

DIGITAL Personal Workstation
a/au-Series

User Information

Order Number: EK-ALUNX-UI. B01

July 1997

July 1997

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FCC Information - Class B

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

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

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

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

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

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

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

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Preface

Welcome

This guide discusses the features and operation of the DIGITAL Personal Workstation *a/au-Series* system. Use this information to set up, start, use, update, troubleshoot, and configure your workstation. You can also find general system information such as console commands and system care here.

Audience

If you are operating, configuring, or adding options to a DIGITAL Personal Workstation, *a/au-Series*, the information included here is helpful to you.

Organization of the Information

This guide includes general DIGITAL Personal Workstation information as well as specific discussions on particular features of the *a/au-Series* system.

The following topics (see the Table of Contents for a detailed listing) are covered:

- Chapter 1, *Getting Started*. Taking an initial inventory; creating a comfortable work environment; connecting external devices; installing, starting, restarting, and turning off the system; preloaded operating system software; and system security.
- Chapter 2, *System Overview*. System features, including front view, rear view, system components, connectors, MLB, and riser card.
- Chapter 3, *Configuring Your System*. Using firmware to configure your system. This chapter includes sections on the *a-Series* and *au-Series* systems as well as instructions for migrating your *au-Series* system to Windows NT or to a dual-boot environment.

Preface

- Chapter 4, *Installing System Options*. Preparing your workstation for expansion; removing and replacing system cover, front door, and bezel; installing expansion boards and internal drives; connecting external devices; and installing the lock.
- Chapter 5, *Installing Main Logic Board Options*. Installing memory for your *a/au-Series* system and replacing the battery.
- Chapter 6, *Troubleshooting*. Basic tips, identifying and solving problems, diagnostics, and advanced problem solving.
- Appendix A, *System Care*.
- Appendix B, *Technical Specifications*.
- Appendix C, *Device Mapping*.
- Appendix D, *Updating System Firmware*.
- Appendix E, *Installing an Operating System*.
- Appendix F, *Equipment Log*.

Conventions

This guide uses the following conventions:

Example	Description
<code>c:\windows</code>	Monospaced text indicates file names, path names, directories, or screen text. Each operating system has its own specific syntax.
[Enter]	Square brackets surrounding text represent a key on the keyboard.
[Ctrl]+[R]	A plus sign indicates that you press both the keys shown at the same time.
	A pointing hand indicates a reference to additional information.

Abbreviations

This guide uses the following abbreviations:

Abbreviation	Meaning
CD	Compact disc.
CD-ROM	Compact disc read-only memory.
DIMM	Dual inline memory module.
DMA	Direct memory access.
DRAM	Dynamic random access memory.
DROM	Diagnostic read only memory.
EIDE	Enhanced integrated drive electronics.
FDC	Floppy disk controller.
flashROM	Electrically erasable, rewriteable, nonvolatile memory.
GB	A GB suffix to a numerical value indicates size in <i>gigabytes</i> (for example, 1 GB). A gigabyte equals 1,073,741,824 bytes.
IRQ	Interrupt request.
ISA	Industry-standard architecture.
Kb	A Kb suffix to a numerical value indicates size in <i>kilobits</i> (for example, 512 Kb). A kilobit equals 1024 bits.
KB	A KB suffix to a numerical value indicates size in <i>kilobytes</i> (for example, 640 KB). A kilobyte equals 1024 bytes.
LED	Light-emitting diode.
MAU	Media adapter unit.
Mb	An Mb suffix to a numerical value indicates size in <i>megabits</i> (for example, 10 Mb). A megabit equals 1,048,576 bits.
MB	A MB suffix to a numerical value indicates size in <i>megabytes</i> (for example, 550 MB). A megabyte equals 1,048,576 bytes.
MHz	Megahertz.
MII	Media independent interface.
ns	Nanoseconds.
NVRAM	Nonvolatile random access memory.
PCI	Peripheral component interconnect.
RISC	Reduced instruction set computing.
ROM	Read only memory.
SCSI	Small computer system interface.
SDRAM	Synchronous dynamic random access memory.

Preface

Special Notices

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

- A **WARNING** indicates the presence of a hazard that can cause personal injury.
- A **CAUTION** indicates the presence of a hazard that can damage hardware or corrupt software.
- A *NOTE* gives general information, such as compatibility with other products or pointers to other information.
- A **HINT** includes suggestions to make your computing tasks easier.

Additional Information Resources

You may wish to consult the following information resources to answer a broad range of questions regarding your DIGITAL Personal Workstation:

- *Quick Setup Guide* (order number ER-B30WW-IM) presents a graphical overview of the DIGITAL Personal Workstation system installation. (Note that not all DIGITAL Personal Workstation systems ship with USB.)
- *DIGITAL Personal Workstation a-Series Service Information* (order number AK-R4R6A-CA). This online material provides detailed service- and technical-related information for service providers.
- *DIGITAL Personal Workstation au-Series Service Information* (order number AK-R58QA-CA). This online material provides detailed service- and technical-related information for service providers.

For other product-related information, consult the DIGITAL Workstations Web site at <http://www.workstation.digital.com/>.

Your distributor or DIGITAL representative also can provide you with information on products and services.

Feedback

Our readers' opinions about this guide or any other DIGITAL manual are important to us. If you have any comments, we'd appreciate your taking the time to send us electronic mail at reader_comments@eng.pko.dec.com.

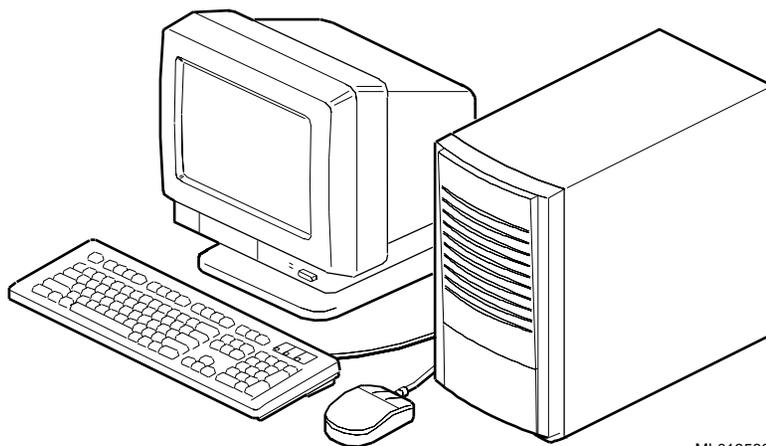
Please reference order number EK-ALUNX-UI. B01 in your correspondence about this manual.

1

Getting Started

Introduction

Your DIGITAL Personal Workstation *a/au-Series* is a high-performance system that uses the latest microprocessor and core logic technology. The system, housed in a mini-tower box, can stand alone or function as a client in an office network environment. This chapter includes an inventory list of the items shipped with your system and describes how to start, install, restart, and turn off your system. You can also find information here about preloaded software as well as guidelines for system security. Figure 1-1 shows a typical DIGITAL Personal Workstation configuration.



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Figure 1-1: DIGITAL Personal Workstation—Typical Configuration

Getting Started

Initial System Inventory

Check to make sure you received the following components with your system, and note the items in Appendix F, Equipment Log, for later reference:

- | | | |
|--|--------------------------------------|-------------------------------------|
| <input type="checkbox"/> Monitor | <input type="checkbox"/> System box | <input type="checkbox"/> Mouse |
| <input type="checkbox"/> Video cable | <input type="checkbox"/> Power cords | <input type="checkbox"/> Microphone |
| <input type="checkbox"/> Documentation | <input type="checkbox"/> Keyboard | <input type="checkbox"/> Headphone |

Your system may include different components from those listed. Consult the shipping list that came with your system for an accurate listing of parts. Also, you may refer to the *Quick Setup Guide* (ER-B30WW-IM) you received for a pictorial representation of the system.

If you think something is missing, contact your distributor or DIGITAL representative.

Getting Started

Pre-Startup Checklist

Before you start your system, perform the following checks:

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

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

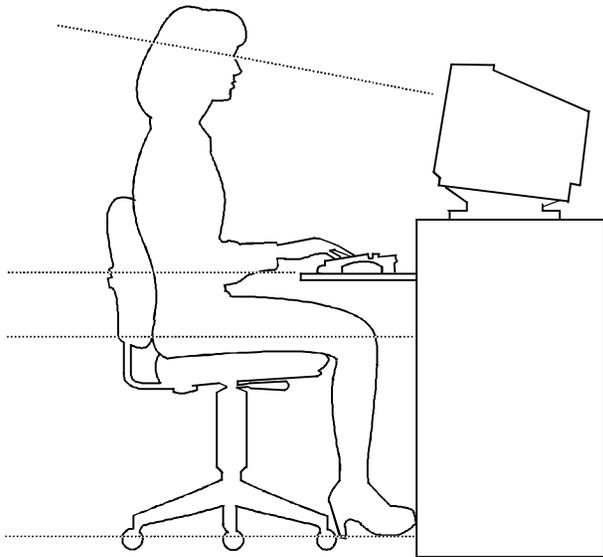
WARNING: When unpacking and moving system components, be aware that some components (such as the monitor) may be too heavy for you to safely lift alone. If you are doubtful about whether you can lift these items alone, please get assistance.

Creating a Comfortable Work Environment

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

Getting Started

Additional ergonomic information is provided on the CD-ROM that you received with your system.



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Figure 1–2: Recommendations for Posture and Work Habits

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.

Table 1–1: Recommendations for Posture and Work Habits

Adjust	To allow the following conditions
Chair	<ol style="list-style-type: none">1. Feet are flat on the floor.2. Legs are vertical and form a right angle to the floor.3. Your thighs are horizontal, and they are not bearing weight. Keep the backs of your knees away from the seat so you do not compress the area behind them, which could restrict the blood flow.4. Your upper body is erect and your lower back is supported with a backrest.

Getting Started

Table 1-1: Recommendations for Posture and Work Habits, continued

Adjust	To allow the following conditions
Keyboard and Mouse	<p>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.</p> <p>6. Upper arms are straight down at your sides, and elbows are close to your sides and support your arm weight. Forearms are at a 70- to 90-degree angle.</p> <p>7. If you use a mouse, rest your hand on the mouse so that your wrist is not on the work surface. Operate the mouse close to your body's centerline.</p>
Head	<p>8. Avoid neck strain. Your head should incline downward, but no more than 15 to 20 degrees.</p>
Monitor	<p>9. No higher than the level of your eyes and at the correct distance for your vision.</p> <p>10. 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.</p>
Work breaks	<p>Take periodic work breaks. Morning, lunch, and afternoon breaks during the 8-hour workday meet most recommendations. Take advantage of work breaks to move around and do other activities.</p>
Lighting	<p>Avoid direct lighting or sunlight on the screen, which causes glare and reflections. Place lighting behind or to the side of your work area, and distribute the lighting evenly on your work area.</p>
Noise	<p>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.</p>
Temperature	<p>20 – 23 degrees C (68 - 74 degrees F).</p>
Humidity	<p>30% – 70%.</p>
Ventilation	<p>Provide adequate air ventilation to operate the equipment and avoid fatigue.</p>
Work Space	<p>> 70 cm (28 inches) center to center, preferably between > 152 cm (60 inches).</p>

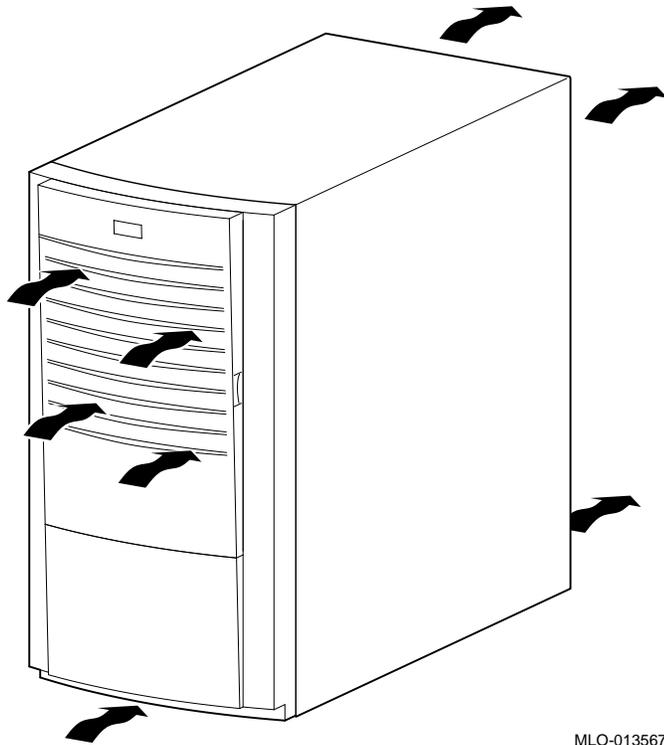
Getting Started

Installing Your System

The *Quick Setup Guide* you received with your system graphically outlines the installation steps.

CAUTION: To ensure proper cooling, verify that air can flow freely into the system front and out the rear of the system.

Position your system so that air can flow freely to and from the vents, as Figure 1–3 shows. Do not block any of the vents, especially those on the system rear or bottom front.



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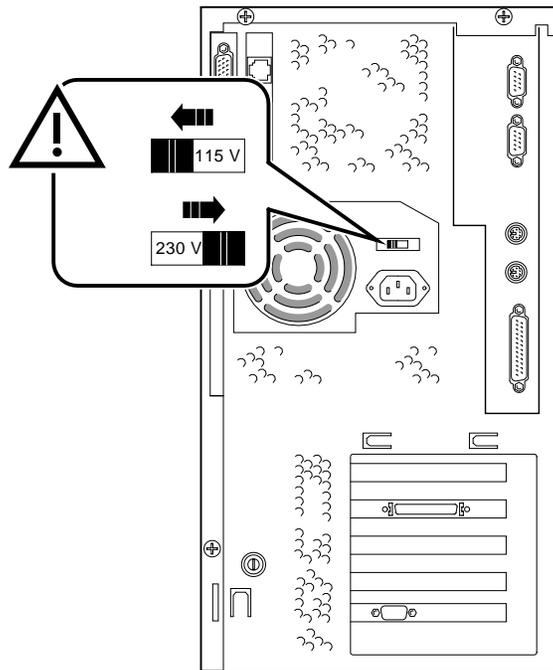
Figure 1–3: System Airflow

Getting Started

Connecting System Parts

To connect the components of your DIGITAL Personal Workstation *a/au-Series* system, perform the following steps:

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



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Figure 1-4: Voltage Selector Switch

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

2. Connect the mouse, keyboard, video cable, microphone, headphone, and power cords to the system components, as Figure 1-5 shows.

Getting Started

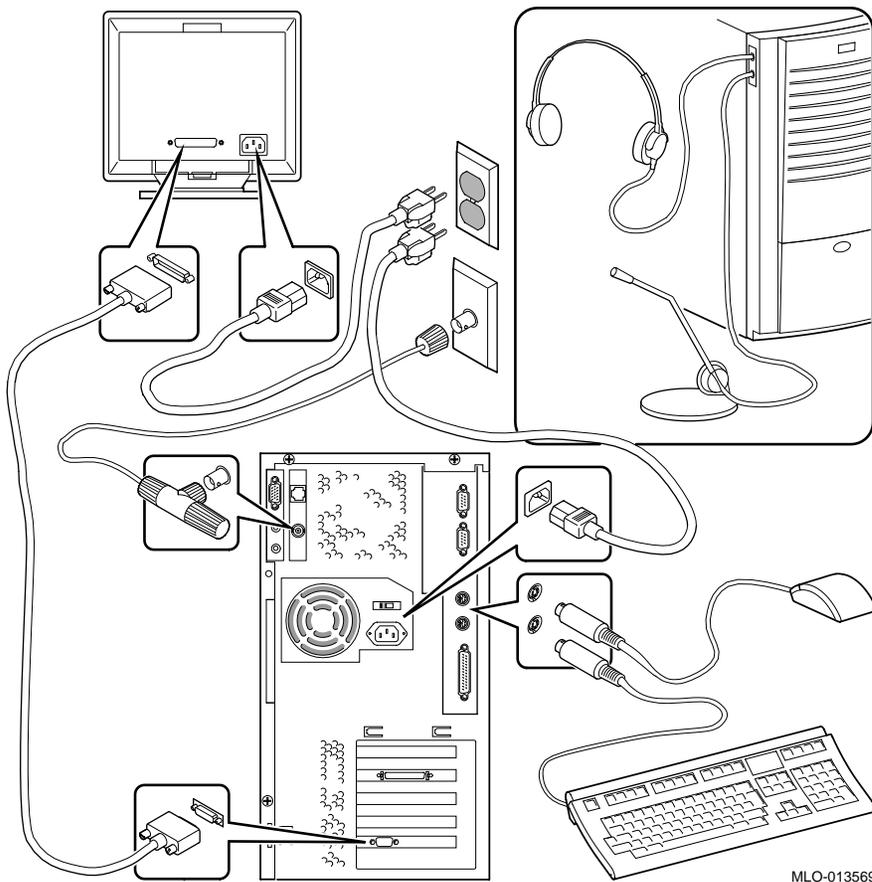


Figure 1–5: Connecting Cables and Power Cords

3. If a SCSI controller is installed and you have an optional external SCSI (small computer system interface) device or SCSI storage box, connect the SCSI cable to the SCSI port on the controller card.

Network Connection

Your DIGITAL Personal Workstation *a/au-Series* system has an embedded Ethernet LAN controller. Refer to Figure 1–5, which shows the MAU installed, and connect your system to the network.

Your system was preconfigured with either a 100 Mbps MII *or* a 10 Mbps MAU.

Getting Started

The internal network cables are already installed for you. Note that optional network kits are available. Contact your DIGITAL representative for more information about the availability of these options.

Connecting External System Devices

The following sections describe how to install the following devices into your system:

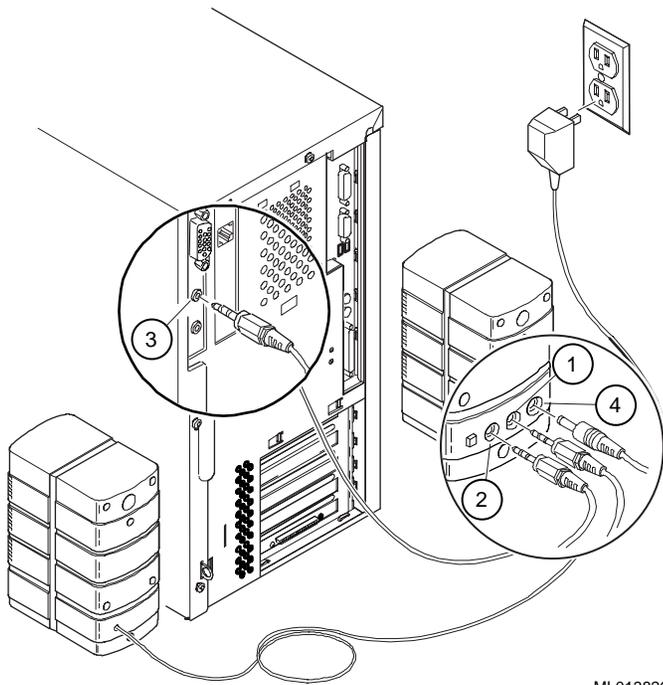
- Speakers
- MIDI/Joystick (not available on all DIGITAL Personal Workstations)
- Local printer

Speakers

If you purchased speakers for your workstation, refer to Figure 1–6 and perform the following steps to connect them:

1. Unpack the speakers.
2. Plug the slave speaker cable into the master speaker "Speaker Output" ①.
3. Connect the loose cable to the master speaker "Audio Input" ② and to the adapter card "Speaker Out" ③.
4. Connect the AC-to-DC adapter cord ④ to the master speaker.
5. Plug the speaker AC-to-DC into a power outlet.

Getting Started



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Figure 1–6: Connecting Speakers

NOTE: Figure 1–6 is representative of typical speaker systems. Your speakers and their connections may vary, depending upon the particular make and model. Refer to the documentation that came with your speakers for further information.

Getting Started

MIDI/Joystick

If you purchased a MIDI/joystick device for your workstation, refer to Figure 1–7 and perform the following steps to connect it:

1. Unpack the MIDI/joystick device.
2. Connect the MIDI/joystick device cable into the MIDI port connector on the adapter card, as Figure 1–7 shows.

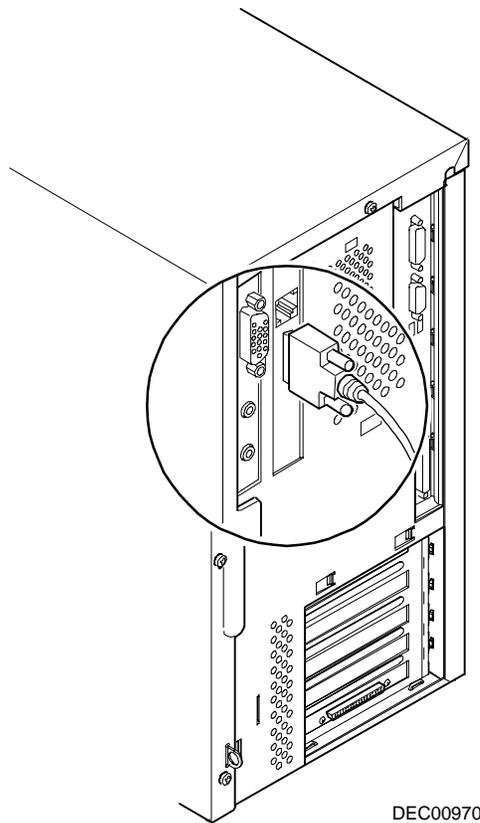


Figure 1–7: Connecting a MIDI/Joystick Device

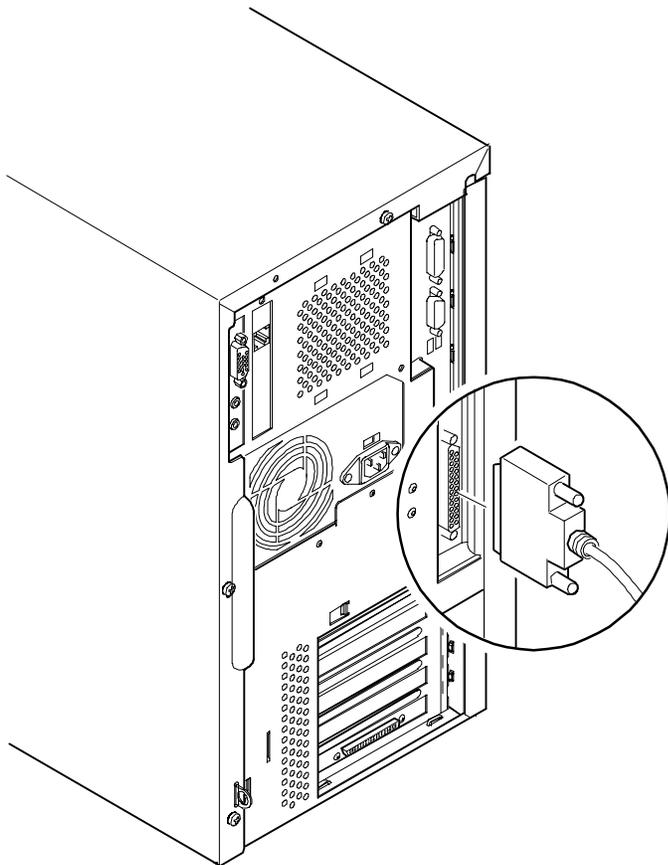
Local Printer

Perform the following steps to connect a local printer to your workstation:

1. Review your printer documentation and perform any pre-installation instructions before attempting to connect it to your workstation.
2. Make sure your printer and workstation are turned off.

Getting Started

3. Plug the printer cable into the appropriate printer port (the parallel port for a parallel printer and a serial port for a serial printer), as Figure 1–8 shows.
4. Turn your printer and workstation on.
5. Configure your printer for operation with your workstation.



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Figure 1–8: Connecting a Printer



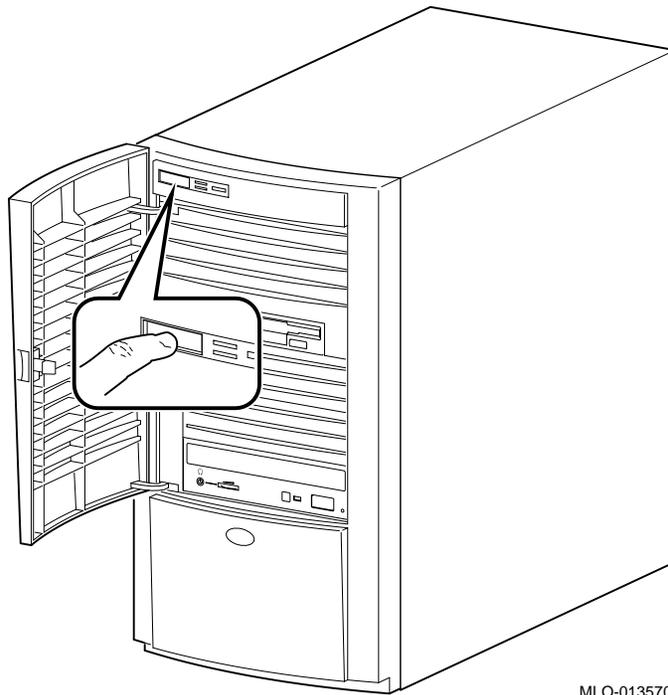
Refer to your operating system online Help and printed documentation for instructions on installing your printer's device driver.

Getting Started

Starting Your System

Perform the following steps to start (boot) your DIGITAL Personal Workstation:

1. Plug the power cord into the wall.
2. Turn on any external devices, system unit power, and monitor power. Figure 1-9 shows the location of the system unit power button.



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Figure 1-9: Starting Your System

3. After waiting for the monitor to warm up, if necessary, adjust the contrast and brightness to obtain a readable screen display. (Refer to the information supplied with your monitor for adjustment instructions.)
4. Allow your system to complete the power-on self test (POST) and device initialization. (This takes approximately 1 minute.)

Getting Started

Preloaded Operating System Software

All *a-Series* systems are shipped with the Microsoft Windows NT operating system. The DIGITAL UNIX operating system is preloaded on all *au-Series* systems.

Turning Off Your System

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

Microsoft Windows NT (*a-Series* System)

Perform the following steps, in order, to turn off your system:

1. Close any application data files you have open as well as any applications you have running. Most application programs prompt you to save the information before closing.
2. Shut down the operating system with the appropriate command.
3. To shut down your operating system, follow these steps:
 - Click on `Start` on the Windows NT toolbar.
 - Select `Shut Down . . .`
 - The Shut Down Windows menu displays.
 - Select `Shut down the computer?`
4. Wait for the operating system to complete the shutdown process. Your system displays a message indicating it is safe to turn off or restart the system.

CAUTION: Do not turn off power to your system or peripherals until the shutdown sequence has completed.

5. To turn off power, press the momentary contact power pushbutton.
6. Disconnect the power cord from the wall before servicing your system.

WARNING: Always disconnect the power cord from the wall before servicing your system.

Getting Started

DIGITAL UNIX (*au-Series System*)

Perform the following steps, in order, to turn off your system:

1. Close any application data files you have open as well as any applications you have running. Most application programs prompt you to save the information before closing.
2. To shut down your operating system, follow these steps:
 - NOTE: You must be a superuser to shut down the system.*
 - Open a terminal window.
 - Type `Shutdown -h now`.
 - The system returns to the SRM console.
3. Your system displays a message indicating it is safe to turn off or restart the system.

CAUTION: Do not turn off power to your system or peripherals until the shutdown sequence has completed.

4. To turn off power, press the system unit power button.
5. Disconnect the power cord from the wall before servicing your system.

WARNING: Always disconnect the power cord from the wall before servicing your system.

Getting Started

Computer Security

Your DIGITAL Personal Workstation *a/au-Series* system includes several software-related security features. See your operation system documentation for more information on the use of these options.

In addition, some of the hardware-related security features are outlined below.

Chassis Lockdown Hasp

A chassis lockdown hasp is secured to the side of the chassis at the lower-left rear of your workstation. When secured with a customer-supplied lock, this hasp prevents others from opening and removing the workstation's outside cover. Using a chain or cable lock, you can secure your workstation to your desk or table as well. See Chapter 4, *Installing System Options*, for details on orienting the hasp.

Optional Lock

You may wish to purchase a Kensington lock (order number PCP3H-AG) for your DIGITAL Personal Workstation *a/au-Series*. See Chapter 4, *Installing System Options*, for instructions on installing this lock.

Passwords

For additional security, most screen saver and pause screen displays can have password protection enabled. Also see Chapter 6, *Troubleshooting*.

2

System Overview

Introduction

This chapter gives an overview of the DIGITAL Personal Workstation *a/au-Series* system. Topics covered include the hardware components, such as the main logic board (MLB), PCI (peripheral component interconnect) architecture, front panel, rear panel, system unit components, and riser card.

System Features

Your DIGITAL Personal Workstation *a/au-Series* system uses a high-performance DIGITAL Semiconductor 21164 CPU chip.

Common System Features

System features common to both the *a-Series* and *au-Series* systems follow:

- ECC protection for main memory.
- 1 MB flashROM.
- 64 MB to 1.5 GB synchronous DRAM main memory.
- Standard keyboard, mouse, floppy, parallel, and dual serial ports.
- CD-quality audio.
- Eight diagnostic LEDs and one power-on LED.
- Mini-tower deskside enclosure.
- 300-watt power supply.
- Five option slots, including two PCI slots and three ISA/PCI combination slots.

System Overview

- Six drive bays, including: one front-access 3.5-inch floppy bay; three front-access 5.25-inch by 1.6-inch half-height drive bays; and two internal 3.5-inch by 1.0-inch bays for hard disk drives (HDDs).
- 100 Mbps (10BaseT, Twisted Pair) Ethernet or *optional* 10 Mbps (10Base2, ThinWire).
- ATAPI CD-ROM.

Specific *a/au-Series* System Features

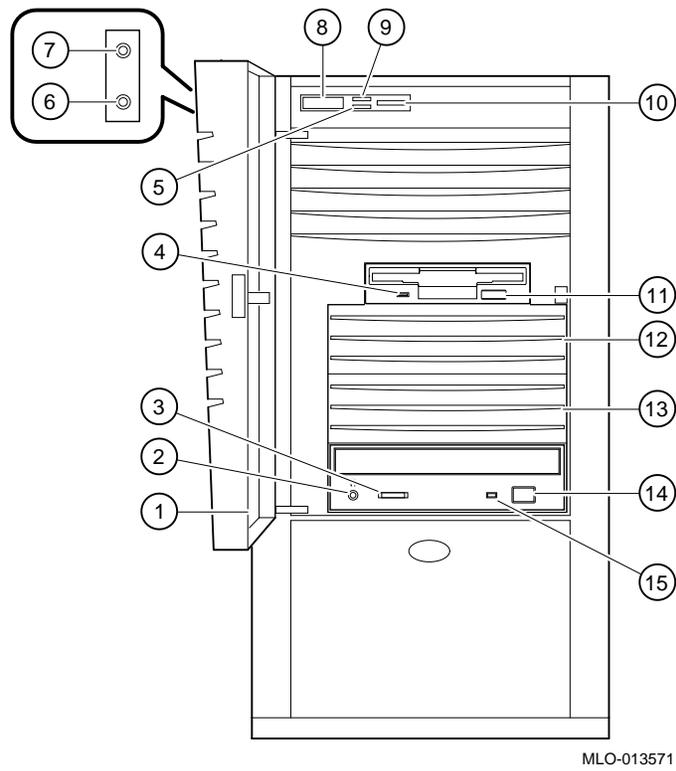
The *a-Series* system was preloaded with the Windows NT operating system. In addition, it includes the Enhanced IDE (EIDE) interface with up to four internal devices.

The *au-Series* system was preloaded with the DIGITAL UNIX operating system.

System Front View

Figure 2-1 is a front view of the system (with the door open) showing the location of the controls and indicators. Table 2-1 describes these items. Your system controls and indicators may be in slightly different positions from those shown.

System Overview



MLO-013571

Figure 2-1: System Front View

System Overview

Table 2-1: Front Components

Figure Legend	Control or Indicator	Function
1	Front door (shown in the open position)	Removable front door.
2	CD-ROM headphone jack	This jack enables you to connect standard stereo headphones so you can listen to audio output from your CD-ROM drive.
3	CD-ROM volume dial	This dial enables you to control the volumes of the CD-ROM headphone audio output from your CD-ROM drive. Volume decreases as the dial is turned to the left and increases as it is turned to the right.
4	Floppy diskette activity LED	Lights when the floppy drive is in use.
5	Disk activity LED	Lights when IDE or the SCSI bus is active.
6	Headphone jack (located on side)	This jack enables you to connect standard stereo headphones to your workstation.
7	Microphone jack (located on side)	This jack enables you to connect a standard microphone to your workstation.
8	System unit power button	Turns workstation on or off.
9	Power LED	Lights when your workstation is on.
10	Reset switch	Resets your workstation and causes power-on self-test to run.
11	Floppy diskette eject button	Releases a 3.5-inch floppy diskette from the diskette drive.
12 & 13	Drive bays	Enable you to add a mass storage device to your workstation
14	CD-ROM eject button	Pressing this button opens and closes the CD-ROM drive cavity so that you can insert or remove CD-ROM disks from the drive.
15	CD-ROM activity light	This LED lights during power-up and during CD-ROM disk access.

System Overview

System Rear View

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

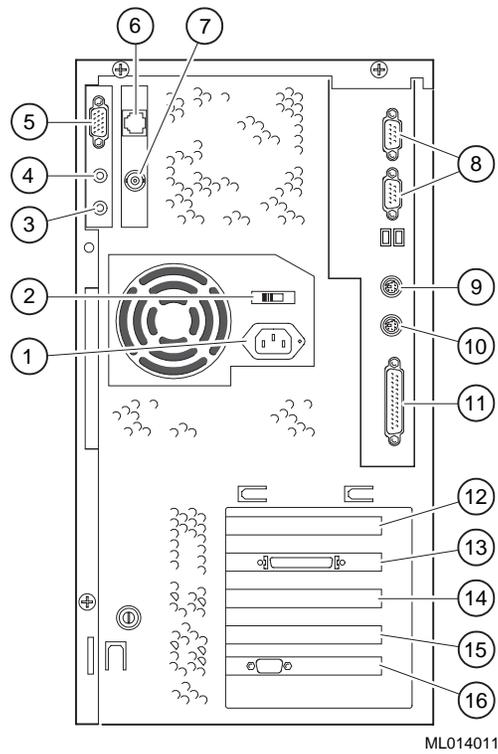


Figure 2-2: Rear Connectors

System Overview

Table 2-2: Rear Connectors

Figure Legend	Connector	Function
1	AC power connector	Connects the system to AC power.
2	Voltage selector switch	Allows you to set your system to work with 115 or 230 Volts AC power.
3	Audio line In	Brings audio signals into the system (for example, from a stereo amplifier).
4	Speaker Out	Brings audio output signals to a speaker or headphone.
5	MIDI/joystick	Allows you to connect a MIDI adapter or joystick.
6	Ethernet Twisted Pair	Connects to the embedded Ethernet controller.
7	ThinWire Ethernet	Connects to the embedded Ethernet controller.
8	COM ports 1 (<i>bottom</i>) and 2 (<i>top</i>)	Connectors for communication ports 1 and 2.
9	Mouse	Connects a PS/2-compatible mouse.
10	Keyboard	Use to connect a 101- or 102-key keyboard.
11	Parallel port	Connects an industry-standard parallel printer or other parallel device to the enhanced bidirectional parallel controller.
12	Slot 1: PCI expansion slot ¹	Used for 32-bit PCI expansion options.
13	Slot 2: PCI/ISA combination slot ¹	Used for either an ISA option or a 32-bit PCI option (for example, SCSI controller, as shown).
14	Slot 3: PCI/ISA combination slot ²	Used for either an ISA option or a 32-bit PCI option.
15	Slot 4: PCI/ISA combination slot ²	Used for either an ISA option or a 64-bit PCI option.
16	Slot 5: PCI expansion slot ²	Used for 64-bit PCI expansion options (for example, video option, as shown).

¹ Slots 1 and 2 are half-size.

² Slots 3 through 5 are full-size.

System Overview

System Unit Components

Figure 2-3 shows the location of the system unit components. Table 2-3 lists the system unit components.

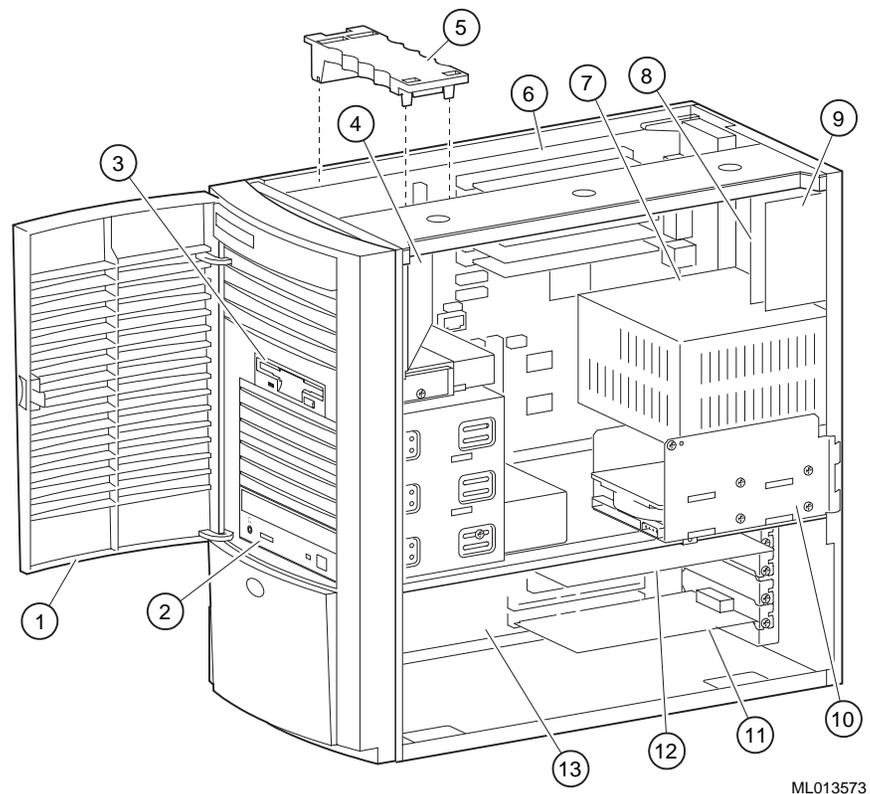


Figure 2-3: System Unit Components

System Overview

Table 2-3: System Unit Components

Figure Legend	Component
1	Front door assembly.
2	Front-access 5.25-inch drive bay with CD-ROM drive.
3	3.5-inch floppy diskette drive.
4	Fan pipe for cooling CPU.
5	MLB (main logic board) retainer bracket. ¹
6	MLB.
7	Power supply.
8	Ethernet connector card (MAU or MII).
9	Audio connector card.
10	Internal 3.5-inch drive bay(s) to support EIDE or SCSI devices.
11	64-bit (or 32-bit) PCI option installed on the riser card.
12	ISA card installed in a PCI/ISA combination slot.
13	Riser card.

¹ Placement of the MLB bracket is important to prevent damage to the MLB. (Proper positioning for the *a/au-Series* system is over the frontmost dimple.)

System Overview

Main Logic Board (MLB)

Figure 2-4 shows the locations of the *a/au-Series* system MLB components. Table 2-4 lists the MLB components.

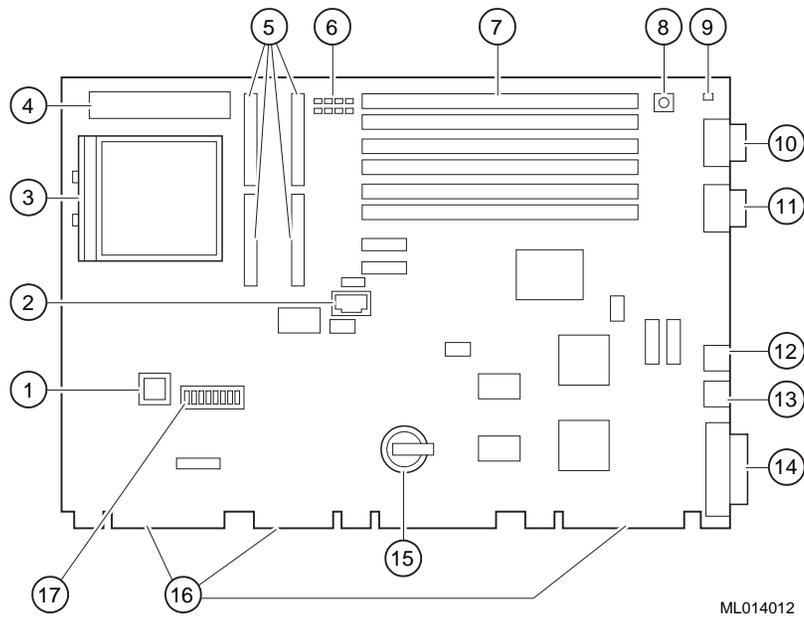


Figure 2-4: MLB Components

System Overview

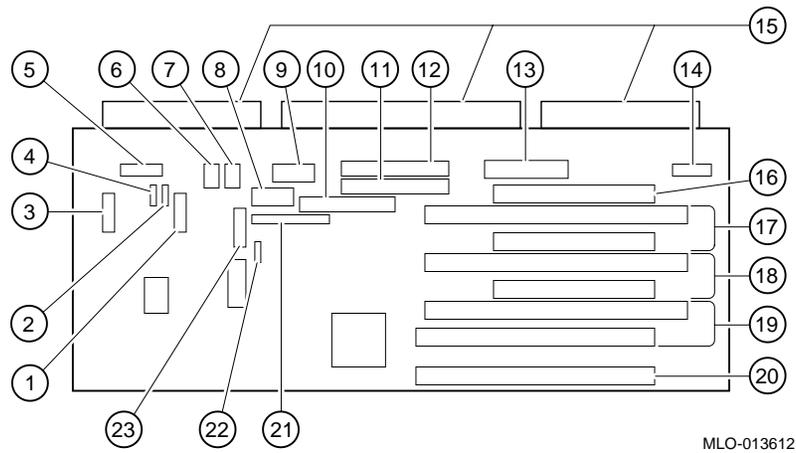
Table 2-4: MLB Components

Figure Legend	Component
1	SROM socket (manufacturing use).
2	SROM diagnostic serial port (manufacturing use).
3	DIGITAL Semiconductor 21164 CPU chip (in ZIF socket).
4	CPU voltage regulator.
5	Cache connectors.
6	Bank of eight diagnostic LEDs.
7	Six DIMM (dual in-line memory module) sockets J1 (bottom slot) through J6 (top slot).
8	Test/diagnose (halt) button.
9	Power LED.
10	COM port 2.
11	COM port 1.
12	Mouse port.
13	Keyboard port.
14	Parallel port.
15	Battery.
16	Connections for riser card.
17	CPU clock frequency selection switch bank.

Riser Card

Figure 2-5 shows the riser card components for the *a/au-Series* system. Table 2-5 lists the riser card components.

CAUTION: Take care to align connectors properly when inserting components.



MLO-013612

Figure 2-5: Riser Card Components

System Overview

Table 2-5: Riser Card Components

Item	Component
1	MIDI /game connector (J14).
2	CD audio In (J11).
3	Audio connector (J13).
4	FAX/modem In (J12).
5	Front panel, side audio, and internal speaker (J15).
6 & 7	Fan In connectors.
8	Power.
9	Not used.
10	FDC connector for floppy diskette drive.
11	<i>a-Series</i> : Secondary EIDE connector (J20). <i>au-Series</i> : Not used.
12	<i>a-Series</i> : Primary EIDE connector (J21). <i>au-Series</i> : CD-ROM connector (J21).
13	Power (+3.3, ± 5 , ± 12) (J9).
14	Not used.
15	Riser card connectors (three) to the MLB.
16	32-bit half-size PCI slot (slot 1).
17	32-bit half-size PCI/ISA combination slot (slot 2).
18	32-bit full-size PCI/ISA combination slot (slot 3).
19	64-bit full-size PCI/ISA combination slot (slot 4).
20	64-bit full-size PCI slot (slot 5).
21	MII connector for 100 Mbps (100BaseT, Twisted Pair) Ethernet (J26).
22	HD active LED (J10).
23	<i>a-Series</i> : AUI Ethernet connector for ThinWire (10Base2) and Twisted Pair (10BaseT) (J7). <i>au-Series</i> : MAU Ethernet connector for ThinWire (10Base2) and Twisted Pair (10BaseT) (J7).

3

Configuring Your System

Introduction

This chapter explains how to:

- configure your DIGITAL Personal Workstation
- migrate to Windows NT (*au-Series* systems only)
- migrate to a dual-boot environment (*au-Series* systems only)

See the specific sections that follow for information on configuring an *a-Series* system running the Microsoft Windows NT operating system; an *au-Series* system running the DIGITAL UNIX operating system; or an *au-Series* system migrating to Windows NT or to a dual-boot environment.

Configuring an *a-Series* System

This section shows you how to configure your *a-Series* system running the Microsoft Windows NT Workstation operating system using the AlphaBIOS firmware.

NOTE: The screens shown are examples only. Your system display may vary from the examples shown.

Using AlphaBIOS Firmware

AlphaBIOS firmware supports the Microsoft Windows NT Workstation operating system. You can use AlphaBIOS firmware to perform various configuration tasks, such as:

- Selecting a copy of the Windows NT system to boot.
- Displaying system configuration information.
- Setting up the hard disk.
- Setting the date and time.

Configuring Your System

- Enabling and setting the delay for auto start.
- Setting or changing the AlphaBIOS password.
- Setting up boot utilities.

Starting AlphaBIOS

When the system is powered on, and the power-on self-tests (POST) successfully complete, the AlphaBIOS firmware is loaded and started. AlphaBIOS performs several initialization tasks, including: initialize the keyboard and video devices, test memory, and detect and initialize disk controllers. After the video device is initialized, subsequent steps are displayed on the monitor in an initialization window.

When initialization is complete, AlphaBIOS leaves the initialization window and displays the boot screen.

Booting the System

The system is booted from the boot screen (Figure 3–1). The boot screen lists each of the different copies of the Windows NT operating system that have been installed on your system. Choose the operating systems to boot and press [Enter] or enter the AlphaBIOS Setup program by pressing [F2].

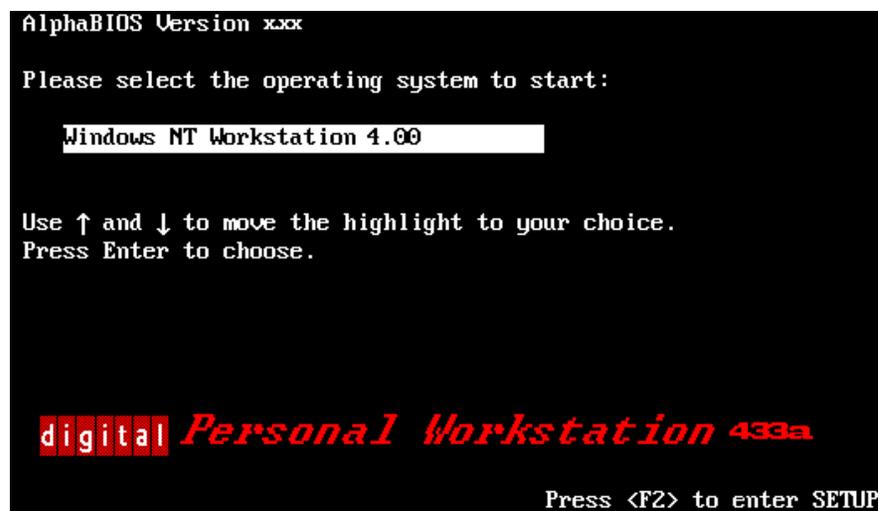


Figure 3–1: AlphaBIOS Boot Screen

Configuring Your System

AlphaBIOS Setup

Start the AlphaBIOS Setup program by pressing [F2] while the boot screen is displayed. Figure 3-2 shows the AlphaBIOS Setup screen. Use the setup screen to select the desired task. Press [Escape] to return to the boot screen.

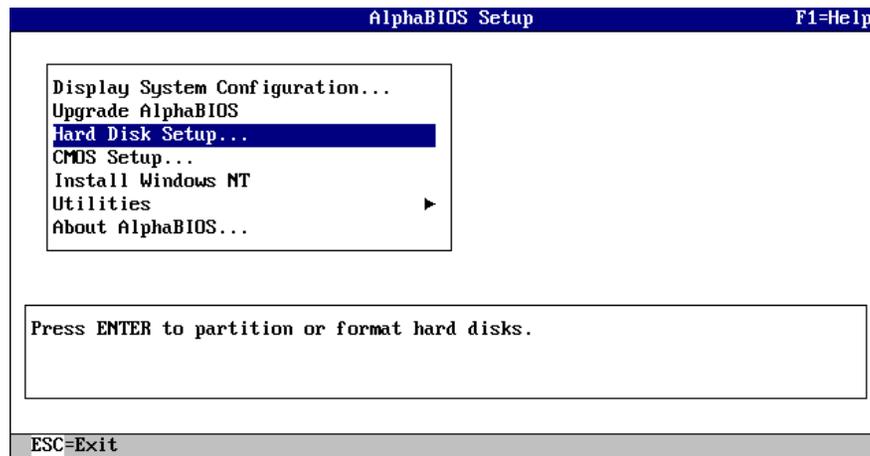


Figure 3-2: AlphaBIOS Setup Screen

Configuring Your System

Displaying Your Configuration

AlphaBIOS provides a clear, easy-to-read display of the system configuration. The display is organized by systemboard, memory, hard disk, PCI, and integrated devices. From the AlphaBIOS Setup screen, select Display System Configuration and press [Enter]. From the Display System Configuration screen, use the arrow keys to select the configuration category you wish to view. Figure 3-3 shows the Systemboard Configuration category.

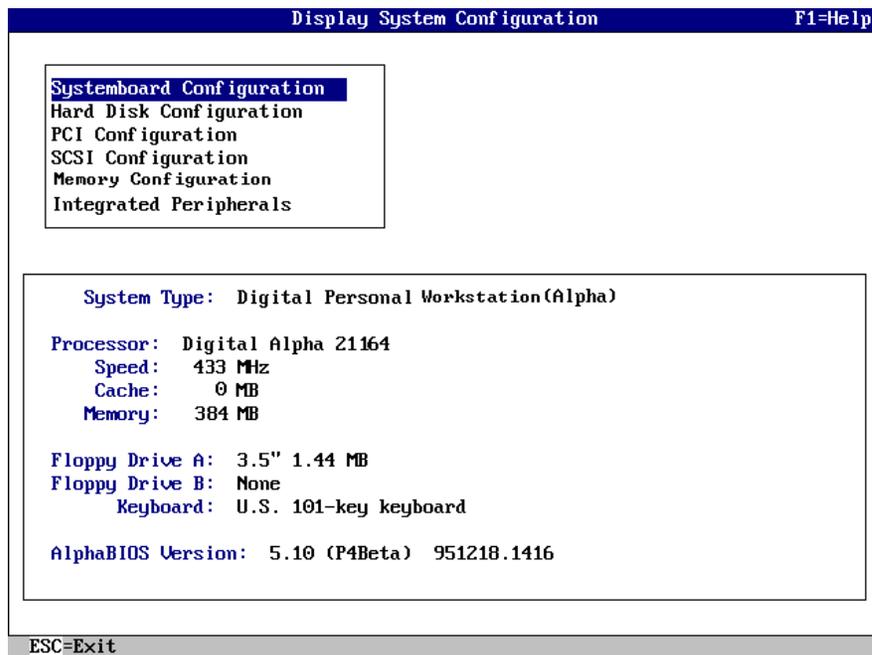


Figure 3-3: Display System Configuration Screen

Memory Configuration

The memory configuration display shows bank size, the starting address of each bank, and the capacity of the DIMMs in the bank.

PCI Configuration

The PCI configuration screen displays both the embedded and the slot-mounted PCI devices. The device names and types, along with their respective revision levels, are displayed.

Configuring Your System

SCSI Configuration

If you ordered a base system configuration, you have the option of ordering either an Adaptec 2950 ultrawide SCSI adapter or a Qlogic 1040B ultrawide adapter (SN-KZPBA-CA). If you ordered a packaged system, your system came with an embedded Qlogic adapter.

Integrated Peripherals

The integrated peripherals screen display shows the addresses and IRQs of the serial and parallel ports.

Setting Up the Hard Disks

AlphaBIOS makes it easy to format and partition hard disks on the system. Typically, you partition and format drive 0. Using the Windows NT Disk Administrator, you can quickly partition and format the other drives. Select Hard Disk Setup from the AlphaBIOS Setup screen. Figure 3–4 shows the Hard Disk Setup screen.

Hard Disk Setup			F1=Help
Disk 0	NCRC810 #0, SCSI ID 0	1001 MB	
	Partition 1	995 MB	FAT
	Partition 2	6 MB	FAT
Disk 1	NCRC810 #0, SCSI ID 3	510 MB	
	Partition 1	200 MB	FAT
	Unused	310 MB	
INSERT=New DEL=Delete F6=Format F7=Express ESC=Exit			

Figure 3–4: Hard Disk Setup Screen

Press [F7] to perform an express disk setup. The express setup command partitions and formats the selected disk in the recommended manner (6 MB FAT system partition).

CMOS Setup Tasks

Use the CMOS setup program shown in Figure 3–5 to configure system parameters such as the date and time, floppy drive types and capacities, keyboard country and style, and auto start enabling and delay. There also is an advanced CMOS setup mode used to control PCI parity checking, memory testing, and AlphaBIOS password.

To enter CMOS Setup, select CMOS Setup from the AlphaBIOS Setup screen. Use [Tab] to move among the fields.

Configuring Your System

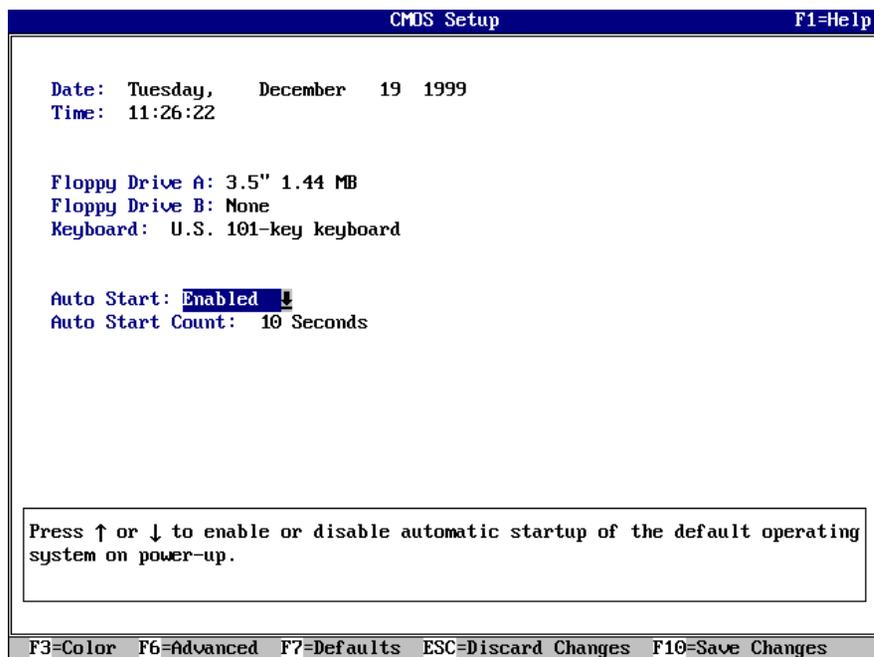


Figure 3-5: CMOS Setup Screen

Date and Time

When setting the time, use the 24-hour format; for example, 10:00 P.M. should be expressed as 22:00:00.

Configuring Your System

Floppy Drive

AlphaBIOS supports the following drive types:

- 3.5-inch, 1.44-MB (shipped with system)
- 5.25-inch, 1.2-MB
- 3.5-inch, 2.88-MB

Keyboard

The keyboard setting allows the use of nearly any language keyboard available. To ensure correct character mappings, make sure that the language of your keyboard, Microsoft Windows NT Workstation, and the keyboard-language selection in CMOS setup all match.

Auto Start and Auto Start Count

The Auto Start setting determines whether the primary operating system is automatically started after the system is reset or power-cycled. The Auto Start Count setting is the amount of time the boot screen is displayed before the default system is automatically started. This delay gives you the opportunity, after resetting or power-cycling the system, to select another operating system to start *or* to enter AlphaBIOS setup.

CMOS Setup Options

- **Color.** Pressing [F3] repeatedly cycles through the available AlphaBIOS color schemes.
- **Advanced.** Pressing [F6] displays the Advanced CMOS Setup screen.
- **Defaults.** Pressing [F7] restores the default standard CMOS setup values without affecting the advanced CMOS setup values.
- **Discard Changes.** Pressing [Escape] restores the settings that were in effect when you started CMOS setup. This option also discards changes made in advanced CMOS setup.
- **Save Changes.** Pressing [F10] saves changes made in both the standard and advanced modes of CMOS setup.

Configuring Your System

Advanced CMOS Setup

Enter the advanced CMOS setup screen shown in Figure 3–6 by pressing [F6] in the CMOS Setup screen.

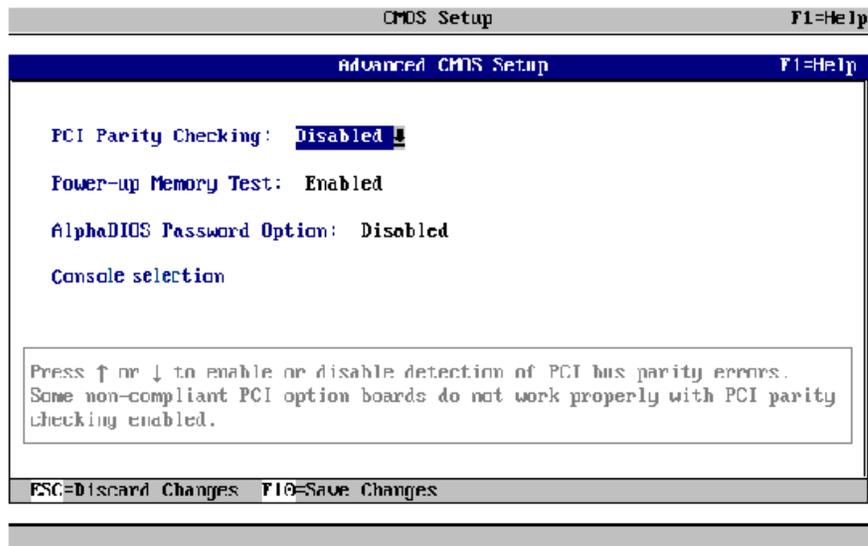


Figure 3–6: Advanced CMOS Setup Screen

PCI Parity Checking

This setting controls PCI parity checking at the PCI bridge chip. Parity checking is performed if enabled and ignored if disabled. The default is disabled. Certain PCI adapters have been known to generate bad parity on the PCI under certain loading conditions, which results in system errors. Ensure that your specific PCI configuration will operate correctly prior to turning on parity checking.

Extended Memory Test

Extended memory test can be enabled or disabled. When enabled, the memory test writes and then reads several patterns of data to main memory. This testing verifies the integrity of the memory but causes a slightly longer boot time.

Configuring Your System

Password Setup

To help maintain system security, AlphaBIOS provides two levels of password protection: system setup and system startup. When system setup protection is enabled, you need a password to enter the AlphaBIOS setup program. When system startup protection is enabled, you must enter a password before system initialization will take place. Startup password protection provides more comprehensive protection than setup password protection because the system cannot be used until you enter the correct password.

NOTE: To change the password, simply set up your password again.

Advanced CMOS Setup Options

- **Discard changes.** Pressing [Escape] restores the settings in effect when you entered advanced CMOS setup. This does not discard changes made to standard CMOS setup.
- **Save changes.** Pressing [F10] saves changes you have made in advanced CMOS setup. When exiting CMOS setup, you also must save your changes at the CMOS setup screen for the changes to be stored permanently.

Utilities

Two utilities, operating system selection and run a maintenance program, are available from the utilities menu.

Configuring Your System

OS Selection Setup

Each operating system selection is a set of information that describes the disk and partition containing OSLOADER.EXE, as Figure 3-7 shows.

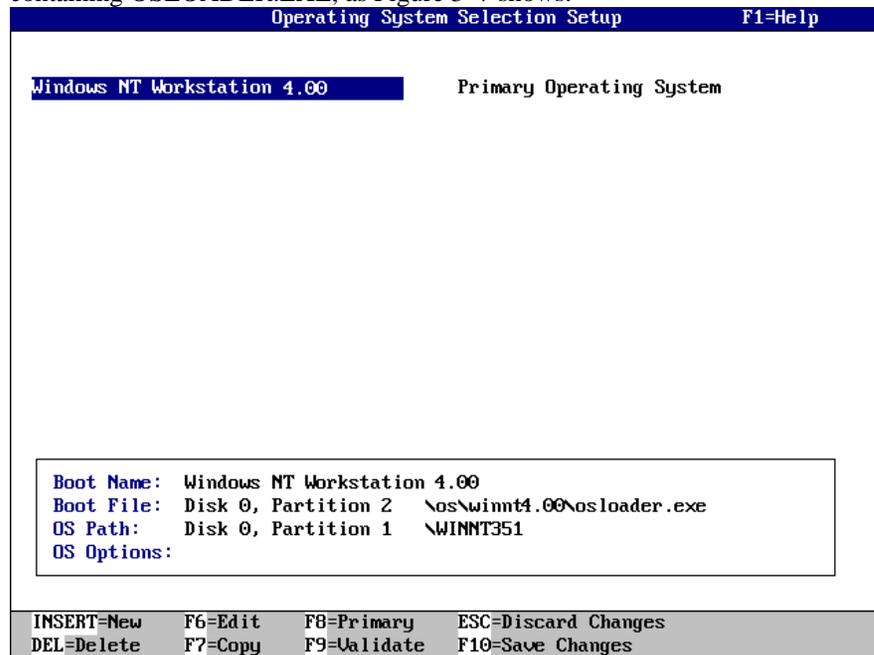


Figure 3-7: Operating System Selection

Running a Maintenance Program

A maintenance program, such as a RAID configuration utility, is run directly from the AlphaBIOS utility menu.

To run a maintenance program, follow this procedure:

1. Start AlphaBIOS setup, select Utilities, select Run Maintenance Program from the submenu, and press [Enter].

In the Current Partition field, select the hard-disk partition, floppy disk, or CD drive from which to run the program. Type the program name into the Program Name field.

Configuring an *au-Series* System

NOTE: The screens shown are examples only. Your system's display may vary from the examples.

Using SRM Firmware

Systems running the DIGITAL UNIX operating system use the SRM firmware. You can use the SRM firmware to perform various configuration tasks, such as:

- Booting the system.
- Setting environment variables.
- Displaying the system configuration.
- Adding ISA bus devices.
- Selecting a copy of the DIGITAL UNIX system to boot.

Conventions

Table 3–1 shows the conventions used in SRM firmware.

Table 3–1: SRM Conventions

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

Configuring Your System

Table 3–2 shows the special characters used in SRM firmware.

Table 3–2: SRM Special Characters

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

Booting the System

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>]
```

Configuring Your System

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

Table 3–3: SRM Boot Command

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 <code>set boot_file</code> command to set the environment variable that specifies a default boot file.
-flags <longword>[,<longword>]	Specifies additional information for the operating system. For DIGITAL UNIX systems, the following symbolic values may be used: i = interactive boot s = boot to single user a = autoboot to multiuser Use the <code>set boot_osflags</code> 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 <code>mop</code> or <code>bootp</code> .
-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 <code>set bootdef_dev</code> command to set an environment variable that specifies a default boot device.

Configuring Your System

Boot Command Examples

Table 3–4 shows boot command examples and their descriptions.

Table 3–4: Boot Command Examples

Command	Description
>>>boot	Boots the system from the default boot device.
>>>boot ewa0	Boots the system from Ethernet port ewa0. If you are booting over a network, set <i>ewa0_protocols</i> and <i>ewa0_inet_init</i> to BOOTP.
>>>boot -file dec2.sys ewa0	Boots the file named dec2.sys from Ethernet port ewa0.
>>>boot -protocol bootp ewa0	Boots using TCP/IP BOOTP protocol from Ethernet port ewa0.
>>>boot -flags 0,1	Boots the system from the default boot device using flag settings 0,1.
>>>boot -halt dka0	Loads the image from disk dka0, but remains in console mode.

Setting and Showing Environment Variables

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]
```

Configuring Your System

Table 3–5 describes the SRM set command options.

Table 3–5: SRM Set Command

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

Set Command Examples

Table 3–6 shows set command examples and their descriptions.

Table 3–6: SRM Set Command Examples

Command	Description
>>>set bootdef_dev ewa0	The default boot device is set to ewa0.
>>>set auto_action boot	The console attempts to boot following an error, halt, or power-up.
>>>set boot_osflags 0,1	The default boot flags are set to 0,1.
>>>set foobar 5	An environment variable called foobar is created and given a value of 5.

Configuring Your System

Show Command

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

The syntax of the show command is:

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

The show command options are described in Table 3–7.

Table 3–7: SRM Show Command

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

Configuring Your System

Show Command Examples

Table 3–8 lists show command examples and their descriptions.

Table 3–8: SRM Show Command Examples

Command	Description
>>>show device dka0.0.0.4.0 DKA0 Toshiba CD-ROM dkc0.0.0.1008.0 DKC0 RZ1BA-BS dkc100.1.0.1008.0 DKC100 Seagate ST15150W dva0.0.0.0.1 DVA0 ewa0.0.0.3.0 EWA0 00-00-F8-75-3A-5C pkc0.7.0.1008.0 PKC0 SCSI Bus ID 7 pqa0.0.0.4.0 PQA0 PCI EIDE pqb0.0.1.4.0 PQB0 PCI EIDE	Lists device information, such as system designation, drive model, or Ethernet address.
>>>show memory 192 MB of System Memory Bank 0=128 MB (Base address 00000000) Bank 1=64 MB (Base address 08000000) Bcache size=0 MB	Lists system RAM, bank sizes, and starting addresses.
>>>show * (See the environment variable section.)	Lists all variables and their settings.
>>>show boot* (See the environment variable section.)	Lists all variables beginning with boot.

Configuring Your System

Environment Variables

Table 3-9 shows selected environment variables and their descriptions (for a complete list, type show * at the SRM prompt).

Table 3-9: SRM Environment Variables

Variable	Description
<i>auto_action</i>	Sets/shows the console action following an error, halt, or power-up. The action can be halt , boot , or restart . Halt is the default.
<i>boot_file</i>	Sets/shows the file name to be used when a bootstrap requires a filename. The default setting is null.
<i>boot_osflags</i>	Sets/shows additional parameters to be passed to system software. When using DIGITAL UNIX software, the following parameters are valid: i = interactive boot s = boot to single user a = autoboot to multiuser
<i>bootdef_dev</i>	Sets/shows the default device or device list from which the system will attempt to boot. If the system software is preloaded, the variable is preset to point to the device containing the preloaded software. Otherwise, the default value is null.
<i>bus_probe_algorithm</i>	Selects which method the firmware uses to probe the PCI bus for PCI devices during initialization. Possible values are new and old . The default is new.
<i>console</i>	Sets the console output to either serial port or the graphics controller.
<i>control_scsi_term</i>	Unused.
<i>ewa0_inet_init</i>	Allows network booting operations. (In this case, possible values are BOOTP or MOP .)

Configuring Your System

Table 3–9: SRM Environment Variables (continued)

Variable	Description
<i>ewa0_mode</i>	Selects which Ethernet port to use: AUI (ThinWire); twisted-pair ; Full Duplex, twisted-pair ; BNC ; Fast (for Fast Ethernet controllers); or FastFD (for Fast Ethernet controllers that support Full Duplex). AUI is the default. (Auto-sensing is not supported.)
<i>ewa0_protocols</i>	Determines the Ethernet protocol, which can be either MOP or BOOTP . MOP is the default.
<i>kbd_hardware_type</i>	Selects the type of keyboard on your system. Possible values are LK411 or PCXAL . PCXAL is the default.
<i>language</i>	The language environment variable associates language <i>n</i> to the system (where <i>n</i> is the number of the language shown below). You can have the system prompt you for the language using the following command: <code>>>>set language 0</code> and then <code>>>>init</code> . Select the desired language. Type <code>>>>init</code> again, then power cycle the system.
<i>os_type</i>	Identifies the operating system being used on the system. Values of UNIX cause the SRM console to load.
<i>pci_parity</i>	<p>This variable 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 if sniff. Default is off.</p> <p>Certain PCI adapters have been known to generate bad parity on the PCI under certain loading conditions, which results in system errors.</p> <p>Ensure that your specific PCI configuration will operate correctly prior to turning on parity checking.</p>

Adding ISA Bus Devices

ISA Configuration Utility

ISA devices cannot be probed for configuration information by the DIGITAL UNIX operating system. Therefore, you must enter ISA option information manually using the ISA configuration utility. Run this utility before installing a new ISA option module on a DIGITAL Personal Workstation *au-Series* system running the DIGITAL UNIX operating system.

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

Configuring Your System

ICONFIG Utility

The ICONFIG utility is a subset of the ISACFG utility. Only one type of each field (or option) can be set (for example, one IRQ or one I/O address) in ICONFIG. Future versions will include more functionality.

Start ICONFIG at the SRM prompt by typing `>>>iconfig`[Return]. The following screen is displayed:

```
ISA CONFIGURATION UTILITY

ISA
Slot  Device Name  Type   Enabled I/O  IRQ  DMA

0      0      MOUSE  Embedded Y      60  12
      1      KBD    Embedded Y      60   1
      2      COM1   Embedded Y     3f8   4
      3      COM2   Embedded Y     2f8   3
      4      LPT1   Embedded Y     3bc   7
      5      FLOPPY Embedded Y     3f0   6     2
      6      EIDE   Embedded Y     1f0  14
      7      ES1888 Embedded Y     220   5     1
```

HELP: Enter up to 15 char device name

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

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

1. Enter up to 15 char device name `DE200-LE` [Tab]
2. Enter i/o address in hex `300` [Tab]
3. Enter IRQ channel in decimal `5` [Tab]
4. Enter dma channel in decimal [Tab]
5. Enter memory address in hex `d0000` [Tab]
6. Enter length of memory in hex `10000` [Tab]
7. Enter N to disable, Y to enable `Y` [Return]

Configuring Your System

When you press [Return], the entry is submitted and checked for conflicts. If conflicts exist, a message is displayed. For example, if you entered an IRQ value of 8 instead of 5, the following message is displayed:

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

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

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

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

ISACFG Utility Command Format

The syntax of the ISACFG command is:

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

The ISACFG command options are described in Table 3-10.

Configuring Your System

Table 3–10: SRM ISACFG Command

Command Option	Description
-all	Shows the entire configuration table. Overrides all other commands.
-dev <dev#>	Optional; defaults to 0 if not entered. On a multifunction or multiport adapter, this specifies the device on the adapter.
-dmachan{0-3} <#>	Allows you to specify up to four DMA (direct memory access) channels for the device.
-enadev <#>	Allows you to specify whether an entry is enabled or disabled. Disabled devices are not used in resource allocation calculations. The possible values are: 0 - No (disabled) 1 - Yes (enabled)
-etyp <#>	Defines an entry type for this entry. The # sign can be: 0 - Causes the entry to be deleted 1 - Single option 2 - Embedded multiport device 3 - Multiport option device
-handle <string>	Binds a name to the driver (up to 15 characters).
-init	Initializes the configuration table to the default settings.
-iobase{0-5} <#>	Specifies up to six I/O base registers (in hexadecimal) for a particular device entry.
-irq{0-3} <#>	Allows you to assign up to four IRQ (interrupt request) channels to the device (use decimal IRQ levels).
-membase{0-2} <#>	Specifies up to three R/W ISA memory regions (in hexadecimal).
-memlen{0-2} <#>	Specifies the length corresponding to membase{0-2} (in hexadecimal).
-mk	Adds an entry into the table.
-mod	Modifies an entry in the table.
-rm	Deletes an entry from the table.
-rombase <#>	Specifies an address for ISA BIOS ext. ROM (in hexadecimal).
-romlen <#>	Specifies length of ROM (in hexadecimal).
-slot <slot#>	Allows you to enter a unique slot number for each ISA adapter. You may assign the numbers in any order. The slot number does not relate to a physical ISA adapter position. Slot 0 is reserved for the MLB devices.
-totdev <#>	Placeholder for you to keep track of the total number of devices, specified by the # sign, at this slot. Modify this for your own use.

Configuring Your System

Adding ISA Options to DIGITAL UNIX Systems

When you add a supported ISA option to an DIGITAL Personal Workstation *au-Series* system running the DIGITAL UNIX operating system, perform the procedure shown in Table 3-11.

Table 3-11: Adding ISA Bus Options with the SRM Firmware

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

ISACFG Command Examples

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

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

Configuring Your System

Enabling the audio subsystem

```
>>>add_sound
```

-or-

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

Disabling the audio subsystem

```
>>>isacfg -slot 2 -rm
```

Displaying the configuration database:

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

Modifying the IRQ0 entry of an option:

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

Removing an entry:

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

Migrating to Windows NT or to a Dual-Boot Environment

This section describes how to migrate your *au-Series* system from the DIGITAL UNIX operating system to Microsoft Windows NT or to a dual-boot system.

Your *au-Series* system was preloaded with the DIGITAL UNIX operating system and includes the latest firmware. Consult the DIGITAL Web site for firmware updates: <http://www.workstation.digital.com/firmware.html>.

Before You Begin

Observe the following guidelines to help ensure a smooth transition to Windows NT or to a dual-boot environment:

- Note your current system's hardware locations, controller types, and boot selections.
- Record how the console reports controllers and devices. Refer to the section earlier in this chapter on using SRM firmware for help in using console firmware to obtain this information.
- Verify that the controllers and devices installed in your system work properly under both operating systems. Options that shipped with your *au-Series* packaged system should work under both DIGITAL UNIX and Windows NT. However, any options that you may have added should be verified for compatibility. Consult the System Options Catalog (SOC) at <http://www.digital.com/info/SOC> for more information.

Configuring Your System

- Carefully record any important environment variables used by DIGITAL UNIX for safekeeping and back up any important data on your system's hard drives.
- Verify that you are using the latest firmware before installing another operating system. Even though your system may work well now, it may require a firmware upgrade to run in a different operating system or in a dual-boot environment.
- Make sure that you have all drivers and support diskettes necessary to install Windows NT as well as any installed options.

Console-Specific Considerations

The DIGITAL Personal Workstation *au-Series* includes two different consoles: SRM, which is compatible with UNIX and VMS device-naming conventions. AlphaBIOS firmware has been tailored for compatibility with the Windows NT operating system device-naming conventions. These two consoles use different methods for recording user preferences, boot selections, and time of day.

Because of the different naming conventions that DIGITAL UNIX and Windows NT use, it is crucial that you record the disk configurations as both consoles view them prior to changing settings or the hardware itself. See the specific instructions later in this guide.

Using the Windows NT Operating System

Special Considerations

If you choose to run the Windows NT operating system, you must install it from CD-ROM. Before beginning the installation, please read through the following considerations.

Hardware Requirements

Windows NT requires a separate hard disk drive. UNIX and NT cannot reside on the same drive. You must ensure that your target drive (1) contains no data *or* (2) that any data on the drive is backed up before you attempt to have two operating systems reside on your workstation.

Precautionary Measures

CAUTION: Installing and running two operating systems on one machine carries risks. To minimize these risks, first ensure that you have backups of all your files.

If you do not plan to keep the DIGITAL UNIX operating system on your machine, you may want to remove UNIX and the data hard drive for safekeeping.

The Windows NT Disk Manager utility does not recognize the format of a UNIX disk. Therefore, take care when recording the SCSI ID of your UNIX disk and disk numbers so that you do not inadvertently allow the Disk Manager to destroy data on your UNIX disk.

Configuring Your System

CAUTION: The Windows NT Disk Manager utility will prompt you to place a “signature” on your UNIX disk. Default is Yes, which does not preserve the UNIX disk. Take care to answer No each time you use the Disk Manager utility when the UNIX disk is in the system.

Early versions of the console firmware did not preserve certain environment variables when switching between operating systems. If you choose to configure your DIGITAL Personal Workstation *au-Series* system as a dual-boot system, you should verify that the DIGITAL UNIX SRM console firmware is version 6.4-278 or later. Using an earlier version will cause the loss of boot paths when you switch between operating systems.

Use the following command from SRM to determine which version of the firmware is on your system:

```
>>>show version
```

You can download current versions of the firmware from the DIGITAL external Web site at <http://www.workstation.digital.com/firmware.html>.

Windows NT V4.0 Operating System Installation Steps

NOTE: After each command, press either [Return] or [Enter], depending upon what type of keyboard you have.

Follow the steps outlined in Sections I and II below to install the Microsoft Windows NT operating system. Also see Appendix E, Installing an Operating System, for a more detailed view (including displayed text during setup) of the Windows NT installation.

I. Switching to the Windows NT Console

1. Type

```
>>>set os_type nt
```
2. Press [Enter].
3. Power cycle the machine.

NOTE: Wait 45 seconds before turning the system back on.

The system now comes up to the AlphaBIOS console for Windows NT.

4. When the system starts up the AlphaBIOS console, press [F2] to enter Setup.
5. Enter Hard Disk Setup.

CAUTION: Do not allow Express Setup to partition disk 0 if disk 0 is your UNIX drive.

Configuring Your System

6. Partition the disk that you will use for Windows NT.
(For example, select disk 1 [SCSI ID 3].)
7. Press [F7] for Express Setup.
8. Press [F10] to continue.
9. A message box stating `Express Setup Complete` displays.
10. Press [Enter] to continue.
11. Press [Esc] to leave Express Setup.
12. Go to CMOS Setup and press [Return].
13. Set the date and time.
14. Press [F10] to save changes.
15. Press [Enter] to continue.

II. Installing the Windows NT Operating System

1. Insert the Windows NT installation CD, and choose `Install Windows NT`.
2. Press [Enter].
3. If the system indicates that the CD-ROM device is not visible, press [Esc] to leave Setup, power cycle the machine, and repeat the process.

NOTE: Wait 45 seconds before turning the system back on.

4. Press [Esc] to return to Setup.
5. Select `Install Windows NT`.
The system partition should be partition 2.
6. When you are prompted for computer type at the Windows NT Setup screen, choose `other`.
7. Press [Enter].
8. Install the hardware support floppy diskette, and select `Digital Personal Workstation a-Series`.
9. When you are prompted about additional storage devices, choose `s` and then `other`.
10. Insert the floppy diskette with the `CMD CSA-64xx IDE Driver`.
11. Press [Enter].
12. After the IDE driver is installed, press [Enter] to continue with Setup.

Configuring Your System

13. At the Windows NT Workstation Setup screen, press [Enter].
14. At the Windows NT Workstation Setup screen, press [Enter] to confirm your hardware and software components.
15. When you are prompted to select a drive on which to install Windows NT, choose the large FAT partition (C).

NOTE: You may choose to format the drive as an NTFS drive. See your Windows NT operating system documentation for more information on drive formats.

16. Press [Enter] to install Windows NT.
17. Select the type of file system you want from the screen choices.
18. Press [Enter].
19. Choose a location for your Windows NT files.
20. Press [Enter].
21. Follow the screen prompts to complete Setup.
Once the installation is complete, system defaults will be set to the Windows NT configuration. Rebooting will default to Windows NT.
22. Install the SCSI driver and the graphics drivers.
The graphics drivers are available from the following Web site:
<http://www.service.digital.com/open3d/>.

Using Multiple Operating Systems

If you have both Windows NT and DIGITAL UNIX installed on your system, you can switch between the operating systems. The following sections explain how to do this.

Switching from Windows NT to DIGITAL UNIX

To switch from the Windows NT operating system to DIGITAL UNIX, follow these steps:

1. From Windows NT, choose Shut down .
2. Restart the computer.
3. Press [F2] to enter AlphaBIOS Setup.
4. To change console selection, from the Setup menu, choose CMOS Setup.
5. Press [Enter].
6. Press [F6] to enter Advanced Setup.
7. Tab to Console Selection.
8. Select Digital UNIX (SRM) .

Configuring Your System

9. Press [F10] twice to save your selections.
10. Press [Enter].
11. Press [Esc] to exit Setup.
12. Power cycle the machine.

NOTE: Wait 45 seconds before turning the system back on.

13. The SRM console prompt >>> displays.
14. Boot the UNIX disk.
(For example, type >>>boot dkc0.)
15. Verify the time and date.

Switching from DIGITAL UNIX to Windows NT

To switch from the DIGITAL UNIX operating system to Windows NT, follow these steps:

1. Shut down the system to the SRM console.
2. Type
>>>set os_type nt
3. Power cycle the machine.

NOTE: Wait 45 seconds before turning the system back on.

4. The AlphaBIOS console should display.
5. Verify the time and date.

4

Installing System Options

Introduction

This chapter covers the following topics related to installing options on your DIGITAL Personal Workstation *a/au-Series* system:

- Preparing your system for expansion
- Removing and replacing the system cover
- Removing the front door
- Removing and replacing the front bezel
- Installing additional system memory
- Installing expansion boards/PCI bus options
- Installing internal drives
- Connecting external devices
- Installing the lock

Installing System Options

Preparing Your System for Expansion

Before you begin to expand your workstation, refer to Chapter 1, Getting Started, for instructions on preventing component damage from static electricity and disconnecting electrical devices.

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

Removing System Cover

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

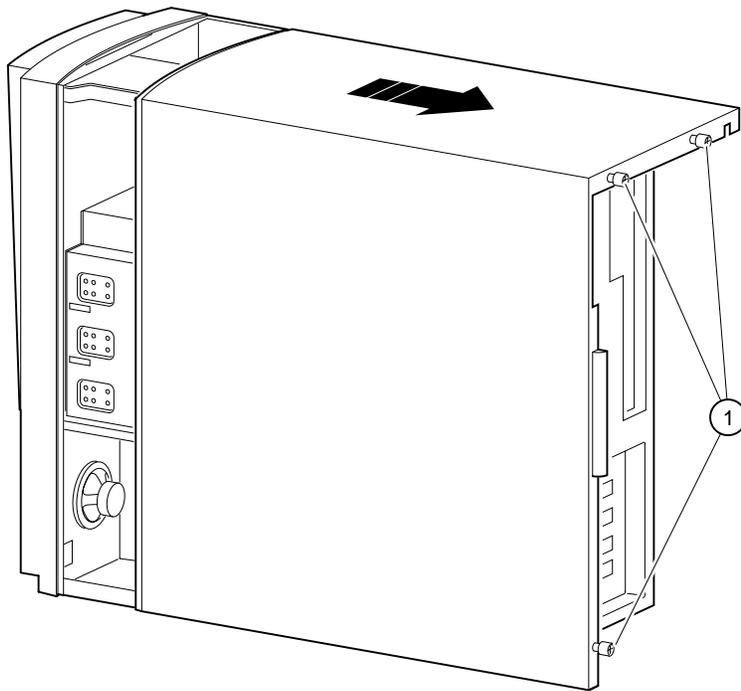
To remove the system cover, refer to Figure 4–1 and perform the following steps:

1. Shut down your system and all peripheral devices.
2. Unplug the power cord.

WARNING: Allow at least 45 seconds for the power supply capacitors to discharge safely.

3. Remove the system lock, if necessary.
4. Locate and loosen the three thumb screws ① that fasten the system cover to the rear panel. Place your thumbs on the upper corners of the system cover, pull back on the cover, and slide the cover back and away from the system enclosure. Then lift the cover up and away from the system.

Installing System Options



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Figure 4-1: Unlocking and Removing the System Cover

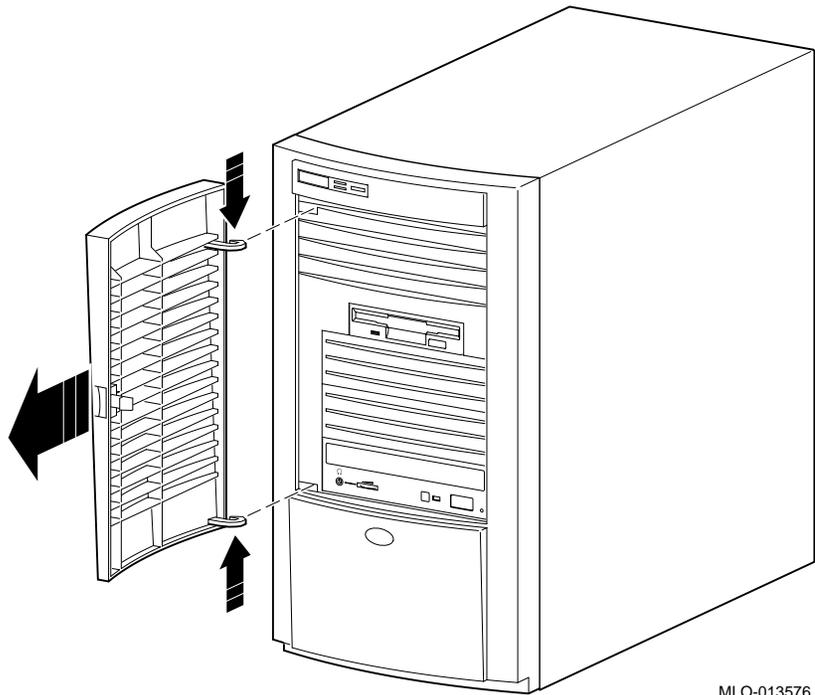
Installing System Options

Removing Front Door

Some users may wish to remove the system front door. This is a matter of personal preference and does not affect the use of front-accessible devices.

To remove the front door, refer to Figure 4–2 and perform the following steps:

1. Open the system door to allow access to the front-accessible devices.
2. While supporting the door, press the top tab down and slide the hinge to the right until it comes free.
3. Lift the door slightly and slide the lower hinge out of the front bezel.
4. Pull the door away from the system.



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Figure 4–2: Removing the Front Door

Installing Expansion Boards

System Device Installation Guidelines

Certain guidelines apply to the installation of graphics and communications devices on your workstation. Follow these guidelines to ensure maximum system performance.

NOTE: On DIGITAL Personal Workstations au-Series systems running DIGITAL UNIX that are being shipped currently, only a CD-ROM device is supported on the IDE bus; no IDE hard disks are supported.

Table 4–1 details the guidelines for installing devices into the system option slots.

Table 4–1: Device Installation Guidelines

Device Type	Slot Restrictions
Graphics <ul style="list-style-type: none"> • PowerStorm 4D40T/4D50T/4D60T 	These dual-type boards must go into slots 4 and 5 simultaneously.
Graphics <ul style="list-style-type: none"> • PowerStorm 3030/4020 	These single-type boards must go into slot 4 or 5.
Communication <ul style="list-style-type: none"> • DEFPA (PCI to FDDI adapter) • DE450 (PCI Ethernet-10 Mbps) • DE500 (10/100 Mbps Fast Ethernet) 	No slot restrictions.
Other	Unlisted devices should be installed only into slots 1 through 3. At system startup, SRM will notify you of any configuration violations.

Installing an Expansion Board

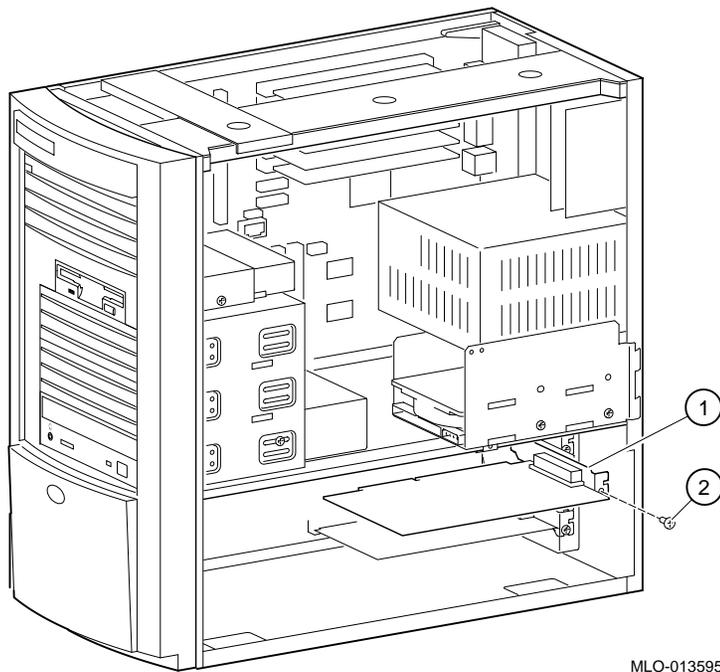
To install an expansion board, refer to Figure 4–3 as you perform the following steps:

1. Turn off your workstation and monitor.
2. Disconnect all external devices, AC power, and monitor power.

CAUTION: Static electricity collects on nonconductors such as paper, cloth, or plastic. A static discharge can be damaging, even though you often cannot see or feel it. To prevent damage to an expansion board, touch the metal frame of your workstation to discharge any static electricity and keep all expansion boards away from nonconductors.

3. Unlock and remove the system cover.
4. Pick an available slot ① for your board.

Installing System Options



MLO-013595

Figure 4-3: Installing an Expansion Board

5. Unscrew and remove the metal filler plate for the slot you have chosen.
6. Insert the new expansion card into the riser card slot. (See Figure 4-3.) Push the board firmly into the socket.
7. Replace the screw ② to secure the module at the rear panel.
8. Replace the outside cover. (See the section on Replacing the System Cover later in this chapter.)
9. Connect all external devices and restore power to the system.

Installing System Options

Expansion Slots

Your DIGITAL Personal Workstation *a/au-Series* system has five expansion slots, including:

- One half-size PCI slot (slot 1)
- One half-size PCI/ISA combination slot (slot 2)
- Two full-size PCI/ISA combination slots (slots 3 and 4)
- One full-size PCI slot (slot 5)

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

Adding Mass Storage Devices

Overview

This section covers configuration guidelines, general drive-installation information, and cable layouts. The *a/au-Series* DIGITAL Personal Workstation supports a maximum of six mass storage devices internally:

- The top device bay contains a factory-installed 3.5-inch floppy diskette drive.
- The second device bay contains a factory-installed CD-ROM drive and room for two additional 5.25-inch half-height removable devices; 3.5-inch devices are supported with adapters.
- The internal device bay is not accessible from the front of the workstation and contains a factory-installed, low-profile (1-inch high), 3.5-inch hard disk drive. This device bay also has room to install a second low-profile (1-inch high), 3.5-inch hard disk drive.

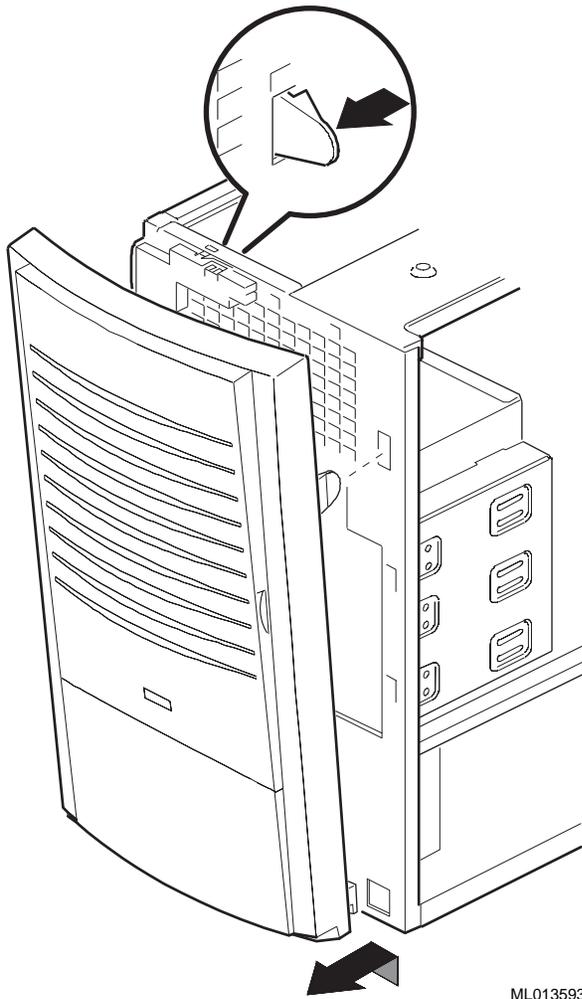
Removing Front Bezel

To install a device into the front bays, you must first remove the workstation's front bezel. Refer to Figure 4-4, and follow the steps outlined:

1. Turn off your workstation and monitor.
2. Disconnect all external devices, AC power, and monitor power.
3. Remove the outside cover, according to the steps outlined earlier in the section, Removing the System Cover.
4. From the top of the workstation, looking down toward the bottom of the front of the chassis, view the two tabs from the front bezel that hold the bezel in place and secure it to the chassis. Find both tabs (one on the left and one on the right).

Installing System Options

5. Push both tabs toward the center of the workstation to release the top of the bezel.
6. Gently pull the top of the bezel approximately 1 inch away from the top of the chassis.
7. Gently, but firmly, pull up on the bezel to unhook the bottom bezel mounts.
8. At this time, you may remove the bezel door.



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Figure 4-4: Removing the Front Bezel

Installing System Options

Configuration Guidelines for SCSI

System configurations ordered with a SCSI host adapter ship with a Qlogic 1040UW Ultra Wide SCSI PCI host adapter. DIGITAL Personal Workstations support up to four drives attached to the adapter's wide internal bus. Narrow devices can be attached to that bus when a 68- to 50-pin adapter is used.

NOTE: At this time, no external devices are supported on the same adapter used for internal devices.

Add a SCSI adapter if you need to attach external SCSI devices.

SCSI can connect computers to peripheral devices, such as CD-ROM drives, tape drives, or hard drives. Ultra Wide SCSI allows up to 15 SCSI devices to be connected to a single port using a daisy chain. (A daisy chain is a series of connections in which the first device is connected to the computer, the second device is connected to the first, and so forth.) Each SCSI device must have a unique SCSI ID.

Bus Length

For Ultra SCSI, the total length of all the cables cannot exceed 1.5 meters (5 feet). The first SCSI card handles only the internal drives. Use another card for external devices.

Installing System Options

Termination

A SCSI bus must be a continuous, linear electrical connection, with termination at each end. SCSI stubs off the main line must not exceed 10 cm. The adapter provides autosensing software-controlled active termination.

There are three connectors on the SCSI adapter:

- 68-pin, high-density external SCSI-2 connector
- 68-pin, high density internal SCSI-2 connector
- 50-pin internal ribbon connector

You can use one or two of the connectors on the card, although it is difficult to meet SCSI bus length restrictions when using more than one connector. Using three violates the SCSI stub length rules.

The first SCSI adapter card can be used only for internal devices because of bus length restrictions. Only the internal 68-pin connector is used. Termination is provided at one end of the bus by an active terminator built onto the internal cable, and the other end of the bus by termination on the adapter card itself.

Additional SCSI adapter cards can be added to connect external devices. Only the external 68-pin connector is used. The adapter card terminates one end of the bus, and you must supply active termination at the end of the external bus. You must not exceed the SCSI bus length restriction of 1.5 meters for UltraSCSI transfer rates.

 Refer to the SCSI controller documentation for more information.

Installing Storage Devices

This section describes how to install drives in the front-accessible bays and the internal bays.

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

Front-Accessible Bays

Normally, the system arrives with a floppy diskette drive in the top, front-accessible bay and a CD-ROM drive in the bottom bay. There are two half-height 5.25-inch bays available for additional drives. Perform the following steps to add a drive in a front-accessible bay:

1. Remove the system cover. (Refer to the section, Removing the System Cover, earlier in this chapter.)
2. Remove the front bezel assembly. (Refer to the section, Removing the Front Bezel, earlier in this chapter.)

Installing System Options

3. Remove the appropriate filler panel from the front bezel (for drives requiring front access).
4. Refer to the drive's documentation and set the drive jumpers (drive 0 for ATAPI CD-ROM, SCSI ID for SCSI drives).
5. If you are installing a 3.5-inch drive, attach the expansion brackets to the sides of the drive, as Figure 4–5 shows.

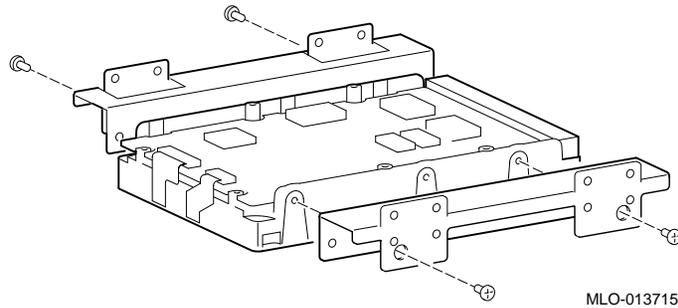
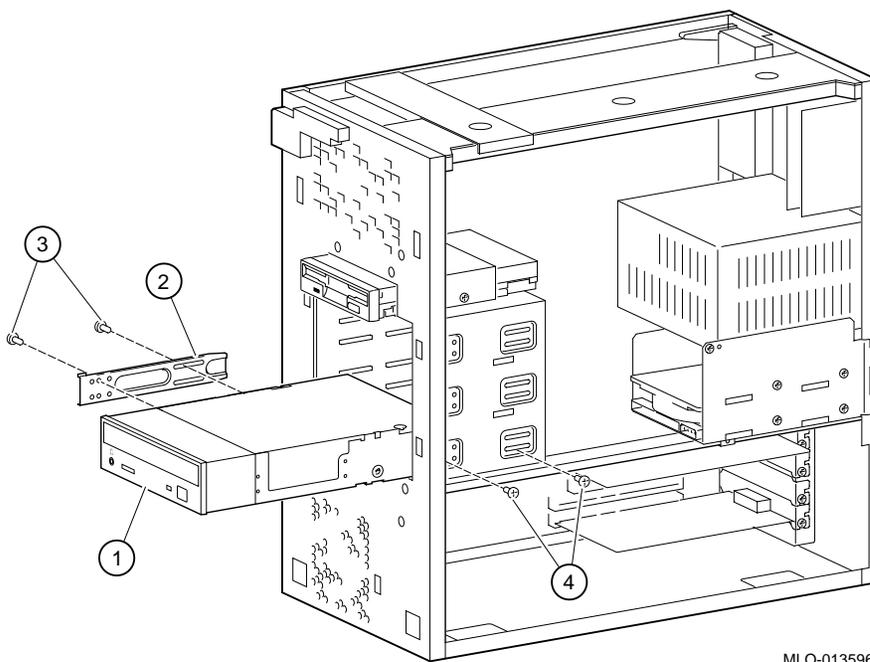


Figure 4–5: Attaching Brackets to a Drive

6. Remove the appropriate metal filler plate.
7. Remove the left side rail from the bay. Do not use sharp instruments that could damage the bay.

Installing System Options



MLO-013596

Figure 4-6: Installing an Additional Drive

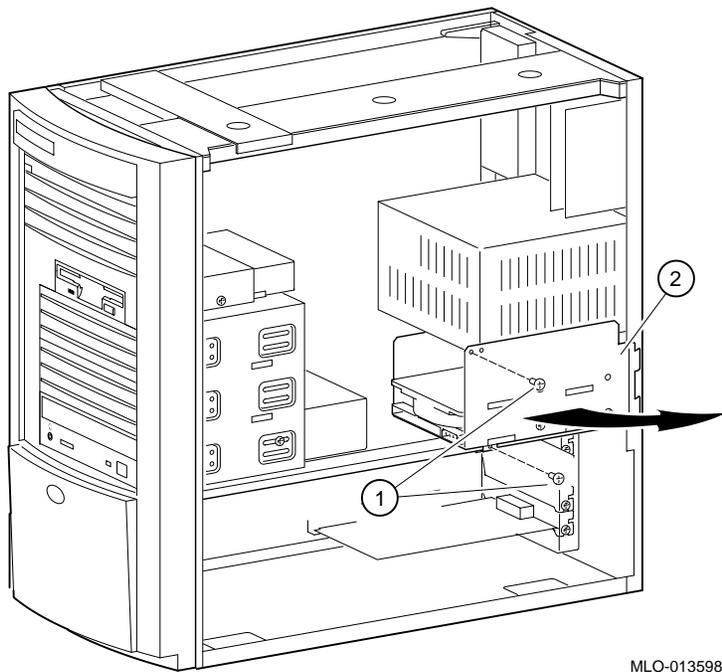
8. Install the side rail ② onto the drive assembly ① (in Figure 4-6, a CD-ROM drive). Use two screws ③ to attach the side rail.
9. Slide the drive, with the rail attached, into the bay and secure it with two screws ④.
10. Connect the data and power cables to the drive.
11. Replace the filler panel if the drive does not need front access.
12. Replace the front bezel assembly.
13. Replace the system cover, if desired. (Refer to the section, Replacing the System Cover, later in the chapter.)

Internal Bays

Usually, the internal bays arrive with a hard drive in the bottom bay. There is one 3.5-inch bay available for an additional drive. Perform the following steps to add a drive in the internal bay:

1. Remove the system cover. (Refer to the section, Removing the System Cover, earlier in this chapter.)
2. See Figure 4-7, and remove the two screws ① from the internal bay cage ②.

Installing System Options

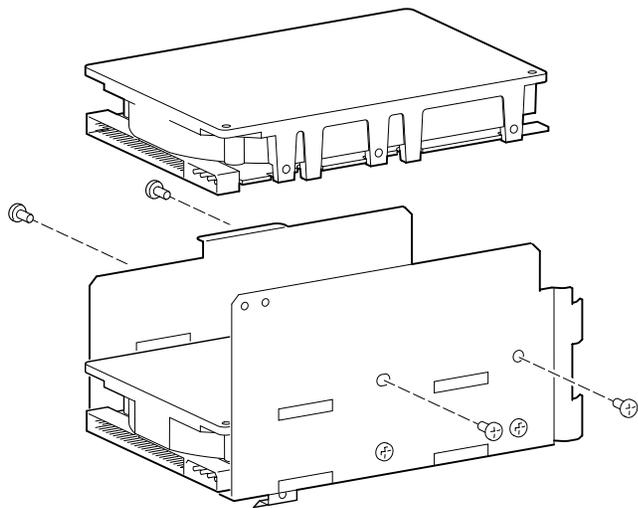


MLO-013598

Figure 4-7: Adding a Drive in the Internal Bay

3. Carefully swing the cage outward and lift it out of the chassis. Take care not to damage the cables attached to the drive in the lower bay.
4. Refer to the drive's documentation and set the drive jumpers (SCSI ID for SCSI drives).
5. Mount the new 3.5-inch drive into the top position using four screws (two on each side). See Figure 4-8.

Installing System Options



MLO-013597

Figure 4–8: Mounting the 3.5-inch Drive

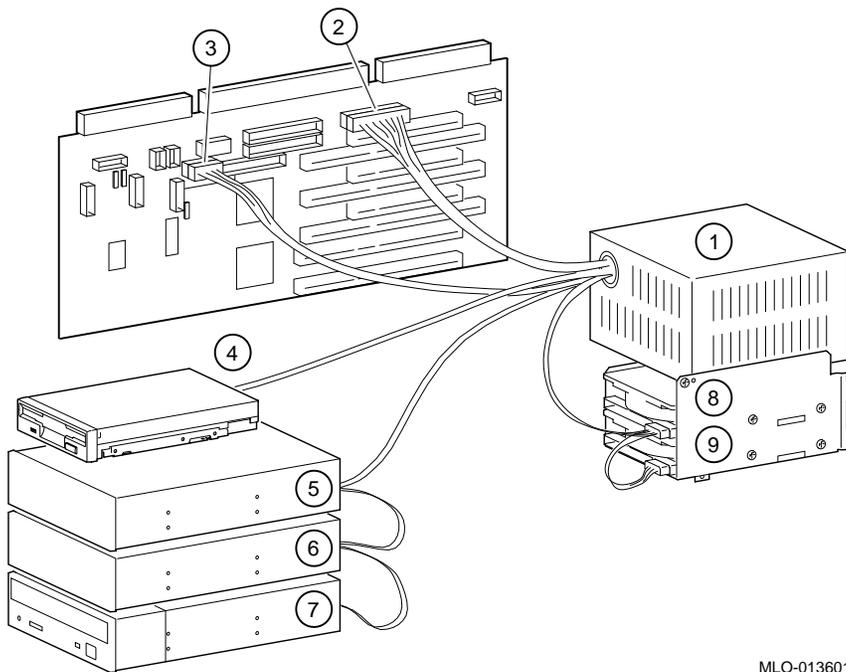
6. Connect the data and power cables to the drive.
7. Reinstall the bay cage and swing it back into position.
8. Fasten the bay cage with two screws: one at the power supply and one in the chassis support bracket.
9. Replace the system cover. (Refer to the section, Replacing the System Cover, later in this chapter.)

Installing System Options

Internal Cable Layout

Figure 4–9 through Figure 4–14 show system-box cabling; Table 4–2 through Table 4–7 list components.

CAUTION: Take care to align all connectors properly.



MLO-013601

Figure 4–9: Power Supply Cable Configuration

Table 4–2: Power Supply Cable Configuration

Legend	Component
1	Power supply.
2	$\pm 12, \pm 5, +3.3V$ DC to MLB.
3	Power connector shown.
4	Floppy drive.
5	Power connector for optional hard drive.
6	Power connector for optional hard drive.
7	CD-ROM drive.
8	Internal hard drive.
9	Internal hard drive.

Installing System Options

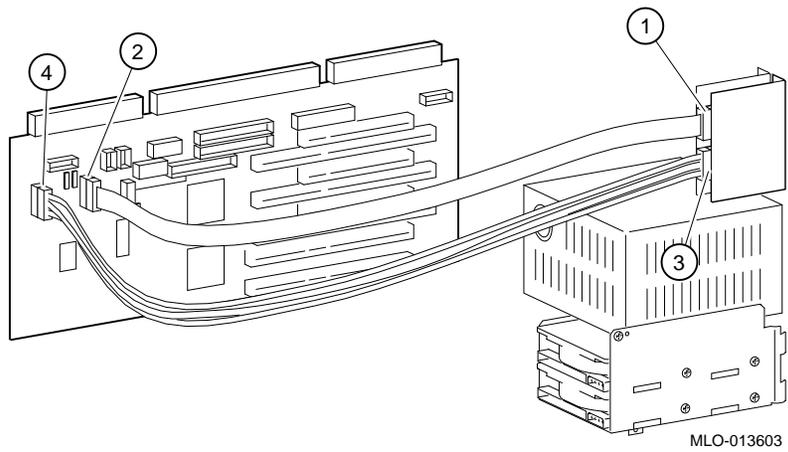


Figure 4-10: Audio Cable Layout

Table 4-3: Audio Cable Layout

Legend	Component
1	Audio card. MIDI/game connector (J4).
2	Riser card. MIDI/game connector (J14).
3	Audio card. Audio signal connector (J3).
4	Riser card. Audio signal cable (J13).

Installing System Options

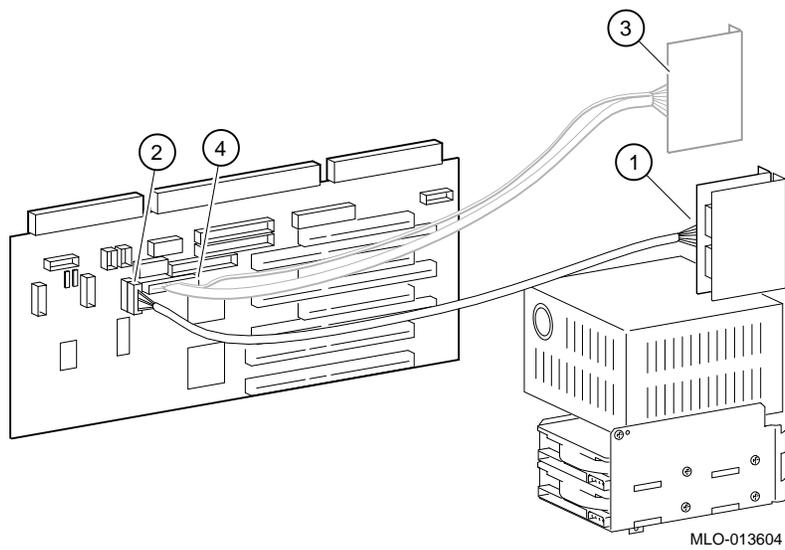


Figure 4–11: MAU or MII Cabling

*NOTE: You can use **either** the MAU or the MII but **not both** simultaneously.*

Table 4–4: MAU or MII Cabling

Legend	Component
1	AUI cable to MAU.
2	Riser card. AUI connector (J7).
3	MII cable.
4	Riser card. MII connector (J26).

Installing System Options

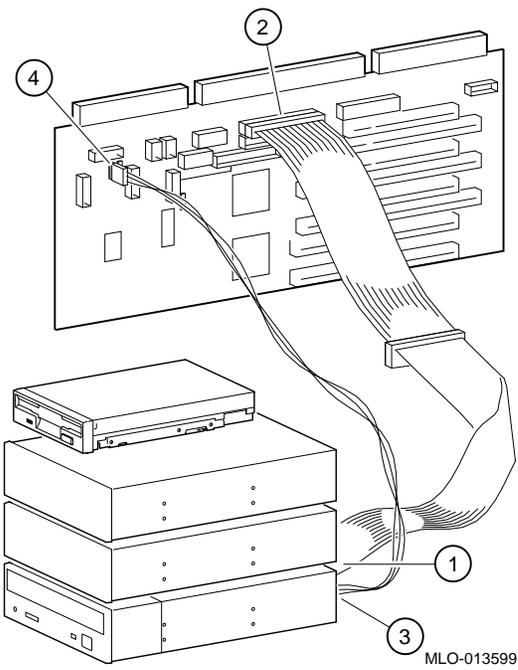
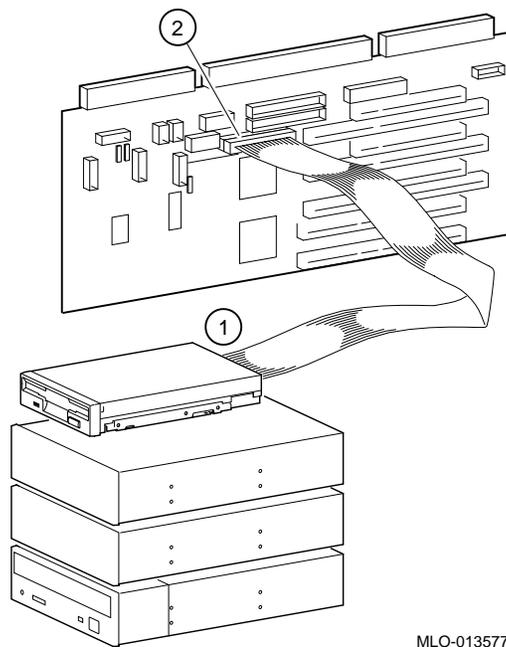


Figure 4-12: CD-ROM Cabling

Table 4-5: CD-ROM Cabling

Legend	Component
1	IDE cable to CD-ROM drive.
2	IDE cable connection to primary channel on riser card (J21).
3	CD audio cable to CD-ROM drive.
4	CD audio cable connection on riser card (J11).

Installing System Options



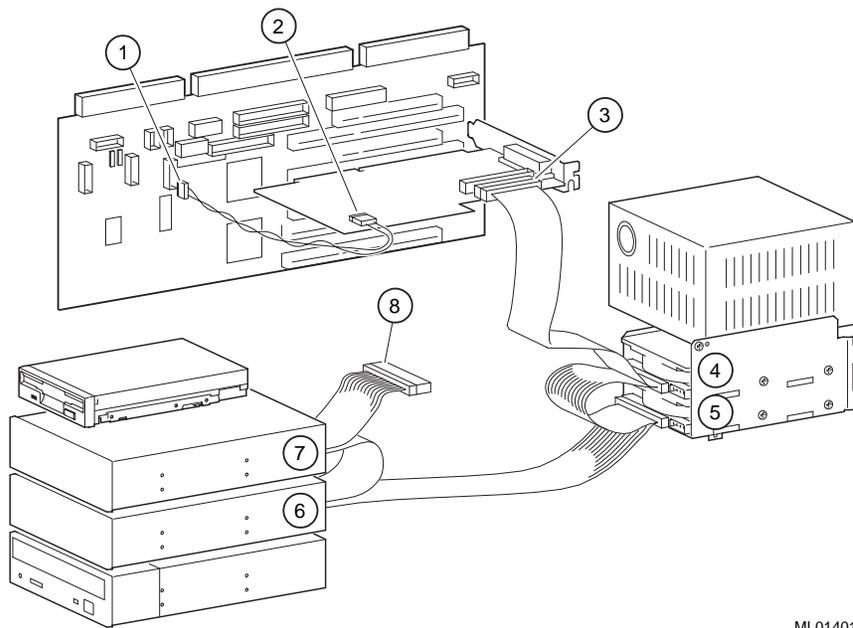
MLO-013577

Figure 4-13: FDC Cabling

Table 4-6: FDC Cabling

Legend	Component
1	FDC cable to floppy diskette drive.
2	FDC cable connection on riser card (J16).

Installing System Options



ML014015

Figure 4-14: SCSI Cabling

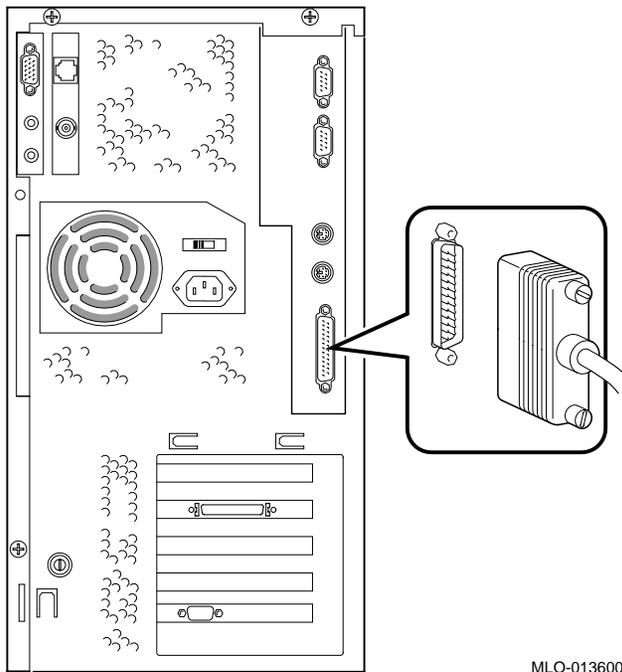
Table 4-7: SCSI Cabling

Legend	Component
1	SCSI drive activity cable (J10) connection to riser card.
2	SCSI drive activity cable.
3	SCSI bus cable into SCSI adapter.
4	Optional SCSI hard drive.
5	SCSI hard drive.
6 & 7	Optional slots.
8	Internal SCSI bus terminator.

Installing System Options

Cabling for a Printer or Other Parallel Device

Connect the cable to the parallel port, as Figure 4–15 shows. Be sure that you are using the correct type of printer cable. If your cable has the incorrect type of connector, you need an adapter or a different cable.



MLO-013600

Figure 4–15: Cabling for Printer or Other Parallel Device

Installing System Options

External SCSI Options

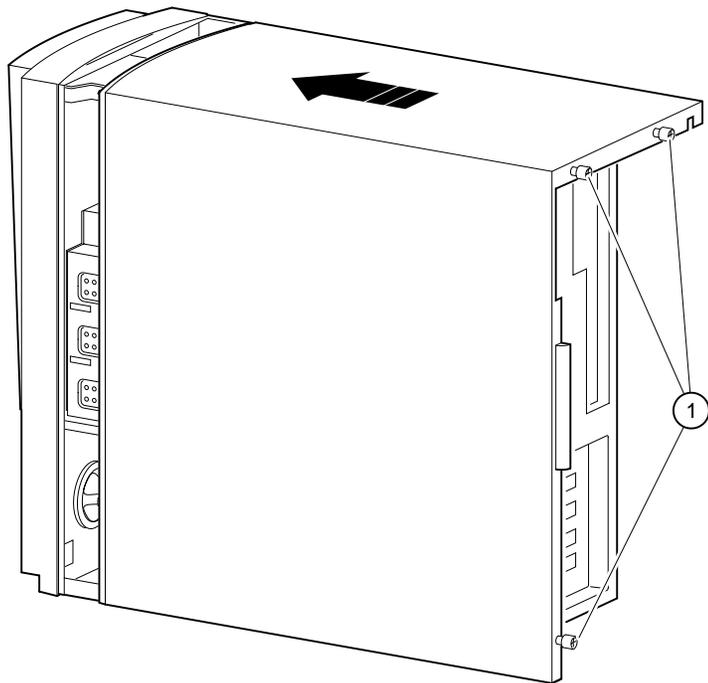
You might wish to connect an external SCSI device or an expansion box. To add external devices, first add another SCSI option card and then follow these steps:

1. Set the drive jumpers or switches for the desired ID.
2. Connect the option's cable to the external port. Use a cable with an appropriate connector.

You may need to use a 68- to 50-pin adapter to connect narrow SCSI devices.

Replacing System Cover

To replace the system cover, see Figure 4–16 and follow the next procedure.



MLO-013605

Figure 4–16: Replacing the System Cover

1. Line up the flanges on the inside of the bottom-left portion of the cover so that they overlap the edge of the chassis body.
2. Then slide the cover forward to secure it into place. Fasten the system cover with the three thumbscrews ① provided.

System Security

Chassis Lockdown Hasp

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

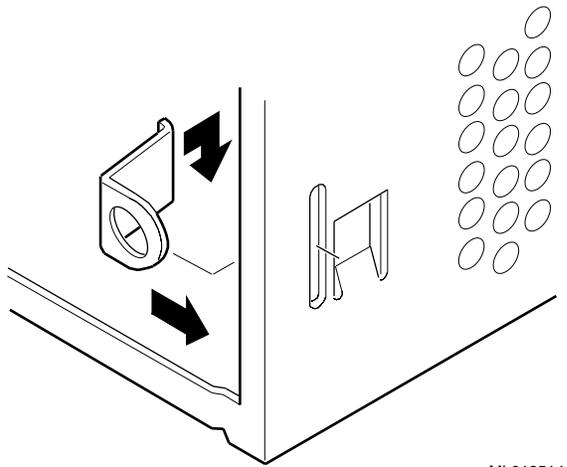
The system is shipped with the lock attached in a position designed for safe shipping; the customer must orient the hasp to allow correct functioning of the lock. Refer to Figure 4-17 and follow these steps:

1. Turn off power to all external devices connected to the workstation.
2. Turn your workstation off, if necessary, by pressing the momentary power pushbutton.
3. Unplug the workstation power cord from the wall outlet.

WARNING: Some power continues to be supplied to the system whenever the system is plugged into the wall. Allow 45 seconds for your system's power supply to discharge before removing the cover.

4. Disconnect the power cord from your workstation.
5. Remove the outside cover, according to the steps outlined in Chapter 4 in the section on Removing the System Cover.
6. Insert the hasp tab and pull it through the rear panel of the chassis.
7. Slide the foot of the hasp behind the rear-panel tongue and seat the foot securely.
8. Replace the outside cover, carefully sliding the left, rear-edge slot over the hasp.
9. Connect the power cord to the workstation and to a wall outlet.
10. Turn on all external devices and then turn on workstation.

Installing System Options



ML013514

Figure 4–17: Chassis Lockdown Hasp

Kensington Lock

If you ordered an optional Kensington lock (order number PCP3H-AG), follow the installation instructions that follow.

To install a Kensington lock, refer to Figure 4–18 and secure the lock onto your system as shown.

1. Insert the lock into the opening at the back of the system.
2. Turn the lock clockwise to secure it.
3. Connect the power cord and plug it into the wall outlet.
4. Turn on the system.

Installing System Options

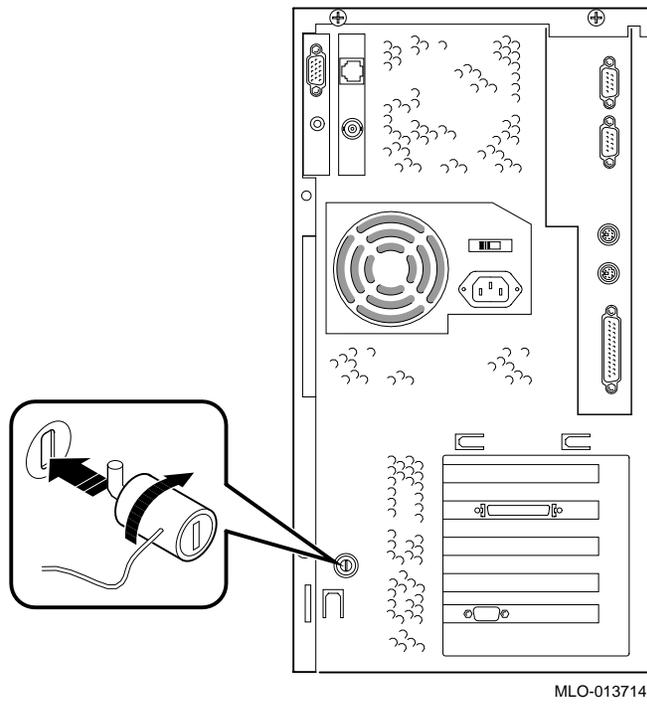


Figure 4-18: Using the Optional Kensington Lock

5

Installing Main Logic Board Options

Introduction

This chapter covers the following topics related to installing main logic board (MLB) options on your DIGITAL Personal Workstation *a/au-Series* system:

- Installing additional system memory
- Replacing the battery

Adding Memory

The procedure for adding DIMMs to the DIGITAL Personal Workstation *a/au-Series* system is outlined below.

There are three memory banks (J1/J2, J3/J4, and J5/J6) in the system; each bank consists of two DIMMs. Two DIMMs are required because the memory bus width is 144-bits (128 bits of data and 16 bits of ECC). Each DIMM in a bank supplies 72 bits of the 144-bit bus width. Both DIMMs in a bank must be identical, and both must be populated.

To add memory modules (DIMMs), refer to Figure 5–1 as you perform the following steps:

1. Install the DIMM ② straight into the socket. Position the DIMM so that both the retaining clips ① at the socket ends engage. Pay close attention to the keying on the DIMM and the socket.
2. Repeat step 1 for the remaining modules.

Installing MLB Options

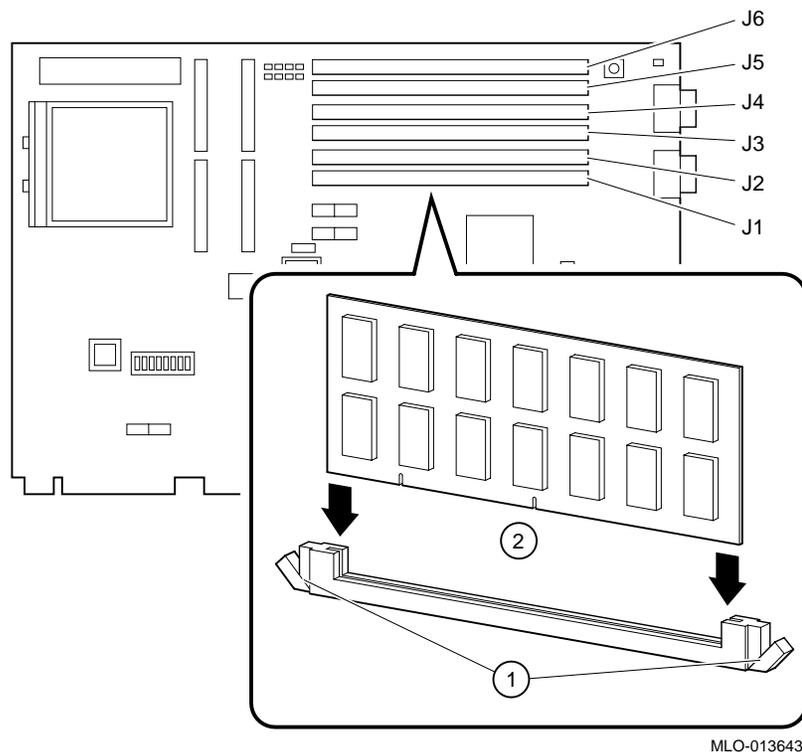


Figure 5-1: Memory Installation

Installing MLB Options

Replacing Battery

The battery supplies power to the realtime clock while the system is off. If necessary, replace the lithium battery with a DIGITAL (P/N 12-41474-05), Toshiba (P/N CR2032), or equivalent 3-Volt DC lithium battery. After replacing the battery, you must verify the system configuration and setup data.

WARNING: If the battery is incorrectly replaced, there is danger of explosion. Replace the battery only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to manufacturer's instructions. Be certain to follow any state or local statutes for proper battery disposal.

CAUTION: Take care not to bend the spring that holds down the battery. A bent spring could result in poor battery contact and intermittent system problems.

To replace the battery, refer to Figure 5-2 and perform the following steps:

1. Gently press down on the battery and push it out sideways, as Figure 5-2 shows.
2. Insert the new battery, positive side (+) up, into the holder.

Installing MLB Options

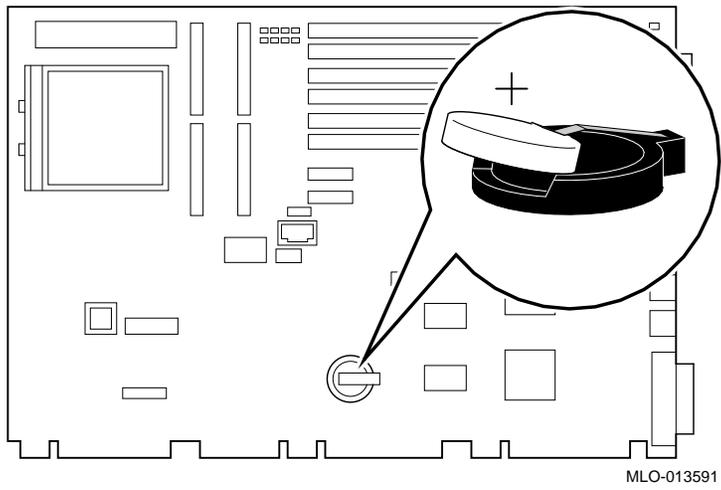


Figure 5-2: Replacing the Battery

6

Troubleshooting

Introduction

This chapter describes initial and system troubleshooting for your DIGITAL Personal Workstation *a/au-Series* system.



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

Tips

Use these troubleshooting tips should your computer ever fail to operate correctly.

- Keep it simple; only troubleshoot one problem at a time. Also, only make one change at a time. For example, if your SCSI hard disk drive fails to boot, do not try all the suggested actions at once. Instead, start with one suggestion such as checking the cables. After securing the cables, try booting your computer. If it does not work, try another suggestion.
- Look for abnormal computer, keyboard, and monitor LED indications. For example, make sure the power on LED lights when you turn on your computer and the drive access indicators light when using either the diskette drive or hard disk drive.
- If you installed external devices, make sure all cables are correctly and securely connected to the appropriate devices and that the devices are installed correctly.
- If you installed devices inside the computer, make sure nothing was bumped or jarred loose, and that all cable connections are securely in place.
- Make sure all device drivers are installed correctly.

Troubleshooting

- Press the Reset button. Try rebooting your system.
- Pay close attention to any error message that appears on your screen.

If the error message is computer related, refer the section on Error Messages later in this chapter for recommended actions.

If the error message is Windows related, refer to any online help and the appropriate Windows documentation supplied with your computer.

- Listen carefully for computer errors in the form of beeps. Record the number of beeps and their patterns then check the Beep Code descriptions later in the chapter for recommended actions.
- README files might be factory installed, on the CD-ROM disk, or as printed material. This README information can help you setup, configure, and operate your computer.

NOTE: If DIGITAL support tells you to return a failed component, pack it in its original container and then return it to DIGITAL or your DIGITAL Authorized Distributor as instructed.

- Check that the power indicator is on and that the fan is running.
- Check the power indicator on the monitor. Also, check the monitor, keyboard, and mouse cables to ensure that they are connected and seated properly.
- Make sure that all cables and connections are secure.
- Contact DIGITAL Services or your service provider for software- or hardware-related problems.

Equipment Log

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

Troubleshooting Your System

Table 6–1 lists how to identify and solve problems that could occur with your system, disk drive, audio, and monitor.

Troubleshooting

Table 6–1: System Troubleshooting

Problem	Possible Cause	Action
Power indicator not on.	System is not plugged in.	Plug the system in, and then turn it back on.
	System is not turned on.	Push the power button.
	No power at the wall outlet.	Use another wall outlet.
	Internal power supply cables not reconnected after installing options.	Reconnect cables.
	Internal power cable connected to the wrong power connector.	Connect to the correct power connector. (See Chapter 4, Installing System Options.)
	Power supply failure.	Contact your service representative.
	Correct voltage not set.	Unplug the system, set correct voltage on system back, and turn system back on. (<i>Note:</i> The power supply may have been damaged.)
	Fans not connected.	Connect fans to the riser card.
	Fan vents blocked.	Remove obstruction from fan vents.
Power switch cable not plugged into riser card.	Plug power switch cable into the riser card.	

Troubleshooting

Table 6-1: System Troubleshooting, *continued*

Problem	Possible Cause	Action
Power is on, but there is no screen display and no beeps.	Brightness and contrast controls are not correctly set.	Adjust the brightness and contrast controls.
	Monitor is off.	Turn on the monitor.
	Monitor cable or power cord is incorrectly installed.	Check all monitor connections.
	Configuration error.	Refer to the video module documentation for more information.
	Monitor is defective.	Try another monitor.
	Defective video controller module.	Replace the video module.
	Keyboard or video controller missing or malfunctioning.	AlphaBIOS or SRM tests for keyboard and video before displaying information. Check connections.
Power is on, but there is no screen display. System beeps on power-up.	Various possible causes.	See Table 6-5.

Troubleshooting

Table 6-1: 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.
	Hard drive cable is not connected.	Connect hard drive cable.
	System cannot find the boot device.	Check the system configuration for correct device parameters. Use the firmware to display system configuration. Look at the hard disk configuration to determine what hard disk is available. Verify the operating system selection information.
	Environment variables incorrectly set.	From the Boot screen, press [F2] to go to setup. From there, go to the desired location to correctly set the environment variables.
	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 or point to the correct partition.
System boots automatically when you don't want it to.	System is set to autoboot.	For DIGITAL UNIX users: When SRM starts, press [Ctrl/C] to stop the autostart countdown. Go to Setup to change a variable. For Windows NT users: When AlphaBIOS starts, press a ↓ to stop the autostart countdown. Go to Setup to change a variable.

Troubleshooting

Table 6-1: System Troubleshooting, *continued*

Problem	Possible Cause	Action
Target boot device not listed in the SRM display system configuration.	Loose power and/or data cable. SCSI bus too long. SCSI drive not set as drive 0.	Secure all signal and power cable connections. Alter SCSI bus to correct length. Reset SCSI drive as drive 0.
No response to keyboard commands.	Keyboard is password protected. Keyboard is not connected. Keyboard is connected to the mouse port.	Enter the keyboard password, if supported by your operating system. Connect the keyboard to the keyboard port. Connect the keyboard to the keyboard port.
No response to mouse commands.	Mouse is not connected. Mouse is connected to the keyboard port. Mouse driver not installed. Mouse ball sticking.	Connect the mouse and restart the operating system. Connect the mouse to the mouse port and restart the operating system. Install the appropriate mouse driver; refer to your supplied application software documentation. Refer to Appendix A.

Troubleshooting

Table 6-1: System Troubleshooting, *continued*

Problem	Possible Cause	Action
<p>System forgets some environment variables or the time-of-day while powered off.</p> <p>For DIGITAL UNIX users: System starts AlphaBIOS rather than SRM firmware. <i>or</i> System forgets user preference for SRM firmware and starts AlphaBIOS firmware when powered on.</p>	<p>Dead battery.</p> <p>No contact between battery holder and battery.</p>	<p>Replace the lithium battery. Use a DIGITAL (P/N 12-41474-05) or type 2032 three-Volt DC lithium battery. (See Chapter 4, Installing System Options.)</p> <p>Carefully adjust metal tab on battery holder to allow contact with battery.</p>
<p>Security mode is enabled. Password does not work.</p>	<p>User does not have correct password.</p>	<p>Perform the following steps:</p> <ol style="list-style-type: none"> 1. Power off the system. 2. Open the system box. 3. Power on the system and wait for the console to start. 4. Press the password reset button on the MLB. 5. Power off the system. 6. Reassemble system. 7. Power on the system. 8. Set new password if desired. <p><i>Note:</i> Take care to remember your password. Get necessary configuration data from the Equipment Log (Appendix F), where you recorded it.</p>

Troubleshooting

Table 6–2: Disk Drive Troubleshooting

Problem	Possible Cause	Action
Hard disk drive cannot read or write information.	Incorrect SCSI drive ID settings.	Set the SCSI ID. Refer to the disk drive installation instructions.
	Loose or incorrectly installed cables.	Make sure all cables are correctly installed.
	Disk drive is not correctly formatted or partitioned.	Format and partition as required using the supplied operating system.
	External drive not powered up.	Turn on the external drive.
Floppy drive cannot read or write information.	Floppy diskette is not formatted.	Format the floppy diskette.
	Floppy diskette is wrong density.	Use a floppy diskette of the proper density for your drive.
	Floppy diskette is worn or damaged.	Try another floppy diskette.
	Floppy diskette is write protected.	Slide the write-protect switch so the hole is not visible.
	Floppy drive is empty.	Insert a floppy diskette.
	Floppy drive power or data cable not connected.	Connect floppy drive power or data cable.
	Floppy drive data cable connector installed backwards.	Install floppy drive data cable connector correctly.

Troubleshooting

Table 6–3: Audio Troubleshooting

Problem	Possible Cause	Action
No sound.	Cables not plugged in.	Plug in the cables.
	Driver not installed.	Install the driver.
	Volume control set low.	Use an on-screen volume control (if available) to increase the volume.
	Headset plugged in.	Unplug headset and plug microphone into correct connector.
	No power to external speakers.	Plug in external speakers.
Cannot record.	Internal speaker not connected.	Connect internal speaker.
	Cables not plugged in.	Plug in the cables.
Distorted sound.	Record volume level set low.	Use the appropriate control to increase the record level.
	Record volume level set high.	Reduce the volume level. (Use amplified speakers.)

Troubleshooting

Table 6-4: 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 receptacle. Monitor is defective.	Turn on the monitor. Connect the power cord to the system or a wall receptacle. Use another receptacle. Try another monitor.
Distorted, rolling, or flickering screen display, or wrong/uneven color.	Adjustments incorrect. Wrong type of monitor. Defective monitor. Monitor signal cable loose or damaged.	Adjust accordingly. Try another monitor. Try another monitor. Inspect connector pins. Replace cable if damaged.
Monitor power indicator is flashing.	Monitor cable not connected.	Connect monitor cable.

Troubleshooting

Error Beep Codes

Table 6–5 shows error beep codes you may encounter while using the DIGITAL Personal Workstation *a/au-Series* system. For example, if the POST (power-on self-test) code could not find any good memory, you would hear a 1-3-3 beep code (one beep, a pause, a burst of three beeps, a pause, and another burst of three beeps).

Table 6–5: Error Beep Codes

Beep Code	Meaning
1-1-4	(1) The POST code could not read the POST or flashROM headers, or (2) there was a checksum failure. ¹
1-2-1	(1) The POST code detected a TOY (time-of-year clock) failure, or (2) the TOY interrupt did not occur.
1-2-4	The POST code detected a hard failure.
1-3-3	The POST code could not find at least 2 MB of good memory.
3-2-1	The POST code was unable to read the header of the flashROM, or the flashROM checksum failed. Therefore, the POST code attempted to boot from the floppy diskette. The attempt failed because there was no boot block on the floppy diskette. ¹
3-2-3	The POST code was directed to load the floppy diskette, but there was no boot block on the floppy diskette.
3-2-4	The POST code detected a failure with the keyboard or mouse controller.
3-3-1	The POST code detected a hard failure. The LEDs may provide more diagnostic information.

¹ These failures may be recoverable if you have prepared an ERD (emergency repair disk).

LEDs

Your *a/au-Series* system contains eight diagnostic LEDs (visible at the top of the MLB with the system cover removed) as well as one power-on LED. During execution of the POST (power-on self-test), before a console display device is available, some errors are reported by the LEDs. The LEDs are written with CDh once the system is fully functional.

Depending upon your operating system, LEDs may remain lighted even though the system is functioning properly. If, however, your system is experiencing problems and any of the LEDs on your system stay lighted, contact your DIGITAL service representative.

A

System Care

Introduction

This appendix describes how to:

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

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

Cleaning the 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 the Monitor

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

WARNING: If you use a prepackaged screen cleaner, ensure that it is *nonflammable*. To prevent cleaner from seeping into the system case, never spray the cleaner directly on the screen. Instead, apply the cleaner to a clean cloth, and then wipe the screen.

System Care

Cleaning the System Mouse

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

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

NOTE: Consistent use of a high-quality mouse pad will decrease debris build-up in the mouse ball.

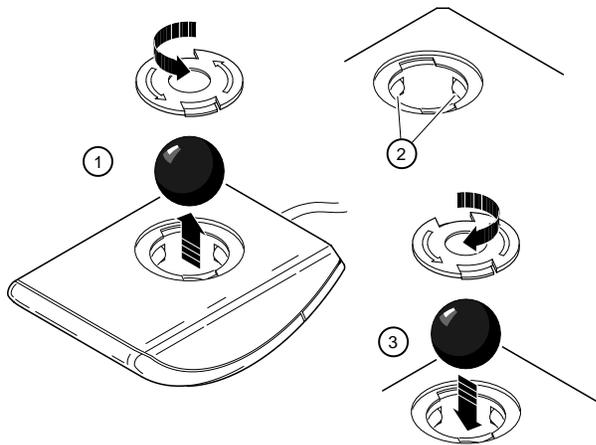


Figure A-1: Cleaning the System Mouse

System Care

Cleaning the System Keyboard

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

Moving the System

Perform the following steps before shipping or moving the system:

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

Packing the System

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

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

Installing the System at a New Location

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

B

Technical Specifications

Introduction

This appendix describes the technical characteristics of the DIGITAL Personal Workstation *a/au-Series* system, including the following:

- System specifications
- External system connectors
- Expansion slot current limitations
- System current requirements
- MLB switches and jumpers

System Specifications

Table B-1 through Table B-5 list the DIGITAL Personal Workstation *a/au-Series* processor features, performance, dimensions, environmental, and acoustics specifications.

Table B-1: Processor Features

Feature	Specification
Processor type	DECchip 21164
Core logic	PYXIS chip
Cache	Optional write-back

Technical Specifications

Table B–2: Specifications

Attributes	Specification
PCI clock	Between 30 and 33.33-Mhz, depending on CPU frequency
Slots	Two PCI and three PCI/ISA combination
Memory	Up to 1.5 GB

Table B–3: Dimensions

Dimension	Specification
Depth	44.8 cm (17.5 in.)
Width	22 cm (8.6 in.)
Height	41 cm (16 in.)
Weight	18.6 kg (41 lb.)

Table B–4: Environmental Specifications

Attributes	Specification
Operating temperature	10°C to 40°C (50°F to 104°F)
Storage temperature	–40°C to 65°C (–4°F to 149°F)
Operating humidity (noncondensing)	10% to 90% relative humidity, maximum wet bulb 28°C (82°F)
Storage humidity (noncondensing)	10% to 90% relative humidity, maximum wet bulb 46°C (114°F)
Altitude Operating Nonoperating	3,048 m (10,000 ft) maximum 12,190 m (40,000 ft) maximum
Shipping vibration	1.03 GRMS 5 to 300 Hz

Technical Specifications

Table B-5: Acoustics: Preliminary Declared Values per ISO 9296 and ISO 7779

Product	Sound Power Level L_{WA} , B		Sound Pressure Level L_{pAm} , dBA (operator position)	
	Idle	Operate	Idle	Operate
DIGITAL Personal Workstation				
• with 0-x disk	5.2	5.2	36	36
• with 2-GB disk	5.3	5.5	37	39

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

External System Connectors

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

- Bidirectional enhanced parallel port connector, 25-pin D-submini female
- Two serial connectors, 9-pin D-submini male
- Keyboard and mouse connectors, 6-pin mini-DIN

Technical Specifications

Bidirectional Enhanced Parallel Port Connector

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

Table B-6: Bidirectional Parallel Port Pinouts

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

Serial Port Connectors

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

The baud rates supported by the system's serial ports are 50, 75, 110, 134.5, 150, 300, 600, 1200, 1800, 2000, 2400, 3600, 4800, 7200, 9600, 19200, 38400, 57600, and 115,200. The serial ports have signals for full MODEM control. Refer to your operating system information to confirm which of the baud rates from the preceding list your operating system supports.

Technical Specifications

Table B-7: 9-Pin Serial Port Pinouts

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

Keyboard and Mouse Connectors

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

Table B-8: Keyboard and Mouse Connector Pinouts

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

Power Supply and Input Power Requirements

The 300-watt voltage-selectable power supply is provided. Table B-9 lists the input power requirements. Table B-10 shows the output voltage specifications.

Table B-9: Input Power Requirements

Rated Voltage Range	Rated Input Current	Operating Frequency Range
100 Volts AC – 120 Volts AC	5.5 A	47 Hz – 63 Hz
220 Volts AC – 240 Volts AC	3 A	47 Hz – 63 Hz

Technical Specifications

Table B-10: System Output Power Specifications

Voltage	Output Current (Amps)
+3.3	0.0 – 20
+5.0	1.5 – 20
+12.0	0.2 – 8.0
-5.0	0.0 – 0.3
-12.0	0.1 – 0.5

Main Logic Board (MLB) Frequency Switches

Figure B-1 shows the switches used to set the CPU clock speed. The settings shown (for a 433-MHz system) are *for example only*. If you perform a CPU upgrade, consult the documentation that comes with the upgrade for instructions on resetting the switches. Otherwise, do not change the switch settings.

CAUTION: You can damage the CPU and the hardware if you run the system with incorrectly set switches for the CPU's maximum speed or other system settings.

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

Technical Specifications

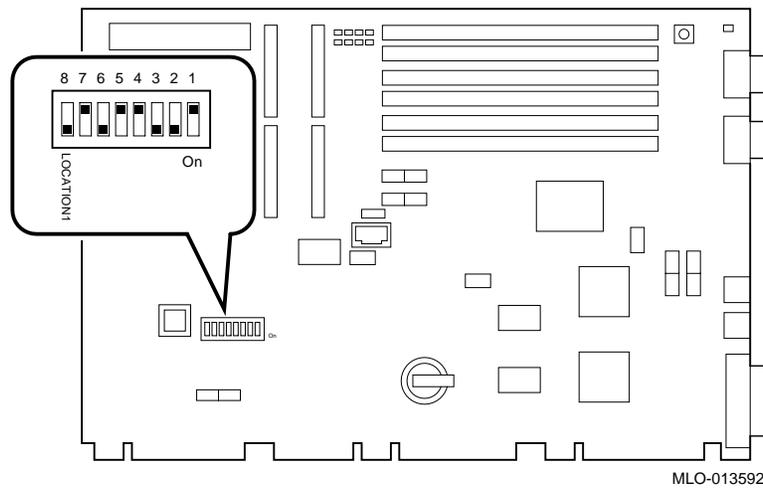


Figure B-1: CPU Frequency Switch Settings

C

Device Mapping

Introduction

This appendix lists system device mapping information, including:

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

I/O Address Map

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

Table C-1: I/O Address Map

ISA I/O Addresses	Devices
0060-0064	Keyboard and mouse
0070-0071	Time-of-year clock
02F8-02FF	Serial port 2
0378-037F	Parallel port
03F0-03F7	Floppy disk
03F8-03FF	Serial port 1
0530-0533	Audio subsystem base address

Device Mapping

Interrupt Map

The IRQ (interrupt request) assignments for the DIGITAL Personal Workstation *a/au-Series* system are shown in Table C-2. This information is useful when adding or reconfiguring options on your system. Avoid conflicts when assigning IRQs by associating one IRQ to one source. PCI interrupt levels are set by the operating system.

Table C-2: Default System Interrupt Assignments

IRQ #	Source	Windows NT-Specific Preassignments	UNIX-Specific Preassignments
0	Timer/counter.		
1	Keyboard.		
2	Internal cascade of IRQ8-15.		
3	Serial port 2 or ISA slot.		
4	Serial port 1 or ISA slot.		
5	Parallel port or ISA slot or audio.		
6	Floppy controller or ISA slot.		
7	Parallel port or ISA slot or audio.		
8	Reserved.		
9	ISA slot or audio.		
10	ISA slot or audio.		
11	ISA slot or audio.		
12	Mouse or ISA slot.		
13	Reserved.		
14	ISA slot or IDE primary.		
15	ISA slot or IDE secondary.		

NOTE: The Ethernet controller and PCI slot 0 (the lowest PCI slot) share the same IRQ.

DMA Channel Assignments

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

Table C-3: DMA Channel Assignments

Channel	Device
0	Audio (or 87303 ECP parallel port).
1	Audio (or 87303 ECP parallel port).
2	Floppy disk controller (ISA option slot).
3	Audio (ISA option slot).
4	Unavailable. (Channels 0-3 are cascaded to this channel.)
5	Available to ISA slots.
6	Available to ISA slots.
7	Available to ISA slots.

SCSI ID Assignments

Table C-4 presents information on the default SCSI ID assignments. Table C-4 shows default system interrupt assignments.

Table C-4: SCSI ID Assignments

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

D

Updating System Firmware

Introduction

This appendix explains how to use the firmware update utility to install firmware upgrades.

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

Consult the appropriate section for system information, depending upon whether you have an *a-Series* system running the Windows NT operating system or an *au-Series* system running the DIGITAL UNIX operating system.

a-Series System Firmware

The DIGITAL Personal Workstation *a-Series* system contains 1 MB of flashROM for the console firmware. The flashROM contains the AlphaBIOS firmware.

Update Utility

Use the update utility to update your AlphaBIOS. The update utility contains two images: the update utility itself and the AlphaBIOS image.

Using the Flash Update Utility from AlphaBIOS

You may update the firmware by either using the supplied CD *or* by copying the firmware from the Internet onto a floppy diskette.

Updating Firmware from AlphaBIOS

To update the firmware from AlphaBIOS using the firmware CD or floppy diskette, follow these steps:

1. Shut down the Windows NT operating system and restart the system.

Updating System Firmware

2. Insert the Firmware Update CD-ROM or a floppy diskette (prepared as the next section describes) into the appropriate drive.
3. From the AlphaBIOS boot screen, press [F2] to enter AlphaBIOS setup.
4. From the AlphaBIOS setup screen, select Upgrade AlphaBIOS.

HINT: AlphaBIOS verifies the system image and displays the old and new firmware versions.

5. Follow the screen prompts to complete the update.

Preparing a Firmware Floppy Diskette

Copy the firmware over the Internet from the ftp.digital.com/pub/Digital/Alpha/firmware area and follow these steps:

1. Format a blank floppy diskette (FAT).
2. Copy the appropriate file to Drive a:.

au-Series System Firmware

The DIGITAL Personal Workstation *au-Series* system contains 1 MB of flashROM for the console firmware. The flashROM contains the SRM console firmware (for the DIGITAL UNIX operating system).

Update Utility

Use the update utility to update your SRM firmware. The update utility contains two images: the update utility itself and the SRM image.

Updating System Firmware

Using the Flash Update Utility from the SRM Console

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

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

```
>>>show device
```

```
dka0.0.0.4.0      DKA0      TOSHIBA CD-ROM XM-56  1796
dkc0.0.0.1008.0   DKC0      RZ1BA-BS              3001
dkc100.1.0.1008.0 DKC100    SEAGATE ST15150W     9107
dva0.0.0.0.1      DKA400    TOSHIBA CD-ROM       0064
dva0.0.0.0.1      DVA0
ewa0.0.0.3.0      EWA0      00-00-F8-75-3A-5C
pkc0.7.0.1008.0   PKC0      SCSI Bus ID 7        5.01
pqa0.0.0.4.0      PQA0      PCI EIDE
pqb0.0.1.4.0      PQB0      PCI EIDE
```

3. Boot the Firmware Update Utility CD-ROM using the device ID display in step 2.

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

```
Bootfile: [alpha433au]as433au_vx_x.exe (where x_x is the appropriate version)
```

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

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

Updating System Firmware

```
setting affinity to the primary CPU
jumping to bootstrap code

apu-version 959328854 *** Firmware Update Utility V2.9 ***
*** System Type: Personal Workstation 433 ***
Update
Verify
List
Show
Dump
Verbose
Nverbose
Debug
Ndebug
?

Apu->
```

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

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

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

```
Apu-> verbose
Apu-> verify SRM
```

6. To exit the update utility, cycle the power. Leave the power off for at least 45 seconds.

NOTE: Commands such as `Dump`, `List`, `Show`, and `Verify` must have verbose mode enabled for their output to be displayed. Type the `Verbose` command at the `Apu->` prompt to enable verbose mode.

E

Installing an Operating System

Introduction

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

Refer to Table E-1 for instructions on installing the Microsoft Windows NT operating system on a properly partitioned and formatted disk; see Table E-2 for instructions on setting up partitions for an NT installation. Refer to Table E-3 for instructions on installing the DIGITAL UNIX operating system.

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

Installing an Operating System

Starting a Windows NT Installation

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

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

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

NOTE: The AlphaBIOS console must be installed and running in order to perform a Windows NT installation.

Table E-1: Starting a Windows NT Installation

Step	Action	Result or Displayed Text
1	Insert the Microsoft Windows NT Workstation CD-ROM into the CD drive.	CD-ROM drive is ready.
2	From the AlphaBIOS boot screen, press [F2].	AlphaBIOS setup screen displays.
3	Select Install Windows NT.	Windows NT setup procedure starts. The following message is displayed: Setup could not determine the type of computer you have, or you have chosen to manually specify the computer type. Select the computer type from the following list, or select "Other" if you have a device support disk provided by your computer manufacturer. . . . => Other
4	Select Other. Press [Enter].	"Please insert the disk labeled Manufacturer-supplied hardware support disk into drive A:."

Installing an Operating System

Table E-1: Starting a Windows NT Installation (continued)

Step	Action	Result or Displayed Text
5	You have chosen to configure a computer for use with Windows NT using a device support disk provided by the computer's manufacturer. Select the computer type from the following list, or press [Esc] to return to the previous screen. =>Digital Personal Workstation Family	You have chosen to change your computer type to one supported by a disk provided by a hardware manufacturer. "Please insert manufacturer-supplied hardware support disk."
6	Select Digital Personal Workstation Family. Press [Enter].	Setup could not determine the type of one or more mass storage devices installed in your system, or you have chosen to manually specify an adapter. Currently, Setup will load support for the following storage devices: Qlogic PCI SCSI Host Adapter <i>or</i> Adaptec Ahxxxx
7	Type "S" to select additional SCSI adapters (in this case, to select an IDE controller).	Select the SCSI adapter you want from the following list, or select "Other" if you have a device support disk provided by an adapter manufacturer. . . . =>Other
8	Select Other . Press [Enter].	Please insert the disk labeled "Manufacturer-supplied hardware support disk" into Drive A:.
9	Insert the adapter hardware support diskette (CMD CSA-64xxx IDE driver). Press [Enter].	You have chosen to configure a SCSI adapter for use with Windows NT, using a device support disk provided by an Adapter manufacturer. Select the SCSI Adapter you want from the following list, or press [Esc] to return to the previous screen. =>CMD CSA-64xx IDE Driver
10	Press [Enter] to continue.	"Setup will load support for the following mass storage device(s)" Qlogic PCI SCSI Host Adapter CMD CSA-64xx IDE Driver

Installing an Operating System

Table E-1: Starting a Windows NT Installation (continued)

Step	Action	Result or Displayed Text
11	Press [Enter] to continue.	Setup has determined that your computer contains the following hardware and software components: Computer: Digital... Display: VGA-Compatible Keyboard: XT, AT, or Enhanced (83-104 keys) Keyboard Layout: US Pointing Device: MousePort Mouse No Changes: The above list matches my computer.
12	Select Display: (to load a video driver). Press [Enter].	You have asked to change the type of display to be installed.
13	Insert the provided display driver diskette. Press [Enter].	You have chosen to change your computer's display type to one supported by a hardware manufacturer-supplied disk.
14	Select the appropriate display driver. Press [Enter].	You can choose your graphics card type from the list displayed.
15	Select "The above list matches my computer." Press [Enter].	"The list below shows existing partitions and spaces available for creating new partitions."
16	Select the desired disk. Press [Enter].	Follow the on-screen instructions and continue the installation. For more information, refer to the <i>Microsoft Windows NT Workstation System Guide</i> .

If you are installing the operating system on a disk that has not been partitioned and formatted, refer to Table E-2.

Installing an Operating System

Table E-2: Setting Up Partitions for a Windows NT Installation

Step	Action	Result
1	From the AlphaBIOS boot screen, press [F2].	AlphaBIOS setup screen displays.
2	Select <code>Hard Disk Setup...</code>	If disk 0 is not partitioned, a message asking if you would like to proceed with default disk partitioning displays.
3	Press [F10] to continue.	Express Setup Complete screen displays.
4	Press [Enter].	A list of disks, including partitions, displays.
5	Press [Escape].	AlphaBIOS setup screen displays. Refer to Table E-1 to re-attempt a Windows NT installation.

Installing an Operating System

Starting a DIGITAL UNIX Installation

To start a DIGITAL UNIX installation, follow the steps in Table E-3.

NOTE: The SRM console must be installed and running in order to perform a DIGITAL UNIX installation. If the AlphaBIOS console is running, refer to Chapter 3, Configuring Your System, for instructions on loading the SRM firmware.

Table E-3: Starting a DIGITAL UNIX Installation

Step	Action	Result
1	At the SRM prompt, type: >>>set boot_osflags ""	Clear the <i>boot_osflags</i> variable.
2	At the SRM prompt, type: >>>set auto_action halt	Halts the system at the console prompt each time the system is turned on, crashes, or when the reset button is pushed.
3	Insert the DIGITAL UNIX CD-ROM into the CD drive.	CD-ROM drive is ready.
4	At the SRM prompt, type: >>>show dev	List of devices displays: dka0.0.0.6.0 DKA0 RZ26L 441A dka400.4.0.6.0 DKA400 RRD43 3213 dva0.0.0.0.1 DVA0
5	From the SRM console, boot the DIGITAL UNIX CD-ROM. >>>boot dka400	Installation information is displayed and you are prompted to select an option. For more information, refer to the DIGITAL UNIX <i>Installation Guide</i> .

F

Equipment Log

Introduction

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

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

Equipment Log

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

- Your system's hardware components (Table F-1).
- Your system's ISA equipment configuration (Table F-2).
- Your system's hardware configuration (Table F-3).
- The operating system or application software installed on your DIGITAL Personal Workstation (Table F-4).
- Additional components (Table F-5).

Equipment Log

Table F-1: Hardware Components

Component	Vendor/ Type/Size	Model Number/ Speed	Serial Number	Date Installed
System unit	Personal Workstation			
System unit key number				
Monitor				
Keyboard				
Mouse				
Optional drive				
Additional storage device 1				
Additional storage device 2				
Additional storage device 3				
Additional storage device 4				

Use Table F-2 to keep track of expansion options for your DIGITAL Personal Workstation. The upper portion of the table shows the standard devices. You can use the lower portion of the table to record the parameters of ISA or PCI devices you add to the riser card.

Equipment Log

Table F-2: ISA Equipment Configuration

Device	Handle	Slot	IOBASE	Membase and Memlen	DMA mode and chan	IRQ 0-3
Keyboard	KBD	0	60			1
Mouse	MOUSE	0	60			12
Serial Line 1	COM1	0	3F8			4
Serial Line 2	COM2	0	2F8			3
Parallel Port	LPT1	0	3BC		3, if used	7
FDC	FLOPPY	0	3F2		2, if used	6
IDE						14, 15
Audio						
Riser Card ISA Expansion Slots						
		2				
		3				
		4				
Riser Card PCI Slots						
		1				
		2				
		3				
		4				
		5				

Equipment Log

Table F-3: Hardware Configuration

Component	DIGITAL Personal Workstation Specifics
CPU (central processing unit) speed and model	
Firmware version: SRM or Firmware version: AlphaBIOS	
Memory size: Bank 0 Bank 1 Bank 2	
Video module (in PCI slot)	
SCSI (in PCI slot)	

Equipment Log

Table F-4: Installed Software

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

Table F-5: Additional Component Information

Component	Vendor	Model Number	Serial Number	Date Installed

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