AlphaServer 300

User's Guide

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This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

Any changes or modifications made to this equipment may void the user's authority to operate this equipment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

The user may find the following booklet prepared by the Federal Communications Commission helpful: *How to Identify and Resolve Radio-TV Interference Problems.* This booklet is available from the U.S. Government Printing Office, Washington, D.C., 20402. Stock No. 004-00398-5.

All external cables connecting to this basic unit need to be shielded. For cables connecting to option boards, see the option manual or installation instructions.

This digital apparatus does not exceed the Class B limits for radio noise emissions set out in the radio interference regulations of the Canadian Department of Communications.

Acoustics - Preliminary Declared Values per ISO 9296 and ISO 7779. 1B=10dBA

Sound Power Level L_{WAd}, B		Sound Pressure Level L_{pAm}, dBA (operator position)	
Idle	Operate	Idle	Operate
4.8	4.9	39	40

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Preface

Welcome to the AlphaServer 300 System

This guide introduces the AlphaServer 300 system.

Use the information here to start, use, update, troubleshoot, and configure your AlphaServer 300 system. You can also find general information on the system components, technical specifications, and console commands.

Audience

If you are operating, configuring, or adding options to the AlphaServer 300 system, the information included here is helpful to you.

Organization of the Information

This information for users covers the following topics (see the Table of Contents for a detailed listing):

- Chapter 1, *System Overview*. Motherboard, keyboard, system controls, indicators, ports, and connections.
- Chapter 2, *Getting Started*. Installing, starting, restarting, and turning off the system.
- Chapter 3, *Console Commands.* Basic commands for ARC and SRM consoles.
- Chapter 4, *Installing System Options*. Installing hard disk, compact disc, and tape drives, memory, option cards, printer cable, and external SCSI cable.
- Chapter 5, *Troubleshooting.* Possible causes and actions to solve problems.
- Appendix A, *Technical Specifications.*
- Appendix B, *Updating System Firmware.*
- Appendix C, *Starting an Operating System Installation.*
- Appendix D, *Equipment Log.*

Conventions

This guide uses the following conventions:

Convention Example	Description
`c:\windows`	Monospaced text indicates file names, path names, directories, or screen text. Each operating system has its own specific syntax.
[Enter]	Square brackets surrounding text represent a key on the keyboard.
[Ctrl]+[R]	A plus sign indicates that you press both the keys shown at the same time.
auto_action	Italic text indicates environment variables. Italic is also occasionally used for emphasis.
☞	A pointing hand indicates a reference to additional information.

Abbreviations

This guide uses the following abbreviations:

Abbreviation	Meaning
ARC	Advanced RISC Computing (the Windows NT Console).
CD	Compact disc.
CD-ROM	Compact disc read-only memory.
CPU	Central processing unit.
DMA	Direct memory access.
DRAM	Dynamic random access memory.
DROM	Diagnostic read only memory.
FDC	Floppy disk controller.
flashROM	Electrically erasable, rewriteable, nonvolatile memory.
GB	A GB suffix to a numerical value indicates size in *gigabytes* (for example, 1 GB). A gigabyte equals 1,073,741,824 bytes.
IRQ	Interrupt request.
ISA	Industry-standard architecture.
Kb	A Kb suffix to a numerical value indicates size in *kilobits* (for example, 512 Kb). A kilobit equals 1024 bits.
KB	A KB suffix to a numerical value indicates size in *kilobytes* (for example, 640 KB). A kilobyte equals 1024 bytes.
LED	Light-emitting diode.
Mb	An Mb suffix to a numerical value indicates size in *megabits* (for example, 10 Mb). A megabit equals 1,048,576 bits.
MB	A MB suffix to a numerical value indicates size in megabytes (for example, 550 MB). A megabyte equals 1,048,576 bytes.
MHz	Megahertz.
MAU	Media adapter unit.
ns	Nanoseconds.
NVRAM	Nonvolatile random access memory.
Digital UNIX	Digital UNIX operating system.
PCI	Peripheral component interconnect.
RISC	Reduced instruction set computing.
ROM	Read only memory.

(continued)

Abbreviation	Meaning
SCSI	Small computer system interface.
SIMM	Single in-line memory modules.
SRM	The Digital UNIX and OpenVMS console firmware.
SROM	Serial read only memory.
VMS	OpenVMS operating system.

Special Notices

This guide uses four kinds of notices to emphasize specific information.

WARNING

A WARNING indicates the presence of a hazard that can cause personal injury.

CAUTION

A CAUTION indicates the presence of a hazard that can cause damage to hardware or that might corrupt software.

NOTE

A NOTE gives general information, such as compatibility with other products or pointers to other information.

HINT

A HINT includes suggestions to make your computing tasks easier.

Additional Information Resources

You may wish to consult the following information resource on your AlphaServer 300 system:

- *AlphaServer 300 Installation Information* (order number EK-AS300-IN) presents a graphical overview of the AlphaServer 300 installation.
- *AlphaServer 300 Service Information* (order number AK-R2M9A-CA) provides troubleshooting and removal and replacement procedures, presented as an on-line help file.
- On the Internet go to: http://www.digital.com/info/alphaserver/products.html where you will find more information on Digital AlphaServer products.

Contact your distributor or Digital representative for other product-related information.

1
System Overview

Introduction

This chapter describes the AlphaServer 300 system hardware components, including the motherboard, PCI architecture, keyboard, front panel controls, rear panel connectors, and security features.

Motherboard

Your AlphaServer 300 system uses a high-performance DECchip 21064A CPU (central processing unit). System features include:

- 2 MB cache memory.
- Memory controller and data path that connects through a 128-bit wide data bus to main memory and through a 128-bit wide data bus to second-level cache. The data is longword parity protected (each set of 32 bits has a parity bit).
- PCI bus adapter with a 32-bit wide multiplexed address/data bus.
- Floppy disk controller that supports a floppy drive and one additional CD drive.
- PCI-based embedded SCSI-2 controller that supports up to seven SCSI peripherals such as hard disk drives, CD-ROM drive, and tape drives.
- One slot for a PCI option, one slot for a PCI or ISA option, and one additional slot for a half-size ISA option.
- Keyboard and mouse ports, two serial ports, and one enhanced bidirectional parallel port.
- PCI based Ethernet adapter.

☞ Refer to Appendix A, Technical Specifications, for additional information.

PCI Architecture

Your system's PCI architecture represents the latest advances in local bus technology. The AlphaServer 300 system PCI architecture delivers maximum performance by providing a wider data path, greater speed, and improved expandability. PCI removes various types of peripheral controllers from the slower ISA bus and connects them directly to a wider, faster data path. The result is faster data transfers for devices such as SCSI controllers and network interface cards—a critical advantage when you are running I/O-intensive software.

PCI local bus features include:

- Highest performance in the market today.
- Best expandability for high-performance peripheral devices.
- Support for multiple bus masters.
- 32-bit data transfer at 132 MB per second (peak).
- PCI-to-ISA bridge capability that allows you to use commonly available ISA options.

System Front View

Figure 1-1 is a front view of the system showing the location of the controls and indicators. Table 1-1 describes these items.

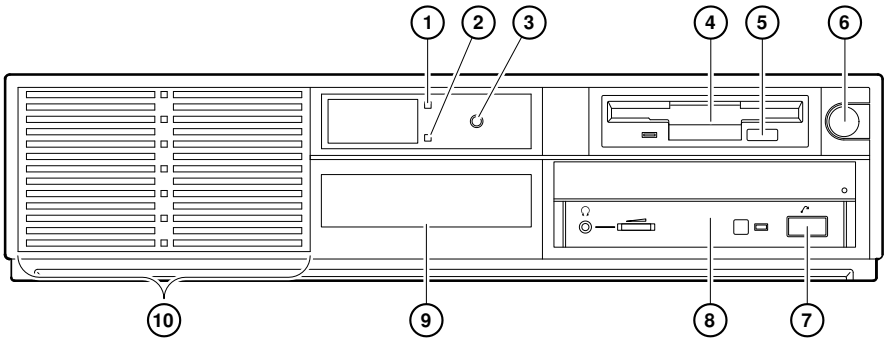

Figure 1-1 Front Controls and Indicators

Table 1-1 Front Controls and Indicators

Figure Legend	Control or Indicator	Function
1	Power indicator	Lights when the system is on.
2	Disk activity indicator	Lights when a hard disk drive is in use.
3	Reset button	This button resets the system and causes the self-test to run. See Appendix A, Technical Specifications, for directions on setting the Reset jumper.
4	Floppy drive	Location of 3.5-inch diskette drive.
5	Floppy eject button	Push to eject the floppy disk.
6	Power on/off button	Turns AC power on and off.
7	CD-ROM eject button	Opens the CD loading drawer.
8	CD drive (optional)	5.25-inch half-size front-accessible drive bay.
9	Hard drive (optional)	3.5-inch low-profile front-accessible hard drive bay.
10	Louvered air intake	Passageway for cooling air to enter the system. *(Do not block air intake.)*

System Rear View

Figure 1-2 shows the rear connectors and lock. Table 1-2 describes their functions.

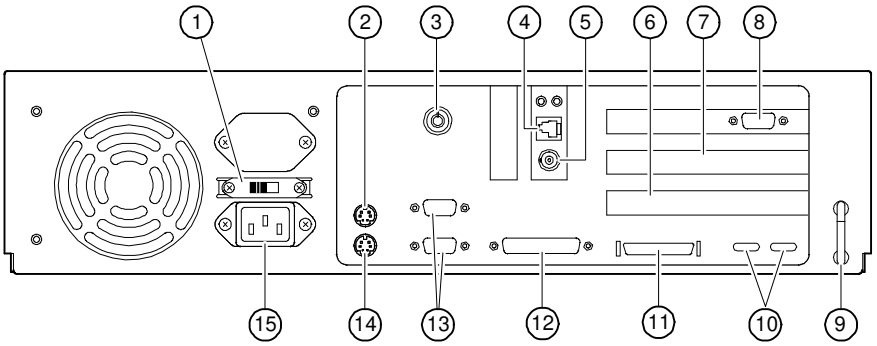

Figure 1-2 Rear Connectors

Table 1-2 Rear Connectors

Figure Legend	Connector	Function
1	Voltage selector switch	Allows you to set your system to work with 115 or 230 volts AC power.
2	Keyboard connector	Use to connect a 101- or 102-key keyboard.
3	System (chassis) lock	Locks top cover.
4	Twisted pair connector	Connection to the embedded Ethernet controller .
5	ThinWire connector	Connection to the embedded Ethernet controller .
6	ISA expansion slot	Used for half-size ISA expansion options only.
7	PCI/ISA expansion slot	Either a PCI or ISA option can use this slot.
8	PCI expansion slot	Used for PCI expansion options. In this example, a PCI graphics adapter is in the slot.
9	Security loop	Attachment point for a padlock and security cable.
10	LED viewing ports	Ports for viewing diagnostic LED indicators.
11	SCSI port	Provides the interface between the system unit and external SCSI devices.

Table 1-2 Rear Connectors (*continued*)

Figure Legend	Connector	Function
12	Enhanced bidirectional parallel port	Connects an industry-standard parallel printer or other parallel device.
13	Serial port connectors	Connects serial devices.
14	Mouse connector	Connects a PS/2-compatible mouse.
15	AC power connector	Connects the system to AC power.

Security Features

Chassis Lock

To avoid theft of internal components, your AlphaServer 300 system comes with a chassis key lock, which is located on the back of your system box. When this lock is in the locked position, the system box cover cannot be removed. Store the key in a safe place.

Security Loop

The security loop discourages theft of your system unit. The loop is designed to be used with a padlock and secure cable.

Passwords

For additional security, most screen saver and pause screen displays can have password protection enabled.

2
Getting Started

Introduction

Your AlphaServer 300 system is a high-performance system that uses the latest microprocessor technology. This chapter describes how to install, turn on, boot, and turn off your AlphaServer 300 system. Figure 2-1 shows a typical AlphaServer 300 system.

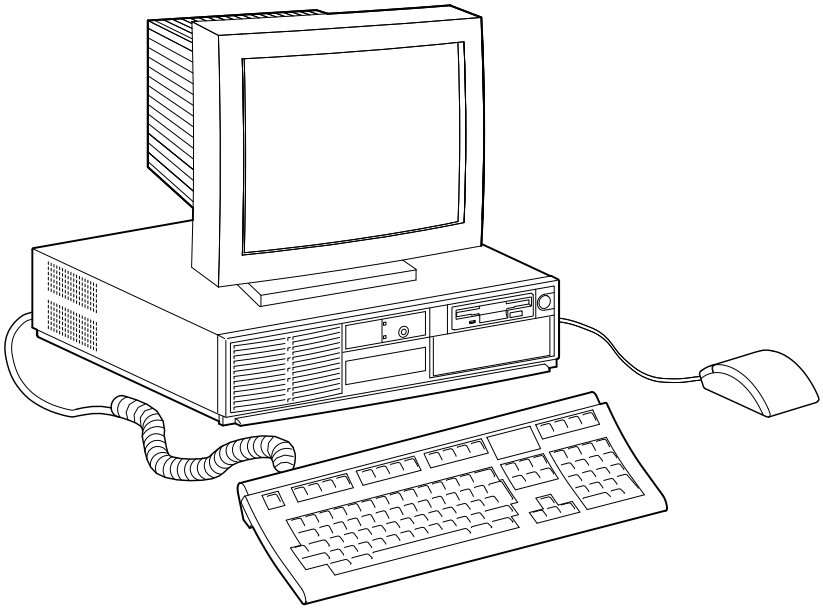

Figure 2-1 AlphaServer 300 System

Before Starting Your System

Before starting your system, perform the following steps:

1. Read and understand the information supplied with your system.
2. Select a well-ventilated site near a grounded power outlet and away from sources of excessive heat. The site should also be isolated from electric noise (for example, spikes, sags, and surges) produced by devices such as air conditioners, large fans, radios, and televisions.
3. Save all shipping containers and packing material for repackaging or moving the system later.

NOTES

1. Do not install optional hardware or application software until you have started your system and verified that the base system is working correctly.

2. On systems that have preloaded software, a label attached to the system unit informs you that licensed software has been installed. Carefully review the software license agreement shipped with your system.

WARNING

When unpacking and moving system components, be aware that some components (such as the system unit or monitor) may be too heavy for you to safely lift alone. If you are doubtful about whether you can lift these items alone, please get assistance.

Identifying the Correct AC Power Cord

A country specific detachable power supply cord will be provided or specified for your AlphaServer 300 system. As there are variations from one country to another, and systems may be moved, please inspect your power cord to ensure it is the correct one for your country or region. If you are not sure that the supplied AC power cord is correct, contact your authorized Digital service representative before you use it.

WARNING

Do not attempt to modify or use an external 115-volt AC power cord for 230-volt AC input power. Modifying the power cord can cause personal injury and severe equipment damage.

Power cords for AlphaServer 300 systems must meet the following criteria:

- Within the U.S. and Canada, this cord set will be Listed, Certified*, SVT, #18AWG, 3-conductor, grounding type, rated minimum 125V, 10A.
- In other countries, this cord set will be <HAR>, minimum 1.0mm^2, rated minimum 250V, 6A, with plugcap appropriate for the country where used.

Installing Your System

The *AlphaServer 300 Installation Information* accompanying your system shows the steps to follow when installing your system.

CAUTIONS

1. To ensure that your system is properly cooled, make sure that air can freely flow into the front and out of the rear of the system unit.

2. The system is designed to be placed horizontally on a desktop. Do not use a stand or rack that would hold the system on its side.

Check to make sure that you received all your system components. (See Appendix D, Equipment Log, to list your equipment.) If something is missing, please contact your distributor or Digital representative.

Position your system so that air can flow freely to and from the vents, as shown in Figure 2-2.

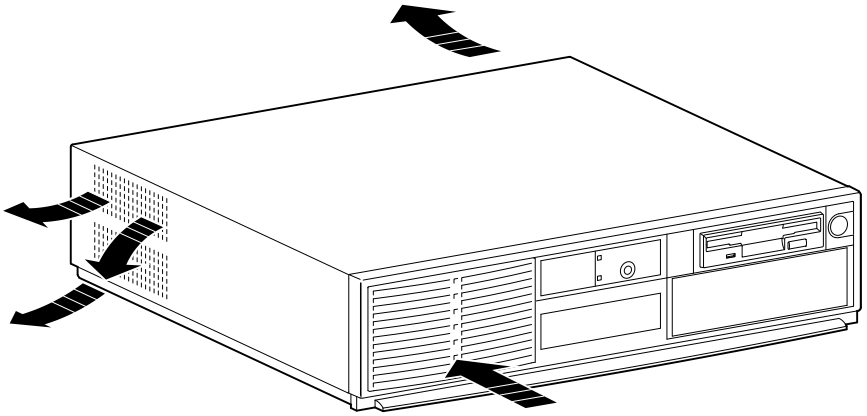

Figure 2-2 System Airflow

Connecting System Parts

To connect the components of your AlphaServer 300 system, perform the following steps:

1. Confirm that the voltage selector switch matches your local voltage (either 115 volts or 230 volts), as Figure 2-3 shows.

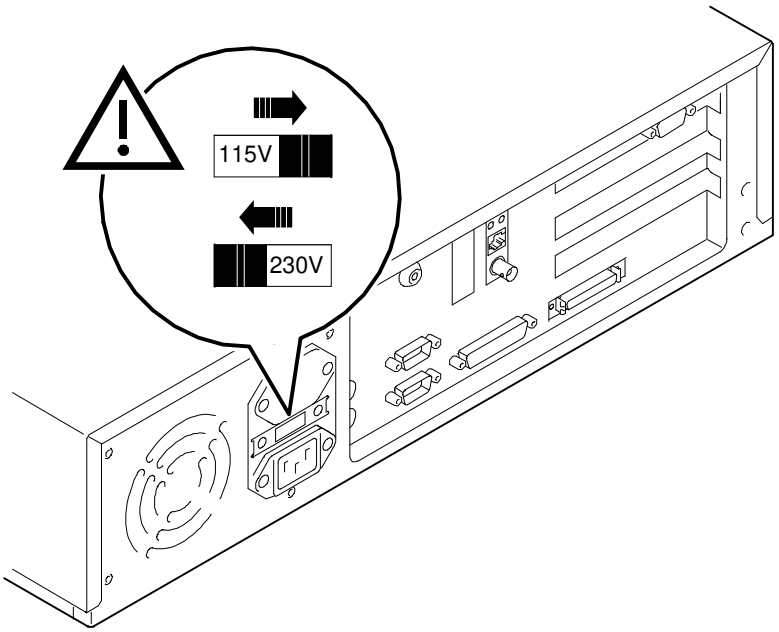

Figure 2-3 Voltage Selector Switch

CAUTION

Improper voltage selection can damage the system's power supply.

2. Ensure that the power switch is in the off (out) position. Refer to your system's *Installation Information* for a view of the positions of this switch.
3. Connect the mouse, keyboard, video cable, and power cords to the system components, as Figure 2-4 shows.

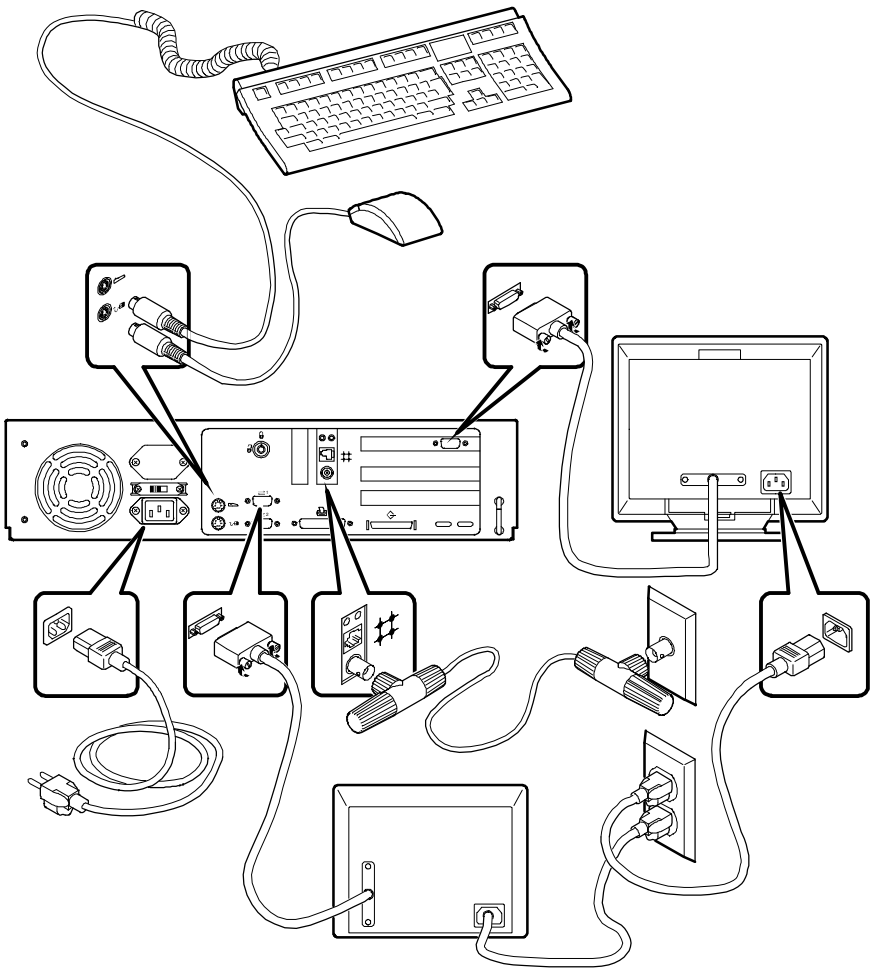

Figure 2-4 Connecting Cables and Power Cords

4. If you have an external SCSI device or SCSI storage box, connect the SCSI cable to the SCSI port on the rear of the system. See the SCSI termination section in Chapter 4.

Console Terminals

The AlphaServer 300 system supports two types of console terminals, a **graphics** terminal and a **serial** terminal. 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. If you are using the Windows NT operating system, a **graphics** terminal is required. If you are using either OpenVMS or Digital UNIX, the terminal may be **graphics** or **serial**.

- The **graphics** terminal attaches to the graphics adapter card on the back of the system. (This terminal is shown on the right side of Figure 2-4.) The "console" environment variable should be set to "graphics."
- The **serial** terminal attaches to the COM1 port on the back of the system. (This terminal is shown at the bottom of Figure 2-4.) The "console" environment variable should be set to "serial."

☞ See Chapter 3, Console Commands, for more information on environment variables.

Serial Port Connectors

The serial port connectors consist of two 9-pin D-subminiature connectors.

The baud rates supported by the system's serial ports are 50, 75, 110, 134.5, 150, 300, 600, 1200, 1800, 2000, 2400, 3600, 4800, 7200, 9600, 19200, 38400, and 57600 (56000 with approximately 3% error), and 115200.

☞ Refer to your operating system documentation to confirm which baud rates are supported by your operating system.

Network Connection

Connect your network interface cable to the appropriate port on your network module. If you are using the Digital UNIX or OpenVMS operating systems, the ThinWire port is selected by default. You can change to the twisted-pair port by entering the following SRM console command:

`>>>set ewa0_mode twisted` (See Chapter 3, Console Commands.)

Installing the Operating System

Digital UNIX and OpenVMS

If you ordered a Digital UNIX or OpenVMS version of the AlphaServer 300 system, your operating system came preloaded.

You may encounter a special circumstance that requires you to reload your operating system, In such a case, refer to your operating system documentation for information on loading. Also refer to Appendix C, Starting an Operating System Installation.

Microsoft Windows NT Server

If you ordered a system with a Microsoft Windows NT license, the operating system is not preloaded. However, Disk 0 on the first SCSI bus is partitioned and formatted so that you can immediately install the operating system. Refer to your operating system documentation for information on loading.

Starting Your System

1. Turn on the system unit power, monitor power, and any external devices. Figure 2-5 shows the location of the system unit power button.

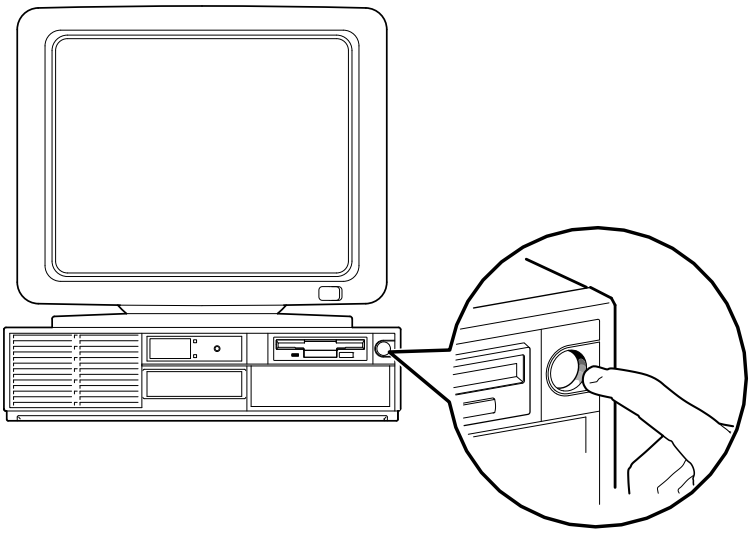

Figure 2-5 Starting Your System

2. If necessary, adjust the monitor contrast and brightness to obtain a readable screen display. (Refer to the information supplied with your monitor for further instructions.)
3. Allow your system to complete any power-on self-tests and device initialization messages. During initialization, you will see information scroll by quickly on the screen. (This takes approximately 1 minute.)
4. If you are booting Digital UNIX or OpenVMS, the system halts and displays the SRM console prompt (>>>). You can now boot the operating system using the **boot** command. (See **boot command** in the SRM console section of Chapter 3.) If the environment variable *auto_action* is set to boot, the system will boot automatically without using a boot command. (See the SRM environment variables section of Chapter 3 for more information.)
5. If you are booting Windows NT, the system normally halts and displays the ARC console Boot Menu. You can now boot the system by selecting **Boot Windows NT** menu choice. (See the ARC console section of Chapter 3 for more information on the Boot Menu.) If autoboot is enabled, the system will boot automatically without using the menu. (See **Setup Autoboot** in the ARC console section of Chapter 3 for more information on setting autoboot and other system parameters.

Turning Off Your System

Before turning off your system, make sure to save and close all open files. If you turn the system off without saving and closing files, you might lose some or all of your work.

Perform the following steps to turn off your system:

1. Close any application data files you have open as well as any applications you have running. Most application programs prompt you to save the information before closing.
2. Shut down the operating system with the appropriate command from Table 2-1.

Table 2-1 Operating System Shutdown

Operating System	Action
Microsoft Windows NT	From the Program Manager File Menu, choose Shutdown. Choose the OK button to confirm.
Digital UNIX	Type the following from a superuser account: `shutdown -h now`
OpenVMS	Type the following from a privileged account: `@sys$system:shutdown`

3. Wait for the operating system to complete the shutdown process. For OpenVMS and Digital UNIX, the SRM console prompt (>>>) is displayed. Microsoft Windows NT displays a window indicating it is safe to turn off or restart the system.
4. Do not turn off power to your system and peripherals until the shutdown sequence has completed.

3
Console Commands

Introduction

The AlphaServer 300 system contains two console subsystems: ARC firmware that supports the Microsoft Windows NT operating system, and SRM firmware that supports the Digital UNIX and OpenVMS operating systems. The console firmware resides in flashROM on the motherboard. The user is responsible for performing system firmware upgrades. Consult Appendix B, Updating System Firmware, for more information.

This chapter gives a basic description of each console's commands.

ARC Console

The ARC console has a menu interface that supports the use of the Microsoft Windows NT operating system. When an AlphaServer 300 system with Microsoft Windows NT is powered on, initialization is performed. During initialization, the firmware checks the information stored in the nonvolatile memory. If the information is unreadable or inconsistent, a warning message is displayed. The warning message identifies the areas that must be fixed prior to booting Microsoft Windows NT. If the information is correct, a menu similar to the following displays after initialization:

```
Alpha Firmware Version 4.49
Copyright (c) 1993-1996 Microsoft Corporation
Copyright (c) 1993-1996 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.
```

ARC Menus

The ARC console consists of three primary menus: Boot, Supplementary, and Setup.

Boot Menu Functions:

- Boot the default boot selection
- Boot an alternate boot selection
- Run a program
- Access the Supplementary menu

Supplementary Menu Functions:

- Install new firmware
- Install Microsoft NT from a compact disc
- Access the Setup menu
- Display the hardware configuration
- Return to the Boot menu

Setup Menu Functions:

- Set the system time
- Set the default system partition

- Configure the system floppy drives and keyboard
- Manage the ARC boot selections
- Set the system to boot automatically
- Edit the system environment variables
- Reset the system to factory defaults
- Set the default operating system and system firmware
- Return to the Supplementary menu, with or without saving Setup menu changes

Booting the System

Boot "boot selection identifier"

Selecting this menu item causes the system to boot the default operating system. The boot selection identifier, Windows NT in this case, uses values that were set up with the "Manage boot selection" menu. The default boot selection identifier is the identifier at the top of the identifier list. When the Boot Windows NT command is selected, you will see something similar to the following:

```
OS Loader V3.5

.............

Microsoft (R) Windows NT (TM) Version 3.5

1 System Processor [49128 Kb memory]

Checking file system on C:

The type of file system is FAT.

The volume is clean.
```

The screen then displays a Microsoft Windows NT Server graphic and the Welcome box appears.

Boot an Alternate Operating System

The "Boot an alternate operating system" command is located in the Boot menu. Use this command to select a boot selection identifier that is different from the default selection. For example, you could have multiple versions of Microsoft Windows NT installed, each with its own unique boot selection identifier; use this command to select the version you want to boot.

Manage Boot Selection Menu

Reach the "Manage boot selection menu" from the Setup menu. Use the manage boot selection menu to add, change, check, delete, dump (list), and rearrange boot selections.

Initially, select Add a boot selection. You are then prompted to select:

- A system partition for this boot selection (The partition defined by the Set default environment variables command should be one of your choices.)
- The osloader directory and name
- Whether or not the operating system is in the same partition as the osloader
- The operating system root directory
- A name (identifier) for this boot selection
- Whether or not the debugger should be initialized at boot time

After you have added a boot selection, use the "Check boot selections" command to perform verification testing of the selections. If an error is detected, you are prompted to ignore, delete, or change the boot selection.

Setup Autoboot

The "Setup autoboot" command is located in the Setup menu. Use this command to enable automatic booting of the system. When you enable autoboot, you will also be prompted to enter a countdown value. (The default is 10 seconds.) The ARC console will wait for the duration of the countdown value before booting the system.

Display Hardware Configuration

This choice, located in the Supplementary menu, displays a list of available hardware devices on your system. An example of the hardware configuration screen display follows the bulleted section.

- The first screen displays processor information, the amount of memory installed, and the type of video card installed.
- The second screen displays devices detected by the firmware. Multi() devices include the monitor, keyboard port, and serial line ports. SCSI() devices are SCSI disk, tape, or CD-ROM devices.
- The third screen displays PCI devices, including a SCSI controller, ISA bridge chip (super I/O chip), Ethernet controller, memory (NVRAM board), and VGA controller.

```
Alpha Processor and System Information:

  Processor ID       21064
  Processor Revision 3
  System Revision    0x1
  Processor Speed    266 MHz
  Physical Memory    64 MB

Extended Firmware Information:

  Version: 4.49 960719.1755
```

```
  NVRAM Environment Usage: 10%
      (329 of 3052 bytes)
Video Option detected:
  BIOS controlled video card

 Press any key to continue...
                            Monday, 11-11-1996  5:05:38 PM
Devices detected by the firmware:

multi(0)video(0)monitor(0)
   multi(0)key(0)keyboard(0)
   multi(0)disk(0)fdisk(0)     (Removable)
   multi(0)serial(0)
   multi(0)serial(1)
   scsi(0)disk(1)rdisk(0)   (RAW)    DEC   RZ28B  (C) DEC0006
** scsi(0)tape(5)tape(0)             DEC   TLZ06  (C) DEC4BQE
   scsi(0)cdrom(6)fdisk(0)(Removable) DEC  RRD45  (C) DEC 1084
** --> Devices detected but not supported by the firmware.


 Press any key to continue...
                             Monday, 11-11-1996  5:05:38 PM


PCI slot information:


Bus  Device  Function Vendor Device Revision Interrupt Device
#    #       #        ID     ID     ID       Vector    Type
---- ------  -------- ------ ------ -------- --------- ------
 0    6       0       1000      1      2         6       SCSI
 0    7       0       8086    484     84         0       ISA bridge
 0   11       0       1011      2     23         a       Ethernet
 0   12       0       1011      7      2         f       Memory
 0   13       0       1011      d     22         9       VGA

 Press any key to continue...
```

Setting System Parameters

Set Default Environment Variables

The "Set default environment variables" command is located in the Setup menu. Use this command to specify the location of the default system partition. Press ESC to return to the previous menu.

```
Enter location of default system partition:

         Select media:
      SCSI Hard Disk
      Floppy Disk
      CD-ROM

Enter SCSI bus number: 0
Enter SCSI ID: 0
Enter partition [must be FAT or NTFS]: 1
```

Set Default Configuration

The "Set default configuration" command is located in the Setup menu. Use this command to select monitor resolution, floppy drive capacity, keyboard language, and SCSI controller (Host) ID.

```
Select monitor resolution:
      1280x1024
      1024x768
      800x600
      640x480

Select floppy drive capacity:
      5.25" 1.2MB
      3.5" 1.44MB
      3.5" 2.88MB

Select second floppy drive capacity:
      5.25" 1.2MB
      3.5" 1.44MB
      3.5" 2.88MB
      None

Select keyboard:
      U.S.         101-key keyboard
      Japanese     106-key keyboard
      French       102-key keyboard
      German       102-key keyboard
      Spanish      102-key keyboard

      .
      .
      .

Enter SCSI Host ID (0-7) for SCSI bus number 0: 7
```

Other Menu Functions

Install New Firmware

The “Install new firmware” command is located in the Supplementary menu. Use this command to install firmware upgrades. When selected, the floppy drive and CD-ROM (compact disc read only memory) will be checked for the firmware update tool. If the proper media is not present, this command will time out. Follow the instructions packaged with the firmware update or refer to Appendix B, Updating System Firmware, in this guide.

Install Windows NT from CD-ROM

The “Install Windows NT from CD-ROM” command is located in the Supplementary menu. You will need to insert the Microsoft Windows NT CD into the CD-ROM drive before selecting this command.

Switching from ARC to SRM Console

To switch from the ARC console (used with the Microsoft Windows NT operating system) to the SRM console (used with the OpenVMS and Digital UNIX operating systems), follow these steps from the Boot menu:

- Select the Supplementary menu
- Select the Setup menu
- Select “Switch to OpenVMS or Digital UNIX console”
- Choose which operating system should be launched at the next power cycle
- Select the Setup menu
- Power cycle the system to implement the change; leave the system off for at least 20 seconds.

SRM Console

The SRM console supports the OpenVMS and Digital UNIX operating systems. The SRM console is a command line interface. For a complete list of SRM commands, type `help` at the SRM prompt (>>>). This section describes console conventions, special characters, environment variables, and the following commands:

- boot
- set
- show

This section also describes two SRM utilities that are used to configure ISA options.

- iconfig
- isacfg

SRM Console Conventions

Table 3-1 SRM Console Conventions

Item	Convention
Console prompt	>>>
Maximum command length	255 characters
Multiple contiguous spaces or tabs	Treated as a single space
Command abbreviations	Allowed, if not ambiguous
Command qualifiers or options	Prefix with a space and a dash "-"
Numbers	Hexadecimal, unless otherwise specified. (Note that registers such as R0–R31 are shown in decimal notation.)

SRM Console Special Characters

Table 3-2 SRM Console Special Characters

Character/Key(s)	Function
Return	Terminates command line input.
Backspace	Deletes the previously typed character.
[Ctrl]+[A]	Toggles insert/overstrike mode. (Overstrike is the default.)
[Ctrl]+[B], or up arrow	Recalls previous commands. (The last 16 commands are stored.)
[Ctrl]+[C]	Terminates the foreground process.
[Ctrl]+[E]	Moves the cursor to the end of the line.
[Ctrl]+[F] or right arrow	Moves the cursor right one position.
[Ctrl]+[H]	Moves the cursor to the beginning of the line.
[Ctrl]+[O]	Stops console output
[Ctrl]+[Q]	XON, Resume flow of data to the console.
[Ctrl]+[S]	XOFF, Stops the flow of data to the console.
[Ctrl]+[U] or [Ctrl] + [D]	Deletes the entire line.
[Ctrl]+[R]	Retypes the current command line.

Boot Command

The boot command performs the following functions:

- Initializes the processor
- Loads a program image from the specified boot device
- Transfers control to the loaded image

The syntax of the boot command is:

```
boot [-file <filename>] [-flags <longword>[,<longword>]]
[-protocols <enet_protocol>] [-halt] [<boot_device>]
```

The boot command options are described in Table 3-3.

Table 3-3 SRM Boot Command Options

Command Option	Description
-file <filename>	Specifies the name of a file to load into the system. For booting from Ethernet, this name is limited to 15 characters. Use the set boot_file command to set the environment variable that specifies a default boot file.
-flags <longword>[,<longword>]	Specifies additional information for the operating system. For systems with OpenVMS, root number and boot flags are specified here. For Digital UNIX systems, the following values may be used: i = interactive boot s = boot to single user a = autoboot to multiuser Use the set boot_osflags command to set an environment variable that specifies a default boot flag value.
-protocols <enet_protocol>	Specifies the Ethernet protocol(s) that will be used for a network boot. Values may be mop or bootp.
-halt	Forces the bootstrap operation to halt and invoke the console program after the image is loaded and the page tables and other data structures are set up.
<boot_device>	Specifies a device path or list of devices that the firmware will attempt to boot. Use the set bootdef_dev command to set an environment variable that specifies a default boot device.

Boot Command Examples

Table 3-4 SRM Boot Command Examples

Command	Description
`>>>boot`	Boots the system from the default boot device.
`>>>boot ewa0`	Boots the system from Ethernet port ewa0.
`>>>boot -file dec2.sys ewa0`	Boots the file named dec2.sys from Ethernet port ewa0.
`>>>boot -protocol bootp ewa0`	Boots using TCP/IP BOOTP protocol from Ethernet port ewa0.
`>>>boot -flags 0,1`	Boots the system from the default boot device using flag settings 0,1.
`>>>boot -halt dka0`	Loads the image from disk dka0, but remains in console mode.

Show Command

The show command displays the current value of a specified environment or displays information about the system.

The syntax of the show command is:

```
show [{config, device, map, memory, pal, version, <envar>...}]
```

The show command options are described in Table 3-5. Environment variables are listed in Table 3-6.

Table 3-5 SRM Show Command Options

Command Option	Description
config	Displays the current memory configuration, PCI logical slots, and ISA logical slots (based on ISACFG utility input to the configuration database).
device [device name]	Displays the devices and controllers in the system. Specifying a device name returns information on that device only.
<envar>	Displays the value of the environment variable specified.
error	Displays error log information.
map	Displays the system virtual memory map.
memory	Displays the memory module configuration.
pal	Displays the version of OpenVMS and Digital UNIX PALcode.
version	Displays the version of the console firmware.

Show Command Examples

```
>>>show device

dka0.0.0.6.0   DKA0   RZ26L  441A
dka400.4.0.6.0 DKA400 RRD43  3213
dva0.0.0.0.1   DVA0
ewa0.0.0.12.0  EWA0 08-00-2B-E2-1C-25
pka0.7.0.6.0   PKA0   SCSI Bus ID 7


>>>show memory

64 Meg of System Memory
Bank 0=32 Mbytes (8 MB per Simm)
      Starting at 0x2000000
Bank 1=32 Mbytes (8 MB per Simm)
      Starting at 0x0
Bank 2 = No Memory Detected


>>>show config

Firmware
SRM Console:   X3.8.5
ARC Console:   4.49
PALcode:       VMS PALcode X5.48-85,
               UNIX PALcode X1.35-55
Serial ROM:    V4.4
Diag ROM:      V1.2

Processor
DECchip (tm) 21064-2    266Mhz 2MB Cache

MEMORY
  32 Meg of System Memory
  Bank 0 = 32 Mbytes(8 MB Per Simm)
           Starting at 0x0
  Bank 1 = 32 Mbytes(8 MB Per Simm)
           Starting at 0x2000000
  Bank 2 = No Memory Detected

PCI Bus
  Bus 00 Slot 06: NCR 810 SCSI Controller
              pka0.7.0.6.0   SCSI Bus ID 7
              dka0.0.0.6.0   RZ26L
              dka400.4.0.6.0 RRD43

  Bus 00 Slot 07: Intel SIO 82378
```

```
  Bus 00 Slot 10: Digital Network
                  Controller
       ewa0.0.0.10.0      08-00-2B-E2-1C-25

  Bus 00 Slot 11: Digital ZLXp Graphics
                  Controller

ISA
Slot Dev Name Type   Enable BaseAd  IRQ DMA
0
      0 MOUSE  Embedded Yes  60     12
      1  KBD   Embedded Yes  60      1
      2  COM1  Embedded Yes  3f8     4
      3  COM2  Embedded Yes  2f8     3
      4  LPT1  Embedded Yes  3bc     7
      5 FLOPPY Embedded Yes  3f0     6   2
2
      0 PCXBJ Singleport Yes 530     9   0


>>>show language

36
```

Notice that 36 corresponds to the value in Table 3-6; in this case, English (American) is the default language. Other environment variables can be specified:

```
>>>show console

graphics
```

Table 3-6 SRM Environment Variables

Variable	Description
auto_action	Sets/shows the console action following an error, halt, or power-up. The action can be halt, boot, or restart. Halt is the default.
boot_file	Sets/shows the file name to be used when a bootstrap requires a file name. The default setting is null.
boot_osflags	Sets/shows additional parameters to be passed to system software. When using OpenVMS software, these parameters are the system root number and boot flags. The default setting is 0,0.
bootdef_dev	Sets/shows the default device or device list from which the system will attempt to boot. If the system software is preloaded, the variable is preset to point to the device containing the preloaded software. Otherwise, the default value is null.
console	Sets the console output to either the COM1 serial port or the graphics controller.
control_scsi_term	Unused in the AlphaServer 300 system.
ewa0_mode	Determines whether the AUI (ThinWire) or the twisted-pair Ethernet ports is enabled. AUI is the default. (Auto-sensing is not supported.)
language n	The language environment variable associates language *n* to the system (where *n* is the number of the language shown below). You can have the system prompt you for the language using the following command: `>>>set language 0` and then `>>>init`. Power cycle the system after you have set the language. *n* Language — *n* Language 0 none (display menu) — 40 Francais (Suisse Romande) 30 Dansk — 42 Italiano 32 Deutsch — 44 Nederlands 34 Deutsch (Schweiz) — 46 Norsk 36 English (American) — 48 Portugues 38 English (British/Irish) — 4A Suomi 3A Espanol — 4C Svenska 3C Francais — 4E Vlaams 3E Francais (Canadian)
os_type	Sets/shows the specified operating system (NT, OpenVMS, or Digital UNIX) that NVRAM will boot.
pci_parity	This variable controls PCI parity checking at the PCI bridge chip. The default setting is off, and should remain at default.

Set Command

The set command is used to set or modify the value of an environment variable. Environment variables are used to pass configuration information between the console firmware and the operating system.

The syntax of the set command is:

```
set <envar> <value> [-default] [-integer] [-string]
```

The set command options are described in Table 3-7.

Table 3-7 SRM Set Command Options

Command Option	Description
<envar>	The environment variable to be assigned a new value.
<value>	The value that is assigned to the environment variable. It can be either a numeric value or an ASCII string.
-default	Restores an environment variable to its default value.
-integer	Creates an environment variable as an integer.
-string	Creates an environment variable as a string.

Set Command Examples

Table 3-8 SRM Set Command Examples

Command	Description
`>>>set bootdef_dev ewa0`	The default boot device is set to ewa0.
`>>>set auto_action boot`	The console attempts to boot following an error, halt, or power-up.
`>>>set osflags 0,1`	The default boot flags are set to 0,1.
`>>>set foobar 5`	An environment variable called foobar is created and given a value of 5.
`>>>set os_type nt`	Sets up the system to start the ARC console after the next power cycle.

Switching from SRM to ARC console

To switch from the SRM console to the ARC console, follow these steps:

- At the SRM prompt, type `>>>set os_type nt`
- Power cycle the server. (Leave the system off for at least 20 seconds.)
- The ARC console Boot menu appears.

ISA Configuration Utilities

ISA devices are not capable of being probed for configuration information by the Digital UNIX or OpenVMS operating systems. Therefore, you must configure ISA option information manually before installing a new ISA option module on an AlphaServer 300 system running either Digital UNIX or OpenVMS.

There are two SRM utilities that can be used to configure ISA options: the ICONFIG utility and the ISACFG utility.

- The ICONFIG utility is a subset of the ISACFG utility. ICONFIG contains scripts to configure one module of each of the three following types: DE205 Ethernet card, PBXJA-AA sound card, and PB2GA-FB graphics card.
- The ISACFG utility is a command line utility. It is useful for configuring more than one ISA module of each type, for example a second DE205 card or two non-Digital ISA options.

The ICONFIG utility and the ISACFG utility are described in the following sections.

ICONFIG Utility

To start the ICONFIG utility, type **iconfig** at the SRM console prompt. The following display appears. Note that the ISA options shown below are factory configured and cannot be deleted.

```
ISA CONFIGURATION UTILITY

Name              I/O  IRQ  DMA  Mem       Length    Enabled

MOUSE             60   12                           Y
KBD               60   1                            Y
COM1              3f8  4                            Y
COM2              2f8  3                            Y
LPT1              3bc  7                            Y
FLOPPY            3f0  6    2                       Y


HELP: Enter up to 15 char device name
```

```
KEY HELP: Arrows/TAB to move, RET once to submit entry, RET
2nd time to exit
```

Using the Built-in ICONFIG Scripts

There are three types of options that can be configured into the AlphaServer 300 system using a built-in script: the DE205 Ethernet module, PBXJA-AA sound module, and PB2GA-FB graphics module (MACH 64). You can use a script to configure only one module of each type. Enter the **help scripts** command to view the available scripts. (Note that the PCXDF-AA fax/modem module is not supported on the AlphaServer 300.)

```
>>>help scripts

NAME

      scripts

FUNCTION

      These scripts are used to set up the system
configuration.

SYNOPSIS

      Available scripts:

            add_de205   Adds DE205 module

            add_fax     Adds FAX module

            add_sound   Adds SOUND module

            add_mach64  Adds ATI-MACH64 module
```

To add a module, type the script name. You must also type **init** to submit the entry. For example, add a PB2GA-FB (MACH64) graphics module as follows:

```
>>> add_mach64

>>> init
```

After the system initializes, type **iconfig** to view the configured options. The MACH64 module now appears in the display, and you can turn off the system and install the module.

Adding Options Manually

If you are configuring more than one of the same type of ISA option (for example, two non-Digital Ethernet options), you must enter the configuration information manually.

NOTE

Type information carefully. If you make a typing error, you cannot correct it. Type **Ctrl/X** to exit the utility. Then type **iconfig** and begin again. To delete an entry you created, position the cursor on the first column of the entry and press the Backspace key.

To add a second ISA option, type **iconfig** at the >>> console prompt. Enter the device name, then tab to the next field and enter the I/O address, and so forth. For example, to add a second DE205 Ethernet controller to the database, follow these steps:

1. Enter up to 15 chars device name	**DE200-LE [TAB]**
2. Enter I/O address in hex	**300 [TAB]**
3. Enter IRQ channel in decimal	**5 [TAB]**
4. Enter dma channel in decimal	**[TAB]**
5. Enter memory address in hex	**d0000 [TAB]**
6. Enter length of memory in hex	**10000 [TAB]**
7. Enter N to disable, Y to enable	**Y [RETURN]**
8. Initialize the system.	**>>>init**
9. View the new entry	**>>>iconfig**
10. Turn off the system and install the new module.	

NOTE

The available IRQ values for ISA options are 5, 9, 10, 14, and 15. On Windows NT systems, IRQs 9, 10, 11, and 15 are preassigned to PCI options, if such options are installed.

If IRQ conflicts exist, a message is displayed. For example, if you entered an IRQ value of 8 instead of 5, the following message is displayed:

```
ISACFG MESSAGE:  ERROR:  IRQ conflict with reserved IRQ values
(0,2,8,11 or 13)
```

If you entered a DMA value of 2 rather than nothing, the following message is displayed:

```
ISACFG MESSAGE:  ERROR:  DMA conflict with slot 0 dev 5
```

ISACFG Utility

Command Format

The syntax of the ISACFG command is:

```
isacfg [-slot <slot#>] [-dev <device#>]
[-all|-rm|-mk|-mod] [-<field> <value>] . . .
```

The ISACFG command options are described in Table 3-9.

Table 3-9 SRM ISACFG Command Options

Command Option	Description
-all	Shows the entire configuration table. Overrides all other commands.
-dev <dev#>	Optional; defaults to 0 if not entered. On a multifunction or multiport adapter, this specifies the device on the adapter.
-dmachan{0-3} <#>	Allows you to specify up to four DMA (direct memory access) channels for the device.
-dmamode{0-3} <#>	Allows you to specify the DMA type for -dmachan{0-3}. DMA modes are: 1 - Block 2 - Demand 4 - Single 8 - Cascade
-enadev <#>	Allows you to specify whether an entry is enabled or disabled. Disabled devices are not used in resource allocation calculations. The possible values are: 0 - No (disabled) 1 - Yes (enabled)

Table 3-9 SRM ISACFG Command Options *(continued)*

Command Option	Description
-etyp <#>	Defines an entry type for this entry. The # sign can be: 0 - Causes the entry to be deleted 1 - Single option 2 - Embedded multiport device 3 - Multiport option device
-handle <string>	Binds a name to the driver (up to 15 characters).
-init	Initializes the configuration table to the default settings.
-iobase{0-5} <#>	Specifies up to six I/O base registers (in hexadecimal) for a particular device entry.
-irq{0-3} <#>	Allows you to assign up to four IRQ (interrupt request) channels to the device (use decimal IRQ levels).
-membase{0-2} <#>	Specifies up to three R/W ISA memory regions.
-memlen{0-2} <#>	Specifies the length corresponding to membase{0-2}.
-mk	Adds an entry into the table.
-mod	Modifies an entry in the table.
-rm	Deletes an entry from the table.
-rombase <#>	Specifies an address for ISA BIOS ext. ROM.
-romlen <#>	Specifies length of ROM.
-slot <slot#>	Allows you to enter a unique slot number for each ISA adapter. You may assign the numbers in any order. The slot number does not relate to a physical ISA adapter position. Slot 0 is reserved for the local multiport adapter.
-totdev <#>	Placeholder for you to keep track of the total number of devices, specified by the # sign, at this slot. Modify this for your own use.

Adding ISA Options to OpenVMS and Digital UNIX Systems

When you need to add more than one ISA option of the same type to an AlphaServer 300 system running the OpenVMS or Digital UNIX operating system, perform the procedure shown in Table 3-10.

Table 3-10 Adding Options to OpenVMS or Digital UNIX Systems

Step	Action	Result or Next Step
1	`>>>isacfg` *options*	Adds the new ISA option to the SRM console configuration table using the appropriate command options.
2	`>>>init`	Typing `init` allows the changes to be used.
3	Configure the ISA option.	Use the manual that came with your ISA option to set the proper configuration.
4	Turn off the system and install the ISA option.	Refer to Chapter 4.
5	Turn on the system and boot.	The operating system boots and sees the new ISA option.

ISACFG Command Examples

This section shows examples of ISACFG commands you use to enter the DE205 into the configuration database. Examples to display, modify, and remove table entries are also included. In some cases, there are scripts available to issue the proper ISACFG command. Script commands are preceded by an "add_" prefix. Long commands can be continued on the next line by typing a backslash "\" at the end of the line.

Adding the DE205 option:

```
>>>add_de205
```

-or-

```
>>>isacfg -slot 1 -dev 0 -mk -handle DE200-LE \
_> -irq0 5 -iobase0 300 -membase0 d0000-etyp 1 -enadev 1
```

Displaying the full configuration database:

```
>>>isacfg -all
```

Modifying the IRQ0 entry of an option:

```
>>>isacfg -mod -slot 1 -irq0 14
```

Removing an entry:

```
>>>isacfg -rm -slot 1 -dev 0
```

4
Installing System Options

Introduction

This chapter covers the following topics related to installing system options on your AlphaServer 300 system:

- Opening and closing the system cover
- Installing additional system memory
- Installing expansion boards
- Cable layout for power, SCSI, and FDC cables
- Installing internal drives
- Connecting external devices
- Replacing the battery

Removing the Top Cover

To remove the top cover, perform the following steps:

1. Turn off your system and all peripheral devices.
2. Unplug the power cord and remove the monitor power cord (if connected) and video cable.
3. Unlock the top cover by turning the key counterclockwise.

HINT

Occasionally, the top cover of the system is pushed back during shipping. This can cause a misalignment of the locking mechanism, which makes operating the key lock difficult. To remedy this, push the top cover toward the bezel; this aligns the cover, allowing you to operate the key lock properly.

CAUTIONS

1. To avoid system damage from static discharge, touch bare (unpainted) metal on the system box before you touch anything inside the system.
2. To avoid system damage from overheating, be careful not to run the system without the top cover in place for extended periods of time.

4. To remove the cover, place your thumbs on the upper corners of the rear panel, pull back on the cover sides, and lift the cover off.

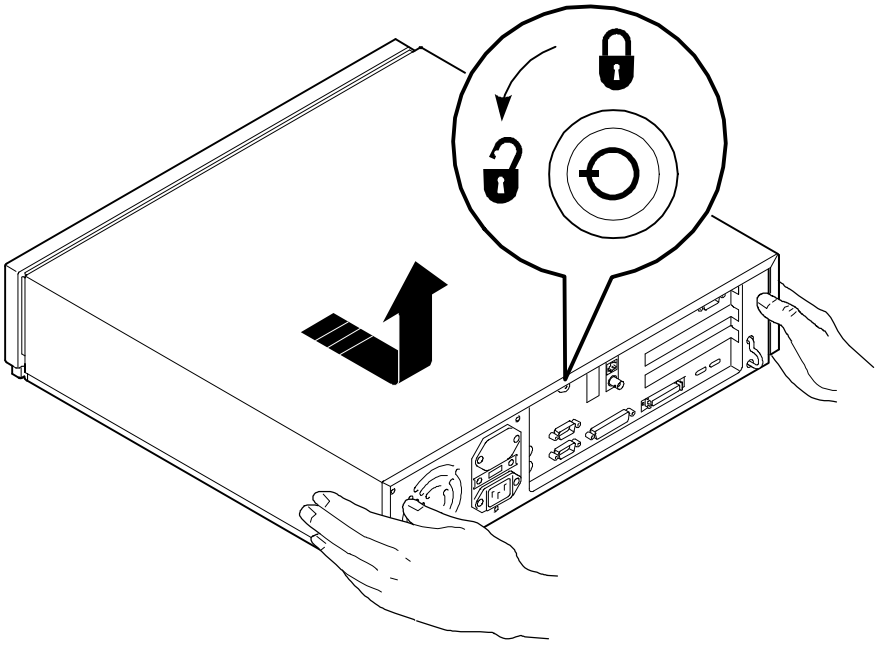

Figure 4-1 Unlocking and Removing Top Cover

System Unit Components

Figure 4-2 shows the location of the AlphaServer 300 system unit components. Table 4-1 lists the system unit components.

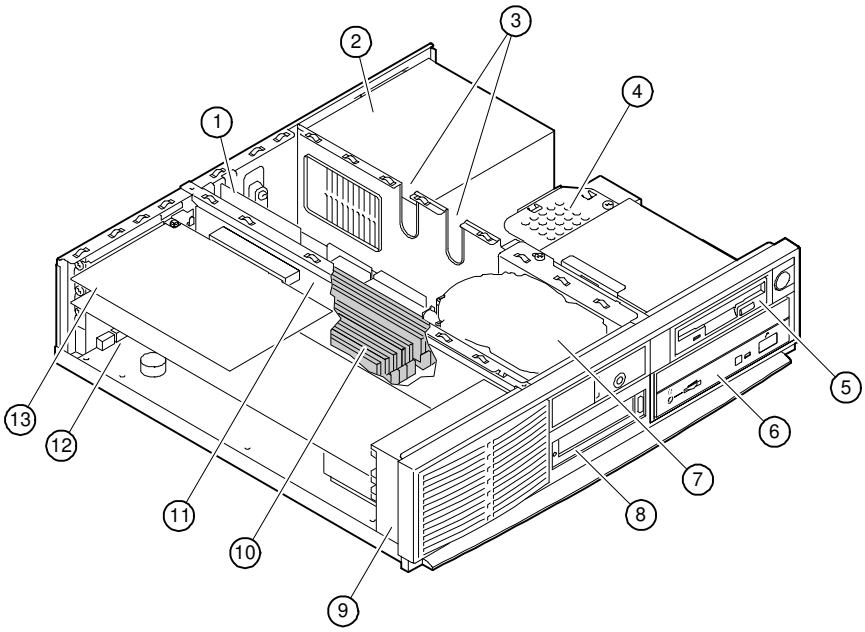

Figure 4-2 System Unit Components

Table 4-1 System Unit Components

Figure Legend	Component
1	MAU provides twisted-pair and ThinWire Ethernet connections (optional).
2	Power supply and fan.
3	Cable routing areas.
4	Speaker.
5	3.5-inch, 1.44-MB floppy disk drive.
6	Optional CD-ROM drive or other 5.25-inch half-size drive.
7	Half-size hard disk drive (not accessible from front).
8	Storage bay for optional hard disk (3.5-inch low-profile).
9	Cooling fan.
10	Memory modules (two banks with four SIMMs in each bank).
11	Riser card for ISA and PCI option cards.
12	Motherboard
13	Typical PCI option card (size varies with option).

Motherboard

Figure 4-3 show the locations of the motherboard components. Table 4-2 lists the motherboard components.

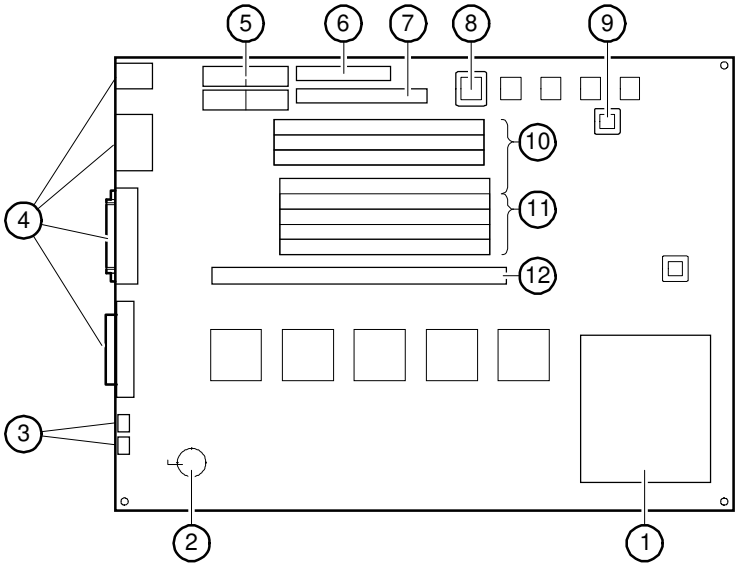

Figure 4-3 Motherboard Components

Table 4-2 Motherboard Components

Figure Legend	Components
1	DECchip 21064A CPU
2	Battery
3	Service LEDs
4	Rear-panel connectors
5	Power connectors
6	FDC connector
7	Internal SCSI connector
8	DROM
9	SROM
10	Bank 1 memory module connectors
11	Bank 0 memory module connectors
12	Riser card connector

Installing Additional System Memory

Adding more memory allows your system to run larger, more memory-intensive software. You can increase your system's memory to 512 MB (megabytes). You can add 32-MB, 64-MB, 128-MB, or 256MB memory options. Each memory option consists of four single in-line memory modules (SIMMs):

- 32-MB option consisting of four 8-MB SIMMs
- 64-MB option consisting of four 16-MB SIMMs
- 128-MB option consisting of four 32-MB SIMMs
- 256-MB option consisting of four 64-MB SIMMs

SIMMs must be of the same capacity and must always be added in sets of four into one of two available memory banks, bank 0 or bank 1 (see items 10 and 11 in Figure 4-3). If all SIMM slots are already used, you can still increase your system's memory by removing four SIMMs from one of the banks and replacing them with four larger SIMMs. The system requires 72-pin parity SIMMs that have an access time of 60 ns or 70 ns.

Adding Memory Modules

To add a set of memory modules (SIMMs), refer to Figure 4-4, which shows a view of the SIMMs from the front of the system, as you perform the following steps:

1. Remove the drive bracket to improve access. (See the section on Installing Storage Options in the Drive Bracket, later in this chapter.)

HINT

If you are adding memory and adding a drive to the *upper bay of the inner storage area* at the same time, add the memory SIMMs while the drive bracket is removed for easier installation. If you are adding memory and adding a drive to the *lower bay of the inner storage area* at the same time, however, remove the SIMMs. Then you can add the lower-bay drive, followed by the SIMMs.

2. Install the SIMM into the socket at an angle ①. Ensure that the notch ③ is aligned with the protrusion in the bottom of the connector. Rock the SIMM gently until it is seated evenly into the bottom of the socket. Tip the SIMM upright ② until both metal retaining clips ④ at the socket ends engage.
3. Repeat steps 1 and 2 for the other two SIMMs.

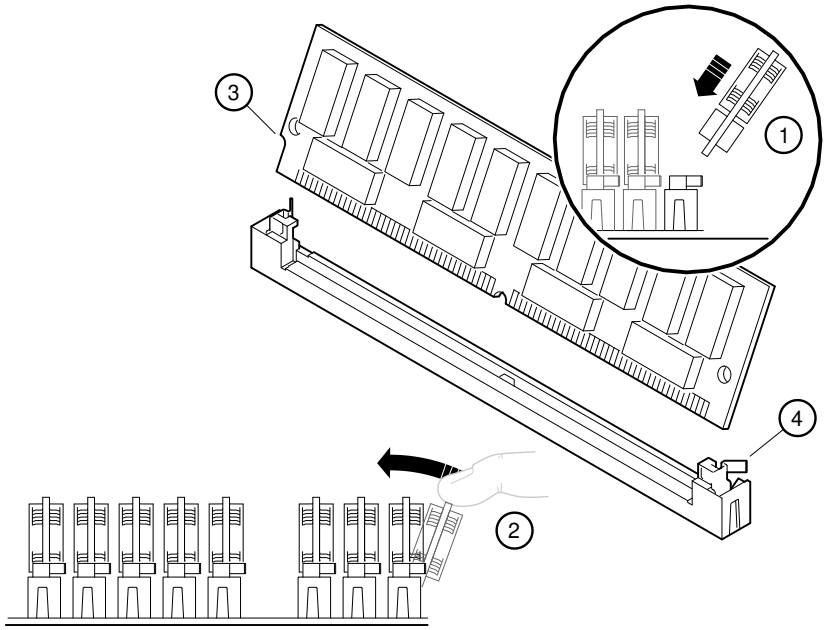

Figure 4-4 Memory Installation

Installing Expansion Boards

The system features one PCI slot, one PCI/ISA combination slot, and one ISA slot (for half-size ISA options only). The combination slot can contain either a PCI or ISA option. The following configuration rules apply to the slots:

If the system has:	Then the system may have up to:
Two PCI-slot options	One ISA-slot option
One PCI-slot option	Two ISA-slot options
No PCI-slot options	Two ISA-slot options

☞ Refer to your option module documentation for instructions on configuring a PCI or an ISA option module.

To install an expansion board, refer to Figure 4-5 as you perform the following steps:

1. Unlock and remove the top cover.
2. Pick an available slot ① (for ISA options) or ② (for PCI options) for your board.

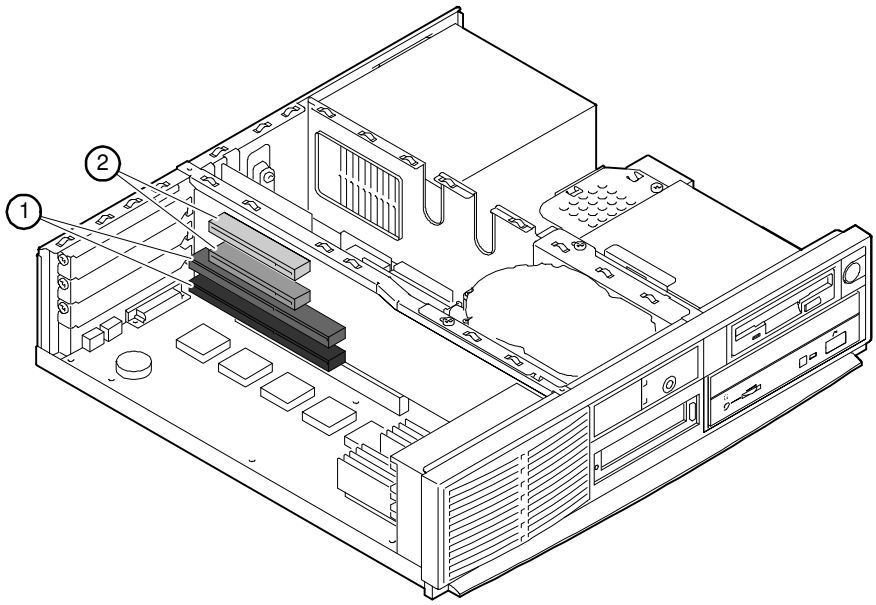

Figure 4-5 Installing an Expansion Board

NOTE

The bottom ISA slot accepts only half-size ISA cards.

3. Unscrew and remove the metal filler plate for the slot you have chosen.
4. Insert the new expansion board into the riser board slot. Push the board firmly into the socket.
5. Replace the screw to secure the module at the rear panel.

NOTE

For ISA options added to Digital UNIX or OpenVMS systems, run the ISA Configuration Utility (from the SRM console prompt, type ICONFIG). See Chapter 3, Console Commands, for more information on this utility.

☞ For more information on operating system-specific options, refer to your operating system documentation.

General Information on Installing Drives

This section covers general drive-installation information, including internal and external SCSI drives, external SCSI, and cable layouts.

SCSI Bus Length

The total SCSI bus length, including internal cables and etch on the motherboard as well as the external cables between storage enclosures and the cables inside the storage enclosures, must not exceed 3 meters (9.8 feet) for fast SCSI operation or 4 meters (13.1 feet) for slow SCSI (5 MB/second) operation. The AlphaServer 300 system's internal SCSI length is 1.2 meters (3.9 feet), leaving 1.8 meters (5.9 feet) available for external fast SCSI use (2.8 meters [9.2 feet] for external slow SCSI use).

Internal SCSI Termination

SCSI drives are connected to a SCSI bus, which must be terminated at each end. Internally (inside the system box), the termination is set correctly at the factory. However, if you add or remove an internal SCSI drive, you may need to change the termination, especially if the drive you add or remove requires moving the end connector of the SCSI cable. For example, Figure 4-6 shows a typical configuration after a CD drive ① was added. Previously, the end connector of the SCSI cable ② was plugged into the hard disk ③ and the SCSI bus was terminated by the hard disk. One of the daisy-chained connectors on the SCSI cable ④ was unused. The SCSI cable originates on the motherboard ⑤ and goes first to another SCSI device ⑥.

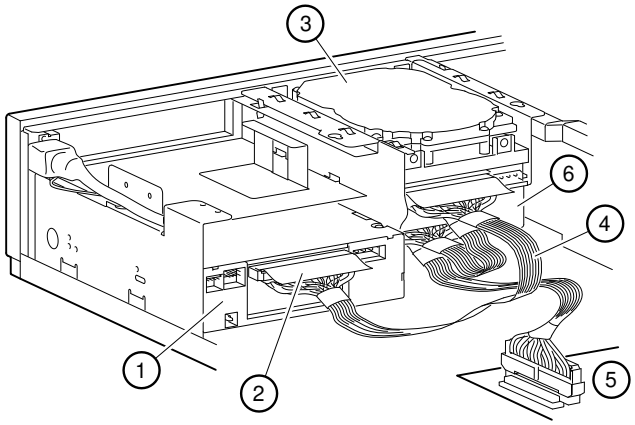

Figure 4-6 Internal SCSI Termination

When adding a SCSI device such as the CD drive in the above example, follow these guidelines:

- You must use the end connector of the SCSI cable to reach the outer storage bay. (Remove the end of the SCSI cable from the hard disk.)
- Drives using a daisy-chained connector must *not* have their terminator enabled. (Disable the terminator on the hard disk, and plug the unused daisy-chained connector into the hard disk.)
- The last drive gets the SCSI cable end connector. (If a SCSI device is mounted in the outer bay, lower position, the end of the SCSI cable must be plugged into that device.)
- Last drive *must* supply the terminator. (Enable the SCSI device's terminator.)

To add or remove the termination of a drive, refer to the appropriate drive manual. Termination methods can vary by option and manufacturer. For example, you may need to add or remove a terminator resistor pack on some types of drives or move a jumper or switch on other types.

External SCSI Termination

Like the internal SCSI bus, the external end of the SCSI bus must also be terminated. When no SCSI cable is plugged into the socket, the SCSI bus is automatically terminated on the motherboard. However, when an external SCSI cable is present, the automatic external termination is disabled. The external SCSI and the last external SCSI device must be properly terminated.

Cable Layout

Figure 4-7 though 4-9 illustrate the storage system cabling within the system box. Table 4-3 though 4-5 list the cable components.

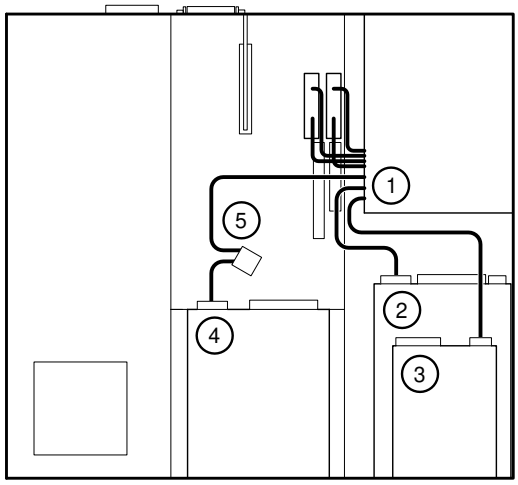

Figure 4-7 Power Cable Layout

Table 4-3 Power Cable Layout

Figure Legend	Component
1	Power supply. (Four power cables are shown going to the motherboard. Future versions may have only three cables.)
2	CD-ROM drive (optional).
3	Floppy diskette drive.
4	Inner bay upper device position (typically, a hard disk).
5	Inner bay lower device power connector (unused in this example).

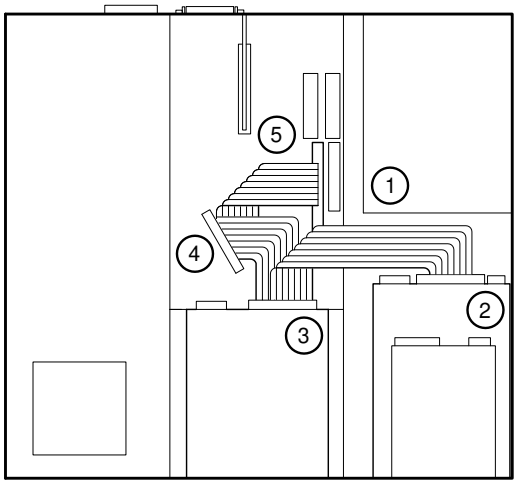

Figure 4-8 Internal SCSI Cable Layout

Table 4-4 Internal SCSI Cable Layout

Figure Legend	Component
1	Power supply.
2	Outer bay lower position SCSI device. (In this example, because this is the last device on the bus, this device furnishes termination for the internal SCSI bus.)
3	Inner bay upper position SCSI device.
4	SCSI cable connector (unused in this example).
5	Motherboard SCSI connector.

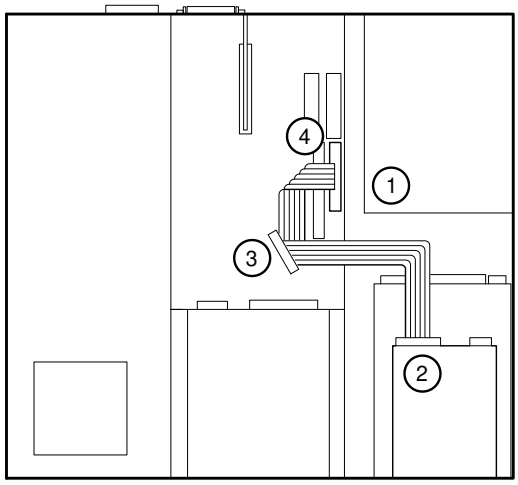

Figure 4-9 FDC Cable Layout

Table 4-5 FDC Cable Layout

Figure Legend	Component
1	Power supply.
2	3.5-inch floppy diskette drive in outer-bay upper position.
3	FDC (floppy disk controller) cable connector. (This can be used for a tape drive or a second floppy drive.)
4	Motherboard floppy disk controller connector.

Installing Storage Options in the Drive Bracket

This section tells how to install drives in the drive bracket (inner-bay upper and lower positions). SCSI hard disk drives and tape drives typically are mounted in a removable drive bracket.

When installing a drive in the drive bracket, follow these steps:

1. If the drive is a SCSI device, set the drive jumpers or switches for the desired SCSI ID (address). This address depends on the unit numbers currently in use. (Appendix D, Equipment Log, contains space to record your system's SCSI ID assignments.) Follow the guidelines in the manual that came with the drive.
2. Loosen the two screws ① holding the drive bracket, lift the rear of the bracket, and then slide the bracket to the rear slightly and lift it out of the system unit, as Figure 4-10 and Figure 4-11 show. Remove cables from the drive *after* the assembly has been lifted out of the system unit.

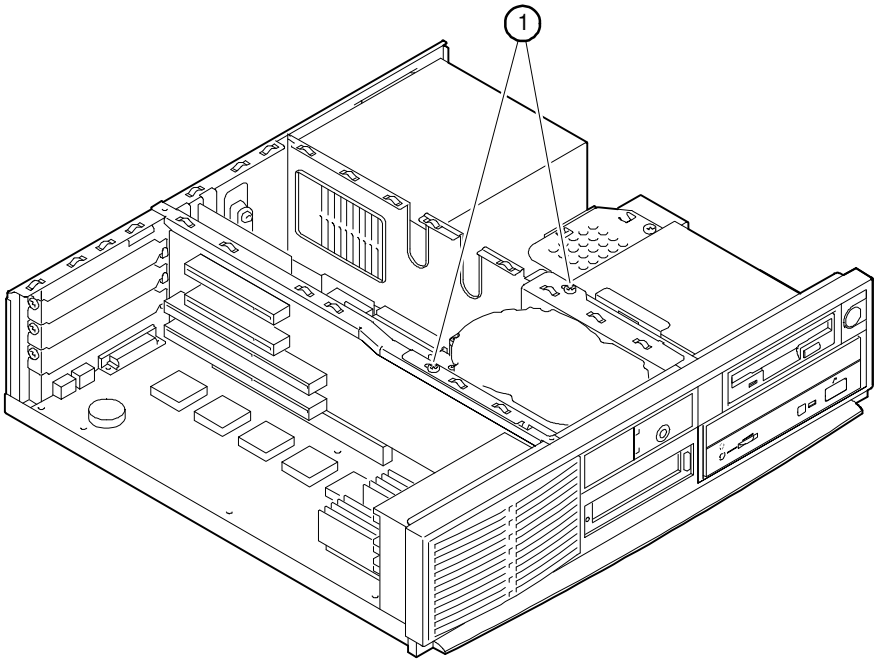

Figure 4-10 Drive Bracket Screws

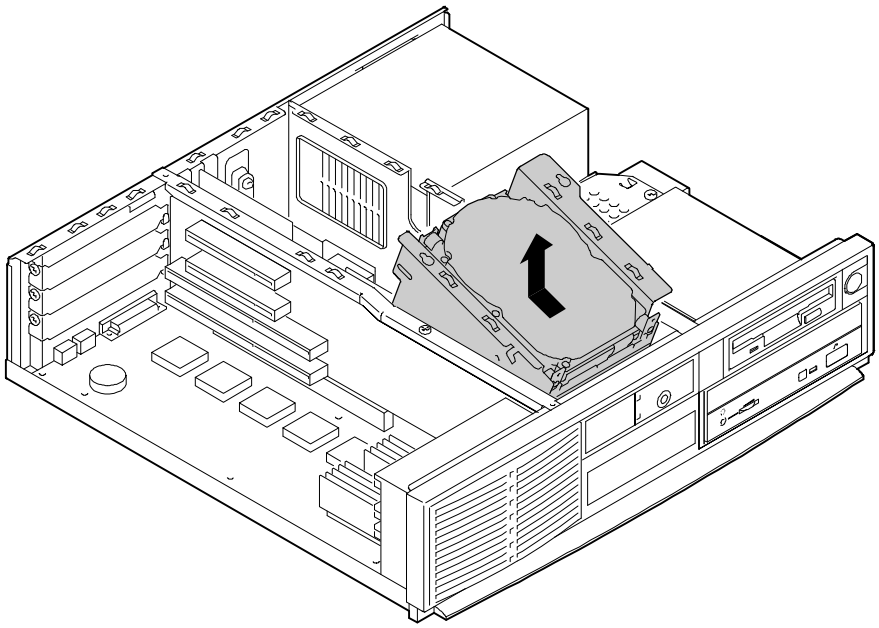

Figure 4-11 Removing Drive Bracket

3. If you are installing a removable media drive in the lower position of the drive bracket, gently push the front-panel filler plate from the rear in front of the tape drive position, as Figure 4-12 shows.

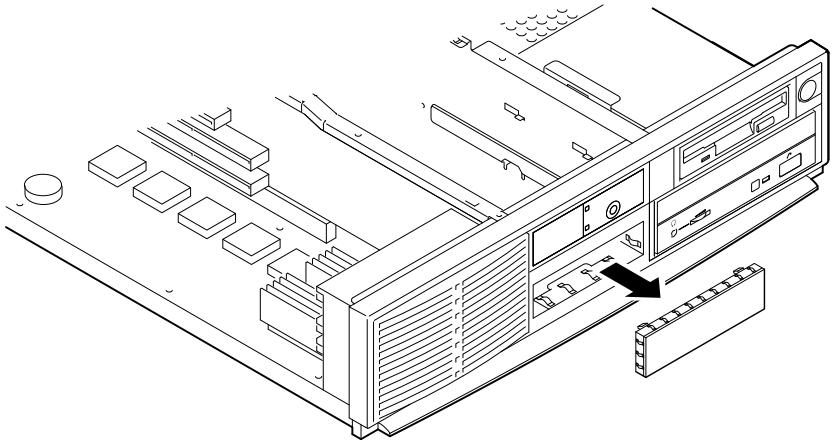

Figure 4-12 Removing Blank Panel

HINT

When you install drives in the bracket, or when you cable those drives, you may find it convenient to rest the bracket on top of the power supply.

4. Orient the bracket as Figure 4-13 shows. Position the drive so that cable connections face to the rear of the system. Select the bracket mounting holes that match the threaded holes in the drive. Mount the drive in the bracket, securing it with the four screws provided with the drive.

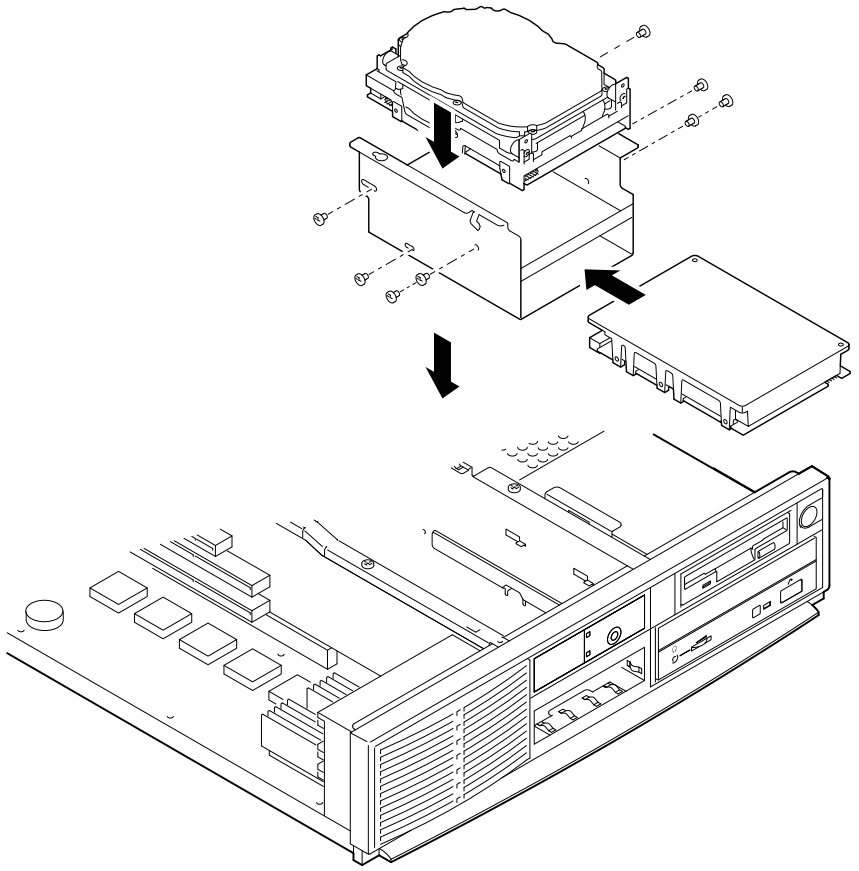

Figure 4-13 Installing Drives in Bracket

5. Connect the bus cable ① and the power cable ② to the rear of the drive as Figure 4-14 shows.

NOTE

The connectors are keyed. Ensure that you orient them correctly.

CAUTION

Ensure that the internal SCSI bus is properly terminated. For guidelines, see the section, General Information on Installing Drives, in this chapter.

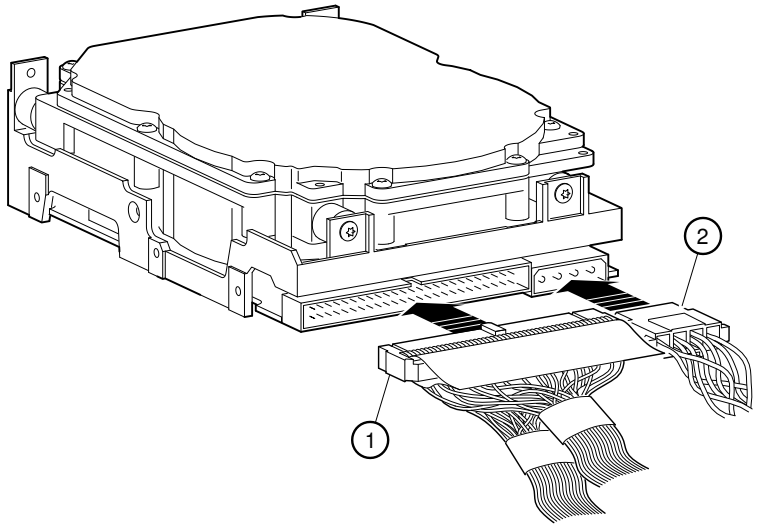

Figure 4-14 Cabling Hard Disks

6. Place the drive bracket into the system unit, as Figure 4-15 shows.
7. Replace the bracket screws.

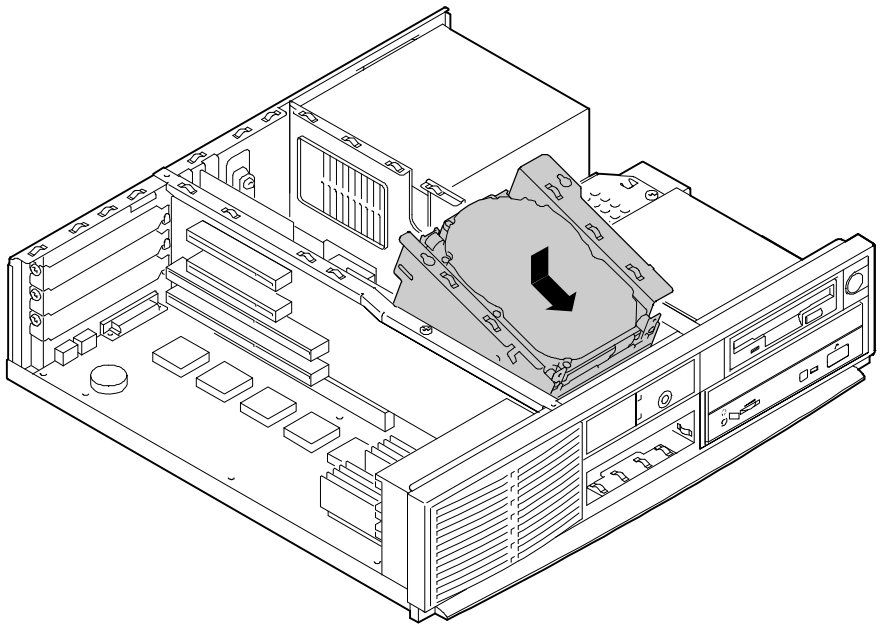

Figure 4-15 Mounting Drives and Installing Drive Bracket

Figure 4-16 shows how the drive cables ① are routed over the SIMMs ②.

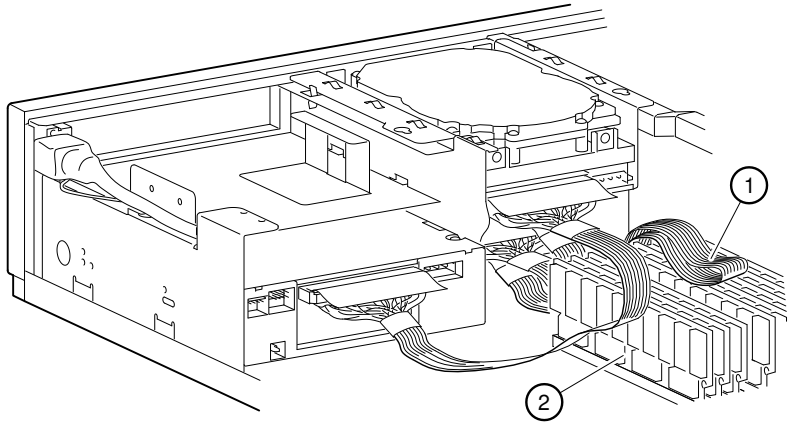

Figure 4-16 Drive Bracket Cable Routing

Storage Bay

This section describes how to install a drive in the outer-bay lower position. You can also use this bay for another 5.25-inch half-size drive, such as the TZK11 tape drive.

CAUTION

Do not install a SCSI hard disk in this bay. This can cause system overheating.

To install a drive, follow these steps:

1. Insert a screwdriver ① through the access port and gently pry the blank panel ② out, as Figure 4-17 shows.

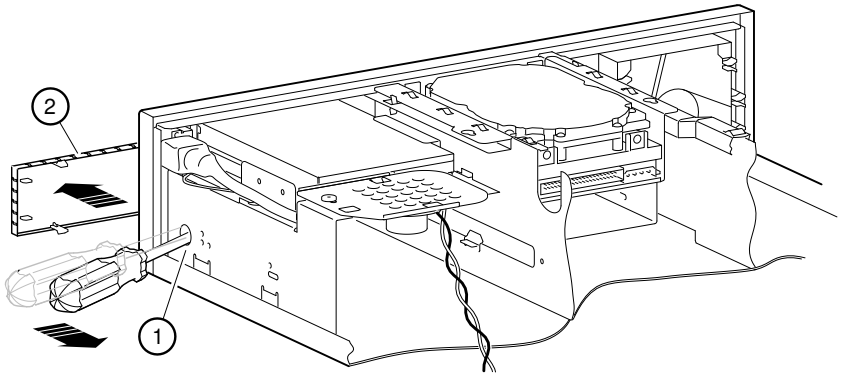

Figure 4-17 Removing Storage Bay Blank Panel

2. For the desired configuration, use the drive jumpers to set the SCSI ID and proper mode.

☞ Refer to your drive's installation guide for specific information.

3. If the storage option you are adding is the last one on the SCSI cable, make sure that the internal SCSI termination is moved from the previous SCSI option to the last option.

4. Mount the holder ① to the side of the drive with two screws, as Figure 4-18 shows.

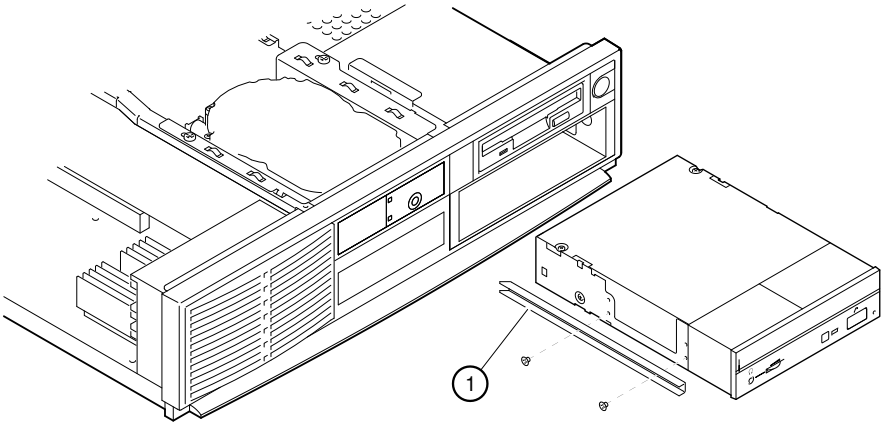

Figure 4-18 Drive Installation

5. Loosen the screw so that you can remove the speaker ①, as Figure 4-19 shows.

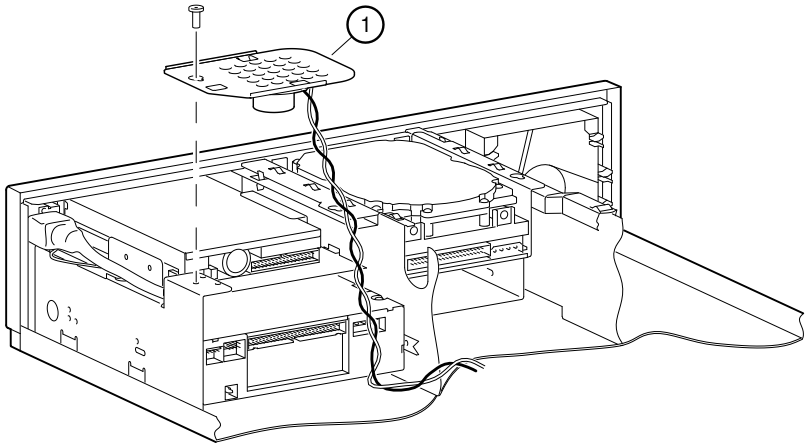

Figure 4-19 Removing the Speaker

6. Slide the drive into the system unit, securing it with two screws on the right side and one screw at the back of the holder on the left, as Figure 4-20 shows.

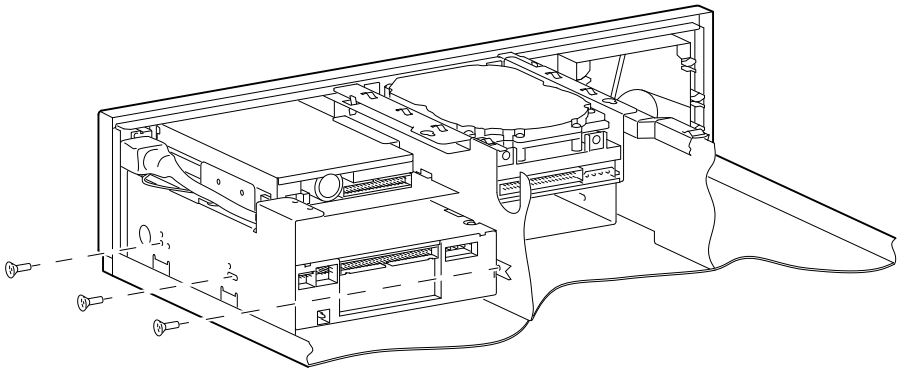

Figure 4-20 Securing the Drive

7. Connect the audio ① (if appropriate, for CD drives), SCSI ②, and power ③ cables, as Figure 4-21 shows.

NOTE

The connectors are keyed. Ensure that you orient them correctly.

CAUTION

Ensure that the internal SCSI bus is properly terminated. For guidelines, see the section, General Information on Installing Drives, in this chapter.

8. Reinstall the speaker bracket.

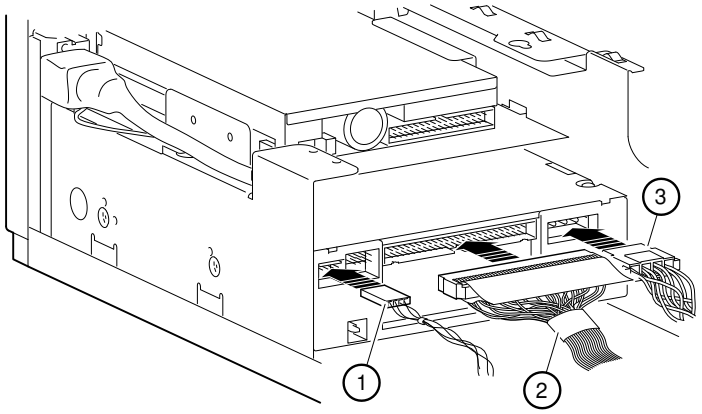

Figure 4-21 Cabling the Drive

Replacing the Battery

The battery supplies power to the real-time clock while the system is off. If you find that when the system is powered on, the time is incorrect, you may need to replace the battery. If this is necessary, replace the lithium battery with a Panasonic BR2032, CR2032, or equivalent. After replacing the battery, you must reenter configuration and setup data using the ARC or SRM console. Refer to Figure 4-22 when replacing the battery.

CAUTION

If the battery is installed incorrectly, there is danger of explosion. Replace the battery only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to manufacturer's instructions.

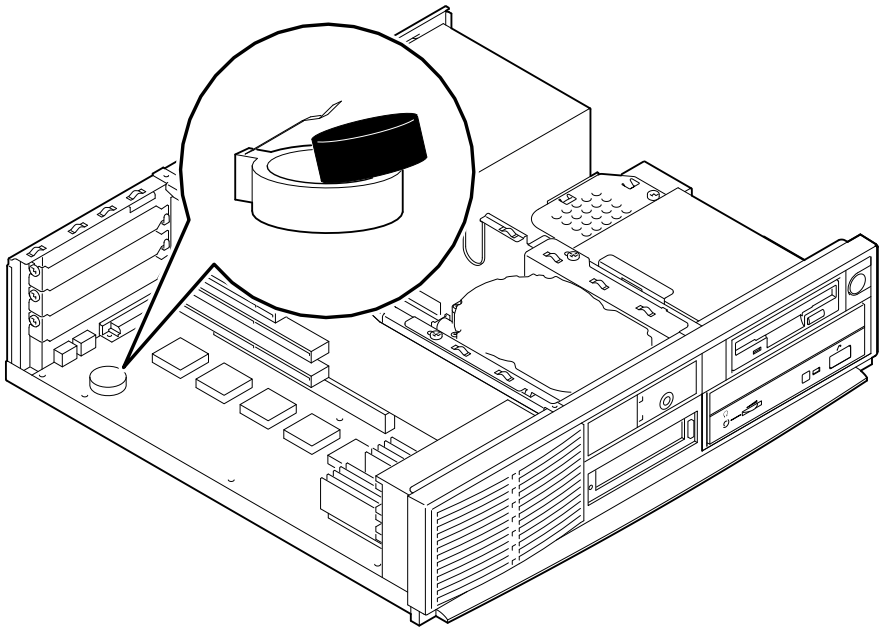

Figure 4-22 Replacing the Battery

1. Gently pry the old battery from the battery holder.
2. Insert the new battery, positive side up, into the holder.

Replacing the System Cover

After you have finished adding options, follow these steps:

1. Check all cable connections to ensure that the connectors are firmly seated.

CAUTION

After adding options, you might wish to test the system with the cover off in case you need to reconfigure jumpers or switches. Take care not to run the system without the cover for an extended time, because you risk damage from overheating.

2. Position all cables so that they will not be pinched by the cover.
3. Replace the system cover and slide it forward to engage it. Be careful to ensure that the gaskets at all edges are properly mated before you fully seat the cover.
4. Lock the system cover, as Figure 4-23 shows.

HINT

If the lock is difficult to turn or if the key does not fit smoothly into the lock, push the cover forward to align it with the bezel side. If the cover does not slide forward easily, press down gently in the center of the rear edge of the cover and then slide the cover forward.

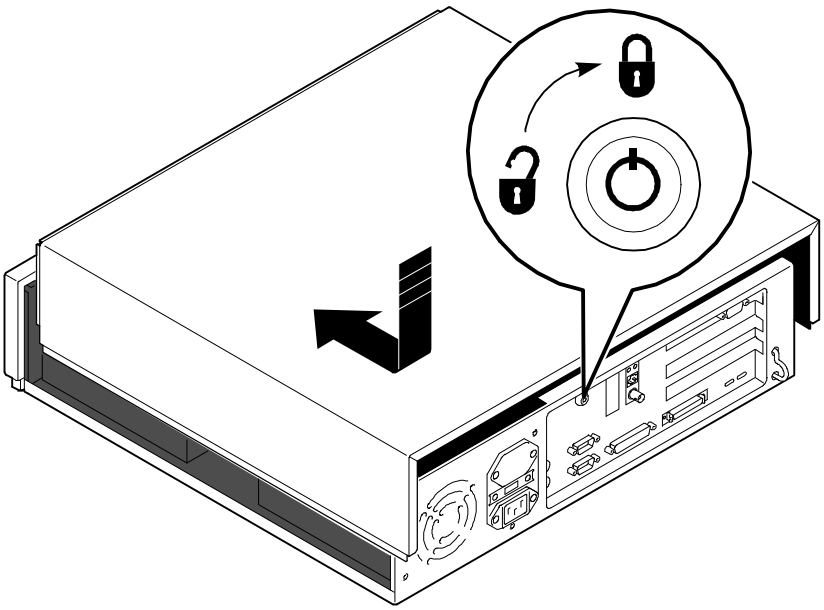

Figure 4-23 Replacing the Locking System Cover

Connecting External Options

Just as you can add many options inside your system unit, you can also place several outside your system, connected by cables. This section outlines how to connect a printer or SCSI device to the rear ports.

NOTE

Be sure to read the instructions that come with your new equipment as well as the appropriate instructions in this section.

Cabling for a Printer or Other Parallel Device

Connect the cable to the parallel port, as Figure 4-24 shows. Be sure that you are using the correct type of printer cable. If your cable has the wrong type of connector, you need an adapter or a different cable.

External SCSI Options

You might wish to connect an external SCSI device, or a SCSI expansion box. To add external SCSI devices, follow these steps:

1. Set the drive jumpers or switches for the desired SCSI ID.
2. Connect the option's SCSI cable to the port. Be sure that you use a cable with a 50-pin high-density type SCSI connector.
3. Terminate the *new* end of the bus at the last external SCSI device, using the appropriate terminator. Make sure that any other external SCSI devices have their terminators removed or disabled.

NOTE

If you remove an external SCSI cable from the rear-panel SCSI connector, the external port is automatically terminated.

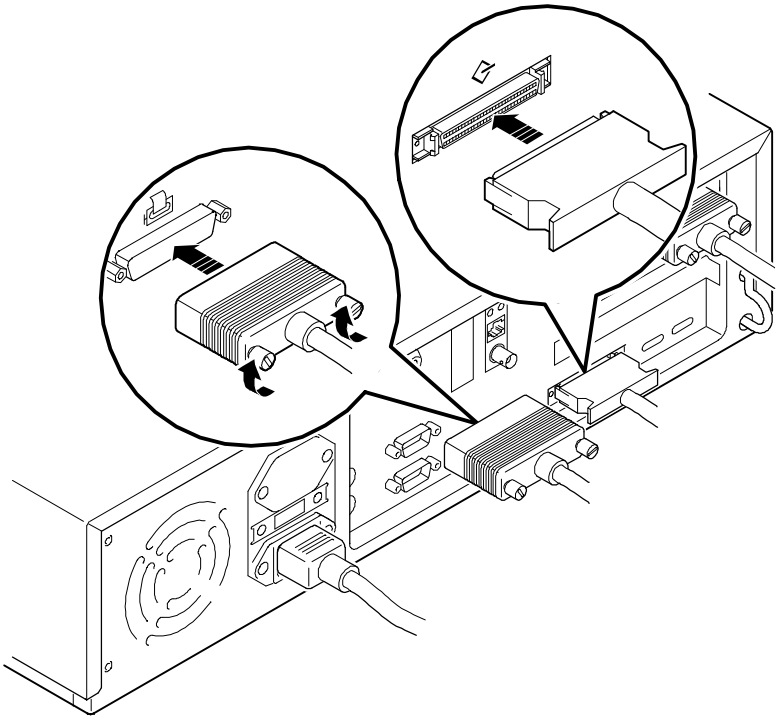

Figure 4-24 Connecting Printer and SCSI Cables

5
Troubleshooting

Introduction

This chapter describes system troubleshooting as well as error beep codes and diagnostic LED codes.

☞ Refer to the documentation supplied with additional options if you are experiencing problems with specific options that you have installed.

Initial Troubleshooting

Follow these general procedures to troubleshoot your AlphaServer 300 system initially:

1. Check that the power indicators are on and that the fan is running.
2. Check the power indicator on the monitor. Also, check the monitor, keyboard, and mouse cables to ensure that they are connected and seated properly.
3. Press the Reset button. If your system fails to boot, turn it off, wait 20 seconds, and then turn it back on.
4. Make sure that all cables and connections are secure.
5. If the operating system has not loaded after 2 minutes, see the diagnostic LEDs section of this chapter.
6. Contact Digital Services or your service provider for software- or hardware-related problems.

NOTE

If you need to return a failed component, pack it in its original container and return it to Digital Equipment Corporation or your service provider.

Equipment Log

For your convenience, Appendix D, Equipment Log, includes a form on which you can record all model numbers and serial numbers of your hardware components (system unit, monitor, keyboard, and mouse) and system hardware configuration information (CPU, memory size, drive size, ports, and so on).

General Troubleshooting

Tables 5-1 through 5-3 list how to identify and solve problems that could occur with your system, disk drive, and monitor.

Table 5-1 System Troubleshooting

Problem	Possible Cause	Action
Power indicator not on.	System is not plugged in.	Turn off the system, plug it in, and then turn it back on again.
	No power at the wall outlet.	Use another wall outlet.
	Internal power supply cables not reconnected after installing options.	Reconnect cables.
	Power supply failure.	Contact your service representative.
Power shuts off	System overheating, fan failure.	Intermittent problems could result from overheating. Check that the air flow path is clear. Make sure there are no materials blocking the input grill. Also make sure the cables inside the system are properly dressed and not impeding the airflow.

Table 5-1 System Troubleshooting *(continued)*

Problem	Possible Cause	Action
Power is on, but there is no screen display.	Brightness and contrast controls are not correctly set.	Adjust the brightness and contrast controls.
	Monitor is off.	Turn on the monitor.
	Monitor cable or power cord is incorrectly installed.	Check all monitor connections.
	Configuration error.	Refer to the video module documentation for more information.
	Monitor is defective.	Try another monitor.
	Defective video controller module.	Replace the video module.

Table 5-1 System Troubleshooting *(continued)*

Problem	Possible Cause	Action
System does not boot.	Operating system software is not installed on the hard disk drive.	Install the appropriate operating system.
	System cannot find the boot device.	Check the system configuration for correct device parameters. *Digital UNIX and OpenVMS:* Use the SRM `show device` command. (See Chapter 3, Console Commands.) Use gathered information to identify target devices for boot command and verify that the system sees all installed devices. *Windows NT:* Use the ARC console to display the available boot devices. First, from the Boot menu select `Supplementary menu...`, then select `Display hardware configuration`. Verify that the target boot device is listed.
	Environment variables incorrectly set.	Check and set the environment variables, if necessary. *Digital UNIX and OpenVMS*: Use the SRM console `show` and `set` commands to check and set the values assigned to boot-related variables such as auto_action, bootdef_dev, and boot_osflags. (See Chapter 3, Console Commands.)

Table 5-1 System Troubleshooting *(continued)*

Problem	Possible Cause	Action
System does not boot (continued).	Environment variables incorrectly set.	*Windows NT:* From the Boot menu, select `Supplementary menu...`, then select `Setup the system...`, then select `Set default environment variables`. (Refer to Chapter 3, Console Commands.)
	Hard disk drive is not correctly formatted or the requested partition does not exist.	Format the hard disk drive or correctly partition the hard disk drive using the supplied software.
	There is no software on the requested partition.	Install software on the requested partition.
Target boot device not listed in `show device`, `show config` (SRM), or `Display Hardware Configuration` (ARC).	Loose cables.	Secure all cable connections.
	SCSI drive jumpers incorrectly set.	Check all SCSI devices for incorrect or conflicting IDs. Refer to the hard disk drive documentation.
	SCSI bus termination incorrectly set.	Check that SCSI bus is properly terminated. (See the General Information on Installing Drives section of Chapter 4.)

Table 5-1 System Troubleshooting *(continued)*

Problem	Possible Cause	Action
No response to keyboard commands.	Keyboard is password protected.	Enter the keyboard password, if supported by your operating system.
	Keyboard is not connected.	Connect the keyboard to the keyboard port.
	Keyboard is connected to the mouse port.	Connect the keyboard to the keyboard port.
No response to mouse commands.	Mouse is not connected.	Connect the mouse and restart the operating system.
	Mouse is connected to the keyboard port.	Connect the mouse to the mouse port and restart the operating system.
	Mouse driver not installed.	Install the appropriate mouse driver; refer to your supplied application software documentation.
	Mouse ball sticking.	Clean the mouse.
Fan failure		Check that the air flow path is clear. Make sure there are no materials blocking the input grill. also check to see that the cables inside the system are properly dressed and not impeding the airflow.
System forgets NVRAM settings, environment variables, or the time-of-day while powered off.	Dead battery	Replace the lithium battery. Use a Panasonic BR2032, CR2032, or equivalent (see Chapter 4, Installing System Options).

Table 5-2 Disk Drive Troubleshooting

Problem	Possible Cause	Action
Hard disk drive cannot read or write information.	Incorrect SCSI drive ID settings.	Set the SCSI ID. Refer to the disk drive installation instructions.
	Loose or incorrectly installed cables.	Make sure all cables are correctly installed.
	Disk drive is not correctly formatted or partitioned.	Format and partition as required using the supplied operating system.
	External drive not powered up.	Turn it on.
Floppy drive cannot read or write information.	Diskette is not formatted.	Format the floppy.
	Floppy is wrong density.	Use a floppy of the proper density for your drive.
	Floppy is worn or damaged.	Try another floppy.
	Floppy is write protected.	Slide the write-protect switch so the hole is blocked. If the problem continues, call service personel.
	Floppy drive is empty.	Insert a floppy.

Table 5-3 Monitor Troubleshooting

Problem	Possible Cause	Action
Monitor power indicator is not on.	Monitor is turned off.	Turn on the monitor.
	Power cord is not connected.	Connect the power cord to the system or a wall receptacle.
	No power at wall receptacle.	Use another receptacle.
	Monitor is defective.	Try another monitor.
System powers up, but monitor is unreadable.	If you have attached an older 3-wire monitor (RGB) that has an optional PBXGA (ZLXp) graphics controller to the AlphaServer 300, the monitor may be out of sync and may require the sync signal on the green signal.	Temporarily attach a five-wire monitor or attach a terminal to the COM1 port and use the serial console. At the SRM console prompt (>>>), type: >>> set tga_sync_green *value* Set the *value* to one of the following: • 1 for the first PBXGA • 2 for the second PBXGA • 3 for both the first and second PBXGA After you have reset the environment variable, you can reattach the 3-wire monitor.
Distorted, rolling, or flickering screen display, or wrong/uneven color.	Adjustments incorrect.	Adjust accordingly.
	Wrong type of monitor.	Try another monitor.
	Defective monitor.	Try another monitor.
	Monitor signal cable loose or damaged.	Inspect connector pins. Replace cable if damaged.

Error Beep Codes

Table 5-4 shows error beep codes you may encounter at system startup. For example, if the SROM (serial read only memory) code could not find any good memory, you would hear a 1-3-3 beep code (one beep, a pause, a burst of three beeps, a pause, and another burst of three beeps). Contact field service.

Table 5-4 Error Beep Codes

Beep Code	Meaning
1-1-4	Basic diagnostic problem.
1-2-1	Real-time clock (BQ3287) failure, or the real-time clock interrupt did not occur.
1-2-4	Hard failure (for example, a Bcache failure).
1-3-3	Insufficient memory.
3-2-1	Header of the flashROM unreadable, or the flashROM checksum failed. Attempted boot failed because either: (1) no floppy in drive, or (2) no boot block on the floppy.
3-2-3	No floppy in drive.
3-2-4	Failure with the keyboard or mouse controller.
3-3-1	Hard failure. Refer to the LEDs to find exact location of failure.

Diagnostic LEDs

Your system contains eight diagnostic LED indicators on the rear of the motherboard (visible through two small holes in the rear panel). The LEDs indicate errors that occur during system initialization and power-on self-test (POST).

Location of the LEDs

Figure 5-1 shows the locations of the diagnostic LED viewing ports ①.

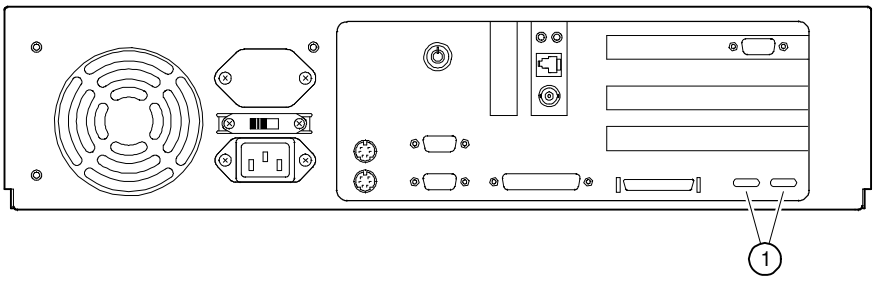

Figure 5-1 Diagnostic LEDs

Interpreting the LED Indicator Values

LED indicator values correspond to power-up tests. Table 5-5 lists these LED indicator values and their meanings. The last two indicator values shown on the table indicate a successful power-up. The meanings are valid when the LEDs have stopped sequencing through tests due to an error condition. The LED Indicator Values column of the table shows the LEDs as you view them from the rear of the system. If any LED codes other than the last two listed in Table 5-5 are displayed, contact field service.

Table 5-5 LED Codes

Bit 7	Bit 0	Meaning
● ● ● ●	● ○ ● ○	Memory test 1 failure
● ● ● ●	● ○ ○ ●	Memory test 2 failure
● ● ● ●	● ○ ○ ○	Memory test 3 failure
● ● ● ●	○ ● ● ●	Memory test 4 failure
● ● ● ●	○ ○ ● ○	DROM and flashROM corrupted
● ● ○ ●	● ● ● ○	Memory test failed
● ● ○ ●	● ● ○ ●	FlashROM ID test failed
● ● ○ ●	● ● ○ ○	NVRAM (nonvolatile random access memory) test failed
● ● ○ ●	● ○ ● ●	SCSI controller test failed
● ● ○ ●	● ○ ● ○	PCI/ISA bridge test failed
● ● ○ ●	● ○ ○ ●	Real-time clock test failed
● ● ○ ●	● ○ ○ ○	Keyboard controller test failed
● ● ○ ●	○ ● ● ●	Floppy controller, bidirectional parallel port, or serial ports test failed
● ● ○ ●	○ ● ● ○	Interrupts test failed
● ● ○ ●	○ ○ ○ ○	Power on self test passed, DROM console running
● ● ● ○	○ ○ ● ○	Floppy load failed
● ● ● ○	○ ○ ○ ●	Flash load failed
○ ○ ● ○	○ ○ ○ ○	Machine check occurred
● ● ● ●	● ● ○ ○	Console initialized (Final display if using ARC)
● ● ● ○	○ ● ○ ●	Console initialized (Final display if using SRM)

●=on, ○=off

A
Technical Specifications

Introduction

This appendix describes the following technical characteristics of the AlphaServer 300 system:

- System specifications
- External system connectors
- Expansion slot current limitations
- System current requirements
- Motherboard jumpers

System Specifications

Tables A-1 through A-4 list the AlphaServer 300 system processor features, performance, dimensions, and environmental specifications.

Table A-1 Processor Features

Feature	AlphaServer 300 System Specifics
Processor type	DECchip 21064A
Core logic	DECchip 21072-AA chipset
Secondary cache	Write-back, 2 MB

Table A-2 System Specifications

Attributes	Specification
PCI clock	33 MHz
Slots	One PCI only, one PCI/ISA, and one ISA-only
Memory	Expandable up to 512 MB
Total SCSI bus length	3 meters (9.8 feet) for fast SCSI operation 4 meters (13.1 feet) for slow SCSI operation

Table A-3 System Dimensions

Dimension	Specification
Width	425.0 mm (17.0 inches)
Length	400.0 mm (16.0 inches)
Height	98.25 mm (3.93 inches)
Weight	11-14 kg (25–30 lb)

Table A-4 System Environmental Specifications

Attributes	Specification
Operating temperature	10°C to 40°C (50°F to 104°F)
Storage temperature	–20°C to 65°C (–4°F to 149°F)
Operating humidity (noncondensing)	20% to 80% relative humidity, maximum wet bulb 40°C (104°F)
Storage humidity (noncondensing)	10% to 90% relative humidity, maximum wet bulb 65°C (149°F)
Altitude Operating Nonoperating	 2,438 m (8,000 ft) maximum 4,876 m (16,000 ft) maximum

Power Supply and Input Power Requirements

Your system comes with a 180-watt or a 210-watt power supply; either of these power supplies fully meets your system's requirements. Both provide five DC voltages: +12 volt, -12 volt, +5 volt, -5 volt, and +3.3 volt DC. These voltages are used by the various components within the system. Table A-5 lists the input power requirements.

Table A-5 System Input Power Requirements

Rated Voltage Range	Rated Input Current [1]	Operating Frequency Range
100 volt AC – 120 volt AC	4 A	47 Hz–63 Hz
220 volt AC– 240 volt AC	3 A	47 Hz–63 Hz

[1] Includes outlet current.

Motherboard Jumpers

Jumper pins allow you to set specific system parameters. Do this by changing the pin location of jumpers (the small, plastic-encased shorting plug that slips over the pins). To change a jumper setting, use your fingers or a pair of needle-nose pliers to remove the jumper from its current location. Place the jumper over the two pins designated for the desired setting. Press the jumper evenly onto the pins. Be careful not to bend the pins.

Jumpers J2, J3, and J27 may be of interest to the user; all others should remain at factory default. Figure A-1 shows the locations of the motherboard jumper pins. Table A-6 lists the motherboard jumpers and factory-default settings. Notice that the square pin of each jumper block is pin 1.

CAUTION

Do not touch any electronic component unless you are safely grounded. Wear a grounded wrist strap or touch an exposed metal part of the system unit chassis. A static discharge from your fingers can permanently damage electronic components.

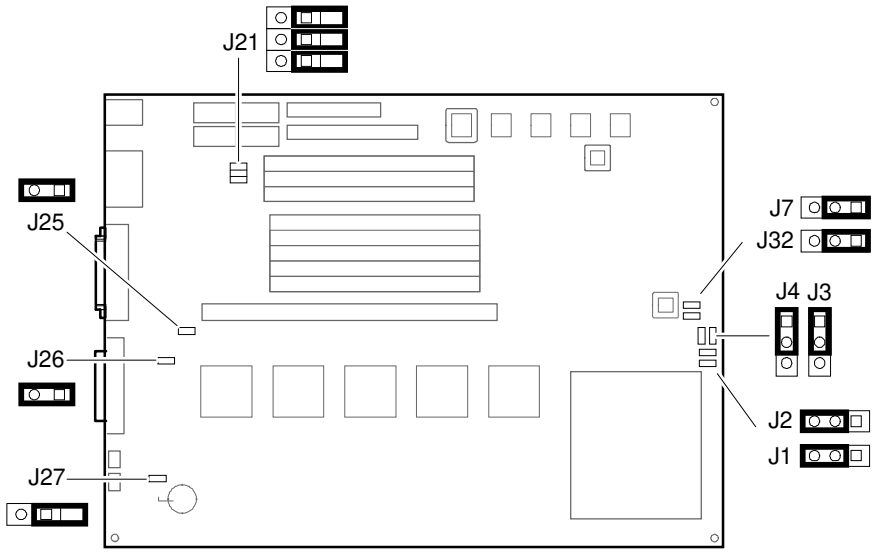

Figure A-1 Motherboard Jumper Locations

Table A-6 Motherboard Jumper Locations

Jumper	Pins	Function	Description
J1	(1 to 2) (2 to 3) (D)	Mini-console. Jump to main console.	Leave at factory default.
J2	(1 to 2) (2 to 3) (D)	Boot floppy. Normal (flashROM load).	The DROM code uses J2 to determine whether an image from a floppy disk or the flashROM containing the console firmware should be loaded into memory and started.
J3	(1 to 2) (D) (2 to 3)	Reset. Halt Interrupt Request.	The front-panel push button can be set to cause either a Reset or a Halt Interrupt Request.

Table A-6 Motherboard Jumper Locations *(continued)*

Jumper	Setting	Function	Description
J4	(1 to 2) (D) (2 to 3)	Enables flashROM writes. Disables writes.	Leave at factory default.
J7	(1 to 2) (D) (2 to 3)	267 MHz CPU. Not used.	Leave at factory default.
J21	(1 to 2) (3 to 4) (5 to 6) Hang off 1 (D) Hang off 3 (D) Hang off 5 (D)	Not used.	Leave at factory default.
J25	(1 to 2) (D) Removed	87332 Super I/O chip. 87312 Super I/O chip.	Leave at factory default.
J26	(1 to 2) (D) Removed	87332 Super I/O chip. 87312 Super I/O chip.	Leave at factory default.
J27	(1 to 2) Hang off 1 (D)	Disables sensing for presence of external cable. Enables sensing for the presence of an external SCSI cable.	J27 controls the automatic SCSI bus terminator. If an external SCSI cable is attached to the SCSI connector, the automatic SCSI terminator turns off. Therefore, the SCSI bus must be terminated at the end of the external bus. When sensing is disabled (J27 1 to 2 installed), an external SCSI terminator is always required, even if no external SCSI devices are present.
J32	(1 to 2) (D) (2 to 3)	267 MHz CPU. Unused.	Leave at factory default.

(D)= Default setting.

B
Updating System Firmware

Introduction

This appendix covers two main topics:

- Updating the ARC and SRM console firmware
- Updating the firmware in PCI options that contain flashROMs.

In general, the system firmware should be updated whenever the operating system is updated to ensure compatibility between the hardware and the operating system.

NOTE

The user is responsible for performing system firmware updates. The location of firmware updates is described in the next section.

Location of Firmware Updates

Alpha systems firmware is distributed on the Alpha Systems Firmware Update CD-ROM in conjunction with updates of the supported operating systems.

The latest Alpha systems firmware files can also be downloaded from the Internet:

- Using a World Wide Web browser, use the following URL:

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

- Using ftp, open a connection to ftp.digital.com, then go to:

  /pub/Digital/Alpha/firmware

New firmware released between shipments of the Firmware Update CD-ROM is available in an interim directory: /pub/Digital/Alpha/firmware/interim/.

Before you download firmware files from the Internet, be sure to read the readme.html or readme.txt file, which explains how to download and use the firmware files.

Updating the Console Firmware

The console firmware on the AlphaServer 300 system is updated by means of an update utility (APU). The update utility contains three images: the update utility itself, the SRM image, and the ARC image.

The update utility can be run from either the SRM console or the ARC console. If you are using the Firmware Update CD-ROM, install it in the CD drive. If you are using floppies, install the floppy in the system's diskette drive. The SRM console uses an update floppy with an Alpha boot block. The ARC console uses a FAT formatted update floppy. Be sure to install the correct floppy for the console you are using to perform the update.

Note

A flashROM write enable jumper (J4) is located on the motherboard and is set by default to enable updates. If you have any problems updating firmware, check the jumper to ensure that it is set properly. See Appendix A for the location of the jumper.

The next sections describe how to update the console firmware using the Firmware Update CD-ROM. If you are using an update floppy, the procedure is the same, except that you enter a different device ID.

Using the Flash Update Utility from the SRM Console

To update the firmware from the SRM console, do the following:

1. Insert the Firmware Update CD-ROM into the CD drive.
2. Type the show device command to determine the device ID of the CD drive.

```
>>>show device

dka0.0.0.6.0     DKA0     RZ26L              440C
dka400.4.0.6.0   DKA400   TOSHIBA CD-ROM     0064
dva0.0.0.0.1     DVA0
ena0.0.0.1.1     ENA0     08-00-2B-38-67-6B
pka0.7.0.6.0     PKA0     SCSI Bus ID 7
```

3. Boot the Firmware Update Utility CD-ROM using the device ID displayed in step 2. (If you are using the update floppy, the device ID would be dva0.)

```
>>>b dka400
```

   You should see a display similar to the following, while the update utility is loading and executing:

```
Bootfile: [alpha200]as200_v2_8.exe
bootstrap code read in
base = 11e000, image_start = 0, image_bytes = ea800
initializing HWRPB at 2000
initializing page table at 110000
initializing machine state
setting affinity to the primary CPU
jumping to bootstrap code
ff.fe.fd.fc.fb.fa.f9.f8.f7.f6.f5.
ef.df.ee.ed.ec.f4.eb.....ea.e9.e8.e7.e5
X3.7-10895, built on Sep 13 1994 at 11:29:42
>>>Execute Update Sequence
Update Script Complete
(boot pmem:180000 -flags 0,0)
bootstrap code read in
base = 180000, image_start = 0, image_bytes = 800000
initializing HWRPB at 2000
initializing page table at 710000
initializing machine state
setting affinity to the primary CPU
jumping to bootstrap code
```

```
apu-version 959328854 *** Firmware Update Utility V2.9 ***
*** System Type: AlphaServer 300***
Update
VERify
List
Show
DUmp
VERBose
NVerbose
DEbug
NDebug
?
Apu>
```

NOTE

The commands displayed above can be entered on the utility command line. The `update` command must be entered in full. The other APU commands can be abbreviated. The minimum characters required are shown in capital letters. Commands such as Dump, List, Show, and Verify must have verbose mode enabled for their output to be displayed. Type the Verbose command at the Apu-> prompt to enter verbose mode.

4. To update the firmware, type `update.` The following information will be displayed as the firmware is being updated.

```
Apu-> update
APU-I *** ROM 0,1 Contents will be destroyed ***
APU-I Are you ready to Program Device? (y/n)y
APU-I Programming device
APU-I Programming device completed
APU-I Programming device
APU-I Programming device completed
Apu->
```

5. Use the verify command to verify the integrity of the SRM firmware. First enable verbose mode by typing `verbose;` then type `verify.`

```
Apu-> verbose

Apu-> verify
```

6. To exit the update utility, cycle the power. Leave the power off for at least 20 seconds before turning it back on.

Using the Flash Update Utility from the ARC Console

To update the firmware from the ARC console, do the following:

1. Insert the Firmware Update CD-ROM into the CD drive. Or, insert the firmware update floppy into the diskette drive.
2. From the ARC Boot Menu, select `Supplementary menu...`
3. Select `Install new firmware,` and complete the update procedure by going to step 4 in the previous section, Using the Flash Update Utility from the SRM Console.

Updating PCI Option Firmware

Some PCI options have firmware on board that should be updated when the system firmware is updated. Examples include the PCI DFPAA FDDI option (device name fwa0) and the PCI KZPSA option (device name pka0). The options can be updated in either of two ways:

1. Booting the PCI Loadable Firmware Update Utility from the Alpha Systems Firmware CD-ROM. This procedure is described below.
2. Booting the PCI Loadable Firmware Update Utility from the network. (This procedure is described in the firmware release notes for this system, available on the Internet.)

The next section describes how to update the PCI firmware using the Firmware Update CD-ROM.

PCI Firmware Update Procedure

1. Insert the Alpha Systems Firmware Update CD-ROM.
2. Use the `show device` command to identify the device ID of the CD-ROM drive.

```
>>> show device

BOOTDEV  ADDR        DEVTYPE. . .

ESA0        08-00-2B-12-00-9C
DKA100    A/1/0      Disk
DKA400    A/4/0      RODISK
..HostID..  A/7      INITR
DKB400    B/4/0      RODISK
..HostID..  B/7      INITR
```

3. Type the following:

```
>>>boot -fl 0,A0 dka400  or
>>>boot -fl 0,A0 dkb400
```
(Either device can be used)

The system displays the following:

```
INIT-S CPU. . .
AUDIT_CHECKSUM_GOOD
AUDIT_LOAD_BEGINS
AUDIT_LOAD_DONE
BOOTFILE:
```

4. Enter the name of the PCI update directory and filename:

```
BOOTFILE: [ALPHA200]AS200_PCI_V1_2.EXE
```

NOTE

The file name may change with new firmware releases. Refer to the documentation that comes with the Alpha Firmware Update CD-ROM.

The boot file is loaded and the system displays the PCI Loadable Firmware Update Utility banner, utility commands, and then the UPD> prompt.

```
*** PCI Loadable Firmware Update Utility V1.2 ***
------------------------------------------------------------
Function    Description
------------------------------------------------------------
Display     Displays the system's configuration table
Exit        Done exit LFU (reset.)
List        Lists the device, revision, firmware name, and
            update revision
Update      Replace current firmware with loadable data
            image
Verify      Compares loadable and hardware images.
? or Help    Scrolls this function table.
------------------------------------------------------------
UPD>
```

5. Enter the following to list the devices and revisions:

```
UPD> list
```

```
Device   Current Revision  Filename    Update Revision
pka0     A06               dfpaa_fw    A07
fwa0     2.45              kzpsa_fw    2.46
```

6. Enter the following to update the PCI firmware:

```
UPD> update

WARNING: updates may take several minutes to complete for
each device.
                     DO NOT ABORT!
pka0     Updating to A06   Verifying A07     Passed.
fwa0     Updating to 2.45  Verifying 2.46    Passed.
UPD>
```

7. Exit the utility.

```
UPD> exit
```

C

Starting an Operating System Installation

Introduction

This information provides what you need to begin an operating system installation. In addition, the appendix includes material for users who wish to add an additional operating system (for example, if you ordered a Digital UNIX system and later decide to use Windows NT as well). Once you have started an installation, follow the on-screen instructions and refer to the appropriate operating system documentation.

Use the table below to locate the operating system you want to install and refer to the appropriate table number:

If you want to:	Go to Table:
Install Windows NT on a properly partitioned and formatted disk	Table C-1
Set up partitions for a Windows NT installation	Table C-2
Install Digital UNIX	Table C-3
Install OpenVMS	Table C-4

Users of multiple operating systems should carefully track their drive ID numbers to avoid operating-system conflicts. See the CAUTION below for further details.

CAUTION

If you boot from a Digital UNIX or OpenVMS disk and also occasionally boot Microsoft Windows NT from another disk, use caution when you run the Windows NT Disk Administrator. When the Disk Administrator detects additional disks, it updates the system configuration. The Disk Administrator prompts you for permission to write a signature to the additional disks. Writing the signature to a Digital UNIX or OpenVMS disk *destroys* the boot block on that disk and makes the operating system on that disk no longer bootable. Select **NO** when you are asked if you want to write a signature to your Digital UNIX or OpenVMS disks.

☞ For information on switching between the ARC and SRM consoles, refer to Chapter 3.

Starting a Windows NT Installation

Digital partitions and formats disk 0 on the first SCSI controller in non-RAID Windows NT systems. The partitions are set up as follows:

- Partition 1 (typically, the C drive) is the size of the disk less 6 MB and formatted FAT. Normally, you select "convert to NTFS" during the Windows NT installation.
- Partition 2 (typically, the D drive) is 6 MB, formatted FAT, and identified as the system partition.

Refer to Table C-1 for the steps to start installing Windows NT on a properly partitioned and formatted disk.

Table C-1 Starting a Windows NT Server Installation

Step	Action	Result
1	Insert the Microsoft Windows NT CD-ROM into the CD drive.	CD-ROM drive is ready.
2	From the ARC console boot menu, select `Supplementary menu...`	Supplementary menu displays.
3	Select `Install Windows NT from CD-ROM.`	Windows NT setup procedure starts. Follow the on-screen instructions. For more information, refer to the *Microsoft Windows NT System Guide.*

If you are installing the operating system on a disk that has not been partitioned and formatted, follow the procedure in Table C-2.

Table C-2 Setting Up Partitions for a Windows NT Server Installation

Step	Action	Result
1	If the ARC (advanced RISC computing) console is running, go to step 2. If the SRM (system reference manual) console is running, at the >>> prompt, type: `>>>set os_type nt` Then cycle the system's power. (Leave the power off for 20 seconds.)	Cycling power after specifying an os_type of *nt* results in the system restarting with the ARC console running. (You will know that the ARC console is starting when the screen turns blue.)
2	Insert the Microsoft Windows NT CD-ROM into the CD drive.	CD-ROM drive is ready.
3	From the ARC console, select `Run a Program`.	You are prompted for the program name. ARCINST, the ARC installation program, provides a means to partition and format the disk for NT prior to installing Windows NT.
4	At the prompt, type: `cd:\alpha\arcinst`	If you see receive a "Pathname is not defined" error, go to the ARC console Setup menu and select `Set the environment variables.` Select CD-ROM, then enter the SCSI bus number and ID of the CD-ROM drive. Next, select `Set the default configuration` and follow the steps. Save the changes and repeat step 4.
5	Choose `Configure Partitions`	Partition menu displays choices that allow you to create, delete, or make an existing partition into a system partition.
6	Choose `Create Partition`	A list of available target devices displays. `Scsi bus 0,Identifier 0,Disk 0 (scsi(0)disk(0)rdisk(0))` Identifier is the ID of the SCSI device, drive 0 in this case.

Table C-2 Setting Up Partitions for a Windows NT Server Installation (continued)

Step	Action	Result
7	Select the desired target device.	A prompt for partition size displays. The system partition should be 6 MB.
8	Enter the desired partition size of your "C" drive minus 6 MB.	Partition successfully created.
9	Press any key to continue.	Do you want to make this the system partition (y/n)?
10	Enter `n` and press return.	Partition formatted successfully.
11	Press any key to continue.	Configure Partitions menu re-displays.
12	Choose `Create Partition`	A list of available target devices displays.
13	Select the desired target device.	A prompt for partition size displays.
14	Enter 6 MB as the desired partition size of your "D" drive.	Partition successfully created.
15	Press any key to continue.	Do you want to make this the system partition (y/n)?
16	Enter `y` and press return.	Partition formatted successfully.
17	Press any key to continue.	Configure Partitions menu re-displays.
18	Select Exit.	ARCINST menu displays.
19	Select Exit.	ARC Boot menu displays.

Starting a Digital UNIX Installation

Table C-3 Starting a Digital UNIX Installation

Step	Action	Result
1	If the SRM console is running, go to step 3. If the ARC console is running, from the Boot menu select the `Supplementary menu...`, then select `Set up the system...`. From the Setup menu, select `Switch to OpenVMS or Digital UNIX console`. Select `Switch to Digital UNIX.`	Selecting Switch to Digital UNIX will cause the system to run the SRM console after the next power cycle.
2	Cycle the system's power. (Leave the system off for 20 seconds.).	Cycling power after selecting the OpenVMS or Digital UNIX console results in the system's restarting with the SRM console running.
3	At the SRM prompt, type: `>>>set boot_osflags""`	Clears the *boot_osflags* variable.
4	At the SRM prompt, type: `>>>set auto_action halt`	Halts the system at the console prompt each time the system is turned on, crashes, or when the reset button is pushed.
5	Insert the Digtial UNIX *for Alpha Systems* CD-ROM into the CD drive.	CD-ROM drive is ready.

6	At the SRM prompt, type:
	`>>>show dev`
		List of devices displays:
		`dka0.0.0.6.0 DKA0 RZ26L 441A`
		`dka400.4.0.6.0 DKA400 RRD43 3213`
		`dva0.0.0.0.1 DVA0`

7	From the SRM console, boot the Digital UNIX CD-ROM. `>>>boot dka400`	Installation information is displayed and you are prompted to select an option. For more information, refer to the *Digtial UNIX Installation Guide.*

Starting an OpenVMS Installation

Table C-4 Starting an OpenVMS Installation

Step	Action	Result
1	If the SRM console is running, go to step 3. If the ARC console is running, from the Boot menu select the `Supplementary menu...`, then select `Set up the system...`. From the Setup menu, select `Switch to OpenVMS or Digital UNIX console`. Select `Switch to OpenVMS.`	Selecting `Switch to OpenVMS` causes the system to run the SRM console after the next power cycle.
2	Cycle the system's power. (Leave the system off for 20 seconds.)	Cycling power after selecting the OpenVMS or Digital UNIX console results in the system's restarting with the SRM console running.
3	Insert the OpenVMS CD-ROM into the CD drive.	CD-ROM drawer closes.

4	At the SRM prompt, type:
	`>>>show dev`
		List of devices displays:
		`dka0.0.0.6.0 DKA0 RZ26L 441A`
		`dka400.4.0.6.0 DKA400 RRD43 3213`
		`dva0.0.0.0.1 DVA0`

5	From the SRM console, boot the OpenVMS CD-ROM. `>>>boot -flags 0,0 dka400`	Installation information is displayed and you are prompted to select an option. For more information, refer to the *OpenVMS Installation Guide.*

D
Equipment Log

Introduction

With the Equipment Log, you can gather information that you may need if problems occur with your system and you need to call your service representative or Digital Equipment Corporation for assistance.

Use the Equipment Log to record information about your system hardware and software components. Update the Equipment Log when you add options.

Equipment Log

The log consists of six tables, which you can use to record the following information:

- Your system's hardware components Table D-1.
- Your system's ISA equipment configuration for your system Table D-2.
- Your SCSI device address settings Table D-3.
- Your system's system hardware configuration Table D-4.
- The operating system or application software installed on your AlphaServer 300 system Table D-5.
- Additional components Table D-6.

Table D-1 Hardware Components

Component	Vendor/ Type/Size	Model Number	Serial Number	Date Installed
System unit	Digital AlphaStation	250 Series		
System unit key number				
Monitor				
Keyboard				
Mouse				
Installed diskette drive				
Additional storage device 1				
Additional storage device 2				
Additional storage device 3				
Additional storage device 4				

Use Table D-1 to keep track of your AlphaServer 300 system's expansion options. The upper portion of the table shows the standard devices. You can use the lower portion of the table to record the parameters of ISA devices you add to the riser card. The columns refer to information entered into the SRM console during configuration. Refer to the ICONFIG section of Chapter 3 for details on entering device parameters in the database.

Table D-2 ISA Equipment Configuration

Device	Handle	Slot	IOBASE	Membase and Memlen	DMAmode and chan	IRQ 0-3
Keyboard	KBD	0	60			1
Mouse	MOUSE	0	60			12
Serial Line 1	COM1	0	3F8			4
Serial Line 2	COM2	0	2F8			3
Parallel port	LPT1	0	3BC			7
FDC	FLOPPY	0	3F0		2	6
Riser Card ISA Expansion Slots						

Table D-3 SCSI Addresses

Address	Device
0	
1	
2	
3	
4	
5	
6	
7	SCSI controller

☞ See Chapter 3, Console Commands, for more on obtaining configuration information for your system.

Table D-4 Hardware Configuration

Component	AlphaServer 300 System Specifics
CPU (central processing unit) speed and model	
Firmware version	
Memory size	
Video module	

Table D-5 Installed Software

Operating System or Application Software	Version Number	License Number	Date Installed

Table D-6 Additional Component Information

Component	Vendor	Model Number	Serial Number	Date Installed

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