AlphaServer DS20L

User's Guide

Order Number: EK-DS20L-UG. B01

This manual is for managers and operators of *HP AlphaServer* DS20L (Series EA2014) systems.

Hewlett-Packard Company

May 2002

FCC Notice

This equipment generates, uses, and may emit radio frequency energy. The equipment has been type tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of FCC rules, which are designed to provide reasonable protection against such radio frequency interference.

Operation of this equipment in a residential area may cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

Any modifications to this device—unless expressly approved by the manufacturer—can void the user’s authority to operate this equipment under part 15 of the FCC rules.

Modifications

The FCC requires the user to be notified that any changes or modifications made to this device that are not expressly approved by Compaq Computer Corporation may void the user's authority to operate the equipment.

Cables

Connections to this device must be made with shielded cables with metallic RFI/EMI connector hoods in order to maintain compliance with FCC Rules and Regulations.

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環境中使用時，可能會造成射頻
干擾，在這種情況下，使用者會
被要求採取某些適當的對策。

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Canadian Notice

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Avis Canadien

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European Union Notice

Products with the CE Marking comply with both the EMC Directive (89/336/EEC) and the Low Voltage Directive (73/23/EEC) issued by the Commission of the European Community.

Compliance with these directives implies conformity to the following European Norms (in brackets are the equivalent international standards):

EN55022 (CISPR 22) - Electromagnetic Interference

EN50082-1 (IEC801-2, IEC801-3, IEC801-4) - Electromagnetic Immunity

EN60950 (IEC950) - Product Safety

Warning!

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Achtung!

Dieses ist ein Gerät der Funkstörgrenzwertklasse A. In Wohnbereichen können bei Betrieb dieses Gerätes Rundfunkstörungen auftreten, in welchen Fällen der Benutzer für entsprechende Gegenmaßnahmen verantwortlich ist.

Attention!

Ceci est un produit de Classe A. Dans un environnement domestique, ce produit risque de créer des interférences radioélectriques, il appartiendra alors à l'utilisateur de prendre les mesures spécifiques appropriées.

Contents

Preface xi

Chapter 1 Overview

1.1 System Features and Components 1-1
1.1.1 Features 1-1
1.1.2 Components 1-4
1.2 Specifications 1-4
1.2.1 Power Connectors 1-4
1.2.2 Estimated Power Consumption 1-5
1.2.3 Environmental 1-6
1.2.3.1 Safety 1-7
1.2.3.2 EMC 1-7
1.2.3.3 Thermal 1-8
1.2.4 Physical 1-8
1.2.4.1 I/O 1-8
1.2.5 Acoustical 1-9
1.3 Front Panel Controls and Indicators 1-10
1.3.1 Removing the Front Bezel 1-11
1.3.2 Inserting or Ejecting a CD 1-11
1.3.3 Halt Button 1-12
1.4 Rear Panel Ports, Slots, and Indicators 1-13
1.5 Internal View of the System 1-14

Chapter 2 Installation and Options

2.1 System Setup and Installation 2-1
2.1.1 Rackmounting 2-2
2.1.2 Connecting the System 2-2
2.2 Installing Options 2-3
2.2.1 Bezel Removal 2-3
2.3 Removal from a Rack 2-4
2.3.1 Removing the Cover 2-5
2.3.2 Memory 2-6

2.3.2.1 Memory Configuration Rules 2-6
2.3.3 PCI Options 2-8
2.3.4 Hard Drive 2-9
2.3.5 CD-ROM 2-14

Chapter 3 Operation

3.1 Powering Up the System 3-1
3.1.1 Turning the System On 3-1
3.1.1.1 LEDs 3-1
3.1.2 SROM Code 3-1
3.1.4 Alpha SRM Console 3-2
3.1.5 Power-Up Display 3-3
3.2 Operating Systems 3-4
3.2.1 Setting Boot Options 3-4
3.2.1.1 auto_action 3-5
3.2.1.2 bootdef_dev 3-6
3.2.1.3 boot_file 3-7
3.2.1.4 boot_osflags 3-8
3.2.1.5 ei*0_inet_init or ew*0_inet_init 3-10
3.2.1.6 ei*0_protocols or ew*0_protocols 3-11
3.2.2 Booting Tru64 UNIX 3-12
3.2.2.1 Booting from a Local Disk 3-12
3.2.2.2 Booting from a Remote Disk 3-14
3.2.3 Starting a Tru64 UNIX Installation 3-16
3.2.3.1 NHD4 and IPK Compatibility 3-16
3.2.4 Installing and Booting Linux 3-18
3.3 Updating Firmware 3-21
3.3.1 Updating Firmware from a Network Device 3-23
3.3.2 LFU Commands 3-25

Chapter 4 Remote Management

4.1 Overview 4-1
4.2 Basic Remote Control 4-2
4.2.1 Startup 4-2
4.2.2 Shutdown 4-3
4.2.3 Link Status 4-3
4.3 The WOL Utility 4-3
4.3.1 Operation 4-4
4.3.2 Restrictions 4-5
4.3.3 Commands 4-5

4.3.4 Exit Status 4-5
4.3.5 Error Conditions 4-5
4.3.6 Examples 4-6
4.3.7 Environment Variables 4-7

Chapter 5 Basic Troubleshooting

5.1 LED Error Indicators 5-1
5.1.1 Internal Power Failure 5-3
5.2 Halting the System 5-3
5.3 Firmware Configuration Jumpers 5-4
5.3.1 J2 Firmware Configuration Jumper Block 5-5
5.4 Fan Status Display 5-6

Appendix A SRM Console

A.1 SRM Console Overview A-1
A.1.1 How Does SRM Boot an OS? A-2
A.1.2 Loading the Secondary Bootstrap Loader A-2
A.2 Invoking the SRM Console A-3
A.3 Command Summary A-4
A.3.1 Commands: Syntax A-6
A.3.2 Commands: Special Keystrokes and Characters A-7
A.4 Show Commands A-9
A.4.1 Show Config A-9
A.4.2 Show Device A-11
A.4.3 Show hwrpb A-13
A.4.4 Show IDE A-18
A.4.5 Show Memory A-19
A.4.6 Show PAL A-19
A.4.7 Show Power A-20
A.4.8 Show Version A-22
A.5 Creating a Power-Up Script A-23
A.6 Booting the Operating System A-25
A.7 Configuring a PCI NVRAM Module A-27
A.8 Testing the System A-28
A.9 Set Commands A-30
A.9.1 Set Password A-30
A.9.2 Set Secure A-31
A.10 Secure Mode A-32
A.10.1 Login Command and Secure Mode A-32
A.11 Clear Password A-33

A.11.1 Resetting the Password A-34
A.12 Stopping and Starting CPU A-34
A.13 Updating Firmware A-35
A.14 Forcing a System Crash Dump A-36
A.15 Using Environment Variables A-37
A.15.1 set *envar* A-37
A.15.2 show *envar* A-38
A.16 Depositing and Examining Data A-39
A.17 Reading a File A-42
A.18 Initializing the System A-43
A.19 Finding Help A-44
A.20 Environment Variable Summary A-45
A.20.1 ac_action A-47
A.20.2 auto_action A-47
A.20.3 bootdef_dev A-48
A.20.4 boot_osflags A-48
A.20.5 com1_baud A-49
A.20.6 ew*0_mode A-50
A.20.7 ew*0_protocols A-50
A.20.8 os_type A-51
A.20.9 password A-51
A.20.10 pci_parity A-52
A.20.11 pk*0_fast A-52
A.20.12 pk*0_host_id A-53
A.20.14 sysvar A-54
A.20.15 tt_allow_login A-54
A.20.16 wol_enable A-55

Examples

3–1 Power-Up Display - Serial Console 3-3
3–2 Booting Tru64 UNIX from a Local Disk 3-12
3–3 Booting Tru64 UNIX from a Remote Disk 3-14
3–4 Text-Based Installation Display 3-16
3–5 Linux Boot Output 3-19
3–6 Starting LFU from the SRM Console 3-21
3–7 Updating Firmware from a Network Device 3-23
3–8 Updating Firmware Using a MOP Server 3-23
5–1 Fan Statuses Using the SRM Show Power Command 5-7
A–1 Show Config Command A-9
A–2 Show Device Command A-11
A–3 Show hwrpb Command A-13

A–4 Show IDE Command....A-18
A–5 Show Memory Command....A-19
A–6 Show PAL Command....A-19
A–7 Show Power Command....A-20
A–8 Show Version Command....A-22
A–9 Editing the nvram Script....A-24
A–10 Clearing the nvram Script....A-24
A–11 Boot Command....A-26
A–12 Prcache Command....A-27
A–13 Test Command....A-28
A–14 Set Password Command....A-30
A–15 Set Secure Command....A-31
A–16 Secure Mode and Login Command....A-33
A–17 Clear Password Command....A-33
A–18 Lfu Command....A-35
A–19 Crash Command....A-36
A–20 Setting and Showing Environment Variables....A-38
A–21 Creating a User-Defined Environment Variable....A-38
A–22 Deposit Command....A-41
A–23 Examine Command....A-41
A–24 More Command....A-42
A–25 Initialize Command....A-43
A–26 Help Command....A-44
A–27 Changing Baud Rate....A-49

Figures

1-1 Power Connectors....1-5
1-2 Front View of the System....1-10
1-3 Removing the Front Bezel....1-11
1-4 Halt Button Location....1-12
1-5 Rear View of the System....1-13
1-6 Internal View of the System....1-14
2-1 Rear Connectors....2-2
2-2 Removing the Front Bezel....2-3
2-3 Removing the System from a Rack....2-4
2-4 Removing the Cover....2-5
2-5 Memory Configuration....2-6
2-6 Adding or Removing Memory....2-7
2-7 Adding or Removing a PCI Module....2-9
2-8 Installing the SCSI Backplane....2-10
2-9 Routing SCSI Cable to the PCI Riser....2-11

2-10 Assembling and Installing the SCSI Hard Drive Carrier 2-12
2-11 Installing the Hard Drive Assembly 2-13
2-12 Installing the CD-ROM 2-15
5-1 Network Connector LEDs 5-2
5-2 J2 Firmware Configuration Jumper Block 5-4
5-3 Fan Locations 5-7

Tables

1–1 AlphaServer DS20L Product Features 1-1
1–2 Environmental Parameters 1-6
1–3 Physical Dimensions 1-8
3–1 LFU Command Summary 3-25
5–1 Front System LED Status Indicators 5-1
5–2 Rear System LED Status Indicators 5-2
5–3 Network Connector LEDs 5-3
5–4 J2 Configuration Jumper Pin Functions 5-6
A–1 Summary of SRM Console Commands A-4
A–2 Syntax for SRM Console Commands A-6
A–3 Special Characters for SRM Console A-7
A–4 Device Naming Convention A-12
A–5 Environment Variable Summary A-45

Preface

Intended Audience

This manual is for managers and operators of *HP AlphaServer* DS20L systems.

Document Structure

This manual has five chapters and one appendix.

- **Chapter 1, Overview**, describes the DS20L system features and components.
- **Chapter 2, Installation and Options**, explains how to set up your DS20L system and how to install optional devices.
- **Chapter 3, Operation**, explains how to turn on your DS20L system, install and boot the operating system, and update the firmware.
- **Chapter 4, Remote Management**, describes remote control and management of the DS20L system.
- **Chapter 5, Basic Troubleshooting**, provides information for customer troubleshooting using basic indicators, switches, and jumpers.
- **Appendix A, SRM Console**, describes the SRM console commands and environment variables.

Documentation Titles

HP AlphaServer DS20L Documentation

Title	Order Number
AlphaServer DS20L User Guide	EK–DS20L–UG
AlphaServer DS20L Service Guide	EK–DS20L–SV
AlphaServer DS20L Power Distribution Unit Installation Guide	EK–DS20L–PD

Information on the Internet

Visit the HP Web site at www.compaq.com for service tools and more information about the *HP AlphaServer* DS20L system.

Tru64 UNIX documentation is available at http://www.tru64unix.compaq.com/docs/

Chapter 1
Overview

1.1 System Features and Components

The AlphaServer DS20L is a 1U rack-mountable system that contains dual EV68B 833 MHz CPUs.

1.1.1 Features

The DS20L system is a 1U-sized dual processor system with up to 2 GB memory, two PCI slots, an optional CD-ROM drive, and a SCSI hard drive. Table 1–1 summarizes the features of the DS20L system.

Table 1–1 AlphaServer DS20L Product Features

Feature	Description
Physical Form Factor	1U Rackmount (1.75 inch x 17 inches x 20 inches).
CPUs	Two Alpha 21264B 833 MHz CPUs.

Continued on next page

Table 1-1 AlphaServer DS20L Product Features (continued)

Feature	Description
Main Memory	Up to eight 168-pin dual inline memory modules (DIMMs); Min 512 MB, Max 2 GB.
	Supports phase locked loop (PLL) or register-based synchronous direct random access memory (SDRAM) serial presence detect (SPD) modules of 128 MB, and 256 MB.
	Low-voltage transistor/transistor logic (LVTTL) compatible memory I/O.
Cache	External L2 cache with 128-bit data path supports:
	4MB cache per processor, DDR SRAMs.
Chipset	21272 (Tsunami) - One Cchip, four Dchips, and two Pchips provide the following:
	Maximum 166 MHz system bus with double data rate (DDR) transfers, maximum bandwidth of 2.67 Gbytes/second.
	One 256-bit memory bus.
	Two 64-bit, 33 MHz PCI buses.
Power	425 W DC PSU: (+)12Vdc and standby (+)5Vdc. Supplies all integrated devices and up to 10A to PCI slots (25W) and 2A to internal disk drive (25W).
Network Controller	Dual 10/100 fast Ethernet network controllers.
Expansion	Two 2/3 length 64-bit PCI slots; 33 MHz.

Table 1-1 AlphaServer DS20L Product Features (continued)

Feature	Description
Disk controller	Embedded Ultra3SCSI controller for internal SCSI disk drive.
Storage	Two storage bays – one 3.5" x 1" hard drive bay, one CD-ROM drive bay.
	Optional CD-ROM
	18.2-GB, 36.4-GB, and 72.8-GB UltraSCSI disk drives that can connect to the embedded SCSI disk controller.
Expansion Ports	Parallel – One bidirectional enhanced port.
	Serial – Two full-duplex asynchronous ports (COM1, COM2)
Firmware	SROM, Alpha Diagnostics, and SRM.
Operating System Support	Minimum OS support: Tru64 UNIX V5.1A, New Hardware Delivery-4 (NHD-4) for Tru64 UNIX Version 5.1A, and the most recent Tru64 UNIX V5.1A Patch Kit
	Tru64 UNIX: Pre-installed software (V5.1A + NHD4), 2-user base license
	Linux-ready systems: Red Hat 7.1 or SuSe 7.1 may be purchased separately from a Linux distributor.
System Management (via PCI Bridge I^2C Controller or System Management Expansion Connector J40)	Monitoring of processor and motherboard voltages and system thermal state.
	Detection of processor and motherboard presence, versions, and asset record.
	Detection of system and power-supply status and power-supply inhibiting.
	Indication of system error for both hardware- and software-detected problems.
	Monitoring of system fan speeds.

1.1.2 Components

The DS20L system has the following observable components:

Enclosure	The system enclosure measures 1.75 inches high by 17.5 inches wide by 20.5 inches deep.
Fans	There are a total of 11 fans in the DS20L system: five on the front of the system (connected by cables to the system motherboard) and six mounted internally. Two of the six *internal* fans are located between the hard drive bay and the PCI card assembly. These are cabled onto the PCI riser. Another fan cabled onto the PCI riser is located near the I/O board; and the three visible from the back of the system cool the power supply.
Bezel	The system has a removable front bezel.
Power Supply	The DS20L system is equipped with a 275-watt AC power (typical input power) 100-240 VAC 47-63 Hz power supply.
Storage Bay	The system includes a custom mounting kit that allows the installation of a one-inch-high 80-pin SCA SCSI disk drive.
CD-ROM Bay	The system accommodates an optional slimline CD-ROM drive; its bay is located on top of the storage bay.

1.2 Specifications

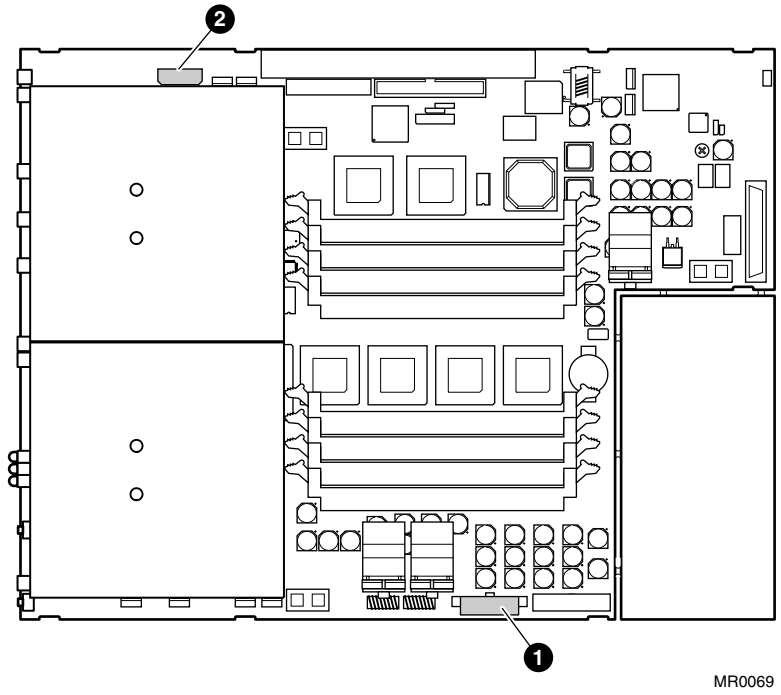
This section describes relevant AlphaServer DS20L specifications.

1.2.1 Power Connectors

Figure 1-1 shows the two power connectors for the DS20L enclosure.

The main power connector provides single 12 VDC power (Figure 1-1, ❶) and 5V standby power. The main power connector pinout is non-standard. There are several voltage regulators on the motherboard to generate various voltages required by the system. The disk power connector (❷) supplies power for the hard drive.

Figure 1-1 Power Connectors



❶ Main power connector - one 7x2 (14-pin)

❷ Disk power connector - one 4x1 (4-pin)

1.2.2 Estimated Power Consumption

The typical power consumption for the *AlphaServe*r DS20L is 275 watts AC.

1.2.3 Environmental

Table 1–2 lists the environmental requirements for the DS20L system.

Table 1–2 Environmental Parameters

Parameter	Specification	
Temperature	Operating	50 to 95°F/10 to 35°C
	NOTE: *Maximum operating temperature at sea level; reduce by 1.0F per 1,000 ft (1.8C per 1,000 m) above sea level.*	
	Non-operating	41 to 122°F/5 to 50°C
	Storage (60 days)	-40 to 151°F/-40 to 66°C
	Rate of change (operating)	20°F/hr / 11C°/hr
Relative Humidity	Operating	10% to 90%
	Non-operating	10% to 95%
	Storage (60 days)	10% to 95%
Maximum Wet Bulb Temperature	Operating	82°F/28°C
	Non-operating	90°F/32°C
	Storage (60 days)	115°F/46°C
Heat Dissipation	Typical configuration:	939 BTU/hr
	2 GB memory 1 hard disk 1 CD-ROM 2 PCI option cards	

Table 1-2 Environmental Parameters (continued)

Parameter	Specification	
Airflow and Quality	Intake location	Front
	Exhaust location	Rear
	Particle size	N/A
	Concentration	N/A
Altitude	Operating	10,000 ft/3,048 m
	Non-operating	40,000 ft/12,192 m
	NOTE: *Higher altitudes are possible if maximum operating temperature is reduced (see Temperature); other restrictions may apply such as maximum permissible altitude for hard drives.*	

1.2.3.1 Safety

The AlphaServer DS20L power supply *must* be connected to a properly grounded, single-phase AC power outlet.

The DS20L (Series EA2014) system meets registered product-safety certification for the U.S. and Canadian Underwriters Laboratories (UL and CUL).

1.2.3.2 EMC

Hewlett-Packard recommends the use of high-quality, shielded cables for all external I/O.

The *AlphaServer* DS20L (Series EA2014) meets electro-magnetic-compatibility (EMC) requirements for the following:

- Federal Communications Commission (FCC) 47 CFR Part 15 Class A (USA)
- EN 55022:1998 Class A ITE emissions requirements (EU)
- EN55024:1998 immunity requirements (EU)

- VCCI Class A ITE (Japan)
- AS/NZS 3548:1995/ Class A ITE (Australia)
- CNS13438 Class A (Taiwan)
- The DS20L is designed for professional use in cluster applications. DS20L clusters deployed in European Community (EC) countries must be configured with a minimum of four (4) DS20Ls to meet the requirements of EN61000-3-2. Hewlett-Packard has certified and labeled the DS20L as European Conforming (CE) compliant based on the minimum four (4) node installation requirement.

1.2.3.3 Thermal

The DS20L system is designed with a high-performance cooling system to maintain internal component temperatures within desired operating ranges. Proper operation of the cooling system requires that the front of the enclosure receives an adequate supply of air. If the system is installed behind a grill or other obstruction, it should be no more restrictive than the standard bezel: approximately 50% open with no shadows. Table 1–2 lists all relevant environmental requirements.

1.2.4 Physical

Table 1–3 gives the physical dimensions of the *AlphaServer* DS20L.

Table 1–3 Physical Dimensions

Dimension	Value
Length	20.5 in / 52 cm
Width	17.5 in / 44.5 cm
Height	1.75 in / 4.5 cm (1U)
Weight	21 lbs / 9.4 kg

1.2.4.1 I/O

The rear-panel connectors are integral to the *AlphaServer* DS20L chassis. The system uses a custom I/O board to provide connections for two serial ports, one parallel port, and two Ethernet RJ45 ports.

The DS20L external rear-panel connectors are shown in Figure 1-5.

1.2.5 Acoustical

The following table shows the *AlphaServer* DS20L (Series EA2014) acoustical specifications.

Preliminary declared values per ISO 9296 and ISO 7779:

	L_{WAd}, B		**L_{pAm}, dBA** (bystander positions)	
	Idle	Operate	Idle	Operate
With 1 or 0 HDD	6.7	6.7	51	51

Current values for specific configurations are available from Hewlett-Packard representatives. 1 B = 10 dBA.

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

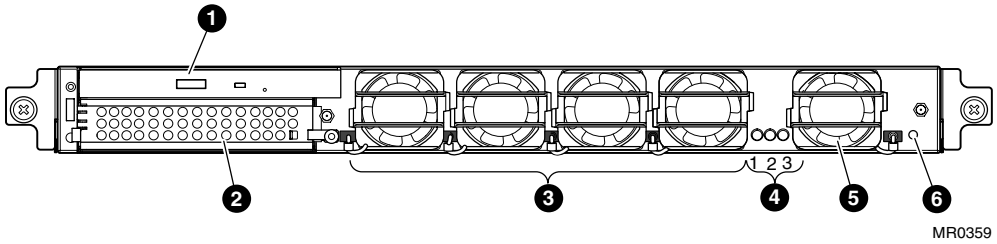
	Schalleistungspegel **L_{WAd}, B**		Schalldruckpegel **L_{pAm}, dBA** (Zuschauerpositionen)	
	Leerlauf	Betrieb	Leerlauf	Betrieb
mit 1 oder 0 HDD	6,7	6,7	51	51

Aktuelle Werte für speziele Ausrüstungsstufen sind uber die Hewlett-Packard Vertretungen erhältelich. 1 B = 10 dBA.

1.3 Front Panel Controls and Indicators

The front panel of the DS20L system contains five fans with connectors to the motherboard, a slimline CD-ROM drive bay, a hard disk drive bay, and three LEDs.

Figure 1-2 Front View of the System



❶ CD-ROM drive (optional)

❷ Hard disk storage bay

❸ Four fans (connected to motherboard)

❹ System LEDs (see Section 5.1 for detailed information)

❺ Fifth fan (connected to motherboard)

❻ Halt button (recessed in hole)

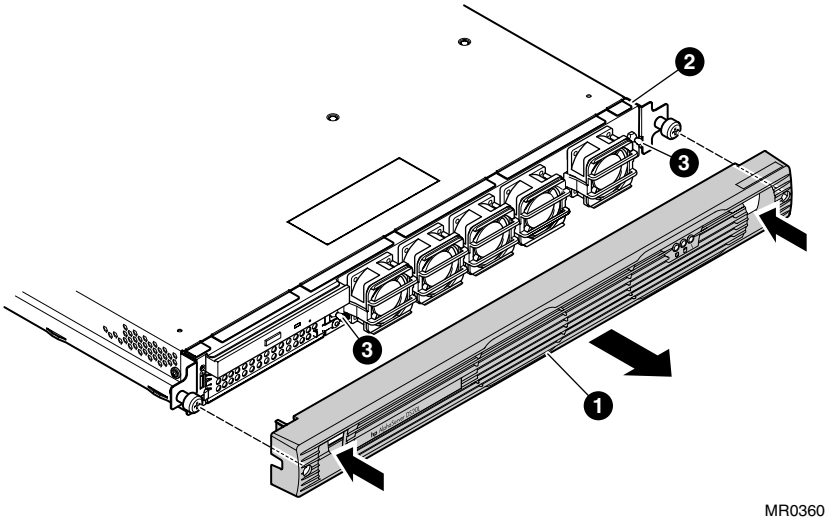
1.3.1 Removing the Front Bezel

The front bezel must be removed to insert or eject a CD.

Figure 1-3 shows how to remove the front bezel ❶ from the enclosure ❷.

1. Place a finger in each side tab of the bezel and pull it gently forward to disengage the bezel from the tabs ❸ on the front of the enclosure.
2. Reverse these procedures to replace the bezel.

Figure 1-3 Removing the Front Bezel



1.3.2 Inserting or Ejecting a CD

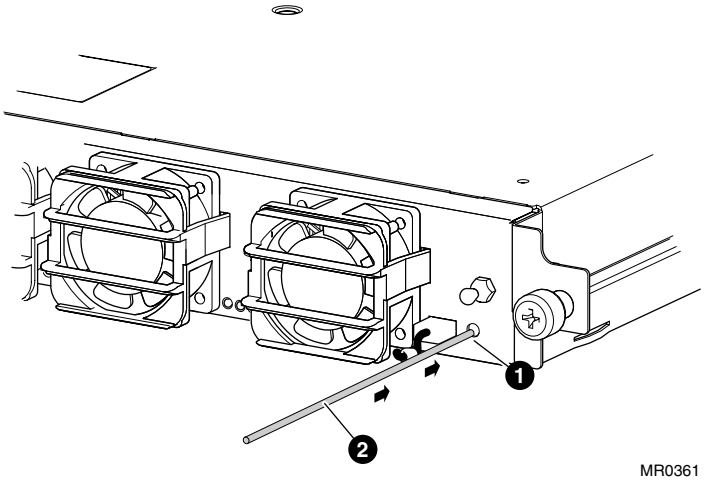
The front bezel must be removed to insert or eject a CD; refer to 1.3.1. When you are finished using the CD-ROM drive, reattach the front bezel.

1.3.3 Halt Button

The AlphaServer DS20L has a Halt button under the front bezel.

The Halt button is accessible through an opening on the front panel of the system. To use it, remove the bezel (see Section 1.3.1) and insert a slender object through the access hole to push it in. See Figure 1-4.

Figure 1-4 Halt Button Location



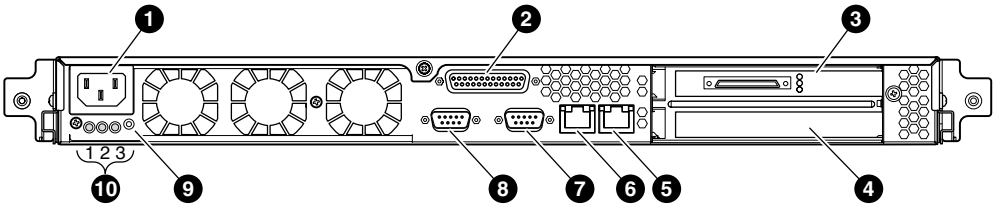
❶ Halt button recessed in cabinet

❷ Long slender object used to reach button

1.4 Rear Panel Ports, Slots, and Indicators

The I/O rear panel contains the dual Ethernet connectors and the parallel and dual serial connectors.

Figure 1-5 Rear View of the System



❶ AC power connector

❷ Parallel port

❸ PCI bus 1

❹ PCI bus 0

❺ Ethernet (for Tru64 UNIX, port 1; for Linux, port 0); two LEDs [1]

❻ Ethernet (for Tru64 UNIX, port 0; for Linux, port 1); two LEDs [1]

❼ COM1

❽ COM2

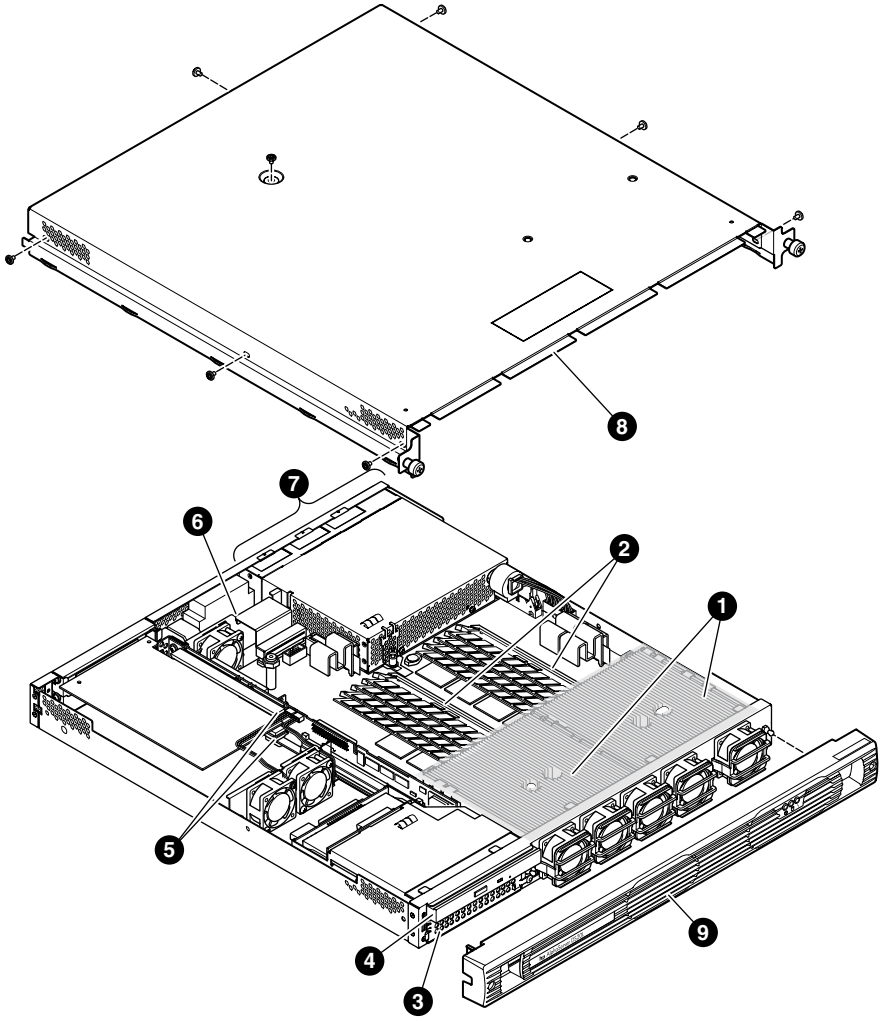
❾ On/Off button

❿ System LEDs (See Section 5.1 for detailed information on all LEDs.)

1.5 Internal View of the System

The AlphaServer DS20L has dual CPUs in a 1U enclosure.

Figure 1-6 Internal View of the System



❶ Dual CPUs; left – CPU 1, right – CPU 0, as oriented in illustration

❷ Memory slots

❸ Hard drive bay

❹ CD-ROM bay

❺ PCI slots located on the PCI riser

❻ I/O daughter card

❼ Power supply

❽ Cover

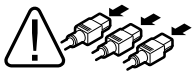
❾ Front bezel

Chapter 2
Installation and Options

2.1 System Setup and Installation

The AlphaServer DS20L is rack-mountable in M-Series racks. Whether in a rack, or in a stand-alone configuration, first connect all external devices, then connect the system to a grounded AC power source.

WARNING: To prevent injury, access is limited to persons who have appropriate technical training and experience. Such persons are expected to understand the hazards of working within this equipment and take measures to minimize danger to themselves or others. These measures include:
1. Remove any jewelry that may conduct electricity.
2. Power down the system and wait 2 minutes to allow components to cool.
3. Wear an anti-static wrist strap when handling internal components.



WARNING: To prevent injury, unplug the power cord from each system's power supply before installing components.

2.1.1 Rackmounting

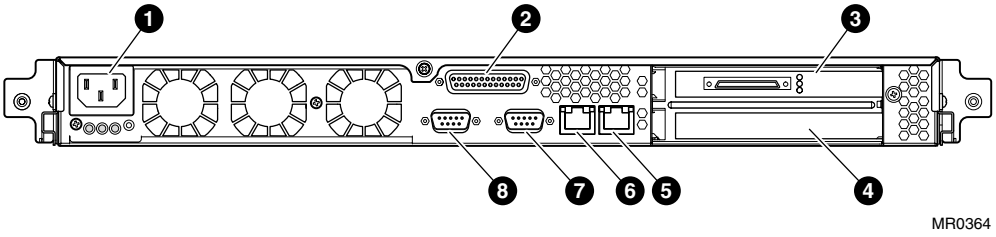
See the documentation that came with your rack rails for installing the *AlphaServer* DS20L in an M-Series rack.

2.1.2 Connecting the System

Connect the appropriate external devices first, then connect the AC power cord to the DS20L and a grounded power source.

Figure 2-1 shows the location of all connectors.

Figure 2-1 Rear Connectors



❶ AC power connector

❷ Parallel port

❸ PCI bus 1

❹ PCI bus 0

❺ Ethernet (for Tru64 UNIX, port 1; for Linux, port 0)

❻ Ethernet (for Tru64 UNIX, port 0; for Linux, port 1)

❼ COM1

❽ COM2

2.2 Installing Options

This section describes how to remove the bezel and/or cover and install memory, PCI options, CD-ROM, or a hard drive.

2.2.1 Bezel Removal

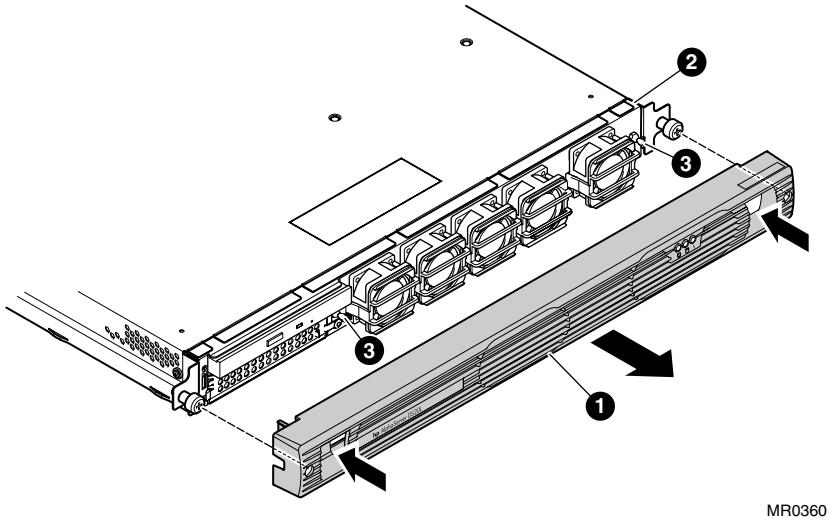
NOTE: *It is not necessary to remove the front bezel to open the cover to access the inside of the enclosure.*

You only have to remove the front bezel if you need to access the front of the enclosure to insert or remove a CD, to remove or install the hard drive or the CD-ROM drive, or remove the system from a rack.

Figure 2-2 shows how to remove the front bezel ❶ from the enclosure ❷.

1. Place a finger in each side tab of the bezel and pull it gently forward to disengage the bezel from the tabs ❸ on the front of the enclosure.

Figure 2-2 Removing the Front Bezel

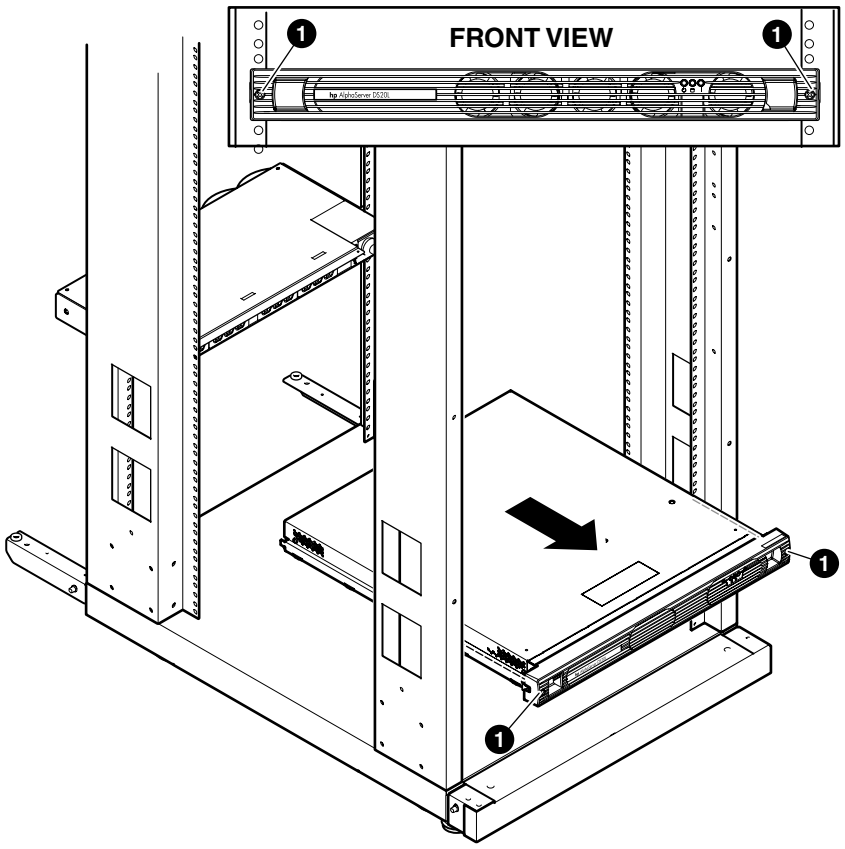


2.3 Removal from a Rack

If the system is mounted in a rack, refer to Figure 2-3 and follow these procedures to remove it from the rack in order to open the cover.

1. Remove power from the system.
2. Disconnect all external cables from the system.
3. Loosen the two captive screws ❶ that hold the system's chassis slides to the rack rails, and lift the system forward and out of the rack.
4. To replace the system in the rack, reverse these steps as necessary.

Figure 2-3 Removing the System from a Rack

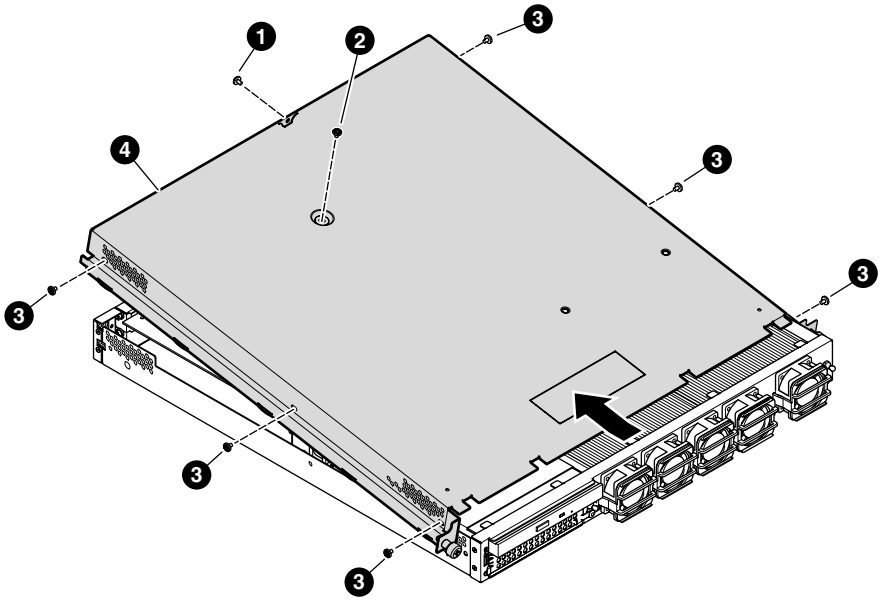


2.3.1 Removing the Cover

To remove the cover, refer to Figure 2-4 and follow these steps:

1. Remove power from the system.
2. Remove the retaining screw ❶ from the rear of the cover.
3. Remove the top screw ❷.
4. Remove three screws ❸ from each side of the cover ❹.
5. Slide the cover back and lift it away from the system.

Figure 2-4 Removing the Cover



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2.3.2 Memory

Memory may be added to or removed from the AlphaServer DS20L.

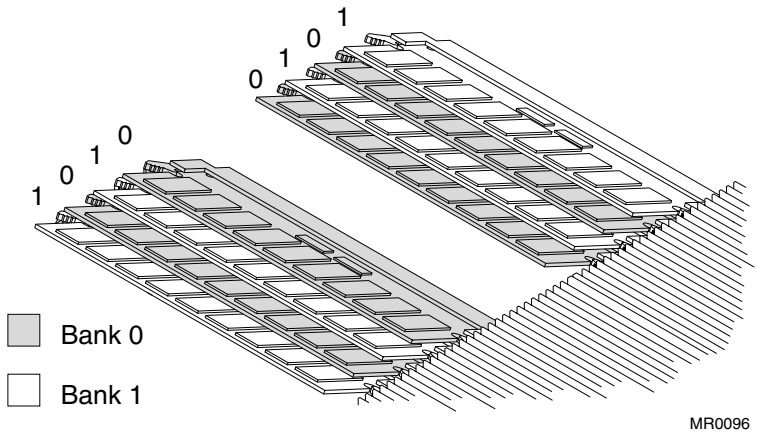
Each memory bank has four slots that accept 168-pin PC100 SDRAM PLL registered/buffered based SPD DIMMs. Memory is supported in a size range from 512 MB to 2 GB.

There are two DIMM banks designated Bank 0 and Bank 1. The slots are arranged in an alternating pattern. See Figure 2-5.

2.3.2.1 Memory Configuration Rules

- A bank must be fully populated; that is, all four slots in a given bank (0 or 1) *must* be filled.
- Bank 0 must be populated first.
- A bank must use the same type, size, and speed DIMMs. Bank 0 and Bank 1 may have different type, size, and speed of DIMMs from each other, however.

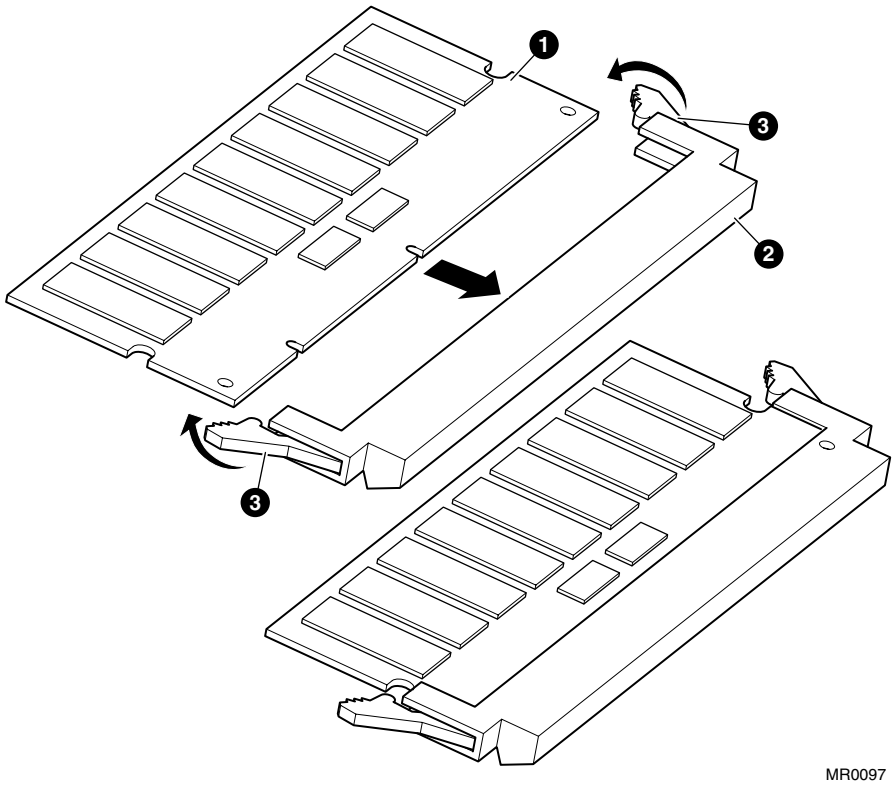
Figure 2-5 Memory Configuration



Refer to Figure 2-6 and follow these steps to add or remove memory.

1. Review the memory configuration and guidelines.
2. Remove the cover (see Section 2.3.1).
3. To insert a memory DIMM ❶, slide it into the appropriate memory slot ❷ and press down gently but firmly to engage the side tabs ❸.
4. To remove a memory DIMM, disengage the side tabs and lift it out from the slot.

Figure 2-6 Adding or Removing Memory



2.3.3 PCI Options

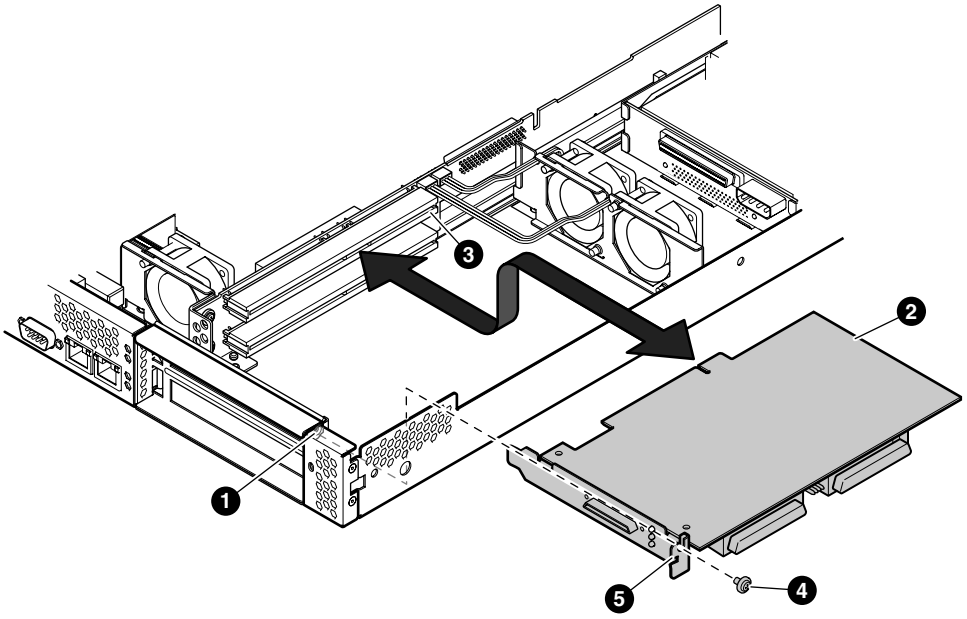
Refer to Figure 2-7 and follow these steps to add or remove PCI options.

CAUTION: *To prevent over-flexing the PCI riser or module, use your hands to support them as you install or remove the PCI module.*

1. Remove the cover (see Section 2.3.1).
2. Determine the slot ❶ you wish to use for the PCI module ❷. Remove the retaining screw and slot cover to expose the slot.
3. Line up the fingers and the notch on the PCI module with the appropriate connector on the PCI riser ❸. While supporting the back of the PCI riser, press the module into place in the slot.
4. Insert the retaining screw ❹ through the side of the enclosure and the PCI module's bracket ❺.

To remove a PCI module, remove the retaining screw. Grasp the PCI module and work out from its connector on the PCI riser.

Figure 2-7 Adding or Removing a PCI Module

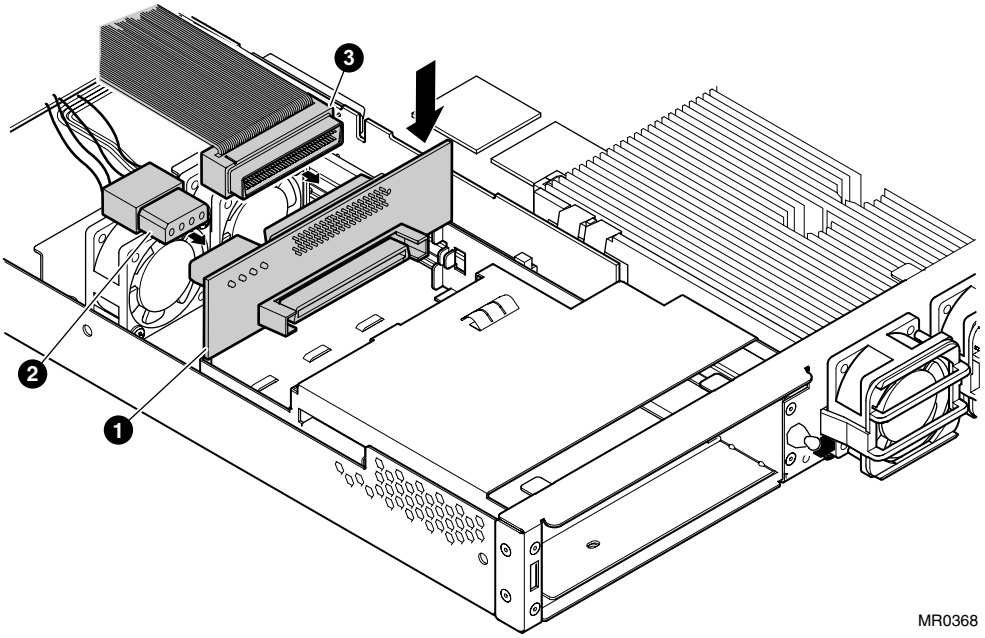


2.3.4 Hard Drive

Follow these steps to add or remove a SCSI hard drive.

1. Remove the front bezel (see Section 2.2.1) and cover (Section 2.3.1).
2. See Figure 2-8. Install the SCSI hard drive backplane ❶ (part of CK-DS20L-AA SCSI cable kit) onto its connector on the back of the SCSI hard drive. Attach the power cable connector ❷, and one end of the data cable to the backplane ❸.

Figure 2-8 Installing the SCSI Backplane



3. Lift the PCI riser and route the SCSI hard drive cable (17-05034-06) under the notch in the PCI riser card by following these steps.
   a. Refer to Figure 2-7 to remove any PCI option modules, then refer to Figure 2-9 for the remainder of these procedures.

CAUTION: *Do not remove the PCI fan bracket ❶ during these procedures. It holds and supports the motherbard in place, making it easier to unplug and lift the PCI riser.*

---

   b. Remove both screws attaching the PCI riser to its rear bracket ❷.
   c. Pull up on the entire PCI riser ❸ and slide it up and lift it free of the enclosure.

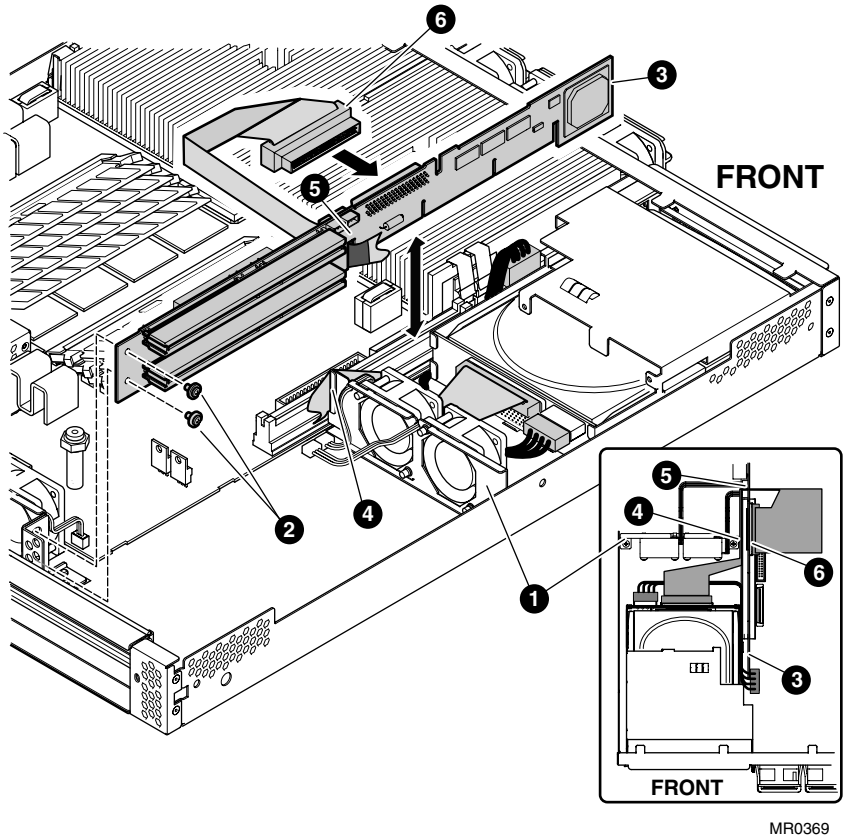
d. Route the SCSI cable through the notch in the PCI fan bracket ❹. One end of the SCSI cable was connected to the SCSI backplane in Step 3, above.

e. Slide the protector on the SCSI cable into the notch ❺ on the PCI riser.

f. Push down firmly and squarely on the PCI riser to seat it back in the motherboard (making sure that the cable remains positioned in the notch) and secure the two screws to the rear bracket.

g. Connect the end of the SCSI cable to its connector on the PCI riser.

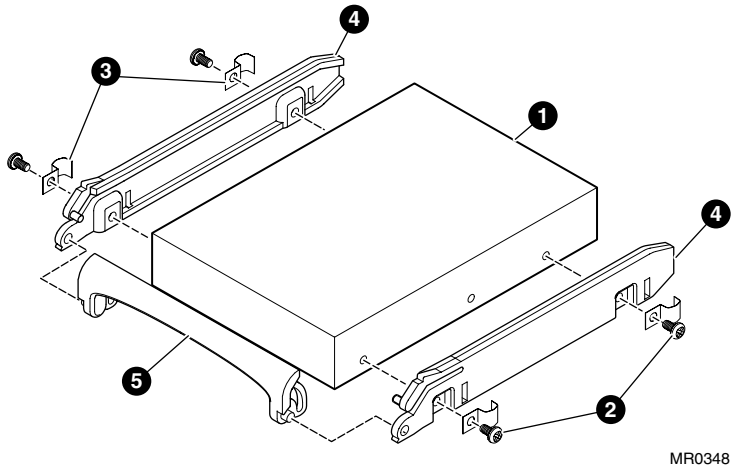
Figure 2-9 Routing SCSI Cable to the PCI Riser



4. See Figure 2-10. Assemble the SCSI drive carrier by attaching the right and left arms ❶ with four tension clips ❷ and four UNC screws ❸ as shown, ensuring that the handle ❹ is secured to the drive ❺ by the front of the arms.

NOTE: *When installing the arms, bias them upward as high as possible on the disk to ensure that the disk does not interfere with the CD-ROM.*

Figure 2-10 Assembling and Installing the SCSI Hard Drive Carrier

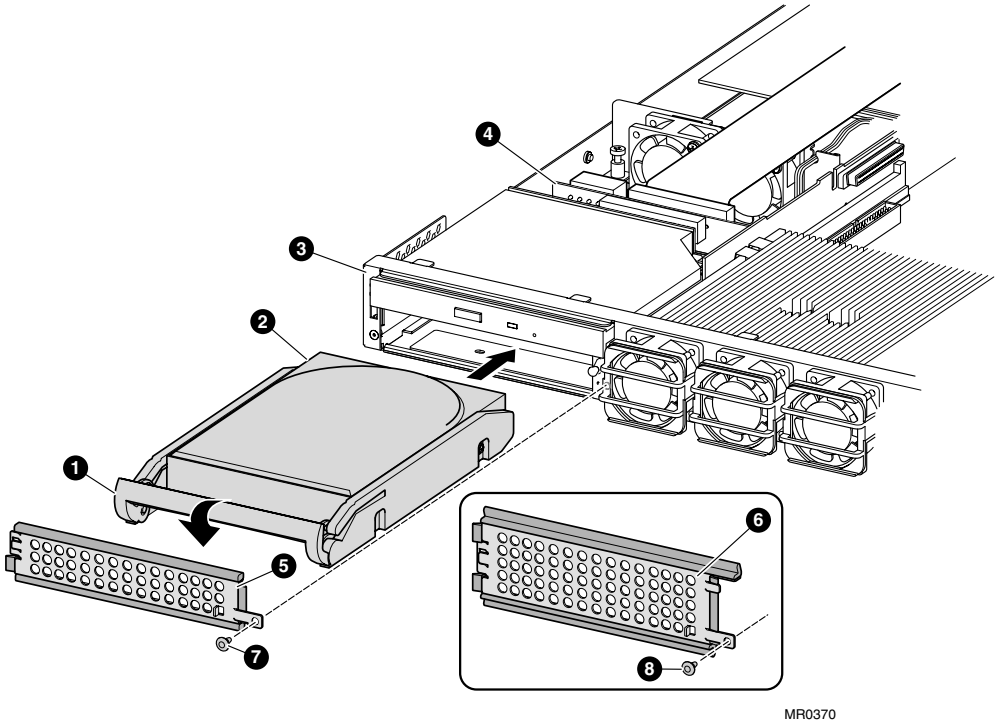


5. See Figure 2-11; with the handle ❶ rotated forward, slide the assembled hard drive and carrier ❷ into the enclosure ❸. Ensure that the drive is connected securely into the SCSI backplane ❹ as shown.

6. Insert the hard drive shield, either ❺ or ❻, into the enclosure, sliding it from right to left to seat the left-hand tabs. (Use ❺ if you have a CD-ROM drive; use ❻ if your system does *not* have a CD-ROM drive.) Secure the drive with the captive snap-in fastener ❼ or ❽.

CAUTION: *If you are installing a SCSI drive, prevent over-flexing backplane by using your hand to support the backplane as you slide the drive into its connector.*

Figure 2-11 Installing the Hard Drive Assembly



7. To remove a SCSI hard drive assembly from the system, the hard drive carrier from the drive, the SCSI backplane, or hard drive cables, reverse these steps as necessary.

2.3.5 CD-ROM

A CD-ROM may be added to or removed from the AlphaServer DS20L.

NOTE: *If you are installing a CD-ROM for the first time, you will have to remove the hard drive shield that is on your system (Figure 2-11 ❺), and replace it with the one that came with the CD-ROM drive (Figure 2-11, ❻), to allow access to operate the CD-ROM.*

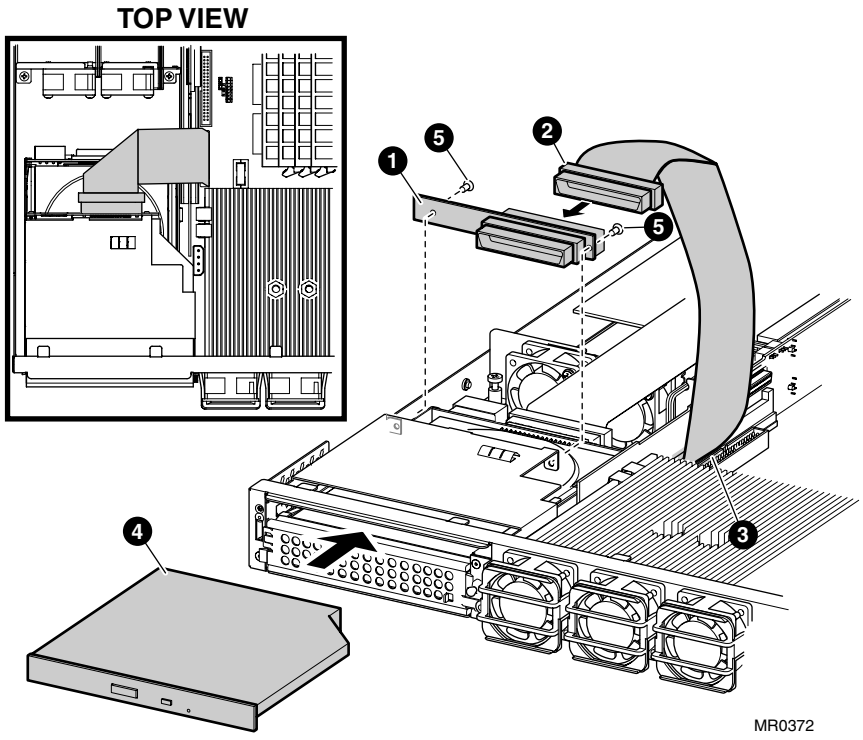
To add or remove a CD-ROM, refer to Figure 2-12 and follow these steps.

1. Remove the front bezel (see Section 2.2.1) and cover (Section 2.3).
2. Install the CD-ROM backplane ❶, attach the combined power and data cable ❷ (17-05140-01), route it over the PCI riser, and connect the other end to the motherboard as shown ❸.
3. Slide the CD-ROM ❹ rearward into its bay.
4. Push the CD-ROM backplane into its connector on the CD-ROM, and attach the two screws ❺ that hold it in place.

To remove a CD-ROM or the CD-ROM backplane from the system, reverse these steps as necessary.

NOTE: *To access the CD-ROM carrier tray after installation, it is necessary to remove the front bezel (see Section 2.2.1) and replace it when you are through.*

Figure 2-12 Installing the CD-ROM



Chapter 3
Operation

3.1 Powering Up the System

This section describes how to turn on the system and what happens when you do.

3.1.1 Turning the System On

After installing the system as discussed in Chapter 2, push the On/Off button to power up the system (see Figure 1-5 ❾ for the location of the On/Off button). Check the LEDs to ensure that the system has power and that there are no initial errors.

3.1.1.1 LEDs

There are two sets of LED system status indicators on the *AlphaServer* DS20L, one set on the front of the system (see Figure 1-2 ❹), and one set on the rear (see Figure 1-5 ❿). Also, each of the network connectors has two LEDs that indicate speed and activity (Figure 1-5 ❺ and ❻).

See Section 5.1 for a listing of all LEDs and their meaning.

3.1.2 SROM Code

When the system is turned on or reset, SROM code automatically loads into Icache in each CPU. The SROM code then:

- Initializes the CPU.
- Detects configuration jumpers and CPU memory configuration.
- Initializes chipset values, including memory timing, Cchip, Dchip, and Pchip registers.

- Performs power-on self-test (POST) of the basic system needed to run diagnostics (memory, etc.).
- Initializes the system memory.
- Initializes the L2 cache.
- Loads diagnostic firmware used by Hewlett-Packard Customer Services engineers.

3.1.4 Alpha SRM Console

The Alpha SRM console firmware provides service functions commonly provided in most computer systems, including the following:

- I/O subsystem initialization
- Operator interface
- OS bootstrap and restart

The SRM console firmware provides Palcode for Tru64 UNIX operating systems.

Users communicate with the SRM console via the COM1/COM2 serial ports. SRM console firmware supports the use of the VT-style terminal attached to the standard serial ports. The SRM console firmware provides a command-line interface with a single UNIX-like shell that has a simple scripting facility. The default settings for COM1/COM2 are 9600 baud, 1 stop bit, and no parity.

3.1.5 Power-Up Display

The power-up display shows the results of power-on self-test (POST).

AlphaServer DS20L systems may have various options that will cause the power-up display to differ slightly from the sample shown here.

Testing begins after pressing the On/Off button, and screen text similar to that in Example 3–1 displays.

Example 3–1 Power-Up Display - Serial Console

```
!!

initializing GCT/FRU at 1e0000
Testing the System
Testing the Memory
Testing the Disks (read only)
Testing ei* devices.

hp AlphaServer DS20L 833 MHz Console V5.9-16, 18-OCT-2001 15:38:57
P00>>>
P00>>> ❶
```

❶ The SRM console banner and prompt P00>>> are printed.
The SRM console is a command-line interface you use to set or read system parameters.

If the **auto_action** environment variable is set to **boot** or **restart** and the **os_type** environment variable is set to **unix**, the system will automatically boot the Tru64 UNIX operating system and not halt at the SRM console (assuming a bootable Tru64 UNIX disk is available and boot parameters are properly set) Refer to Section 3.2.1 for details.

3.2 Operating Systems

This section discusses booting the Tru64 UNIX and the Linux operating systems, and starting an installation of the operating systems.

NOTE: *Your system may have factory-installed software (FIS); that is, the operating system has already been installed. If so, refer to the FIS documentation included with your system to boot the operating system for the first time. Linux-ready systems do not come with factory-installed software.*

3.2.1 Setting Boot Options

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

auto_action	Determines the default action the system takes when the system is power cycled, reset, or experiences a failure.
bootdef_dev	Device or device list from which booting is to be attempted when no path is specified on the command line.
boot_file	Specifies a default file name to be used for booting when no file name is specified by the **boot** command.
boot_osflags	Defines parameters (boot flags) used by the operating system to determine some aspects of a system bootstrap.
ei*0_inet_init or **ew*0_inet_init**	Determines whether the interface's internal Internet database is initialized from nvram or from a network server (through the bootp protocol). Set this environment variable if you are booting Tru64 UNIX from a RIS server.
ei*0_protocols or **ew*0_protocols**	Defines a default network boot protocol (bootp or mop).

3.2.1.1 auto_action

The SRM auto_action environment variable determines the default action the system takes when the system is power cycled, reset, or experiences a failure.

Systems can boot automatically (if set to autoboot) from the default boot device under the following conditions:

- When you first turn on system power
- When you power cycle or reset the system
- When system power comes on after a power failure
- After a panic

The factory setting for **auto_action** is **halt**. The **halt** setting causes the system to stop in the SRM console. You must then boot the operating system manually.

For maximum system availability, **auto_action** can be set to **boot** or **restart**.

- With the **boot** setting, the operating system boots automatically after the SRM **init** command is issued.
- With the **restart** setting, the operating system boots automatically after the SRM **init** command is issued, and it also reboots after an operating system crash.

Example

To set the default action to **boot**, enter the following SRM commands:

```
P00>>> set auto_action boot
P00>>> init
```

3.2.1.2 bootdef_dev

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

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

The syntax is:

set bootdef_dev *boot_device*

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

Example

In this example, two boot devices are specified. The system will try booting from dqb0 and, if unsuccessful, will boot from dkb0.

```
P00>>> set bootdef_dev dqb0, dkb0
```

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

3.2.1.3 boot_file

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

The syntax is:

set boot_file *filename*

Example

```
P00>>> set boot_file ""
```

NOTE: *This command clears the boot file setting and sets the string to empty.*

3.2.1.4 boot_osflags

The boot_osflags environment variable sets the default boot flags.

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

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

The syntax is:

set boot_osflags *flags_value*

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

Tru64 UNIX Systems

Tru64 UNIX systems take a single ASCII character as the *flags_value* argument.

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

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

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

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

Example

The following setting will autoboot Tru64 UNIX to multiuser mode when you enter the **boot** command.

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

Linux Systems

If aboot.conf contains (0: 1/vmlinux.gz ro root=/dev/sda2), the system can be booted by one of the following methods:

1.

```
set boot_file
set boot_osflags 0
boot dkb0
```

---or---

2.

```
boot dkb0 -file "" -flags 0
```

---or---

3.

```
set boot_file 1/vmlinuz.gz
set boot_osflags "ro root=/dev/sda2"
boot dkb0
```

Example

Single-user mode is typically used for troubleshooting. To make system changes at this run level, you must have read/write privileges. The command to boot Linux into single-user mode is similar to the following example where "*f*" root is in partition 2 of dka0, and the kernel is in /boot/Compaq.gz.

```
P00>>> boot -file "1/vmlinux.gz" -flags "root=/dev/sda2 rw single"
```

Example

The following command sets the **boot_osflags** environment variable for Linux:

```
P00>>> set boot_osflags 0
```

3.2.1.5 ei*0_inet_init or ew*0_inet_init

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

Legal values are **nvram** and **bootp**. The default value is **bootp**. Set this environment variable if you are booting Tru64 UNIX from a RIS server.

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

The syntax is:

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

Example

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

3.2.1.6 ei*0_protocols or ew*0_protocols

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

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

The syntax is:

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

The option for *protocol_value* is limited to **bootp**:

bootp Sets the network protocol to bootp, the setting typically used with the Tru64 UNIX operating system.

Example

```
P00>>> show device
.
.
.
ewa0.0.0.1001.0     EWA0          08-00-2B-3E-BC-B5
ewb0.0.0.12.0       EWB0          00-00-C0-33-E0-0D
ewc0.0.0.13.0       EWC0          08-00-2B-E6-4B-F3
.
.
.
P00>>> set ewa0_protocols bootp
P00>>> show ewa0_protocols
ewa0_protocols        bootp
```

3.2.2 Booting Tru64 UNIX

Tru64 UNIX can be booted from a local disk or from a Remote Installation Services (RIS) server over a local area network.

To boot from a RIS server, you must first register your system as a RIS client. Refer to the Tru64 UNIX *Sharing Software on a Local Area Network* manual for information about setting up and using RIS and the Tru64 UNIX *Installation Guide - Advanced Topics* manual for information about installing Tru64 UNIX from a RIS server.

3.2.2.1 Booting from a Local Disk

Example 3–2 Booting Tru64 UNIX from a Local Disk

```
P00>>> sh boot* ❶
boot_dev                dkb0.0.0.5.0
boot_file
boot_osflags            A
boot_reset              OFF
bootbios
bootdef_dev             dkb0.0.0.5.0
booted_dev
booted_file
booted_osflags
P00>>> show device ❷
dkb0.0.0.5.0               DKB0              COMPAQ BF01865222  B004 ❸
dqb0.0.1.16.0              DQB0          SAMSUNG CD-ROM SN-124  q008
eia0.0.0.3.1               EIA0              00-02-56-00-08-7A
eib0.0.0.4.0               EIB0              00-02-56-00-08-79
pka0.7.0.3.0               PKA0                  SCSI Bus ID 7
pkb0.7.0.5.0               PKB0                  SCSI Bus ID 7
P00>>> b ❹
(boot dkb0.0.0.5.0 -flags A)
block 0 of dkb0.0.0.5.0 is a valid boot block
reading 14 blocks from dkb0.0.0.5.0
bootstrap code read in
base = 200000, image_start = 0, image_bytes = 1c00
initializing HWRPB at 2000
initializing page table at 1ff4a000
initializing machine state
setting affinity to the primary CPU
jumping to bootstrap code
.
The system is ready.
Compaq Tru64 UNIX V5.1A (Rev. 1885) (hpsq5) console ❺
login:
```

❶ The **show boot** command displays the current default boot device.

❷ The **show device** command displays device information, including name and type of connection to the system.

❸ The operating system is on this device. The name of this device, dkb0, is used as an argument to the **boot** command.

❹ This command loads Tru64 UNIX from the disk dkb0, using the boot file vmunix and autobooting to multiuser mode.

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

❺ The operating system banner displays.

3.2.2.2 Booting from a Remote Disk

Example 3–3 Booting Tru64 UNIX from a Remote Disk

```
P00>>> show device ❶
. . .
eia0.0.3.1          EIA0    08-00-2B-E2-9C-60 ❷

>>>
>>> boot -flags an -protocols bootp eia0 ❸
(boot eia0.0.3.1 -flags an)
Building FRU table

Trying BOOTP boot.

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

Secondary boot program - Thu Oct 18 22:33:13 EST 2001

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

Tru64 UNIX Version V5.1A (sabl28.eng.pko.dec.com) console ❹
```

❶ The **show device** command displays device information, including name and type of connection to the system.

❷ The operating system is on a remote disk, eia0. The name of this device, eia0, is used as an argument to the **boot** command.

❸ This command loads Tru64 UNIX from eia0, autobooting to multiuser mode.

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

❹ The operating system banner displays.

3.2.3 Starting a Tru64 UNIX Installation

Tru64 UNIX can be installed from the CD-ROM drive connected to the system or from a Remote Installation Services (RIS) server over a local area network. The user interface that you see after you boot your system depends on whether your system console is a VGA monitor or a serial terminal.

To install the operating system from a RIS server, you must first register your system as a RIS client. Refer to the Tru64 UNIX *Sharing Software on a Local Area Network* manual for information about setting up and using RIS and the Tru64 UNIX *Installation Guide - Advanced Topics* manual for information about installing Tru64 UNIX from a RIS server.

3.2.3.1 NHD4 and IPK Compatibility

You must install the NHD4 kit during a full installation of the operating system on a DS20L system. The kernel modules for the DS20L are included in the NHD4 kit. When you install NHD4, you must also install the most current TRU64 UNIX patch kit before you return your system to production. It does not matter which one you install first.

Example 3–4 Text-Based Installation Display

```
P00>>> b dqb0
(boot dqb0.0.1.16.0 -flags a)
block 0 of dqb0.0.1.16.0 is a valid boot block
reading 16 blocks from dqb0.0.1.16.0
bootstrap code read in
base = 200000, image_start = 0, image_bytes = 2000
initializing HWRPB at 2000
initializing page table at 1fff0000
initializing machine state
setting affinity to the primary CPU
jumping to bootstrap code

Tru64 UNIX boot - Thu Oct 18 15:03:19 EST 2001

Loading vmunix ...
.
.

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


*** Performing CDROM Installation
```

```
Loading installation process and scanning system hardware.


Welcome to the UNIX Installation Procedure

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

During the question and answer session, you can go back to any
previous question and change your answer by entering:  history
You can get more information about a question by entering:  help

There are two types of installations:

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

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

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

The Installation Guide contains more information about installing
UNIX.

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

Enter your choice:
```

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

A text-based installation procedure is displayed, as shown in Example 3–4. Enter the choices appropriate for your system.

See the *Tru64 UNIX Installation Guide* for complete installation instructions.

3.2.4 Installing and Booting Linux

Obtain the Linux installation document and install Linux on the system. Then verify the firmware version, boot device, and boot parameters, and issue the boot command.

You need V5.6-3 or higher of the SRM console to install Linux. If you have a lower version of the firmware, you will need to upgrade. For instructions and the latest firmware images, see the following URL.

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

The procedure for installing Linux on an Alpha system is described in the Alpha Linux installation document for your Linux distribution. The installation document can be downloaded from the following Web site:

http://www.compaq.com/alphaserver/linux

Linux Boot Procedure

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

```
P00>> show version
version                 V5.6-3 Mar 12 2001 08:36:11
P00>>
```

2. Enter the **show device** command to determine the unit number of the drive for your boot device, in this case dkb0.0.0.5.0.

```
P00>>> show device
dkb0.0.0.5.0               DKB0              COMPAQ BF01865222  B004
dqb0.0.1.16.0              DQB0           SAMSUNG CD-ROM SN-124  q008
eia0.0.0.3.1               EIA0              00-02-56-00-08-7A
eib0.0.0.4.0               EIB0              00-02-56-00-08-79
pka0.7.0.3.0               PKA0                  SCSI Bus ID 7
pkb0.7.0.5.0               PKB0                  SCSI Bus ID 7
P00>>>
```

3. Ensure that the SRM console environment sysvar is set to 5 prior to installing or booting Linux.

```
P00>>> set sysvar 5
P00>>> init
```

4. When switching back from Linux to Tru64 UNIX, verify that the SRM console environment sysvar is equal to 12.

```
P00>>> set sysvar 12
P00>>> init
```

5. After installing Linux, set **boot** environment variables appropriately for your installation. The typical values indicating booting from dka0 with the first aboot.conf entry are shown in this example.

```
P00>>> set bootdef_dev dkb0
P00>>> set boot_file
P00>>> set boot_osflags 0
P00>>> show boot*
boot_dev                  dkb0.0.0.5.0
boot_file
boot_osflags              0
boot_reset                OFF
bootdef_dev
booted_dev
booted_file
booted_osflags
```

6. From SRM enter the **boot** command. Example 3–5 shows an abbreviated **boot** output. This example shows messages similar to what you will see when booting Linux. The example is from a RedHat Linux 7.0 boot.

Example 3–5 Linux Boot Output

```
>>> boot
(boot dka0.0.0.8.0 -flags 0)
block 0 of dka0.0.0.8.0 is a valid boot block
reading 163 blocks from dka0.0.0.8.0
bootstrap code read in
base = 2d4000, image_start = 0, image_bytes = 14600
initializing HWRPB at 2000
initializing page table at 7fff0000
initializing machine state
setting affinity to the primary CPU
jumping to bootstrap code
aboot: Linux/Alpha SRM bootloader version 0.7
aboot: switching to OSF/1 PALcode version 1.87
aboot: booting from device 'SCSI 0 8 0 0 0 0 0'
```

```
aboot: valid disklabel found: 3 partitions.
aboot: loading uncompressed vmlinuz-2.4.3-7privateer2smp...
aboot: loading compressed vmlinuz-2.4.3-7privateer2smp...
aboot: zero-filling 369720 bytes at 0xfffffc0000ce9400
aboot: starting kernel vmlinuz-2.4.3-7privateer2smp with
arguments root=/dev/sda2 console=ttyS0
Linux version 2.4.3-7privateer2smp (root@privateer) (gcc
version 2.96 20000731 (Red Hat Linux 7.1 2.96-85)) #1 SMP Thu
May 24 11:01:14 EDT 2001
Booting GENERIC on Titan variation Privateer using machine
vector PRIVATEER from SRM
Command line: root=/dev/sda2 console=ttyS0
memcluster 0, usage 1, start        0, end      362
memcluster 1, usage 0, start      362, end   262135
memcluster 2, usage 1, start   262135, end   262144
freeing pages 362:1024
freeing pages 1700:262135
SMP: 4 CPUs probed -- cpu_present_mask = f
On node 0 totalpages: 262144
.
.
.
autorun ...
... autorun DONE.
NET4: Linux TCP/IP 1.0 for NET4.0
IP Protocols: ICMP, UDP, TCP, IGMP
IP: routing cache hash table of 16384 buckets, 256Kbytes
TCP: Hash tables configured (established 524288 bind 65536)
Linux IP multicast router 0.06 plus PIM-SM
NET4: Unix domain sockets 1.0/SMP for Linux NET4.0.
VFS: Mounted root (ext2 filesystem) readonly.
Freeing unused kernel memory: 432k freed
.
.
.
login:
```

3.3 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.

Example 3–6 Starting LFU from the SRM Console

Revision levels and devices listed are for example only; your results may vary.

```
>>> lfu

Checking dqb0.0.1.16.0 for the option firmware files. . .

Option firmware files were not found on CD or floppy.
If you want to load the options firmware,
please enter the device on which the files are located(ewa0),
or just hit <return> to proceed with a standard console update: dqb0

Please enter the name of the options firmware files list, or
Hit <return> to use the default filename (ds20lfw.txt)  :

Copying filename.txt from dqb0. . .
Copying filename1.ROM from dqb0. . .
Copying filename2.ROM from dqb0. . .



             ***** Loadable Firmware Update Utility *****
--------------------------------------------------------------------------
 Function    Description
--------------------------------------------------------------------------
 Display     Displays the system's configuration table.
 Exit        Done exit LFU (reset).
 List        Lists the device, revision, firmware name, and update revision.
 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> update *

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

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

                          DO NOT ABORT!

srm             Updating to 5.9-16...  Verifying 5.9-16...  PASSED.

UPD> exit
```

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.*

Use the Loadable Firmware Update (LFU) utility to update system firmware. From the SRM console, start LFU by issuing the **lfu** command (see Example 3–6).

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.

3.3.1 Updating Firmware from a Network Device

Updating firmware from a network device can be done using the bootp command or using a local MOP server.

Example 3–7 Updating Firmware from a Network Device

```
P00>>> boot -file ds20lsrm ❶ -proto bootp eia0
(boot eia0.0.0.3.1 -flags A)

Trying BOOTP boot.

Broadcasting BOOTP Request...
..
```

❶ Name of the firmware image (.exe extension) to be loaded.

You can also use the default image using this command.

```
P00>>> b eia0
```

Example 3–8 Updating Firmware Using a MOP Server

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

```
P00>>> boot -file v5917_shupdate ❶ -proto mop eia0
(boot eia0.0.0.3.1 -file v5917_shupdate -flags A)

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

Network load complete.
Host name: BESSIE
Host address: aa-00-04-00-06-74

bootstrap code read in
base = 200000, image_start = 0, image_bytes = 157c00
initializing HWRPB at 2000
initializing page table at 3ff48000
initializing machine state
setting affinity to the primary CPU
jumping to bootstrap code
1536 Meg of system memory
initializing GCT/FRU at 3ff3c000
```

```
                ***** Loadable Firmware Update Utility *****
--------------------------------------------------------------------------------
 Function    Description
--------------------------------------------------------------------------------

 Display     Displays the system's configuration table.
 Exit        Done exit LFU (reset).
 List        Lists the device, revision, firmware name, and update revision.
 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> u srm

Confirm update on:
srm
[Y/(N)]y
WARNING: updates may take several minutes to complete for each device.

                           DO NOT ABORT!

srm             Updating to 5.9-17...  Verifying 5.9-17...  PASSED.

UPD> ex


 Initializing....
Initializing...1536 Meg of system memory
initializing GCT/FRU at 1e0000
Testing the System
Testing the Memory
Testing ei* devices.

hp AlphaServer DS20L 833 MHz Console V5.9-17, Nov 28 2001 09:20:22
P00>>>
```

❶ Name of the firmware image (.SYS extension) to be loaded.

3.3.2 LFU Commands

The commands summarized in Table 3–1 are used to update system firmware. See Section A.13 for an example of the LFU command output.

Table 3–1 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.

display

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

exit

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

help

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

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

lfu

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

list

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

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

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

readme

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

update

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

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

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

---

verify

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

Chapter 4
Remote Management

This chapter contains an overview of the remote control features and describes how remote management is supported.

4.1 Overview

An *AlphaServer* DS20L system is usually configured in a network cluster with other rack-optimized nodes. Each system has integrated network interfaces so that management stations can be used for control rather than duplicating central management functions on each system. These management stations provide for remote access to the rest of the systems. DS20L systems include remote control features to permit remote station access to firmware and operating software.

Each DS20L system includes two on-board Ethernet controllers, two serial ports, and up to two PCI add-in adapters. The primary Ethernet controller supports optional special remote management control functions. (The wake-on-LAN utility highlighted in this chapter is supported only on the primary network interface port.) The secondary Ethernet controller is used for general-purpose network traffic including network management messages. The dual serial ports are used for firmware and operating system console access when not using the integrated Ethernet connections for console service. The add-in PCI adapters are used to enhance general network performance or for external peripheral devices.

Serial console access is primarily used for diagnostic access in or out of the rack. In rack-optimized configurations, serial port access is usually managed with network-capable terminal servers for access to command-line interfaces instead of remote network console access and management.

4.2 Basic Remote Control

The DS20L motherboard includes two Intel i82559 Ethernet controllers. Each controller is on a different host PCI bus (device 4 on host bus 0 and device 3 on host bus 1). The controller on host bus 0 is the primary controller (and its RJ45 connector is the left-hand one on the rear of the chassis; the other controller is the secondary controller. The primary Ethernet is kept separate and protected from general access when special management functions are enabled.

The power supply unit includes a pushbutton to start or shut down the system. The primary Ethernet controller is connected to the same motherboard logic so that the same control available with the pushbutton can be exercised remotely over the primary Ethernet network. This remote power-up/down does not require any software intervention (except to leave the Ethernet controller itself enabled). Normal Ethernet traffic can share the primary controller without affecting the power-up/down function.

The primary Ethernet controller is optionally configured to implement privileged operations such as secure login and server control commands.

4.2.1 Startup

When enabled for remote power control, the *AlphaServer* DS20L primary Ethernet controller EEPROM is programmed to enable recognition of a unique per system wake-up packet Ethernet message that will assert the WOL signal to the power sequencing logic. Both the power sequencer and the primary Ethernet controller are powered by the power supply standby output and so are always enabled so long as main AC is present.

The system is shipped with the optional wakeup packet recognition disabled. To enable it, use the administrative command

```
/usr/sbin/cs20wolon
```

on each system to be remotely powered up/down.

Each motherboard is labeled with the Ethernet address of the primary controller (for example, the primary 00:02:56:00:00:FD and the secondary controller always the next address in order, 00:02:56:00:00:FE). This address can be found by use of either the administrative **ifconfig(8)** command or the SRM console configuration command **show devices** or by examining the label inside the system.

In order to start the desired system, use the administrative command

```
/usr/sbin/cs20wake00:02:56:00:00:fd
```

on any other system directly connected to the privileged primary Ethernet network.

4.2.2 Shutdown

The status of a running system is normally monitored using network connections over the primary (or secondary) Ethernet controllers (that is, using ICMP or SNMP messages). It is also monitorable via network management services.

In order to shut down the desired system, use the administrative command

```
/usr/sbin/cs20standby00:02:56:00:00:fd
```

on any other system directly connected to the privileged primary Ethernet network.

NOTE: *Tru64 UNIX does not accommodate remote power-off.*

4.2.3 Link Status

The power status of a DS20L system is remotely observable using a managed Ethernet hub or switch. When the system is powered down (in standby mode with blinking green LED on the front or rear panel), the two Ethernet controllers have a matching link status: the primary controller is powered by standby and has active link status (so it can receive the wakeup packet) and the secondary controller is powered down and has no active link status. When the system is powered up, both Ethernet controllers have active link status. If powered down, the secondary controller link is dropped while the primary link is kept up.

4.3 The WOL Utility

The WOL utility (wake on LAN) generates and transmits a network packet to power on a remote system. Before you can use the WOL utility, you must enable the wake-on-LAN feature on the target system.

You must specify the target system's hardware address. You may optionally specify the network interface to use in making the connection to the target system. If no network interface is specified, the WOL utility locates the first configured network interface and prompts you for confirmation.

4.3.1 Operation

To enable the wake-on-LAN feature, set the target system's **wol_enable** console variable to on and reset the system so that the network controller can read the new state. Use one of the following methods to enable this feature on the target system:

- From the target system's console prompt, enter the following commands:

  >>> **set wol_enable on**
  >>> **init**

- From the target system's Tru64 UNIX root prompt, enter the following commands:

  % **consvar -s wol_enable on**
  set wol_enable = on
  % **consvar –a**
  Console environment variables saved
  % **reboot**

Use one of the following methods to disable the wake-on-LAN feature:

- From the target system's console prompt, enter the following commands:

  >>> **set wol_enable off**
  >>> **init**

- From the target system's Tru64 UNIX root prompt, enter the following commands:
  % **consvar -s wol_enable off**
  set wol_enable = on
  % **consvar –a**
  Console environment variables saved
  % **reboot**

NOTE: *You must reset the target system for the new setting to take effect.*

4.3.2 Restrictions

The following restrictions apply to the WOL utility.

- You must be logged in as root or have superuser privileges to use the WOL utility.
- The target system must be on the same subnet as the system where the WOL utility is involked.
- The target system's power cannot be turned off with the WOL utility.

4.3.3 Commands

Syntax: /usr/sbin/wol [*nw_interface*] hw_address

`nw_interface`

Specifies the network interface to use in making the connection to the target system, for example:`tu1`. This argument is optional.

`hw_address`

Specifies the hardware network address of the target system. This argument is mandatory.

00-02-56-00-03-29

4.3.4 Exit Status

Exiting successfully will return the prompt `0` (Zero)

If an error occurred, you will see `>0`

4.3.5 Error Conditions

You may encounter the following common error conditions:

`Error detecting default interface`

Explanation:
The WOL utility cannot detect a default network interface automatically.

User Action:
- Verify that a configured network interface exists on your system.
- Manually specify a configured network interface on the WOL command line.

```
Patterns must be specified as hex digits
The Magic Packet address must be specified as 00-11-22-33-44-55
```

Explanation:
The hardware network address entered was in the wrong format. The argument must be in the following format: *xx-xx-xx-xx-xx-xx* where *x* is a hexadecimal character (0 through 9 and A through F, inclusive).

User Action:
Specify the hardware network address correctly.

```
wand: socket: Address family not supported by protocol family
```

Explanation:
The system where you entered the WOL command is not on the same subnet as the target system.

User Action:
Enter the WOL command on a system that is on the same subnet as the target system.

4.3.6 Examples

The following example shows a simple use of the WOL utility, where the host system detects the first configured network interface and prompts for confirmation.

```
# /usr/sbin/wol 00-02-56-00-03-29
No sending device specified, using tu0, continue? (y/n) y
```

The following example shows the same use of the WOL utility, where the user declines confirmation of the selected network interface:

```
# /usr/sbin/wol 00-02-56-00-03-29
No sending device specified, using tu0, continue? (y/n) n
Aborting...
```

The following example explicitly specifies a network interface:

```
# /usr/sbin/wol tu1 00-02-56-00-03-29
```

4.3.7 Environment Variables

The following command enables or disables the wake-on-LAN feature on the target system. Valid values are `on` and `off`.

`wol_enable`

NOTE: *This is a system console variable, not a Tru64 UNIX environment variable. Section 4.3.1 tells you how to enable the wake-on-LAN feature on the target system. You must enable this feature before you use the WOL utility.*

Chapter 5
Basic Troubleshooting

5.1 LED Error Indicators

There are system LED indicators are on both the front and back of the AlphaServer DS20L, and each of the network connectors has status LEDs.

Figure 1-2 in the first chapter identifies the system LED indicators on the front of the system.

Table 5–1 Front System LED Status Indicators

LED	Function
1	Steady red when system failure needs attention. Off when the system is functioning properly.
2	Blinks amber to indicate system activity.
3	Blinks green when the system is in Standby mode. Glows green to indicate that system power is on.

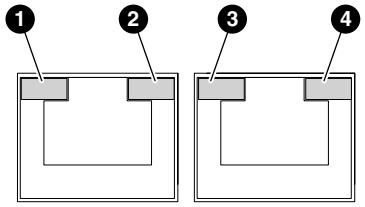
Figure 1-5 in the first chapter identifies the system LED indicators on the rear of the system.

Table 5–2 Rear System LED Status Indicators

LED	Function
1	Steady red when system failure needs attention. Off when the system is functioning properly.
2	Blinks amber to indicate system activity.
3	Blinks green when the system is in Standby mode. Glows green to indicate that system power is on. Glows red when the system power has failed.

Figure 1-5 in the first chapter identifies the Ethernet network connectors on the rear of the system. Figure 5-1 shows the LEDs in the upper corners of each connector; Table 5–3 gives their meaning.

Figure 5-1 Network Connector LEDs



MR0288

❶ Ethernet speed LED (for Tru64 UNIX on port 0; for Linux on port 1)

❷ Ethernet activity LED (for Tru64 UNIX on port 0; for Linux on port 1)

❸ Ethernet speed LED (for Tru64 UNIX on port 1; for Linux on port 0)

❹ Ethernet activity LED (for Tru64 UNIX on port 1; for Linux on port 0)

Table 5–3 Network Connector LEDs

LED	LED Status	Meaning
Speed LED (upper left-hand corner)	Off	Connector running at 10 M-bits
	Green	Connector running at 100 M-bits
	Orange	Connector on Standby
Activity LED (upper right-hand corner)	Off	Not linked
	Yellow	Linked
	Blinking Yellow	Activity

5.1.1 Internal Power Failure

Take these steps if your system experiences an internal power failure.

In the event of an internal power failure, clear the red power fail LED with the steps shown. The main AC must be removed to clear the indication; manual, remote, and automatic wake-up have no effect.

1. Unplug the AC power cord.
2. Replug the AC power cord.
3. Leave stand-by power on.
4. If the red power-fail state persists, contact Customer Support.

5.2 Halting the System

Depressing the Halt button, located under the front bezel and shown in Figure 1-4, will return the system to the SRM console prompt in most cases. To use it, remove the bezel and follow the instructions in Section 1.3.3. If the system does not display the SRM console prompt after depressing the Halt button, cycle the power switch to reboot the operating system.

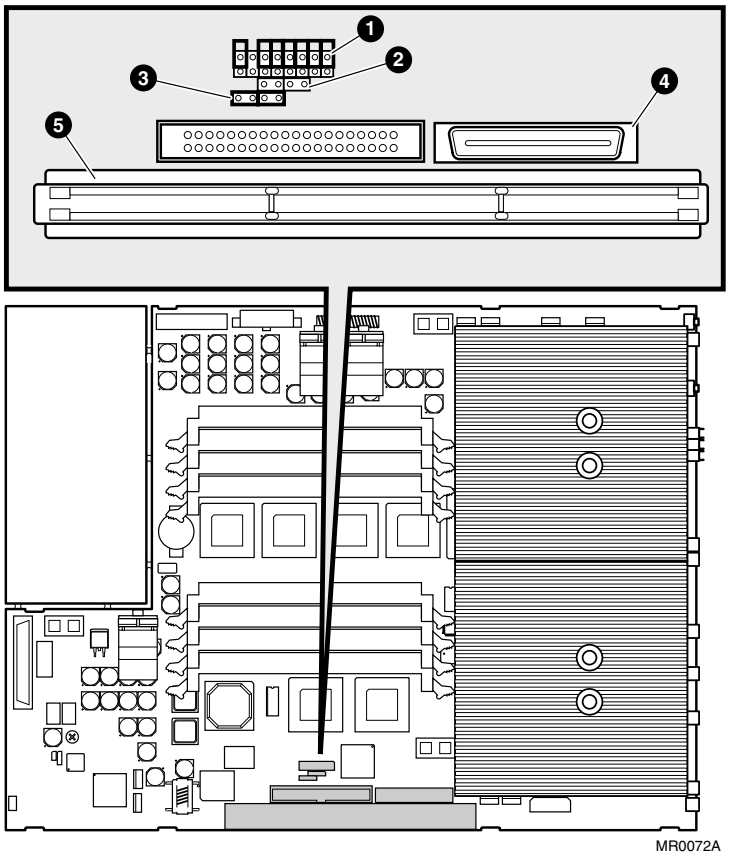
5.3 Firmware Configuration Jumpers

Motherboard jumpers are used to change the configuration of the AlphaServer DS20L system.

The factory default firmware configuration jumper block in the *AlphaServer* DS20L is J2. Remove the cover to locate the jumper block. See Section 2.3.1.

Figure 5-2 shows the relative positioning of the J2 jumper with other jumpers and connectors, and depicts all jumpers in their default position. Section 5.3.1 describes the functions of the pins.

Figure 5-2 J2 Firmware Configuration Jumper Block



❶ Firmware configuration jumper block, J2; the pins are numbered as shown:

15	13	11	9	7	5	3	1
16	14	12	10	8	6	4	2

❷ Jumper J41 (not used)

❸ CPU disable jumper J1 (for factory use only)

❹ IDE connector 1 (CD-ROM)

❺ PCI riser slot

5.3.1 J2 Firmware Configuration Jumper Block

The J2 jumper may be used by customers to change the firmware configuration setting.

The DS20L system motherboard has an eight-position, 2-pin firmware configuration jumper block used for troubleshooting and error recovery. See Figure 5-2.

- J2 jumper pins 1 through 6 are used for configuration of the DS20L system.
- Pins 7-8, 9-10, 11-12, and 13-14 are reserved or not used.

Table 5–4 shows the J2 configuration jumper pin functions for pins 1-2, 3-4, 5-6, and 15-16.

Table 5–4 J2 Configuration Jumper Pin Functions

Function	Install Jumper on Pins		
	5-6	3-4	1-2
Normal operations; execute firmware and boot to operating system using current or default environment settings.	0	0	0
Restore factory default environmental settings.	0	0	1
Upgrade or recover firmware (COM1).	0	1	0
Failsafe reflash from CD-ROM (COM1).	0	1	1
Field installation and test mode.	1	*	*

Note: 0 = no jumper installed, 1 = jumper installed
** indicates reserved pins*

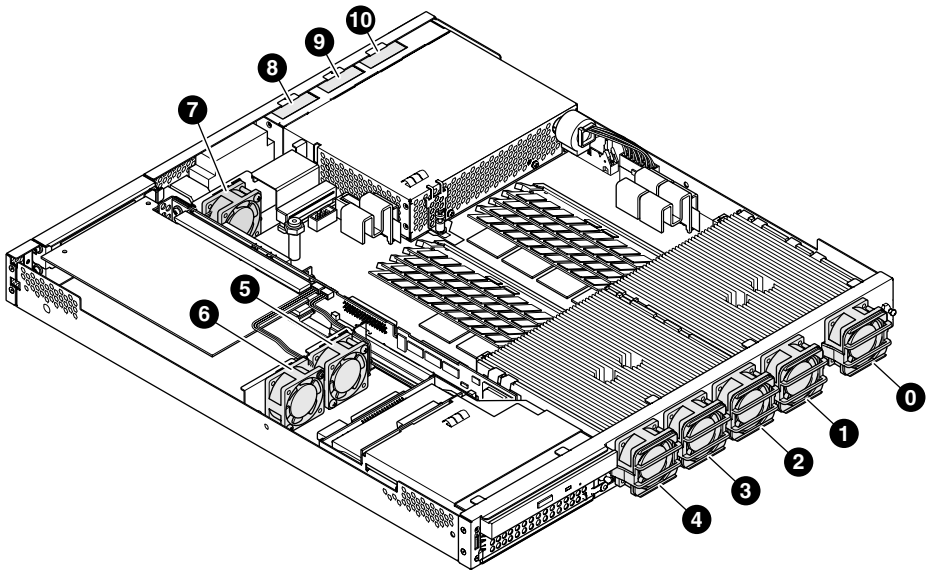
5.4 Fan Status Display

The SRM **show power** command can help you to identify a failing fan. Example 5–1 identifies the location of the information for each individual fan in a sample show power command display; Figure 5-3 shows the corresponding fan locations in the DS20L system. See Section A.4.7 in Appendix A for a detailed description of the **show power** command.

Example 5–1 Fan Statuses Using the SRM Show Power Command

```
P00>>> show power
Processor Module Information
                Proc 1   Proc 2     Dimm     I/O     Riser    PSU
 Fan1 Status      OK⓿     OK❷       OK❹      OK⓾      OK❻     OK❽
 Fan2 Status      OK❶     OK❸                OK❼      OK❺     OK❾
        2.5V      OK       OK        OK
       Vccp1      OK       OK        OK
        3.3V      OK       OK        OK       OK       OK
        5.0V      OK       OK        OK                         OK
       12.0V      OK       OK        OK       OK       OK       OK
       Vccp2
Temperature    28.00    27.00     45.00    33.00     33.00    39.00
Power status: all OK
Dimm         1    2    3    4    5    6    7    8
Megabytes  256  256  256  256    X    X    X    X
System fail LED Extinguished
System enters standby on AC power
Normal SROM deselected
```

Figure 5-3 Fan Locations



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Appendix A
SRM Console

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

A.1 SRM Console Overview

This section contains an overview of the SRM console and its use.

The SRM console works very much like a Unix shell. It views your NVRAM and devices as a pseudo-filesystem. You can see this if you use the **ls** command. Also, it contains a fairly large set of diagnostic, setup, and debugging utilities. As in the Unix shell, you can pipe the output of one command to the input of another, and there is a more command that works not unlike the Unix one. To get a full listing of available commands, see Section A.3 or run:

```
>>> help | more
```

SRM has environment variables, a number of which are pre-defined and correspond to locations in NVRAM. You can view the entire list of environment variables and their values with the **show** command (there are quite a few of them, so you will probably want to pipe its output to more). You can also show variables matching a "glob" pattern - for example, show boot* will show all the variables starting in "boot". See Section A.20.

Environment variables are categorized as either *read-only*, *warm non-volatile*, or *cold non-volatile*. The most useful pre-defined environment variables for the purposes of booting Linux are **bootdef_dev, boot_file, boot_flags,** and **auto_action,** all of which are cold non-volatile.

To set environment variables, use the **set** command, like this:

```
>>> set bootdef_def dka0
```

If you set an undefined variable, it will be created for you; however, it will not persist across reboots.

The **bootdef_dev** variable specifies the device that will be booted from if no device is specified on the boot command line, or in an automatic boot. The **boot_file** variable contains the filename to be loaded by the secondary bootloader, while **boot_flags** contains any extra flags. **auto_action** specifies the action which the console should take on power-up. By default, it is set to **halt**, meaning that the machine will start up in the SRM console. Once you have configured your bootloader and the boot-related variables, you can set it to **boot** in order to boot automatically on power-up.

A.1.1 How Does SRM Boot an OS?

All recent versions of SRM can boot from both SCSI disks.

Booting Linux with SRM is a two-step process: first, SRM loads and transfers control to the secondary bootstrap loader. Then the secondary bootstrap loader sets up the environment for Linux, reads the kernel image from a disk filesystem, and finally transfers control to Linux.

These two loaders are described in more detail below.

A.1.2 Loading the Secondary Bootstrap Loader

There are two secondary bootstrap loaders for Linux: the raw loader that comes with the Linux kernel and `aboot`, which is distributed separately.

SRM knows nothing about filesystems or disk partitions. It simply expects that the secondary bootstrap loader occupies a consecutive range of physical disk sector, starting from a given offset. The information on the size of the secondary bootstrap loader and the offset of its first disk sector is stored in the first 512 byte sector. Specifically, the long integer at offset 480 stores the *size* of the secondary bootstrap loader (in 512-byte blocks) and the long integer at offset 488 gives the *sector number* at which the secondary bootstrap loader starts. The first sector also stores

a flag-word at offset 496, which is always 0, and a checksum at offset 504. The checksum is simply the sum of the first 63 long integers in the first sector.

If the checksum in the first sector is correct, SRM goes ahead and reads the *size* sectors starting from the sector given in the *sector number* field and places them in *virtual* memory at address `0x20000000`. If the reading completes successfully, SRM performs a jump to address `0x20000000`.

A.2 Invoking the SRM Console

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

If you are running Tru64 UNIX operating system

- The preferred method to invoke the SRM console is to shut down the operating system according to the procedure described in your operating system documentation.
- An alternative method is to press the Halt button. See Figure 1-3.

Following one of these steps, the console prompt, >>>, will be displayed. You are now at the SRM console.

If you are running Linux

To switch to the SRM console, power cycle the system. The SRM console will boot.

A.3 Command Summary

This section presents a command summary, gives the syntax for the console commands, and explains the special keystrokes and characters available in SRM console mode.

Table A–1 Summary of SRM Console Commands

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

Table A-1 Summary of SRM Console Commands (continued)

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

A.3.1 Commands: Syntax

Table A–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 A–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.

A.3.2 Commands: Special Keystrokes and Characters

Table A–3 Special Characters for SRM Console

Character	Function
Return or **Enter**	Terminates a command line. No action is taken on a command until it is terminated. If no characters are entered and this key is pressed, the console just redisplays the prompt.
**Backslash **	Continues a command on the next line. Must be the last character on the line to be continued.
←Backspace	Moves the cursor left one position, deleting one character.
Delete	Deletes the previous character.
Help	Entered at the console prompt without arguments, it 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 ↑	Recalls previous command or commands. The last 16 commands are stored in the recall buffer.
Ctrl/C	Terminates the process that is running. Clears Ctrl/S; resumes output suspended by Ctrl/O. When entered as part of a command line, deletes the current line. Ctrl/C has no effect as part of a binary data stream.
Ctrl/E	Moves the cursor to the end of the line.
Ctrl/F or →	Moves the cursor right one position.
Ctrl/H	Moves the cursor to the beginning of the line.

Continued on next page

Table A-3 Special Characters for SRM Console (continued)

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

A.4 Show Commands

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

A.4.1 Show Config

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

Syntax: **show config**

Example A–1 Show Config Command

```
P00>>> sh config
                        hp AlphaServer DS20L 833 MHz

SRM Console:    V5.9-16
PALcode:        OpenVMS PALcode V1.90-71, Tru64 UNIX PALcode V1.86-68

Processors
CPU 0        Alpha 21264B-4 833 MHz  (EV68B pass 2.2)SROM Revision: V2.5.2.2.32
             Bcache size: 4 MB

CPU 1        Alpha 21264B-4 833 MHz  (EV68B pass 2.2)SROM Revision: V2.5.2.2.32
             Bcache size: 4 MB

Core Logic
Cchip           DECchip 21272-CA Rev 2.1
Dchip           DECchip 21272-DA Rev 2.0
Pchip 0         DECchip 21272-EA Rev 2.2
Pchip 1         DECchip 21272-EA Rev 2.2

TIG             Rev 4.15
Arbiter         Rev 2.8 (0x1)
Power EPLD      Rev 9
Reset EPLD      Rev 1

MEMORY

Array #       Size     Base Addr
-------    ----------  ---------
   0         256 MB    000000000

Total Bad Pages = 0
Total Good Memory = 256 MBytes

PCI Hose 00
```

```
     Bus 00  Slot 03: Adaptec 29160
                                pka0.7.0.3.0          SCSI Bus ID 7
                                dka0.0.0.3.0           COMPAQ BF01865222
     Bus 00  Slot 04: Intel 8255x Ethernet
                                eib0.0.0.4.0          00-02-56-00-08-7D
     Bus 00  Slot 07: Acer Labs M1543C
                                                      Bridge to Bus 1, ISA
     Bus 00  Slot 16: Acer Labs M1543C IDE
                                dqa.0.0.16.0
                                dqb0.0.1.16.0          SAMSUNG CD-ROM SN-12
     Bus 00  Slot 17: Acer Labs M1543C PMU

PCI Hose 01
     Bus 00  Slot 03: Intel 8255x Ethernet
                                eia0.0.0.3.1          00-02-56-00-08-7E

ISA
Slot    Device  Name            Type         Enabled  BaseAddr  IRQ     DMA
0
        0       MOUSE           Embedded        Yes     60      12

        1       KBD             Embedded        Yes     60      1

        2       COM1            Embedded        Yes     3f8     4

        3       COM2            Embedded        Yes     2f8     3

        4       LPT1            Embedded        Yes     3bc     7

        5       FLOPPY          Embedded        Yes     3f0     6       2

        6       EIDE            Embedded        Yes     1f0     14
                                                        3f6     15
                                                        170
                                                        376

        7       PWR_MANAGEMENT  Embedded        Yes
        8       USB             Embedded        No
```

A.4.2 Show Device

The show device command displays status for devices and controllers in the system: SCSI and MSCP devices, and the network.

Syntax: **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.

Example A–2 Show Device Command

```
P00>>> show device
dkb0.0.0.5.0               DKB0              COMPAQ BF01865222  B004
dqb0.0.1.16.0              DQB0           SAMSUNG CD-ROM SN-124  q008
eia0.0.0.3.1               EIA0              00-02-56-00-08-7A
eib0.0.0.4.0               EIB0              00-02-56-00-08-79
pka0.7.0.3.0               PKA0                  SCSI Bus ID 7
pkb0.7.0.5.0               PKB0                  SCSI Bus ID 7
P00>>> b
```

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

Table A–4 Device Naming Convention

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

A.4.3 Show hwrpb

The show hwrpb command displays the hwrpb memory location.

Syntax: **show hwrpb**

Example A–3 Show hwrpb Command

```
P00>>> sho hwrpb
HWRPB is at 2000
00002000 hwrpb
          0  00000000 00002000 Physical address of base of HWRPB
          8  00000042 50525748 Identifying string 'HWRPB'
         16  00000000 0000000D HWRPB version number
         24  00000000 00000B80 HWPRB size
         32  00000000 00000000 ID of primary processor
         40  00000000 00002000 System page size in bytes
         48  00000000 0000002C Physical address size in bits
         56  00000000 000000FF Maximum ASN value
         64  7373656E 646E694B System serial number
         72  00007427 6E736920
         80  00000000 00000022 Alpha system type
         88  00000000 00003005 system subtype
         96  00000000 00000005 System revision
        104  00000000 00400000 Interval clock interrupt frequency
        112  00000000 31ABA855 Cycle Counter frequency
        120  00000002 00000000 Virtual page table base
        128  00000000 00000000 Reserved for architecture use, SBZ
        136  00000000 00000140 Offset to Translation Buffer Hint Block
        144  00000000 00000002 Number of processor supported
        152  00000000 00000280 Size of Per-CPU Slots in bytes
        160  00000000 00000180 Offset to Per-CPU Slots
        168  00000000 00000001 Number of CTBs in CTB table
        176  00000000 00000160 Size of largest CTB in CTB table
        184  00000000 00000680 Offset to Console Terminal Block
        192  00000000 000007E0 Offset to Console Routine Block
        200  00000000 00000840 Offset to Memory Data Descriptors
        208  00000000 00034260 Offset to Configuration Data Table
        216  00000000 001DE000 Offset to FRU Table
        224  00000000 00000000 Starting VA of SAVE_TERM routine
        232  00000000 00000000 Procedure Value of SAVE_TERM routine
        240  00000000 00000000 Starting VA of RESTORE_TERM routine
        248  00000000 00000000 Procedure Value of RESTORE_TERM routine
        256  00000000 00000000 VA of restart routine
        264  00000000 00000000 Restart procedure value
        272  00000000 00000000 Reserved to System Software
        280  00000000 001E0000 Reserved to Hardware
        288  7373D9DA 555F8E8F Checksum of HWRPB
        296  00000000 00000000 RX Ready bitmask
        304  00000000 00000000 TX Ready bitmask
```

```
        312  00000000 00000AC0 Offset to DSRDB

00002180 slot at index 0
        00000000 00000000 KSP
        00000000 00000000 ESP
        00000000 00000000 SSP
        00000000 00000000 USP
        00000000 00000000 PTBR
        00000000 00000000 ASN
        00000000 00000000 ASTEN_SR
        00000000 00000000 FEN
        00000000 00000000 CC
        00000000 00000000 SCRATCH [0]
        00000000 00000000 SCRATCH [1]
        00000000 00000000 SCRATCH [2]
        00000000 00000000 SCRATCH [3]
        00000000 00000000 SCRATCH [4]
        00000000 00000000 SCRATCH [5]
        000001CC 00000000 SCRATCH [6]
        0 Boot in progress
        0 Restart capable
        1 Processor available
        1 Processor present
        0 Operator halted
        0 Context valid
        1 Palcode valid
        1 Palcode memory valid
        1 Palcode loaded
        0 Reserved MBZ
        0 Halt requested
        0 Reserved MBZ
        0 Reserved MBZ
        00000000 00000000 PAL_MEM_LEN
        00000000 00000000 PAL_SCR_LEN
        00000000 00000000 PAL_MEM_ADR
        00000000 00000000 PAL_SCR_ADR
        00020047 0001015A PAL_REV
        00000004 0000000D CPU_TYPE
        00000000 00000007 CPU_VAR
        00000000 00000000 CPU_REV
        00000000 00000000 SERIAL_NUM
        00000000 00000000 SERIAL_NUM
        00000000 00006000 PAL_LOGOUT
        00000000 00000400 PAL_LOGOUT_LEN
        00000000 00000000 HALT_PCBB
        00000000 00000000 HALT_PC
        00000000 00000000 HALT_PS
        00000000 00000000 HALT_ARGLIST
        00000000 00000000 HALT_RETURN
        00000000 00000000 HALT_VALUE
        00000000 00000000 HALTCODE
        00000000 00000000 RSVD_SW
        00000000 RXLEN
        00000000 TXLEN
        00000004 00000008 CPU_COMP
```

```
00002400 slot at index 1
        00000000 00000000 KSP
        00000000 00000000 ESP
        00000000 00000000 SSP
        00000000 00000000 USP
        00000000 00000000 PTBR
        00000000 00000000 ASN
        00000000 00000000 ASTEN_SR
        00000000 00000000 FEN
        00000000 00000000 CC
        00000000 00000000 SCRATCH [0]
        00000000 00000000 SCRATCH [1]
        00000000 00000000 SCRATCH [2]
        00000000 00000000 SCRATCH [3]
        00000000 00000000 SCRATCH [4]
        00000000 00000000 SCRATCH [5]
        000001CC 00000000 SCRATCH [6]
        0 Boot in progress
        0 Restart capable
        1 Processor available
        1 Processor present
        0 Operator halted
        0 Context valid
        1 Palcode valid
        1 Palcode memory valid
        1 Palcode loaded
        0 Reserved MBZ
        0 Halt requested
        0 Reserved MBZ
        0 Reserved MBZ
        00000000 00000000 PAL_MEM_LEN
        00000000 00000000 PAL_SCR_LEN
        00000000 00000000 PAL_MEM_ADR
        00000000 00000000 PAL_SCR_ADR
        00020047 0001015A PAL_REV
        00000004 0000000D CPU_TYPE
        00000000 00000007 CPU_VAR
        00000000 00000000 CPU_REV
        00000000 00000000 SERIAL_NUM
        00000000 00000000 SERIAL_NUM
        00000000 00006400 PAL_LOGOUT
        00000000 00000400 PAL_LOGOUT_LEN
        00000000 00000000 HALT_PCBB
        00000000 00000000 HALT_PC
        00000000 00000000 HALT_PS
        00000000 00000000 HALT_ARGLIST
        00000000 00000000 HALT_RETURN
        00000000 00000000 HALT_VALUE
        00000000 00000000 HALTCODE
        00000000 00000000 RSVD_SW
        00000000 RXLEN
        00000000 TXLEN
        00000004 00000008 CPU_COMP
```

```
00002680        console terminal block
        00000000 00000004 TYPE
        00000000 00000000 ID
        00000000 00000000 RSVD
        00000000 00000160 DEV_DEP_LEN
        00000000 00000015 DEV_IPL
        00000000 00000000 TX_SCB_OFFSET
        00000000 00000000 RX_SCB_OFFSET
        00000000 00000002 TERM_TYPE
        00000000 00000000 KB_TYPE
        00000000 00000000 KB_TRN_TBL
        00000000 00000000 KB_MAP_TBL
        00000000 00000000 KB_STATE
        00000000 00000000 LAST_KEY
        00000000 00000000 US_FONT
        00000000 00000000 MCS_FONT
        00000000 00000000 FONT_WIDTH
        00000000 00000000 FONT_HEIGHT
        00000000 00000000 MONITOR_WIDTH
        00000000 00000000 MONITOR_HEIGHT
        00000000 00000000 MONITOR_DENSITY
        00000000 00000000 NUM_PLANES
        00000000 00000000 CURSOR_WIDTH
        00000000 00000000 CURSOR_HEIGHT
        00000000 00000000 NUM_HEADS
        00000000 00000000 OPWIN
        00000000 00000000 HEAD_OFFSET
        00000000 00000000 PUTCHAR_ROUTINE
        00000000 00000000 IO_STATE
        00000000 00000000 LISTENER_STATE
        00000000 00000000 EXT_INFO
        00000000 00000000 SERVER_OFFSET
        00000000 00000000 LINE_PARAM
        00000000 00000000 TERM_IN_LOC
        00000000 00000000 TERM_IN_LOC_EXT
        00000000 00000000 TERM_OUT_LOC
        00000000 00000000 TERM_OUT_LOC_EXT
        00000000 TERM_IN_PROTOCOL
        00000000 TERM_OUT_PROTOCOL

000027E0        console routine block
        00000000 00000000 VDISPATCH
        00000000 001ADC40 PDISPATCH
        00000000 00000000 VFIXUP
        00000000 001ADC50 PFIXUP
        00000000 00000002 ENTRIES
        00000000 0000015C PAGES

        00000000 10000000 V_ADDRESS
        00000000 00002000 P_ADDRESS
        00000000 000000FF PAGE_COUNT

        00000000 101FE000 V_ADDRESS
        00000000 3FF46000 P_ADDRESS
        00000000 0000005D PAGE_COUNT
```

```
00002840        memory descriptor
        00000000 00000106 CHECKSUM
        00000000 00000000 IMP_DATA_PA
        00000000 00000005 CLUSTER_COUNT

        00000000 00000000 START_PFN
        00000000 00000100 PFN_COUNT
        00000000 00000000 TEST_COUNT
        00000000 00000000 BITMAP_VA
        00000000 00000000 BITMAP_PA
        00000000 00000000 BITMAP_CHKSUM
        00000000 00000001 USAGE
                         0 bad page(s)

        00000000 00000100 START_PFN
        00000000 0001FEA3 PFN_COUNT
        00000000 0001FEA3 TEST_COUNT
        00000000 00000000 BITMAP_VA
        00000000 3FF58000 BITMAP_PA
        00000007 FFFFF805 BITMAP_CHKSUM
        00000000 00000000 USAGE
                         0 bad page(s)

        00000000 0001FFA3 START_PFN
        00000000 0000005D PFN_COUNT
        00000000 00000000 TEST_COUNT
        00000000 00000000 BITMAP_VA
        00000000 00000000 BITMAP_PA
        00000000 00000000 BITMAP_CHKSUM
        00000000 00000001 USAGE
                         0 bad page(s)

        00000000 00020000 START_PFN
        00000000 0001FFFE PFN_COUNT
        00000000 0001FFFE TEST_COUNT
        00000000 00000000 BITMAP_VA
        00000000 7FFFC000 BITMAP_PA
        3FFFFFFF FFFFF800 BITMAP_CHKSUM
        00000000 00000000 USAGE
                         0 bad page(s)

        00000000 0003FFFE START_PFN
        00000000 00000002 PFN_COUNT
        00000000 00000000 TEST_COUNT
        00000000 00000000 BITMAP_VA
        00000000 00000000 BITMAP_PA
        00000000 00000000 BITMAP_CHKSUM
        00000000 00000001 USAGE
                         0 bad page(s)

00002AC0        Dynamic System Recognition Data block
        00000000 000007D6 SMM
        00000000 00000018 Offset to LURT
        00000000 00000068 Offset to Name Count
```

```
        00000000 00000009 LURT Count
        00000000 0000004B LURT Column 1
        FFFFFFFF FFFFFFFF LURT Column 2
        FFFFFFFF FFFFFFFF LURT Column 3
        FFFFFFFF FFFFFFFF LURT Column 4
        FFFFFFFF FFFFFFFF LURT Column 5
        FFFFFFFF FFFFFFFF LURT Column 6
        FFFFFFFF FFFFFFFF LURT Column 7
        00000000 0000041A LURT Column 8
        00000000 0000041A LURT Column 9
        00000000 00000020 Name Count
        Platform Name = hp AlphaServer DS20L 833 MHz
P00>>>
```

A.4.4 Show IDE

The show ide command displays the register setup for the primary and secondary IDE controllers.

Syntax: **show ide**

Example A–4 Show IDE Command

```
P00>>>show ide

ACER M5229: IDE Status
  UDMAP  CA
         Primary Drive 0 Ultra DMA enabled
         Primary Drive 1 Ultra DMA enabled
  UDMAS  44
         Secondary Drive 0 Ultra DMA disabled
         Secondary Drive 1 Ultra DMA disabled
  PCAS   01: active 1 clocks (30 nsec)
  PCCB   31: active 3 clocks (90 nsec),recovery 1 clocks (30 nsec)
  PCDT0  00: active 8 clocks (242 nsec),recovery 16 clocks (484 nsec)
  PCDT1  00: active 8 clocks (242 nsec),recovery 16 clocks (484 nsec)
  SCAS   00: active 8 clocks (242 nsec)
  SCCB   00: active 8 clocks (242 nsec),recovery 16 clocks (484 nsec)
  SCDT0  00: active 8 clocks (242 nsec),recovery 16 clocks (484 nsec)
  SCDT1  00: active 8 clocks (242 nsec),recovery 16 clocks (484 nsec)
```

A.4.5 Show Memory

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

Syntax: **show memory**

Example A–5 Show Memory Command

```
P00>>> show memory

Array #       Size     Base Addr
-------    ----------  ---------
   0         1024 MB    000000000

Total Bad Pages = 0
Total Good Memory = 1024 MBytes
P00>>>
```

A.4.6 Show PAL

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

Syntax: **show pal**

Example A–6 Show PAL Command

```
>>> show pal
PAL        OpenVMS PALcode V1.90-71, Tru64 UNIX PALcode V1.86-68
>>>
```

A.4.7 Show Power

The show power command displays status information about the power supply, the system, PCI and CPU fans, and temperature. This command is useful for displaying the error state of a system that shuts down because of a fan, temperature, or power supply failure.

Use this command to display information if the system can be restarted after a shut down.

Syntax: **show power** *[option]*

-status (default)	All monitored values are displayed as either OK or FAIL.
-verbose	The calibrated values are displayed.
-raw	The internal sensor monitored values are displayed.
-which	Restricts the scan and display to those sensors with a one in the which parameter bitmask.

CPU0	0x01
CPU1	0x02
DIMM	0x04
IO	0x08
riser	0x10
PSU	0x20

NOTE: *Fan statuses for the DS20L system are shown in unique areas on this display. See Chapter 5, Section 5.4 for the fan status locations.*

Example A–7 Show Power Command

```
P00>>> show power
Processor Module Information

               Proc 1   Proc 2     Dimm      I/O    Riser      PSU
 Fan1 Status       OK       OK       OK       OK       OK       OK
 Fan2 Status       OK       OK                OK       OK       OK
       2.5V        OK       OK       OK
      Vccp1        OK       OK       OK
       3.3V        OK       OK       OK       OK       OK
       5.0V        OK       OK       OK                         OK
      12.0V        OK       OK       OK       OK       OK       OK
      Vccp2
```

```
 Temperature    28.00    27.00    45.00    33.00    33.00    39.00

Power status: all OK

Dimm         1    2    3    4    5    6    7    8
Megabytes  256  256  256  256    X    X    X    X

System fail LED Extinguished
System enters standby on AC power
Normal SROM deselected


P00>>> show power -verbose
Processor Module Information

               Proc 1   Proc 2     Dimm      I/O    Riser      PSU
 Fan1 Status     8544     8598     8231     8231     8766     8385
 Fan2 Status     8653     8385                 0     8083     8282
       2.5V      2.52     2.51     2.52
      Vccp1      1.63     1.61     1.50
       3.3V      3.36     3.33     3.36     3.28     3.35
       5.0V      4.94     4.97     4.97     5.36     4.94     5.52
      12.0V     12.12    12.06    12.18    12.18    12.12    12.25
      Vccp2      1.18     0.42
 Temperature    33.00    31.00    45.00    37.00    37.00    44.00

Dimm         1    2    3    4    5    6    7    8
Megabytes   64   64   64   64   64   64   64   64

System fail LED Extinguished
System enters standby on AC power
Normal SROM deselected


P00>>> show power -raw
Processor Module Information

               Proc 1   Proc 2     Dimm      I/O    Riser      PSU
 Fan1 Status       9e       9d       a4       a3       9a       a1
 Fan2 Status       9c       a1                ff       a8       a3
       2.5V        c3       c1       c2
      Vccp1        74       73       6b
       3.3V        c3       c2       c4       bf       c3
       5.0V        bf       bf       bf       cd       be       d3
      12.0V        c2       c1       c3       c3       c2       c4
      Vccp2        54       1f
 Temperature       42       40       5a       4a       4a       58

Dimm         1    2    3    4    5    6    7    8
Megabytes   64   64   64   64   64   64   64   64

System fail LED Extinguished
System enters standby on AC power
Normal SROM deselected


P00>>> show power -verbose -which 8
Processor Module Information

                                      I/O
 Fan1 Status                         8282
 Fan2 Status                         8333
```

```
        2.5V
       Vccp1
        3.3V                                3.30
        5.0V                                5.62
       12.0V                               12.12
       Vccp2
 Temperature                               35.00

Dimm         1    2    3    4    5    6    7    8
Megabytes  128  128  128  128    X    X    X    X

System fail LED Extinguished
System enters standby on AC power
Normal SROM deselected
```

A.4.8 Show Version

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

Syntax: **show version**

Example A–8 Show Version Command

```
P00>>> show version
version                 V5.9-16 16-OCT-2001 15:38:57
P00>>>
```

A.5 Creating a Power-Up Script

A special nonvolatile file named "nvram" is stored in EEROM, and is always invoked during the power-up sequence. You can create an nvram script to include any commands you want the system to execute at power-up. You alter, create, and edit the nvram script using the SRM edit command. With edit, lines can be added, overwritten, or deleted.

Syntax: **edit** *file*
where *file* is the name of the file to be edited.

The editing commands are:

Help	Displays the brief help file.
List	Lists the current file prefixed with line numbers.
Renumber	Renumbers the lines of the file in increments of 10.
Exit	Leaves the editor and closes the file, saving all changes.
Quit	Leaves the editor and closes the file without saving changes.
Nn	Deletes line number nn.
Nn text	Adds or overwrites line number nn with text.

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

Example A–9 shows how to modify the user-created power-up script, "nvram." The pound sign (#) indicates explanatory comments. In this example the script is edited to include a command that allows you to boot the Tru64 UNIX operating system over the network.

Example A–9 Editing the nvram Script

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

To clear the script, enter line numbers without any text. This deletes the lines. See Example A–10.

Example A–10 Clearing the nvram Script

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

A.6 Booting the Operating System

The boot command is used to boot the operating system. The boot command initializes the processor, loads a program image from the specified boot device, and transfers control to that image.

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

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

Example A–11 Boot Command

```
P00>>> b
(boot dkb0.0.0.5.0 -flags A)
block 0 of dkb0.0.0.5.0 is a valid boot block
reading 14 blocks from dkb0.0.0.5.0
bootstrap code read in
base = 200000, image_start = 0, image_bytes = 1c00
initializing HWRPB at 2000
initializing page table at 1ff4a000
initializing machine state
setting affinity to the primary CPU
jumping to bootstrap code
.
.
.
The system is ready.


Compaq Tru64 UNIX V5.1A (Rev. 1885) (hpsq5) console

login:
```

A.7 Configuring a PCI NVRAM Module

The prcache command is used for system configuration to check PCI NVRAM configuration information and battery status, to clear data from the NVRAM module, and to set the date of the next battery replacement. The command is used only with Tru64 UNIX systems.

Syntax: prcache -{f,z,b}

-f Checks configuration information and battery status.

-z Clears valid data; writes zeros to memory.

-b Sets the date (month and year) for battery replacement.

Example A–12 Prcache Command

```
>>> prcache -f
PCI NVRAM Disk Cache: passed
Size:   2MB
PCI Memory Address: 40000000
System ID: 12000000
State:  - not valid
Battery Status: good (Charging)
Battery Disconnect Circuit Status: enabled

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

A.8 Testing the System

The test command runs console-based exercisers for devices in the system. Ctrl/C can abort testing.

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

-t *time* Specifies the run time in seconds. The default for system test is 150 seconds (2.5 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.

Example A–13 Test Command

```
P00>>> test

System test, runtime 150 seconds

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

Default zone extended at the expense of memzone.
Use INIT before booting
Testing ei* devices.

No VGA/TGA available for testing

Testing Memory

Testing IDE/ATAPI disks (read-only)

 ID       Program      Device       Pass  Hard/Soft Bytes Written  Bytes Read
-------- ------------ ------------ ------ --------- ------------- -------------
000003cb      memtest memory            1    0    0      83886080      83886080
000003ca      memtest memory            1    0    0      83886080      83886080
000003cc      memtest memory            1    0    0      83886080      83886080
0000042a     exer_kid dqa0.0.0.16.      0    0    0             0         21504
0000042c     exer_kid dqb0.0.1.16.      0    0    0             0         17408
```

```
 ID       Program      Device       Pass  Hard/Soft Bytes Written  Bytes Read
-------- ------------ ------------ ------ --------- ------------- -------------
000003cb      memtest memory            1    0    0     444596224     444596224
000003ca      memtest memory            1    0    0     452984832     452984832
000003cc      memtest memory            1    0    0     444596224     444596224
0000042a     exer_kid dqa0.0.0.16.      0    0    0             0        145920
0000042c     exer_kid dqb0.0.1.16.      0    0    0             0        142336
 ID       Program      Device       Pass  Hard/Soft Bytes Written  Bytes Read
-------- ------------ ------------ ------ --------- ------------- -------------
000003cb      memtest memory            2    0    0     813694976     813694976
000003ca      memtest memory            2    0    0     813694976     813694976
000003cc      memtest memory            1    0    0     805306368     805306368
0000042a     exer_kid dqa0.0.0.16.      0    0    0             0        268288
0000042c     exer_kid dqb0.0.1.16.      0    0    0             0        264192
^C
P00>>>
```

Type **cat el** to show the log if you wish.

A.9 Set Commands

This section lists some of the more common **set** commands and how to use them.

A.9.1 Set Password

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.

Syntax: set password

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

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.

Example A–14 Set Password Command

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

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

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

A.9.2 Set Secure

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.

Syntax: **set secure**

Example A–15 Set Secure Command

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

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

A.10 Secure Mode

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

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

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

A.10.1 Login Command and Secure Mode

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.*

Example A–16 Secure Mode and Login Command

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


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


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

A.11 Clear Password

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.

Example A–17 Clear Password Command

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

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

A.11.1 Resetting the Password

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

From the Local Console Terminal

1. Enter the **login** command: `>>> 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.

A.12 Stopping and Starting CPU

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

Syntax: **halt (or stop)** *0*
where 0 is the number of the CPU (0 or 1) to halt.

A.13 Updating Firmware

The lfu command is used to update firmware from the SRM console prompt. The lfu command starts the Loadable Firmware Update (LFU) Utility.

The syntax is: **lfu**

Example A–18 Lfu Command

```
>>> lfu

Checking dqb0.0.1.16.0 for the option firmware files. . .
Copying ds20lsrm.rom from dqb0.0.1.16.0. . .
Copying diags.rom from dqb0.0.1.16.0. . .


                ***** Loadable Firmware Update Utility *****
--------------------------------------------------------------------------------
 Function    Description
--------------------------------------------------------------------------------

 Display     Displays the system's configuration table.
 Exit        Done exit LFU (reset).
 List        Lists the device, revision, firmware name, and update revision.
 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

diags               1.4-9              diags_fw             1.4-9

srm                 5.9-16            srm_fw                5.9-17

UPD> update

Confirm update on:
diags
srm
[Y/(N)]
```

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.

A.14 Forcing a System Crash Dump

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

Syntax: **crash** *[device]*

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

Example A–19 Crash Command

```
>>> crash

CPU 0 restarting

DUMP: 401408 blocks available for dumping.
DUMP: 38535 required for a partial dump.
DUMP: 0x805001 is the primary swap with 401407, start our last 38534
    : of dump at 362873, going to end (real end is one more, for header)
DUMP.prom: dev SCSI 1 3 0 4 400 0 0, block 131072
DUMP: Header to 0x805001 at 401407 (0x61fff)
DUMP.prom: dev SCSI 1 3 0 4 400 0 0, block 131072
DUMP: Dump to 0x805001: ...................: End 0x805001
DUMP.prom: dev SCSI 1 3 0 4 400 0 0, block 131072
DUMP: Header to 0x805001 at 401407 (0x61fff)
succeeded

halted CPU 0

halt code = 5
HALT instruction executed
PC = fffffc00004e2d64
>>>
```

A.15 Using Environment Variables

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

Environment variables are set or changed with the **set *envar*** command (where envar is a placeholder for the environment to be changed) and set to default values with the **set -default *envar*** command. Their values are viewed with the **show *envar*** command. User-defined nonvolatile environment variables are created with the **edit** command described in Section A.5.

A.15.1 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.

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

-default	Restores an environment variable to its default setting.
envar	The name of the environment variable to be displayed. The wildcard * displays all environment variables, which are: **console, kbd_hardware_type, language, ocp_text,** and **os_type.**
value	The new value of the environment variable.

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

A.15.2 show *envar*

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

Syntax: **show** *envar*

envar	The name of the environment variable to be displayed. The wildcard * displays all environment variables, which are: **console, kbd_hardware_type, language, ocp_text,** and **os_type.**

Example A–20 Setting and Showing Environment Variables

```
>>> show console
console                   graphics
>>> set console serial
>>> show console
console                   serial
>>> init                 # The system must be init'ed for
                          the new parameters to take effect
```

Example A–21 Creating a User-Defined Environment Variable

```
>>> edit nvram

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

>>>
```

In Example A–21 the nvram script is edited so that an environment variable called "mopv3_boot" is created and set to 1 on each power-up. By default, MOP boot sends 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.

A.16 Depositing and Examining Data

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

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

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

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

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

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

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

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

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

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.

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.

Example A–22 Deposit Command

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

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

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

>>> d -l -n 10 -s 200 pmem:0 8      # Deposit 8 in the 1st longword of the
                                    # first 17 pages in physical memory

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

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

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

Example A–23 Examine Command

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

>>> examine sp                      # Examine the stack pointer.
gpr:   F0 (   R30)  0000000000072A60

>>> e -n 6 r4                       # Examine register R4 & the next 6 registers.
grp: 20 (    R4) 0000000000005000
grp: 28 (    R5) 000000000FFFE000
grp: 30 (    R6) 00000003F8000C00
grp: 38 (    R7) 0000000053F761AE
grp: 40 (    R8) 0000010000000000
grp: 48 (    R9) 00000003F7800100
grp: 50 (   R10) 00000000000C7FFC

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

A.17 Reading a File

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

Syntax: **more** [*file*...]

where *file* is the name of the file to be displayed.

The **more** command is similar to that used in the MS-DOS and UNIX operating systems. It is useful for displaying output that scrolls too quickly to be viewed. For example, when you power up the system, the system startup messages scroll, and the messages are logged to an event log.

When the >>> prompt displays, you can use the **more** command to display the contents of the event log file.

Example A–24 More Command

```
>>> more el                  # Display SRM console's event log one screen at a time.
. . .
--More-- (SPACE - next page, ENTER - next line, Q - quit)


>>> help * | more            # Display online help one screen at a time.
. . .
--More-- (SPACE - next page, ENTER - next line, Q - quit)
```

A.18 Initializing the System

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

Syntax: initialize

After self-tests are executed, the system autoboots unless:

- A halt assertion condition exists –or–
- 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.

Example A–25 Initialize Command

```
P00>>> init
Initializing...1024 Meg of system memory
initializing GCT/FRU at 1e0000
Testing the System
Testing the Memory
Testing ei* devices.

hp AlphaServer DS20L 833 MHz Console V5.9-16, 16-OCT-2001 15:38:57
P00>>>
```

A.19 Finding Help

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

Syntax: **help** [*command* **. . .**]

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

None	Displays the complete list of commands for which you can receive help.
Command_name	Displays information about the console command.
Argument_string (such as "sh")	Displays information about all commands that begin with that string.

Example A–26 Help Command

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

A.20 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 A–5 lists the environment variables. Detailed descriptions follow. The environment variables are specific to the SRM console.

Table A–5 Environment Variable Summary

Environment Variable	Function
ac_action	Changes the default action when AC power is applied to the system from STANDBY to BOOT, or vice versa.
auto_action	Specifies the console's action at power-up, a failure, or a reset.
bootdef_dev	Specifies the default boot device string.
boot_osflags	Specifies the default operating system boot flags.
com*_baud	Changes the default baud rate of the COM1 or COM2 serial port.
cpu_enabled	Enables or disables a specific secondary CPU.
ew*0_mode	Specifies the connection type of the default Ethernet controller.
ew*0_protocols	Specifies network protocols for booting over the Ethernet controller.

Continued on next page

Table A-5 Environment Variable Summary (continued)

Environment Variable	Function
ocp_text	Overrides the default OCP display text with specified text.
os_type	Specifies the operating system. Valid entries are unix and linux.
password	A password stored in the NVRAM used to secure the console.
pci_parity	Disables or enables parity checking on the PCI bus.
pk*0_fast	Enables fast SCSI mode.
pk*0_host_id	Specifies the default value for a controller host bus node ID.
sysvar	Determines if the system variation value should be overridden from 12 to 5. This allows OS versions before those that are aware of the DS20L to run properly.
tt_allow_login	Enables or disables login to the SRM console firmware on other console ports.
wol_enable	Sets the remote power cycle toggle capability for eib0 (the Ethernet NIC on hose 0 device 4).

A.20.1 ac_action

Specifies the action the system takes when AC power is applied.

Syntax: **set ac_action** *boot*

where *value* can be:

boot The system boots automatically when AC power is applied. Boot is the default.

standby The system goes to standby when AC power is applied.

A.20.2 auto_action

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

Syntax: **set auto_action** *value*

where *value* can be:

halt The system remains in console mode after power-up or a system crash.

boot The system boots automatically when it is turned on and halts after a system failure.

restart The system boots automatically when it is turned on or after it fails.

NOTE: *If a halt assertion exists, the console ignores the auto_action setting and halts at the SRM console.*

A.20.3 bootdef_dev

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

Syntax: **set bootdef_dev** *boot_device*

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

A.20.4 boot_osflags

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

Syntax: **set boot_osflags** *flags_value*

where *flags_value* can be:

- **a** Load operating system software from the specified boot device (autoboot). Boot to multi-user mode.
- **i** Prompt for the name of a file to load and other options (boot interactively). Boot to single-user mode.
- **s** Stop in single-user mode. Boots /vmunix to single-user mode and stops at the # (root) prompt.
- **D** Full dump; implies "**s**" as well. By default, if Tru64 UNIX crashes, it completes a partial memory dump. Specifying "**D**" forces a full dump if the system crashes.

A.20.5 com1_baud

The default baud rate for the system is 9600. The upper limit is 115200. With the com1_baud environment variable, you can set the baud rate to match that of the device connected to the port.

Syntax: **set com1_baud** *baud_value*

where *baud_value* is 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**).

You will be asked to confirm the change, as shown in Example A–27.

Example A–27 Changing Baud Rate

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

A.20.6 ew*0_mode

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

Syntax: **set ew*0_mode** *value*

where *value* can be:

aui	Device type is AUI.
bnc	Device type is ThinWire.
fast	Device type is fast 100BaseT.
fastfd	Device type is fast full duplex 100BaseT.
full	Device type is full duplex twisted-pair.
twisted-pair	Device type is full duplex twisted-pair.

A.20.7 ew*0_protocols

Enables network protocols for booting and other functions.

Syntax: **set ew*0_protocols** *protocol_value*

where *protocol_value* can be:

bootp	Sets the network protocol to bootp, the setting typically used with the Tru64 UNIX operating system.

A.20.8 os_type

The os_type environment variable specifies the default operating system. This variable is set at the factory to the setting for the operating system purchased. Use this command to change the factory default setting. Whenever you change the value of os_type**, you must reset the system by pressing the Halt button or issuing the** initialize **command.**

Syntax: **set os_type** *os_type*

where os_type can be:

unix Tru64 UNIX is the default operating system, and the SRM firmware is started during power-up or reset.

linux Linux is the default operating system, and the SRM firmware is started during power-up or reset.

A.20.9 password

Sets or clears the console password stored in NVRAM.

Syntax: **set password**

where 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.

A.20.10 pci_parity

Disables or enables parity checking on the PCI bus.

Syntax: **set pci_parity** *value*

where *value* can be*:*

(default) **on** Enables PCI parity checking.

off Disables PCI parity checking.

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 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.

A.20.11 pk*0_fast

Enables fast SCSI to perform in either standard or fast mode.

Syntax: **set pk*0_fast** *scsi_speed*

where *scsi_speed* can be:

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

0 The controller is in standard SCSI 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.

A.20.12 pk*0_host_id

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

Syntax: **set pk*_host_id** *scsi_node_id*

where *scsi_node_id* is the bus node ID, a number from 0 to 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.

A.20.14 sysvar

Determines if the system variation value should be overridden from 12 to 5. This allows operating system versions before those that are aware of the DS20L to run properly.

Syntax: **set syvar** *value*

where *value* can be:

5 For Linux.

(default) **low** For Tru64 UNIX.

A.20.15 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 local - the terminal connected through the COM1 port. The command set tt_allow_login 1 **enables remote logins through the COM2 port.**

Syntax: **set tt_allow_login** *value*

where *value* can be:

(default) **1** Enables remote login through the COM2 port.

0 Disables remote login through the COM2 port.

A.20.16wol_enable

Sets the remote power cycle toggle capability for eib0 (the Ethernet NIC on hose 0 device 4). This state is held in the EEPROM associated with this NIC.

Syntax: **set wol_enable** *value*

where *value* can be:

(default)	**off**	Wake on LAN utility disabled.
	on	Wake on LAN utility enabled.

Index

A

ac_action environment variable, SRM, A-45, A-47
Acoustical specifications, 1-9
Alpha Diagnostics, 1-3
auto_action environment variable, SRM, 3-3, 3-5, A-45, A-47

B

Baud rate, setting for COM* ports, A-49
Bays
  CD-ROM, 1-4
  storage, 1-4
Bezel, 1-4
Bezel removal, 1-11, 2-3
boot command, SRM, 3-12, 3-13, 3-15, A-4, A-26
  using in secure mode, A-32
Boot flags
  Linux, 3-9
  Tru64 UNIX, 3-8
Boot options, 3-4
  setting, 3-4
boot_file environment variable, SRM, 3-7, 3-13, 3-15, A-32
boot_flags environment variable, SRM, A-32
boot_osflags environment variable, SRM, 3-8, 3-13, 3-15, A-45, A-48
  Tru64 UNIX, A-48
bootdef_dev environment variable, SRM, 3-6, 3-13, 3-15, A-32, A-45
Booting
  Linux, 3-18
  passing information to command, A-48
  Tru64 UNIX, 3-12
    from local disk, 3-12
    from remote disk, 3-14
bootp protocol, 3-11

C

Cable routing, 2-11
Cache, 1-2
  Icache, 3-1
CD
  inserting or ejecting, 1-11
CD-ROM, 1-3, 1-4
  installing or removing, 2-14
Certification
  EMC, 1-7
Chipset, 1-2
clear envar command, SRM, A-4
clear *password* command, SRM, A-4, A-33
COM* ports, setting baud rate, A-49
com*_baud environment variable, SRM, A-45, A-49
Command syntax, SRM console, A-6
Components, 1-1, 1-4
Connecting the system, 2-2
Connectors
  power, 1-4, 1-5
  rear, 1-8, 2-2
Console
  SRM, 3-3
Console commands, SRM, A-4, A-5
Console environment variable, SRM, A-37, A-38
continue command, SRM, A-4
  using in secure mode, A-32

Cover removal, 2-5
CPU, 1-1, 3-1
cpu_enabled environment variable, SRM, A-45
crash command, SRM, A-4, A-36
Crash dump, A-36

D

deposit command, SRM, A-4, A-41
Depositing data, A-41
Device naming conventions, SRM, A-12
Dimensions, 1-8
Disk controller
  Ultra3SCSI, 1-3
Display
  power-up, 3-3
display command, LFU, 3-25
Display fan status, 5-6
Displaying system configuration, A-9
Displaying the value or setting of an environment variable, A-38
Double Data Rate (DDR) transfers, 1-2
DS20L system features, 1-1

E

edit command, SRM, A-4, A-39
ei*0_inet_init environment variable, SRM, 3-10
ei*0_protocols environment variable SRM, 3-11
Ejecting a CD, 1-11
EMC specifications, 1-7
enable_wol environment variable, SRM, A-46, A-55
Enclosure, 1-4
Environment variables, SRM, A-37
  auto_action, 3-3
  boot_file, 3-13, 3-15, A-32
  boot_flags, A-32
  boot_osflags, 3-13, 3-15
  bootdef_dev, 3-13, 3-15, A-32
  displaying the value or setting, A-38
  modifying, A-37
  os_type, 3-3
  password, A-33
  setting, A-37
  summary, A-45
Environmental requirements
  altitude, 1-7
  heat
    airflow and quality, 1-7
    dissipation, 1-6
  maximum wet bulb temperature, 1-6
  relative humidity, 1-6
  temperature, 1-6
Environmental specifications, 1-6
Ethernet, specifying controller type, A-50, A-55
ew*0_inet_init environment variable, SRM, 3-10
ew*0_mode environment variable, SRM, A-45, A-50
ew*0_protocols environment variable SRM, 3-11
ew*0_protocols environment variable, SRM, A-45, A-50
examine command, SRM, A-4, A-41
Examing data, A-41
exit command, LFU, 3-22, 3-25
Expansion ports, 1-3
External L2 cache, 1-2

F

Factory-installed software (FIS), 3-4
Fan failure
  fan status display, 5-6
Fan status display, 5-6
Fans, 1-4
Finding help
  SRM console, A-44
Firmware, 1-3
  updating, 3-21, 3-22
  updating from network device, 3-23
  updating from SRM, A-35
  updating, SRM command, 3-21

Firmware configuration
jumper block, 5-5
jumper pins, 5-6
jumpers, 5-4
Front bezel removal, 1-11, 2-3
Front panel, 1-10
Front view, 1-10

H

Halt button, 1-12, 5-3
halt command, SRM, A-4, A-34
Halting the system, 5-3
Hard drive
inserting, 2-13
installing or removing, 2-9
Hard drive assembly, 2-12
Hard drives, 1-3
help command, LFU, 3-25, 3-26
help command, SRM, A-4, A-44

I

I/O
card, *1-2*
shield, 1-8
slots, 1-2
specifications, 1-8
initialize command, SRM, A-4, A-23, A-43
Initializing the system, A-43
Inserting a CD, 1-11
Inserting a hard drive, 2-13
Installation
system, 2-1
Installing
Linux, 3-18
Tru64 UNIX, 3-16
Installing a CD-ROM drive, 2-14
Installing a hard drive, 2-9
Installing a SCSI backplane, 2-10
Installing memory, 2-6
Installing options, 2-3
Installing PCI options, 2-8
Internal view, 1-14
IPK, 3-16

J

Jumper pins, 5-6
Jumpers
firmware configuration, 5-4

K

kbd_hardware_type environment variable, SRM, A-37, A-38

L

language environment variable, SRM, A-37, A-38
LEDs, 3-1
error statuses, 5-1
front system status, 5-1
network connector status, 5-2, 5-3
rear system status, 5-2
LFU, 3-21
commands, 3-25
from CD-ROM, 3-22
from SRM console, 3-21
starting, 3-21, 3-22
typical update procedure, 3-22
updating firmware from network device, 3-23
lfu command, LFU, 3-25, 3-26
lfu command, SRM, 3-22, A-4, A-35
LFU commands
display, 3-25
exit, 3-22, 3-25
help, 3-25, 3-26
lfu, 3-25, 3-26
list, 3-22, 3-25, 3-26
readme, 3-25, 3-26
summary, 3-25
update, 3-22, 3-25, 3-27
verify, 3-25, 3-27
Linux
booting, 3-18

installing, 3-18
list command, LFU, 3-22, 3-25, 3-26
Loadable Firmware Update utility. *See* LFU
login command, SRM, A-4, A-33
using in secure mode, A-32

M

Main memory, 1-2
Maximum power consumption, 1-5
Memory, 1-2
configuration, 2-6
installing or removing, 2-6
Modifying an environment variable, SRM, A-37
more command, SRM, A-5, A-42

N

Naming conventions, SRM, A-12
Network controller, 1-2
Network protocols, enabling for booting and other functions, SRM, A-50
Network status LEDs, 5-2, 5-3
NHD4, 3-16

O

ocp_text environment variable, SRM, A-37, A-38, A-46
Opening the system, 2-5
Operating system
booting Linux, 3-18
booting Tru64 UNIX, 3-12
from local disk, 3-12
from remote disk, 3-14
specifying default, A-51
Operating systems, 1-3, 3-4
Options
installing, 2-3
OS support, 3-2
os_type environment variable, SRM, 3-3, A-38, A-51

P

password environment variable, SRM, A-33
PCI
enabling and disabling parity checking on bus, SRM, A-51, A-52
PCI options
installing or removing, 2-8
PCI slots, 1-2
pci_parity environment variable, SRM, A-46, A-51, A-52
PCI-ISA Bridge I2C controller, 1-3
Physical dimensions, 1-4, 1-8
Physical form factor, 1-1
pk*0_fast environment variable, SRM, A-46, A-52
pk*0_host_id environment variable, SRM, A-46, A-53
POST, 3-2
Power
connectors, 1-4, 1-5
internal failure, 5-3
maximum consumption, 1-5
overview, 1-2
specifications, 1-4, 1-5
supply, 1-4
Powering up the system, 3-1
Power-up display, 3-3
Power-up self-test, 3-2
Power-up, specifying console action, SRM, A-47
prcache command, SRM, A-5, A-27

R

Rack mounting, 2-2
Rackmount system removal, 2-4
Reading a file, A-42
readme command, LFU, 3-25, 3-26
Rear connectors, 2-2
Rear view, 1-13
Remote management
basic control, 4-2

link status, 4-3
overview, 4-1
shutdown, 4-3
startup, 4-2
WOL utility, 4-3
Removing a CD, 1-11
Removing the bezel, 1-11, 2-3
Removing the cover, 2-5
Removing the system from rack, 2-4
Reset, specifying console action, SRM, A-47
RIS
Booting Tru64 UNIX, 3-12
Tru64 UNIX installation, 3-16
Routing
SCSI cable, 2-11

S

Safety, 1-7
SCSI
enabling fast SCSI, SRM, A-52
setting controller host bus node ID, SRM, A-53
SCSI backplane
installing or removing, 2-10
SCSI cable
routing, 2-11
SCSI disk controller, 1-3
set *envar* command, SRM, A-5, A-37, A-38
set host command, SRM, A-5
set password command, SRM, A-5, A-30
set secure command, SRM, A-5, A-31
Setting an environment variable, A-37
Setting boot options, 3-4
Setup, 2-1
show boot command, SRM, 3-13
show config command, SRM, A-5, A-9
show device command, SRM, 3-12, 3-13, 3-15, A-5, A-11
show envar command, SRM, A-5, A-38
show hwrpb command, SRM, A-13
show ide command, SRM, A-18
show IDE command, SRM, A-5
show memory command, SRM, A-5, A-19
show pal command, SRM, A-5, A-19
Show power command
fan statuses, 5-6
show power command, SRM, A-5, A-20
show version command, SRM, A-5, A-22
Special characters, SRM console, A-7
Specifications, 1-4
acoustical, 1-9
dimensions, 1-8
EMC, 1-7
environmental, 1-6
I/O, 1-8
power, 1-4, 1-5
thermal, 1-8
SRM console, 3-3
command line interface, 3-2
command syntax, A-6
communication access, 3-2
device naming conventions, A-12
firmware design, 3-2
invoking, A-3
overview, 3-2
special characters, A-7
summary of commands, A-4
summary of environment variables, A-45
updating firmware, A-35
SRM console commands
boot, 3-13, 3-15, A-4, A-26
using in secure mode, A-32
clear *envar*, *A-4*
clear *password*, *A-4*, A-33
continue, A-4
using in secure mode, A-32
crash, A-4, A-36
deposit, A-4, A-41
edit, A-4, A-39
examine, A-4, A-41
halt, A-4, A-34
help, A-4, A-44

initialize, A-4, A-23, A-43
lfu, 3-22, A-4, A-35
login, A-4, A-33
using in secure mode, A-32
more, A-5, A-42
prcache, A-5, A-27
set envar, A-5, A-37, A-38
set host, A-5
set password, A-5, A-30
set secure, A-5, A-31
show boot, 3-13
show config, A-5, A-9
show device, 3-13, 3-15, A-5, A-11
show *envar*, *A-5*, A-38
show hwrpb, A-13
show ide, A-5, A-18
show memory, A-5, A-19
show pal, A-5, A-19
show power, A-5, A-20
show version, A-5, A-22
start
using in secure mode, A-32
stop, A-5, A-34
summary of commands, A-4
test, A-5, A-28
SRM console environment variables
ac_action, A-45, A-47
auto_action, A-45, A-47
boot_osflags, A-45, A-48
boot_osflags, Tru64 UNIX, A-48
bootdef_dev, A-45
com*_baud, A-45, A-49
commands for displaying the value or setting, A-38
commands for modifying, A-37
commands for setting, A-37
commands for using, A-37
cpu_enabled, A-45
enable_wol, A-46, A-55
ew*0_mode, A-45, A-50
ew*0_protocols, A-45, A-50
ocp_text, A-46
os_type, A-51
pci_parity, A-46, A-51, A-52
pk*0_fast, A-46, A-52
pk*0_host_id, A-46, A-53
sysvar, A-46, A-54
tt_allow_login, A-46, A-54
SRM firmware
enabling and disabling login to, A-54
SROM code, 3-1
start command, SRM
using in secure mode, A-32
stop command, SRM, A-5, A-34
Storage, 1-3
Storage bays, 1-3, 1-4
Syntax
SRM console commands, A-6
System
components, 1-1, 1-4
features, 1-1
front view, 1-10
installation, 2-1
internal view, 1-14
management, 1-3
powering up, 3-1
rear view, 1-13
setup, 2-1
specifications, 1-4
System configuration
displaying in SRM console, A-9
System crash dump, A-36
System failure, specifying console action, SRM, A-47
System removal from rack, 2-4
System status LEDs
front, 5-1
rear, 5-2
sysvar environment variable, SRM, A-46, A-54

T

Test
power-up, 3-2
test command, SRM, A-5, A-28

Testing the system (all operating systems), A-28
Thermal specifications, 1-8
Troubleshooting, 5-1
Tru64 UNIX
  booting, 3-12
    from local disk, 3-12
    from remote disk, 3-14
  console for, A-1
  installing, 3-16
  specifying as default operating system, A-51
  text-based installation display, 3-16
tt_allow_login environment variable, SRM, A-46, A-54

U

Ultra3SCSI disc controller, 1-3
update command, LFU, 3-22, 3-25, 3-27
Updating firmware, 3-21
Updating firmware from SRM console, 3-21, A-35

V

verify command, LFU, 3-25, 3-27

W

WOL, 4-3, 4-6
  commands, 4-5
  environment variables, 4-7
  errors, 4-5
  exiting, 4-5
  operation, 4-4
  overview, 4-3
  restrictions, 4-5