

# Digital AlphaStation™ 200 Series

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## User Information

Order Number: EK-PCDTA-UI. E01

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**July 1995**

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**FCC Information - Class B**

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.



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# Preface

## Welcome to the Digital AlphaStation 200 Series System

This guide introduces the Digital AlphaStation 200 Series system.

Use the information here to start, use, update, troubleshoot, and configure your Digital AlphaStation 200 Series system. You can also find general system information such as console commands and system care here.

## Audience

If you are operating, configuring, or adding options to the Digital AlphaStation 200 Series system, you will find the information included here helpful.


## Organization of the Information

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

- Chapter 1, *Getting Started*. Installing, starting, restarting, and turning off the system
- Chapter 2, *System Overview*. Motherboard, keyboard, system controls, indicators, ports, and connections
- Chapter 3, *Installing System Options*. Installing hard disk, compact disc, and tape drives, memory, option cards, printer cable, and external SCSI cable
- Chapter 4, *Troubleshooting*. Possible causes and actions to solve problems
- Appendix A, *Console Commands*
- Appendix B, *System Care*. Cleaning your system, monitor, and mouse
- Appendix C, *Technical Specifications*
- Appendix D, *Device Mapping*. I/O addresses and interrupts
- Appendix E, *Updating System Firmware*
- Appendix F, *Starting an Operating System Installation*
- Appendix G, *Sound Card Overview*
- Appendix H, *Equipment Log*

## Conventions

This guide uses the following conventions:

Convention Example	Description
<code>c:\windows</code>	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.
<i>auto_action</i>	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 <i>gigabytes</i> (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 <i>kilobits</i> (for example, 512 Kb). A kilobit equals 1024 bits.
KB	A KB suffix to a numerical value indicates size in <i>kilobytes</i> (for example, 640 KB). A kilobyte equals 1024 bytes.
LED	Light-emitting diode.
Mb	An Mb suffix to a numerical value indicates size in <i>megabits</i> (for example, 10 Mb). A megabit equals 1,048,576 bits.
MB	A MB suffix to a numerical value indicates size in <i>megabytes</i> (for example, 550 MB). A megabyte equals 1,048,576 bytes.
MHz	Megahertz.
MAU	Media adapter unit.
ns	Nanoseconds.
NVRAM	Nonvolatile random access memory.
OSF	DEC OSF/1 operating system.
PCI	Peripheral component interconnect.
RISC	Reduced instruction set computing.
ROM	Read only memory.

## Preface

*(continued)*

Abbreviation	Meaning
SCSI	Small computer system interface.
SIMM	Single in-line memory modules.
SRM	OSF/1 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.

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### WARNING

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

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### CAUTION

---

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

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### NOTE

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

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### HINT

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A HINT includes suggestions to make your computing tasks easier.

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## Additional Information Resources

You may wish to consult the following information resources on your Digital AlphaStation 200 Series system:

- *Digital AlphaStation™ 200 Series Installation Information* (order number EK-PCDTA-II) presents a graphical overview of the Digital AlphaStation 200 Series installation.
- *Digital AlphaStation™ 200/400 Series Technical Information* (order number EK-PCDSA-TI). This optional manual contains detailed technical information for value-added resellers (VARs) and independent software vendors.

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



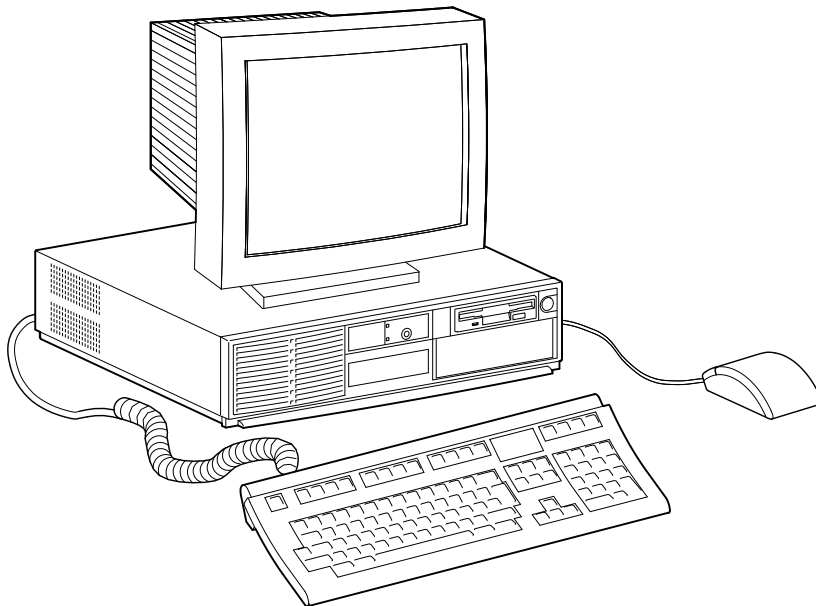
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## Getting Started

### Introduction

Your Digital AlphaStation 200 Series system is a high-performance system that uses the latest microprocessor technology. The system can stand alone or function as a client in an office network environment. This chapter describes how to start, install, restart, and turn off your Digital AlphaStation 200 Series system. You can also find information here about preloaded software as well as guidelines for system security. Figure 1-1 shows a typical Digital AlphaStation 200 Series system.



**Figure 1-1. Digital AlphaStation 200 Series System**

## Getting Started

### Before Starting Your System

Before you start 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 also should 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.

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#### NOTES

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- a. Do not install optional hardware or application software until you have started your system and verified that the base system is working correctly.
  - b. On systems that have preloaded software, a label attached to the system unit informs you that there licensed software installed has been installed. Carefully review the software license agreement shipped with your system.
- 

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#### WARNING

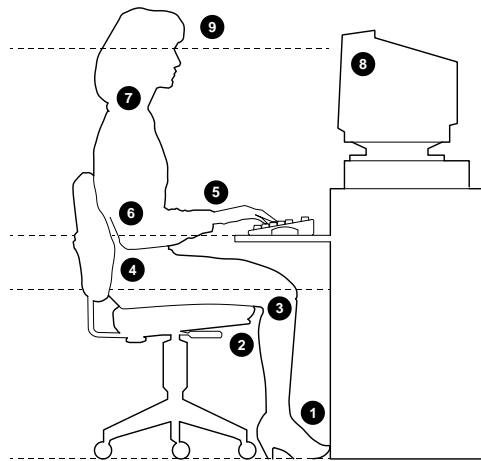
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**When unpacking and moving system components, be aware that some components (such as the system unit or monitor) may be too heavy for you to safely lift alone. If you are doubtful about whether you can lift these items alone, please get assistance.**

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### Posture and Work Habits

If you exercise poor posture while you work or if your equipment is poorly set up, certain recent scientific articles suggest that personal injury may result. Other articles suggest that there is no cause and effect. Because the safety of our users is a great concern to Digital Equipment Corporation, we strongly urge that you read and follow the precautions outlined in Figure 1-2 and Table 1-1. In addition, be sure to adjust your work space so that you are comfortable, and change your position frequently.



**Figure 1-2. Recommendations for Posture and Work Habits**

**Table 1-1. Recommendations for Posture and Work Habits**

Adjust	To allow the following conditions
Chair	<ol style="list-style-type: none"> <li>1. Feet are flat on the floor.</li> <li>2. Legs are vertical and form a right angle to the floor.</li> <li>3. Your thighs are horizontal, and they are not bearing weight. Keep the backs of your knees away from the seat so you do not compress the area behind them, which could restrict the blood flow.</li> <li>4. Your upper body is erect and your lower back is supported with a backrest.</li> </ol>
Keyboard and Mouse	<ol style="list-style-type: none"> <li>5. Your wrists are straight and do not flex more than 15 degrees. They are supported and do not rest on sharp edges. If you use a mouse, rest your hand on the mouse so your wrist is not on the work surface. Operate the mouse close to your body's centerline.</li> <li>6. Upper arms are straight down at your sides, and elbows are close to your sides and support your arm weight. Forearms are at a 70- to 90-degree angle.</li> </ol>

## Getting Started

**Table 1-1. Recommendations for Posture and Work Habits (*continued*)**

Head	7. Avoid neck strain. Your head should incline downward, but no more than 15 to 20 degrees.
Monitor	8. No higher than the level of your eyes and at the correct distance for your vision. 9. Avoid eye fatigue, which can be caused by glare, image quality, uncomfortable furniture, eye height, and uncorrected vision. If you cannot focus to read at different distances, you may need special glasses. Relax your eyes periodically by focusing on distant objects.
Lighting	Avoid direct lighting or sunlight on the screen, which causes glare and reflections. Place lighting behind or to the side of your work area, and distribute the lighting evenly on your work area.
Noise	Keep background noise at a minimum. Background noise above 65 dBA is tiring. Sound-absorbing materials (for example, curtains, carpeting, and acoustic tile) can help reduce background noise.
Temperature	20 – 23 degrees C (68 - 74 degrees F)
Humidity	30% – 70%
Ventilation	Provide adequate air ventilation to operate the equipment and avoid fatigue.
Work Space	> 70 cm (28 inches) center to center, preferably between > 152 cm (60 inches).

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### **WARNING**

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**If you experience pain or discomfort while using your system, rest and review the instructions for posture and work habits. If the pain or discomfort continues after resuming work, discontinue use and report the condition to your job supervisor or physician.**

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## Identifying the Correct AC Power Cord

Your Digital AlphaStation 200 Series system came with the proper AC power cord. 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.

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### WARNING

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**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.**

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Power cords supplied with the Digital AlphaStation 200 Series system meet the following criteria:

- UL and CSA Certified cord rated for use at 250 Volts AC with a current rating that is at least 125% of the current rating of the Digital AlphaStation 200 Series system. In Europe, the cordage carries the <HAR> mark.
- The AC plug is terminated in a grounding-type male plug designed for use in the region. It must also have marks showing certification by an agency acceptable in the region.
- The connector at the computer end must be an IEC-type CEE-22 female connector.
- The cord length does not exceed 4.5 meters (14.5 feet).

## Getting Started

### Installing Your System

The Digital AlphaStation 200 Series system *Installation Information* you received with your system graphically outlines the steps to follow in installing your system.

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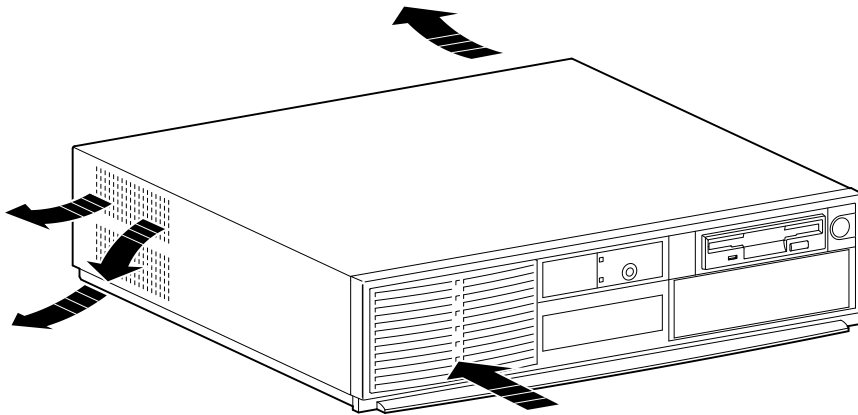
#### CAUTIONS

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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 installed 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 H, 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 1-3.



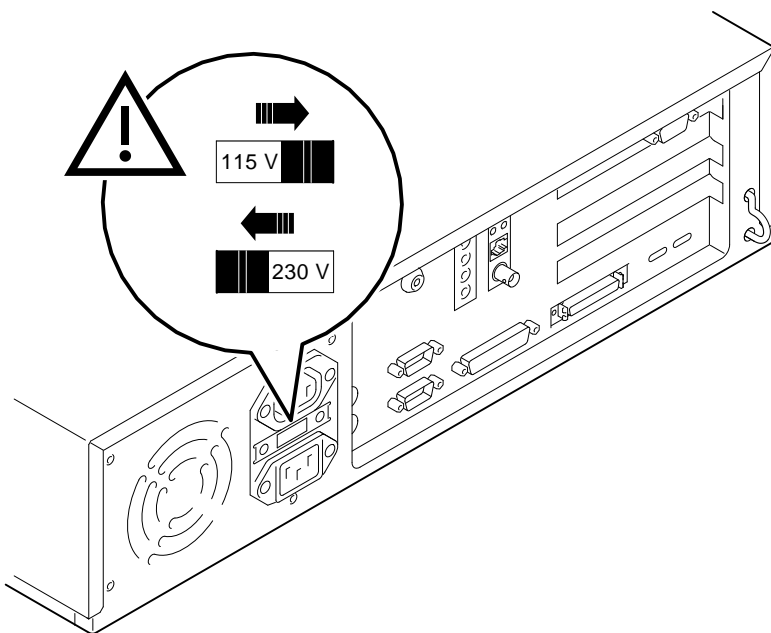
**Figure 1-3. System Airflow**



## Connecting System Parts

To connect the components of your Digital AlphaStation 200 Series system, perform the following steps:

1. Confirm that the voltage selector switch matches your local voltage (either 115 Volts or 230 Volts), as Figure 1-4 shows.



**Figure 1-4. Voltage Selector Switch**

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**CAUTION**

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

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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 1-5 shows.

## Getting Started

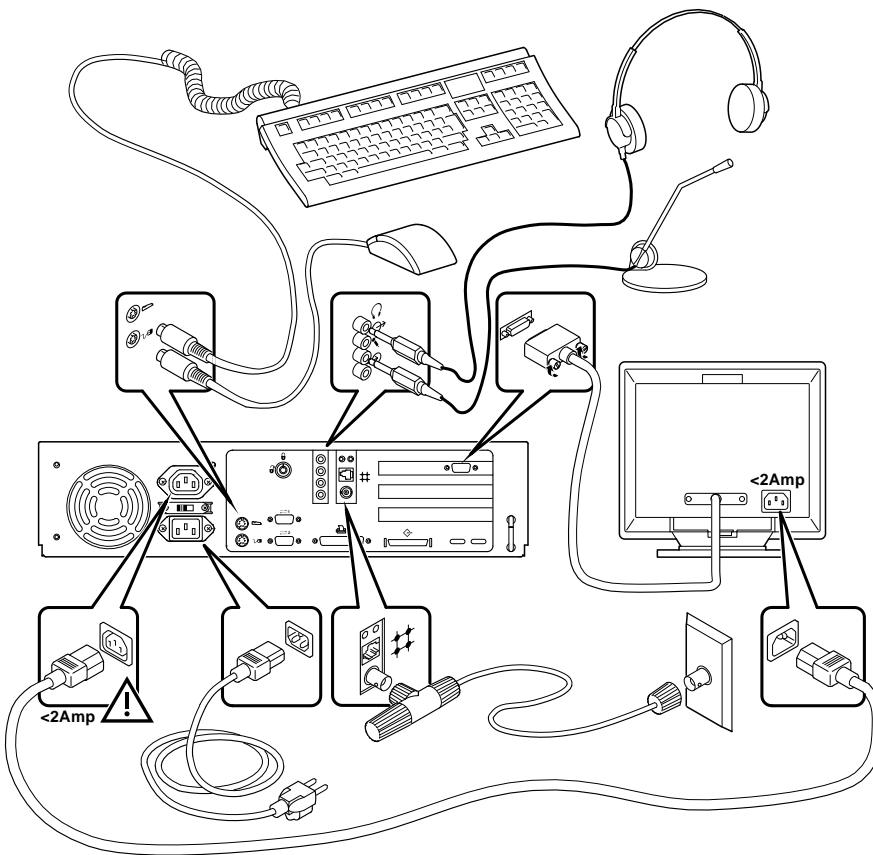
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### CAUTION

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The system auxiliary AC outlet is limited to 2 Amps at 115 Volts (1 Amp at 230 Volts). Plug higher-amperage video monitors into a wall receptacle.

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**Figure 1-5. Connecting Cables and Power Cords**

4. If you have an external SCSI (small computer system interface) 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 3.

## Network Connection

If you ordered a system with an optional network module, 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 selected port type by using the following SRM console commands:

```
>>>set ewa0_mode twisted      (for the twisted pair port)
```

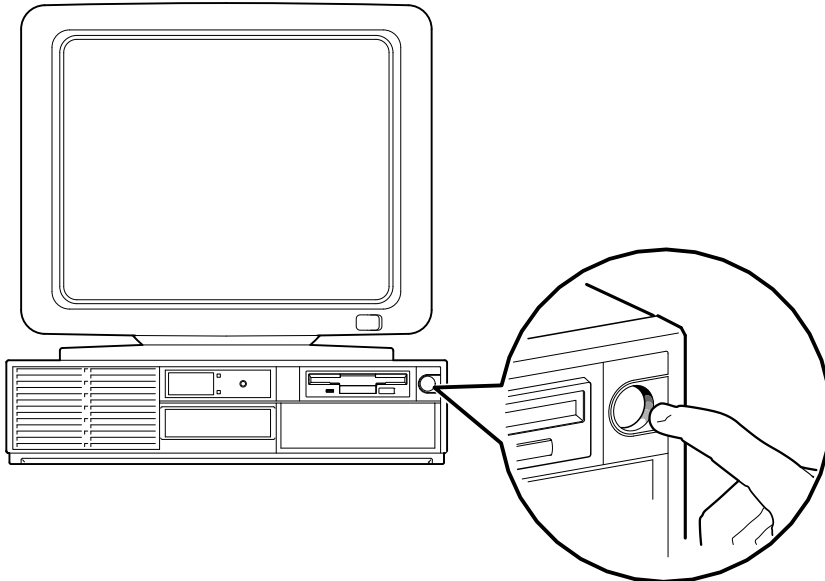
```
>>>set ewa0_mode AUI          (for the ThinWire port)
```

After changing the port, type `>>>init` or power cycle the machine. (See Appendix A, Console Commands.)

## Starting Your System

Perform the following steps in the order outlined to start (boot) your Digital AlphaStation 200 Series system:

1. Turn on the system unit power, monitor power, and any external devices. Figure 1-6 shows the location of the system unit power button.



**Figure 1-6. 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.)


## Getting Started

3. Allow your system to complete any power-on self tests and device initialization messages. (This takes approximately 1 minute.) If you are using the OpenVMS or Digital UNIX operating systems, and the *auto\_action* environment variable is set to "boot," the system starts as soon as the self tests have completed (less than 2 minutes). If you are using the Microsoft Windows NT Workstation operating system and autoboot is enabled, the system starts after a countdown expires (default is 10 seconds).

## Preloaded Operating System Software

If you ordered a Digital UNIX or OpenVMS version of the AlphaStation 200 Series system, your operating system came preloaded. If you ordered a Microsoft Windows NT Workstation version, the operating system is not preloaded. Disk 0 on the first SCSI bus, however, is partitioned and formatted so that you can immediately install the operating system.

Depending on how the environment variables are set, your system shows one of the operating system-specific displays discussed next, after the self tests have completed successfully.

 For more information on environment variables, see Appendix A, Console Commands.

## Microsoft Windows NT Workstation

If you ordered a system with the Microsoft Windows NT Workstation operating system, you will see the following display after system power-on and initialization:

```
ARC Multiboot Alpha AXP Version 4.28
Copyright (c) 1993-1995 Microsoft Corporation
Copyright (c) 1993-1995 Digital Equipment Corporation
```

Boot menu:

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

Use the arrow keys to select, then press Enter.

If autoboot is enabled, a countdown timer [default 10 seconds] is displayed. Booting occurs when the timer expires.

### Digital UNIX

If you are using the Digital UNIX operating system, you see either a >>> prompt (if *auto\_action* is set to Halt) or the system proceeds to boot Digital UNIX (if *auto\_action* is set to Boot) when you power on your system.



For more information, refer to your operating system documentation.

### OpenVMS

If you are using the OpenVMS operating system, you see either a >>> prompt (if *auto\_action* is set to Halt) or the system proceeds to boot OpenVMS (if *auto\_action* is set to Boot) when you power on your system.



For more information, refer to your operating system documentation.

### Switching Console Firmware

AlphaStation 200 Series systems currently ship with 512-KB of console firmware flashROM. The flashROMs are loaded with SRM firmware for OpenVMS and Digital UNIX systems, or ARC firmware for Windows NT systems. You can change from SRM to ARC or from ARC to SRM by using the Firmware Update Utility. (Refer to Appendix E, Updating System Firmware.) You do not need to modify your system hardware. The operation simply reprograms the firmware flashROMs.

### If No Operating System Is Installed



If an operating system was not *preloaded* on your system, refer to your operating system documentation for information on loading. (See also Appendix F, Starting an Operating System Installation.)

## 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 1-2 below:

**Table 1-2. Operating System Shut Down**

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

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 Workstation 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.

## **Computer Security**

Your Digital AlphaStation 200 Series system includes several security-related features. See your operation system documentation for more information on the use of these options.

### **Chassis Lock**

To avoid theft of internal components, your Digital AlphaStation 200 Series 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, no one else can open the system box. 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

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## System Overview

### Introduction

This chapter describes the Digital AlphaStation 200 Series system hardware components, including the motherboard features, PCI (peripheral component interconnect) architecture, front panel, rear panel, interior components, motherboard components, and keyboard.

### Motherboard

Your Digital AlphaStation 200 Series system uses a high-performance DECchip 21064 or 21064A CPU (central processing unit). System features include:

- 512 KB (kilobyte) cache memory.
- Memory controller and data path that connects through a 64-bit wide data bus to main memory and through a 128-bit wide data bus to second-level cache. The data is longword (32-bits) parity protected.
- PCI bus adapter with a 32-bit wide multiplexed address/data bus.
- Floppy disk controller that supports a floppy drive (optional on some models).
- SCSI-2 controller that supports up to seven internal and external SCSI devices.
- One slot for a PCI option, one slot for a PCI or ISA (industry-standard architecture) option and one additional slot for a half-size ISA option.
- Keyboard and mouse ports.
- Two serial ports.
- One enhanced bidirectional parallel port.
- High-performance graphics adapter.
- Ethernet adapter.
- Sound card.



Refer to Appendix C, Technical Specifications, for additional information.

## System Overview

### PCI Architecture

Your system's PCI architecture represents the latest advances in local bus technology. The Digital AlphaStation 200 Series 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 high-end video adapters—a critical advantage when you are running graphic- and I/O-intensive software.

PCI local bus features include:

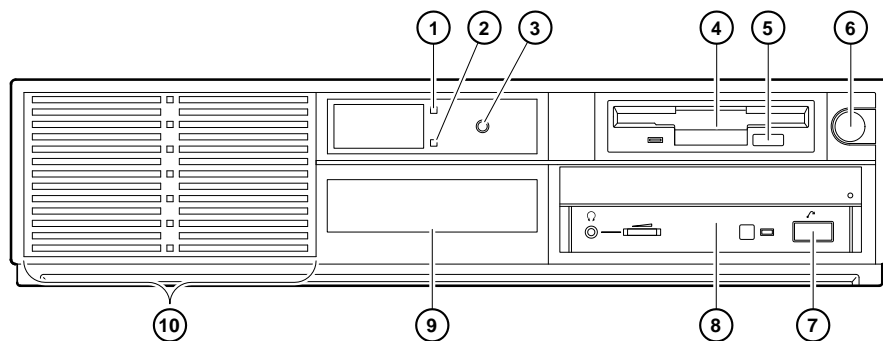
- Highest performance in the market today.
- Best expandability for high-performance peripheral devices.
- Support for multiple bus masters.
- 32-bit data transfer at 132 MB (megabytes) per second (peak).
- PCI-to-ISA bridge capability that allows you to use commonly available ISA options.

### SCSI Controller

The Digital AlphaStation 200 Series system uses a PCI-based embedded SCSI-2 controller that controls up to seven SCSI peripherals such as hard disk drives, CD-ROM (compact disc read only memory) drives, and tape drives.

### System Front View

Figure 2-1 is a front view of the system showing the location of the controls and indicators. Table 2-1 describes these items.



**Figure 2-1. Front Controls and Indicators**

## System Overview

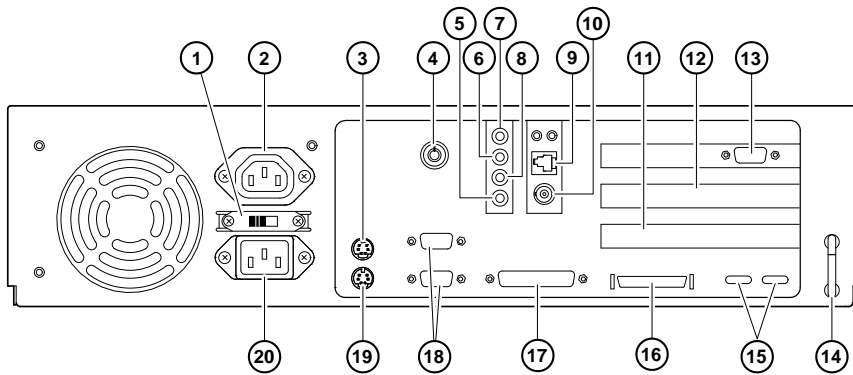
**Table 2-1. Front Controls and Indicators**

<b>Figure Legend</b>	<b>Control or Indicator</b>	<b>Function</b>
1	Power indicator	Power. Lights when the system is on.
2	Disk activity indicator	Hard disk drive. 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 C, Technical Specifications, for directions on setting the Halt/Reset jumper.
4	Floppy drive (optional on some models)	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-height front-accessible drive bay.
9	Hard drive (optional)	3.5-inch low-profile front-accessible drive bay.
10	Louvered air intake	Passageway for cooling air to enter the system. <i>(Do not block air intake.)</i>

## System Overview

### System Rear View

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



**Figure 2-2. Rear Connectors**

**Table 2-2. 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	Monitor power connector	Use to connect a monitor to AC power. <i>If your monitor consumes more than 2 Amps at 115 Volts (1 Amp at 230 Volts), connect it directly to your wall outlet.</i> This connector may be missing from future versions of the system.
3	Keyboard connector	Use to connect a 101- or 102-key keyboard.
4	System (chassis) lock	Locks top cover.

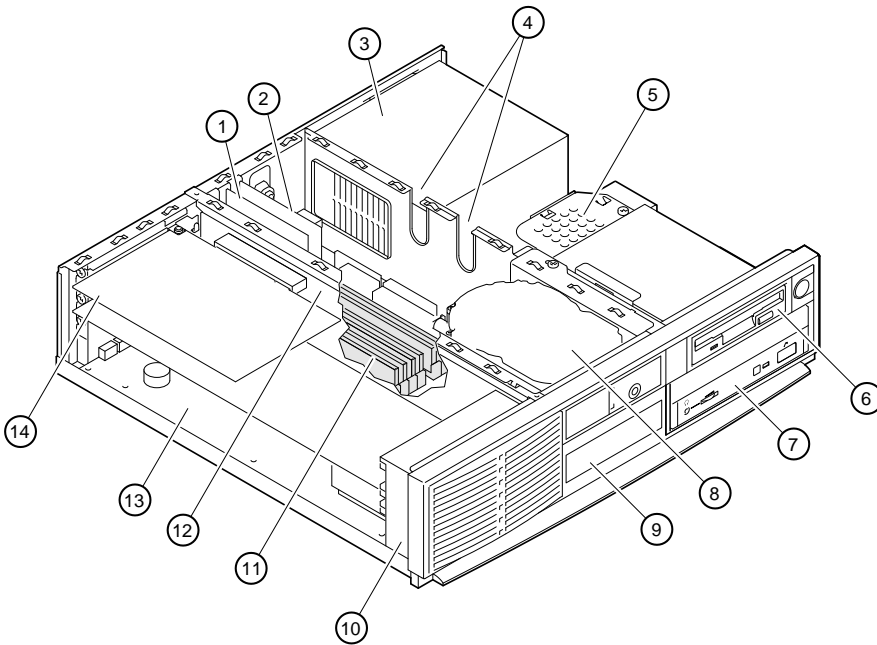
**Table 2-2. Rear Connectors (continued)**

<b>Figure Legend</b>	<b>Connector</b>	<b>Function</b>
5	Sound card line in connector	Brings audio signals into the card (for example, from a stereo amplifier).
6	Sound card line out connector	Routes audio signals to an external amplifier.
7	Sound card headphone jack	Connector for the headphones or amplified speakers.
8	Sound card microphone jack	Connector for the microphone.
9	Twisted pair connector	Connection to the embedded Ethernet controller .
10	ThinWire connector	Connection to the embedded Ethernet controller .
11	ISA expansion slot	Used for half-size ISA expansion options only.
12	PCI/ISA expansion slot	Either a PCI or ISA option can use this slot.
13	PCI expansion slot	Used for PCI expansion options. (In earlier systems, this slot was a PCI/ISA combo slot. The slot was changed to PCI only to support two-board PCI options.) In this example, a PCI graphics adapter is in the slot.
14	Security loop	Attaches padlock and security cable.
15	LED viewing ports	Ports for viewing diagnostic LED indicators.
16	SCSI port	Provides the interface between the system unit and external SCSI devices.
17	Enhanced bidirectional parallel port	Connects an industry-standard parallel printer or other parallel device.
18	Serial port connectors	Connects serial devices.
19	Mouse connector	Connects a PS/2-compatible mouse.
20	AC power connector	Connects the system to AC power.

## System Overview

### System Unit Components

Figure 2-3 shows the location of the Digital AlphaStation 200 Series system unit components. Table 2-3 lists the system unit components.



**Figure 2-3. System Unit Components**

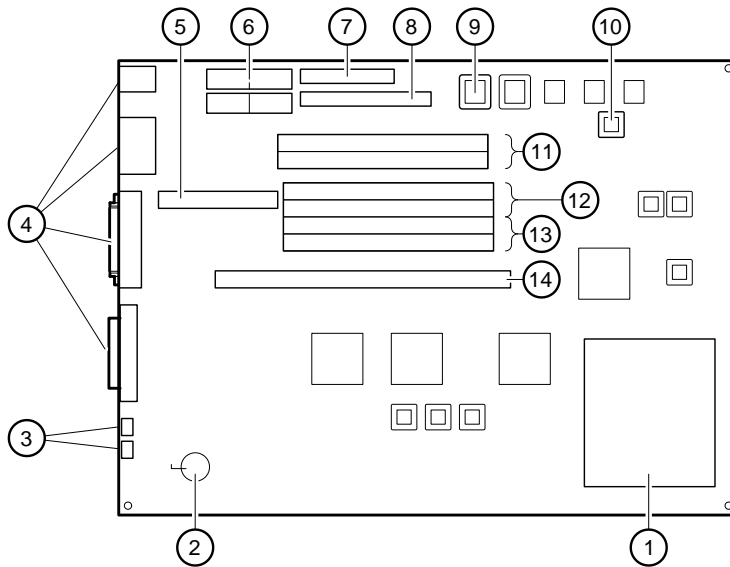
**Table 2-3. System Unit Components**

<b>Figure Legend</b>	<b>Component</b>
1	Media adapter unit (MAU). Provides twisted pair and ThinWire Ethernet connections (optional).
2	Sound card. Microsoft Windows Sound System-compatible sound card installed in a dedicated motherboard slot.
3	Power supply and fan.
4	Cable routing areas.
5	Speaker.
6	3.5-inch, 1.44-MB (megabyte) floppy disk drive (optional on some models).
7	Optional CD-ROM drive (or other 5.25-inch half-height drive).
8	Half-height hard disk drive (nonaccessible from front).
9	Storage for optional 3.5-inch low-profile hard disk drive.
10	Cooling fan.
11	Memory modules.
12	Riser card for ISA (industry-standard architecture) and PCI (peripheral component interconnect) option cards.
13	Motherboard.
14	Typical PCI option card (size varies with option).

## System Overview

### Motherboard

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



**Figure 2-4. Motherboard Components**



**Table 2-4. Motherboard Components**

Figure Legend	Components
1	DECchip 21064 or 21064A CPU
2	Battery
3	Service LEDs
4	Rear-panel connectors
5	Dedicated sound card connector
6	Power connectors
7	Floppy drive controller (FDC) connector
8	Internal SCSI connector
9	DROM (Diagnostic ROM)
10	SROM (Serial ROM)
11	Bank 2 memory module connectors
12	Bank 1 memory module connectors
13	Bank 0 memory module connectors
14	Riser card connector

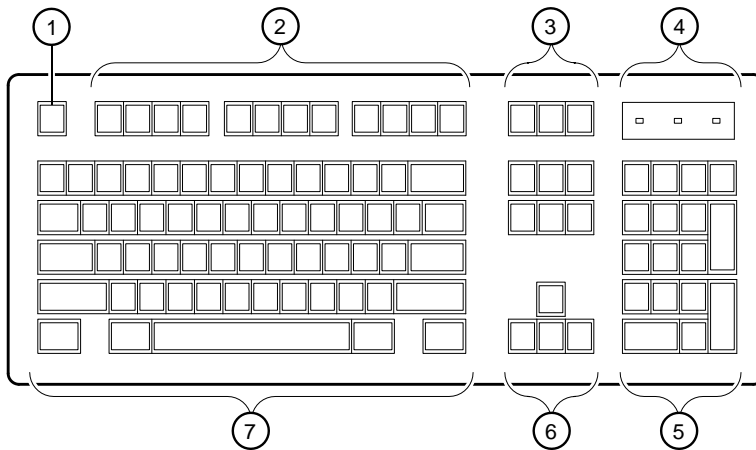
## Keyboard

Your system is equipped with a 101-key enhanced keyboard (similar to the one shown in Figure 2-5) that allows you to communicate with your system by entering data or commands. (Depending upon which operating system you ordered, your particular keyboard may vary from the one shown here.) Note that some European language keyboards have 102 keys. You can adjust the keyboard angle for your comfort. The underside of the keyboard has feet that swing down and lock into place. Refer to Table 2-5 for information on keyboard key groups and functions.



Refer to your operating system or application software documentation for software-specific key functions.

## System Overview



**Figure 2-5. Keyboard Layout**

**Table 2-5. Key Groups and Functions**

Figure Legend	Key, Key Group	Function
1	Escape key	This key is program-specific. Its function is determined by the installed application software.
2	Function key group	These keys are program-specific. Their functions are determined by the installed application software.
3	Edit key group	These keys are program-specific. Their functions are determined by the installed application software.
4	Indicator lights	Indicates whether the NumLock, CapsLock, or ScrollLock has been activated.
5	Numeric keypad	These keys perform numeric functions and software-defined functions, including cursor control. The NumLock key allows you to toggle between the numeric functions and software-defined functions.
6	Cursor control key group	These keys control the movement of the highlighted cursor on the monitor screen.
7	Alphanumeric key group	The keys are typewriter-specific.

# 3

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## Installing System Options

### Introduction

This chapter covers the following topics related to installing system options on your Digital AlphaStation 200 Series system:

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

## Installing System Options

### Removing the Top Cover

To remove the top cover, refer to Figure 3-1 and 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. To unlock the top cover, turn the key counterclockwise.

---

#### HINT

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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.

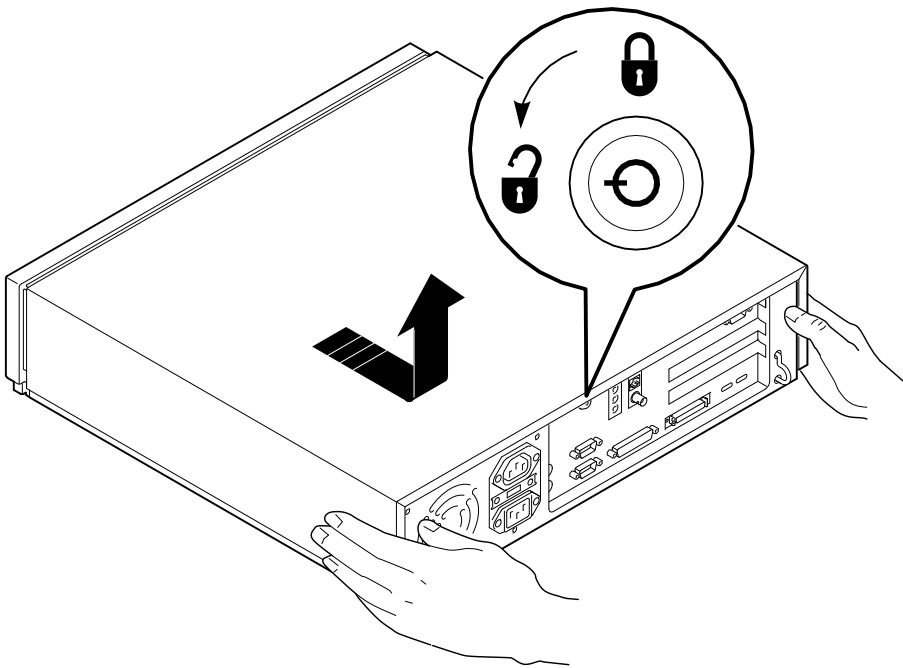
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#### CAUTIONS

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- a. To avoid system damage from static discharge, touch bare (unpainted) metal on the system box before you touch anything inside the system.
  - b. 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 3-1. Unlocking and Removing Top Cover**

## Installing System Options

### Installing Additional System Memory

Adding more memory allows your system to run more memory-intensive software, which decreases paging and swapping activities. These actions, in turn, increase your system's performance. You can increase your system's memory to 192 MB (384 MB when 64-MB SIMMs are available). You can add 16-MB, 32-MB, 64-MB, or 128-MB memory options. These memory options are pairs of single in-line memory modules (SIMMs): a 16-MB option consisting of two 8-MB SIMMs, a 32-MB option consisting of two 16-MB SIMMs, a 64-MB option consisting of two 32-MB SIMMs, or a 128-MB option consisting of two 64-MB SIMMs.

*Always* add SIMMs in pairs into one of three available memory banks (bank 0, 1, or 2). If all SIMM slots are already used, you can still increase your system's memory by removing a smaller pair of SIMMs from one of the banks and replacing them with a larger pair. The system requires 72-pin parity SIMMs that have an access time of 70 ns (nanoseconds) or 60 ns.

### Adding Memory Modules

To add a pair of memory modules (SIMMs), refer to Figure 3-2, which shows a view of the SIMMs from the rear of the motherboard, 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

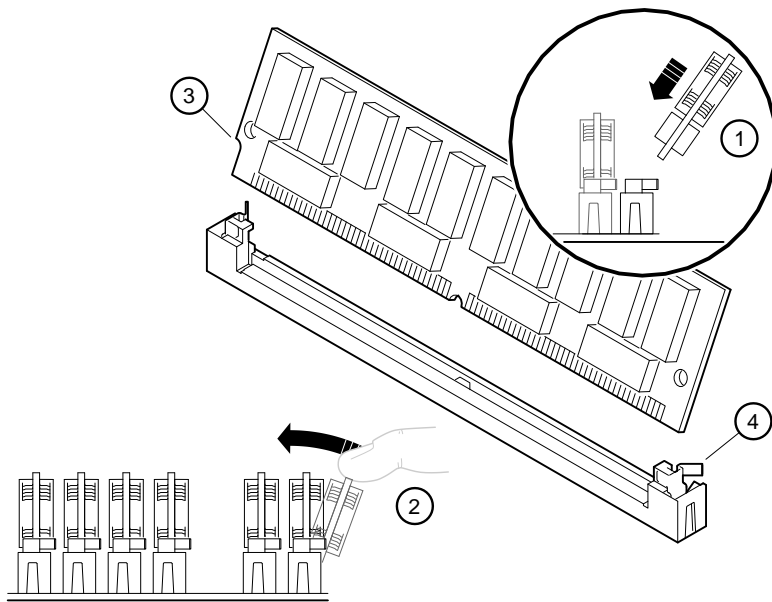
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If you are adding memory and adding a drive to the *upper bay of the inner storage area* at the same time, add the memory SIMMs while the drive bracket is removed for easier installation. If you are adding memory and adding a drive to the *lower bay 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 the metal retaining clips ④ at the socket ends engage.
3. Repeat steps 1 and 2 for the second module.

## Installing System Options



**Figure 3-2. Memory Installation**

## Installing System Options

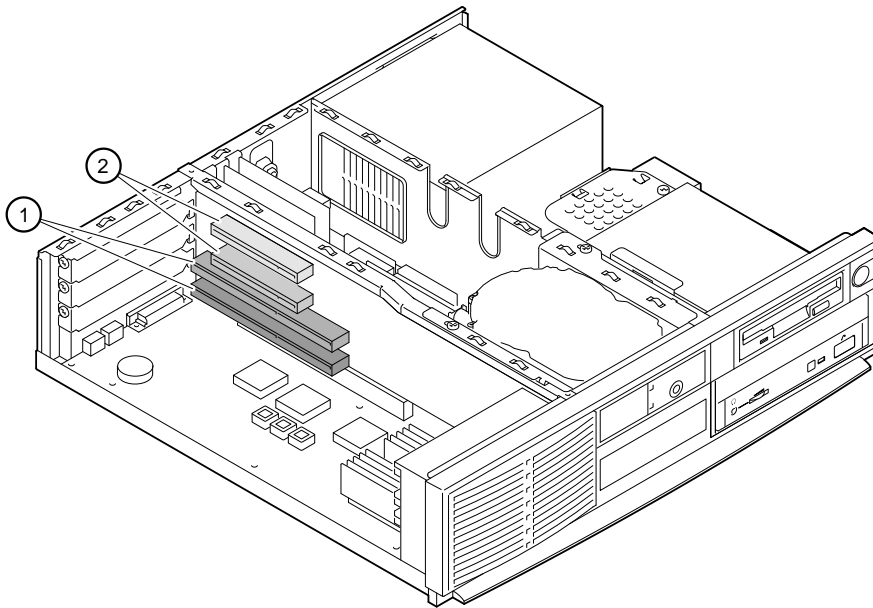
### Installing Expansion Boards

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. (In earlier systems, there were two PCI/ISA combo slots. One slot was changed to PCI only to support two-board PCI 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 3-3 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 3-3. Installing an Expansion Board**

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#### NOTE

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

---

3. Unscrew and remove the metal filler plate for the slot you have chosen.



## Installing System Options

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

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For ISA options added to Digital UNIX or OpenVMS systems, run the ISA configuration utility (type ICONFIG at the SRM console prompt, >>>). See Appendix A, Console Commands, for more information on this utility.

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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.

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### HINT

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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.

---

## SCSI Bus Length

The total SCSI bus length includes the length of the internal cables, wiring on the motherboard, external cables, and the cables inside the external storage enclosures. The total length must not exceed:

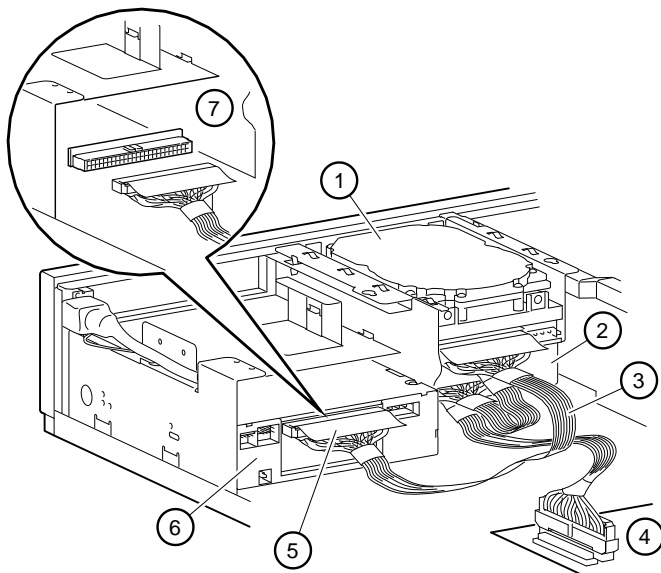
- 3 meters (9.8 feet) for fast SCSI (10 MB/second) operation.
- 4 meters (13.1 feet) for "slow" SCSI (5 MB/second) operation.

The Digital AlphaStation 200 Series system internal SCSI length is 1.2 meters (3.9 feet). This leaves 1.8 meters (5.9 feet) available externally for fast SCSI use. If slow SCSI is used, then an external length of 2.8 meters (9.2 feet) is available.

## Installing System Options

### 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. For example, Figure 3-4 shows a typical SCSI configuration. The internal SCSI cable ③ is plugged into the motherboard ④. The cable contains daisy-chained connectors for attaching devices such as a hard drive ① and other SCSI device ②. The other end of the SCSI cable ⑤ is terminated either by a CD drive ⑥ or the SCSI terminator plug ⑦.



**Figure 3-4. 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.
- 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.)
- 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. (If the end of the cable is plugged into a drive in the outer, lower bay, that drive must be the one to provide termination. Otherwise, the end of the SCSI cable must have the Digital-supplied terminator installed.)

## Installing System Options

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.

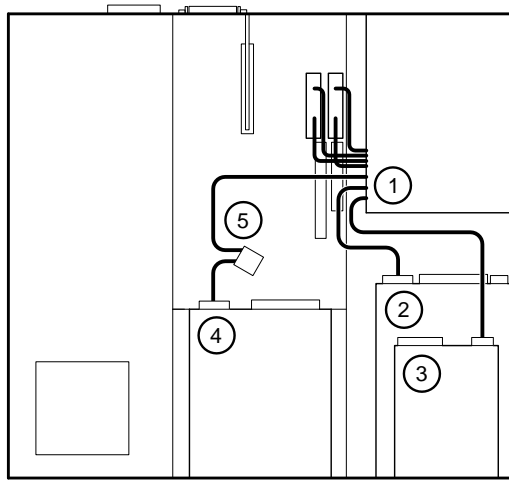
### **External SCSI Termination**

Like the internal SCSI bus, the external end of the SCSI bus also must be terminated. When no SCSI devices are present on the external SCSI bus, the bus is automatically terminated on the motherboard. When, however, an external SCSI cable is present, the automatic external termination is disabled, and the last external SCSI device must be properly terminated.

## Installing System Options

### Cable Layout

Figures 3-5 through 3-8 illustrate the storage system cabling within the system box. Tables 3-1 through 3-4 list the cable components.

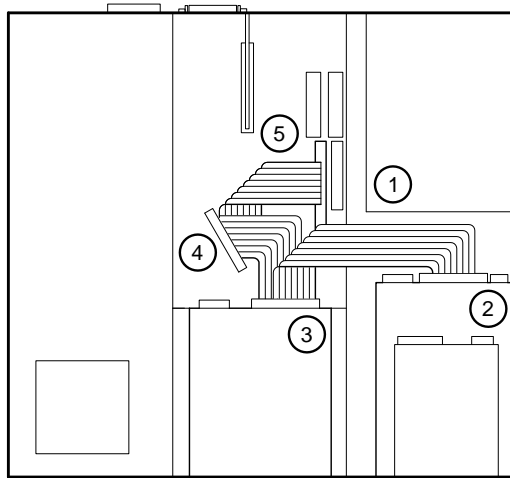


**Figure 3-5. Power Cable Layout**

**Table 3-1. 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 (optional on some models).
4	Inner bay upper device position (typically, a hard disk).
5	Inner bay lower device power connector (unused in this example).

## Installing System Options

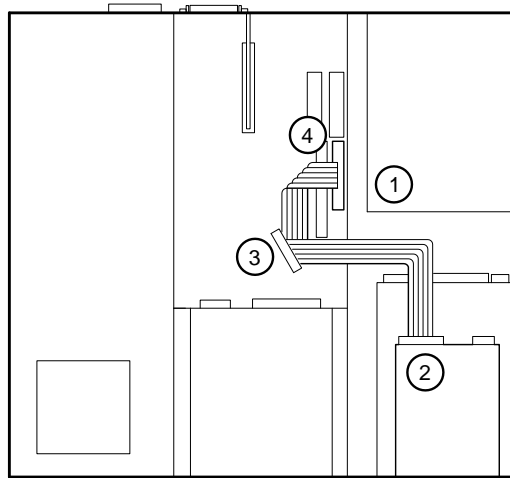


**Figure 3-6. Internal SCSI Cable Layout**

**Table 3-2. 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. If there is no device in the lower, outer position, termination is supplied by a terminator plug.)
3	Inner bay upper position SCSI device.
4	SCSI cable connector (unused in this example).
5	Motherboard SCSI connector.

## Installing System Options

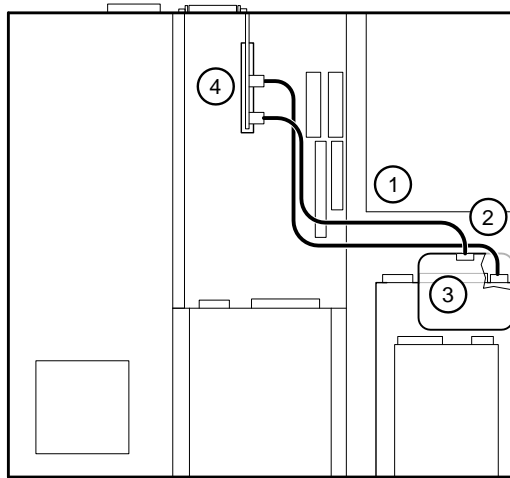


**Figure 3-7. FDC Cable Layout**

**Table 3-3. FDC Cable Layout**

Figure Legend	Component
1	Power supply.
2	3.5-inch floppy diskette drive in outer-bay upper position (optional on some models).
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 System Options



**Figure 3-8. Audio Cable Layout**

**Table 3-4. Audio Cable Layout**

Figure Legend	Component
1	Power supply.
2	Audio cable to bring CD-ROM audio to the sound card. (The CD-ROM drive is optional.)
3	Speaker assembly and cable from sound card.
4	Sound card located in a dedicated motherboard slot.

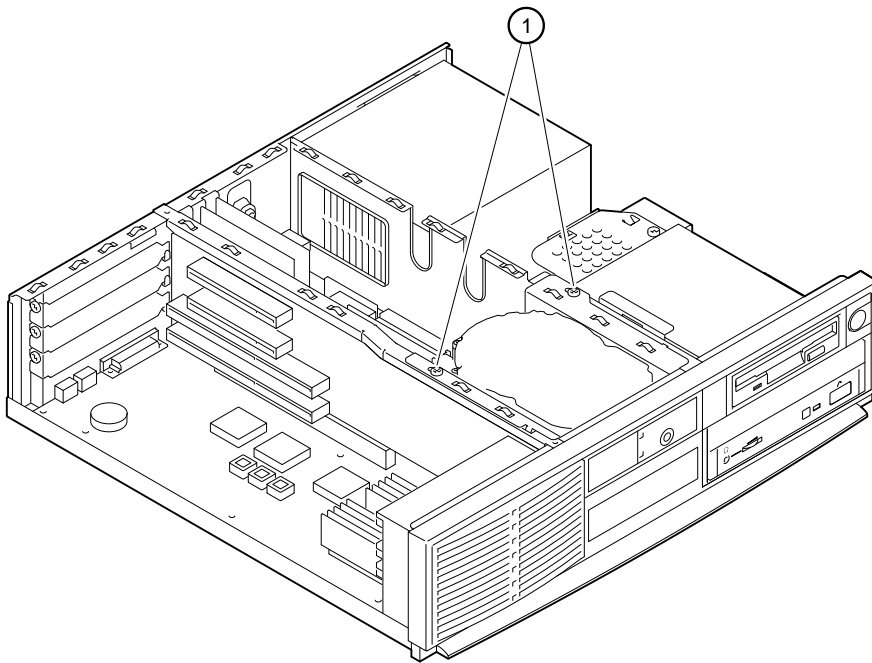
## Installing System Options

### Installing Storage Options in the Drive Bracket

This section tells you 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.

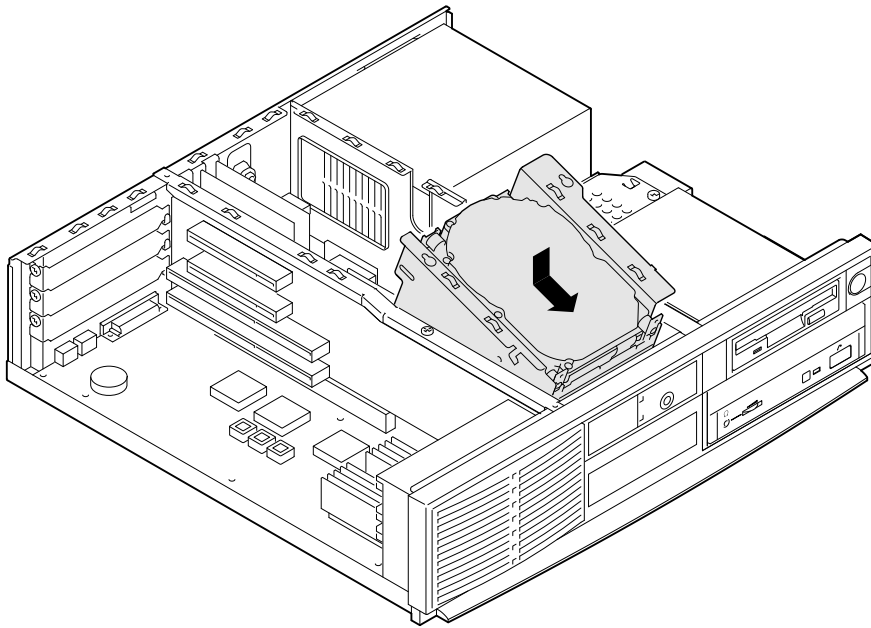
When installing a drive in the drive bracket, follow these steps:

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. (See Appendix D, Device Mapping, for a list of typical SCSI ID assignments. Appendix H, Equipment Log, contains space to record your system's SCSI ID assignments.) Follow the guidelines in the manual that came with the drive.
2. Remove 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 Figures 3-9 and 3-10 show. Remove cables from the drive *after* the assembly has been lifted out of the system unit.



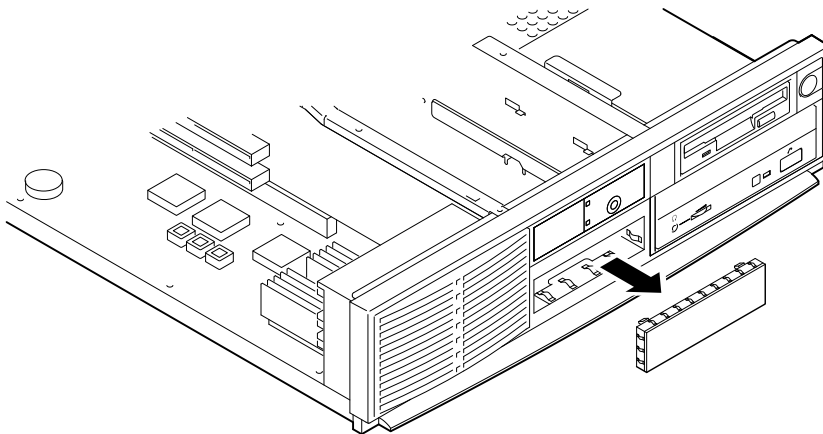
**Figure 3-9. Loosening Drive Bracket Screws**





**Figure 3-10. Removing Drive Bracket**

3. If you are installing a removable media drive in the lower position of the drive bracket, gently pop the panel out, as Figure 3-11 shows.



**Figure 3-11. Removing Blank Panel**

## Installing System Options

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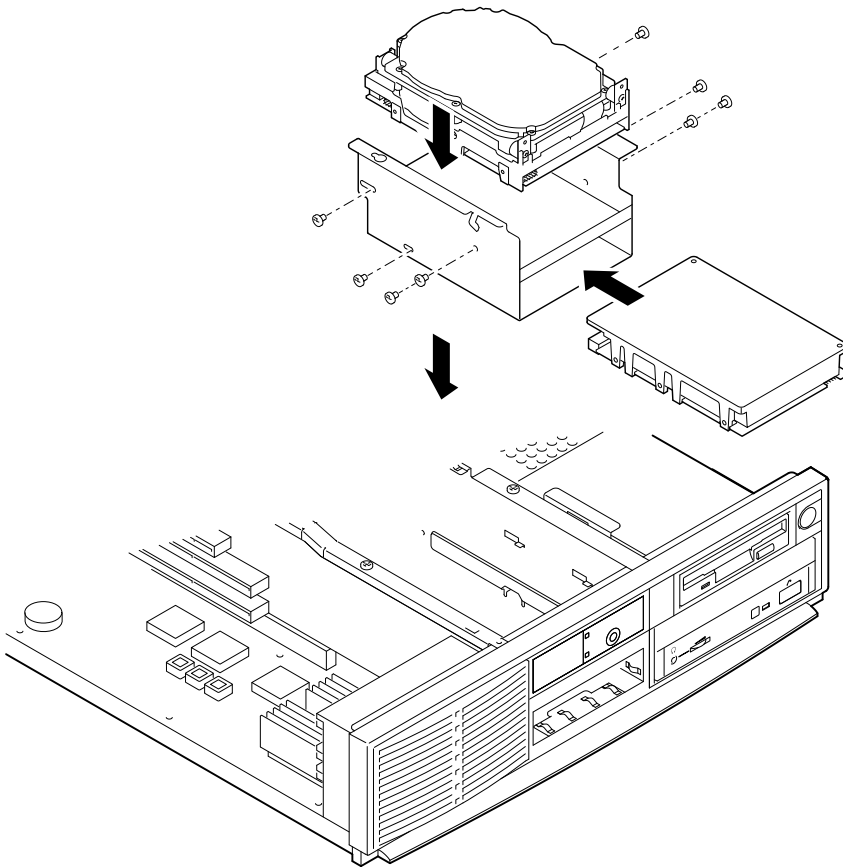
### HINT

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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 3-12 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 3-12. Installing Drives in Bracket**

## Installing System Options

5. Connect the bus cable ① and the power cable ② to the rear of the drive, as Figure 3-13 shows.

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### NOTE

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

---

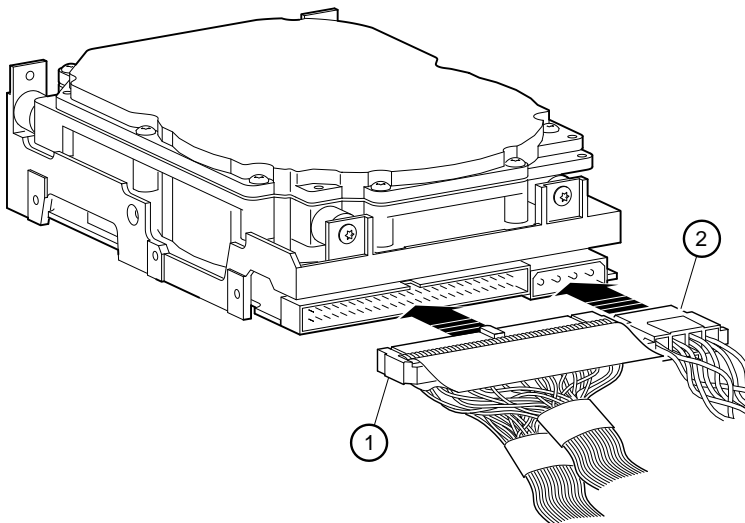
---

### CAUTION

---

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

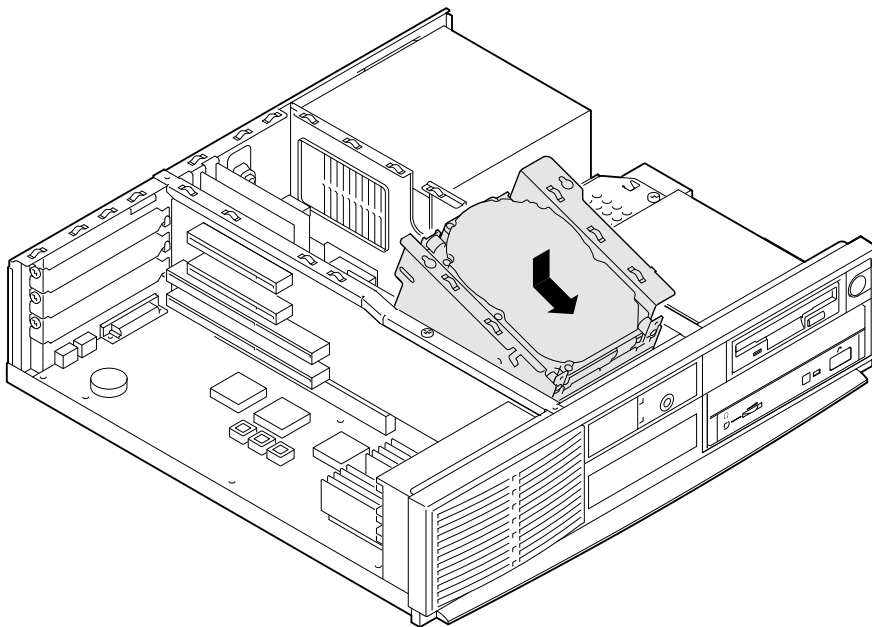
---



**Figure 3-13. Cabling Hard Disks**

## Installing System Options

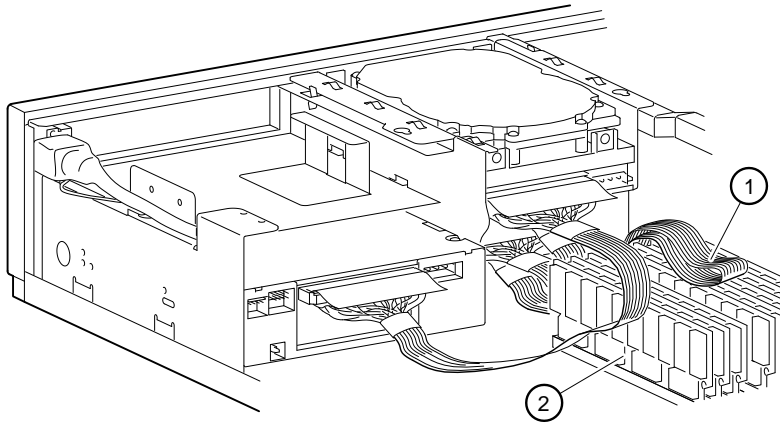
6. Place the drive bracket into the system unit, as Figure 3-14 shows.
7. Replace the bracket screws.



**Figure 3-14. Mounting Drives and Installing Drive Bracket**

## Installing System Options

Figure 3-15 shows how the drive cables ① are routed over the SIMMs ②. (In your system, the spacing of cables will be tighter than the figure here shows.)



**Figure 3-15. Drive Bracket Cable Routing**

## Outer Storage Bay

### Lower Position

This section describes how to install a drive in the outer bay lower position. You also can use this bay for another 5.25-inch half-size drive, such as the TLZ06, TLZ07, or TZK11 tape drive.

---

#### CAUTION

---

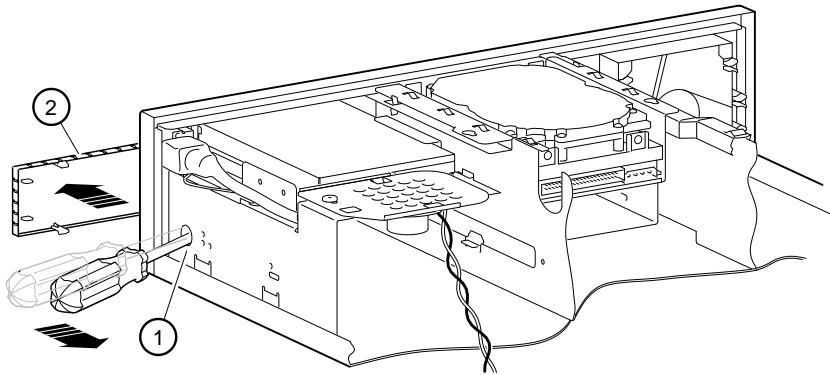
Do not install a SCSI hard disk in this bay. This can cause system overheating.

---

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 3-16 shows.

## Installing System Options

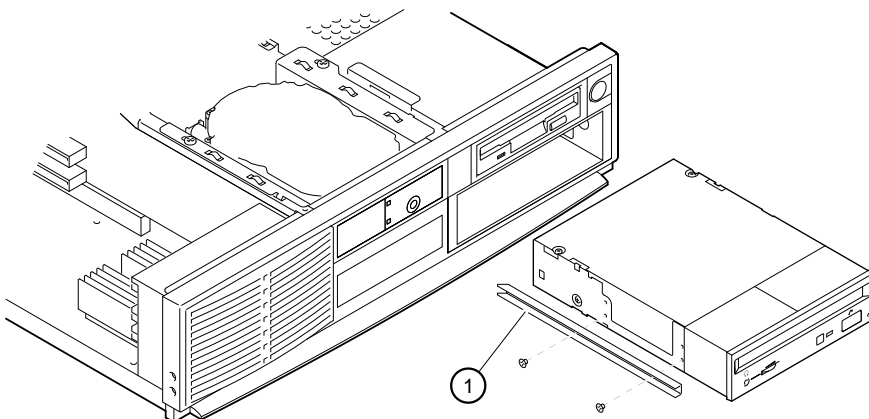


**Figure 3-16. Removing Blank Panel**

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.

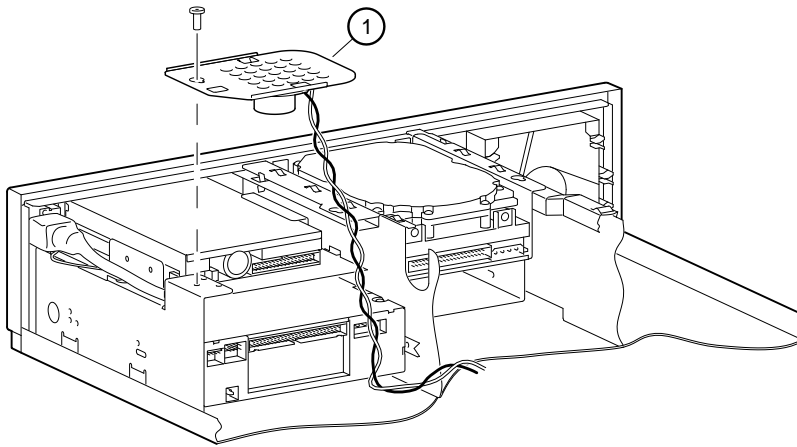
3. If the storage option you are adding is the last one on the SCSI cable, make sure that the internal SCSI termination is moved from the previous SCSI option to the last option.
4. Mount the holder ① to the side of the drive with two screws, as Figure 3-17 shows.



**Figure 3-17. Drive Installation**

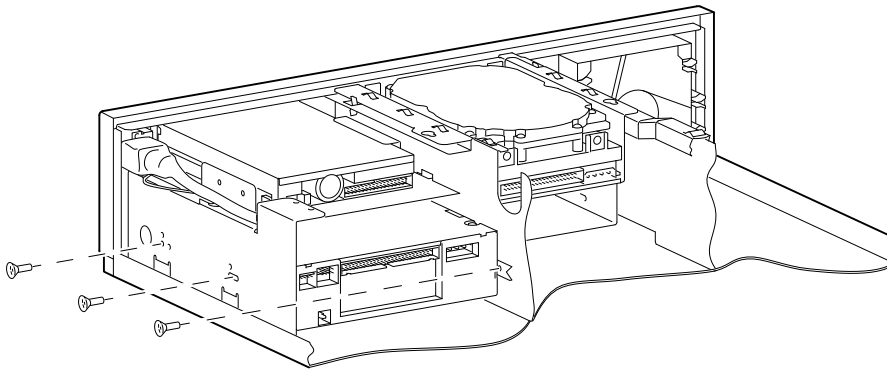
## Installing System Options

5. Loosen the screw so that you can remove the speaker ①, as Figure 3-18 shows.



**Figure 3-18. Removing the Speaker**

6. Slide the drive into the system unit, securing it with two screws on right side and one screw at back of holder on the left, as Figure 3-19 shows.



**Figure 3-19. Securing Drive**

## Installing System Options

7. Connect the audio ① (for CD drives), SCSI ②, and power ③ cables, as Figure 3-20 shows.

---

### NOTE

---

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

---

---

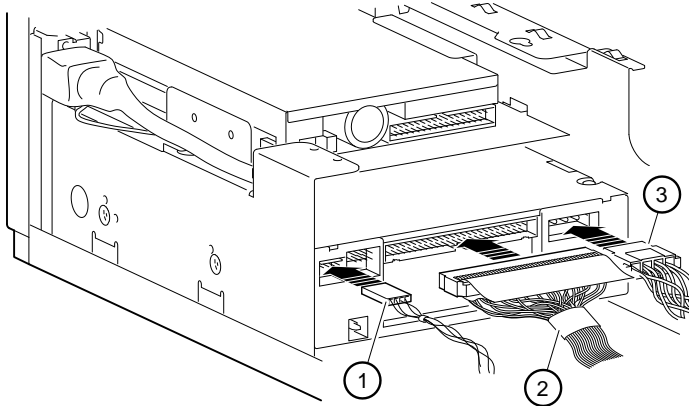
### CAUTION

---

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 3-20. Cabling Drive**

## Upper Position

This section describes how to install a floppy drive in the upper position of the outer bay.

To install a floppy drive, follow these steps, and refer to Figure 3-21.:

1. Remove the speaker assembly by loosening the single fastening screw. Slide off the speaker bracket, and set it aside carefully for later re-installation.
2. Screw the floppy drive into the upper-right position of the outer storage bay.



## Installing System Options

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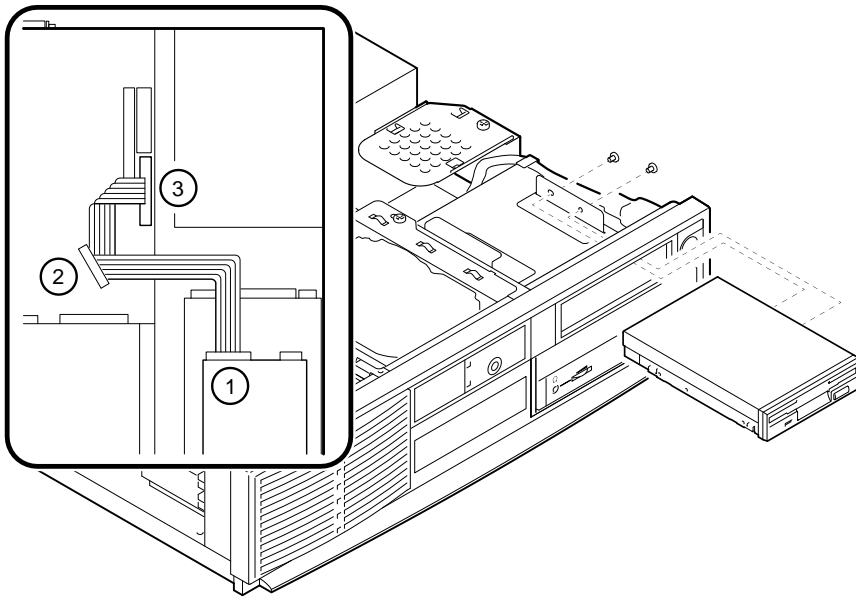
### CAUTION

---

You may need to slightly adjust the power-switch cabling to access the floppy drive mounting screws. Be careful not to cross-thread these mounting screws.

---

3. Insert the last connector ③ (the one with the shortest distance to the next connector ②) of the floppy drive cable into the CPU connector. Make sure that the red stripe on the cable is facing the rear of the system.



**Figure 3-21. Installing a Floppy Drive**

4. Route the cable through the cable slot, and connect the end connector ① to the floppy drive. Make sure that the cable connector key is facing the top of the floppy drive.

---

### NOTE

---

Route all cables as close to the chassis as possible so that cooling air flow will not be restricted.

---

5. Connect the power supply connector to the floppy drive.
6. Reinstall the speaker assembly.

## Replacing the Battery

The battery supplies power to the real time clock while the system is off. If necessary, replace the lithium battery with a Panasonic BR2032, CR2032, or equivalent battery. After replacing the battery, you must reenter configuration and setup data using the ARC or SRM console.

---

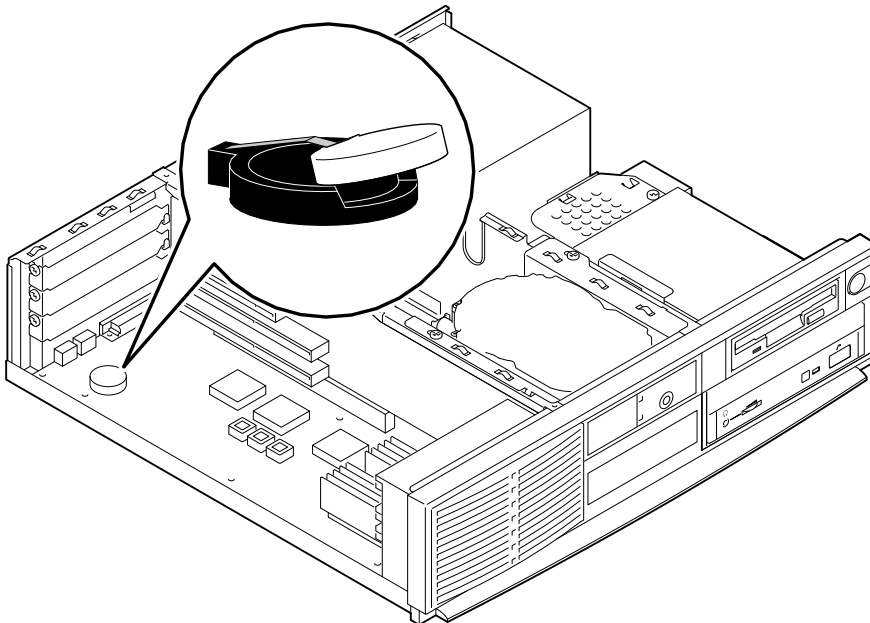
### CAUTION

---

If the battery is incorrectly replaced, 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.

---

1. Gently pry the old battery from the battery holder, as Figure 3-22 shows.
2. Insert the new battery, positive side up, into the holder.



**Figure 3-22. Replacing the Battery**

## 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 system cover, as Figure 3-23 shows.

---

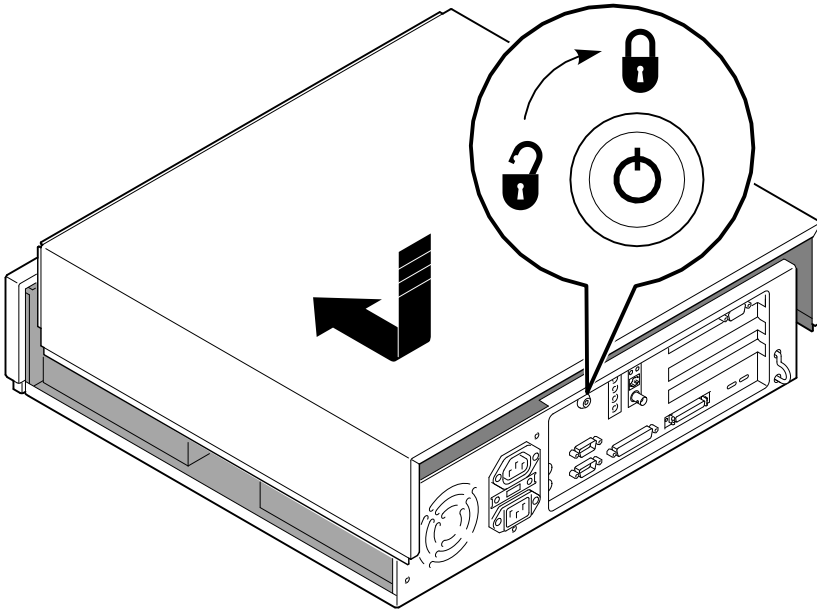
### HINT

---

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.

---

## Installing System Options



**Figure 3-23. Replacing and 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 3-24 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.

## Installing System Options

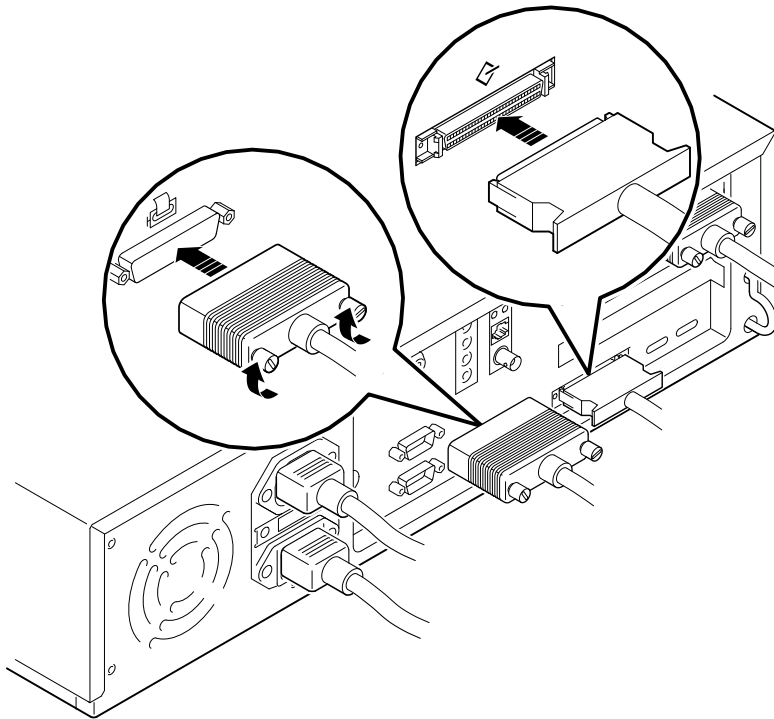
---

### NOTE

---

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

---



**Figure 3-24. Connecting Printer and SCSI Cables**


# 4

---

## Troubleshooting

### Introduction

This chapter describes initial and system troubleshooting as well as error beep codes and diagnostic LED (light-emitting diodes) 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 Digital AlphaStation 200 Series 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 Halt/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 two 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.

---

## Troubleshooting

### Equipment Log

For your convenience, Appendix H, 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 4-1 through 4-3 list how to identify and solve problems that could occur with your system, disk drive, audio, and monitor.

**Table 4-1. System Troubleshooting**

<b>Problem</b>	<b>Possible Cause</b>	<b>Action</b>
Power indicator not on.	System is not plugged in.  No power at the wall outlet.  Internal power supply cables not reconnected after installing options.  Power supply failure.	Turn off the system, plug it in, and then turn it back on again.  Use another wall outlet.  Reconnect cables.  Contact your service representative.
Power is on, but there is no screen display.	Brightness and contrast controls are not correctly set.  Monitor is off.  Monitor cable or power cord is incorrectly installed.  Configuration error.  Monitor is defective.  Defective video controller module.	Adjust the brightness and contrast controls.  Turn on the monitor.  Check all monitor connections.  Refer to the video module documentation for more information.  Try another monitor.  Replace the video module.



**Table 4-1. System Troubleshooting (continued)**

Problem	Possible Cause	Action
System does not boot.	<p>Operating system software is not installed on the hard disk drive.</p> <p>System cannot find the boot device.</p> <p>Environment variables incorrectly set.</p>	<p>Install the appropriate operating system.</p> <p>Check the system configuration for correct device parameters.  <i>OSF/1 and OpenVMS:</i> Use the SRM show config and show device commands. (See Appendix A, Console Commands.) Use gathered information to identify target devices for boot command and verify that the system sees all installed devices.</p> <p><i>Windows NT:</i> Use the ARC console to display the available boot devices. First, from the Boot menu select Supplementary menu..., then select List available boot devices. Verify that the target boot device is listed.</p> <p>Check and set the environment variables, if necessary.  <i>OSF/1 and OpenVMS:</i> Use the SRM console show and set commands to check and set the values assigned to boot-related variables such as <i>auto_action</i>, <i>bootdef_dev</i>, and <i>boot_osflags</i>. (See Appendix A, Console Commands.)</p> <p>If you are attempting to use BOOTP, you must set <i>ewa0_protocols</i> and <i>ewa0_inet_init</i> to BOOTP.</p>

## Troubleshooting

**Table 4-1. System Troubleshooting (continued)**

Problem	Possible Cause	Action
System does not boot (continued)	<p>Environment variables incorrectly set (continued).</p> <p>Hard disk drive is not correctly formatted or the requested partition does not exist.</p> <p>There is no software on the requested partition.</p>	<p><i>Windows NT:</i> From the Boot menu, select Supplementary menu..., then select Setup the system..., then select Set default environment variables. (Refer to Appendix A, Console Commands.)</p> <p>Format the hard disk drive or correctly partition the hard disk drive using the supplied software.</p> <p>Install software on the requested partition.</p>
System boots automatically when you want to get to the console prompt >>>.	System is set to autoboot. <i>Auto_action</i> is set to BOOT.	<p>Type ctrl/Cs during self test. or before the windowing system starts.</p> <p>Once you are at the console prompt &gt;&gt;&gt;, type <i>set auto_action halt</i> to prevent autobooting.</p>
Target boot device not listed in show device, show config (SRM), or List available boot devices (ARC)	<p>Loose cables.</p> <p>SCSI drive jumpers incorrectly set.</p> <p>SCSI (small computer system interface) bus termination incorrectly set.</p>	<p>Secure all cable connections.</p> <p>Check all SCSI devices for incorrect or conflicting IDs. Refer to the hard disk drive documentation.</p> <p>Check that SCSI bus is properly terminated. (See the General Information on Installing Drives section of Chapter 3.)</p>

**Table 4-1. System Troubleshooting (continued)**

<b>Problem</b>	<b>Possible Cause</b>	<b>Action</b>
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.	Refer to the section on cleaning the mouse.
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 3, Installing System Options).
	No contact between battery holder and battery.	Adjust metal tab on battery holder to allow contact with battery.

## Troubleshooting

**Table 4-2. Disk Drive Troubleshooting**

<b>Problem</b>	<b>Possible Cause</b>	<b>Action</b>
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 not visible.
	Floppy drive is empty.	Insert a floppy.

**Table 4-3. Audio Troubleshooting**

<b>Problem</b>	<b>Possible Cause</b>	<b>Action</b>
No sound	Cables not plugged in.	Plug in the cables.
	Driver not installed.	Install the driver.
	Volume control set low.	Use the on-screen volume control to increase the volume.
Cannot record	Cables not plugged in.	Plug in the cables.
	Record level set low.	Use the appropriate control to increase the record level.
Distorted sound	Volume level set high.	Reduce the volume level. (Use amplified speakers.)

## Troubleshooting

**Table 4-4. Monitor Troubleshooting**

<b>Problem</b>	<b>Possible Cause</b>	<b>Action</b>
Monitor power indicator is not on.	<p>Monitor is turned off.</p> <p>Power cord is not connected.</p> <p>No power at wall receptacle.</p> <p>Monitor is defective.</p>	<p>Turn on the monitor.</p> <p>Connect the power cord to the system or a wall receptacle.</p> <p>Use another receptacle.</p> <p>Try another monitor.</p>
Distorted, rolling, or flickering screen display, or wrong/uneven color.	<p>Adjustments incorrect.</p> <p>Wrong type of monitor.</p> <p>Defective monitor.</p> <p>Monitor signal cable loose or damaged.</p> <p>Monitor out of sync.</p>	<p>Adjust accordingly.</p> <p>Try another monitor.</p> <p>Try another monitor.</p> <p>Inspect connector pins. Replace cable if damaged.</p> <p>If you have a three-wire monitor, try setting sync to the green signal. For a ZLXp controller in slot 1, set <i>tga_sync_green</i> to 1; for a ZLXp controller in slot 2, set <i>tga_sync_green</i> to 2. If your system has two controllers, set <i>tga_sync_green</i> to 3.</p> <p>To set the variable, temporarily connect a five-wire monitor or hook a terminal to the COM1 port and use the serial console.</p>

## Troubleshooting

### Error Beep Codes

Table 4-5 shows error beep codes you may encounter while using the Digital AlphaStation 200 Series system. 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).

**Table 4-5. Error Beep Codes**

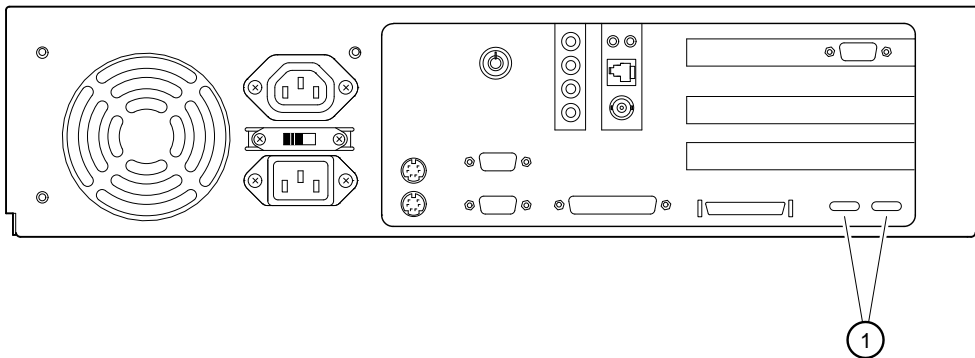
<b>Beep Code</b>	<b>Meaning</b>
1-1-4	(1) The SROM code could not read the DROM (diagnostic read only memory) or flashROM headers, or (2) there was a checksum failure.
1-2-1	(1) The DROM code detected a realtime clock (BQ3287) failure, or (2) the realtime clock interrupt did not occur.
1-2-4	The SROM code detected a hard failure (for example, a Bcache failure).
1-3-3	(1) The SROM code could not find at least 2-MB of good memory.
3-2-1	The DROM code was unable to read the header of the flashROM, or the flashROM checksum failed. Therefore, the DROM code attempted to boot from the floppy. The attempt failed because of either: (1) no floppy in drive, or (2) no boot block on the floppy.
3-2-3	The DROM code was directed by the position of jumper J2 to load the floppy, but there was no floppy in the drive.
3-2-4	The DROM code detected a failure with the keyboard or mouse controller.
3-3-1	The DROM code detected a 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, power-on self test (POST), and console initialization.

### Location of the LEDs

Figure 4-1 ① shows the locations of the diagnostic LED viewing ports.



**Figure 4-1. Diagnostic LEDs**

### Interpreting the LED Indicator Values

Table 4-6 lists the LED indicator values and their meanings. 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.

## Troubleshooting

**Table 4-6. LED Codes**

Indicator Values <sup>1</sup>		Hex Value	Meaning
Bit 7	Bit 0		
● ● ● ●	● ○ ● ○	FA	Memory test 1 failure
● ● ● ●	● ○ ○ ●	F9	Memory test 2 failure
● ● ● ●	● ○ ○ ○	F8	Memory test 3 failure
● ● ● ●	○ ● ● ●	F7	Memory test 4 failure
● ● ● ●	○ ○ ● ○	F2	DROM and flashROM corrupted
● ● ○ ●	● ● ● ○	DE	Memory test failed
● ● ○ ●	● ● ○ ●	DD	FlashROM ID test failed
● ● ○ ●	● ● ○ ○	DC	NVRAM (nonvolatile random access memory) test failed
● ● ○ ●	● ○ ● ●	DB	SCSI controller test failed
● ● ○ ●	● ○ ● ○	DA	PCI (peripheral component interconnect)/ISA (industry-standard architecture) bridge test failed
● ● ○ ●	● ○ ○ ●	D9	Realtime clock test failed
● ● ○ ●	● ○ ○ ○	D8	Keyboard controller test failed
● ● ○ ●	○ ● ● ●	D7	Floppy controller, bidirectional parallel port, or serial ports test failed
● ● ○ ●	○ ● ● ○	D6	Interrupts test failed
● ● ○ ●	○ ○ ○ ○	D0	Power on self test passed, DROM console running
● ● ● ○	○ ○ ● ○	E2	Floppy load failed
● ● ● ○	○ ○ ○ ●	E1	Flash load failed
○ ○ ● ○	○ ○ ○ ○	20	Machine check occurred
● ● ● ●	● ● ○ ○	FC	Console initialized (Final display if using ARC)
● ● ● ○	○ ● ○ ●	E5	Console initialized (Final display if using SRM)

<sup>1</sup> The filled-in circle (●) indicates that the LED is on, and the open circle (○) indicates off.



# A

---

## Console Commands

### Introduction

The Digital AlphaStation 200 Series system contains either of two console subsystems: advanced RISC computing (ARC) firmware that supports the Microsoft Windows NT Workstation operating systems *or* SRM firmware that supports the Digital UNIX and OpenVMS operating systems. The console firmware resides in 512 KB (kilobyte) of *user-upgradeable* flashROM on the motherboard. The flashROMs can be updated in the field.

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

---

#### NOTE

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The user is responsible for performing system firmware upgrades. Consult your upgrade documentation for more information.

---

## Console Commands

### ARC Console

The ARC console firmware supports the Microsoft Windows NT Workstation operating system and has the following features:

- An easy-to-use menu interface that allows you to:
  - Set the date and time.
  - Set default environment variables.
  - Display system configuration information.
  - Manage boot selections.
  - Control SCSI termination and PCI parity.
  - Update the ARC console firmware.
  - Install the Windows NT Workstation operating system.
- Resides in 512 KB (kilobytes) of flashROM on the CPU module.
- Can be updated in the field.

### ARC Console Initialization

When you power on the Digital AlphaStation 200 Series system, a series of power-on self tests (POST) are performed and the ARC firmware is started. Once the firmware is started, it initializes itself. 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 the Microsoft Windows NT Workstation operating system. Once the ARC console has been initialized successfully, a menu similar to the following is displayed:

## Console Commands

```
ARC Multiboot Alpha AXP Version 4.28
Copyright (c) 1993-1995 Microsoft Corporation
Copyright (c) 1993-1995 Digital Equipment Corporation

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

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

The following sections describe configuration-related tasks that you can perform with the ARC console.

### Displaying Your Alpha XL System Configuration

The `Display hardware configuration` command is located in the Supplementary menu. Use this command to display information about:

- Devices that were detected (and are supported) by the ARC console
- Processor revision and speed as well as physical memory size
- Video option detected
- PCI slots including vendor, revision, and device type

For example, a typical system hardware configuration may display as follows:

```
Alpha Processor and System Information
Processor ID      21064
Processor Revision 3
System Revision   0x1
Processor Speed   233 Mhz
Physical Memory   32 MB
```

```
Extended Firmware Information:
  Version: 4.28 950403.1028
NVRAM Environment Usage: 10%
  (327 of 3052 bytes)
```

```
Video Option detected:
```

## Console Commands

Devices detected and supported 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)    (2 Partitions) DEC  RZ28
scsi(0)cdrom(4)fdisk(0)  (Removable)    DEC  RRD43
```

PCI slot information:

Virtual						Device
Bus	Slot	Function	Vendor	Device	Revision	Type
0	6	0	1000	1	1	SCSI
0	7	0	8086	484	3	ISA bridge
0	11	0	1011	4	1	Video card
0	12	0	1011	2	22	Ethernet

## Setting the 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. For example, when the partition is on a SCSI hard disk, you are prompted for the SCSI bus number, drive SCSI ID, and the partition number. These values set an environment variable. Windows NT uses the environment variable to determine the correct drive and partition to boot from.

You must know your disk configuration before performing these steps. If you are unsure about your disk configuration, select `Display hardware configuration` from the `Supplementary` menu. (See the previous section.)

1. When the ARC boot menu appears, select `Supplementary` menu, and press [Enter]. Select `Set up the system...` and press [Enter].
2. Select `Set default environment variables` and press [Enter].
3. For the system partition location, select `SCSI Hard Disk` and press [Enter].
4. Enter the SCSI bus number (typically, 0) and the SCSI ID of the disk where the partition resides.

---

**NOTE**

---

If you are unsure about the environment values, accept the default values of 0. If these values are incorrect for your system (if, for example, your hard disk drives are on a SCSI bus 1, through a secondary controller), Windows NT setup will prompt you to run the ARCINST utility. The ARCINST utility provides valid values that you can use to set this environment variable correctly. (Refer to Appendix E for information on running the ARCINST utility.)

---

5. Enter the partition number on the disk, which should be 2, and press [Enter].

## Setting the Default Configuration

The `Set default configuration` command is located in the Setup menu. Use this command to select:

- Monitor resolution.
- Floppy drive capacity. (You must change the Default value of 2.88 MB to 1.44 MB for this system.)
- Keyboard language.
- SCSI controller (Host) ID (typically, 7).

For example, when selected, the `Set default configuration` command prompts you to make the following choices:

Select monitor resolution:

```
1280x1024
1024x768
800x600
640x480
```

Select first floppy drive capacity:

```
5.25" 1.2MB
3.5" 1.44MB
3.5" 2.88MB
None
```

Select second floppy drive capacity:

```
5.25" 1.2MB
3.5" 1.44MB
3.5" 2.88MB
```

## Console Commands

None

Select keyboard:

- U.S. 101-key keyboard
- Japanese 106-key keyboard
- French 102-key keyboard
- German 102-key keyboard
- Spanish 102-key keyboard
- Spanish variation
- Canadian French 102-key keyboard
- Swiss 102-key keyboard
- Italian 102-key keyboard
- Finnish/Swedish keyboard
- Norwegian keyboard
- Danish 102-key keyboard
- U.K. 102-key keyboard

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

## Setting the Date and Time

The `Set system time` command is located in the `Setup` menu. Use this command to set the system's date and time.

## Selecting a Default Language

The first time power is applied after updating the ARC console firmware, you are prompted to select a default ARC console language.

1. At the `Set system language` menu, select either `English` or `Other language` as appropriate. If you selected `English`, your Alpha XL system displays the `Boot` menu (or the `Setup` menu if you selected the `Set system language` command from there), and you have completed this task.

If you selected `Other language`, you are prompted for the location of the message and font files. Go to step 2.

2. Insert the diskette or CD-ROM containing the ARC console firmware message and font files into a drive. If the files are located on your hard disk, go to step 3.
3. Select either `Floppy disk`, `CD-ROM`, or `Hard Disk` as appropriate, and press `[Enter]`. The languages available are displayed on the screen.
4. At the `Language` menu, select the language of your choice and press `[Enter]`.
5. The screen clears and you are asked if you would like to save the language files to hard disk. Select `Yes` and press `[Enter]`.
6. You are prompted to choose a location on the hard disk for the language files. (A default location is selected.) Press `[Enter]` to accept the default; otherwise, select `Alternate Hard Disk location` and press `[Enter]`.

Edit the partition and the directory location to indicate where you wish to store the language files, then press `[Enter]`. The language files are copied to the hard disk, and the ARC `Boot` menu appears in the language you selected.

## Console Commands

---

### NOTE

---

You can also change the default language at any other time by selecting `Set up the system`, then selecting `Set system language`, and following the prompts.

---

## Managing the Boot Selection Menu

You reach the `Boot selection` menu by selecting `Manage boot selection` menu from the `Setup` menu. Use the 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:

Select a system partition for this boot selection.

```
SCSI Bus 0 Hard Disk 0 Partition 2
New System Partition
```

(The partition defined by the `Set default environment variables` command must be one of the available choices.)

Enter the `osloader` directory and name:

```
\os\winnt\osloader.exe
```

Is the operating system in the same partition as the `osloader`:

```
Yes
No
```

Enter the operating system root directory: `\winnt`

Enter a name for this boot selection: `Windows NT`

Do you want to initialize the debugger at boot time?:

```
Yes
No
```

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.

Along with adding boot selections, the `Boot selections` menu allows you to:

```
Change a boot selection
Check boot selections
Delete a boot selection
```



## Console Commands

Dump boot selections  
Rearrange boot selections

### Booting Your System

The `Boot` command is the first selection in the `Boot` menu. Use this command to boot Windows NT using the default boot selection identifier. The default boot selection identifier is the one at the top of the list. You can change the order of the list by selecting the `Rearrange boot selections` command from the `Boot` selection menu.

### Booting 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 can have multiple versions of Microsoft Windows NT Workstation installed, each with its own unique boot selection identifier. Use this command to select the version that you want to boot.

### Setting PCI Parity

PCI parity is controlled from the `Machine Specific Setup` menu. The setting controls PCI parity checking at the PCI bridge chip. The new value becomes effective after an init or power cycle.

From the `Machine Specific Setup` menu, select the appropriate line and press [Enter]. The "\*" shows which parity mode is selected.

( ) PCI parity checking enabled  
(\* ) PCI parity checking disabled

When you enable parity checking, the following message is displayed:

Certain PCI adapters have been known to generate bad parity on the PCI, resulting in system errors.

Please ensure that your specific PCI configuration will operate correctly prior to turning on parity checking.

Are you sure you want to do this?

Yes  
No

### Setting 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 are also

## Console Commands

prompted to enter a countdown value (10 seconds is the default). The ARC console waits for the duration of the countdown value before booting the system.

### **Installing 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 drive are checked for the firmware update utility. If the proper media is not present, this command times out. For more detailed information on performing firmware updates, follow the instructions packaged with the update. (Also, refer to Appendix E, `Updating System Firmware`.)

### **Installing Windows NT from CD-ROM**

The `Install Windows NT from CD-ROM` command is located in the `Supplementary` menu. You must put the Microsoft Windows NT Workstation CD into the CD drive before selecting this command.

## SRM Console

The SRM console supports the OpenVMS and Digital UNIX operating systems. The SRM console offers many different commands. For a complete list of SRM commands, type `help` at the SRM prompt (`>>>`). This section describes environment variables and the following commands:

- `boot`
- `set`
- `show`
- `examine`
- `deposit`
- `ISACFG`
- `ICONFIG`

## SRM Console Conventions

Table A-1 lists the console conventions.

**Table A-1. SRM Console Conventions**

Item	Convention
Console prompt	<code>&gt;&gt;&gt;</code>
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.)

## Console Commands

### SRM Console Special Characters

Table A-2 lists console special characters and their functions.

**Table A-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 ↓	Recalls previous commands. (The last 16 commands are stored.)
[Ctrl]+[C]	Terminates the foreground process.
[Ctrl]+[D] or ←	Moves the cursor left one position.
[Ctrl]+[E]	Moves the cursor to the end of the line.
[Ctrl]+[F] or →	Moves the cursor right one position.
[Ctrl]+[H]	Moves the cursor to the beginning of the line.
[Ctrl]+[O]	Suppresses/resumes (toggles) 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]	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 A-3.

**Table A-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.

## Console Commands

### Boot Command Examples

Table A-4 shows boot command examples and their descriptions.

**Table A-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. If you are booting over a network, set <i>ewa0_protocols</i> and <i>ewa0_inet_init</i> to BOOTP.
>>>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.

## 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 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 A-5.

**Table A-5. 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 A-6 shows set command examples and their descriptions.

**Table A-6. 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 boot_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.

## Console Commands

### Show Command

The show command displays the current value of a specified environment variable. The show command also displays information about the system, according to the arguments entered.

The syntax of the show command is:

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

The show command options are described in Table A-7.

**Table A-7. 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 OSF PALcode.
version	Displays the version of the console firmware.



## Console Commands

### Show Command Examples

Table A-8 lists show command examples and their descriptions.

**Table A-8. SRM Show Command Examples**

Command	Description
>>>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	Lists device information, such as system designation, drive model, or Ethernet address.
>>>show memory 48 Meg of System Memory Bank 0=16 Mbytes (8 MB per Simm) Starting at 0x2000000 Bank 1=32 Mbytes (16 MB per Simm) Starting at 0x0 Bank 2=No Memory Detected	Lists system RAM (random access memory), bank sizes, and starting addresses.
>>>show * (See the environment variable section.)	Lists all variables and their settings.
>>>show boot* (See the environment variable section.)	Lists all variables beginning with boot.

## Console Commands

### Examine Command

The examine command displays the contents of an address you specify. The address can be a memory location, register, device, or file.

The syntax of the examine command is:

```
examine [-{b,w,l,q,o,h,d}] [-{physical, virtual, gpr, fpr, ipr}] [-n <count>] [-s <step>] [<device>:]<address>
```

The examine command options are described in Table A-9.

**Table A-9. SRM Examine Command Options**

Command Option	Description
-b	Byte of data.
-w	Word of data.
-l	Longword of data.
-q	Quadword of data.
-o	Octaword of data.
-h	Hexaword of data.
-d	Displays data as a decoded macro instruction.
-physical	References physical address space.
-virtual	References virtual address space.
-gpr	References general purpose register address space.
-fpr	References floating point register address space.
-ipr	References internal processor register address space.
-n <count>	Specifies the number of consecutive locations to examine.
-s <step>	Specifies the address increment as a hexadecimal value. This option allows you to override the increment that is normally derived from the data size.
[<device>:]	Selects the device to access.
<address>	Specifies the address of the first location to examine within the current device.

## Console Commands

### Examine Command Examples

Table A-10 shows examine command examples and their descriptions.

**Table A-10. SRM Examine Command Examples**

Command	Description
>>>e r0 gpr: 0 (R0) 0000000000000002	Examines R0 using a symbolic address.
>>>e -g 0 gpr: 0 (R0) 0000000000000002	Examines R0 using address space.
>>>e gpr:0 gpr: 0 (R0) 0000000000000002	Examines R0 using device name.
>>>e pc PC psr: 0(PC) FFFFFFFF80072954	Examines the system.
>>>examine -n 5 r7 gpr: 38 (R7) 0000000000000000 gpr: 40 (R8) 0000000000000000 gpr: 48 (R9) 0000000000000000 gpr: 50 (R10) 000000007FFBF800 gpr: 58 (R11) 000000007FF781A2 gpr: 60 (R12) 0000000000000000	Examines R7 and the next 5 registers.
>>>examine ipr:11 ipr: 11 (KSP) FFFFFFFF8228DFD0	Examines internal processor register 11.

## Console Commands

### Deposit Command

The deposit command writes data to an address that you specify. The address can be a memory location, register, device, or file.

The syntax of the deposit command is:

```
deposit [-{b,w,l,q,o,h}] [-{physical,virtual,gpr,fpr,ipr}] [-n  
<count>] [-s <step>] [<device>:]<address> <data>
```

The deposit command options are described in Table A-11.

**Table A-11. SRM Deposit Command Options**

Command Option	Description
-b	Byte of data.
-w	Word of data.
-l	Longword of data.
-q	Quadword of data.
-o	Octaword of data.
-h	Hexaword of data.
-physical	References physical address space.
-virtual	References virtual address space.
-gpr	References general purpose register address space.
-fpr	References floating point register address space.
-ipr	References internal processor register address space.
-n <count>	Specifies the number of consecutive locations to examine.
-s <step>	Specifies the address increment as a hexadecimal value. This option allows you to override the increment that is normally derived from the data size.
[<device>:]	Selects the device to access. The following devices are supported: <ul style="list-style-type: none"><li>• pmem: Physical memory</li><li>• vmem: Virtual memory. All access and protection checking will occur.</li></ul>

**Table A-11. SRM Deposit Command Options (*continued*)**

Command Option	Description
<address>	<p>An address that specifies the offset within a device into which data is deposited. The address also may be any legal symbolic address. Valid symbolic addresses are:</p> <ul style="list-style-type: none"> <li>• <i>gpr-name</i>. Symbol representing General Purpose Register.</li> <li>• <i>ipr-name</i>. Symbol representing Internal Processor Register.</li> <li>• <i>PC</i>. Program Counter.</li> <li>• <i>+</i>. The location immediately following the last location referenced by an examine or deposit.</li> <li>• <i>-</i>. The location immediately preceding the last location referenced by an examine or deposit.</li> <li>• <i>*</i>. The location last referenced by an examine or deposit.</li> <li>• <i>@</i>. The location addressed by the last location referenced by an examine or deposit.</li> </ul>
<data>	The data to be deposited.

**Deposit Command Examples**

Table A-12 shows deposit command examples and their descriptions.

**Table A-12. SRM Deposit Command Examples**

Command	Description
>>>d -n 1FF pmem:0 0	Clears the first 512 bytes of physical memory.
>>>d -l -n 3 pmem:1234 5	Deposits 5 into four longwords starting at physical memory address 1234.
>>>d -n 8 R0 FFFFFFFF	Loads GPRs R0 through R8 with -1.
>>>d -l -n 10 -s 200 pmem:0 8	Deposits 8 in the first longword of the first 17 pages in physical memory.

## Console Commands

### Environment Variables

Table A-13 shows selected environment variables and their descriptions (for a complete list, type show \* at the SRM prompt).

**Table A-13. SRM Environment Variables**

Variable	Description
<i>auto_action</i>	Sets/shows the console action following an error, halt, or power-up. The action can be <b>halt</b> , <b>boot</b> , or <b>restart</b> . Halt is the default.
<i>boot_file</i>	Sets/shows the file name to be used when a bootstrap requires a filename. The default setting is null.
<i>boot_osflags</i>	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 <b>0,0</b> .  When using Digital UNIX software, the following parameters are valid:  <b>i</b> = interactive boot <b>s</b> = boot to single user <b>a</b> = autoboot to multiuser
<i>bootdef_dev</i>	Sets/shows the default device or device list from which the system will attempt to boot. If the system software is pre-loaded, the variable is preset to point to the device containing the pre-loaded software. Otherwise, the default value is null.
<i>console</i>	Sets the console output to either <b>serial</b> port or the <b>graphics</b> controller.
<i>control_scsi_term</i>	Unused in the Digital AlphaStation 200 Series system.
<i>ewa0_inet_init</i>	Allows network booting operations. (In this case, the possible value is <b>BOOTP</b> .)
<i>ewa0_mode</i>	Selects which Ethernet port to use: either <b>AUI</b> (ThinWire) or the <b>twisted-pair</b> . AUI is the default. (Auto-sensing is not supported.)
<i>ewa0_protocols</i>	Determines the Ethernet protocol, which should be set to <b>BOOTP</b> .
<i>language</i>	The language environment variable associates language <i>n</i> to the system (where <i>n</i> 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. Select the desired language. Type >>>init again, then power cycle the system.

## Console Commands

**Table A-13. SRM Environment Variables (continued)**

<i>os_type</i>	Determines which console is loaded. Values of <b>OpenVMS</b> , <b>OSF</b> , or <b>VMS</b> cause the SRM console to load. A value of <b>NT</b> causes the ARC console to load.
<i>pka0_fast</i>	A value of <b>0</b> sets the SCSI mode to slow (5 MB/sec); a value of <b>1</b> sets the SCSI mode to fast (10 MB/sec). <i>Digital UNIX operating system users</i> also must edit the configuration file and rebuild the kernel.
<i>pci_parity</i>	<p>This variable controls PCI parity checking at the PCI bridge chip. Parity checking is performed if <b>on</b>, disabled if <b>off</b>, and dependent on the SCSI controller revision if <b>sniff</b>. Default is off.</p> <p>Certain PCI adapters have been known to generate bad parity on the PCI under certain loading conditions, which results in system errors.</p> <p>Please ensure that your specific PCI configuration will operate correctly prior to turning on parity checking.</p>
<i>tga_sync_green</i>	<p>Allows the ZLXp graphics option to put the sync signal onto the green signal line (for three-wire monitors):</p> <ul style="list-style-type: none"> <li>Type <b>1</b> after the command if the controller is in slot 1.</li> <li>Type <b>2</b> after the command if the controller is in slot 2.</li> <li>Type <b>3</b> if the command if your system has two controllers.</li> </ul>

## Console Commands

### ISA Configuration Utility

ISA (industry-standard architecture) devices cannot be probed for configuration information by the Digital UNIX or OpenVMS operating system. Therefore, you must enter ISA option information manually using the ISA configuration utility. Run this utility before installing a new ISA option module on a Digital AlphaStation 200 Series running either the Digital UNIX or OpenVMS operating system.

Two methods are available to perform ISA configuration tasks: a forms-based interface (ICONFIG) and a command line interface (ISACFG).

#### ICONFIG Utility

The ICONFIG utility is a subset of the ISACFG utility. In this release of ICONFIG, only one type of each field (or option) can be set (for example, one IRQ or one address). Future versions will include more functionality.

To use the forms-based interface of ICONFIG, start ICONFIG at the SRM prompt by typing `>>>iconfig`[Return]. The following screen is displayed:

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



## Console Commands

To add an ISA option, first enter the device's name, then move to the next field and enter its I/O address, and so forth. For example, to add a DE205 Ethernet controller to the database, follow these steps in response to the `HELP:` prompts at the bottom of the display:

1. Enter up to 15 char 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]`

When you press `[Return]`, the entry is submitted and checked for conflicts. If 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
```

You can delete an entire entry by using the `[Backspace]` key.

### 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 A-14.

## Console Commands

**Table A-14. 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.
-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)
-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 (in hexadecimal).
-memlen{0-2} <#>	Specifies the length corresponding to membase{0-2} (in hexadecimal).
-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 (in hexadecimal).
-romlen <#>	Specifies length of ROM (in hexadecimal).
-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 motherboard devices.
-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 add a supported ISA option to an AlphaStation 200 Series system running the OpenVMS or Digital UNIX operating system, perform the procedure shown in Table A-15.

**Table A-15. Adding Options to OpenVMS or Digital UNIX Systems**

Step	Action	Result or Next Step
1	Perform operating system configuration tasks, if any. Refer to your operating system installation guide and release notes.	The operating system is prepared for the ISA option.
2	Shut down the system.	The system is at the console prompt (>>>).
3	>>>isacfg <i>options</i>	Adds the new ISA option to the SRM console configuration table using the appropriate command options.
4	>>>init	Typing <code>init</code> allows the changes to be used.
5	Configure the ISA option.	Use the manual that came with your ISA option to set the proper configuration.
6	Turn off the system and install the ISA option.	Refer to Chapter 3.
7	Turn on the system and boot.	The operating system boots and sees the new ISA option.

## Console Commands

### ISACFG Command Examples

This section shows examples of ISACFG commands you use to enter the DE205, sound card, and the FAX/MODEM options into the configuration database. Examples to display, modify, and remove table entries are included as well. In some cases, there are scripts available to issue the proper ISACFG command. Script commands are preceded by an "add\_" prefix. To continue long commands onto the next line, type a backslash (\) at the end of the line.

*Always* type an `init` command after doing ISACFG commands.

#### **Adding the DE205 option:**

```
>>>add_de205
```

-or-

```
>>>isacfg -slot 1 -dev 0 -mk -handle DE200-LE -irq0 5 \  
_> -iobase0 300 -membase0 d0000 -memlen0 10000 -etyp 1 -enadev 1
```

#### **Adding the sound card option:**

```
>>>add_sound
```

-or-

```
>>>isacfg -slot 2 -etyp 1 -mk -iobase0 530 -iobase1 388 \  
_>-irq0 9 -dmachan0 0 -dmachan1 1 -handle PCXBJ -enadev 1
```

#### **Adding the FAX/MODEM option:**

```
>>>add_fax
```

-or-

the following two commands:

```
>>>isacfg -mod -slot 0 -dev 3 -enadev 0  
>>>isacfg -slot 4 -dev 0 -ml -handle COM4 -irq0 3 \  
_> -iobase0 2e8 -etyp 1 -enadev 1
```

#### **Displaying the 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
```

# B

---

## System Care

### Introduction

This appendix describes how to:

- Clean your system, including the outside enclosure, monitor screen, mouse, and keyboard
- Move your system

---

#### WARNING

---

**Make sure you turn off the system and disconnect any external devices before cleaning any part of your system. When using a moistened cloth for cleaning, do not allow any excess fluid to leak into the system, keyboard, or monitor. Wait until the system is completely dry before applying power.**

---

### Cleaning Your System Unit

Clean the outside of the system periodically with a soft cloth lightly moistened with a mild detergent solution. Do not use solvents or abrasive cleaners.

### Cleaning Your Monitor

If the monitor screen gets dirty, clean it with a sponge or chamois cloth lightly dampened with a mild detergent solution. Do not use solvents or abrasive cleaners.

## System Care

---

### WARNING

---

If you use a prepackaged screen cleaner, make sure that it is *nonflammable*. Never spray the cleaner directly on the screen. Instead, apply the cleaner to a clean cloth, and then clean the screen.

---

## Cleaning Your Mouse

If your mouse does not move smoothly or if the pointer jumps across the screen when you are using the mouse, the ball inside the mouse may need cleaning. To clean the ball, perform the following steps as Figure B-1 shows:

1. Turn the mouse over and remove the plate on the bottom.
2. Remove the locking ring and rubber ball ①.
3. Clean the ball and rollers ② with a cotton swab that has been lightly dampened with a mild detergent.
4. Replace the ball and plate ③.

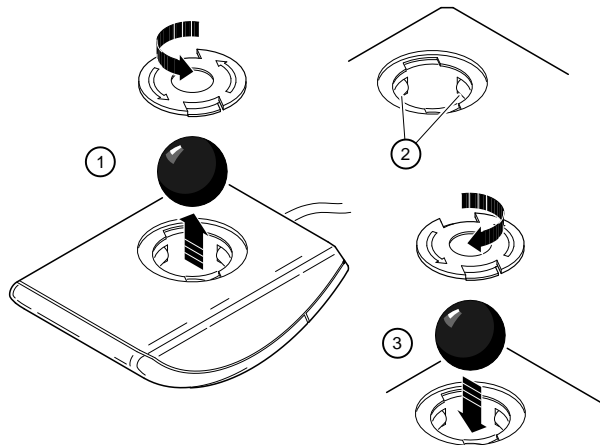


Figure B-1. Cleaning the Mouse

## Cleaning Your Keyboard

From time to time, your keyboard keys might get dirty with use. Wipe the keys with a clean cloth that has been lightly dampened with a mild detergent solution.

## **Moving Your System**

Perform the following steps before shipping or moving the system:

1. Back up all files stored on the hard disk drive.
2. Turn off the external peripherals, the system, and the monitor.
3. Disconnect the power cord from the wall outlet and from the back of the system unit.
4. Disconnect the monitor, keyboard, mouse, and any other cables from the back of the system unit.
5. Package the system as the next section, Packing Your System, describes.

## **Packing Your System**

If you are moving the system a short distance (for example, from one room to another in the same building), you do not have to pack it. If you are shipping the system or moving it by vehicle, though, pack it to avoid damage.

Pack the system in the original packing material and containers. If you did not save the boxes and packing material, use a sturdy carton and cushion the computer well to avoid damage.

## **Installing Your System at a New Location**

After moving the system to a new location, follow the installation instructions on the installation information to unpack and install it.





# C

---

## Technical Specifications

### Introduction

This appendix describes the following technical characteristics of the Digital AlphaStation 200 Series system:

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

## Technical Specifications

### System Specifications

Tables C-1 through C-5 list the Digital AlphaStation 200 Series system processor features, performance, dimensions, environmental, and acoustics specifications.

**Table C-1. Processor Features**

Feature	Digital AlphaStation 200 Series System Specifics
Processor type	DECchip 21064 or DECchip 21064A
Core logic	DECchip 21071-AA chipset
Secondary cache	Write-back, 512 KB (kilobyte)

**Table C-2. System Specifications**

Attributes	Specification
PCI clock	33 MHz
Slots	One PCI only, one PCI/ISA, and one ISA-only
Memory	Expandable up to 384* MB (megabytes)
Total SCSI bus length	3 meters (9.8 feet) for fast SCSI operation 4 meters (13.1 feet) for slow SCSI operation

\* Memory is expandable up to 384 MB when 64-MB SIMMs are available.

**Table C-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)

Technical Specifications

**Table C-4. System Environmental Specifications**

<b>Attributes</b>	<b>Specification</b>
Operating temperature	10°C – 40°C (50°F to 104°F)
Storage temperature	–20°C – 65°C (–4°F to 149°F)
Operating humidity (noncondensing)	20% – 80% relative humidity, maximum wet bulb 40°C (104°F)
Storage humidity (noncondensing)	10% – 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

**Table C-5. Acoustics - Preliminary Declared Values per ISO 9296 and ISO 7779**

<b>Product</b>	<b>Sound Power Level L<sub>WA</sub>d, B</b>		<b>Sound Pressure Level L<sub>pA</sub>m, dBA (operator position)</b>	
	<b>Idle</b>	<b>Operate</b>	<b>Idle</b>	<b>Operate</b>
PB420-AA	4.8	4.9	39	40

## Technical Specifications

### External System Connectors

This section lists the pin assignments for your system's external connectors.

- Bidirectional enhanced parallel port connector, 25-pin D-submini female
- Serial connectors, 9-pin D-submini male
- Keyboard and mouse connectors, 6-pin mini-DIN
- SCSI port, high-density, shielded

### Bidirectional Enhanced Parallel Port Connector

The bidirectional connector provides an interface to a printer or other parallel devices. Table C-6 lists pin assignments. An asterisk (\*) after a signal name indicates an active low signal.

**Table C-6. Bidirectional Parallel Port Pinouts**

DB25 Pin	Signal	Function
1	STB-R*	Strobe
2	PRTD0	Printer data bit 0
3	PRTD1	Printer data bit 1
4	PRTD2	Printer data bit 2
5	PRTD3	Printer data bit 3
6	PRTD4	Printer data bit 4
7	PRTD5	Printer data bit 5
8	PRTD6	Printer data bit 6
9	PRTD7	Printer data bit 7
10	ACK*	Acknowledge
11	BUSY	Busy
12	PE	Paper end
13	SLCT	Select
14	AUTOFDXT*	Autofeed
15	ERR*	Error
16	INIT*	Initialize printer
17	SLCTIN*	Select input
18 to 25	GND	Ground

## Serial Port Connectors

The serial port connectors consist of two 9-pin D-submini connectors. Table C-7 lists their pin assignments.

The baud rates supported by the system's serial ports are 50, 75, 110, 134.5, 150, 300, 600, 1200, 1800, 2400, 4800, 7200, 9600, 19200, 38400, 57600, and 115,200. The serial ports have signals for full MODEM control. Refer to your operating system information to confirm which of the baud rates from the preceding list your operating system supports.

**Table C-7. 9-Pin Serial Port Pinouts**

DB9 Pin	Signal	Function
1	DCD	Data carrier detect
2	RXD	Receive data
3	TXD	Transmit data
4	DTR	Data terminal ready
5	GND	Ground
6	DSR	Data set ready
7	RTS	Request to send
8	CTS	Clear to send
9	RI	Ring indicator

## Keyboard and Mouse Connectors

The keyboard and mouse connectors consist of two 6-pin mini-DIN connectors. Table C-8 lists their pin assignments.

**Table C-8. Keyboard and Mouse Connector Pinouts**

Pin	Keyboard Signals	Mouse Signals
1	KB Data	MS Data
2	Reserved	Reserved
3	Ground	Ground
4	+5 Volts dc	+5 Volts dc
5	KB Clock	MS Clock
6	Reserved	Reserved

## Technical Specifications

### SCSI Port Connector

The external SCSI connector is a 50-pin high-density connector. Table C-9 lists the pin assignments.

**Table C-9. SCSI Port Pinouts**

Pin	Signal	Pin	Signal
1	gnd	26	-DB (0)
2	gnd	27	-DB (1)
3	gnd	28	-DB (2)
4	gnd	29	-DB (3)
5	gnd	30	-DB (4)
6	gnd	31	-DB (5)
7	gnd	32	-DB (6)
8	gnd	33	-DB (7)
9	gnd	34	-DB (P)
10	gnd	35	gnd
11	gnd	36	gnd
12	reserved	37	reserved
13	open	38	TERMPWR
14	reserved	39	reserved
15	gnd	40	gnd
16	gnd	41	-ATN
17	gnd	42	gnd
18	gnd	43	-BSY
19	gnd	44	-ACK
20	gnd	45	-RST
21	gnd	46	-MSG
22	gnd	47	-SEL
23	gnd	48	-CD
24	gnd	49	-REQ
25	gnd	50	-I/O

## Power Supply and Input Power Requirements

The 180-watt power supply provides five dc voltages: +12 Volts, -12 Volts, +5 Volts, -5 Volts, and +3.3 Volts DC. These voltages are used by the various components within the system. Table C-10 lists the input power requirements.

**Table C-10. System Input Power Requirements**

Rated Voltage Range	Rated Input Current <sup>1</sup>	Operating Frequency Range
100 Volts AC – 120 Volts AC	4 A	47 Hz – 63 Hz
220 Volts AC – 240 Volts AC	3 A	47 Hz – 63 Hz

<sup>1</sup> Includes outlet current.

## Motherboard Jumpers

Jumper pins allow you to set specific system parameters. Do this by changing the pin location of jumpers. (A *jumper* is a small, plastic-encased conductor [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.

Figure C-1 shows the locations of the motherboard jumper pins. Table C-11 lists the motherboard jumpers and factory-default settings. Note that the square pin of each jumper block is pin 1.

---

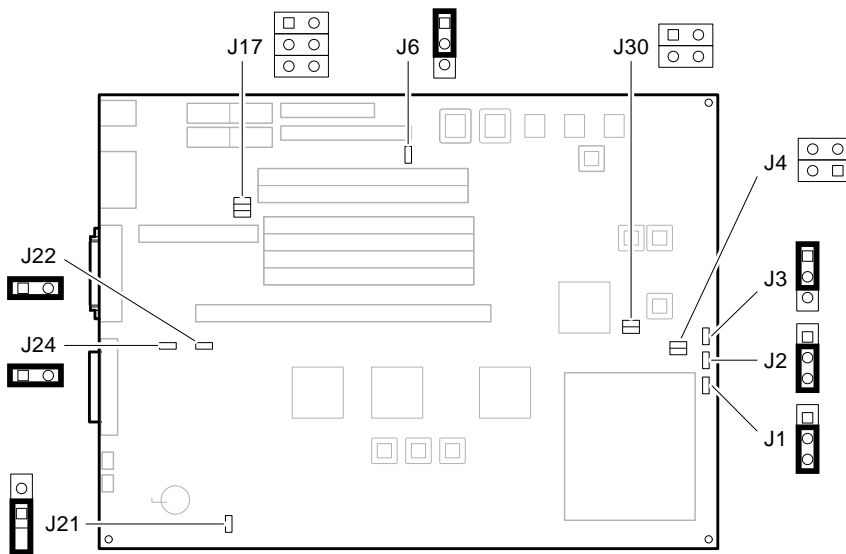
### CAUTION

---

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.

---

## Technical Specifications



**Figure C-1. Motherboard Jumper Locations**

**Table C-11. Motherboard Jumper Locations**

Jumper	Setting	Function	Description
J1	(1 to 2)	Mini-console.	The position of J1 determines whether the SROM code goes to the SROM mini-console (for manufacturing use) or passes control to the next stage of initialization, the DROM code.
	(2 to 3) (D)	Jump to main console.	
J2	(1 to 2)	Boot floppy.	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.
	(2 to 3) (D)	Normal (flashROM load).	
J3	(1 to 2) (D)	Reset.	The front-panel push button can be set to cause either a Reset or a Halt Interrupt Request.
	(2 to 3)	Halt Interrupt Request.	



## Technical Specifications

**Table C-11. Motherboard Jumper Locations (*continued*)**

Jumper	Setting	Function	Description
J4	(1 to 2) and (3 to 4)	PLL clock source.	This jumper is used to select the clock source.
	Not installed (D)	Oscillator clock source.	The AlphaStation 200 Series system uses the oscillator as the clock source.
J6	(1 to 2) (D)	Enables flashROM writes.	The J6 jumper can be used to prevent writes to the flashROMs. Typically, writes are enabled.
	(2 to 3)	Disables writes.	
J17	(1 to 2) (3 to 4) (5 to 6)	Keyboard controller inputs.	All are unused.
J21	(1 to 2)	Disables sensing for presence of external cable.	J21 controls the automatic SCSI bus terminator. If an external SCSI cable is attached to the SCSI connector, the automatic SCSI terminator turns off. The SCSI bus must be terminated at the end of the external bus. When sensing is disabled (J21 1 to 2 installed), an external SCSI terminator is <i>required</i> , even if no external SCSI devices are present.
	Hang Off (D)	Enables sensing for the presence of an external SCSI cable.	If a cable is present, the SCSI bus must be terminated at the end of the external bus.
J22	(1 to 2) (D)	87332 Super I/O chip.	J22 is installed when the 87332 Super I/O chip is used. This chip supports enhanced parallel port operations.
	Removed	87312 Super I/O chip.	
J24	(1 to 2) (D)	87332 Super I/O chip.	J24 is installed when the 87332 Super I/O chip is used. This chip supports enhanced parallel port operations.
	Removed	87332 Super I/O chip.	
J30		To be used for future upgrades.	

(D)= Default setting.



# D

---

## Device Mapping

### Introduction

This appendix lists system device mapping information, including:

- I/O address map
- Interrupt map
- DMA (direct memory access) channel assignments
- SCSI (small computer system interface) ID assignments

### I/O Address Map

Table D-1 presents information on the I/O address map.

**Table D-1. I/O Address Map**

<b>ISA I/O Addresses</b>	<b>Devices</b>
0060-0064	Keyboard and mouse
0070-0071	Time-of-year clock
02F8-02FF	Serial port 2
0378-037F	Parallel port
0388-038B	Sound card MIDI
03F0-03F7	Floppy disk
03F8-03FF	Serial port 1
0530-0533	Sound card CODEC

## Device Mapping

### Interrupt Map

The IRQ (interrupt request) assignments for the Digital AlphaStation 200 Series system are shown in Table D-2. This information is useful when adding or reconfiguring options on your system. Avoid conflicts when assigning IRQs by associating one IRQ to one source. PCI interrupt levels are set either by the operating system (as in the Windows NT operating system) or by the SRM console (as in the OpenVMS and Digital UNIX operating systems).

**Table D-2. Default System Interrupt Assignments**

IRQ#	Source
0	Timer/counter.
1	Keyboard.
2	Internal cascade of 8259.
3	Serial port 2 or ISA (industry-standard architecture) slot.
4	Serial port 1 or ISA slot.
5	Parallel port, PCI (peripheral component interconnect) interrupt, or ISA slot.
6	Floppy controller or ISA slot.
7	Parallel port or ISA slot.
8	Reserved.
9	PCI interrupt or ISA slot (Windows NT assigns this IRQ to the PCI slot 2 in the riser board [PIRQ2].)
10	PCI interrupt or ISA slot (Windows NT assigns this IRQ to the built-in PCI Ethernet Controller [PIRQ0].)
11	SCSI controller or ISA slot (Windows NT assigns this IRQ to the built-in PCI SCSI Controller [PIRQ3].)
12	Mouse or ISA slot.
13	Reserved.
14	ISA slot.
15	PCI interrupt or ISA slot (Windows NT assigns this IRQ to the PCI slot 1 in the riser board [PIRQ1].)

## DMA Channel Assignments

The DMA channel assignments for ISA options are shown in Table D-3. This information is useful when adding ISA options to your system. Avoid DMA channel conflicts by not assigning multiple devices to the same channel.

**Table D-3. DMA Channel Assignments**

Channel	Device
0	Available to ISA slots.
1	Available to ISA slots.
2	Floppy disk controller.
3	Parallel port, ISA slots.
4	Unavailable. (Channels 0-3 are cascaded to this channel.)
5	Available to ISA slots.
6	Available to ISA slots.
7	Available to ISA slots.

## SCSI ID Assignments

Table D-4 presents information on the default SCSI ID assignments.

**Table D-4. SCSI ID Assignments**

ID	Device
7	SCSI controller
6	Available
5	Tape (if present)
4	CD-ROM
3	Available
2	Available
1	Second hard disk (if present)
0	First hard disk (typically, the system disk)



# E

---

## Updating System Firmware

### Introduction

This appendix explains how to use the firmware update utility to install firmware upgrades and change from SRM firmware to ARC firmware or vice versa.

---

#### NOTE

---

The user is responsible for performing system firmware upgrades. Consult your upgrade documentation for more information.

---

### System Firmware

The Digital AlphaStation 200 Series system contains 512-KB of flashROM for the console firmware. The flashROM contains either the ARC console firmware (for the Windows NT operating system) or the SRM console firmware (for the Digital UNIX and OpenVMS operating systems).

### Update Utility

Use the update utility to update your ARC and SRM firmware or change from SRM to ARC firmware or vice versa. The update utility contains three images: the update utility itself, the SRM image, and the ARC image.

### Flash Enable Jumper

The flashROM write enable jumper (J6) is located on the motherboard and is set to the write enable position by default. If you have any problems updating firmware, check the jumper to ensure that it is set properly. See Appendix C for the location of the jumper.

## Upgrading System Firmware

### 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 display in step 2.

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

```
>>>b -fl 0,a0 dka400
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
```



## Upgrading System Firmware

```
apu-version 959328854 *** Firmware Update Utility V2.9 ***
*** System Type: Alpha Workstation 200/400 ***
Update
Verify
List
Show
Dump
Verbose
Nverbose
Debug
Ndebug
?
Apu->
```

4. To update the firmware, type `update`. The following information will be displayed as the firmware is being updated. The actual information may change between versions.

```
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 SRM` 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.

---

### NOTE

---

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 enable verbose mode.

---

## Upgrading System Firmware

### 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.
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`.

### Switching Console Firmware

To switch from SRM firmware to ARC firmware or vice versa, load and start the firmware update utility as shown previously in this section.

At the `Apu->` prompt type `update` followed by either `arc` or `srm`. Specifying `arc` will cause the ARC firmware to load and specifying `srm` causes the SRM firmware to load. If you do not specify either ARC or SRM, the currently installed console firmware is updated. (Make sure you have the latest version available firmware version before updating.) The following example shows the ARC firmware being loaded. The actual information may change between versions.

```
Apu-> update arc
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->
```

# F

---

## Starting an Operating System Installation

### Introduction

This information provides what you need to begin an operating system installation. Once you have started an installation, follow the on-screen instructions and refer to the appropriate operating system documentation.

Using the table below, first 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 Workstation on a properly partitioned and formatted disk	F-1
Set up partitions for a Windows NT Workstation installation	F-2
Install Digital UNIX	F-3
Install OpenVMS	F-4

---

### CAUTION

If you boot from a Digital UNIX or OpenVMS disk and also occasionally boot Microsoft Windows NT Workstation 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.

---

## Starting an Operating System Installation

### Starting a Windows NT Workstation Installation

Digital partitions and formats disk 0 on the first SCSI controller in non-RAID Windows NT Workstation 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 F-1 for the steps to start installing Windows NT Workstation on a properly partitioned and formatted disk.

---

#### NOTE

---

The ARC console must be installed and running in order to perform a Windows NT installation. If the SRM console is running, refer to Appendix E, Updating System Firmware, for the instructions to load the ARC firmware.

---

**Table F-1. Starting a Windows NT Workstation Installation**

Step	Action	Result
1	Insert the Microsoft Windows NT Workstation 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 <i>Microsoft Windows NT Workstation System Guide</i> .

## Starting an Operating System Installation

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

**Table F-2. Setting Up Partitions for a Windows NT Workstation Installation**

Step	Action	Result
1	Insert the Microsoft Windows NT Workstation CD-ROM into the CD drive.	CD-ROM drive is ready.
2	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.
3	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.
4	Choose Configure Partitions	Partition menu displays choices that allow you to create, delete, or make an existing partition into a system partition.
5	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.

## Starting an Operating System Installation

**Table F-2. Setting Up Partitions for a Windows NT Workstation Installation  
(continued)**

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

## Starting an Operating System Installation

### Starting a Digital UNIX Installation

To start a Digital UNIX installation, follow the steps in Table F-3.

---

#### NOTE

---

The SRM console must be installed and running in order to perform a Digital UNIX installation. If the ARC console is running, refer to Appendix E, *Updating System Firmware*, for the instructions to load the SRM firmware.

---

**Table F-3. Starting a Digital UNIX Installation**

Step	Action	Result
1	At the SRM prompt, type: >>>set boot_osflags " "	Clear the <i>boot_osflags</i> variable.
2	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.
3	Insert the <i>Digital UNIX for AXP™ Systems</i> CD-ROM into the CD drive.	CD-ROM drive is ready.
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 Digital UNIX CD-ROM. >>>boot dka400	Installation information is displayed and you are prompted to select an option. For more information, refer to the <i>Digital UNIX Installation Guide</i> .

## Starting an Operating System Installation

### Starting an OpenVMS Installation

To start an OpenVMS installation, follow the steps in Table F-4.

---

**NOTE**

---

The SRM console must be installed and running in order to perform an OpenVMS installation. If the ARC console is running, refer to Appendix E, Updating System Firmware, for the instructions to load the SRM firmware.

---

**Table F-4. Starting an OpenVMS Installation**

Step	Action	Result
1	Insert the OpenVMS CD-ROM into the CD drive.	CD-ROM drawer closes.
2	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
3	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 <i>OpenVMS Installation Guide</i> .



# G

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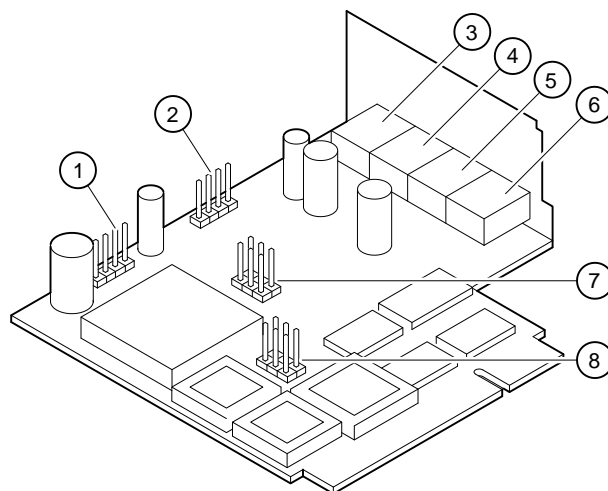
## Sound Card Overview

### Introduction

This appendix describes the Digital AlphaStation 200 Series system sound card. The card is installed in a dedicated ISA slot in the motherboard.

### Module Layout

Figure G-1 and Table G-1 describe the connectors and jumpers for the Digital AlphaStation 200 Series system sound card.



**Figure G-1. Sound Card Connectors and Jumpers**

## Sound Board Overview

**Table G-1. Sound Card Component Descriptions**

Figure Legend	Component	Function
1	J5	Speaker output
2	J6	CD audio input
3	J7	Headphone jack
4	J4	Line out jack
5	J2	Microphone jack
6	J3	Line in
7	J8	Not used
8	J9	Sound card configuration jumpers

## Module Connectors

There are three connectors on the module (J8 is not used). Since none is keyed, look for a pin 1 designation on both the cable connector and the module connector.

The speaker connector (J5 SPKR) works correctly, even if the connector is put on upside down. Speaker connector pinouts are listed below:

Pin	Signal
1	4–32 Ohm speaker
2	Unconnected
3	Unconnected
4	Ground

Use the CD connector to route CD audio from a CD-ROM drive to the audio card. The CD connector (J6 CD) left and right channels are reversed if you put the connector on upside down. Pinouts for the CD connector are listed below:

Pin	Signal
1	Left channel
2	Ground
3	Ground
4	Right channel

## Sound Board Overview

### Module Jumpers

The sound card uses jumpers located at J9 to select motherboard sound routing and to set the card's bus address.

The TCE (timer-counter enable) jumper determines whether or not sounds generated on the motherboard go to the speaker. The TCE jumper is factory-set to allow beeps to go to the speaker (jumper in), as listed below:

Jumper	Description
TCE IN J9(1-4)	Motherboard beeps to speaker (D).
TCE OUT	Motherboard beeps are ignored.

(D) = Factory default.

The SW1 and SW2 jumpers determine the base address of the audio module. These are factory-set (both jumpers in) and should only be changed when the address conflicts with another option's address, as the next table lists.

SW1 J9(2-5)	SW2 J9(3-6)	Base Address
OUT	OUT	x604
OUT	IN	xF40
IN	OUT	xE80
IN	IN	x530 (D)

(D) = Factory default.

### External Connection Jacks

The rear-panel jacks are standard 3.5-mm stereo jacks.

Plugging a headphone into the headphone jack disables the speaker. You can plug a pair of speakers into the headphone jack. (Amplified speakers are recommended.)

The microphone jack is for an electret microphone (2.2 Kohm to 2.5V).

You may use line-in and line-out jacks to connect receivers, amplifiers, or other audio equipment.

### Software

Before applications can use your sound card, the card must be known to your operating system. Each operating system has a unique way of learning about the card. The following sections explain how to get this process underway for each operating system.

## Sound Board Overview

### Microsoft Windows NT Workstation Operating System

To make the sound card available to Windows NT applications, you must install and set up the driver, as the following steps describe:

1. From the Control Panel, select Drivers.
2. Click Add, and choose Windows Sound System from the list of drivers. Then click OK. (If the driver is not present on the system disk, you may be prompted to load Windows NT distribution media.)
3. The Windows Sound System Driver menu appears. Select Interrupt 7 (IRQ7), the default DMA channel, and the default I/O address.


### Digital UNIX Operating System

The Digital UNIX operating system supports the sound card through Multimedia Services for Digital UNIX, which is normally preloaded at the manufacturing site. The manufacturing site also loads the sound card configuration information into the SRM console configuration database. The information in the database is passed onto the operating system.

Use the following command to verify that the sound card is loaded into the configuration database:

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

You will know the sound card is loaded if you see a record with the handle "PCXBJ."


 Refer to the ISACFG section of Appendix A for more information.

Use the following command when you are logged in as "root" to verify that the multimedia services are installed:

```
# setld -i |grep MME
```

Look for the following response and verify that the word `installed` is present:

```
MMExxxxxxx installed xxx xxx Audio Card Driver
```

 Refer to the *Multimedia Services for Digital UNIX AXP Installation Guide* for more information.

Digital's multimedia application programming interface (API), which is included with the Multimedia Services for Digital UNIX, is based on Microsoft's Video for Windows interface. This provides developers with a common API and support for the same audio and video file formats as Video for Windows does.

## Sound Board Overview

### OpenVMS Operating System


The OpenVMS operating system contains a sound driver that supports the sound card. Configuration information is stored in the SRM console configuration database.

Usually, the manufacturing site loads the sound card configuration information into the SRM console configuration database. The information in the database is passed onto the operating system.

Use the following command to verify that the sound card is loaded into the configuration database:

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

You will know the sound card is loaded if you see a record with the handle "PCXBJ."

 Refer to the ISACFG section of Appendix A for more information.



# H

---

## 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 H-1).
- Your system's ISA equipment configuration for your system (Table H-2).
- Your SCSI (small computer system interface) device address settings (Table H-3).
- Your system's system hardware configuration (Table H-4).
- The operating system or application software installed on your Digital AlphaStation 200 Series system (Table H-5).
- Additional components (Table H-6).

## Equipment Log

**Table H-1. Hardware Components**

<b>Component</b>	<b>Vendor/ Type/Size</b>	<b>Model Number/ Speed</b>	<b>Serial Number</b>	<b>Date Installed</b>
System unit	AlphaStation 200 Series	4/166, for example		
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 H-2 to keep track of your AlphaStation 200 Series 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 the SRM console used on Digital UNIX and OpenVMS systems needs. Refer to the ISACFG section of Appendix A for details on entering device parameters in the database.



Equipment Log

**Table H-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		3, if used	7
FDC	FLOPPY	0	3F0		2	6
Sound card	PCXBJ	2	530, 388		0, 1	9
<b>Riser Card ISA Expansion Slots</b>						

**Table H-3. SCSI Addresses**

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

Equipment Log

**Table H-4. Hardware Configuration**

Component	Digital AlphaStation 200 Series System Specifics
CPU (central processing unit) speed and model	
Firmware version: SROM, DROM, ARC, SRM	
Memory size: Bank 0 Bank 1 Bank 2	
Video module	

**Table H-5. Installed Software**

Operating System or Application Software	Version Number	License Number	Date Installed	Which Disk?

**Table H-6. Additional Component Information**

Component	Vendor	Model Number	Serial Number	Date Installed

---

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