DIGITAL AlphaServer 4100 Central Office System

Installation/Owner's/Service Guide

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Preface

Overview

This guide provides the information necessary to install the AlphaServer 4100 central office system in a 48.26-cm (19-in.) NEBS 2000/ETSI-compliant cabinet. It also provides information on operating and troubleshooting the AlphaServer 4100 central office system, and removing and replacing field replaceable units (FRUs).

Intended Audience

This guide is intended for Compaq service personnel or qualified Self-maintenance customers who are familiar with installing computer systems, and for system managers and others who perform system management tasks.

How to Use This Guide

Read this guide *before* installing the AlphaServer 4100 central office system.

Before installation review the warranty. The terms of the warranty agreement with Compaq may require that a qualified Compaq Customer Services representative install the system. Contact your local Compaq representative if you have any questions.

Organization

This guide is organized as follows:

Chapter 1, Introduction – Provides an overview of the AlphaServer 4100 central office system and a description of the basic components and controls.

Chapter 2, Installation – Provides site preparation, unpacking, system installation, and option installation information.

Chapter 3, System Power-Up and Verification – Provides information for powering up the system and verifying system operation.

Chapter 4, Operation – Provides information for installing the operating system, Updating firmware, and operating the system remotely.

Chapter 5, SRM Console – Provides information on using the SRM console.

Chapter 6, AlphaBIOS Console – Provides information on using the AlphaBIOS console.

Chapter 7, Troubleshooting – Provides information for identifying and resolving system problems that prevent proper operation.

Chapter 8, Removal and Replacement – Provides the removal and replacement procedures for the major system components.

Appendix A, Hardware Specifications – Provides the physical, environmental, and electrical specifications for the AlphaServer 4100 central office system.

Appendix B, Field Replaceable Units (FRUs) – Lists all of the FRUs and their part numbers for the AlphaServer 4100 central office system chassis.

Appendix C, Options – Lists the options that are available for the AlphaServer 4100 central office system.

Appendix D, Default Jumper Settings – Lists the default jumper settings for the modules in the AlphaServer 4100 central office system.

Related Documents

Other documents related to the AlphaServer 4100 central office system include the following:

- *AlphaServer 4100 System Drawer User's Guide* (EK-4100A-UG)

- *AlphaServer 4100 Service Manual* (EK-4100A-SV)

- *AlphaServer 4000/4100 Configuration and Installation Guide* (EK-4100A-CG)

- *DIGITAL Custom AlphaServer 4100 System Solutions Installation/Owner's/Service Guide* (EK-410LP-IN)

Conventions

This guide uses the following conventions:

Convention	Meaning
Note	A note calls the reader's attention to any item of information that may be of special importance.
Caution	A caution contains information essential to avoid damage to the equipment.
Warning	A warning contains information essential to the safety of personnel.
❶	Circled numbers provide a link between figures or examples and text.
MONOSPACE	Text displayed on the screen is shown in monospace type.
bold type	Bold type denotes user input or software commands.
Italic type	Italic type emphasizes important information, indicates variables, and indicates complete titles of manuals.

The following symbols appear on the chassis. Please review their definitions below:

This Dangerous Voltage warning symbol indicates risk of electrical shock and indicates hazards from dangerous voltage.

This Attention symbol is used to alert the reader about specific safety conditions, and to instruct the reader to read separate instructional material.

Reader's Comments

Compaq welcomes your comments on this or any other manual. You can send your comments to Compaq in the following ways:

- Internet electronic mail: *reader-comments@digital.com*

- Mail:

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  Information Design

  PKO3-2/21J

  129 Parker Street

  Maynard, MA 01754-2199

For additional information call 1-800-344-4825.

<div align="right">

1
Introduction

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1.1 General

This chapter introduces the AlphaServer 4100 central office system and describes the system components and controls.

The AlphaServer 4100 central office system (see Figure 1-1) is a high-performance server packaged specifically for the Telecommunications Central Office environment. The system is contained in a slide-mounted chassis that fits into a NEBS 2000/ETSI-compliant 48.26-cm (19-in.) EIA cabinet.

The AlphaServer 4100 central office system is part of the AlphaServer 4100 product line. This product line is a family of Alpha, symmetric multiprocessor, server systems that are supported by multiple operating systems (DIGITAL UNIX, OpenVMS, and Windows NT). These server systems are suitable for several computing environments: general-purpose commercial, high-performance application and database, and PC LAN server.

The server's CPU is based on the DECchip 21164A (EV56) processor chip running at 533 MHz.

Figure 1-1 AlphaServer 4100 Central Office System
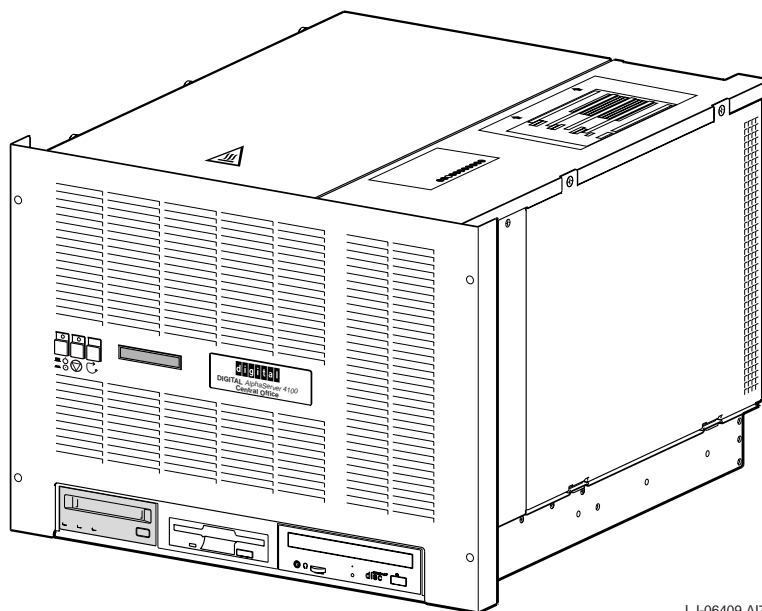
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1.2 Characteristics

Table 1-1 highlights the specific characteristics of the AlphaServer 4100 central office system.

Table 1-1 System Characteristics

Characteristic	Description
Processor capability	Contains up to four CPU modules. Each CPU module contains a DECchip 21164A processor chip running at 533 MHz and a 4 MB synchronous data cache external to the processor chip. Each CPU module has a fan for cooling.
High-performance PCI I/O subsystem	The server has 11 PCI slots and one PCI/EISA combination slot that are implemented as follows: three PCI buses that have three slots each for PCI options and a fourth PCI bus that has two dedicated PCI slots and one slot for either PCI or EISA options.
EISA I/O bus	EISA I/O bus is capable of supporting industry-standard EISA options, such as: • Network adapters • Video/audio options • Storage adapters
Internal mass storage	Contains two internal disk bays for installing up to two optional 3.5 in. half-height SCSI disk drives.
Floppy drive	Contains one 1.44 MB floppy drive.
CD-ROM drive	Contains one 12X speed CD-ROM drive.
Tape drive	Contains a bay for installing an optional TLZ10 DAT tape drive.
External storage devices	Supports external StorageWorks compatible storage devices for low-cost, high-capacity, flexible configurations. This provides the ability to have many independent disks that may be configured in stripe sets, shadow sets, or RAID sets to optimize performance according to customer requirements.
High availability	Supports disk hot swap in external StorageWorks shelves as well as clustering with proper software and controllers.
CPU chip technology	The DECchip 21164A is manufactured by using DIGITAL CMOS process.
CPU clock rate	533 MHz for DECchip 21164A
System bus bandwidth	1.1 GB/s (128-bit)
Main memory	Contains up to four memory pairs. A memory pair is two modules of the same size and type, which together comprise one memory option. Memory pairs are 128 MB (2 x 64 MB) or 1 GB (2 x 512 MB) half height modules. Maximum memory can be from 512 MB, using 128 MB memory options, to 4 GB using 1 GB memory options.

1.3 Components and Controls

System components and controls are located at the front, internally, and at the rear of the system chassis.

1.3.1 Front Components

Figure 1-2 shows the components located on the front of the system chassis.

Figure 1-2 Front Components
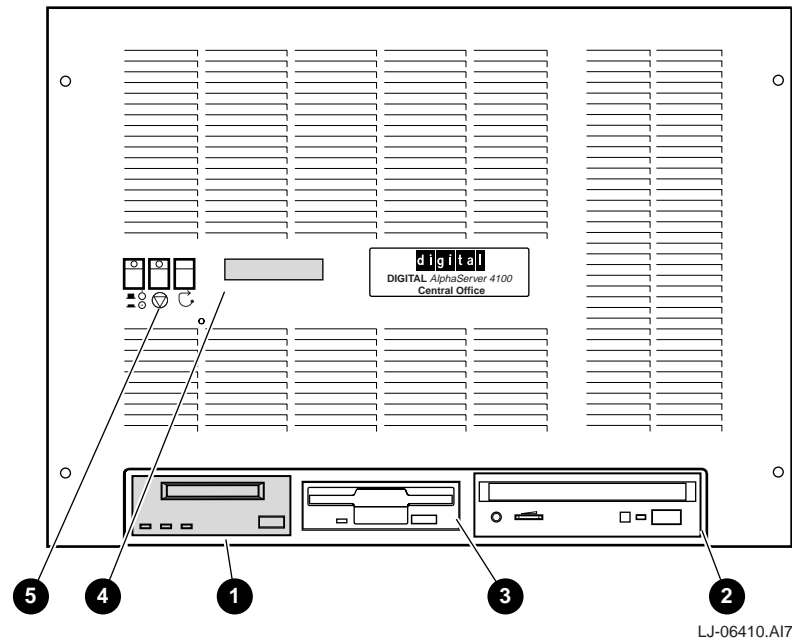
LJ-06410.AI7

❶ Optional tape drive   ❹ Operator control panel display module

❷ CD-ROM drive   ❺ Operator control panel switch module

❸ Floppy drive

1.3.2 Operator Control Panel

The operator control panel (OCP), shown in Figure 1-3, is located on the front of the system chassis and consists of a switch module, containing three buttons, and a display module.

Figure 1-3 Operator Control Panel

LJ-06411.AI7
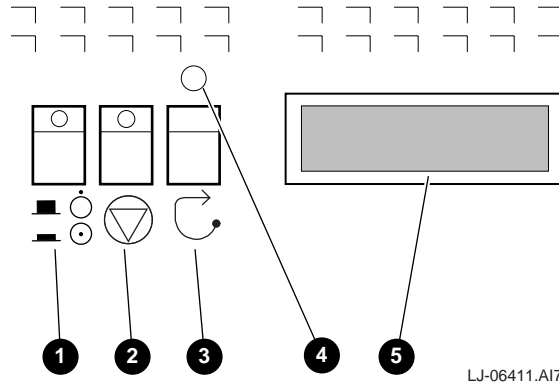
❶ **Power button** — Powers the system secondary dc power on or off. When the LED on the button is lit, the dc power is on.

❷ **Halt button** — Pressing this button in (so the LED on the button is lit) does the following:

- If DIGITAL UNIX or OpenVMS is running, halts the operating system and returns to the SRM console.

- If the Halt button is in when the system is reset or powered up, the system halts in the SRM console, regardless of the operating system. DIGITAL UNIX and OpenVMS systems that are configured for autoboot will not boot if the Halt button is in. Windows NT systems halt in the SRM console: AlphaBIOS is not loaded and started.

❸ **Reset button** — Initializes the system.

❹ **Adjustment screw** — Adjusts the brightness of the display.

❺ **Display** — Indicates status during power-up and testing. See Chapter 7 for the messages that are displayed and their meanings. While the operating system is running, the system type is displayed as a default. This message can be changed by the user.

1.3.3 Internal Components

Figure 1-4 shows the internal components of the system chassis.

Figure 1-4 Internal Components
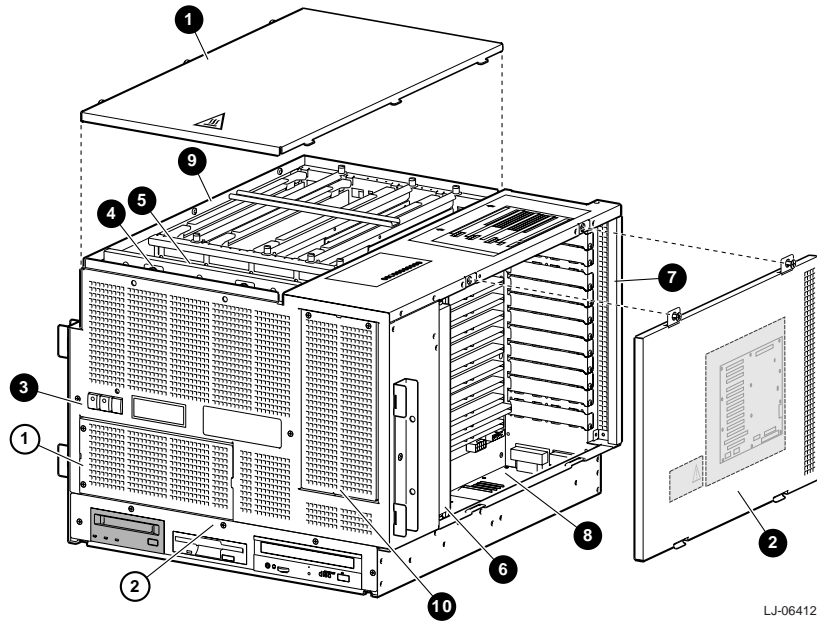
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❶	Top cover	❼	PCI/EISA card cage
❷	Right side cover	❽	Server control module
❸	OCP assembly	❾	System card cage
❹	System card-cage fan assembly	❿	Hard disk drive tray cover
❺	Front card-cage EMI/RFI honeycomb filter	①	Front access cover
❻	PCI/EISA card-cage fan assembly	②	Removable media assembly

1.3.4 Rear Components

Figure 1-5 shows the components located on the rear of the system chassis.

Figure 1-5 Rear Components

LJ-06413.AI7
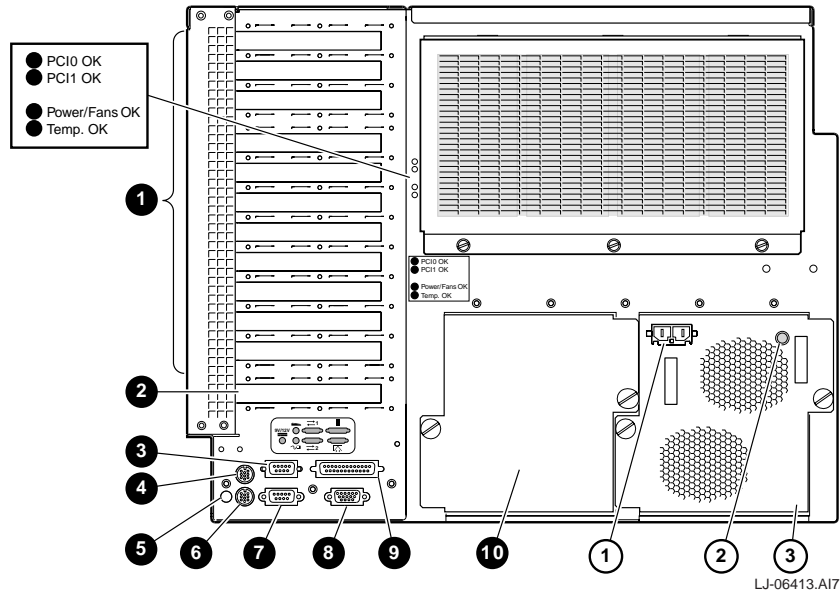
❶	PCI board slots	❽	Modem port
❷	PCI/EISA slot	❾	Parallel port
❸	Serial port (COM1)	❿	Optional power supply cover
❹	Keyboard port	①	DC input receptacle
❺	12 Vdc power connector	②	Power supply LED
❻	Mouse port	③	Power supply
❼	Serial port (COM2)		

1.3.5 Safety and Information Labels

Figure 1-6 shows safety and information labels located on the outside and inside covers of the system chassis.

Figure 1-6 Safety and Information Labels

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2
Installation
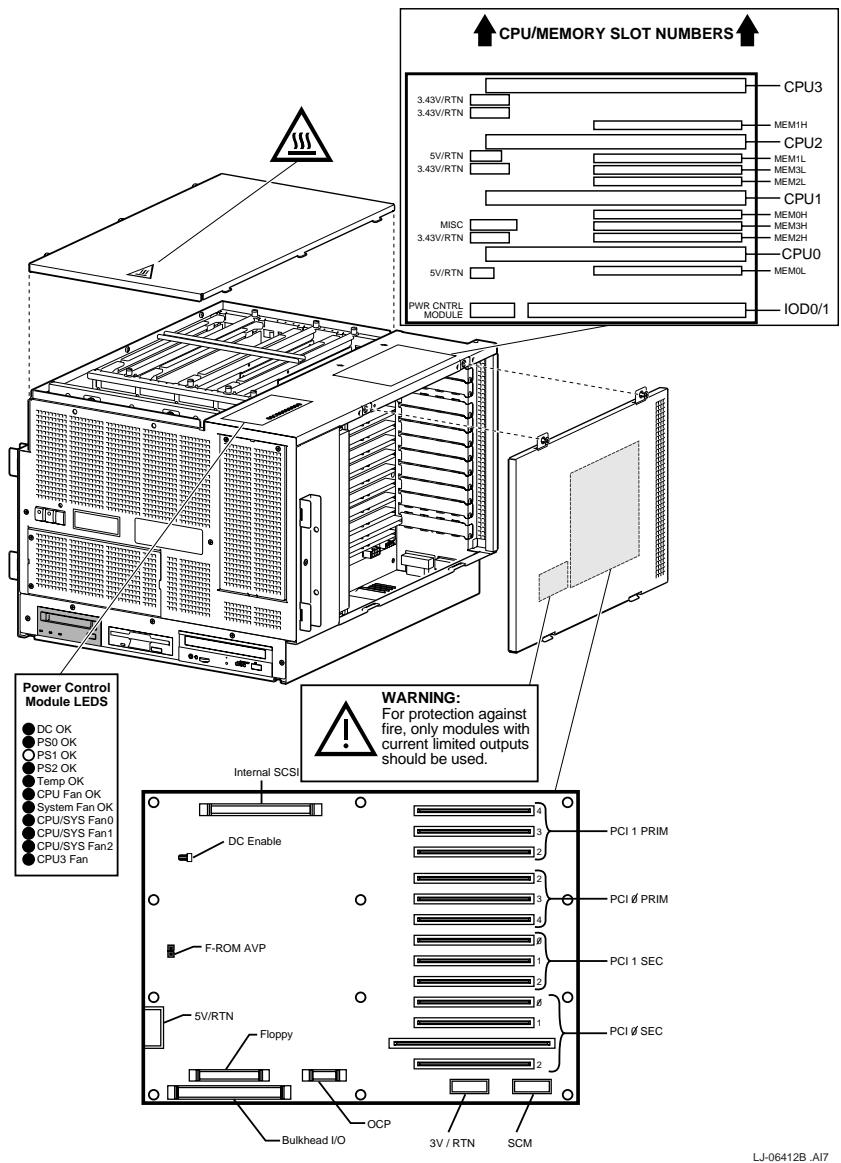
2.1 General

This chapter covers the installation of the AlphaServer 4100 central office system in a 48.26-cm (19-in.) NEBS 2000/ETSI-compliant cabinet. The major topics covered in this chapter include:

- Site Preparation

- Unpacking the Shipment

- Installing the AlphaServer 4100 Central Office System

    – Determining the Installation Area

    – Attaching the Slide Assemblies to the Cabinet Rails

    – Installing Rail Nuts and Standoffs on the Front Rails

    – Attaching the Inner Races to the Chassis

    – Mounting the System on the Slides

    – Connecting the Power Cable(s)

- Installing the Interlock System

- Installing PCI/EISA Option Modules

- Connecting to Networks

- Connecting Serial and Parallel Devices

- Connecting a VGA Monitor or Serial Terminal

- Installing Optional CPU Modules

- Installing Optional Memory Pairs

- Installing Optional Hard Disk Drives

- Installing an Optional Tape Drive

- Installing an Optional Power Supply

- Installing the Guardian

2.2 Site Preparation

The installation instructions that follow assume that:

- All cables that you plan to connect to your system are in place and clearly labeled. These cables are:

  Terminal data cables

  Telephone cables

  Network cables

- The specifications and conditions listed in Appendix A have been met.

- The system is located in an area that provides sufficient clearance for ventilation and servicing. A clearance of 61 cm (24 in.) at the rear and 129.6 cm (51 in.) at the front of the cabinet is required for service.

_____**Caution**_____

Do not impede airflow by obstructing the front and rear of the cabinet. Exceeding internal thermal limits can affect system reliability.

_____

_____**WARNING**_____

The AlphaServer 4100 central office system can weigh up to 47.63 kg (105 lb). To prevent personal injury and equipment damage, ensure that the system is contained in an enclosure that can be stabilized when the system is pulled out on its slides.

_____

_____**ACHTUNG** _____

Das AlphaServer 4100 Central Office System kann bis zu 47,63 kg (105 lb) wiegen. Um Personen- und Geräteschaden zu vermeiden, sollten Sie deshalb sicherstellen, daß sich das System in einem Gehäuse befindet, das stabilisiert werden kann, wenn das System an den Schienen herausgezogen wird.

_____

2.3 Unpacking the Shipment

The AlphaServer 4100 central office system shipment may include several cartons. Check the packing list to ensure that all items listed have been received.

If the equipment is damaged or if any items are missing, notify the delivery agent and contact the Compaq sales representative.

Save all shipping cartons in case the equipment needs to be moved to a new location, or needs to be returned for repair.

_____ **WARNING** _____

The AlphaServer 4100 central office system can weigh up to 47.63 kg (105 lb). Use sufficient personnel or the proper lifting equipment when lifting or moving the system.
_____

_____**ACHTUNG** _____

Das AlphaServer 4100 Central Office System kann bis zu 47,63 kg (105 lb) wiegen. Beim Hochheben oder Transport des Systems sollten deshalb genügend Hilfskräfte vorhanden sein oder die richtigen Hebewerkzeuge benutzt werden.
_____

2.4 Installing the AlphaServer 4100 Central Office System

The following sections contain the procedure for installing the AlphaServer 4100 central office system in a 48.26-cm (19-in.) NEBS 2000/ETSI-compliant cabinet.

Tools Required

- Phillips-head screwdriver
- Flat-blade screwdriver
- Adjustable wrench

2.4.1 Determining the Installation Area

The AlphaServer 4100 central office system requires 35.56 cm (14.00 in.) of vertical space or 24 contiguous holes in a 48.26-cm (19-in.) NEBS 2000/ETSI-compliant cabinet.

The holes in a NEBS 2000/ETSI-compliant cabinet rails follow a pattern of 1.27 cm (0.50 in.), 1.59 cm (0.625 in.), and 1.59 cm (0.625 in.). This pattern is called a *set* and is repeated for the length of the cabinet rails.

To determine the installation area, perform the following steps at the front and the rear cabinet rails (refer to Figure 2-1).

1. Select a section of the cabinet rail where there is a 1.27 cm (0.05 in.) space between two holes and make a mark between these two holes. This is the *starting point* of the installation area.

2. Count up or down 24 holes from the starting point and make a mark above or below the 24th hole. The area between these two marks is the *installation area*. The bottom hole of the installation area is identified as hole 1 of the installation area.

3. Repeat steps 1 and 2 for the same holes on the front of both front rails and the rear of both rear rails.

The total installation area for the AlphaServer 4100 central office system is or 35.56 cm (14.00 in.) of vertical space.

Figure 2-1 Installation Area and Rail-Hole Pattern
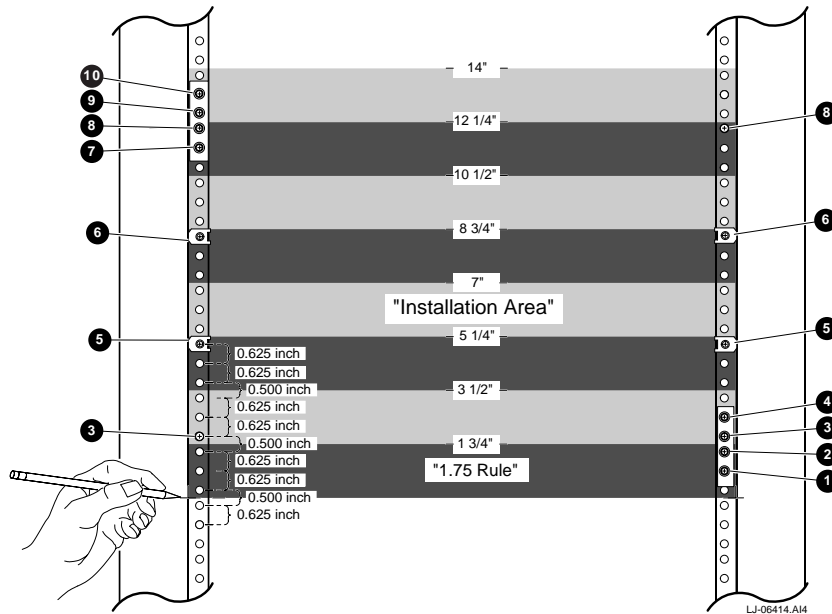
❶ Hole 2 for attaching right slide bracket.

❷ Hole 3 for attaching right slide bracket.

❸ Hole 4 for installing standoff on right front rail and for installing standoff and nut on left front rail.

❹ Hole 5 for attaching right slide bracket.

❺ Hole 9 for rail nut used to secure system to left and right front rails.

❻ Hole 15 for rail nut used to secure system to left and right front rails.

❼ Hole 20 for attaching left slide bracket.

❽ Hole 21 for installing standoff on left front rail and for installing standoff and nut on right front rail.

❾ Hole 22 for attaching left slide bracket.

❿ Hole 23 for attaching left slide bracket.

2.4.2 Attaching the Slide Assemblies to the Cabinet Rails

The following sections contain the procedures for attaching the right and left slide assembles to the cabinet rails.

2.4.2.1 Attaching the Right Slide Assembly to the Cabinet Rails

To attach the right slide assembly to the cabinet rails, refer to Figure 2-2 and proceed as follows:

1. Determine the proper mounting holes for the right slide brackets. The proper mounting holes are the 2nd, 3rd, 4th, and 5th holes of the installation area (see Figure 2-1).

2. Locate the right slide assembly.

3. Place the right front slide bracket ❶ on the inside of the right front rail and align the four slide bracket holes with the 2nd, 3rd, 4th, and 5th holes of the installation area on the right front rail.

4. Install three 10-32 truss-head screws ❷ in the 2nd, 3rd, and 5th holes of the installation area to secure the right front slide bracket to the right front rail, but *do not* tighten.

5. Install a 10-32 standoff ❸ in the 4th hole of the installation area on the right front rail. Tighten this standoff.

6. Place the right rear slide bracket ❹ on the inside of the right rear rail and align the four slide bracket holes with the 2nd, 3rd, 4th, and 5th holes of the installation area on the right rear rail.

7. Install four 10-32 truss-head screws ❺ in the 2nd, 3rd, 4th, and 5th holes of the installation area to secure the right rear slide bracket to the right rear rail, but *do not* tighten.

8. Tighten the two 8-32 screws and nuts that secure the right rear slide bracket to the right slide assembly.

9. Securely tighten all seven 10-32 truss-head screws that secure the right slide assembly to the right front and rear cabinet rails.

Figure 2-2 Attaching the Slide Assemblies to the Cabinet Rails

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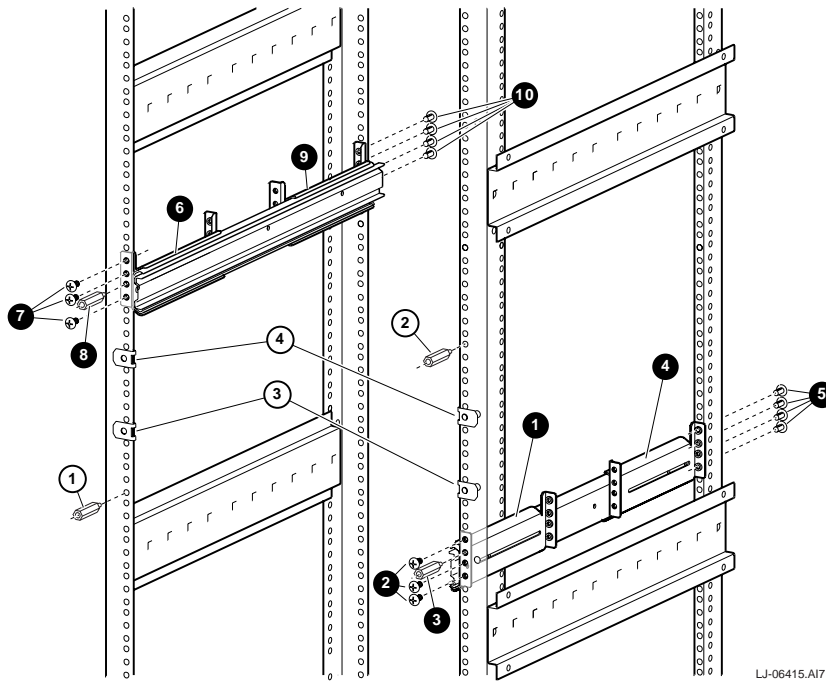
2.4.2.2 Attaching the Left Slide Assembly to the Cabinet Rails

To attach the left slide assembly to the cabinet rails, refer to Figure 2-2 and proceed as follows:

1. Determine the proper mounting holes for the left slide brackets. The proper mounting holes are the 20th, 21st, 22nd, and 23rd holes of the installation area (see Figure 2-1).

2. Locate the left slide assembly.

3. Place the left front slide bracket ❻ on the inside of the left front rail and align the four slide bracket holes and with the 20th, 21st, 22nd, and 23rd holes of the installation area on the left front rail.

4. Install three 10-32 truss-head screws ❼ in the 20th, 22nd, and 23rd holes of the installation area to secure the left front slide bracket to the left front rail, but *do not* tighten.

5. Install a 10-32 standoff ❽ in the 21st hole of the installation area on the left front rail. Tighten this standoff.

6. Place the left rear slide bracket ❾ on the inside of the left rear rail and align the four slide bracket holes and with the 20th, 21st, 22nd, and 23rd holes of the installation area on the left rear rail.

7. Install four 10-32 truss-head screws ❿ in the 20th, 21st, 22nd, and 23rd holes of the installation area to secure the left rear slide bracket to the left rear rail, but *do not* tighten.

8. Tighten the two 8-32 screws and nuts that secure the left rear slide bracket to the left slide assembly.

9. Securely tighten all seven 10-32 truss-head screws that secure the left slide assembly to the left front and rear cabinet rails.

2.4.3 Installing Rail Nuts and Standoffs on the Front Rails

Four rail nuts and two standoffs and nuts must be installed on the front cabinet rails to receive the screws that secure the system to the rails and the screws that secure the front bezel to the rails. Refer to Figure 2-2 and use the following procedure to install the rail nuts and standoffs and nuts:

1. Install a 10-32 standoff ① in the 4th hole of the installation area on the left front rail and secure it in place with a 10-32 nut.

2. Install a 10-32 standoff ② in the 21st hole of the installation area on the right front rail and secure it in place with a 10-32 nut.

3. Install a rail nut ③ over the 9th hole of the installation area on the left and right front rails by sliding the rail nut over the edge of the cabinet rail and aligning it with the hole. Ensure that the threaded half of the rail nuts are toward the inside of the cabinet.

4. Install a rail nut ④ over the 15th hole of the installation area on the left and right front rails by sliding the rail nut over the edge of the cabinet rail and aligning it with the hole. Ensure that the threaded half of the rail nuts are toward the inside of the cabinet.

2.4.4 Attaching the Inner Races to the Chassis

To attach the inner slide races to the chassis, refer to Figure 2-3 and proceed as follows:

_____ **Caution** _____

When performing this procedure, ensure that the arrow ❶ (shown in Figure 2-3) points upward and the locking lever ❷ points toward the front of the system. Otherwise, the slide will be damaged when the system is installed on the slide assemblies.

_____

Attach the right inner slide race ❸ to the lower right side of the system chassis (as viewed from the front) using four 8-32 pan-head screws ❹.

Attach the left inner slide race ❺ to the upper left side of the system chassis (as viewed from the front) using four 8-32 pan-head screws ❻.

Figure 2-3 Attaching the Inner Slide Races

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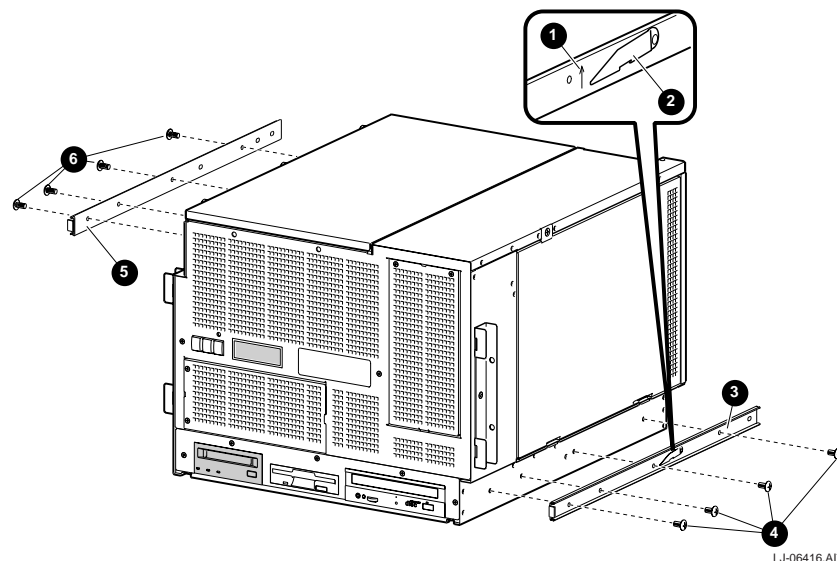
2.4.5 Mounting the System on the Slides

To mount the system on the slides, refer to Figure 2-4 and proceed as follows:

_____**WARNING**_____

The AlphaServer 4100 central office system can weigh up to 47.63 kg (105 lb). Use sufficient personnel or the proper lifting equipment when lifting or moving the system.

_____

_____**ACHTUNG** _____

Das AlphaServer 4100 Central Office System kann bis zu 47,63 kg (105 lb) wiegen. Beim Hochheben oder Transport des Systems sollten deshalb genügend Hilfskräfte vorhanden sein oder die richtigen Hebewerkzeuge benutzt werden.

_____

Stabilize the cabinet before installing the system into the cabinet.

1. Pull both equipment slides ❶ out fully to their locked positions.

2. Lift the chassis and position it so that the slide races ❷ fit into the front end of the slides.

3. Push the system into the slides until it stops. Push up on the two locking levers ❸ and then push the system into the cabinet.

4. Secure the system to the front cabinet rails using four 10-32 truss-head screws ❹. The screws go through the left and right chassis flanges ❺ and into the rail nuts ❻ previously installed on the cabinet rails.

5. Place the front bezel ❼ onto the bezel brackets located on the front of the chassis and secure the front bezel to the cabinet rails using four 10-32 truss-head screws ❽. The screws go through the front bezel and into the standoffs ❾ previously installed on the cabinet rails.

Figure 2-4 Mounting the System on the Slides
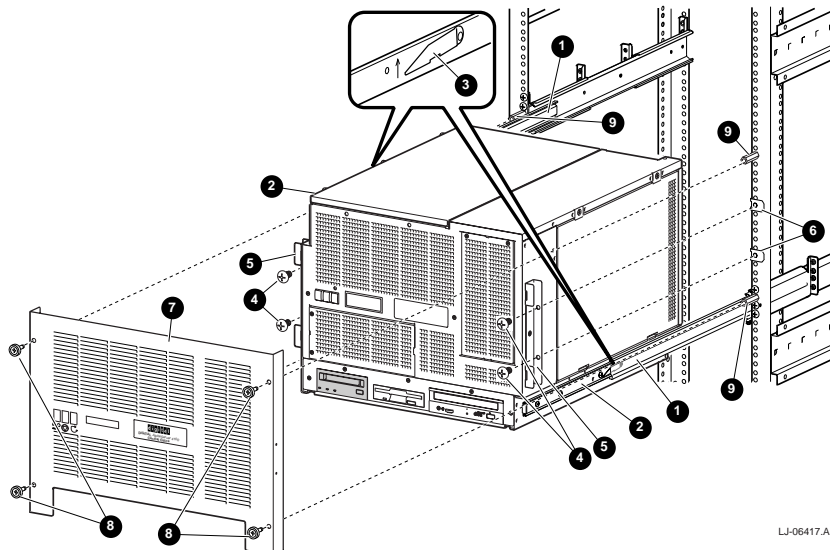
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2.4.6 Connecting the Power Cable(s)

To install the power cable(s), refer to Figure 2-5 and proceed as follows:

1. Attach the power cable ❶ to the right power supply dc input receptacle ❷ located on the rear of the chassis.

_____ **Note** _____

At this time, leave the other end of the power cable disconnected from the cabinet power distribution unit.

_____

2. If the system has a second power supply installed, repeat step 1 to connect the power cable for the left power supply.

Figure 2-5 Connecting the Power Cable(s)
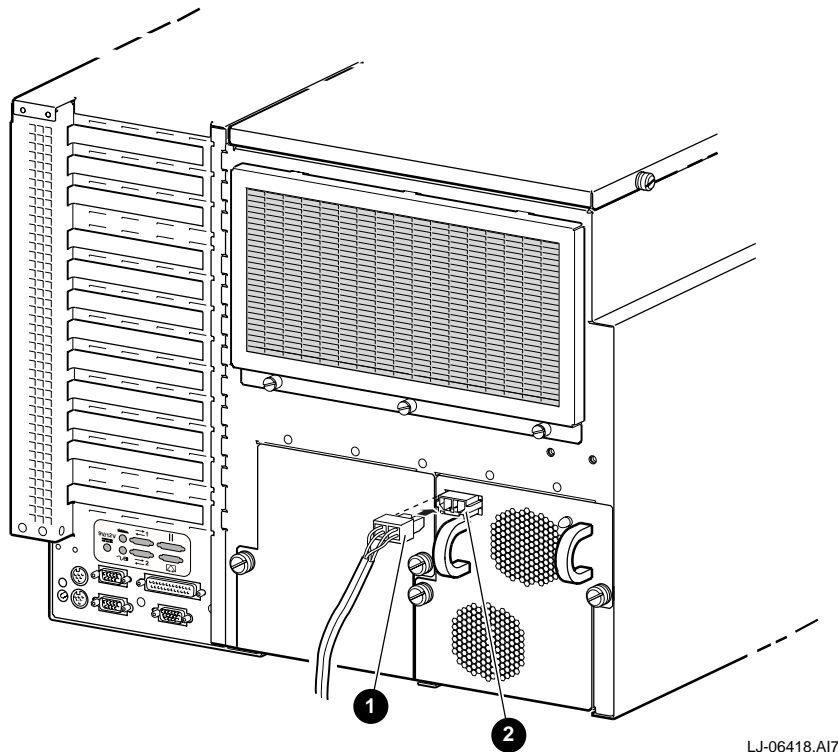
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2.5 Installing the Interlock System

The interlock system helps prevent cabinet instability by allowing only one system at a time to be pulled out of the cabinet.

The interlock system consists of a vertical rod on which are mounted actuator latches for each product installed in the cabinet. These actuator latches engage the interlock actuator bracket on the rear of rackmount systems. When a rackmount system is pulled out of the cabinet, the actuator latches rotate to prevent any other rackmount system that has an interlock actuator bracket from being pulled out of the cabinet.

2.5.1 Installing the Interlock Actuator Bracket

The interlock actuator bracket helps to prevent cabinet instability by allowing only one system at a time to be pulled out of the cabinet. Install the interlock actuator bracket if the system cabinet has an interlock system.

_____ **Note** _____

In some cabinets the interlock rod in the cabinet may not engage the interlock actuator bracket properly. In these cases, do not install the interlock actuator bracket.

_____

_____**WARNING**_____

If the system is installed in a cabinet without an interlock rod or the rod is not compatible with the system interlock actuator bracket, it is the customer's responsibility to provide a stable cabinet.

_____

_____**ACHTUNG** _____

Falls das System in einem Gehäuse ohne Verriegelungsklammer installiert wird oder die vertikale Stange mit der Verriegelungsklammer des Systems nicht kompatibel ist, dann ist der Kunde selbst für die Bereitstellung eines stabilen Gehäuses verantwortlich.

_____

Figure 2-6 shows how to mount the interlock actuator bracket. Mount the interlock actuator bracket ❶ at the rear of the system using two 8-32 screws ❷.

Figure 2-6 Installing the Interlock Actuator Bracket

LJ-06470.AI7
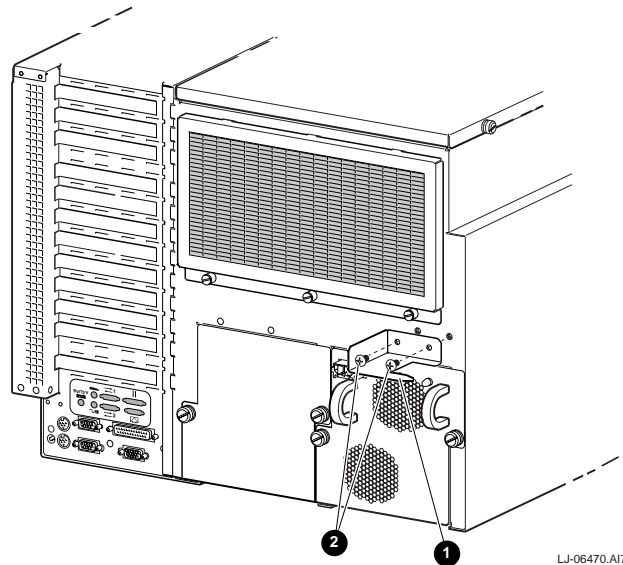
2.5.2 Installing the Interlock Actuator Latches

If additional products are installed into the cabinet, actuator latches for those products should be installed. To install actuator latches, refer to Figure 2-7 and proceed as follows:

1. Remove the screws securing the bottom mounting bracket ❹ to the cabinet.

2. Slide the mounting bracket off the bottom of the vertical rod ❶.

3. Slide the actuator latch ❷ for the new product onto the bottom of the vertical rod.

4. Slide the stabilizer bracket ❺ for the new product onto the bottom of the vertical rod.

5. Replace the bottom mounting bracket ❹ and install the screws removed in step 1 but *do not* tighten them.

6. Position the stabilizer bracket so that the top surface of the stabilizer bracket ❺ is aligned just below the interlock actuator bracket on the installed system (see top expanded view). This may require the loosening and sliding of other latches and stabilizer brackets to accommodate the new configuration.

7. Install and tighten the two 10-32 truss-head screws provided to secure the stabilizer bracket to the rear rail (see top expanded view).

8. Position the new actuator latch ❷ to properly engage the interlock actuator bracket, and tighten the two 6-32 set screws to secure the latch (see top expanded view).

9. Now tighten the screws to secure the bottom mounting bracket ❹.

The expanded view (A) shows the position of the actuator latches when all systems are pushed into the cabinet. The expanded view (B) shows the position of all actuator latches after one system has been pulled out.

_____ **Note**_____

The interlock system is compatible with the AlphaServer 4100 central office system. Other systems may not be compatible because the interlock actuator bracket may not engage properly. In these cases, do not install the interlock actuator bracket on those systems.

_____

_____**WARNING**_____

If a system is installed without an interlock actuator bracket or the vertical rod in the cabinet does not engage properly with the system interlock actuator bracket, it is the customer's responsibility to provide a stable cabinet.
_____

_____**ACHTUNG**_____

Falls ein System ohne Verriegelungsklammer installiert wird oder die vertikale Stange im Gehäuse nicht richtig in der Verriegelungsklammer des Systems einrastet, dann ist der Kunde selbst für die Bereitstellung eines stabilen Gehäuses verantwortlich.
_____

Figure 2-7 The Interlock System
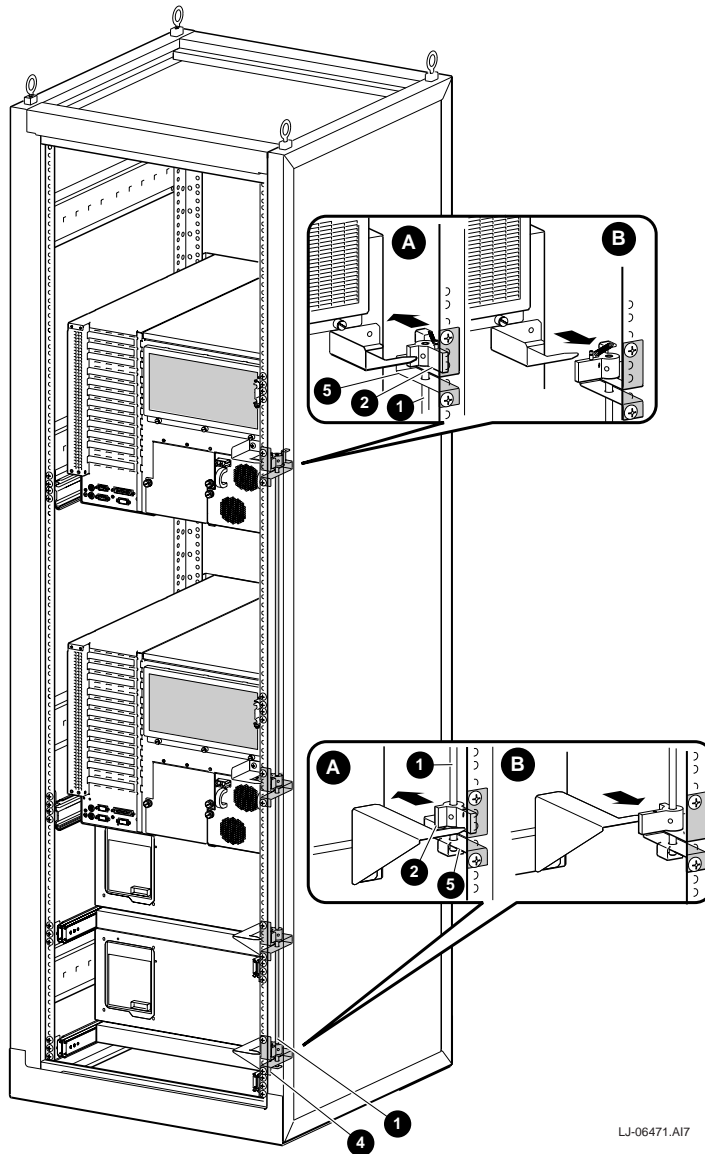
LJ-06471.AI7

2.6 Installing PCI/EISA Option Modules

Refer to Figure 2-8 for the layout of the PCI/EISA slots on the PCI/EISA backplane. Eleven of the slots are dedicated to PCI options only, while the twelfth slot can be used to install either a PCI option or an EISA option.

_____ WARNING _____

For protection against fire, only modules with current limited output should be used.
_____

_____ ACHTUNG _____

Zum Schutz gegen Feuer sollten nur Module mit begrenztem Ausgangsstrom benutzt werden.
_____

Figure 2-8 PCI/EISA Backplane Layout
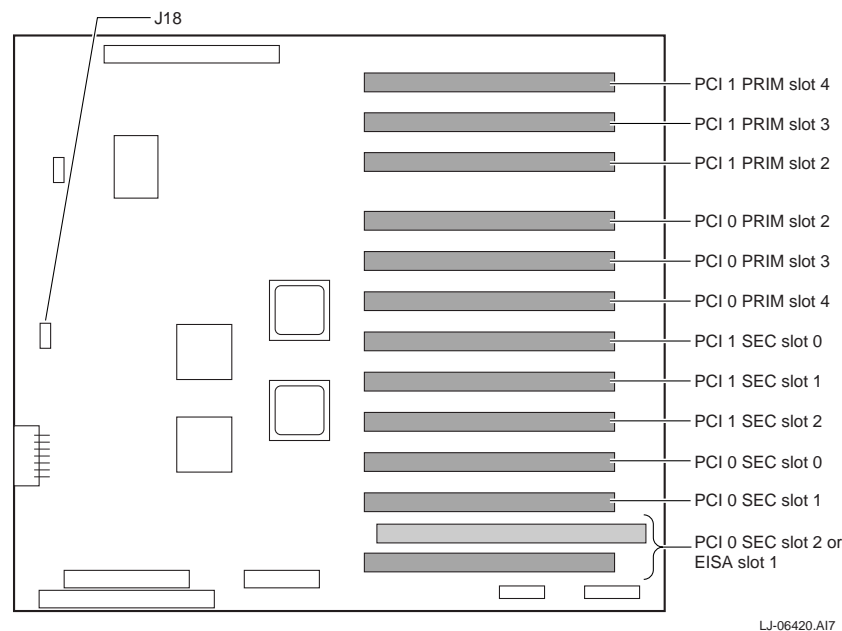
Perform the following procedure to install a PCI/EISA option module:

1. Perform an orderly power down of the system.

2. Ensure that the power On/Off button on the OCP is in the Off position.

3. Disconnect the power cable(s) from the dc input receptacle(s) on the rear of the chassis.

4. Extend the chassis for service (see Section 8.3).

5. Remove the right side cover (see Section 8.5).

6. Remove filler panel screw ❶ and the blank filler panel from the slot selected for installing the PCI/EISA option module (see Figure 2-9). Save the filler panel screw for securing the option module in place.

7. Put on an antistatic wriststrap.

_____**Caution**_____

An antistatic wriststrap *must* be worn when handling any module to prevent damage to the module.

_____

8. Slide the option module ❷ into the selected slot and apply firm pressure until the module is firmly seated (see Figure 2-9). Secure the module in place with the filler panel screw ❶ that was removed in step 6.

After installing the option module, reverse steps 1 through 5 and reboot the system.

Figure 2-9 Installing PCI/EISA Option Modules
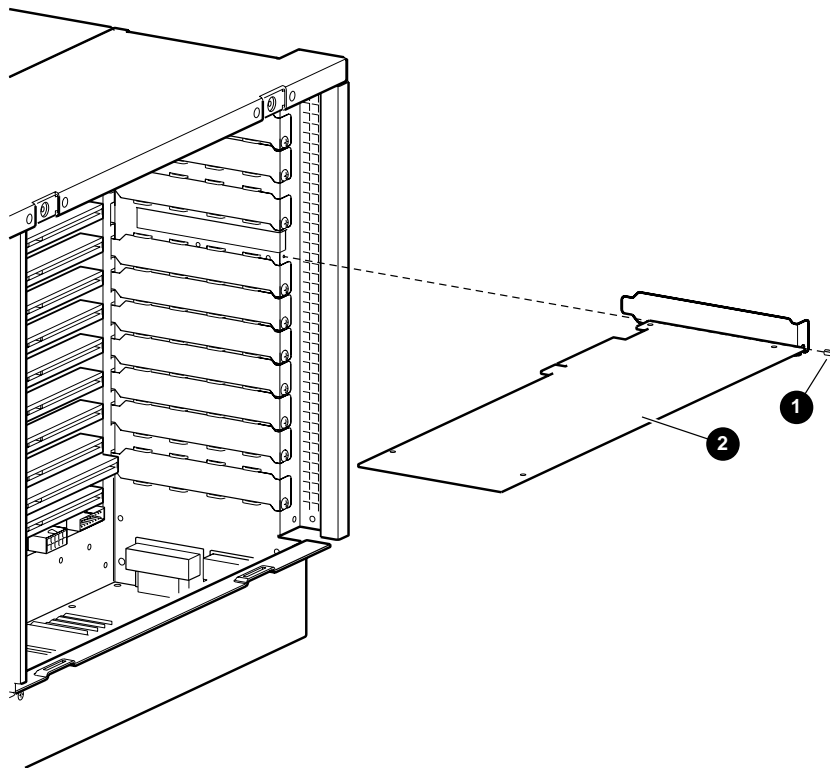
LJ-06421.AI7

2.7 Connecting to Networks

The system can support Ethernet or other network options by using network adapters that can be connected to the PCI/EISA buses.

For information about connecting your system to networks other than Ethernet, refer to the documentation that came with the network adapter.

The system can be connected to an AUI, 10BASE-T, or ThinWire Ethernet network as shown on a DE435 adapter in Figure 2-10.

Figure 2-10 Ethernet Network Connections
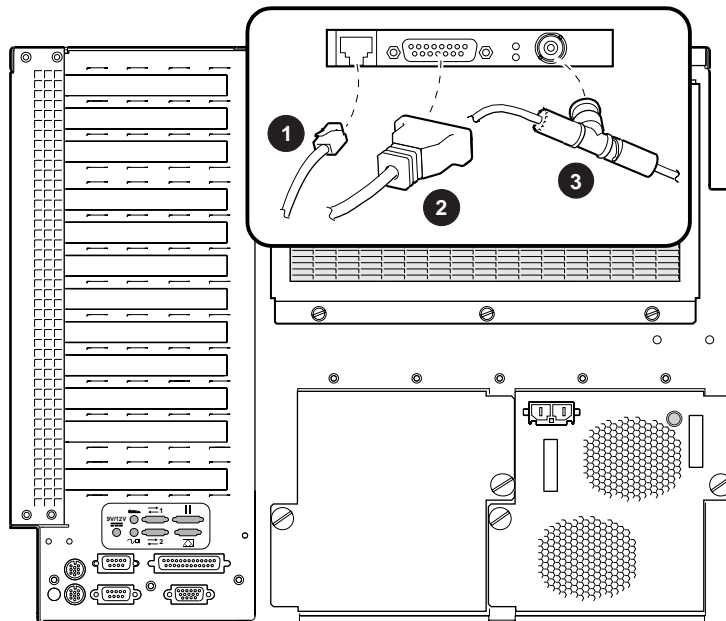
LJ-06422.AI7

❶ 10BASE-T Ethernet connector   ❸ ThinWire Ethernet connector

❷ AUI Ethernet connector

2.8 Connecting Serial and Parallel Devices

Connect a serial or parallel printer, modem, or console terminal to your system through the serial and parallel ports at the rear of the system (see Figure 2-11).

_____**Caution**_____

Before connecting serial or parallel devices to the system, turn off the dc power to the system with the power On/Off button on the OCP.

_____

For information about connecting a specific device to your system, refer to the documentation for that device.

Figure 2-11 Connecting Serial and Parallel Devices

LJ-06423.AI7
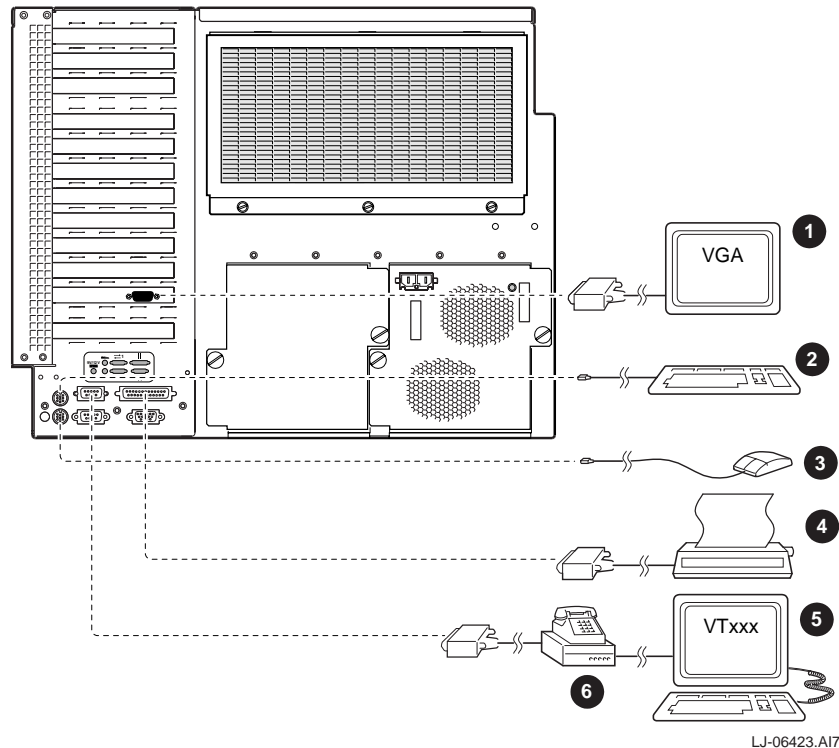
❶ VGA monitor

❷ Keyboard

❸ Mouse

❹ Printer connected to parallel port

❺ Console terminal connected to serial port (COM1)

❻ Modem

2.9 Connecting a VGA Monitor or Serial Terminal

Either an optional VGA monitor or a DIGITAL VT-series terminal (VT*xxx*) can be connected to the system as shown in Figure 2-12. If a VGA monitor is connected, a VGA adapter must first be installed in a PCI slot.

_____ **Caution** _____

Before connecting a terminal to the system, turn off the dc power to the system with the power On/Off button on the OCP.

_____

For information about connecting a specific terminal to your system, refer to the documentation for that terminal.

_____ **Note** _____

DIGITAL VT-series terminal (VT*xxx*) requires an H8571-J serial adapter that is included with every system.

_____

Figure 2-12 Terminal Connections
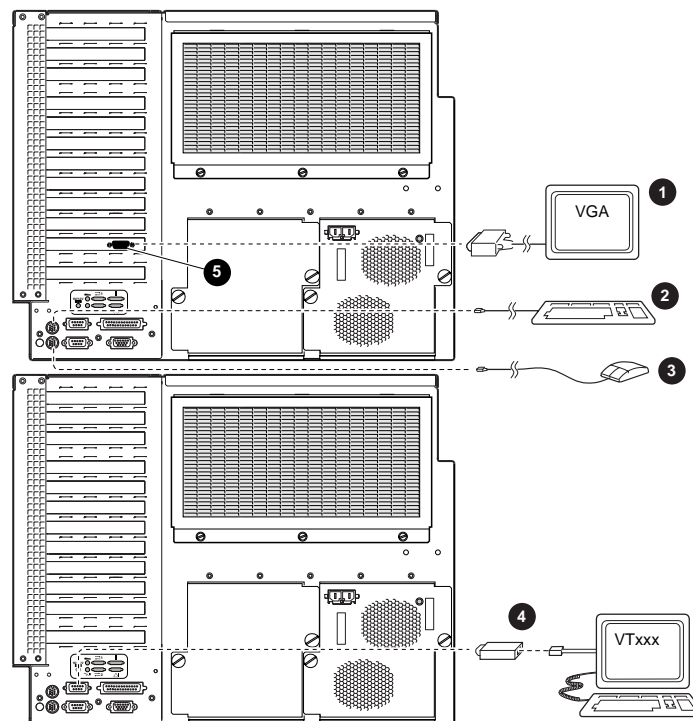
LJ-06424.AI7

❶ VGA monitor   ❹ H8571-J serial adapter

❷ Keyboard   ❺ VGA adapter

❸ Mouse

2.10 Installing Optional CPU Modules

The AlphaServer 4100 central office system can contain up to four CPU modules. Figure 2-13 shows the CPU slot locations on the system motherboard. Each CPU module has a 4 MB data cache and a fan for cooling. The following configuration rules apply to the CPU modules:

- The first CPU module must be in CPU slot 0 to provide the system clock.

- Additional CPU modules should be installed in ascending order by slot number.

- All CPU modules must have the same clock frequency.

Figure 2-13 CPU Slot Layout on the System Motherboard

LJ-06425.AI4
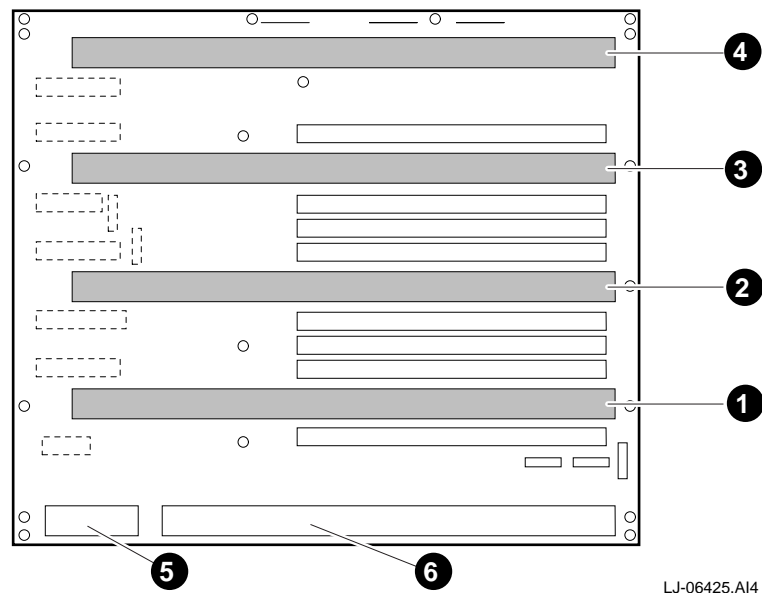
❶ CPU slot 0   ❹ CPU slot 3

❷ CPU slot 1   ❺ Power control module

❸ CPU slot 2   ❻ System bus to PCI bus module

Perform the following procedure to install an optional CPU module:

1. Perform an orderly power down of the system.

2. Ensure that the power On/Off button on the OCP is in the Off position.

3. Disconnect the power cable(s) from the power supply dc input receptacle(s) on the rear of the chassis.

4. Extend the chassis for service (see Section 8.3).

5. Remove the top cover (see Section 8.4).

6. Remove the CPU vibration brace (see Section 8.14).

7. Locate the next available slot for installing a CPU module. CPU modules should be installed in ascending order by slot number (see Figure 2-13 for CPU slot locations).

8. Put on an antistatic wriststrap.

_____ **Caution** _____

An antistatic wriststrap *must* be worn when handling any module to prevent
damage to the module.

_____

9. Hold the CPU module ❶ to be installed by the ejector levers ❷ at each end of the module
    and align the CPU module with the chosen slot so that the fan is to the right (as viewed
    from the front of the chassis) (see Figure 2-14).

10. Slide the CPU module down into the slot until it stops.

11. Push down on the two ejector levers to lock the CPU module into the slot.

12. Remove the 6-32 pan-head screw from the center of the CPU handle and use it to secure
    the CPU module to the CPU vibration brace after the brace is reinstalled.

After installing the CPU module, reverse steps 1 through 6 and reboot the system.

Figure 2-14 Installing Optional CPU Modules

LJ-05888.DWG
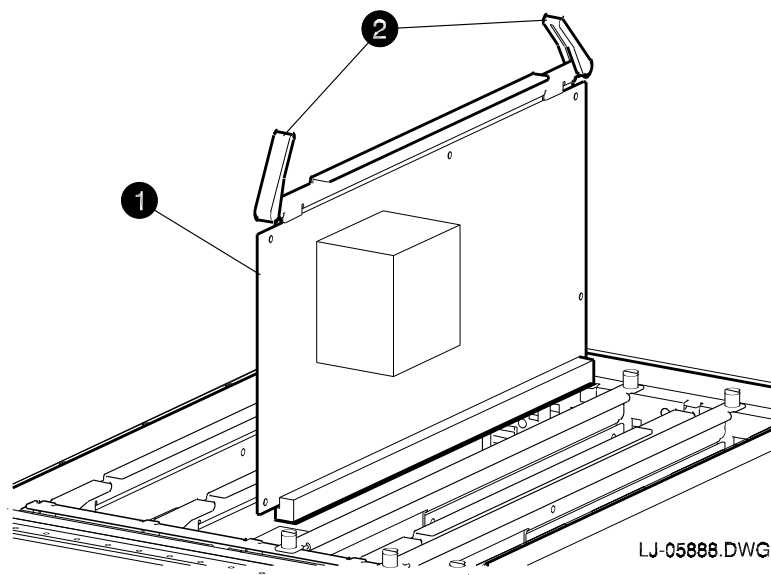
2.11 Installing Optional Memory Pairs

The AlphaServer 4100 central office system can contain up to four memory pairs. Each pair consists of two modules that are the size and type. One module of the pair provides the low half and the other the high half of that pair's memory region. Two different memory pairs are available. One pair is 128 MB, which consists of two 64 MB modules, and the other pair is 1 GB, which consists of two 512 MB modules. Figure 2-15 shows the memory slot locations on the system motherboard. The following configuration rules apply to the memory modules:

- Memory modules are installed and used in pairs. Both modules in a memory pair must be the of the same size and type.

- The largest memory pair must be installed in slots MEM 0L and MEM 0H.

- Other memory pairs must be the same size or smaller than the first memory pair.

- Additional memory pairs must be installed in ascending order by slot number.

Figure 2-15 Memory Slot Layout on the System Motherboard

LJ-06426.AI4
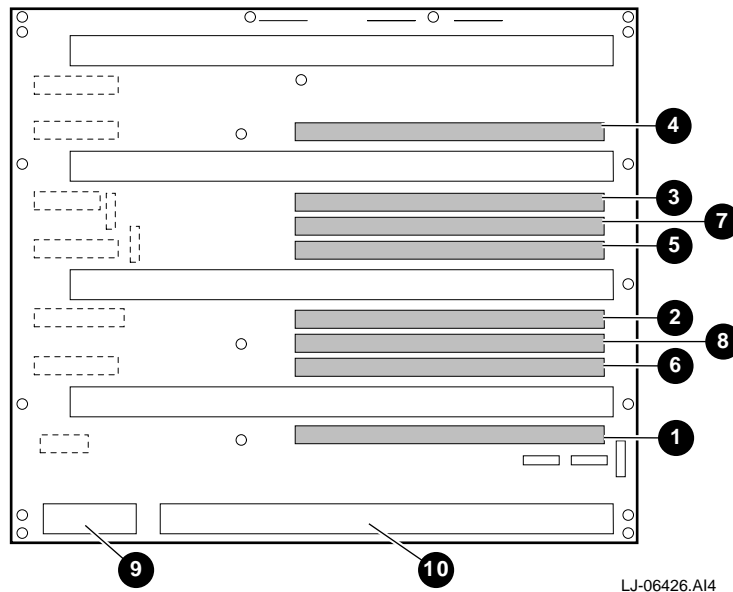
❶	Memory slot 0 Low	❻	Memory slot 2 High
❷	Memory slot 0 High	❼	Memory slot 3 Low
❸	Memory slot 1 Low	❽	Memory slot 3 High
❹	Memory slot 1 High	❾	Power control module
❺	Memory slot 2 Low	❿	System bus to PCI bus Module

Perform the following procedure to install an optional memory pair:

1. Perform an orderly power down of the system.

2. Ensure that the power On/Off button on the OCP is in the Off position.

3. Disconnect the power cable(s) from the power supply dc input receptacle(s) on the rear of the chassis.

4. Extend the chassis for service (see Section 8.3).

5. Remove the top cover (see Section 8.4).

6. Remove the CPU vibration brace (see Section 8.15).

7. Locate the next available pair of slots for installing a memory pair. Memory pairs should be installed in ascending order by slot number (see Figure 2-15 for memory pair slot locations). If the memory pair is being installed in memory slot 1 Low and High, remove the blank memory module handle installed in memory slot 1 High.

8. Put on an antistatic wriststrap.

_____ **Caution** _____

An antistatic wriststrap *must* be worn when handling any module to prevent damage to the module.
_____

9. Hold the memory module ❶ to be installed by the handle ❷ on the top of the module and align the memory module with the low slot of the chosen slot pair (see Figure 2-16).

10. Slide the memory module down into the slot until it is properly seated.

11. Secure the memory module in place with the two captive thumb screws ❸ located on each end of the module handle.

12. Repeat steps 9 through 11 to install the second memory module in the high slot of the chosen slot pair. If the memory pair is being installed in memory slot 1 Low and High, remove the 6-32 pan-head screw from the center of the memory module handle for memory slot 1 High and use it to secure the memory module to the CPU vibration brace after the brace is reinstalled.

After installing both memory modules in the pair, reverse steps 1 through 6 and reboot the system.

Figure 2-16 Installing Optional Memory Pairs

LJ-05890.DWG
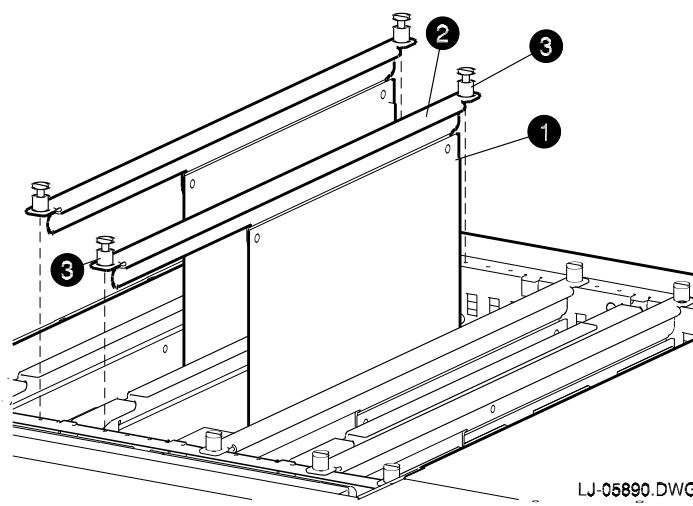
2.12 Installing Optional Hard Disk Drives

The AlphaServer 4100 central office system chassis contains an internal tray for installing optional hard disk drives.

Perform the following procedure to install an optional hard disk drive:

1. Perform an orderly power down of the system.

2. Ensure that the power On/Off button on the OCP is in the Off position.

3. Disconnect the power cable(s) from the power supply dc input receptacle(s) on the rear of the chassis.

4. Remove the front bezel (see Section 8.2).

5. Extend the chassis for service (see Section 8.3).

6. Remove the two screws ❶ that secure the top of the hard drive tray cover ❷ (see Figure 2-17).

7. Pry the top of the hard drive tray cover out by inserting a flat-blade screwdriver in the notch (see Figure 2-17).

8. Slide the hard drive tray cover up until the bottom edge comes out from under the metal tab ❸ and remove from the chassis.

Figure 2-17 Removing the Hard Drive Tray Cover
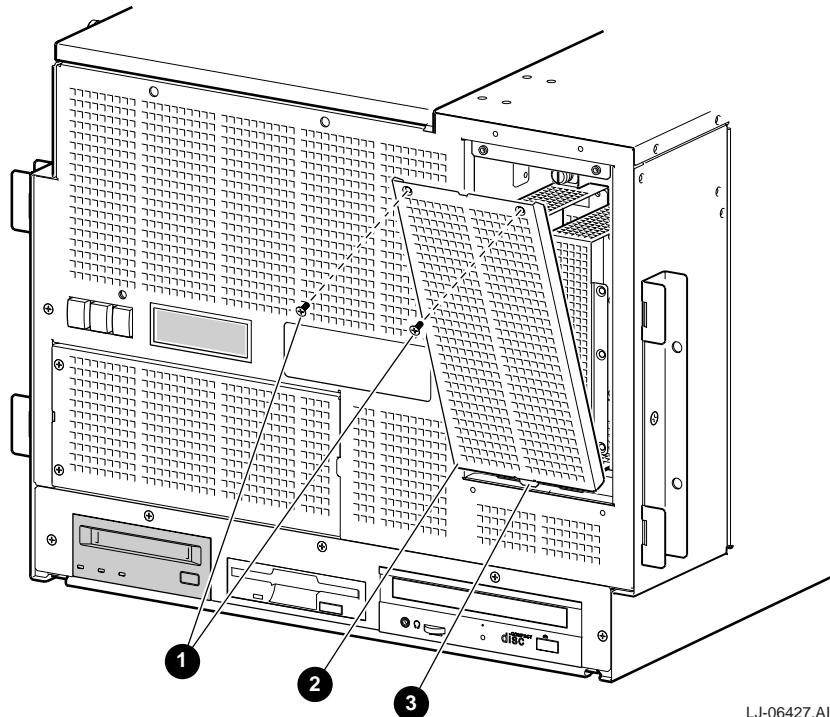
LJ-06427.AI7

9. Remove the two screws ❹ that secure the bottom of the hard drive tray ❺ to the chassis (see Figure 2-18).

10. Loosen the two captive screws ❻ that secure the top of the hard drive tray to the chassis (see Figure 2-18).

11. Tilt the top of the hard drive tray ❺ out until it is out of the chassis (see Figure 2-19).

12. Lift the hard drive tray until the tabs ❼ along the bottom front edge come out of the slots in the chassis, and then pull the hard drive tray out and away from the chassis (see Figure 2-19).

Figure 2-18 Removing the Hard Drive Tray

LJ-06428.AI7
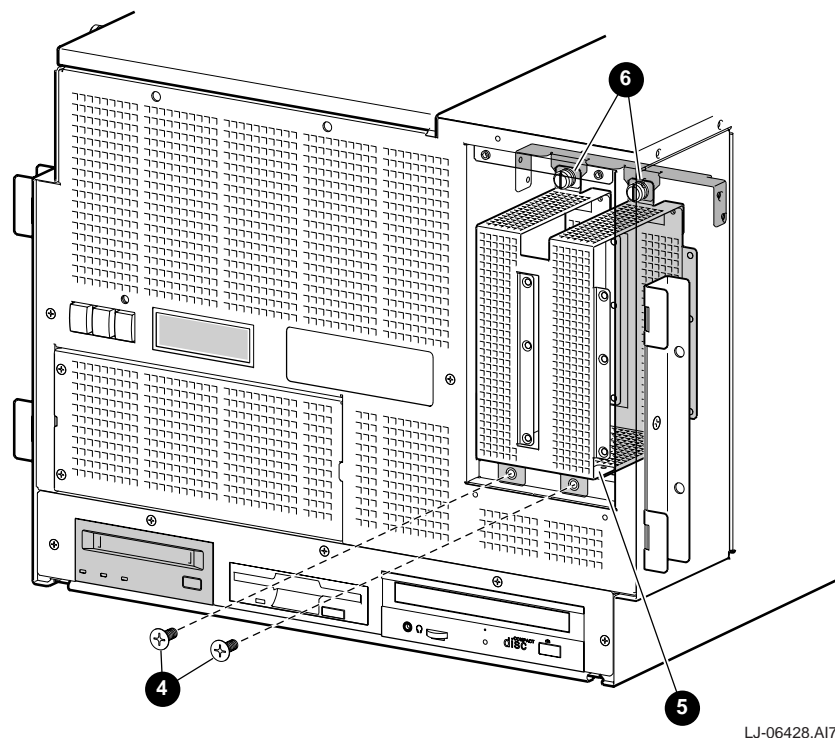
_____ **Note** _____

The first drive installed should be installed in the right side of the hard drive tray while the second drive should be installed in the left side of the hard drive tray. Neither drive needs to be terminated since the end connector provides the termination.

_____

13. If this is the first drive being installed in the right side of the hard drive tray, set the SCSI ID jumper on the rear of the drive for a SCSI ID of 0. If this is the second drive being installed in the left side of the hard drive tray, set the SCSI ID jumper on the rear of the drive for a SCSI ID of 1. Refer to the documentation shipped with the drive for the SCSI ID jumper location.

14. Slide the first drive ❽ being installed into the right side of the hard drive tray ❾ with the power and data connectors pointing toward the top ❿ of the hard drive tray (see Figure 2-19).

15. Secure the drive into the hard drive tray with six screws ① (see Figure 2-19).

16. If this is the first drive being installed, connect the shortest power ② and data ③ cable connectors to the rear of the drive. If this is the second drive being installed, connect the longest power and data cable connectors to the rear of the drive.

After installing the hard disk drive, reverse steps 1 through 12 and reboot the system.

Figure 2-19 Installing a Drive in the Hard Drive Tray
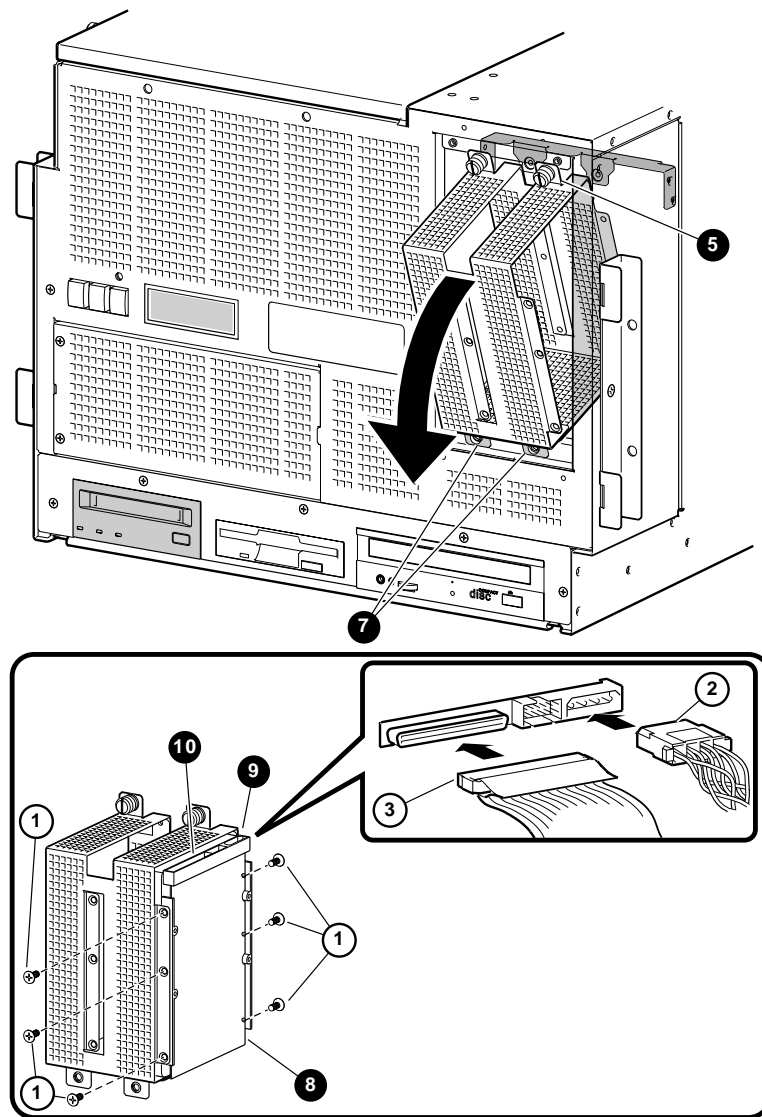
LJ-06429.AI7

2.13 Installing an Optional Tape Drive

The AlphaServer 4100 central office system chassis contains an internal bay for installing an optional tape drive (see Figure 2-20).

Perform the following procedure to install an optional tape drive:

1. Perform an orderly power down of the system.

2. Ensure that the power On/Off button on the OCP is in the Off position.

3. Disconnect the power cable(s) from the power supply dc input receptacle(s) on the rear of the chassis.

4. Remove the front bezel (see Section 8.2).

5. Extend the chassis for service (see Section 8.3).

6. Remove the removable media assembly (see Section 8.6).

7. Remove the two screws ❶ that secure the tape drive cover plate ❷ to the bottom ❸ of the removable media assembly and remove the cover plate.

8. Place the tape drive ❹ onto the removable media assembly with the front of the drive through the tape drive opening on the removable media assembly.

9. Secure the tape drive in place on the removable media assembly with four screws ❺.

10. Connect the power ❻ and data ❼ cables to the rear of the tape drive.

After installing the tape drive, reverse steps 1 through 6 and reboot the system.

Figure 2-20 Installing an Optional Tape Drive
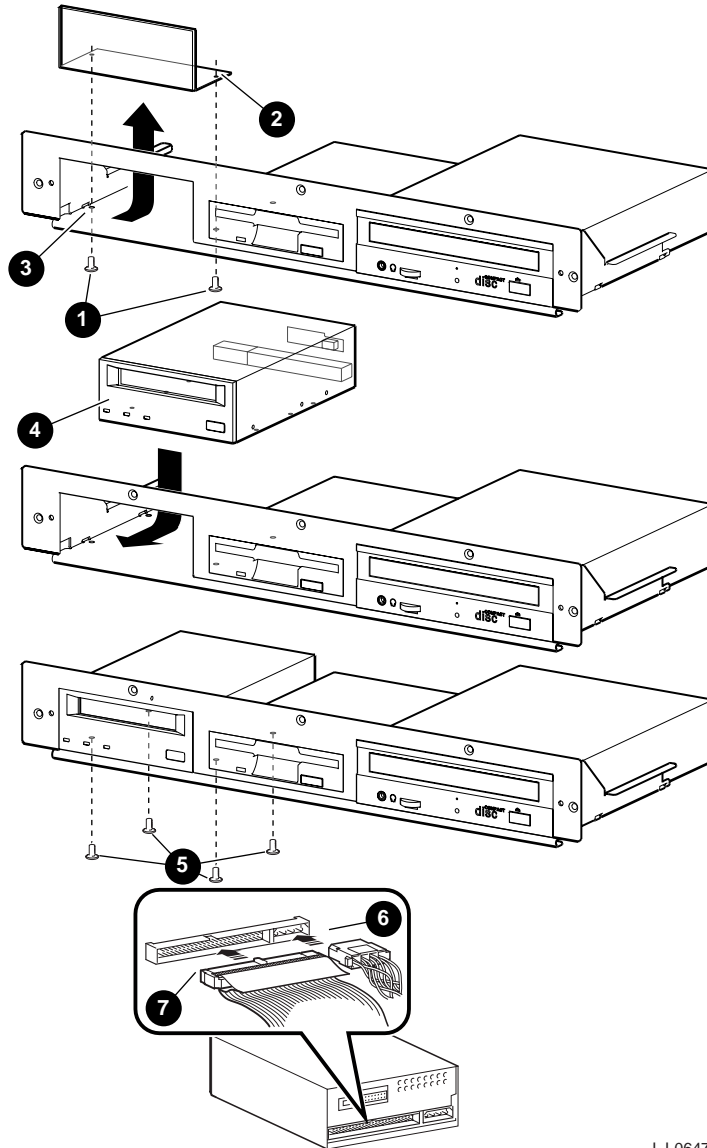
LJ-06472.AI7

2.14 Installing an Optional Power Supply

A second, optional, power supply can be installed in the AlphaServer 4100 central office system to provide redundant operation.

Perform the following procedure to install an optional power supply:

1. Perform an orderly power down of the system.

2. Ensure that the power On/Off button on the OCP is in the Off position.

3. Disconnect the power cable from the power supply dc input receptacle on the rear of the chassis.

4. Loosen the two captive screws ❶ that secure the blank power supply cover plate ❷ to the rear of the chassis and remove the cover plate (see Figure 2-21).

Figure 2-21 Removing Power Supply Cover Plate
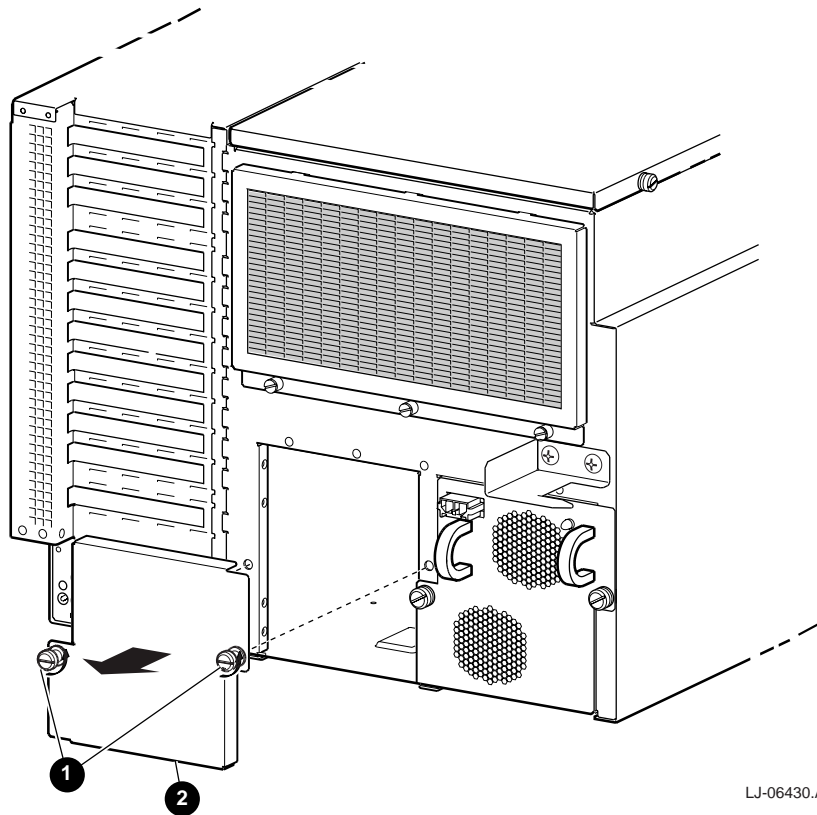
LJ-06430.AI7

5. Slide the optional power supply ❶ into the chassis and apply firm pressure until it is seated properly (see Figure 2-22).

6. Secure the optional power supply to the rear of the chassis with the two captive screws ❷ (see Figure 2-22).

7. Install the multi power cable disconnect warning label on the chassis above the new power supply.

After installing the new power supply, reverse steps 1 through 3 and reboot the system.

Figure 2-22 Installing the New Power Supply

CAUTION: Disconnect all power cables before servicing to avoid an energy hazard.
ATTENTION: Désconnectez tous les cables d'alimentation avant chaque entretien afin d'eviter tout accident électrique.
ACHTUNG: Ziehen Sie zur Vermeidung von Stromstöben vor der Wartung alle Netzkabel heraus.
PRECAUCION: Desconecte todos los cables de alimentación antes de dar mantenimiento para evitar que ocurran daños con la alimentación.
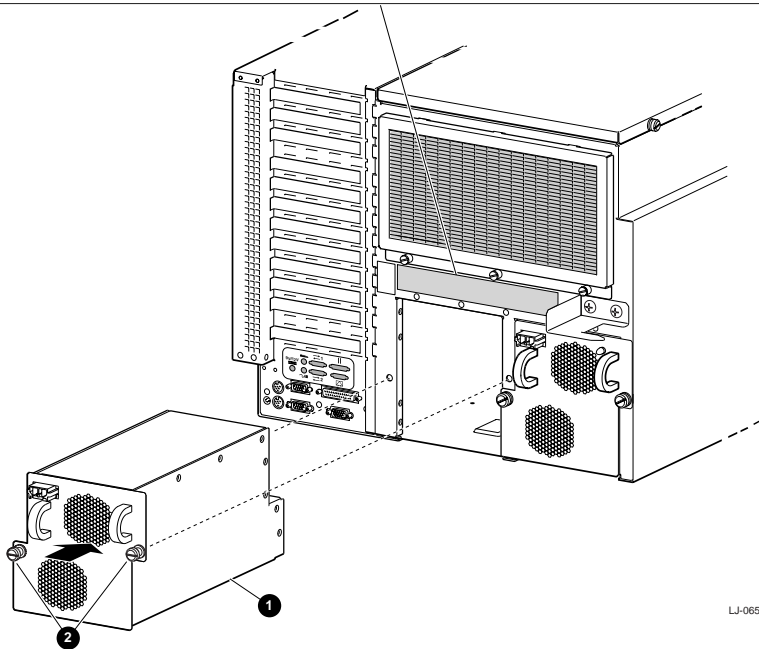
LJ-06517.AI7

2.15 Installing the Guardian

A Guardian can be installed on the rear of the AlphaServer 4100 central office system to simulate a keyboard and mouse connection.

Perform the following procedure to install a Guardian and Guardian bracket:

1. Perform an orderly power down of the system.

2. Ensure that the power On/Off button on the OCP is in the Off position.

3. Disconnect the power cable from the power supply dc input receptacle on the rear of the chassis.

4. Snap the Guardian into the Guardian bracket.

5. Use two screws ❶ to secure the Guardian bracket ❷ to the rear of the chassis (see Figure 2-23).

6. Connect the two cables from the Guardian to the mouse and keyboard connectors on the AlphaServer 4100 central office system.

After installing the Guardian, reverse steps 1 through 3 and reboot the system.

Figure 2-23 Installing the Guardian Bracket

LJ-06520.AI7

3
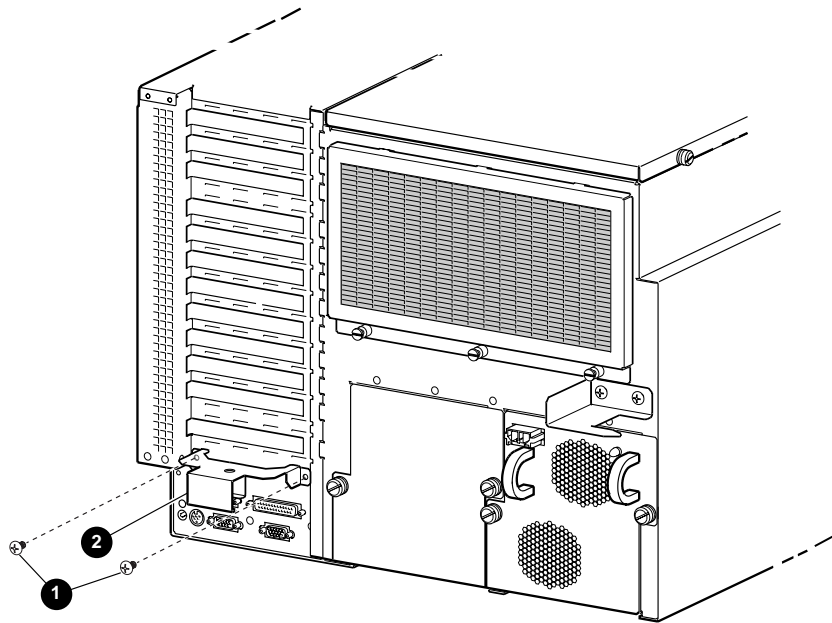
System Power-Up and Verification

3.1 Introduction

This chapter provides an overview of the power-up procedure, LED checks, preboot tasks, and booting the operating system. Sections include:

Turn On Power

- Check Power-Up Test Results
- If Power-Up Fails
  - Check Control Panel Message
  - Check Module LEDs
- Show Commands for Installation
- Preboot Tasks
  - Setting Environment Variables (EVs)
  - Running ECU
  - Running RCU
  - Updating Firmware
- Booting OpenVMS
- Booting DIGITAL UNIX
- Booting Windows NT

3.2 Turn On Power

Before turning on power, check all power cable connections. Ensure that the cabinet power controller or power distribution unit is plugged in and that the circuit breaker(s) are On.

Use the following procedure to turn on power to the AlphaServer 4100 central office system.

1. Press the Halt button ❸ in on the operator control panel to force the SRM console (this will override the SRM console os_type environment variable setting). The Halt button LED lights when pressed in (see Figure 3-1).

2. Press the Power button ❷ to power up the system. The Power button LED lights when pressed in (see Figure 3-1).

Figure 3-1 Operator Control Panel

LJ-06411.AI7
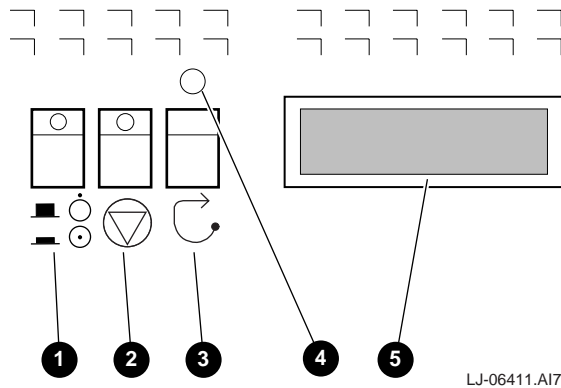
❶ Power button

❷ Halt button

❸ Reset button

❹ Display brightness adjustment screw

❺ Display

3.3 Check Power-Up Test Results

After powering up the system, testing begins and status messages display on the console terminal and on the operator control panel display. Check the test results on the console terminal. Example 3-1 shows a sample display of test results. The entire power-up display prints to a serial terminal (if the console environment variable is set to serial); the last several lines print to either a serial terminal or a graphics monitor.

Example 3-1 Power-Up Display

```
SROM V1.1 on cpu0                                         ❶
SROM V3.0 on cpu1
SROM V3.0 on cpu2
SROM V3.0 on cpu3
XSROM V5.1 on cpu1                                        ❷
XSROM V5.1 on cpu3
XSROM V5.1 on cpu2
XSROM V5.1 on cpu0
BCache testing complete on cpu1                          ❸
BCache testing complete on cpu3
BCache testing complete on cpu0
BCache testing complete on cpu2
mem_pair0 - 1024 MB                                       ❹
20..20..20..20..21..21..21..21..23..please wait 20 seconds ❺
for T24 to complete 24..24..24..24..
Memory testing complete on cpu0
Memory testing complete on cpu3
Memory testing complete on cpu2
Memory testing complete on cpu1
starting console on CPU 0                                 ❻
sizing memory                                            ❼
  0    1024 MB EDO
starting console on CPU 1
starting console on CPU 2
starting console on CPU 3
probing IOD1 hose 1                                       ❽
  bus 0 slot 1 - NCR 53C810
  bus 0 slot 3 - QLogic ISP1020
  bus 0 slot 5 - PCI-PCI Bridge
    probing PCI-PCI Bridge, bus 2
      bus 2 slot 2 - DECchip 21040-AA
probing IOD0 hose 0
  bus 0 slot 1 - PCEB
    probing EISA Bridge, bus 1
  bus 0 slot 2 - S3 Trio64/Trio32
  bus 0 slot 4 - QLogic ISP1020
```

```
        bus 0 slot 5 - PCI-PCI Bridge
          probing PCI-PCI Bridge, bus 2
    Configuring I/O adapters...
      ncr0, hose 1, bus 0, slot 1
      isp0, hose 1, bus 0, slot 3
      tulip0, hose 1, bus 2, slot 2
      floppy0, hose 0, bus 1, slot 0
      isp1, hose 0, bus 0, slot 4
    System temperature is 25 degrees C
    AlphaServer 4X00 Console V5.1-3, 4-FEB-1998 16:40:08  ❾
    P00>>>
```

❶ On power-up, the SROM code on each CPU module loads into that module's I-cache and tests the processor chip. If all tests pass, the module's LED lights. If any test fails, the LED remains clear and power-up terminates.

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

Each CPU prints an SROM message to the device attached to the COM1 port and to the control panel display. (The banner prints to the COM1 port if the **console** environment variable is set to **serial**. If it is set to **graphics**, nothing prints to the console terminal, only to the control panel display, until ❻. See Section 5.16 for information about environment variables.)

❷ The S-cache on each CPU module is initialized, and the XSROM code in the FEPROM on the PCI motherboard is unloaded into them. (If the unload is not successful, the SROM unloads XSROM code from a different FEPROM sector. If the second try fails, the CPU hangs.)

Each CPU starts the XSROM code, which prints an XSROM message to the COM1 port and to the control panel display.

❸ The three S-cache banks on each CPU are enabled, and the B-cache is tested. If a failure occurs, a message is printed to the COM1 port and to the control panel display immediately.

Each CPU prints a B-cache completion message to COM1.

❹ The primary CPU is determined for the second time. It then sizes memory.

Information on memory pairs is printed to the COM1 port. If an illegal memory configuration is detected, a warning message is printed to the COM1 port and the control panel display.

❺ Memory is initialized and tested, and test traces are printed to the COM1 port and the control panel display. (The numbers for tests 20 and 21 might appear interspersed; this is normal behavior. Test 24 can take several minutes if the memory is very large. The message "P0 TEST 24 MEM**" is displayed on the control panel display; the second asterisk rotates to indicate that testing is continuing. All CPUs in a multiprocessor system share the memory testing to minimize test time. If a failure occurs, a message is printed to the COM1 port and to the control panel display immediately.

Each CPU prints a test completion message to the COM1 port.

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

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

❼ The size and type of each memory pair is determined.

The console is started on each of the secondary CPUs. A status message prints for each CPU.

❽ The PCI bridges (indicated as IOD*n*) are probed and the devices are reported. I/O adapters are configured.

❾ The SRM console banner and prompt are printed. (The SRM prompt is shown in this manual as P00>>>. It can, however, be P01>>>, P02>>>, or P03>>>. The number indicates the primary processor.) If the **auto_action** environment variable is set to **boot** or **restart** and the **os_type** environment variable is set to **unix** or **openvms**, the DIGITAL UNIX or OpenVMS operating system boots.

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

Refer to Chapter 5 for information about the SRM console and to Chapter 6 for information about AlphaBIOS console.

3.4 If Power-Up Fails

If the power-up test fails or if the console prompt does not appear after the power-up test completes, check the operator control panel messages or the module LEDs for failure information.

3.4.1 Check Operator Control Panel Messages

If the console prompt does not appear after test results, check the operator control panel message.

The operator control panel has a LED display. Status messages are displayed during power-up testing. Test failure information is also displayed.

_____**Notes** _____

If an error occurs, you may need to reset the system and observe the display since display error messages are visible for approximately 4 seconds before power-up initialization and testing continues.
If nothing is displayed on the control panel display and/or the serial display terminal, check the module LEDs (see Section 3.4.2).

_____

Figure 3-2 shows the four display fields and Table 3-1 lists a description of each field.

Figure 3-2 Operator Control Panel Display

P0 TEST 11 CPU00
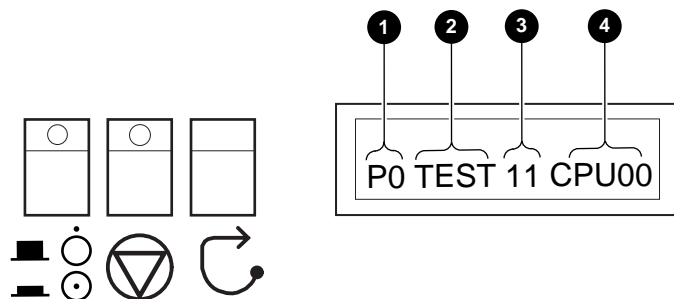
LJ-06431.AI7

Table 3-1 Operator Control Panel Display Fields

Field	Content	Display	Meaning
❶	CPU number	P0–P3	CPU reporting status
❷	Status	TEST	Tests are executing
		FAIL	Failure has been detected
		MCHK	Machine check has occurred
		INTR	Interrupt has occurred
❸	Test number (for DIGITAL use only)		
❹	Suspected device	CPU0–3	CPU module number
		MEM0–3 and L, H, or *	Memory pair number and low module, high module, or either
		IOD0	System bus to PCI bus 0
		IOD1	System bus to PCI bus 1
		FROM0	Flash ROM
		COMBO	COM controller
		PCEB	PCI-to-EISA bridge
		ESC	EISA system controller
		NVRAM	Nonvolatile RAM
		TOY	Real time clock
		I8242	Keyboard and mouse controller

3.4.2 Check Module LEDs

Figure 3-3 shows the CPU, system bus to PCI bus module, and power control module LEDs. Table 3-2 lists LED status following a successful power-up. You can see all module LEDs from the rear of the system chassis.

Figure 3-3 Module LEDs

Power Control
Module LEDs

- ● DCOK_SENSE
- ● PS0_OK
- ○ PS1_OK
- ● PS2_OK
- ● TEMP_OK
- ● CPUFAN_OK
- ● SYSFAN_OK
- ◐ CS_FAN0
- ◐ CS_FAN1
- ◐ CS_FAN2
- ◐ C_FAN3

System Bus to PCI Bus
Module LEDs

- ● IOD0 Self-Test Pass
- ● IOD1 Self-Test Pass

- ● POWER_FAN_OK
- ● TEMP_OK

CPU LEDs

- ● DC_OK
- ○ SROM Oscillator
- ● CPU Self-Test Pass

● Normally On

◐ Tested at one-second intervals

○ Off if power supply not present
or broken
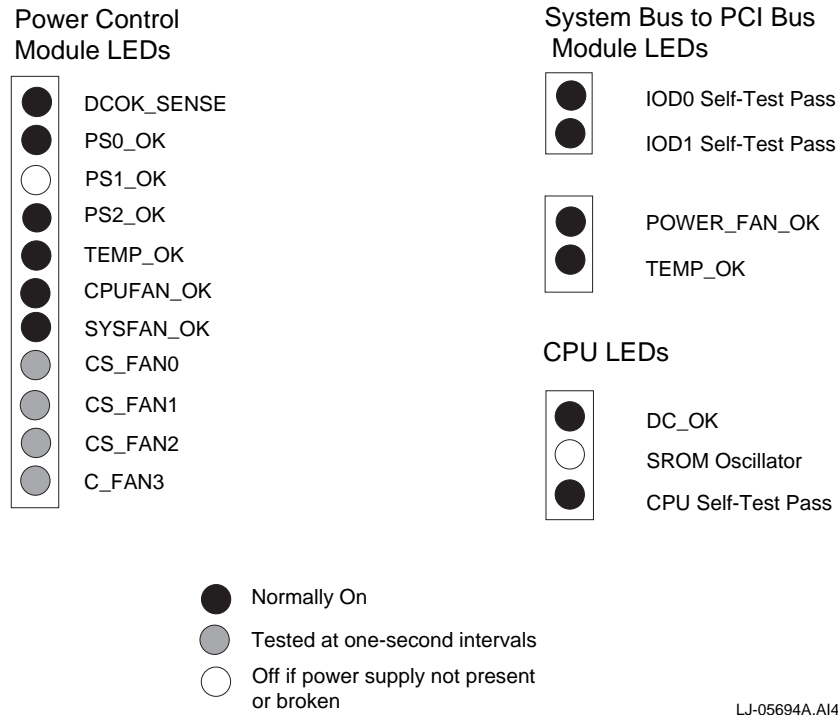
LJ-05694A.AI4

Table 3-2 Module LEDs on Power-Up

LED	Power-Up State	Description
CPU Module		
DC OK	On	DC power is OK.
SROM Oscillator	Off	SROM loaded into processor.
CPU Self-Test Pass	On	Processor chip passed SROM tests.
System Bus to PCI BUS Module		
IOD0 Self-Test Pass	On	System bus to PCI bus module passed SROM tests.
IOD1 Self-Test Pass	On	System bus to PCI bus module passed SROM tests.
POWER FAN OK	On	Power fan is running.
TEMP OK	On	System bus to PCI bus module temperature is OK.
Power Control Module		
DCOK SENSE	On	DC power is okay.
PS0 OK	On	First power supply is operating.
PS1 OK	On (if present)	Second power supply is operating.
PS2 OK	On	Always on even though a third power supply doesn't exist.
TEMP OK	On	Temperature is OK.
CPUFAN OK	On	CPU fans are OK.
SYSFAN OK	On	System fans are OK.
CS FAN0	Blinking	Fan is OK.
CS FAN1	Blinking	Fan is OK.
CS FAN2	Blinking	Fan is OK.
C FAN3	Blinking	Fan is OK.

If the system does not power up, the problem may be a disconnected power cable or a fan. Check the following:

- Is the system power cable(s) plugged into the cabinet power distribution unit?

- Is the system power supply operating?

- Are the CPU fans operating?

_____ **Note** _____

If the power control module LEDs indicate a power supply failure, look at the rear of the system to verify the condition of the power supply LED. If the LED is not lit, the power supply has failed. If the LED is lit, the power supply is good and the problem is between the power supply and the power control module or the power control module itself.

_____

3.5 Show Commands for Installation

Use show commands to obtain information on the system configuration and power status.

Use the **show configuration** command to see a listing of the modules in the system. This command shows the module motherboard or PCI slot number, module name, module type, revision, mnemonic, and the self-test status of PCI and EISA modules. In Example 3-2, all PCI and EISA modules passed (+) self-test.

Example 3-2 Show Configuration

```
P00>>> show config

                          Digital Equipment Corporation

                          AlphaServer 4X00

Console V5.1-3   OpenVMS PALcode V1.19-14, DIGITAL UNIX PALcode
V1.21-22


 Module                          Type     Rev     Name
 System Motherboard              0        0000    mthrbrd0
 Memory  1024 MB EDO             0        0000    mem0
 CPU (4MB Cache)                 3        0002    cpu0
 CPU (4MB Cache)                 3        0003    cpu1
 Bridge (IOD0/IOD1)              600      0032    iod0/iod1
 PCI Motherboard                 8        0001    saddle0
 CPU (4MB Cache)                 3        0001    cpu2
 CPU (4MB Cache)                 3        0003    cpu3


 Bus 0  iod0 (PCI0)
 Slot    Option Name             Type     Rev     Name
 1       PCEB                    4828086  0004    pceb0
 2       S3 Trio64/Trio32        88115333 0054    vga0
 4       QLogic ISP1020          10201077 0005    isp1
 5       PCI-PCI Bridge          261011   0001    pcb1


 Bus 1  pceb0 (EISA Bridge connected to iod0, slot 1)
 Slot    Option Name             Type     Rev     Name
 Bus 2  pcb1 (PCI-PCI Bridge connected to iod0, slot 5)
 Slot    Option Name             Type     Rev     Name


 Bus 0  iod1 (PCI1)
 Slot    Option Name             Type     Rev     Name
 1       NCR 53C810              11000    0002    ncr0
 3       QLogic ISP1020          10201077 0005    isp0
 5       PCI-PCI Bridge          261011   0001    pcb0
```

```
 Bus 2  pcb0 (PCI-PCI Bridge connected to iod1, slot 5)
 Slot   Option Name              Type     Rev     Name
 2      DECchip 21040-AA         21011    0024    tulip0
P00>>>
```

The **show power** command displays status information on the power supplies, system fans, CPU fans, and system temperature.

Example 3-3 Show Power

```
P00>>> show power❷


                        Status
Power Supply 0       good            # Represents the 1st power
supply.
Power Supply 1       not present     # Represents the 2nd power
supply.
Power Supply 2       good            # Always displays good even
though
                                      a third power supply
doesn't exist.
System Fans          good
CPU Fans             good
Temperature          good


Current ambient temperature is 25 degrees C
System shutdown temperature is set to 51 degrees C


The system was last reset via a power-on reset


0 Environmental events are logged in nvram
P00>>>
```

For more information on the show commands, see Chapter 5

3.6 Preboot Tasks

Preboot tasks consist of setting environment variables, running ECU, running utility programs, and updating firmware.

3.6.1 Setting Environment Variables

If you are running DIGITAL UNIX or OpenVMS, you may want to check the settings for several environment variables (EVs) to see if they match your configuration. For example, the os_type for DIGITAL UNIX and OpenVMS should be set to unix/vms. Example 3-4 shows other environment variables you may want to set.

Example 3-4 Setting Environment Variables

```
P00>>> show envar❶                   #Enter this command to show EV
                                     #settings.
[EV settings are displayed]
P00>>> set os_type❷                  #Sets the EV for your operating
                                     #system.
P00>>> set ew*0_mode❸                #Sets the Ethernet device type.

P00>>> set pk*0_fast❹                #Sets the speed for fast SCSI
                                     #devices.
P00>>> set bootdef_dev❺              #Sets the boot device.

P00>>> set boot_osflags❻             #Sets the boot flags.

P00>>> set console❼                  #Sets the console type to
                                     #serial or graphics.
```

❶ Enter the **show envar** command to display EV settings.

❷ The commands **set os_type openvms** or **set os_type unix** selects the corresponding operating system (OpenVMS or UNIX) and the corresponding SRM console. The command **set os_type nt** selects the alphabios console and Windows NT becomes the default operating system. The **os_type** EV takes effect only after a subsequent reset or power-up.

❸ The ew*0_mode environment variable is used to set an Ethernet controller to run an AUI, ThinWire, or twisted-pair Ethernet network.

❹ Entering **set pk*0_fast 1** enables fast SCSI mode. Other possible pk*0 EVs include pk*0_host_id, which specifies the default value for a controller host bus node ID, and pk*0_soft_term, which enables or disables SCSI terminators on systems that use the QLogic ISP1020 SCSI controller.

❺ Use the command **set bootdef_dev** to set the name of the device on which the system software has been loaded.

❻ When you issue a **set boot_osflags**, you pass information to the boot command. For example, entering **set boot_osflags a** loads the operating software from the specified boot device (autoboot), and boots to multiuser mode when the operating system is DIGITAL UNIX. Refer to your operating system documentation for more information on os_flags definitions.

❼ Issue a **set console graphics** command to set the console mode to graphics. The other option is **serial**. This console EV takes effect only after a subsequent reset or power-up.

For more information on environment variables, see the Section 5.16.

3.6.2 Running ECU

The EISA Configuration Utility (ECU) is used to configure EISA options on AlphaServer systems. At the SRM console prompt, enter alphabios to bring up the AlphaBIOS console (you must run ECU in AlphaBIOS console mode. Figure 3-4 shows the AlphaBIOS Setup display when run from a serial terminal.

Figure 3-4 Running ECU

```
AlphaBIOS Setup                          F1=Help

Display System Configuration...
Upgrade AlphaBIOS
Hard Disk Setup...
CMOS Setup...
Install Windows NT
Utilities                    Run ECU from floppy...
About AlphaBIOS...           OS Selection Setup...
                             Run Maintenance Program...




Insert the floppy containing EISA Configuration Utility
(ECU) and press ENTER to run it.


ESC=Exit
```

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The AlphaBIOS console can be run over the serial line on a system not having a keyboard plugged into it. All systems are shipped with a graphics card, a keyboard, and a mouse; however, a graphics monitor is required only on a system that will be running Windows NT. For DIGITAL UNIX and OpenVMS systems, having a monitor will be the exception, not the rule. Therefore, this description is slanted toward DIGITAL UNIX and OpenVMS systems. See the Chapter 6 for more information on running the AlphaBIOS console with a graphics monitor.

When AlphaBIOS is loaded from SRM, it checks to see if there is a graphics card or a keyboard. If one or the other is absent, then AlphaBIOS directs its output to the console serial line (top 9–pin connector). It assumes that the terminal connected to this port is a VT320 or later terminal.

1. Enter **alphabios** at the console prompt. The top-level AlphaBIOS screen appears.

2. At the top-level AlphaBIOS screen, select the operating system and press Enter to choose.

3. At the AlphaBIOS Setup screen, select Utilities. Under Utilities, select Run ECU from floppy. See Figure 3-4.

4. Next, insert the floppy containing the EISA Configuration Utility and press Enter to run it.

3.6.3 Running Utility Programs

Maintenance programs such as RAID and EISA configuration utilities are run from the
AlphaBIOS Utility menu. At the SRM console prompt, enter alphabios to bring up the
AlphaBIOS console (you must run these utility programs in AlphaBIOS console mode).
Figure 3-5 shows the AlphaBIOS Setup screen and the Run Maintenance Program Dialog
box.

1. At the Setup screen, select Utilities. Press Enter.

2. At the Utilities screen, select Run Maintenance Program. Press Enter.

3. In the Run Maintenance Program dialog box, type **swxcrmgr.exe** in the Program Name
    field if a VGA monitor is used or type **srlmgr.exe** if a serial terminal is used.

4. Press Enter to execute the program.

Figure 3-5 Run Maintenance Program Dialog Box
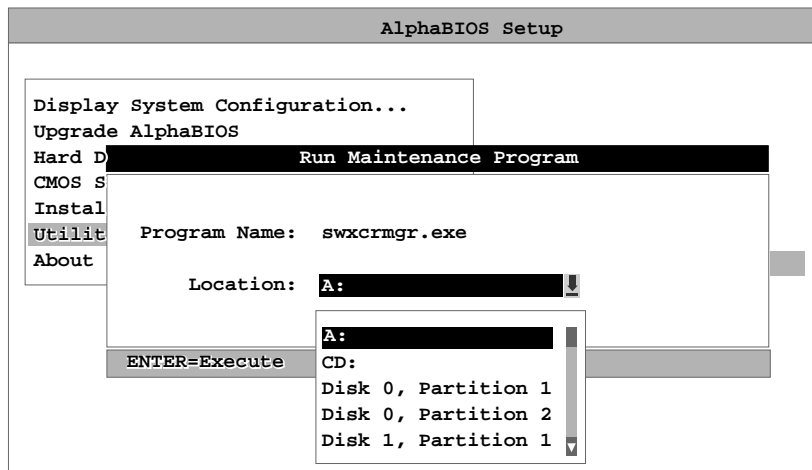
LJ-05726.AI4

3.6.4 Updating Firmware

The Loadable Firmware Utility (LFU) is used to update firmware on any module in the system. Example 3-5 shows a sample LFU session; the firmware load device is the local CD-ROM drive.

Example 3-5 Running LFU

```
P00>>> lfu  ❶


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


Select firmware load device (cda0, dva0, ewa0), or
Press <return> to bypass loading and proceed to LFU: DKA500  ❷


Please enter the name of the options firmware files list, or
Press <return> to use the default filename [AS4X00FW]: AS4X00FW
❸


Copying AS4X00CP from DKA500.5.0.1.1 .
Copying [as4x00]RHREADME from DKA500.5.0.1.1 .
Copying [as4x00]RHSRMROM from DKA500.5.0.1.1 .............
Copying [as4x00]RHARCROM from DKA500.5.0.1.1 .............


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


UPD> list  ❺
Device          Current Revision      Filename      Update Revision
AlphaBIOS         V5.12-2             arcrom           V6.40-1
srmflash          V1.0-9             srmrom           V2.0-3
```

```
UPD> update * ❻

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


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


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


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


                          DO NOT ABORT!
srmflash         Updating to V2.0-3...  Verifying V2.0-3...
PASSED.


UPD> exit❼

P00>>>
```

❶ Enter the **lfu** command at the SRM console prompt.

❷ The user is prompted to select a firmware load device (for example, CDA0 (local CD-ROM drive), DVA0 (floppy drive)), or EWA0 (Ethernet).

❸ The user is prompted to enter the options firmware file list. The default filename is AS4X00FW.

❹ A list of the LFU functions is displayed.

❺ Enter **list** to get information on each device.

❻ The user enters **update *** to update firmware on each device.

❼ Enter **exit** to return to the console prompt.

3.7 Booting OpenVMS

OpenVMS can be booted from a local disk (see Example 3-6), a disk connected through a cluster (see Example 3-7), or a remote disk through an Ethernet connection (see Example 3-8). Refer to the documentation shipped with the operating system for booting instructions.

Example 3-6 Booting OpenVMS from a Local Disk

```
P00>>> show device                                              ❶
polling ncr0 (NCR 53C810) slot 1, bus 0 PCI, hose 1   SCSI Bus ID 7
dka500.5.0.1.1      DKa500                      RRD45   1645
polling ncr1 (NCR 53C810) slot 2, bus 0 PCI, hose 1   SCSI Bus ID 7
dkb0.0.0.2.1        DKb0                        RZ29B   0016
dkb100.1.0.2.1      DKb100                      RZ29B   0016
.
.
.
polling floppy0 (FLOPPY) PCEB - XBUS hose 0
dva0.0.0.1000.0     DVA0                        RX23
polling tulip0 (DECchip 21040-AA) slot 3, bus 0 PCI, hose 0
ewa0.0.0.3.0: 00-00-F8-20-14-61
P00>>> show boot_reset                                          ❷
boot_reset              OFF
P00>>> show bootdef_dev                                         ❸
bootdef_dev             dkb0.0.0.2.1
P00>>> boot                                                     ❹
 SROM V2.0 on cpu0                                              ❷
 SROM V2.0 on cpu1
XSROM V2.0 on cpu1
XSROM V2.0 on cpu0
.
.
.
System temperature is 24 degrees C
AlphaServer 4100lp Console V2.0-3, 2-AUG-1996 15:17:48


CPU 0 booting


(boot dkb0.0.0.2.1 -flags 0)
Building FRU table
block 0 of dkb0.0.0.2.1 is a valid boot block
reading 1002 blocks from dkb0.0.0.2.1
```

```
bootstrap code read in
.
.
.
Welcome to OpenVMS Alpha (TM) Operating System, Version V6.2-1H3❺
```

❶ The **show device** command displays device information, including name and type of connection to the system. See Section 5.3. for a description of the **show device** command and the device naming convention.

❷ The **boot_reset** environment variable was previously set to "on," causing the power-up trace to display when the system initializes (see Section 3.3). See Section 5.10 for commands used with environment variables.

❸ The **bootdef_dev** environment variable specifies the default boot device. In this example, the default boot device was previously set to dkb0.0.0.2.1.

❹ No boot device is specified in the **boot** command; the default boot device was set with the environment variable. See Section 5.4 for a description of the **boot** command.

The **boot** command accepts the name of a boot device, a boot file name through the **-file** option, and boot flags through the **-flags** option. The environment variables **bootdef_dev**, **boot_file**, and **boot_osflags** can also be used to specify the default boot device or device list, the default boot file, and flag information. When an option and the corresponding environment variable are both in a command string, the option overrides the environment variable. The value of the environment variable, however, is not changed. See Section 5.16 for information about environment variables.

❺ The operating system banner displays.

Example 3-7 Booting OpenVMS from a Disk on a Cluster

```
P00>>> show bootdef_dev                                          ❶
bootdef_dev              dua1.8.0.5.1
P00>>> show device                                               ❷
polling ncr0 (NCR 53C810) slot 1, bus 0 PCI, hose 1   SCSI Bus ID 7
dka500.5.0.1.1     DKa500                        RRD45  1645
polling dac0 (Mylex DAC960) slot 4, bus 0 PCI, hose 1
dra0.0.0.4.1       DRA0                          1 Member JBOD
dra1.0.0.4.1       DRA1                          1 Member JBOD
dra2.0.0.4.1       DRA2                          4 Member RAID 5
polling cipca0 (CIPCA) slot 3, bus 0 PCI, hose 1   cixcd_poll_comp
cipca_a.4.0.5.1    dua     CI Bus ID 4                           ❸
dua24.2.0.5.1      $22$DUA24 (HSC702)       RA92
dua30.2.0.5.1      $22$DUA30 (HSC702)       RA92
.
.
.
dua0.8.0.5.1       $22$DUA0 (RAWHSJ)        HSX1
dua1.8.0.5.1       $22$DUA1 (RAWHSJ)        HSX1               ❸
.
.
.
P00>>>boot                                                       ❹
(boot dua1.8.0.5.1 -flags 0)
Building FRU table
.
.
.
Welcome to OpenVMS Alpha (TM) Operating System, Version V6.2-1H3❺
```

❶ The **bootdef_dev** environment variable specifies the default boot device. In this example, the default boot device was previously set to dua1.8.0.5.1. See Section 5.10 for commands used with environment variables.

❷ The **show device** command displays device information, including name and type of connection to the system. See Section 5.3 for a description of the **show device** command and the device naming convention.

❸ The disk dua1.8.0.5.1 is on the CI cluster that includes this system.

❹ No boot device is specified in the **boot** command; the default boot device was set with the environment variable. See Section 5.4 for a description of the **boot** command.

The **boot** command accepts the name of a boot device, a boot file name through the **-file** option, and boot flags through the **-flags** option. The environment variables **bootdef_dev**, **boot_file**, and **boot_osflags** can also be used to specify the default boot device or device list, the default boot file, and flag information. When an option and the corresponding environment variable are both in a command string, the option overrides the environment variable. The value of the environment variable, however, is not changed. See Section 5.16 for information about environment variables.

❺ The operating system banner prints.

Example 3-8 Booting OpenVMS from a Remote Disk

```
P00>>> show device                                              ❶
polling ncr0 (NCR 53C810) slot 1, bus 0 PCI, hose 1    SCSI Bus ID 7
dka500.5.0.1.1      DKa500                      RRD45   1645
polling kzpsa0 (DEC KZPSA) slot 2, bus 0 PCI, hose 1   TPwr 1 Fast 1 Bus ID 5
kzpsa0.5.0.2.1      dkb     TPwr 1 Fast 1 Bus ID 5    N01   A10
polling kzpsa1 (DEC KZPSA) slot 3, bus 0 PCI, hose 1   TPwr 1 Fast 1 Bus ID 5
kzpsa1.5.0.3.1      dkc     TPwr 1 Fast 1 Bus ID 5    N01   A10
polling floppy0 (FLOPPY) PCEB - XBUS hose 0
dva0.0.0.1000.0     DVA0                      RX23
polling kzpsa2 (DEC KZPSA) slot 2, bus 0 PCI, hose 0   TPwr 1 Fast 1 Bus ID 5
kzpsa2.5.0.2.0      dke     TPwr 1 Fast 1 Bus ID 5    P01   A10
polling kzpsa3 (DEC KZPSA) slot 3, bus 0 PCI, hose 0   TPwr 1 Fast 1 Bus ID 5
kzpsa3.5.0.3.0      dkf     TPwr 1 Fast 1 Bus ID 5    P01   A10
polling kzpsa4 (DEC KZPSA) slot 4, bus 0 PCI, hose 0   TPwr 1 Fast 1 Bus ID 5
kzpsa4.5.0.5.0      dkg     TPwr 1 Fast 1 Bus ID 5    F01   A10
dkg0.0.0.5.0        DKg0                      RZ26J   589H
mkg300.3.0.5.0      MKg300                    TLZ09   0165
polling tulip0 (DECchip 21140-AA) slot 4, bus 0 PCI, hose 1
ewa0.0.0.5.1: 00-00-F8-00-42-04                                 ❶
P00>>> boot ewa0 -flags 0                                       ❷
(boot ewa0.0.0.5.1 -flags 0)
Building FRU table


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


Network load complete.
.
.
.
Welcome to OpenVMS Alpha (TM) Operating System, Version V6.2-1H3❸
```

❶ The **show device** command displays device information, including name and type of connection to the system. In this example the Ethernet connection is ewa0. See Section 5.3 for a description of the **show device** command and the device naming convention.

❷ The **boot** command specifies ewa0 as the boot device. See Section 5.4 for a description of the **boot** command.

The **boot** command accepts the name of a boot device, a boot file name through the **-file** option, and boot flags through the **-flags** option. The environment variables **bootdef_dev**, **boot_file**, and **boot_osflags** can also be used to specify the default boot device or device list, the default boot file, and flag information. When an option and the corresponding environment variable are both in a command string, the option overrides the environment variable. The value of the environment variable, however, is not changed. See Section 5.16 for information about environment variables.

❸ The operating system banner prints.

3.8 Booting DIGITAL UNIX

DIGITAL UNIX can be booted from a local disk (see Example 3-9), a disk connected through a cluster (see Example 3-10), or a remote disk through an Ethernet connection (see Example 3-11). Refer to the documentation shipped with the operating system for booting instructions.

Example 3-9 Booting DIGITAL UNIX from a Local Disk

```
P00>>> show device                                              ❶
polling ncr0 (NCR 53C810) slot 1, bus 0 PCI, hose 1   SCSI Bus ID 7
dka500.5.0.1.1      DKa500                     RRD45   1645
polling ncr1 (NCR 53C810) slot 3, bus 0 PCI, hose 1   SCSI Bus ID 7
dkb100.1.0.3.1      DKb100                     RZ29B   0007
dkb200.2.0.3.1      DKb200                     RZ29B   0007
dkb400.4.0.3.1      DKb400                     RZ29B   0007 ❷
polling floppy0 (FLOPPY) PCEB - XBUS hose 0
dva0.0.0.1000.0     DVA0                       RX23
polling tulip0 (DECchip 21040-AA) slot 2, bus 0 PCI, hose 1
ewa0.0.0.2.1: 08-00-2B-E5-B4-1A


P00>>> boot -file vmunix -flags a dkb400                        ❸
(boot dkb4.4.0.3.1 -file vmunix -flags a)
Building FRU table
block 0 of dkb4.4.0.3.1 is a valid boot block
reading 16 blocks from dkb4.4.0.3.1
bootstrap code read in
base = 200000, image_start = 0, image_bytes = 2000
initializing HWRPB at 2000
initializing page table at 1f2000
initializing machine state
setting affinity to the primary CPU
jumping to bootstrap code


OSF boot - Mon Aug 5 21:56:39 EDT 1996
Loading vmunix ...
.
.
.
The system is ready.


DIGITAL UNIX Version 3.2D                            ❹
```

❶ The **show device** command displays device information, including name and type of connection to the system. See Section 5.3 for a description of the **show device** command and the device naming convention.

❷ The operating system is on the third disk connected to the system through the controller in slot 3 of PCI1. The name of this device, dkb400, is used as an argument to the **boot** command.

❸ This command loads DIGITAL UNIX from the disk dkb400, using the boot file vmunix and autobooting to multiuser mode. See Section 5.4 for a description of the **boot** command.

The **boot** command accepts the name of a boot device, a boot file name through the **-file** option, and boot flags through the **-flags** option. The environment variables **bootdef_dev**, **boot_file**, and **boot_osflags** can also be used to specify the default boot device or device list, the default boot file, and flag information. When an option and the corresponding environment variable are both in a command string, the option overrides the environment variable. The value of the environment variable, however, is not changed. See Section 5.16 for information about environment variables.

❹ The operating system banner displays.

Example 3-10 Booting DIGITAL UNIX from a Disk on a Cluster

```
P00>>> show boot*                                                    ❶
boot_arg0                 0
boot_arg1
boot_dev                  dkb0.0.0.5.1
boot_file                 vmunix
boot_osflags              a
boot_reset                OFF
bootdef_dev               dkb0.0.0.5.1
booted_dev
booted_file
booted_osflags


P00>>> boot                                                          ❷
(boot dkb0.0.0.5.1 -flags a)
halted CPU 1
halt code = 1
operator initiated halt
PC = fffffc0000264600
Building FRU table
block 0 of dkb0.0.0.5.1 is a valid boot block
reading 16 blocks from dkb0.0.0.5.1
bootstrap code read in
base = 200000, image_start = 0, image_bytes = 2000
initializing HWRPB at 2000
initializing page table at 1f2000
initializing machine state
setting affinity to the primary CPU
Configuring I/O adapters...
jumping to bootstrap code
OSF boot - Mon Jul 29 21:56:39 EDT 1996
Loading vmunix ...
.
.
.
The system is ready.
DIGITAL UNIX Version 3.2D                                            ❸
```

❶ The **show boot*** command lists all environment variables that begin with the string "boot." In this example, the **bootdef_dev** environment variable sets the default boot device to dkb0.0.0.5.1, and **boot_osflags** indicates that the system will autoboot to multiuser mode. See Section 5.16 for descriptions of these environment variables.

❷ The **boot** command needs no options, since the environment variables pass all necessary information.

The **boot** command accepts the name of a boot device, a boot file name through the **-file** option, and boot flags through the **-flags** option. The environment variables **bootdef_dev**, **boot_file**, and **boot_osflags** can also be used to specify the default boot device or device list, the default boot file, and flag information. When an option and the corresponding environment variable are both in a command string, the option overrides the environment variable. The value of the environment variable, however, is not changed. See Section 5.16 for information about environment variables.

❸ The operating system banner displays.

Example 3-11 Booting DIGITAL UNIX from a Remote Disk

```
P00>>> show device                                                      ❶
polling ncr0 (NCR 53C810) slot 1, bus 0 PCI, hose 1  SCSI Bus ID 7
dka500.5.0.1.1      DKa500                    RRD45   1645
polling floppy0 (FLOPPY) PCEB - XBUS hose 0
dva0.0.0.1000.0     DVA0                      RX23
polling kzpsa0 (DEC KZPSA) slot 3, bus 0 PCI, hose 0  TPwr 1 Fast 1 Bus ID 7
kzpsa0.7.0.3.0      dkb     TPwr 1 Fast 1 Bus ID 7    N01   A09
dkb100.1.0.3.0      DKb100                    RZ29B   0007
dkb200.2.0.3.0      DKb200                    RZ29B   0007
dkb300.3.0.3.0      DKb300                    RZ29B   0007
dkb500.5.0.3.0      DKb500                    RZ29B   0007
polling ncr1 (NCR 53C810) slot 2, bus 0 PCI, hose 0  SCSI Bus ID 7
dkc400.4.0.2.0      DKc400                    RZ29B   0007
polling tulip0 (DECchip 21040-AA) slot 2, bus 0 PCI, hose 1
ewa0.0.0.2.1: 08-00-2B-E5-B4-1A                                          ❷
polling tulip1 (DECchip 21041-AA) slot 4, bus 0 PCI, hose 1
ewb0.0.0.4.1: 00-00-F8-00-AC-B4


P00>>> boot -flags an -protocols bootp ewa0                              ❸
(boot ewa0.0.0.4.1 -flags an)
Building FRU table


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


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

```
Loading vmunix ...

.

.

.

The system is ready.


DIGITAL UNIX Version 3.2D                                              ❹
```

❶   The **show device** command displays device information, including name and type of connection to the system. See Section 5.3 for a description of the **show device** command and the device naming convention.

❷   The operating system is on a remote disk accessed through the Ethernet controller in slot 4 of PCI1. The name of this device, ewa0, is used as an argument to the **boot** command.

❸   This command loads DIGITAL UNIX from ewa0, autobooting to multiuser mode. See Section 5.4 for a description of the **boot** command.

     The **boot** command accepts the name of a boot device, a boot file name through the **-file** option, and boot flags through the **-flags** option. The environment variables **bootdef_dev**, **boot_file**, and **boot_osflags** can also be used to specify the default boot device or device list, the default boot file, and flag information. When an option and the corresponding environment variable are both in a command string, the option overrides the environment variable. The value of the environment variable, however, is not changed. See Section 5.16 for information about environment variables.

❹   The operating system banner displays.

3.9 Booting Windows NT

Microsoft Windows NT is started from the AlphaBIOS Boot screen shown in Figure 3-6.

The setting of the SRM **os_type** environment variable determines if AlphaBIOS is loaded and started on reset and power-up. If **os_type** is set to **nt**, after the power-up display (see Section 3.3) the SRM console is loaded and started, and it then loads and starts the AlphaBIOS console. AlphaBIOS must be running before Windows NT can be booted.

The method used for booting Windows NT is determined by the setting of **Auto Start** in the AlphaBIOS **Standard CMOS Setup** screen (see Section 6.8).

- If **Auto Start** is enabled, the primary version of Windows NT starts automatically.

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

_____ **Note** _____

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

_____

Figure 3-6 AlphaBIOS Boot Screen

```
AlphaBIOS Version 5.12

Please select the operating system to start:

     Windows NT Server 3.51


Use ↓ and ↑ to move the highlight to your choice.
Press Enter to choose.




     digital Alpha

                           Press <F2> to enter SETUP
```

LJ-05708.AI4

4
Operation
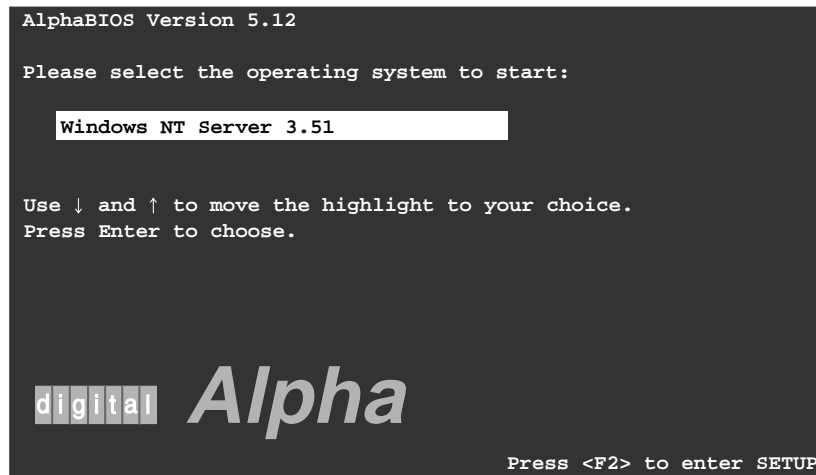
4.1 Introduction

This chapter provides basic operating instructions, including installing the operating system, updating firmware, and operating the system from a remote location.

Sections in this chapter are:

- Installing DIGITAL UNIX
- Installing OpenVMS
- Installing Windows NT
- Updating Firmware
- Operating the System Remotely

4.2 Installing DIGITAL UNIX

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

Example 4-1 Installing DIGITAL UNIX

```
P00>>> boot dka500                                              ❶
(boot dka500.5.0.1.1 –flags a)
Building FRU table                                              ❷
block 0 of dka500.5.0.1.1 is a valid boot block
reading 16 blocks from dka500.5.0.1.1
bootstrap code read in
base = 200000, image_start = 0, image_bytes = 2000
initializing HWRPB at 2000
initializing page table at 1f2000
initializing machine state
setting affinity to the primary CPU
jumping to bootstrap code


OSF boot – Mon Jul 24 21:56:39 EDT 1995


Loading hupdate ...
Starting hupdate at 0x20000000
Using hvmunix


Loading hvmunix ...
Current PAL Revision <0x20000000010111>
Switching to OSF PALcode Succeeded
New PAL Revision <0x20000000020115>
Loading into KSEG Address Space


Sizes:
text = 4460352
data = 5555024
bss  = 1498368
Starting at 0xfffffc0000239290


Alpha boot: available memory from 0x2dfe000 to 0x7fff6000
physical memory = 2048.00 megabytes.
available memory = 2001.96 megabytes.
using 7856 buffers containing 61.37 megabytes of memory
```

```
Firmware revision: 2.0
PALcode: DIGITAL-UNIX/OSF version 1.21
AlphaServer 4100
pci1 at mcbus0 slot 5
psiop0 at pci1 slot 1
.
.
.
Printer service started
The system is ready.



DIGITAL UNIX Version 3.2D


login: root
Password:
```

❶   Use the **boot** command to install the operating system from the internal CD-ROM, which is always dka500.

❷   See your operating system documentation for installation instructions.

4.3 Installing OpenVMS

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

Example 4-2 Installing OpenVMS

```
P00>>> boot -flags 0,0 dka500                                        ❶

Initializing...

SROM V1.0 on cpu0

.

.   [The initialization display prints. See Section 3.3.]

.


AlphaServer 4100 Console V1.0-1, 2-APR-1996 15:17:48


CPU 0 booting


(boot dka500.5.0.1.1 -flags 0,0)

Building FRU table

block 0 of dka500.5.0.1.1 is a valid boot block

reading 1002 blocks from dka500.5.0.1.1

bootstrap code read in

base = 200000, image_start = 0, image_bytes = 7d400

initializing HWRPB at 2000

initializing page table at 1f2000

initializing machine state

setting affinity to the primary CPU

jumping to bootstrap code


    OpenVMS (TM) Alpha Operating System, Version 6.2-1H3        ❷


%SMP-I-SECMSG, CPU #01 message:    P01>>>START

%SMP-I-CPUBOOTED, CPU #01 has joined the PRIMARY CPU in multiprocessor
operation


Installing required known files...


    Configuring devices...
```

```
        ************************************************************

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


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


        Please choose one of the following:


            1)  Install or upgrade OpenVMS Alpha Version 6.2-1H3
            2)  List layered product kits that this procedure can install
            3)  Install or upgrade layered product(s)
            4)  Execute DCL commands and procedures
            5)  Shut down this system


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

❶   Use the **boot** command to install the operating system from the internal CD-ROM,
     which is always dka500.

❷   See your operating system documentation for installation instructions.

4.4 Installing Windows NT

Windows NT is installed from the internal CD-ROM. Up to four versions of Windows NT can be resident in a system at one time.

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

1. Start AlphaBIOS. If the system is in the SRM console, issue the command **alphabios**.

2. From the **AlphaBIOS Boot** screen, enter **AlphaBIOS Setup** by pressing the F2 key.

3. From **AlphaBIOS Setup** select **CMOS Setup**, and press Enter.

4. From **CMOS Setup** set the system date and time.

5. Return to the **AlphaBIOS Setup** screen by pressing the F10 key.

6. Select **Hard Disk Setup**, and press Enter.

7. Perform an express hard disk setup by pressing the F7 key to enter **Express Setup**.

8. Continue the setup by pressing the F10 key.

9. Go to the procedure below.

This procedure is for all Windows NT installations:

1. Put the Windows NT CD into the CD-ROM drive.

2. Start **AlphaBIOS Setup**.

3. Select **Install Windows NT** (see Figure 4-1) and press Enter.

4. Follow the prompts to complete the installation. For more information on installing Windows NT, refer to the *Installation Guide* in your Windows NT software package.

Figure 4-1 Installing Windows NT

```
                                          AlphaBIOS Setup

     ┌──────────────────────────────────────────────┐
     │  Display System Configuration...             │
     │  Upgrade AlphaBIOS                           │
     │  Hard Disk Setup...                          │
     │  CMOS Setup...                               │
     │  Install Windows NT                          │
     │  Utilities                                ►  │
     │  About AlphaBIOS...                          │
     └──────────────────────────────────────────────┘


     ┌──────────────────────────────────────────────┐
     │  Press ENTER to install Windows NT.          │
     │                                              │
     │                                              │
     └──────────────────────────────────────────────┘

       ESC=Exit
```
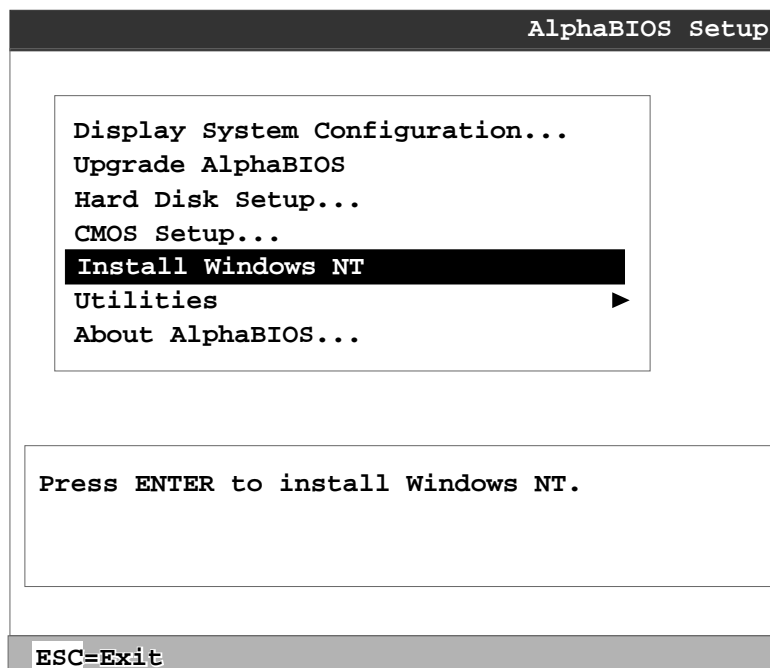
LJ-05707.AI4

4.5 Updating Firmware

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

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

- From the SRM console, start LFU by issuing the **lfu** command (see Example 4-3). Also from the SRM console, LFU can be booted from the Alpha CD-ROM (V3.7 or later), as shown in Example 4-4.

- From the AlphaBIOS console, select **Upgrade AlphaBIOS** from the **AlphaBIOS Setup** screen (see Figure 4-2).

Example 4-3 Starting LFU from the SRM Console

```
P00>>> lfu


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


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

Example 4-4 Booting LFU from the CD-ROM

```
P00>>> show dev ncr0
polling ncr0 (NCR 53C810) slot 1, bus 0 PCI, hose 1   SCSI Bus ID 7
dka500.5.0.1.1    DKa500                     RRD45  1645
P00>>> boot dka500
(boot dka500.5.0.1.1 -flags 0,0)
block 0 of dka500.5.0.1.1 is a valid boot block
.
.
.
jumping to bootstrap code


The default bootfile for this platform is
        [AS4X00]AS4X00_LFU.EXE
Hit <RETURN> at the prompt to use the default bootfile.
Bootfile: <CR>


Starting Firmware Update Utility
```

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

Figure 4-2 Starting LFU from the AlphaBIOS Console

```
┌──────────────────────────────────────────────────────────────────┐
│                        AlphaBIOS Setup                             │
├──────────────────────────────────────────────────────────────────┤
│   ┌────────────────────────────────────────────────┐              │
│   │  Display System Configuration...                │              │
│   │ ▐Upgrade AlphaBIOS                              ▌│              │
│   │  Hard Disk Setup                                │              │
│   │  CMOS Setup...                                  │              │
│   │  Install Windows NT                             │              │
│   │  Utilities                            ►         │              │
│   │  About AlphaBIOS...                             │              │
│   └────────────────────────────────────────────────┘              │
│                                                                    │
│   ┌────────────────────────────────────────────────────────────┐  │
│   │ Press ENTER to upgrade your AlphaBIOS from floppy or CD-ROM.│  │
│   │                                                            │  │
│   └────────────────────────────────────────────────────────────┘  │
│                                                                    │
│  ▐ESC=Exit▌                                                        │
└──────────────────────────────────────────────────────────────────┘
```
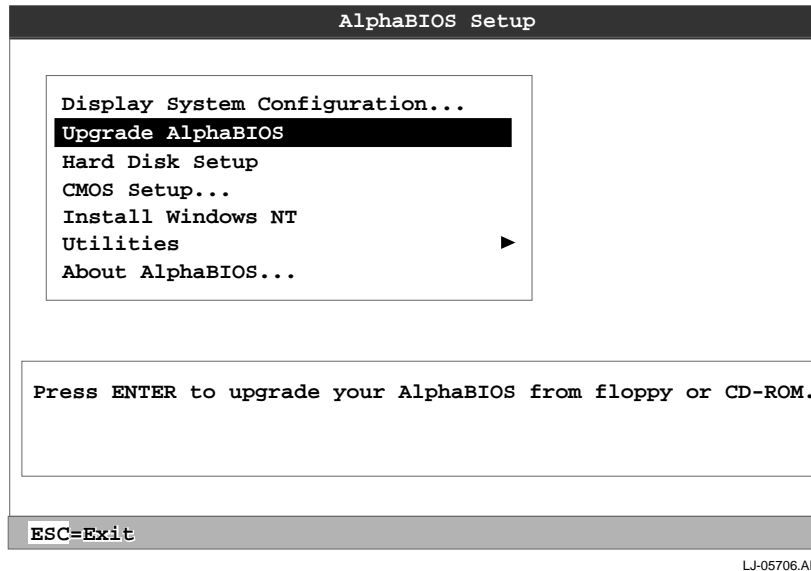
LJ-05706.AI4

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 exit back to the console.

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

4.5.1 Updating Firmware from the Internal CD-ROM

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

Example 4-5 Updating Firmware from the Internal CD-ROM

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


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


Please enter the name of the options firmware files list, or
Press <return> to use the default filename [AS4X00FW]: AS4X00FW ❷


Copying AS4X00CP from DKA500.5.0.1.1 .
Copying [as4x00]RHREADME from DKA500.5.0.1.1 .
Copying [as4x00]RHSRMROM from DKA500.5.0.1.1 ....................
Copying [as4x00]RHARCROM from DKA500.5.0.1.1 .............


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

 Function    Description                                          ❸
-----------------------------------------------------------------

 Display     Displays the system's configuration table.

 Exit        Done exit LFU (reset).

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

 Lfu         Restarts LFU.

 Readme      Lists important release information.

 Update      Replaces current firmware with loadable data image.

 Verify      Compares loadable and hardware images.

 ? or Help   Scrolls this function table.
-----------------------------------------------------------------


UPD> list                                                         ❹


Device          Current Revision    Filename       Update Revision
AlphaBIOS       V5.12-2             arcrom          V6.40-1
srmflash        V1.0-9             srmrom          V2.0-3


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

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


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


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


                        DO NOT ABORT!
srmflash        Updating to V2.0-3...  Verifying V2.0-3...  PASSED.


UPD> exit                                                                 ❼
```

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

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

AS4X00FW   SRM console, AlphaBIOS console, and I/O adapter firmware.
(default)

AS4X00CP   SRM console and AlphaBIOS console firmware only.

AS4X00IO   I/O adapter firmware only.

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

❸   The LFU function table and prompt (UPD>) display.

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

❺   The **update** command updates the device specified or all devices. In this example, the wildcard indicates that all devices supported by the selected update file will be updated.

❻   For each device, you are asked to confirm that you want to update the firmware. The default is no. Once the update begins, do not abort the operation. Doing so will corrupt the firmware on the module.

❼   The **exit** command returns you to the console from which you entered LFU (either SRM or AlphaBIOS).

4.5.2 Updating Firmware from the Internal Floppy Disk (Creating the Diskettes)

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

1. Download the update files from the Internet.

    You can access the firmware as follows:

    *   Using a World Wide Web browser (such as Mosaic or Netscape), follow links to AlphaServer 4100 systems, then technical resources from URL:

        http://www.digital.com/info/alphaserver/products.html

    *   Using ftp, copy the file:

        ftp://ftp.digital.com/pub/Digital/Alpha/firmware/

    The files are structured as those on the firmware CD and are separated by CD release. For example, the contents of the V3.6 firmware CD are located at:

    ftp://ftp.digital.com/pub/Digital/Alpha/firmware/v3.6

2. On a PC, copy files onto two FAT-formatted diskettes as shown in Table 4-1.

    From an OpenVMS system, copy files onto two ODS2-formatted diskettes as shown in Example 4-6.

Table 4-1 File Locations for Creating Update Diskettes on a PC

Console Update Diskette	I/O Update Diskette
AS4X00FW.TXT	AS4X00IO.TXT
AS4X00CP.TXT	RHREADME.SYS
RHREADME.SYS	CIPCA214.SYS
RHSRMROM.SYS	DFPAA246.SYS
RHARCROM.SYS	KZPAAA10.SYS

Example 4-6 Creating Update Diskettes on an OpenVMS System

Console update diskette

```
$ inquire ignore "Insert blank HD floppy in DVA0, then continue"
$ set verify
$ set proc/priv=all
$ init /density=hd/index=begin dva0: rhods2cp
$ mount dva0: rhods2cp
$ create /directory dva0:[as4x00]
$ copy as4x00fw.sys dva0:[as4x00]as4x00fw.sys
$ copy as4x00cp.sys dva0:[as4x00]as4x00cp.sys
$ copy rhreadme.sys dva0:[as4x00]rhreadme.sys
$ copy as4x00fw.txt dva0:[as4x00]as4x00fw.txt
$ copy as4x00cp.txt dva0:[as4x00]as4x00cp.txt
$ copy rhsrmrom.sys dva0:[as4x00]rhsrmrom.sys
$ copy rharcrom.sys dva0:[as4x00]rharcrom.sys
$ dismount dva0:
$ set noverify
$ exit
```

I/O update diskette

```
$ inquire ignore "Insert blank HD floppy in DVA0, then continue"
$ set verify
$ set proc/priv=all
$ init /density=hd/index=begin dva0: rhods2io
$ mount dva0: rhods2io
$ create /directory dva0:[as4x00]
$ create /directory dva0:[options]
$ copy as4x00fw.sys dva0:[as4x00]as4x00fw.sys
$ copy as4x00io.sys dva0:[as4x00]as4x00io.sys
$ copy rhreadme.sys dva0:[as4x00]rhreadme.sys
$ copy as4x00fw.txt dva0:[as4x00]as4x00fw.txt
$ copy as4x00io.txt dva0:[as4x00]as4x00io.txt
$ copy cipca214.sys dva0:[options]cipca214.sys
$ copy dfpaa246.sys dva0:[options]dfpaa246.sys
$ copy kzpsaA10.sys dva0:[options]kzpsaa10.sys
$ dismount dva0:
$ set noverify
$ exit
```

4.5.3 Updating Firmware from the Internal Floppy Disk (Performing the Update)

Insert an update diskette (see Section 4.5.2) into the internal floppy drive. Start LFU and select dva0 as the load device.

Example 4-7 Updating Firmware from the Internal Floppy Disk

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


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


Please enter the name of the options firmware files list, or
Press <return> to use the default filename [AS4X00IO,(AS4X00CP)]:
AS4X00IO                                                          ❷


Copying AS4X00IO from DVA0 .
Copying RHREADME from DVA0 .
Copying CIPCA214 from DVA0 .
Copying DFPAA252 from DVA0 ...
Copying KZPSAA11 from DVA0 ...
.
. [The function table displays, followed by the UPD> prompt, as
. shown in Example 4-5


UPD> list                                                         ❸


Device          Current Revision    Filename      Update Revision
AlphaBIOS         V5.12-3            arcrom        Missing file
pfi0              2.46               dfpaa_fw         2.52
srmflash         T3.2-21            srmrom        Missing file
                                     cipca_fw        A214
                                     kzpsa_fw        A11


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


Confirm update on: pfi0             [Y/(N)] y                     ❺


                     DO NOT ABORT!
pfi0          Updating to 2.52... Verifying to 2.52... PASSED.
```

```
UPD> lfu                                                              ❻


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


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


Please enter the name of the options firmware files list, or
Press <return> to use the default filename [AS4X00IO,(AS4X00CP)]:❼


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


UPD> exit                                                            ❽
```

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

❷   Select the file that has the firmware update, or press Enter to select the default file. When the internal floppy disk is the load device, the file options are:

AS4X00CP (default)   SRM console and AlphaBIOS console firmware only.

AS4X00IO   I/O adapter firmware only.

The default option in Example 4-5 (AS4X00FW) is not available, since the file is too large to fit on a 1.44 MB diskette. This means that when a floppy disk is the load device, you can update either console firmware or I/O adapter firmware, but not both in the same LFU session. If you need to update both, after finishing the first update, restart LFU with the **lfu** command and insert the diskette with the other file.

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

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

❹   The **update** command updates the device specified or all devices.

❺   For each device, you are asked to confirm that you want to update the firmware. The default is no. Once the update begins, do not abort the operation. Doing so will corrupt the firmware on the module.

❻   The **lfu** command restarts the utility so that console firmware can be updated. (Another method is shown in Example 4-8, where the user specifies the file AS4X00FW and is prompted to insert the second diskette.)

❼   The default update file, AS4X00CP, is selected. The console firmware can now be updated, using the same procedure as for the I/O firmware.

❽   The **exit** command returns you to the console from which you entered LFU (either SRM or AlphaBIOS).

Example 4-8 Selecting AS4X00FW to Update Firmware from the Internal Floppy Disk

```
P00>>> lfu


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


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


Please enter the name of the firmware files list, or
Press <return> to use the default filename [AS4X00IO,(AS4X00CP)]: AS4X00FW


Copying AS4X00FW from DVA0 .
Copying RHREADME from DVA0 .
Copying RHSRMROM from DVA0 .........................
Copying RHARCROM from DVA0 ...............
Copying CIPCA214 from DVA0
Please insert next floppy containing the firmware,
Press <return> when ready. Or type DONE to abort.
Copying CIPCA214 from DVA0 .
Copying DFPAA246 from DVA0 ...
Copying KZPSAA10 from DVA0 ...
.
.
.
```

4.5.4 Updating Firmware from a Network Device

Copy files to the local MOP server's MOP load area, start LFU, and select ewa0 as the load device. Before starting LFU, download the update files from the Internet (see Section 4.5.2). You will need the files with the extension .SYS. Copy these files to your local MOP server's MOP load area.

Example 4-9 Updating Firmware from a Network Device

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


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

Press <return> to bypass loading and proceed to LFU: ewa0        ❶


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

Press <return> to use the default filename [AS4X00FW]:           ❷


Copying AS4X00FW from EWA0 .

Copying RHREADME from EWA0 .

Copying RHSRMROM from EWA0 ..........................

Copying RHARCROM from EWA0 ............

Copying CIPCA214 from EWA0 .

Copying DFPAA246 from EWA0 ...

Copying KZPSAA11 from EWA0 ...

.

.  [The function table displays, followed by the UPD> prompt, as
.  shown in Example 4-5.]


UPD> list                                                       ❸


Device          Current Revision   Filename      Update Revision

AlphaBIOS         V5.12-2           arcrom          V6.40-1

kzpsa0            A10               kzpsa_fw        A10

kzpsa1            A10               kzpsa_fw        A10

srmflash          V1.0-9            srmrom          V2.0-3

                                    cipca_fw        A214

                                    dfpaa_fw          2.46


UPD> update * -all                                              ❹

WARNING: updates may take several minutes to complete for each device.
                       DO NOT ABORT!
```

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


                        DO NOT ABORT!
kzpsa0       Updating to  A11    ... Verifying A11...  PASSED.


                        DO NOT ABORT!
kzpsa1       Updating to  A11    ... Verifying A11...  PASSED.


                        DO NOT ABORT!
srmflash     Updating to V2.0-3...  Verifying V2.0-3...  PASSED.


UPD> exit                                                    ❺
```

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

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

     AS4X00FW   SRM console, AlphaBIOS console, and I/O adapter
     (default)   firmware.

     AS4X00CP   SRM console and AlphaBIOS console firmware only.

     AS4X00IO   I/O adapter firmware only.

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

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

❹   The **update** command updates the device specified or all devices. In this example,
     the wildcard indicates that all devices supported by the selected update file will be
     updated. Typically LFU requests confirmation before updating each console's or
     device's firmware. The **-all** option eliminates the update confirmation requests.

❺   The **exit** command returns you to the console from which you entered LFU (either
     SRM or AlphaBIOS).

4.5.5 LFU Commands

The commands summarized in Table 4-2 are used to update system firmware.

Table 4-2 LFU Command Summary

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

These commands are described in the following pages.

display

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

exit

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

help

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

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

 Function    Description

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

 Display     Displays the system's configuration table.

 Exit        Done exit LFU (reset).

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

 Lfu         Restarts LFU.

 Readme      Lists important release information.

 Update      Replaces current firmware with loadable data image.

 Verify      Compares loadable and hardware images.

 ? or Help   Scrolls this function table.

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

lfu

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

list

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

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

- Current Revision — The revision of the device's current firmware

- Filename — The name of the file used to update that firmware

- Update Revision — The revision of the firmware update image

readme

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

update

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

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

_____ **Caution** _____

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

verify

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

4.6 Operating the System Remotely

The remote console monitor (RCM) is used to monitor and control the system remotely. The RCM resides on the server control module and allows the system administrator to connect remotely to a managed system through a modem, using a serial terminal or terminal emulator.

The RCM has special console firmware that is used to remotely control an AlphaServer system. The RCM firmware resides on an independent microprocessor. It is not part of the SRM console that resides in the flash ROM. The RCM firmware has its own command interface that allows the user to perform the tasks that can usually be done from the system's serial console terminal. RCM console commands are used to reset, halt, and power the system on or off, regardless of the operating system or hardware state. The RCM console commands are also used to monitor the power supplies, temperature, and fans.

The user can enter the RCM console either remotely or through the local serial console terminal. Once in command mode, the user can enter commands to control and monitor the system.

- To enter the RCM console remotely, the user dials in through a modem, enters a password, and then types a special escape sequence that invokes RCM command mode. You must set up the modem before you can dial in remotely. See Section 4.6.1.

- To enter the RCM console locally, the user types the escape sequence at the SRM console prompt on the local serial console terminal.

The RCM also provides an autonomous dial-out capability when it detects a power failure within the system. When triggered, the RCM dials a paging service at 30-minute intervals until the administrator clears the alert within the RCM.

4.6.1 Modem Usage

To use the RCM to monitor a system remotely, first make the connections to the server control module, as shown in Figure 4-3. Then configure the modem port for dial-in.

Figure 4-3 RCM Connections

LJ-06455.AI4
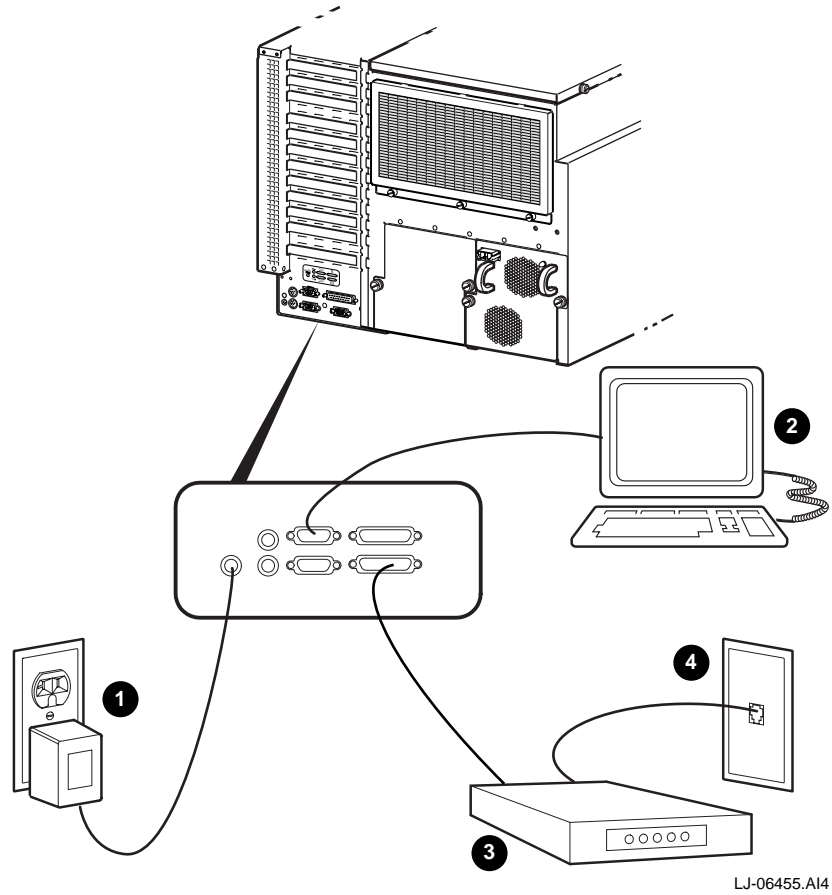
❶ External power supply   ❸ Modem

❷ Console terminal   ❹ Phone jack

4.6.1.1 Modem Selection

The RCM requires a Hayes-compatible modem. The controls that the RCM sends to the modem have been selected to be acceptable to a wide selection of modems. The modems that have been tested and qualified include:

Motorola LifeStyle Series 28.8
AT&T DATAPORT 14.4/FAX
Zoom Model 360

The U.S. Robotics Sportster DATA/FAX MODEM is also supported, but requires some modification of the modem initialization and answer strings. See Section 4.6.7.

4.6.1.2 Modem Configuration Procedure

1. Connect a Hayes-compatible modem to the RCM as shown in Figure 4-3, and power up the modem.

2. From the local serial console terminal, enter the RCM firmware console by typing the following escape sequence:

   ```
   ^]^]rcm
   ```

   The character "^" is created by simultaneously holding down the Ctrl key and pressing the] key (right square bracket). The firmware prompt, RCM>, should now be displayed.

3. Enter a modem password with the **setpass** command. See Section 4.6.3.

4. Enable the modem port with the **enable** command. See Section 4.6.3.

5. Enter the **quit** command to leave the RCM console.

6. You are now ready to dial in remotely.

4.6.1.3 Dialing In to the RCM Modem Port

1. Dial the modem connected to the server control module. The RCM answers the call and after a few seconds prompts for a password with a "#" character.

2. Enter the password that was loaded using the **setpass** command. The user has three tries to correctly enter the password. On the third unsuccessful attempt, the connection is terminated, and as a security precaution, the modem is not answered again for 5 minutes.

   On successful entry of the password, the RCM banner message "RCM V1.0" is displayed, and the user is connected to the system COM1 port. At this point the local terminal keyboard is disabled except for entering the RCM console firmware. The local terminal displays all the terminal traffic going out to the modem.

3. To connect to the RCM firmware console, type the RCM escape sequence.

Refer to Example 4-10 for an example of the modem dial-in procedure.

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

Example 4-10 Sample Remote Dial-In Dialog

```
ATQ0V1E1S0      !When modem dial-in connection is made, a screen
=0              display similar to this appears.
OK
ATDT30167
CONNECT
9600
#               !Enter password at this prompt.
RCM V1.0        !RCM banner is displayed.
^]^]rcm         !Enter the escape sequence after the banner is displayed.
                The escape sequence is not echoed on the terminal.
RCM>            !RCM prompt is displayed. Commands to control and
                monitor the system can be entered.
```

4.6.1.4 Terminating a Remote Console (Modem) Session

Terminate the modem session by executing a **hangup** command from the RCM console firmware. This will cleanly terminate the modem connection.

If the modem connection is terminated without using the **hangup** command, or if the line is dropped due to phone line problems, the RCM will detect carrier loss and initiate an internal **hangup** command. This process can take a minute or more, and the local terminal will be locked out until the auto hangup process completes.

If the modem link is idle for more than 20 minutes, the RCM initiates an auto hangup.

4.6.2 Entering and Leaving Command Mode

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

Entering the RCM Firmware Console

To enter the RCM firmware console, enter the RCM escape sequence. See ❶ in Example 4-11 for the default sequence.

The escape sequence is not echoed on the terminal or sent to the system. Once in the RCM firmware console, the user is in RCM command mode and can enter RCM console commands.

Leaving Command Mode

To leave the RCM command mode and reconnect to the system console port, enter the **quit** command, then press Return to get a prompt from the operating system or system console. (See ❷ in Example 4-11.)

Example 4-11 Entering and Leaving RCM Command Mode

```
^]^]rcm            ❶

RCM>


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

4.6.3 RCM Commands

The RCM commands summarized in Table 4-3 are used to control and monitor a system remotely.

Table 4-3 RCM Command Summary

Command	Function
alert_clr	Clears alert flag, stopping dial-out alert cycle
alert_dis	Disables the dial-out alert function
alert_ena	Enables the dial-out alert function
disable	Disables remote access to the modem port
enable	Enables remote access to the modem port
hangup	Terminates the modem connection
halt	Halts server
help or **?**	Displays the list of commands
poweroff	Turns off power to server
poweron	Turns on power to server
quit	Exits console mode and returns to system console port
reset	Resets the server
setesc	Changes the escape sequence for entering command mode
setpass	Changes the modem access password
status	Displays server's status and sensors

Command Conventions

- The commands are not case sensitive.

- A command must be entered in full.

- If a command is entered that is not valid, the command fails with the message:

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

Enter a valid command.

The RCM commands are described on the following sections.

4.6.3.1 alert_clr

The **alert_clr** command clears an alert condition within the RCM. The alert enable condition remains active, and the RCM will again enter the alert condition when it detects a system power failure. See Section 4.6.4

```
RCM>alert_clr
```

4.6.3.2 alert_dis

The **alert_dis** command disables RCM dial-out capability. It also clears any outstanding alerts (see Section 4.6.4). The alert disable state is nonvolatile. Dial-out capability remains disabled until the **alert_enable** command is issued.

```
RCM>alert_dis
```

4.6.3.3 alert_ena

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

```
RCM>alert_ena
```

In order for the **alert_enable** command to work, two conditions must be met:

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

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

See Section 4.6.4.

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

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

4.6.3.4 disable

The **disable** command disables remote access to the RCM modem port.

```
RCM>disable
```

The module's remote access default state is DISABLED. The modem enable state is nonvolatile. When the modem is disabled, it remains disabled until the **enable** command is issued. If a modem connection is in progress, entering the **disable** command terminates it.

4.6.3.5 enable

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

```
RCM>enable
```

The module's remote access default state is DISABLED.

The modem enable state is nonvolatile. When the modem is enabled, it remains enabled until the **disable** command is issued.

The **enable** command can fail for two reasons:

- There is no modem access password configured.

- The modem is not connected or is not working properly.

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

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

4.6.3.6 hangup

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

```
RCM>hangup
```

4.6.3.7 halt

The **halt** command attempts to halt the managed system. It is functionally equivalent to pressing the Halt button on the system operator control panel to the "in" position and then releasing it to the "out" position. The RCM console firmware exits command mode and reconnects the user's terminal to the server's COM1 serial port.

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

_____ **Note** _____

Pressing the Halt button has no effect on systems running Windows NT.
_____

4.6.3.8 help or ?

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

4.6.3.9 poweroff

The **poweroff** command requests the RCM module to power off the system. It is functionally equivalent to turning off the system power from the operator control panel.

```
RCM>poweroff
```

If the system is already powered off, this command has no effect.

The external power to the RCM must be connected in order to power off the system from the RCM firmware console. If the external power supply is not connected, the command will not power the system down, and displays the message:

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

4.6.3.10 poweron

The **poweron** command requests the RCM module to power on the system. For the system power to come on, the following conditions must be met:

- AC power must be present at the power supply inputs.

- The DC On/Off button must be in the "on" position.

- All system interlocks must be set correctly.

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

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

_____ **Note** _____

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

_____

4.6.3.11 quit

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

```
Focus returned to COM port
```

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

4.6.3.12 reset

The **reset** command requests the RCM module to perform a hardware reset. It is functionally equivalent to pressing the Reset button on the system operator control panel.

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

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

- The system restarts and the system console firmware reinitializes.

- The console exits RCM command mode and reconnects the user's terminal to the server's COM1 serial port.

- The power-up messages are displayed, and then the console prompt is displayed or the operating system boot messages are displayed, depending on the state of the Halt button.

4.6.3.13 setesc

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

_____ **Note** _____

If you change the escape sequence, be sure to record the new sequence. Although the module factory defaults can be restored if the user has forgotten the escape sequence, this involves accessing the server control module and moving a jumper.

_____

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

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

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

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

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

Control characters are not echoed when entering the escape sequence. To verify the complete escape sequence, use the **status** command.

4.6.3.14 setpass

The **setpass** command allows the user to change the modem access password that is prompted for at the beginning of a modem session. The password is stored in the module's on-board NVRAM.

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

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

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

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

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

If the user has forgotten the password, a new password can be entered.

4.6.3.15 status

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

```
RCM>status

Firmware Rev: V1.0
Escape Sequence: ^]^]RCM
Remote Access: ENABLE/DISABLE
Alerts: ENABLE/DISABLE
Alert Pending: YES/NO (C)
Temp (C): 26.0
RCM Power Control: ON/OFF
External Power: ON
Server Power: OFF

RCM>
```

The status fields are explained in Table 4-4.

Table 4-4 RCM Status Command Fields

Item	Description
Firmware Rev:	Revision of RCM firmware.
Escape Sequence:	Current escape sequence to enter RCM firmware console.
Remote Access:	Modem remote access state. (ENABLE/DISABLE)
Alerts:	Alert dial-out state. (ENABLE/DISABLE)
Alert Pending:	Alert condition triggered. (YES/NO)
Temp (C):	Current system temperature in degrees Celsius.
RCM Power Control:	Current state of RCM system power control. (ON/OFF)
External Power:	Current state of power from external power supply to server control module. (ON/OFF)

4.6.4 Dial-Out Alerts

The RCM can be configured to automatically dial out through the modem (usually to a paging service) when it detects a power failure within the system. When a dial-out alert is triggered, the RCM initializes the modem for dial-out, sends the dial-out string, hangs up the modem, and reconfigures the modem for dial-in. The RCM and modem must continue to be powered, and the phone line must remain active, for the dial-out alert function to operate.

Enabling the Dial-Out Alert Function:

1. Enter the **set rcm_dialout** command, followed by a dial-out alert string, from the SRM console (see ❶ in Example 4-12).

   The *string* is a modem dial-out character string, not to exceed 47 characters, that is used by the RCM when dialing out through the modem. See the next topic for details on composing the modem dial-out string.

2. Enter the RCM firmware console and enter the **enable** command to enable remote access dial-in. The RCM firmware **status** command should display "Remote Access: ENABLE." (See ❷ in Example 4-12.)

3. Enter the RCM firmware **alert_ena** command to enable outgoing alerts. (See ❸ in Example 4-12.)

Example 4-12 Configuring the Modem for Dial-Out Alerts

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


RCM>enable

RCM>status

.

.

Remote Access:   Enable                    ❷

.

RCM>alert_ena                              ❸
```

Composing a Modem Dial-Out String

The modem dial-out string emulates a user dialing an automatic paging service. Typically, the user dials the pager phone number, waits for a tone, and then enters a series of numbers.

The RCM dial-out string (see Example 4-13) has the following requirements:

- The entire string following the **set rcm_dialout** command must be enclosed by quotation marks.

- The characters ATDT must be entered after the opening quotation marks. Do not mix case. Enter the characters either in all uppercase or all lowercase.

- Enter the character X if the line to be used also carries voice mail. Refer to the example that follows.

The valid characters for the dial-out string are the characters on a phone keypad: 0–9, *, and #. In addition, a comma (,) requests that the modem pause for 2 seconds, and a semicolon (;) is required to terminate the string.

Example 4-13 Typical RCM Dial-Out Command

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

Use the **show** command to verify the RCM dial-out string:

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

Elements of the Dial-Out String

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

4.6.5 Resetting the RCM to Factory Defaults

If the escape sequence has been forgotten, you can reset the controller to factory settings. Use the following procedure to reset the controller to factory settings.

1. Power down the server and access the server control module, as follows:

   Expose the PCI bus card cage. Remove the screws holding the cover in place and slide it off the chassis. If necessary, remove several PCI and EISA options from the bottom of the PCI card cage until you have enough space to access the server control module.

2. Unplug the external power supply to the server control module.

   Locate the password and option reset jumper. The jumper number, which is etched on the board, depends on the revision of the server control module.

   _____ **Note**_____

   If the RCM section of the server control module does not have an orange relay, the jumper number is J6. If the RCM section of the server control module has an orange relay, the jumper number is J7.

   _____

3. Move the jumper so that it is sitting on both pins.

4. Replace any panels or covers as necessary so you can power up the system. Press the Halt button and then power up the system to the SRM console prompt. Powering up with the password and option reset jumper in place resets the escape sequence, password, and modem enable states to the factory default.

5. When the console prompt is displayed, power down the system and move the password and option reset jumper back onto the single pin.

6. Replace any PCI or EISA modules you removed and replace the PCI bus card cage cover.

7. Power up the system to the SRM console prompt and type the default escape sequence to enter RCM command mode:

   `^]^]RCM`

8. Configure the module as desired. You must reset the password and modem enable states in order to enable remote access.

4.6.6 RCM Troubleshooting Guide

Table 4-5 lists a number of possible causes and suggested solutions for symptoms.

Table 4-5 RCM Troubleshooting

Symptom	Possible Cause	Suggested Solution
The local terminal will not communicate with the system or the RCM.	System and terminal baud rate set incorrectly.	Set the system and terminal baud rates to 9600 baud.
	Cables not correctly installed.	Review external cable installation.
RCM will not answer when the modem is called.	Modem cables may be incorrectly installed.	Check modem phone lines and connections.
	RCM remote access is disabled.	Enable remote access.
	RCM does not have a valid password set.	Set password and enable remote access.
	The local terminal is currently in the RCM console firmware.	Issue a **quit** command on the local terminal.
	On power-up, the RCM defers initializing the modem for 30 seconds to allow the modem to complete its internal diagnostics and initialization.	Wait 30 seconds after powering up the system and RCM before attempting to dial in.
	Modem may have had power cycled since last being initialized or modem is not set up correctly.	Enter **enable** command from RCM console.
After the system and RCM are powered up, the COM port seems to hang and then starts working after a few seconds.	This delay is normal behavior.	Wait a few seconds for the COM port to start working.
RCM installation is complete, but system will not power up.	RCM Power Control: is set to DISABLE.	Enter RCM console and issue the **poweron** command.
New password, escape sequence, and modem enable state are forgotten when system and RCM module are powered down.	The password and option reset jumper is still installed. If the RCM section of the server control module does not have an orange relay, the jumper number is J6. If it does have an orange relay, the number is J7.	After resetting RCM to factory defaults, move the jumper so that it is setting on only one pin.
The remote user sees a "+++" string on the screen.	The modem is confirming whether the modem has really lost carrier. This occurs when the modem sees an idle time, followed by a "3," followed by a carriage return, with no subsequent traffic. If the modem is still connected, it will remain so.	This is normal behavior.
The message "unknown command" is displayed when the user enters a carriage return by itself.	The terminal or terminal emulator is including a linefeed character with the carriage return.	Change the terminal or terminal emulator setting so that "new line" is not selected.
Cannot enable modem or modem will not answer.	The modem is not configured correctly to work with the RCM.	Modify the modem initialization and/or answer string as described in Section 4.6.7.

4.6.7 Modem Dialog Details

This section provides further details on the dialog between the RCM and the modem and is intended to help you reprogram your modem if necessary.

Phases of Modem Operation

The RCM is programmed to expect specific responses from the modem during four phases of operation:

*   Initialization

*   Ring detection

*   Answer

*   Hang-up

The initialization and answer command strings are stored in the RCM NVRAM. The factory default strings are:

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

Answer string   `ATXA<cr>`

_____ **Note**_____

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

_____

Initialization

The RCM initializes the modem to the following configuration:

Factory defaults (`&F0`)

No Echo (`E`)

Numeric response codes (`V`)

No Auto Answer (`S0=0`)

Guard-band = 1 second (`S12=50`)

Fixed modem-to-RCM baud rate

Connect at highest possible reliability and speed

The RCM expects to receive a "`0<cr>`" (OK) in response to the initialization string. If it does not, the **enable** command will fail.

This default initialization string works on a wide variety of modems. If your modem does not configure itself to these parameters, the initialization string will need to be modified. See the topic in this section entitled Modifying Initialization and Answer Strings.

Ring Detection

The RCM expects to be informed of an in-bound call by the modem signaling the RCM with the string, "`2<cr>`" (RING).

Answer

When the RCM receives the ring message from the modem, it responds with the answer string. The "X" command modifier used in the default answer string forces the modem to report simple connect, rather than connect at *xxxx*. The RCM expects a simple connect message, "1<cr>" (CONNECTED). If the modem responds with anything else, the RCM forces a hang-up and initializes the modem.

The default answer string is formatted to request the modem to provide only basic status. If your modem does not provide the basic response, the answer string, and/or initialization string will need to be modified. See the topic in this section entitled Modifying Initialization and Answer Strings.

After receiving the "connect" status, the modem waits for 6 seconds, and then prompts the user for a password.

Hangup

When the RCM is requested to hang up the modem, it forces the modem into command mode and issues the **hangup** command to the modem. This is done by pausing for a minimum of the guard time, sending the modem "+++". When the modem responds with "0<cr>" (OK), the hang-up command string is sent. The modem should respond with "3<cr>" (NO CARRIER). After this interchange, the modem is reinitialized in preparation for the next dial-in session.

RCM/Modem Interchange Overview

Table 4-6 summarizes the actions between the RCM and the modem from initialization to hangup.

Table 4-6 RCM/Modem Interchange Summary

Action	Data to modem	Data from Modem
Initialization command	AT&F0EVS0=0S12=50<cr>	
Initialization successful		0<cr>
Phone line ringing		2<cr>
RCM answering	ATXA<cr>	
Modem successfully connected		1<cr>
Force modem into command mode	<guard_band>+++	
Modem in command mode		0<cr>
Hangup	ATH<cr>	
Successful hangup		3<cr>

Modifying Initialization and Answer Strings

The initialization and answer strings are stored in the RCM's NVRAM. They come pre-programmed to support a wide selection of modems. In the circumstance where the default initialization and answer strings do not set the modem into the desired mode, the following SRM **set** and **show** commands are provided to enable the user to define and examine the initialization and answer strings.

To replace the initialization string:

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

To replace the answer string:

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

To display all the RCM user settable strings:

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

Initialization and Answer String Substitutions

The following modems have been identified as requiring modified initialization and/or answer strings.

Modem Model	Initialization String	Answer String
RCM Defaults	"AT&F0EVS0=0S12=50"	"ATXA"
USRobotics Sportster 28,800 Data/Fax Modem	RCM default	"ATX0&B1&A0A"

5
SRM Console

5.1 Introduction

The SRM console is the command line interface that supports the DIGITAL UNIX and OpenVMS operating systems.

This chapter describes typical functions a user performs, along with descriptions of commands and environment variables. Sections in this chapter are:

- Switching from SRM to the AlphaBIOS Console
- Displaying the System Configuration
- Booting the Operating System
- Configuring the System
  - Configuring DSSI
  - Configuring a PCI NVRAM Module
  - Configuring EISA and RAID
- Testing the System
- Stopping and Starting CPUs
- Updating Firmware
- Forcing a System Crash Dump
- Using Environment Variables
- Depositing and Examining Data
- Reading a File
- Initializing the System
- Finding Help
- Command Summary
- Environment Variable Summary

5.2 Switching from SRM to the AlphaBIOS Console

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

Example 5-1 Switching to the AlphaBIOS Console

```
P00>>> alphabios
```

alphabios

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

alphabios

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

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

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

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

1. Set the SRM **os_type** environment variable to **nt**.

2. Set the SRM **console** environment variable to **graphics**.

3. Reset the system with the Reset button or by power cycling.

4. Run the EISA Configuration Utility, using the ECU program for Windows NT.

5.3 Displaying the System Configuration

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

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

show config

Example 5-2 Show Config Command

```
 P00>>> show config
                          Digital Equipment Corporation
                               AlphaServer 4X00
 Console V5.1-3   OpenVMS PALcode V1.19-14, DIGITAL UNIX PALcode V1.21-22
 Module                          Type     Rev    Name
  System Motherboard              0        0000   mthrbrd0
  Memory  1024 MB EDO             0        0000   mem0
  CPU (4MB Cache)                 3        0002   cpu0
  CPU (4MB Cache)                 3        0003   cpu1
  Bridge (IOD0/IOD1)              600      0032   iod0/iod1
  PCI Motherboard                 8        0001   saddle0
  CPU (4MB Cache)                 3        0001   cpu2
  CPU (4MB Cache)                 3        0003   cpu3


  Bus 0  iod0 (PCI0)
  Slot    Option Name             Type     Rev    Name
  1       PCEB                    4828086  0004   pceb0
  2       S3 Trio64/Trio32        88115333 0054   vga0
  4       QLogic ISP1020          10201077 0005   isp1
  5       PCI-PCI Bridge          261011   0001   pcb1


  Bus 1  pceb0 (EISA Bridge connected to iod0, slot 1)
  Slot    Option Name             Type     Rev    Name
  Bus 2  pcb1 (PCI-PCI Bridge connected to iod0, slot 5)
  Slot    Option Name             Type     Rev    Name


  Bus 0  iod1 (PCI1)
  Slot    Option Name             Type     Rev    Name
  1       NCR 53C810              11000    0002   ncr0
  3       QLogic ISP1020          10201077 0005   isp0
  5       PCI-PCI Bridge          261011   0001   pcb0


  Bus 2  pcb0 (PCI-PCI Bridge connected to iod1, slot 5)
  Slot    Option Name             Type     Rev    Name
  2       DECchip 21040-AA        21011    0024   tulip0
 P00>>>
```

The **show cpu** command displays the status of all CPUs in the system. The syntax is:

show cpu

Example 5-3 Show CPU Command

```
P00>>> show cpu

Primary CPU:      00
Active CPUs:      00    01
Configured CPUs:  00    01
SROM Revision:    V1.1  V1.1


P00>>>
```

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

show device [*controller_name*]

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

An example of a device name is **dka500.5.0.1.1**. Table 5-1 shows the interpretation of this device name.

Example 5-4 Show Device Command

```
P00>>> show device
polling ncr0 (NCR 53C810) slot 0, bus 0 PCI, hose 1   SCSI Bus ID 7
dka500.5.0.1.1     DKa500                      RRD45  1645
polling ncr1 (NCR 53C810) slot 1, bus 0 PCI, hose 1   SCSI Bus ID 7
dkb100.1.0.3.1     DKb100                      RZ29B  0007
dkb200.2.0.3.1     DKb200                      RZ29B  0007
dkb400.4.0.3.1     DKb400                      RZ29B  0007
polling floppy0 (FLOPPY) PCEB - XBUS hose 0
dva0.0.0.1000.0    DVA0                        RX23
polling tulip0 (DECchip 21040-AA) slot 2, bus 0 PCI, hose 1
ewa0.0.0.2.1: 08-00-2B-E5-B4-1A


P00>>>
```

Table 5-1 Device Naming Convention

	Category	Description
dk	Driver ID	Two-letter designator of port or class driver

dk	SCSI disk	fw	FDDI device
dr	RAID set device	mk	SCSI tape
du	DSSI disk	mu	DSSI tape
dv	Diskette drive	pk	SCSI port
ew	Ethernet port	pu	DSSI port

	Category	Description
a	Storage adapter ID	One-letter designator of storage adapter (a, b, c...).
500	Device unit number	Unique number (MSCP unit number). SCSI unit numbers are forced to 100 X node ID.
5	Bus node number	Bus node ID.
0	Channel number	Used for multi-channel devices.
1	Logical slot number	Corresponds to PCI slot number.

Slot	PCI 0	PCI 1
4	PCI device	PCI device
3	PCI device	PCI device
2	PCI or EISA device	PCI device

	Category	Description
1	Hose number	0 — PCI 0 1 — PCI 1

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

show fru

Example 5-5 Show FRU Command

```
P00>>> show fru
                    Digital Equipment Corporation
                         AlphaServer 4X00
Console V5.1-3 OpenVMS PALcode V1.19-14, DIGITAL UNIX PALcode V1.21-22
Module              Part #     Type    Rev    Name        Serial #
 System Motherboard  23803-03  0       0000   mthrbrd0    KA826BLE68
 Memory  1024 MB EDO  N/A       0       0000   mem0        N/A
 CPU (4MB Cache)      B3004-AA  3       0002   cpu0        KA636RZEWZ
 CPU (4MB Cache)      B3005-CA  3       0003   cpu1        KA813FY330
 Bridge (IOD0/IOD1)   B3040-AA  600     0032   iod0/iod1   KA801F2148
 PCI Motherboard      25565-01  8       0001   saddle0     KA01408896
 CPU (4MB Cache)      B3005-CA  3       0001   cpu2        KA74537346
 CPU (4MB Cache)      B3005-CA  3       0003   cpu3        KA820SA971


Bus 0   iod0 (PCI0)
 Slot    Option Name               Type      Rev     Name
 1       PCEB                      4828086   0004    pceb0
 2       S3 Trio64/Trio32          88115333  0054    vga0
 4       QLogic ISP1020            10201077  0005    isp1
 5       PCI-PCI Bridge            261011    0001    pcb1


 Bus 1   pceb0 (EISA Bridge connected to iod0, slot 1)
 Slot    Option Name               Type      Rev     Name
 Bus 2   pcb1 (PCI-PCI Bridge connected to iod0, slot 5)
 Slot    Option Name               Type      Rev     Name


 Bus 0   iod1 (PCI1)
 Slot    Option Name               Type      Rev     Name
 1       NCR 53C810                11000     0002    ncr0
 3       QLogic ISP1020            10201077  0005    isp0
 5       PCI-PCI Bridge            261011    0001    pcb0


 Bus 2   pcb0 (PCI-PCI Bridge connected to iod1, slot 5)
 Slot    Option Name               Type      Rev     Name
 2       DECchip 21040-AA          21011     0024    tulip0
P00>>>
```

The **show memory** command displays information about each memory pair: slot number (see Figure 2-18 for memory slots), type (synchronous or EDO), size of the memory pair in megabytes, and the starting address of the pair. The syntax is:

show memory

Example 5-6 Show Memory Command

```
P00>>> show memory

Slot    Type      MB     Base
----    ----      ----   --------
 0       EDO      1024   0
 1       EDO      1024   10000000

Total            2048
P00>>>
```

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

show network

Example 5-7 Show Network Command

```
P00>>> show network
polling tulip0 (DECchip 21040-AA) slot 2, bus 0 PCI, hose 1
ewa0.0.0.2.1: 08-00-2B-E5-B4-1A
P00>>>
```

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

show pal

Example 5-8 Show PAL Command

```
P00>>> show pal
pal  OpenVMS PALcode V1.19-14, DIGITAL UNIX PALcode V1.21-22
P00>>>
```

The **show power** command displays status information about the power supplies, system fans, CPU fans, and temperature. This command is useful for displaying the error state of a DIGITAL UNIX or OpenVMS system that shuts down because of a fan, temperature, or power supply failure. If the system can be restarted, use this command. (If it cannot be restarted, use the RCM **status** command; see Section 4.6.3.)

The syntax is:

show power

Example 5-9 Show Power Command

```
P00>>> show power


                    Status
Power Supply 0      good          # Represents the 1st power supply.

Power Supply 1      not present   # Represents the 2nd power supply.

Power Supply 2      good          # Always displays good even though
                                    a third power supply doesn't exist.

System Fans         good

CPU Fans            good

Temperature         good


Current ambient temperature is 25 degrees C

System shutdown temperature is set to 51 degrees C


The system was last reset via a power-on reset


0 Environmental events are logged in nvram
P00>>>
```

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

show version

Example 5-10 Show Version Command

```
P00>>> show version
version                 V5.1-3 4-FEB-1998 13:59:28
P00>>>
```

5.4 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. The syntax is:

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

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

Example 5-11 Boot Command

```
P00>>> boot dkb0
 SROM V1.1 on cpu0
 SROM V1.1 on cpu1
 SROM V1.1 on cpu2
 SROM V1.1 on cpu3
XSROM V2.0 on cpu2
XSROM V2.0 on cpu1
XSROM V2.0 on cpu0
XSROM V2.0 on cpu3
mem_pair0 - 1024 MB
20..20..20..21..21..21..20..21..23..24..24..24..24..
Memory testing complete on cpu0
Memory testing complete on cpu1
Memory testing complete on cpu3
Memory testing complete on cpu2
starting console on CPU 0
```

```
sizing memory
  0    1024 MB EDO
starting console on CPU 1
starting console on CPU 2
starting console on CPU 3
probing IOD1 hose 1
  bus 0 slot 1 - NCR 53C810
  bus 0 slot 2 - DEC KZPSA
  bus 0 slot 3 - NCR 53C810
probing IOD0 hose 0
  bus 0 slot 1 - PCEB
  bus 0 slot 2 - DEC PCI FDDI
  bus 0 slot 3 - PBXGA-AA

configuring I/O adapters...
  ncr0, hose 1, slot 1, bus 0
  kzpsa0, hose 1, slot 2, bus 0
  ncr1, hose 1, slot 3, bus 0
floppy0, hose 0, slot 0, bus 1
  pfi0, hose 0, slot 1, bus 0

System temperature is 24 degrees C
AlphaServer 4X00 Console V5.1-3, 24-JUL-1998 18:18:26

CPU 0 booting

(boot dkb0.0.0.2.1 -flags 0)
Building FRU table
.
.
.
setting affinity to the primary CPU
jumping to bootstrap code

    OpenVMS (TM) Alpha Operating System, Version 6.2-1H3
```

5.5 Configuring the System

The following sections describe the procedures used to configure the system when a DSSI device, a PCI NVRAM module, and EISA or RAID devices are in the system.

5.5.1 Configuring DSSI

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

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

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

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

Example 5-12 Set Host Command

```
P00>>> show device kfpsa0
   dud0.0.0.3.0                  R2YQYA$DIA0                  RF72
P00>>> set mode diag
P00>>> config kfpsa*
P00>>> set host -dup dud0
    starting DIRECT on pud0.0.0.3.0 (R2YQYA)


    Copyright (C) 1995  Digital Equipment Corporation
    PRFMON V1.0  D  2-NOV-1995 10:30:58
    DKCOPY V1.0  D  2-NOV-1995 10:30:58
    DRVEXR V2.0  D  2-NOV-1995 10:30:58
    DRVTST V2.0  D  2-NOV-1995 10:30:58
    HISTRY V1.0  D  2-NOV-1995 10:30:58
    DIRECT V1.0  D  2-NOV-1995 10:30:58
    ERASE  V2.0  D  2-NOV-1995 10:30:58
    VERIFY V1.0  D  2-NOV-1995 10:30:58
    DKUTIL V1.0  D  2-NOV-1995 10:30:58
    PARAMS V2.0  D  2-NOV-1995 10:30:58
    Total of 10 programs.
    Task?
P00>>> set host -dup -task params dud0
    starting PARAMS on pud0.0.0.3.0 (R2YQYA)
```

```
          Copyright (C) 1995  Digital Equipment Corporation


          PARAMS> show allclass


          Parameter   Current        Default      Type   Radix

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

          ALLCLASS              0            0    Byte    Dec  B


          PARAMS> exit
          Exiting...
     P00>>>
```

5.5.2 Configuring a PCI NVRAM Module

The **prcache** command is used for system configuration when a PCI NVRAM module is in the system.

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

prcache -{f,z,b}

-f   Checks configuration information and battery status.

-z   Clears valid data; writes zeros to memory.

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

Example 5-13 Prcache Command

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

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

5.5.3 Configuring EISA and RAID

Configure EISA and RAID devices from the AlphaBIOS console. Figure 5-1 shows the AlphaBIOS Setup screen, from which you run the configuration utilities.

Figure 5-1 Configuring EISA and RAID Devices

```
                          AlphaBIOS Setup

  Display System Configuration...
  Upgrade AlphaBIOS
  Hard D          Run Maintenance Program        F1=Help
  CMOS S
  Instal     Program Name:   swxcrmgr.exe
  Utilit
  About         Location:    A:                     ↓

                             A:
             ENTER=Execute   CD:
                             Disk 0, Partition 1
                             Disk 0, Partition 2
                             Disk 1, Partition 1
```
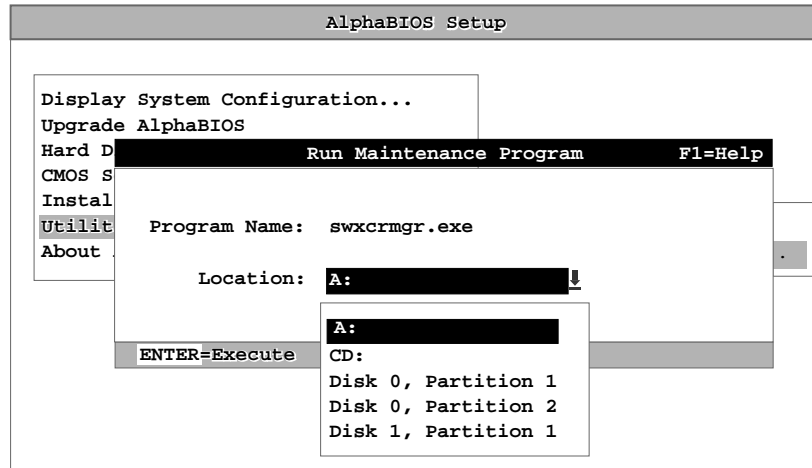
LJ-05709.AI4

5.6 Testing the System

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

Testing can be aborted by Ctrl/C.

_____ **Note** _____

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

_____

The syntax is:

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

-t *time*	Specifies the run time in seconds. The default for system test is 600 seconds (10 minutes).
-q	Disables the display of status messages as exerciser processes are started and stopped during testing. Sets the environment variable **d_verbose** to zero.
option	Either **cpu***n*, **mem***n*, or **pci***n*, where *n* is 0, 1, 2, 3, or *. If nothing is specified, the entire system is tested.

Example 5-14 Test Command

```
P00>>> test
Console is in diagnostic mode
System test, runtime 600 seconds


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


Configuring system..
polling ncr0 (NCR 53C810) slot 1, bus 0 PCI, hose 1   SCSI Bus ID 7
dka500.5.0.1.1     DKa500                   RRD45  1645
polling ncr1 (NCR 53C810) slot 3, bus 0 PCI, hose 1   SCSI Bus ID 7
dkb200.2.0.3.1     DKb200                   RZ29B  0007
dkb400.4.0.3.1     DKb400                   RZ29B  0007
polling floppy0 (FLOPPY) PCEB - XBUS hose 0
dva0.0.0.1000.0    DVA0                     RX23
polling tulip0 (DECchip 21040-AA) slot 2, bus 0 PCI, hose 1
ewa0.0.0.2.1: 08-00-2B-E5-B4-1A


Testing EWA0 network device


Testing VGA (alphanumeric mode only)


Starting background memory test, affinity to all CPUs..
Starting processor/cache thrasher on each CPU..
```

```
Starting processor/cache thrasher on each CPU..
Starting processor/cache thrasher on each CPU..
Starting processor/cache thrasher on each CPU..


Testing SCSI disks (read-only)
No CD/ROM present, skipping embedded SCSI test
Testing other SCSI devices (read-only)..


Testing floppy drive (dva0, read-only)
ID        Program   Device        Pass Hard/Soft Bytes Written  Bytes Read
-------   ---------  ------------- ---- --------- -------------- ----------
00003047 memtest    memory           1  0    0      134217728    134217728
00003050 memtest    memory         205  0    0      213883392    213883392
00003059 memtest    memory         192  0    0      200253568    200253568
00003062 memtest    memory         192  0    0      200253568    200253568
00003084 memtest    memory          80  0    0       82827392     82827392
000030d8 exer_kid   dkb200.2.0.3    26  0    0              0     13690880
000030d9 exer_kid   dkb400.4.0.3    26  0    0              0     13674496
0000310d exer_kid   dva0.0.0.100     0  0    0              0            0


ID        Program   Device        Pass Hard/Soft Bytes Written  Bytes Read
-------   ---------  ------------- ---- --------- -------------- ----------
00003047 memtest    memory           1  0    0      432013312    432013312
00003050 memtest    memory         635  0    0      664716032    664716032
00003059 memtest    memory         619  0    0      647940864    647940864
00003062 memtest    memory         620  0    0      648989312    648989312
00003084 memtest    memory         263  0    0      274693376    274693376
000030d8 exer_kid   dkb200.2.0.3    90  0    0              0     47572992
000030d9 exer_kid   dkb400.4.0.3    90  0    0              0     47523840
0000310d exer_kid   dva0.0.0.100     0  0    0              0       327680
 ID       Program   Device        Pass Hard/Soft Bytes Written  Bytes Read
-------   ---------  ------------- ---- --------- -------------- ----------
00003047 memtest    memory           1  0    0      727711744    727711744
00003050 memtest    memory        1054  0    0     1104015744   1104015744
00003059 memtest    memory        1039  0    0     1088289024   1088289024
00003062 memtest    memory        1041  0    0     1090385920   1090385920
00003084 memtest    memory         447  0    0      467607808    467607808
000030d8 exer_kid   dkb200.2.0.3   155  0    0              0     81488896
000030d9 exer_kid   dkb400.4.0.3   155  0    0              0     81472512
0000310d exer_kid   dva0.0.0.100     1  0    0              0       607232
^C
Testing aborted. Shutting down tests.
Please wait..


System test complete
P00>>>
```

5.7 Stopping and Starting CPUs

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

start

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

start [**&p***n*] [*address*]

&p*n*   Specifies the processor. *n* is 0, 1, 2, or 3.

address   The starting address of the program.

halt (or stop

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

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

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

continue

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

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

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

&p*n*   Specifies the processor. *n* is 0, 1, 2, or 3.

address   The starting address of the program.

_____ **Note** _____

Some console commands, for example, **boot**, can alter the machine state so that program mode cannot be successfully resumed (unless you include **-halt** in the **boot** command). If program mode cannot be resumed, reboot the operating system.
Other commands that alter machine state are **lfu**, **show device**, **show network**, **test**, and **start**.

_____

Example 5-15 Start, Halt, and Continue Commands

```
P00>>> start &p1


P00>>> halt 1


halted CPU 1
CPU 2 is not halted
CPU 3 is not halted

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


continuing CPU 1
```

5.8 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

_____ **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 Section 4.5 for more information about updating firmware.

Example 5-16 LFU Command

```
P00>>> lfu


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


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


Please enter the name of the options firmware files list, or
Press <return> to use the default filename [AS4X00FW]: AS4X00FW


Copying AS4X00CP from DKA500.5.0.1.1 .
Copying [as4x00]RHREADME from DKA500.5.0.1.1 .
Copying [as4x00]RHSRMROM from DKA500.5.0.1.1 .......................
Copying [as4x00]RHARCROM from DKA500.5.0.1.1 .............


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

```
UPD> list


Device          Current Revision    Filename          Update Revision
AlphaBIOS       V5.12-2             arcrom            V6.40-1
srmflash        V1.0-9             srmrom            V2.0-3


UPD> update *


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


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


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


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


                     DO NOT ABORT!
srmflash       Updating to V2.0-3...  Verifying V2.0-3...  PASSED.


UPD> exit
```

5.9 Forcing a System Crash Dump

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

crash *[device]*

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

Example 5-17 Crash Command

```
P00>>> crash

CPU 0 restarting

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

halted CPU 0

halt code = 5
HALT instruction executed
PC = fffffc00004e2d64
P00>>>
```

5.10 Using Environment Variables

The set *envar* and show *envar* commands are used to set and view environment variables. The edit command can be used to create a user-defined nonvolatile environment variable. Environment variables pass configuration information between the console and the operating system. Their settings determine how the system powers up, boots the operating system, and operates. Environment variables are set or changed with the **set *envar*** command and set to default values with the **set -default *envar*** command. Their values are viewed with the **show *envar*** command. User-defined nonvolatile environment variables are created with the **edit** command.

set *envar*

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

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

-default   Restores an environment variable to its default setting.

envar   The name of the environment variable to be modified.

value   The new value of the environment variable.

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

> **console**
> **kbd_hardware_type**
> **language**
> **ocp_text**
> **os_type**

show *envar*

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

show *envar*

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

Example 5-18 Set *envar* and Show *envar* Commands

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

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

In Example 5-19 the nvram script is edited so that an environment variable called "mop3_boot" is created and set to 1 on each power-up. By default, MOP boots send four MOP V4 requests before defaulting to MOP V3. This user-created environment variable forces the SRM console to bypass MOP V4 requests. This speeds up MOP booting on networks with MOP V3 software.

The syntax is:

edit *file*

file is the name of the file to be edited.

The editing commands are:

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

_____ **Note** _____

It is possible to disable the system by editing the nvram script. For example, including the command **initialize** in the script will put the system into an endless loop.

_____

Example 5-19 Edit Command

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


P00>>>
```

5.11 Depositing and Examining Data

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

deposit

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

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

examine

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

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

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

The syntax for both commands is:

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

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

-b	Defines data size as byte.
-w	Defines data size as word.
-l (default)	Defines data size as longword.
-q	Defines data size as quadword.
-o	Defines data size as octaword.
-h	Defines data size as hexword.
-d	Instruction decode (**examine** command only)
-n *value*	The number of consecutive locations to modify.
-s *value*	The address increment size. The default is the data size.
*space***:**	Device name (or address space) of the device to access.
address	Offset within a device to which data is deposited. Can be:

	dev_name	A device name.
	fpr- *name*	The floating-point register set; *name* is F0 to F31.
	gpr- *name*	The general register set; *name* is R0 to R31.
	ipr- *name*	The internal processor registers.
	pt- *name*	The PALtemp register set; *name* is PT0 to PT23.
	pmem	Physical memory (default).
	vmem	Virtual memory.

data	Data to be deposited.

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

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

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

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

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

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

Example 5-20 Deposit Command

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


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


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


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

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


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


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


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

Example 5-21 Examine Command

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


P00>>> examine sp              # Examine the stack pointer.
gpr:   F0 (   R30)  0000000000072A60


P00>>> e -n 6 r4               # Examine register R4 and
                               # the next six registers.
grp: 20 (     R4) 0000000000005000
grp: 28 (     R5) 000000000FFFE000
grp: 30 (     R6) 00000003F8000C00
grp: 38 (     R7) 0000000053F761AE
grp: 40 (     R8) 0000010000000000
grp: 48 (     R9) 00000003F7800100
grp: 50 (    R10) 00000000000C7FFC


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

5.12 Reading a File

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

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

more [*file*...]

file is the name of the file to be displayed.

Example 5-22 More Command

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


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

5.13 Initializing the System

The **initialize** command resets the system and executes the power-up tests. Issuing this command is equivalent to pressing the Reset button. The syntax is:

initialize

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

The Halt button on the control panel is pushed in.

The **auto_action** environment variable is set to **halt**.

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

Example 5-23 Initialize Command

```
P00>>> initialize
Initializing…


SROM V1.1 on cpu0
SROM V3.0 on cpu1
SROM V3.0 on cpu2
SROM V3.0 on cpu3
XSROM V5.1 on cpu1
XSROM V5.1 on cpu3
XSROM V5.1 on cpu2
XSROM V5.1 on cpu0
BCache testing complete on cpu1
BCache testing complete on cpu3
BCache testing complete on cpu0
BCache testing complete on cpu2
mem_pair0 - 1024 MB
20..20..20..20..21..21..21..21..23..
please wait 20 seconds for T24 to complete
24..24..24..24..
Memory testing complete on cpu0
Memory testing complete on cpu3
Memory testing complete on cpu2
Memory testing complete on cpu1
starting console on CPU 0
sizing memory
  0    1024 MB EDO
starting console on CPU 1
starting console on CPU 2
```

```
starting console on CPU 3
probing IOD1 hose 1
  bus 0 slot 1 - NCR 53C810
  bus 0 slot 3 - QLogic ISP1020
  bus 0 slot 5 - PCI-PCI Bridge
    probing PCI-PCI Bridge, bus 2
      bus 2 slot 2 - DECchip 21040-AA
probing IOD0 hose 0
  bus 0 slot 1 - PCEB
    probing EISA Bridge, bus 1
  bus 0 slot 2 - S3 Trio64/Trio32
  bus 0 slot 4 - QLogic ISP1020
  bus 0 slot 5 - PCI-PCI Bridge
    probing PCI-PCI Bridge, bus 2
Configuring I/O adapters...
  ncr0, hose 1, bus 0, slot 1
  isp0, hose 1, bus 0, slot 3
  tulip0, hose 1, bus 2, slot 2
  floppy0, hose 0, bus 1, slot 0
  isp1, hose 0, bus 0, slot 4

System temperature is 25 degrees C
AlphaServer 4X00 Console V5.1-3, 4-FEB-1998 18:18:26
P00>>>arc
loading AlphaBIOS firmware
Building FRU table
Starting AlphaBIOS
```

5.14 Finding Help

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

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

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 5-24 Help (or Man) Command

```
P00>>> help set           # or man set
NAME

      set

FUNCTION

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

SYNOPSIS

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

            where

            <option>={host,mode}

            where

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

            [-default]
```

5.15 Command Summary

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

The commands listed in Table 5-2 are described in the previous sections. Table 5-3 lists command syntax, and Table 5-4 shows special characters.

Table 5-2 Summary of SRM Console Commands

Command	Function
alphabios	Loads and starts the AlphaBIOS console.
boot	Loads and starts the operating system.
clear *envar*	Resets an environment variable to its default value.
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.
lfu	Runs the Loadable Firmware Update Utility.
man	Displays information about the specified console command.
more	Displays a file one screen at a time.
prcache	Utility that initializes and displays status of the PCI NVRAM.
set *envar*	Sets or modifies the value of an environment variable.
set host	Connects to a MSCP DUP server on a DSSI device.
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 fru	Displays the serial number and revision level of system bus options.
show memory	Displays memory module information.
show network	Displays the state of network devices in the system.
show pal	Displays the version of the privileged architecture library code (PALcode).
show power	Displays information about the power supplies, system fans, CPU fans, and temperature.
show version	Displays the version of the console program.
start	Starts a program that was previously loaded on the processor specified
stop	Halts the specified processor. (Same as **halt**.)
test	Runs firmware diagnostics for the system.

Table 5-3 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 5-4) causes display of an error message.
Case	Upper- or lowercase characters can be used for input. Characters are displayed in the case in which they are entered.
Abbreviation	Only by dropping characters from the end of words. You must enter the minimum number of characters to identify the keyword unambiguously. Abbreviation of environment variables is allowed with the **show** command.
Options	You can use command options, to modify the environment, after the command keyword or after any symbol or number in the command. See individual command descriptions for examples.
Numbers	Most numbers in console commands are in decimal notation. Two exceptions, both of which use hexadecimal notation, are addresses and numbers used in the **deposit** command. The default radix can be overridden by inserting %d before numbers you want to express in decimal, %b before binary, %o before octal, or %x before hexadecimal. Register names (for example, R0) are not considered numbers and use decimal notation.
No characters	A command line with no characters is a null command. The console program takes no action and does not issue an error message; it returns the console prompt. The console supports command line recall and editing.
Spaces or tabs	Multiple adjacent spaces and tabs are compressed and treated as a single space. The console program ignores leading and trailing spaces.

Table 5-4 Special Characters for SRM Console

Character	Function
Return or Enter	Terminates a command line. No action is taken on a command until it is terminated. If no characters are entered and this key is pressed, the console just redisplays the prompt.
Backslash (\)	Continues a command on the next line. Must be the last character on the line to be continued.
Delete	Deletes the previous character.
Help	By itself, displays first-level help. When pressed after part of a command, displays options available.
Ctrl/A or F14	Toggles between insert and overstrike modes. The default is overstrike.
Ctrl/B or up-arrow	Recalls previous command or commands. The last 16 commands are stored in the recall buffer.
Ctrl/C or Ctrl/P	Terminates the process that is running. Clears Ctrl/S; resumes output suspended by Ctrl/O. When entered as part of a command line, deletes the current line. Ctrl/C has no effect as part of a binary data stream.
Ctrl/D or left-arrow	Moves the cursor left one position.
Ctrl/E	Moves the cursor to the end of the line.
Ctrl/F or right-arrow	Moves the cursor right one position.
Ctrl/H or Backspace or F12	Moves the cursor to the beginning of the line.
Ctrl/J	Deletes the previous word.
Ctrl/O	Stops output to the console terminal for the current command. Toggles between enable and disable. The output can be reenabled by other means as well: when the console prompts for a command, issues an error message, or enters program mode, or when Ctrl/P is entered.
Ctrl/Q	Resumes output to the console terminal that was suspended by Ctrl/S.
Ctrl/R	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.

5.16 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 5-5 Environment Variables Summary

Environment Variable	Function
auto_action	Specifies the console's action at power-up, a failure, or a reset.
boot_osflags	Specifies the default operating system boot flags.
bootdef_dev	Specifies the default boot device string.
com*_baud	Changes the default baud rate of the COM 1 or the COM2 serial port.
console	Specifies the device on which power-up output is displayed (serial terminal or graphics monitor).
cpu_enabled	Enables or disables a specific secondary CPU.
ew*0_mode	Specifies the connection type of the default Ethernet controller.
ew*0_protocols	Specifies network protocols for booting over the Ethernet controller.
Kbd_hardware_type	Specifies the default console keyboard type.
kzpsa*_host_id	Specifies the default value for the KZPSA host SCSI bus node ID.
language	Specifies the console keyboard layout.
memory_test	Specifies the extent to which memory will be tested.
ocp_text	Overrides the default OCP display text with specified text.
os_type	Specifies the operating system and sets the appropriate console interface.
pci_parity	Disables or enables parity checking on the PCI bus.
pk*0_fast	Enables fast SCSI mode.
pk*0_host_id	Specifies the default value for a controller host bus node ID.
pk*0_soft_term	Enables or disables SCSI terminators on systems that use the QLogic ISP1020 SCSI controller.
tga_sync_green	Specifies the location of the SYNC signal generated by the DIGITAL ZLXp-E PCI graphics accelerator option.
tt_allow_login	Enables or disables login to the SRM console firmware on other console ports.

These environment variables are described in the following pages.

_____ **Note**_____

These environment variables are specific to the SRM console.

_____

auto_action

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

set auto_action *value*

The options for *value* are:

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

bootdef_dev

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

set bootdef_dev *boot_device*

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

boot_osflags

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

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

set boot_osflags *flags_value*

The options for *flags_value* are:

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

When the operating system is OpenVMS, the syntax is:

set boot_osflags *root_number,boot_flags*

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

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

boot_flags   The hexadecimal value of the bit number or numbers set. To specify multiple
                  boot flags, add the flag values (logical OR). See Table 5-6.

Table 5-6 Settings for boot_osflags Bootflags (OpenVMS)

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

com*_baud

The default baud rate for the custom AlphaServer 4100 system is 9600. With the **com*_baud**
environment variable, you can set the baud rate to match that of the device connected to the
port. Resetting the baud rate of the COM1 port bypasses the RCM (see Section 4.6). You will
be asked to confirm the change, as shown here:

```
P00>>> set com1_baud 19200

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

bad value - com1_baud not modified

P00>>>
```

The syntax is:

set com*_baud *baud_value*

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

console

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

set console *output_device*

The options for *output_device* are:

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

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

cpu_enabled

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

_____ **Note** _____

The primary CPU cannot be disabled.

_____

The syntax is:

set cpu_enabled *hex_digit*

The options for *hex_digit* are 0 – F (hexadecimal).

ew*0_mode

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

The syntax is:

set ew*0_mode *value*

The options for *value* are:

aui	Device type is AUI.
auto-sense	Device type is sensed by the console.
bnc	Device type is ThinWire.
fast	Device type is fast 100BaseT.
fastfd	Device type is fast full duplex 100BaseT.
full	Device type is full duplex twisted pair.
twisted-pair	Device type is 10BaseT (twisted pair).

ew*0_protocols

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

set ew*0_protocols *protocol_value*

The options for *protocol_value* are:

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

kbd_hardware_type

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

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

The syntax is:

set kbd_hardware_type *keyboard_type*

The options for *keyboard_type* are:

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

kzpsa*_host_id

See **pk*0_host_id.**

language

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

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

The syntax is:

set language *language_code*

The options for *language_code* are:

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

memory_test

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

set memory_test *value*

The options for *value* are:

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

ocp_text

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

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

The syntax is:

set ocp_text *message*

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

os_type

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

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

The syntax is:

set os_type *os_type*

The options for *os_type* are:

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

pci_parity

Disables or enables parity checking on the PCI bus.

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

The syntax is:

set pci_parity *value*

The options for *value* are:

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

pk*0_fast

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

The syntax is:

set pk*0_fast *scsi_speed*

The options for *scsi_speed* are:

0   The controller is in standard SCSI mode.

1 (default)   The controller is in Fast SCSI mode.

pk*0_host_id

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

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

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

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

The syntax is:

set pk*_host_id *scsi_node_id*

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

pk*0_soft_term

Enables or disables SCSI terminators. This command applies to systems that use the QLogic ISP1020 SCSI controller.

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

The syntax is:

set pk*0_soft_term *value*

The options for *value* are:

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

tga_sync_green

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

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

The syntax is:

set tga_sync_green *value*

The options for *value* are:

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

tt_allow_login

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

The syntax is:

set tt_allow_login *value*

The options for *value* are:

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

6
AlphaBIOS Console

6.1 Introduction

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

Sections in this chapter are:

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

_____ **Note** _____

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

_____

6.2 Switching from AlphaBIOS to the SRM Console

It is necessary to switch to the SRM console to boot DIGITAL UNIX or OpenVMS or to run firmware-based diagnostics. To switch from AlphaBIOS to the SRM console, press the Halt button on the control panel (the LED lights) and reset the system, or select DIGITAL UNIX (SRM) or OpenVMS (SRM) from the Advanced CMOS Setup screen (see Figure 6-1) and reset the system.

Figure 6-1 Switching to the SRM Console

```
                    Advanced CMOS Setup              F1=Help


   PCI Parity Checking:  Disabled

   Power-up Memory Test:  Enabled

   AlphaBIOS Password Option:  Disabled

   Console Selection:   Digital UNIX Console (SRM)

   Power-up Memory Test Windows NT Console (AlphaBIOS)
                        OpenVMS Console (SRM)
                        Digital UNIX Console (SRM)




   Press ↑ or ↓ to select the firmware console that will be presented
   the next time the system is power-cycled.



 ESC=Discard Changes  F10=Save Changes
```

LJ-05730.AI4

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

1. Select **CMOS Setup** and press Enter.

2. In the **CMOS Setup** screen press F6. The **Advanced CMOS Setup** screen displays.

3. Select **DIGITAL UNIX (SRM)** or **OpenVMS (SRM)** and press F10.

4. The **CMOS Setup** screen displays. Press F10 to save the change.

5. Run the EISA Configuration Utility, using the ECU diskette for DIGITAL UNIX and OpenVMS.

_____ **Note** _____

ECU must be run before booting DIGITAL UNIX or OpenVMS.

_____

6. Reset the system.

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

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

- If you make the selection in the **Advanced CMOS Setup** screen, the system will continue to stop in the SRM console whenever it is powered-up, reset, or initialized until the Windows NT operating system is again specified.

- If you press the Halt button and reset, no system setup information is changed, and AlphaBIOS will start the next time the system is powered-up, reset, or initialized with the Halt button out (the LED is off).

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

6.3 Starting AlphaBIOS

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

Figure 6-2 Boot Screen

```
AlphaBIOS Version 5.12

Please select the operating system to start:

   Windows NT Server 3.51


Use ↓ and ↑ to move the highlight to your choice.
Press Enter to choose.




digital Alpha
                              Press <F2> to enter SETUP
```

LJ-05708.AI4
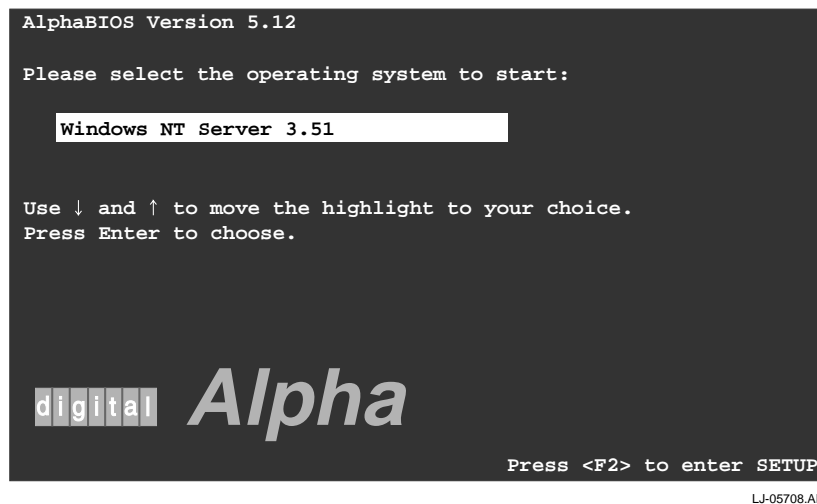
The **Boot** screen shown in Figure 6-2 displays at power-up and reset. Press F2 at this screen to enter the setup program.

The **AlphaBIOS Setup** screen shown in Figure 6-3 displays. From this screen you can select the tasks to perform. Use the arrow keys to select the menu item you want and press Enter. (Refer to Section 6.4 for information on navigating through the AlphaBIOS screens.)

Figure 6-3 AlphaBIOS Setup Screen

```
                                    AlphaBIOS Setup


      Display System Configuration...
      Upgrade AlphaBIOS
      Hard Disk Setup...
      CMOS Setup...
      Install Windows NT
      Utilities                          ►
      About AlphaBIOS...



    Press ENTER to partition or format hard disks.



  ESC=Exit
```

LJ-05705.AI4
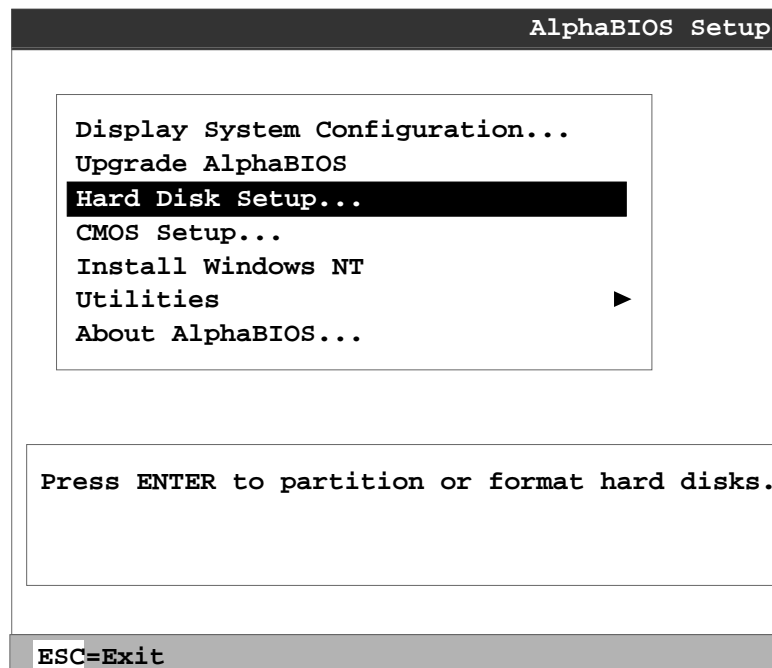
6.4 Keyboard Conventions and Help

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

Two levels of keyboard help are available. The first level, reached by pressing F1 once, shows explanations of the keystrokes available for the specific part of AlphaBIOS currently displayed. An example of the help displayed by pressing F1 once, in this case from the **CMOS Setup** screen, is shown in Figure 6-4.

Figure 6-4 First Level Help Screen

```
            Help: CMOS Setup              F1=Key Help

F3            Change color scheme.


F6            Enter Advanced CMOS Setup.


F7            Set factory default CMOS settings.


ESC           Exit CMOS Setup and discard any changes.


F10           Exit CMOS Setup and save changes,
              including changes from Advanced CMOS Setup.


  ENTER=Continue
```

LJ-05703.AI4

The second level of keyboard help, reached by pressing F1 from the first help screen, shows explanations of the keystrokes available for navigating the interface throughout AlphaBIOS (see Figure 6-5).

Figure 6-5 Second Level Help Screen

```
                    AlphaBIOS Setup                F1=Help

                    Help: Action Keys

  TAB       Move highlight forward between fields of a dialog.

  SHIFT+TAB Move highlight backward between fields of a dialog.

  ↑ ↓       Move highlight within a menu, or cycle through available field
            values in a dialog window.

  ALT+↓     Drop down a menu of choices from a drop-down listbox.  A
            drop-down listbox can be recognized by the ⬇ symbol.

  HOME      Move to the beginning of a text entry field.

  END       Move to the end of a test entry field.

  ← →       Move to the left or right in a text entry field.

  ESC       Discard changes and/or backup to previous screen.



    ENTER=Continue
```

LJ-05704.AI4

6.5 Displaying the System Configuration

The **Display System Configuration** screen, shown in Figure 6-6, provides information about the system's installed processor, memory, attached devices, and option boards. From the **AlphaBIOS Setup** screen select **Display System Configuration**, then the category for the desired information.

Figure 6-6 Display System Configuration Screen

```
                    Display System Configuration


    ┌─────────────────────────────────┐
    │ Systemboard Configuration       │
    │ Hard Disk Configuration         │
    │ PCI Configuration               │
    │ Eisa Configuration              │
    │ SCSI Configuration              │
    │ MC Bus Configuration            │
    │ Memory Configuration            │
    │ Integrated Peripherals          │
    └─────────────────────────────────┘

   ┌─────────────────────────────────────────────────────────┐
   │      System Type:  AlphaServer 4100                      │
   │                                                          │
   │   Processor:  Digital Alpha 21164A, Revision 4.0 (4 Processors)
   │       Speed:   466 MHz                                   │
   │      Memory:   1024 MB                                   │
   │                                                          │
   │   Floppy Drive A:  3.5" 1.44 MB                          │
   │   Floppy Drive B:  None                                  │
   │         Keyboard:  U.S. 101-key keyboard                 │
   │                                                          │
   │   AlphaBIOS Version:  5.12                               │
   │                                                          │
   └─────────────────────────────────────────────────────────┘

 ESC=Exit
```

LJ-05710.AI4

Use the following procedure to display the system configuration.

1. Start AlphaBIOS, select **Display System Configuration**, and press Enter.

2. In the **Display System Configuration** screen, use the arrow keys to select the configuration category you want to see.

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

- System motherboard

- Hard disk

- PCI bus

- EISA bus

- SCSI devices

- System bus

- Memory

- Integrated peripherals

The sections that follow explain the display for each component.

6.5.1 System Board Configuration

The **System Board Configuration** screen is shown in Figure 6-7.

Figure 6-7 System Board Configuration
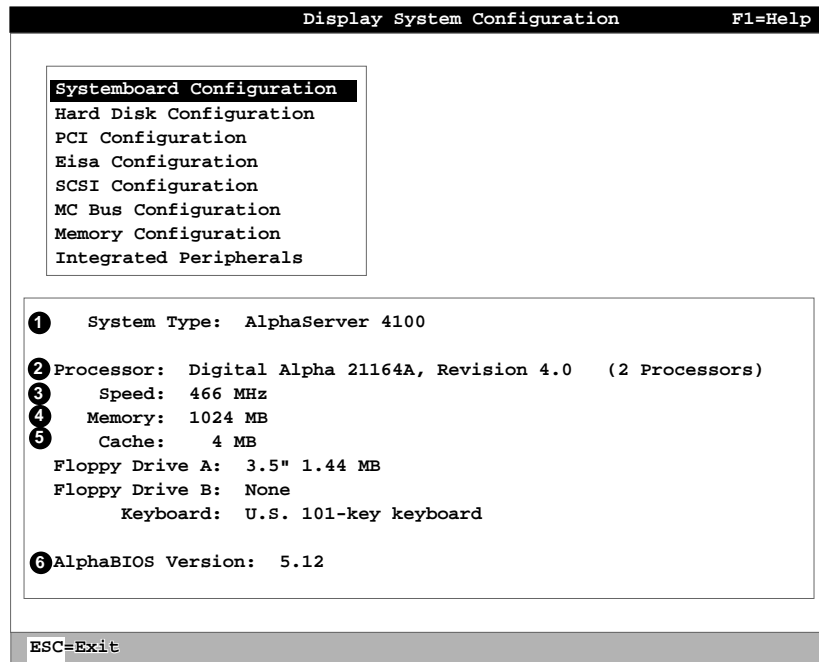
LJ-05717.AI4

❶ System type — The model number of the system.

❷ Processor — The model and revision of the processor chip. Revision level information can be useful in troubleshooting problems with technical support personnel.

❸ Speed — The speed at which the processor runs.

❹ Memory — The amount, in megabytes, of main memory in the system.

❺ Cache — The amount, in megabytes, of static RAM cache memory installed.

❻ AlphaBIOS version — The version of AlphaBIOS currently running on the system. This field has three parts: major version number is the major revision of the BIOS; minor version number signifies enhancements that have been made since the last major revision; build date shows when the BIOS was compiled.

6.5.2 Hard Disk Configuration

The **Hard Disk Configuration** screen is shown in Figure 6-8.

_____ **Note** _____

This screen is for information only, it cannot be edited. To make changes to the
hard disk setup, use the Hard Disk Setup screen (see Section 6.7).

_____

Figure 6-8 Hard Disk Configuration


```
                            Display System Configuration

      Systemboard Configuration
      Hard Disk Configuration
      PCI Configuration
      Eisa Configuration
      SCSI Configuration
      NC Bus Configuration
      Memory Configuration
      Integrated Peripherals


     ❶        ❷     ❸      ❹                    ❺
   Disk  0   NCRC810 #0, SCSI ID 3            510 MB
             DEC     RZ25L   (C) DEC0007
             Partition 1                     200 MB        ❽ NRFS
             Partition 2  ❻            ❼     200 MB          FAT
             Unused                          110 MB

   Disk  1   NCRC810 #0, SCSI ID 5          1001 MB
             DEC     RZ26    (C) DECT386
             Partition 1                     995 MB          NTFS
             Partition 2                       6 MB          FAT
```
LJ-05718.AI4

❶ Physical disk ID — Based on the SCSI ID. The disk with the lowest SCSI ID is disk 0, the
disk with the next lowest SCSI ID is disk 1, and so on.

❷ Controller — The brand and model of SCSI chip used on the SCSI controller.

❸ Controller number — Based on how many SCSI controllers of a particular type are installed
in the system. The first controller of a type is always numbered 0.

❹ SCSI ID number — A unique number you assign to each SCSI device installed in the system.
This is usually done with jumpers or a thumb wheel attached to the drive housing.

❺ Size — The raw capacity of the drive. Formatting the drive with different file systems (for
example, FAT and NTFS) may result in different usable sizes because of the differences in
how storage is managed under those file systems.

❻ Partition number — Within a single drive, partition numbers are assigned in sequential order:
1, 2, 3, and so on. The partitions populate the drive from the innermost cylinders to the
outermost cylinders. If you have a large hard disk (over 800 MB) and plan to use the FAT file
system, it is a good idea to break the disk into several smaller partitions because the FAT file
system uses disk space more efficiently at smaller partition sizes. This is not a concern for
the NTFS file system, however, as it uses disk space very efficiently at all partition sizes.

❼ Partition size — The raw (unformatted) storage capacity of the partition. Actual storage space
will differ based on the file system with which the partition is formatted.

❽ Partition format — The file system (if any) used on a partition. This field displays FAT,
NTFS, or unknown (if the partition is unformatted).

6.5.3 PCI Configuration

The **PCI Configuration** screen is shown in Figure 6-9.

Figure 6-9 PCI Configuration

LJ-05719.AI4

❶   Device name — The name and model of the device as recorded in the device's firmware.

❷   Device type — Lists the function of the device in the system.

❸   Physical slot — Lists the actual PCI slot number to which the device is attached. Refer to your system manual for information on the physical location of PCI slot locations on your particular system board.

❹   Revision — The revision level of the device signifies the number of times it has been updated by the manufacturer.

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

1.   Press Enter to enable selection in the device list.

2.   Use the arrow keys to select the device for which you want additional detail.

3.   Press Enter, and the detail is displayed.

4.   Press Escape to return to the table of PCI devices.

The **Advanced PCI Information** screen is shown in Figure 6-10.

Figure 6-10 Advanced PCI Information Screen

```
                    Advanced PCI Information
❶                    ❷                    ❸
Bus Number=0, Device Number=7, Function Number=0
❹
Configuration Space:

    Register Name          Hex Offset    Hex    Value

    Vendor ID                  00             8086
    Device ID                  02             0482
    Command                    04             0047
    Status                     06             0200
    Revision ID                08               05
    Prog. I/F                  09               00
    Sub Class Code             0A               00
    Class Code                 0B               00
    Cache Line Size            0C               00
    Latency Timer              0D               20
    Header Type                0E               00
    BIST                       0F               00
    Base Address 0             10         00000000   ▽

ENTER=Continue
```
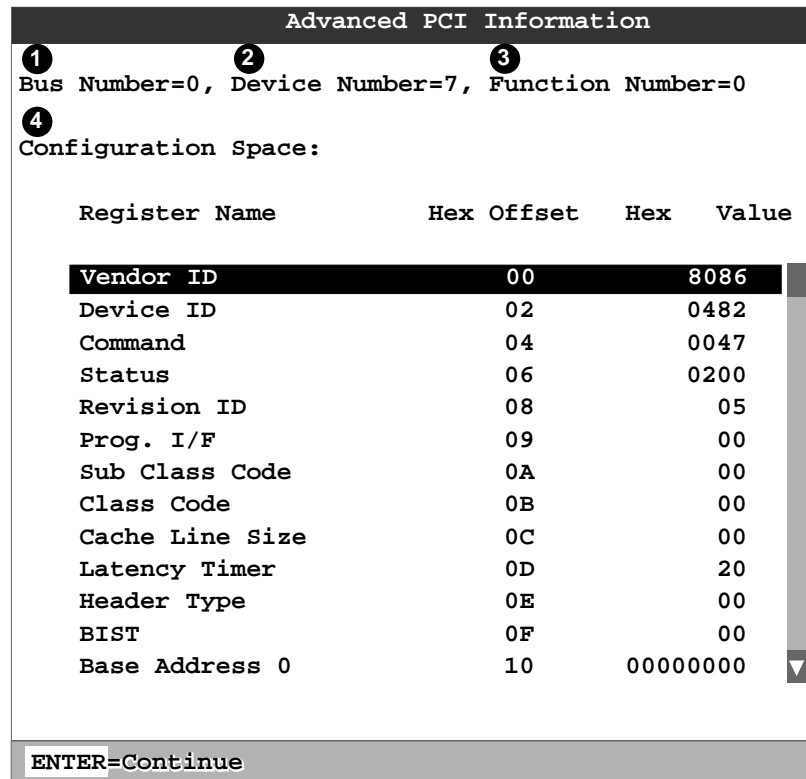
LJ-05720.AI4

❶ Bus number — The virtual PCI bus number.

❷ Device number — The PCI bus device number.

❸ Function number — Represents the number assigned to a particular function on a
multifunction device. For example, a combination Ethernet/SCSI controller would be
listed twice, with the first function listed as 0 and the other as 1.

❹ Configuration header space— Displays the information in the selected device's PCI
configuration space.

6.5.4 EISA Configuration

The **EISA Configuration** screen is shown in Figure 6-11.

Figure 6-11 EISA Configuration

```
                        Display System configuration
  ┌──────────────────────────────────┐
  │ Systemboard Configuration        │
  │ Hard Disk Configuration          │
  │ PCI Configuration                │
  │ Eisa Configuration               │
  │ SCSI Configuration               │
  │ MC Bus Configuration             │
  │ Memory Configuration             │
  │ Integrated Peripherals           │
  └──────────────────────────────────┘
    ❶                  ❷                  ❸
  Device Name        Device Type        Physical Slot
  ─────────────      ───────────        ─────────────
  DEC 5301           Other              Embedded
  FLOPPY             DISK               Embedded

  ENTER=Select   ESC=Exit
```

LJ-05721.AI4
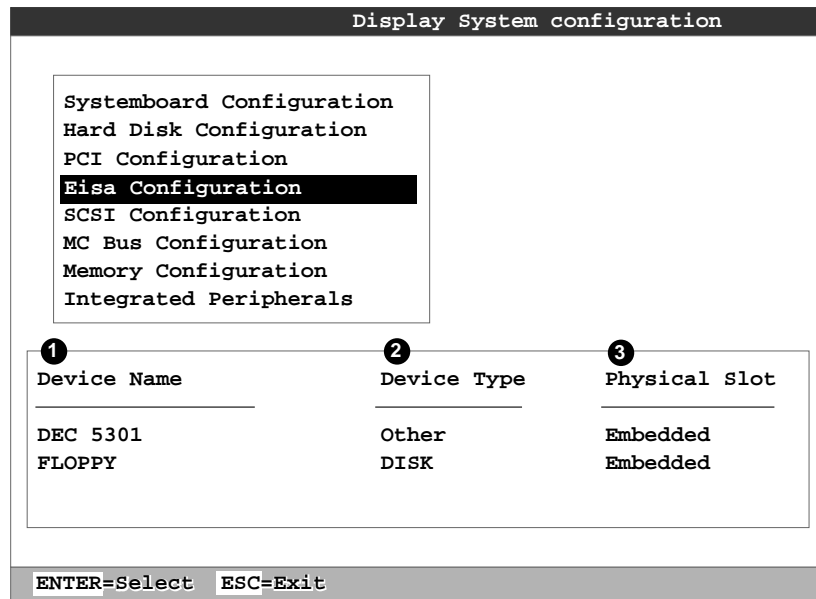
❶ Device name — Includes a three-character manufacturer code, followed by a three-digit board type, followed by a one-digit revision number.

❷ Device type — Identifies the board type (for example, network).

❸ Physical slot — Lists the actual EISA slot number to which the device is attached. The embedded EISA system controller is always first on this list.

6.5.5 SCSI Configuration

The **SCSI Configuration** screen is shown in Figure 6-12.

Figure 6-12 SCSI Configuration

```
                    Display System Configuration

    ┌──────────────────────────────┐
    │ Systemboard Configuration    │
    │ Hard Disk Configuration      │
    │ PCI Configuration            │
    │ Eisa Configuration           │
    │ SCSI Configuration        ►  │ ┌──────────────┐
    │ MC Bus Configuration         │ │ QLISP1020 #0 │
    │ Memory Configuration         │ │ KZPSX #0     │
    │ Integrated Peripherals       │ └──────────────┘
    └──────────────────────────────┘


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

      ❷          ❸                ❹          ❺
      SCSI ID    Device           Size       Description

         0       Disk 0           2047 MB    SEAGATE    ST32550W    0021
         1       Disk 1           2049 MB    SEAGATE    ST32551W    0526
         5       CD-ROM                      DEC        RRD45  (C) DEC1645
```

LJ-05722.AI4

❶ SCSI controller information — Describes the physical characteristics of the selected SCSI controller. This line includes:

Controller — Brand and model of SCSI chip used on the SCSI controller.

Controller number — Based on the number of SCSI controllers of a particular type in the system. The first controller of a type is always numbered 0.

SCSI ID number — A unique number assigned to the SCSI controller. The standard controller numbering scheme is for controllers to be SCSI ID 7.

SCSI bus number — Indicates if the controller is first or second in the system. The first controller is tied to SCSI bus 0, and the second to SCSI bus 1.

❷ SCSI ID — A unique number you assign to each SCSI device in the system. This is usually done with jumpers or a thumb wheel attached to the drive housing.

❸ Device type — Displays whether the device is a hard disk, CD-ROM, scanner, or other type of device.

❹ Size — The raw capacity of the drive. Formatting the drive with different file systems (for example, FAT and NTFS) may result in different usable sizes because of differences in the way those file systems manage storage. This is left blank if it is not applicable to a device (for example, a scanner).

❺ Description — The name and model of the device as recorded in the device's firmware.

6.5.6 System Bus Configuration

The **System Bus Configuration** screen is shown in Figure 6-13.

Figure 6-13 System Bus Configuration

```
                      Display System Configuration        F1=Help

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

 ❶    ❷              ❸              ❹          ❺
 McBus Module Name        Module Type    Revision    Physical Slot

 1     Memory             0              0000        MEM
 2     CPU (Cached)       1              0000        CPU0
 3     CPU (Cached)       1              0000        CPU1
 4     MCBus-PCI Bridge   6008           0021        IOD0/1
 5     MCBus-PCI Bridge   6007           0021        IOD0/1
 6     CPU (Cached)       1              0000        CPU2
 7     CPU (Cached)       1              0000        CPU3


 ESC=Exit
```

LJ-05723.AI4

❶ MC bus number — Identifies the location of a component on the system bus.

❷ Module name — The DIGITAL internal identifier for a system component.

❸ Module type — Identifies the function of the system component.

❹ Revision — A DIGITAL internal number representing the manufacturing revision level of the system component.

❺ Physical slot — Represents the actual location of the system component on the bus. Refer to Figure 2-16 and Figure 2-18 for the module placement on the system motherboard.

6.5.7 Memory Configuration

The **Memory Configuration** screen is shown in Figure 6-14.

Figure 6-14 Memory Configuration

```
┌─────────────────────────────────────────────────────────────────────┐
│        Display System Configuration                    F1=Help        │
│                                                                       │
│   ┌─────────────────────────────┐                                    │
│   │ Systemboard Configuration   │                                    │
│   │ Hard Disk Configuration     │                                    │
│   │ PCI Configuration           │                                    │
│   │ Eisa Configuration          │                                    │
│   │ SCSI Configuration          │                                    │
│   │ MC Bus Configuration        │                                    │
│   │ Memory Configuration        │                                    │
│   │ Integrated Peripherals      │                                    │
│   └─────────────────────────────┘                                    │
│                                                                       │
│   ┌─────────────────────────────────────────────────────────────┐   │
│   │                                                               │   │
│   │              System Memory Configuration                      │   │
│   │              ─────────────────────────                        │   │
│   │                                                               │   │
│   │                                                               │   │
│   │              Memory :   256 MB                                │   │
│   │                                                               │   │
│   │                                                               │   │
│   └─────────────────────────────────────────────────────────────┘   │
│                                                                       │
│   ESC=Exit                                                            │
└─────────────────────────────────────────────────────────────────────┘
```
LJ-05724.EPS
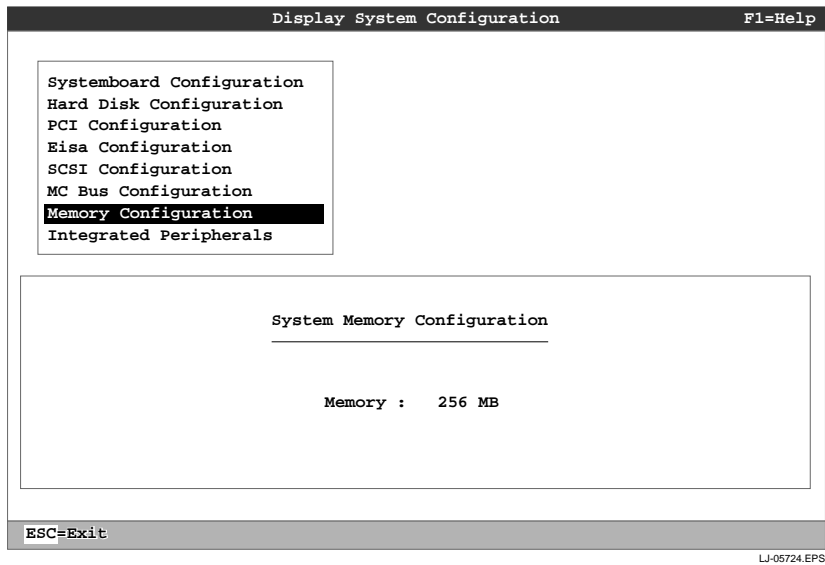
6.5.8 Integrated Peripherals

The **Integrated Peripherals Configuration** screen is shown in Figure 6-15.

Figure 6-15 Integrated Peripherals

LJ-05725.AI4
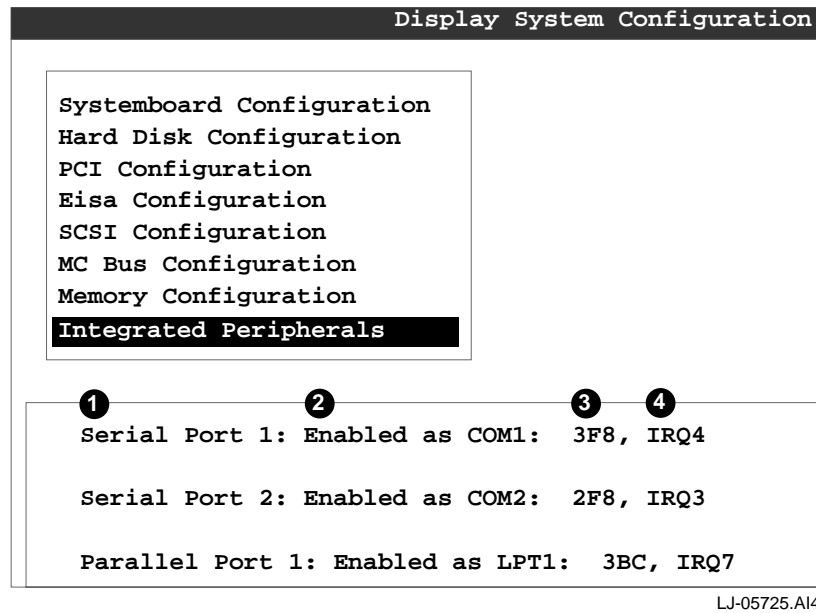
❶ Device type — The physical device as it exists on the system board

❷ MS DOS name — Shows if the device is enabled, and if it is enabled, the addressable MS-DOS name for the device.

❸ Port address — The physical memory location from and to which data travels as it is received into the device, and sent from the device, respectively.

❹ Interrupt — The interrupt request line (IRQ) used by the device to get the CPU's attention.

6.6 Updating Firmware

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

Use the following procedure to upgrade from an earlier version of AlphaBIOS:

1. Insert the diskette or CD-ROM containing the AlphaBIOS upgrade.

2. If you are not already running **AlphaBIOS Setup**, start it by restarting your system and pressing F2 when the **Boot** screen is displayed.

3. In the main **AlphaBIOS Setup** screen, select **Upgrade AlphaBIOS** (see Figure 6-16) and press Enter.

    The system is reset and the Loadable Firmware Update (LFU) utility is started. See Section 4.5.5 for LFU commands.

4. When the upgrade is complete, issue the LFU **exit** command. The system is reset and you are returned to AlphaBIOS.

    If you press the Reset button instead of issuing the LFU **exit** command, the system is reset and you are returned to LFU.

Figure 6-16 Updating Firmware

```
                          AlphaBIOS Setup

     ┌────────────────────────────────────────────┐
     │  Display System Configuration...            │
     │  Upgrade AlphaBIOS                           │
     │  Hard Disk Setup                             │
     │  CMOS Setup...                               │
     │  Install Windows NT                          │
     │  Utilities                          ►        │
     │  About AlphaBIOS...                          │
     └────────────────────────────────────────────┘


     ┌────────────────────────────────────────────┐
     │  Press ENTER to upgrade your AlphaBIOS from floppy or CD-ROM.  │
     │                                              │
     │                                              │
     └────────────────────────────────────────────┘

     ESC=Exit
```
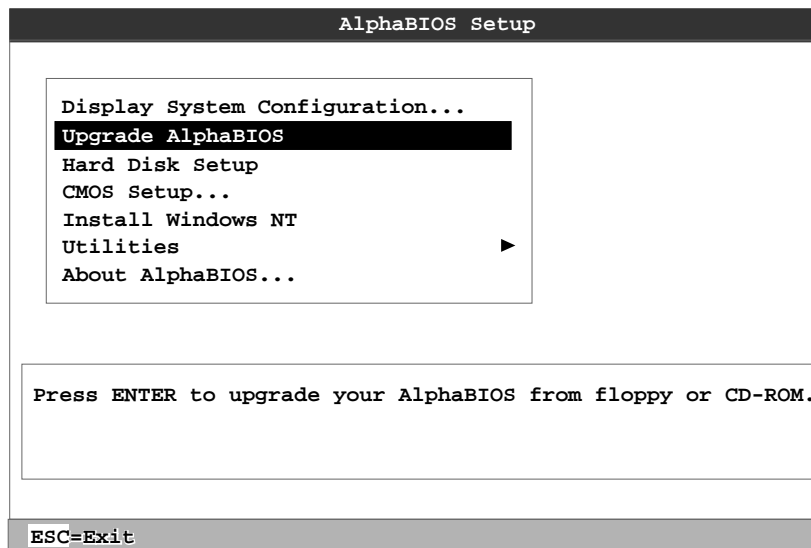
LJ-05706.AI4

6.7 Setting up the Hard Disk

You can perform either an express or a custom hard disk setup. An express setup, described in this section, creates the recommended partition arrangement on the first hard disk, but it does not map bad sectors. Custom hard disk setup is described in Section 6.7.1 and Section 6.7.2.

_____ **Caution** _____

Hard disk changes are immediate; the changes are made as soon as they are entered. Unintended data loss could occur, so it is important to use care when changing your hard disk arrangement.

_____

The **Hard Disk Setup** screen is shown in Figure 6-17.

Figure 6-17 Hard Disk Setup Screen

LJ-05711.AI4

❶ Physical disk ID — Based on the SCSI ID. The disk with the lowest SCSI ID is disk 0, the disk with the next lowest SCSI ID is disk 1, and so on.

❷ Controller — Brand and model of SCSI chip used on the SCSI controller.

❸ Controller number — Based on how many SCSI controllers of a particular type are installed in the system. The first controller of a type is always numbered 0.

❹ SCSI ID number — A unique number you assign to each SCSI device in the system. This is usually done with jumpers or a thumb wheel attached to the drive housing.

❺ Size — The raw capacity of the drive. Formatting the drive with different file systems (for example, FAT and NTFS) may result in different usable sizes because of the differences in how storage is managed under those file systems.

❻ Partition number — Within a single drive, partition numbers are assigned in sequential order: 1, 2, 3, and so on. The partitions populate the drive from the innermost cylinders to the outermost. If you have a large hard disk (over 800 MB) and plan to use the FAT file system, it is a good idea to break the disk into several smaller partitions because the FAT file system uses disk space more efficiently at smaller partition sizes. This is not a concern for the NTFS file system, since it uses disk space very efficiently at all partition sizes.

❼ Partition size — The raw (unformatted) storage capacity of the partition. Actual storage space will differ based on the file system with which the partition is formatted.

❽ Partition format — The file system (if any) used on a partition. This field displays FAT, NTFS, or unknown (if the partition is unformatted).

❾ Disk setup options

Insert partition (Insert key) — Use this option to create new partitions. Before creating a new partition, be sure to select an unpartitioned space. Pressing the Insert key while an already partitioned space is selected causes an informational error to be displayed.

Delete partition (Delete key) — Use this option to delete existing partitions. Before deleting a

partition, be sure any data you want to save on the partition has been backed up. Deleting a partition deletes all data on that partition but leaves the rest of the disk unaffected. Pressing the Delete key while an unpartitioned space is selected displays an informational error.

Format partition (F6 key) — Format a partitioned space with the FAT file system.

Express setup (F7 key) — Create the default recommended partition arrangement for Windows NT.

Exit (Escape key) — Return to the **AlphaBIOS Setup** screen.

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

To perform an express hard disk setup

1. If you have any needed information on your disk, back it up before proceeding.

2. Start **AlphaBIOS Setup**, select **Hard Disk Setup**, and press Enter.

3. Press F7 to enter **Express Setup**.

4. Press F10 to continue with the setup.

6.7.1 Manually Creating and Deleting Partitions

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

To create a partition

1. Start AlphaBIOS and select **Hard Disk Setup**. Press Enter.

2. Select the disk on which to create the partition.

3. If one or more partitions already exist on the disk, select the unpartitioned space.

4. Press Insert. A dialog box displays, similar to Figure 6-18.

5. Type the size of the partition to create and press Enter.

Figure 6-18 Create New Partition Dialog Box

```
                      Hard Disk Setup

 Disk  0   NCRC810 #0, SCSI ID 3                  510 MB
           Partition 1                            200 MB        NTFS
           Unused                                 310 MB
          ┌─── Create new partition, Disk 0 Partition 2 ───┐
 Disk  1  │                                                │
          │                                                │   NTFS
          │                                                │   FAT
          │                                                │
          │        Available space:  310   MB              │
          │                                                │
          │        New Partition Size: 200   MB            │
          │                                                │
          │                                                │
          │                                                │
          │ ENTER=Continue   ESC=Cancel                    │
          └────────────────────────────────────────────────┘
```

LJ-05712.AI4

To delete a partition

1. Start AlphaBIOS and select **Hard Disk Setup**. Press Enter.

2. Select the partition to be deleted (see ❶ in Figure 6-19).

3. Press Delete. A dialog box displays (see ❷ in Figure 6-19).

4. Press F10 to confirm the deletion.

Figure 6-19 Delete Partition Dialog Box

```
                        Hard Disk Setup

  Disk  0   NCRC810 #0, SCSI ID 3                510 MB
            Partition 1                          200 MB              NTFS
        ❶  Partition 2                          200 MB              FAT
            Unused                               110 MB

  Disk  1   NCRC810 #0, SCSI ID 5               1001 MB
            Partition 1                          995 MB              NTFS
            Partitio       Delete Disk 0, Partition 2               FAT

           ❷  The delete operation will destroy all
              data on partition 2 of disk 0.

              Press F10 to continue.  Press ESC to
              cancel.

               F10=Continue   ESC=Cancel
```
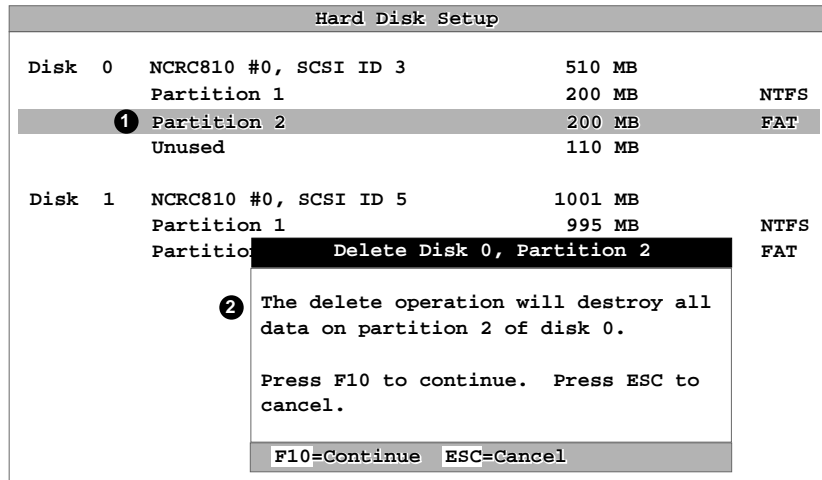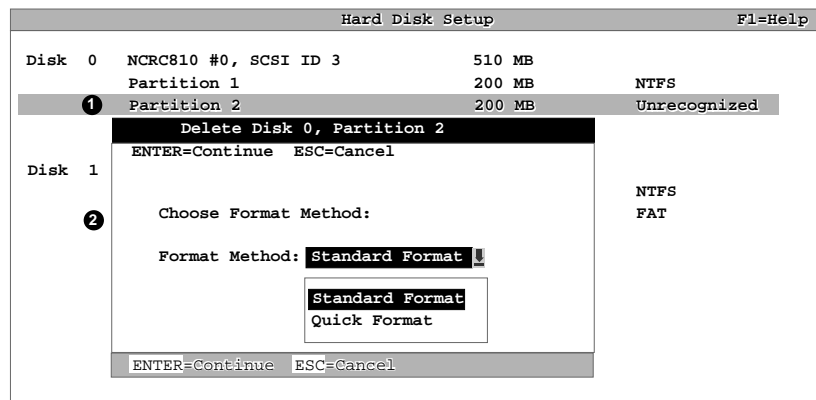
LJ-05713.AI4

6.7.2 Formatting a FAT Partition

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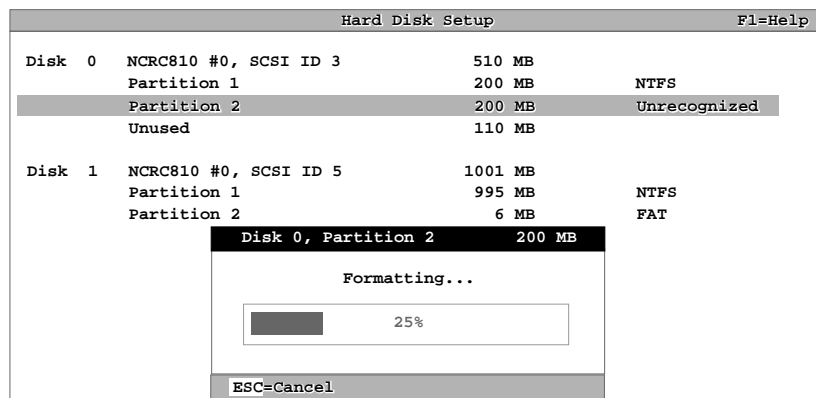
To format a FAT partition

1. Start AlphaBIOS and select **Hard Disk Setup**. Press Enter.

2. Select the partition to be formatted (see ❶ in Figure 6-20).

3. Press F6. A dialog box displays, asking whether to perform a quick or standard format (see ❷ in Figure 6-20). If you select **Quick Format**, the formatting is completed immediately, but no bad sectors are mapped. If you select **Standard Format**, a dialog box similar to that in Figure 6-21 displays while the drive is formatted, showing the progress of the formatting. Standard formatting maps bad sectors.

4. Select a format method, and press Enter.

Figure 6-20 Formatting a FAT Partition

```
                          Hard Disk Setup                        F1=Help

Disk  0   NCRC810 #0, SCSI ID 3              510 MB
          Partition 1                        200 MB        NTFS
     ❶   Partition 2                        200 MB        Unrecognized
             Delete Disk 0, Partition 2
          ENTER=Continue   ESC=Cancel
Disk  1
                                                          NTFS
     ❷      Choose Format Method:                         FAT

             Format Method: Standard Format

                           Standard Format
                           Quick Format


          ENTER=Continue   ESC=Cancel
```

LJ-05714.AI4

Figure 6-21 Standard Formatting

```
                          Hard Disk Setup                        F1=Help

Disk  0   NCRC810 #0, SCSI ID 3              510 MB
          Partition 1                        200 MB        NTFS
          Partition 2                        200 MB        Unrecognized
          Unused                             110 MB

Disk  1   NCRC810 #0, SCSI ID 5             1001 MB
          Partition 1                        995 MB        NTFS
          Partition 2                          6 MB        FAT
               Disk 0, Partition 2          200 MB

                          Formatting...

                 [    ]        25%


          ESC=Cancel
```
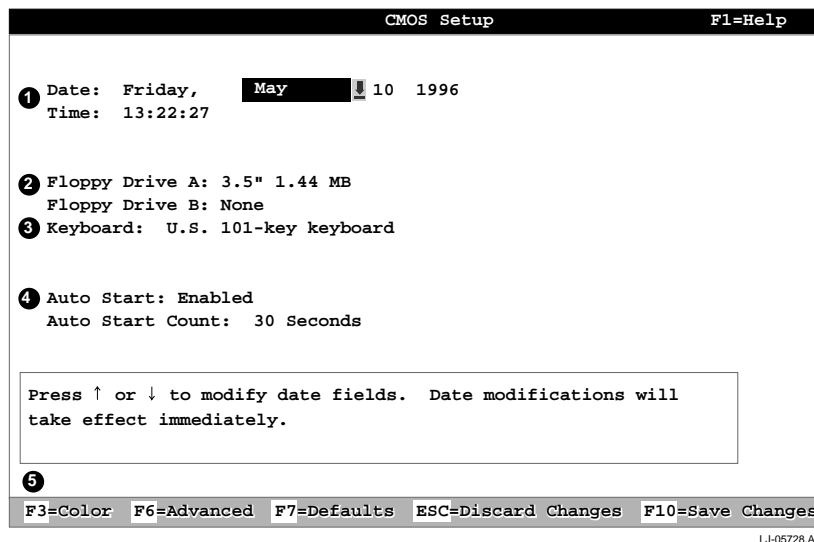
LJ-05715.AI4

6.8 Performing Setup Tasks

CMOS Setup is used to configure several system parameters. CMOS Setup has two modes: Standard CMOS Setup (see Figure 6-22) is used to configure basic system parameters; Advanced CMOS Setup (see Figure 6-23) is used for system-specific parameters and password protection.

To enter Standard CMOS Setup

1. Start AlphaBIOS.

2. Select **CMOS Setup**, and press Enter.

Figure 6-22 Standard CMOS Setup Screen

```
                              CMOS Setup                    F1=Help


❶ Date:  Friday,    ▐ May    ▐↓ 10   1996
   Time:  13:22:27


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


❹ Auto Start: Enabled
   Auto Start Count:  30 Seconds

 ┌─────────────────────────────────────────────────────────┐
 │ Press ↑ or ↓ to modify date fields.  Date modifications will │
 │ take effect immediately.                                  │
 └─────────────────────────────────────────────────────────┘

❺
 F3=Color  F6=Advanced  F7=Defaults  ESC=Discard Changes  F10=Save Changes
```
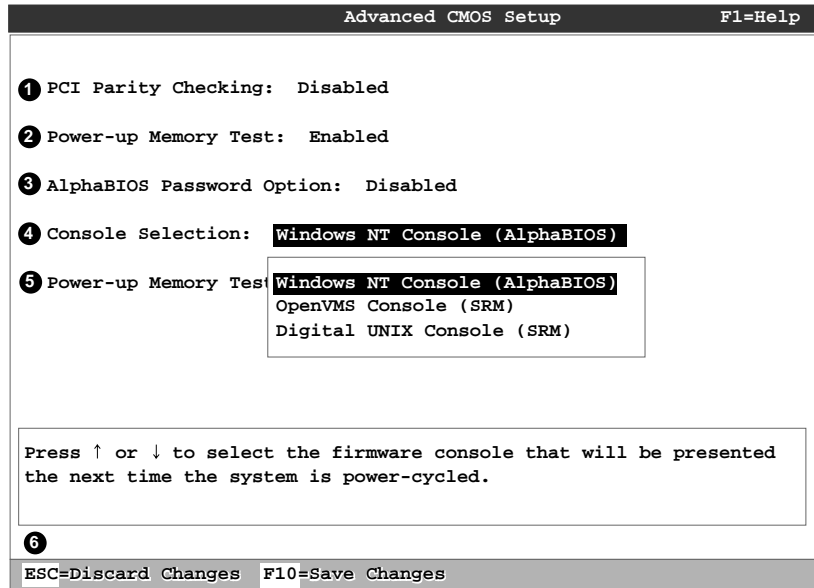
LJ-05728.AI4

❶ Date and time — When setting the time, use the 24-hour format. (For example, 10:00 p.m. is 22:00:00.)

❷ Floppy drive — The only drive type supported is 3.5 inch, 1.44 MB.

❸ Keyboard — The keyboard setting makes it possible to use most language keyboards. To ensure correct character mappings, the language of your keyboard, Windows NT, and the keyboard language selection in **CMOS Setup** should all match.

❹ Auto start and auto start count — The **Auto Start** setting determines whether the primary operating system is automatically started after the system is reset or power-cycled. The Auto Start Count setting is the amount of time the **Boot** screen is displayed before the default system is automatically started. This delay gives you the opportunity, after resetting or power-cycling the system, to select another version of Windows NT to start or to enter **AlphaBIOS Setup.**

❺ **Standard CMOS Setup** options

Color (F3 key) — Repeatedly cycles through the available AlphaBIOS color schemes.

Advanced (F6 key) — Displays the **Advanced CMOS Setup** screen.

Defaults (F7 key) — Restores the default **Standard CMOS Setup** values without affecting the **Advanced CMOS Setup** values.

Discard changes (Escape key) — Restores the settings in effect when you started **CMOS Setup**. This option also discards changes made in **Advanced CMOS Setup**.

Save changes (F10) — Saves changes made in both the standard and advanced modes of **CMOS Setup**.

To enter Advanced CMOS Setup

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

2. In the **Standard CMOS Setup** screen, press F6.

Figure 6-23 Advanced CMOS Setup Screen

```
                        Advanced CMOS Setup              F1=Help

  ❶ PCI Parity Checking:  Disabled

  ❷ Power-up Memory Test:  Enabled

  ❸ AlphaBIOS Password Option:  Disabled

  ❹ Console Selection:   Windows NT Console (AlphaBIOS)

  ❺ Power-up Memory Test Windows NT Console (AlphaBIOS)
                         OpenVMS Console (SRM)
                         Digital UNIX Console (SRM)




    Press ↑ or ↓ to select the firmware console that will be presented
    the next time the system is power-cycled.


  ❻
  ESC=Discard Changes  F10=Save Changes
```

LJ-05729.AI4

❶ PCI parity checking — Enables and disables settings for PCI parity checking, which ensures data integrity across the PCI bus. Because some third-party PCI options do not correctly implement PCI parity generation, the default is Disabled.

❷ Power-up memory test — Enables and disables settings for the power-up memory test.

❸ Password setup — Enables and disables settings for password setup.

Password protection provides two levels of security for your system: setup, which requires a password to start **AlphaBIOS Setup**, and startup, which requires a password before the system initializes. Startup protection provides more comprehensive protection than setup protection because the system cannot be used at all until the correct password is entered.

❹ Console selection — Switches from AlphaBIOS to SRM firmware. If you select OpenVMS (SRM) or DIGITAL UNIX (SRM), the next time you reset your system, the SRM firmware will be loaded instead of AlphaBIOS. This menu selection changes the setting of the **os_type** environment variable in the SRM console.

❺ Memory test length — Selects the length of memory testing that will be done the next time the system is power-cycled.

❻ **Advanced CMOS Setup** options

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

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

6.9 Installing Windows NT

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

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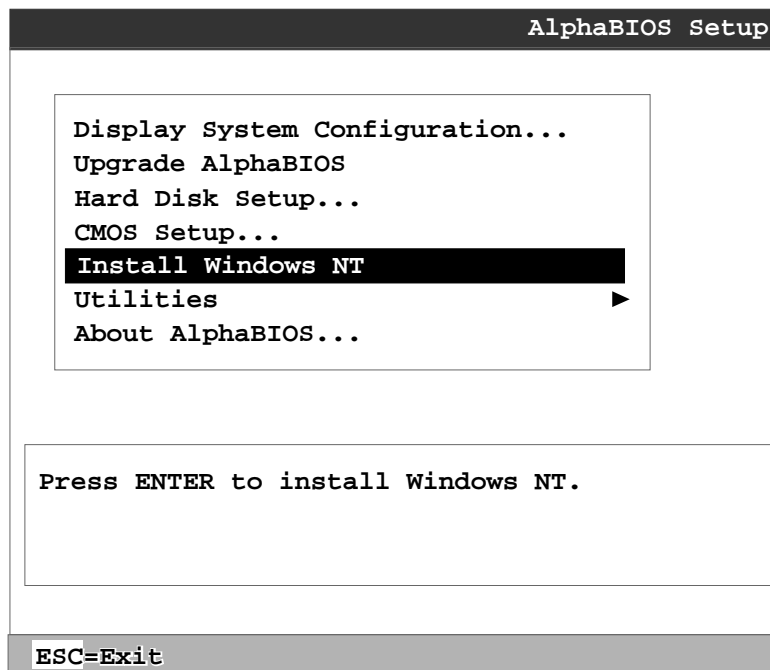
_____ **Note** _____

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

1. Use **CMOS Setup** to set the system date and time: start **AlphaBIOS Setup**, select **CMOS Setup**, and press Enter.

2. Perform an express hard disk setup: return to the main **AlphaBIOS Setup** screen, select **Hard Disk Setup**, and press Enter.

3. Put the Windows NT CD into the CD-ROM drive.

4. Start **AlphaBIOS Setup**, select **Install Windows NT** (see Figure 6-24), and press Enter.

5. Follow the prompts to complete the installation. For more information on installing Windows NT, refer to the *Installation Guide* in your Windows NT software package.

Figure 6-24 Installing Windows NT

```
                                              AlphaBIOS Setup
  ┌─────────────────────────────────────────────────┐
  │                                                  │
  │   Display System Configuration...                │
  │   Upgrade AlphaBIOS                              │
  │   Hard Disk Setup...                            │
  │   CMOS Setup...                                 │
  │   Install Windows NT                            │
  │   Utilities                            ►        │
  │   About AlphaBIOS...                            │
  │                                                  │
  └─────────────────────────────────────────────────┘

  ┌──────────────────────────────────────────────────┐
  │ Press ENTER to install Windows NT.               │
  │                                                  │
  │                                                  │
  └──────────────────────────────────────────────────┘

   ESC=Exit
```

LJ-05707.AI4

6.10 Running Utility Programs

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

Figure 6-25 Run Maintenance Program Dialog Box
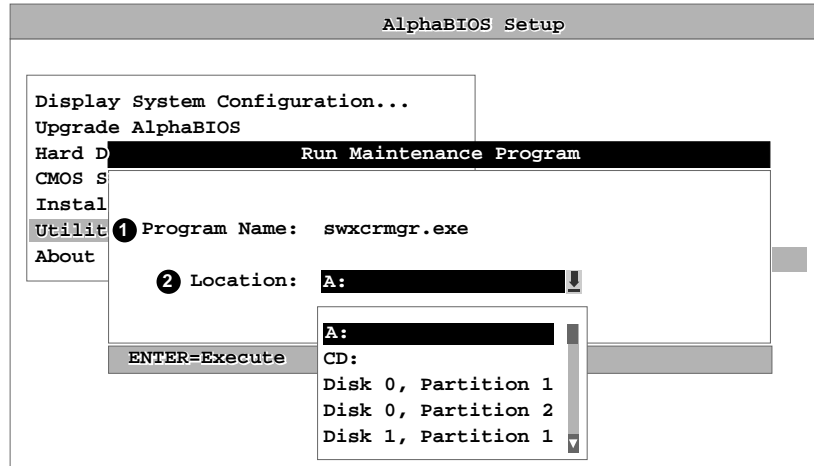
LJ-05727.AI4

❶ Program name — The program to be run. It must be an executable program with an .EXE filename extension. However, when entering the program name, it is not necessary to type the extension.

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

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

6.11 Selecting the Version of Windows NT

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

_____ **Note** _____

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

_____

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

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

Figure 6-26 shows how operating system selections appear in AlphaBIOS.

Figure 6-26 Operating System Selections

```
              Operating System Selection Setup


  Windows NT Server 3.51                    Primary Operating System
  Windows NT Server 3.50


    Boot Name:  Windows NT Server 3.51
    Boot File:  Disk 0, Partition 2    \os\winnt351\osloader.exe
    OS Path:    Disk 0, Partition 1    \WINNT351
    OS Options:


  INSERT=New    F6=Edit     F8=Primary    ESC=Discard Changes
  DEL=Delete    F7=Copy     F9=Validate   F10=Save Changes
```

```
              Operating System Selection Setup


  Windows NT Server 3.50                    Primary Operating System
  Windows NT Server 3.51


    Boot Name:  Windows NT Server 3.50
    Boot File:  Disk 0, Partition 2    \os\winnt350\osloader.exe
    OS Path:    Disk 0, Partition 1    \WINNT350
    OS Options:


  INSERT=New    F6=Edit     F8=Primary    ESC=Discard Changes
  DEL=Delete    F7=Copy     F9=Validate   F10=Save Changes
```

LJ-05702.AI4

6.11.1 Designating a Primary Operating System

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

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

Figure 6-27 illustrates the relationship between multiple-operating-system installations, **Auto Start**, and the primary operating system.

Figure 6-27 Primary Operating System

LJ-05700.AI4
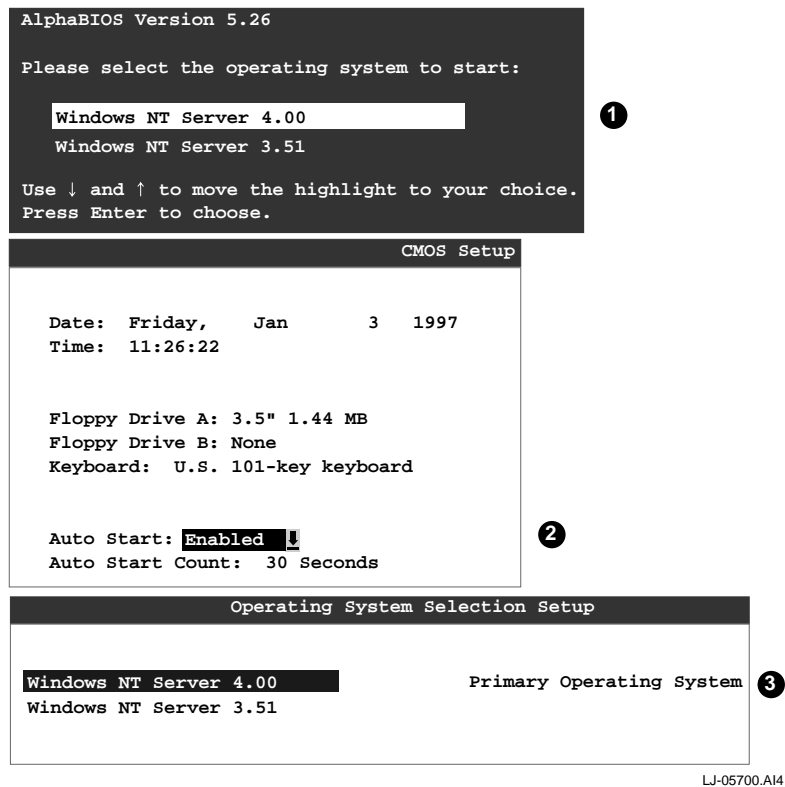
❶ The primary operating system is listed first on the **Boot** screen.

❷ The primary operating system starts automatically if the **Auto Start** option is enabled in **CMOS Setup**.

❸ The primary operating system can be selected in the **Operating System Selection Setup** screen.

Use the following procedure to designate a new primary operating system:

1. From the **AlphaBIOS Setup** screen select **Utilities**. In the selection box that displays, choose **OS Selection Setup**.

2. The **Operating System Selections Setup** screen displays. Select the primary operating system from the list displayed.

6.11.2 Primary Operating System and the Auto Start Option

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

AlphaBIOS boots Windows NT in two stages. The first stage involves reading an OS Loader program from a disk. As of Windows NT version 3.51, the name of the OS Loader program is OSLOADER.EXE. The selection for the operating system must describe the path where AlphaBIOS will find the OS Loader program. Note that the OS Loader program *must* be located on a partition formatted with the FAT file system.

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

Figure 6-28 shows the **Operating System Selection Setup** screen.

Figure 6-28 Operating System Selection Setup
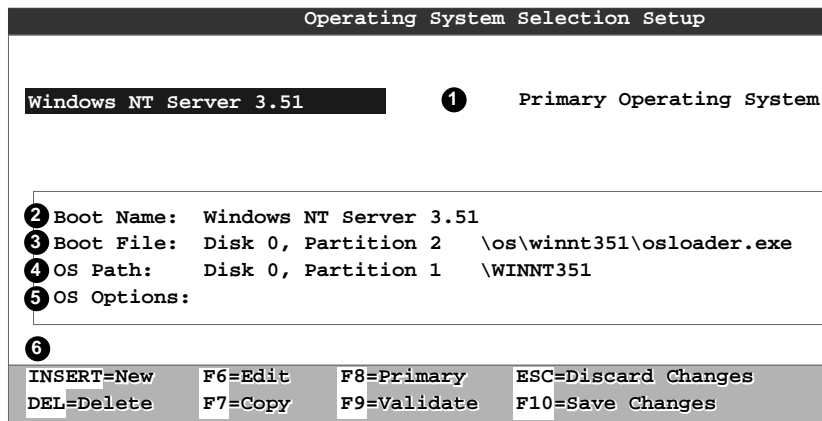

```
                    Operating System Selection Setup


  Windows NT Server 3.51            ❶      Primary Operating System



 ❷Boot Name:   Windows NT Server 3.51
 ❸Boot File:   Disk 0, Partition 2    \os\winnt351\osloader.exe
 ❹OS Path:     Disk 0, Partition 1    \WINNT351
 ❺OS Options:


 ❻
  INSERT=New     F6=Edit     F8=Primary     ESC=Discard Changes
  DEL=Delete     F7=Copy     F9=Validate    F10=Save Changes
```
LJ-05716.AI4

❶ Primary operating system — The OS that appears first on the **AlphaBIOS Boot** screen. It is also the version of the OS that automatically starts if **Auto Start** is selected. Any of the operating system selections can be the primary operating system.

❷ Boot name — Each boot name is associated with an operating system selection. Windows NT setup automatically creates a boot name each time you install the operating system. Because the boot name is only a name, you can modify it at any time without affecting the rest of the operating system selection. Note that the boot name must have at least one character.

❸ Boot file — Describes the disk, partition, path, and name of the file that AlphaBIOS passes control to during the process of starting the operating system. This setting is created along with the operating system selection during Windows NT setup, and it is usually not modified by the user. However, this setting can be modified if necessary. For example, a developer testing different versions of OSLOADER.EXE can store the different versions in different locations and modify this line to start the operating system with the different versions as needed.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

7
Troubleshooting

7.1 Introduction

This chapter contains basic troubleshooting information that uses the LEDs on the CPU modules, power control module, and the system bus to PCI bus module, along with the operator control panel display messages to diagnose system problems.

Sections in this chapter are:

- System does not Power Up

- Operator Control Panel Display is Blank

- Operator Control Panel Display Indicates an Error

- Operator Control Panel Display is Not Readable

7.2 System Does not Power Up

If the system does not power up, the problem could be caused by the power cable(s) not being plugged in, by a CPU or card-cage fan not operating, or by a power supply failure. Use the status of the power control module LEDs, shown in Figure 7-1, along with the information in Table 7-1 to isolate power problems.

Figure 7-1 Power Control Module LEDs
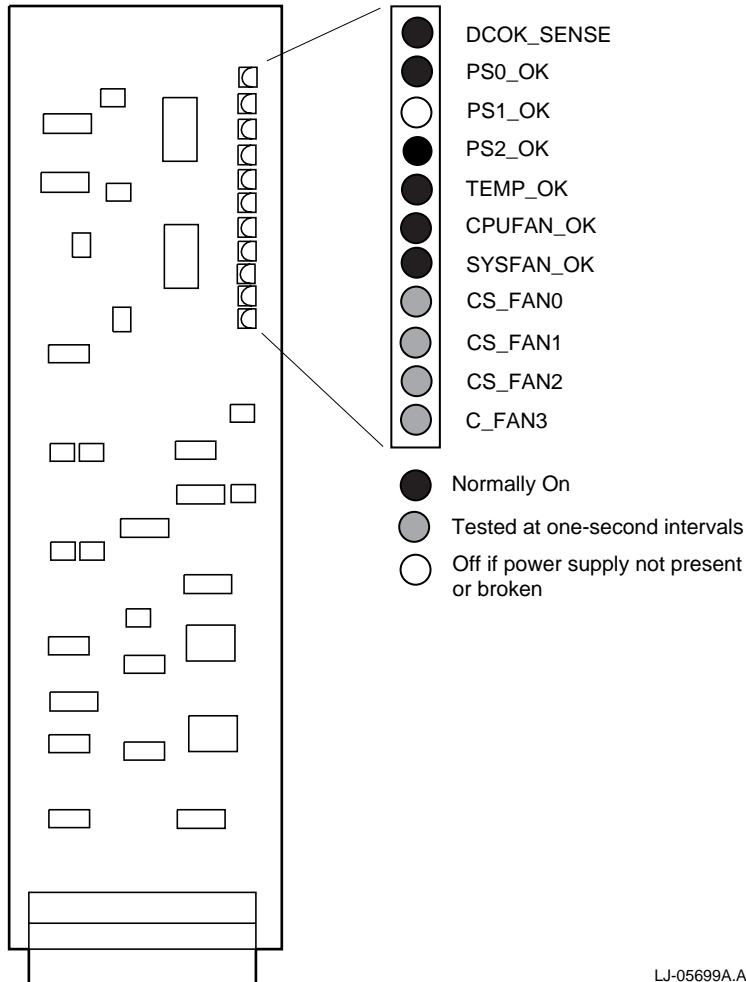
LJ-05699A.AI4

Table 7-1 Power Control Module LEDs

LED	State	Description
DCOK_SENSE	On	Both +5.0V and +4.43V are present and within limits.
	Off	Either one or both of the voltages are not present or within limits.
PS0_OK	On	Power supply 0 (the first power supply) is present and has asserted POK_H.
	Off	Power supply 0 has not asserted POK_H.
PS1_OK	On	Power supply 1 (the second power supply) is present and has asserted POK_H.
	Off	Power supply 1 is not present or has not asserted POK_H.
PS2_OK	On	Power supply 2 cannot be present in the AlphaServer 4100 central office system, but the LED will always be On.
TEMP_OK	On	The system temperature is below 55° C (normal).
	Off	The system temperature is above 55° C (abnormal).
CPUFAN_OK	On	All CPU fans are OK.
	Off	A CPU fan has failed. The specific fan is identified by the CS_FANn or C_FAN3 LED that remains lit.
SYSFAN_OK	On	All system (card-cage) fans are OK.
	Off	A system fan has failed. The specific fan is identified by the CS_FANn LED that remains lit.
CS_FAN0	On	CPU fan 0 and the right system card-cage fan are being sampled or one of them has failed as indicated by the CPUFAN_OK and SYSFAN_OK LEDs.
	Off	CPU fan 0 and the right system card-cage fan are not being sampled and are functioning properly.
CS_FAN1	On	CPU fan 1 and the left system card-cage fan are being sampled or one of them has failed as indicated by the CPUFAN_OK and SYSFAN_OK LEDs.
	Off	CPU fan 1 and the left system card-cage fan are not being sampled and are functioning properly.
CS_FAN2	On	CPU fan 2 and the PCI/EISA card-cage fan are being sampled or one of them has failed as indicated by the CPUFAN_OK and SYSFAN_OK LEDs.
	Off	CPU fan 2 and the PCI/EISA card-cage fan are not being sampled and are functioning properly.
C_FAN3	On	CPU fan 3 is being sampled or has failed as indicated by the CPUFAN_OK LED.
	Off	CPU fan 3 is not being sampled and is functioning properly.

_____ **Note** _____

If the power control module LEDs indicate a power supply failure, look through
the power supply fan at the rear of the system to verify the condition of the power
supply LED. If the LED is not lit, the power supply has failed. If the LED is lit,
the power supply is good and the problem is between the power supply and the
power control module or the power control module itself.

_____

7.3 Operator Control Panel Display is Blank

If the system powers up, but the operator control panel is blank, the problem may be a CPU module, the system bus to PCI bus module, the PCI/EISA motherboard, the OCP control module, the OCP display module, or the cable connecting the PCI/EISA motherboard and the OCP display module. Use the status of the CPU module and system bus to PCI bus module LEDs, shown in Figure 7-2, along with the information in Table 7-2 and Table 7-3 to isolate a blank OCP display problems.

Figure 7-2 CPU and System Bus to PCI Bus Module LEDs
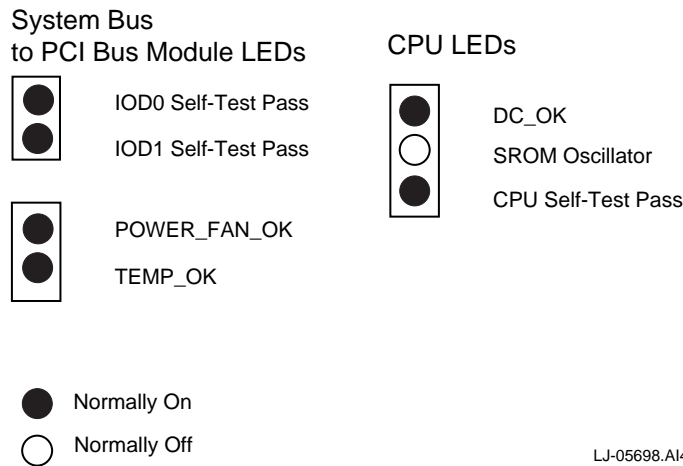
Table 7-2 CPU LEDs

LED	State	Description
DC_OK	On	Indicates that DC power is available.
	Off	A power problem exists. Refer to the power control module LEDs for the cause of the problem (see Table 7-1).
SROM Oscillator	On	The SROM on the CPU module is being loaded.
	Off	Normal. The SROM on the CPU module has already been loaded.
CPU Self-Test Pass	On	The CPU chip is functioning properly.
		Note: Running AlphaBIOS causes this LED to turn off. The Halt button on the OCP can be used to prevent the AlphaBIOS console from booting, thus assuring the validity of this LED. If the LED is lit, the SRM console command **alphabios** can be used to load and run the AlphaBIOS console.
	Off	The CPU module has failed.
		Note: Running AlphaBIOS causes this LED to turn off. See the note above for information about this.

Table 7-3 System Bus to PCI Bus Module LEDs

LED	State	Description
IOD0 Self-Test Pass	On	Bus0 of the system bus to PCI bus module has passed self-test.
	Off	The system bus to PCI b us module has failed.
IOD1 Self-Test Pass	On	Bus1 of the system bus to PCI bus module has passed self-test.
	Off	The system bus to PCI b us module has failed.
POWER_FAN_OK	On	Indicates that power is available and that the fans are operating properly.
	Off	Power is not available or a fan is not operating. Refer to the power control module LEDs (see Table 7-1) for the cause of the problem.
TEMP_OK	On	The system temperature is below 55° C (normal).
	Off	The system temperature is above 55° C (abnormal). Refer to the power control module LEDs (see Table 7-1) for the cause of the problem.

7.4 Operator Control Panel Display Indicates an Error

The operator control panel display indicates the failing device when testing fails. See Figure 7-3 and Table 7-4 for the location and meaning of the fields in the display.

Figure 7-3 Operator Control Panel Display
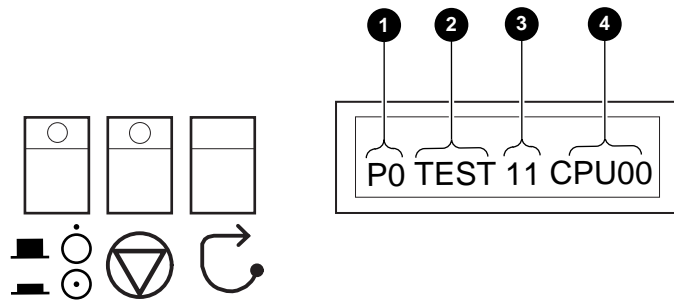
LJ-06431.AI7

Table 7-4 Operator Control Panel Display

Field	Content	Display	Meaning
❶	CPU number	P0–P3	CPU reporting status
❷	Status	TEST	Tests are executing
		FAIL	Failure has been detected
		MCHK	Machine check has occurred
		INTR	Error interrupt has occurred
❸	Test number (for DIGITAL use only)		
❹	Suspected device	CPU0–3	CPU module number[1]
		MEM0–3 and L, H, or *	Memory pair number and low module, high module, or either[2]
		IOD0	System bus to PCI bus 0[3]
		IOD1	System bus to PCI bus 1[3]
		FROM0	Flash ROM[4]
		COMBO	COM controller[4]
		PCEB	PCI-to-EISA bridge[4]
		ESC	EISA system controller[4]
		NVRAM	Nonvolatile RAM[4]
		TOY	Real time clock[4]
		I8242	Keyboard and mouse controller[4]

---

[1] CPU module

[2] Memory module

[3] System bus to PCI bus module

[4] PCI/EISA motherboard

7.5 Operator Control Panel Display is Not Readable

If the operator control panel display is not readable, perform the following:

1. Check the brightness adjustment screw on the operator control panel (see Figure 1-3) and adjust if necessary.

2. Check the orientation of the 16-pin OCP display module connector on the rear of the OCP cover assembly. The cable should be connected with pin 1 (indicated by the odd colored wire on the cable) toward the bottom of the connector and the 1 stamped in the metal.

8

Removal and Replacement

8.1 Introduction

This chapter contains the procedures for removing and replacing the following major components of the AlphaServer 4100 central office system:

- Front Bezel
- Extending the Chassis for Service
- Top Cover
- Right Side Cover
- Removable Media Assembly
- CD-ROM Drive
- Floppy Drive
- Power Supply
- Front Access Cover
- OCP Assembly
- OCP Control Module
- OCP Switch Module
- OCP Display Module
- MIL 167-1 CPU Vibration Brace
- Memory Modules
- CPU Modules
- Power Control Module
- System Card-Cage Fans
- Front Card-Cage EMI/RFI Honeycomb Filter
- 4-Fan Input Tach Alarm Module
- PCI/EISA Card-Cage Fans
- PCI/EISA Option Modules
- Server Control Module
- PCI/EISA Backplane

- System Bus to PCI Bus Module

- System Motherboard

- Power Supply Junction Box

- Rear Card-Cage EMI/RFI Honeycomb Filter

_____**WARNING**_____

Before servicing the AlphaServer 4100 central office system chassis or performing any of the following removal and replacement procedures, ensure that the DC On/Off button on the OCP is in the OFF position and disconnect the power cable(s) from the power supply dc input receptacle(s) on the rear of the chassis.

_____

_____ **ACHTUNG** _____

Vor der Wartung des Gehäuses des AlphaServer 4100 Central Office Systems bzw. vor der Durchführung irgendwelcher der folgenden Verfahren zum Entfernen oder Auswechseln von Komponenten müssen der On/Off-Netzstromschalter auf dem OCP auf OFF eingestellt und das bzw. die Netzkabel aus der bzw. den Netzsteckereingangsbuchse(n) an der Rückseite des Gehäuses gezogen werden.

_____

_____**WARNING**_____

Only a qualified service person should remove and replace components in the AlphaServer 4100 central office system. A qualified service person should have the technical training and experience necessary to be aware of the hazards to which they are exposed in performing a task and the measures that should be taken to minimize the danger to themselves or other persons.

_____

_____ **ACHTUNG** _____

Die Komponenten des AlphaServer 4100 Central Office Systems dürfen nur von erfahrenem und qualifiziertem Wartungspersonal entfernt bzw. ausgewechselt werden. Qualifiziertes Personal sollte entsprechend technisch geschult sein und über die nötige Erfahrung verfügen, um die möglichen Gefahren zu kennen, denen sie bei der Ausführung der notwendigen Wartungsarbeiten ausgesetzt sein könnten, und um die entsprechenden Schritte zur Minimierung dieser Gefahren für das Wartungspersonal und für andere Personen unternehmen zu können.

_____

Tools Required

The following tools are required for servicing the AlphaServer 4100 central office system chassis:

- Phillips-head and flat-blade screwdriver

- Adjustable wrench

8.2 Front Bezel

Perform the following procedure to remove the front bezel from the AlphaServer 4100 central office system chassis:

1. Remove the four 10-32 truss-head screws ❶ that secure the front bezel ❷ to the standoffs ❸ on the left and right front rails (see Figure 8-1).

2. Lift the bezel up and pull away from the chassis.

To replace the front bezel, refer to Figure 8-1 and proceed as follows:

1. Slide the four tabs on the rear of the front bezel into the bezel brackets ❹ located on the front of the chassis.

2. Secure the front bezel to the standoffs on the left and right front rails with four 10-32 truss-head screws.

Figure 8-1 Removing and Replacing the Front Bezel
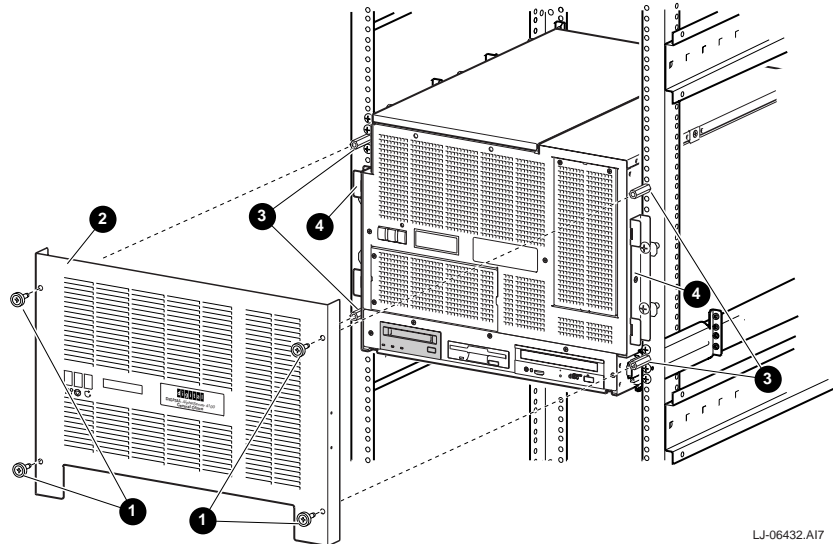
LJ-06432.AI7

8.3 Extending the Chassis for Service

_____WARNING_____

Before extending the chassis for service, ensure that the cabinet is stable and that all provided stabilizing features have been activated. The stabilizing features for the rack or cabinet are configuration dependent.
_____

_____ ACHTUNG _____

Bevor das Gehäuse für die Wartung erweitert wird, sollten Sie sicherstellen, daß es stabil ist und alle verfügbaren Stabilisierungsfunktionen eingeschaltet sind. Die Stabilisierungsfunktionen für das Gestell oder Gehäuse hängen von der jeweiligen Konfiguration ab.
_____

Perform the following procedure to extend AlphaServer 4100 central office system chassis for service:

1. Extend the stabilizing legs at the front of the cabinet (if stabilizing legs are provided).

2. Remove the front bezel (see Section 8.2).

3. Remove the four 10-32 truss head screws ❶ that secure the chassis to the front rails (see Figure 8-2).

_____Caution_____

Check and ensure that all cables are free to follow the chassis before extending the chassis.
_____

4. Carefully pull the chassis forward until the slides lock in the extended position.

To secure the chassis in the cabinet, press up on the left and right slide locks ❷, and reverse steps 1 through 4 of the extension procedure.

Figure 8-2 Extending the Chassis for Service

LJ-06433.AI7
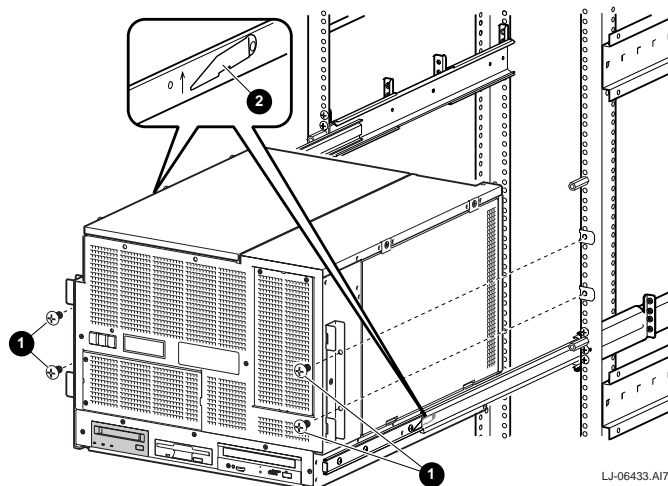
8.4 Top Cover

_____ **Caution** _____

Use care when removing and replacing the cover to prevent damage to the RFI
gaskets that are located around the cover and opening.
_____

Perform the following procedure to remove the top cover:

1. Extend the chassis for service (see Section 8.3).

2. Loosen the three captive screws ❶ on the left edge of the top cover ❷ (see Figure 8-3).

3. Pull the top cover to the left until the tabs along the right edge come out of the slots in
    the chassis (see Figure 8-3).

4. Lift the top cover off of the chassis.

To replace the top cover, refer to Figure 8-3 and reverse steps 1 through 4 of the removal
procedure.

Figure 8-3 Removing and Replacing the Top Cover
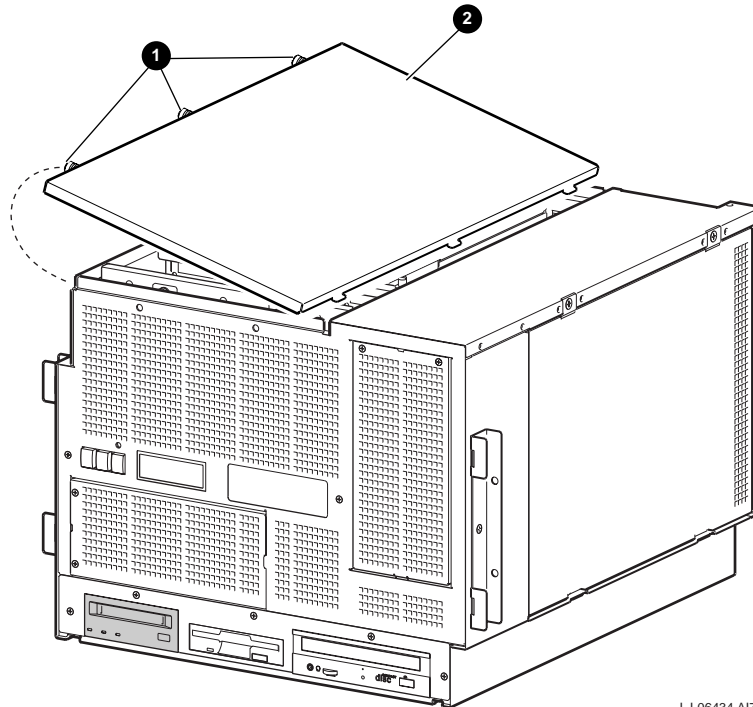
LJ-06434.AI7

8.5 Right Side Cover

_____Caution_____

Use care when removing and replacing the cover to prevent damage to the RFI
gaskets that are located around the four sides of the cover.

_____

Perform the following procedure to remove the right side cover:

1. Extend the chassis for service (see Section 8.3).

2. Loosen the two captive screws ❶ along the top edge of the right side cover ❷ (see Figure
   8-4).

3. Tilt the top of the right side cover out from the chassis (see Figure 8-4).

4. Lift the right side cover until the tabs ❸ along the bottom edge come out of the slots ❹ in
   the chassis, and then pull the right side cover out and away from the chassis.

To replace the right side cover, refer to Figure 8-4 and reverse steps 1 through 4 of the
removal procedure.

Figure 8-4 Removing and Replacing the Right Side Cover

LJ-06435.AI7
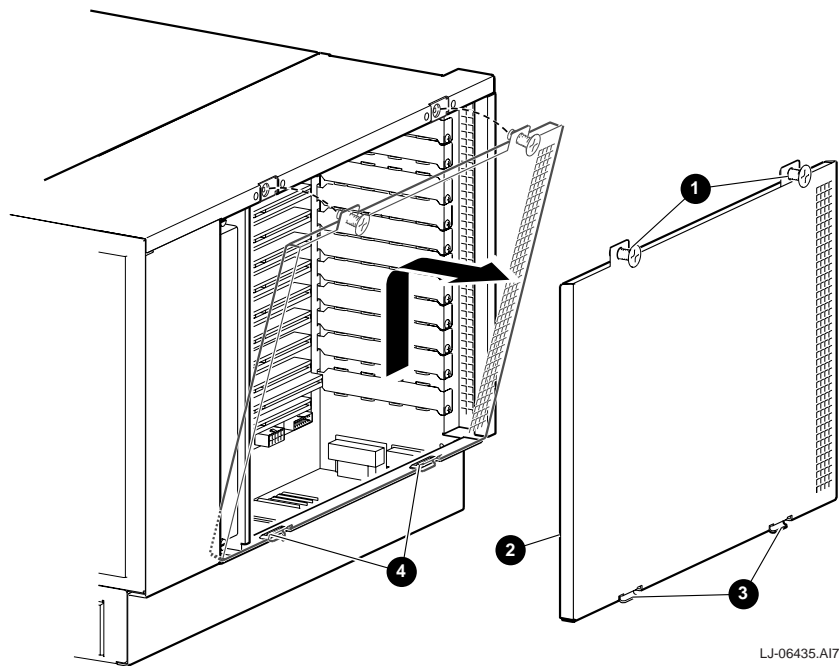
8.6 Removable Media Assembly

Perform the following procedure to remove the removable media assembly:

1. Extend the chassis for service (see Section 8.3).

2. Remove the right side cover (see Section 8.5).

3. Remove the five screws ❶ that secure the removable media assembly ❷ to the front of the chassis (see Figure 8-5).

4. While guiding the cables through the opening in the front wall of the PCI/EISA card-cage area ❸, slide the removable media assembly out of the chassis until the device power and data cables can be accessed.

5. Disconnect the power ❹ and data ❺ cables from the CD-ROM drive and the floppy drive.

To replace the removable media assembly, refer to Figure 8-5 and reverse steps 1 through 5 of the removal procedure.

Figure 8-5 Removing and Replacing the Removable Media Assembly
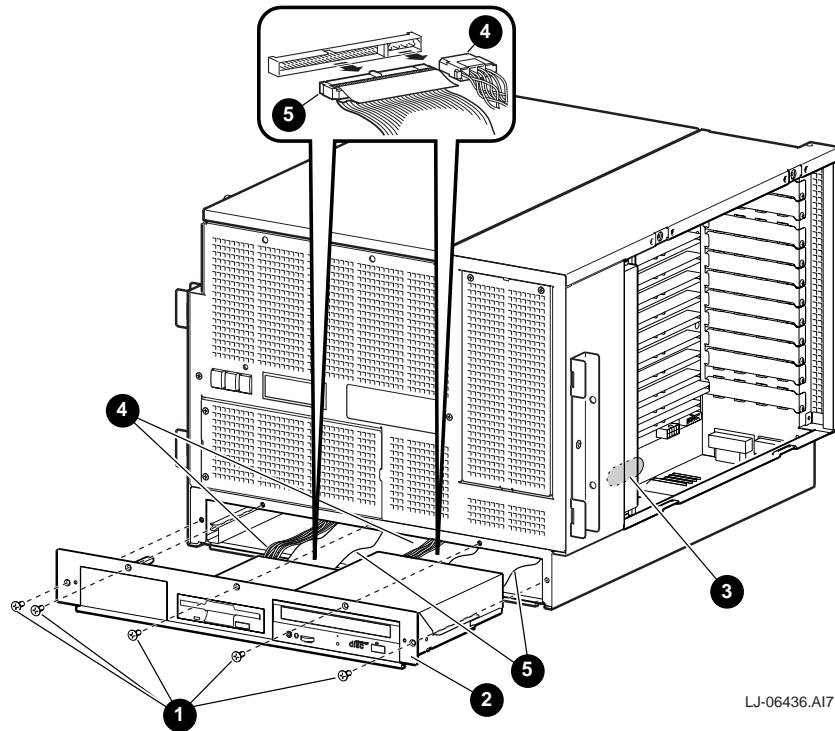
LJ-06436.AI7

8.7 CD-ROM Drive

Perform the following procedure to remove the CD-ROM drive:

1. Extend the chassis for service (see Section 8.3).

2. Remove the removable media assembly (see Section 8.6).

3. Remove the four screws ❶ that secure the CD-ROM drive ❷ to the removable media assembly (see Figure 8-6).

4. Slide the CD-ROM drive back out of the opening in the front of the removable media assembly.

To replace the CD-ROM drive, refer to Figure 8-6 and reverse steps 1 through 4 of the removal procedure. Ensure that the new CD-ROM drive SCSI ID jumper is set to match the SCSI ID jumper on the drive that was removed.

**Figure 8-6 Removing and Replacing the CD-ROM Drive**
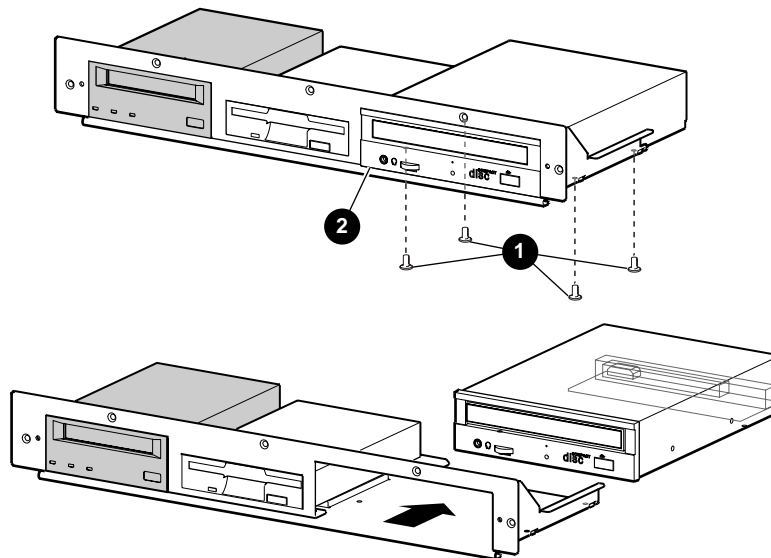
LJ-06437.AI7

8.8 Floppy Drive

Perform the following procedure to remove the floppy drive:

1. Extend the chassis for service (see Section 8.3).

2. Remove the removable media assembly (see Section 8.6).

3. Remove the four screws ❶ that secure the floppy drive ❷ to the removable media assembly (see Figure 8-7).

4. Slide the floppy drive back out of the opening in the front of the removable media assembly.

To replace the floppy drive, refer to Figure 8-7 and reverse steps 1 through 4 of the removal procedure. Ensure that the new floppy drive ID is set to match the ID on the floppy drive being replaced.

Figure 8-7 Removing and Replacing the Floppy Drive

LJ-06456.AI7
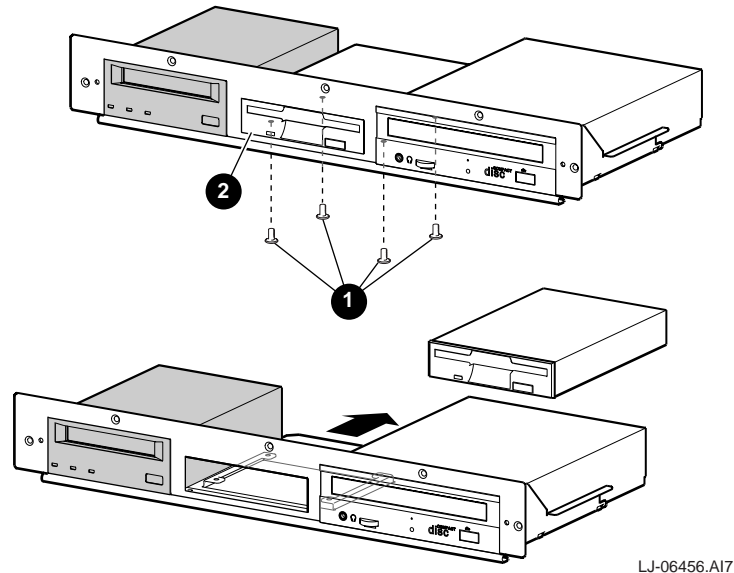
8.9 Power Supply

Perform the following procedure to remove the power supply:

1. At the rear of the chassis, loosen the two captive screws ❶ that secure the power supply ❷ to the chassis (see Figure 8-8).

2. Grasp the two handles on the power supply and pull the power supply out of the chassis.

To replace the power supply, refer to Figure 8-8 and reverse steps 1 and 2 of the removal procedure.

Figure 8-8 Removing and Replacing the Power Supply
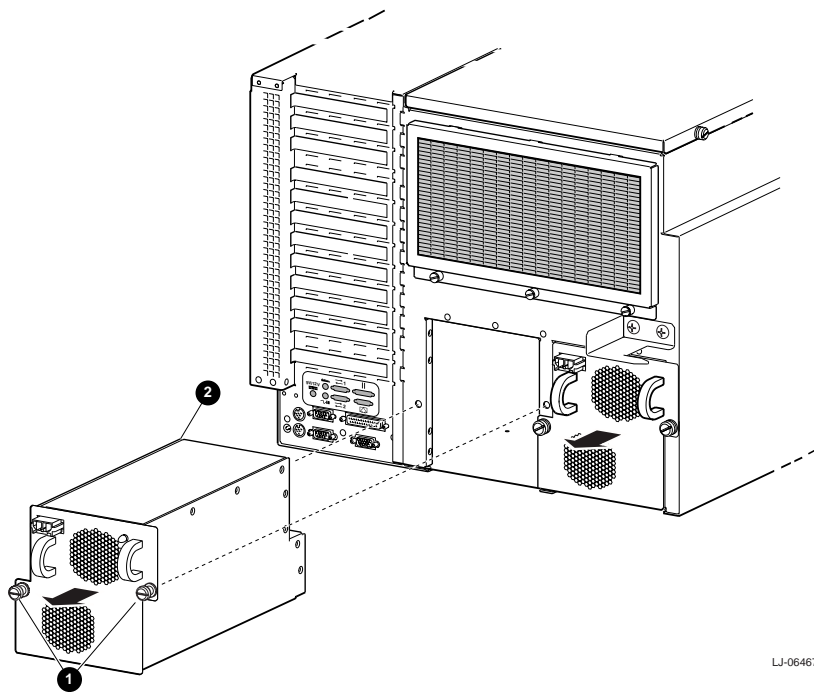
LJ-06467.AI7

8.10 Front Access Cover

Perform the following procedure to remove the front access cover:

1. Extend the chassis for service (see Section 8.3).

2. Remove the two screws ❶ that secure the front access cover ❷ to the front of the chassis (see Figure 8-9).

3. Pry the left side of the front access cover out by inserting a flat-blade screwdriver in the notch ❸ (see Figure 8-9).

4. Slide the front access cover to the left until the right edge comes out from under the metal tab ❹ and remove from the chassis.

To replace the front access cover, refer to Figure 8-9 and reverse steps 1 through 4 of the removal procedure.

Figure 8-9 Removing and Replacing the Front Access Cover
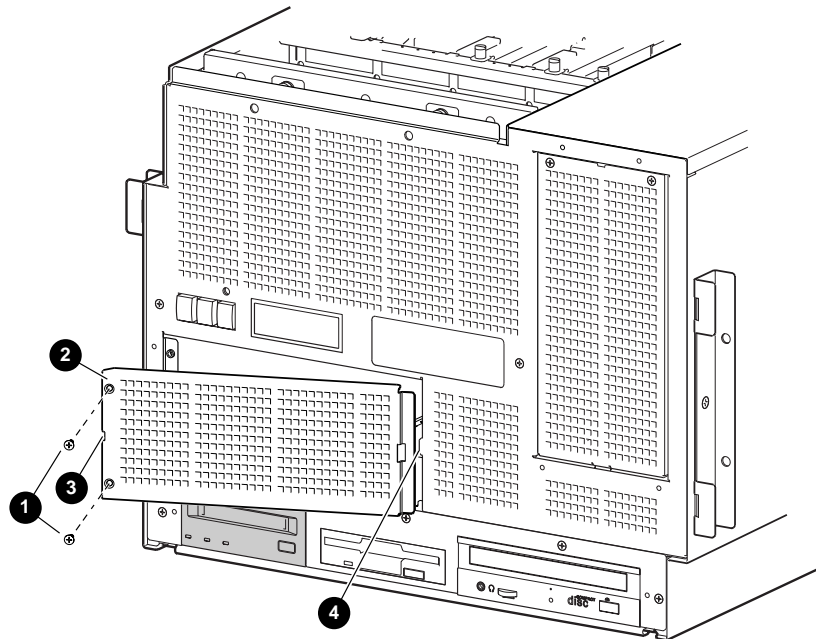
LJ-06518.AI7

8.11 OCP Assembly

Perform the following procedure to remove the OCP assembly:

1. Extend the chassis for service (see Section 8.3).

2. Remove the front access cover (see Section 8.10).

3. While reaching through the front access cover opening and holding the OCP assembly ❶ in place, remove the two screws ❷ that secure the OCP assembly to the front inside of the chassis (see Figure 8-10).

4. Move the OCP assembly down and out through the front access cover opening in the front of the chassis until the cable connections on the rear of the OCP assembly can be accessed.

5. Disconnect the ribbon cable ❸ from the vertical connector on the bottom edge of the OCP control module (see Figure 8-10).

6. Disconnect the 2-pin power supply connector ❹ from the back of the OCP control module (see Figure 8-10).

To replace the OCP assembly, refer to Figure 8-10 and reverse steps 1 through 6 of the removal procedure.

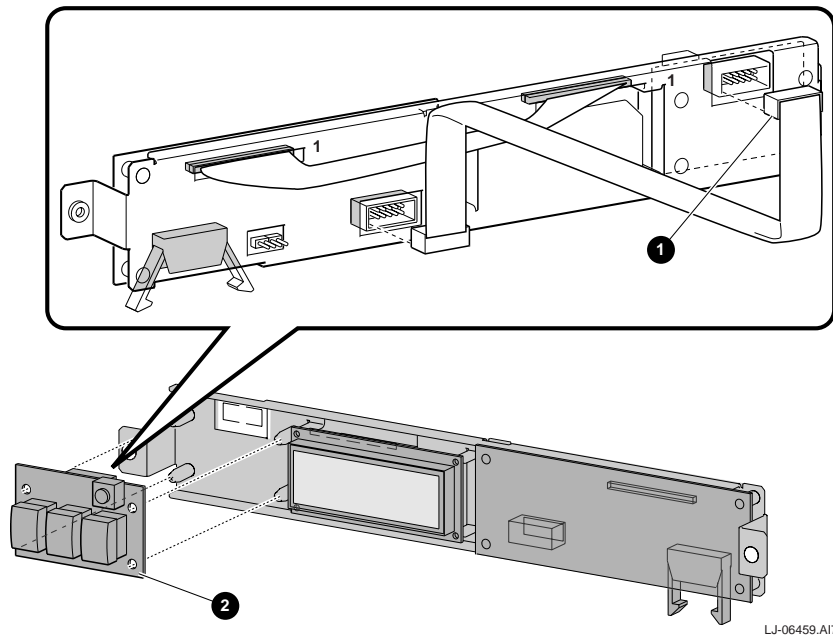**Figure 8-10 Removing and Replacing the OCP Assembly**
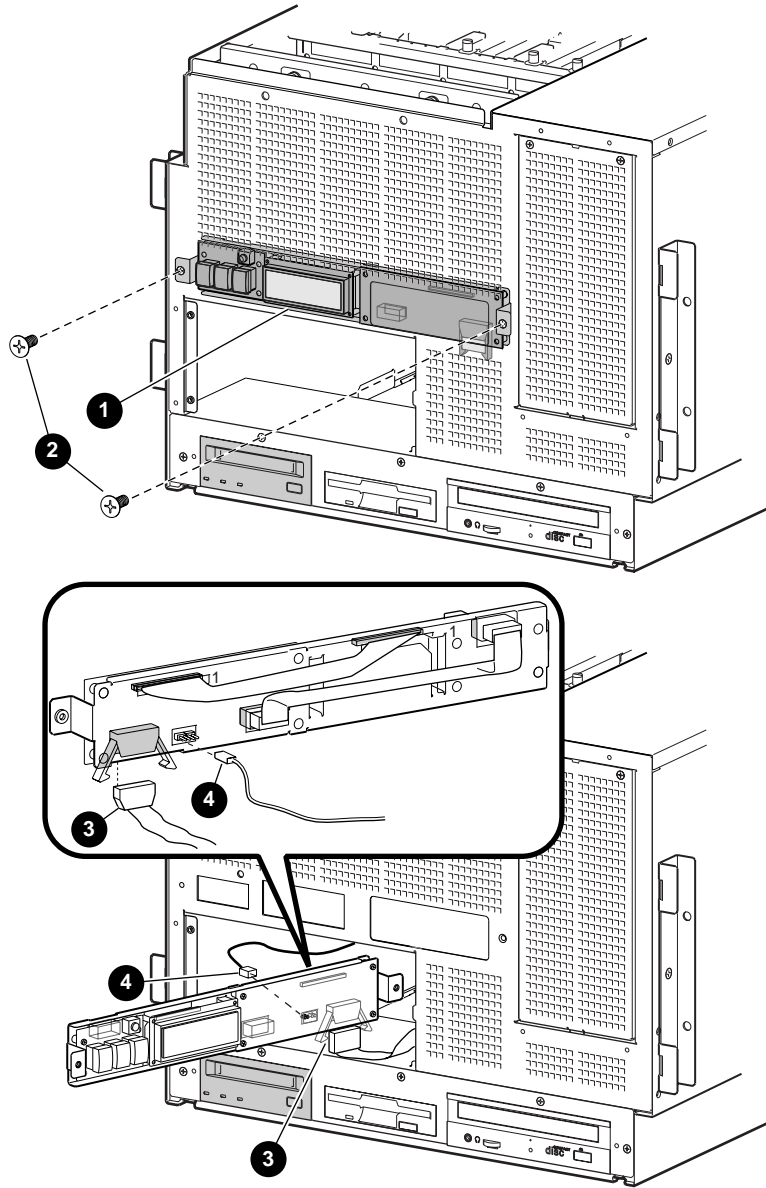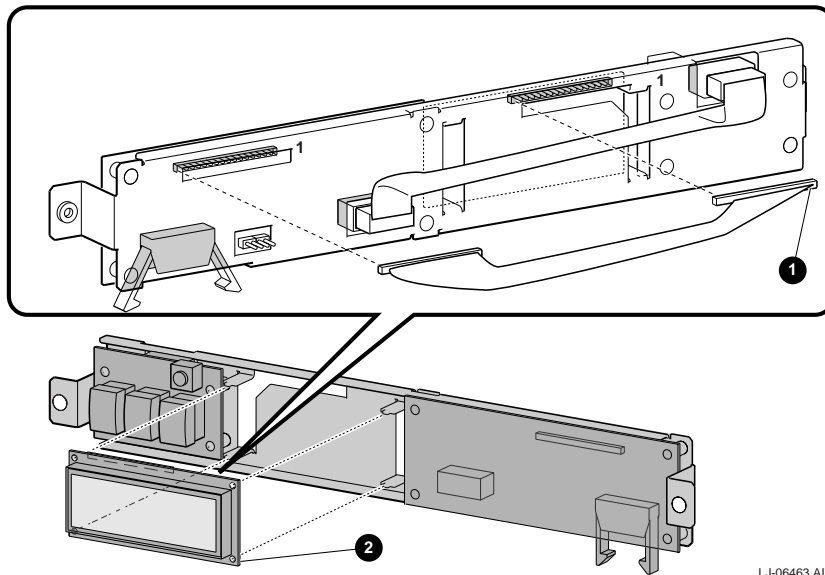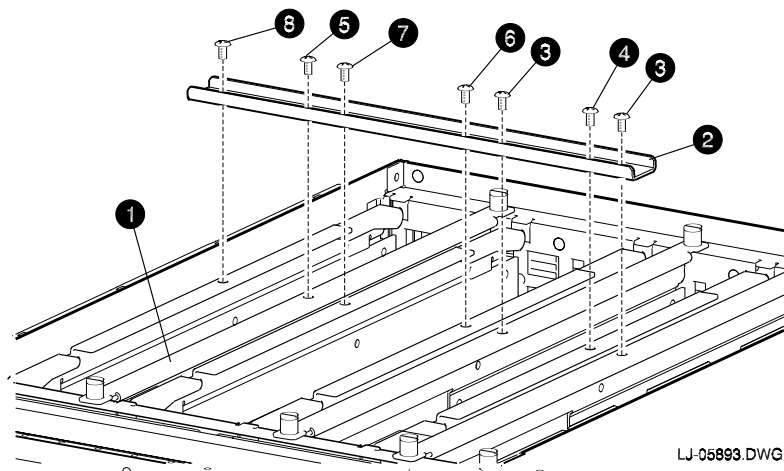

LJ-06457.AI7

8.12 OCP Control Module

Perform the following procedure to remove the OCP control module:

1. Extend the chassis for service (see Section 8.3).

2. Remove the OCP assembly (see Section 8.11).

3. Disconnect the 16-pin OCP display module connector ❶ and the 10-pin OCP switch module connector ❷ from the OCP control module (see Figure 8-11). When reconnecting the 16-pin OCP display module connector, ensure that pin 1 (indicated by the odd colored wire on the cable) is toward the right end of the connector (as viewed from the rear) and the 1 marked on the board.

4. Unsnap the OCP control module ❹ from the four standoffs that secure the module to the OCP assembly and lift the OCP control module off of the OCP assembly(see Figure 8-11).

To replace the OCP control module, refer to Figure 8-11 and reverse steps 1 through 4 of the removal procedure. Ensure that the jumper ❸ on the new OCP control module is set to match the jumper on the module being replaced.

Figure 8-11 Removing and Replacing the OCP Control Module
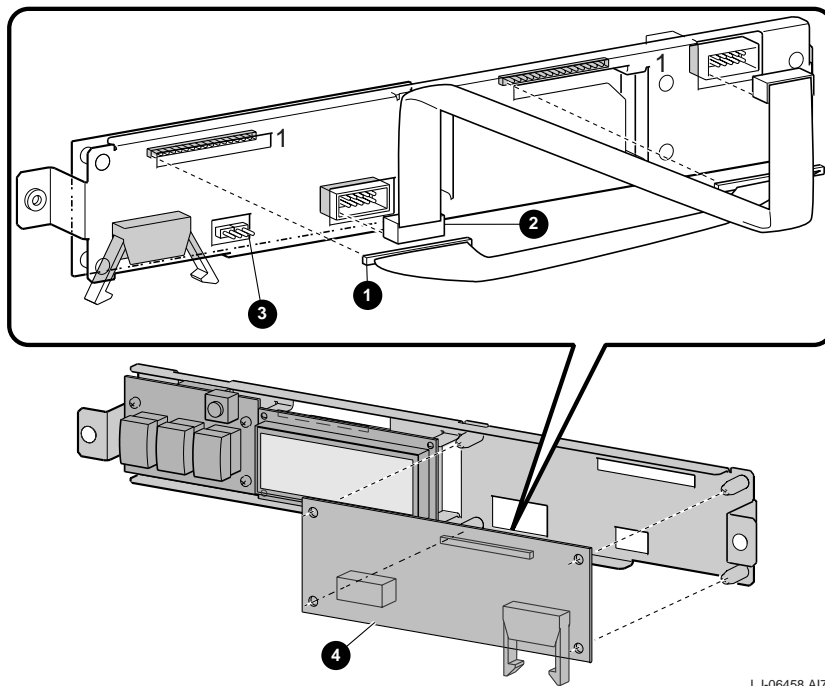
LJ-06458.AI7

8.13 OCP Switch Module

Perform the following procedure to remove the OCP switch module:

1. Extend the chassis for service (see Section 8.3).

2. Remove the OCP assembly (see Section 8.11).

3. Disconnect the 10-pin OCP switch module connector ❶ from the rear of the OCP switch module (see Figure 8-12).

4. Unsnap the OCP switch module ❷ from the four standoffs that secure the module to the OCP assembly and lift the OCP switch module off of the OCP assembly (see Figure 8-12).

To replace the OCP switch module, refer to Figure 8-12 and reverse steps 1 through 4 of the removal procedure.

Figure 8-12 Removing and Replacing the OCP Switch Module

LJ-06459.AI7

8.14 OCP Display Module

Perform the following procedure to remove the OCP display module:

1. Extend the chassis for service (see Section 8.3).

2. Remove the OCP assembly (see Section 8.11).

3. Disconnect the 16-pin OCP display module connector ❶ from the rear of the OCP display module (see Figure 8-13). When reconnecting the 16-pin OCP display module connector, ensure that pin 1 (indicated by the odd colored wire on the cable) is toward the right end of the connector (as viewed from the rear) and the 1 on the module.

4. Remove the OCP display module ❷ from the four standoffs on the OCP assembly and lift the module off of the OCP assembly (see Figure 8-13).

To replace the OCP display module, refer to Figure 8-13 and reverse steps 1 through 4 of the removal procedure.

Figure 8-13 Removing and Replacing the OCP Display Module

LJ-06463.AI7

8.15 MIL 167-1 CPU Vibration Brace

Perform the following procedure to remove the MIL 167-1 CPU vibration brace:

1. Extend the chassis for service (see Section 8.3).

2. Remove the top cover (see Section 8.4).

3. Loosen the two 6-32 pan-head screws ❸ that secure the brace ❷ to the two memory modules installed in the memory slot 0 Low and memory slot 0 High positions (see Figure 8-14).

4. Loosen the 6-32 pan-head screw ❹ that secures the brace to the CPU module installed in CPU slot 0 (see Figure 8-14).

5. Loosen the 6-32 pan-head screw ❺ that secures the brace to the blank memory module handle ❶ or the memory module installed in memory slot 1 High (see Figure 8-14).

6. If a CPU module is installed in CPU slot 1, loosen the 6-32 pan-head screw ❻ that secures the brace to it (see Figure 8-14).

7. If a CPU module is installed in CPU slot 2, loosen the 6-32 pan-head screw ❼ that secures the brace to it (see Figure 8-14).

8. If a CPU module is installed in CPU slot 3, loosen the 6-32 pan-head screw ❽ that secures the brace to it (see Figure 8-14).

9. Slide the CPU vibration brace toward the front of the system and lift it from across the top of the CPU and memory modules in the system card-cage.

To replace the MIL 167-1 CPU vibration brace, refer to Figure 8-14 and reverse steps 1 through 9 of the removal procedure.

Figure 8-14 Removing and Replacing the MIL 167-1 CPU Vibration Brace

LJ-05893.DWG

8.16 Memory Modules

Perform the following procedure to remove a memory module:

1. Extend the chassis for service (see Section 8.3).

2. Remove the top cover (see Section 8.4).

3. Remove the CPU vibration brace (see Section 8.15).

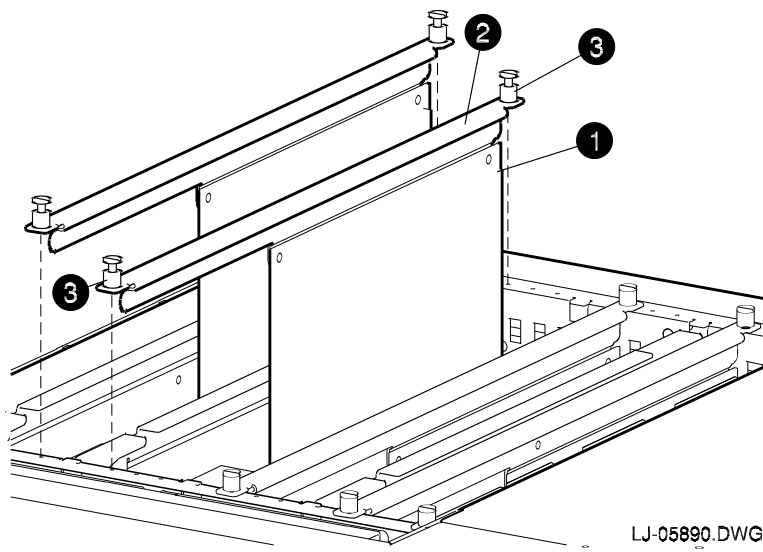4. Put on an antistatic wriststrap.

_____**Caution**_____

An antistatic wriststrap *must* be worn when handling any module to prevent
damage to the module.

_____

5. Loosen the two captive thumb screws ❸ located on each end of the module handle ❷ on
    the memory module ❶ being removed (see Figure 8-15).

6. Pull the memory module straight up out of its slot (see Figure 8-15).

To replace the memory module, refer to Figure 8-15 and reverse steps 1 through 6 of the
removal procedure. If the memory module being replaced is located in memory slot 0 Low,
memory slot 0 High, or memory slot 1 High, remove the 6-32 pan-head screw from the center
of the replacement module handle and use it to secure the replacement module to the CPU
vibration brace after the brace is reinstalled.

Figure 8-15 Removing and Replacing Memory Modules

8.17 CPU Modules

Perform the following procedure to remove a CPU module:

1. Extend the chassis for service (see Section 8.3).

2. Remove the top cover (see Section 8.4).

3. Remove the CPU vibration brace (see Section 8.15).

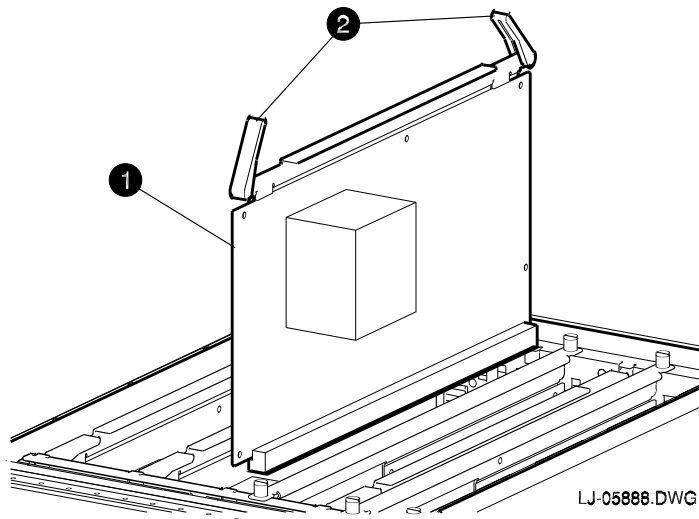4. Put on an antistatic wriststrap.

_____ **Caution** _____

An antistatic wriststrap *must* be worn when handling any module to prevent
damage to the module.

_____

5. If memory modules are installed in the two slots to the right of the CPU module being
   removed, they must be removed before the CPU module can be removed (see Section
   8.16).

6. Pull up on the ejector levers ❷ located on each end of the CPU module ❶ being removed
   (see Figure 8-16).

7. Pull the CPU module straight up out of its slot (see Figure 8-16).

To replace the CPU module, refer to Figure 8-16 and reverse steps 1 through 7 of the removal
procedure. Remove the 6-32 pan-head screw from the center of the replacement CPU module
handle and use it to secure the CPU module to the CPU vibration brace after it is reinstalled.

Figure 8-16 Removing and Replacing CPU Modules

LJ-05888.DWG

8.18 Power Control Module

Perform the following procedure to remove the power control module:

1. Extend the chassis for service (see Section 8.3).

2. Remove the top cover (see Section 8.4).

3. Put on an antistatic wriststrap.

_____**Caution**_____

An antistatic wriststrap *must* be worn when handling any module to prevent
damage to the module.
_____

4. Loosen the captive thumb screw ❷ that secures the power control module ❶ to the front
   CPU support bracket (see Figure 8-17).

5. Pull the power control module straight up out of its slot (see Figure 8-17).

To replace the power control module, refer to Figure 8-17 and reverse steps 1 through 5 of the
removal procedure.

Figure 8-17 Removing and Replacing the Power Control Module

LJ-05919.DWG
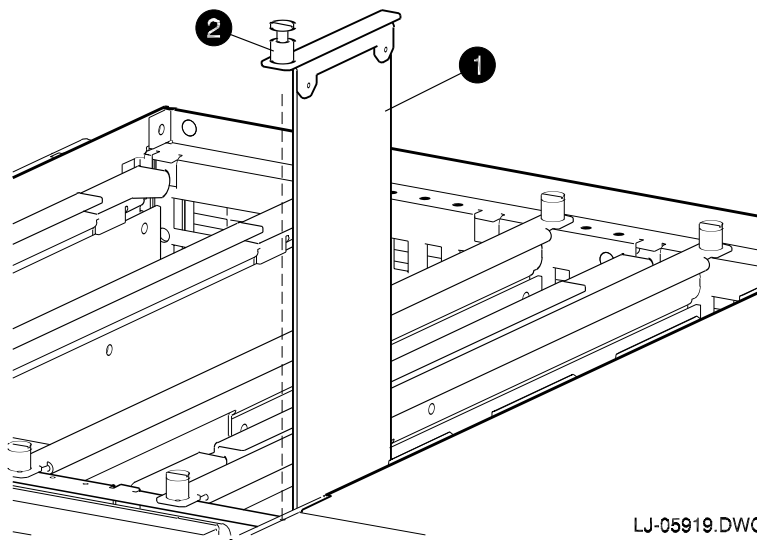
8.19 System Card-Cage Fans

Perform the following procedure to remove the system card-cage fans:

1. Extend the chassis for service (see Section 8.3).

2. Remove the top cover (see Section 8.4).

3. Loosen the two captive screws ❶ along the top front of the fan assembly by inserting a screwdriver through the two access holes ❷ in the front of the chassis (see Figure 8-18).

4. Disconnect the left and right fan power cables ❸ (see Figure 8-18).

5. Lift the fan assembly ❹ out of the chassis (see Figure 8-18).

6. Remove the four screws that secure the failing fan to the fan assembly.

To replace the system card-cage fans, refer to Figure 8-18 and reverse steps 1 through 6 of the removal procedure.

Figure 8-18 Removing and Replacing the System Card-Cage Fan Assembly

LJ-06443.AI7

8.20 Front Card-Cage EMI/RFI Honeycomb Filter

Perform the following procedure to remove the front card-cage EMI/RFI honeycomb filter:

1. Extend the chassis for service (see Section 8.3).

2. Remove the top cover (see Section 8.4).

3. Loosen the three captive screws ❶ along the top rear of the EMI/RFI honeycomb filter assembly ❷ (see Figure 8-19).

4. Tilt the EMI/RFI honeycomb filter assembly toward the rear of the chassis and lift the EMI/RFI honeycomb filter assembly until the three tabs ❸ on the bottom of the EMI/RFI honeycomb filter assembly come out of the three slots ❹ in the chassis (see Figure 8-19).

Figure 8-19 Removing and Replacing the Front Card-Cage EMI/RFI Honeycomb Filter Assembly
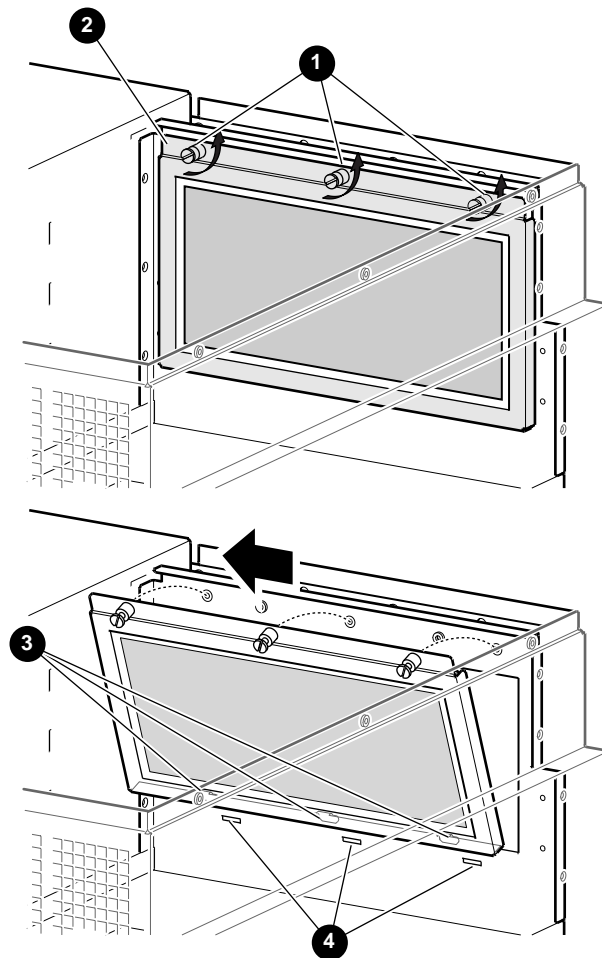
LJ-06464.AI7

5. Remove the EMI/RFI honeycomb filter element ❶ from the EMI/RFI honeycomb filter assembly (see Figure 8-20).

To replace a front card-cage EMI/RFI honeycomb filter, refer to Figure 8-19 and Figure 8-20 and reverse steps 1 through 5 of the removal procedure. Ensure that the EMI/RFI gasket on the replacement EMI/RFI honeycomb filter element is toward the front of the chassis.

**Figure 8-20 Removing the Front Card-Cage EMI/RFI Honeycomb Filter**

LJ-06465.AI7
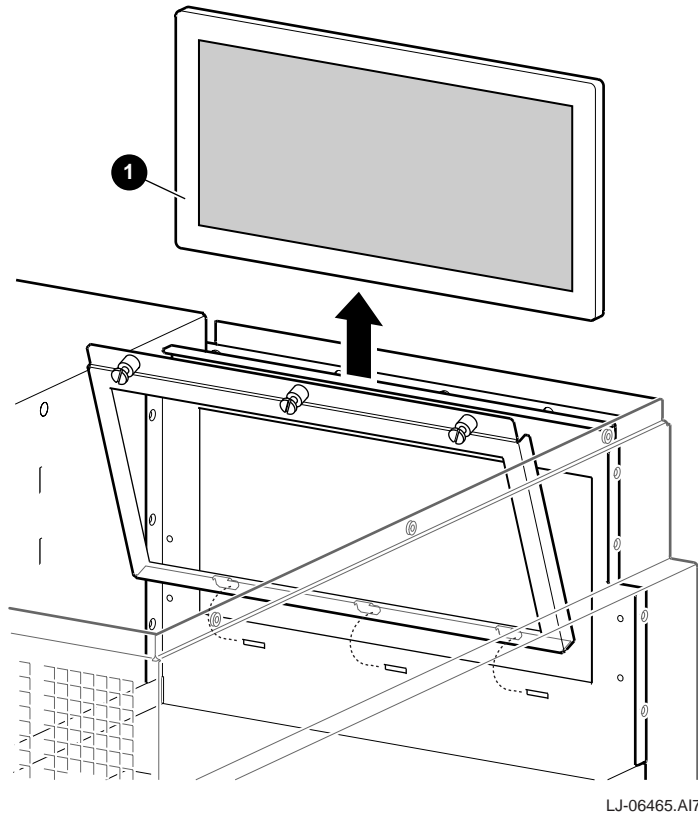
8.21 4-Fan Input Tach Alarm Module

Perform the following procedure to remove the 4-fan input tach alarm module:

1. Extend the chassis for service (see Section 8.3).

2. Remove the hard drive tray cover from the front of the chassis (see Figure 2-18).

3. Remove the hard drive tray (see Figure 2-19).

4. Disconnect the two fan power cables ❶ from the 4-fan input tach alarm module ❷ located above the hard drive tray (see Figure 8-21).

5. Disconnect the power cable ❸ from the 4-fan input tach alarm module (see Figure 8-21).

6. Unsnap the 4-fan input tach alarm module from the four standoffs and remove the 4-fan input tach alarm module from the chassis (see Figure 8-21).

To replace the 4-fan input tach alarm module, refer to Figure 8-21 and reverse steps 1 through 6 of the removal procedure.

Figure 8-21 Removing and Replacing the 4-Fan Input Tach Alarm Module
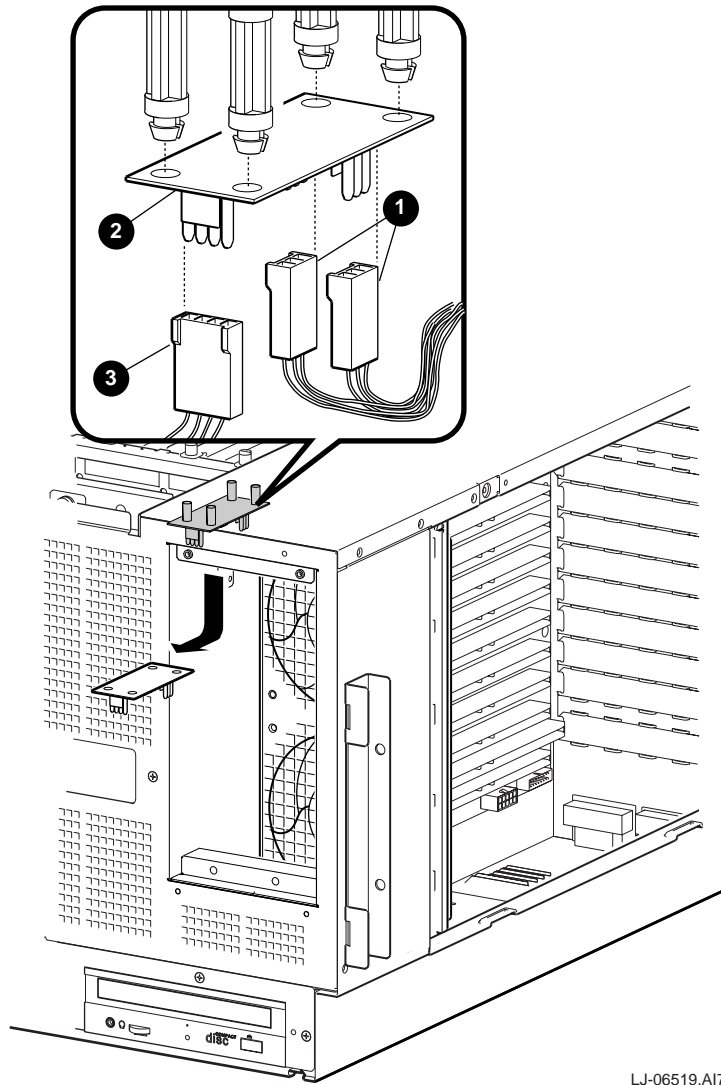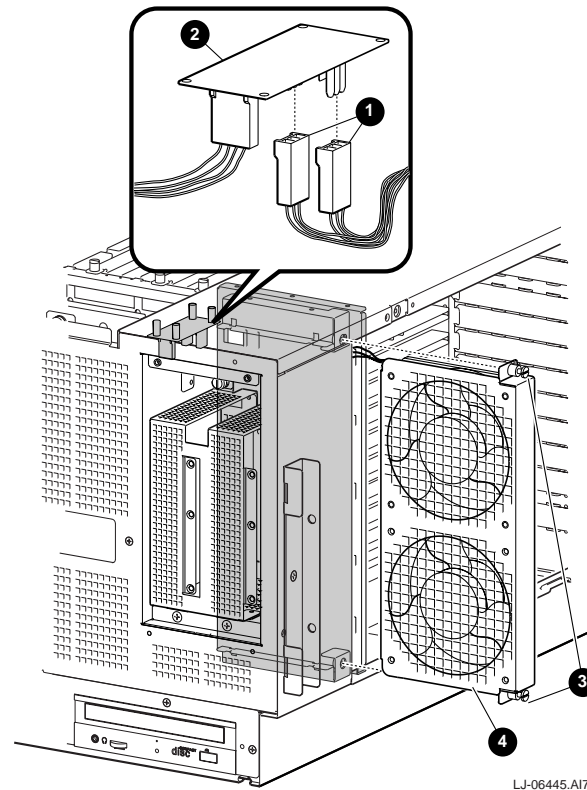

LJ-06519.AI7

8.22 PCI/EISA Card-Cage Fans

Perform the following procedure to remove the PCI/EISA card-cage fans:

1. Extend the chassis for service (see Section 8.3).

2. Remove the right side cover (see 8.5).

3. Remove the hard drive tray cover from the front of the chassis (see Figure 2-18).

4. Disconnect the two fan power cables ❶ from the 4-fan input tach alarm module ❷ located above the hard drive tray (see Figure 8-22).

5. Loosen the two captive screws ❸ that secure the top and bottom of the fan assembly ❹ to the chassis (see Figure 8-22).

6. Pull the fan assembly out of the chassis (see Figure 8-22).

7. Remove the four screws that secure the failing fan to the fan assembly.

To replace the PCI/EISA card-cage fans, refer to Figure 8-22 and reverse steps 1 through 7 of the removal procedure.

Figure 8-22 Removing and Replacing the PCI/EISA Card-Cage Fan Assembly

LJ-06445.AI7

8.23 PCI/EISA Option Modules

_____WARNING_____

For protection against fire, only modules with current limited output should be used.
_____

_____ ACHTUNG _____

**Zum Schutz gegen Feuer sollten nur Module mit begrenztem Ausgangsstrom benutzt werden.**
_____

Perform the following procedure to remove PCI/EISA option modules:

1. Extend the chassis for service (see Section 8.3).

2. Remove the right side cover (see 8.5).

3. Disconnect any cables that are connected to the PCI/EISA option module from the rear of the chassis.

4. Remove the screw ❶ that secures the PCI/EISA option module ❷ in its slot (see Figure 8-23).

5. Slide the PCI/EISA option module out of the slot (see Figure 8-23).

To replace the PCI/EISA option module, refer to Figure 8-23 and reverse steps 1 through 5 of the removal procedure. Ensure that the jumpers on the new module are set to match the jumpers on the module being replaced.

Figure 8-23 Removing and Replacing a PCI/EISA Option Module
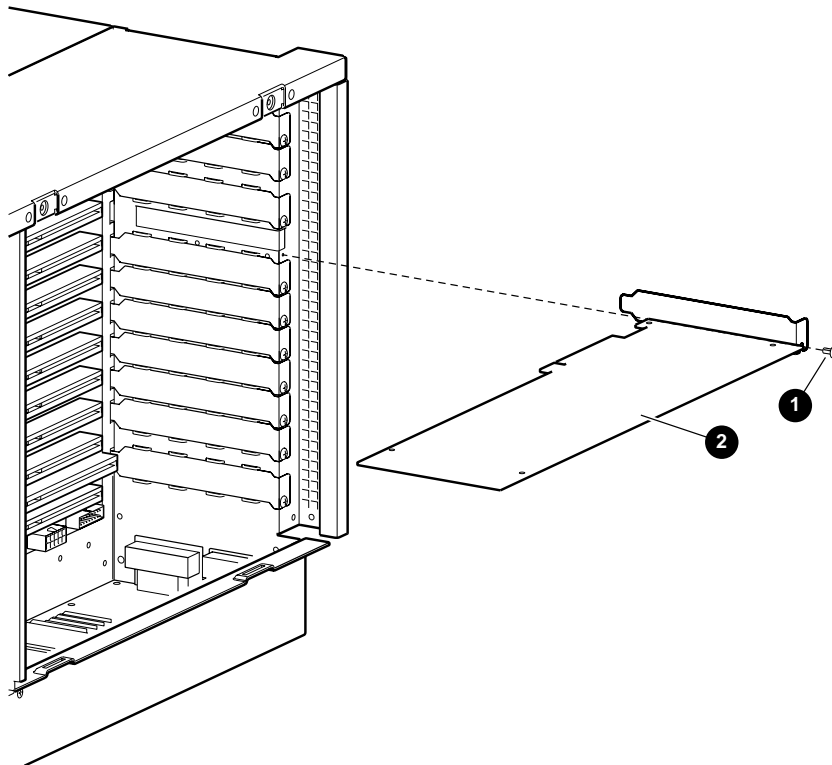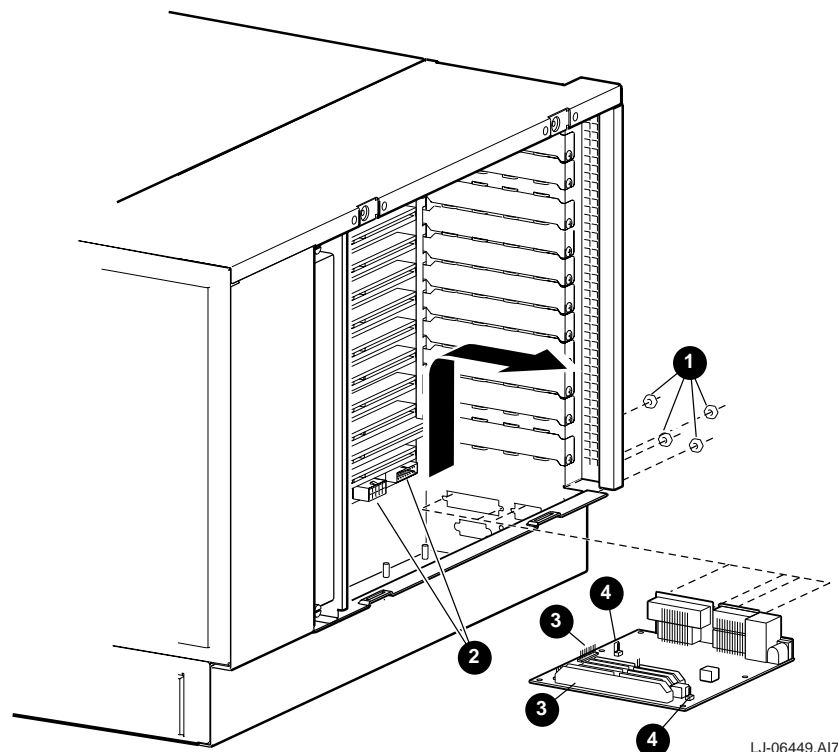

LJ-06421.AI7

8.24 Server Control Module

Perform the following procedure to remove the server control module:

1. Extend the chassis for service (see Section 8.3).

2. Remove the right side cover (see Section 8.5).

3. Disconnect any cables that are connected to the server control module from the rear of the chassis.

4. Remove the four nuts ❶ that secure the COM1 and parallel connectors to the rear of the chassis (see Figure 8-24).

5. If necessary, remove enough PCI/EISA option modules to allow access to the server control module.

6. Disconnect the two power cables from the connectors ❷ at the bottom of the PCI/EISA backplane (see Figure 8-24).

7. Disconnect the two ribbon cables ❸ and the two 2-wire connectors ❹ from the server control module (see Figure 8-24).

8. Lift the front edge of the server control module to unsnap it from the two standoffs.

9. Tilt the front edge of the server control module up and pull it forward until the connectors on the rear of the module clear the cutouts on the rear of the chassis.

To replace the server control module, refer to Figure 8-24 and reverse steps 1 through 9 of the removal procedure. Ensure that the jumpers on the new module are set to match the jumpers on the module being replaced.

Figure 8-24 Removing and Replacing the Server Control Module
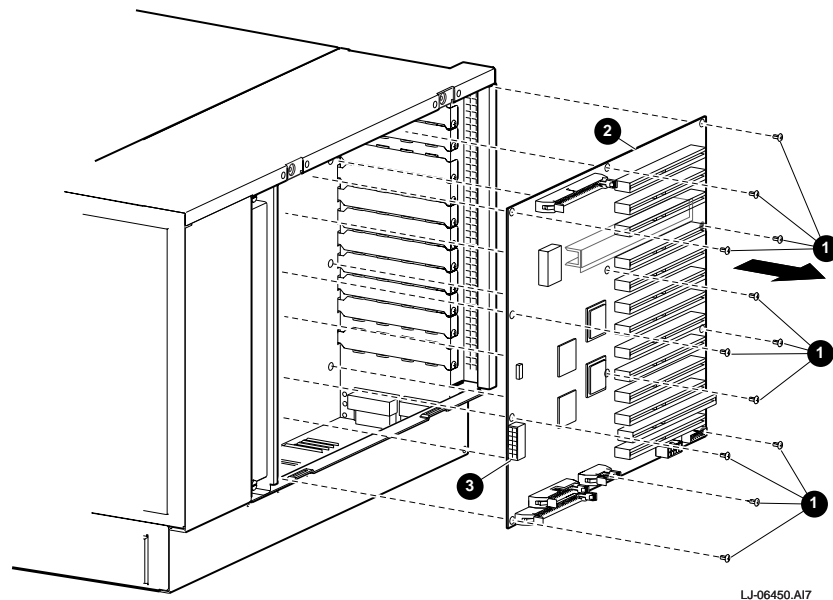

LJ-06449.AI7

8.25 PCI/EISA Backplane

Perform the following procedure to remove the PCI/EISA backplane:

1. Extend the chassis for service (see Section 8.3).

2. Remove the right side cover (see Section 8.5).

3. Remove all of the PCI/EISA option modules (see Section 8.23).

4. Remove the front access cover (see Section 8.10).

5. Disconnect the eight cables from the PCI/EISA backplane. The cable to the connector ❸ on the front edge of the PCI/EISA backplane can be disconnected by reaching through the front access cover.

6. Remove the 12 screws ❶ that secure the PCI/EISA backplane ❷ to the card-cage wall (see Figure 8-25).

7. Pull straight out on the PCI/EISA backplane to disconnect it from the system bus to PCI bus module.

8. Remove the PCI/EISA backplane from the PCI/EISA card-cage.

To replace the PCI/EISA backplane, refer to Figure 8-25 and reverse steps 1 through 8 of the removal procedure. Ensure that the jumper on the new PCI/EISA backplane is set to match the jumper on the backplane being replaced.

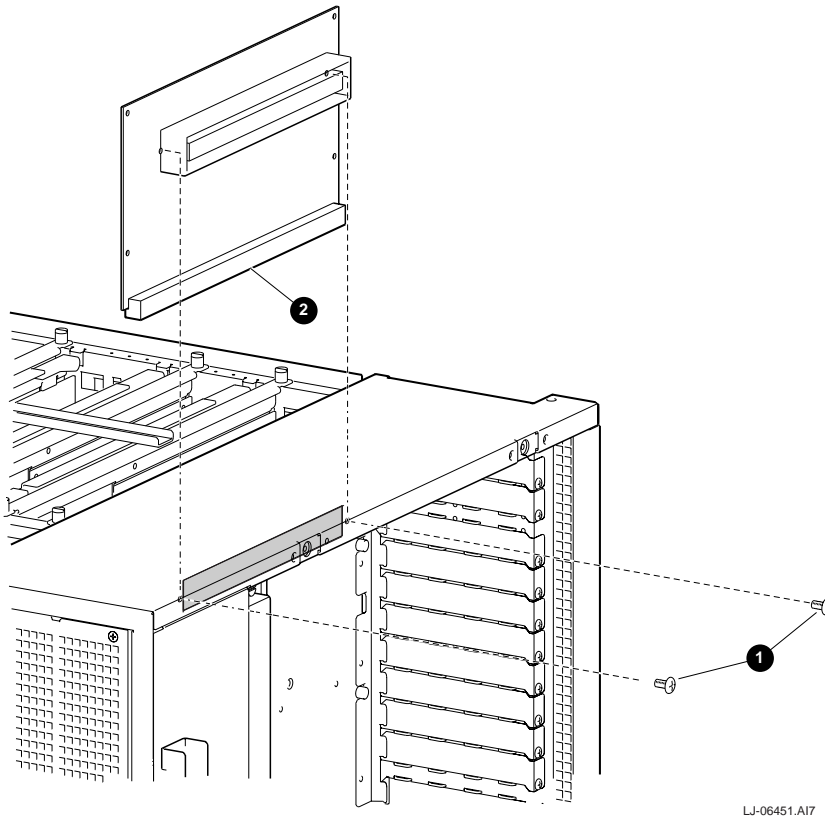**Figure 8-25 Removing and Replacing the PCI/EISA Backplane**

LJ-06450.AI7

8.26 System Bus to PCI Bus Module

Perform the following procedure to remove the system bus to PCI bus module:

1. Extend the chassis for service (see Section 8.3).

2. Remove the PCI/EISA backplane (see Section 8.25).

3. From inside of the PCI/EISA card-cage area, remove the two screws ❶ that secure the system bus to PCI bus module ❷ to the card-cage wall (see Figure 8-26).

4. Remove the top cover (see Section 8.4).

5. Lift up on the system bus to PCI bus module ❷ and remove it from the system card-cage (see Figure 8-26).

To replace the system bus to PCI bus module, refer to Figure 8-26 and reverse steps 1 through 5 of the removal procedure.

Figure 8-26 Removing and Replacing the System Bus to PCI Bus Module
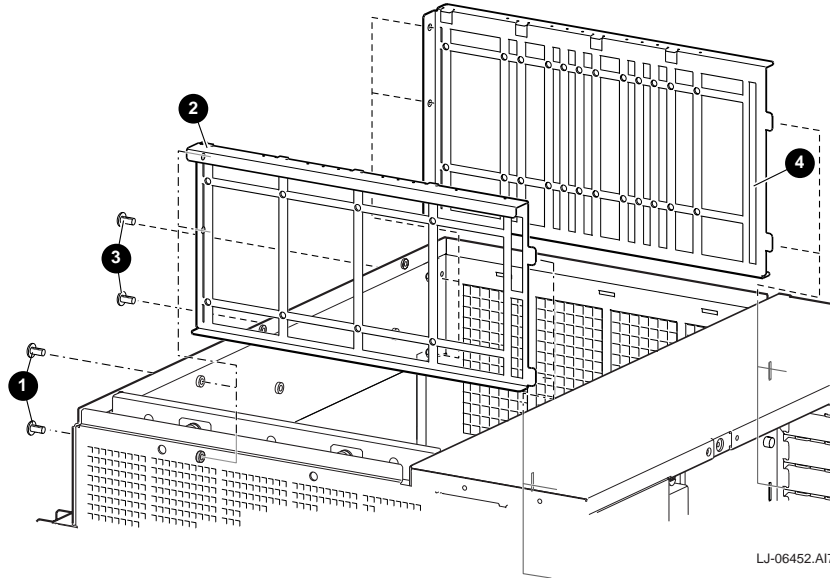

LJ-06451.AI7

8.27 System Motherboard

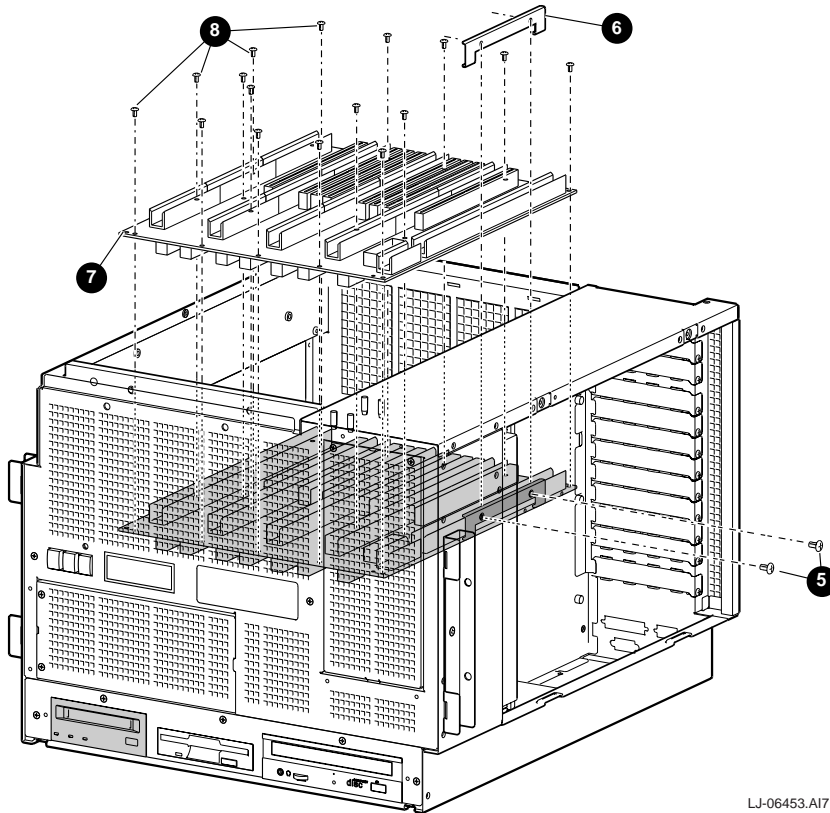Perform the following procedure to remove the system motherboard:

1. Extend the chassis for service (see Section 8.3).

2. Remove the PCI/EISA backplane (see Section 8.25).

3. Remove the top cover (see Section 8.4).

4. Remove all of the memory modules (see Section 8.16).

5. Remove all of the CPU modules (see Section 8.17).

6. Remove the power control module (see Section 8.18).

7. Remove the system bus to PCI bus module (see Section 8.26).

8. Remove the two screws ❶ from the left side of the chassis that secure the front CPU support bracket ❷ to the left card-cage wall (see Figure 8-27).

9. Swing the left end of the front CPU support bracket toward the front of the chassis until the two metal tabs on the right end of the front CPU support bracket can be removed from the slots in the right card-cage wall (see Figure 8-27).

10. Lift the front CPU support bracket from the chassis.

11. Remove the two screws ❸ from the left side of the chassis that secure the rear CPU support bracket ❹ to the left card-cage wall (see Figure 8-27).

12. Swing the left end of the rear CPU support bracket toward the front of the chassis until the two metal tabs on the right end of the rear CPU support bracket can be removed from the slots in the right card-cage wall (see Figure 8-27).

13. Lift the rear CPU support bracket from the chassis.

14. Remove the two screws ❺, from inside the PCI/EISA card-cage area, that secure the motherboard securing bracket ❻ to the right card-cage wall and remove the motherboard securing bracket (see Figure 8-28).

15. Remove the 16 screws ❽ that secure the system motherboard ❼ to the bottom of the chassis (see Figure 8-28).

16. Lift the front edge of the system motherboard until the power connectors on the bottom front edge of the system motherboard disconnect from the power supply junction box.

17. Lift the system motherboard up and out of the chassis.

To replace the system motherboard, refer to Figure 8-27 and Figure 8-28 and reverse steps 1 through 17 of the removal procedure.

Figure 8-27 Removing and Replacing the Front and Rear CPU Support Brackets

LJ-06452.AI7

Figure 8-28 Removing and Replacing the System Motherboard


LJ-06453.AI7

8.28 Power Supply Junction Box

Perform the following procedure to remove the power supply junction box:

1. Extend the chassis for service (see Section 8.3).

2. Remove the PCI/EISA backplane (see Section 8.25).

3. Remove the top cover (see Section 8.4).

4. Remove all of the memory modules (see Section 8.16).

5. Remove all of the CPU modules (see Section 8.17).

6. Remove the power control module (see Section 8.18).

7. Remove the system bus to PCI bus module (see Section 8.26).

8. Remove the power supply (see Section 8.9).

9. Remove the system motherboard (see Section 8.27).

10. Remove the front access cover (see Section 8.10).

11. Remove the four screws ❶ that secure the power supply junction box tabs ❷ from the bottom of the system card-cage area (see Figure 8-29). When reinstalling the power supply junction box, do not tighten these four screws until after reinstalling the system motherboard.

12. While reaching through the front access cover opening in the front of the chassis, lower the front of the power supply junction box and pull it forward until the three metal tabs ❸ on the rear of the power supply junction box come out of the slots ❸ on the mounting bracket (see Figure 8-29).

13. Tilt the power supply junction box ❹ so that the left end is forward, then slide the power supply junction box forward out of the front access cover opening in the front of the chassis (see Figure 8-29).

To replace the power supply junction box, refer to Figure 8-29 and reverse steps 1 through 13 of the removal procedure.

Figure 8-29 Removing and Replacing the Power Supply Junction Box
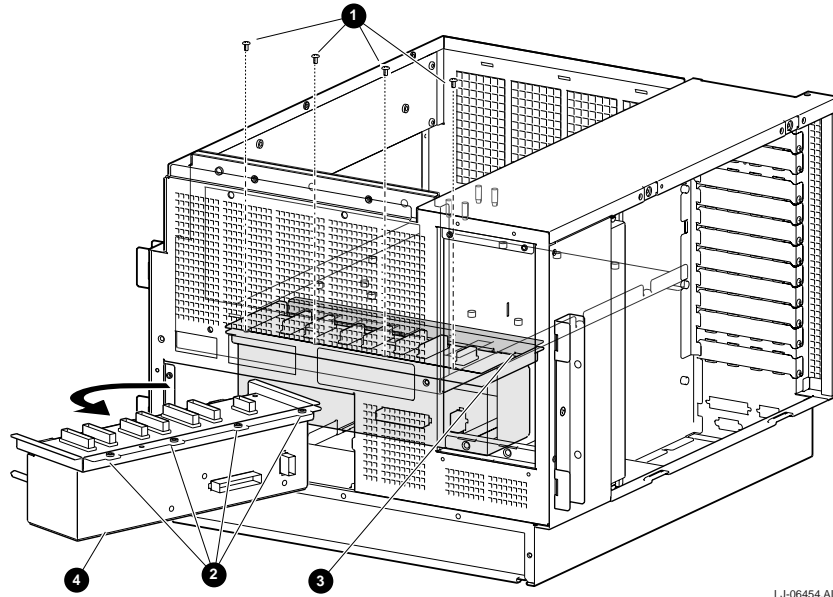

LJ-06454.AI7

8.29 Rear Card-Cage EMI/RFI Honeycomb Filter

Perform the following procedure to remove the rear card-cage EMI/RFI honeycomb filter:

1. Loosen the three captive screws ❶ that secure the rear card-cage EMI/RFI honeycomb filter bracket ❷ to the rear of the chassis (see Figure 8-30).

2. Lift up on the bottom of the rear card-cage EMI/RFI honeycomb filter bracket and slide the bracket to the right (see Figure 8-30).

3. Remove the three metal tabs ❸ at the top of the rear card-cage EMI/RFI honeycomb filter bracket from the three slots in the chassis.

4. Remove the rear card-cage EMI/RFI honeycomb filter bracket and remove the EMI/RFI honeycomb filter element ❹ from inside the bracket.

To replace the rear card-cage EMI/RFI honeycomb filter, refer to Figure 8-30 and reverse steps 1 and 4 of the removal procedure. Ensure that the EMI/RFI gasket on the replacement EMI/RFI honeycomb filter element is toward the front of the chassis.

Figure 8-30 Removing and Replacing the Rear Card-Cage EMI/RFI Honeycomb Filter

LJ-06468.AI7

A
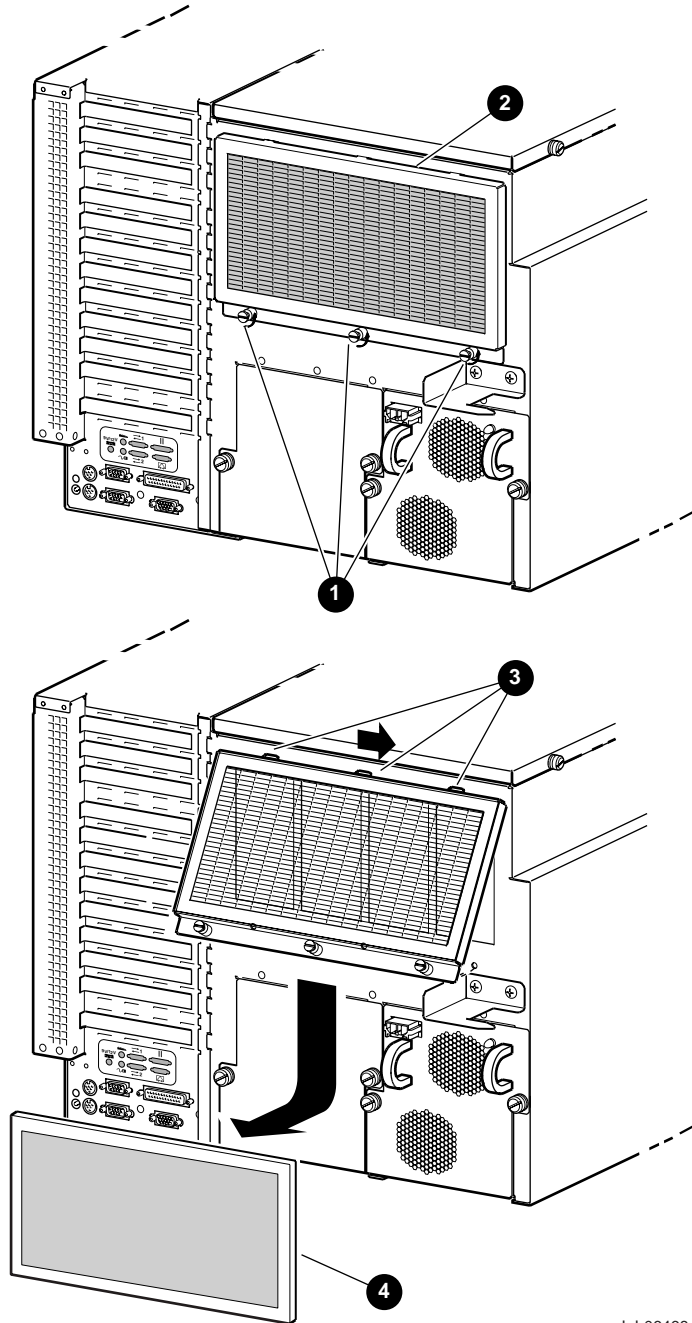
Hardware Specifications

Table A-1 contains the physical, environmental, and electrical specifications for the AlphaServer 4100 central office system.

Table A-1 AlphaServer 4100 Central Office System Specifications

Physical Characteristics	
Chassis	
Weight	47.63 kg (105 lb.)
Length	53.85 cm (21.2 in.)
Width	44.45 cm (17.5 in.)
Height	35.56 cm (14.00 in.)
Environmental Requirements	
Temperature range	10°C to 40°C (50°F to 104°F)
Temperature change rate	11°C/hr (20°F/hr) maximum
Wet bulb temperature (maximum)	28°C (82°F)
Dew point temperature (minimum)	2°C (36°F)
Relative humidity	10% to 95% (noncondensing)
Air intake location	Front
Air exhaust location	Rear
Heat dissipation (maximum)	3330 BTU/hr
Altitude	-60 m to 3353 m (-200 ft to 11,000 ft)
Electrical Requirements	
Nominal voltage	-48 Vdc
Operational voltage range	-36 to -72 Vdc
Input current (maximum)	20.3 A at -48 Vdc
Input power (maximum)	975 W

B
Field Replaceable Units (FRUs)

The major field replaceable units (FRUs) and their part numbers for the AlphaServer 4100 central office system are listed in Table B-1.

Table B-1 AlphaServer 4100 Central Office System FRUs

Part Description	Part Number
CPU Module (replacement for failed modules)	2T-B3005-CA
Memory Module (512 MB)	B3031-FT
Memory Module (64 MB)	2T-B3020-CA
Floppy Drive	RX23L-AA or current model
CD-ROM Drive	RRD46-AA or current model
Power Supply	30-50498-01
Power Supply Junction Box	30-50509-01
OCP Control Module	54-25143-01
OCP Switch Module	54-24366-01
OCP Display Module	30-43049-01
System Card-Cage Fan	12-23609-21
PCI/EISA Card-Cage Fan	12-49698-01
4-Fan Input Tach Alarm Module	30-49510-01
Server Control Module	54-24674-01
PCI/EISA Backplane	54-25565-01
Power Control Module	54-25099-02
System Bus to PCI Bus Module	B3040-AA
System Motherboard	54-23803-01

C
Options

The available options and their part numbers for the AlphaServer 4100 central office system are listed in Table C-1.

Table C-1 AlphaServer 4100 Central Office System Options

Option Description	Part Number
CPU Option Module (DIGITAL UNIX Systems)	2T-KN304-DB
CPU Option Module (OpenVMS Systems)	2T-KN304-DC
CPU Option Module (Windows NT Systems)	2T-KN304-DD
Memory Pair (1 GB)	2T-MS331-FA
Memory Pair (128 MB)	2T-MS320-CA
Hard Disk Drive (4.3 GB)	RZ29L-EB
Hard Disk Drive (9.1 GB)	RZ40-EB
Tape Drive	TLZ10-LG
Redundant Power Supply	H7815-AB

D
Default Jumper Settings

The default jumper settings for the various modules in the AlphaServer 4100 central office system are listed in Table D-1.

Table D-1 Default Jumper Settings

Module	Jumper	Default Setting
PCI/EISA motherboard	J18	Closed (installed)
Server control module	J5	Open (not installed)
	J7	Open (not installed)
OCP control module	J5	Closed (installed)