AlphaServer 2100A

Owner's Guide

Part Number: EK–2100A–OP. A01

Digital Equipment Corporation
Maynard, Massachusetts

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

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

Shielded Cables: If shielded cables have been supplied or specified, they must be used on the system in order to maintain international regulatory compliance.

European Common Market:

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

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

Avertisement! Cet appareil et un appareil de Classe A. Dans un environment résidential, cet appareil peut provoquer des brouillages radioélectriques. Dans ce cas, il peut être demandé de prendre les mesures appropriées.

Japan:

この装置は，第一種情報装置（商工業地域において使用されるべき情報装置）で商工業地域での電波障害防止を目的とした情報処理装置等電波障害自主規制協議会（VCCI）基準に適合しております。

従って，住宅地域またはその隣接した地域で使用すると，ラジオ，テレビジョン受信機等に受信障害を与えることがあります。

取扱説明書に従って正しい取り扱いをして下さい。

Acoustics: Preliminary declared values per ISO 9296 and ISO 7779:

	Sound Power Level L_{WAd}, B	**Sound Pressure Level L_{pAm}, dBA (Bystander Positions)**
Idle	6.5	47
Operating	6.5	47

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

Schallemissionswerte: Verläufige Werteangaben nach ISO 9296 und ISO 7779/DIN EN27779 (10 March 1994).

	Schallelstungspegl L_{WAd}, B	**Schalldruckpegal L_{pAm}, dBA (Zuschauerpositionen)**
Leerlauf	6,5	47
Betrieb	6,5	47

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

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Preface

Purpose of This Guide

This guide, together with the *AlphaServer 2000/2100/2100A Firmware Reference Guide,* describes the hardware and operation of the AlphaServer 2100A system.

Who Should Use This Guide

This book is for system managers and others who are responsible for operating and managing AlphaServer 2100A systems.

Organization of This Guide

This guide contains information about how to use your system to best advantage:

- Chapter 1 introduces the system and describes the hardware components and controls.
- Chapter 2 describes the setup and operation of the system.
- Chapter 3 describes how to identify your system configuration and how to change your configuration, if desired.
- Chapter 4 explains how to identify and resolve problems that may prevent the system from operating correctly.
- Chapter 5 contains system specifications for the pedestal system.
- The glossary defines technical terms related to the AlphaServer 2100A system.

Safety Symbols

Pay particular attention to the warning symbols that appear in this document. These symbols alert you to potential dangers.

Warning: CPU and memory modules have parts that operate at high temperatures. Wait 2 minutes after power is removed before handling these modules.

Warning: For protection against fire, only modules with current-limited outputs should be used.

Conventions

The following table lists typeface conventions used in this guide.

Convention	Meaning
lowercase	Firmware commands are shown in lowercase. However, you can enter firmware commands in uppercase or lowercase.
Warning	Warnings contain information to prevent personal injury.
Caution	Cautions provide information to prevent damage to equipment or software.
[ ]	In command format descriptions, brackets indicate optional elements.
`boot`	Console and operating system commands are shown in this special typeface.
italic type	Italic type in console command syntax indicates a variable.
< >	In console mode on-line help, angle brackets enclose a placeholder for which you must specify a value.
{ }	In command descriptions, braces containing items separated by commas imply mutually exclusive items.
1 2 3…	In some illustrations, a numbered callout labels a part of the illustration. In text, it refers to a labeled part of a corresponding illustration.

Important Related Information

Alpha Firmware Updates

An Alpha Firmware CD-ROM is shipped on an "as released" basis with the Digital UNIX, OpenVMS, and Windows NT operating systems. The Alpha firmware files can also be downloaded from the Internet as follows:

- ftp://ftp.digital.com/pub/Digital/Alpha/firmware/
- http://www.service.digital.com/alpha/server/firmware/

New versions of firmware released between shipments of the Alpha Firmware CD-ROM are available in an interim directory:

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

ECU Revisions

The EISA Configuration Utility (ECU) is used for configuring EISA options and some ISA options on AlphaServer systems. Your AlphaServer 2100A computer came with an ECU kit, which includes the ECU license. Customers who already have the ECU and license, but need the latest revision of the ECU, can order a separate kit. Call 1-800-DIGITAL to order.

If you plan to migrate from Digital UNIX or OpenVMS to Windows NT, you must re-run the appropriate ECU. Failure to run the operating system-specific ECU will cause system failure.

Digital UNIX Information

The following documents contain special instructions related to AlphaServer 2100A systems that run the Digital UNIX operating system. Be sure to read the documents for the version of the operating system shipped with your system.

- *Digital UNIX Release Notes*
- *Digital UNIX Installation Guide*

OpenVMS Patches

Software patches for the OpenVMS operating system are available from the World Wide Web as follows:

http://www.service.digital.com/html/patch_service.html

Choose the "Contract Access" option if you have a valid software service contract with Digital or you wish to become a software contract customer. Choose the "Public Access" option if you do not have a software service contract.

Related Documents

Document	Location
AlphaServer 2100A Basic Installation	Shipped with 2100A pedestal system.
AlphaServer 2000/2100/2100A Firmware Reference Guide	Shipped with 2100A series systems.
Operating system documentation	Shipped with operating system.
Digital Systems and Options Catalog	ftp://ftp.digital.com/pub/Digital/info/SOC/
Wide SCSI Technical Bulletin	http://www.service.digital.com/alpha/server/as2100a/docs/
Supported Options List	ftp://ftp.digital.com/pub/Digital/Alpha/systems/as2100a/docs/ or http://www.service.digital.com/alpha/server/as2100a/docs/
Microsoft Hardware Compatibility Lists	http://www.windowsnt.digital.com/support/hcl/hcl.htm

1 Components and Controls

This chapter is intended to introduce you to the AlphaServer 2100A computer and make you familiar with the system hardware.

In This Chapter

This chapter covers the following components of the AlphaServer 2100A system:

- Operator Control Panel
- Doors and Panels
- System Front
- System Rear
- System Module Locations
- Accessories

System Features

A powerful symmetric multiprocessing (SMP) server, the AlphaServer 2100A system offers departmental computing power and capabilities in a pedestal package. The system is based on Digital's 64-bit, Alpha RISC architecture, which provides fast processing and quick response for advanced applications.

The system resides in the BA740 pedestal enclosure, which is designed for office environments where a compact footprint and low to medium disk storage capacities are required. The enclosure supports up to four CPUs, providing SMP, industry-standard PCI and EISA I/O, and up to 64 gigabytes of in-cabinet storage (400 gigabytes total). Up to 2 gigabytes of high-capacity memory are supported (1 gigabyte on 4-CPU configurations).

System Highlights

Table 1-1 highlights specific characteristics of the AlphaServer 2100A system.

Table 1-1: System Characteristics

	2100A 4/275	2100A 5/250	2100A 5/300
CPU Features			
Symmetric multiprocessing	1–4 processors	1–4 processors	1–4 processors
Processor	Alpha 21064A	Alpha 21164	Alpha 21164
CPU clock speed	275 MHz	250 MHz	291 MHz
Cache size on chip			
(I-cache/D-cache)	16 KB/16 KB	8 KB/8 KB→96 KB (unified L2)	8 KB/8 KB→96 KB (unified L2)
On-board cache (per processor)	4 MB	4 MB	4 MB
In-cabinet CPU upgrade	Yes	Yes	Yes
Memory (maximum)	2 GB (1 GB for 4-CPU config.)	2 GB (1 GB for 4-CPU config.)	2 GB (1 GB for 4-CPU config.)

Internal Storage

16 hot-swap disks (64 GB); 3 removable media; 1 floppy diskette (1.44 MB), 1 CD-ROM (600 MB); RAID 0, 1, 0+1, 5 (optional)

I/O Features

Maximum disk — internal-total/SCSI-2/with Arrays

Internal: 64 GB
SCSI-2: 400 GB
SCSI-2 with arrays: 1000 GB

Maximum I/O throughput

132 MB/sec (PCI); 33 MB/sec (EISA)

I/O support

8 PCI slots, 3 EISA slots

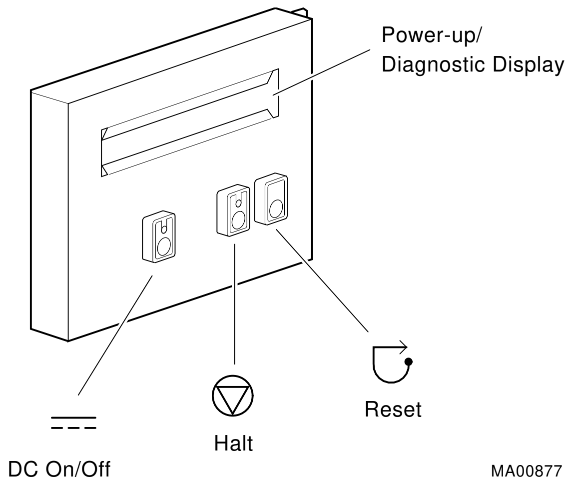
High Availability Features

Auto reboot, memory failover, thermal management, optional redundant power system, optional RAID, disk hot swap, dual SCSI backplane, ECC cache, ECC memory, SMP CPU failover, error logging, optional UPS.

Operator Control Panel

The operator control panel, shown in Figure 1-1, is located on the front of the system. It contains a diagnostic display and power-on, halt, and reset buttons.

Figure 1-1: Operator Control Panel



Power-Up Diagnostic Display

The power-up/diagnostic display gives system status messages during power-up and diagnostics. Use the display to check the results of system self-tests until the console firmware is enabled.

For information about interpreting specific power-up messages, refer to Chapter 2.

DC On/Off Button

The DC On/Off button controls the flow of DC power to the system. Use the DC On/Off button to power the system up or down. The DC On/Off light, located on the DC On/Off button, is lit whenever DC power is present.

Halt Button

The Halt button interrupts an operating system session if you are running Digital UNIX or OpenVMS. The Halt light, located on the Halt button, comes on briefly during the system self-tests. Thereafter, the Halt light comes on and remains lit whenever DC power is present and the Halt button is in the "in" position.

Halt Button and Operating System Boot

Pressing the Halt button to the "in" position before you power up the system boots the SRM console and prevents the operating system from booting.

- To boot the Digital UNIX or OpenVMS operating system, the Halt button must be in the "out" position.
- To boot the Windows NT operating system, the Halt button must be in the "out" position, and you must enter the `arc` command at the SRM console to invoke the ARC console and access the Windows NT Boot menu.

Note

Basic operating system boot instructions are given in Chapter 2. For detailed information on the SRM and ARC consoles, refer to the *AlphaServer 2000/2100/2100A Firmware Reference Guide*.

Invoking SRM Console with the Halt Button

Pressing the Halt button during a Digital UNIX or OpenVMS operating system session invokes the SRM console.

Pressing the Halt button during a Windows NT session has no effect.

Caution

Pressing the Halt button interrupts your Digital UNIX or OpenVMS operating system session. Before pressing the Halt button, shut down your operating system according to the operating system shutdown procedure described in your operating system documentation.

Returning to Operating System Mode

To return to operating system mode from console mode, press the Halt button to the "out" position and reboot the operating system.

Note

If you unintentionally press the Halt button and do not enter commands that disturb the system state, you may be able to resume your operating system session by entering the `continue` command. If the computer is running the OpenVMS operating system, entering the `continue` command after halting the system with Ctrl/P has the same effect.

Reset Button

Pressing the Reset button resets the system. The system stops all current processes, initializes, and performs startup self-tests. Press the Reset button to reset the system if it hangs or to initialize the system if you have changed system settings.

Caution

Pressing the Reset button stops all system processes. Do not press Reset while the operating system is running unless your system has hung and you have exhausted all other ways of terminating the process.

Doors and Panels

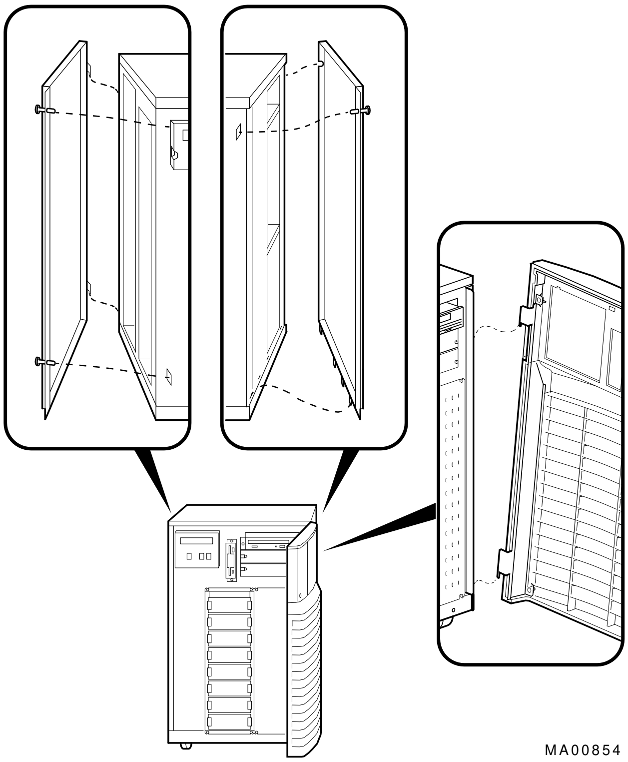
To gain access to system components in the BA740 enclosure, remove the system's side panels, as shown in Figure 1-2.

Caution

Replace side panels before you turn on DC power. The system will not power up if the left panel is not in place.

Do not remove the left panel when the system is running. If you remove the left panel without first properly shutting down the system, the system will power down unexpectedly and you may lose data.

Figure 1-2: Door and Panel Removal



Left Panel

The card cage is located behind the left panel. To access the card cage so that you can insert or remove modules, remove the left panel as shown in Figure 1-2.

Caution

Before removing the left panel:

1. Perform orderly shutdown of the operating system.
2. Turn off DC power by pressing the DC On/Off button to the “off” (O) position.
3. Set the AC On/Off switch on each power supply to the “off” position.
4. Unplug the AC power cord for each power supply.

Right Panel

The system comes with one power supply, unless you ordered a second power supply. The power supply is located behind the right panel. For normal operation, you should not need to access the power supply.

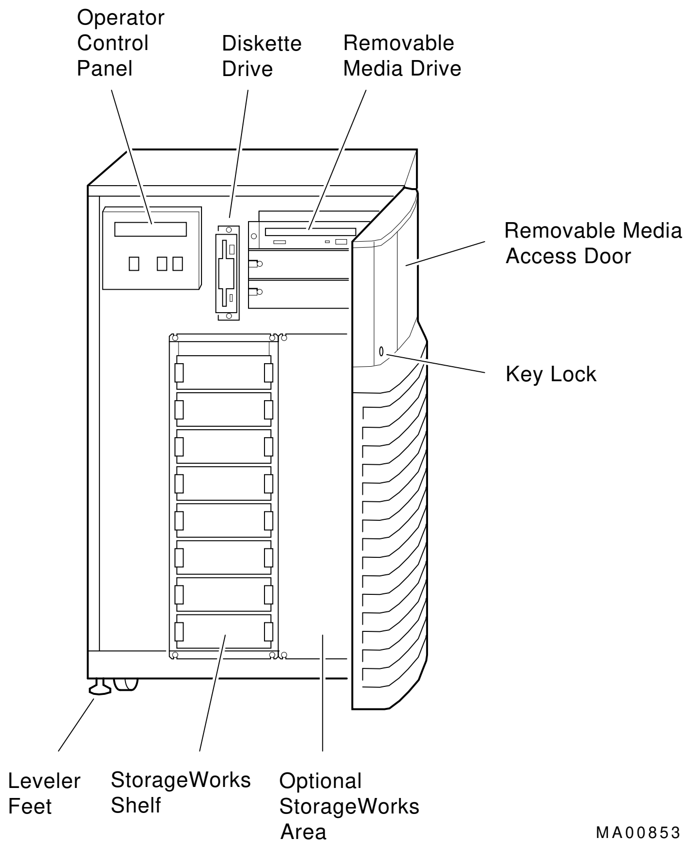
Front Door

Hard disks are located behind the front door. For normal operation, it is not necessary to remove the front door. However, you may remove the front door as shown in Figure 1-2.

System Front

The components located on the front of the enclosure are shown in Figure 1-3.

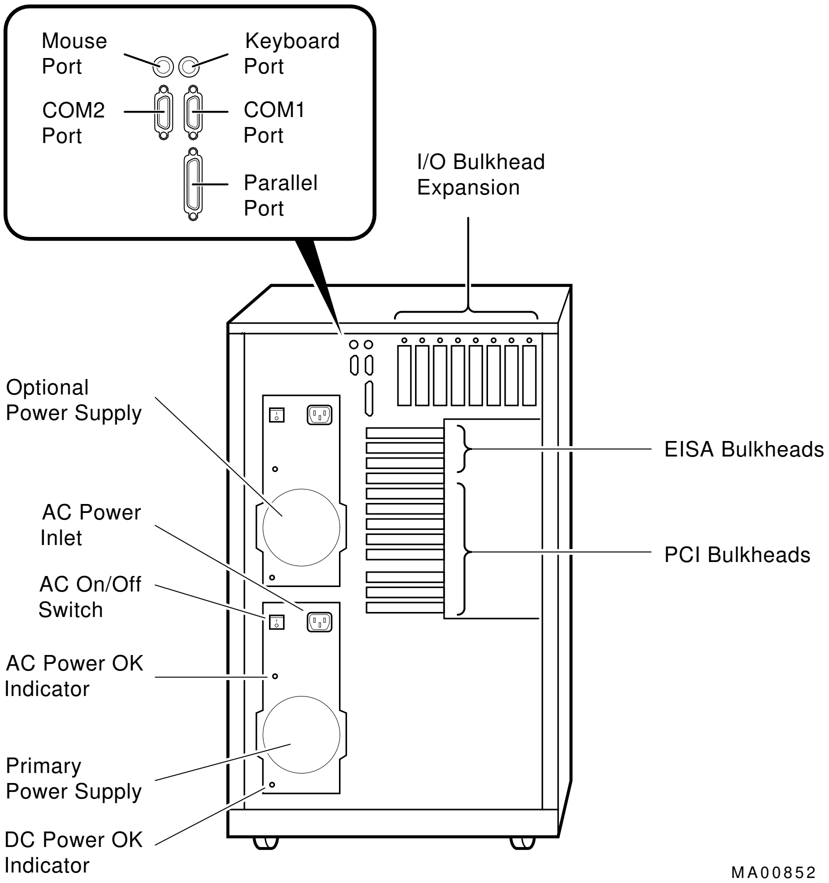
Figure 1-3: Front Components



System Rear

The components and indicators located on the rear of the enclosure are shown in Figure 1-4.

Figure 1-4: Rear Components



Note

The AC Power OK indicator and the DC Power OK indicator are on (green) during normal operation.

System Module Locations

In the BA740 enclosure, system modules, such as CPU modules, memory modules, and PCI or EISA boards, are housed in the card cage behind the left panel of the system. Figure 1-5 shows the locations of modules, and Figure 1-6 shows the physical slot numbering.

To access the card cage, remove the left panel as described in the section "Doors and Panels."

Figure 1-5: Location of Modules and Slots

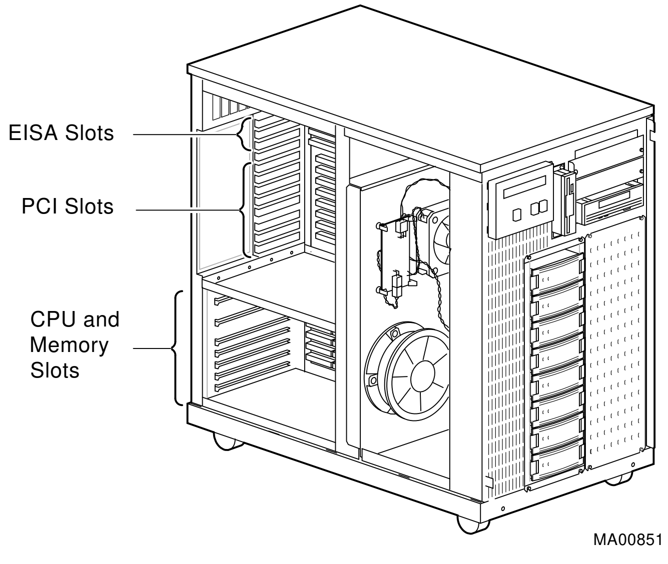
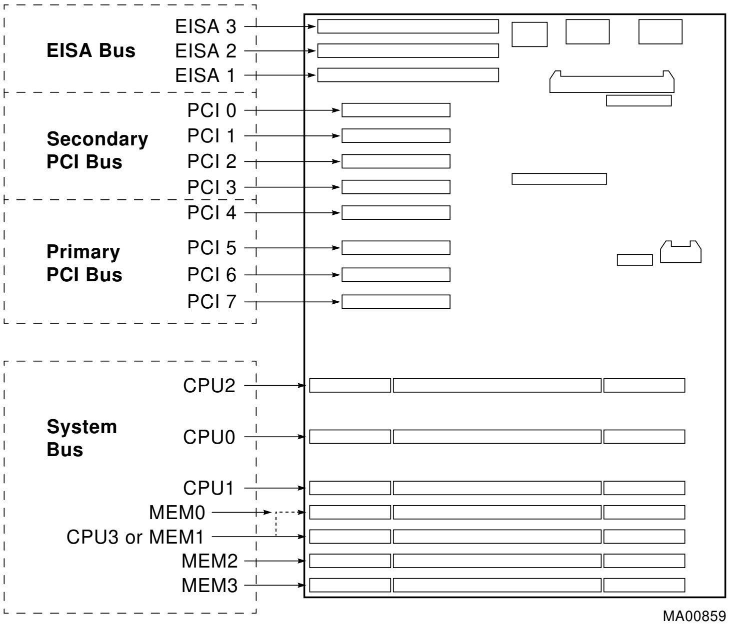


Figure 1-6: System Bus Option Slot Numbering



Accessories

Your system shipment includes a number of accessories. The items in the accessories box vary, depending on what you ordered. At a minimum, the accessories box contains some combination of the items listed below.

ECU diskette (2)	Runs the EISA Configuration Utility (ECU). The system shipment includes two ECU diskettes: one for configuring Digital UNIX and OpenVMS and one for configuring Windows NT.
Keyboard and mouse	For use with graphics monitor.
Primary power cord	Connects AC power to the power supply.
Second power cord	Connects AC power to a second power supply, if you ordered one.
Documentation	Describes system operation, firmware, installation of peripherals ordered with the system.

2

Setup and Basic Operation

This chapter describes how to set up the system and perform basic tasks. Basic system installation is covered in the *AlphaServer 2100A Basic Installation* card. This chapter supplements the installation card and provides additional setup information.

Preparing the Site

Before you set up your AlphaServer 2100A computer, be sure you have properly prepared the site and are familiar with the environmental specifications listed in Chapter 5. In addition, follow the guidelines below for maximum system reliability.

- Be sure you have enough electrical outlets for all the equipment: one for the computer, one for the console terminal, and one for each external peripheral device.
- Provide 15 cm (5.9 in.) of ventilation space behind the computer.
- Make sure the site is well ventilated and that there is adequate lighting.
- Route cables to peripherals out of high traffic areas.
- Make note of cable length restrictions in planning for installation of peripherals.
- Do not use power strips or extension cords to provide electrical power to the computer or peripherals.
- Do not install the computer next to open windows where environmental conditions are not controlled.
- Do not install the computer in areas of heavy traffic.
- Do not use the top of the computer as a storage place for anything.

Connecting a Monitor or Terminal

You can connect either a graphics monitor or a Digital VT-series serial terminal (VT320 minimum) or equivalent to your system. You connect the two types of devices differently, as shown in Figure 2-1. Make sure the DC power to the system is turned off before connecting a monitor or terminal.

- Connect a graphics monitor to an available PCI or EISA bulkhead slot at the rear of the system. Windows NT systems require a graphics monitor.

Note

The cable that connects to the rear of the graphics monitor has multiple plugs. These plugs are either color-coded or coded by letters that indicate the color. Use the coding on the cable and the corresponding coding on the monitor to determine where to attach each cable plug.

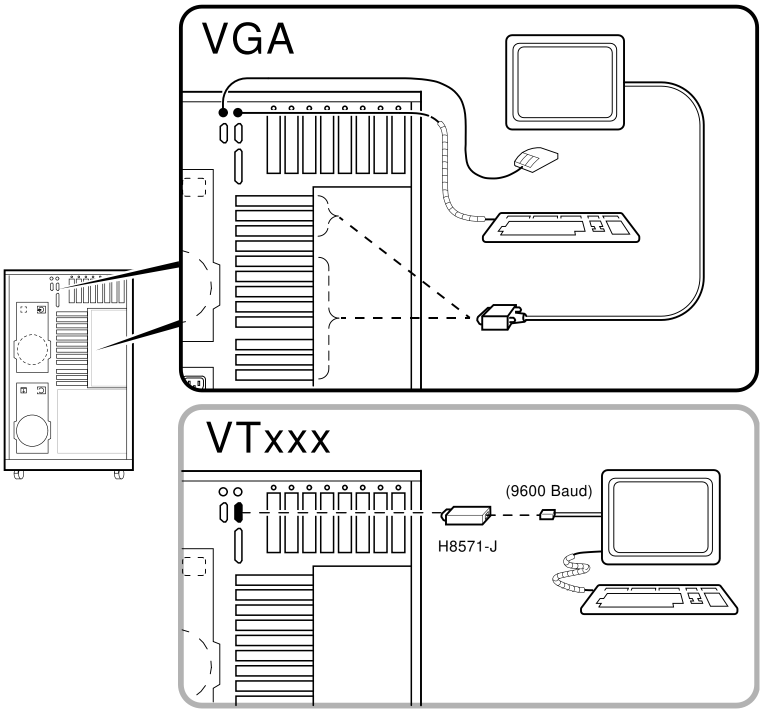
- Connect a VT-series terminal to the COM1 serial port at the rear of the system. You need an H8571-J adapter to make the connection. The adapter is an option and is not shipped with the system unless you ordered it. If you need to order the adapter, call 1-800-DIGITAL (U.S.A. and Canada) or your authorized Digital Partner.

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

Connecting the Keyboard and Mouse

Connect the keyboard and mouse into their respective ports on the rear of the system as shown in Figure 2-1. Make sure the DC power to the system is off before connecting the keyboard and mouse.

Figure 2-1: Monitor, Terminal, Keyboard, and Mouse Connections



ZLXp-E PCI Graphics Accelerator (PBXGA)

If you purchased a ZLXp-E PCI graphics accelerator card for your computer, you need to set an environment variable so that the monitor will synchronize.

The correct setting, displayed with the `show` command, is:

```
P00>>> show tga_sync_green
tga_sync_green          0
```

If your monitor does not synchronize, set the parameter as follows:

```
P00>>> set tga_sync_green 00
```

This command sets all graphics cards to synchronize on a separate vertical SYNC line, as required by some monitors. See your monitor documentation for all other information.

Serial and Parallel Connections

You can connect a printer, modem, and console terminal to your system through the serial and parallel ports at the rear of the system (Figure 2-2).

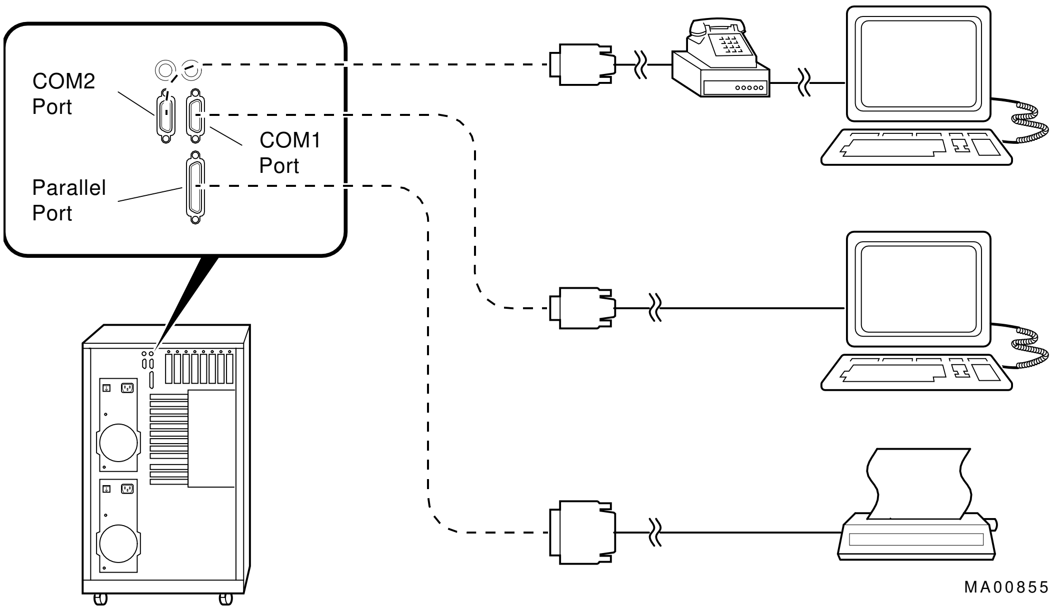
- COM1 is an EIA-232 asynchronous serial port for a VT320 or higher (or equivalent) console terminal.
- COM2 is an EIA-232 asynchronous serial port for a modem that connects to an auxiliary console device.
- The parallel port is the port for connecting a printer.

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

Note

You need the optional H8571-J adapter to make the connection to COM1 or COM2.

Figure 2-2: Serial and Parallel Connections



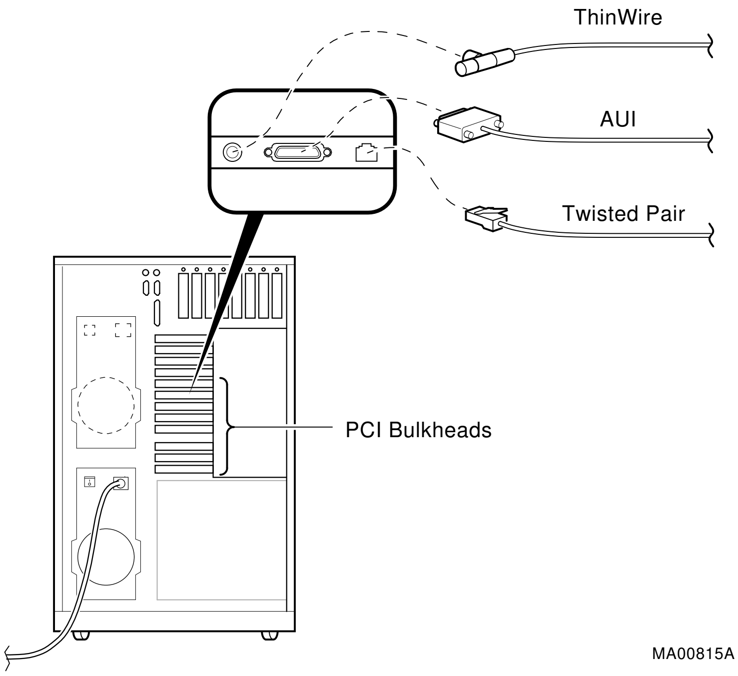
Network Options

An Ethernet adapter is included with the system that allows you to connect the computer to Ethernet/IEEE 802.3. You can connect ThinWire, AUI, or twisted-pair Ethernet cables. Figure 2-3 shows the cable connections.

For information on setting an Ethernet controller to run a ThinWire, AUI, or twisted pair Ethernet network, refer to the “set ew*0_mode” command section in the *AlphaServer 2000/2100/2100A Firmware Reference Guide*.

For more information on the Ethernet adapter, consult the adapter documentation that came in the system accessories box.

Figure 2-3: Ethernet Cable Connections



Moving the System

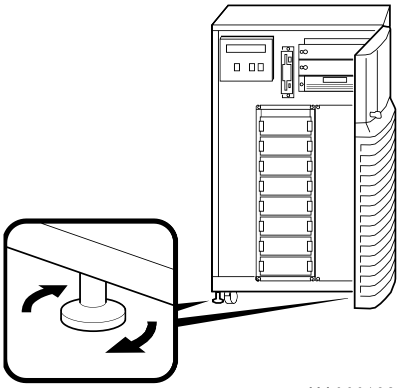
If you need to move your AlphaServer 2100A pedestal system to a new environment, be sure you are familiar with the environmental specifications and power cord requirements described in Chapter 5.

Repositioning the System

To reposition the pedestal system within the same environment, raise the system leveler feet (shown in Figure 2-4) so that they no longer touch the floor, and push the system to the new destination. When you have positioned the system, lower the leveler feet to the floor so that they hold the system stationary.

If you ship your system to a new location, carefully repackage it so that it can withstand the normal bumps or shocks associated with moving.

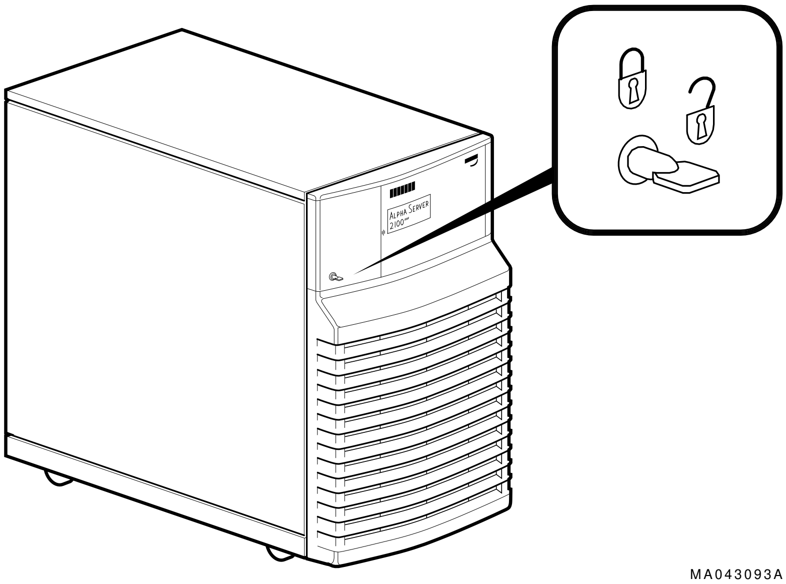
Figure 2-4: Leveler Feet



Opening the System Door

The key used to lock and unlock the front door is packaged with the system installation card. The key lock is shown in Figure 2-5.

Figure 2-5: Front Door Key



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Turning the System On

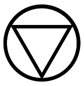
Turn on the system in the sequence shown below and described in the following sections:

1. Check System Settings
2. Power Up the System
3. Check Power-Up Display
4. Perform Pre-Boot Tasks
5. Boot Operating System

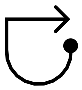
Checking Settings

When the system is off, the DC On/Off button is off (O) and the Halt button should be in the "out" position, and the AC On/Off switch on the power supply should be off (O).

DC On/Off

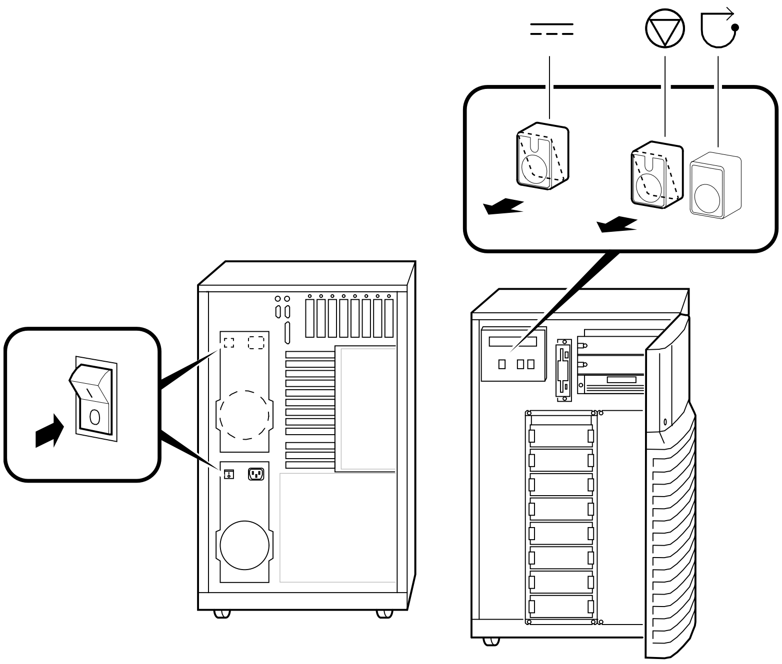


Halt



Reset

Figure 2-6: Powered-Down System Settings



Powering Up

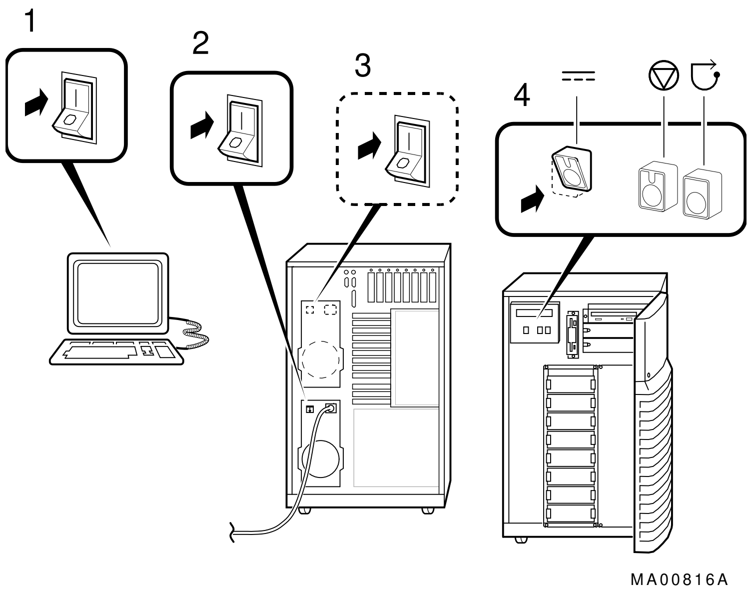
1. Be sure the AC power cord for each power supply is plugged in.
2. Power up any external expansion boxes connected to your system, for example, expansion boxes that house storage devices.
3. Power up the system in the order shown in Figure 2-7:

   Terminal
   AC On/Off switch
   Second AC On/Off switch (if a second power supply is present)
   DC On/Off switch

Caution

Both the left and right panels (shown in Figure 2-2) should be in place before you power up the system. An interlock switch on the left panel prevents the system from powering up if the left panel is not in place.

Figure 2-7: Power-Up Procedure



Displaying Power-Up Information

Power-up information is displayed on the system's console terminal. The console terminal may be either a graphics monitor connected to the VGA module at the rear of the system or a serial terminal connected through the COM1 serial port. The setting of the “console” environment variable determines where the system will display power-up output.

The default setting of the “console” environment variable is “graphics.” If you are using a serial terminal, the power-up display will be blank. Press Return to enter console mode, then set the “console” environment variable to “serial.” This will route the power-up screen to the COM1 serial communication port.

The following example shows the command used to set the console to display power-up output to a serial terminal. Note that you must initialize the system after setting the “console” environment variable. For more information, see the *AlphaServer 2000/2100/2100A Firmware Reference Guide.*

Example:

```
P00>>>  set console serial
P00>>>  init
```

Checking the Power-Up Displays

After you power up the system, check the status of three displays:

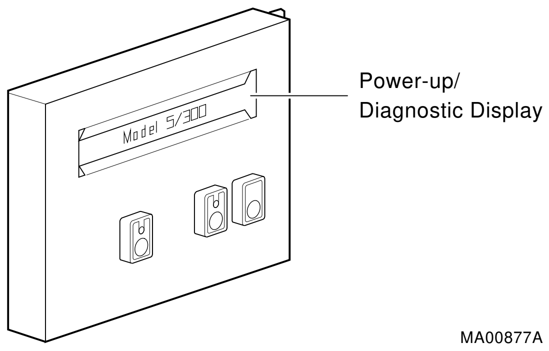
- Power-up/diagnostic display on the operator control panel
- System startup screen display
- Console prompt (Digital UNIX or OpenVMS systems) or Boot menu (Microsoft Windows NT systems)

If any of the displays do not appear as described in the next sections, refer to Chapter 4 for troubleshooting information.

Operator Control Panel Power-Up/Diagnostic Display

The power-up/diagnostic display (Figure 2-8), located on the operator control panel on the front of the system, displays the results of system self-tests during power-up.

Figure 2-8: Power-Up/Diagnostic Display



As self-tests begin, the following message is displayed:

`starting console on CPUn`

When the system has completed self-tests, the message `Model n/nnn` is displayed, where *n* represents the CPU variant and *nnn* represents the system model number—for example, Model 5/300. You can customize this message for your system by changing the value of the "ocp_text" environment variable. Refer to the section on the `set ocp_text` command in the *AlphaServer 2000/2100/2100A Firmware Reference Guide.*

Table 2-2 explains the messages that may appear on the power-up display.

Note

AlphaServer 2100A systems offer high-availability "CPU failover" functionality. On multiprocessor systems, the failover feature allows the system to power up and boot the operating system even if one CPU has failed. The CPU STATUS message described in Table 2-2 indicates the status of each CPU. For more information on CPU failover, see Chapter 4.

Table 2-2: Power-Up Display Messages

Message	Meaning
TEST	Displayed while the system performs diagnostic tests and exercisers. The type of module under test, its slot number, and the currently executing test number, are also displayed.
NO MEM INSTALLED	Displayed if you power up with no memory installed.
FAIL *module_type*	If an error is detected in the CPU, memory, or I/O, a failure message is displayed and the Halt button LED lights for a few seconds. The error is logged to the appropriate module by the serial control bus. In nearly all cases, the power-up tests continue. The module_type and slot number for the module that failed, along with the test number that detected the error, are displayed. Module types and/or slot numbers: CPU_*nn* — CPU module 0, 1, 2, or 3 MEM_*nn*— Memory module 0, 1, 2, or 3 I/O_0 —System backplane
CPU STATUS	Summary of CPU testing—The status of each CPU from right to left, starting with CPU0 is displayed: P — CPU passed F — CPU failed -- — CPU not present
STARTING CPU #	The console is starting the primary CPU.
CONSOLE STARTED	The SRM console has been unloaded from flash ROM and has assumed control of the system.
TEST MEM BANK #\	The console is testing memory.
PROBE I/O SUBSYS	The console is checking the PCI and EISA bridges.
SYSTEM RESET	The Reset button has been pressed.
Model *n/nnn*	When the system is under operating system control, the CPU variant *n* and system model number *nnn* are displayed unless you supply your own text using the ocp_text environment variable.
21164 TIMEOUT	An Alpha 21164 microprocessor IBOX timeout occurred.
3.3V/CLOCK FAIL	A voltage or clock failure occurred on the CPU module.
MEM_yy NVR ERROR	A checksum error occurred in the memory EEROM.

System Startup Screen

The system startup screen will scroll. To redisplay the messages that scroll by, enter the `more el` command when the `P00>>>` console prompt is displayed. This command lists the contents of the event log file to the console terminal one screen at a time.

Note

If your system is configured to run Windows NT, you will need to switch to the SRM console if you wish to use the `more el` command. See the section "Switching from ARC to SRM" in this chapter.

The screen display looks similar to the following example:

```
VMS PALcode X5.48-112, OSF PALcode X1.35-81
starting console on CPU 0
Testing Memory bank 0
Testing Memory bank 1
Configuring Memory Modules
probing hose 0, PCI
probing PCI-to-PCI bridge, bus 1
probing PCI-to-PCI bridge, bus 2
bus 1, slot 1 -- pka -- NCR 53C810
bus 2, slot 0 -- ewa -- DECchip 21040-AA
bus 2, slot 1 -- pkb -- QLogic ISP1020
bus 2, slot 2 -- pkc -- QLogic ISP1020
bus 0, slot 8 -- vga -- S3 Trio64/Trio32
probing hose 1, EISA
starting console on CPU1
Memory Testing and Configuration Status
Module   Size    Base Addr   Intlv Mode  Intlv Unit  Status
  0      128MB    00000000      1-Way        0       Passed
Total Bad Pages 0
Testing the System
Testing the Disks (read only)
Testing the Network
AlphaServer 2100A Console V4.3-130, built on Oct 25 1995 at
19:44:57
P00>>>
```

SRM Console Prompt or ARC Boot Menu

The next display on your console terminal is either a console prompt or a Boot menu, depending on the operating system the system is configured to run.

- If the system is configured for Digital UNIX or OpenVMS, the following console prompt should be displayed:

  ```
  P00>>>
  ```

- If the system is configured for Windows NT, the Boot menu should be displayed.

Example 2-1: ARC Boot menu

```
ARC Multiboot Alpha Version (n.nn)
Copyright (c) 1993--1995 Microsoft Corporation
Copyright (c) 1993--1995 Digital Equipment Corporation

Boot menu:

      Boot Windows NT
      Boot an alternate operating system
      Run a program
      Supplementary menu

Use the arrow keys to select, then press Enter.
```

Note

If you do not see either a console prompt or the Boot menu, press Return several times.

If the screen display on your terminal does not correspond to the operating system that you plan to boot, switch to the other console firmware as described next.

Bootstrap Firmware

The console terminal displays are controlled by the computer's console subsystem, which contains firmware code (software code embedded in hardware) that controls system initialization and bootstrapping.

There are two versions of the firmware. "SRM" firmware supports the Digital UNIX and OpenVMS operating systems. "ARC" firmware supports the Microsoft Windows NT operating system. Consult the *AlphaServer 2000/2100/2100A Firmware Reference Guide* for detailed information on the console firmware.

Switching from SRM to ARC

To switch from the SRM console to the ARC console, enter the `arc` command:

```
P00>>> arc
```

Once the ARC console firmware is loaded and the system is initialized, the Windows NT Boot menu is displayed.

Switching from ARC to SRM

Switch from the ARC console to the SRM console as follows:

1. From the Boot menu, select Supplementary menu.
2. From the Supplementary menu, select Set up the system ….
3. From the Setup menu, select Switch to OpenVMS or Digital UNIX console.
4. Select your operating system, then select the Setup menu and press Enter.
5. When the message "Power-cycle the system to implement the change" is displayed, press the Reset button.

Once the console firmware is loaded and the system is initialized, the SRM console prompt, `P00>>>`, is displayed.

Preboot Tasks

You may need to perform some of the following tasks before booting your operating system.

- Run the EISA Configuration Utility.
- Run the RAID Standalone Configuration Utility (systems with a KZESC-*xx* or KZPSC-*xx* controller).
- Check required environment variable settings.
- Change the way your system powers up or boots.
- Verify your configuration.

The remainder of this section contains more information about each of these tasks.

Running the EISA Configuration Utility

If you have added or moved an EISA or ISA board, you must run the EISA Configuration Utility before booting the operating system. See “EISA Bus Options” in Chapter 3.

RAID Standalone Configuration Utility

If you purchased a StorageWorks RAID Array 200 Subsystem, which includes either a KZESC-*xx* (SWXCR-E*x*) or KZPSC-*xx* (SWXCR-P*x*) controller, you must configure the logical RAID sets before booting or building your operating system. The default factory configuration may not be appropriate for every application. You configure the RAID sets with the RAID Array 200 Standalone Configuration Utility.

The Standalone Utility diskette is in the StorageWorks RAID Array 200 Subsystems kit. For instructions on using the utility, refer to the *StorageWorks RAID Array 200 Subsystems Controller Installation and Standalone Configuration Utility User's Guide*.

AlphaServer 2100A systems configured with RAID and running ARC firmware V4.30 or higher require the RAID Standalone Configuration Utility V3.11. This includes firmware V2.16 for EISA based controllers and V2.19 for PCI based controllers.

Checking Environment Variable Settings (Digital UNIX or OpenVMS)

If you are running Digital UNIX or OpenVMS, you may want to ensure that the settings for the following variables match your configuration. For example, the os_type environment variable for Digital UNIX and OpenVMS should be set to unix/vms. The `set` command used to reset the particular variable is shown in parentheses. For more information about environment variables, refer to the *AlphaServer 2000/2100/2100A Firmware Reference Guide*.

- Operating system (set os_type)
- Ethernet device type (set ew*0_mode)
- Console display device type (set console)
- Speed for Fast SCSI devices (set pk*0_fast)
- Boot device (set bootdef_dev)
- Boot flags (set boot_osflags)

Changing Default Power-Up or Bootstrap

If you want to change the way the system powers up or boots the operating system, you need to change default values for your system's environment variables. Typical changes would be to set the system to autoboot or to change the default boot device.

- For information about changing these variables on a Digital UNIX or OpenVMS system, refer to the *AlphaServer 2000/2100/2100A Firmware Reference Guide*.
- Microsoft Windows NT systems boot automatically. If you do not want your Windows NT system to boot automatically, select Set up autoboot from the Setup menu and choose No when prompted. Refer to the *AlphaServer 2000/2100/2100A Firmware Reference Guide* for more information.

Verifying Your Configuration

Digital UNIX or OpenVMS
Use the following SRM console commands to verify your system configuration.

- `show config`—Displays the buses on the system and the devices found on those buses.
- `show device`—Displays the devices and controllers in the system.
- `show fru`—Displays information and slot location for CPU, memory, and I/O modules installed in the system.
- `show memory`—Displays main memory configuration.
- `set` and `show`—Set and display environment variable settings.

For more information about these commands, refer to Chapter 3.

Microsoft Windows NT
The ARC menu item Display hardware configuration displays the system's hardware configuration, including the ARC boot device names for devices installed in the system. For more information about this menu option, refer to Chapter 3.

For a more complete listing of the options that are recognized by your system, you may want to enter the SRM `show` commands for the Digital UNIX and OpenVMS operating systems.

To enter SRM commands, you must switch from the ARC to the SRM console. For information about switching to the SRM console, refer to "Switching from ARC to SRM," earlier in this chapter. Switch back to the ARC console before booting the Microsoft Windows NT operating system.

Booting an Operating System

You can boot one of the following operating systems:

- Digital UNIX
- OpenVMS
- Microsoft Windows NT

If you did not boot factory installed software or your operating system was not factory installed, refer to Table 2-3 for next steps.

Table 2-3: Booting for the First Time

Condition	Reference
If you have not booted Factory Installed Software	See the Factory Installed Software (FIS) document that came with your system.
If your operating system was not factory installed, and you have not loaded or booted the operating system	See the operating system installation document that came with your system. Windows NT systems come with instructions for installing Windows NT on AlphaServer systems. Be sure to read that information before trying to install Windows NT.

Booting Digital UNIX or OpenVMS Software

Boot the Digital UNIX or OpenVMS operating system as follows:

1. Enter `boot` or `b` at the P00>>> console prompt and press Return. When you enter `boot` or `b`, the system uses default values for the boot device and boot flags unless you specify the boot device or boot flags on the command line.

   For example, the following command autoboots a Digital UNIX system to multiuser mode from the SCSI disk, dka0:

   ```
   P00>>> boot -flags a dka0
   ```

   The following command boots an OpenVMS system from the Ethernet device, ewa0. The default root directory (SYS0.SYSEXE) is used, and the system boots to the SYSBOOT prompt (-flags 0,1).

   ```
   P00>>> boot -flags 0,1 ewa0
   ```

2. After a few minutes, the operating system login banner is displayed on the console terminal. Log in at the login prompt. When the operating system prompt is displayed, you can begin normal software operation.

Note

For information about boot device names, refer to the “show device” section in Chapter 3 of this book. For information on setting an alternative boot device or boot flags, refer to the description of the `set bootdef_dev` command and the `set boot_osflags` command in the *AlphaServer 2000/2100/2100A Firmware Reference Guide*.

Booting Microsoft Windows NT Software

If you are booting Microsoft Windows NT, the Windows NT Boot menu should be displayed (refer to Example 2-1).

Microsoft Windows NT boots automatically after the Boot menu is displayed for the specified countdown period.

Autobooting an Operating System

On systems running Digital UNIX or OpenVMS, the auto_action environment variable lets you set the default action the system takes on power-up, reset, or after an operating system crash. For maximum system availability, the variable can be set to cause the system to automatically reboot the operating system after most system failures.

Windows NT auto reboots by default, but lets you specify a countdown value so you can stop the system from booting if you need to carry out other tasks from the console firmware.

For detailed information on setting auto reboot, see the *AlphaServer 2000/2100/2100A Firmware Reference Guide.*

Setting Digital UNIX or OpenVMS to Autoboot

The default console action on Digital UNIX or OpenVMS systems is “halt.”

1. To set the default action to “boot,” enter the following command.
```
P00>>> set auto_action boot
```
2. Ensure that the bootdef_dev environment variable is set to the device from which you want the operating system to boot. In this example the device is the Ethernet port, ewa0.
```
P00>>> show bootdef_dev
bootdef_dev    ewa0.0.0.3000.0
```
3. Initialize the system.
```
P00>>> init
```

Setting Windows NT to Autoboot

The default action for the Windows NT operating system is to autoboot at power-up and after a reset or system crash. If your Windows NT system is not set to autoboot, reset it as follows:

1. Step through the ARC menus to the Setup menu.
2. Choose Setup autoboot, and enter Yes when prompted.
3. Enter a countdown value in seconds.
4. Save the system setup.

Turning the System Off

Before You Begin

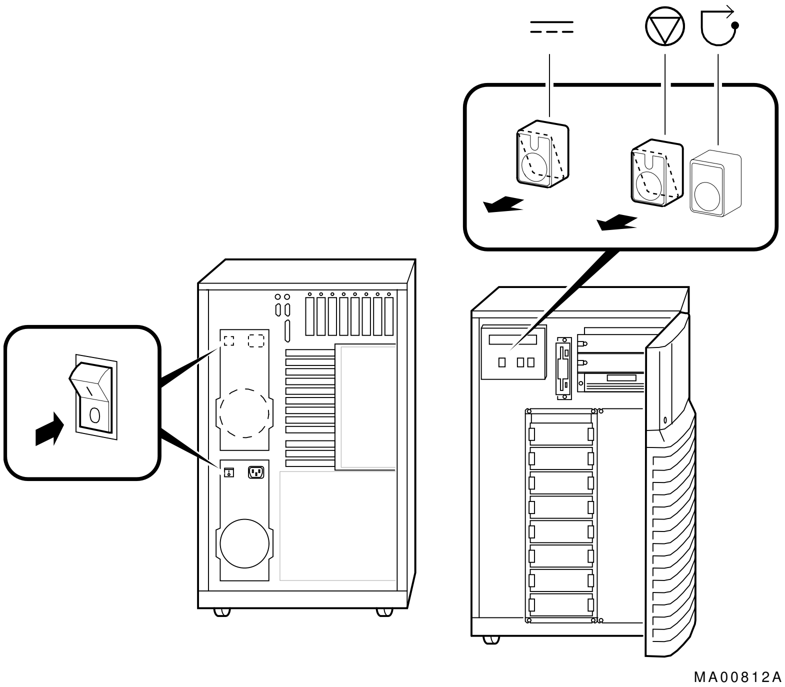
You may not need to power down the system to recover from some hangs and other problems. First try pressing the Reset button on the operator control panel.

Turning Off DC Power

To turn off your system:

1. Shut down the operating system. Refer to the shutdown procedure in your operating system documentation.
2. After you shut down the operating system, press the DC On/Off button to the off (O) position, as shown in Figure 2-9.
3. Set the Halt button to the "out" position. If the Halt button is in, the system will not boot when you power up.

Figure 2-9: Turning Off the System



Extended Power-Down

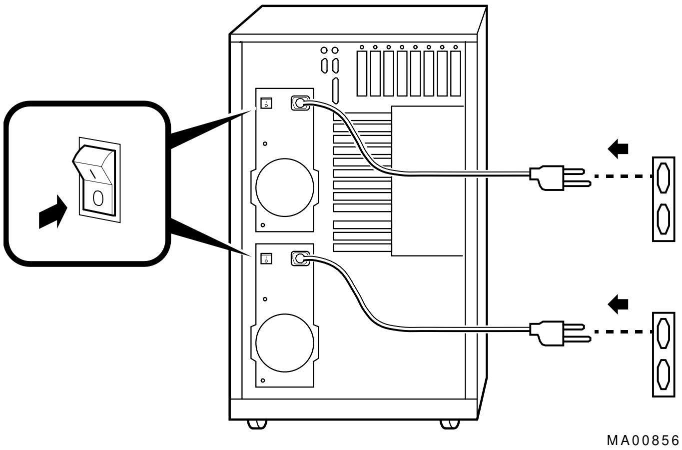
To shut down the system for an extended period:

1. Turn off DC power as described in the previous section.
2. Turn off AC power (Figure 2-10).
3. Remove the system power plugs (Figure 2-10).

Caution

If two power supplies are present, unplug the AC power cord for each power supply.

Figure 2-10: Extended Power-Down Settings



Console Mode

A console terminal is required for your system. You can connect either a graphics monitor or a Digital VT-series terminal or equivalent. The console terminal is used to configure the system and boot the operating system. From the console terminal, you can issue commands to the system when the operating system is not running.

Console mode is the state in which the system and the console terminal operate under the control of the console firmware rather than the operating system. When you issue commands from the console terminal and firmware is executing, the system is in console mode.

On Digital UNIX and OpenVMS systems, the console mode prompt is `P00>>>.` You can use control characters and supported keys to enter console commands at the console mode prompt, as described in the *Firmware Reference Guide.*

On Windows NT systems, a menu interface is used in console mode.

Invoking Console Mode

Invoke console mode by shutting down the operating system according to the operating system shutdown procedure described in your operating system documentation.

- Pressing the Halt button on the operator control panel invokes console mode if you are running Digital UNIX or OpenVMS. However, invoke console mode with the Halt button only if you are unable to shut down the Digital UNIX or OpenVMS operating system using the proper software shutdown procedure.
- Pressing the Halt button has no effect if you are running Microsoft Windows NT.

Remote Console Access

If you are running Digital UNIX or OpenVMS, you can invoke console mode from a remote terminal.

1. Connect the remote terminal to the system through the COM1 or COM2 port at the rear of the system (refer to Figure 2-2). The optional H8571-J adapter is required for the connection.
2. Shut down the operating system.
3. When the shutdown has completed, press Return. The console prompt `P00>>>` is displayed.

Switching Between Operating Systems

You can switch between the operating systems that you have installed on the AlphaServer 2100A system by following the instructions below. However, you first need to be familiar with the ARC and SRM console firmware and the EISA Configuration Utility.

Caution

You must run the EISA Configuration Utility when you switch between Windows NT and Digital UNIX or OpenVMS. Not all options are supported under all of the operating systems. Before you run the ECU, check the *AlphaServer 2100A Supported Options List* (see the Internet address listed in the Preface) for the requirements for the operating system to which you are switching.

Switching Between Digital UNIX and OpenVMS

1. Invoke the SRM console mode by shutting down the operating system, using the proper software shutdown procedure.
2. Follow the operating system boot procedure for either Digital UNIX or OpenVMS.

Switching from Digital UNIX or OpenVMS to Microsoft Windows NT

1. Invoke the SRM console mode by shutting down the operating system, using the proper software shutdown procedure.
2. Insert the ECU diskette containing the configuration files for Windows NT.
3. Run the EISA Configuration Utility (ECU) from that diskette. For information about running the ECU, refer to “Configuring EISA and ISA Options” in Chapter 3.
4. Remove the ECU diskette. At this point, you are using the ARC console.
5. Boot Windows NT from the Boot menu.

Switching from Microsoft Windows NT to Digital UNIX or OpenVMS

1. If you are booting Digital UNIX or OpenVMS, select Switch to OpenVMS or Digital UNIX console from the Setup menu and press Enter.
2. Insert the ECU diskette containing the configuration files for Digital UNIX and OpenVMS.
3. Run the EISA Configuration Utility (ECU) from that diskette. For information about running the ECU, refer to “Configuring EISA and ISA Options” in Chapter 3.
4. Remove the ECU diskette.
5. Follow the operating system boot procedure for either Digital UNIX or OpenVMS.

Operating Removable Storage Devices

The following sections describe how to insert and remove storage media into removable-media drives.

Before You Operate Storage Devices

Typically, you must set up a device before you can begin using it. You set up a device while the operating system is running.

- On Digital UNIX systems, use the (mount) command.
- On OpenVMS systems, use the (MOUNT) command.
- On Windows NT systems, use the Disk Administrator.

Refer to your operating system documentation for more information about how to set up a device.

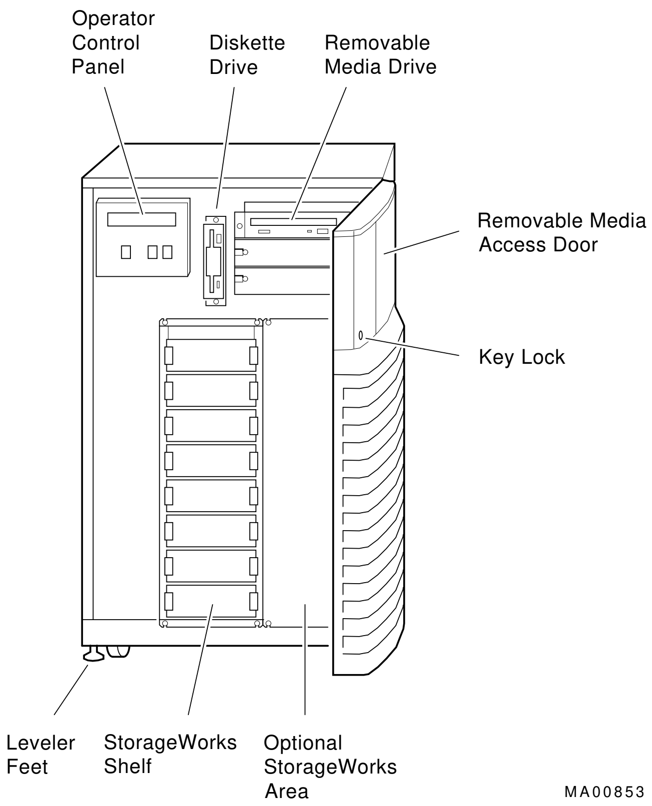
Storage Compartments

The computer has one 3.5-inch floppy diskette drive and one CD-ROM drive. The CD-ROM drive uses one 5.25 half height (HH) bay in the removable media drive area.

The system also supports tape devices mounted in 5.25-inch HH bays. With the CD-ROM installed, you can install either two 5.25 HH tapes or one 5.25 full height (FH) tape.

Storage compartments are at the front of the system, as shown in Figure 2-11.

Figure 2-11: Storage Compartments



Operating a CD-ROM Drive

Your system may have one of two types of CD-ROM drives: a caddyless drive or one that must be used with a disc caddy.

Caution

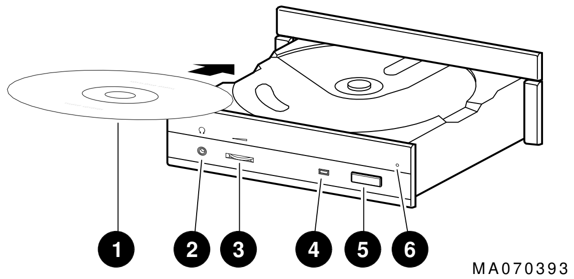
Handle a disc by its edges. Do not touch the surface of a compact disc. Fingerprints and dust can render the disc unreadable.

Caddyless Drive

Figure 2-12 shows the components of a caddyless CD-ROM drive.

1	Compact disc
2	Headphone port
3	Headphone volume control
4	Busy light
5	Eject button
6	Manual eject hole

Figure 2-12: Caddyless CD-ROM Drive

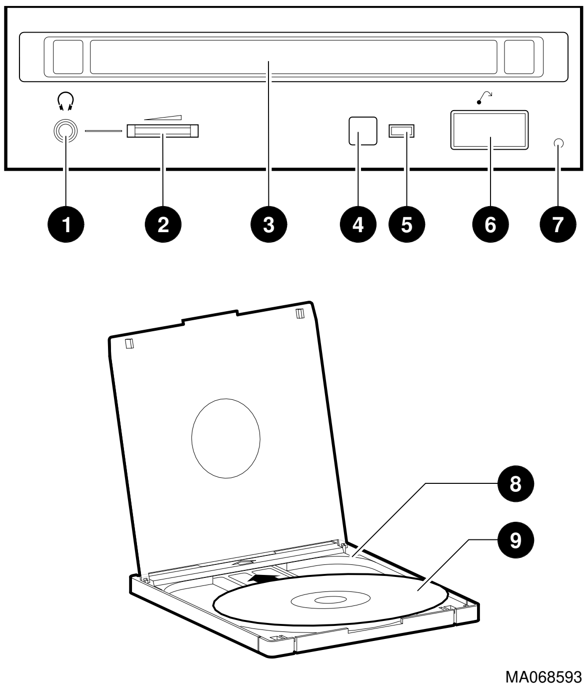


Drive with Caddy

Figure 2-13 shows the components of a CD-ROM drive with a disc caddy.

1	Headphone port
2	Headphone volume control
3	Disc caddy slot
4	ID dimple
5	Busy light
6	Eject button
7	Manual eject hole
8	CD-ROM caddy
9	Compact disc

Figure 2-13: CD-ROM Drive with Caddy



Inserting and Removing a Compact Disc

Caddyless Drives

Insertion: (Figure 2-14)

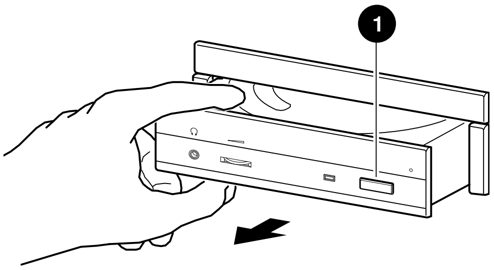
1. Press the drive Eject button **(1)**. The disc drawer ejects part way.
2. Gently pull the disc drawer far enough out so that you can insert the compact disc.
3. Insert the disc into the drawer.
4. Push the drawer back in.

The busy light comes on. When the busy light goes off, the drive is ready to use. To operate the drive, follow the instructions provided with your system software.

Removal: (Figure 2-14)

1. Press the drive Eject button **(1)**. The disc drawer ejects part way.
2. Gently pull the drawer out far enough so that you can remove the compact disc.
3. Remove the compact disc.
4. Push the drawer back in.

Figure 2-14: Inserting and Removing a Caddyless Compact Disc



Drives with Caddy

Insertion: (Figure 2-15)

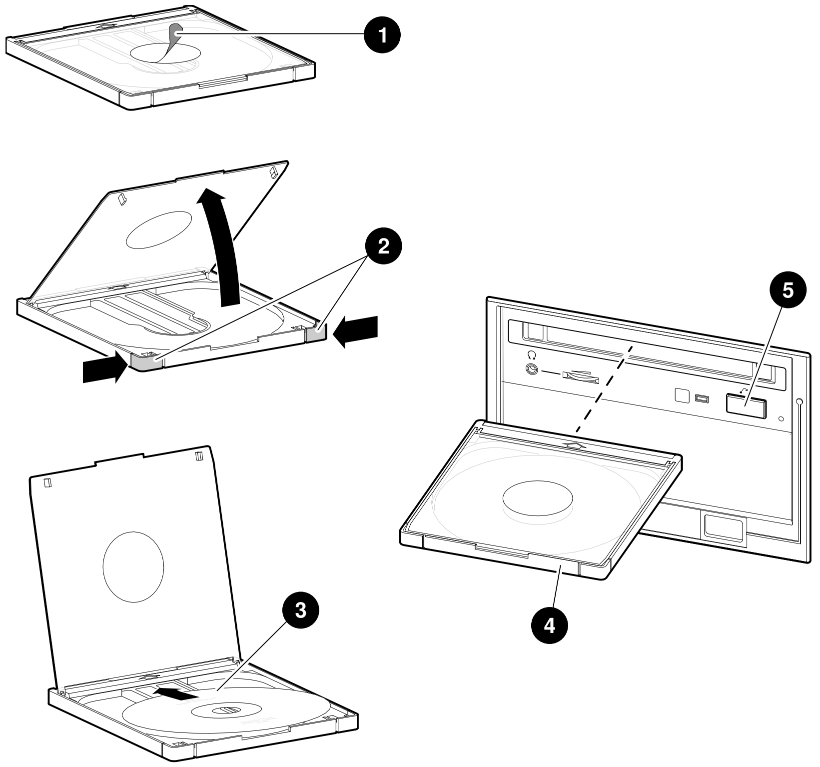
1. Gather both the caddy and the disc you wish to insert.
2. If there is a protective film on the center of the caddy lid, remove the film **(1).**
3. Open the caddy by pressing the tabs on both sides of the caddy at the end opposite the shutter **(2).**
4. Place the disc, printed side up, in the caddy **(3).**
5. Press firmly on both corners to close the caddy lid.
6. Insert the caddy into the drive **(4).** Push the caddy gently into the drive as far as it will go. The caddy should be completely inside the drive when properly inserted.

   The busy light comes on when the caddy has been inserted correctly.
7. When the busy light goes off, the drive is ready to use. To operate the drive, follow the instructions provided with your system software.

Removal: (Figure 2-15)

1. Press the Eject button (**5**). The caddy ejects part way.
2. Remove the caddy from the drive.

Figure 2-15: Inserting and Removing a CD-ROM Caddy



Operating a DAT Tape Drive

DAT Description

A DAT tape drive stores information on removable tape cartridges. Figure 2-16 shows the components of a DAT drive.

1	Tape/activity light
2	Write-protect light
3	Tape cassette slot
4	Tape unload button
5	Tape cassette
6	Write-protect switch (write-protected position)
7	Write-protect switch (write-enabled position)

Inserting a Tape

To insert the tape into a DAT drive (Figure 2-16):

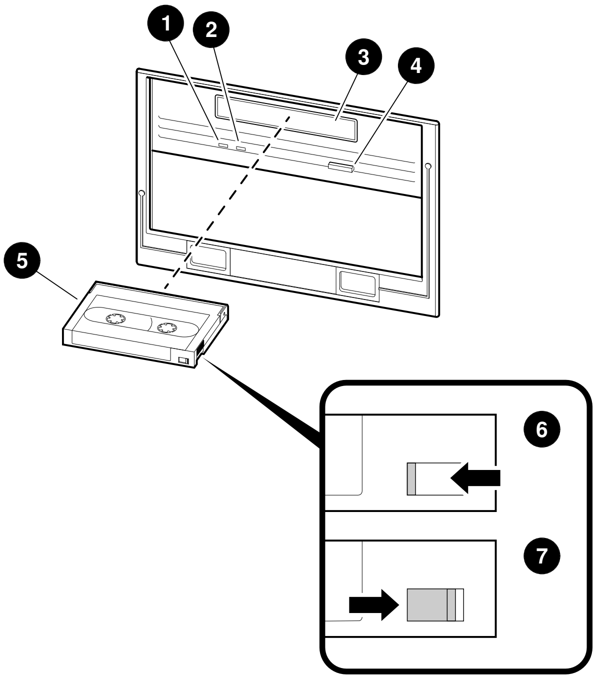
1. Check to see that the tape/activity light **(1)** on the drive is unlit. If it is lit, there is already a tape in the drive. Remove the tape from the drive before continuing. (See “Removing a Tape.”
2. Set the write-protect switch on the tape that you wish to insert to either the write-protected **(6)** or write-enabled **(7)** position.
3. Insert the tape into the drive, with the tape oriented as shown in **(5)**.

Removing a Tape

To remove a tape from a DAT drive (Figure 2-16):

1. Check to see that the tape/activity light **(1)** is on steady green (not flashing). If the tape/activity light is flashing, the drive has not finished completing a data transfer. Wait until the tape/activity light comes on steady green before proceeding.
2. Press the unload button **(4)** to eject the tape. The tape ejects part way.
3. Remove the tape from the drive.

Figure 2-16: Inserting and Removing a Tape (DAT)



Operating a Diskette Drive

Diskette drives read information from, or write it to, removable diskettes. Figure 2-17 shows a diskette and the components of a diskette drive.

1	Eject button
2	Busy light
3	Write-protect switch
4	Write-protect switch (write-protected position)
5	Write-protect switch (write-enabled position)

Inserting a Diskette

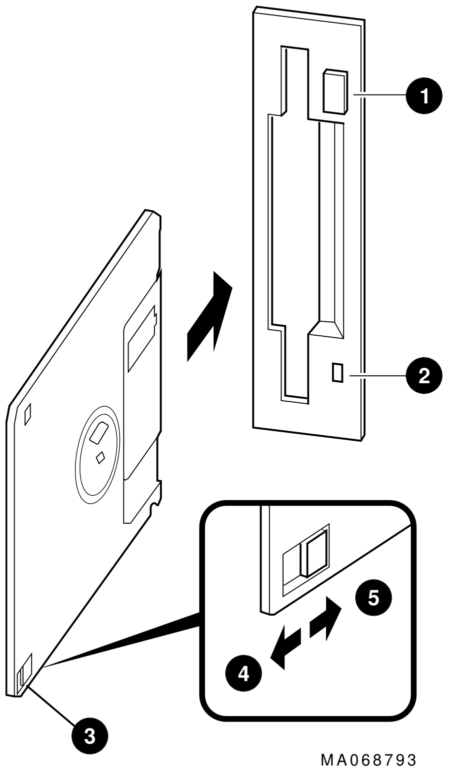
Insert a diskette into a diskette drive as shown in Figure 2-17.

1. Set the write-protect switch on the diskette **(3)** to either the write-protected **(4)** or write-enabled **(5)** position.
2. Insert the diskette into the drive as shown.

Removing a Diskette

Remove a diskette by pressing the Eject button on the diskette drive **(1)**, as shown in Figure 2-17.

Figure 2-17: Diskette Insertion and Removal



Operating a QIC Drive

QIC tape drives read information from or write it to removable tapes. Figure 2-18 shows a QIC tape drive and a compatible tape.

Inserting a QIC Tape

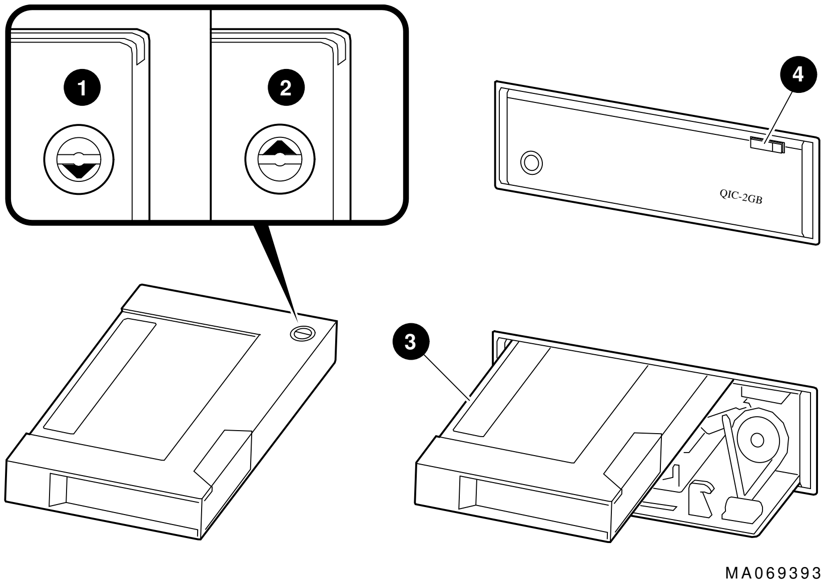
Insert a QIC tape into a QIC tape drive as follows:

1. Set the write-protect switch on the tape to either the write-protected **(1)** or write-enabled **(2)** position.
2. Insert the tape into the drive **(3).**

Removing a QIC Tape

Remove a QIC tape by pressing the Eject button on the QIC tape drive **(4)**.

Figure 2-18: QIC Tape Insertion and Removal



3

Configuring the System

This chapter explains the configuration of the AlphaServer 2100A series system.

In this Chapter

This chapter covers the following information:

- Verifying System Configuration
- Configuring System Options
- System Bus
- EISA Bus Options
- ISA Bus Options
- PCI Bus Options
- SCSI buses
- Power Supply Configurations
- Upgrades
- Supported Options

Verifying Your System Configuration

Examining System Settings

Several SRM console commands and ARC menu options allow you to examine system configuration and environment variable settings.

To use these commands or menu options, invoke console mode, as described in the section "Invoking Console Mode" in Chapter 2.

Firmware Menu Options for Microsoft Windows NT

The following ARC menu options are used to verify system configuration on systems running the Microsoft Windows NT operating system.

- The Display hardware configuration item on the Supplementary menu displays the ARC boot device names for devices installed in the system.
- The Set default environment variables item on the Setup menu allows you to select values for ARC firmware environment variables.

The next sections describe these menu options.

Viewing ARC Hardware Display

To view the hardware configuration on systems running the Microsoft Windows NT operating system, choose the Display hardware configuration menu item from the Supplementary menu and press Enter.

There are several parts to the hardware display:

- The first screen displays processor information, the amount of memory installed, and the type of video card installed.
- The second screen displays the boot devices.
- The third and fourth screens display information about the adapters installed in the system's EISA and PCI slots, respectively.

Example 3-1 shows a sample ARC hardware configuration display. Table 3-1 explains the meaning of device names listed under "Devices detected by the firmware."

Note

The hardware configuration display does not list tape drives or network devices.

Example 3-1: Sample Hardware Configuration Display

```
Alpha Processor and System Information:

   Processor ID       21164
   Processor Revision 2.2
   System Revision    0x0
   Processor Speed    250.00 MHz
   Physical Memory    512 MB


Extended Firmware Information:
   Version: 4.43 951101.1202


NVRAM Environment Usage: 52%
   (540 of 1024 bytes)

Video Option detected:

   24 Plane Frame Buffer video card:  ZLXp-E2


 Press any key to continue...
```

```
                              Monday, 11-13-1995    5:05:23 PM
Devices detected by the firmware:

eisa(0)video(0)monitor(0)
multi(0)key(0)keyboard(0)
eisa(0)disk(0)fdisk(0)     (Removable)
multi(0)serial(0)
multi(0)serial(1)
scsi(0)disk(1)rdisk(0)  (RAW)             DEC  RZ28  (C) DECD41C
scsi(0)disk(2)rdisk(0)  (RAW)             DEC  RZ28  (C) DECD41C
**scsi(0)tape(5)tape(0)                   DEC  TLZ06 (C)DEC0491

scsi(0)cdrom(6)fdisk(0) (Removable)       DEC RRD45  (C) DEC 1084
scsi(1)disk(8)rdisk(0)  (2 Partitions)    MYLEX DAC960
scsi(1)disk(9)rdisk(0)  (RAW)             MYLEX DAC960
scsi(1)disk(10)rdisk(0) (RAW)             MYLEX DAC960

** --> Devices detected but not supported by the firmware.

 Press any key to continue...
```

```
                          Monday, 11-13-1995    5:05:23 PM

PCI slot information:

Bus    Device  Function Vendor Device Revision Interrupt Device
Number Number  Number   ID     ID     ID       Vector     Type
------ ------- -------- ------ ------ -------- --------- ------
0         0      0        1011    2      23        22      Ethernet
0         1      0        1000     1      1        21      SCSI
0         2      0        8086   482      3         0      EISA bridge
0         7      0        1011     4      3        24      Video card

 Press any key to continue...

                          Monday, 11-13-1995    5:05:23 PM

EISA slot information:

Slot   Device    Identifier
0      Other     DEC2A01
4      Display   PHI8041
6      Unknown   ADP0001
7      Disk      MLX0075
0      Disk      FLOPPY

Press any key to continue...

                          Monday, 11-13-1995  5:05:23 PM

Copyright (c) 1993-1995 Microsoft Corporation
Copyright (c) 1993-1995 Digital Equipment Corporation
```

Table 3-1: Device Names

Name	Description
multi(0)key(0)keyboard(0) multi(0)serial(0) multi(0)serial(1)	The multi() devices are located on the system module. These devices include the keyboard port and the serial line ports.
eisa(0)video(0)monitor(0) eisa(0)disk(0)fdisk(0)	The eisa () devices are provided by devices on the EISA bus. These devices include the monitor and the floppy drive.
scsi(0)disk(0)rdisk(0) scsi(0)cdrom(6)fdisk(0)	The scsi () devices are SCSI disk or CD-ROM devices. These examples represent installed SCSI devices. The disk drive is set to SCSI ID 0, and the CD-ROM drive is set to SCSI ID 6. The devices have logical unit numbers of 0.

Viewing ARC Environment Variables

To view the default ARC environment variables, select the Set default environment variables item from the Setup menu. You will see a display similar to Example 3-2. Table 3-2 explains the environment variables listed in the example.

Example 3-2: Set Default Environment Variables Display

```
Use Arrow keys to select a variable, ESC to exit:

      Name:
      Value:

Environment variables:

CONSOLEIN=multi()key()keyboard()console()
CONSOLEOUT=eisa()video()monitor()console()
FWSEARCHPATH=scsi()disk(0)rdisk()partition(1)
TIMEZONE=PST8PDT
A:=eisa()disk()fdisk()
FLOPPY2=N
FLOPPY=1
AUTOLOAD=YES
COUNTDOWN=10
KEYBOARDTYPE=0
VERSION=4.xx
ENABLEPCIPARITYCHECKING=FALSE
```

Table 3-2: ARC Firmware Environment Variables

Variable	Description
CONSOLEIN	The console input device. The default value is multi()key()keyboard()console().
CONSOLEOUT	The console output device. The default value is eisa()video()monitor()console().
FWSEARCHPATH	The search path used by the ARC firmware and other programs to locate particular files. The default value is the same as the SYSTEMPARTITION environment variable value.
TIMEZONE	The time zone in which the system is located. This variable accepts ISO/IEC9945-1 (POSIX) standard values.
A:	The default diskette drive. The default value is eisa()disk()fdisk().
FLOPPY2	The capacity of an optional second diskette drive, either N (not installed), 1, 2, or 3.
FLOPPY	The capacity of the default diskette drive, either 1 (1.2 MB), 2 (1.44 MB), or 3 (2.88 MB).
AUTOLOAD	The default startup action, either YES (boot) or NO or undefined (remain in ARC firmware).
COUNTDOWN	The default time limit in seconds before the system boots automatically when AUTOLOAD is set to yes. The default value is 10.
KEYBOARDTYPE	The keyboard language. The default is 0 (zero) for U.S. (English).
VERSION	The firmware version.
ENABLEPCIPARITY-CHECKING	When set to the default value (FALSE), disables parity checking on the PCI bus in order to prevent machine check errors that can occur if the PCI device has not properly set the parity on the bus. Also allows peripheral devices that do not fully conform to the PCI specification to be used without generating parity errors.

For More Information

For a more complete listing of the options that are recognized by your Microsoft Windows NT system, you may want to enter the SRM commands described in the next section. To enter SRM commands, you must switch from the ARC to the SRM console. See "Switching from ARC to SRM" in Chapter 2. Switch back to the ARC console before booting the Microsoft Windows NT operating system.

Firmware Console Commands for Digital UNIX and OpenVMS

The following SRM console commands are used to verify system configuration on systems running either the Digital UNIX or OpenVMS operating system.

`show config`	Displays the buses on the system and the devices found on those buses.
`show device`	Displays the devices and controllers in the system.
`show fru`	Displays information and slot location for CPU, memory, and I/O modules installed in the system
`show memory`	Displays main memory configuration.
`set and show`	Set and display environment variable settings.

The next sections explain the output of these commands.

show config

The `show config` command displays logical CPU and memory devices found on the system bus, and logical devices on the PCI bus and EISA bus. You can use the information in the display to identify target devices for commands such as `boot` and `test`, as well as to verify that the system sees all the devices that are installed. The example below is described on the following page.

Example:

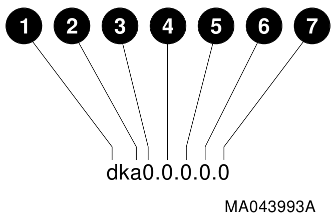
```
P00>>> show config

                   Digital Equipment Corporation
                         AlphaServer 2100A 5/300

SRM Console V4.3-134     VMS PALcode V1.15-3, OSF PALcode V1.18-2

Component        Status   Module ID
CPU 0              P      B2020-BA DECchip (tm) 21164-1
CPU 1              P      B2020-BA DECchip (tm) 21164-1
Memory 0           P      B2021-CA   128 MB
I/O                       B2222-AA
                          dva0.0.0.1000.1    RX26

Slot   Option             Hose 0, Bus 0, PCI
  2    Intel 82375EB                         Bridge to Bus 1, EISA
  3    DECchip 21050-AA                      Bridge to Bus 2, PCI
  7    DECchip 21050-AA                      Bridge to Bus 3, PCI
  9    S3 Trio64/Trio32

Slot   Option             Hose 0, Bus 1, EISA

Slot   Option             Hose 0, Bus 2, PCI
  1    NCR 53C810         pka0.7.0.2001.0    SCSI Bus ID 7
                          dka500.5.0.2001.0  RRD43

Slot   Option             Hose 0, Bus 3, PCI
  0    DECchip 21040-AA   ewa0.0.0.3000.0    08-00-2B-E4-AE-A4
       Qlogic ISP1020     pkb0.7.0.3001.0    SCSI Bus ID 7
                          dkb0.0.0.3001.0    RZ28
                          dkb100.1.0.3001.0  RZ28
                          dkb200.2.0.3001.0  RZ26L

P00>>>
```

Category	Description
Component, Status, and Module ID	These columns display the core system, including CPUs, memory, and I/O, and indicate their power-up status: P (pass) or F (fail).
Hose 0, Bus 0, PCI	All controllers on Hose 0, Bus 0 of the primary PCI bus. The logical slot numbers are listed in the left column of the example. Slot 0-1 = Reserved Slot 2 = PCI to EISA bridge chip Slot 3 = PCI to PCI bridge chip Slots 4-5 = Reserved Slots 6-9 = Correspond to physical PCI card cage slots on the primary PCI bus: Slot 6 = PCI 4 Slot 7 = PCI 5 Slot 8 = PCI 6 Slot 9 = PCI 7 In the case of storage controllers, the devices off the controller are also displayed.
Hose 0, Bus 1, EISA	All controllers on Hose 0, Bus 1 of the EISA bus. The logical slot numbers in the left column of the example correspond to physical EISA card cage slots 1–3. In the case of storage controllers, the devices off the controller are also displayed.
Hose 0, Bus 2, PCI	All controllers on Hose 0, Bus 2 of the secondary PCI bus. The logical slot numbers are listed in the left column of the example. Slot 0 and 2–5 = Reserved Slot 1 = SCSI controller on system backplane, along with storage drives on the bus. Slots 6-9 = Correspond to physical PCI card cage slots on the secondary PCI bus: Slot 6 = PCI 0 Slot 7 = PCI 1 Slot 8 = PCI 2 Slot 9 = PCI 3

show device

The `show device` command displays the devices and controllers in the system. The device naming convention is shown in Figure 3-1.

Figure 3-1: Device Naming Convention



1 Driver ID		Two-letter port or class driver designator DR-RAID set device DV-Diskette drive EW-Ethernet port (PCI) PK-SCSI port, DK-SCSI disk, MK-SCSI tape PU-DSSI port, DU-DSSI disk, MU-DSSI tape
2	Storage Adapter ID:	One-letter storage adapter designator (A,B,C…)
3	Device Unit Number	Unique device unit number (MSCP unit number). SCSI unit numbers are forced to 100 x node ID.
4	Bus Node Number	Bus node ID
5	Channel Number	Used for multi-channel devices.
6	Logical Slot Number	For EISA options: Correspond to EISA card cage physical slot numbers (1–3). For PCI options: Slot 0 = Reserved Slot 1 = SCSI controller on system backplane Slot 2 = PCI to EISA bridge chip Slot 3= PCI to PCI bridge chip Slots 4–5 = Reserved Slots 6–9 (primary bus). Correspond to physical PCI card cage slots: PCI 4, PCI 5, PCI 6, and PCI 7. Slots 6–9 (secondary bus). Correspond to physical PCI card cage slots: PCI 0, PCI 1, PCI 2, and PCI 3.
7	Hose Number	0 PCI_0 (32-bit PCI) 1 EISA

Example:

```
P00>>> show device
1                      2          3                 4        5
dka500.5.0.2001.0   DKA500                        RRD43    1084
dkb0.0.0.3001.0     DKB0                          RZ28     442E
dkb100.1.0.3001.0   DKB100                        RZ28     442E
dkb200.2.0.3001.0   DKB200                        RZ26L    440C
dva0.0.0.1000.0     DVA0                          RX26
ewa0.0.0.3000.0     EWA0          08-00-2B-E4-AE-A4
pka0.7.0.2001.0     PKA0              SCSI Bus ID 7
pkb0.7.0.3001.0     PKB0              SCSI Bus ID 7    2.10
P00>>>
```

1	Full console device name
2	Abbreviated device name
3	Node name. An alphanumeric node name of up to 6 characters can be set. (not shown)
4	Device type
5	Firmware version (if known)

show fru

The `show fru` command reports module and error information for the following field-replaceable units (FRUs) based on the serial control bus EEPROM data:

- CPU modules
- Memory modules
- I/O modules

For each of the above modules, the slot position, option name, part number, hardware and firmware revision, and option serial number, as well as any reported symptom-directed diagnostics (SDD) and test-directed diagnostics (TDD) event logs are displayed. In addition, installed PCI and EISA modules are displayed with their respective physical slot numbers.

```
P00>>> show fru

1      2      3             4      5                    6

                             Rev                  Events logged
Slot   Option Part#         Hw Sw  Serial#        SDD    TDD
   0   IO     B2222-AA      B2 0   NI53400096     00     00
   2   CPU0   B2020-AA      B2 10  KA426C0457     00     01
   4   MEM0   B2021-CA      A1 0   ML34398735     00     01

Slot   Option               Hose 0, Bus 1, PCI on Primary I/O
   9   DECchip 21050-AA                         PCI Option Slot 3
Slot   Option               Hose 0, Bus 0, PCI on Primary I/O
   8   S3 Trio64/Trio32                         PCI Option Slot 6

Slot   Option               Hose 0, Bus 1, EISA on Primary I/O
P00>>>
```

1 System bus physical slot number for FRU (slots 0–7 top to bottom)
Slot 0: System backplane (dedicated EISA/PCI card cage slot)
Slot 1–3, 5: CPU modules
Slot 4–7: Memory modules

2 Option name (I/O, CPU#, or MEM#)

3 Option part number

4 Revision numbers (hardware and firmware)

5 Option serial number

6 Events logged:
Numbers other than "00" indicate that errors have been logged.

SDD Number of symptom-directed diagnostic events logged by the serial ROM diagnostics at power-up.

TDD Number of test-directed diagnostic events logged by the firmware diagnostics at power-up.

show memory

The `show memory` command displays information for each memory module in the system.

Synopsis:

show memory

Examples:

```
P00>>> show memory
1         2         3              4              5         6

Module    Size     Base Addr    Intlv Mode  Intlv Unit  Status
-------   -----    ----------   ----------- ----------- -------
0         128MB    00000000       1-Way          0       Passed

Total Bad Pages 0
7

P00>>>
```

1	Module slot number
2	Size of memory module
3	Base or starting address of memory module
4	Interleave mode—number of modules interleaved (1–4-way interleaving)
5	Interleave unit number
6	Status (passed, failed, or not configured)
7	Number of bad pages in memory (8 KB/page)

set and show

The `set` command sets or modifies the value of an environment variable. The `show` command displays the results of the `set` command. Environment variables are typically set when you are configuring a system. They are used to pass configuration information between the console firmware and the operating system. The settings determine how a system powers up, boots the operating system, and operates.

Examples:

```
P00>>> set bootdef_dev dka0
P00>>> show bootdef_dev
bootdef_dev         dka0.0.0.2001.0

P00>>> show auto_action
auto_action         boot

P00>>> set boot_osflags 0,1
P00>>>
```

For more information about the `set` and `show` commands, including the environment variables that you can set, refer to the *AlphaServer 2000/2100/2100A Firmware Reference Guide*.

System Bus Options

The system bus interconnects the CPUs and memory modules. It is the hardware structure through which data processed by the microprocessor is transferred throughout the system.

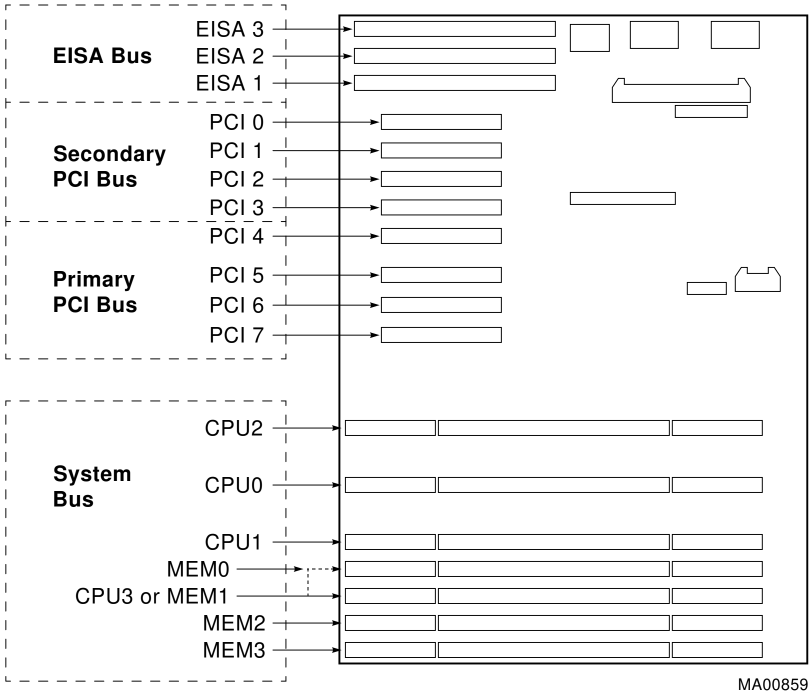
Figure 3-2 shows the locations of the system bus and the system bus options slots. To access the system bus options, remove the left panel. Refer to the section "Doors and Panels" in Chapter 1 to remove the left panel. Be sure to reattach the panel screws before attempting to power up the system again.

Caution

Do not remove the left panel when the system is running. If you remove the left panel without first properly shutting down the system, the system will power down and you may lose data.

The AlphaServer 2100A system supports options for several types of bus architectures, including PCI, EISA, and ISA. The next sections describe the system bus options for your system. For information about installing a specific option, refer to the documentation for that option.

Figure 3-2: System Bus Option Slots



CPU Modules

The computer can support up to four CPUs in a symmetric multiprocessing (SMP) configuration. Figure 3-3 shows the supported system bus configurations depending on the number of CPUs in the system. Configure the CPUs exactly as shown in the illustration to ensure proper system functioning. Also make note of the following requirements:

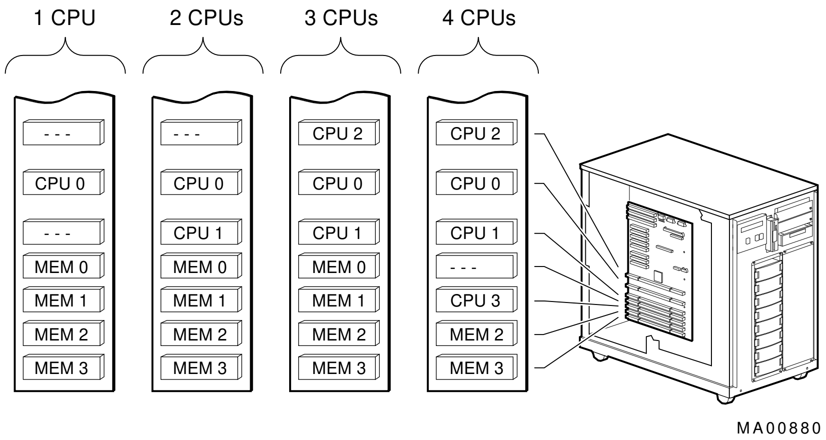
- The system must have a CPU module installed in slot CPU 0.
- When installing four CPUs, install the fourth CPU in slot MEM 1. The fourth CPU displaces memory in slot MEM 0 and MEM 1 (Figure 3-3).
- You need a second power supply if your system is fully configured and contains a second storage assembly or more than two CPUs.

Warning

Before installing a CPU module, turn off all power to the system (both AC and DC). Refer to “Powering Down the System” in Chapter 2 for information about turning off AC and DC power.

For information on CPU SMP upgrades, see the *Digital Systems and Options Catalog*.

Figure 3-3: System Bus Configurations According to Number of CPUs



Warning: CPU and memory modules have parts that operate at high temperatures. Wait 2 minutes after power is removed before handling these modules.

Memory Modules

The computer can support up to four memory modules, for a total of 2 gigabytes of memory. A minimum of one memory module is required. The system supports 64-MB, 128-MB and 512-MB memory modules.

For information on memory upgrades, see the *Digital Systems and Options Catalog*.

Warning

Before installing a memory module, turn off all power to the system (both AC and DC). Refer to “Powering Down the System” in Chapter 2 for information about turning off AC and DC power.

EISA Bus Options

The EISA bus (Extended Industry Standard Architecture bus) is a 32-bit, industry-standard I/O bus. EISA is a superset of the well-established 16-bit ISA bus. EISA was designed to accept newer 32-bit options while still remaining compatible with older 8-bit and 16-bit options.

With a bandwidth of 33 MB/sec, EISA is well suited to medium-performance options, such as modems, asynchronous communication controllers, and other miscellaneous peripherals. You can install up to three boards—EISA, ISA, or a combination of the two—in the EISA bus portion of the card cage. All slots are bus master slots. EISA slots can be filled in any order.

Figure 3-2 shows the location of EISA/ISA slots. To access the card cage, remove the left panel. Refer to the section “Doors and Panels” in Chapter 1 to remove the left panel. Be sure to reattach the panel screws before attempting to power up the system again.

Caution

Do not remove the left panel when the system is running. If you remove the left panel without first properly shutting down the system, the system will power down and you may lose data.

For information about installing a specific EISA option, refer to the documentation for that option. For information about configuring an EISA option, refer to the section “Configuring EISA and ISA Options” in this chapter.

Warning

Before installing EISA options, turn off all power to the system (both AC and DC). Refer to the section “Powering Down the System” in Chapter 2 for information about turning off AC and DC power.

⚠ **Warning:** For protection against fire, only modules with current-limited outputs should be used.

ISA Bus Options

The ISA bus (Industry Standard Architecture bus) is an industry-standard, 16-bit I/O bus. The EISA bus is a superset of the well-established ISA bus and is backward compatible with 16-bit and 8-bit architectures. Therefore, ISA boards can be used in the AlphaServer 2100A system, provided the operating system supports the device and enough system resources are available to configure the device.

You can install up to three boards—EISA, ISA, or a combination of the two—in the EISA bus portion of the card cage. All slots are bus master slots. EISA slots can be filled in any order.

Figure 3-2 shows the location of EISA/ISA slots. To access the card cage, remove the left panel. Refer to the section “Doors and Panels” in Chapter 1 to remove the left panel. Be sure to reattach the panel screws before attempting to power up the system again.

Caution

Do not remove the left panel when the system is running. If you remove the left panel without first properly shutting down the system, the system will power down and you may lose data.

For information about installing a specific option, refer to the documentation for that option. For information about configuring an ISA option, refer to the section “Configuring EISA and ISA Options” in this chapter.

Warning

Before installing ISA options, turn off all power to the system (both AC and DC). Refer to the section “Powering Down the System” in Chapter 2 for information about turning off AC and DC power.

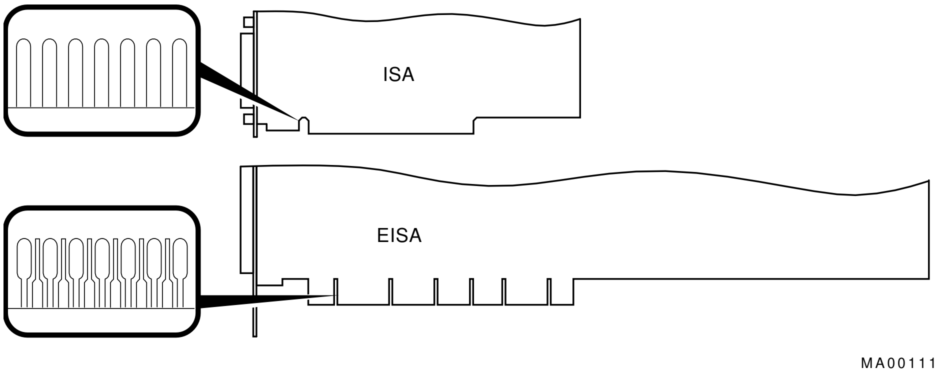
⚠ **Warning:** For protection against fire, only modules with current-limited outputs should be used.

Identifying ISA and EISA Options

By examining the contacts on the option board, you can distinguish between EISA and ISA options (see Figure 3-4):

- ISA boards have one row of gold contacts.
- EISA boards have two interlocking rows of gold contacts.

Figure 3-4: ISA and EISA Boards



Configuring EISA and ISA Options

EISA Configuration Utility

Whenever you add or move EISA options or some ISA options in your system, you must run a utility called the EISA Configuration Utility (ECU). EISA options and some ISA options have a corresponding configuration (CFG) file, which describes the characteristics and the system resources required for that option. The ECU uses the CFG file to create a conflict-free configuration. Note that ISA options still require manual configuration using switches or jumpers, as described in the documentation for the option.

The ECU is a menu-based utility that provides on-line help to guide you through the configuration process. The ECU is supplied on diskettes shipped with your system. Make a backup copy of the configuration diskette, using a utility such as the Microsoft Windows File Manager. (Select Copy Disk … from the Disk menu.)

Use the backup copy when you are configuring the system. The system configuration diskette must have the volume label SYSTEMCFG.

Note

The CFG files supplied with the option you want to install may not work on this system if the option is not supported. Before you install an option, check that your system supports the option. Refer to the section of this chapter entitled "Supported Options."

Setting Up a Serial Terminal to Run ECU

On the AlphaServer 2100A system, you can run the ECU from either a VGA-compatible graphics monitor or from a serial terminal (VT200 or higher, or equivalent). Graphics is the default. To use a serial terminal with the ECU, do the following:

1. Invoke the terminal setup utility as described in the documentation for your serial terminal and change settings as follows:

   - From the General menu, set the terminal mode to VTxxx mode, 8-bit controls.
   - From the Comm menu, set the character format to 8 bit, no parity, and set receive XOFF to 128 or greater.

2. Enter the following commands at the SRM console prompt to set the console terminal to receive input in serial mode.

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

Before You Use the ECU

Follow the instructions in this section before you run the EISA Configuration Utility.

1. Install EISA boards. If you are installing ISA boards, wait until after you run the ECU. For information about installing a specific option, refer to the documentation for that option.

2. Locate the correct ECU diskette for your operating system. (The ECU diskettes are shipped in the accessories box.) Make a copy of the diskette and keep the original in a safe place. Use the backup copy for configuring options.

   ECU Diskette DEC AXP (AK-PYCJ*-CA) for Microsoft Windows NT
   ECU Diskette DEC AXP (AK-Q2CR*-CA) for Digital UNIX and OpenVMS

Using the ECU

Complete the following steps to start the ECU:

1. Invoke the console firmware.

   Systems running Microsoft Windows NT—Shut down the operating system or power up to the console Boot menu.

   Systems running Digital UNIX or OpenVMS—Shut down the operating system and press the Halt button or power up with the Halt button set to the “in” position. When the console prompt `P00>>>` is displayed, set the halt button to the “out” position.

2. Start the ECU as follows:

   Systems running Microsoft Windows NT—Select the following menus:

   - From the Boot menu, select Supplementary menu.
   - From the Supplementary menu, select Set up the system ….
   - Insert the ECU diskette for Windows NT (AK-PYCJ*-CA) into the diskette drive.

   From the Setup menu, select Run EISA configuration utility from floppy. This boots the ECU program. The ECU main menu is displayed, as shown in Example 3-3.

Systems running Digital UNIX or OpenVMS—Start ECU as follows:

- Insert the ECU diskette for Digital UNIX or OpenVMS (AK-Q2CR*-CA) into the diskette drive.
- Enter the `ecu` command. The message “loading ARC firmware” is displayed. When the firmware has finished loading, the ECU program is booted and the main menu is displayed.

Example 3-3: ECU Main Menu

```
EISA Configuration Utility
Steps in configuring your computer

STEP 1: Important EISA configuration information
STEP 2: Add or remove boards
STEP 3: View or edit details
STEP 4: Examine required details
STEP 5: Save and exit

>Select=ENTER<    <Cancel=ESC>)
```

Note

Step 1 of the ECU provides online help. It is recommended that you select this step and become familiar with the utility before proceeding.

3. Complete the ECU procedure according to the guidelines provided in the following sections.
   - If you are configuring an EISA bus that contains only EISA options, refer to Table 3-3.
   - If you are configuring only EISA options, do not perform Step 2 of the ECU, Add or Remove Boards. EISA boards are recognized and configured automatically.
   - If you are configuring an EISA bus that contains both ISA and EISA options, refer to Table 3-4.
4. After you have saved configuration information and exited from the ECU:

   Systems running Microsoft Windows NT—Remove the ECU diskette from the drive and boot the operating system.

   Systems running Digital UNIX or OpenVMS—Remove the ECU diskette from the drive. Return to the SRM console firmware as follows:
   - From the Boot menu, select Supplementary menu.
   - From the Supplementary menu, select Set up the system …. The Setup menu is then displayed.
   - From the Setup menu, select Switch to OpenVMS or Digital UNIX console. This allows you to select your operating system console.
   - Select your operating system console, then select Supplementary menu, and save changes ….
   - When the message "Power-cycle the system to implement the change" is displayed, press the Reset button. (Do not press the DC On/Off button.) Once the console firmware is loaded and device drivers are initialized, you can boot the operating system.
5. Verify that the new options are configured correctly.

Configuring EISA Options

EISA boards are recognized and configured automatically. Table 3-3 summarizes the steps necessary to configure an EISA bus that contains no ISA options. Run the ECU as described in the section "Using the ECU."

Table 3-3: Procedure for Configuring EISA Bus (EISA Options Only)

Step	Explanation
Install EISA option	Use the instructions provided with the EISA option.
Power up the system and run ECU.	If the ECU locates the required CFG configuration files, it displays the main menu. The CFG file for the option may reside on a configuration diskette packaged with the option or may be included on the system configuration diskette. Note: It is not necessary to run Step 2 of the ECU, Add or Remove Boards. EISA boards are recognized and configured automatically.
View or edit details (optional).	The View or Edit Details ECU option is used to change user-selectable settings or to change the resources allocated for these functions (IRQs, DMA channels, I/O ports, and so on). This step is not required when you are using the board's default settings.
Save your configuration.	The Save and Exit ECU option saves your configuration information to the system's nonvolatile memory.
Return to the SRM console and restart the system. This step applies to Digital UNIX and OpenVMS systems only.	Refer to step 4 of the section "Using the ECU" for operating system-specific instructions.

Configuring EISA/ISA Options

ISA boards are configured manually, whereas EISA boards are configured through the ECU software. Study Table 3-4 for a summary of steps to configure an EISA bus that contains both EISA and ISA options. Run the ECU as described in the section “Using the ECU.”

Table 3-4: Procedure for Configuring EISA Bus with ISA Options

Step	Explanation
Install or move EISA option. Do not install ISA boards.	Use the instructions provided with the EISA option. ISA boards are installed after the configuration process is complete.
Power up the system and run the ECU.	If you have installed an EISA option, the ECU must locate the CFG file for that option. The CFG file for the option may reside on a configuration diskette packaged with the option or may be included on the system configuration diskette.
Add the ISA board to the configuration list.	Use the Add or Remove Boards ECU option to add the CFG file for the ISA option and to select an acceptable slot for the option. The CFG file for the option may reside on a configuration diskette packaged with the option or may be included on the system configuration diskette. If you cannot find the CFG file for the ISA option, select the generic CFG file for ISA options from the configuration diskette.
View or edit details (optional).	The View or Edit Details ECU option is used to change user-selectable settings or to change the resources allocated for these functions (IRQs, DMA channels, I/O ports, and so on). This step is not required when you are using the board's default settings.
Examine and set required switches to match the displayed settings.	The Examine Required Switches ECU option displays the correct switch and jumper settings that you must physically set for each ISA option. Although the ECU cannot detect or change the settings of ISA boards, it uses the information from the previous step to determine the correct switch settings for these options. Physically set the board's jumpers and switches to match the required settings.
Save your configuration.	The Save and Exit ECU option saves your configuration information to the system's nonvolatile memory.
Return to the SRM console and turn off the system. This step applies to Digital UNIX and OpenVMS systems only.	Refer to step 4 of the section "Using the ECU" for information about returning to the SRM console.
Install ISA board and turn on the system.	Use the instructions provided with the ISA option.

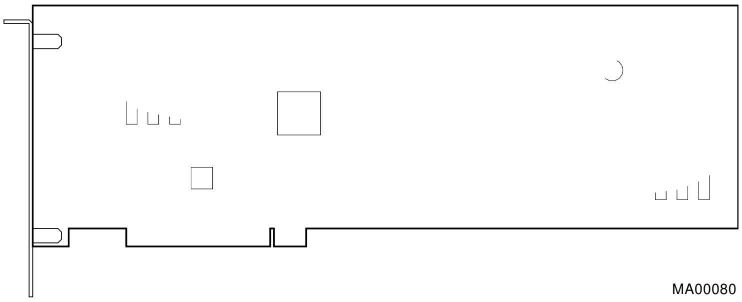
PCI Bus Options

For options that require high performance, a Peripheral Component Interconnect (PCI) bus is included in the AlphaServer 2100A system.

PCI is an industry-standard expansion I/O bus that is the preferred bus for high-performance I/O options, such as network interconnects (FDDI, Ethernet, Token Ring), storage interconnects (SCSI, Fast SCSI, IPI), and high-performance video applications. The AlphaServer 2100A system supports 32-bit PCI options.

You can install up to eight 32-bit PCI options. A PCI board is shown in Figure 3-5.

Figure 3-5: PCI Board



PCI-to-PCI Bridge

The AlphaServer 2100A computer has a PCI-to-PCI bridge on board (DECchip 21050). The PCI bus slots are shown in Figure 3-2, and the bus architecture is illustrated in Figure 5-1.

- Physical PCI slots 4, 5, 6, and 7 are the bottom 4 slots in front of the bridge (primary PCI).
- Physical PCI slots 0, 1, 2, and 3 are the top 4 slots behind the bridge (secondary PCI).

PCI options that also contain a PCI-to-PCI bridge must be installed on the primary PCI bus, slots 4, 5, 6, or 7. For example, multiple function adapters usually contain a PCI-to-PCI bridge. Refer to the following documents for restrictions on specific PCI options:

- *AlphaServer 2100A Hardware Release Notes*—shipped with the computer.
- *AlphaServer 2100A Supported Options List*—Refer to the section of this chapter entitled “Supported Options.”

Installing PCI Boards

Install PCI boards according to the instructions supplied with the option. PCI boards require no additional configuration procedures; the system automatically recognizes the boards and assigns the appropriate system resources.

Warning

Before installing PCI options, turn off all power to the system (both AC and DC). Refer to the section "Powering Down the System" in Chapter 2 for information about turning off AC and DC power.

Warning: For protection against fire, only modules with current-limited outputs should be used.

SCSI Buses

Removable Storage Bus

A PCI-based SCSI controller on the system backplane provides 8-bit (narrow) Fast SCSI-2 support for removable media devices. You can install either three 5.25 HH devices or one 5.25 full height (FH) and one 5.25 HH device.

Internal StorageWorks Shelves

Storage subsystems on the AlphaServer 2100A computer use the common storage elements of the Digital StorageWorks modular storage system. The system has one 16-bit (wide) internal StorageWorks shelf, plus an area for adding a second, optional 16-bit (wide) StorageWorks shelf. In planning a SCSI configuration, note the following:

- Narrow devices can be used in the wide StorageWorks shelf, as long as the devices are at a supported revision level. The narrow devices will run in narrow mode.
- Narrow and wide devices can be mixed in the wide StorageWorks shelf. In a mixed configuration, wide devices run in wide mode and narrow devices run in narrow mode.
- For best performance, wide devices should be operated in wide SCSI-2 mode.

Supported devices and configuration rules for wide SCSI-2 are described in the *Wide SCSI Technical Bulletin*. This bulletin is frequently updated and can be downloaded from the Internet:

http://www.service.digital.com/alpha/server/as2100a/docs/

Single and Dual Bus Configurations

Each internal StorageWorks shelf can contain up to eight 3.5-inch SCSI disk drives and can be configured as a single bus or a dual bus.

- Single bus—Supports up to seven drives, each with a unique node ID. In this configuration, the bottom slot is not used.
- Dual bus—Supports up to four pairs of drives (node IDs 0–3, top to bottom).

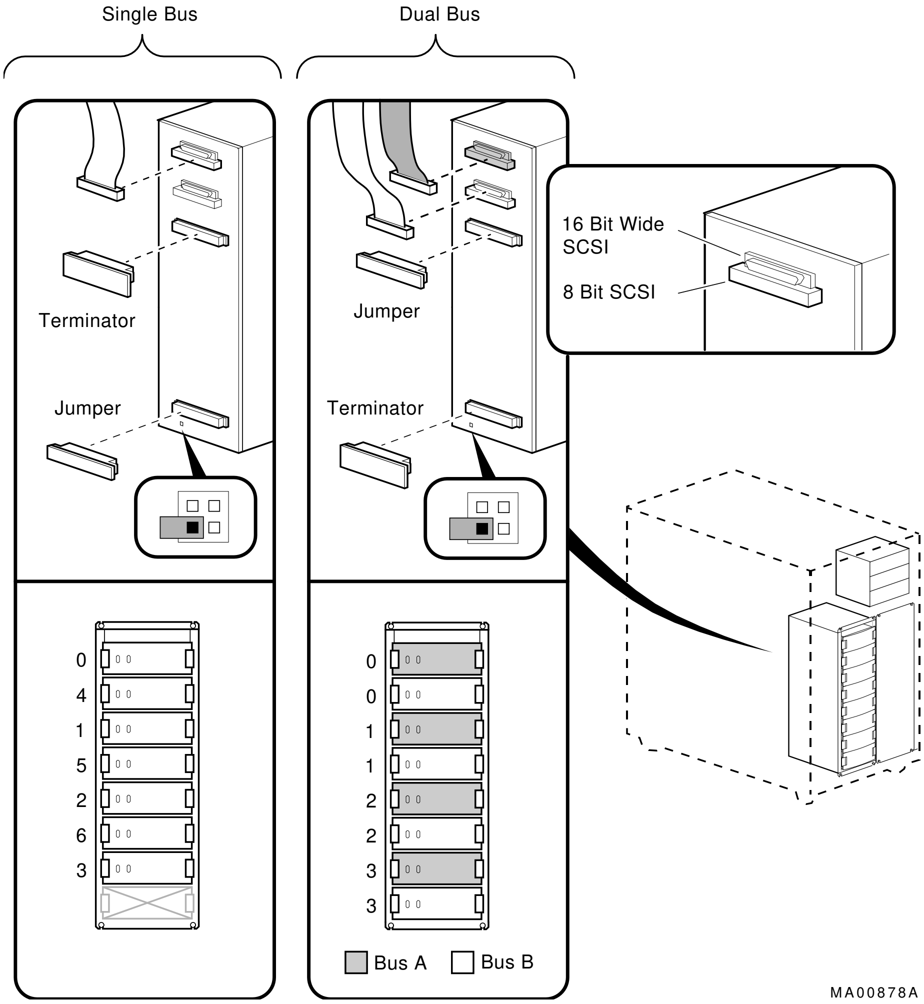
In dual-bus mode, there are two completely separate groupings of four devices. These groupings are physically separated so that if one group of devices fails, the other continues to run (dual SCSI backplane). Refer to Figure 5-1.

The backplane of the StorageWorks shelf supplies the drive's SCSI node ID according to the location of the drive within the storage shelf. The storage shelf configuration is controlled by the position of the terminator and jumper.

The supported internal single and dual bus configurations are shown in Figure 3-6.

- In the single bus configuration, the jumper is on one pin (disabled), and the SCSI node IDs are numbered 0–6.
- In the dual bus configuration, the jumper is on one pin (disabled), and the SCSI node IDs are numbered 0–3, top to bottom, for both buses.

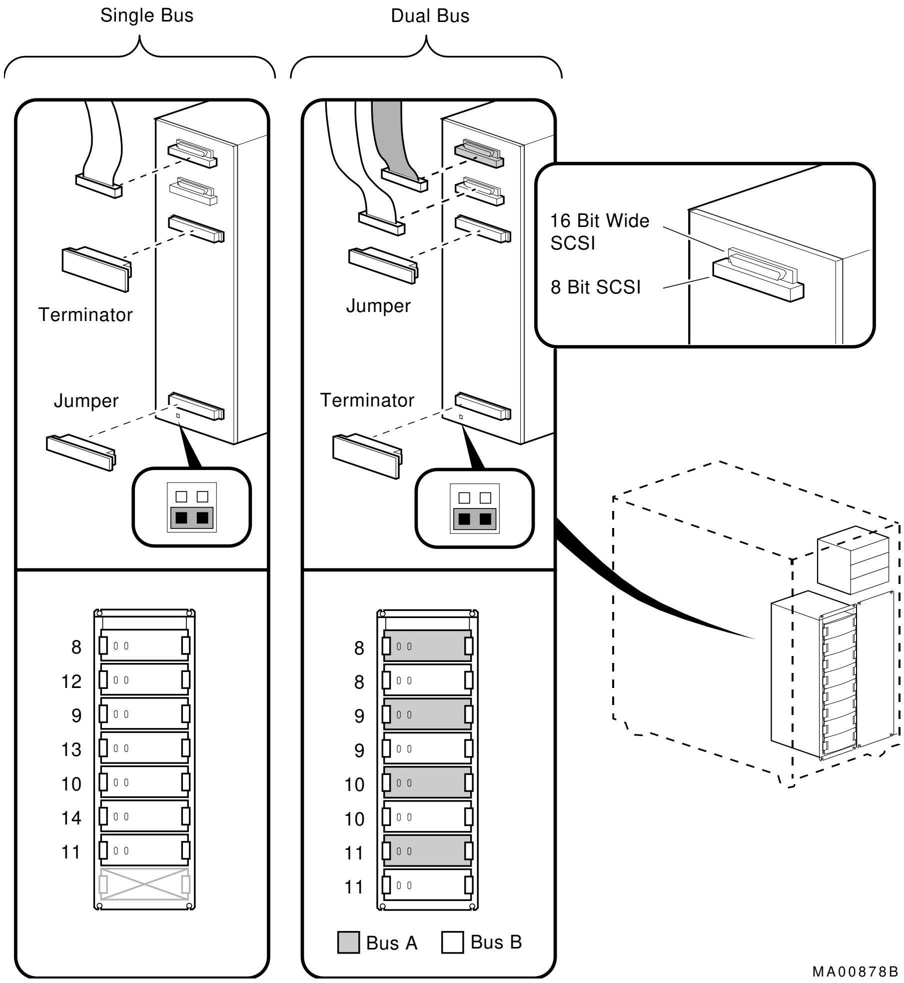
Figure 3-6: Internal StorageWorks Bus Configurations



Alternative SCSI configurations for the AlphaServer 2100A system are shown in Figure 3-7. The pedestal system does not support 16 devices on a single bus internal to the enclosure. Check controllers and operating system support for 16 devices external to the pedestal enclosure.

- In the single bus configuration, the jumper is on any 2 pins (enabled), and the SCSI node IDs are numbered 8–14.
- In the dual bus configuration, the jumper is on any 2 pins (enabled), and the SCSI node IDs are numbered 8–11, top to bottom, for both buses.

Figure 3-7: Alternative StorageWorks Bus Configurations

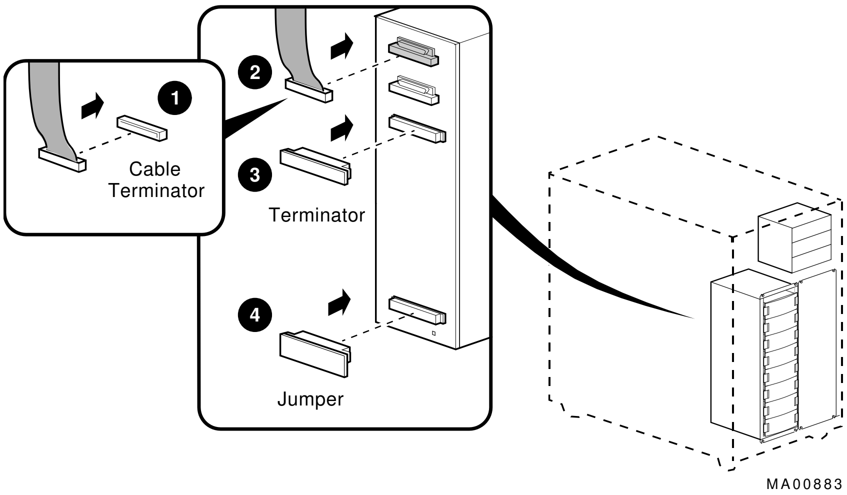


Extending the Removable Media Bus

The removable-media bus can be configured to extend into an internal StorageWorks shelf.

1. Remove the cable terminator **(1)**. The cable terminator is not used in this configuration.
2. Install the cable connector **(2)**.
3. Connect the terminator **(3)** and jumper **(4)** on the internal StorageWorks shelf (dual bus configuration), as shown in Figure 3-8.

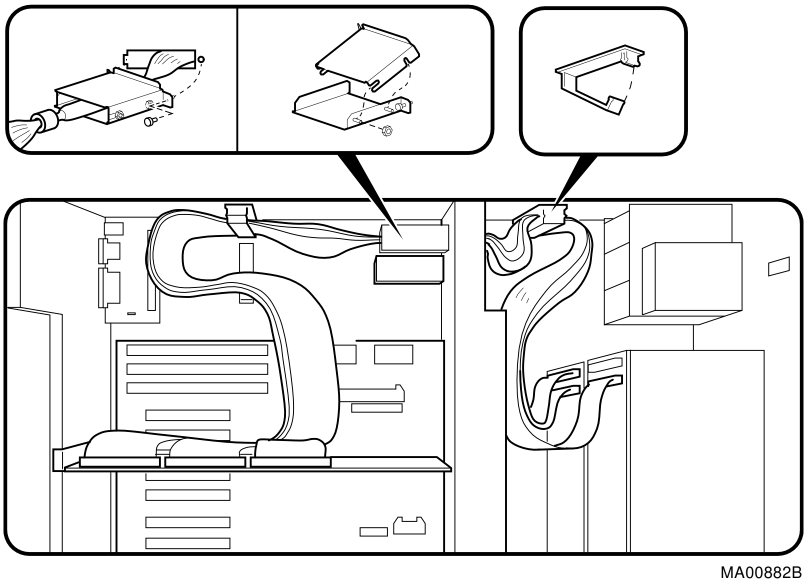
Figure 3-8: Extending the Removable-Media Bus



SCSI Cable Routing to Internal StorageWorks Shelves

Figure 3-9 shows how to route the SCSI cables from a SCSI controller to a second internal StorageWorks shelf.

Figure 3-9: SCSI Cable Routing



Installing StorageWorks Fixed Disk Drives

Swapping Drives

If you purchased a StorageWorks RAID Array 200 Subsystems Controller with your computer, you can “hot swap” drives, that is, you can install or replace drives without first shutting down the operating system or powering down the computer. The RAID subsystem includes either the KZESC-*xx* (SWXCR-E*x*) EISA or the KZPSC-*xx* (SWXCR-P*x*) PCI RAID controller.

For information on hot swapping drives, see *StorageWorks RAID Array 200 Subsystems Controller Installation and Standalone Configuration Utility User’s Guide*, EK-SWRA2-IG, provided with your StorageWorks RAID Array 200 Software kit.

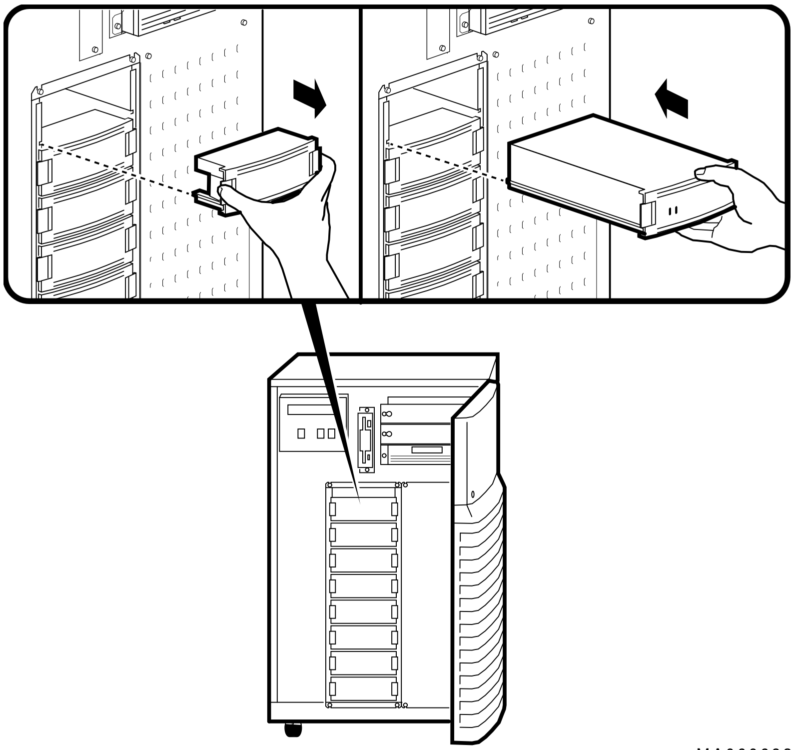
If your StorageWorks drives are not plugged into the RAID subsystem, shut down the operating system before swapping a drive. However, you do not need to power down the server before installing the drive.

Installing Drives

Install a StorageWorks disk drive as shown in Figure 3-10.

1. If your StorageWorks drives are plugged into the RAID subsystem, go to step 2. If your drives are not plugged into the RAID subsystem, shut down the operating system before you go to step 2.
2. Remove a blank bezel by pressing the two mounting tabs and pull the bezel out of the shelf.
3. Insert the hard-disk drive into the guide slots and push it in until the tabs lock in place.

Figure 3-10: Installing StorageWorks Disk Drive



External SCSI Expansion

External SCSI-2 devices, such as tabletop or rackmounted storage devices, can be connected to the system by EISA- or PCI-based adapters. Use the following rules to determine if a particular SCSI-2 device can be used:

- The device must be supported by the operating system. Consult the *AlphaServer 2100A Supported Options List* on the Internet or contact the hardware vendor.
- A maximum of seven devices can be attached on any one SCSI-2 controller.
- Each device on the bus must have a unique bus node ID. You may need to change a device's default bus node ID in order to make it unique. All removable-media device bus node IDs are set by switches on the device. For information about setting a device's bus node ID, refer to the guide for that device.
- The SCSI buses on the AlphaServer 2100A run at 10 MB/sec (Fast SCSI-2), and can therefore be a maximum length from end to end of 3 meters. To prevent problems, ensure that a connector is correctly terminated on each end of the SCSI bus, that no disks or tapes in the middle of the bus are terminated, and that the end-to-end length of the SCSI bus is under 3 meters.

Guidelines for Systems with KZESC-xx or KZPSC-xx Controller

If you purchased a StorageWorks RAID Array 200 Subsystems Controller for your AlphaServer 2100A system, observe the guidelines below when you add, move, or reconfigure RAID devices. The RAID subsystem includes either the KZESC-*xx* (SWXCR-E*x*) EISA or the KZPSC-*xx* (SWXCR-P*x*) PCI RAID controller.

- Run the EISA Configuration Utility (ECU) as described in this chapter to configure all modules on the EISA bus, if using an EISA adapter.
- Run the Standalone Configuration Utility as described in the *StorageWorks RAID Array 200 Subsystems Controller Installation and Standalone Configuration Utility User's Guide* to set up the disk drives and logical units. The standalone utility is provided on a diskette with the StorageWorks RAID subsystem kit.
- Refer to the section "Problems with RAID Devices" in Chapter 4 of this guide for RAID troubleshooting hints related to the AlphaServer 2100A system.

For information about installing, monitoring, and maintaining the StorageWorks RAID Array 200 Subsystems, consult the documentation listed below. These documents are included in the StorageWorks RAID Array 200 Subsystems Software kit.

Document	Part Number
StorageWorks RAID Array 200 Subsystems Controller Installation and Standalone Configuration Utility User's Guide	EK-SWRA2-IG
StorageWorks RAID Array 200 Online Management Utility for OpenVMS AXP User's Guide	AA-Q6WVB-TE
StorageWorks RAID Array 200 Online Management Utility for Digital UNIX User's Guide	AA-Q6TGD-TE
StorageWorks RAID Array 200 Online Management Utility for Windows NT - AXP User's Guide	AA-Q6SWC-TE
Release Notes: StorageWorks RAID Array 200 Online Management Utilities for Alpha-Based Systems	AA-QGTTB-TE

Power Supply Configurations

AlphaServer 2100A systems offer added reliability with redundant power options. You can also order uninterruptible power supply (UPS) options. The power supplies can be configured in three different modes of operation, as explained below and shown in Figure 3-11 and Figure 3-12.

Power Supply Modes

Single Power Supply. The single power supply mode is intended for entry-level systems, such as a system configured with:

Two CPUs
One memory module
One diskette drive
One CD-ROM drive
One internal StorageWorks shelf with eight 3.5-in. drives
Up to eight PCI/EISA options

Dual Power Supply, Redundant Mode. Two power supplies configured in redundant mode provide redundant power (n + 1) for entry-level and moderately configured systems, such as the system configuration listed above. In redundant mode if one power supply fails, the second supply provides power, and the system continues to operate normally.

To activate redundant mode power, install the power supply mode jumper (W1) on the system backplane, as shown in Figure 3-12.

Dual Power Supply, Full Power Mode. Two power supplies configured in full power mode provide full power for more heavily configured systems, such as a system with more than two CPUs or more than one internal StorageWorks shelf. These systems require the power of two power supplies.

Figure 3-11: Power Supply Configurations

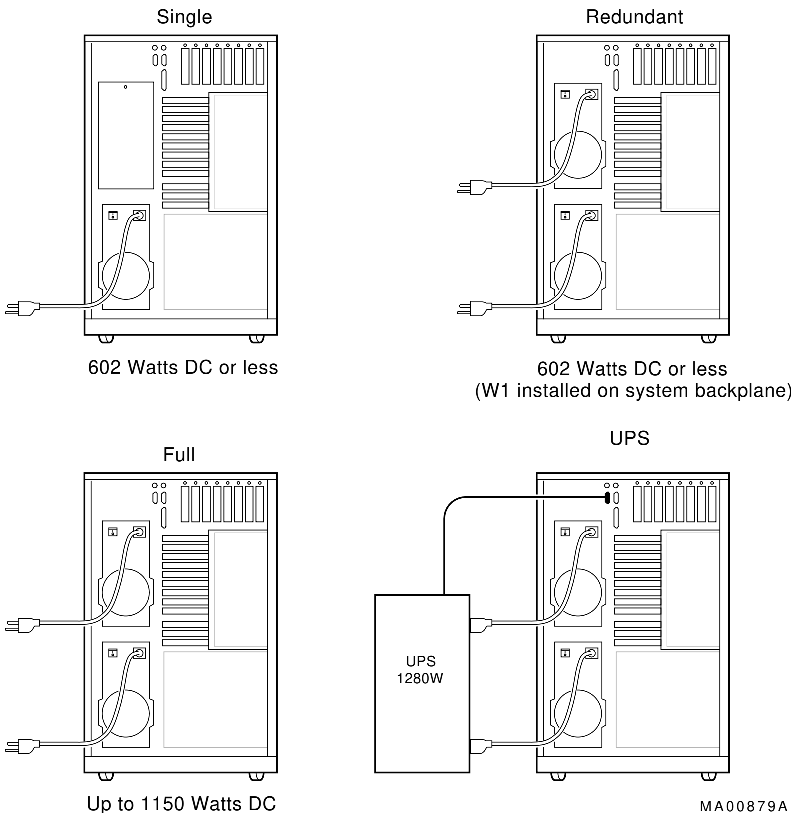
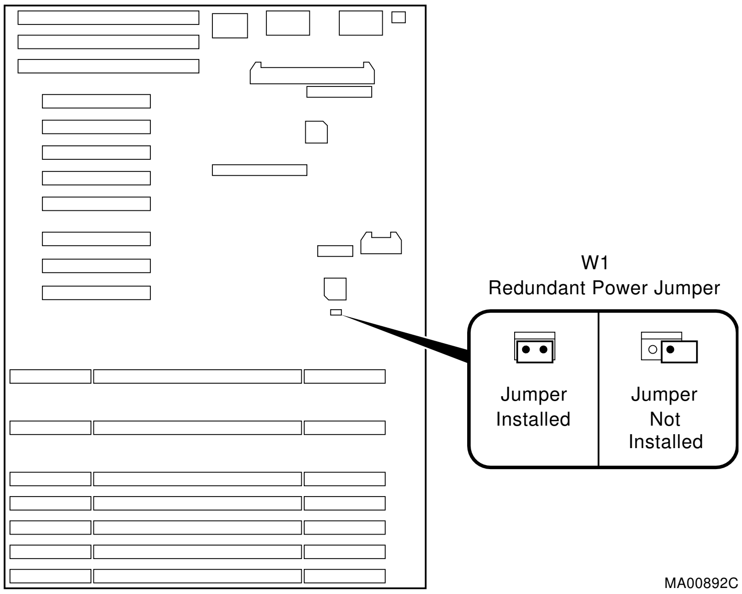


Figure 3-12: Installing Jumper for Redundant Power



Upgrades

A variety of upgrade options are available with the AlphaServer 2100A computer, including CPU SMP upgrades, memory upgrades, and storage upgrades.

Planning an Upgrade

Plan an upgrade by performing the following tasks:

1. List the modules and devices in your current configuration.
    - If you are running Digital UNIX or OpenVMS, enter the `show device` or `show config` command at the console prompt.
    - If you are running Microsoft Windows NT, access the Hardware configuration display menu item.
2. Decide how you wish to change your system. You can obtain a current description of available upgrades from the *Digital Systems and Options Catalog*. See the section of this chapter entitled “Supported Options.”
3. Determine whether you can install the new option yourself, or whether you need to contact a Digital service representative or other qualified service person.

Note

Removable-media devices and internal StorageWorks shelves should be installed only by a qualified service person.

4. Determine whether you will need a second power supply. You will need a second power supply if your system is fully configured and contains a second storage assembly or more than two CPUs. Refer to the section “Power Supply Configurations” and the section “Power Consumption Guidelines” in this chapter.
5. Order the options and, if necessary, a second power supply.
6. Install and configure the options.

Adding Third-Party Devices

Third-party devices are devices purchased from vendors other than Digital.

Before purchasing third-party devices, check with the vendor to ensure that your system and operating system support the device.

For information about installing supported third-party devices inside the system unit, refer to the documentation for the device. The computer has the standard brackets for installing devices.

Supported Options

Any options you wish to add must be supported by the target operating system.

Windows NT Hardware Compatibility Lists

The Microsoft Windows NT Hardware Compatibility Lists are lists of computers and peripherals that have been tested and have passed compatibility testing with Windows NT V3.5. The lists include options from third-party vendors. The lists may be obtained from Library 1 of the WINNT **(GO WINNT)** forum or Library 17 of the MSWIN32 **(GO MSWIN32)** forum on CompuServe.

You can also obtain the Hardware Compatibility Lists from the Internet:

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

AlphaServer 2100A Supported Options List

Refer to the *AlphaServer 2100A Supported Options List* for a list of options supported under Digital UNIX, OpenVMS, and Windows NT. The options list is available from the Internet at the following locations:

ftp://ftp.digital.com/pub/Digital/Alpha/systems/as2100a/docs/

http://www.service.digital.com/alpha/server/as2100a/docs.html

Digital Systems and Options Catalog

The *Digital Systems and Options Catalog* is regularly published to assist customers in ordering and configuring systems and hardware options. Each printing of the catalog presents all of the products that are announced, actively marketed, and available for ordering. If necessary, past editions should be retained for reference.

Call 1-800-DIGITAL (U.S.A. and Canada) or your authorized Digital Partner to talk to a consultant about your configuration.

Access printable PostScript files of any section of the catalog from the Internet as follows: (Be sure to check the Readme file.)

ftp://ftp.digital.com/pub/Digital/info/SOC/

Power Consumption Guidelines

If you are planning to order additional options, consider the power consumption guidelines below to determine if you need to add a second power supply.

The single and redundant mode power supply configurations are available to those systems drawing the following power:

602 watts or less DC output power
39 A or less of 3.3 V power
62 A or less of 5.1 V power
12.5 A or less of +12 V power
1.0 A of -12 V power

4
Troubleshooting

This chapter provides information to help you identify, report, and troubleshoot problems on your AlphaServer 2100A system.

In This Chapter

The troubleshooting areas covered in this chapter include the following:

- Reporting Problems
- Power Problems
- Problems Getting to Console Mode
- Interpreting the Operator Control Panel Power-Up Display
- Console Reported Problems
- Mass Storage Problems Indicated at Power-Up
- EISA Bus Problems Indicated at Power-Up
- PCI Bus Problems Indicated at Power-Up
- Boot Problems
- Operating System Reported Problems
- Problems with RAID Devices

Before You Begin

Decide How Much Troubleshooting to Undertake

Before you begin troubleshooting, be sure you are aware of any service agreement for your system. Your service agreement will help you determine how much troubleshooting and repair you should undertake yourself.

- If you are a self-maintenance customer, use the information in this chapter to help identify and resolve the problem. Refer to the AlphaServer 2000/2100/2100A RM/2100A CAB Series Service Guide for more comprehensive troubleshooting information.
- If you have a service agreement with Digital or wish to purchase a service agreement, contact a Digital support center for assistance.

Use the troubleshooting tables in this chapter to identify problems with your system. You can also run diagnostic tests, using the `test` command (described in this chapter) and the `show fru` command (described in Chapter 3).

Note

If you are running Windows NT, switch from the ARC to the SRM console in order to run the `test` and `show fru` commands. For information about switching to the SRM console, refer to "Switching from ARC to SRM" in Chapter 2.

Determine the type of problem your system is experiencing from the list in Table 4-1.

Table 4-1: Problem Reference

Problem	Section Reference
System powers down unexpectedly or does not power up.	Power Problems
Power-up screens are not displayed on the console terminal.	Problems Getting to Console Mode
Power-up screens report an error or do not complete.	Console Reported Problems
System cannot find the boot device or the device does not boot.	Boot Problems
Operating system startup screen does not appear, software applications do not run, or operating system reports an error.	Operating System Reported Problems
• Some RAID drives do not appear on the `show device d` display. • Drives on the RAID controller power up with Fault light on. • Image copy of DRA logical drive does not boot. • Cannot access disks.	Problems with RAID Devices

Note

If you cannot determine the problem your system is experiencing, or if the corrective actions in the troubleshooting tables do not resolve the problem, see the section "Reporting Problems."

Reporting Problems

If you are unable to locate the system problem in the troubleshooting tables, or the actions suggested did not solve the problem, contact the nearest Digital support center. Before calling to report a problem, complete the following checklist.

Pre-call Checklist

1. Locate the part and serial numbers, printed on the label at the rear of your system. Record these numbers on a copy of the Problem Worksheet in this chapter (Figure 4-1). The support center will need this information when you call.
2. Fill in the “Status of the System” information on the worksheet.
3. Note the problem, possible causes, if you know them, and solutions suggested in the troubleshooting tables. Also indicate what actions, if any, you have already taken to try to correct the problem.
4. Be prepared to read information from the console screen and to enter commands at the keyboard while you talk to the support center representative.

Digital Contact Information

Digital Equipment Corporation has support centers in many countries. For service, call 1-800-354-9000 (toll free U.S.A., Canada, or Mexico). You can obtain country-specific contact information from the World Wide Web at:

http://www.digital.com/info/misc/contacts.txt.html.

Figure 4-1: Problem Worksheet

AlphaServer 2100A Problem Worksheet

DEC service representative telephone number: ________________________________

Serial Number: ____

Status of the System (check all that apply):

____ DC power light is not on

____ OCP power/diagnostic display failure message

____ Operating system fails to boot

_____ Diagnostic test error message

_____ Console program fails to boot

_____ Console error message

OCP powerup/diagnostic display:

____

____

____

Screen error message:

____

____

____

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Troubleshooting notes:

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Power Problems

Table 4-2 describes how to troubleshoot the system when there is no power at the system enclosure or when the power supply subsystem lights indicate power trouble.

Table 4-2: Troubleshooting Power Problems

Symptom	Action
AC OK light on the power supply is not on when the AC On/Off switch is set to "on."	Check the power source and power cord.
	Check that the left panel is properly secured. A safety interlock switch shuts off power to the system if the panel is open.
	Make sure the power supplies are plugged in and that the AC On/Off switch on each supply is set to "on."
AC OK light is on, but system does not power on.	Check the DC On/Off button setting on the operator control panel.
	Check that the ambient room temperature is within environmental specifications (10–35°C, 50–95°F).
Power supply shuts down after approximately 5 seconds (fan failure).	Using a flashlight, look through the front (to the left of the internal StorageWorks shelf) to determine if the 6.75-inch fan is spinning at power-up. A failure of this fan causes the system to shut down after approximately 5 seconds.

Problems Getting to Console Mode

Table 4-3 explains what to do when you power up the system, but the console terminal does not display the power-up screen.

Table 4-3: Troubleshooting Problems Getting to Console Mode

Symptom	Action
Power-up screen is not displayed.	Check power-up/diagnostic display on the operator control panel for a failure during self-tests.
	Check that the keyboard and monitor are properly connected and powered on.
	If the power-up screen is not displayed, yet the system enters console mode when you press the Return key, check that the "console" environment variable is set correctly. If you are using a graphics monitor, the variable should be set to "graphics." If you are using a serial terminal, the variable should be set to "serial."
	If "console" is set to serial, the power-up screen is routed to the COM1 serial communication port and cannot be viewed from the graphics monitor.
	Try connecting a console terminal to the COM1 serial communication port. If necessary use a 9-pin connector. Check baud rate setting for console terminal and system. The system baud rate setting is 9600. When using the COM1 port, you must set the "console" environment variable to "serial."

Interpreting the Operator Control Panel Power-Up Display

Table 4-4 explains how to interpret power-up messages.

Table 4-4: Power-Up Messages

Message	Meaning
TEST	Displayed while the system performs diagnostic tests and exercisers. The type of module under test, its slot number, and the currently executing test number, are also displayed.
NO MEM INSTALLED	Displayed if you power up with no memory installed.
FAIL *module_type*	If an error is detected in the CPU, memory, or I/O, a failure message is displayed and the Halt button LED lights for a few seconds. The error is logged to the appropriate module by the serial control bus. In nearly all cases, the power-up tests continue. The module type and slot number for the module that failed, along with the test number that detected the error are also displayed. Module types and/or slot numbers: CPU_*nn*— CPU module 0, 1, 2, or 3 MEM_*nn* — Memory module 0, 1, 2, or 3 I/O_0 — System backplane
CPU STATUS	Summary of CPU testing—The status of each CPU from right to left, starting with CPU0 is displayed: P — CPU passed F — CPU failed -- — CPU not present
STARTING CPU #	The console is starting the primary CPU.
CONSOLE STARTED	The SRM console has been loaded into memory and has assumed control of the system.
TEST MEM BANK #\	The console is testing memory.
PROBE I/O SUBSYS	The console is checking the PCI and EISA bridges.
SYSTEM RESET	The Reset button has been pressed.
Model *n/nnn*	When the system is under operating system control, the CPU variant *n* and system model number *nnn* are displayed unless you supply your own text using the ocp_text environment variable.
21164 TIMEOUT	An Alpha 21164 microprocessor IBOX timeout occurred.
3.3V/CLOCK FAIL	A voltage or clock failure occurred on the CPU module.
MEM_yy NVR ERROR	A checksum error occurred in the memory EEROM.

CPU Failover

AlphaServer 2100A multiprocessor systems offer high-availability "failover" functionality. This feature allows the system to power up and boot the operating system in case of a CPU failure.

How Failover Works

When you power up or reset a multiprocessor system, each CPU, in parallel, runs a set of diagnostic tests. If any tests fail, errors are logged, and the failing CPU is not configured in the system. Responsibility for initializing memory and booting the console firmware is transferred to the next higher working CPU, and the boot process continues.

Messages on the operator control panel power-up/diagnostic display indicate the status of failed components. The number of the CPU serving as the primary CPU is displayed in the SRM console prompt; for example, `P01>>>`.

How to Determine the Status of CPU Tests

If a CPU fails during power-up, the Halt button LED on the operator control panel lights for a few seconds, and the power-up/diagnostic display CPU STATUS message shows the failing CPU ("F" indicates failure).

You can also use the following SRM firmware commands to examine the status of CPU tests or to see if errors are logged to a CPU.

- `show fru`, described in Chapter 3
- `show config`, described in Chapter 3

Fail-Safe Loader (FSL)

The AlphaServer 2100A system has redundant or backup ROM called the "fail-safe loader" (FSL) that is activated under the following circumstances:

- If the SRM console firmware is corrupted; for example, as a result of a failed firmware update.
- If a hardware failure during power-up prevents the console firmware from loading.
- If there is a configuration error, such as an incorrect environment variable setting.
- If the FSL enable switch is activated.

Automatic Activation

If the SRM console firmware is corrupted, the FSL is automatically loaded into memory. The system power-up display appears, followed by the FSL prompt:

```
AlphaServer 2100 Console V4.3-111, built on Sep 12 1995 at 15:38:55
ash>
```

Also, the power-up/diagnostic display on the operator control panel displays a FAIL I/O_04 message.

At the `ash>` prompt, reinstall the console firmware files, using your latest firmware update media.

Manual Activation

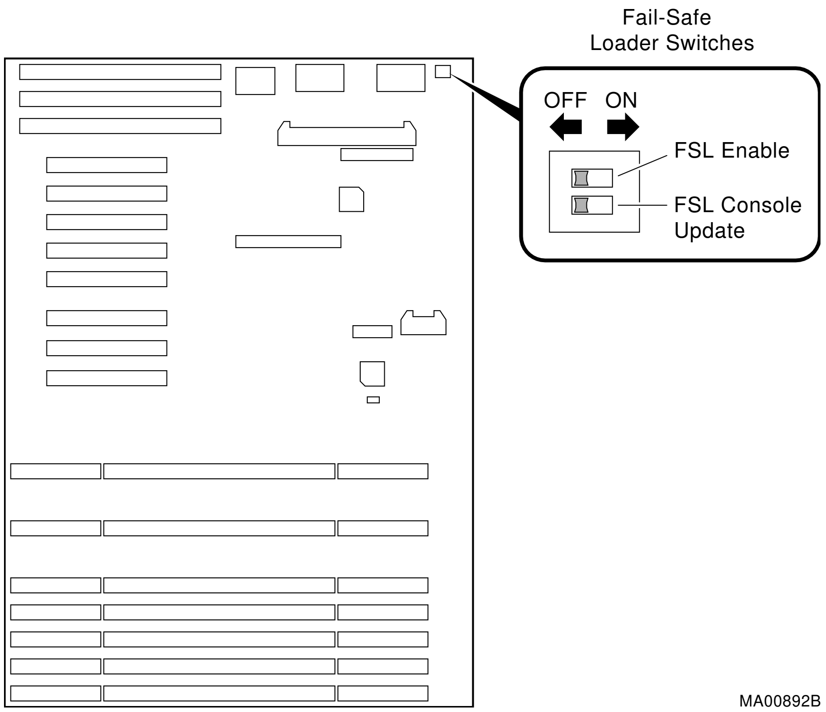
If necessary, you can activate the FSL manually as follows:

1. Make sure the system is off.
2. Locate the two FSL switches on the backplane (Figure 4-2).
3. Using a small flat implement, push the FSL enable switch (top switch) to the right (enabled).
4. Power on the system.
5. Perform limited commands from the FSL console, as described in the next section.
6. When you have finished, power down the system and push the FSL enable switch to the left (disabled).

The fail-safe loader switches function as follows:

- The FSL enable switch (top switch) selects the FSL firmware.
- The FSL console update switch (bottom switch) allows writes to the fail-safe loader and is used to update the fail-safe loader firmware during a system upgrade.

Figure 4-2: Fail-Safe Loader Switches on System Backplane



Using the FSL

From the FSL console `ash>` prompt, you can make corrections to environment variables, edit the "nvram" file, or initialize drivers so that you can perform a firmware update.

- To assign a correct value to an environment variable, use the `show` and `set` commands, as described in the *AlphaServer 2000/2100/2100A Firmware Reference Guide*.
- To edit the "nvram" file, use the `edit` command. The "nvram" file is a user-defined power-up script invoked during the power-up sequence. The "nvram" file and the `edit` command are described in the *AlphaServer 2000/2100/2100A Firmware Reference Guide*.
- To initialize all available drivers and boot updated firmware, enter the following commands. Substitute the name of the update file for the variable *update_file*.

```
ash> init -driver 6
ash> boot update_file
```

Caution

If you manually activated the FSL by pushing the FSL enable switch on the system backplane to the right, you must push the FSL enable switch to the left (disable) before performing the firmware update.

Updating the FSL

When you perform a system upgrade, such as replacing your existing CPUs with faster CPUs, you should update the fail-safe loader. Instructions on updating the FSL are provided with system upgrade kits.

Console Reported Problems

Table 4-5 describes how to troubleshoot your system when self-tests do not complete or when error messages are displayed on the console terminal in console mode.

Table 4-5: Troubleshooting Console Reported Problems

Symptom	Action
Power-up tests do not complete.	Use power-up/diagnostic display on the operator control panel.
The system powers up to the `ash>` prompt.	Reinstall firmware. Refer to the firmware update documentation for firmware installation instructions. Contact your Digital customer support center if you do not have a backup copy of the firmware.
Console program reports error, indicated by one of the following: • Operator control panel displays failure message at power-up • Halt button LED lights during power-up • Power-up screen includes error messages	Use power-up/diagnostic display on the operator control panel to determine error. Use the `show fru` command described in Chapter 3 to see if errors have been logged. Examine the console event log (enter the `more el` command) or power-up screens to check for embedded error messages recorded during power-up. If power-up screens or the console event log indicate problems with mass storage devices, or if storage devices are missing from the `show config` display, use the mass storage troubleshooting tables to determine the problem. If power-up screens or the console event log indicate problems with PCI devices, or if PCI devices are missing from the `show config` display, use the PCI troubleshooting table to isolate the problem. Issue the `test` commandto isolate the problem. See the description at the end of this section.

test

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

Note

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

Devices are tested in the following order:

1. Memory tests (one pass)
2. Read-only tests: DK* disks, DR* disks, DU* disks, DV* floppy, MK* tapes, MU* tapes.
3. Console loopback tests if lb (loopback) argument is specified: COM2 serial port and parallel port
4. VGA console tests. These tests are only run if the graphics monitor is not used as the console terminal, that is, the console environment variable is set to “serial.” The VGA console test displays rows of the word “Digital.”
5. Network external loopback tests for ewa0. This test requires that the Ethernet port be terminated or connected to a live network; otherwise, the test will fail.

Synopsis:

test [lb]

Arguments:

[lb]	The loopback option includes console loopback tests for the COM2 serial port and the parallel port during the test sequence.

Example 1

In this example, the system is tested, and the tests complete successfully.

```
P00>>> test
Testing the Memory
Testing the DK* Disks(read only)
dkb600.6.0.2.1 has no media present or is disabled via the
RUN/STOP switch
file open failed for dkb600.6.0.2.1
No DR* Disks available for testing
Testing the MK* Tapes(read only)
Testing the DV* Floppy Disks(read only)
file open failed for dva0.0.0.0.1
Testing the VGA(Alphanumeric Mode only)
Testing the EW* Network
P00>>>
```

Example 2

In this example, the system is tested, and the system reports an error message. No network server responded to a loopback message. Ethernet connectivity on this system should be checked.

```
P00>>> test
Testing the Memory
Testing the DK* Disks(read only)
No DR* Disks available for testing
Testing the MK* Tapes(read only)
Testing the DV* Floppy Disks(read only)
Testing the VGA(Alphanumeric Mode only)
Testing the EW* Network

*** Error (ewa0), Mop loop message timed out
from: 08-00-2b-3b-42-fd

*** List index: 7 received count: 0 expected count 2
P00>>>
```

Mass Storage Problems Indicated at Power-Up

Mass storage failures at power-up are usually indicated by read fail messages.

- Table 4-6 provides information for troubleshooting fixed-media mass storage problems indicated at power-up.
- Table 4-7 provides information for troubleshooting removable-media mass storage problems indicated at power-up.

Table 4-6: Troubleshooting Fixed-Media Problems

Symptom	Problem	Action
Fault LED for drive is on (steady).	Drive has failed.	Replace drive.
Drives with duplicate SCSI IDs are missing from the `show config` display.	Duplicate SCSI IDs (when removable-media bus is extended to StorageWorks shelf).	Correct removable-media SCSI IDs.
Valid drives are missing from the `show config` display or one drive may appear seven times.	SCSI ID set to 7 (reserved for host ID).	Correct SCSI IDs.
Valid drives are missing from the `show config` display or one drive may appear seven times.	Duplicate host IDs on a shared bus.	Change host ID using the `set pk*0_host_id` command described in the *AlphaServer 2000/2100/2100A Firmware Reference Guide.*
Problems persist after eliminating the above problem sources.	I/O module failure (if removable-media bus is extended to StorageWorks shelf) or PCI or EISA storage adapter option failure.	Replace storage adapter module or system backplane.

Table 4-7: Troubleshooting Removable-Media Problems

Symptom	Problem	Corrective Action
Fault LED for drive is on (steady).	Drive failure	Replace drive.
Drives with duplicate SCSI IDs are missing from the `show config` display.	Duplicate SCSI IDs.	Correct bus SCSI IDs.
Valid drives are missing from the `show config` display or one drive may appear seven times.	SCSI ID set to 7 (reserved for host ID).	Correct SCSI IDs
Valid drives are missing from the `show config` display or one drive may appear seven times..	Duplicate host IDs on a shared bus.	Change host ID using the set pk*0_host_id command described in the *AlphaServer 2000/2100/2100A Firmware Reference Guide.*
Activity LEDs do not come on. Drive missing from the `show config` display.	Missing or loose cables.	Remove device and inspect cable connections.
Read/write errors in console event log; storage adapter port may fail.	Missing internal terminator.	Check that cable terminator (12-36929-01) is installed at end of SCSI bus.
Devices produce errors or device IDs are dropped.	Extra terminator.	Check that cable terminator (12-36929-01) is removed if bus cable is connected to internal StorageWorks.
Problems persist after eliminating the above problem sources.	I/O module failure.	Replace system backplane.

EISA Bus Problems Indicated at Power-Up

EISA bus failures at power-up are usually indicated by the following message displayed during power-up:

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

Run the EISA Configuration Utility if this message is displayed.

Table 4-8 provides information for troubleshooting EISA bus problems that continue after you run the ECU.

Table 4-8: Troubleshooting EISA Problems

Step	Action
1	Confirm that the EISA module and any cabling are properly seated.
2	Run the ECU to:
	Confirm that the system has been configured with the most recently installed controller.
	See what the hardware jumper and switch setting should be for each ISA controller.
	See what the software setting should be for each ISA and EISA controller.
	See if the ECU deactivated any controllers to prevent conflict. Deactivation is indicated by angle brackets (<>).
	See if any controllers are locked, which limits the ECU's ability to change resource assignments. Locked controllers are indicated by an exclamation mark (!).
3	Confirm that hardware jumpers and switches on ISA controllers reflect the settings indicated by the ECU. Start with the last ISA module installed.
4	Check for a bad slot by moving the last installed controller to a different slot.
5	If you are unable to solve the problem, call the option manufacturer or Digital customer support for help.

Additional EISA Troubleshooting Tips

The following tips can aid in isolating EISA bus problems:

- Peripheral device controllers need to be seated (inserted) carefully, but firmly, into their slot to make all necessary contacts. Improper seating is a common source of problems for EISA modules.
- The CFG files supplied with the option you want to install may not work on AlphaServer 2100A systems. Some CFG files call overlay files that are not required on this system or may reference inappropriate system resources, for example, BIOS addresses. Contact the option vendor to obtain the proper CFG file.
- Peripherals cannot share direct memory access (DMA) channels. Assignment of more than one peripheral to the same DMA channel can cause unpredictable results or even loss of function of the EISA module.
- Systems running Windows NT can assign shared interrupt lines (IRQs). Digital UNIX and OpenVMS do not allow shared interrupts.
- Not all EISA products work together. EISA is an open standard, and not every EISA product or combination of products can be tested. Violations of specifications may matter in some configurations, but not in others.

  Manufacturers of EISA options often test the most common combinations and may have a list of ISA and EISA options that do not function in combination with particular systems. Be sure to check the documentation or contact the option vendor for the most up-to-date information.
- EISA options will not function unless they are first configured using the ECU.
- The ECU will not notify you if the configuration program diskette is write-protected when it attempts to write the system configuration file (system.sci) to the diskette.

PCI Bus Problems Indicated at Power-Up

PCI bus failures at power-up are usually indicated by the inability of the system to see a PCI device. Use Table 4-10 to diagnose the likely cause of the problem.

Table 4-9: Troubleshooting PCI Problems

Step	Action
1	Confirm that the PCI device and any cabling are properly seated.
2	Check for a bad slot by moving the last installed controller to a different slot.
3	If you are unable to solve the problem, call the option manufacturer or Digital customer support for help.

Boot Problems

Table 4-10 describes how to troubleshoot problems that occur while the system is booting operating system software.

Table 4-10: Troubleshooting Boot Problems

Symptom	Action
System cannot find boot device.	Check the system configuration for the correct device parameters (node ID, device name, and so on). **Digital UNIX and OpenVMS:** use the `show config` and `show device` commands. **Windows NT:** use the Display hardware configuration selection and the Set default environment variables selection. Check the system configuration for the correct environment variable settings. **Digital UNIX and OpenVMS:** examine the auto_action, bootdef_dev, boot_osflags, and os_type environment variables. For problems booting over a network, check the ew*0_protocols environment variable setting. Set to bootp if booting from Digital UNIX. Set to mop if booting from OpenVMS. **Windows NT:** examine the FWSEARCHPATH, AUTOLOAD, and COUNTDOWN environment variables.
Device does not boot.	• For problems booting over a network, check the ew*0_protocols environment variable setting. Set to bootp if booting from Digital UNIX. Set to mop if booting from OpenVMS. • Issue the `test` command to check that the boot device is operating.

Operating System Reported Problems

Table 4-11 describes possible problems reported by the operating system and suggested actions.

Table 4-11: Troubleshooting Operating System Reported Errors

Symptom	Action
System is hung or has crashed.	Examine the crash dump file. Refer to the *OpenVMS Alpha System Dump Analyzer Utility Manual* for information on how to interpret OpenVMS crash dump files. Refer to the *Guide to Kernel Debugging* (AA–PS2TA–TE) for information on using the Digital UNIX Krash Utility.
Operating system is running.	Have the Digital support center examine the operating system error log files to isolate the problem. Self-maintenance customers can refer to the *AlphaServer 2100A/2100A RM/2100A CAB Series Service Guide*. If the problem occurs intermittently, have the Digital support center run an operating system exerciser, such as DEC VET to stress the system. Refer to the *DEC Verifier and Exerciser Tool User's Guide* (AA–PTTMA–TE) for instructions on running DEC VET.

Problems with RAID Devices

Table 4-12 provides troubleshooting hints for AlphaServer 2100A systems that have the StorageWorks RAID Array 200 Subsystem. The RAID subsystem includes either the KZESC-*xx* (SWXCR-E*x*) EISA or the KZPSC-*xx* (SWXCR-P*x*) PCI RAID controller.

Table 4-12: Troubleshooting RAID Problems

Symptom	Action
Some RAID drives do not appear on the `show device d` display.	Valid configured RAID logical drives will appear as DRA0–DRAn, not as Dkn. Configure the drives by running the standalone configuration utility, as described in *StorageWorks RAID Array 200 Subsystems Controller Installation and Standalone Configuration Utility User's Guide* EK–SWRA2–IG. Note that several physical disks can be grouped as a single logical DRAn device.
Drives on the RAID subsystem power up with the amber Fault light on.	Whenever you move drives onto or off of the controller, run the standalone configuration utility to set up the drives and logical units. Follow the instructions in the standalone configuration utility user's guide, listed above.
Cannot access disks connected to the RAID subsystem on Windows NT.	On Windows NT systems, disks connected to the controller must be spun up before they can be accessed. While running the ECU, verify that the controller is set to spin up two disks every 6 seconds. This is the default setting if you are using the default configuration files for the controller. If the settings are different, adjust them as needed.

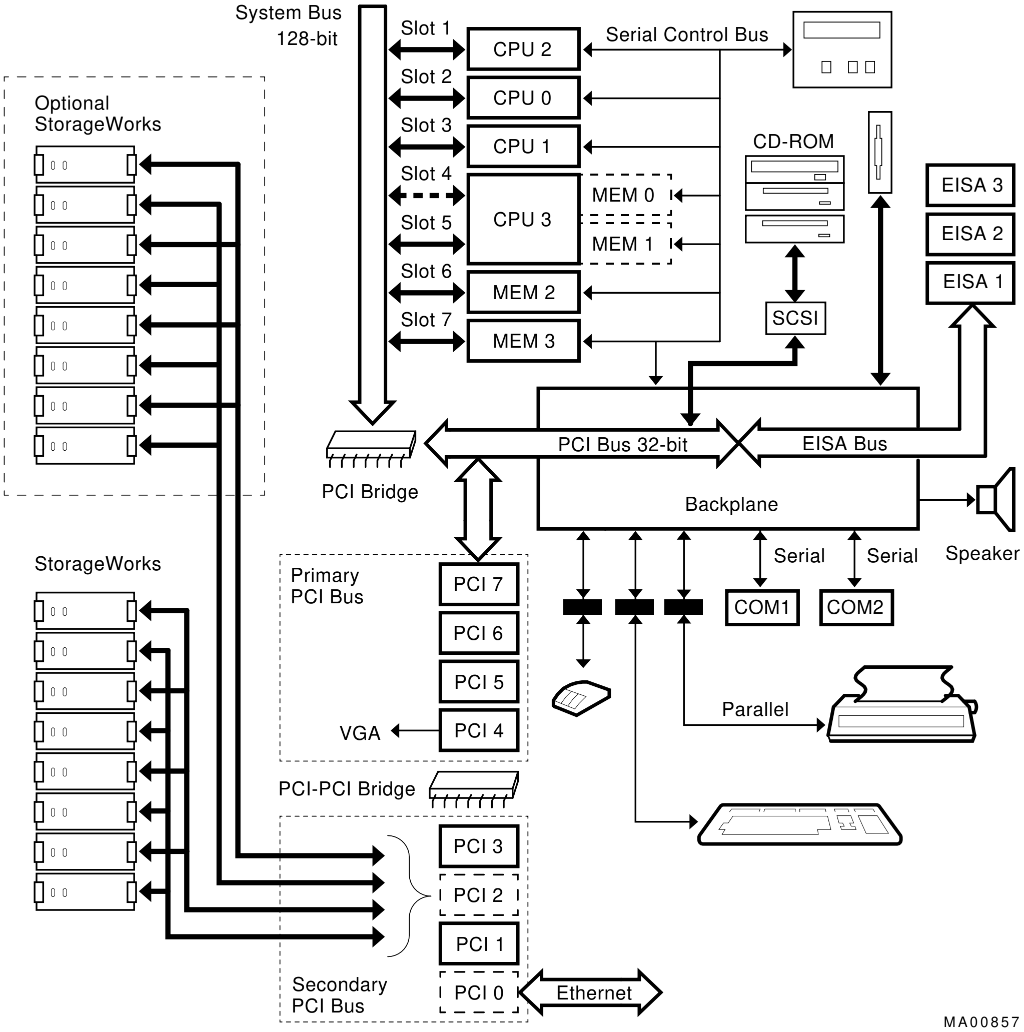
5
Specifications

This chapter contains the specifications of the AlphaServer 2100A pedestal system.

Architecture

Figure 5-1 illustrates the AlphaServer 2100A pedestal system architecture.

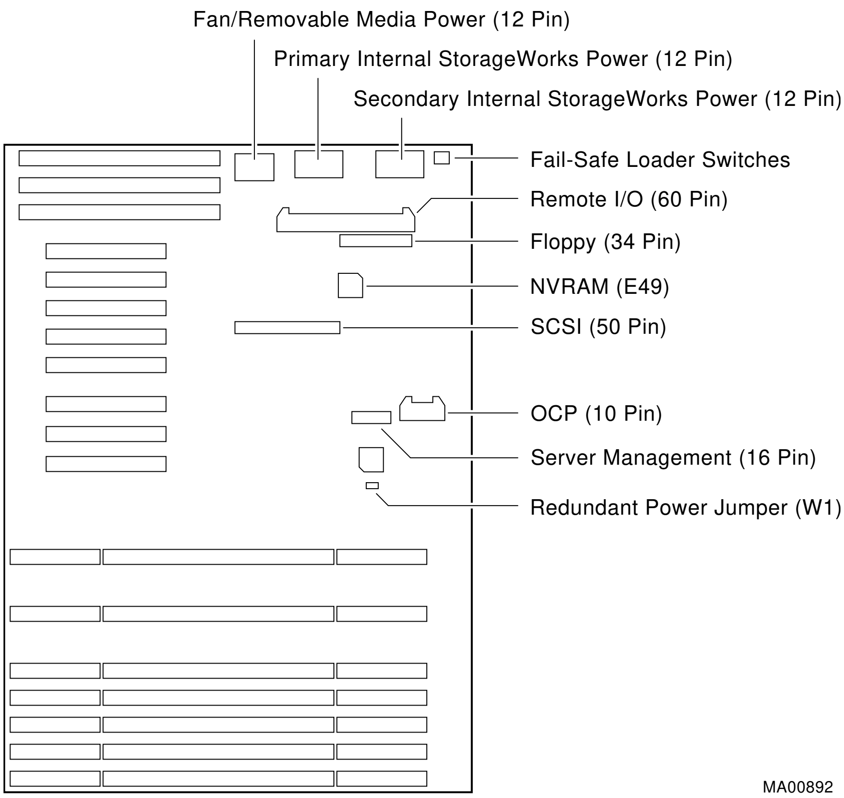
Figure 5-1: System Architecture



System Backplane

Figure 5-2 shows the locations of the main connectors, jumpers, and switches on the system backplane, as well as the location of the NVRAM.

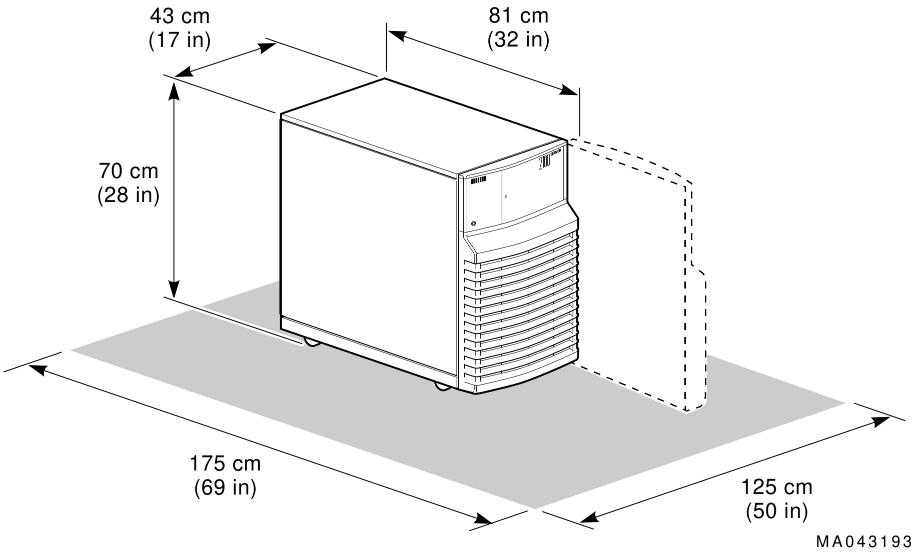
Figure 5-2: Connectors, Jumpers, Switches, NVRAM on System Backplane



System Dimensions

Figure 5-3 shows the system dimensions and the clearance area necessary for service access.

Figure 5-3: System Dimensions and Service Area



Environmental Specifications

Table 5-1 describes the environmental specifications for the AlphaServer 2100A system.

Table 5-1: Environmental Specifications

Specification	Measurement
Operating temperature	10–35° C 50–95°F
Relative humidity (noncondensing)	20-80%
Maximum heat dissipation	
Single power supply	880 W, 3005 Btu/hr
Dual power supply	1280 W, 4371 Btu/hr
Minimum operating clearance	
Front	75 cm (29.5 in.)
Rear	15 cm (5.9 in.)
Maximum operating altitude	2000 m (6562 ft)
Maximum power consumption	
Single power supply	880 W
Dual power supply	1280 W
Operating voltage range single phase	100–120 VAC/ 220–240 VAC
Operating frequency range	47 Hz to 63 Hz
Power cord length	2.4 m (8 ft)
Declared operating acoustic level	LNPEc (BELs) = 6.6 max per ISO 7779

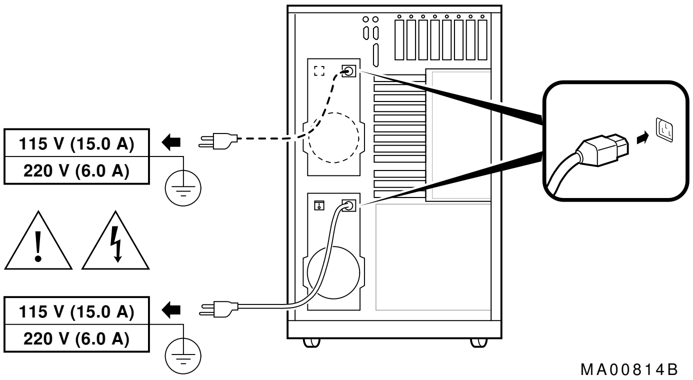
Power Requirements

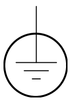
Depending on what you ordered, your system has either one or two power supplies. Figure 5-4 shows the power requirements for each power supply.

Voltage selection is not required. This equipment is intended for use at all rated AC-input voltages.

Warning: Plug this equipment into a properly grounded power receptacle.

Figure 5-4: Power Requirements





This symbol indicates a grounded power receptacle.

Power Cords

Power cords for your Digital system are country specific. Table 5-2 lists the correct power cord order numbers for various countries.

- Use the power cord BN number to identify the power cord.
- The Digital Number is used by Digital service representatives.

Note

One power cord is required for each power supply in your system. To order, call 1-800-DIGITAL (U.S.A. and Canada) or your authorized Digital distributor.

Table 5-2: Power Cords

Country	Power Cord BN Number	Digital Number
U.S., Japan, Canada	BN27Y-1J	17-00083-15
Australia, New Zealand	BN19H-2E	17-00198-14
Central Europe (Aus, Bel, Fra, Ger, Fin, Hol, Nor, Swe, Por, Spa)	BN19C-2E	17-00199-21
U.K., Ireland	BN19A-2E	17-00209-15
Switzerland	BN19E-2E	17-00210-13
Denmark	BN19K-2E	17-00310-08
Italy	BN19M-2E	17-00364-18
India, South Africa	BN19S-2E	17-00456-16
Israel	BN18L-2E	17-00457-16

Glossary

10BASE-T Ethernet network

IEEE standard 802.3-compliant Ethernet products used for local distribution of data. These networking products characteristically use twisted-pair cable.

Alpha microprocessor

A CMOS, single-chip processor based on the Alpha architecture and used on AlphaGeneration based computers.

AlphaGeneration

Identifies products and services that use Digital's Alpha 64-bit computing environments.

AlphaServer

Digital's new generation of server systems based on the Alpha 64-bit computing architecture.

AUI Ethernet network

Attachment unit interface. An IEEE standard 802.3-compliant Ethernet network connected with standard Ethernet cable.

ARC

User interface to the console firmware for operating systems that expect firmware compliance with the *Windows NT Portable Boot Loader Specification*. ARC stands for Advanced RISC Computing.

autoboot

A system boot initiated automatically by software when the system is powered up or reset.

availability

The amount of scheduled time that a computing system provides application service during the year. Availability is typically measured as either a percentage of uptime per year or as system unavailability, the number of hours or minutes of downtime per year.

BA350 storage shelf

A StorageWorks modular storage shelf used for disk storage in some AlphaServer systems.

BA740 enclosure

The enclosure that houses the AlphaServer 2100A pedestal system.

BA744 enclosure

The enclosure that houses the AlphaServer 2100A RM (rackmountable) system and AlphaServer 2100A CAB (cabinet) system.

backplane

The main board or panel that connects all the modules in a computer system.

backup cache

A second, very fast cache memory that is closely coupled with the processor.

bandwidth

Term used to express the rate of data transfer in a bus or I/O channel. It is expressed as the amount of data that can be transferred in a given time, for example, megabytes per second.

battery backup unit

A battery unit that provides power to the entire system enclosure (or to an expander enclosure) in the event of a power failure. Another term for uninterruptible power supply (UPS).

boot

Short for bootstrap. Load an operating system into memory.

boot device

The device from which the system bootstrap software is loaded.

boot flags

A flag is a system parameter set by the user. Boot flags contain information that is read and used by the bootstrap software during a system bootstrap procedure.

boot server

A computer system that provides boot services to remote devices such as network routers.

bootstrap

The process of loading an operating system into memory.

bugcheck

A software condition, usually the response to software's detection of an “internal inconsistency,” which results in the execution of the system bugcheck code.

bus

A collection of many transmission lines or wires. The bus interconnects computer system components, providing a communications paths for addresses, data, and control information or external terminals and systems in a communications network.

bystander

A system bus node (CPU, I/O, or memory) that is not addressed by a current system bus commander.

byte

A group of eight contiguous bits starting on an addressable byte boundary. The bits are numbered right to left, 0 through 7.

cache memory

A small, high-speed memory placed between slower main memory and the processor. A cache increases effective memory transfer rates and processor speed. It contains copies of data recently used by the processor and fetches several bytes of data from memory in anticipation that the processor will access the next sequential series of bytes.

card cage

A mechanical assembly in the shape of a frame that holds modules against the system and storage backplanes.

carrier

The individual container for all StorageWorks devices, power supplies, and so forth. In some cases because of small form factors, more than one device can be mounted in a carrier. Carriers can be inserted in modular shelves. Modular shelves can be mounted in modular enclosures.

CD-ROM

A read-only compact disc. The optical removable media used in a compact disc reader.

central processing unit

The unit of the computer that is responsible for interpreting and executing instructions.

client-server computing

An approach to computing whereby a computer—the "server"—provides a set of services across a network to a group of computers requesting those services—the "clients."

cluster

A group of networked computers that communicate over a common interface. The systems in the cluster share resources, and software programs work in close cooperation.

cold bootstrap

A bootstrap operation following a power-up or system initialization (restart). On Alpha based systems, the console loads PALcode, sizes memory, and initializes environment variables.

commander

In a particular bus transaction, a CPU or I/O that initiates the transaction.

command line interface

One of two modes of operation in the AlphaServer operator interface. The command line interface supports the OpenVMS and Digital UNIX operating systems. It allows you to configure and test the hardware, examine and alter system state, and boot the operating system.

console mode

The state in which the system and the console terminal operate under the control of the console program.

console program

The code that the CPU executes during console mode.

console subsystem

The subsystem that provides the user interface for a computer system when the operating system is not running.

console terminal

The terminal connected to the console subsystem. It is used to start the system and direct activities between the computer operator and the computer system.

CPU failover

On multiprocessor AlphaServer systems, functionality that allows the system to power up and boot the operating system even if only one CPU is working.

data bus

A bus used to carry data between two or more components of the system.

data cache

A high-speed cache memory reserved for the storage of data. Abbreviated as D-cache.

Digital UNIX operating system

A general-purpose operating system based on the Open Software Foundation technology. Digital UNIX runs on the range of AlphaGeneration systems, from workstations to servers.

DEC VET

Digital DEC Verifier and Exerciser Tool. A multipurpose system diagnostic tool that performs exerciser-oriented maintenance testing.

diagnostic program

A program that is used to find and correct problems with a computer system.

direct-mapping cache

A cache organization in which only one address comparison is needed to locate any data in the cache, because any block of main memory data can be placed in only one possible position in the cache.

direct memory access (DMA)

Access to memory by an I/O device that does not require processor intervention.

DRAM

Dynamic random-access memory. Read/write memory that must be refreshed (read from or written to) periodically to maintain the storage of information.

DSSI

Digital's proprietary data bus that uses the System Communication Architecture (SCA) protocols for direct host-to-storage communications.

DSSI cluster

A cluster system that uses the DSSI bus as the interconnect between DSSI disks and systems.

DUP server

Diagnostic Utility Program server. A firmware program on-board DSSI devices that allows a user to set host to a specified device in order to run internal tests or modify device parameters.

ECC

Error correction code. Code and algorithms used by logic to facilitate error detection and correction.

EEPROM

Electrically erasable programmable read-only memory. A memory device that can be byte-erased, written to, and read from.

EISA bus

Extended Industry Standard Architecture bus. A 32-bit industry-standard I/O bus used primarily in high-end PCs and servers.

EISA Configuration Utility

A menu-based utility supplied on diskette that is used for configuring EISA and ISA options. The ECU must be run whenever you change, add, or remove an EISA or ISA controller.

environment variables

Global data structures that can be accessed only from console mode. The setting of these data structures determines how a system powers up, boots the operating system, and operates.

ERF/UERF

Error Report Formatter. ERF is used to present error log information for OpenVMS. UERF is used to present error log information for Digital UNIX.

Ethernet

IEEE 802.3 standard local area network.

Factory Installed Software (FIS)

Operating system software that is loaded into a system disk during manufacturing. On site, the FIS is bootstrapped in the system.

fail-safe loader (FSL)

A program that allows you to power up without initiating drivers or running power-up diagnostics. From the fail-safe loader you can perform limited console functions.

Fast SCSI

An optional mode of SCSI-2 that allows transmission rates of up to 10 megabytes per second.

FDDI

Fiber Distributed Data Interface. A high-speed networking technology that uses fiber optics as the transmissions medium.

FIB

Flexible interconnect bridge. A converter that allows the expansion of the system enclosure to other DSSI devices and systems.

field-replaceable unit

Any system component that a qualified service person is able to replace on site.

firmware

Software code stored in hardware.

fixed-media compartments

Compartments that house nonremovable storage media.

Flash ROM

Flash-erasable programmable read-only memory. Flash ROMs can be bank- or bulk-erased.

FRU

Field-replaceable unit. Any system component that a qualified service person is able to replace on site.

full-height device (FH)

Standard form factor for 5.25-inch storage devices.

half-height device (HH)

Standard form factor for storage devices that are not the height of full-height devices.

halt

The action of transferring control of the system to the console program.

hose

The interface between the card cage and the I/O subsystems.

hot swap

The process of removing a device from the system without shutting down the operating system or powering down the hardware.

initialization

The sequence of steps that prepare the computer system to start. Occurs after a system has been powered up.

instruction cache

A high-speed cache memory reserved for the storage of instructions. Abbreviated as I-cache.

interrupt request lines (IRQs)

Bus signals that connect an EISA or ISA module (for example, a disk controller) to the system so that the module can get the system's attention by means of an interrupt.

ISA

Industry Standard Architecture. An 8-bit or 16-bit industry-standard I/O bus, widely used in personal computer products. The EISA bus is a superset of the ISA bus.

LAN

Local area network. A high-speed network that supports computers that are connected over limited distances.

latency

The amount of time it takes the system to respond to an event.

LED

Light-emitting diode. A semiconductor device that glows when supplied with voltage. A LED is used as an indicator light.

loopback test

Internal and external tests that are used to isolate a failure by testing segments of a particular control or data path. A subset of ROM-based diagnostics.

machine check/interrupts

An operating system action triggered by certain system hardware-detected errors that can be fatal to system operation. Once triggered, machine check handler software analyzes the error.

mass storage device

An input/output device on which data is stored. Typical mass storage devices include disks, magnetic tapes, and CD-ROMs.

memory interleaving

The process of assigning consecutive physical memory addresses across multiple memory controllers. Improves total memory bandwidth by overlapping system bus command execution across multiple memory modules.

menu interface

One of two modes of operation in the AlphaServer operator interface. Menu mode lets you boot the Windows NT operating system by selecting choices from a simple menu. The EISA Configuration Utility is also run from the menu interface.

modular shelves

In the StorageWorks modular subsystem, a shelf contains one or more modular carriers. Modular shelves can be mounted in system enclosures, in I/O expansion enclosures, and in various StorageWorks modular enclosures.

MOP

Maintenance Operations Protocol. A transport protocol for network bootstraps and other network operations.

motherboard

The main circuit board of a computer. The motherboard contains the base electronics for the system (for example, base I/O, CPU, ROM, and console serial line unit) and has connectors where options (such as I/Os and memories) can be plugged in.

multiprocessing system

A system that executes multiple tasks simultaneously.

node

A device that has an address on, is connected to, and is able to communicate with other devices on a bus. Also, an individual computer system connected to the network that can communicate with other systems on the network.

NVRAM

Nonvolatile random-access memory. Memory that retains its information in the absence of power.

nvram file

A user-defined power-up script that is always invoked during the power-up sequence.

OCP

Operator control panel.

open system

A system that implements sufficient open specifications for interfaces, services, and supporting formats to enable applications software to:

- Be ported across a wide range of systems with minimal changes
- Interoperate with other applications on local and remote systems
- Interact with users in a style that facilitates user portability

OpenVMS operating system

A general-purpose multiuser operating system that supports AlphaGeneration computers in both production and development environments. OpenVMS software supports industry standards, facilitating application portability and interoperability. OpenVMS provides symmetric multiprocessing (SMP) support for Alpha multiprocessing systems.

operating system mode

The state in which the system console terminal is under the control of the operating system. Also called program mode.

operator control panel

The panel located behind the front door of the system that contains the power-up/diagnostic display, DC On/Off button, Halt button, and Reset button.

PALcode

Alpha Privileged Architecture Library code, written to support Alpha processors. PALcode implements architecturally defined behavior.

PCI

Peripheral Component Interconnect. An industry-standard expansion I/O bus that is the preferred bus for high-performance I/O options. Available in a 32-bit and a 64-bit version.

portability

The degree to which a software application can be easily moved from one computing environment to another.

porting

Adapting a given body of code so that it will provide equivalent functions in a computing environment that differs from the original implementation environment.

power-down

The sequence of steps that stops the flow of electrical current to a system or its components.

power-up

The sequence of events that starts the flow of electrical current to a system or its components.

primary cache

The cache memory that is the fastest and closest to the processor.

processor module

Module that contains the CPU chip.

program mode

The state in which the system console terminal is under the control of a program other than the console program.

RAID

Redundant array of independent disks. A technique that organizes disk data to improve performance and reliability. RAID has three attributes:

- It is a set of physical disks viewed by the user as a single logical device.
- The user's data is distributed across the physical set of drives in a defined manner.
- Redundant disk capacity is added so that the user's data can be recovered even if a drive fails.

RAID Standalone Configuration Utility

A configuration utility supplied on diskette that is used to set up the disk drives and logical units on systems that have a StorageWorks RAID Array 200 Subsystems controller.

redundant

Describes duplicate or extra computing components that protect a computing system from failure.

reliability

The probability a device or system will not fail to perform its intended functions during a specified time.

responder

In any particular bus transaction, memory, CPU, or I/O that accepts or supplies data in response to a command/address from the system bus commander.

RISC

Reduced instruction set computer. A processor with an instruction set that is reduced in complexity.

ROM-based diagnostics

Diagnostic programs resident in read-only memory.

script

A group of commands to be executed. Similar to an OpenVMS command file.

SCSI

Small Computer System Interface. An ANSI-standard interface for connecting disks and other peripheral devices to computer systems. Some devices are supported under the SCSI-1 specification; others are supported under the SCSI-2 specification.

self-test

A test that is invoked automatically when the system powers up.

serial control bus

A two-conductor serial interconnect that is independent of the system bus. This bus links the processor modules, the I/O, the memory, the power subsystem, and the operator control panel.

serial ROM

In the context of the CPU module, ROM read by the Alpha microprocessor after reset that contains low-level diagnostic and initialization routines.

SMP

Symmetric multiprocessing. A processing configuration in which multiple processors in a system operate as equals, dividing and sharing the workload.

SRM

User interface to console firmware for operating systems that expect firmware compliance with the *Alpha System Reference Manual (SRM)*.

storage array

A group of mass storage devices, frequently configured as one logical disk.

StorageWorks

Digital's modular storage subsystem (MSS), which is the core technology of the Alpha SCSI-2 mass storage solution. Consists of a family of low-cost mass storage products that can be configured to meet current and future storage needs.

symmetric multiprocessing (SMP)

A processing configuration in which multiple processors in a system operate as equals, dividing and sharing the workload.

symptom-directed diagnostics (SDD)

An approach to diagnosing computer system problems whereby error data logged by the operating system is analyzed to capture information about the problem.

system bus

The hardware structure that interconnects the CPUs and memory modules and that tranfers data processed by the microprocessors throughout the system.

system disk

The device on which the operating system resides.

TCP/IP

Transmission Control Protocol/Internet Protocol. A set of software communications protocols widely used in UNIX operating environments. TCP delivers data over a connection between applications on different computers on a network; IP controls how packets (units of data) are transferred between computers on a network.

test-directed diagnostics (TDDs)

An approach to diagnosing computer system problems whereby error data logged by diagnostic programs resident in read-only memory (RBDs) is analyzed to capture information about the problem.

thickwire

One-half inch, 50-Ohm coaxial cable that interconnects the components in many IEEE standard 802.3-compliant Ethernet networks.

ThinWire

Ethernet cabling and technology used for local distribution of data communications. ThinWire cabling is thinner than thickwire cabling.

twisted pair

A cable made by twisting together two insulated conductors that have no common covering.

uninterruptible power supply (UPS)

A battery-backup option that maintains AC power to a computer system if a power failure occurs.

warm bootstrap

A subset of the cold bootstrap operation. On AlphaGeneration systems, during a warm bootstrap, the console does not load PALcode, size memory, or initialize environment variables.

wide area network (WAN)

A high-speed network that connects a server to a distant host computer, PC, or other server, or that connects numerous computers in numerous distant locations.

Windows NT

“New technology” operating system owned by Microsoft, Inc. The AlphaServer systems currently support the Windows NT, OpenVMS, and Digital UNIX operating systems.

write back

A cache management technique in which data from a write operation to cache is written into main memory only when the data in cache must be overwritten.

write-enabled

Indicates a device onto which data can be written.

write-protected

Indicates a device onto which data cannot be written.

write through

A cache management technique in which data from a write operation is copied to both cache and main memory.

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