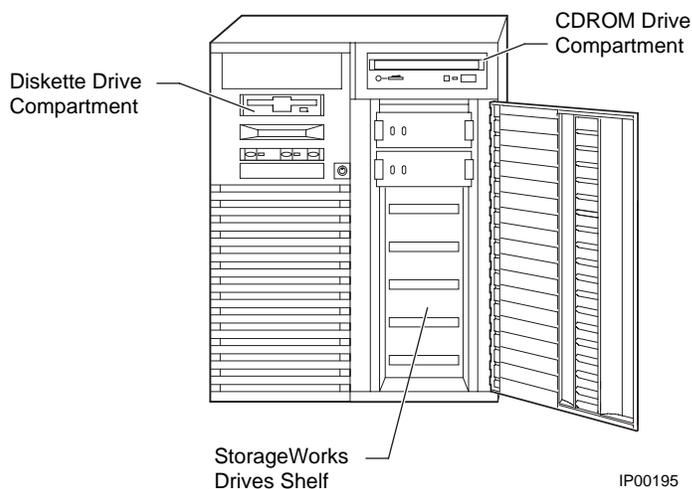
If the **console** environment variable is set to **graphics** and no graphics monitor is attached to the keyboard port, pressing a carriage return on a serial terminal attached to COM1 (after power-up testing has completed) makes it the console device and the console prompt is sent to it.

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.

Options

Options include storage, PCI and EISA/ISA I/O cards, and 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 EISA/ISA Options

The system supports PCI options and EISA/ISA options for:

- SCSI storage expansion
- Networking and communications

- Graphics
- Sound

Memory Options

You can increase your system's memory to 2 gigabytes by using various combinations of memory options. Adding more memory allows your system to run memory-intensive software more quickly.

The system supports the following memory option sizes:

- 64 MB
- 256 MB

Memory options include a 64-MB option consisting of two 32 MB DIMMs, and a 256-MB option consisting of two 128 MB DIMMs.

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.

The latest version of the firmware is available on the World Wide Web:

<http://www.windowsnt.digital.com>

Overview

2

Installing the System

This chapter explains how to set up and install your system hardware. It covers these topics:

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

System Setup Overview

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

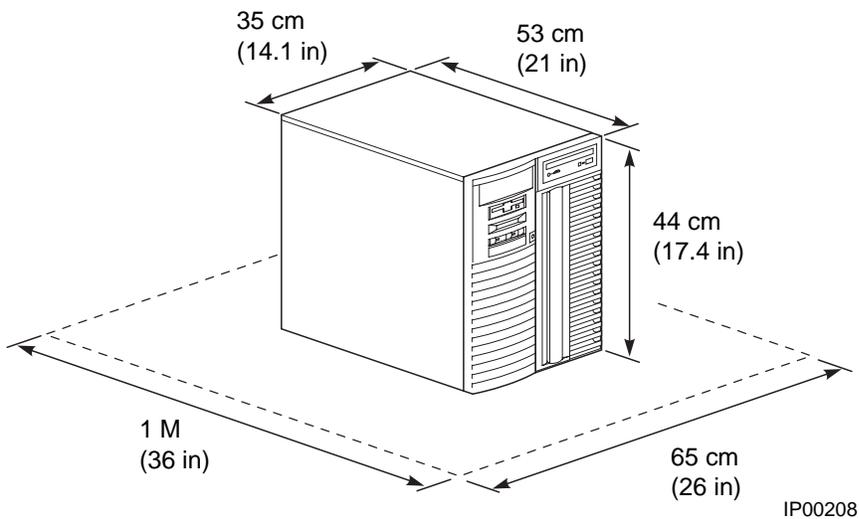
1. Select a location for the system, giving consideration to service access, environmental requirements, and power requirements.
2. Confirm that you have all the desired accessories that ship with the system and any accessories you may want to add.
3. Connect the keyboard, mouse, printer, and monitor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

Installing the System

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



Environmental Requirements

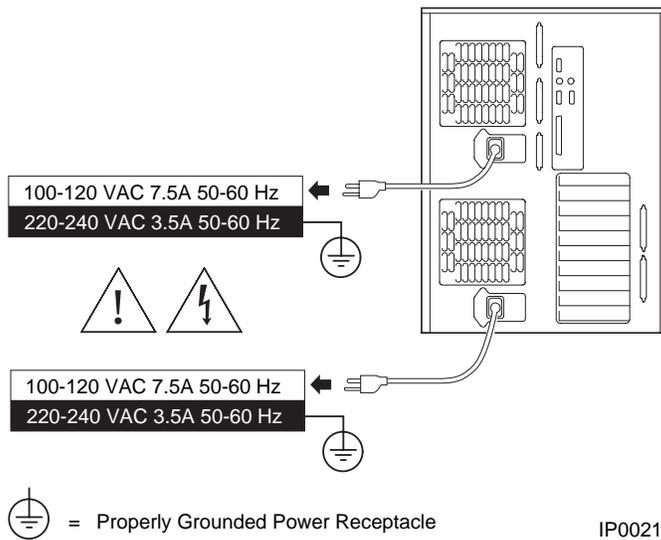
Table 2-1 Environmental Requirements

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.

Power Requirements

Your system ships with two power supplies. Both power supplies connect to an AC outlet.

Figure 2–2 Power Supply Requirements



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

Installing the System

Acoustical Data

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

Product	Sound Power Level L_{WAd} B		Sound Pressure Level L_{nAm} dBA (bystander positions)	
	Idle	Operate	Idle	Operate
54HHA-AA/B, 54KHA-AA/B, and 54ZHA-AA, and all DIGITAL Server 5300 systems without hard drives	5.6	5.6	37	37
All DIGITAL Server 5300 systems with 1xRZ1CB disk drive	5.6	5.7	37	38

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

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

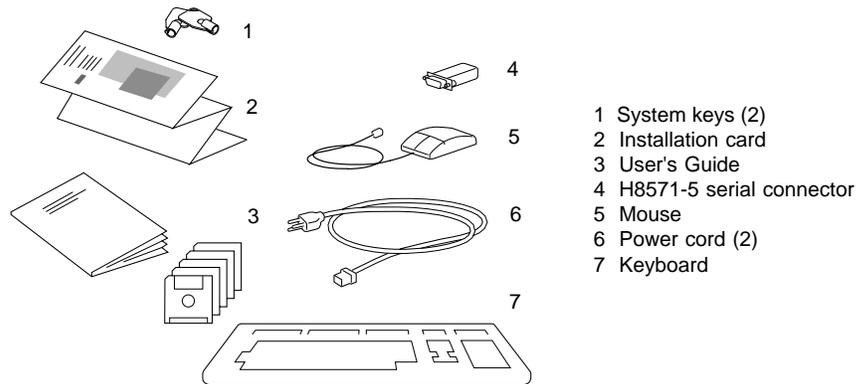
Produkt	Schalleistungspegel L_{WAd} B		Schalldruckpegel L_{nAm} dBA (Zuschauerpositionen)	
	Leerlauf	Betrieb	Leerlauf	Betrieb
54HHA-AA/B, 54KHA-AA/B, 54ZHA-AA und alle DIGITAL Server 5300 Systeme ohne Plattenlaufwerke	5,6	5,6	37	37
Alle DIGITAL Server 5300 Systeme mit 1xRZ1CB Plattenlaufwerk	5,6	5,7	37	38

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

System Accessories

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

Figure 2-3 System Accessories



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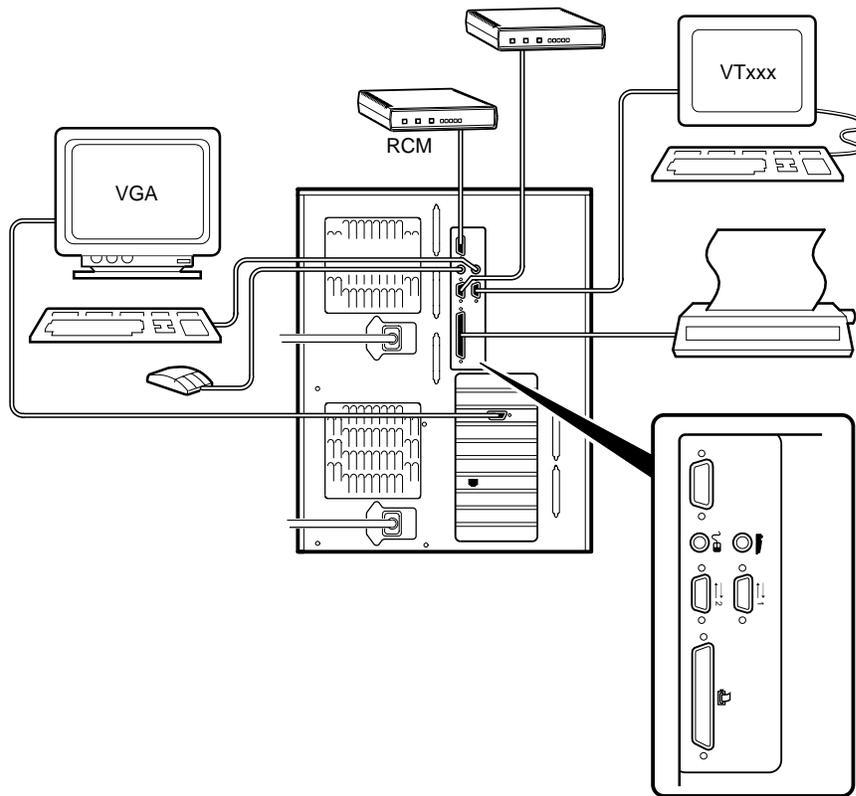
If you are using a keyboard, a mouse, or a printer, connect each to the appropriate connector at the rear of the system. See Figure 1-2 to verify the location of the connectors.

Installing the System

Connecting the System

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

Figure 2-4 System Connections

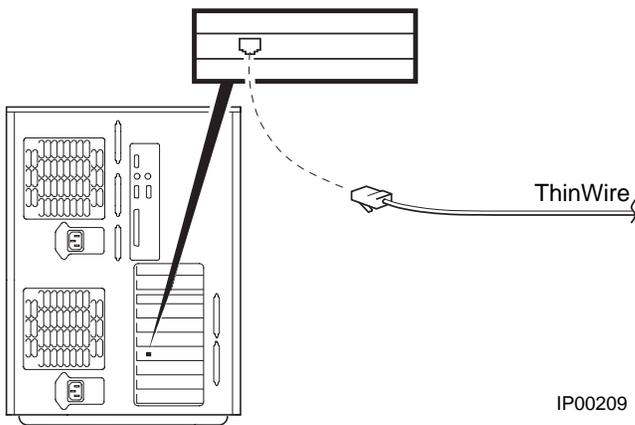


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Connecting to Network Hardware

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



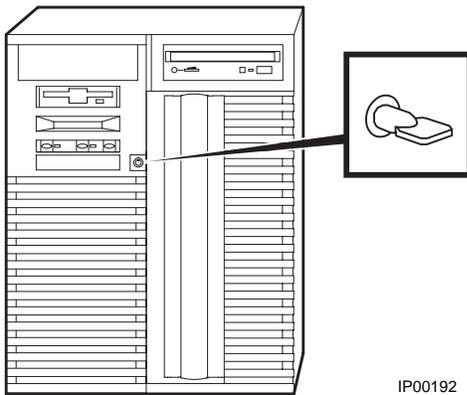
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Installing the System

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



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.

3

Operation

This chapter provides basic operating instructions, including powering up the system, booting, and operating system installation. It also provides information about updating firmware.

Sections in this chapter are:

- Powering Up the System
- Power-Up Display
- Booting Windows NT
- Installing Windows NT
- Updating Firmware
- Hard Disk Partitioning
- Using the Halt Button
- Halt Assertion

Operation

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 for more information.

Operation

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

```
P00>>> initialize
Initializing..

  SROM V3.0 on cpu0           ❶
  SROM V3.0 on cpu1
XSROM V5.0 on cpu1           ❷
XSROM V5.0 on cpu0
BCache testing complete on cpu1  ❸
BCache testing complete on cpu0
mem_pair0 - 256 MB           ❹
20..20..21..21..23..         ❺
please wait 9 seconds for T24 to complete
24..24..
Memory testing complete on cpu1
Memory testing complete on cpu0
```

Continued on next page

Operation

- ❶ On power-up, the SRAM code on each CPU module loads into that module's I-cache and tests the processor chip. If any test fails, power-up terminates.

The primary CPU is determined for the first of three times. The primary CPU then executes a loopback test on each PCI bridge. If this test passes, the bridge LED lights; if it fails, the LED remains clear and power-up continues. The EISA system control, PCI-to-EISA bridge, COM1 port, and control panel port are all initialized.

Each CPU prints an SRAM message to the device attached to the COM1 port and to the control panel display. (The banner prints to the COM1 port if the **console** environment variable is set to **serial**. If it is set to **graphics**, nothing prints to the console terminal, only to the control panel display, until ❷. See the "Environment Variable Summary" in Chapter 4 for information about environment variables.)

- ❷ The S-cache on each CPU module is initialized, and the XSROM code in the system FEPRAM is unloaded into them. (If the unload is not successful, the SRAM unloads XSROM code from a different FEPRAM sector. If the second try fails, the CPU hangs.) Each CPU starts the XSROM code, which prints an XSROM message to the COM1 port and to the control panel display.
- ❸ The three S-cache banks on each CPU are enabled, and the B-cache is tested. If a failure occurs, a message is printed to the COM1 port and to the control panel display immediately. Each CPU prints a B-cache completion message to COM1.
- ❹ The primary CPU is determined for the second time. It then sizes memory. Information on memory DIMMs is printed to the COM1 port. If an illegal memory configuration is detected, a warning message is printed to the COM1 port and the control panel display.
- ❺ Memory is initialized and tested, and test traces are printed to the COM1 port and the control panel display. The numbers for tests 20 and 21 might appear interspersed; this is normal behavior. Test 24 can take several minutes if the memory is very large; the message preceding the test 24 trace indicates an estimate of the time this test will take. If a failure occurs, a message is printed to the COM1 port and to the control panel display immediately. Each CPU prints a test completion message to the COM1 port

Continued on next page

Operation

Example 3-1 Power-Up Display (Continued)

```
starting console on CPU 0
sizing memory
  0    256 MB DIMM
starting console on CPU 1
probing IOD1 hose 1
  bus 0 slot 1 - NCR 53C810
probing IOD0 hose 0
  bus 0 slot 1 - PCEB
    probing EISA Bridge, bus 1
  bus 0 slot 2 - S3 Trio64/Trio32
  bus 0 slot 3 - DECchip 21040-AA
configuring I/O adapters...
  ncr0, hose 1, bus 0, slot 1
  floppy0, hose 0, bus 1, slot 0
  tulip0, hose 0, bus 0, slot 3
System temperature is 23 degrees C
DIGITAL Server 5300 Console V5.0-10, 19-NOV-1997
13:57:07
P00>>>
```

6

7

8

Operation

- ⑥ The primary CPU is determined for the last time. The primary CPU unloads PALcode and decompression code from the FEPROM on the system board to its B-cache. The primary CPU then jumps to the PALcode to start the SRM console.

The primary CPU prints a message indicating that it is running the console. Starting with this message, the power-up display is printed to any console terminal, regardless of the state of the **console** environment variable. (If **console** is set to **graphics**, the display from here to the “configuring I/O adapters...” line is saved in a memory buffer and printed to the graphics monitor after the PCI buses are sized and the VGA device is initialized.)

- ⑦ The size and type of each memory DIMM pair is determined.
The console is started on the secondary CPU. A status message prints for each CPU.
- ⑧ The PCI bridges (indicated as IOD n) are probed and the devices are reported. I/O adapters are configured.
- ⑨ 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.) The SRM console then loads and starts the AlphaBIOS console.

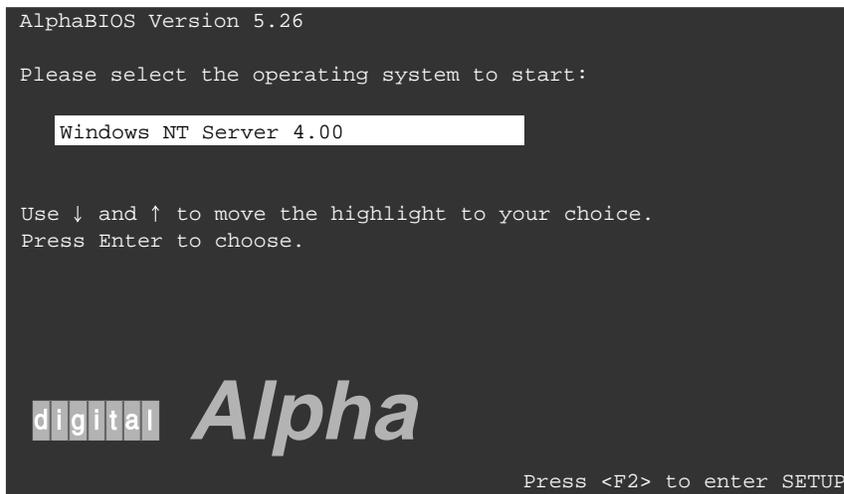
Refer to Chapter 4 for information about the SRM console and to Chapter 5 for AlphaBIOS.

Operation

Booting Windows NT

Microsoft Windows NT is started from the AlphaBIOS Boot screen.

Figure 3–2 AlphaBIOS Boot Screen



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Operation

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).

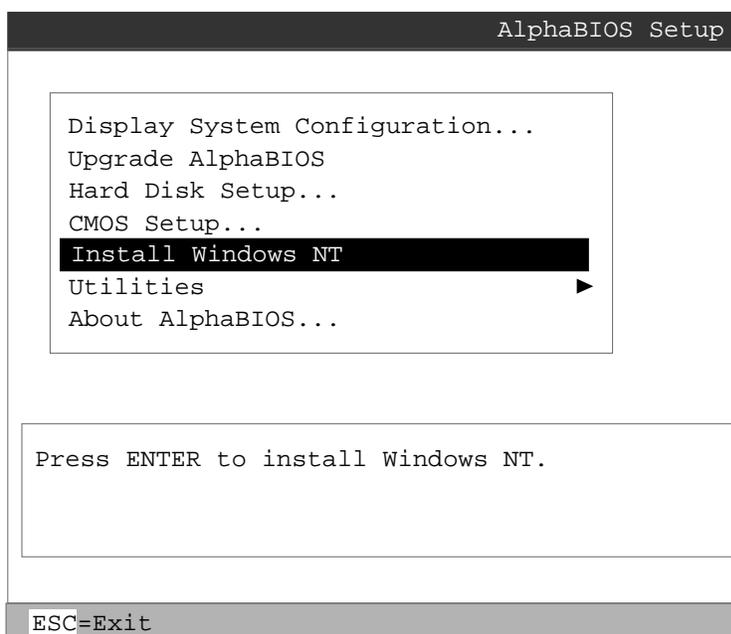
- If **Auto Start** is enabled, the primary version of Windows NT starts automatically.
- If **Auto Start** is disabled, use the arrow keys to select the Windows NT version to start. Press Enter to boot Windows NT.

Operation

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



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Operation

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 four 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. Start AlphaBIOS. If the system is in the SRM console, issue the command **alphabios**.
2. From the **AlphaBIOS Boot** screen, enter **AlphaBIOS Setup** by pressing the F2 key.
3. From **AlphaBIOS Setup** select **CMOS Setup**, and press Enter.
4. From **CMOS Setup** set the system date and time.
5. Return to the **AlphaBIOS Setup** screen by pressing the F10 key.
6. Select **Hard Disk Setup**, and press Enter.
7. Perform an express hard disk setup by pressing the F7 key to enter **Express Setup**.
8. Continue the setup by pressing the F10 key.
9. Go to the procedure below.

This procedure is for all Windows NT installations:

1. Put the Windows NT CD into the CD-ROM drive.
2. Start **AlphaBIOS Setup**.
3. Select **Install Windows NT** and press Enter.
4. 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.

Operation

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.

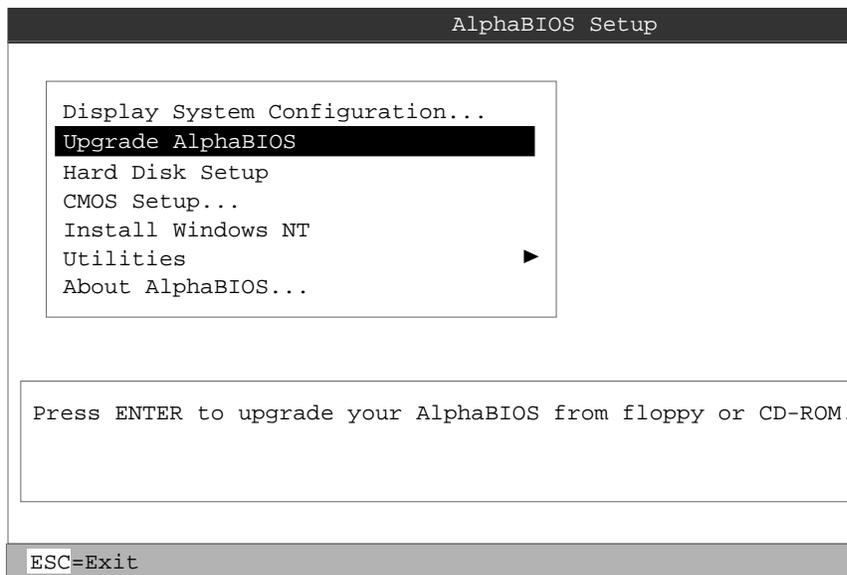
Example 3-2 Starting LFU from the SRM Console

```
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



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Operation

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 3-2). Also from the SRM console, LFU can be booted from the Alpha CD-ROM (V3.7 or later), as shown in Example 3-3.
- 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.

The sections that follow show examples of updating firmware from the local CD-ROM, the local floppy, and a network device. Following the examples is an LFU command reference.

Example 3-3 Booting LFU from the CD-ROM

```
P00>>> show dev ncr0
polling ncr0 (NCR 53C810) slot 1, bus 0 PCI, hose 1   SCSI Bus ID
7
dka500.5.0.1.1   DKa500                               RRD46  1645
P00>>> boot dka500
(boot dka500.5.0.1.1 -flags 0,0)
block 0 of dka500.5.0.1.1 is a valid boot block
.
.
.
jumping to bootstrap code
```

```
The default bootfile for this platform is
[AS1200]AS1200_LFU.EXE
Hit <RETURN> at the prompt to use the default bootfile.
Bootfile: <CR>
```

```
Starting Firmware Update Utility
```

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

Operation

Updating Firmware from the CD-ROM

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

Example 3-4 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 ❶

Please enter the name of the options firmware files list, or
Press <return> to use the default filename [AS1200FW]: AS1200CP ❷

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 ❸
-----
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 ❹

Device      Current Revision  Filename  Update Revision
AlphaBIOS   V5.32-0          arcrom    V6.40-1
srmflash    V5.0-1           srmrom    V6.0-3
```

Continued on next page

Operation

- 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:

AS1200FW (default)	SRM console, AlphaBIOS console, and I/O adapter firmware.
AS1200CP	SRM console and AlphaBIOS console firmware only.
AS1200IO	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

Operation

Example 3-4 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

Operation

- 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).

Operation

LFU Commands

The commands summarized in Table 3–4 are used to update system firmware.

Table 3–4 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.

Operation

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.

Hard Disk Partitioning

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:

1. Windows NT 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.
2. 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.

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.

Operation

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.

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.

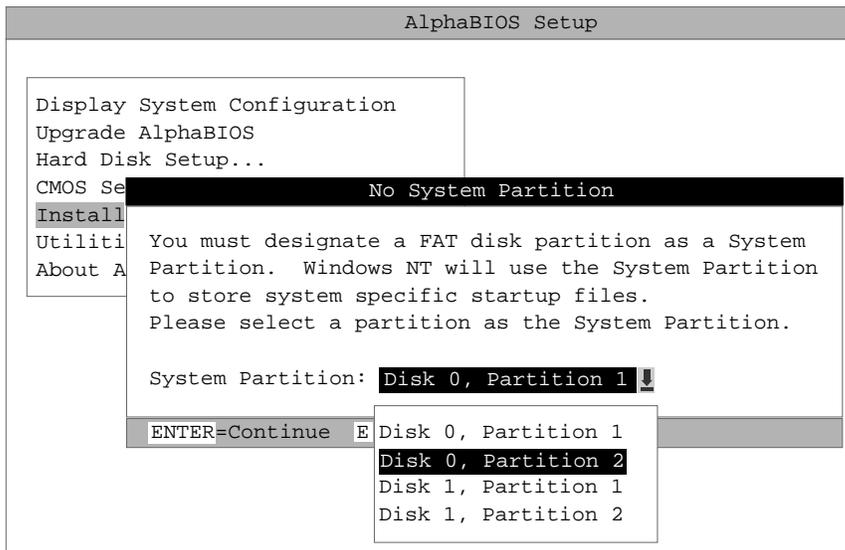
The purpose of the system partition is twofold. First, it tells the Windows NT installation program where to place the OS Loader and hardware support files. Second, upon subsequent restarts of Windows NT, the system partition definition tells AlphaBIOS where the OSLOADER.EXE file is so it can successfully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

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



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Operation

Using the Halt Button

Use the Halt button to clear the SRM console password, or force a halt assertion, as described in the next section.

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. Chapter 4 describes the procedure.

Halt Assertion

A halt assertion allows you to disable automatic startup of the AlphaBIOS 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.

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) while the system is powering up or 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 Haltbutton or remotely entering the RCM **halt** command.*

Operation

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 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 operating system at power-up or reset if the **Auto Start** selection in the AlphaBIOS **Standard CMOS Setup** screen is set.

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 Chapter 4 for more information on editing the nvram script.

4

SRM Console

The SRM console is the command-line firmware interface. 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
- Testing the System
- Making the System Secure
- Stopping and Starting CPUs
- Updating Firmware
- Using Environment Variables
- Depositing and Examining Data
- Reading a File
- Initializing the System
- Finding Help
- Switching from SRM to AlphaBIOS Console
- Environment Variable Summary

SRM Console

Invoking the SRM Console

Invoke the SRM console by shutting down the operating system and pressing the Halt button in and then pressing the Reset button.

From the AlphaBIOS console, perform the following steps to switch to the SRM console:

- Press the Reset button, wait 5 seconds, then press the Halt button. The AlphaBIOS firmware will boot.

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

Command Summary

The SRM (*Alpha System Reference Manual*) console is a command line firmware interface. 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.
clear <i>envar</i>	Resets an environment variable to its default value.
clear password	Sets the password to zero.
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.
lfu	Runs the Loadable Firmware Update Utility.
login	Turns off secure mode, enabling access to all SRM console commands during the current session.
man	Displays information about the specified console command.

Continued on next page

SRM Console

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 PCI NVRAM.
set <i>envvar</i>	Sets or modifies the value of an environment variable.
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>envvar</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 fru	Displays the serial number and revision level of system bus options.
show memory	Displays memory module information.
show network	Displays the state of network devices in the system.
show power	Displays information about the power supplies, system fans, CPU fans, and temperature.
show version	Displays the version of the console program.
start	Starts a program that was previously loaded on the processor specified.
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.

SRM Console

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

Displaying the System Configuration

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

Example 4-1 Show Config Command

```
P00>>> show config
          Digital Equipment Corporation
          DIGITAL Server 5300

Console V5.0-2
Module                                     Type      Rev       Name
System Motherboard                       0         0003     mthbrd0
Memory 256 MB DIMM                       0         0000     mem0
CPU (4MB Cache)                          3         0001     cpu0
CPU (4MB Cache)                          3         0001     cpu1
Bridge (IOD0/IOD1)                       600       0032     iod0/iod1
PCI Motherboard                          a         0003     saddle0

Bus 0 iod0 (PCI0)
Slot   Option Name                       Type      Rev       Name
1      PCEB                               4828086   0005     pceb0
3      S3 Trio64/Trio32                   88115333 0000     vga0
4      DECchip 21140-AA                   91011     0012     tulip1

Bus 1 pceb0 (EISA Bridge connected to iod0, slot1)
Slot   Option Name                       Type      Rev       Name

Bus 0 iod1 (PCI1)
Slot   Option Name                       Type      Rev       Name
1      NCR 53C810                          11000     0002     ncr0
2      DECchip 21040-AA                   21011     0023     tulip0
3      ATI Mach64                          43541002 0009     vga1
4      PCI-PCI Bridge                     11011     0002     pcb0

Bus 2 pcb0 (PCI-PCI Bridge connected to iod1, slot 4)
Slot   Option Name                       Type      Rev       Name
0      Qlogic ISP1020                       10201077 0002     isp0
P00>>>
```

SRM Console

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

show config

Example 4-2 Show CPU Command

```
P00>>> show cpu
```

```
Primary CPU:      00
Active CPUs:     00    01
Configured CPUs: 00    01
SRAM Revision:   V3.0  V3.0
```

```
P00>>>
```

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

show cpu

Example 4-3 Show Device Command

```

P00>>> show dev
polling ncr0 (NCR 53C810) slot 1, bus 0 PCI, hose 1   SCSI
Bus ID 7
dka500.5.0.1.1      Dka500                      RRD46  0557
polling isp0 (QLogic ISP1020) slot 0, bus 2 PCI, hose 1
SCSI Bus ID 7
dkb0.0.0.2000.1    Dkb0                      RZ29B  0007
polling floppy0 (FLOPPY) PCEB - XBUS hose 0
dva0.0.0.1000.0    DVA0                      RX23
polling tulip0 (DECchip 21040-AA) slot 2, bus 0 PCI, hose 1
ewa0.0.0.2.1       08-00-2B-E6-4B-CC BNC
polling tulip1 (DECchip 21140-AA) slot 4, bus 0 PCI, hose 0
ewb0.0.0.4.0       00-00-F8-02-23-74 AUI
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 **dka500.5.0.1.1**. 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 disk fw FDDI device
	dr RAID set device m SCSI tape k
	dv Diskette drive pk SCSI port
	ew Ethernet port pu DSSI port
a Storage adapter ID	One-letter designator of storage adapter (a, b, c...).
500 Device unit number	Unique number (MSCP unit number). SCSI unit numbers are forced to 100 X node ID.
5 Bus node number	Bus node ID.
0 Channel number	Used for multi-channel devices.
1 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 Slot Numbers

Slot	PCI 0	PCI 1	EISA/ISA
1	EISA bridge	Embedded SCSI CD-ROM	EISA or ISA device
2	PCI device	PCI device	
3	PCI device	PCI device	
4	PCI device	PCI device	

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Example 4-4 Show FRU Command

```
P00>>> show fru
                                     Digital Equipment Corporation
                                     DIGITAL Server 5300

Console V5.0-2
Module      Part #    Type    Rev    Name      Serial #
System Motherboard 25147-01 0       0000    mthrb0rd0 NI72000047
Memory     64 MB DIMM N/A     0       0000    mem0       N/A
Memory     64 MB DIMM N/A     0       0000    mem1       N/A
Memory     64 MB DIMM N/A     0       0000    mem2       N/A
Memory     64 MB DIMM N/A     0       0000    mem3       N/A
CPU (4MB Cache) B3004-DA 3       0000    cpu0      KA705TRVNS
Bridge (IOD0/IOD1) 25147-01 600    0032    iod0/iod1 NI72000047
PCI Motherboard 25147-01 a       0003    saddle0   NI72000047

Bus 0 iod0 (PCI0)
Slot  Option Name      Type    Rev    Name
1      PCEB                4828086 0005    pceb0
2      S3 Trio64/Trio32  88115333 0054    vga0
3      DECchip 21041-AA  141011  0011    tulip0

Bus 1 pceb0 (EISA Bridge connected to iod0, slot 1)
Slot  Option Name      Type    Rev    Name

Bus 0 iod1 (PCI1)
Slot  Option Name      Type    Rev    Name
1      NCR 53C810        11000  0002    ncr0
4      QLogic ISP1020    10201077 0005    isp0
```

The **show fru** command displays information for CPU, memory, and PCI. This information is based on data in the serial control bus EPROM. The syntax is:

show fru

SRM Console

Example 4-5 Show Memory Command

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

Slot	Type	MB	Base
0	DIMM	64	0
1	DIMM	64	20000000
2	DIMM	64	40000000
3	DIMM	64	60000000
Total		256	

```
P00>>>
```

The **show memory** command displays information about each memory pair: slot number, type (DIMM), size of the memory pair in megabytes, and the starting address of the pair. The syntax is:

show memory

Example 4-6 Show Network Command

```
P00>>> show net
polling tulip0 (DECchip 21040-AA) slot 2, bus 0 PCI,
hose 1
ewa0.0.0.2.1      08-00-2B-E6-4B-CC      BNC
polling tulip1 (DECchip 21140-AA) slot 4, bus 0 PCI,
hose 0
ewb0.0.0.4.0      00-00-F8-02-23-74      AUI
P00>>>
```

The **show network** command displays the assigned network device names and other information about network (FDDI and Ethernet) cards. The syntax is:

show network

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Example 4-7 Show Power Command

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

	Status
Power Supply 0	good
Power Supply 1	good
System Fans	good
CPU Fans	good
Temperature	good

```
Current ambient temperature is 23 degrees C
System shutdown temperature is set to 55 degrees C
```

```
The system was last reset via a system software reset
```

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

```
Total Environmental Events: 5 (5 logged)
```

```
1  JUL 25  1:17  Temperature, Fans, Power Supplies
Normal
2  Jul 29 23:44  Temperature, Fans, Power Supplies
Normal
3  Jul 29 23:51  Temperature, Fans, Power Supplies
Normal
4  Jul 30  0:18  System Fan 0 Failure
5  Jul 30 19:22  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

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Example 4-8 Show Version Command

```
P00>>> show version
version      V5.0-2 20-OCT-1997 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

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 4-9 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.

Example 4-10 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.

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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.

Testing the System

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

Example 4-11 Test Command

```
P00>>> test
Console is in diagnostic mode
System test, runtime 1200 seconds

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

Configuring adapters..
polling ncr0 (NCR 53C810) slot 1, bus 0 PCI, hose 1   SCSI Bus ID 7
dka500.5.0.1.1      Dka500                          RRD46  0557
polling isp0 (QLogic ISP1020) slot 0, bus 2 PCI, hose 1   SCSI Bus
ID 7
dkb0.0.0.2000.1    Dkb0                          RZ29B  0007
polling floppy0 (FLOPPY) PCEB - XBUS hose 0
dva0.0.0.1000.0    DVA0                          RX23
polling tulip0 (DECchip 21040-AA) slot 2, bus 0 PCI, hose 1
ewa0.0.0.2.1       08-00-2B-E6-4B-CC BNC
polling tulip1 (DECchip 21140-AA) slot 4, bus 0 PCI, hose 0
ewb0.0.0.4.0       00-00-F8-02-23-74 AUI

Testing Ethernet device(s)
External loopback failed on ewb0 - check network connection

Testing VGA (alphanumeric mode only)

Starting phase 1 background cache/memory tests, affinity to all
CPUs..
Starting phase 1 processor/cache thrasher on CPU0..
```

Continued on next page

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Testing SCSI disks

No CD-ROM present, skipping embedded SCSI test

Testing other SCSI devices (read-only)..

Testing floppy drive (dva0, read-only)

ID	Program	Device	Pass	Hard/Soft	Bytes Written	Bytes Read
00001a64	memtest	memory	1	0 0	125829120	125829120
00001acf	memtest	memory	2	0 0	67108800	67108800
00001aeb	memtest	memory	2	0 0	67108800	67108800
00001afd	memtest	memory	2	0 0	67108800	67108800
00001afe	memtest	memory	2	0 0	67108800	67108800
00001b3d	memtest	memory	5	0 0	56622816	56622816
00001b47	memtest	memory	2	0 0	48758688	48758688
00001c1c	exer_kid	dkb0.0.0.200	0	0 0	0	10305536
00001c44	exer_kid	dva0.0.0.100	0	0 0	0	0

ID	Program	Device	Pass	Hard/Soft	Bytes Written	Bytes Read
00001a64	memtest	memory	1	0 0	247463936	247463936
00001acf	memtest	memory	4	0 0	201326400	201326400
00001aeb	memtest	memory	4	0 0	201326400	201326400
00001afd	memtest	memory	4	0 0	201326400	201326400
00001afe	memtest	memory	4	0 0	201326400	201326400
00001b3d	memtest	memory	17	0 0	201325568	201325568
00001b47	memtest	memory	7	0 0	195034752	195034752
00001c1c	exer_kid	dkb0.0.0.200	0	0 0	0	34701312
00001c44	exer_kid	dva0.0.0.100	0	0 0	0	491520

Testing aborted. Shutting down tests.

Please wait..

System test complete

^C

P00>>>

SRM Console

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

Testing can be aborted by Ctrl/C.

*NOTE: Switch from AlphaBIOS to the SRM console in order to enter the **test** command. 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.
- option* Either **cpun**, **memn**, or **pcin**, where *n* is 0, 1, or *. If nothing is specified the entire system is tested.

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 4-12 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. Any characters entered after the 30th character are not stored.

The syntax is:

set password

Example 4-13 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 **login**, **continue**, and **start**.

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.

SRM Console

Example 4-14 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 Chapter 3 for information on halt assertion.*

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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
```

SRM Console

Example 4-15 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.

Stopping and Starting CPUs

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

Example 4-16 Start, Halt, and Continue Commands

```
P00>>> start &p1

P00>>> halt 1

halted CPU 1

halt code = 1
operator initiated halt
PC = ffffffff8007cc68
P00>>> continue &p1

continuing CPU 1
```

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start

The **start** command starts a program that was previously loaded on the processor specified. If none is specified, the program is started on the primary processor. The syntax is:

start [**&pn**] [*address*]

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

address The starting address of the program.

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**, **show network**, **test**, and **start**.*

Updating Firmware

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

Example 4-17 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 [AS1200FW]: AS1200CP
```

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

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

```
UPD> list
```

Device	Current Revision	Filename	Update
Revision			
AlphaBIOS	V5.32-0	arcrom	V6.40-1
srmflash	V5.0-2	srmrom	V6.0-3

```
UPD> update *
```

Continued on next page

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Example 4-17 Lfu Command (Continued)

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.

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. An `init` command is used to activate a new environment variable.

Example 4-18 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 “Creating a Power-Up Script” later in this chapter. This section describes the environment variables in detail.

SRM Console

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
language
ocp_text

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 * d all environment variables.

Example 4-19 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 4-19 the nvram script is edited so that an environment variable called “mop3_boot” is created and set to 1 on each power-up. By default, MOP boots send four MOP V4 requests before defaulting to MOP V3. This user-created environment variable forces the SRM console to bypass MOP V4 requests. This speeds up MOP booting on networks with MOP V3 software.

Depositing and Examining Data

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

Example 4-20 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 4-21 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 4-21 Examine Command (Continued)

```

grp: 20 (    R4) 00000000000005000
grp: 28 (    R5) 000000000FFFE000
grp: 30 (    R6) 00000003F8000C00
grp: 38 (    R7) 0000000053F761AE
grp: 40 (    R8) 00000100000000000
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

SRM Console

-o	Defines data size as octaword.
-h	Defines data size as hexword.
-d	Instruction decode (examine command only)
-n value	The number of consecutive locations to modify.
-s value	The address increment size. The default is the data size.
<i>space:</i>	Device name (or address space) of the device to access.
<i>address</i>	Offset within a device to which data is deposited. Can be: <i>dev_name</i> A device name. fpr- name The floating-point register set; <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.
<i>data</i>	Data to be deposited.

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

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

Reading a File

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

Example 4-22 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.

Initializing the System

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

Example 4-23 Initialize Command

```
P00>>> initialize
Initializing. . .

    SROM V3.0 on cpu0
    SROM V3.0 on cpu1
XSROM V5.0 on cpu1
XSROM V5.0 on cpu0
BCache testing complete on cpu1
BCache testing complete on cpu0
mem_pair0 - 64 MB
20..20..21..21..23..
please wait 9 seconds for T24 to complete
24..24..
Memory testing complete on cpu1
Memory testing complete on cpu0
starting console on CPU 0
sizing memory
    0    64 MB DIMM
starting console on CPU 1
probing IOD1 hose 1
    bus 0 slot 1 - NCR 53C810
probing IOD0 hose 0
    bus 0 slot 1 - PCEB
        probing EISA Bridge, bus 1
    bus 0 slot 2 - S3 Trio64/Trio32
    bus 0 slot 3 - DECchip 21040-AA
    bus 0 slot 5 - NCR 53C810
configuring I/O adapters...
    ncr0, hose 1, bus 0, slot 1
    floppy0, hose 0, bus 1, slot 0
    tulip0, hose 0, bus 0, slot 3
    ncr1, hose 0, bus 0, slot 5
System temperature is 23 degrees C
DIGITAL Server 5300 Console V5.0-2, 19-NOV-1997
13:57:07
P00>>>
```

SRM Console

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 Chapter 3).
- The **auto_action** environment variable is set to **halt**.

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

Finding Help

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

Example 4-24 Help (or Man) Command

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

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

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

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

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 4-25 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, shut down the operating system and press the Halt button in, then press the Reset button.

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
com*_baud	Changes the default baud rate of the COM 1 or the 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.
kzpsa*_host_id	Specifies the default value for the KZPSA host SCSI bus node ID.
memory_test	Specifies the extent to which memory will be tested. For DIGITAL UNIX systems only.
ocp_text	Overrides the default OCP display text with specified text.
pci_parity	Disables or enables parity checking on the PCI bus.
pk*0_fast	Enables fast SCSI mode.
pk*0_host_id	Specifies the default value for a controller host bus node ID.
pk*0_soft_term	Enables or disables SCSI terminators on systems that use the QLogic ISP1020 SCSI controller.
tt_allow_login	Enables or disables login to the SRM console firmware on other console ports.

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: You must disable 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.

SRM Console

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 – 3 (hexadecimal).

memory_test

Determines the extent of memory testing on the next reset. The syntax is:

set memory_test *value*

The options for *value* are:

- | | |
|-----------------------|--|
| full (default) | Specifies that the full memory test will be run. Systems using the OpenVMS operating system must run the full memory test. |
| partial | Specifies that the first 256 MB of memory will be tested. |
| none | Specifies that memory will not be tested. (However, tests are always run on the first 32 MB.) |

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.

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.

SRM Console

pci_parity

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

The syntax is:

set pci_parity *value*

The options for *value* are:

- on** (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 ISP1020 SCSI controller. The QLogic ISP1020 SCSI controller implements the 16-bit wide SCSI bus. The QLogic module has two terminators, one for the low eight bits and one for the high eight bits.

The syntax is:

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

The options for *value* are:

- | | |
|----------------------|--|
| off | Disables termination of all 16 bits. |
| low (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. |

SRM Console

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.

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

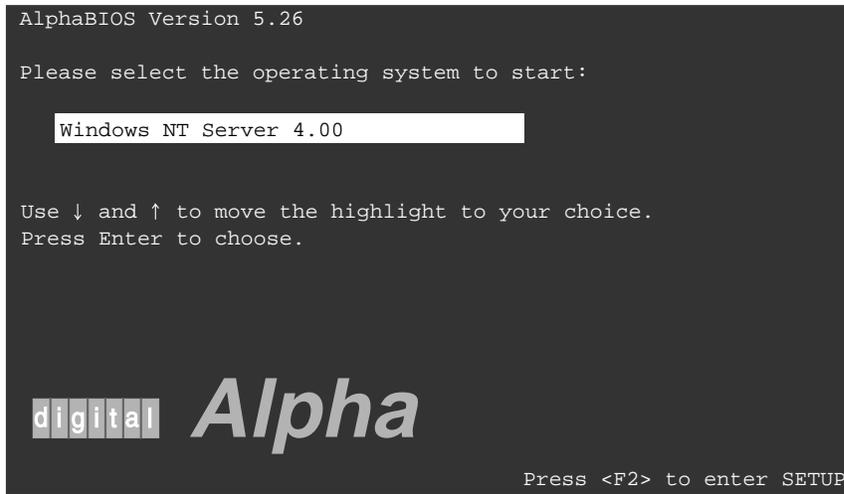
NOTE: To run firmware tests, switch to the SRM console and issue the **test** command. See Chapter 4.

AlphaBIOS Console

Starting AlphaBIOS

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

Figure 5-1 Boot Screen



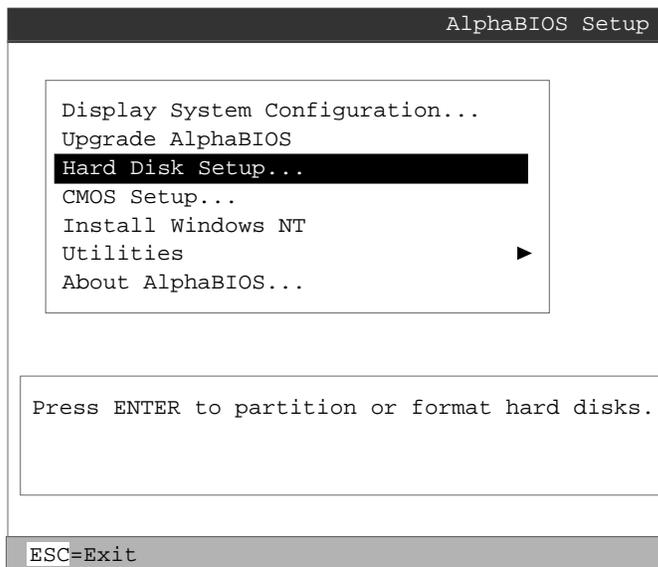
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AlphaBIOS Console

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 for information on navigating the AlphaBIOS screens.)

Figure 5-2 AlphaBIOS Setup Screen



PK-0726-96

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		

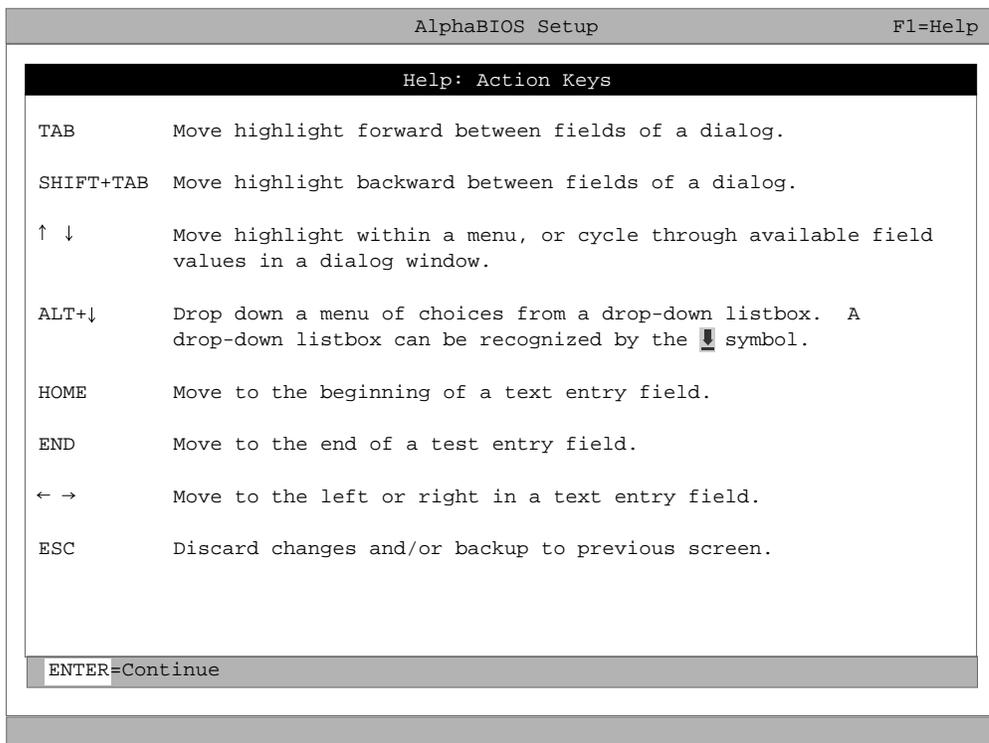
PK-0724-96

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

Two levels of keyboard help are available. The first level, reached by pressing F1 once, shows explanations of the keystrokes available for the specific part of AlphaBIOS currently displayed. An example of the help displayed by pressing F1 once, in this case from the **CMOS Setup** screen, is shown in Figure 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

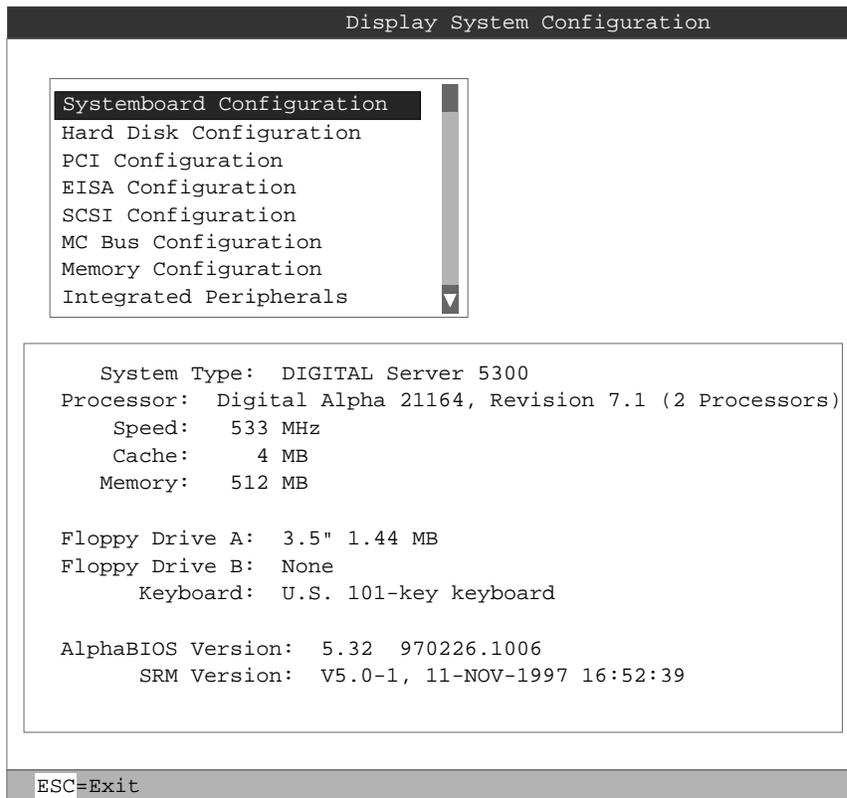


PK-0725-96

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



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AlphaBIOS Console

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:

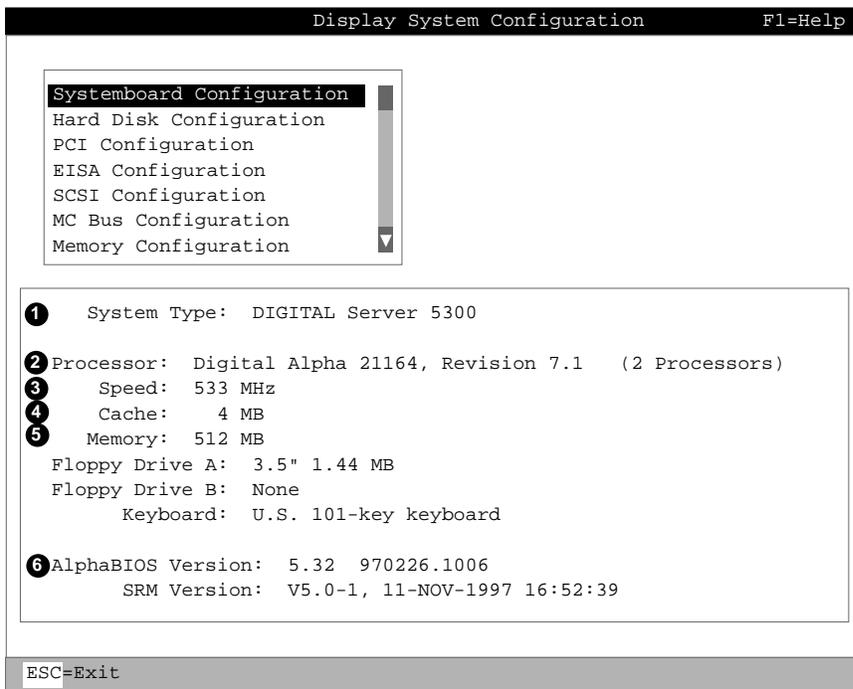
- System motherboard
- Hard disk
- PCI bus
- EISA bus
- SCSI devices
- System bus
- Memory
- Integrated peripherals

The sections that follow explain the display for each component.

AlphaBIOS Console

System Board Configuration

Figure 5-6 System Board Configuration

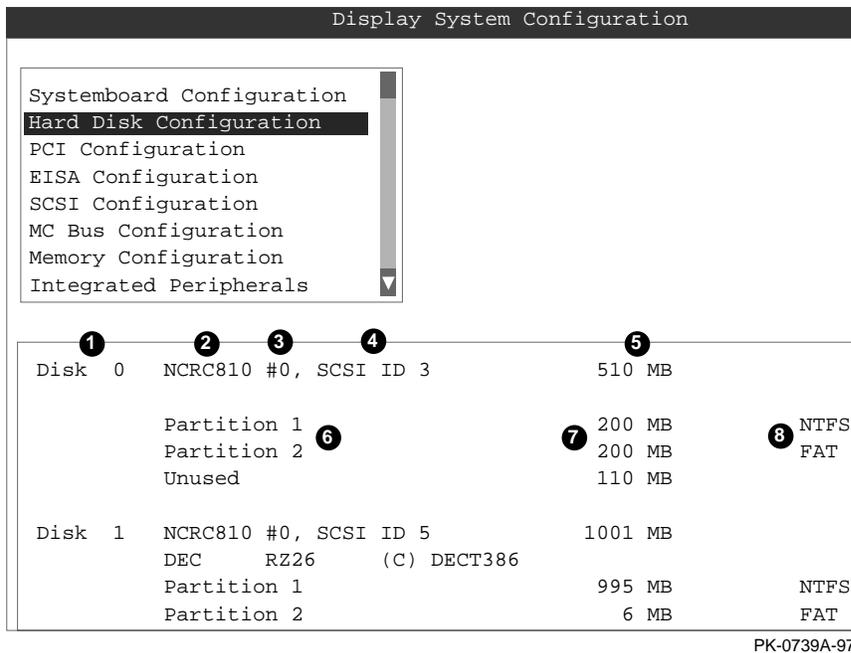


AlphaBIOS Console

- 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, in kilobytes, of static RAM cache memory installed.
- ❺ Memory — The amount, in megabytes, of main memory in the system.
- ❻ Firmware versions — The versions of AlphaBIOS and SRM currently running on the system.

Hard Disk Configuration

Figure 5-7 Hard Disk Configuration



PK-0739A-97

*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.*

AlphaBIOS Console

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

AlphaBIOS Console

PCI Configuration

Figure 5-8 PCI Configuration

Display System Configuration F1=Help

Systemboard Configuration
Hard Disk Configuration
PCI Configuration
EISA Configuration
SCSI Configuration
MC Bus Configuration
Memory Configuration

1 Device Name	2 Device Type	3 Revision	4 Physical Slot
Intel 82375 PCEB	EISA bridge	5	PCI0-Embedded
S3 Trio32/64	VGA	0	PCI0-2
DIGITAL 21140	Ethernet	32	PCI0-3
NCRC810	SCSI	2	PCI1-Embedded
DIGITAL KZPSX	SCSI	0	PCI1-2
DIGITAL KZPSX	SCSI	0	PCI1-3
DIGITAL 21050	PCI bridge	2	PCI1-4
QLogic ISP1020/1040	SCSI	2	PCI1-4-Bridged

ENTER=Select ESC=Exit

PK-0740D-97

AlphaBIOS Console

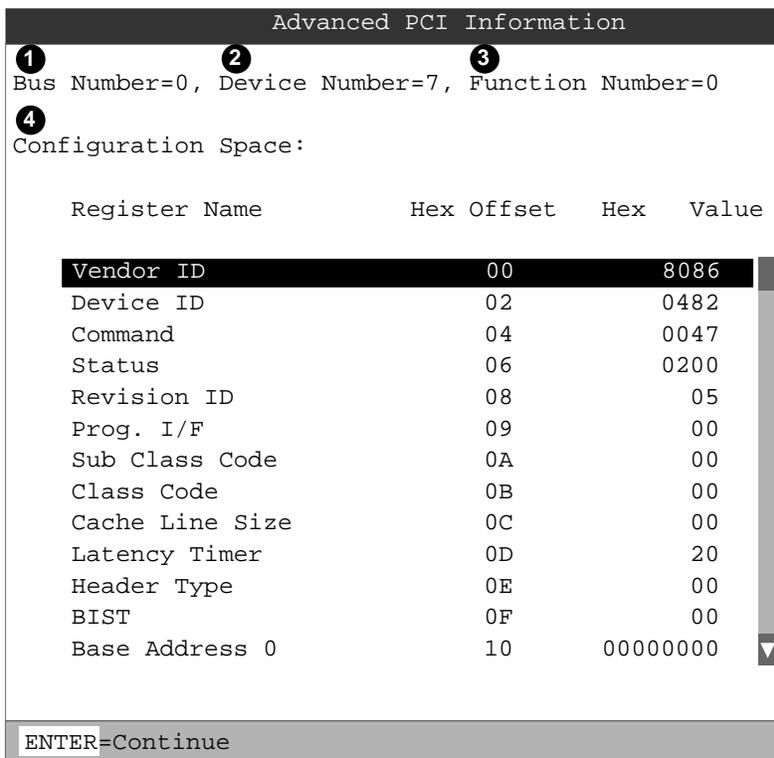
- ❶ Device name — The name and model of the device as recorded in the device's firmware.
- ❷ Device type — Lists the function of the device in the system.
- ❸ Revision — The revision level of the device signifies the number of times it has been updated by the manufacturer.
- ❹ Physical slot — Lists the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

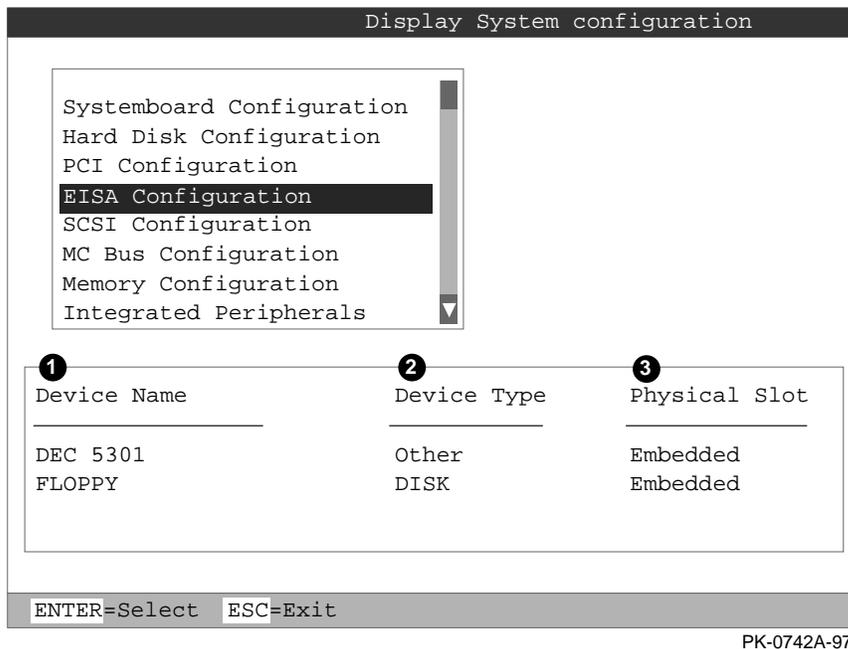


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- ① Bus number — The virtual PCI bus number.
- ② Device number — The PCI bus device number.
- ③ Function number — Represents the number assigned to a particular function on a multifunction device. For example, a combination Ethernet/SCSI controller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

EISA Configuration

Figure 5-10 EISA Configuration



PK-0742A-97

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

SCSI Configuration

Figure 5-11 SCSI Configuration

The screenshot shows the 'Display System Configuration' menu with 'SCSI Configuration' selected. A sub-menu is open showing 'QLISP1020 #0' and 'KZPSX #0'. Below this, a table lists SCSI devices with columns for SCSI ID, Device, Size, and Description. The table contains three rows: Disk 0 (2047 MB), Disk 1 (2049 MB), and CD-ROM (DEC RRD45).

1 QLISP1020 #0, SCSI ID 7, SCSI Bus 0

2 SCSI ID	3 Device	4 Size	5 Description
0	Disk 0	2047 MB	SEAGATE ST32550W 0021
1	Disk 1	2049 MB	SEAGATE ST32551W 0526
5	CD-ROM		DEC RRD45 (C) DEC1645

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AlphaBIOS Console

- 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 in the system. This is usually done with jumpers or a thumb wheel attached to the drive housing.
- ❸ Device type — Displays whether the device is a hard disk, CD-ROM, scanner, or other type.
- 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.

System Bus Configuration

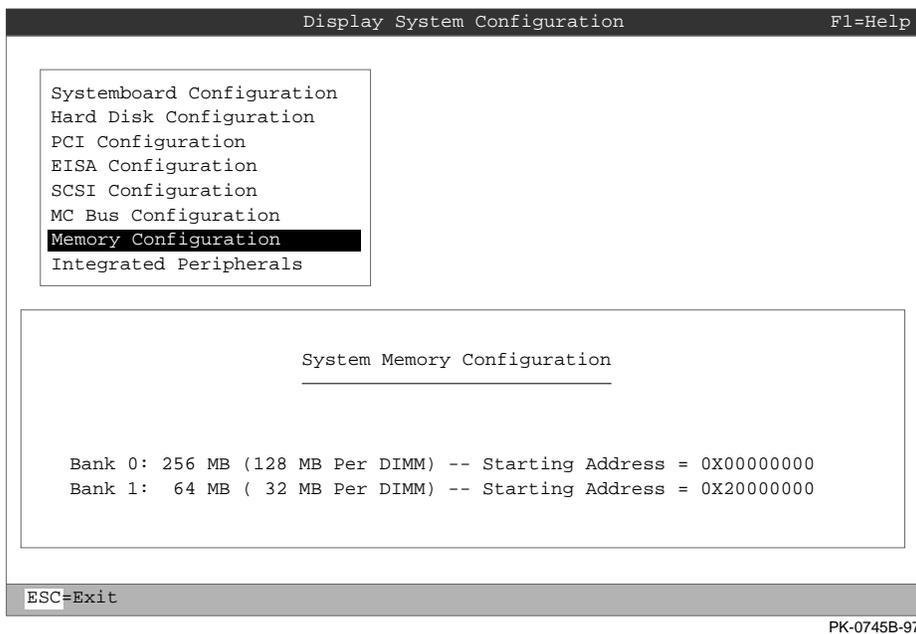
Figure 5-12 System Bus Configuration

1	2	3	4	5
McBus	Module Name	Module Type	Revision	Physical Slot
1	Memory	0	0000	MEM
2	CPU (EV56 Cached)	3	0002	CPU0
3	CPU (EV56 Cached)	3	0002	CPU1
4	MCBus-PCI Bridge	6008	0031	IOD0/1
5	MCBus-PCI Bridge	6000	0031	IOD0/1

- ❶ MC bus number — Identifies the location of a component on the system bus.
- ❷ Module name — The DIGITAL internal identifier for a system component.
- ❸ Module type — Identifies the function of the system component.
- ❹ Revision — A DIGITAL internal number representing the manufacturing revision level of the system component.
- ❺ Physical slot — Represents the actual location of the system component on the bus.

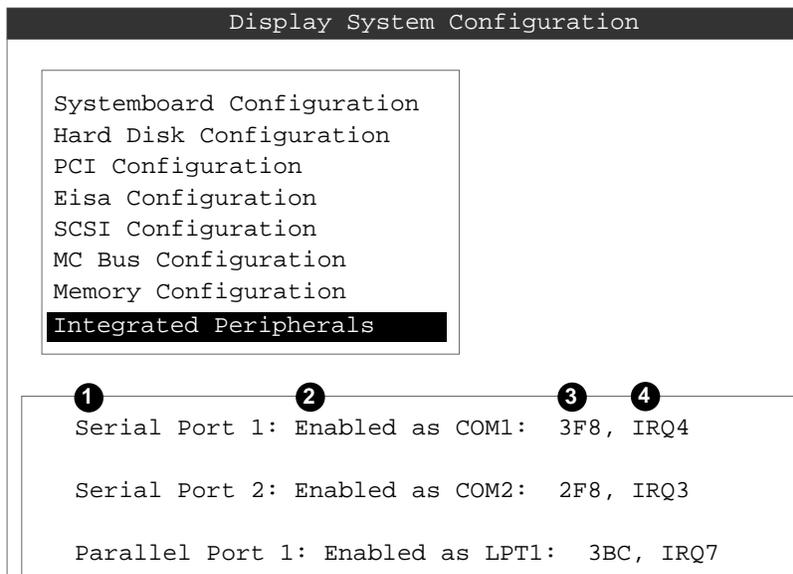
Memory Configuration

Figure 5-13 Memory Configuration



Integrated Peripherals

Figure 5-14 Integrated Peripherals



PK-0746A-96

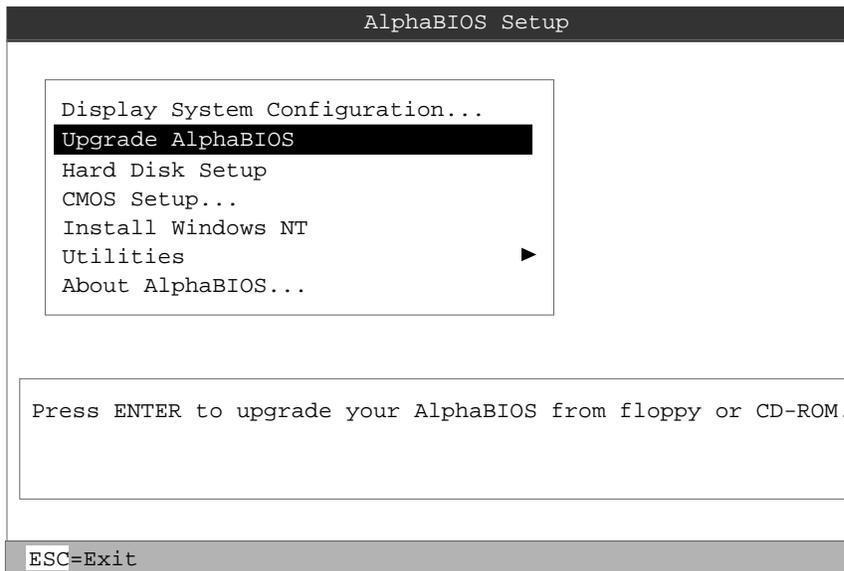
AlphaBIOS Console

- 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.

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 5-15 Updating Firmware



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AlphaBIOS Console

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

Setting Up the Hard Disk

You can perform either an express or a custom hard disk setup. An express setup, described in this section, creates the recommended partition arrangement on the first hard disk, but it does not map bad sectors. Custom hard disk setup is described in Sections 5 and 5.

Figure 5-16 Hard Disk Setup Screen

Hard Disk Setup			
1	2	3	4
Disk 0	QLISP1020 #0, SCSI ID 3		5 510 MB
	6 Partition 1	7 200 MB	8 NTFS
	Unused		310 MB
Disk 1	NCRC810 #0, SCSI ID 5		1001 MB
	Partition 1	995 MB	NTFS
	Partition 2	6 MB	FAT
9	INSERT=New DEL=Delete F6=Format F7=Express ESC=Exit		

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CAUTION: *Hard disk changes are immediate; the changes are made as soon as they are entered. Unintended data loss could occur, so 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 to each SCSI device in the system. This is usually done with 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

AlphaBIOS Console

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.

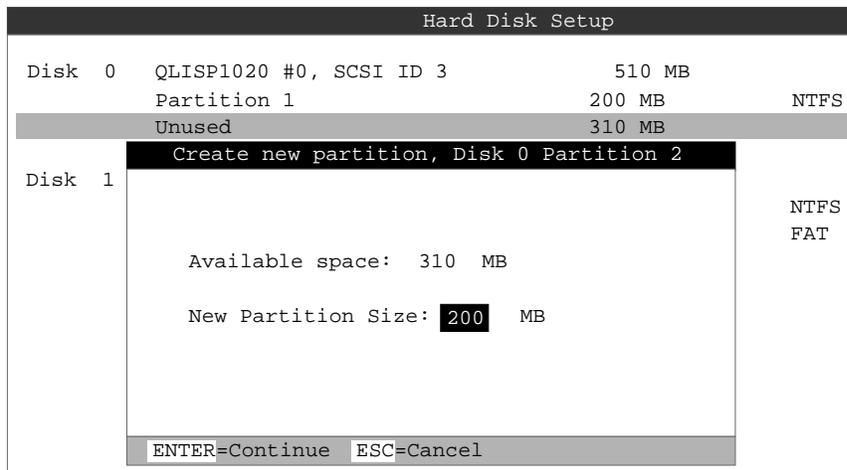
To perform an express hard disk setup

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.

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 5-17 Create New Partition Dialog Box



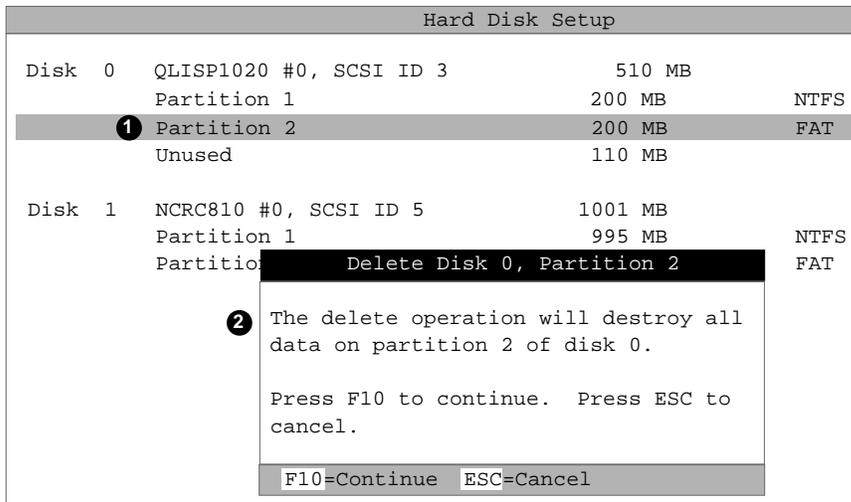
PK-0733-96

To create a partition

1. Start AlphaBIOS and select **Hard Disk Setup**. Press Enter.
2. Select the disk on which to create the partition.
3. If one or more partitions already exist on the disk, select the unpartitioned space.
4. Press Insert. A dialog box is displayed, similar to Figure 5-17.
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 5-18).
3. Press Delete. A dialog box is displayed (see ❷).
4. Press F10 to confirm the deletion.

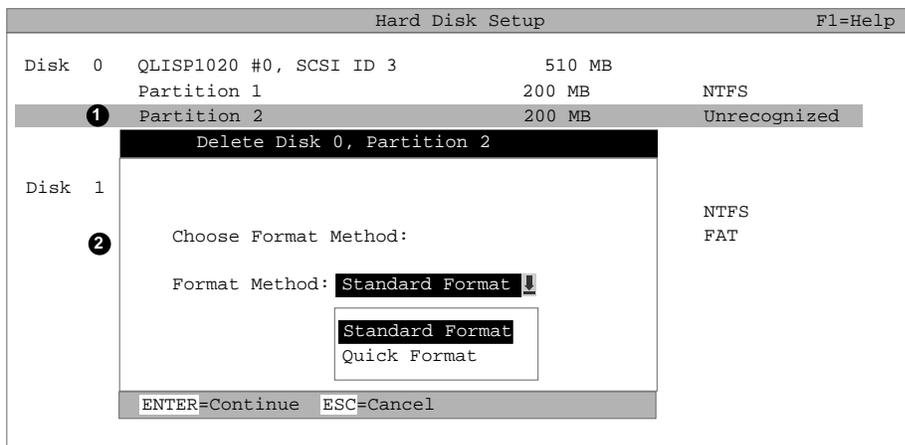
Figure 5-18 Delete Partition Dialog Box

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Formatting a FAT Partition

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

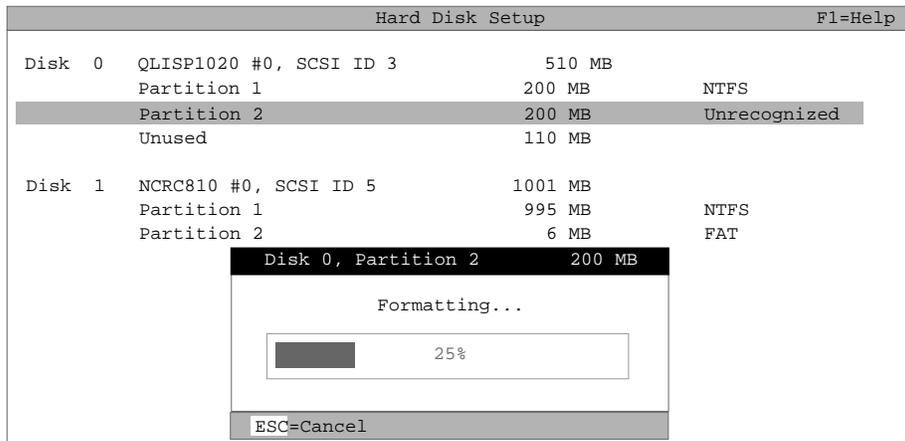
Figure 5-19 Formatting a FAT Partition



PK-0735A-96

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 5-19).
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 5-20 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.

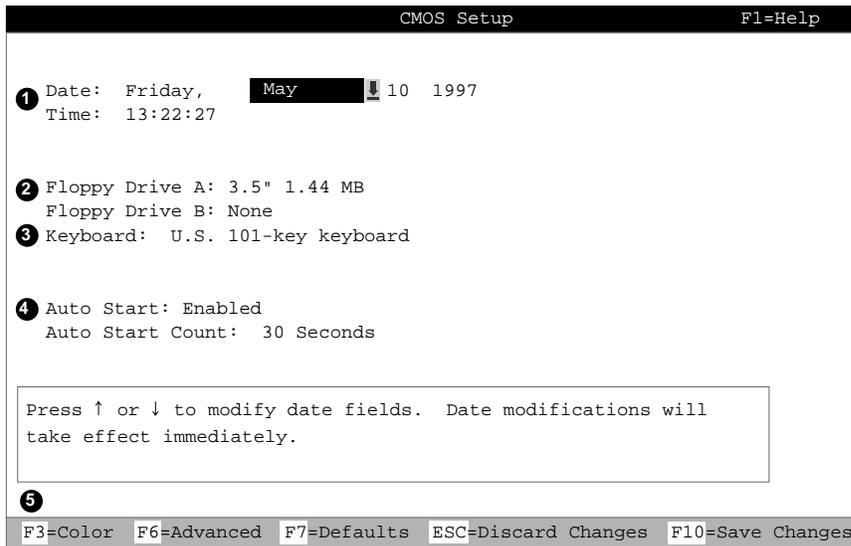
Figure 5-20 Standard Formatting

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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 5-21 Standard CMOS Setup Screen



PK-0749C-97

To enter Standard CMOS Setup

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

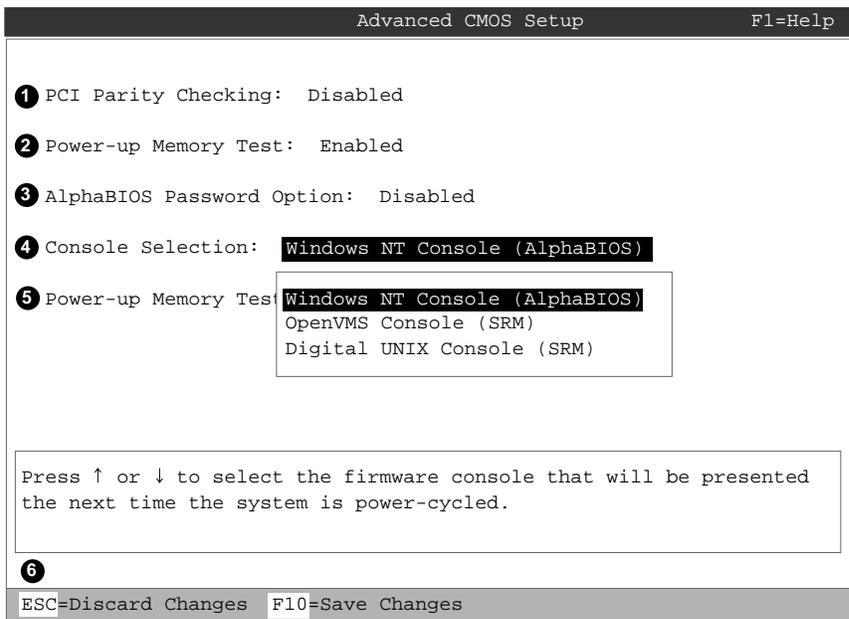
AlphaBIOS Console

- 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

AlphaBIOS Console

Figure 5-22 Advanced CMOS Setup Screen



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To Enter Advanced CMOS Setup

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

AlphaBIOS Console

- 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.

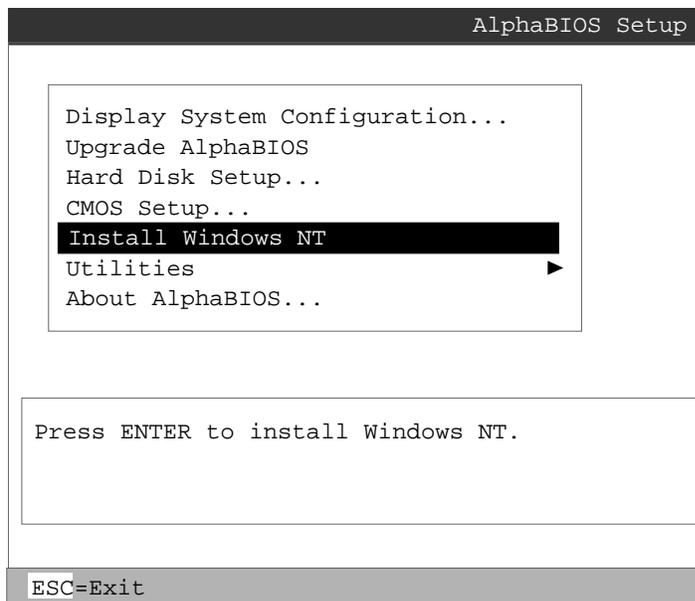
Password protection provides two levels of security for your system: setup, which requires a password to start **AlphaBIOS Setup**, and startup, which requires a password before the system initializes. Startup protection provides more comprehensive protection than setup protection because the system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

AlphaBIOS Console

Installing Windows NT

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

Figure 5-23 Installing Windows NT



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AlphaBIOS Console

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

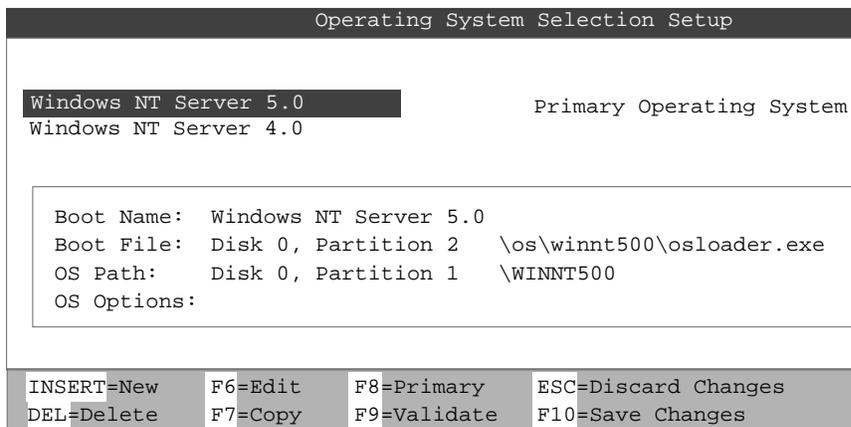
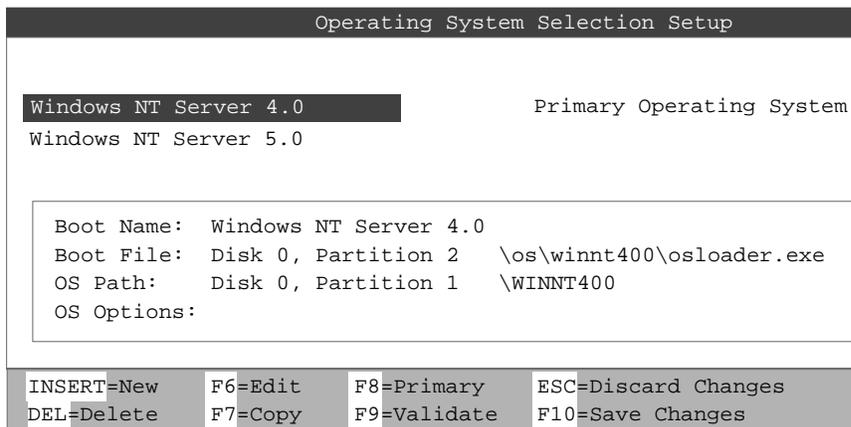
NOTE: Steps 1 and 2 in the following procedure are necessary only when you are first setting up your system. On subsequent installations and upgrades, begin at step 3.

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

Selecting the Version of Windows NT

Up to four 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 5-24 Operating System Selections



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AlphaBIOS Console

NOTE: The term “operating system selection,” refers to a version of Windows NT

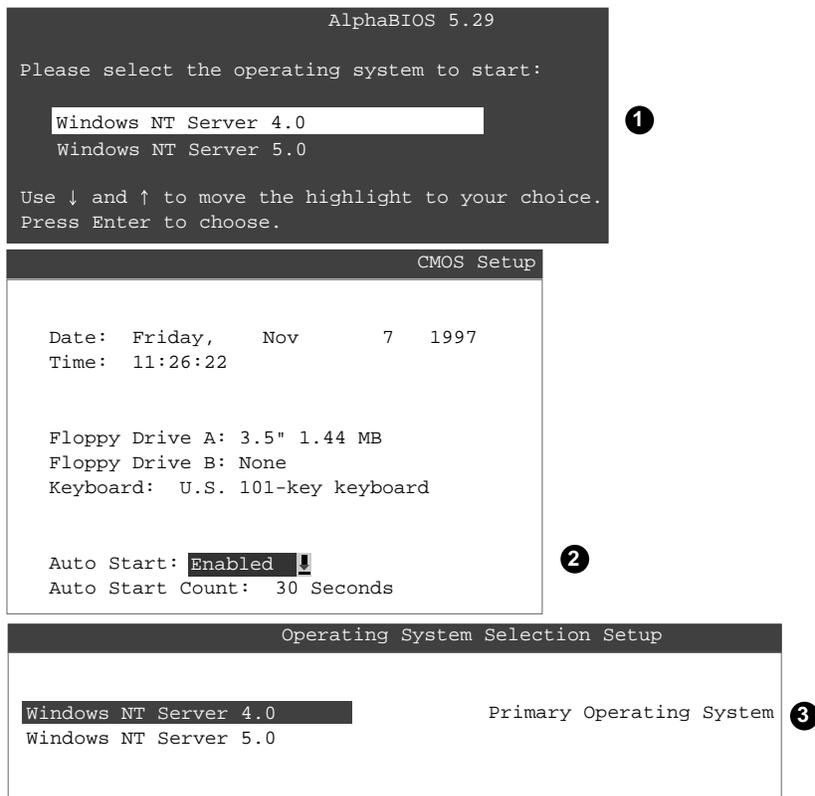
Each operating system selection is a set of information for a version of Windows NT. It describes the disk and partition containing the OSLOADER.EXE file associated with a particular operating system installation, as well as the path to the operating system itself. In addition, the operating system selection 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, as the Windows NT installation creates and modifies operating system selections as needed.

AlphaBIOS Console

Designating a Primary Operating System

Figure 5-25 Primary Operating System



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AlphaBIOS Console

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

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

Figure 5-25 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:

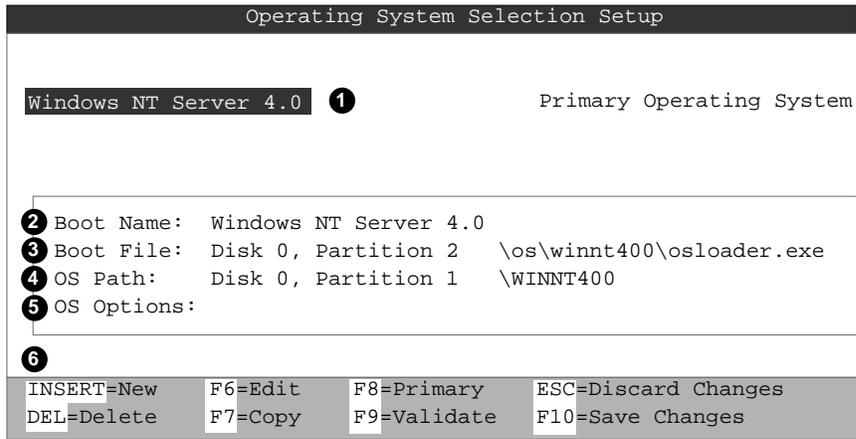
1. From the **AlphaBIOS Setup** screen select **Utilities**. In the selection box that is displayed, choose **OS Selection Setup**.
2. The **Operating System Selections Setup** screen is displayed. Select the primary operating system from the list displayed.

AlphaBIOS Console

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 5-26 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.

AlphaBIOS Console

- 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

AlphaBIOS Console

- 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.

AlphaBIOS Console

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.

AlphaBIOS Console

Switching from AlphaBIOS to SRM Console

It is necessary to switch to the SRM console to run firmware-based diagnostics.

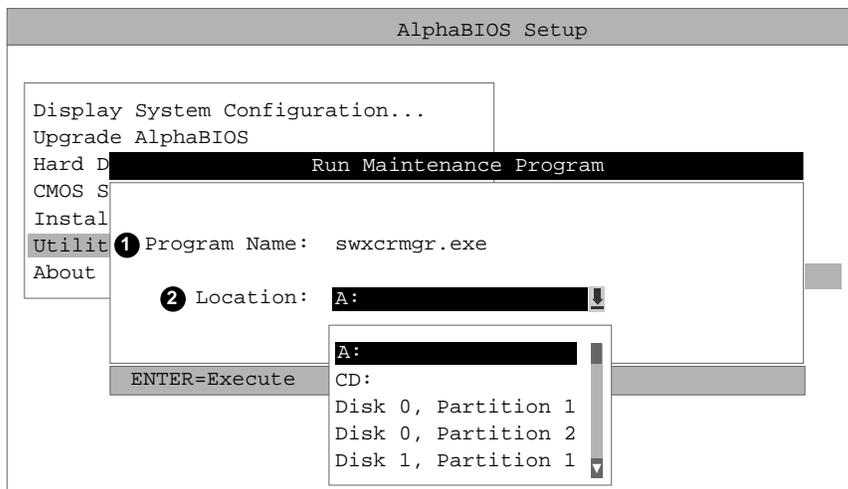
To switch from AlphaBIOS to the SRM console, press the Reset button on the control panel, wait 5 seconds, and press the Halt button.

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

Running Utility Programs

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

Figure 5-27 Run Maintenance Program Dialog Box



PK-0747A-96

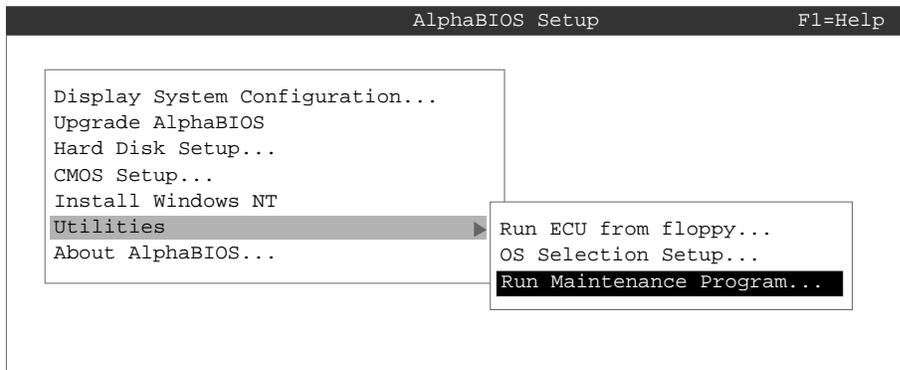
- ❶ Program name — The program to be run. It must be an executable program with an .EXE extension. It is not necessary to type the extension.
Programs run from AlphaBIOS must be written as ARC compatible images.
- ❷ Location — The location from which the program in the Program Name field will be run 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.

AlphaBIOS Console

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 5-28.
3. In the **Run Maintenance Program** dialog box (Figure 5-27), 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 5-28 AlphaBIOS Utilities Menu



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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.

AlphaBIOS Console

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. You can also use the RCM from the local console terminal.

Sections in this chapter are:

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

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 RCM is run from a serial console terminal or terminal emulator. A command interface lets you to 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, you type the escape sequence at the SRM console prompt on the local serial console terminal.

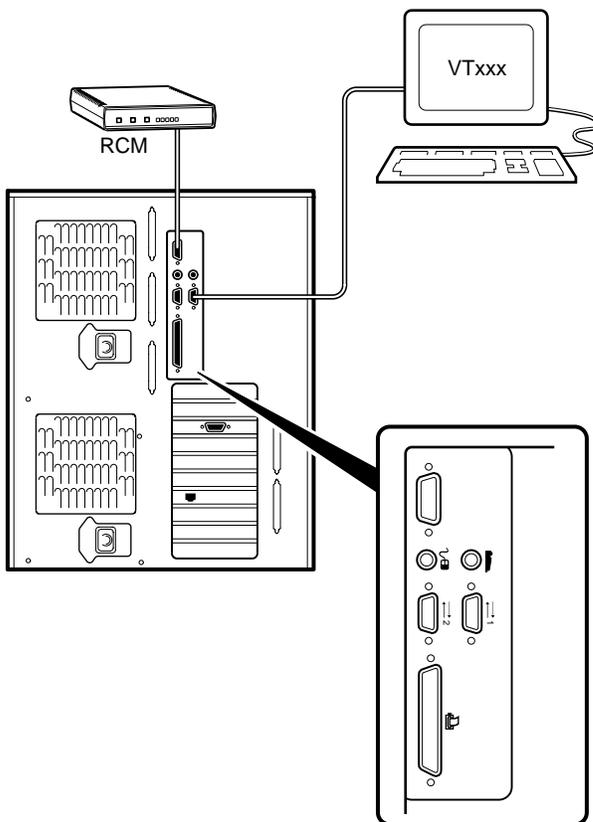
When you are not monitoring the system remotely, you can use the RCM dial-out alert feature. With dial-out alerts enabled, the RCM dials a paging service to alert you about a power failure within the system.

*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 Chapter 3 for information on halt assertion.*

First-Time Setup

To set up the RCM to monitor a system remotely, connect the console terminal and modem to the ports 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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Managing the System Remotely

Configuring the Modem

The RCM requires a Hayes-compatible modem. The controls that the RCM sends to the modem are acceptable to a wide selection of modems. After selecting the modem, connect it and configure it.

Qualified Modems

The modems that have been tested and qualified with this system are:

- Motorola 3400 Lifestyle 28.8
- AT&T Dataport 14.4/FAX
- Hayes Smartmodem Optima 288 V-34/V.FC + FAX

Modem Configuration Procedure

1. Connect a Hayes-compatible modem to the RCM as shown in Figure 6-1, and power up the modem.
2. From the local serial console terminal, type the following escape sequence to invoke the RCM:

```
P00>>> ^]^[rcm
```

The character “^” is created by simultaneously holding down the Ctrl key and pressing the] key (right square bracket). The SRM prompt, RCM>, is displayed.

3. Use the **setpass** command to set a modem password.
4. Enable the modem port with the **enable** command.
5. Enter the **quit** command to leave the RCM.
6. You are now ready to dial in remotely.

Dialing In and Invoking RCM

To dial in to the RCM modem port, dial the modem, enter the modem password at the # prompt, and type the escape sequence. 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.*

Managing the System Remotely

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

```
RCM> hangup
```

5. 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.

Using RCM Locally

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
```

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
alert_clr	Clears alert flag, stopping dial-out alert cycle
alert_dis	Disables the dial-out alert function
alert_ena	Enables the dial-out alert function
disable	Disables remote access to the modem port
enable	Enables remote access to the modem port
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.
hangup	Terminates the modem connection
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
setpass	Changes the modem access password
status	Displays system status and sensors

Managing the System Remotely

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 ***
```

alert_clr

The **alert_clr** command clears an alert condition within the RCM. The alert enable condition remains active, and the RCM will again enter the alert condition if it detects a system power failure.

```
RCM>alert_clr
```

alert_dis

The **alert_dis** command disables RCM dial-out. It also clears any outstanding alerts. Dial-out remains disabled until the **alert_enable** command is issued. See also the **enable** and **disable** commands.

```
RCM>alert_dis
```

alert_ena

The **alert_ena** command enables the RCM to automatically dial out when it detects a power failure within the system. The RCM repeats the dial-out alert at 30-minute intervals until the alert is cleared. Dial-out remains enabled until the **alert_disable** command or the **disable** command is issued. See also the **enable** and **disable** commands.

```
RCM>alert_ena
```

Managing the System Remotely

Two conditions must be met for the **alert_enable** command to work:

A modem dial-out string must be entered from the system console.

Remote access to the RCM modem port must be enabled with the **enable** command.

If the **alert_enable** command is entered when remote access is disabled, the following message is displayed:

```
*** error ***
```

disable

The **disable** command disables remote access to the RCM modem port. It also disables RCM dial-out.

```
RCM>disable
```

When the modem is disabled, it remains disabled until the **enable** command is issued. If a modem connection is in progress, entering the **disable** command terminates it.

*NOTE: If the modem has been disabled from the RCM switchpack on the motherboard, the **enable** command does not work. To enable the modem, reset the switch 2 (MODEM OFF) on the switchpack to OFF (enabled). See “Using the RCM Switchpack,” later in this chapter.*

enable

The **enable** command enables remote access to the RCM modem port. It can take up to 10 seconds for the **enable** command to be executed.

```
RCM>enable
```

When the modem is enabled, it remains enabled until the **disable** command is issued.

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The **enable** command can fail for the following reasons:

- No modem access password was set.
- The initialization string or the answer string might not be set properly. (See “Modem Dialog Details,” later in this chapter.)
- The modem is not connected or is not working properly.
- The modem has been disabled from the RCM switchpack. To enable the modem, reset switch 2 (MODEM OFF) on the switchpack to OFF (enabled).

If the **enable** command fails, the following message is displayed:

```
*** ERROR - enable failed ***
```

hangup

The **hangup** command terminates the modem session. When this command is issued, the remote user is disconnected from the server. This command can be issued from either the local or remote console.

```
RCM>hangup
```

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 Chapter 3 for information on halt assertion.

Managing the System Remotely

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 Chapter 3 for information on halt assertion.

*NOTE: 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 Chapter 3 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.

Managing the System Remotely

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
```

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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.

setpass

The **setpass** command allows the user to change the modem access password that is prompted for at the beginning of a modem session.

```
RCM>setpass
new pass>*****
RCM>
```

The maximum length for the password is 15 characters. If the password exceeds 15 characters, the command fails with the message:

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

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The minimum password length is one character, followed by a carriage return. If only a carriage return is entered, the command fails with the message:

```
*** ERROR - illegal password ***
```

If you forget the password, you can enter a new password.

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  
Alerts: DISABLE  
Alert Pending: NO  
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.

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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)
Alerts:	Alert dial-out state. (ENABLE/DISABLE)
Alert Pending:	Alert condition triggered. (YES/NO)
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.

Dial-Out Alerts

When you are not monitoring the system remotely, you can use the RCM dial-out feature to notify you of a power failure within the system.

When a dial-out alert is triggered, the RCM initializes the modem for dial-out, sends the dial-out string, hangs up the modem, and reconfigures the modem for dial-in. The modem must continue to be powered, and the phone line must remain active, for the dial-out alert feature to work. Also, if you are connected to the system remotely, the dial-out feature does not work.

Enabling Dial-Out Alerts

1. Enter the **set rcm_dialout** command, followed by a dial-out alert string, from the SRM console (see ❶ in Example 6-3). See the next topic for details on composing the modem dial-out string.
2. Invoke the RCM and enter the **enable** command to enable remote access dial-in. The RCM **status** command should display “Remote Access: Enable.” See ❷.
3. Enter the **alert_ena** command to enable outgoing alerts. See ❸.

Example 6-3 Configuring the Modem for Dial-Out Alerts

```
P00>>> set rcm_dialout "ATDTstring#;" ❶

RCM>enable
RCM>status
.
.
Remote Access:  Enable ❷
.
RCM>alert_ena ❸
```

Managing the System Remotely

Composing the Dial-Out String

Enter the **set rcm_dialout** command from the SRM console to compose the dial-out string. Use the **show** command to verify the string. See Example 6-4.

Example 6-4 Typical RCM Dial-Out Command

```
P00>>> set rcm_dialout
"ATXDT9,15085553333,,,,,,,,5085553332#;"

P00>>> show rcm_dialout
rcm_dialout      ATXDT9,15085553333,,,,,,,,5085553332#;
```

The dial-out string has the following requirements:

- The string cannot exceed 47 characters.
- Enclose the entire string following the **set rcm_dialout** command in quotation marks.
- Enter the characters ATDT after the opening quotation marks. Do not mix case.
- Enter the character X after "AT" if the line to be used also carries voice mail.
- The valid characters for the dial-out string are the characters on a phone keypad: 0–9, *, and #. A comma (,) requests that the modem pause for 2 seconds, and a semicolon (;) is required to terminate the string.

The elements of the dial-out string are explained in Table 6-3.

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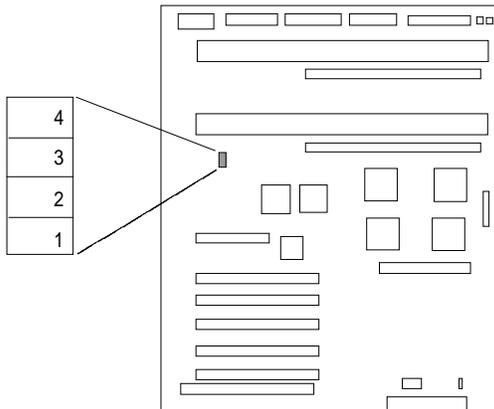
Table 6-3 Elements of the Dial-Out String

ATXDT	AT = Attention X = Forces the modem to dial “blindly” (not look for a dial tone). Enter X if the dial-out line modifies its dial tone when used for services such as voice mail. D = Dial T = Tone (for touch-tone) , = Pause for 2 seconds
9,	In the example, “9” gets an outside line. Enter the number for an outside line if your system requires it.
15085553333	Dial the paging service.
, , , , , , ,	Pause for 12 seconds for paging service to answer
5085553332#	“Message,” usually a call-back number for the paging service.
;	Return to command mode. Must be entered at end of string.

Using the RCM Switchpack

The RCM operating mode is controlled by a switchpack on the system board. Use the switches to enable or disable certain RCM functions, if desired.

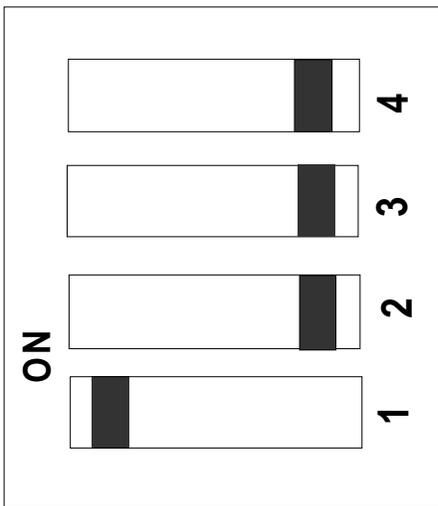
Figure 6-2 Location of RCM Switchpack on System Board



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Figure 6-3 RCM Switches (Factory Settings)



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Switch	Name	Description
1	EN RCM	Enables or disables the RCM. The default is ON (RCM enabled). The OFF setting disables RCM.
2	MODEM OFF	Enables or disables the modem. The default is OFF (modem enabled).
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).

Managing the System Remotely

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 (MODEM OFF)—Set this switch to ON (disable) if you want to prevent the use of the RCM for monitoring a system remotely. RCM commands can still be run from the local serial console terminal.
- 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 system board. 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 Chapter 7.
4. Locate the RCM switchpack on the system board 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.

Managing the System Remotely

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 system board, 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.

Power up the system to the SRM console prompt, and type the default escape sequence to invoke RCM command mode:

```
^] ^]RCM
```

10. Reset the modem password. Reset the escape sequence, if desired, as well as any other states.

Troubleshooting Guide

Table 6-4 is a list of possible causes and suggested solutions for symptoms you might see.

Table 6-4 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.
	Modem session was not terminated with the hangup command.	Wait several minutes for the local terminal to become active again. Wait for the remote session to be completed.
The console terminal is displaying garbage.	A remote RCM session is in progress, so the local console terminal is disabled. System and terminal baud rate set incorrectly.	Disable RCM and set the system and terminal baud rates to 9600 baud.

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Table 6-4 RCM Troubleshooting (continued)

Symptom	Possible Cause	Suggested Solution
RCM does not answer when the modem is called.	Modem cables may be incorrectly installed.	Check modem phone lines and connections.
	RCM remote access is disabled.	Enable remote access.
	RCM does not have a valid modem password set.	Set password and enable remote access.
	Switch setting incorrect.	Set switch 1 to ON; switch 2 to OFF.
	The local terminal is currently attached to the RCM.	Enter quit on the local terminal.
	On power-up, the RCM defers initializing the modem for 30 seconds to allow the modem to complete its internal diagnostics and initialization.	Wait 30 seconds after powering up the system and RCM before attempting to dial in. Enter enable command from RCM.
After the system and RCM are powered up, the COM port seems to hang briefly.	Modem may have had power cycled since last being initialized or modem is not set up correctly.	
	This delay is normal behavior.	Wait a few seconds for the COM port to start working.

Continued on next page

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Table 6-4 RCM Troubleshooting (continued)

Symptom	Possible Cause	Suggested Solution
RCM installation is complete, but system does not power up.	RCM Power Control: is set to DISABLE.	Invoke RCM and issue the poweron command.
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.
The remote user sees a “+++” string on the screen.	The modem is confirming whether the modem has really lost carrier. This occurs when the modem sees an idle time, followed by a “3,” followed by a carriage return, with no subsequent traffic. If the modem is still connected, it will remain so.	This is normal behavior.
The message “unknown command” is displayed when the user enters a carriage return by itself.	The terminal or terminal emulator is including a linefeed character with the carriage return.	Change the terminal or terminal emulator setting so that “new line” is not selected.
Cannot enable modem or modem will not answer.	The modem is not configured correctly to work with the RCM. The modem has been disabled on the RCM switchpack.	Modify the modem initialization and/or answer string as described in Section 6. Refer to Section 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>>>
```

Managing the System Remotely

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&f0e0v0x0s0=2

Managing the System Remotely

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 Pair
- Installing a PCI or EISA/ISA Card
- Installing a Power Supply

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

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

- System board
- System backplane
- System fans
- Interlocking sensor switch
- Front bezel
- Operator control panel

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

Installing Components

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:

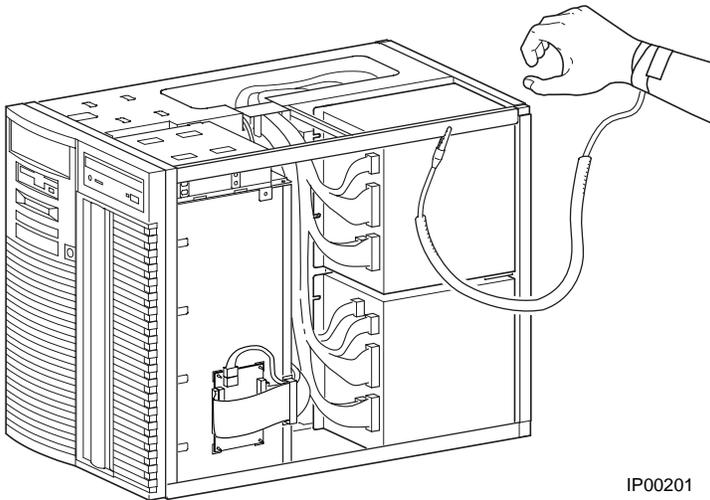
- Flat-head screwdriver
- Phillips screwdriver
- Antistatic wrist strap
- Replacement option board kit or device kit, if necessary

Installing Components

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.

CAUTION: Do not disconnect the power cords from the system or the power outlets. The power cord grounds the system unit, preventing damage to the components.

Figure 7-1 Attaching the Antistatic Wrist Strap

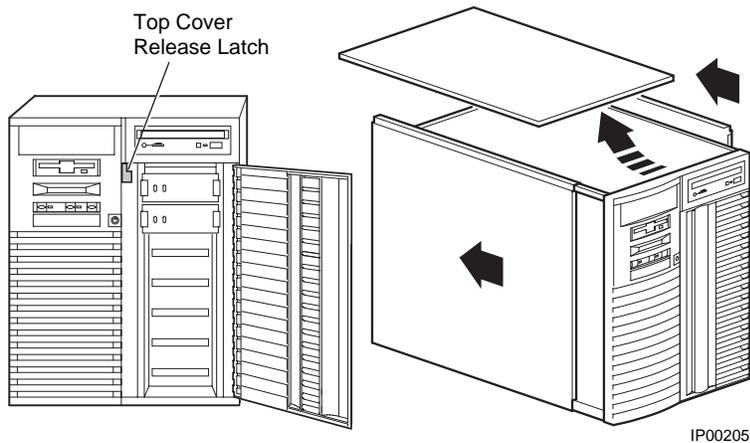


IP00201

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 install or remove a power supply or a second SCSI controller.

Figure 7-2 Removing Top Cover and Side Panels



IP00205

Installing Components

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:

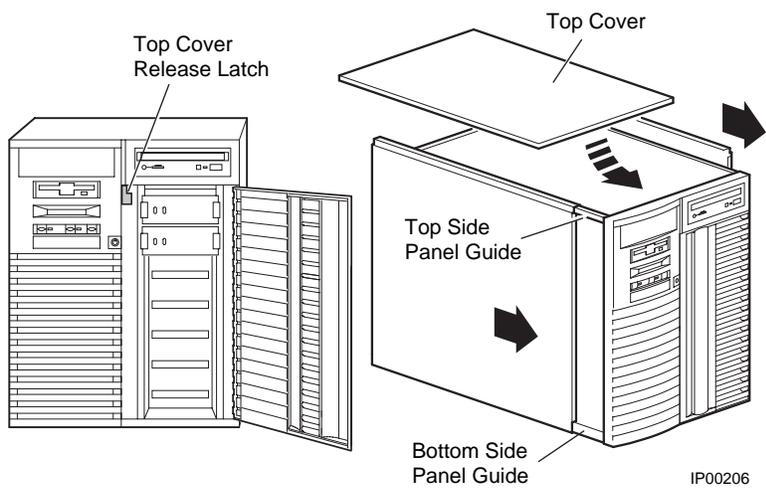
1. Shut down the operating system following the instructions listed in the operating system documentation.
2. Press the On/Off switches on all external options connected to the system to the off position.
3. Press the On/Off button on the system unit to the off position. An interlocking sensor switch 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 about 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.)

Installing Components

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



Installing Components

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.*

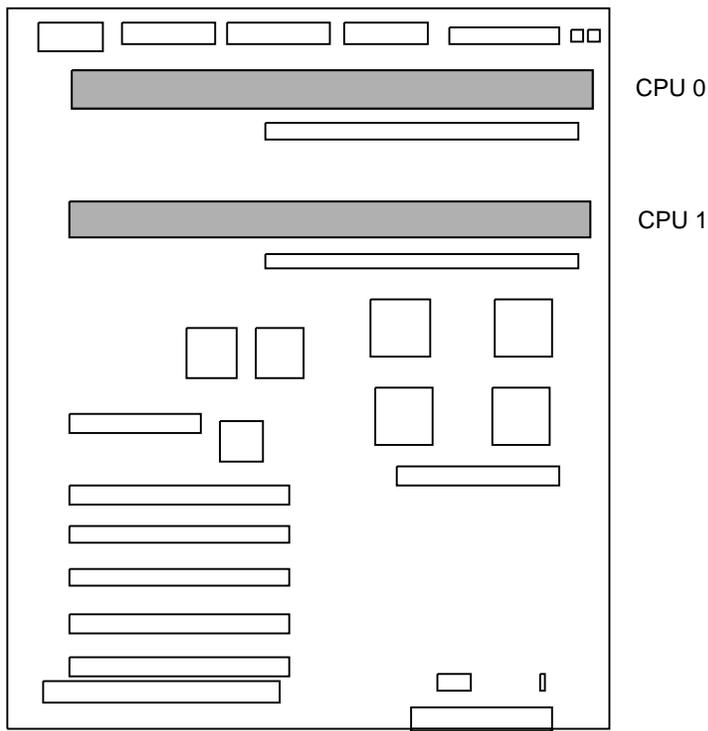
5. Hold down the top cover release latch until the top cover is in place, and then release it to secure the cover and panels.
6. Lock the door to secure the top cover and side panels.
7. Set the On/Off switches on all external options connected to the system to the on position.
8. Press the On/Off button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

Installing Components

Installing a CPU Module

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 cpu` command from the SRM console or display the system bus configuration from the AlphaBIOS console.

Figure 7-4 CPU Module Slots



PK-0903C-97

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.

Installing Components

Removal

NOTE: Before removing the CPU module, you must remove the memory card adjacent to it. See the next section for the memory card removal procedure.

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

Installing Components

3. Unscrew the module handle that secures the outer edge of the CPU module (two retainer screws).
4. Release the card by extending the handle clip on each end outward.
5. Holding the outer edge of the card, gently pull it out of the slot.

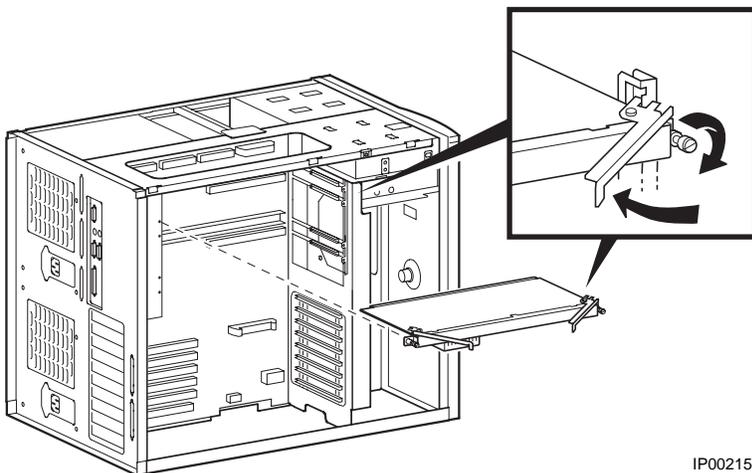
Installation

1. Slide the CPU card into the system board slot.
2. Visually align the CPU card with the system board white connector and press the card into the connector. Check to see that the module handle clips are aligned with the slot notches.
3. Press inward on the handle clip on each end of the card until they catch in a closed position.
4. Secure the card by tightening the two captive retainer screws.
5. Replace the memory card.

Verification

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

Figure 7-5 CPU Module Installation



IP00215

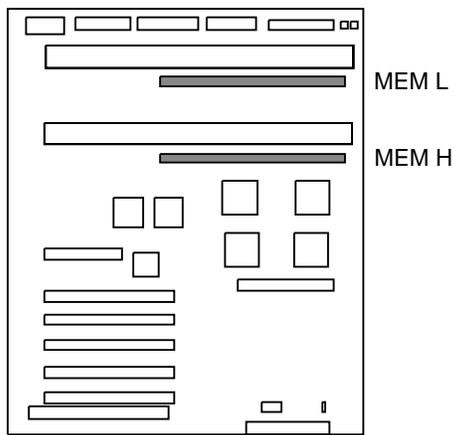
Installing a Memory DIMM Pair

Remove the top cover and side panel to access the system board. After you have re-installed the memory card, verify the installation by issuing the show memory command from the SRM console or display the memory configuration from the AlphaBIOS console. Figure 7-6 shows the memory slots on the system board.

Configuration Rules

- There are two riser cards; one DIMM of each pair is installed in the same slot on each riser card (see Figure 7-7).
- Both DIMMs in a memory pair must be the same size, either 64 MB or 256 MB.
- The larger memory pair (256 MB) must be installed in riser card slot 0.
- Other memory pairs must be the same size or smaller than the first memory pair.
- Memory pairs must be installed in consecutive slots. The first pair goes into slot 0, the second pair into slot 1, and so on.
- If a 64-MB DIMM pair is installed in slot 0, the memory configuration cannot exceed 4 DIMM pairs.

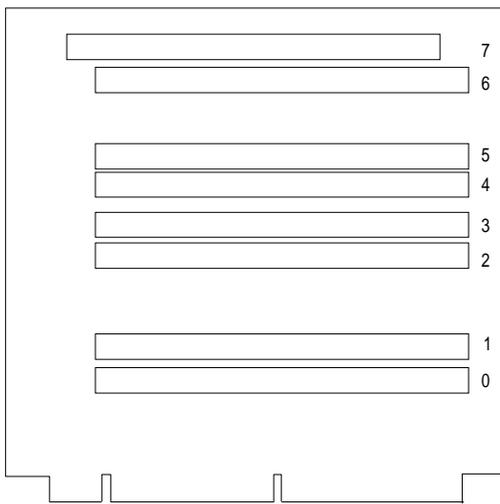
Figure 7-6 Memory Slots on System Board



PK-0903D-97

Installing Components

Figure 7–7 Riser Card DIMM Slots



PKW0505A-97

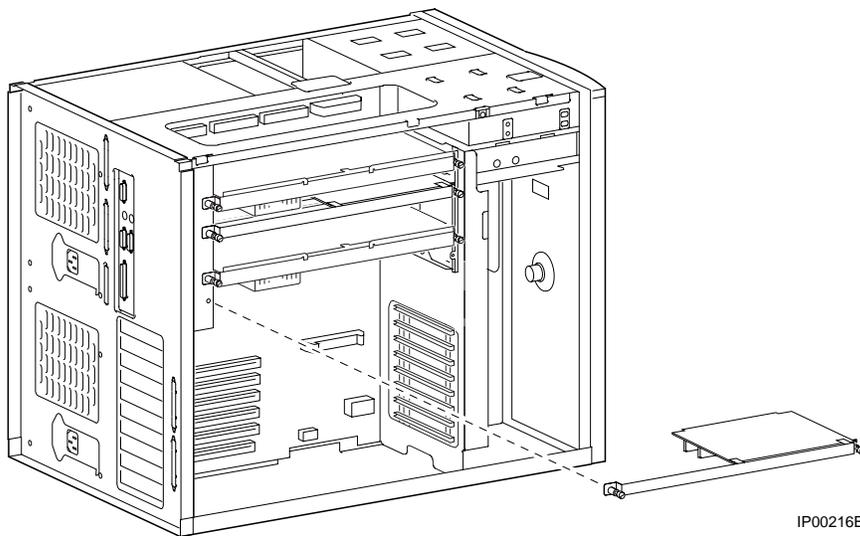
Memory Card Removal and DIMM Installation

1. Shut down the operating system and power down the system.
2. Remove the top cover and left side panel.
3. Unscrew the module handle that secures the outer edge of the memory card (two retainer screws). See Figure 7-8.
4. Holding the outer edge of the card, gently pull it out of the slot.
5. *CAUTION: Hold the memory card in your hands while installing DIMMs. Do not lay the card on a flat surface to install DIMMs. This may damage components on the other side of the memory card.*
6. While holding the memory card, align the DIMM in the connector and press down. The connector levers close.
7. Repeat the previous steps for each riser card/DIMM.

To install the memory card, reverse steps 1 through 4 in the removal procedure for each riser card/DIMM.

Installing Components

Figure 7–8 Memory Card Installation



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.

Installing Components

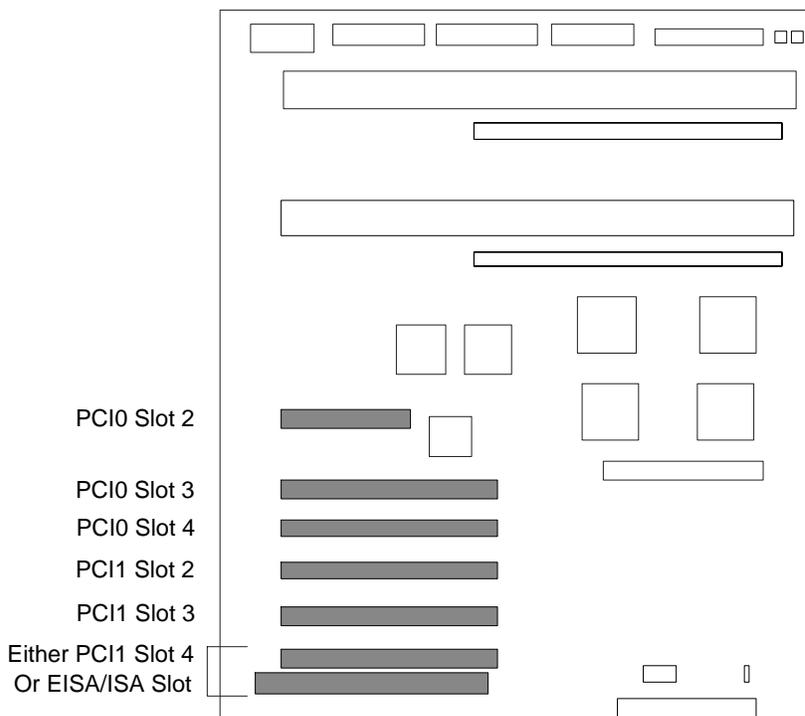
Installing a PCI or EISA/ISA Card

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

- SCSI controllers (KZPxx-xx) must be installed in PCI0.
- A graphics card can be installed in PCI0 slot 2.

Figure 7–9 PCI and EISA/ISA Slots



PK-0903E-97

Installing Components

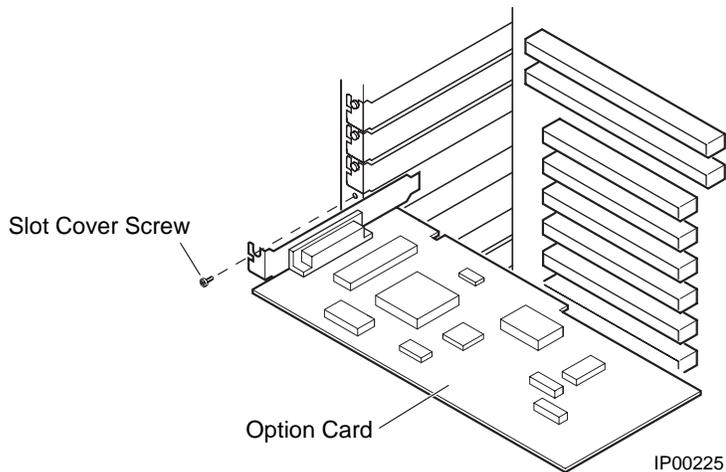
Option Card Installation

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.
6. Replace covers.

Verification

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 7-10 PCI/ISA Card Installation

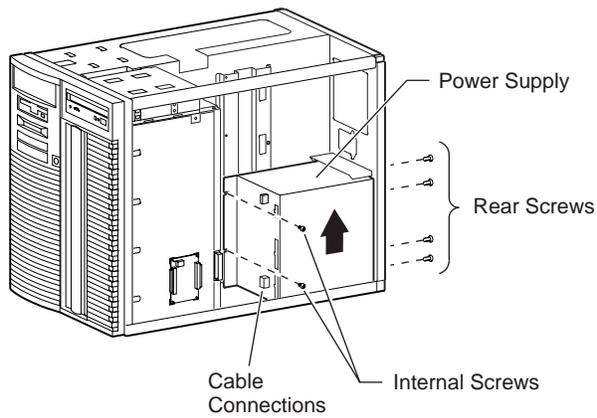


Installing Components

Installing a Power Supply

The following procedures describe how to install and remove a power supply. The procedures for installing and removing both power supplies are similar, unless otherwise noted.

Figure 7-11 Removing a Power Supply



IP00177

Installing Components

Power Supply Removal

1. Shut down the operating system and power down the system.
2. Remove the top cover and right side panel.
3. Disconnect all internal and external cables from the power supply.
4. Loosen the four screws that secure the power supply to the outside of the unit.
5. Loosen the two screws that secure the internal end of the power supply to the system unit.
6. Slide the power supply toward the internal side, lift it up off its tabs, and remove it through the top of the enclosure.

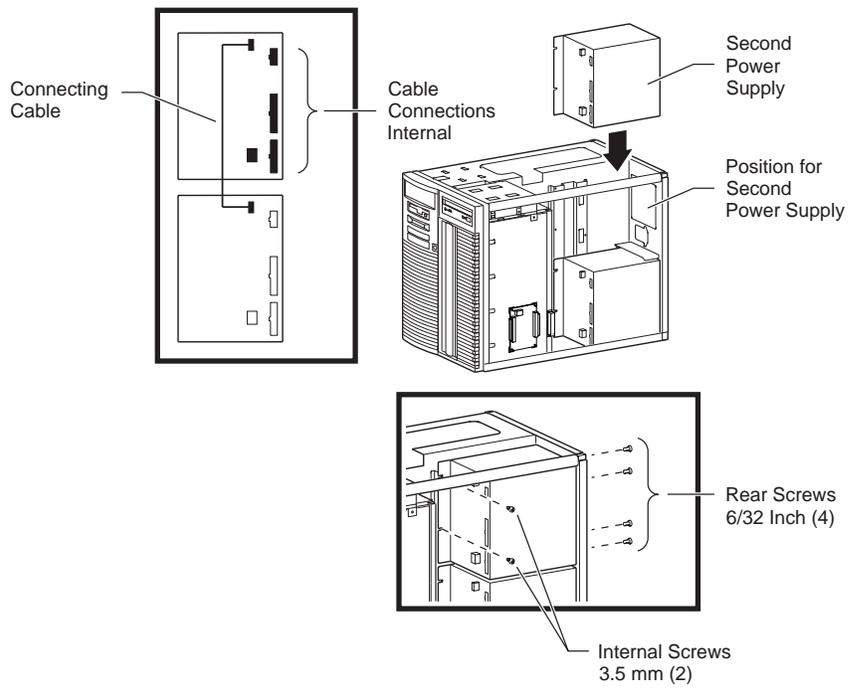
NOTE: If you are removing the bottom power supply, you must remove the top power supply first.

Power Supply Installation

1. Insert the power supply through the top of the enclosure.
2. Slide the power supply over its tabs and toward the back panel so that it aligns with the screw holes in the system unit frame. The first supply slides directly into the lower position from the side of the system unit. The second power supply slides down from above the system unit and rests upon a ledge.
3. Tighten the two screws that secure the internal end of the power supply.
4. Tighten the four screws that secure the power supply to the outside of the unit. Do not use the screws that secured the protective shield.
5. Connect all internal and external cables to the power supply. If you are installing a second power supply, an additional internal cable is required for connecting the two supplies. Each power supply connects directly to an AC outlet.

Installing Components

Figure 7-12 Installing a Power Supply



IP00176

8

Troubleshooting

This chapter contains basic troubleshooting information. For more about troubleshooting, see the *DIGITAL Server 5300 Service Guide*.

Sections in this chapter are:

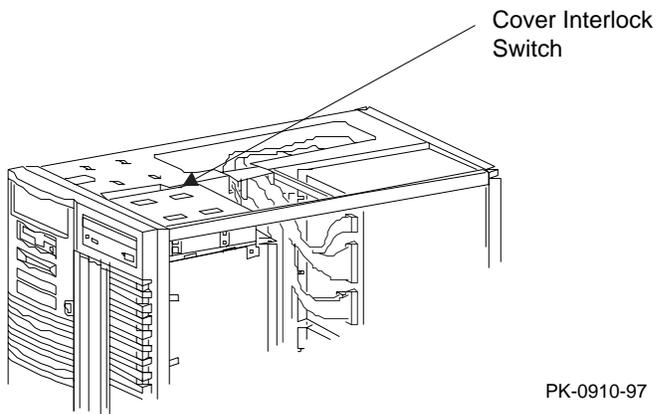
- System Does Not Power Up
- Control Panel Display Indicates an Error

Troubleshooting

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, or a disengaged cover interlock.

Figure 8–1 Location of Cover Interlock



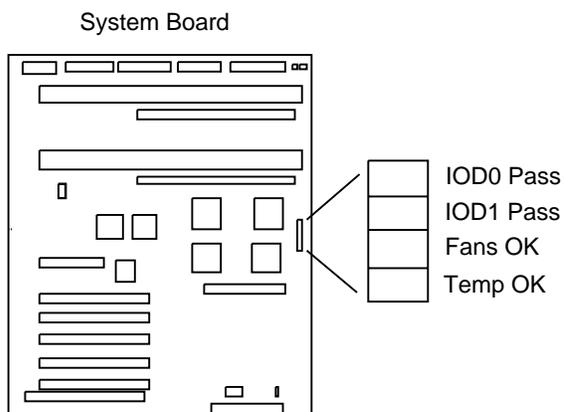
PK-0910-97

Troubleshooting

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.
- Is J2 engaged?
- Are the power supplies operating?
- Are the system fans operating?
- Are the CPU fans operating?
- Is RCM functional? If yes, has a **poweroff** command been issued?
- Are the system board LEDs on? See Figure 8–2.

Figure 8–2 System Board LEDs

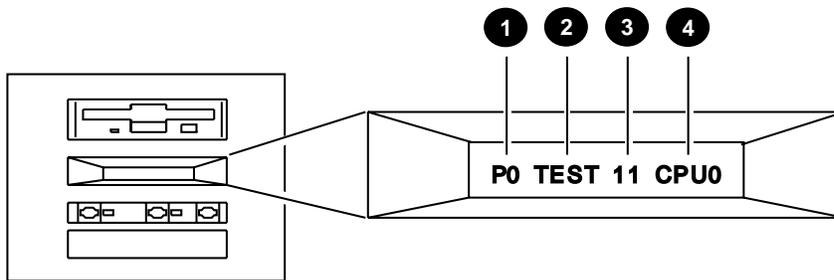


PK-0904-97

Control Panel Display Indicates an Error

The control panel display indicates the likely device causing the failure.

Figure 8–3 Control Panel Display



PK-0905-97

If the control panel display indicates an error

Check the failing device called out in the control panel display. See Figure 8–3 and Table 8–5 for the location and meaning of the fields in the display.

Table 8–5 Control Panel Display

Field	Content	Display	Meaning
❶	CPU number	P0–P1	CPU reporting status
❷	Status	TEST	Tests are executing
		FAIL	Failure has been detected
		MCHK	Machine check has occurred
		INTR	Error interrupt has occurred
❸	Test number (for DIGITAL use only)		
❹	Suspected device	CPU0–1	CPU module number ¹
		MEM0–7 and L, H, or *	Memory pair number and low module, high module, or either ²
		IOD0	Bridge to PCI bus 0 ¹
		IOD1	Bridge to PCI bus 1 ³
		FROM0	Flash ROM ³
		COMBO	COM controller ³
		PCEB	PCI-to-EISA bridge ³
		ESC	EISA system controller ³
		NVRAM	Nonvolatile RAM ³
		TOY	Real time clock ³
		I8242	Keyboard and mouse controller ³

1 CPU module

2 Memory module

3 System board

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