

AlphaStation 600 Series

User Information

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June 1995

This book introduces the AlphaStation 600 Series system. Use the information in this book to configure, start, use, update, and troubleshoot your system. You will also find general system information, such as console commands and system care, in this book.

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**Digital Equipment Corporation
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[S2868]

This device complies with Part 15 of the FCC rules. Operation is subject to the following conditions:

- (1) this device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

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 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 the 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 keyboard and video ports should be connected only with shielded data cables with an external ferrite bead over the cable. When either of these ports is connected with cables without such a ferrite bead, the additional ferrite beads shall be clamped over these cables next to the cable connector.

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Preface

Welcome to the AlphaStation 600 Series System

This book introduces the AlphaStation 600 Series system.

Use the information in this book to configure, start, use, update, and troubleshoot your AlphaStation 600 Series system. You can also find general system information such as console commands and system care in this book.

Audience

If you will be operating, configuring, or adding options to the AlphaStation 600 Series system, the information included in this book will be helpful to you.

Organization of the Information

This information for users covers the following topics:

- Chapter 1, Getting Started, describes installing, starting, restarting, and turning off the system.
- Chapter 2, System Overview, describes the hardware components, including the peripheral component interconnect (PCI) architecture, the controller, the keyboard, the system unit front panel, and the system unit rear panel.
- Chapter 3, Installing System Options, describes the system unit components and gives instructions and illustrations to help you remove and replace them.
- Chapter 4, Troubleshooting, describes system troubleshooting as well as the error beep codes.
- Appendix A, Console Commands, contains a basic description of the advanced RISC computing (ARC) console commands and the system reference manual (SRM) console commands.


Preface

- Appendix B, System Care, describes how to clean your system, monitor, mouse, and keyboard. It also contains instructions for moving and reinstalling your system.
- Appendix C, Technical Specifications, describes the technical characteristics of the system.
- Appendix D, Device Mapping, lists system device address mapping information, including I/O addresses and interrupts.
- Appendix E, Updating System Firmware, explains how to use the firmware update utility.
- Appendix F, Starting an Operating System Installation, provides the information you need to begin an operating system installation.
- Appendix G, Equipment Log, contains tables that you can use to record information about your system hardware and software components.

Refer to the Table of Contents for a detailed listing of topics.

Conventions

This guide uses the following conventions:

Convention Example	Description
c:\windowsc:\windows>	Monospaced, bold text indicates file names, path names, directories, or screen text.
[Enter]	Square brackets surrounding text represent a key on the keyboard.
[Ctrl]+[R]	A plus sign between keyboard keys indicates that the keys shown should be pressed at the same time.
<i>auto_action</i>	Italic text indicates environment variables. Titles of information sources are in italic, and occasionally italic is used for emphasis in the text.
	A pointing hand indicates a reference to additional information.

Abbreviations

This guide uses the following abbreviations:

Abbreviation	Meaning
AC	alternating current
amp	ampere
ARC	advanced RISC computing (Windows NT console)
ARCINST	ARC installation program
C	Celsius
CD	compact disc
CD-ROM	compact disc read-only memory
CEE	International Commission for Conformity Certification of Electrical Equipment
CFG	configuration file
cm	centimeters
CPU	central processing unit
CSA	Canadian Standards Association
DC	direct current
DMA	direct memory access
DRAM	dynamic random-access memory
DROM	diagnostic read-only memory
ECU	EISA configuration utility
EISA	extended industry-standard architecture
flashROM	electrically erasable, rewriteable, nonvolatile memory
ft	feet
GB	gigabyte
Hz	hertz
IEC	International Electrotechnical Commission
I/O	input/output
IRQ	interrupt request
ISA	industry-standard architecture
ISACFG	ISA configuration file
ISO	International Organization for Standardization

Preface

Abbreviation	Meaning
Kb	kilobit
KB	kilobyte
kg	kilogram
lb	pound
LED	light-emitting diode
m	meter
MAU	media adapter unit
Mb	megabit
MB	megabyte
MHz	megahertz.
mm	millimeter
ns	nanoseconds
NVRAM	nonvolatile random-access memory
OSF	DEC Open Software Foundation/1 UNIX operating system
PCI	peripheral component interconnect
RISC	reduced instruction set computing
ROM	read-only memory
SCSI	small computer system interface
SIMM	single in-line memory modules
SRM	system reference manual (the DEC OSF/1 and OpenVMS consoles)
SRAM	serial read-only memory
UL	Underwriters Laboratories
VAR	value-added reseller
V AC	volts alternating current
VMS	Virtual Memory System
W	watt

Special Notices

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

WARNING

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

CAUTION

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

NOTE

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

Additional Information Resources

You may wish to consult the following information resource for additional information about your AlphaStation 600 Series system:

- *AlphaStation 600 Series Installation Information* (order number EK-AS800-IN), which presents a graphical overview of the AlphaStation 600 Series system installation.

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

1

Getting Started

Introduction

Your AlphaStation 600 Series 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 install, start, restart, and turn off your AlphaStation 600 Series system. You can also find information here about preloaded software as well as guidelines for system security. Figure 1-1 shows a typical AlphaStation 600 Series system.

Getting Started

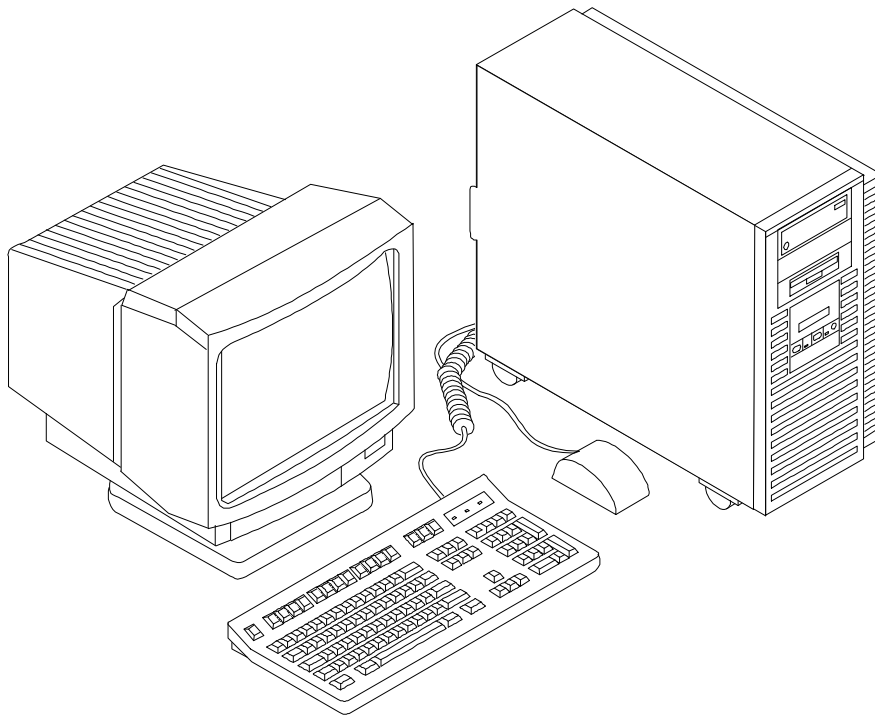


Figure 1-1. AlphaStation 600 Series System

Before Starting Your System

Before you start your system, follow this procedure:

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. Also, use an appropriate power strip to isolate the site from electric noise (for example, spikes, sags, and surges) produced by devices such as air conditioners, large fans, radios, and televisions.
3. Save all shipping containers and packing material for repackaging or moving the system later.

NOTES

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

WARNING

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

Posture and Work Habits

If you use poor posture while you work or if your equipment is poorly positioned, personal injury may result (as suggested by certain recent scientific articles). Although other articles suggest that there is no cause and effect, we strongly recommend that you read and follow the precautions outlined in Figure 1-2 and Table 1-1. In addition, be sure to adjust your work area so that you are comfortable.

Getting Started

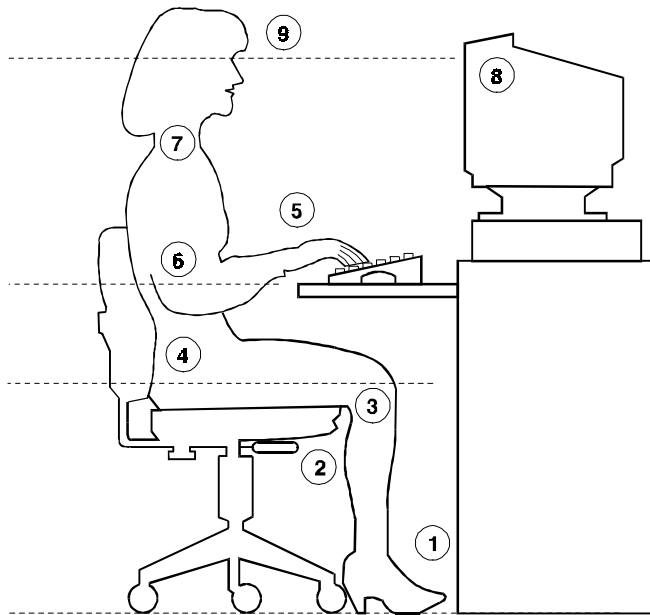


Figure 1-2. Recommendations for Posture and Work Habits

Table 1-1. Recommendations for Posture and Work Habits

Adjust	Figure Callout	To allow the following conditions:
Chair	1	Your feet are flat on the floor.
	2	Your legs are vertical and form a right angle to the floor.
	3	Your thighs are horizontal, and they are not bearing weight. To prevent restriction of the blood flow, keep the backs of your knees away from the seat so you do not compress the area behind them.
	4	Your upper body is erect and your lower back is supported with a backrest.

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

Adjust	Figure Callout	To allow for the following conditions:
Keyboard and Mouse	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.
	6	Your upper arms are straight down at your sides, and your elbows are close to your sides and support your arm weight. Forearms are at a 70- to 90-degree angle.
Head	7	Avoid neck strain. Your head should incline downward, but no more than 15 to 20 degrees.
Monitor	8	The monitor should be 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		Direct lighting or sunlight on the screen 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		The temperature should be between 20° and 23°C (68° and 74° F).
Humidity		The humidity should be between 30% and 70%.
Ventilation		Provide adequate air ventilation to operate the equipment and avoid fatigue.
Work Area		Your work area should be greater than 70 cm (28 inches) center to center, preferably 152 cm (60 inches).

Getting Started

WARNING

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.

Identifying the Correct AC Power Cord

The proper AC power cord accompanies your AlphaStation 600 Series system. Because variations exist from one country to another, and systems may be moved, inspect your power cord to ensure that 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 or distributor before you use it.

WARNING

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

Power cords supplied with the AlphaStation 600 Series system meet the following criteria:

- The cords are UL-listed and CSA-certified, rated for use at 250V AC with a current rating that is at least 125% of the current rating of the AlphaStation 600 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 IEC¹-type CEE²-22 female connector.
- The cord length does not exceed 4.5 m (14.5 ft).

¹ International Electrotechnical Commission.

² International Commission for Conformity Certification of Electrical Equipment.

Installing Your System

The *AlphaStation 600 Series Installation Information* you received with your system graphically outlines the steps to follow to install your system.

1. Make sure you received all of your system components. Use Appendix G, Equipment Log, to list your equipment. If something is missing, please contact your distributor or Digital representative.
2. If you are using rack-mount installation, remove the glide pads (enclosure feet).
3. Position your system so that air can flow freely to and from the vents, as shown in Figure 1-3.

CAUTIONS

To ensure that your system is properly cooled:

- Make sure that air can freely flow into the front ② and out of the rear ① of the system unit.
 - Do not remove a filler plate until you are ready to add a new system component.
-

Getting Started

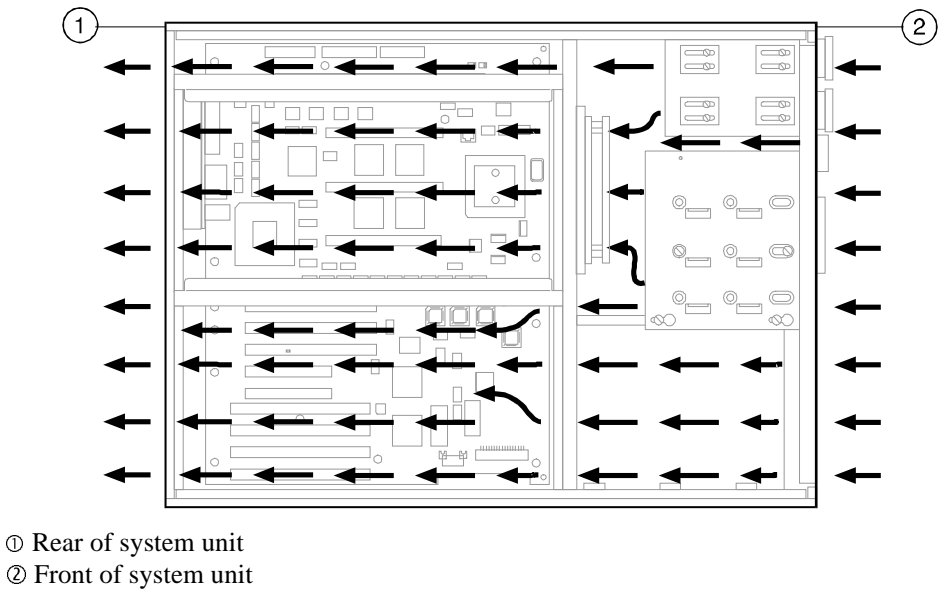


Figure 1-3. System Airflow (Side View, Cover Removed)

Connecting System Components

To connect the components of your AlphaStation 600 Series system, follow this procedure:

NOTE

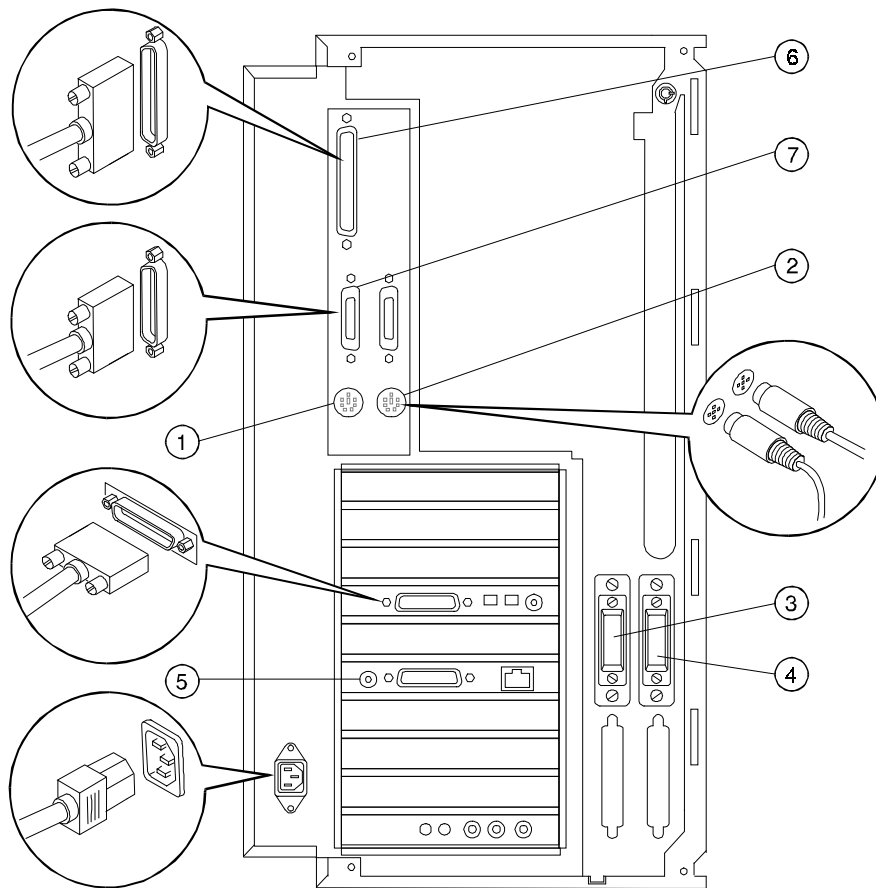
The AlphaStation 600 Series system runs on 88V–268V AC and 48–62 Hz. The system uses an autosensing power supply.

1. Ensure that the On/Off switch is in the Off (flush) position. See Figure 1-5 for a view of the switch positions.
2. Connect the mouse, keyboard, video cable, and power cords to the system components, as shown in Figure 1-4. There are two SCSI external expansion ports in the lower-right rear panel: a 50-pin (narrow) and a 68-pin (wide). Install the 50-pin and 68-pin terminators supplied with the system if you are not going to use these expansion ports

NOTE

If you disconnect the mouse or keyboard during operation, data will be lost and you will have to power-cycle the entire system.

Getting Started



- ① Mouse connector
- ② Keyboard connector
- ③ SCSI bus connector - 50-pin (narrow)
- ④ SCSI bus connector - 68-pin (wide)
- ⑤ Network connectors
- ⑥ Parallel port
- ⑦ Serial ports

Figure 1-4. Connecting Cables and the Power Cord

3. If you have an external small computer system interface (SCSI) interface or SCSI storage box, connect the SCSI cable to the appropriate SCSI port on the rear of the system. See the section on SCSI Termination in Chapter 3 for additional information.

Network Connection

The AlphaStation 600 Series I/O subsystem module has thick-wire, ThinWire, and twisted-pair connectors for connecting to a network. Use the appropriate connector for your application. The I/O subsystem module is factory-configured for ThinWire Ethernet. Refer to Appendix C for additional information on the I/O subsystem.

Starting Your System

Perform the following steps to start your AlphaStation 600 Series system:

1. Turn on the system unit, monitor power, and any external devices. Figure 1-5 shows the location of the system unit On/Off button.
2. If necessary, adjust the monitor contrast and brightness to obtain a readable screen display. Refer to the information supplied with your monitor for further instructions.
3. Allow your system to complete any power-on self tests and device initialization messages. This will take approximately 1 minute. If you are using the DEC OSF/1 or OpenVMS 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 Windows NT, the operating system starts after a countdown expires (default is 10 seconds).

Getting Started

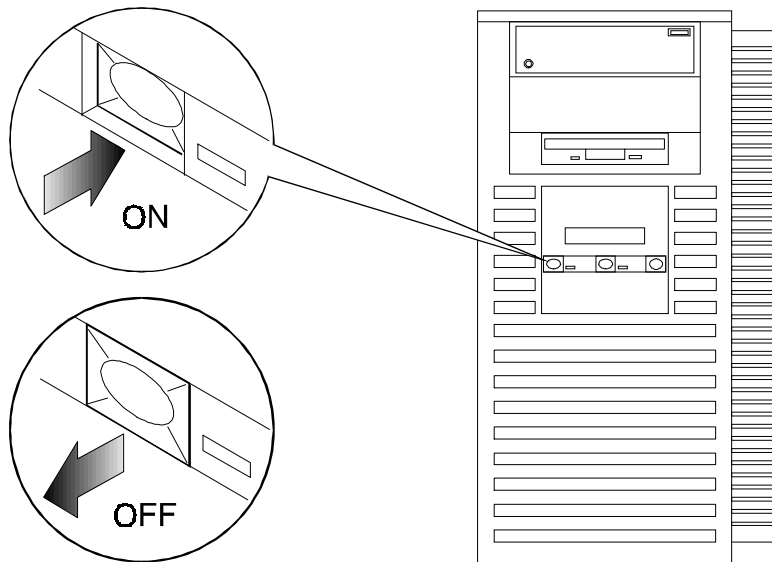


Figure 1-5. Starting Your System

Preloaded Operating System Software

Your AlphaStation 600 Series system comes with one of the following operating systems preloaded:

- DEC OSF/1
- OpenVMS

NOTE

Windows NT is available but is not preloaded on your AlphaStation 600 Series system.

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

DEC OSF/1

If you are using the DEC OSF/1 operating system, either you see a >>> prompt (if *auto_action* is set to Halt) or the system proceeds to boot DEC OSF/1 (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, either you see 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

To switch from the ARC console (used with the Microsoft Windows NT Workstation operating system) to the SRM console (used with the DEC OSF/1 and OpenVMS operating systems), follow these steps from the Boot menu:

1. Select **Supplementary menu...**
2. Select **Set up the system...**
3. Select **Switch to OpenVMS or OSF console**
4. Select **Switch to OpenVMS**
-or-
Select **Switch to OSF**
5. Select **Setup menu...**
6. Power-cycle the system to implement the change.

To switch from the SRM console to the ARC console, at the SRM prompt (>>>), type:

arc

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 how to load it.

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 could corrupt some or all of your data.

To turn off your system, follow this procedure:

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 the table below:

Table 1-2. System Shutdown Commands

Operating System	Action
Windows NT	From the Program Manager File menu, choose Shutdown . Choose the OK button to confirm.
DEC OSF/1	Type the following from a superuser account: shutdown -h now
OpenVMS	Type the following from a privileged account: @sys\$system:shutdown

3. Wait for the operating system to complete the shutdown process. For DEC OSF/1 or OpenVMS, the SRM console prompt (>>>) is displayed. Windows NT displays a window indicating it is safe to turn off or restart the system.
4. Do not turn off power to your system and peripherals until the shutdown sequence completes.

Computer Security

Use the security lock and passwords to protect your AlphaStation 600 Series system.

Security Lock

To avoid theft of internal components, your AlphaStation 600 Series system comes with a security key lock, which is located on the back of your system unit. When this lock is in the locked position, no one else can open the system box. Store the key in a safe place.

Passwords

You can set your system for screen saver and pause screen passwords. See your operating system documentation for more information on the availability and use of these options.

2

System Overview

Introduction

This chapter describes the AlphaStation 600 Series system hardware components, including the peripheral component interconnect (PCI) architecture, the keyboard, the system unit front panel, and the system unit rear panel.

System Unit

Your AlphaStation 600 Series system uses a high-performance Alpha architecture CPU.

The system unit includes:

- Two external storage bays for 5.25-inch or 3.5-inch devices
- Three internal storage bays for 3.5-inch devices
- Diskette controller that supports one or two diskette drives
- One 3.5-inch external diskette drive
- Small Computer System Interface (SCSI3) controller with both internal and external busses that support up to 16 SCSI devices, and thick wire, ThinWire, or twisted-pair Ethernet ports.
- Three slots for 64-bit PCI options; one slot for 32-bit PCI options; three slots for EISA/ISA plug-in options; and one slot that can be either a fourth EISA slot or a second 32-bit PCI slot.
- Keyboard and mouse ports
- Two serial ports
- One parallel port

System Overview

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

PCI Architecture

Your system's PCI architecture represents the latest advances in local bus technology. The PCI architecture of your AlphaStation 600 Series system delivers maximum performance from your system by providing a wider data path, greater speed, and improved expandability.

PCI local bus features include:

- Highest performance in the workstation market today
- Best expandability for high-performance peripheral devices
- Support for multiple bus masters
- Both 32-bit and 64-bit data transfer
- PCI-to-EISA bridge capability that allows you to use commonly available EISA options

AlphaStation 600 Series I/O Subsystem

The AlphaStation 600 Series system uses a 64-bit PCI I/O subsystem module. This module supports two Fast and Wide SCSI3-compatible ports; it also supports thick wire, ThinWire, and twisted-pair Ethernet.

The I/O subsystem module should always be installed in the first 32-bit PCI slot (J8). See Figures 3-4 and 3-15 for slot locations, and Appendix C for additional information.

The Keyboard

Your system comes equipped with a 101-key enhanced keyboard (shown in Figure 2-1) that allows you to communicate with your system by entering data or commands. Note that some European keyboards have 108 keys. Refer to Table 2-1 for information on keyboard key groups and functions.

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

NOTE

You can adjust the angle of the keyboard for your comfort. The underside of the keyboard has feet that swing down and lock into place.

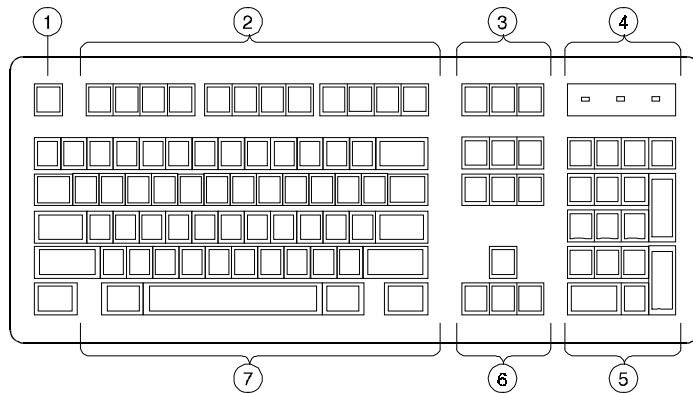


Figure 2-1. Typical Keyboard Layout

Table 2-1. 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	These lights indicate whether [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	These typewriter-specific keys feature automatic-repeat capability. If you press and hold down any of these keys, the keystroke repeats automatically until released.

System Overview

System Front Panel

Figure 2-2 shows a front view of the system with pointers to the controls and indicators. Table 2-2 describes these items.

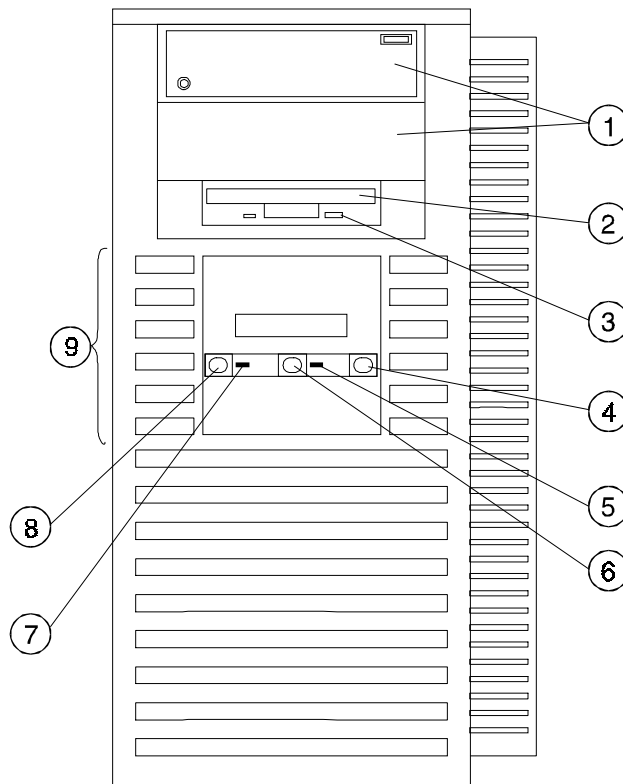


Figure 2-2. Front Controls, Indicators, and Drive Bay Locations

Table 2-2. Front Controls, Indicators, and Drive Bay Locations

Figure Legend	Control or Indicator	Function
1	External drive bays	Location of two external bays for 5.25-inch or 3.5-inch devices.
2	Diskette drive	Location of 3.5-inch diskette drive.

System Overview

Table 2-2. Front Controls, Indicators, and Drive Bay Locations (continued)

Figure Legend	Control or Indicator	Function
3	Diskette eject button	Releases a 3.5-inch diskette from the diskette drive.
4	Halt button	When pressed, the system halts immediately (the halt button is a momentary contact switch).
5	Indicator	Lights when system is in the Halt state.
6	Reset button	When pressed, resets the system and causes the self-test to run.
7	Indicator	DC On, lights when the system is on.
8	On/Off button	Turns DC power on and off.
9	Internal drive assembly	Location of the drive bays for the three 3.5-inch devices.

System Overview

System Rear Panel

Figure 2-3 shows the rear connectors. Table 2-3 lists the rear connectors and describes their functions.

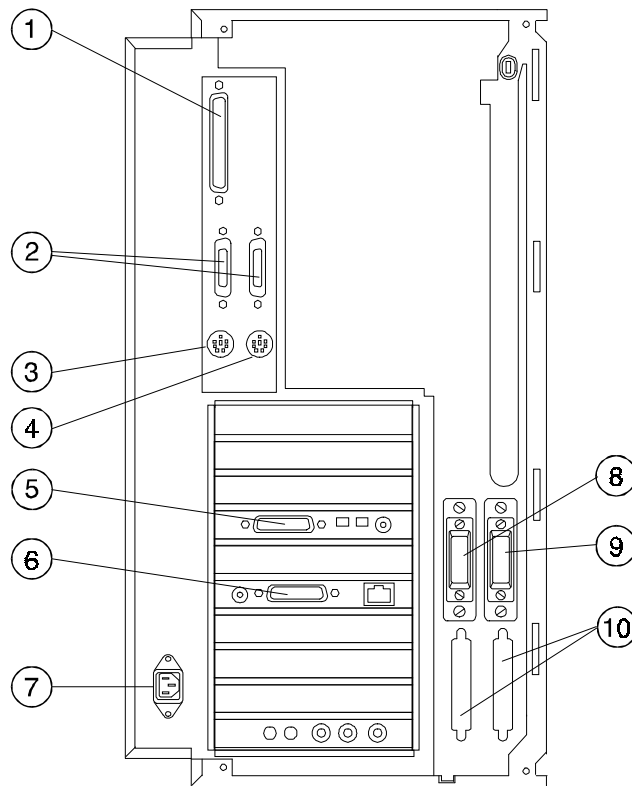


Figure 2-3. Rear Connectors (Rear View)

Table 2-3. Rear Connectors

Figure Legend	Connector	Function
1	Parallel port connector	Connects an industry-standard parallel printer.
2	Serial port connectors	Connect serial devices.
3	Mouse connector	Connects a PS/2-compatible mouse.
4	Keyboard connector	Connects a keyboard.
5	Video port (on option module)	Provides the interface between the video/graphics expansion module (option) and the supported monitor.
6	Network connectors	Provide ThinWire, thick wire, and twisted-pair network connections. Refer to Appendix C for information on the I/O subsystem
7	AC power connector	Connects the system to AC power.
8	SCSI connector - 50-pin	Provides the interface between the system unit and external SCSI devices.
9	SCSI connector - 68-pin	Provides the interface between the system unit and external SCSI devices.
10	SCSI slots	Provide the interface between the system unit and external SCSI devices when optional SCSI modules are added to the system.

3

Installing System Options

Introduction

This chapter describes the AlphaStation 600 Series system unit components and gives instructions and illustrations to help you install them. The following components are described:

- External and internal drive bay devices
- Cache memory modules
- Tower memory single in-line memory modules (SIMMs)
- ISA, EISA, and PCI bus options
- Operator control panel (OCP)

CAUTION

When working on the internals of the system unit (for example, replacing an option), you must wear a grounded wrist strap.

System Unit Components

Figure 3-1 shows the location of the AlphaStation 600 Series system unit components. Table 3-1 lists the system unit components.

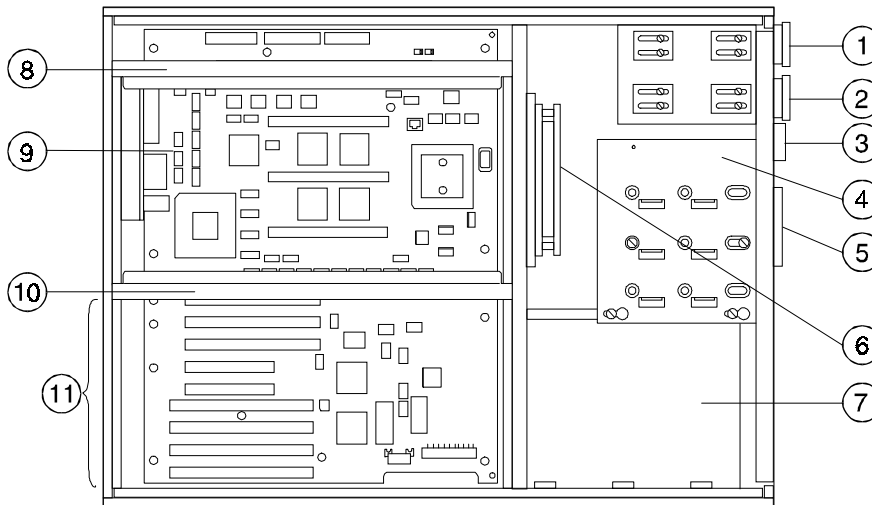


Figure 3-1. System Unit Components

Table 3-1. System Unit Components

Figure Legend	Component
1, 2	External drive bays for 5.25-inch or 3.5-inch devices
3	3.5-inch diskette drive
4	Internal drive assembly for 3.5-inch devices
5	Operator control panel
6	Fan
7	Power supply
8, 10	Memory towers
9	System board
11	Three 64-bit PCI expansion slots, two 32-bit PCI expansion slots, and four EISA/ISA expansion slots

Left Side Panel

To gain access to the inside of the AlphaStation 600 Series system unit, remove the left side panel. The system has a safety interlock on the side panel. Removal of this panel turns off the system if you have not already done so.

NOTE

If you are using a rack mount, the side panel is the top of the system unit.

Removing the Left Side Panel

To remove the left side panel, follow this procedure:

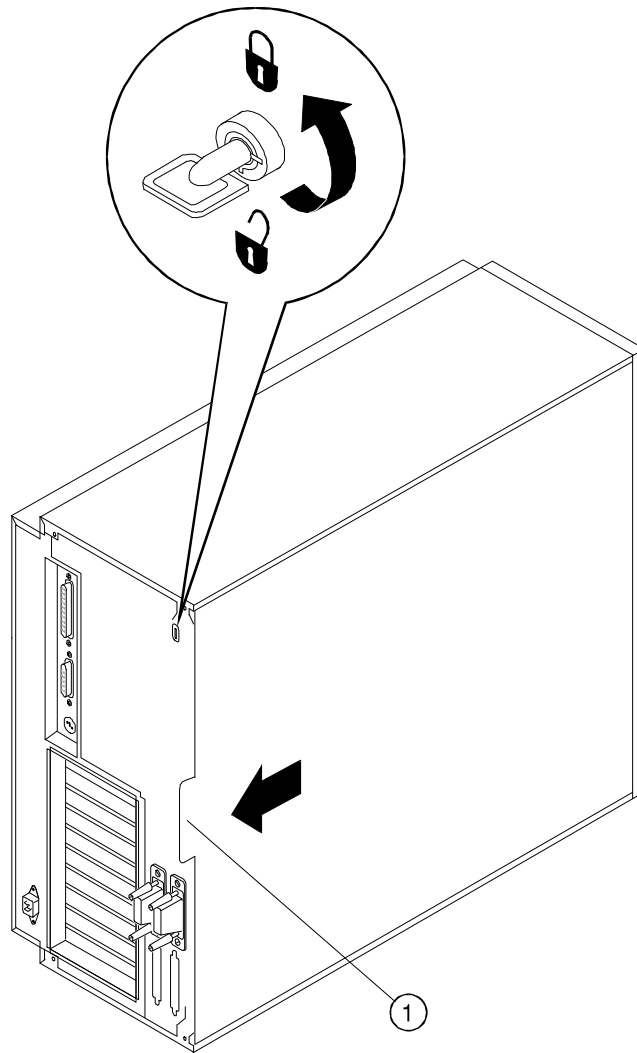
1. Turn off your system and all peripheral devices.
2. Unplug the power cord from the wall outlet.
3. Wait at least 15 seconds, to allow time for the power supply capacitors to discharge safely.
4. Unlock the left side panel by turning the key counterclockwise to a vertical position, as shown in Figure 3-2.

CAUTION

To avoid system damage from static discharge, wear a grounded wrist strap before you touch anything inside the system.

5. Slide the panel toward the rear of the system unit (as shown in Figure 3-3) and remove it.

Installing System Options



① Finger grip

Figure 3-2. Unlocking and Removing the Left Side Panel

Replacing the Left Side Panel

Replace the left side panel., as shown in Figure 3-3, and lock it.

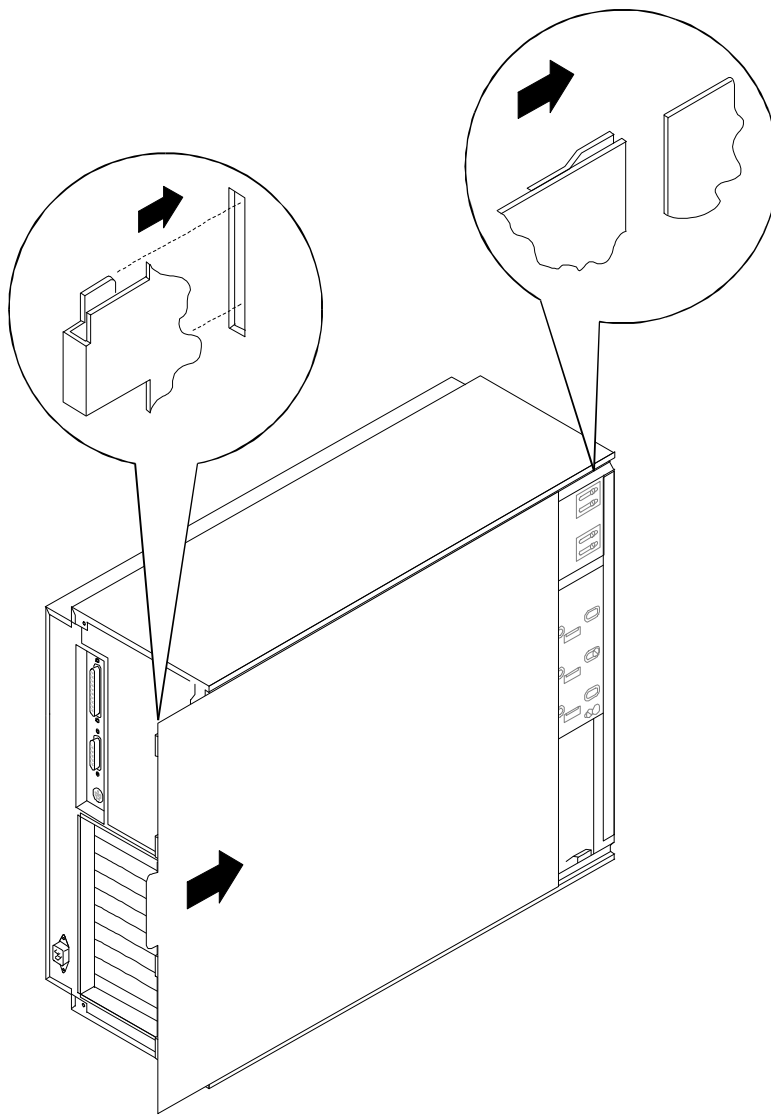


Figure 3-3. Replacing the Left Side Panel

Installing System Options

System Board

Figure 3-4 shows the location of the AlphaStation 600 Series system board components. Table 3-2 describes these components. .

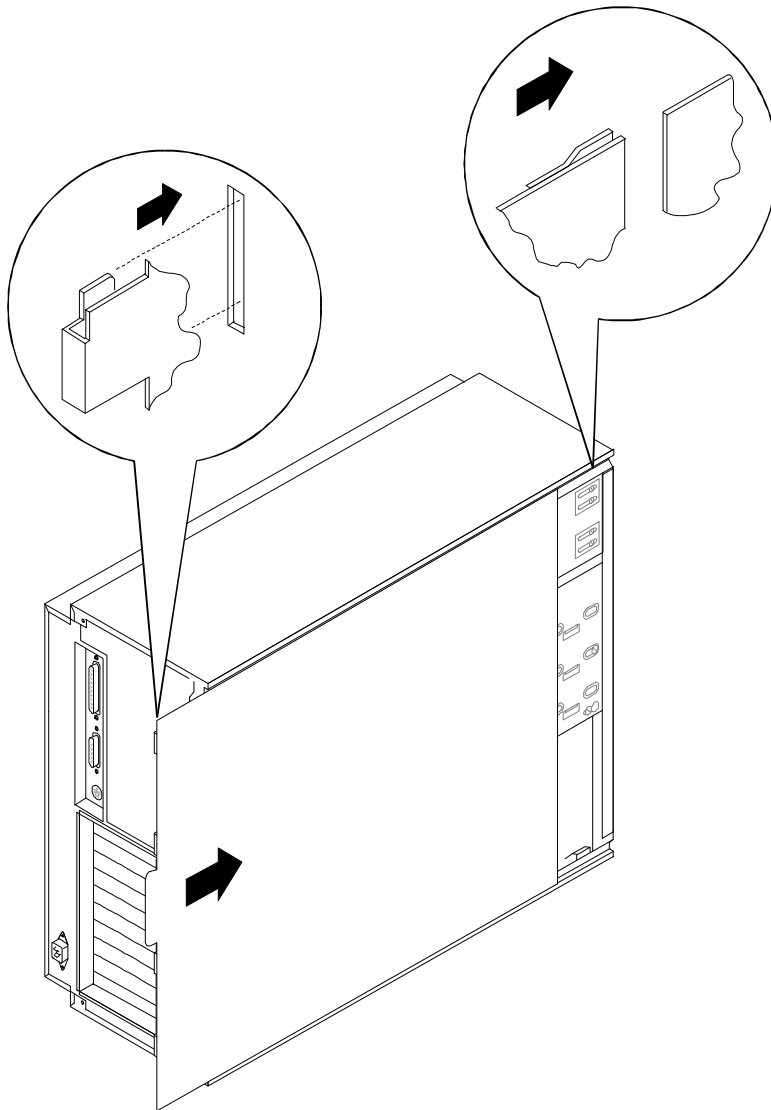


Figure 3-4. System Board Components

Table 3-2. System Board Components

Figure Legend	Components
1	System board
2	Power connector (+5V sense, -5V, +12V, -12V, and 3.3V sense)
3	Power connector (+5V)
4	Power connector (+3.3V)
5	Mounting holes (13 places)
6	Fan(s) connectors
7	Locating pin holes (two places)
8, 12	Connectors for memory towers (tower 1 and tower 2) to be populated with RAM
9, 10, 11	Connectors for cache memory modules
13	PCI and EISA expansion slots (may be used as one or the other at any given time)
14	3.5-inch removable media interface connector
15	OCP connector
16	EISA expansion slots
17	PCI 32-bit expansion slots
18	PCI 64-bit expansion slots
19	Mouse and keyboard connectors
20	Serial ports
21	Parallel port

Installing System Options

System Memory

The AlphaStation 600 Series system memory. comprises three cache memory modules located on the system board and a variable number of random-access memory (RAM) SIMMs located on the two memory towers. Adding more memory allows your system to run larger, more memory-intensive software more quickly. You can increase your system's RAM up to 1GB.

Cache Memory

Each AlphaStation 600 Series system contains three cache modules, which function as a single logical unit. Each module must be the same size (2MB, 4MB, etc.), and all three modules are required. The location of the connectors for cache memory modules is shown in Figure 3-4.

Random-Access Memory

Each AlphaStation 600 Series system contains two memory towers. Each tower contains connectors for 16 SIMMs, which are populated in banks of four on a tower. The two memory towers must be populated identically and in the order shown in Figure 3-5.

Installing System Options

Adding a SIMM to a Memory Tower

NOTE

Random-access memory can be added only in eight-SIMM increments (four per tower). When you add an increment, you must add SIMMs to the same locations in each memory tower quadrant.

To add a SIMM. to a memory tower, see Figure 3-6 and follow this procedure:

1. Turn off your system and unplug the power cord from the wall outlet.
2. Unlock and remove the left side panel, as described earlier in this chapter.
3. Remove the cache module hold-down bracket ⑤.

NOTE

The hold-down bracket is used for shipping purposes only. Store it in a safe place so that you can replace it if you need to ship or move the system. Refer to the section on Moving Your System in Appendix B for additional information.

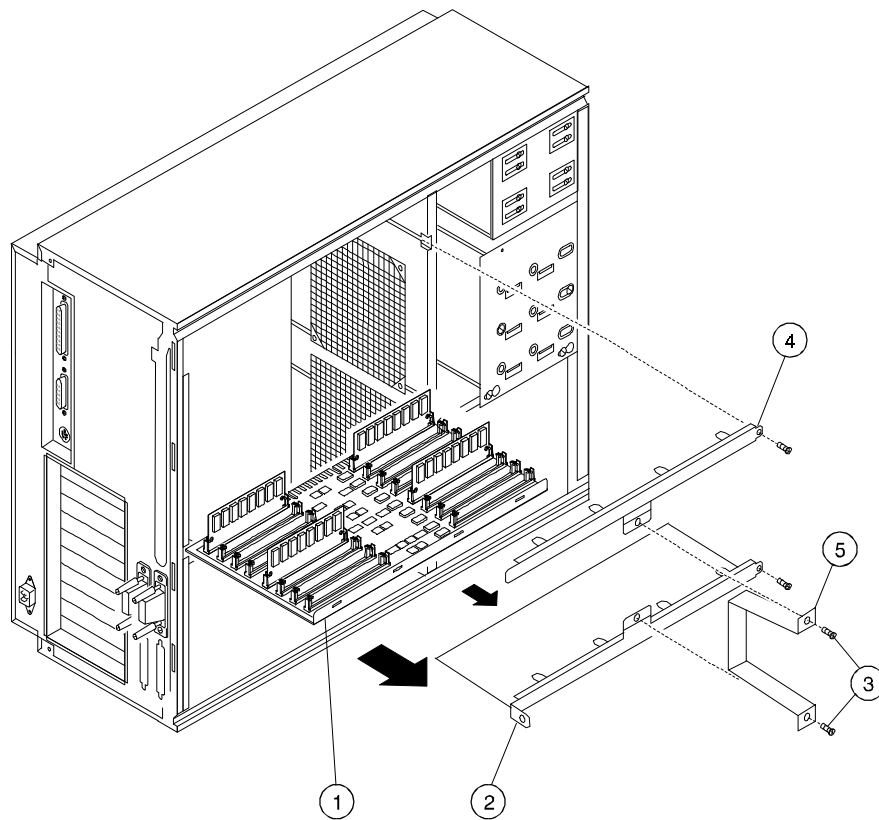
4. Remove the memory tower retaining bracket: lower memory tower ②; upper memory tower ④. (Upper tower not shown.)

NOTE

The lower memory tower retaining bracket has an integral shield and is secured to the system unit enclosure with two screws, one at each end of the bracket.

5. Hold the tower ① firmly on both sides and pull it out of the system unit.

Installing System Options



- ① Memory tower board
- ② Lower memory tower board retaining bracket and shield
- ③ Cache module hold-down bracket mounting screws
- ④ Upper memory tower board retaining bracket
- ⑤ Cache module hold-down bracket

Figure 3-6. Removing a Memory Tower

Installing System Options

6. Install the SIMM in the socket at a 45-degree angle (see Figure 3-7). Be sure that the notch ① is oriented as shown. Rock the SIMM gently until it is seated evenly in the bottom of the socket. Tip the SIMM upright until both the retaining clips at the ends of the socket engage. **Repeat this process for all eight SIMMs.**

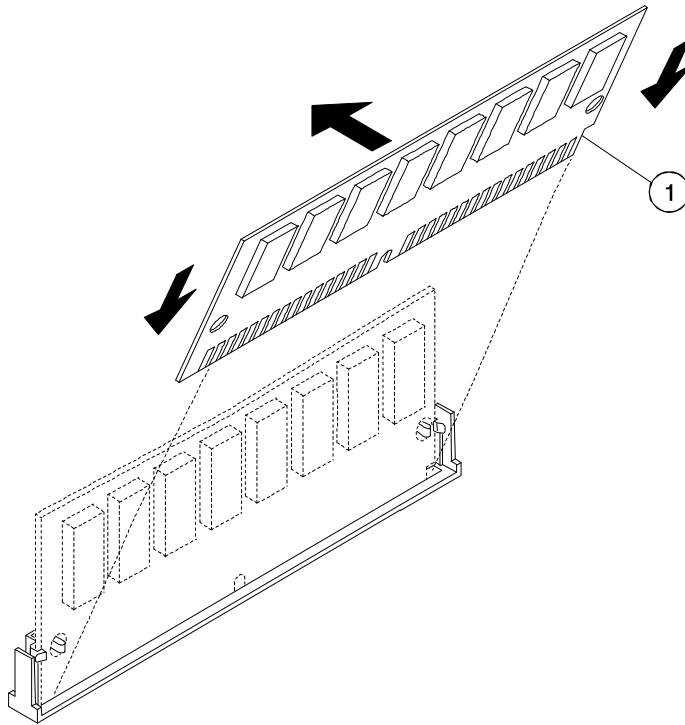


Figure 3-7. Installing a SIMM

7. Replace the memory tower, using the card guides to ensure proper alignment. Use appropriate force to seat the tower properly.
8. Replace the retaining bracket and insert the retaining bracket mounting screw.

NOTE

The lower memory tower retaining bracket has an integral shield and is secured to the system unit enclosure with two screws, one at each end of the bracket.

Installing System Options

9. Replace and lock the left side panel, as described earlier in this chapter.
10. Connect the power cord and plug it into the wall outlet

Replacing the Cache Memory Modules

If you want to replace the cache memory modules with modules of a different size, follow this procedure:

CAUTION

When working on the internals of the system unit (for example, replacing an option), you must wear a grounded wrist strap.

1. Turn off your system and unplug the power cord from the wall outlet.
2. Unlock and remove the left side panel, as described earlier in this chapter.
3. Remove the cache module hold-down bracket.

NOTE

The hold-down bracket is used for shipping purposes only. Store it in a safe place so that you can replace it if you need to ship or move the system. Refer to the section on Moving Your System in Appendix B for additional information.

4. Remove and replace the cache modules. See Figure 3-4 for the location of the cache module connectors.

NOTE

Each module holds one-third of the cache space; that is, 2MB/3, 4MB/3, or 8MB/3. All cache modules must be the same size.

5. Replace and lock the left side panel, as described earlier in this chapter.
6. Connect the power cord and plug it into the wall outlet.

Installing System Options

External Drive Bay Devices

The AlphaStation 600 Series system supports three external drive bay devices: a slimline 3.5-inch diskette drive and two 5.25-inch half-high removable media devices (intended for tape and CD-ROM use.)

SCSI Addresses

Before installing a SCSI drive, you must either set or verify the setting of the drive's SCSI address (SCSI ID). Digital recommends that you use Table 3-3 as a guide for the selection of an address for your SCSI drive. Although Table 3-3 shows eight SCSI addresses, wide-bus SCSI can support up to 15 addresses.

Table 3-3. SCSI Address Recommendations

SCSI Address (ID)	Device (Drive) Recommended
0	System disk (where your operating system resides)
1	Expansion/hard drive
2	Expansion/hard drive
3	Expansion/hard drive
4	Expansion/hard drive
5	CD-ROM drive
6	Expansion
7	Host adapter (SCSI controller)

SCSI Termination

The AlphaStation 600 Series system has an optional PCI/SCSI card. The internal SCSI bus cable terminates internally on the cable. The cables that exit the rear bulkhead must be terminated externally on the system unit rear panel. See Figure 1-4 for the location of the SCSI bus terminators. Refer to the section on SCSI Connectors in Appendix C, Technical Specifications, for additional information.

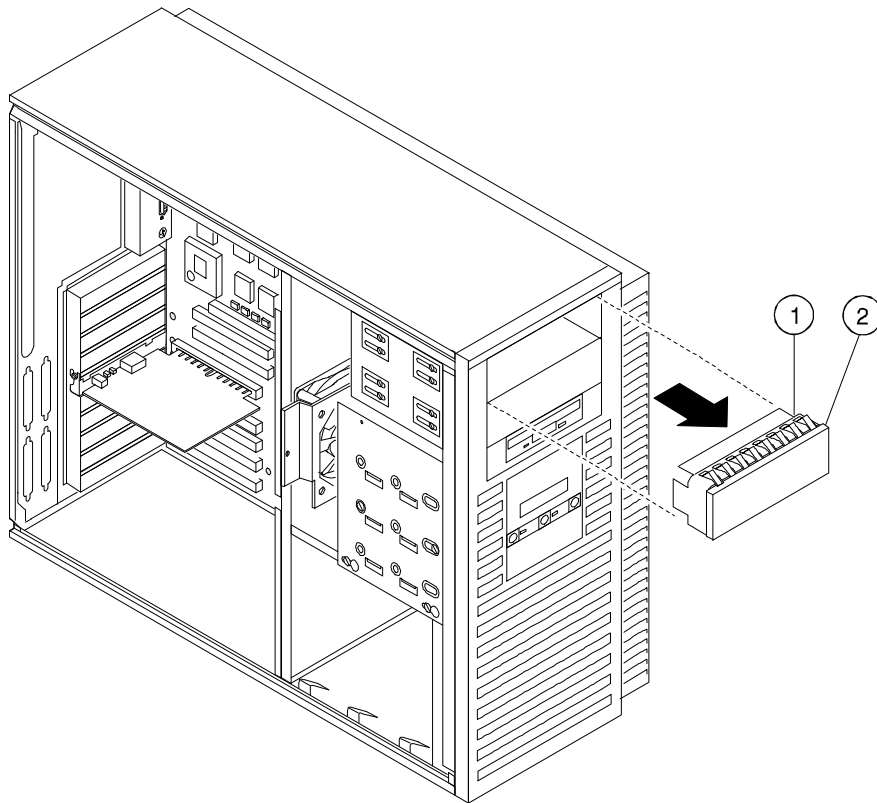
CAUTION

Failure to properly set up the SCSI termination may result in loss of data or damage to the file system.

Installing External Drive Bay Devices

To install an external drive bay device, follow this procedure: .

1. Turn off your system and unplug the power cord from the wall outlet.
2. Unlock and remove the left side panel, as described earlier in this chapter.
3. Carefully remove the plastic filler panel ②, pushing it out from the inside using a Phillips screwdriver inserted through one of the screw holes in the side of the drive bay.



- ① Shield
- ② Filler panel

Figure 3-8. Removing a Plastic Filler Panel

Installing System Options

4. Refer to your drive documentation to configure the drive. If the drive is a SCSI drive, you must select a SCSI address and make sure SCSI termination is disabled. Terminator power should be enabled. Record the SCSI address you use in Appendix G.
5. Attach the securing bracket by aligning the holes and inserting the screws, as shown in Figure 3-9.
6. Connect the power and SCSI cables to the drive before fully inserting and securing the device. Figure 3-10 shows a SCSI cabling configuration using one diskette drive and three SCSI drives. If you have a SCSI tape drive, it connects to the SCSI cable. Figure 3-11 shows the cables from the power supply.

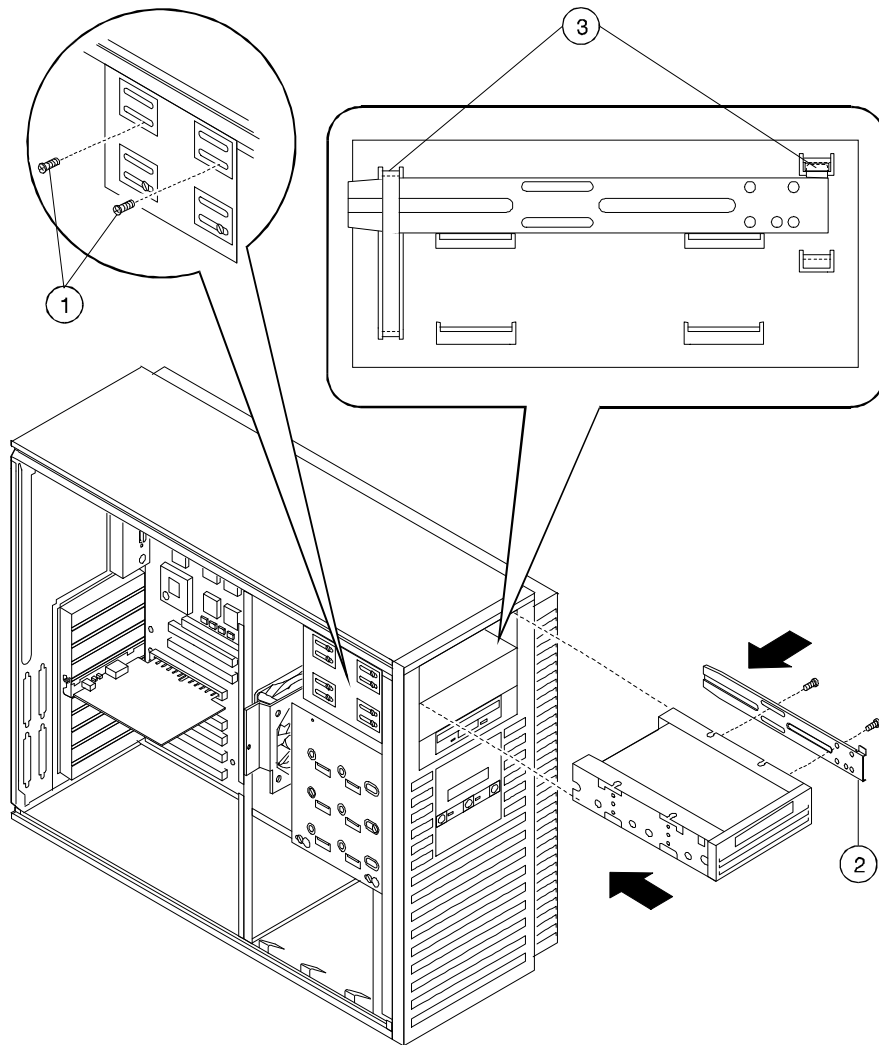
NOTES

- The CD-ROM must always go in the top slot.
 - The CD-ROM and tape drives are narrow SCSI devices. You must use the wide-to-narrow SCSI adapters with them, as shown in Figure 3-10. Two adapters (part number 17-04009-01) are supplied with the system.
 - If you are using SCSI2 “wide” drives, you do not need the adapter.
-

Verify that the cable is connected in the correct orientation. All cables and most connectors are keyed so that you cannot connect them incorrectly. If your drive is not keyed, you must connect pin 1 of the cable to pin 1 of the connector.

Pin 1 of the cable is on the edge with the colored stripe or pattern. Pin 1 of the connector should be marked with a small number "1" at one end of the connector or with a small number "1" or "2" printed on the circuit board near one end of the connector.

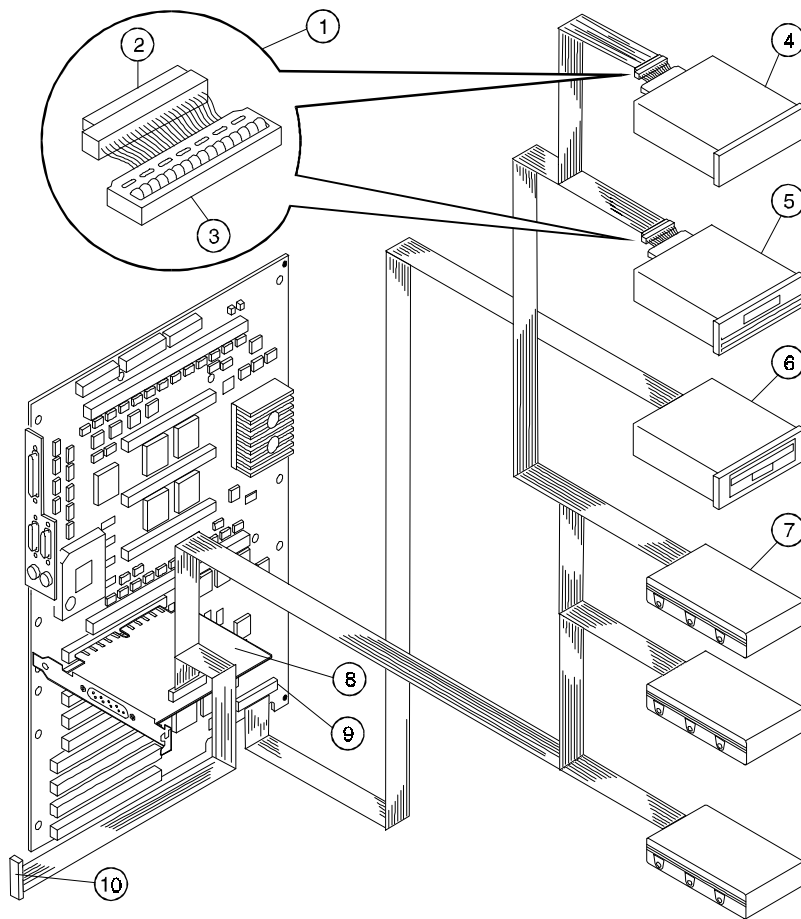
Installing System Options



- ① Two mounting screws for each device
- ② Securing bracket, with two mounting screws
- ③ Bracket shown in place

Figure 3-9. Attaching the Securing Bracket and Installing the Device

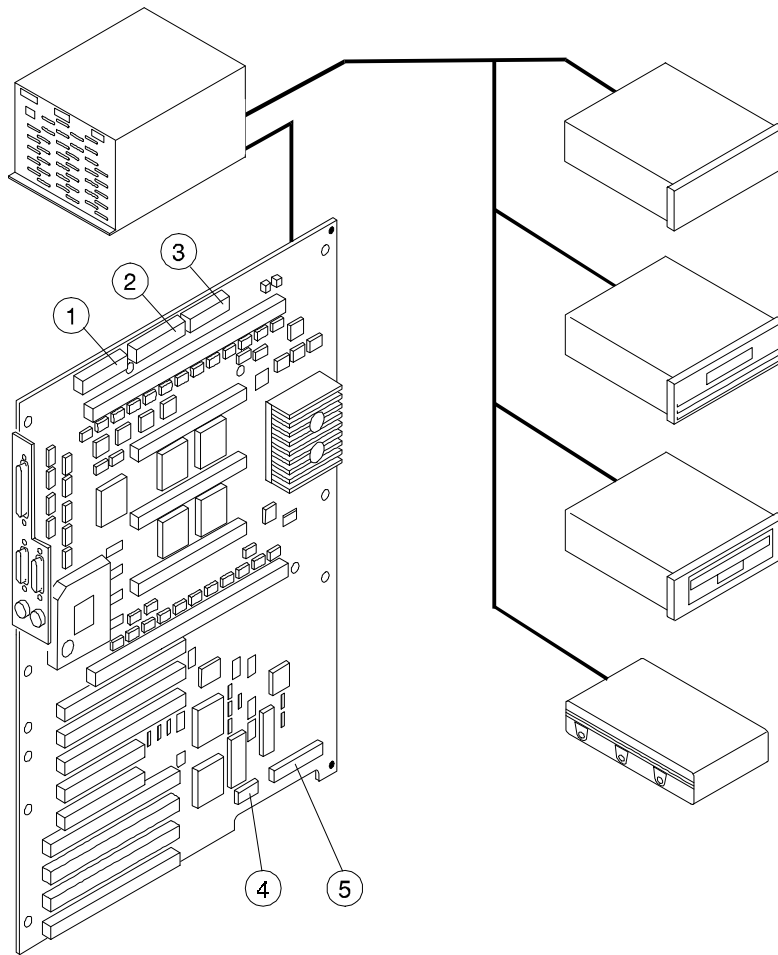
Installing System Options



- ① Wide-to-narrow SCSI adapter
- ② Cable end
- ③ Drive end
- ④ CD-ROM
- ⑤ Tape drive
- ⑥ Slimline diskette
- ⑦ Disk drives
- ⑧ SCSI controller
- ⑨ 3.5-inch removable device connector
- ⑩ External SCSI connector

Figure 3-10. SCSI and Removable Device Connector Cable Configuration

Installing System Options



- ① J21 - power connector (+5V sense, -5V, +12V, -12V, and +3.3V sense)
- ② J19 - power connector (+5V)
- ③ J20 - power connector (+3.3V)
- ④ J22 - OCP connector
- ⑤ J18 - 3.5-inch removable device connector

Figure 3-11. Power Cable Configuration

Installing System Options

7. Slide the drive in and secure it with two mounting screws, as shown in Figure 3-9.

NOTE

If you are mounting a 3.5-inch drive in a 5.25-inch drive bay, you need 3.5-to-5.25-inch exchange brackets on the 3.5-inch drive.

8. Replace and lock the left side panel, as described earlier in this chapter.
9. Connect the power cord and plug it into the wall outlet.

Internal Drive Bay Devices

The AlphaStation 600 Series system supports three 3.5-inch devices in a drive assembly. To add or replace these devices, you must remove the entire drive assembly from your system unit, remove the devices from the assembly, and install the new devices. .

Removing the Drive Assembly from the System Unit

To remove the drive assembly from the system unit, see Figure 3-12 and follow this procedure:

1. Turn off your system and unplug the power cord from the wall outlet.
2. Unlock and remove the left side panel, as described earlier in this chapter.
3. Remove the SCSI and power cables from the devices in the drive assembly. Note the position of the cables so that you can reconnect them to the correct devices later.
4. Loosen the two mounting screws ② just above the power supply in the keyhole slots.
5. Slide the drive assembly ① toward the rear of the system unit and remove it.

Installing System Options

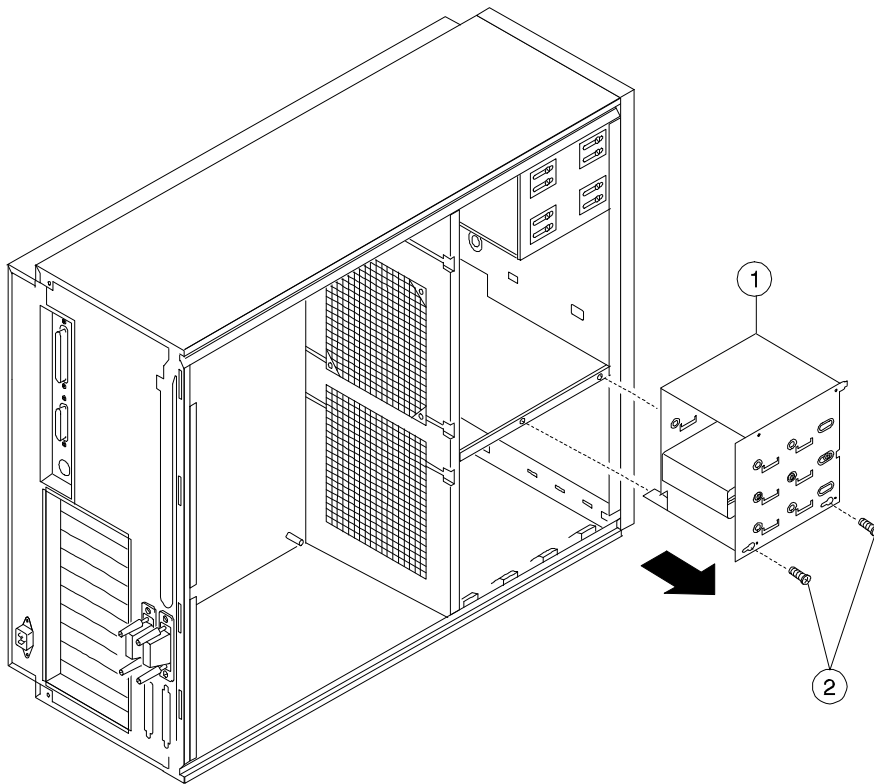


Figure 3-12. Removing the Drive Assembly

Removing a Device from the Drive Assembly

To remove a device from the drive assembly, see Figure 3-13 and follow this procedure:

1. Remove a device by removing the screws ③ on both sides and sliding the device ② out of the assembly ①.

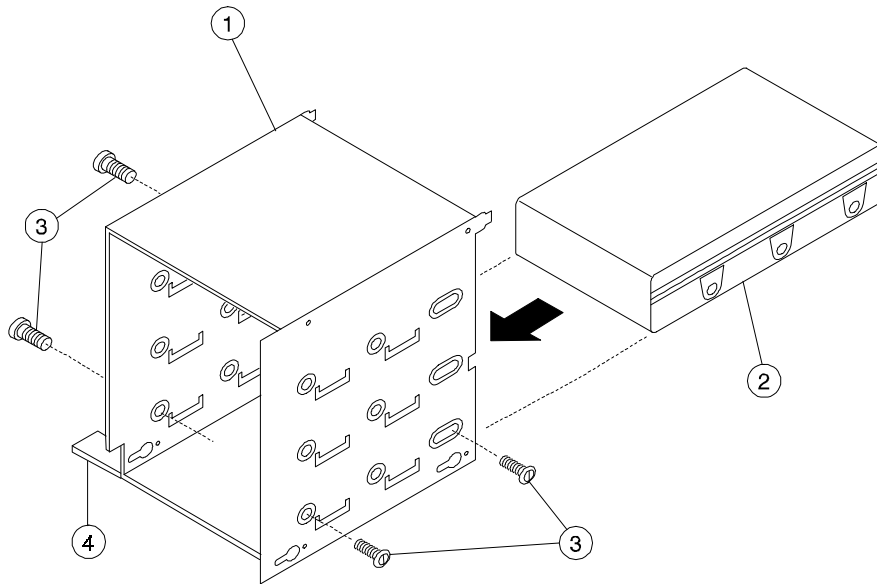


Figure 3-13. Removing a Device from the Drive Assembly

2. Slide the drive into the drive assembly and secure it with screws.

CAUTION

Be sure to use the screws that came with the drive. Other screws may be too long and could damage the internal mechanism of the drive.

Installing System Options

Replacing the Drive Assembly in the System Unit

To replace the drive assembly in the system unit, follow this procedure:

1. Reconnect the SCSI and power cables to the drives.
2. Replace the drive assembly in the system unit by sliding it forward until it is properly positioned. Ensure that the two mounting tabs ④ on the drive assembly engage the mounting finger and slot in the system unit.
3. Tighten the two mounting screws.
4. Replace and lock the left side panel, as described earlier in this chapter.
5. Connect the power cord and plug it into the wall outlet.

ISA, EISA, and PCI Expansion Options

The AlphaStation 600 Series system features three 64-bit PCI slots, two 32-bit PCI slots, and four EISA/ISA slots. One 32-bit PCI slot and one EISA slot share a position, so only one of them can be installed at a time. See Figure 3-4 for additional information. .

You can determine whether an option is industry standard architecture (ISA), extended industry-standard architecture (EISA), or peripheral component interconnect (PCI) by examining the contacts on the module (shown in Figure 3-14):

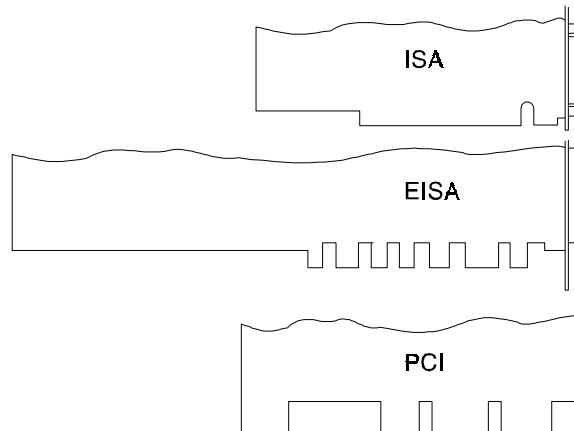


Figure 3-14. ISA, EISA, and PCI Expansion Module Contacts

NOTE

The EISA/ISA slot numbering shown in Figure 3-15 shows the CPU service priority of the devices on the EISA/ISA bus.

ISA Bus

The ISA bus is a 16-bit I/O bus designed to be backward-compatible with 16-bit and 8-bit architectures. Therefore, ISA modules can be used in your system, provided that the operating system supports the device.

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

Installing System Options

EISA Bus

The EISA bus is a 32-bit I/O bus. EISA is a superset of the well-established 16-bit ISA bus. EISA was designed to accept newer 32-bit components, while remaining compatible with older 8-bit and 16-bit cards.

EISA offers performance of up to 33 MB/second for bus masters. All slots are bus master slots and can be filled in any sequence.

- ☞ Refer to your option module documentation for instructions on configuring an EISA option module.

PCI Bus

The PCI bus is an industry-standard I/O bus that is the preferred bus for high-performance I/O options. The system supports 32-bit and 64-bit PCI option modules.

- ☞ PCI option modules require no additional configuration procedures; the system automatically recognizes the modules and assigns the appropriate system resources. Refer to your option module documentation for additional information.

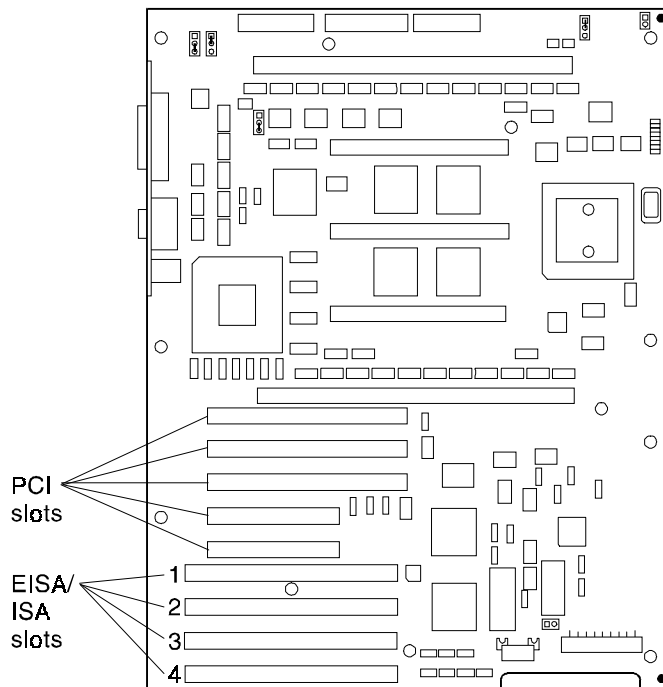


Figure 3-15. EISA/ISA Slot Numbering

Installing Expansion Modules

To install an expansion module, see Figure 3-16 and follow this procedure:

1. Turn off your system and unplug the power cord.
2. Unlock and remove the left side panel, as described earlier in this chapter.
3. Unscrew and remove the metal slot cover ①.
4. Insert the new expansion module into the socket in the system board ②. Push the module firmly into the socket.

Installing System Options

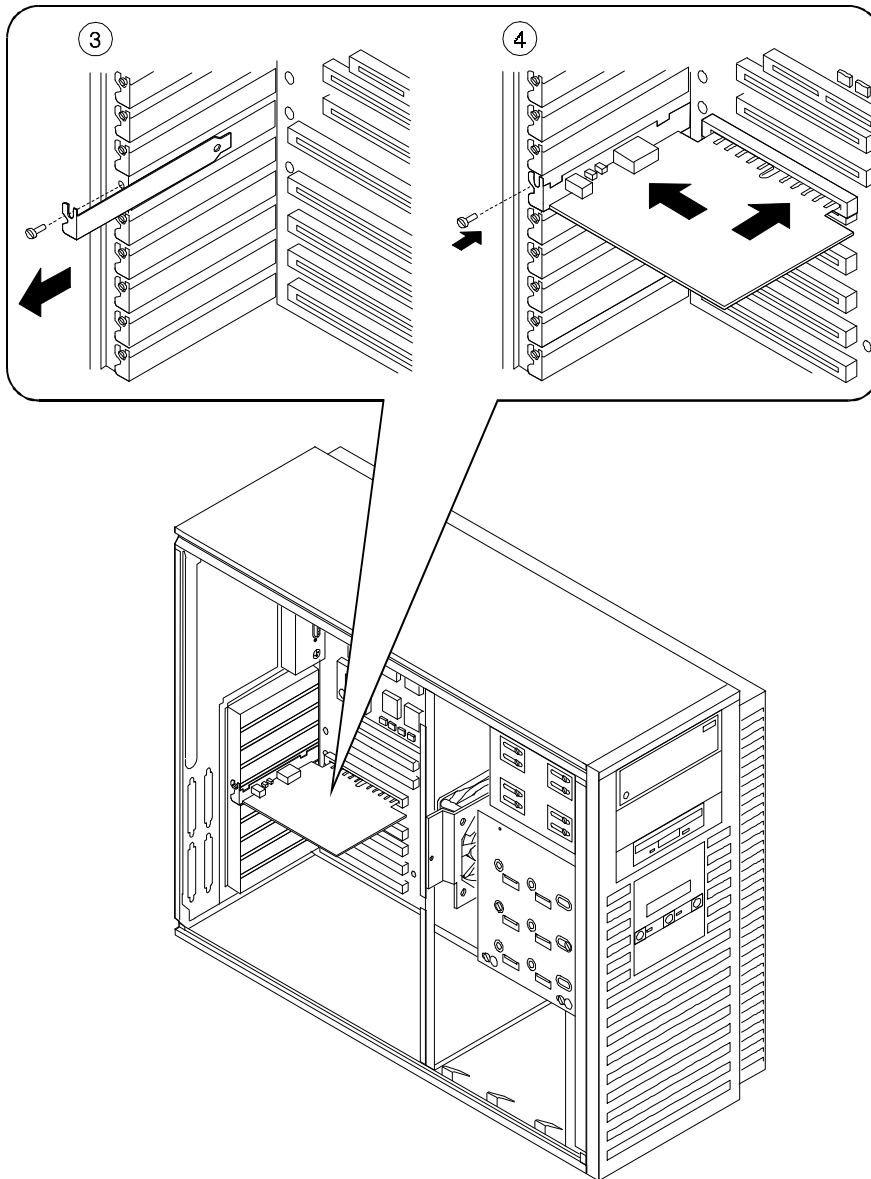


Figure 3-16. Installing an Expansion Module

Installing System Options

5. Replace the screw that formerly held the slot cover to secure the module ②.
 6. Replace and lock the left side panel, as described earlier in this chapter.
 7. Connect the power cord and plug it into the wall outlet and turn on the system.
 8. For ISA options added to DEC OSF/1 or OpenVMS systems, run the configuration utility. Refer to Appendix A, Console Commands, for more information on this utility.
- ☞ For more information on operating system-specific options, refer to your operating system and option documentation.

Installing System Options

The Operator Control Panel

If you are either using a rack mount for the AlphaStation 600 Series system unit or positioning the system horizontally on a desk top, you may want to rotate the operator control panel (OCP) 90 degrees.

Rotating the OCP

To rotate the OCP, follow this procedure:

1. Turn off your system and unplug the power cord from the wall outlet.
2. Remove the front bezel ①, as shown in Figure 3-17.

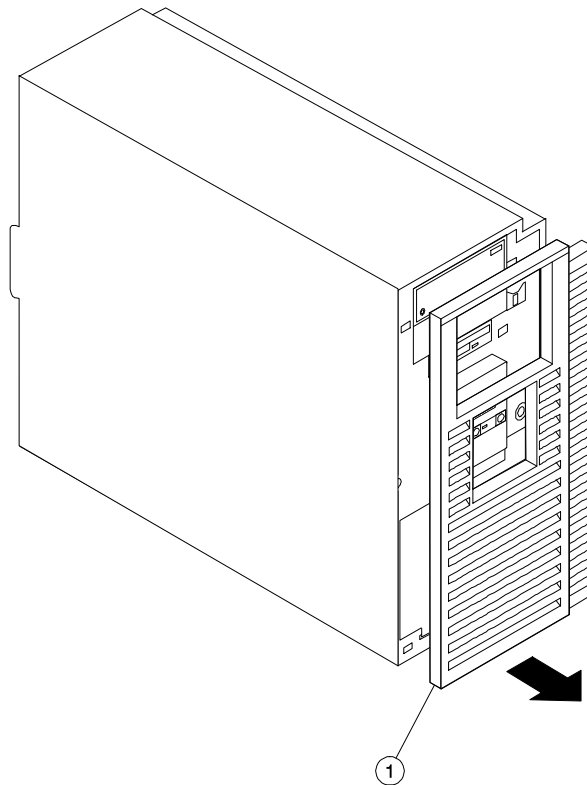


Figure 3-17. Removing the Front Bezel

Installing System Options

2. Remove the OCP ② by pressing down ①, as shown in Figure 3-18; rotate the OCP ③ to the left 90 degrees ④.

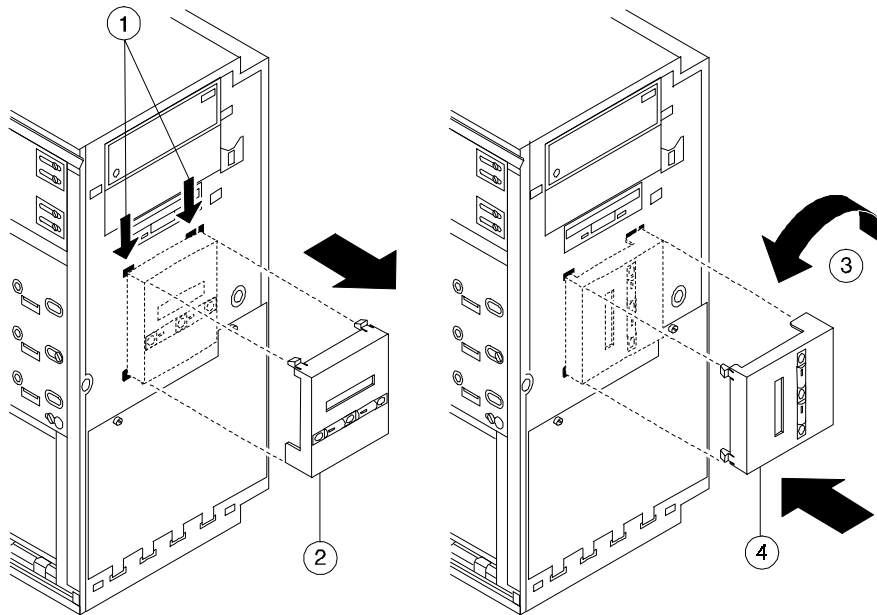


Figure 3-18. Rotating the OCP

3. Reinsert the OCP.
4. Replace the front bezel.
5. Connect the power cord and plug it into the wall.

4

Troubleshooting

Introduction

This chapter describes initial and general troubleshooting as well as the error beep codes.

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

Initial Troubleshooting

To troubleshoot your AlphaStation 600 Series system initially, follow this procedure:

1. Check that the power indicator is on.
2. Check the power indicator on the monitor.
3. Make sure that all cables and connections are secure.
4. Press the Halt/Reset button. If your system fails to boot, turn it off, wait 20 seconds, and turn it back on.
5. Contact your Digital service representative or service provider for software- or hardware-related problems by calling 1-800-DIGITAL.

Troubleshooting

NOTE

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

General Troubleshooting

Tables 4-1 through 4-4 list how to identify and solve problems that could occur with your system, disk drive, and monitor.

Table 4-1. System Troubleshooting

Problem	Possible Cause	Action
Power indicator not on.	System is not plugged in.	Turn off the system, plug it in, and then turn it back on again.
	No power at the wall outlet.	Use another wall outlet.
	Power supply failure.	Contact your service representative.
	Internal power supply cables not reconnected after installing options.	Reconnect cables.
	Removable side panel not installed properly.	Reinstall removable side panel.
Power is on, but there is no screen display.	Brightness and contrast controls are not correctly set.	Adjust the brightness and contrast controls.
	Monitor is off.	Turn on the monitor.
	Monitor cable or power cord is incorrectly installed.	Check all monitor connections.
	Configuration error. ARC console may be set incorrectly to "Serial."	Set the ARC console to "Graphics." See pp. A-1 and A-2. Refer to the video module documentation for more information.
	Monitor is defective.	Try another monitor.
	Defective video controller module.	Replace the video module.

Table 4-1. System Troubleshooting (continued)

Problem	Possible Cause	Action
System does not boot	Operating system software is not installed on the hard disk drive.	Install the appropriate operating system.
	System cannot find the boot device.	<p>Check the system configuration for correct device parameters.</p> <p>DEC OSF/1 and OpenVMS: Use the SRM show config and show device commands. (Refer to Appendix A, “Console Commands.”) Use gathered information to identify target devices for the boot command and verify that the system acknowledges all installed devices.</p> <p>Windows NT: Use the ARC console to display the available boot devices. First, from the Boot menu select Supplementary menu...; then select Display hardware configuration. Verify that the target boot device is listed.</p>
	Environment variables incorrectly set.	<p>Check and set the environment variables, if necessary.</p> <p>DEC OSF/1 and OpenVMS: Use the SRM console show envar and set envar 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_osflag</i>. (Refer to Appendix A, “Console Commands.”)</p>

Troubleshooting

Table 4-1. System Troubleshooting (continued)

Problem	Possible Cause	Action
System does not boot. (continued)	Environment variables incorrectly set.	Windows NT: From the Boot menu, select Supplementary menu... ; then select Setup the system... ; then select Set default environment variables. (Refer to Appendix A, "Console Commands.")
	Hard disk drive is not correctly formatted, or the requested partition does not exist.	Format the hard disk drive or correctly partition the hard disk drive using the supplied software.
	There is no software on the requested partition.	Install software on the requested partition.
Target boot device not listed in show device, show config (SRM), or Display hardware configuration (ARC)	Loose cables.	Secure all cable connections.
	SCSI drive jumpers incorrectly set.	Check all SCSI devices for incorrect or conflicting IDs. Refer to the hard disk drive documentation.
No response to keyboard commands	SCSI bus termination incorrectly set.	Check that the SCSI bus is properly terminated. Refer to Chapter 3 for more information.
	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. ³
	Keyboard is connected to the mouse port.	Connect the keyboard to the keyboard port. ¹

³Turn the system off before connecting the keyboard.

Table 4-1. System Troubleshooting (continued)

Problem	Possible Cause	Action
No response to mouse commands	<p>Mouse is not connected.</p> <p>Mouse is connected to the keyboard port.</p> <p>Mouse driver not installed.</p> <p>Mouse ball sticking.</p>	<p>Connect the mouse.⁴</p> <p>Connect the mouse to the mouse port.²</p> <p>Install the appropriate mouse driver. Refer to your application software documentation.</p> <p>Clean the mouse. Refer to Appendix B, System Care, for information on cleaning the mouse.</p>

⁴Turn the system off before connecting the mouse.

Troubleshooting

Table 4-2. Disk Drive Troubleshooting

Problem	Possible Cause	Action
Hard disk drive cannot read or write information	Incorrect disk drive jumper settings.	Refer to the disk drive installation instructions.
	Loose or incorrectly installed cables.	Make sure all cables are correctly installed.
	SCSI hard disk drive is not correctly formatted or partitioned.	Format and partition as required using the supplied operating system.
Diskette drive cannot read or write information.	Diskette is not formatted.	Format the diskette.
	Diskette is wrong density.	Use a diskette of the proper density for your drive.
	Diskette is worn or damaged.	Try another diskette.
	Diskette is write-protected.	Slide the write-protect switch so the hole is not visible.
	Diskette drive is empty.	Insert a diskette.

Troubleshooting

Table 4-3. Monitor Troubleshooting

Problem	Possible Cause	Action
Monitor power indicator is not on	Monitor is turned off. Power cord is not connected. No power at wall outlet. Power indicator is defective.	Turn on the monitor. Connect the power cord to the system or a wall outlet. Use another outlet. Contact your service representative or Digital Equipment Corporation.
Distorted, rolling, or flickering screen display, or wrong or uneven color	Monitor incorrectly adjusted. Wrong type of monitor. Defective monitor. Monitor signal cable incorrectly installed.	Adjust accordingly. Try another monitor. Try another monitor. Straighten any bent connector pins and then reconnect the monitor.

Troubleshooting

Status and Error Codes

Table 4-4 shows status and error codes you may encounter while using the AlphaStation 600 Series system.

Table 4-4. Status and Error Codes

Status Code	Meaning
DF	Power is on
DE	Initializing cpu/system interface
DD	Sizing CPU speed
DC	Sizing and initializing the scache
DB	Initializing and testing the PCI bus
DA	Sizing the bcache
D9	Sizing memory
D8	Configuring memory
D7	Initializing memory test
D6	Testing bcache bits
D5	Testing memory bits
D4	Testing bcache addresses
D3	Testing memory addresses
D2	Testing bcache cells
D1	Testing memory cells
D0	Initializing all memory
CF	Loading flash ROM code
CE	Reinitializing cpu/system interface
CD	Code execution complete

Table 4-4. Status and Error Codes (continued)

Nonfatal Error Code	Meaning
EE	No bcache size bits detected
EB	Failed to detect CPU speed
E9	Failed to detect real-time clock; system defaults to 300 MHz
E4	Bcache address line error; system operates without bcache
E3	Memory address line error; system maps out the offending bank and reconfigures without it
E2	Bcache cell error
E1	Memory cell error
E0	ROM checksum error
Fatal Error Code	Meaning
FF	No scache bits set in sc_ctl register
FD	Floppy drive error
FC	No MMBs, or MMB mismatch
FA	System cannot detect any usable memory, or detected memory fails the memory tests
F9	Sys init failure — read/write miscompare in one of the control/status registers
F8	PCI data path error
F6	System finds a bad CIA memory csr
F5	Bcache data path error
F4	memory data path error
F1	ROM data path read error

Equipment Log

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

A

Console Commands

Introduction

The AlphaStation 600 Series system contains two console subsystems:

- Advanced RISC computing (ARC) firmware that supports the Windows NT operating system
- System reference manual (SRM) firmware that supports the DEC OSF/1 and OpenVMS operating systems

The console firmware resides in 1MB of flashROM on the system board. FlashROM memory can be updated in the field.

This appendix gives a basic description of commands for each console.

ARC Console

The ARC console supports the use of the Windows NT operating system. The ARC console uses a menu interface. When an AlphaStation 600 Series system with Windows NT is turned on, a menu similar to the following displays after initialization:

```
ARC Multiboot Alpha AXP Version 4.xx
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.

Console Commands

During initialization, the firmware checks the information stored in the nonvolatile memory. If the information is unreadable or inconsistent, a warning message displays. The warning message identifies the areas that must be fixed prior to booting Windows NT..

Commands You Need to Know

The sections that follow describe ARC console commands that you need to know.

Display Hardware Configuration

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

- Devices detected (and supported) by the ARC console
- Alpha AXP processor revision, speed, and physical memory size
- Video option detected
- PCI slots, including vendor, revision, and device type

Set Default Environment Variables

The **Set default environment variables** command is located in the Setup menu. Use this command to specify the location of the default system partition. For example, when the partition is on a SCSI hard disk, you are prompted for the SCSI bus number, the SCSI ID of the drive, and the partition number.

Set Default Configuration

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

- Monitor resolution
- Diskette drive capacity
- Keyboard language
- SCSI controller (host) ID
- EISA bus configuration

Manage 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:

- A system partition for this boot selection. (The partition defined by the **Set default environment variables** command should be one of your choices.)

Console Commands

- The osloader directory and name.
- Whether or not the operating system is in the same partition as the osloader.
- The operating system root directory.
- A name (identifier) for this boot selection.
- Whether or not the debugger should be initialized at startup time.

After you add a boot selection, use the **Check boot selections** command to perform verification testing of the selections. If the system detects an error, it prompts you to ignore, delete, or change the boot selection.

Machine Specific Setup

You reach the Machine specific setup menu from the Setup menu. Use this menu to control PCI parity checking, which is (by default) set to On, and SCSI termination of the external portion of the SCSI bus, which is (by default) set to Internal.

Boot (Boot Selection Identifier)

The **Boot** command is the first selection in the Boot menu. Use this command to start up Windows NT using the default boot selection identifier (which is specified in the Boot selection menu).

Boot an Alternate Operating System

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

Other Commands of Interest

The sections that follow describe ARC console commands that you may find useful.

Setup Autoboot

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

Install New Firmware

The **Install new firmware** is located in the Supplementary menu. Use this command to install firmware upgrades. When selected, the diskette drive and CD-ROM will be checked for the firmware update tool. If the proper media is not present, this command will time out. Follow the instructions packaged with the firmware update.

Console Commands

Install Windows NT from CD-ROM

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

Switch to OpenVMS or OSF Console

The **Switch to OpenVMS or OSF console** command is located in the Setup menu. Use this command to select the operating system console that should be launched at the next power cycle.

SRM Console

The SRM console supports the Digital OSF/1 and OpenVMS 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**
- **ecu**
- **set**
- **show**
- **examine**
- **deposit**

SRM Console Conventions

Table A-1 lists SRM console conventions.

Table A-1. SRM Console Conventions

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

Console Commands

SRM Console Shortcut Keys

Table A-2 lists SRM console shortcut keys and their functions.

Table A-2. SRM Console Shortcut Keys

Shortcut Key	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, resumes the 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>]
```

where:

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 OSF/1 systems, the following flag parameters may be used: i = interactive boot s = boot to single user a = autoboot to multi-user 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-3 shows **boot** command examples and their descriptions.

Table A-3. Boot Command Examples

Command	Description
<code>>>>boot</code>	Boots the system from the default boot device.
<code>>>>boot ewa0</code>	Boots the system from Ethernet port ewa0.
<code>>>>boot -file dec2.sys mke0</code>	Boots the file named dec2.sys from Ethernet port mke0.
<code>>>>boot -protocol bootp eza0</code>	Boots using TCP/IP BOOTP protocol from Ethernet port eza0.
<code>>>>boot -flags 0,1</code>	Boots the system from the default boot device using flag settings 0,1.
<code>>>>boot -halt dka0</code>	Loads the image from disk dka0, but remains in console mode.

Console Commands

ECU Command

The **ecu** command transfers execution to the ARC console and automatically runs the EISA Configuration utility. Be sure to insert the ECU diskette before you issue this command.

The syntax of the **ecu** command is:

ecu

Refer to the section on Using the EISA Configuration Utility later in this appendix for additional information

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]

where:

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.

Console Commands

Set Command Examples

Table A-4 shows **set** command examples and their descriptions.

Table A-4. Set Command Examples

Command	Description
>>>set bootdef_dev ewa0	The default boot device is set to ewa0.
>>>set auto_action boot	The console will attempt to boot following an error, halt, or power cycle.
>>>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.

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>...}]
```

where:

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 [<i>device name</i>]	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.
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-5 lists **show** command examples and their descriptions.

Table A-5. Show Command Examples

Command	Description
<pre>>>>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</pre>	Lists device information, such as system designation, drive model, or Ethernet address.
<pre>>>>show memory Memory Size = 288Mb Bank Size Base Addr Speed 00 128Mb 000000000 Fast 01 128Mb 008000000 Fast 06 032Mb 010000000 Slow BCache Size = 4Mb Tested Memory = 33Mbytes</pre>	Lists system RAM, bank sizes, starting addresses, and versions of SROM and diagnostic read-only memory (DROM) used.
<pre>>>>show * (Refer to the next section.)</pre>	Lists all variables and their settings.
<pre>>>>show boot* (Refer to the next section.)</pre>	Lists all variables beginning with boot.

Console Commands

Environment Variables

Table A-6 shows selected environment variables and their descriptions. For a complete list, type **show *** at the SRM prompt.

Table A-6. Environment Variables

Variable	Description
auto_action	Sets/shows the console action following an error, halt, or power-cycle. The action can be halt, boot, or restart. Halt is the default.
boot_file	Sets/shows the file name to be used when a bootstrap requires a file name. The default setting is null.
boot_osflags	Sets/shows additional parameters to be passed to system software. When using OpenVMS software, these parameters are the system root number and boot flags. The default setting is 0,0.
bootdef_dev	Sets/shows the default device or device list from which the system will attempt to boot. If the system software is preloaded, the variable is preset to point to the device containing the preloaded software. Otherwise, the default value is null.
console	Sets the console output to either serial port or the graphics controller.
os_type	Sets/shows the specified operating system (NT, OpenVMS, or OSF) that nonvolatile random-access memory (NVRAM) will boot.
pci_parity	Controls PCI parity checking at the PCI bridge chip. Parity checking is performed if on, disabled if off, and dependent on the SCSI controller revision.

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>
```

where:

Command Option	Description
-b	Byte of data.
-w	Word of data.
-l	Longword of data.
-q	Quadword of data.
-o	Octaword of data.
-h	Hexword 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-7 shows **examine** command examples and their descriptions.

Table A-7. Examine Command Examples

Command	Description
<pre>>>>e r0 gpr: 0 (R0) 0000000000000002</pre>	Examines R0 using a symbolic address.
<pre>>>>e -g 0 gpr: 0 (R0) 0000000000000002</pre>	Examines R0 using address space.
<pre>>>>e gpr:0 gpr: 0 (R0) 0000000000000002</pre>	Examines R0 using device name.
<pre>>>>e pc PC psr: 0(PC) FFFFFFFF80072954</pre>	Examines the program counter.
<pre>>>>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</pre>	Examines R7 and the next five registers.
<pre>>>>examine ipr:11 ipr: 11 (KSP) FFFFFFFF8228DFD0</pre>	Examine internal processor register 11.

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>
```

where:

Command Option	Description
-b	Byte of data.
-w	Word of data.
-l	Longword of data.
-q	Quadword of data.
-o	Octaword of data.
-h	Hexword of data.
-physical	Reference physical address space.
-virtual	Reference virtual address space.
-gpr	Reference general-purpose register address space.
-fpr	Reference floating-point register address space.
-ipr	Reference internal-processor register address space.
-n <count>	Specifies the number of consecutive locations to deposit.
-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"> • pmem: Physical memory • vmem: Virtual memory. All access and protection checking will occur.

Console Commands

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

Deposit Command Examples

Table A-8 shows **deposit** command examples and their descriptions.

Table A-8. Deposit Command Examples

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

Using the EISA Configuration Utility

Whenever you add, remove, or move an EISA or ISA module in your AlphaStation 600 Series system, you need to run the EISA configuration utility (ECU). The ECU is a menu-based utility, run from the ARC menu interface, that provides on-line help to guide you through the configuration process.

Each EISA or ISA module has a corresponding configuration file (CFG), which describes the characteristics and the system resources required for that option. The ECU uses the CFG to create a conflict-free configuration.

The ECU is supplied on a diskette that is shipped with your system. Make a copy of the ECU diskette, and keep the original in a safe place. Use the backup copy when you are configuring the system. The ECU diskette must have the volume label SYSTEMCFG.

NOTE


The CFG files supplied with the option you want to install may not work if the option is not supported on this system. Before you install an option, check that your system supports the option.

Before You Run the ECU

CAUTION

Make sure the system is turned off before you install options.

Before you run the ECU:

- 1 Refer to the documentation that comes with your option module to determine if it is an EISA or ISA option.
2. Install EISA options. (You install ISA options *after* you run the ECU.)
 For information about installing a specific option, refer to the documentation for that option.
3. Familiarize yourself with the utility.

You can find more information about the ECU by reading the ECU on-line help. To read the on-line help, start the ECU. On-line help for the ECU is located under Step 1, Important EISA Configuration Information.

4. Familiarize yourself with the configuration procedure for your system:

Console Commands

- If you are installing, moving, or removing an EISA option, refer to the section on Configuring EISA Options in this appendix.
 - If you are installing, moving, or removing an ISA option, refer to the section on Configuring ISA Options in this appendix.
5. The ECU diskette is shipped in the accessories kit that accompanies your system. Make a copy of the diskette and keep the original in a safe place. Use the backup copy for configuring options.

Configuring EISA Options

EISA options are recognized and configured automatically. To configure an EISA bus that contains no ISA options, follow these steps:

1. Install, move, or remove the EISA option module.
Use the instructions provided with the EISA option.
2. Invoke the console firmware.
 - **For systems running Windows NT:** Shut down the operating system or power up to the console Boot menu.
 - **For systems running DEC OSF/1 or OpenVMS:** Shut down the operating system and press the Halt switch. When the console prompt >>> is displayed, invoke the ECU, as described in Step 3.
3. Invoke the ECU as follows:
 - **For systems running Windows NT:**
 - a. From the Boot menu, select the Supplementary menu.
 - b. From the Supplementary menu, select the Setup menu. Insert the ECU diskette for Windows NT into the diskette drive.
 - c. From the Setup menu, select **Run EISA configuration utility from floppy**. This initializes the ECU program. There may be a 10- to 20-second delay in system activity while the system recognizes the ECU.
 - **For systems running DEC OSF/1 or OpenVMS:**
 - a. Insert the ECU diskette for DEC OSF/1 or OpenVMS into the diskette drive.
 - b. Enter the **ecu** command.

The **message loading ARC firmware** displays. There may be a 10- to 20-second delay in system activity while the system recognizes the ECU. When the firmware has finished loading, the ECU program is initialized.

Console Commands

If the ECU locates the required CFG configuration files, it displays the main menu. The CFG for the option may reside on a configuration diskette packaged with the option or may be included on the system configuration diskette.

NOTE

It is not necessary to run Step 2 of the ECU, Add or remove boards. EISA modules are recognized and configured automatically.

4. Change settings or resources (*optional*).

This step is not required when you are using the board's default settings.

The View or Edit Details ECU option is used to change user-selectable settings or to change the resources allocated for these functions (for example, IRQs, DMA channels, and I/O ports).

5. Save your configuration.

The Save and Exit ECU option saves your configuration information to the system's nonvolatile memory.

6. Return to the SRM console (DEC OSF/1 and OpenVMS systems only) and restart the system.

For systems running Windows NT:

Remove the ECU diskette from the diskette drive and initialize the operating system.

For systems running DEC OSF/1 or OpenVMS:

Return to the SRM console, as follows:

- a. From the Boot menu, select **Supplementary menu**.
- b. From the Supplementary menu, select **Set up the system menu**.
- c. From the Setup menu, select **Switch to OpenVMS or OSF console**.
This allows you to select your operating system console.
- d. Select your operating system; then press Enter on the Setup menu.
- e. When the message **Power-cycle the system to implement the change** is displayed, press the Reset button. Do not press the On/Off switch. After the console firmware is loaded and device drivers are initialized, you can boot the operating system.

Console Commands

Configuring ISA Options

To configure ISA options, follow these steps:

1. Start up the system and run the ECU.
2. Add the ISA card configuration file to the configuration list.

Use the **Add or Remove Boards** ECU option to add the configuration file (CFG) for the ISA option and to select an acceptable slot for the option.

In some cases, the CFG file for the ISA option may reside on a configuration diskette packaged with the option. If so, insert that diskette and follow its directions.

For most ISA options, the CFG is not on a diskette. If it is not, you need to use the generic ISA adapter definition option on the ECU diskette.

3. Change settings or resources (optional).

The **View or Edit Details** ECU option is used to change user-selectable settings or to change the resources allocated for these functions (for example, IRQs, DMA channels, and I/O ports).

This step is not required when you are using the board's default settings.

4. Examine and set required switches to match the displayed settings.
5. Save your configuration.

The **Save and Exit** ECU option saves your configuration information to the system's nonvolatile memory.

6. Return to the SRM console (DEC OSF/1 and OpenVMS systems only) and restart the system.

For systems running Windows NT:

Remove the ECU diskette from the diskette drive and initialize the operating system.

For systems running DEC OSF/1 or OpenVMS:

Return to the SRM console, as follows:

- a. From the Supplementary menu, select **Setup menu**.
- b. From the Setup menu, select **Switch to OpenVMS or OSF console**. This option allows you to select your operating system console.
- c. Select your operating system; then press Enter on the Setup menu.
- d. When the message **Power-cycle the system to implement the change** is displayed, press the Reset button. Do not press the On/Off switch.

Console Commands

After the console firmware is loaded and device drivers are initialized, you can boot the operating system.

7. Install the ISA module and turn on the system.
Use the instructions provided with the ISA option.

B

System Care

Introduction

This appendix describes how to:

- Clean your system, including the outside enclosure, monitor, 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 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 shown in Figure B-1:

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

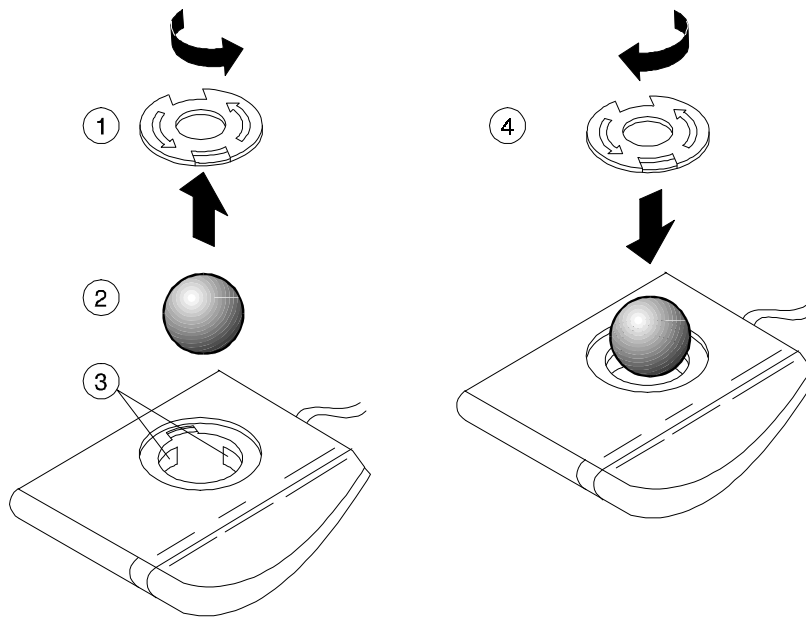


Figure B-1. Cleaning the Mouse

Cleaning Your Keyboard

Your keyboard keys may get dirty with use. Clean them 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. Replace the cache module hold-down bracket. See Figure 3-6 for additional information.
6. Package the system as described in the section on Packing Your System later in this appendix.

System Care

WARNING

When packing 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.

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. However, if you are shipping the system or moving it by vehicle, pack it 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, unpack and install it following the installation instructions on the installation information.

C

Technical Specifications

Introduction

This appendix describes the following technical characteristics of the AlphaStation 600 Series system:

- System specifications
- External system connectors
- Expansion slot current limitations
- System current requirements
- System board jumpers
- I/O subsystem module

System Specifications

Tables C-1 through C-4 list the AlphaStation 600 Series system processor features, dimensions, environmental specifications, and acoustics specifications.

Technical Specifications

Table C-1. System Specifications

Attributes	Specification
PCI clock	33 MHz
Data I/O	64-bit PCI
System board RAM	Expandable up to 1.0 GB

Table C-2. System Dimensions

Dimension	Specification
Width	238.8 mm (9.4 inches)
Length	645.2 mm (25.4 inches)
Height	442 mm (17.4 inches)
Weight	32+ kg (70+ lb)

Table C-3. System Environmental Specifications

Attributes	Specification
Operating temperature	10°C to 40°C (50°F to 104°F) (without removable media)
Storage temperature	−40°C to 66°C (−40F to 151°F)
Operating humidity (noncondensing)	10% to 90% relative humidity, (without removable media) 20% to 80% relative humidity (with removable media) maximum wet bulb 2°C (36°F)
Storage humidity (noncondensing)	10% to 90% relative humidity, maximum wet bulb 65°C (149°F)
Altitude Operating Nonoperating	2,438 m (8,000 ft) maximum 4,876 m (16,000 ft) maximum
Shipping vibration	IAW Federal Standard 101, method 5019
Nonoperating shock	30 G, 25 ms halfsine

Table C-4. Acoustics-Declared Values According to ISO 9296 and ISO 7779

Product	Sound Power Level L_{WA_d} , B		Sound Pressure Level L_{pAm} , dBA	
	Idle	Operate	(Operator Position) Idle Operate	
PB620-A9	5.1	5.2	33	34

NOTE

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

External System Connectors

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

- Parallel 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

Technical Specifications

Parallel Port Connector

The parallel port connector provides an interface to a printer or other parallel devices. Table C-5 lists pin assignments. An asterisk (*) after a signal name indicates an active low signal.

Table C-5. 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-6 lists their pin assignments.

The baud rates supported by the system's serial ports are 300, 1200, 2400, 4800, 9600, 19200, and 38400.

Table C-6. 9-Pin 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-7 lists their pin assignments.

Table C-7. Keyboard and Mouse Connector Pinouts

Pin	Signal
1	Data
2	Reserved
3	Ground
4	+5V DC (fused)
5	Clock
6	Reserved

Technical Specifications

SCSI Connectors

Two SCSI ports exit the AlphaStation 600 Series system unit:

- A 68-pin high-density, wide port that is terminated at the I/O subsystem module
- A 50-pin port that is wide internally but exits as a narrow bus

Tables C-8 and C-9 list the SCSI pin assignments.

Table C-8. Wide SCSI Pinouts

Signal Name	Connector Contact Number	Cable Conductor Number	Connector Contact Number	Signal Name
GROUND	1	1 2	35	-DB(12)
GROUND	2	3 4	36	-DB(13)
GROUND	3	5 6	37	-DB(14)
GROUND	4	7 8	38	-DB(15)
GROUND	5	9 10	39	-DB(P1)
GROUND	6	11 12	40	-DB(0)
GROUND	7	13 14	41	-DB(1)
GROUND	8	15 16	42	-DB(2)
GROUND	9	17 18	43	-DB(3)
GROUND	10	19 20	44	-DB(4)
GROUND	11	21 22	45	-DB(5)
GROUND	12	23 24	46	-DB(6)
GROUND	13	25 26	47	-DB(7)
GROUND	14	27 28	48	-DB(P)
GROUND	15	29 30	49	GROUND
GROUND	16	31 32	50	GROUND
TERMPWR	17	33 34	51	TERMPWR
TERMPWR	18	35 36	52	TERMPWR
RESERVED	19	37 38	53	RESERVED
GROUND	20	39 40	54	GROUND
GROUND	21	41 42	55	-ATN
GROUND	22	43 44	56	GROUND
GROUND	23	45 46	57	-BSY

Technical Specifications

Table C-8. Wide SCSI Pinouts (Continued)

Signal Name	Connector Contact Number	Cable Conductor Number		Connector Contact Number	Signal Name
GROUND	24	47	48	58	-ACK
GROUND	25	49	50	59	-RST
GROUND	26	51	52	60	-MSG
GROUND	27	53	54	61	-SEL
GROUND	28	55	56	62	-C/D
GROUND	29	57	58	63	-REQ
GROUND	30	59	60	64	-I/O
GROUND	31	61	62	65	-DB(8)
GROUND	32	63	64	66	-DB(9)
GROUND	33	65	66	67	-DB(10)
GROUND	34	67	68	68	-DB(11)

Table C-9. Narrow SCSI Pinouts

Signal Name	Connector Contact Number	Cable Conductor Number		Connector Contact Number	Signal Name
GROUND	1	1	2	2	-DB(0)
GROUND	3	3	4	4	-DB(1)
GROUND	5	5	6	6	-DB(2)
GROUND	7	7	8	8	-DB(3)
GROUND	9	9	10	10	-DB(4)
GROUND	11	11	12	12	-DB(5)
GROUND	13	13	14	14	-DB(6)
GROUND	15	15	16	16	-DB(7)
GROUND	17	17	18	18	-DB(P)
GROUND	19	19	20	20	GROUND
GROUND	21	21	22	22	GROUND
OPEN	23	23	24	24	OPEN

Technical Specifications

Table C-9. Narrow SCSI Pinouts (Continued)

Signal Name	Connector Contact Number	Cable Conductor Number		Connector Contact Number	Signal Name
OPEN	25	25	26	26	TERMPWR
RESERVED	27	27	28	28	RESERVED
GROUND	29	29	30	30	GROUND
GROUND	31	31	32	32	-ATN
GROUND	33	33	34	34	GROUND
GROUND	35	35	36	36	-BSY
GROUND	37	37	38	38	-ACK
GROUND	39	39	40	40	-RST
GROUND	41	41	42	42	-MSG
GROUND	43	43	44	44	-SEL
GROUND	45	45	46	46	-C/D
GROUND	47	47	48	48	-REQ
GROUND	49	49	50	50	-I/O

Expansion Slots

The system board contains three 64-bit PCI, two 32-bit PCI (one shared with an EISA slot), and four EISA/ISA expansion slots. The maximum available +5V DC allowable to any expansion slot depends on the following parameters:

- Power supply capacity
- The +5V DC requirements of the system board
- The +5V DC requirements of the peripherals
- The power demands of all other slots in use and of the system board

Power Supply and Input Power Requirements

The 400-watt power supply provides five DC voltages: +12V, -12V, +5V, -5V, and +3.43V DC. These voltages are used by the various components within the system and are listed in Table C-10.

Table C-10. Output Power Requirements

DC Outputs	Maximum Load	Maximum Power
+3.4V	36.4 amps	120.0 W
+5.0V	52.0 amps	265.0 W
-5.0V (aux)	0.6 amps	1.0 W
+12.0V	11.0 amps	132.0 W
-12.0V	0.2 amps	2.4 W
Maximum Watts		400 W

HINT

The maximum power from any combination of +3.3V and +5.0V does not exceed 335 W.

The AlphaStation 600 Series system has the rated voltage range described in Table C-11.

Table C-11. Input Power Requirements

Rated Voltage Range	Rated Input Current	Operating Frequency Range
88V AC–264V AC	8–4 amps	47 Hz–63 Hz

System Board Jumper Locations

Jumper pins allow you to set specific system parameters. Set them by changing the pin location of jumper blocks. A jumper block is a small plastic-encased conductor (shorting plug) that slips over the pins. To change a jumper setting, remove the jumper from its current location with your fingers or small needlenose pliers. 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 system board jumper pins. Table C-12 lists the system board jumpers and factory-default settings. Pin 1 is always oriented toward the top of the board.

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 result in permanent damage to electronic components

Technical Specifications

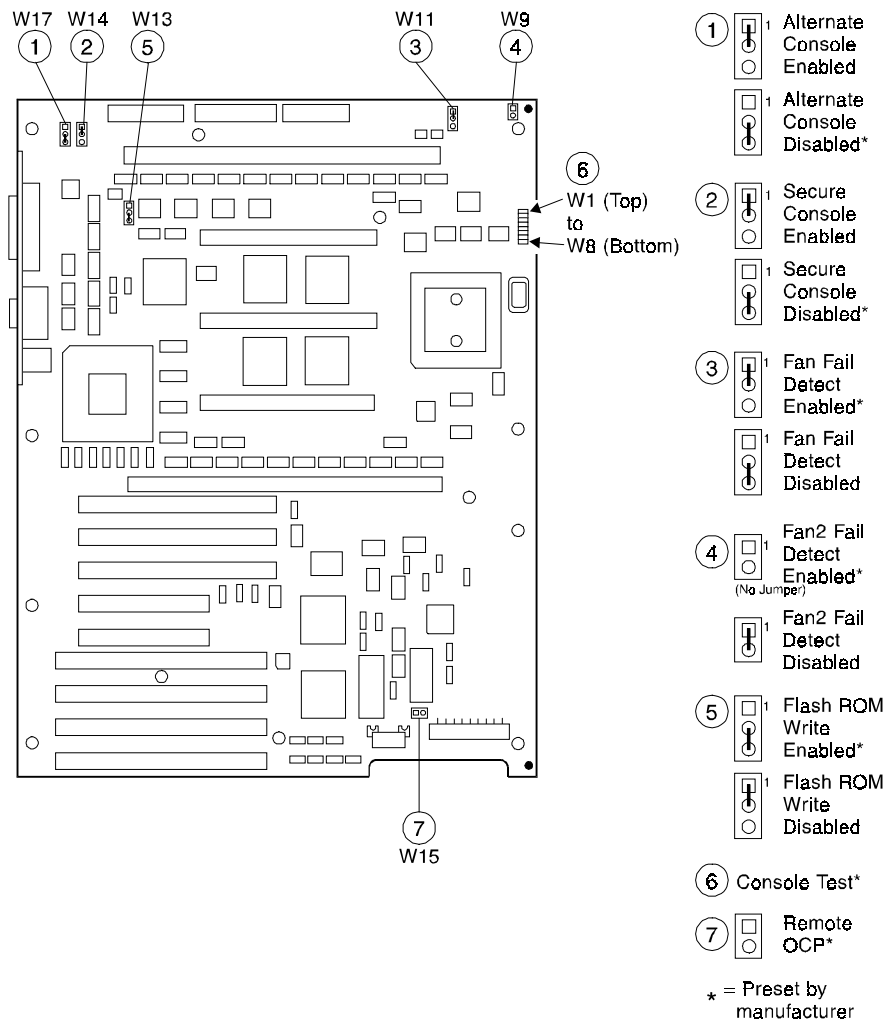


Figure C-1. System Board Jumper Locations

Technical Specifications

Table C-12. System Board Jumpers

Jumper	Pins 1 to 2	Parked on 2	Function
W1 to W8	N/A	Factory-installed at W1	Console test
W9	Fan2 Fail Detect Disabled	N/A	Fan2 Fail (no jumper* to enable)
W11	Fan Fail Detect Enabled*	Fan Fail Detect Disabled	Fan Fail
W13	FlashROM Write Disabled	FlashROM Write Enabled*	FlashROM write access
W14	Secure Console Enabled	Secure Console Disabled*	Secure console
W15	N/A	N/A	Remote OCP
W17	Alternate Console Enabled	Alternate Console Disabled*	Alternate console

(*) = Default position.

I/O Subsystem Module

The AlphaStation 600 Series I/O subsystem module supports two Fast and Wide SCSI3-compatible ports, and thick wire, ThinWire, and twisted-pair Ethernet connections.

SCSI Controller

Refer to Figure C-2. The port nearest the rear bulkhead is port A (J3); the second connector (J2) is port B and the third connector (J1) is a differential connector.

Port A is wired to all the internal SCSI devices by a wide SCSI cable (part number 17-04077). The wide SCSI cable has built-in active termination. This cable connects the CD-ROM, a second 5.25" option, and up to three hard drives to the I/O module. At the I/O module, the SCSI bus is high-byte terminated. From that point the cable continues to the rear bulkhead as a narrow bus. In the accessory kit there is a narrow SCSI terminator that should be used at the rear bulkhead, in the slot labeled "SCSI bus A," to complete the proper termination for the internal SCSI port. This bus can be used to connect external narrow SCSI devices. The maximum length for an external cable and device is 1.2 meters (approximately 4 ft.). The SCSI bus supports up to seven devices and care should be taken to be sure that no SCSI IDs are duplicated.

Port B is high- and low-byte terminated at the I/O module. A cable (part number 17-04020) is used to bring this bus to the rear bulkhead. In the accessory kit there is a wide, single-ended, active terminator. This terminator should be used at the rear bulkhead at the port labeled "SCSI bus B" for proper termination. This bus can be expanded to other wide or narrow SCSI devices; it can be extended outside the enclosure by 2.4 meters (approximately 8 feet) in the single-ended mode. This maximum length must include the internal length of any device connected to it.

There are five 3-pin jumpers on the I/O module which enable/disable on-board SCSI termination. See Table C-13.

Table C-13. I/O Subsystem Module Jumpers

Jumper	Normal Position	Function
W1	Enabled	SCSI port B low data byte termination
W2	Enabled	SCSI port B high data byte termination
W3	Enabled	SCSI port A high data byte termination
W4	Disabled	SCSI port A low data byte termination
W5	Thinwire	ThinWire/thickwire Ethernet port select
W6	Disabled	Reserved

Technical Specifications

Ethernet Interface

The AlphaStation 600 Series I/O subsystem also supports Ethernet connections. The module provides for thick wire, ThinWire, or twisted-pair Ethernet operation. Refer to Figure C-2.

Thick Wire Jumpering

For thick wire operation, set the jumper at W5 over pins 1 and 2 (nearest the back panel of the machine).

ThinWire or Twisted-pair Jumpering

For ThinWire or twisted-pair operation, set the jumper at W5 over pins 2 and 3 (nearest the front of the machine).

Software Switches

In conjunction with jumper W5 are software switches which must be set properly from the console mode. To determine the system setup, type:

```
show ewa0
```

at the >>> prompt. To set the proper mode, type:

```
set ewa0 x
```

where x is equal to either AUI or twisted-pair operation. Do not use the autosensing mode.

Technical Specifications

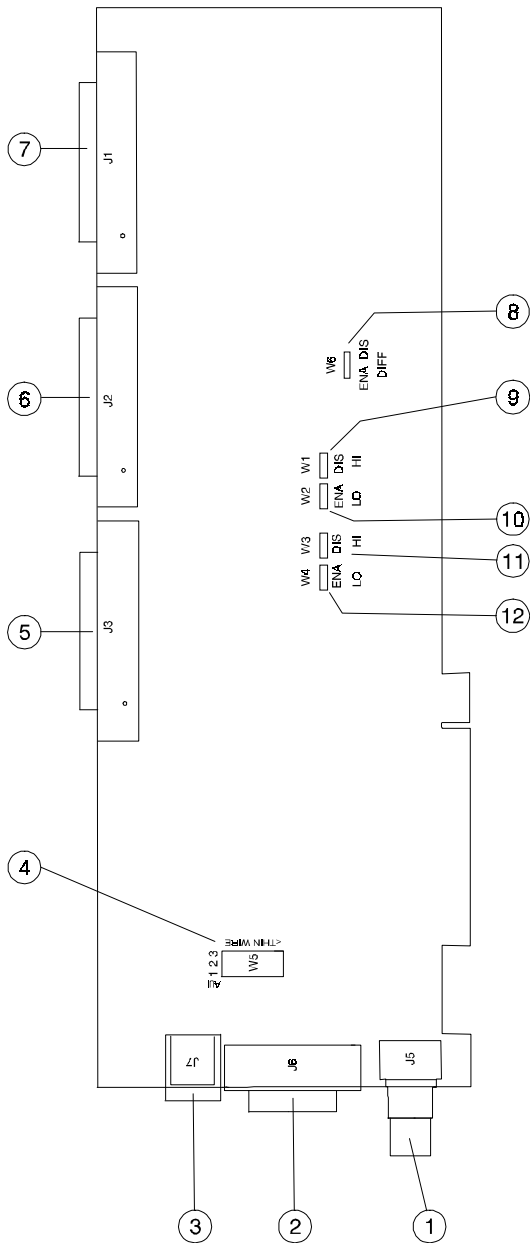


Figure Legend	Function
1	J5 ThinWire Ethernet port
2	J6 Thickwire Ethernet port
3	J7 Twisted-pair Ethernet port
4	W5 ThinWire/thick wire Ethernet port select
5	J3 Internal SCSI bus A
6	J2 External SCSI bus B
7	J1 Differential SCSI bus connector
8	W6 Reserved (normally disabled)
9	W1 Low byte SCSI bus B termination (normally enabled)
10	W2 High byte SCSI bus B termination (normally enabled)
11	W3 High byte SCSI bus A termination (normally enabled)
12	W4 Low byte SCSI bus A termination (normally enabled)

Figure C-2. I/O Subsystem Module Jumper/Connector Locations

D

Device Mapping

Introduction

This appendix lists system device mapping information, including:

- I/O address map
- Interrupt map

I/O Address Map

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

Table D-1. I/O Address Map

ISA I/O Addresses	Devices
0000-02F7	Reserved
02F8-02FF	Serial port 2
03BC-03BE	Parallel port
03BF-03EF	Reserved
03F0-03F7	Diskette drive
03F8-03FF	Serial port 1
0400-07FF	Reserved

Device Mapping

Interrupt Map

The IRQ assignments for the AlphaStation 600 Series are shown in Table D-2; the EISA interrupt assignments are shown in Table D-3. 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 Windows NT) or by the SRM console (as in DEC OSF/1 and OpenVMS).

Table D-2. Main Interrupt Logic IRQ Pin Assignments

Output	IRQ ⁵	Interrupt	Usage (Reference Designator)
EV5 IRQ<1>	0	Int A	PCI Slot 2 – 64-bit (J9)
	1	Int B	
	2	Int C	
	3	Int D	
	4	Int A	PCI Slot 2 – 64-bit (J10)
	5	Int B	
	6	Int C	
	7	Int D	
	8	Int A	PCI Slot 0 – 64-bit (J11)
	9	Int B	
	10	Int C	
	11	Int D	
	12	Int A	PCI Slot 4 – 32-bit (shared PCI/EISA slot) (J7)
13	Int B		
14	Int C		
15	Int D		
16	Int A	PCI Slot 3 – 32-bit (J8)	
17	Int B		
18	Int C		
19	Int D		
23–20		Jumpers	
27–24		Module REV	
30–28		Reserved	
31	EISA_INT	8259 INT output	

⁵ All unmasked IRQ inputs have equal priority.

Device Mapping

Table D-3. EISA Interrupt Assignments

Priority	Label	Controller	Int/External	Interrupt Source		
1	IRQ 0	1	Internal	Internal timer 1 counter 0 out		
2	IRQ 1		External	Keyboard		
3-10	IRQ 2		External	Interrupt from controller 2		
3	IRQ 8#	2	External	Reserved (normally real-time clock)		
4	IRQ 9			EISA bus pin B04		
5	IRQ 10			EISA bus pin D03		
6	IRQ 11			EISA bus pin D04		
7	IRQ 12			EISA bus pin D05, mouse interrupt (ABFULL)		
8	IRQ 13			Reserved (normally, 487 coprocessor error)		
9	IRQ 14			EISA bus pin D07		
10	IRQ 15			EISA bus pin D06		
11	IRQ 3			1	External	EISA bus pin B25
12	IRQ 4					EISA bus pin B24
13	IRQ 5	EISA bus pin B23				
14	IRQ 6	EISA bus pin B22				
15	IRQ 7	EISA bus pin B21				

E

Updating System Firmware

Introduction

This appendix explains how to use the firmware update utility. It is the user's responsibility to update the system firmware.

System Firmware

The AlphaStation 600 Series system contains four flashROMs, two with ARC console firmware (for the Windows NT operating system) and two with SRM console firmware (for the DEC OSF/1 and OpenVMS operating systems).

Update Utility

Use the update utility to update your ARC and SRM firmware. See the section on Using the Flash Update Utility later in this appendix for additional information. The update utility contains three images: the update utility itself, the SRM image, and the ARC image.

Flash Enable Jumper

Before you can update your system firmware, the flashROM enable jumper (W9) must be in the write-enabled position. Refer to the section on System Board Jumpers in Appendix C and to Figure C-1 for additional information.

Using the Flash Update Utility

To update the firmware:

1. Insert the CD-ROM with the updated firmware.
2. Reboot the system.

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

Updating System Firmware

```
*** Alpha Firmware Update Utility V1.0 ***
*** System Type: AlphaStation 600 Series ***
Update
Verify
List
Show
Dump
?
Apu->
```

3. To update the firmware, type **update**. The following information will be displayed as the firmware updates. The actual information may change between versions.

```
Apu-> update
Version = 3.0.f
Vendor = DEC
Product = AlphaStation 600 Series
Firmware = ARC
Length = 0x31e25
Rom Set = 1 (Roms 2,3)
APU-I VERIFY LOADED ROM IMAGE
0x31e65
APU-I VERIFY LOADED ROM IMAGE DONE
Rom 2 Manufacturer = Amd (0x01) 28F020 (0x2a) 256K x 8
Rom 3 Manufacturer = Amd (0x01) 28F020 (0x2a) 256K x 8
Version = bl3_1
Vendor = DEC
Product = AlphaStation 600 Series
Firmware = SRM
Length = 0x62a00
Rom Set = 0 (Roms 0,1)
APU-I VERIFY LOADED ROM IMAGE
0x62a40
APU-I VERIFY LOADED ROM IMAGE DONE
```

Updating System Firmware

```
Rom 0 Manufacturer = Amd (0x01) 28F020 (0x2a) 256K x 8
Rom 1 Manufacturer = Amd (0x01) 28F020 (0x2a) 256K x 8
Version = bl3_1
Vendor = DEC
Product =AlphaStation 600 Series
Firmware = SRM
Length = 0x60e00
Rom Set = 0 (Roms 0,1)
APU-I VERIFY LOADED ROM IMAGE
0x62a40
APU-I VERIFY LOADED ROM IMAGE DONE
APU-I *** ROMS 0,1 CONTENTS WILL BE DESTROYED ***
APU-I ARE YOU READY TO PROGRAM DEVICE ? (Y/N ) y
Rom 0 Manufacturer = Amd (0x01) 28F020 (0x2a) 256K x 8
Rom 1 Manufacturer = Amd (0x01) 28F020 (0x2a) 256K x 8
APU-I ROM SET NOT ERASED
APU-I PRECHARGING DEVICE
0x80000
APU-I ERASING ROM DEVICE
0x80000
APU-I PROGRAMMING DEVICE
0x60e40
APU-I ROM 0 VERIFYING ROM IMAGE
0x60e40
APU-I PROGRAMMING COMPLETED
0x60e40
0x60e40
SRM Rom Update Successful
Version = 3.0.f
Vendor = DEC
Product = AlphaStation 600 Series
Firmware = ARC
```

Updating System Firmware

```
Length = 0x31e25
Rom Set = 1 (Roms 2,3)
APU-I VERIFY LOADED ROM IMAGE
0x31e65
APU-I VERIFY LOADED ROM IMAGE DONE
Rom 2 Manufacturer = Amd (0x01) 28F020 (0x2a) 256K x 8
Rom 3 Manufacturer = Amd (0x01) 28F020 (0x2a) 256K x 8
APU-I ROM SET NOT ERASED
APU-I PRECHARGING DEVICE
0x80000
APU-I ERASING ROM DEVICE
0x80000
APU-I PROGRAMMING DEVICE
0x31e65
APU-I ROM 1 VERIFYING ROM IMAGE
0x31e65
APU-I PROGRAMMING COMPLETED
0x31e65
0x31e65
ARC Rom Update Successful
Apu->
```

4. Use the `verify SRM` command to verify the integrity of the SRM firmware.

```
Apu-> ver srm
Version = bl3_1
Vendor = DEC
Product = AlphaStation 600 Series
Firmware = SRM
Length = 0x62a00
Rom Set = 0 (Roms 0,1)
APU-I VERIFY LOADED ROM IMAGE
x62a40
```

Updating System Firmware

```
APU-I VERIFY LOADED ROM IMAGE DONE  
0x62a40  
0x62a40  
Rom Checksum 0xd0  
Rom Verify Successful  
Apu->
```

5. To exit the update utility, type **quit**.

```
Apu->quit
```


F

Starting an Operating System Installation

Introduction

This appendix provides the information you need to begin an operating system installation. After you have started an installation, you can complete it by following on-screen instructions and referring 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 install:	Go to Table:
DEC OSF/1	Table F-4
OpenVMS	Table F-5

NOTE

To install Windows NT, follow the procedure in the *Windows NT Release Notes for the AlphaStation 600*.

Starting an Operating System Installation

Starting a DEC OSF/1 Installation

To start a DEC OSF/1 installation, refer to Table F-4.

Table F-4. Starting a DEC OSF/1 Installation

Action	Result
<p>1. If the SRM console is running, go to Step 4. If the ARC console is running, from the Boot menu, select the Supplementary menu...; then select Set up the system... From the Setup menu, select Switch to OpenVMS or OSF console. Select Switch to OSF.</p>	<p>Selecting Switch to OSF will cause the system to run the SRM console after the next power cycle.</p>
<p>2. Cycle the system's power.</p>	<p>Cycling power after selecting the DEC OSF/1 or OpenVMS console results in the system restarting with the SRM console running.</p>
<p>3. At the SRM prompt (>>>), type: set boot_osflags</p>	<p>Clears the <i>boot_osflags</i> variable.</p>
<p>4. At the SRM prompt (>>>), type: set auto_action halt</p>	<p>Halts the system at the console prompt each time the system is turned on, crashes, or when the reset button is pushed.</p>
<p>5. Insert the <i>DEC OSF/1 for AXP™ Systems</i> CD-ROM into the CD drive.</p>	<p>The CD-ROM drawer closes.</p>
<p>6. At the SRM prompt (>>>), type: show dev</p>	<p>List of devices displays:</p> <pre>dka0.0.0.6.0 DKA0 RZ26L 441A dka500.4.0.6.0 DKA500 RRD43 3213 dva0.0.0.0.1 DVA0</pre>
<p>7. From the SRM console, boot the DEC OSF/1 CD-ROM. At the SRM prompt (>>>), type: boot dka500</p>	<p>Installation information is displayed and you are prompted to select an option. For more information, refer to the <i>DEC OSF/1 Installation Guide</i>.</p>

Starting an Operating System Installation

Starting an OpenVMS Installation

To start an OpenVMS installation, follow the steps in Table F-5.

Table F-5. Starting an OpenVMS Installation

Action	Result
<p>1. If the SRM console is running, go to Step 4.</p> <p>If the ARC console is running from the Boot menu, select the Supplementary menu...; then select Set up the system... From the Setup menu, select Switch to OpenVMS or OSF console. Select Switch to OpenVMS.</p>	<p>Selecting Switch to OpenVMS causes the system to run the SRM console after the next power-cycle.</p>
<p>2. Cycle the system's power.</p>	<p>Cycling power after selecting the DEC OSF/1 or OpenVMS console results in the system restarting with the SRM console running.</p>
<p>3. Insert the OpenVMS CD-ROM into the CD drive.</p>	<p>CD-ROM drawer closes.</p>
<p>4. At the SRM prompt (>>>), type: show dev</p>	<p>List of devices displays:</p> <pre>dka0.0.0.6.0 DKA0 RZ26L 441A dka500.4.0.6.0 DKA500 RRD43 3213 dva0.0.0.0.1 DVA0</pre>
<p>5. From the SRM console, boot the OpenVMS CD-ROM. At the SRM prompt (>>>), type:</p> <pre>boot -flags 0,0 dka500</pre>	<p>Installation information is displayed and you are prompted to select an option. For more information, refer to the <i>OpenVMS Installation Guide</i>.</p>

G

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 Digital 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 five tables, which you can use to record the following information:

- Your system's hardware components (Table G-1)
- Your SCSI device address settings (Table G-2)
- Your system's system hardware configuration (Table G-3)
- The operating system or application software installed on your AlphaStation 600 Series system (Table G-4)
- Additional components (Table G-5)

Equipment Log

Table G-1. Hardware Components

Component	Vendor/ Type/Size	Model Number	Serial Number	Date Installed
System unit	AlphaStation	600 Series		
System unit key number				
Monitor				
Keyboard				
Mouse				
Installed diskette drive				
Additional storage device 1				
Additional storage device 2				
Additional storage device 3				
Additional storage device 4				
Additional storage device 5				

NOTE

See the regulatory label on the rear bulkhead for such information as the serial number.

Table G-2. SCSI Addresses

Device	Address	Device	Address

Equipment Log

Table G-3. Hardware Configuration

Component	AlphaStation 600 Series System Specifics
CPU speed and model	
Firmware version	
Memory size	
Video module	

Table G-4. Installed Software

Operating System or Application Software	Version Number	License Number	Date Installed

Table G-5. Additional Component Information

Component	Vendor	Model Number	Serial Number	Date Installed

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