Digital Personal Workstations

System Reference

Part Number: ER-B30WW-UA. B01

Digital Equipment Corporation

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FCC Notice

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.

Canadian DOC Notice

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.

VCCI Notice

This equipment is in the 2nd Class category (information equipment to be used in a residential area or an adjacent area thereto) and conforms to the standards set by the Voluntary Control Council For Interference by Data Processing Equipment and Electronic Office Machines aimed at preventing radio interference in such residential area.

When used near a radio or TV receiver, it may become the cause of radio interference.

Read the instructions for correct handling.

German Ergonomic Notice

This equipment meets or exceeds the ergonomic requirements of ZH1/618 and is certified to bear the GS mark by TUV Rheinland of Germany.

Safety Requirements

This equipment meets or exceeds requirements for safety in the U.S. (UL 1950), Canada (CSA C22.2 No. 950), and Europe (EN 60950/IEC 950) with Nordic requirements.

WARNING: There is a danger of battery explosion if a lithium battery is incorrectly replaced. To prevent damage to your computer, be sure the + side faces up when installing a new battery. Also, be sure you replace the battery with either a Digital (P/N 12-41474-05), Toshiba (P/N CR2032), or equivalent 3 V dc lithium battery.

Depending on your locality, your computer's battery might be considered hazardous waste. Make sure you follow any state or local statute to properly dispose of the old battery.

ADVARSEL: Der er fare for, at et lithiumbatteri eksploderer, hvis det udskiftes ukorrekt. Undgå, at beskadige din computer - HUSK, at + siden skal vende opad, når du installerer et nyt batteri. Du skal udskifte batteriet med enten et Digital (delnummer 12-41474-05), Toshiba (delnummer CR2032), eller tilsvarende 3 V jævnstrøms lithiumbatteri.

Afhængig af dit lokalområde, er det muligt, at din computers batteri betragtes som farligt affald. Husk, at følge evt. miljølove og lokale bestemmelser, når du kasserer det gamle batteri**.**

VAROITUS: Litiumpatterit voivat räjähtää, jos ne asennetaan väärin. Estääksesi tietokoneesi vaurioitumisen varmista, että patteria asentaessasi sen positiivinen (+) puoli on ylöspäin. Tarkista myös, että käyttämäsi uusi patteri on joko Digital (osa no. 12-41474-05), Toshiba (osa no. CR2032) tai vastaavanlainen 3 voltin tasavirtalitiumpatteri.

Asuinpaikastasi riippuen tietokoneesi patteria voidaan pitää ongelmajätteenä. Pidä huoli, että hävität vanhan patterin voimassa olevien lakien ja asetusten mukaisesti.

VARNING! Det kan förekomma en batteriexplosion om ett litium-jonbatteri byts ut på felaktigt sätt. Förhindra att datorn skadas genom att se till att plussidan (+) är uppåtvänd när du sätter i ett nytt batteri. Det gamla batteriet får endast bytas ut mot ett Digital-batteri (artikelnummer 12-41474-05), ett Toshiba-batteri (artikelnummer CR2032) eller ett motsvarande litiumbatteri på 3 volt likström.

Datorbatterier anses vara miljöfarligt avfall i många länder. Du måste följa alla lokala bestämmelser när du avyttrar ett gammalt batteri.

Laser Safety Notices

All CD-ROM drives included in Digital Personal Workstations are classified as Class 1 laser products and comply with safety standards as set by U.S. government and applicable European agencies.

No hazardous radiation is emitted from this CD-ROM drive; the laser beam is completely enclosed in the CD-ROM subassembly during all customer operation and maintenance. In the event that repair or service of the CD-ROM subassembly is required, only authorized Digital service personnel should perform such repairs.

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Introduction

This guide describes how to operate, configure, and upgrade your Digital Personal Workstation. The information presented will help to familiarize you with all aspects of your workstation and provide a reference tool for questions you might have in the future.

Related Material

A *Quick Setup Guide* is available as a supplement to this *System Reference*. This guide describes how to initially setup your workstation.

A *Digital PC Systems Solutions* manual is available to help you troubleshoot your workstation should it fail to operate after initial setup or after installing optional devices.

A *System Software* manual provides information on the operating system, utilities, and device drivers that came with your workstation. Your workstation also came with a CD-ROM disk that can be used to restore your system software. Refer to the CD-INFO.TXT file on the CD-ROM disk for installation and configuration information.

A *Warranty and Service Information* booklet is supplied with your workstation. This booklet provides warranty information and a listing of phone numbers for technical support.

README files come with the factory installed software and on the supplied CD-ROM disk. This information can help you setup, configure, and operate your workstation. Digital recommends that you read this information first.

Windows NT Workstation documentation is provided as an on-line help file and in printed form.

Latest Product Information and Updates

You can access product information and download the latest BIOS, device drivers, and software updates using the Internet at:

http://www.workstation.digital.com

Once accessed, go to the "Firmware and Drivers" section.

180i, 200i, and 200i^2 Digital Personal Workstation

180i, 200i, and 200i^2 Digital Personal Workstations offer a single 180 MHz or 200 MHz Pentiumâ-Pro processor configuration or a dual 200 MHz Pentiumâ-Pro processor configuration with 256 KB on-chip cache (each processor), up to 256 MB of EDO or 512 MB of fast-page parity workstation memory (via eight SIMM sockets), 2D/3D graphics PCI expansion board, 16-bit stereo-quality audio, an integrated 32-bit PCI ethernet controller, 10/100Base-T ready, (other network options are available) and a 32-bit ultra-wide SCSI (UW-SCSI) adapter.

266i and 266i^2 Digital Personal Workstations

266i and 266i^2 Digital Personal Workstations offer a single 266 MHz Pentiumâ II processor or dual 266 MHz Pentiumâ II processors with 32 KB level 1 and 512 KB level 2 on-chip cache (each processor), up to 256 MB of EDO or 512 MB of fast-page parity workstation memory (via eight SIMM sockets), 2D/3D graphics PCI expansion board, 16-bit stereo-quality audio, and an integrated 32-bit PCI Ethernet controller, 10/100Base-T ready, (other network options are available) and a 32-bit ultra-wide SCSI (UW-SCSI) adapter
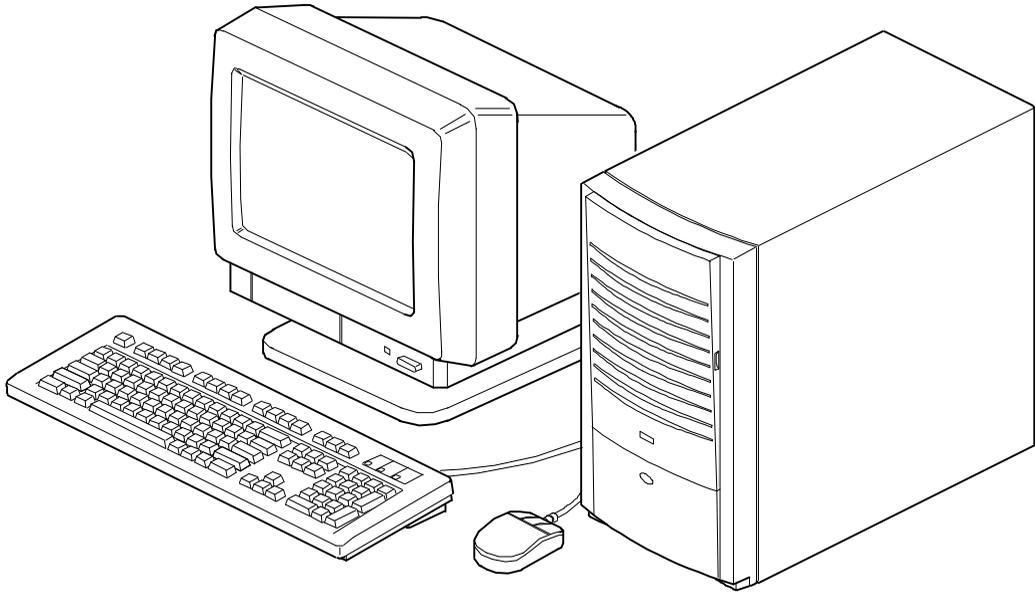
DEC00900

Typical *Digital Personal Workstation*

NOTE: Note that your monitor, keyboard, and mouse might look different.

Audience

This guide is written specifically for anyone responsible for configuring and expanding a Digital Personal Workstation.

Organization

This guide contains the following:

- Chapter 1: *Beyond Quick Setup*— This chapter describes your workstation's front and rear panel components, indicators, and connectors. This chapter also explains how to physically secure your workstation to a desk or table, connect optional external devices (such as headphones, microphone, printer, etc.), use your workstation's Windows enhanced keyboard, how to remove and replace the front bezel door, and create a comfortable working environment.

- Chapter 2: *Using the BIOS Setup Utility*—This chapter provides task-based information on how to configure your workstation using the BIOS Setup utility.

- Chapter 3: *Inside Your Workstation*—This chapter provides internal workstation component descriptions and locations as well as how to remove the main logic board, replace the battery, and upgrade to a higher-performance processor.

- Chapter 4: *Main Logic Board Expansion*—This chapter explains how to install additional workstation memory.

- Chapter 5: *Adding Expansion Boards*—This chapter explains how to install ISA and PCI expansion boards.

- Chapter 6: *Adding Mass Storage Devices*—This chapter explains how to install and connect optional mass storage devices.

- Appendix A: *Technical Specifications*—This appendix lists vital workstation operating and performance specifications. Also included is information about your workstation's jumper and switch settings.

- Appendix B: *Device Mapping*—This appendix contains tables listing the main logic board's memory map, I/O address map, interrupt map, and DMA map.

Conventions

Convention Example	Description
Quick Setup	Italics are typically used for titles, comments, and references to other sections of this document or other documents.
`c:\windows>`	Monospaced text indicates information that your workstation or software displays. For example, a directory path or error message.
`SCU.BAT`	Monospaced text can also indicate a command that you need to enter to run an application or utility.
[Enter]	Square brackets surrounding text represents a keyboard key.
[Ctrl]+[Alt]+[Del]	A plus sign indicates that the keys shown should be pressed at the same time.

Special Notices

Three kinds of special notices are used in this *System Reference* guide to emphasize specific information.

WARNING: indicates the presence of a hazard that can cause personal injury if the hazard is not avoided.

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

SHOCK OR STATIC SENSITIVE: indicates the presence of a hazard that might cause personal injury due to a shock or static discharge damage to hardware.

NOTES: are used to provide additional information.

Beyond Quick Setup *1*

Introduction

This chapter describes your workstation's front and rear panel components, indicators, and connectors. This chapter also explains how to physically secure your workstation to a desk or table, connect optional external devices (such as headphones, microphone, printer, etc.), use your workstation's Windows enhanced keyboard, how to remove and replace the front bezel door, and create a comfortable working environment.

Front Panel Controls and Indicators

Figure Legend	Control or Indicator	Function
A	Headphone jack	This jack enables you to connect standard stereo headphones to your workstation.
B	Microphone jack	This jack enables you to connect a standard microphone to your workstation.
C	On/off switch	Turns your workstation's power on and off.
D	Power LED	Lights when your workstation is turned on.
E	Reset switch[1]	Resets your workstation and causes POST to run.
F	Diskette eject button	Releases a 3½-inch diskette from the diskette drive.
G	Drive bays	Enables you to add additional mass storage device(s) to your workstation.
H	Hard disk drive LED	Lights when your hard disk drive is in use.
I	Diskette activity LED	Lights when the diskette drive is in use.
J	CD-ROM headphone jack[2]	This jack enables you to connect standard stereo headphones so you can listen to audio output from your CD-ROM drive.
K	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.
L	CD-ROM activity light	This LED lights during power up and when accessing the CD-ROM disk.
M	CD-ROM eject button	Pressing this button opens and closes the CD-ROM drive cavity so you can insert or remove CD-ROM disks from the drive.
N	Front bezel door	Restricts access to the front panel drive bays.

(1) Digital designed the reset button so it does not protrude significantly from the front bezel. This design prevents accidentally resetting the workstation. To reset your workstation, use a device such as a pen or pencil to push the reset button.

(2) Your CD-ROM drive might look different than the CD-ROM drive depicted.
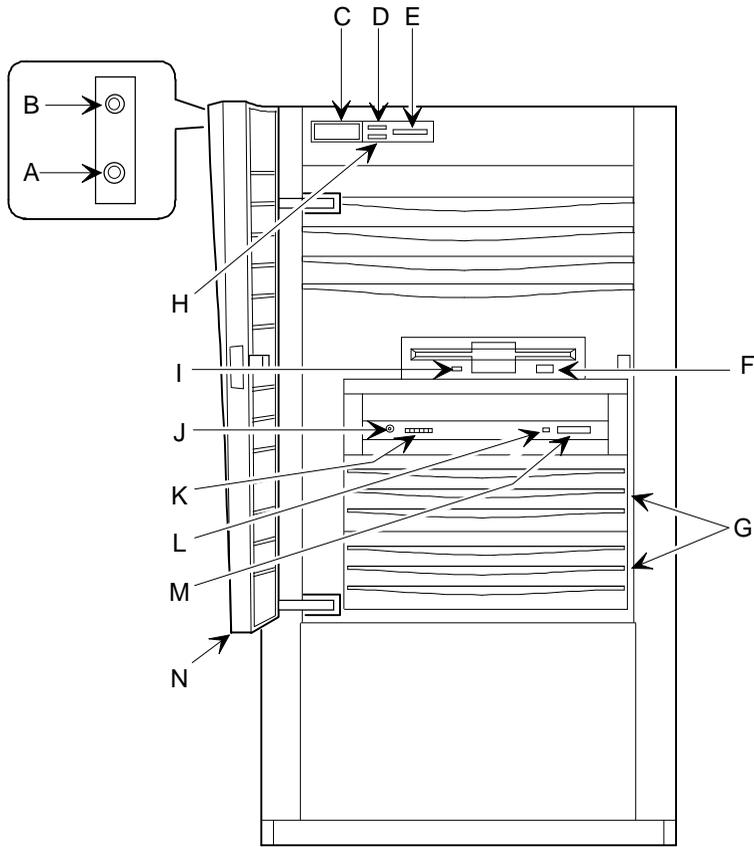
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Figure 1-1. Front Panel Controls and Indicators

Rear Panel Connectors and Voltage Select Switch

Figure Legend	Connector or Switch	Function
A	Chassis lockdown	Enables you to physically anchor your workstation to a fixed location.
B	ac line connector	Enables you to connect your workstation to an ac power source.
C	Line in (microphone)	This jack enables you to connect an audio input device like a microphone to your workstation.
D	Speaker out	This jack enables you to connect a set of speakers to your workstation.
E	MIDI/joystick port connector	Enables you to connect a MIDI/joystick device to your workstation.
F	10Base-T port connector (RJ45)	Enables you to connect to a 10/100Base-T (Twisted-Pair) network.
G	Voltage select switch	Enables you to select 115 V ac input power or 230 V ac input power.
H	Serial port connectors	Enables you to connect serial devices.
I	USB ports	Enables you to connect Universal Serial Bus (USB) devices.
J	Video port connector[1]	Enables you to connect a high-resolution monitor to your workstation.
K	Mouse connector	Enables you to connect a PS/2 style mouse.
L	Keyboard connector	Enables you to connect a Windows enhanced keyboard.
M	Parallel port connector	Enables you to connect a standard, Enhanced Parallel Port (EPP), or Enhanced Capabilities Port (ECP) parallel printer.

[1] Video expansion board might look different depending on model

continued

Figure Legend	Connector or Switch	Function
N	External SCSI port	Enables you to connect external SCSI devices to your workstation.
O	Expansion board slots	Enables you to install additional ISA and PCI expansion boards.
P	10Base-2 port connector (BNC)[1]	Enables you to connect to a 10Base-2 (ethernet ThinWire) network.

[1] Standard on the 180i, 200i, and 200i^2 Digital Personal Workstations.
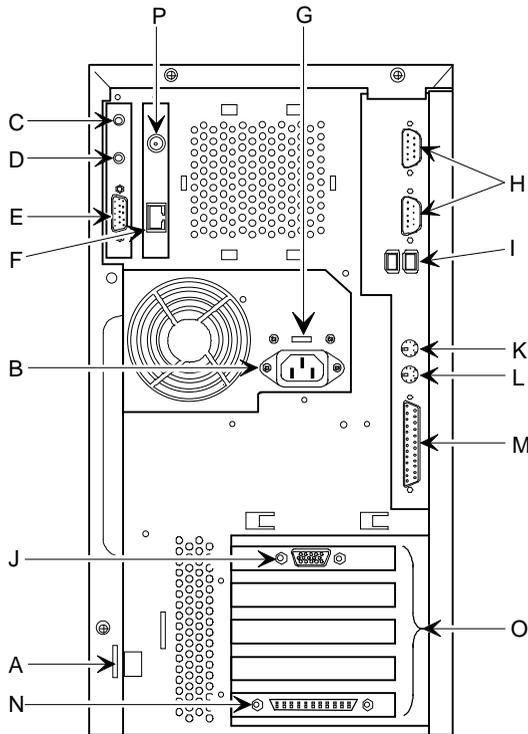
DEC00939-2

Figure 1-2. Rear Panel Connectors and Voltage Select Switch

Removing your Workstation's Outside Cover

1. Turn off power to all external devices connected to your workstation.

2. Turn your workstation off.

3. Unplug your workstation and monitor power cord from the wall outlet.

4. For workstation's without a chassis lock, go to step 4a. For workstations with a chassis lock, go to step 4b.

   a. Release the outside cover by loosing the rear-panel thumbscrews.

   b. Unlock the outside cover by inserting the key and turning it counter clockwise. Loosen the other two rear-panel thumbscrews.

5. Slide the outside cover backwards and then carefully lift it away from the chassis.

SHOCK OR STATIC SENSITIVE: Static electricity collects on non-conductors 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 circuit boards and/or components:

- Before touching any circuit board or component, touch the metal frame of your workstation to discharge any static electricity.

- Keep circuit boards and components away from non-conductors.
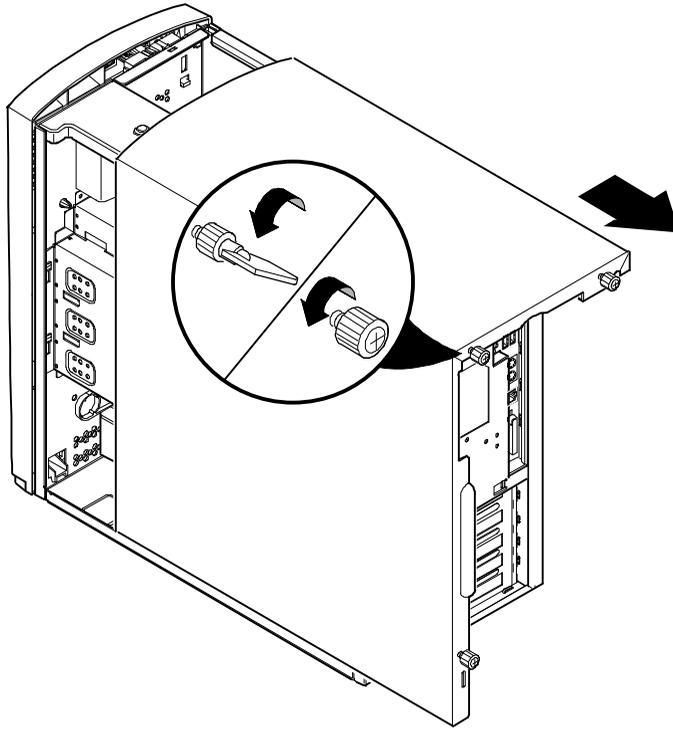
DEC01215-2

Figure 1-3. Removing the Outside Cover

Replacing your Workstation's Outside Cover

To replace the outside cover:

1. Replace the outside cover by sliding it onto the chassis.

2. For workstation's without a chassis lock, go to step 2a. For workstations with a chassis lock, go to step 2b.

    a. Secure the outside cover to the chassis using the rear panel thumbscrews.

    b. Secure the outside cover to the chassis by inserting the key and turning it clockwise. Tighten the other two rear-panel thumbscrews.
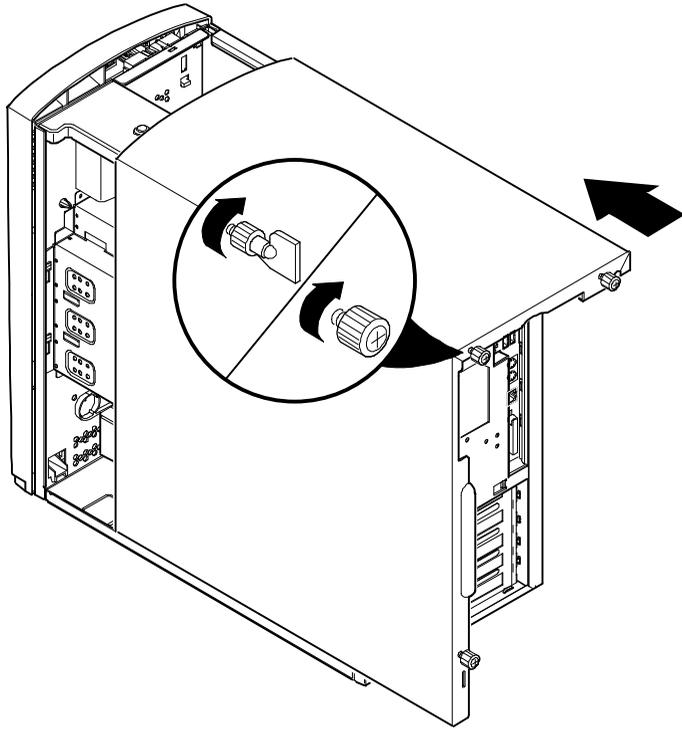
DEC01215-3

Figure 1-4. Replacing the Outside Cover

Connecting Speakers

If your workstation came with an audio card and you purchased speakers, perform the following instructions to connect them:

1. Unpack the speakers.

2. Plug the slave speaker cable into the master speaker "Speaker Output" (A, Figure 1-5).

3. Connect the loose cable to the master speaker "Audio Input" (B, Figure 1-5) and to the adapter card "Speaker Out" (C, Figure 1-5).

4. Connect the ac-to-dc adapter cord to the master speaker (D, Figure 1-5).

5. Plug the speaker ac-to-dc into a power outlet.

> **NOTE:** This diagram is only representative of typical speaker systems. Your actual speakers and how they connect might vary depending upon the make and model. Refer to the documentation that came with your speakers for more information.
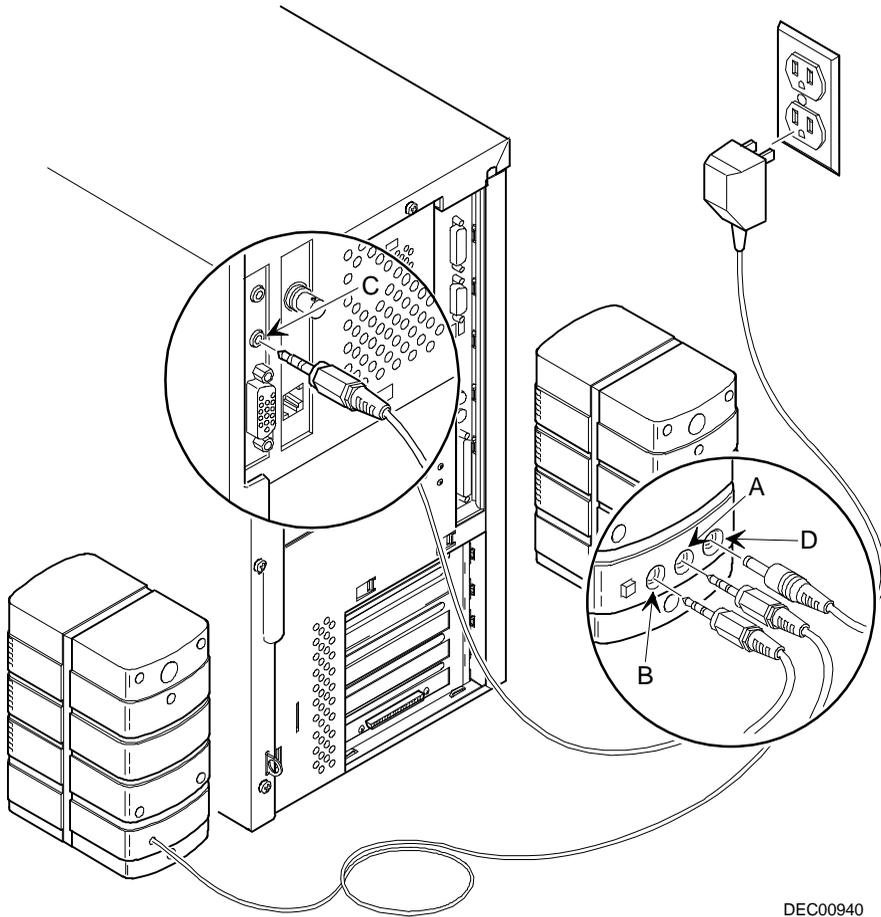
DEC00940

Figure 1-5. Connecting Speakers

Connecting Headphones

If your workstation came with integrated audio capabilities and you purchased headphones, perform the following instructions to connect them:

1. Unpack the headphones.

2. Connect the headphones cable into the connector at the left/front of your workstation.
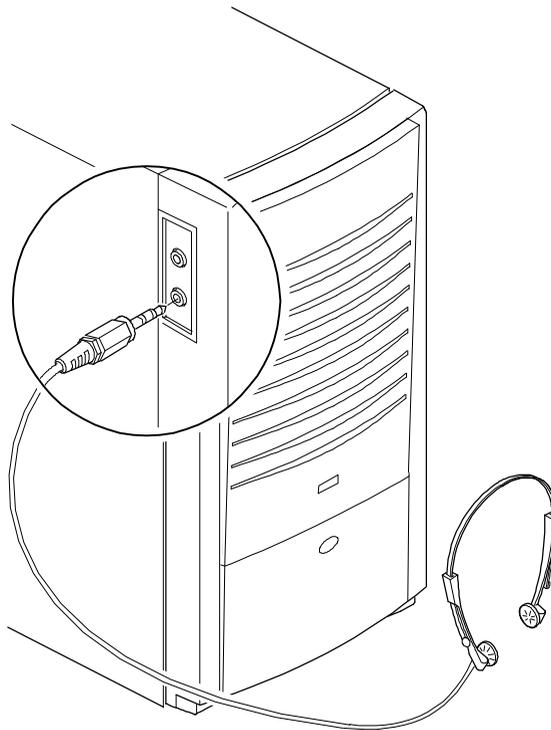
DEC00941-2

Figure 1-6. Connecting Headphones

Connecting a Microphone

If your workstation came with integrated audio capabilities and you purchased a microphone, perform the following instructions to connect it:

1. Unpack the microphone and assemble the base.

2. Connect the microphone cable into the connector at the left/front of your workstation.
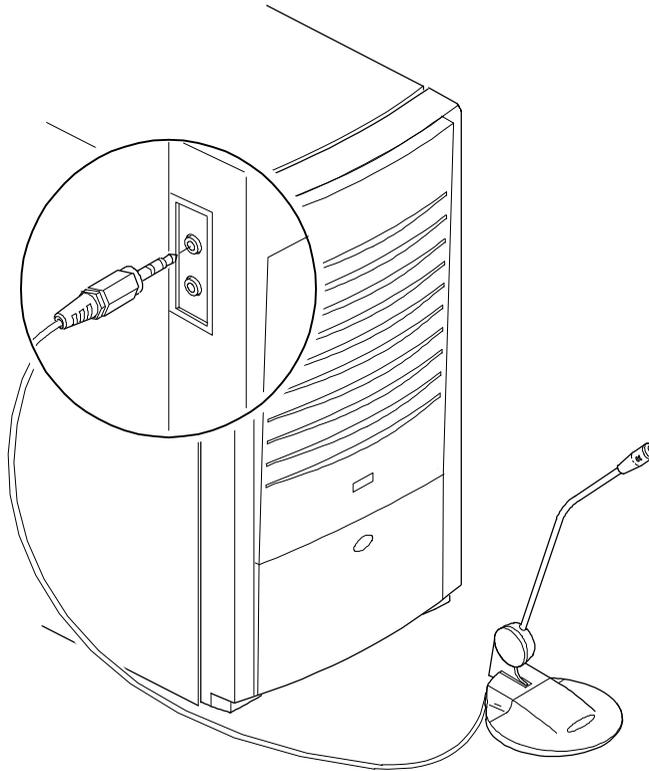
DEC00941-3

Figure 1-7. Connecting a Microphone

Connecting a MIDI/Joystick Device

If your workstation came with integrated audio capabilities and you purchased a MIDI/joystick device, perform the following instructions 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.
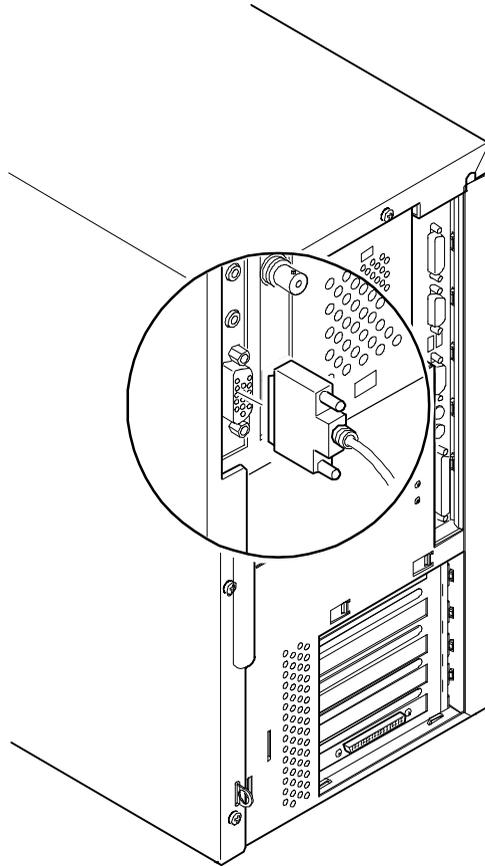
DEC00970

Figure 1-8. Connecting a MIDI/Joystick Device

Connecting a Local Printer

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

1. Look over 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.

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).

4. Turn on your workstation and then turn on your printer.

5. Configure your printer for operation with your workstation.

    Refer to your Windows NT Workstation on-line help and printed documentation for instructions on installing your printer's device driver.
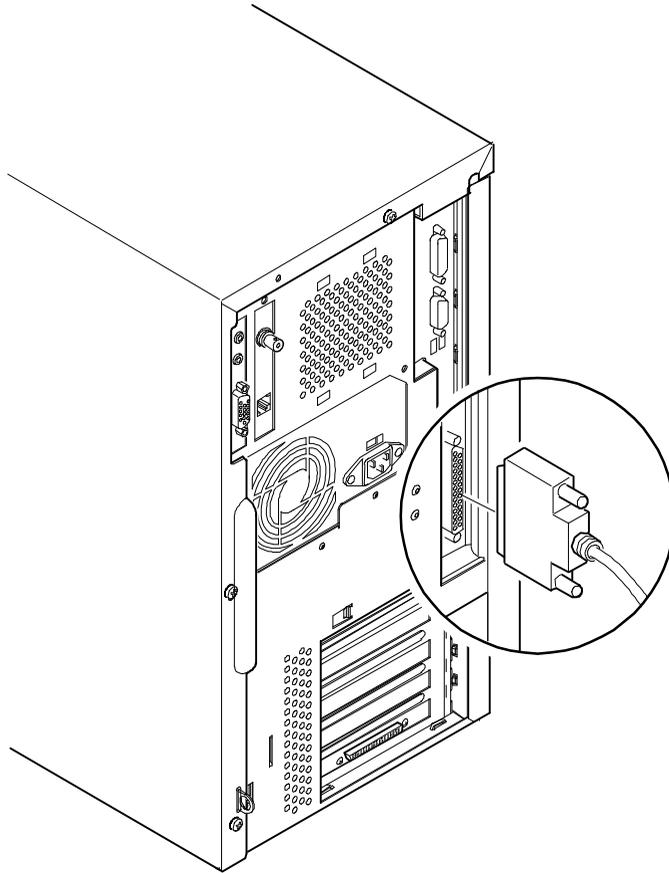
DEC00943

Figure 1-9. Connecting a Printer

Connecting a Universal Serial Bus (USB) Device

USB simplifies connectivity requirements for plug and play external devices by consolidating ports and eliminating the need to open the workstation to plug in expansion boards.

Refer to your manufacturer's documentation for installation instructions.

NOTE: Windows NT Version 3.51 and Windows NT Version 4.0 do not support Plug & Play. This means that USB devices have to be manually configured and setup as they are added to your workstation.

If you purchased a USB device for your workstation, perform the following instructions to connect it:

1. Unpack the USB device.

2. Connect the USB device cable into one of the USB port connectors at the rear of your workstation.

NOTE: Since USB devices are not yet generally available at the time of this guide's printing, the USB ports have been disabled in the workstation BIOS. If you have a USB device, you will need to upgrade your BIOS for USB support. As USB devices become available at your local workstation retail stores, the BIOS upgrade will be available. Refer to "Flash Utility" in chapter 2 for information on how to flash your BIOS. Check with your Digital support representative for the availability of this BIOS. Refer to "Service" on-line help for the Digital support phone number for your location.
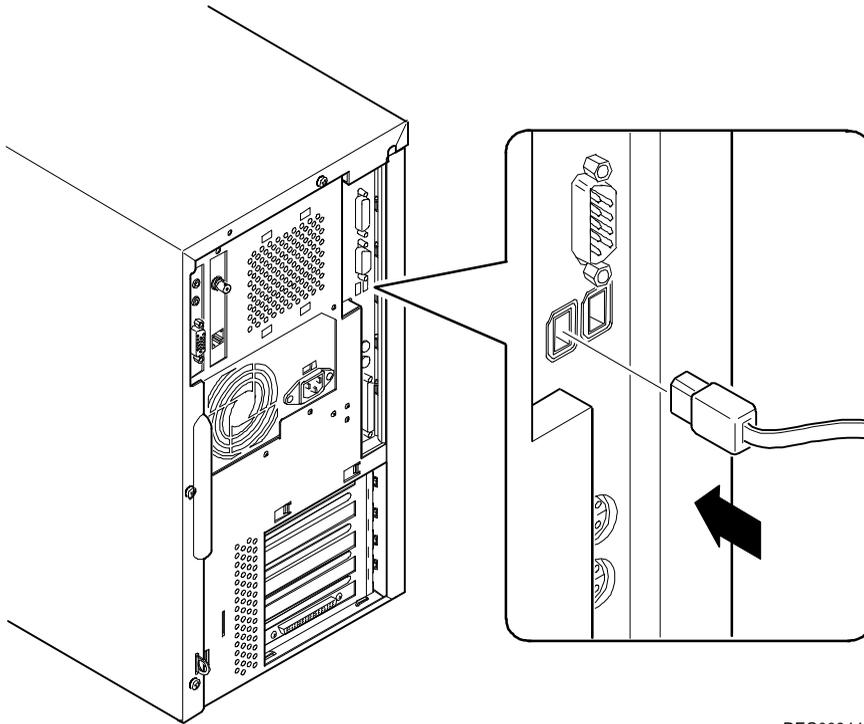
DEC00944

Figure 1-10. Connecting a USB Device

Your Workstation's Windows Enhanced Keyboard

Your workstation comes equipped with a 104-key Windows enhanced keyboard that enables you to communicate with your workstation by entering data or commands. Note that some European language keyboards have different key layouts.

The right and left Windows (A and B, Figure 1-11) keys bring up the Start menu much like pointing and clicking the left mouse button on the Start button. These keys can be used at any time you are in the Windows NT Workstation shell and do not affect or change the current mouse position. Both keys can be used to modify other keys. The operating system controls the functionality of the Windows keys and only shell applications should implement these keys.
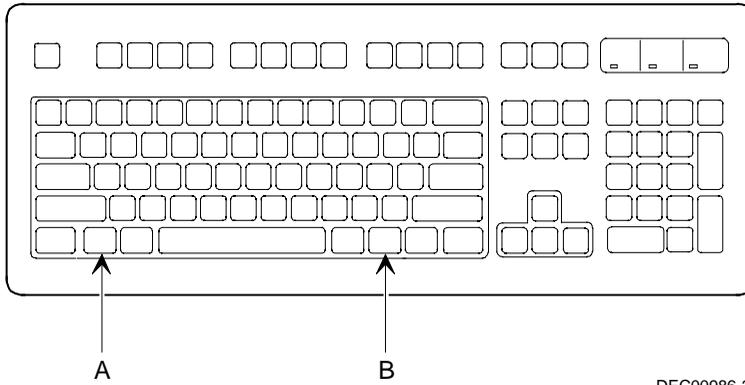
DEC00986-2

Figure 1-11. Windows Enhanced Keyboard

Removing the Front Bezel Door

The front bezel door has been designed so that the door assembly can be removed if you prefer not to have a front bezel door on your workstation. You can use the following procedures to replace the door assembly should the door break in some way.

1. Open the front bezel door so that the door is open 90 degrees.

2. With one hand near the top hinge area (top inside edge of the door), apply pressure to the top of the top hinge assembly.

3. With your other hand on the outside of the top of the door, apply pressure on the top-front of the door, rotating the top of the door frame clockwise towards the center of the workstation.

4. Once the top hinge has cleared, lift the door from the bottom hinge point.

5. If you are not replacing the door and wish not to have a door on your workstation, safely store the front door to ensure it will not get broken.
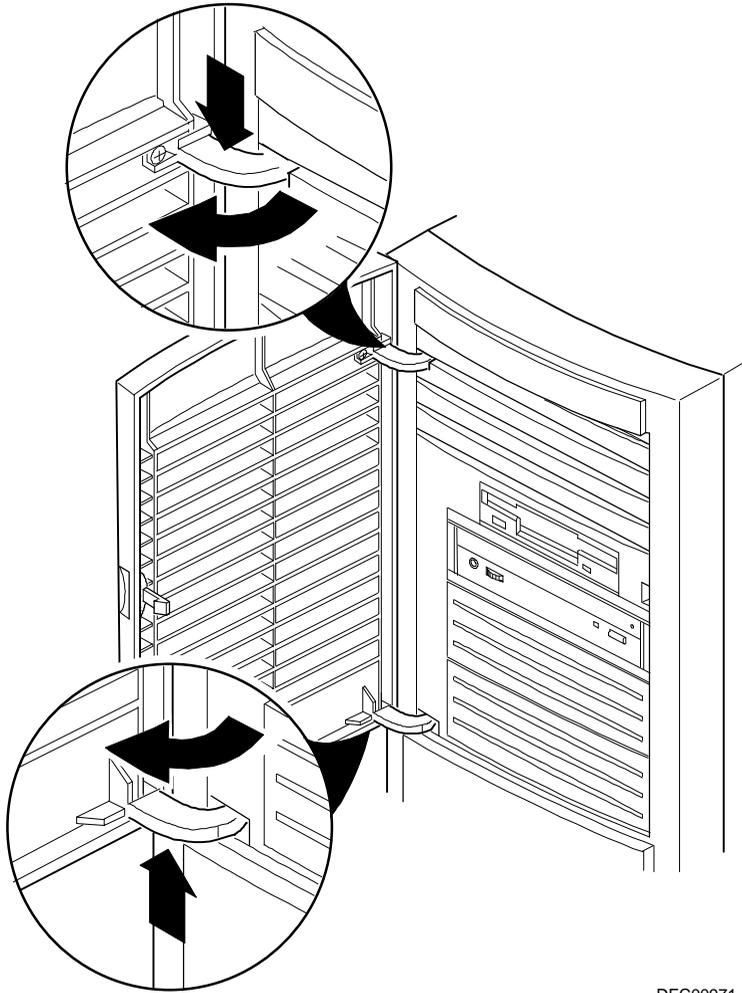
DEC00971

Figure 1-12. Removing the Front Bezel Door

Replacing the Front Bezel Door

To replace the front bezel door:

1. Insert the door into the front bezel doorway so that the bottom hinge is in the lower hinge point and the door is perpendicular to the door frame and the top of the door is angled near the top-right corner of the door frame.

2. With one hand near the top hinge area (top inside edge of the door), apply pressure to the top of the door assembly.

3. With your other hand inside the top of the door frame (inside top-left of the door way), apply pressure while lifting up on the bezel door casement.

4. While applying an opposing pressure to the two surfaces, gently rotate the top of the door counter clockwise into the door frame. The top hinge should snap into the hinge point hole in the top of the door frame.
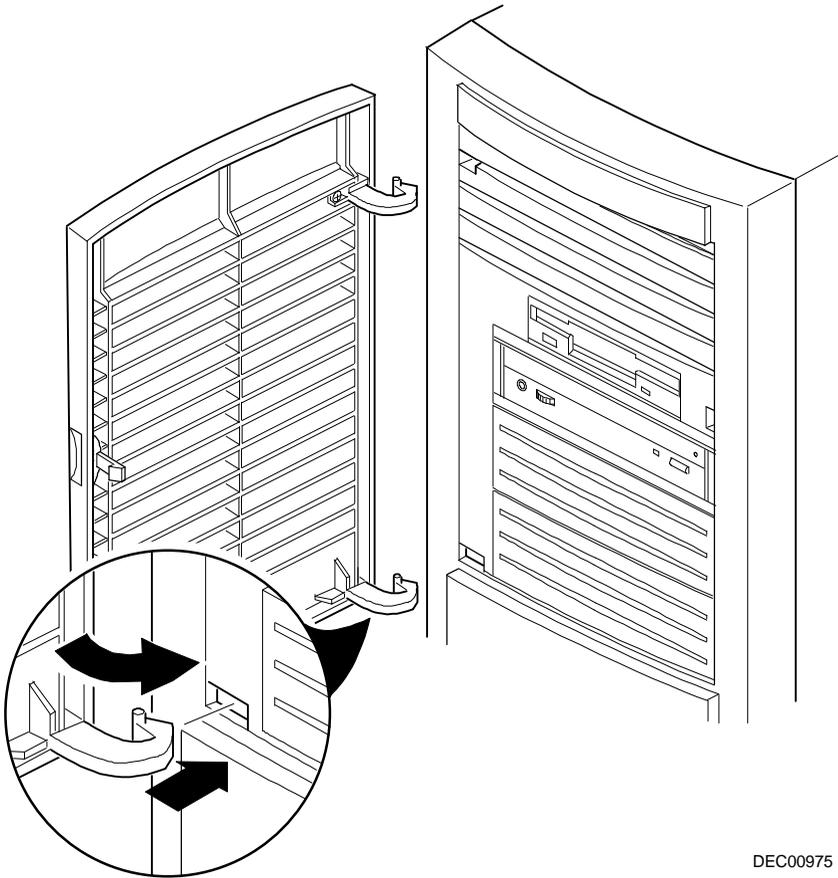
DEC00975

Figure 1-13. Replacing the Front Bezel Door

Creating a Comfortable Working Environment

Under circumstances of poor posture or poor setup, certain recent scientific articles suggest that injuries may occur. Other articles suggest that there is no cause and effect. Because the safety of our users is a great concern, it is important to take these precautions:

- Be comfortable in your work space.

- Change your posture frequently.

- Proceed according to the recommendations in the following table and figure.

Adjust	So . . .
Chair	Feet are flat on the floor.
	Legs are vertical forming a right angle to the floor.
	Your weight is off your thighs and they are horizontal. Keep the back of your knees away from the seat so you do not compress the area behind them, which could restrict the blood flow.
	Your upper body is erect and your lower back is supported with a backrest.
Keyboard or mouse	Your wrists are straight and do not bend more than 15 degrees. They may be supported when resting but not on sharp edges. Type comfortably, with no more key pressure than needed to feel the contact point.
	Upper arms are straight down at your sides, elbows are close to your sides and support your arm weight. Forearms are at a 70 degree to 90 degree angle.
	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.

Adjust	So . . .
Head	Avoid neck strain. Your head should incline downward, but no more than 15 to 20 degrees.
Monitor	No higher than the level of your eyes and at the correct distance for your vision.
	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 looking at distant objects.
Work breaks	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.
Lighting	Avoid direct lighting or sunlight on the screen, which causes glare and reflections. Place lighting behind or to the side of your work area, and distribute the lighting evenly on your work area.
	Your workstation monitor's screen has an antiglare treatment to reduce glare. Adjust the brightness and contrast controls as needed.
Noise	Keep background noise at a minimum. Background noise above 65 dBA is tiring. Sound-absorbing materials (curtains, carpeting, and acoustic tile) can help reduce background noise.
Temperature	20 to 23 degrees C (68 to 74 degrees F).
Humidity	30% to 70%.
Ventilation	Provide adequate air ventilation to avoid fatigue and to operate the equipment.
Space between set ups	> 70 cm (28 in.) center to center, preferably > 152 cm (60 in.).

IMPORTANT: If you experience pain or discomfort during use of the PC, take a rest break and review the instructions for proper ergonomic setup and use. If the pain or discomfort continues after resuming use of the PC, discontinue use and report the condition to your job supervisor or physician.
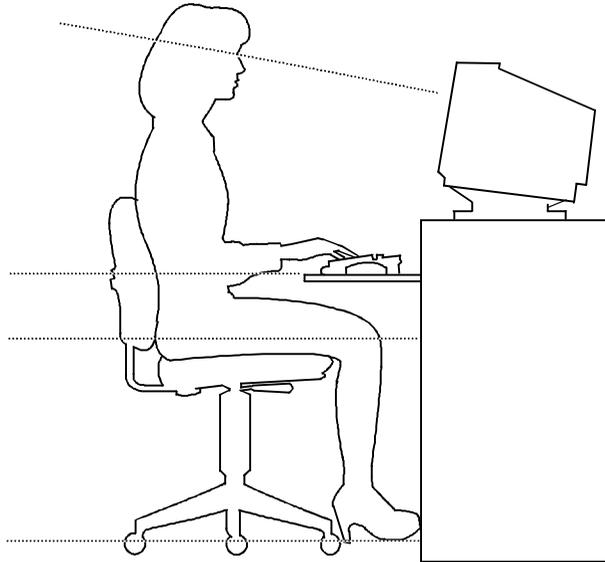
DEC00454

Figure 1-14. Creating a Comfortable Working Environment

Using the BIOS Setup Utility *2*

What is the BIOS Setup Utility?

The BIOS Setup utility enables you to select and store permanently information about your workstation's hardware and software in the battery-backed memory of the CMOS RAM. This information takes effect each time the workstation boots and can be changed any time you run setup.

You should use the BIOS Setup utility if you experience problems with your hard disk (IDE only) or if you need to reconfigure or expand your workstation.

This chapter provides information on how to configure your workstation using the BIOS Setup utility.

> **△ CAUTION:** Your workstation was setup for normal operation at the factory and will operate properly without additional configuring.
>
> It is important for you to read carefully and understand this chapter before attempting to modify your workstation's factory settings. Changing some settings might cause your workstation to operate improperly.

Here are some instances when you might wish to change your workstation's initial setup. You might need to:

- Change time and date
- Alter your workstation's security level

- Change the boot options

- Reconfigure power management

- Setup your keyboard for your comfort and use

Additionally, you will need to change your workstation's initial setup after:

- Upgrading hardware (such as adding a new IDE hard disk drive)

- Reconfiguring your mouse, COM, or LPT ports

> **NOTE:** If you do change BIOS settings, make sure you record the new settings and keep this information in a safe place. Should you ever have to reset the settings, such as when you replace your battery, you can use this information to reconfigure your workstation's BIOS.

The remainder of this chapter explains how to run the BIOS Setup utility, maneuver through the options, and perform specific tasks.

Accessing the BIOS Setup Utility

To access the BIOS Setup utility, perform the following steps:

1. Turn on your workstation and allow the Power-On Self Test (POST) to complete.

2. Make a note of any configuration errors listed, and then press [F2] to display the Main menu.

3. Follow the instructions on your monitor screen and any on-line help pop-up screens to configure you workstation.

Helpful Hints

When using the BIOS Setup utility consider:

- Several keyboard keys are assigned to help you select menus and sub-menus, options, change option values, and display help information. These keys are displayed at the bottom of all menus as follows:

Key	Function
F1	Help (provides a general help screen)
Esc	Exit (Exits the Setup utility and exits sub menus within the Setup utility)
↑↓ arrow keys	Select Item
← → arrow keys	Select Menu
-/+ or spacebar	Change Values
Enter	Select > Sub-Menu
F9	Setup Defaults (Restore all current Setup screen values to their factory default settings)
F10	Previous Values (Restores all BIOS values from the last session)

- Item-specific help is available anytime during the setup process and appears at the right of the setup screen when an option is highlighted.

- Choosing the "Exit" menu reveals several helpful options:

  – Select "Save Changes & Exit" to save all Setup values and exit Setup.

  – Select "Exit Without Saving Changes" to exit Setup without recording any changes.

    NOTE: Answer the Warning message carefully.

  – Select "Get Default Values" to set all setup options to their factory default values.

  – Select "Load Previous Values" to restore all setup values from the last session.

  – Select "Save Changes" to save all setup selections without exiting Setup.

Changing Your Workstation's Configuration

The following sections provide detailed information on changing your workstation's factory configuration. Before changing any setting, make sure you fully read and understand the information provided and view any on-line help for a selected setting.

Changing Time and Date

There may be instances when it will be necessary, such as daylight savings or if you move to a different time zone, to change the date and/or time that is resident in your workstation's BIOS. The following directions show you how this is done.

1. Reboot the workstation and enter Setup.

2. In the Main menu, using the cursor keys and [Tab], select (highlight) the System Time or System Date field you want to change.

3. Use [+] or [-] to change the field to the desired value.

    You can also enter the desired date and time.

4. Save Changes and Exit Setup and allow your workstation to reboot.

Setting Up Security

CAUTION: Security of your workstation is paramount when using it for important information. Make sure that you safeguard this process from the very beginning of your setup and installation process. Also, remember that passwords work both ways. They might keep unwanted or unauthorized personnel out of your workstation, but if the password is lost or forgotten, you too are locked out of your workstation. Switches on the main logic board of your workstation clear all passwords. Make sure that the workstation chassis is secured at all times. This same process can be used should you loose or forget the workstation passwords.

The following sections describe the security features available and how to use them.

Refer to Appendix A, "Technical Specification," for information on clearing passwords.

Setting Supervisor and User Passwords

Your workstation has two password levels that can be set to prevent unauthorized access to workstation files or to the BIOS Setup utility. If a supervisor password is set, the workstation asks you to enter a password before accessing the BIOS Setup utility.

If "Password On Boot" is enabled, and both the supervisor and user passwords are entered, you need to enter either the supervisor or user password to use the workstation.   Password on boot limits who accesses the workstation and at what level of functionality you receive.

Additionally, if after selecting [F2] during the boot sequence, the user password is entered instead of the supervisor password, the Main, Boot, Advanced, and Power menus in the BIOS Setup utility are rendered inaccessible.

> **NOTE:** A supervisor password must be set before you can set a user password. If the supervisor password is later deleted, the user password is automatically removed.

Perform the following steps to set a supervisor password:

1. Reboot the workstation and enter Setup.

2. Highlight the "Security" menu.

3. Highlight "Set Supervisor Password" and press [Enter].

4. Type in a seven (7) digit alpha-numeric supervisor password and then press [Enter].

5. Retype your password as instructed and press [Enter]. (Notice that "Supervisor Password Is" field now indicates Enabled.)

If desired, set a user password as follows:

1. Highlight "Set User Password" and press [Enter].

2. Type in a seven (7) digit alpha-numeric user password and then press [Enter].

3. To confirm, retype your user password as instructed and press [Enter]. (Notice that "User Password Is" field now indicates Enabled.)

4. Press [Esc] then [Enter] twice to exit the BIOS Setup utility and to reboot the workstation so changes immediately take affect.

The workstation runs the POST and then asks for the password, which has just been set.

If you forget your password, refer to Appendix A "Technical Specificatons" for information on resetting your password.

Enabling Password On Boot

When "Password On Boot" is enabled, a screen appears after POST. The screen asks you to enter your supervisor or user password to allow your workstation to finish the boot sequence.

Perform the following steps to set "Password On Boot":

1. Reboot the workstation and enter Setup.

2. Highlight the "Security" menu.

3. Highlight "Password On Boot."

4. Press the [+] key. (Pressing the [+] key again reverses your action.)

5. Press [Esc] then [Enter] twice to exit the BIOS Setup utility and to reboot the workstation so changes immediately take affect.

Eliminating User and Supervisor Passwords

To eliminate your workstation's password(s), follow the directions given below:

1. Reboot the workstation and enter Setup.

2. Enter the supervisor password and press [Enter].

3. Do you wish to eliminate the User Password or the Supervisor Password?

   If User Password, select "Set User Password."
   If Supervisor Password, select "Set Supervisor Password."

4. Press Enter three times.

    You have cleared the old password and are returned to the "Security" menu. Verify that the appropriate password is disabled by checking "User Password is" or the "Supervisor Password is" field, whichever is relevant.

5. Press [Esc] then [Enter] twice to exit the BIOS Setup utility and to reboot the workstation so changes immediately take affect.

Protecting Against Boot Sector Viruses

Your workstation incorporates, in the BIOS Setup utility, a selection to write protect the fixed disk boot sector. By write-protecting the boot sector, you can protect your workstation against viruses that corrupt the boot sector.

The "Fixed Disk Boot Sector" line in the Security menu allows you to enable a very important anti-virus attribute. Selecting "Write-Protect" can help you to protect your hard disk from being corrupted by viruses, which could disable your hard disk.

To write-protect your fixed disk boot sector:

1. Reboot the workstation and enter Setup.

2. Highlight the "Security" menu.

3. Highlight "Fixed Disk Boot Sector."

4. Press the [+] key to enable write-protect (pressing the [+] key again, returns your workstation to normal).

5. Press [Esc] then [Enter] twice to exit the BIOS Setup utility and to reboot the workstation so changes immediately take affect.

Other Security Options

These options can provide further security for your workstation under certain conditions.

> ⚠️ **CAUTION:** Consider your security needs carefully before using the following option. While this option is enabled, the contents of the hard disk drive cannot be backed up to diskettes and the workstation cannot be booted from a diskette drive.

- If "Password On Boot" is enabled and "Diskette Access" is set to "Supervisor," entering the supervisor password at boot allows access to a diskette. Entering the user password at boot, however, prevents the workstation from accessing a diskette.

- *Custom Sign On Banner* – When enabled, allows a custom banner to be displayed every time you turn your workstation on.

- *Diskette Access* – While enabled, this option prevents the workstation from accessing a diskette.

- *Network Server* – Locks the keyboard and mouse to prevent tampering during network operation. You must enter a supervisor password to unlock the keyboard and mouse.

- *Suspend Lock System* – Found in the "Power" menu, this feature is enabled if your Power Management selections put your workstation into the "System Standby" or "System Suspend" modes. This feature disables your keyboard and mouse; you can reactivate them after entering a password.

> **NOTE:** The Suspend Lock System key combination enabled in Setup will be the combination required to place your workstation automatically into standby.

Setting Power Management Options

This section describes how to select and set your workstation's Power Management parameters using the BIOS Setup utility.

△ **CAUTION:** Windows NT Workstation 3.51 and 4.0 do not support Power Management. Your workstation BIOS has Power Management features but if you are using Windows NT Workstation, current versions of Windows NT Workstation will override the BIOS and Power Management features will not work. Should future versions of Windows NT Workstation support Power Management, the following features should then be available.

Setting up Power Management

NOTE: None of the power management features available in the BIOS Setup utility apply unless the "Power Management" field is set to Enabled.

To initialize the power management features:

1. Reboot the workstation and enter Setup.

2. Highlight the "Power" menu.

3. Highlight "Power Management."

4. Press the [+] key to select Enable (pressing the [+] key again, returns your workstation to Disable).

NOTE: "System Standby Timer" and "System Suspend Timer" have been preset. You can change these times by selecting them and pressing the + key to sequence through the available options.

5. Choose other Power Management options as desired.

6. Press [Esc] then [Enter] twice to exit the BIOS Setup utility and to reboot the workstation so changes immediately take affect.

Cooling Fan Detection

Your workstation BIOS checks to ensure that your workstation cooling fan is working before your workstation boots. This is to ensure that your workstation does not over heat because of the higher operating temperatures associated with the Pentiumâ II processors. If the BIOS detects a "Cooling Fan Failure" before the boot process completes, the following message appears:

```
WARNING!!! No Fan Power detected
Power off, check fan power or press <F1> to ignore
```

No beep codes are generated with this failure. If a fan failure is detected after the workstation boots, the workstation will generate a five second long, short beeping sound and will slow the processor down to 1/8 its normal speed to reduce the heat generated by the processors and will continue to operate at that speed until the fan power is restored.

Configuring for New Disk Drives

These sections describe how to configure new disk drives in the BIOS Setup utility.

Diskette Drive Configuration

Diskette drives need to be configured from within the BIOS Setup utility once the new diskette drive is installed.

To configure a newly installed diskette drive, proceed as follows:

1. Reboot the workstation and enter Setup.

2. Highlight the Main menu.

3. Highlight "Diskette A" or "Diskette B" (depending upon how you connected the diskette drive to your workstation).

4. Press the [+] key to sequence through the available options.

5. Press [Esc] then [Enter] twice to exit the BIOS Setup utility and to reboot the workstation so changes immediately take affect.

SCSI Hard Disk Drive Configuration

Your workstation comes with SCSI hard disk drives that have been setup and configured at the factory. However, your workstation also supports IDE hard disk drives should you choose to install and use them.

Refer to "SCSI Guidelines" in Chapter 6 for information about setting up and configuring your workstation to use both SCSI and IDE hard disk drives.

IDE Hard Disk Drive Configuration

Installing new ANSI-supported IDE hard disks is made easier by the "Autotype" drive detect mode available in the BIOS Setup utility.

Autotyping a Hard Disk

To Autotype a newly installed hard disk:

1. Reboot the workstation and enter Setup.

2. Highlight the "Main" menu.

3. Select an "IDE Adapter" field to assign the new hard disk and press [Enter].

4. Select "Autotype Fixed Disk" and press [Enter].

   The BIOS Setup utility searches the hard disk and fills-in the disk parameters. If a parameter does not read correctly, follow the "Manually Defining a Hard Disk" procedure given later in this chapter.

5. Press [Esc] once and verify that the selected IDE Adapter field reads correctly for your hard disk.

   For example: IDE Adapter 0 Master (C: 835 MB). If the selected IDE Adapter field does not read correctly, follow the "Manually Defining a Hard Disk" procedure given later in this chapter.

6. Press [Esc] once then [Enter] twice to exit the BIOS Setup utility and to reboot the workstation so changes immediately take affect.

Manually Defining a Hard Disk

If your hard disk was not recognized correctly by the Autotype mode in the BIOS Setup utility, or you wish to change your hard disk's definition, you can manually define your hard disk drive as follows:

1. Reboot the workstation and enter Setup.

2. Highlight the "Main" menu.

3. Select an "IDE Adapter" field to assign the new hard disk and press [Enter].

4. Select the type [USER] and then fill in the parameters.

5. Press [Esc] once and verify that the selected IDE Adapter field reads correctly for your hard disk. For example: IDE Adapter 0 Master (C: 835 MB).

6. Press [Esc], then [Enter] twice to exit the BIOS Setup utility and to reboot the workstation so changes immediately take affect.

Changing the Boot Sequence

It is sometimes necessary to change your workstation's boot sequence. For example, when connecting to a network. (Follow your network manual's instructions to determine the correct boot sequence.)

To change the boot sequence, proceed as follows:

1. Reboot the workstation and enter Setup.

2. Highlight the "Boot" menu.

    Diskette drive, Hard Disk, and CD-ROM Drive are displayed. The number shows the current ordering. For example, if CD-ROM Drive is 1 and Diskette Drive is 2, the workstation boots first from the CD-ROM drive. If it is empty, the workstation goes to the diskette drive and then finally to the hard disk drive.

3. Use the [-] and ['] arrows to locate the field you want to change. Then use the [+] to raise the order and [-] to lower it.

4. Press [Esc] twice then [Enter] twice to exit the BIOS Setup utility and to reboot the workstation so changes immediately take affect.

Speeding up the Boot Process

There are three options for speeding up the boot process. They in essence eliminate or replace displays or checks. To make these changes, proceed as follows:

1. Reboot the workstation and enter Setup.

2. Highlight the Main menu.

3. Highlight "Boot Options" and then press [Enter].

The following table lists the items displayed and describes them.

Field	Description
Summary screen	Displays the workstations configuration
Quiet boot	Replaces POST boot messages with a display of the Digital logo
Floppy check	Verifies the floppy boot drive
POST error	Pauses and displays the Setup prompt or Resume boot prompt, if an error occurs during the boot sequence. If disabled, the workstation always attempts to boot.
Setup prompt	Displays the Setup prompt message during the boot sequence. If disabled, the Setup prompt message will not be displayed. However, you can still access the BIOS Setup utility.

4. Select the item(s) you wish to change and use the [+] or [-] as follows:

Field	Speed Up Boot Selection
Summary	Disable
Quiet boot	Enable
Floppy check	Disable
POST error	Disable
Setup prompt	Enable

5. Press [Esc] twice then [Enter] twice to exit the BIOS Setup utility and to reboot the workstation so changes immediately take effect.

Resetting Keyboard Features

Several parameters effecting keyboard performance can be altered from within the BIOS Setup utility. They are: "NumLock," "Key Click," "Keyboard Auto-Repeat Rate," and "Keyboard Auto-Repeat Delay."

- "NumLock" is factory set to "Auto" at boot which means that the number pad is on each time you boot. This is desirable, for example, if you primarily use spreadsheets or accounting software.

  If, however, you primarily use a word processor or desktop publishing program, you might wish to leave NumLock off at boot to avoid having to turn it off manually.

- "Key Click," when enabled, produces an audible "Click" whenever a key is pressed.

  Most keys on the keyboard automatically repeat the character they represent if the keys are held down.

- "Keyboard Auto-Repeat Rate" sets the number of times per second a character repeats.

- "Keyboard Auto-Repeat Delay" sets the time that elapses before the character begins repeating.

Changing the Keyboard Features

To change the keyboard features:

1. Reboot the workstation and enter Setup.

2. Highlight the "Main" menu.

3. Highlight "Keyboard Features" and press [Enter].

If you wish to leave "NumLock" on, skip steps 4 and 5, otherwise:

4. Highlight "NumLock."

5. Press the [+] key to sequence through your options, select "Off."

If you wish to leave "Key Click" disabled, skip steps 6 and 7, other otherwise:

6. Select "Key Click."

7. Press the [+] key to select Enable.

If you wish to leave the "Keyboard Auto-Repeat Rate" (the number of times per second a character repeats) the same, skip steps 8 and 9, otherwise:

8. Highlight "Keyboard Auto-Repeat Rate."

9. Press the [+] key to sequence through the available options.

If you wish to leave the "Keyboard Auto-Repeat Delay" (the time that elapses before the character begins repeating) the same, skip steps 10 and 11, otherwise:

10. Highlight "Keyboard Auto-Repeat Delay."

11. Press the [+] key to sequence through the available options.

12. Press [Esc] twice then [Enter] twice to exit the BIOS Setup utility and to reboot the workstation so changes immediately take effect.

Flash Utility

All workstations have BIOS software in a read-only, non-volatile memory (ROM) chip. This BIOS initializes hardware and boots the operating system when the workstation is turned on. The BIOS also provides access to other services such as keyboard and disk drives.

Your workstation comes equipped with flash memory. This means that you can restore your workstation's BIOS simply by running the flash utility. If necessary, you can also upgrade your workstation's BIOS to future releases by running the flash utility along with any flash BIOS update diskette.

Only use the flash utility to upgrade your workstation's BIOS if you are instructed to do so by an authorized Digital support representative. Instructions on how to flash your BIOS, the flash utility, and BIOS updates are available from the workstation web page.

Refer to the "Preface" for additional access information.

Inside Your Workstation 3

Introduction

This chapter shows the location of your workstation's internal components. Expansion information is also covered in this chapter along with illustrations detailing the main logic board and backplane.

Each workstation contains a main logic board and a backplane. The main logic board provides most of the chips and components. The backplane contains slots for connecting expansion boards.

The chapter concludes with instructions on how to:

- Remove the main logic board

- Replace the battery

- Install to a higher-performance processor

Improving Workstation Performance

As your computing needs change, you can achieve improved workstation performance by:

- Installing additional workstation memory

- Upgrading your hard disk drives

- Installing a higher performance main logic board design

Preparing Your Workstation for Expansion

Before you begin to expand your workstation, refer to Chapter 1, "Beyond Quick Setup," for instructions on preventing component damage from static electricity, disconnecting external devices, and removing the outside cover.

Your Workstation's Components and Connectors (180i, 200i, and 200i^2 Models)

The following sections show your 180i, 200i, and 200i^2 Digital Personal Workstation's main logic board and connector locations. Use the information presented anytime you need to connect external devices, expand, or upgrade this workstation.

Workstation Components

Figure Legend	Component
A	Door assembly
B	Front access 5¼-inch drive bay with CD-ROM
C	3½-inch diskette drive
D	Main logic board (MLB)
E	Power supply
F	Internal 3½-inch drive bay(s) (supports IDE, narrow, and wide SCSI hard disk drives)
G	Backplane
H	Front access 5¼-inch drive bays (supports IDE, narrow, wide and ultra-wide SCSI devices)

DEC00902-2

Figure 3-1. Workstation Components

Main Logic Board Components

Figure Legend	Component
A	Super I/O controller
B	Intel 440FX PCI/memory controller
C	Intel PIIX3 ISA/IDE/USB controller
D	Workstation flash BIOS
E	Dip switch
F	Workstation battery
G	DBX data bus controller
H	Pentium-Pro processor
I	Voltage regulator module (VRM)
J	Eight 72-pin, 32-bit SIMM sockets
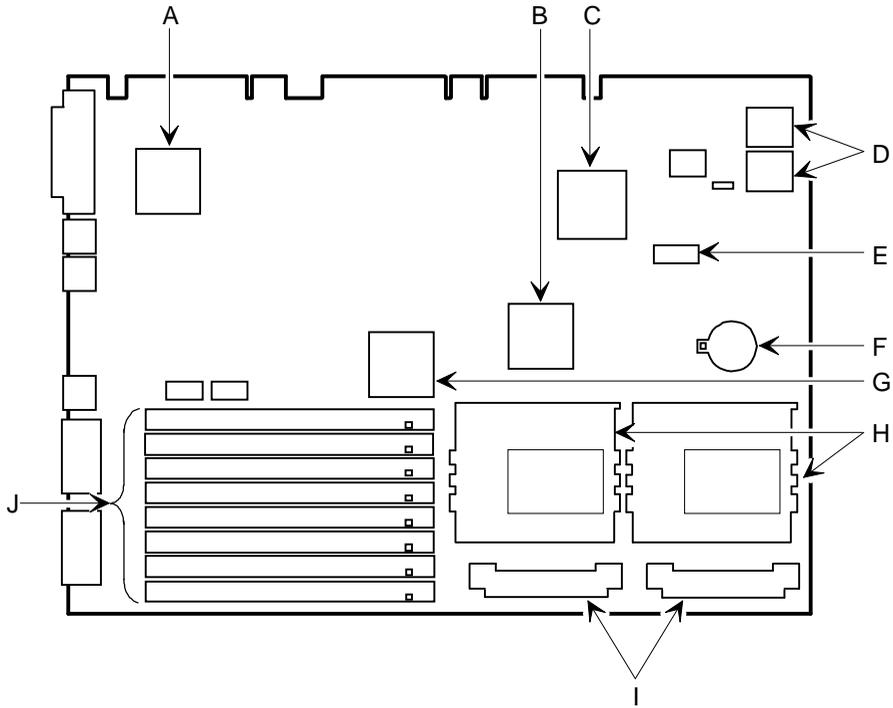
DEC00945-2

Figure 3-2. Main Logic Board Components

Main Logic Board Rear Panel Connectors

Figure Legend	Connector
A	Parallel port
B	Keyboard port
C	Mouse port
D	Two USB ports
E	Two serial ports

NOTE: Your workstation's video port is located on the PCI video expansion board that was factory installed into your workstation.

Your workstation's external SCSI port is located on the PCI SCSI adapter that was factory installed into your workstation.
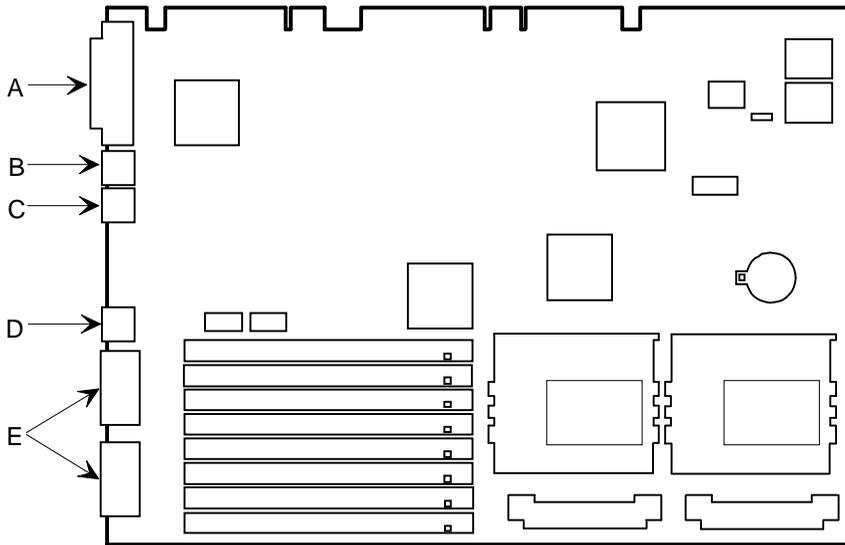
DEC00945-3

Figure 3-3. Main Logic Board Components (Rear Panel)

Your Workstation's Components and Connectors (266i and 266i^2 Models)

The following sections show your 266i and 266i^2 Digital Personal Workstation's main logic board and connector locations. Use the information presented anytime you need to connect external devices, expand, or upgrade these workstations.

Workstation Components

Figure Legend	Component
A	Door assembly
B	Front access 5¼-inch drive bay with CD-ROM
C	3½-inch diskette drive
D	Main logic board (MLB)
E	Power supply
F	Internal 3½-inch drive bay(s) (supports IDE, narrow, and wide SCSI hard disk drives)
G	Backplane
H	Front access 5¼-inch drive bays (supports IDE, narrow, wide and ultra-wide SCSI devices)

DEC01216-2

Figure 3-4. Workstation Components

Main Logic Board Components

Figure Legend	Component
A	Super I/O controller
B	Intel PIIX3 ISA/IDE/USB Controller
C	Workstation flash BIOS
D	Dip switch
E	Intel 440FX PCI/Memory Controller
F	Workstation battery
G	Pentiumâ II processor(s)
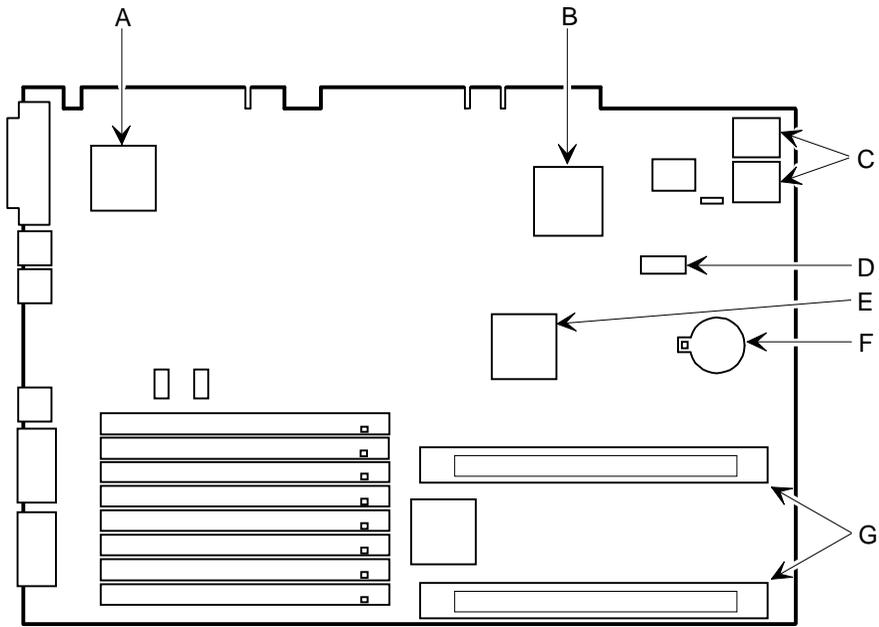
DEC01217-2

Figure 3-5. Main Logic Board Components

Main Logic Board Connectors (Rear Panel)

Figure Legend	Connector
A	Parallel port
B	Keyboard port
C	Mouse port
D	Two USB ports
E	Two serial ports

NOTE: Your workstation's video port is located on the PCI video expansion board that was factory installed into your workstation.

Your workstation's external SCSI port is located on the PCI SCSI adapter that was factory installed into your workstation.
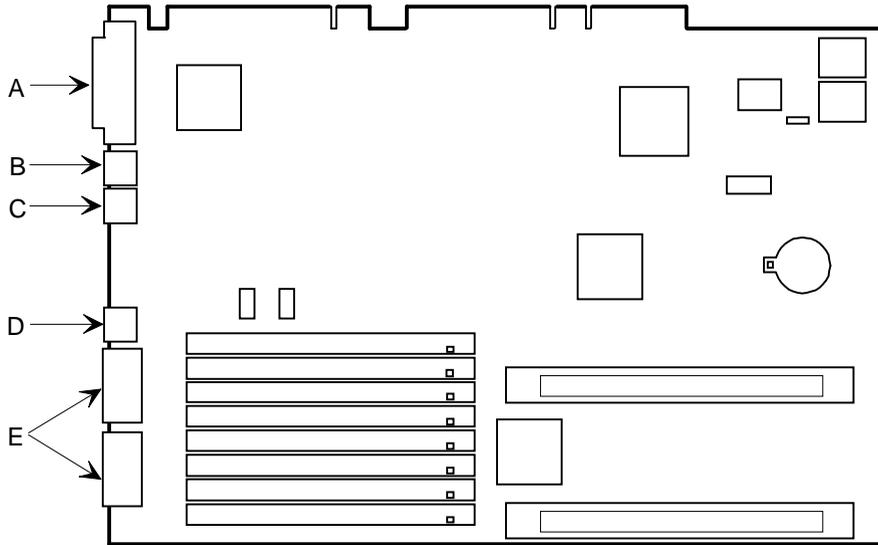
DEC01217-4

Figure 3-6. Main Logic Board Components (Rear Panel)

Main Logic Board Connectors

Figure Legend	Connector
A	Eight 72-pin, 32-bit SIMM sockets
B	Pentiumâ II processor socket 1 connectors (primary on top, secondary on bottom)
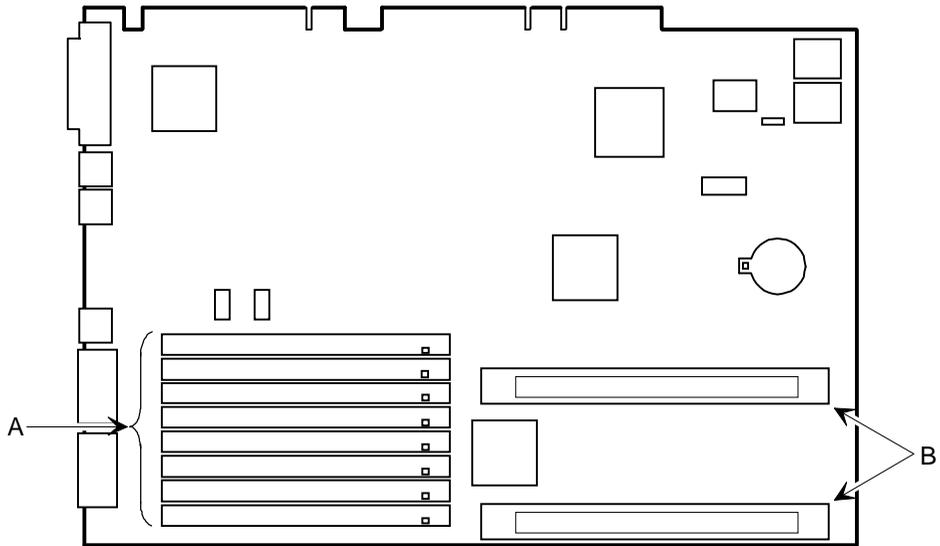
DEC01217-3

Figure 3-7. Main Logic Board Connectors

Backplane Components and Connectors (All Models)

Figure Legend	Connector
A	MIDI/game port (not available on all models)
B	CD-ROM audio input connector (CD-IN)
C	Audio connector (not available on all models)
D	Fax/modem audio input connector (F/M IN)[1]
E	Control panel connector
F	Fan in connectors
G	Power connector (5 V dc)
H	Diskette drive connector
I	Secondary IDE drive connector (recommended for an installed CD-ROM drive)
J	Primary IDE drive connector
K	Power connector
L	Main logic board connectors
M	32-bit half-size PCI slot (slot 1)
N	32-bit half-size PCI/ISA combination slot (slot 2)
O	32-bit full-size PCI/ISA combination slot (slot 3)
P	32-bit full-size PCI/ISA combination slot (slot 4)
Q	32-bit full-size PCI slot (slot 5)
R	100Base-T LAN connector (MII)
S	HD active LED
T	10Base-T LAN connector
U	Power connector (3.3 V dc)

(1)   This connector is used for Fax/Modems with speaker phone capabilities

Fax/Modem Audio Input Connector (F/M IN)

Item D, Figure 3-8	Description
Pin 1	Audio in (fax/modem)
Pin 2	Ground
Pin 3	Ground
Pin 4	Microphone in (fax/modem)

DEC01218-2
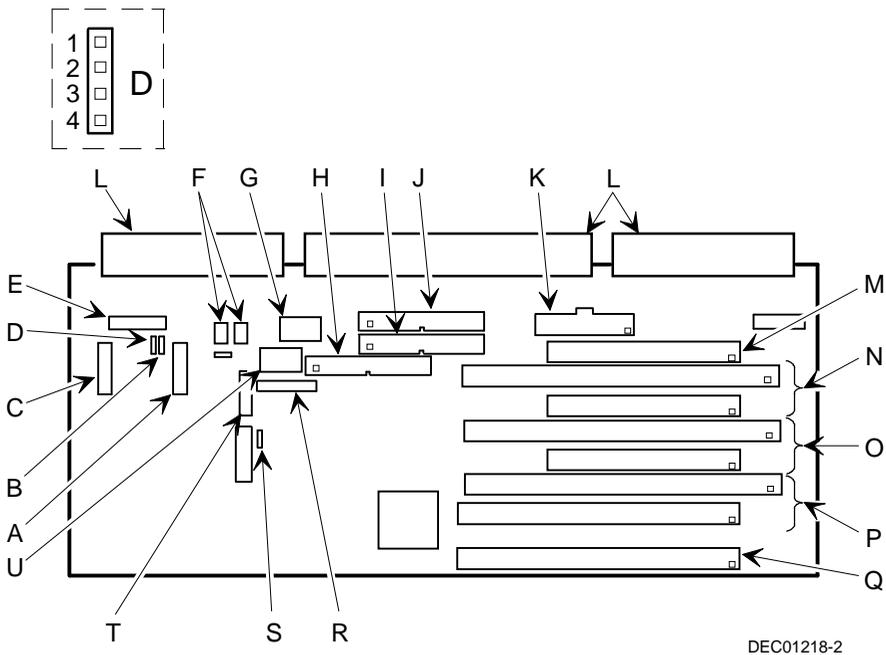
Figure 3-8. Backplane Components and Connectors (All Models)

Network Adapter Card Connector

All Digital Personal Workstations are network ready. You can use 10Base-2 (A, Figure 3-9) or 10Base-T (B, Figure 3-9) ports at the rear of your workstation to connect your external network cables. The internal network cables are already installed for you. Note that an optional 100/10Base-Tx network kit is also available. This kit provides RJ-45 100/10Base-Tx support. No 10Base-2 (BNC) is available at 100 Mpbs. Contact your Digital sales representative for more information about the availability of this option.

NOTE: Only the 180i, 200i, and 200i[2] Digital Personal Workstations include the 10Base-2/10Base-T network connection as a standard. The 266i and 266i[2] models include the 10/100Base-Tx network connection as a standard.
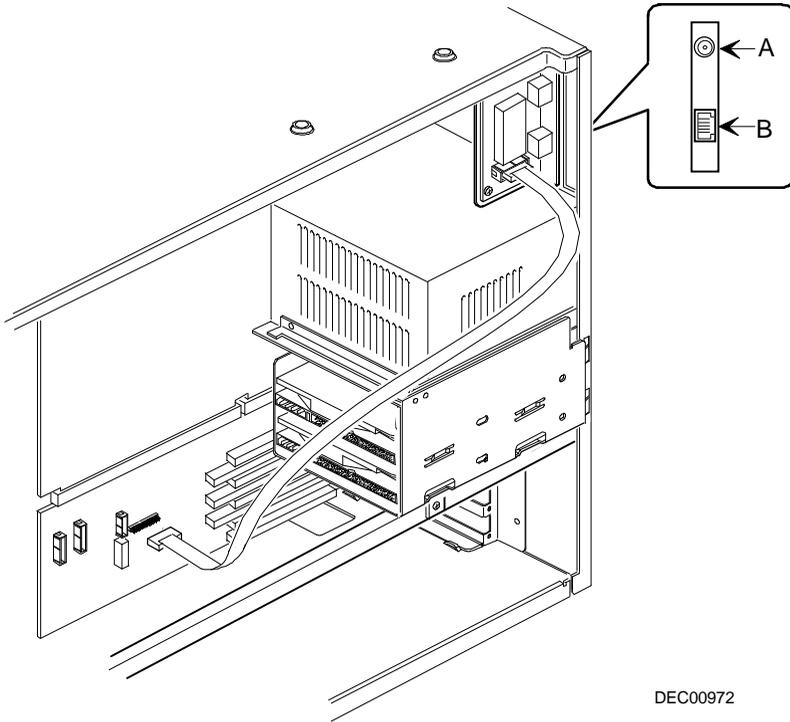
DEC00972

Figure 3-9. Network Adapter Card Connector

Audio/MIDI/Joystick Adapter Card Connectors

All Digital Personal Workstations come with an integrated ESS sound chip and an audio/MIDI/joystick adapter card installed. This card enables you to connect a MIDI/joystick device and speakers to your workstation.

Figure Legend	Connector
A	Line in
B	Speaker out
C	MIDI port/joystick port
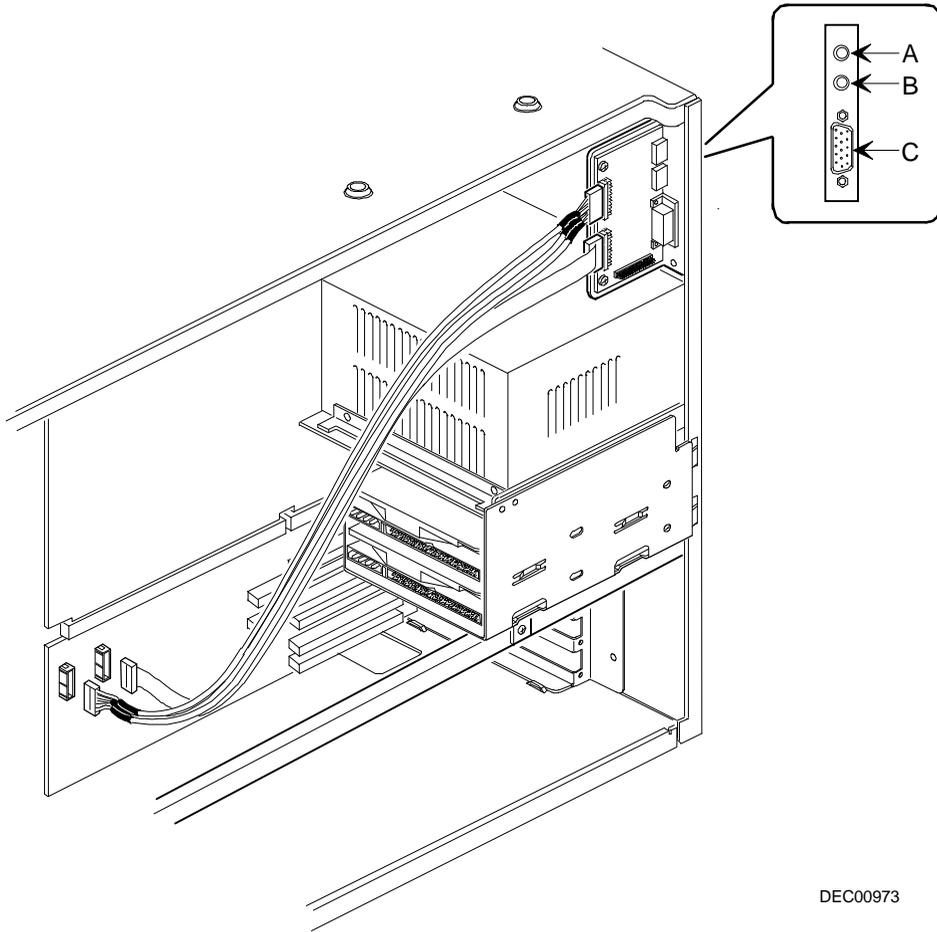
DEC00973

Figure 3-10. Audio/MIDI/Joystick Adapter Card Connectors

Removing the Main Logic Board

To remove the main logic board, follow these steps:

1. Turn off your workstation and monitor.

2. Disconnect all external devices, ac power, and monitor power.

3. Remove the outside cover.

4. Pull up on the two latches attached to the main logic board.

    This separates the main logic board from the backplane.

5. Carefully remove the main logic board from the chassis.

To replace the main logic board, follow these steps:

1. Carefully slide the main logic board into the chassis.

    Make sure the main logic board completely engages the backplane and the two latches fully lock into place.

2. Replace the outside cover.

3. Connect all external devices, ac power, and monitor power.

STATIC SENSITIVE: Static electricity collects on non-conductors 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 the main logic board:

Touch the metal frame of your workstation to discharge any static electricity.

Keep the main logic board away from non-conductors.
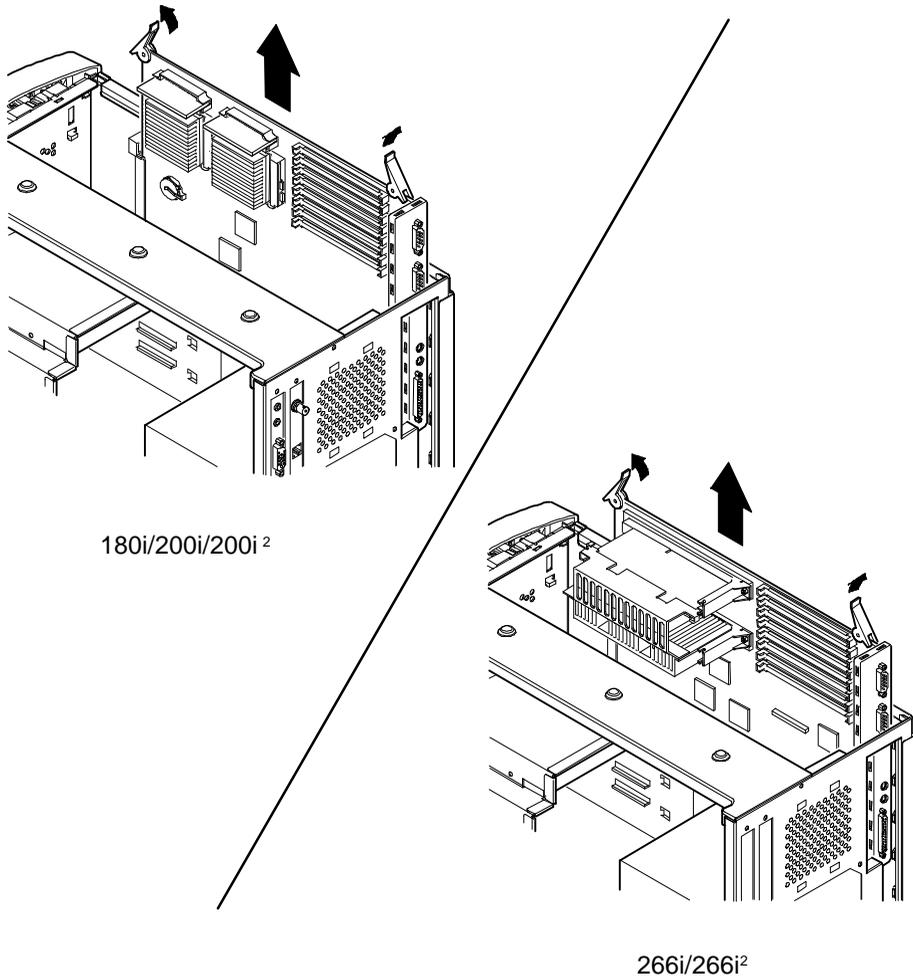
180i/200i/200i ^{2}

266i/266i^2

DEC01219

Figure 3-10. Removing the Main Logic Board

Replacing the Lithium Battery

Your workstation comes with a Lithium 3 V dc wafer-style battery. If your workstation ever fails to retain the correct date, time, or configuration settings when it is turned on, you need to replace the installed device.

To replace the Lithium battery, perform the following:

1. Record the workstation configuration settings using the BIOS Setup utility.

2. Turn off your workstation and monitor.

3. Disconnect all external devices, ac power, and monitor power.

4. Remove the outside cover.

5. Remove the main logic board.

6. Do not pull on the clip. Push the battery out by applying side-ways pressure on the battery as indicated. It will slip out of the battery clip.

   WARNING: There is a danger of battery explosion if a lithium battery is incorrectly replaced. To prevent damage to your workstation, be sure the + side faces up when installing a new battery. Also, be sure you replace the battery with either a Digital (P/N 12-41474-05), Toshiba (P/N CR2032), or equivalent 3 V dc lithium battery.

   Depending on your locality, your workstation's battery might be considered hazardous waste. Make sure you follow any state or local statute to properly dispose of the old battery.

7. To install a new battery, slide the battery in from the side marked "PUSH", without pulling up on the clip. The battery will slide in.

8. Replace the main logic board.

9. Replace the outside cover.

10. Connect all external devices and restore power.

11. Run the BIOS Setup utility to reconfigure your workstation using recorded configuration settings from step 1.

Refer to Chapter 2, "Using the BIOS Setup Utility."

180i/200i/200i [2]

266i/266i[2]
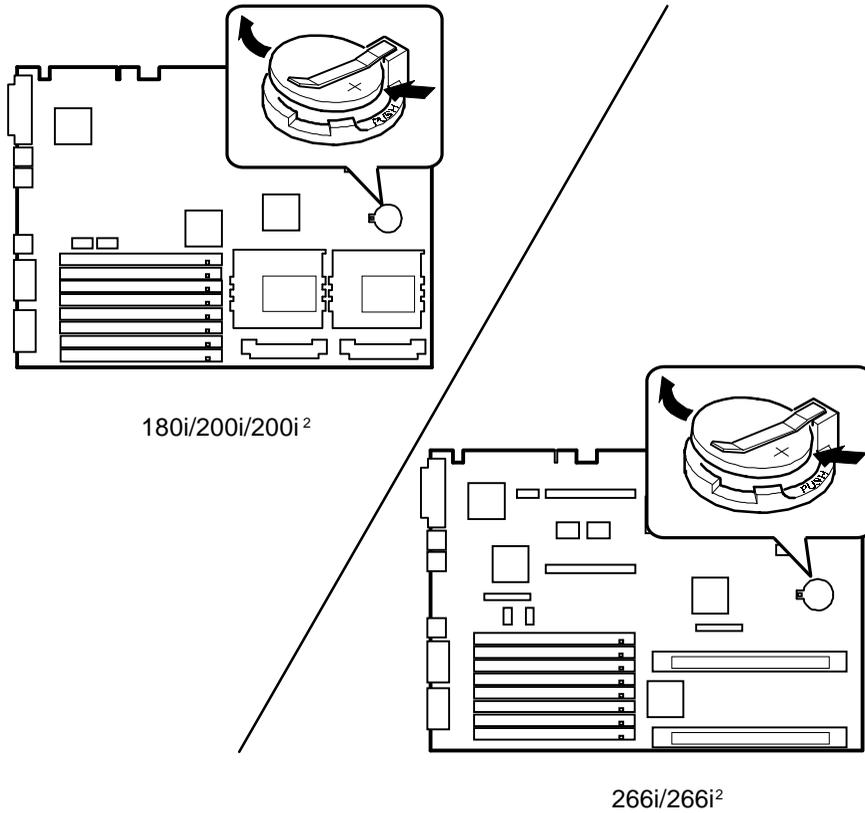
DEC01220

Figure 3-11. Replacing the Battery

Installing a Higher Performance Processor (180i, 200i, and 200i² Models)

Your 180i, 200i, and 200i² Digital Personal Workstation comes with the capability to install dual Intel Pentium-Pro processors installed in ZIF sockets. Contact your Digital sales representative or reseller for future processor upgrade availability and ordering information for your workstation.

> **NOTE:** If you purchased your workstation with just one processor and wish to upgrade it to a dual processor workstation, be aware that processors go through an evolutionary development process called "Processor Stepping." This is where the processor is subtlety changed where one processor chip might be slightly different than another. If both processor chips are not identical in their "Step," one processor might not work with the other. When purchasing the second processor, try to obtain one with the same revision numbers or close to the same serial number to ensure that the chips are compatible. If you fail to find a compatible chip, you might be forced to buy two processors and replace the first or original processor.

To install a higher performance processor:

1. Turn off your workstation and monitor.

2. Disconnect all external devices connected to the main logic board (MLB), including the keyboard, mouse and printer; ac power, and monitor power.

3. Remove the outside cover.

> **STATIC SENSITIVE:** Static electricity collects on non-conductors 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 the processor:
>
> Touch the metal frame of your workstation to discharge any static electricity.
>
> Keep the processor away from non-conductors.

4. Remove the main logic board (refer to "Removing the Main Logic Board" earlier in this chapter)

5. Remove the heat sink clips, on the upgrade CPU option you received, by applying gentle downward pressure on the clip.

6. Lift up the ZIF socket lever to release the upgrade CPU and heat sink from the ZIF socket.

7. Lift up the lever on the empty ZIF socket.

8. Carefully install the CPU and heat sink assembly in the empty ZIF socket.

> **NOTE:** Some processors might require a voltage regulator, other than the one that came with your workstation, to operate correctly. Contact your workstation sales representative for more information.

Make sure pin 1 on the processor is aligned with pin 1 on the ZIF socket (A, Figure 3-12).

9. Return the lever to its original position.

10. Secure the heat sink on the processor using the heat sink clips you removed in step 5.

11. Set all appropriate processor jumpers and or switch settings on the main logic board.

   Refer to Appendix A, "Technical Specifications," for jumper and switch locations.

12. Carefully slide the main logic board into the chassis. Ensure that the MLB completely engages the backplane and that the two latches are fully locked into place.

13. Replace the outside cover.

14. Connect all external devices.

15. Power on the system and note that the "Dual CPU present" message displays during POST.

To make the CPU upgrade changes take effect, you must reinstall the Windows NT operating system, as follows:

1. Back up your system disk and data.

2. Reinstall Windows NT per the instructions in the Windows NT *Installation Manual.* Choose the "Upgrade" option during installation to upgrade the Windows NT kernel from single to multiprocessor.

> **NOTE:** When the Windows NT operating system upgrade is complete, there should be no need to restore file space.

You have now completed the dual processor upgrade installation and configuration.
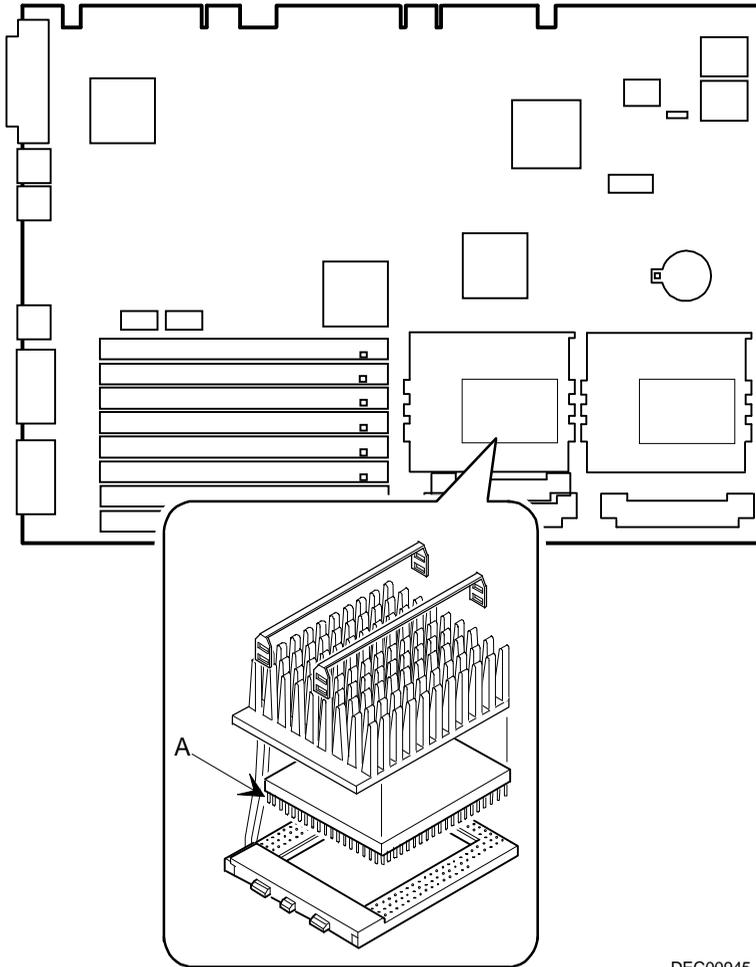
DEC00945-6

Figure 3-12. Installing a Higher Performance Processor

Installing a Higher Performance Processor (266i and 266i^2 Models)

Your workstation is equipped with either a single or dual Intel Pentiumâ II processor module installed in the appropriate Slot 1 socket on the main logic board. Total workstation performance is based upon your workstation main logic board design, speed and L2 cache of the processor module(s), amount of workstation memory, video controller type and amount of video memory, and performance characteristics of your hard disk drive.

If your workstation was purchased with a single Pentiumâ II processor and you wish to upgrade to a faster processor, or to a dual processor configuration, consider the following information prior to upgrading your workstation.

1. Your workstation main logic board contains:

    - An Intel 440FX (Natoma) memory and PCI controller

    - Switch selectable processor clock input frequencies up to 400 MHz (Refer to Appendix A for switch settings)

2. Single Pentiumâ II processor modules must be installed in the primary Slot 1 socket (closest to the workstation battery) and have a termination card installed in the second Slot 1 socket.

3. Pentiumâ II processor modules are available with 512 KB L2 cache memory. Dual processor configurations must have matching L2 caches.

4. Dual processor configurations must have Pentiumâ II processors with matching stepping (manufacturing revision). Processors with different stepping might not function properly.

5. Higher performance Pentiumâ II processors might require loading the latest BIOS firmware revision.

6. Upgrading from a single Pentiumâ II processor or to dual Pentiumâ II processor configuration requires a reloading of the operating system.

NOTE: Current versions of Windows 95 does not support dual processors. If you wish to upgrade your workstation to a dual processor configuration, you will also need to change operating systems. Microsoft Windows NT 3.51 and 4.0 support dual processors.

Contact your Digital sales representative or reseller for future processor upgrades and BIOS revisions.

To upgrade from a single-processor configuration to a dual-processor configuration:

NOTE: Instructions that accompany your Pentiumâ II processor Upgrade Kit supersede the directions provided below.

1. Turn off your workstation and monitor.

2. Disconnect all external devices, ac power, and monitor power.

3. Remove the outside cover.

STATIC SENSITIVE: Static electricity collects on non-conductors 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 the processor:

- Touch the metal frame of your workstation to discharge any static electricity.

- Keep the processor away from non-conductors.

4. Release the processor from its socket by pushing in on the two plastic tabs at each side of the processor (see Figure 3-13).

5. Carefully remove the old processor and termination card out and away from their sockets.

NOTE: Because of dual processor stepping, some upgrade kits might come with a completely assembled dual processor assembly. If your upgrade kit has two processors, skip steps 6 and 7.
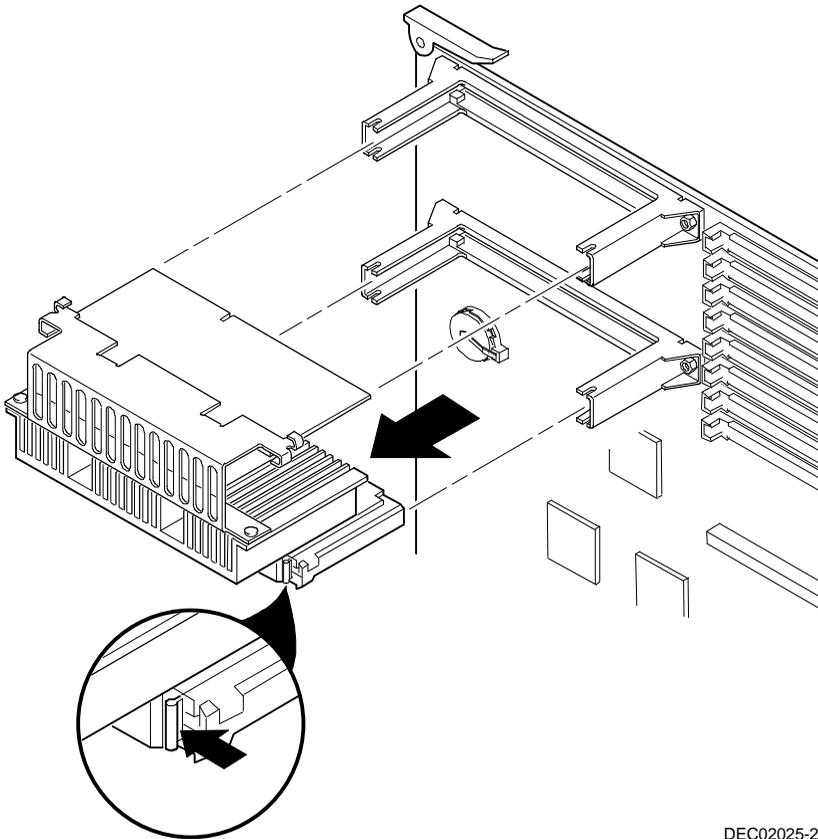
DEC02025-2

Figure 3-13. Releasing the Installed Processor

6.   Remove the bracket, with the termination card attached, from the processor's heatsink (see Figure 3-14).
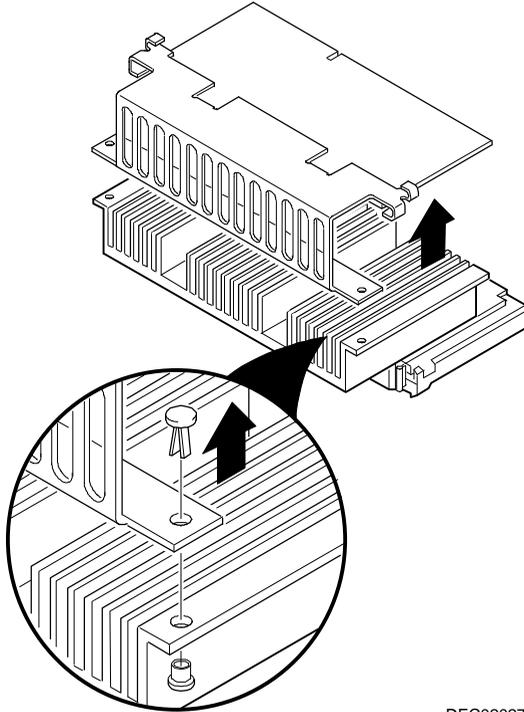
DEC02027

Figure 3-14. Removing the Bracket and Termination Card

7. Attach the new heat sink, with new processor attached, to the old heatsink (see Figure 3-15).
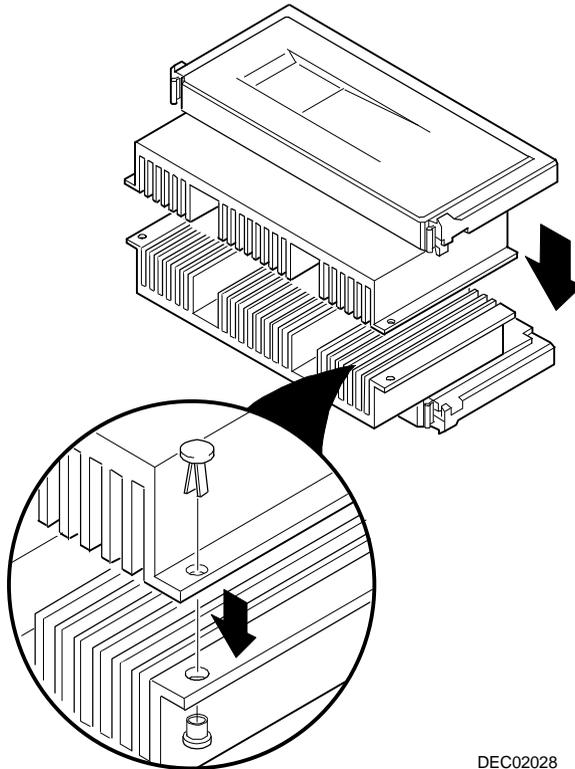
DEC02028

Figure 3-15. Attaching the New Processor

8. Carefully insert both processors into their respective sockets on the main logic board (see Figure 3-16).

9. Secure both processors to their sockets by pushing out on the two plastic tabs at each side of each processor.
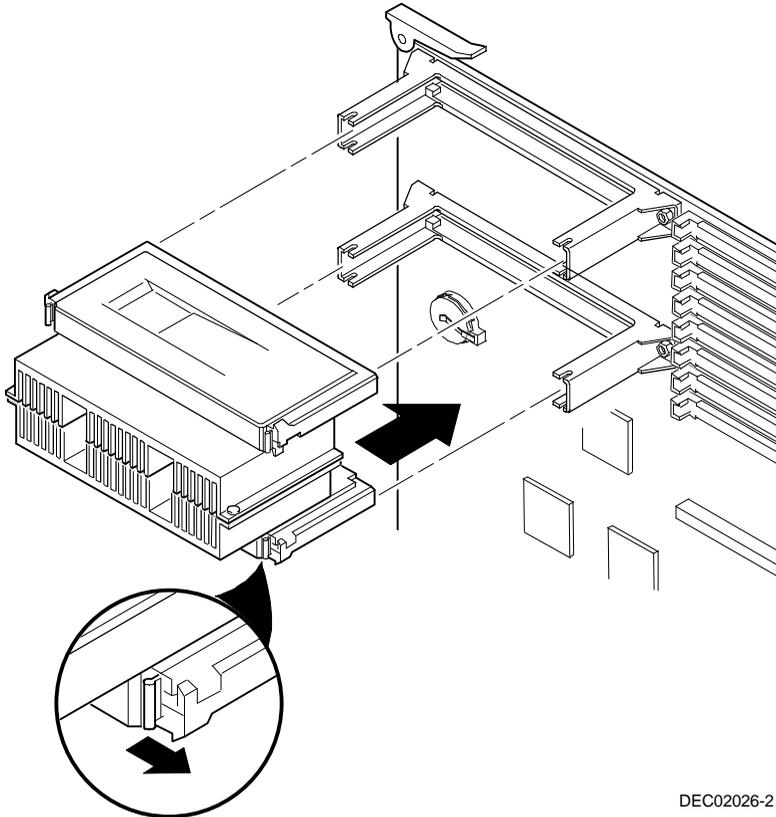
DEC02026-2

Figure 3-16. Installing Both Processors

9. Set all appropriate switch settings on the main logic board.

    Refer to Appendix A, "Technical Specifications," for jumper and switch location settings with the "Processor Clock Speed Switch Settings" table.

10. Replace the outside cover.

11. Connect all external devices and restore power.

> **NOTE:** A restoration CD-ROM has been supplied with your processor upgrade kit. Use this CD-ROM to install an operating system and a diagnostics program that support a dual processor configuration.
>
> This CD-ROM also contains information on how to obtain a new workstation BIOS.

12. Turn on your workstation and insert the supplied restoration CD-ROM. Once inserted, run the setup program to load the operating system and any additional software.

Main Logic Board Expansion 4

Introduction

This chapter provides detailed instructions on installing additional workstation memory.

Refer to Chapter 1, "Beyond Quick Setup," information on removing and replacing your workstation's outside cover.

Installing Additional Workstation Memory

Adding more memory enables your workstation to run larger, more complicated software and run it more quickly.

All Digital Personal Workstations support fast-paging parity 72-pin SIMM DRAM. 180i, 200i, and 200i^2 models also support non-parity Extended Data Out (EDO) memory. 266i and 266i^2 models also support parity EDO memory. Depending upon which workstation product you have purchased, you might have either EDO or Fast-Page DRAM installed in your workstation.

Digital Personal Workstations come with either 32 MB or 64 MB of Extended Data Out (EDO) or Fast-Page memory. Digital Personal Workstations also support four memory banks (see Figure 4-1). Each bank contains two 72-pin SIMM connectors. They are labeled as follows:

    BANK0 = J13, J14
    BANK1 = J15, J16
    BANK2 = J17, J18
    BANK3 = J19, J20

You can increase the amount of workstation memory up to 256 MB (EDO) or 512 MB (Fast-Page parity) using the eight SIMM sockets on the main logic board.

EDO Memory

Digital Personal Workstations support either non-parity or parity EDO memory. EDO memory, in pairs of 8 MB, 16 MB, or 32 MB, is faster than standard or Fast-Page memory. 64 MB EDO SIMMs are not available at this time. Contact your Digital sales representative for information about the availability of these SIMMs.

ECC Memory Support (Fast-Page DRAM)

Error Correcting Code (ECC) memory functionality is provided in Digital Personal Workstations using standard Fast-Page parity DRAM and the installed Intel 440FX core logic chip. Fast-Page memory should be installed in pairs of 8 MB, 16 MB, 32 MB, or 64 MB.
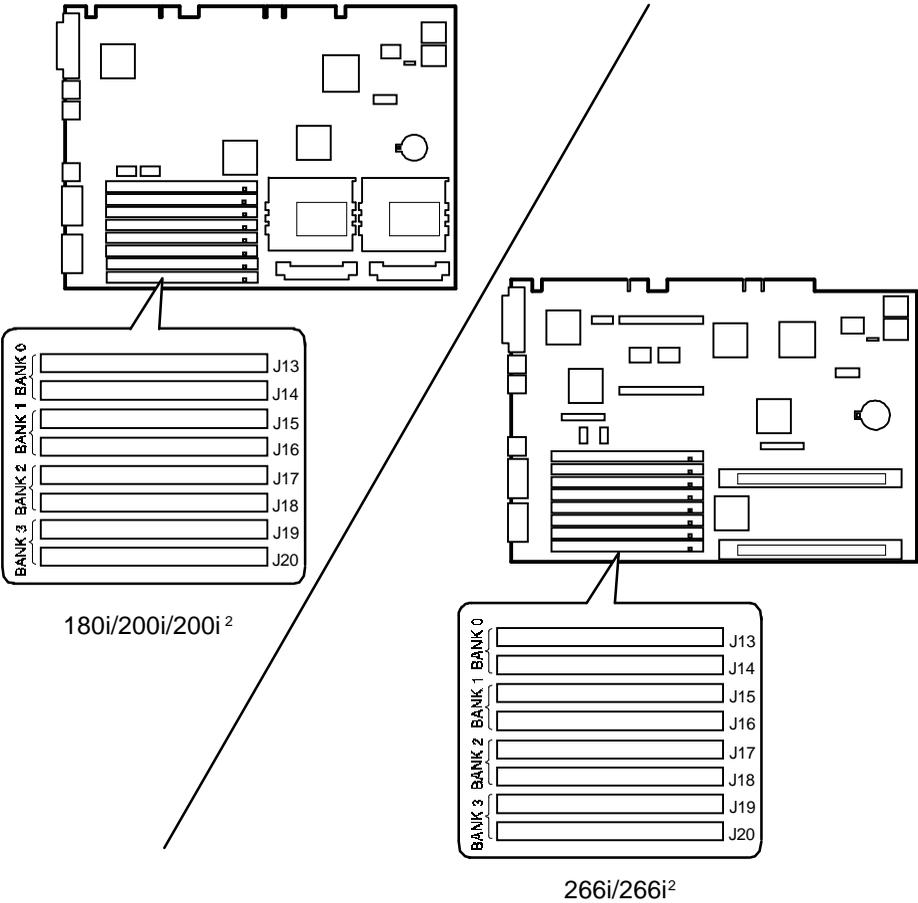
Figure 4-1. SIMM Socket Locations

DEC01221

Adding EDO SIMMs

When adding EDO SIMMs:

- SIMM socket pairs must be populated with the same SIMM densities, single or double. For example, SIMM sockets J15 and J16 must be populated with the same densities. However, SIMM sockets J17 and J18 can be populated with SIMMs with a different density than J15 and J16.

- EDO and Fast-Page parity DRAM can be mixed within the memory array. However, only one type can be used per any SIMM socket pair. If different types of memory are used, your workstation will optimize each row for that type of memory.

- 8 = 8 MB EDO SIMM, no parity.

- 16 = 16 MB EDO SIMM, no parity.

- 32 = 32 MB EDO SIMM, no parity.

Refer to "Memory Configurations (EDO)" for a list of SIMM combinations supported by your Digital Personal Workstation and to "Installing a SIMM" for detailed instructions on installing SIMMs.

Memory Configurations (Parity EDO)

Bank 0		Bank 1		Bank 2		Bank 3		
Socket J13	Socket J14	Socket J15	Socket J16	Socket J17	Socket J18	Socket J19	Socket J20	Total
8 MB	8 MB							16 MB
8 MB	8 MB	8 MB	8 MB					32 MB
16 MB	16 MB							32 MB
8 MB	8 MB	8 MB	8 MB	8 MB	8 MB			48 MB
16 MB	16 MB	8 MB	8 MB					48 MB
8 MB	8 MB	8 MB	8 MB	8 MB	8 MB	8 MB	8 MB	64 MB
16 MB	16 MB	8 MB	8 MB	8 MB	8 MB			64 MB
16 MB	16 MB	16 MB	16 MB					64 MB
32 MB	32 MB							64 MB
16 MB	16 MB	16 MB	16 MB	16 MB	16 MB	16 MB	16 MB	128 MB
32 MB	32 MB	16 MB	16 MB	16 MB	16 MB			128 MB
32 MB	32 MB	16 MB	16 MB	8 MB	8 MB	8 MB	8 MB	128 MB
32 MB	32 MB	32 MB	32 MB					128 MB
32 MB	32 MB	32 MB	32 MB	8 MB	8 MB			144 MB
32 MB	32 MB	32 MB	32 MB	8 MB	8 MB	8 MB	8 MB	160 MB
32 MB	32 MB	32 MB	32 MB	16 MB	16 MB			160 MB
32 MB	32 MB	32 MB	32 MB	16 MB	16 MB	8 MB	8 MB	176 MB
32 MB	32 MB	32 MB	32 MB	32 MB	32 MB			192 MB
32 MB	32 MB	32 MB	32 MB	32 MB	32 MB	8 MB	8 MB	208 MB
32 MB	32 MB	32 MB	32 MB	32 MB	32 MB	16 MB	16 MB	224 MB
32 MB	32 MB	32 MB	32 MB	32 MB	32 MB	32 MB	32 MB	256 MB

Table does not list all possible configurations.

Adding Fast-Page Parity SIMMs

When adding Fast-Page parity SIMMs:

- SIMM socket pairs must be populated with the same SIMM densities, single or double. For example, SIMM sockets J15 and J16 must be populated with the same densities. However, SIMM sockets J17 and J18 can be populated with SIMMs with a different density than J15 and J16.

- EDO and Fast-Page parity DRAM can be mixed within the memory array. However, only one type can be used per any SIMM socket pair. If different types of memory are used, your workstation will optimize each bank for that type of memory.

- Parity and non-parity fast-page DRAMs are supported; ECC cannot be implemented without parity DRAM SIMMs. 60 or 70 ns DRAMs are supported.

- 8 = 8 MB SIMM, with parity.

- 16 = 16 MB SIMM, with parity.

- 32 = 32 MB SIMM, with parity.

- 64 = 64 MB SIMM, with parity.

  Refer to "Memory Configurations (Fast-Page Parity)" for a list of SIMM combinations supported by your Digital Personal Workstation and to "Installing a SIMM" for detailed instructions on installing SIMMs.

Memory Configurations (Fast-Page Parity)

Bank 0		Bank 1		Bank 2		Bank 3		
Socket J13	Socket J14	Socket J15	Socket J16	Socket J17	Socket J18	Socket J19	Socket J20	Total
8 MB	8 MB							16 MB
8 MB	8 MB	8 MB	8 MB					32 MB
16 MB	16 MB							32 MB
8 MB	8 MB	8 MB	8 MB	8 MB	8 MB			48 MB
16 MB	16 MB	8 MB	8 MB					48 MB
8 MB	8 MB	8 MB	8 MB	8 MB	8 MB	8 MB	8 MB	64 MB
16 MB	16 MB	8 MB	8 MB	8 MB	8 MB			64 MB
16 MB	16 MB	16 MB	16 MB					64 MB
32 MB	32 MB							64 MB
16 MB	16 MB	16 MB	16 MB	16 MB	16 MB	16 MB	16 MB	128 MB
32 MB	32 MB	16 MB	16 MB	16 MB	16 MB			128 MB
32 MB	32 MB	16 MB	16 MB	8 MB	8 MB	8 MB	8 MB	128 MB
32 MB	32 MB	32 MB	32 MB					128 MB
32 MB	32 MB	32 MB	32 MB	8 MB	8 MB			144 MB
32 MB	32 MB	32 MB	32 MB	8 MB	8 MB	8 MB	8 MB	160 MB
32 MB	32 MB	32 MB	32 MB	16 MB	16 MB			160 MB
32 MB	32 MB	32 MB	32 MB	16 MB	16 MB	8 MB	8 MB	176 MB
32 MB	32 MB	32 MB	32 MB	32 MB	32 MB			192 MB
32 MB	32 MB	32 MB	32 MB	32 MB	32 MB	8 MB	8 MB	208 MB
32 MB	32 MB	32 MB	32 MB	32 MB	32 MB	16 MB	16 MB	224 MB
32 MB	32 MB	32 MB	32 MB	32 MB	32 MB	32 MB	32 MB	256 MB
64 MB	64 MB	64 MB	64 MB					256 MB
64 MB	64 MB	64 MB	64 MB	64 MB	64 MB			384 MB
64 MB	64 MB	64 MB	64 MB	64 MB	64 MB	8 MB	8 MB	400 MB
64 MB	64 MB	64 MB	64 MB	64 MB	64 MB	16 MB	16 MB	416 MB
64 MB	64 MB	64 MB	64 MB	64 MB	64 MB	32 MB	32 MB	448 MB
64 MB	64 MB	64 MB	64 MB	64 MB	64 MB	64 MB	64 MB	512 MB

Table does not list all possible configurations.

Installing a SIMM

To install a SIMM, perform the following:

1. Turn off your workstation and monitor.

2. Disconnect all external devices, ac power, and monitor power.

3. Remove the outside cover.

4. Install the SIMM into the socket at a 45 degree angle.

   Make sure the notch is oriented as shown (A, Figure 4-2). Rock the SIMM gently until it completely engages the bottom of the socket. Tip the SIMM upright until both retaining clips engage (B, C, Figure 4-2).

5. Replace the outside cover.

6. Connect all external devices and restore power.

STATIC SENSITIVE: Static electricity collects on non-conductors 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 a SIMM:

Touch the metal frame of your workstation to discharge any static electricity.

Keep all SIMMs away from non-conductors.
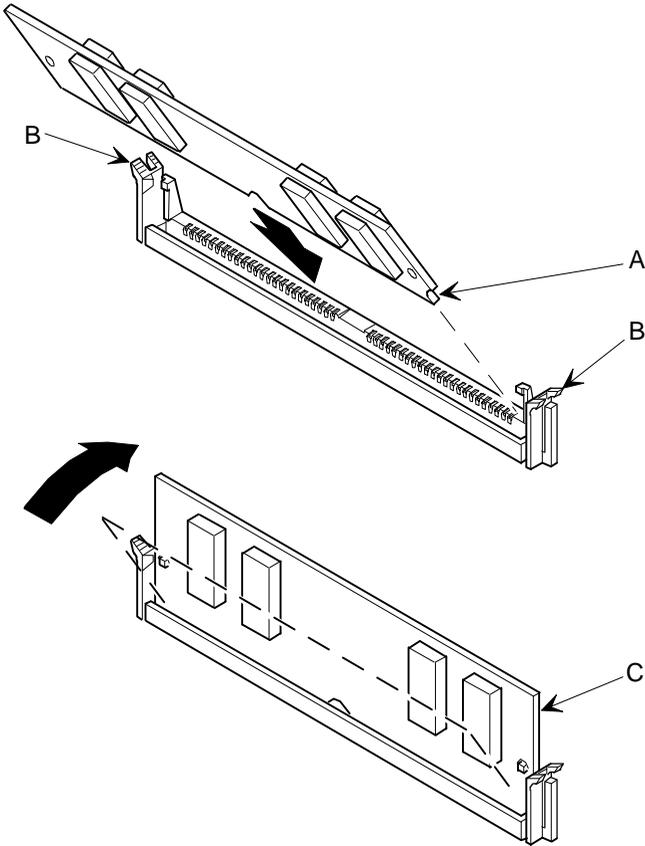
DEC00921

Figure 4-2. Installing a SIMM

Adding Expansion Boards **5**

Introduction

For all Digital Personal Workstations, expansion slots are located on a backplane. This chapter describes the location of these slots and provides detailed instructions on installing ISA and PCI expansion boards.

Plug and Play technology eliminates the process of manually configuring optional expansion boards for operation in your workstation. With Plug and Play, your workstation's BIOS, operating system, and hardware logic built into expansion boards work to assign automatically interrupt requests (IRQs), I/O and memory addresses, and DMA channels for optimum performance.

> **NOTE:** If you are using Windows NT Workstation, use the ISA Configuration Utility (ICU) supplied with your workstation to correctly assign resources used by the ISA expansion boards.

Expansion Slots

Your Digital Personal Workstation backplane contains five slots for installing:

- Three ISA expansion boards and two PCI expansion boards

  or

- Five PCI expansion boards (refer to the table)

CAUTION: Due to PCI system architecture, your video expansion board should be installed in a primary PCI slot. Failure to do this can result in poor video performance or no video at all.

Expansion Slot Designation	Slot Type	Description
PCI1	Secondary	Supports half-length 32-bit PCI local bus expansion boards
		Uses the fifth (top) expansion slot at the rear panel
ISA1		Supports half-length industry-standard 16-bit ISA expansion boards
		Uses the fourth expansion slot at the rear panel
		Designated as a shared slot with PCI slot PCI2[1]
PCI2	Secondary	Supports half-length 32-bit PCI local bus expansion boards
		Uses the fourth expansion slot at the rear panel
		Designated as a shared slot with ISA slot ISA1[1]
ISA2		Supports full-length industry-standard 16-bit ISA expansion boards
		Uses the third expansion slot at the rear panel
		Designated as a shared slot with PCI slot PCI3[1]
PCI3	Secondary	Supports full-length 32-bit PCI local bus expansion boards
		Uses the third expansion slot at the rear panel
		Designated as a shared slot with ISA slot ISA2[1]
ISA3		Supports full-length industry-standard 16-bit ISA expansion boards
		Uses the second expansion slot at the rear panel
		Designated as a shared slot with PCI slot PCI4[1]
PCI4	Primary	Supports full-length 32-bit PCI local bus expansion boards
		Uses the second expansion slot at the rear panel
		Designated as a shared slot with ISA slot ISA3[1]
PCI5	Primary	Supports full-length 32-bit PCI local bus expansion boards
		Uses the first (bottom) expansion slot at the rear panel

[1] Only one expansion board can reside in slot PCI2, 3, or 4 and ISA1, 2, or 3 at any one time. These slots have to share the second, third, and fourth expansion slot openings at the rear panel, thus, a maximum of five expansion boards can be supported at any one time.
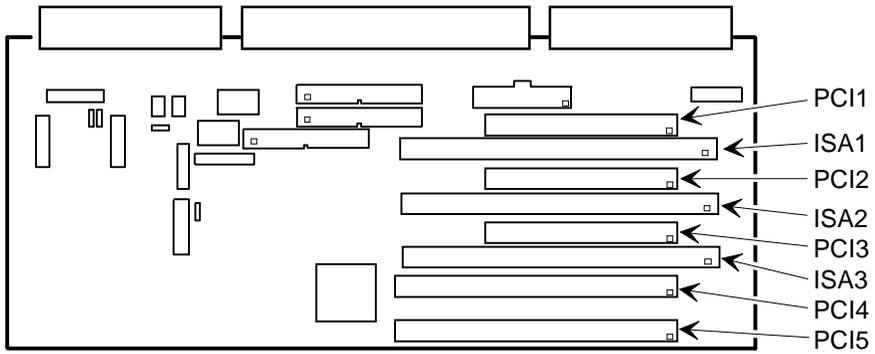
DEC01218-3

Figure 5-1. Expansion Board Slots

Installing Expansion Boards

To install an ISA or PCI local bus expansion board:

NOTE: Read and fully understand your optional expansion board's documentation before installing it.

Do not install non-Plug and Play expansion boards until you have run the ICU to determine what configuration the ICU recommends. Configure any jumpers on the expansion board and then install the expansion board.

1. Turn off your workstation and monitor.

2. Disconnect all external devices, ac power, and monitor power.

3. Remove the outside cover.

4. You can rotate the disk drives to make the area more accessible.

5. Unscrew the metal filler plate(s) from the selected expansion slot.

STATIC SENSITIVE: Static electricity collects on non-conductors 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.

Keep all expansion boards away from non-conductors.
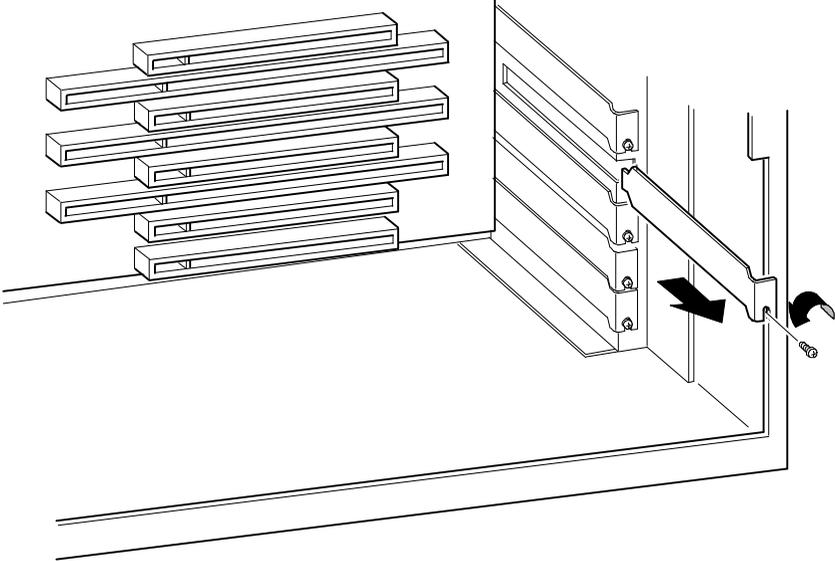
DEC00951-2

Figure 5-2. Removing a Metal Filler Plate

6. Insert the new expansion board into the socket.

   Push the expansion board firmly into place.

7. Secure the expansion board to the slot with the screw removed in step 4.

8. Replace the outside cover.

9. Connect all external devices and restore power.
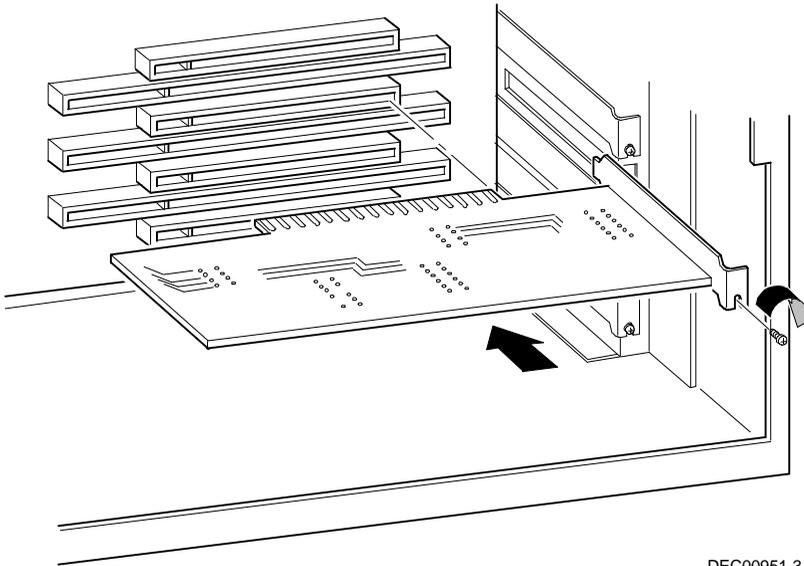
DEC00951-3

**Figure 5-3. Installing an Expansion Board**

Removing Expansion Boards

If you remove a legacy expansion board or remove an expansion board from a workstation running Windows NT Workstation, run the ICU. Use the ICU bootable diskette with Windows NT Workstation. You can then remove the expansion board from the ICU Configuration menu and thereby free up resources listed in the ICU database.

Adding Mass Storage Devices *6*

Introduction

This chapter provides detailed information on installing mass storage devices, such as another hard disk drive, a tape drive, or another diskette drive. This chapter also describes how to connect diskette, IDE, and SCSI mass storage devices after installation. Note that these installation instructions are referenced as looking from the front of the workstation to the rear.

> **NOTE:** Your workstation's software supports hard disk drives utilizing Self-Monitoring Analysis Technology (S.M.A.R.T.). Using S.M.A.R.T. IDE devices helps you monitor disk drive operation and provides early detection of a potential disk failure.

Before adding mass storage devices to your workstation, review the following installation guidelines:

1. Refer to the manufacturer's instructions for your device to determine if switches or jumper settings need to be set or installed on the device. Set all switches and jumpers accordingly before installing the device.

2. Select an available drive bay and then install the device as instructed in the following sections of this manual.

3. Connect the device to an appropriate interface ribbon cable connector as described in the following sections. Also consider the following cabling guidelines:

   – Your workstation has two Enhanced IDE (EIDE) drive interface connections labeled "primary" and "secondary" located on the workstation backplane.

   – Each IDE drive interface connector supports a maximum of two IDE devices.

   – If only one IDE device is connected to the primary or secondary IDE interface, then the IDE device must be attached to the outermost ribbon cable connector.

   – When adding a second IDE hard disk drive to the primary IDE interface, configure the drive for "slave" operation.

   – ATAPI storage devices such as CD-ROM and tape backup drives must be connected to the secondary IDE interface. If the ATAPI drive is the only device installed on the secondary interface, configure the drive for "master" operation. If a hard disk drive is also connected to the secondary IDE interface, then configure the ATAPI drive for "slave" operation.

   NOTE: ATAPI storage devices might require installation of special device drivers. Refer to the manufacturer's instructions for more information.

   – The 3½-inch diskette drive installed in your workstation has its device ID set to 0.

4. Run the BIOS Setup utility to configure your workstation so it recognizes the newly installed mass storage devices.

    Also, depending on which operation system is installed on your workstation, you might be prompted to perform additional installation procedures for CD-ROM or tape backup devices.

5. Refer to your operating system documentation for information on formatting hard disk drives and/or creating disk partitions.

Installing Mass Storage Devices

All Digital Personal Workstations contain six mass storage device bays:

*   The top device bay contains a factory installed 3½-inch diskette drive.

*   The second device bay contains a factory installed CD-ROM.

*   The third and fourth device bays can hold a 5¼-inch (1-inch or 1.6-inch half-height device. For example, a diskette, tape backup unit, or hard disk drive.

*   The internal device bay is not accessible from the front of any workstation and contains a factory installed, low-profile (1-inch high), 3½-inch hard disk drive. This device bay also has room to install a second low-profile (1-inch high), 3½-inch hard disk drive.

The following procedures and illustrations show a base Digital Personal Workstation configuration. Your specific drive bay configurations and storage devices might vary.

> **NOTE:** After market hard disk drives should come with instructions, a manual, and an Installation Kit that should include mounting rails. Contact your "Peripheral Reseller" to determine if an Installation or Hard Disk Drive Mounting Kit is included with your hard disk drive.

Removing the Front Bezel

To install a device into the front bays, the front workstation bezel must be removed. The following procedures describe how to remove the front bezel.

1. Turn off your workstation and monitor.

2. Disconnect all external devices, ac power, and monitor power.

3. Remove the outside cover.

4. From the top of the workstation, looking down towards the bottom of the front of the chassis, you should see 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).

5. By pushing on both of these tabs towards the center of the workstation, you can release the top of the bezel.

6. Gently pull the top of the bezel approximately an inch away from the top of the chassis.

7. Gently but firmly, pull up on the bezel to detach the bottom bezel mounts.

8. At this time you might want to remove the bezel door for your particular usage environment.

    Refer to "Removing the Front Bezel Door" in chapter 1 for directions on how to remove the front bezel door.
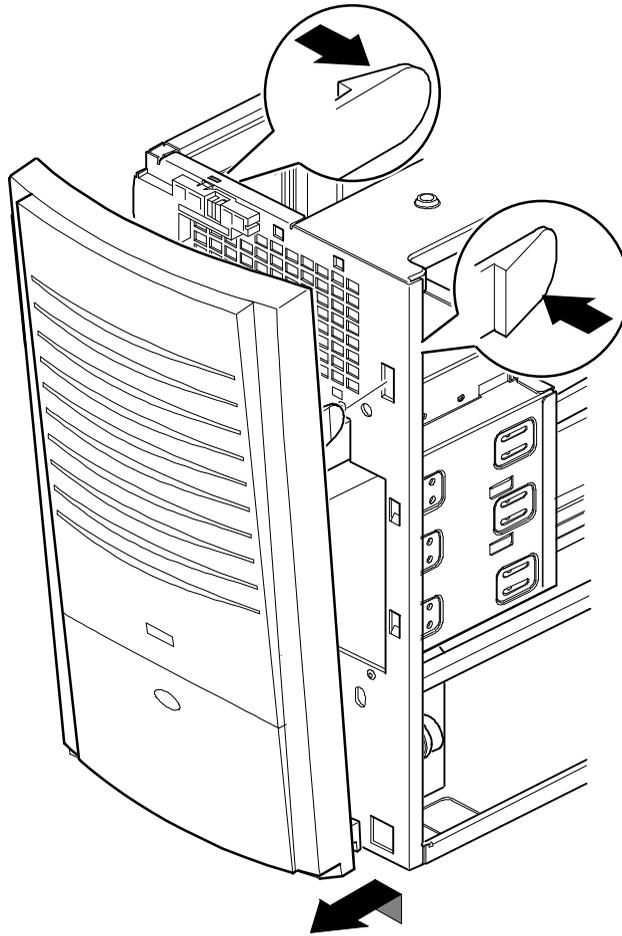
DEC00758-10

Figure 6-1. Removing the Front Bezel

Installing a 3½-Inch Device into a Front Device Bay

The following procedures describe how to install 3½-inch device into a front-access device bay.

> **NOTE:** Refer to the manufacturer's instructions for your device to determine if switches or jumper settings need to be set or installed on the device. Set all switch and jumper settings accordingly.

1. Turn off your workstation and monitor.

2. Disconnect all external devices, ac power, and monitor power.

3. Remove the outside cover.

4. Remove the front bezel (see Figure 6-1).

5. Remove the EMI shield filler plate.

6. Remove the drive rail from the inside of the chassis drive bay.

7. Install the brackets and drive rail onto the 3½-inch device (see Figure 6-2).
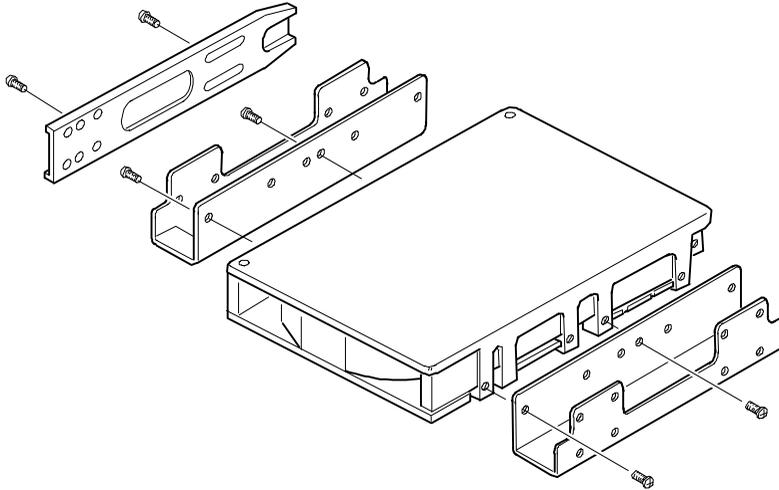
DEC00723

Figure 6-2. Installing Drive Rail and 3½-Inch Device Brackets

8   Carefully slide the 3½-inch device into the device bay.

Secure the device using the supplied mounting screws.

9.   Connect the power and data cables to the 3½-inch device.

*Refer to "Connecting Diskette and IDE Devices" later in this chapter.*
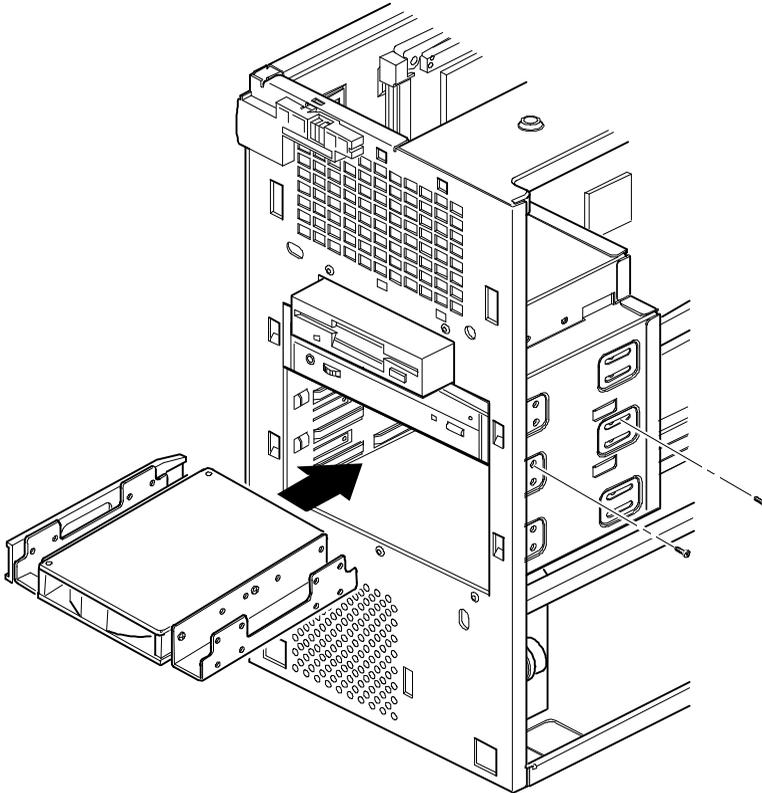
DEC00758-8

Figure 6-3. Installing a 3⅟₂-Inch Device

Installing a 5¼-Inch Device Into a Front Device Bay

The following procedures describe how to install 5¼-inch device into a front-access device bay.

NOTE: Refer to the manufacturer's instructions for your device to determine if switches or jumper settings need to be set or installed on the device. Set all switch and jumper settings accordingly.

1. Turn off your workstation and monitor.

2. Disconnect all external devices, ac power, and monitor power.

3. Remove the outside cover

4. Remove the front bezel (see Figure 6-1).

5. If necessary, remove the filler panel from the front bezel.

6. Remove the EMI shield filler plate (if applicable).

7. Remove the drive rail from the inside of the chassis.

8. Using the supplied drive rail and mounting screws, install the 5¼-inch device into the appropriate device bay.
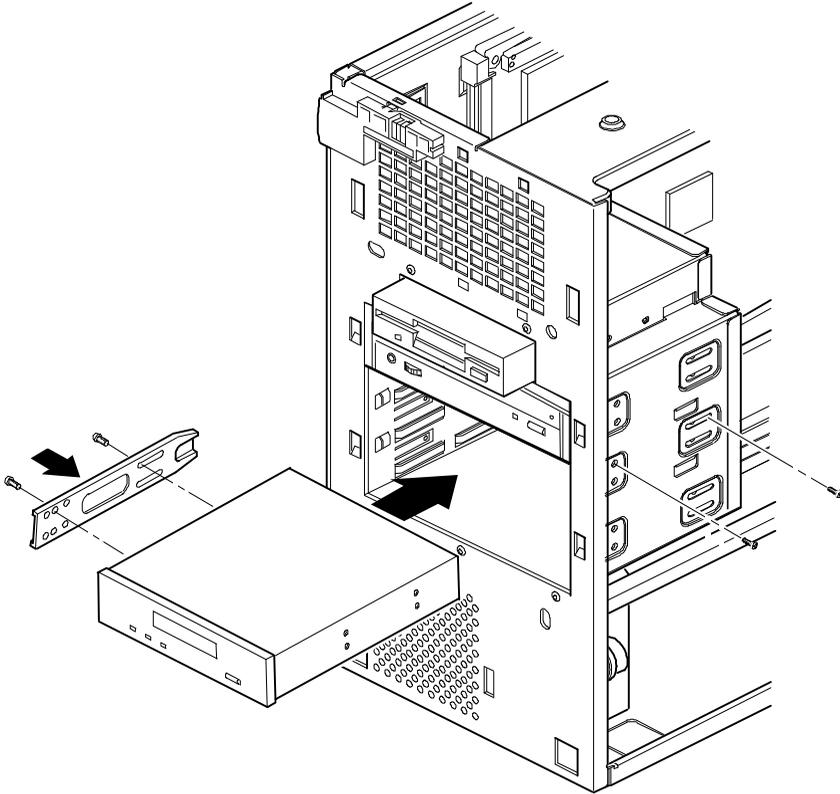
DEC00758-9

Figure 6-4. Installing 5¼-Inch Device

9. If necessary, replace the filler panel.

10. Connect power and data cables to 5¼-inch device.

   Refer to "Connecting Diskette and IDE Devices" later in this chapter.

Installing a 3½-Inch Device into the Internal Device Bay

The following procedures describe how to install a low profile, 1-inch high, 3½-inch mass storage device into the internal device bay.

> **NOTE:** Refer to the manufacturer's instructions for your mass storage device to determine if switches or jumper settings need to be set or installed on the device. Set all switch or jumper settings accordingly.

1. Turn off your workstation and monitor.

2. Disconnect all external devices, ac power, and monitor power.

3. Remove the outside cover.

4. Disconnect the data and power cables from the installed hard disk drive.

   Refer to "Connecting Diskette and IDE Devices" later in this chapter.

5. Remove the two screws securing the device bay to the chassis.

6. Swing the device bay away from the chassis to gain access to the upper bay.
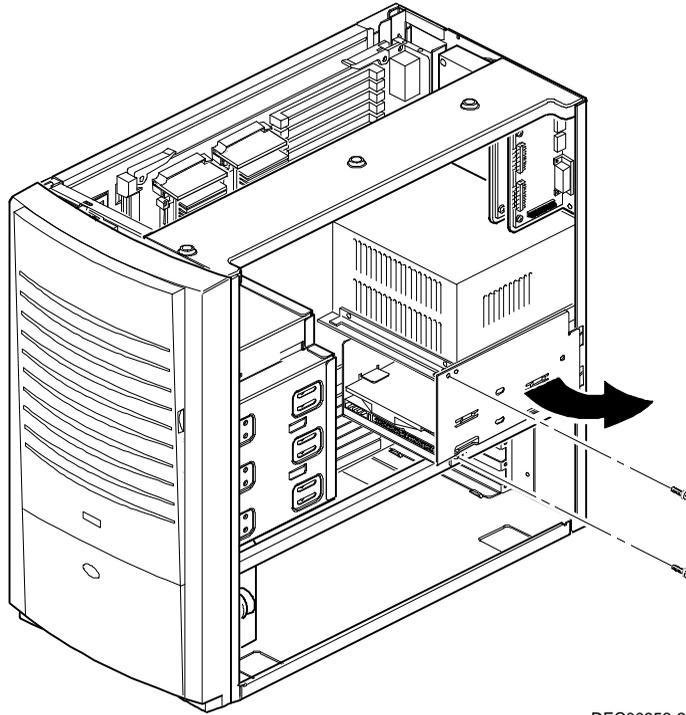
DEC00953-2

Figure 6-5. Accessing the Internal 3½-Inch Device Bay

7. Attach the 3½-inch device to the internal 3½-inch device bay.

    Secure the device using the supplied mounting screws.
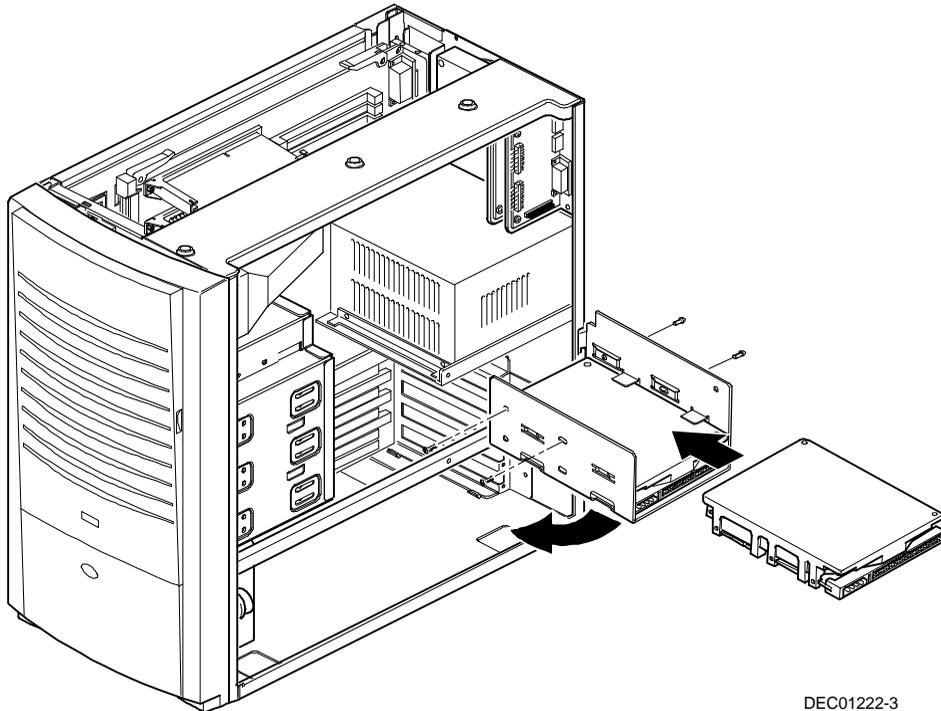
DEC01222-3

Figure 6-6. Attaching a 3½-Inch Device to the Internal 3½-inch Device Bay

8. Secure the internal 3½-inch device bay to the chassis using the screw removed in step 5.

9.   Connect the power and data cables.

    Refer to "Connecting Diskette and IDE Devices" later in this chapter.

Connecting Diskette and IDE Devices

To connect a diskette or IDE device, perform the following:

1. Connect the supplied ribbon cable to the device as shown in Figure 6-7 and 6-8.

   NOTE: If only one IDE device is installed, make sure you use the ribbon cable connector furthest from the main logic board connector.

   Make sure the cable is connected with the correct orientation. Most cables and sockets are keyed so you cannot connect them backwards. If your cable or device is not keyed, you must connect pin 1 of the cable to pin 1 of the device's socket.

   Pin 1 of the cable is on edge with the colored stripe. Pin 1 of the device's socket should be marked with a number or symbol at one end of the socket or with a number or symbol printed on the circuit board near one end of the socket. If necessary, refer to the device's documentation for pin 1 orientation.

2. Connect a power cable to device.

3. Replace the outside cover.

4. Connect all external devices and restore power.

5. Run the BIOS Setup utility to configure your workstation.

   Refer to Chapter 2, "Using the BIOS Setup Utility."

Figure Legend	Diskette Drive Component
A	Power connection
B	Diskette drive
C	Diskette drive connections
D	Backplane diskette drive connection
E	Power supply
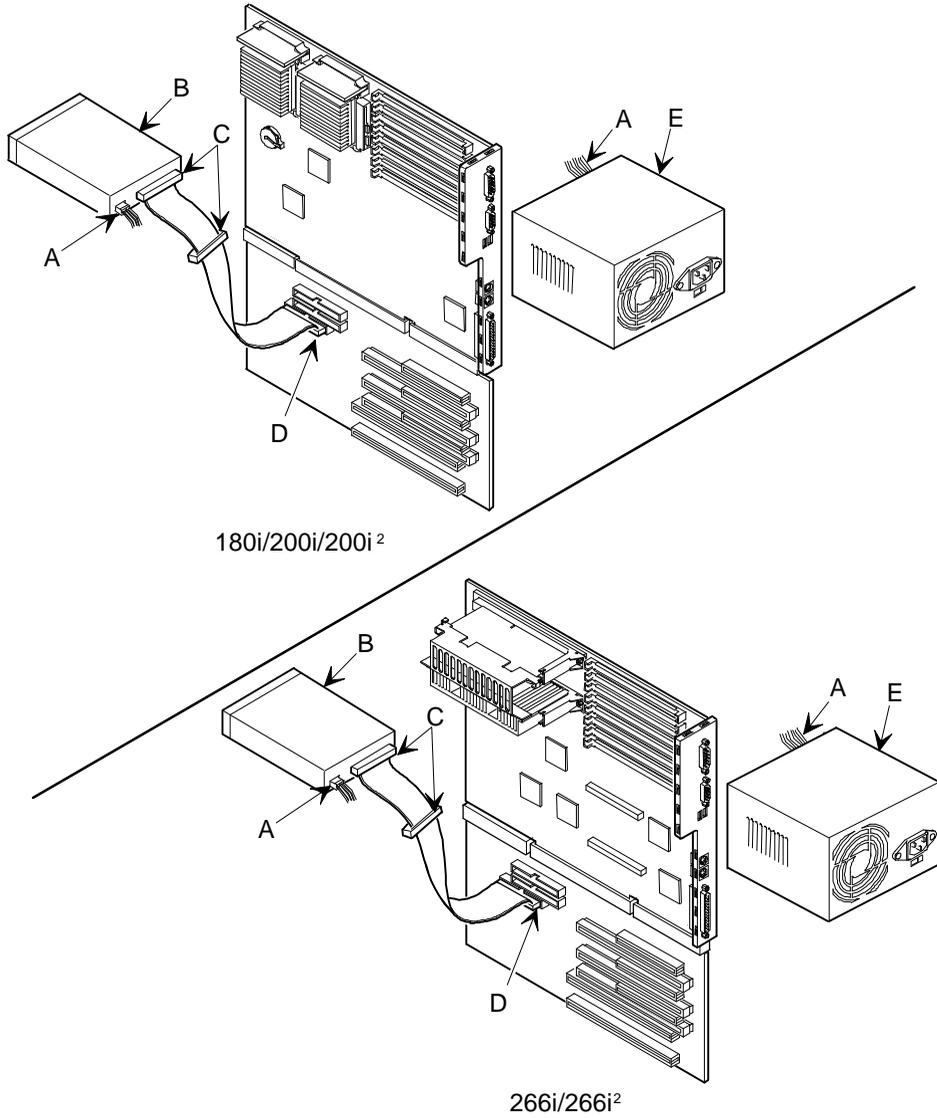
180i/200i/200i²

266i/266i²

DEC01223-2

Figure 6-7. Diskette Device Data Cable Connections

Figure Legend	IDE Drive Component
A	Backplane IDE drive connection (primary)
B	Power connections
C	Power supply
D	Primary IDE hard disk drive
E	Primary IDE hard disk drive connections
F	Backplane IDE drive connection (secondary)
G	Secondary IDE hard disk drive connections
H[1]	CD-ROM drive

[1] The CD-ROM drive is connected to the secondary IDE port and configured as a master drive.

180i/200i/200i ^{2}

266i/266i^2

DEC01224-2
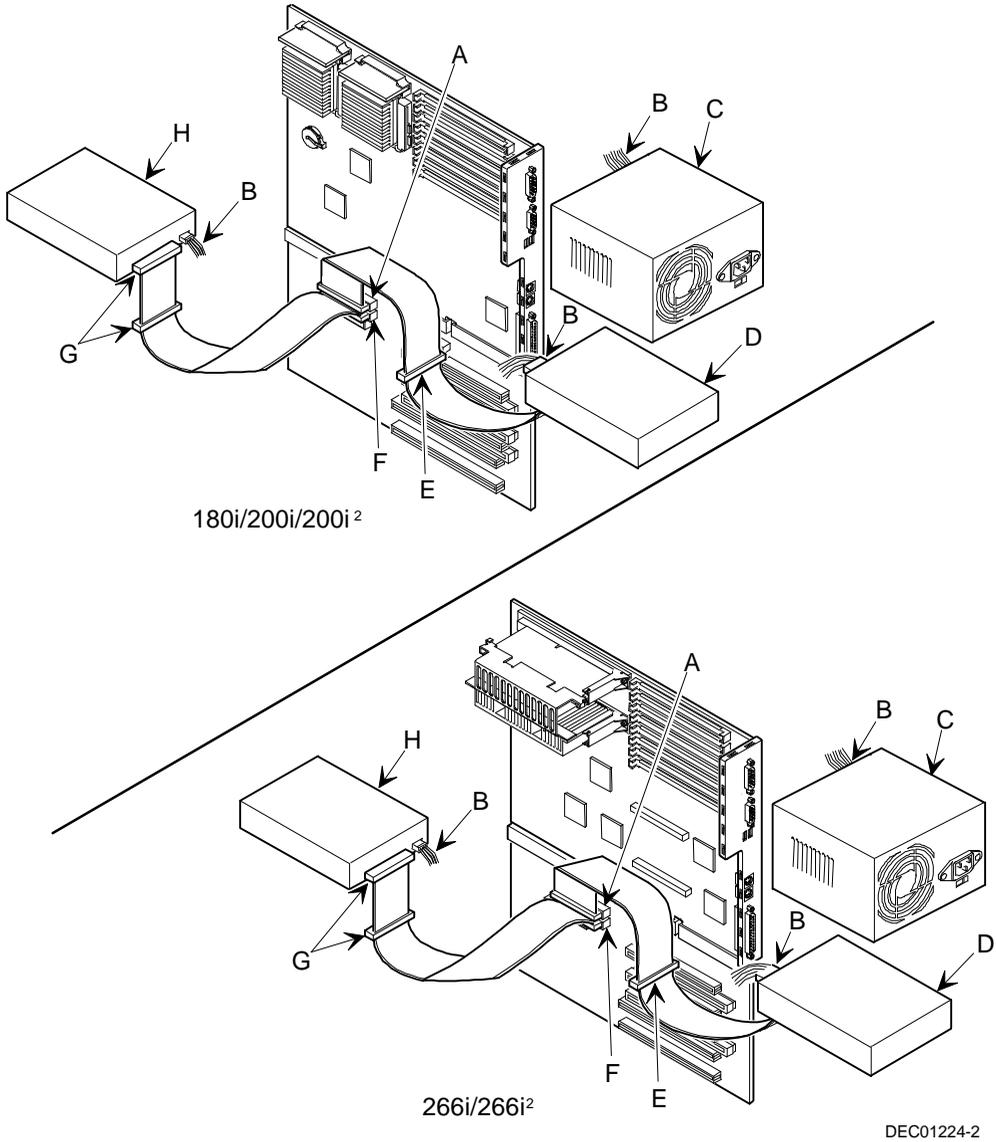
Figure 6-8. IDE Device Data Cable Connections

Connecting SCSI Devices

Your Digital Personal Workstation comes with an Adaptec 2940UW SCSI adapter installed in one of the five PCI local bus expansion board slots on the backplane. Ultra-wide SCSI HDDs provide a performance advantage over EIDE HDDs. Your Digital Personal Workstation supports up to five internal SCSI devices. Additional SCSI devices can be added to your workstation by using the SCSI adapter's external connector. The Adaptec 2940UW supports up to 16 devices (including the host adapter) in total.

The SCSI adapter also supports industry-standard 8-bit, narrow 50-pin, 16-bit wide and ultra-wide 68-pin SCSI devices. Narrow SCSI devices support a 10 Mbps burst transfer rate. Wide SCSI devices support a 20 Mbps burst transfer rate. Ultra-wide SCSI devices support a 40 Mbps burst transfer rate. Separate SCSI interface connectors are provided on the SCSI adapter to connect the appropriate SCSI interface cable. In most cases your workstation has been supplied with a 68-pin wide SCSI ribbon cable installed at the factory.

> *Contact your Digital sales representative for ordering information on SCSI cables and devices.*

Your workstation configuration, SCSI adapter, and all SCSI devices must work together for optimum performance. Use the following guidelines to configure your workstation and all SCSI devices.

- Fast and wide SCSI supports up to 16 devices.

- Each SCSI device attached to the host adapter (including the SCSI adapter) must have a unique SCSI ID. SCSI adapters usually default to SCSI ID 7. Use SCSI ID 0 through 6 (narrow devices) and 0 through 15 (wide and ultra-wide devices) for the remaining SCSI devices. Hard disk drives should be configured to start with SCSI ID 0 and the lower ID numbers.

- Narrow devices on a wide cable count as two SCSI IDs. For example, if the narrow CD-ROM drive is SCSI ID 4, the SCSI ID 12 is no longer available. The narrow CD-ROM device counts as two devices on a 16-bit wide data path.

- Both ends of the SCSI bus must be properly terminated. Your SCSI adapter comes with its SCSI terminators enabled. This properly terminates the SCSI adapter (the first device in the SCSI bus). The supplied SCSI ribbon cable is equipped with an active SCSI terminator installed at the end of the cable (the last device in the SCSI bus).

- SCSI device drivers are required to operate your SCSI devices. These device drivers have been factory installed for your factory installed SCSI devices. You must install device drivers for the SCSI devices that you add.

  Refer to the supplied System Software Manual if you need more information about the factory installed SCSI device drivers.

- Run the SCSI configuration utility to change host adapter settings to fit your specific configuration. You can start the SCSI configuration utility by pressing [Ctrl] + [A] at the prompt during workstation boot.

  Refer to the supplied Adaptec SCSI documentation for more information.

To connect SCSI devices, perform the following:

1. Connect the supplied ribbon cable to the appropriate device(s) as shown in Figure 6-9.

   Make sure the cable is connected with the correct orientation. Most cables and sockets are keyed so you cannot connect them backwards. If your cable or device is not keyed, you must connect pin 1 of the cable to pin 1 of the device's socket.

   Pin 1 of the cable is on edge with the colored stripe. Pin 1 of the device's socket should be marked with an arrow at one end of the socket. If necessary, refer to the device's documentation for pin 1 orientation.

2. Connect a power cable to device.

3. Replace the outside cover.

4. Connect all external devices and restore power.

5. If you want to fine tune some SCSI settings, you can use the SCSI configuration utility to configure your workstation by pressing [Ctrl] + [A] when the BIOS banner appears during the boot process.

   Refer to the supplied Adaptec SCSI documentation for more information.

Technical Specifications A
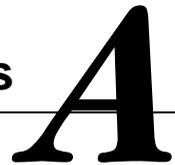
Introduction

This appendix provides information about the technical characteristics of the 180i, 200i, and 200i^2 Digital Personal Workstations. It also includes information about the technical characteristics of the 266i and 266i^2 Digital Personal Workstations.

- Workstation specifications

- ISA and PCI expansion slots

- Power supply and input power

- Nominal current requirements

- Power supply and power cord requirements

- Main logic board jumpers and switches

- If you forget your password

Workstation Specifications

The following sections list your Digital Personal Workstation's performance, dimensions, and environmental specifications.

Features (180i, 200i, and 200i^2 Models)

Feature	Specification
Internal cache	256 KB (each processor) L2 16 KB L1 (processor internal)
Network	Single-chip controller for 32-bit PCI bus
	Factory shipped with 10Base-T/10Base-2 standard, 100Base-T ready
Audio	ESS single-chip controller with 64-bit stereo audio

Features (266i and 266i^2 Models)

Feature	Specification
Internal cache	32 KB level 1 (each processor)
	64 KB L2 (each processor)
Network	Single-chip controller for 32-bit PCI bus
	Factory shipped with 10/100Base-T standard
Audio	ESS single-chip controller with 16-bit stereo audio

Performance Specifications

Attributes	Specification
ISA clock	8.33 MHz
PCI clock	33 MHz

Data I/O
  ISA
  PCI
	
	8-bit and 16-bit
	32-bit

Main logic board DRAM	72-pin, EDO or fast-page parity memory for 180i, 200i, and 200i^2 models
	72-pin, EDO parity and fast-page parity memory for 266i and 266i^2 models
	32 MB standard, expandable up to 256 MB, using 32 MB SIMMs (EDO)
	or
	512 MB, using 64 MB SIMMs (fast-page parity)
Workstation BIOS	2 Mb Flash ROM

Dimensions

Dimension	Specification
Width	215.9 mm (8.5 in.)
Depth	444.5 mm (17.5 in.)
Height	406.4 mm (16.0 in.)
Weight	15.2 kg (33.6 lb) [1]

[1] Your workstation's weight might vary depending upon your specific configuration.

Shipping/Packaging Dimensions

Dimension	Specification
Width	600.94 mm (23.66 in.)
Depth	508 mm (20 in.)
Height	415.54 mm (16.36 in.)
Weight	17.7 kg (39.02 lb)

Environmental Specifications

Attributes	Specification
Operating temperature	10 °C to 40 °C (50 °F to 104 °F)
Storage temperature	-40 °C to 66 °C (-40 °F to 150.8 °F)
Operating humidity (noncondensing)	10% to 90% relative humidity, maximum wet bulb 40 °C (104 °F)
Storage humidity (noncondensing)	10% to 95% relative humidity, maximum wet bulb 65 °C (149 °F)
Altitude Operating	3,048 m (10,000 ft) max., max temp = 22.5 °C (72.5 °F)
Nonoperating	12,192 m (40,000 ft) max., max temp = 21 °C ~ 23 °C (69.8 ~ 73.4 F
Shipping vibration	IAW Federal Standard 101, method 5019
Nonoperating shock	30 G, 25 ms halfsine

ISA Expansion Slots

The maximum available +5 V dc current allowable to any ISA expansion slot depends upon the following parameters:

- Power supply capacity

- The +5 V dc requirements of the main logic board

- The +5 V dc requirements of the peripherals

- The power demands of all other slots in use

PCI Local Bus Expansion Slots

Your workstation's backplane contains five PCI local bus expansion slots. These slots support:

- Universal 3.3 V dc and 5 V dc PCI expansion boards

- Standard power PCI expansion slots (up to 25 watts)

- Bus mastering

System Input Power Requirements

Rated Voltage Range	Maximum Range	Rated Input Current @ 300 W	Operating Frequency Range
100 V ac - 120 V ac	88 V ac - 135 V ac	4 A	47 Hz - 63 Hz
220 V ac - 240 V ac	176 V ac - 265 V ac	2 A	47 Hz - 63 Hz

Power Supply Requirements

All Digital Personal Workstation power supplies provide six dc voltages: +12 V dc, -12 V dc, +5 V dc, -5 V dc, 5 VSB, and +3.3 V dc. These voltages are used by the various components within the workstation.

Current Requirements

This workstation's power supply provides the following maximum current requirements:

- Total power 300 W maximum

    - +3.3 V   0 A min, 33 A max.

    - +5 V   2.0 A min, 40 A max.

    - +12 V   0 A min, 12 A max.

    - -5 V   0 A min, 0.3 A max.

    - -12 V   0 A min, 0.5 A max.

    - 5 VSB   0 A min, 0.1 A max.

Power Cord Requirements

⚠ **WARNING:** Do not attempt to modify or use an external 100 V ac (Japan only) or 115 V ac power cord for 220-240 V ac input power. Modifying either power cord can cause personal injury and severe equipment damage.

The power cord used with this workstation must meet the following criteria:

- UL and CSA Certified cordage rated for use at 250 V ac with a current rating that is at least 125% of the current rating of the product. In Europe, the cordage must have the <HAR> mark.

- The ac plug is terminated in a grounding-type male plug designed for use in the region. It must also have marks showing certification by an agency acceptable in the region.

- The connector at the workstation end is an IEC type CEE-22 female connector.

- The maximum length is 4.5 meters (14.5 feet).

Main Logic Board Jumper and Switch Settings (180i, 200i, and 200i^2 Models)

STATIC SENSITIVE: Static electricity collects on non-conductors 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 the main logic board:

Touch the metal frame of your workstation to discharge any static electricity.

Feature	Function	Setting	Description
Processor/ bus clock speed	66 MHz[1] 60 MHz	SW1-1, on[1] SW1-1, off[2]	Determines the processor and PCI clock speed for the installed processor(s). For example:
			200 MHz processor = 66 MHz (66 x 3) 180 MHz processor = 60 MHz (60 x 3)
CPU bus speed (60 MHz)	2x bus speed	SW2, on SW3, on SW4, on	Processor speed: 120 MHz
	2.5x bus speed	SW2, off SW3, on SW4, on	Processor speed: 150 MHz
	3x bus speed[1]	SW2, on[1] SW3, off[1] SW4, on[1]	Processor speed: 180 MHz[1]
	3.5x bus speed	SW2, off SW3, off SW4, on	Processor speed: 210 MHz
	4x bus speed	SW2, on SW3, on SW4, off	Processor speed: 240 MHz

(1) Factory default for 200i/200i^2 models

(2) Factory default for 180i model

Feature	Function	Setting	Description
CPU bus speed (66 MHz)	2x bus speed	SW2, on SW3, on SW4, on	Processor speed: 133 MHz
	2.5x bus speed	SW2, off SW3, on SW4, on	Processor speed: 166 MHz
	3x bus speed[1]	SW2, on[1] SW3, off[1] SW4, on[1]	Processor speed: 200 MHz[1]
	3.5x bus speed	SW2, off SW3, off SW4, on	Processor speed: 233 MHz
	4x bus speed	SW2, on SW3, on SW4, off	Processor speed: 266 MHz
Password clear	Disabled[1] Enabled	SW1-5, off[1] SW1-5, on	If you forget your password, set this switch to ON and then restart your workstation.
Recovery mode	Disabled[1] Enabled	SW1-6, off[1] SW1-6, on	If your BIOS upgrade failed, refer to the README.TXT file that came with the BIOS upgrade.

[1] Factory default

continued

Feature	Function	Setting	Description
CMOS clear	Disabled[1] Enabled	SW1-7, off[1] SW1-7, on	Your main logic board's flash BIOS upgrade switch must be OFF to prevent unauthorized personnel from loading a new workstation BIOS. Loading a new workstation BIOS might allow someone to override other workstation security features or introduce a virus into your workstation.
Factory setting	Factory setting	SW1-8, on SW1-8, off[1]	Always leave this switch in the off position.
Boot block update	Enabled Disabled[1]	J27, pins 2 and 3 J27, pins 1 and 2[1]	Disabling this jumper prevents corruption of the boot block when a boot block update is not required.

[1] Factory default
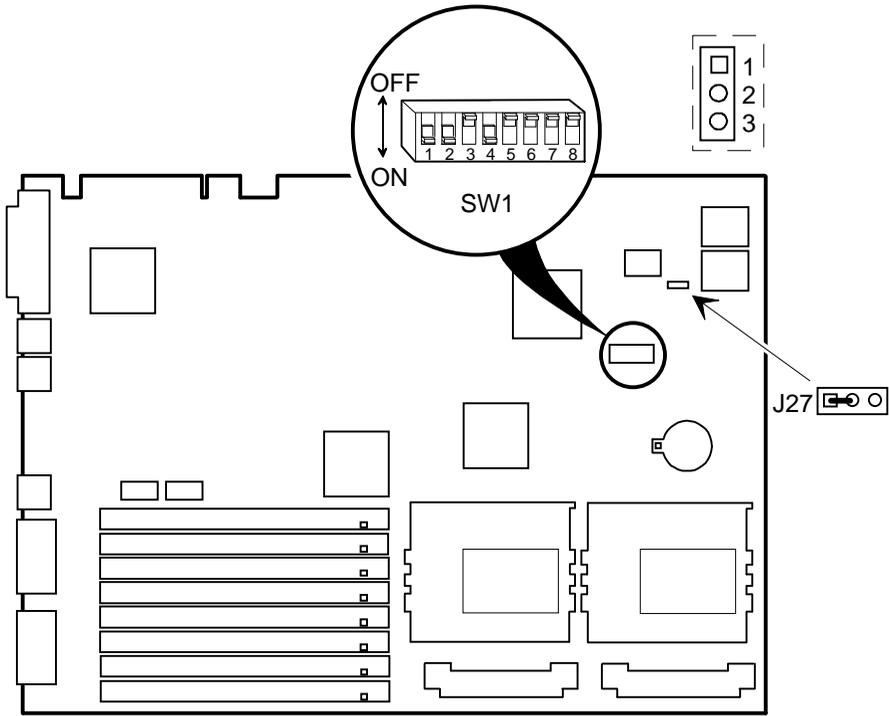
DEC00945-9

**Figure A-1. Main Logic Board Jumper and Switch Settings
(180i, 200i, and 200i^2 Models)**

Main Logic Board Jumper and Switch Settings (266i and 266i² Models)

The jumper and switch settings located on the main logic board can be set to control many features in your workstation. Use the following tables and figure to locate the jumper and switch settings on the main logic board and then modify the settings for desired results.

Feature	Function	Setting	Description
Bus clock	66 MHz 60 MHz	SW1-1, ON[1] SW1-1, OFF	Determines the processor and PCI clock speed for the installed processor. This switch must be set along with the SW1-2, SW1-3, SW1-4, and SW1-8 CPU Core/Bus Ratio switches. Refer to the Processor Clock Speed Switch Settings table.
Password clear	Clear Normal[1]	SW1-5, ON SW1-5, OFF[1]	If you forget your password, set this switch to ON and then restart the workstation.
Recovery mode	Recovery Normal[1]	SW1-6, ON SW1-6, OFF[1]	If your flash BIOS upgrade failed, set this switch to ON so you can boot your workstation from a Crisis Recovery diskette. Refer to the README.TXT provided with the flash BIOS upgrade.
Clear CMOS	Enable Disable[1]	SW1-7, ON SW1-7, OFF[1]	Clears CMOS of all BIOS setup information. Use the Enable setting when your workstation will not boot, and BIOS setup cannot be accessed due to configuration data corruption. This switch must be set back to Disable before rebooting your workstation.

(1) Factory default setting
OFF = Up; ON = down

Feature	Function	Setting	Description
Bus/core frequency ratio		SW1-2, OFF[1] SW1-3, OFF[1] SW1-4, ON[1] SW1-8, ON[1]	Sets processor clock speed x 3.5
		SW1-2, ON SW1-3, ON SW1-4, OFF SW1-8, ON	Sets processor clock speed x 4
		SW1-2, OFF SW1-3, ON SW1-4, OFF SW1-8, ON	Sets processor clock speed x 4.5
		SW1-2, ON SW1-3, OFF SW1-4, OFF SW1-8, ON	Sets processor clock speed x 5
		SW1-2, OFF SW1-3, OFF SW1-4, OFF SW1-8, ON	Sets processor clock speed x 5.5
			Must be set with SW1-1 processor/bus clock speed switch to match CPU clock speed. For example, 66 MHz x 3 = 200 MHz processor. Refer to the Processor Clock Speed Switch Settings table.

(1) Factory default setting
OFF = Up; ON = down

continued

Feature	Function	Setting	Description
Bus/core frequency ratio		SW1-2, ON SW1-3, ON SW1-4, ON SW1-8, OFF	Sets processor clock speed x 6
		SW1-2, OFF SW1-3, ON SW1-4, ON SW1-8, OFF	Sets processor clock speed x 6.5
		SW1-2, ON SW1-3, OFF SW1-4, ON SW1-8, OFF	Sets processor clock speed x 7
		SW1-2, OFF SW1-3, OFF SW1-4, ON SW1-8, OFF	Sets processor clock speed x 7.5
		SW1-2, ON SW1-3, ON SW1-4, OFF SW1-8, OFF	Sets processor clock speed x 8
			Must be set with SW1-1 processor/bus clock speed switch to match CPU clock speed. For example, 66 MHz x 3 = 200 MHz processor. Refer to the Processor Clock Speed Switch Settings table.
Boot block	Disabled[1] Enabled	J27, pins 1 and 2[1] J27, pins 2 and 3	When disabled, prevents corruption or reprogramming of BIOS boot block data. Updating the BIOS boot block data is normally reserved for factory use only, unless instructed otherwise by your Service provider.

(1) Factory default setting
OFF = Up; ON = down

Processor Clock Speed Switch Settings (266i and 266i^2 Models)

The following table provides the switch settings for a number of available Pentiumâ II processors. The switches are set correctly for the processor that came with the workstation you purchased.

Processor Speed	SW1-2	SW1-3	SW1-4	SW1-8
233 MHz	Off	Off	On	On
266 MHz	On	On	Off	On
300 MHz[1]	Off	On	Off	On
333 MHz[1]	On	Off	Off	On

[1] The processor speeds indicated above are anticipated future processor products from Intel. This does not constitute a promise of the availability of such a processor, but should it be made available some time in the future, these are the needed switch settings to support such a processor.
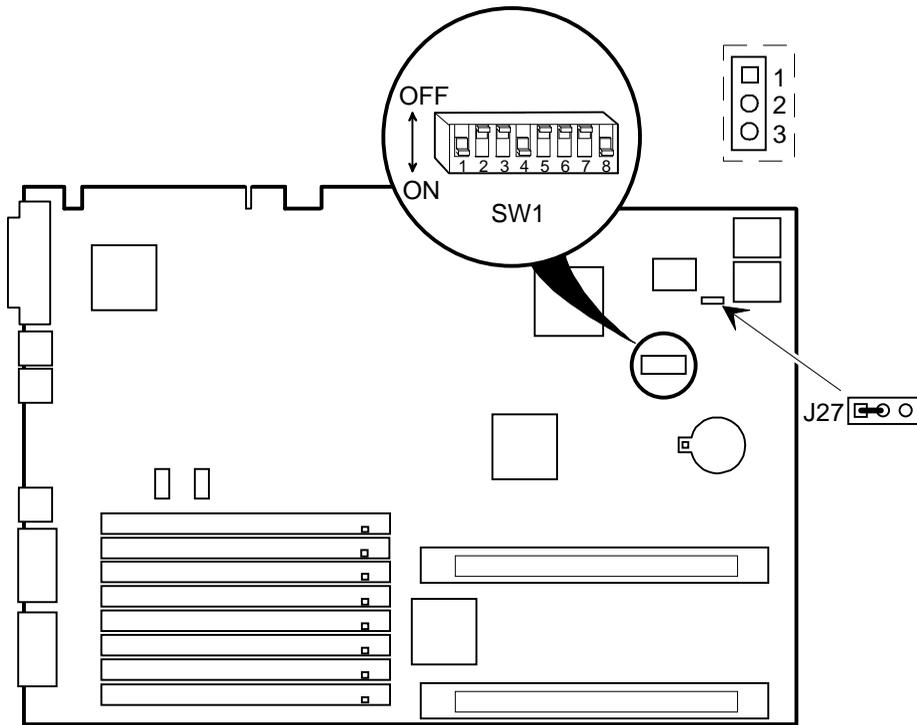
DEC01217-6

Figure A-2. Main Logic Board Switch Locations (266i and 266i^2 Models)

If You Forget Your Password

Use the following procedure to erase a password from your computer.

1. Turn off your computer and remove the outside cover.

2. Change switch SW1-5 to enabled (switch on).

3. Reconnect your computer and turn it on.

   Booting your computer with this switch in the on position erases the existing password(s).

4. Turn off your computer and remove the outside cover.

5. Change switch SW1-5 to disabled (switch off).

6. Reconnect your computer and turn it on.

7. Using the BIOS Setup utility, assign a new password.

   Refer to Chapter 2, "Using the BIOS Setup Utility," for more information.

Device Mapping B

Introduction

This appendix provides a series of tables listing mapping and address information related to workstation memory and various main logic board devices (keyboard controller, interrupt controller, DMA controller, etc.).

Your workstation's memory and address locations are allocated at the factory to operate within a standard PC environment. However, due to the number of optional devices and/or expansion boards that are available, sometimes memory and address locations need to be changed. For example, some network expansion boards require a specific memory location. If that location is already allocated, a memory conflict results and the expansion board will not operate as expected. Note that some memory, I/O and interrupt locations can be changed using the BIOS Setup utility.

Refer to Chapter 2, "Using the BIOS Setup Utility," for additional information.

CAUTION: Before changing any memory or address location, refer to the documentation supplied with the optional device, expansion board, or software application and make sure adequate information is available. If not, contact the option or software manufacturer for further information.

Full Range Processor Memory Address Map

Range	Function	Size
0 to 9FFFFh	Base memory	640 KB
A0000h to BFFFFh	Video RAM	128 KB
C0000h to C7FFFh	Video BIOS	32 KB
C8000h to DFFFFh	BIOS extension ROM (AT bus used)	96 KB
E0000h to FFFFFh	PnP BIOS/APM BIOS	128 KB
	Extended memory (EDO)	256 MB
	Extended memory (fast-page parity)	512 MB

I/O Address Map

Range (hexadecimal)	Function
000 - 00F	DMA controller one
020 - 021	Interrupt controller one
040 - 043	Interval timer
060 - 06F	Keyboard controller
070 - 07F	Real-Time Clock (RTC), NMI
080 - 08F	DMA page register
0A0 - 0A1	Interrupt controller two
0C0 - 0CF	DMA controller two
0F0	Clear math co-processor busy
0F1	Reset math co-processor
0F8 - 0FF	Math co-processor
170 - 177	Secondary IDE controller
1F0 - 1F7	Primary IDE controller
220 - 22F	Audio
278 - 27A	LPT2
2E8 - 2EF	COM4

Range (hexadecimal)	Function
2F8 - 2FF	COM2
378 - 37A	LPT1
388 - 38B	Audio, FM music synthesizer
3BC - 3BE	LPT3
3E8 - 3EF	COM3
3F0 - 3F7	Diskette (floppy disk) controller
3F6 - 3F7	Primary/secondary IDE controller (alt status, device address)
3F8 - 3FF	COM1
4D0	Edge/level control register - INTCNTRL1
4D1	Edge/level control register - INTCNTRL2
CF8 - CFF	PCI configure space control register
22-3F	Programming chip select
0FFD	Programming chip select

Interrupt Levels

Interrupt Number	Interrupt Source
IRQ0	Timer tick
IRQ1	Keyboard controller
IRQ2	Cascade interrupt
IRQ3	COM2, COM4, if enabled
IRQ4	COM1, COM3, if enabled
IRQ5	Audio, if enabled
IRQ6	Diskette (floppy disk) drive, if enabled
IRQ7	LPT1, LPT3, if enabled
IRQ8	Real Time Clock (RTC)
IRQ9	(PCI device or reserved) default video
IRQ10	(PCI device or reserved) default SCSI
IRQ11	(PCI device or reserved) default network
IRQ12	Mouse interrupt, if enabled
IRQ13	Math co-processor
IRQ14	IDE primary, if enabled
IRQ15	IDE secondary, if enabled

DMA Channel Assignment

Channel	Controller	Function
0	1	Refresh
1	1	Audio (if enabled)
2	1	Diskette (floppy disk) controller, if enabled
3	1	ECP
4	2	Cascade DMA
5	2	Playback audio (if enabled)
6	2	Not used
7	2	Not used

Figure Legend	Component
A	CD-ROM drive (or other SCSI device)
B	Power connection
C	Single-ended active terminator
D	SCSI connectors
E	SCSI hard disk drive
F	SCSI adapter connector (50-pin)
G	External SCSI connector
H	Power supply
I	SCSI adapter connector (68-pin)
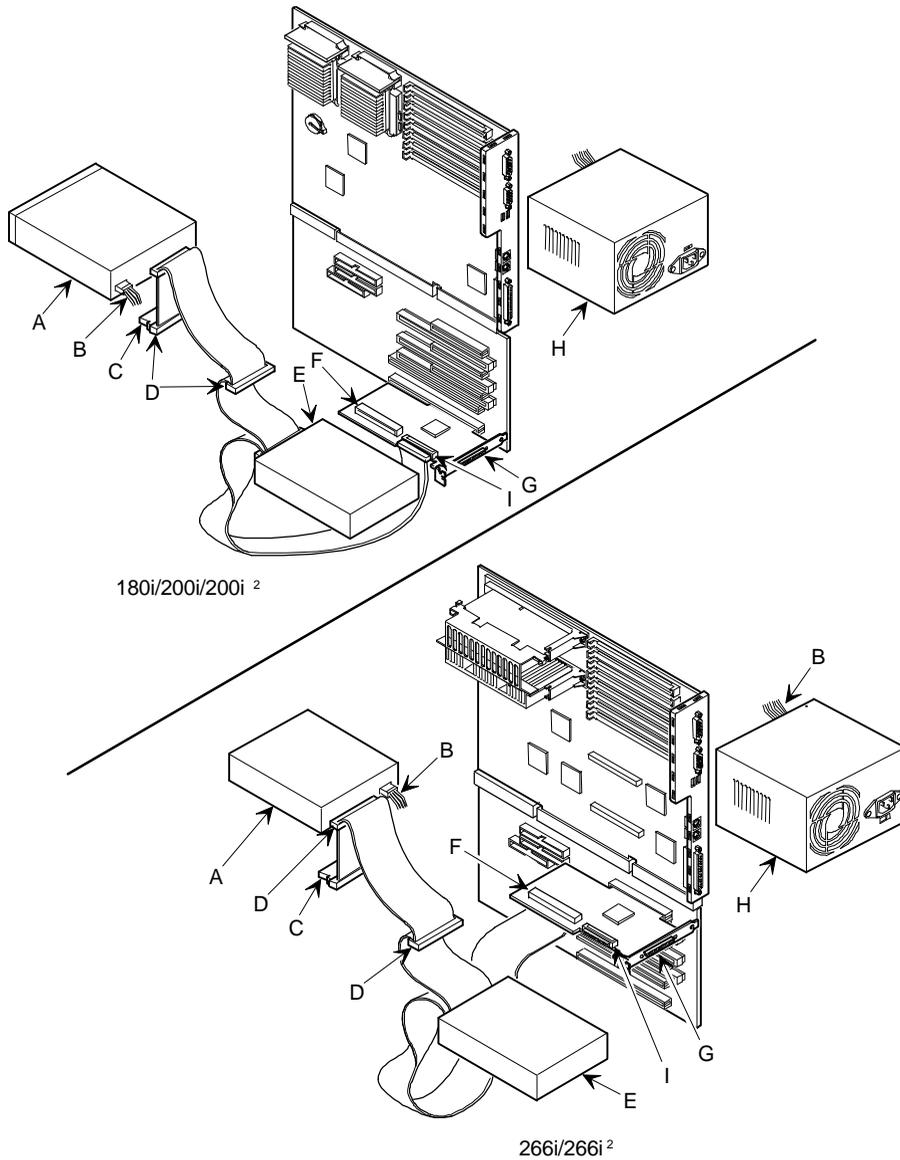
180i/200i/200i ^{2}

266i/266i ^{2}

DEC01225-2

Figure 6-9. SCSI Device Data Cable Connections

Glossary *G*

address

A specific location or range of locations in your workstation's memory or in a port (such as a parallel or serial port). Memory addresses specify the location of information, while I/O addresses specify the location of a port used by a particular component of your workstation.

application

A program or set of programs that operate in conjunction with an operating system, also called "application software." Categories of application software include word processors, databases, spreadsheets, and telecommunications software. Specific examples of application software include WordPerfect, Lotus 1-2-3, and Procomm Plus.

base memory

Memory accessible to MS-DOS, up to a maximum of 640 KB; also called "conventional memory." See also expanded memory (EMS) and extended memory (XMS).

Basic Input/Output System (BIOS)

Abbreviated as BIOS and pronounced "by-oss." The BIOS enables your workstation to control major input/output devices such as the keyboard and disk drives.

batch file

A defined series of commands saved in a file, which can then be executed as a unit in order to save time and/or keystrokes. MS-DOS batch files have the extension .BAT. Batch files created for other operating systems, such as Windows 95 or Windows NT Workstation, might have other extensions.

baud

A unit of speed in data transmission, as one bit per second for binary signals. See also bits-per-second (bps).

bit

The smallest unit of electronically stored information, represented by the binary digits 0 or 1. See also byte.

bits per second

Abbreviated as bps. The number of binary digits transmitted by an electronic device (such as a modem) in one second. Also see baud and bit.

board

A device containing electronic circuitry and microprocessors. Usually used in connection with a modifying word, as follows:

- main logic board - The primary electronic component of your workstation

- expansion board - A board which enhances your workstation's abilities in some way

- video board - A board which enables your workstation to display information on a monitor

booting

The process of self-testing and configuration that completes each time your workstation is turned on (a "hard boot") or restarted (a "soft boot" or "reboot") by pressing the reset button or the [Ctrl]-[Alt]-[Del] key combination. This might include a memory test, loading of device drivers via CONFIG.SYS, and execution of the AUTOEXEC.BAT file.

byte

The amount of storage space used to represent one character (such as a letter or number). One byte contains eight bits. The following table describes other commonly-used units of electronic storage space. These units are typically used to describe amounts of available memory.

Kilobit (Kb)	1,024 bits
Kilobyte (KB)	1,024 bytes
Megabit (Mb)	1,048,576 bits
Megabyte (MB)	1,048,576 bytes
Gigabyte (GB)	1,073,741,824 bytes

cache memory

A block of reserved memory that improves workstation performance by minimizing the number of processor memory accesses. The workstation achieves this by storing recently used data or instructions in reserved memory, where it can be retrieved more quickly.

CD-ROM

Compact Disk-Read Only Memory. The CD-ROM drive and CD-ROM disk comprise an integral part of a multimedia system. The disk stores a very large amount of audio, video, graphic and/or encyclopedic information that is read by the drive for use in a workstation application. Because the disk is read only, you cannot write to the disk from your workstation's hard drive, floppy drive, or from your workstation's memory.

ClientWORKS

ClientWORKS is the family of client management and networking tools that Digital supports on its entire line of desktop personal workstations. The Client Management feature provides workstation users with an easy method to keep track of their components. See Desktop Management Interface.

CMOS

A type of memory that uses very little power. CMOS memory is often used to store information such as the time and date for your workstation's internal clock.

cursor

A line, block, or other indicator on your monitor screen. The cursor identifies the point at which typed characters or other information will appear on the screen. Note that while a mouse or other pointing device can often be used to move the cursor, the mouse-pointer and a normal cursor might appear in different places on your screen.

DDC

Display Data Channel - a feature that queries the monitor to identify itself to the workstation which then chooses the optimal refresh rate for the monitor.

Desktop Management Interface (DMI)

DMI is a component of ClientWORKS and provides an enhanced and powerful set of utilities and software to help network administrators keep track of the installed hardware and software, either locally or on a network. See ClientWORKS.

device driver

A file that gives your workstation specific information on operating a particular physical device (such as a CD-ROM drive or a mouse) or application software (such as a memory manager). Device drivers are usually loaded into memory each time your workstation boots if they are listed in your CONFIG.SYS file.

Direct Memory Access (DMA)

DMA displays or delivers information from your workstation's memory without making use of the processor. Devices with DMA capability (for example, many sound cards) must be properly configured in order for your workstation to recognize and make use of this ability.

DPMS

1. Display Power Management Signaling. Technology that enables video controller circuitry to control the operating condition of a monitor, thereby decreasing the monitor's energy consumption.

2. DOS Protected Mode Services. A way for a software application to access extended memory, often by use of a specialized device driver. Examples of software that uses DPMS include certain versions of Stacker and PKZip.

EDO

    See Extended Data Out.

Enhanced Parallel Port (EPP)

An option available in your workstation's BIOS which affects the way a printer attached to your parallel port communicates with your workstation. If your printer supports this standard, enabling the EPP option will allow faster printing. This specification also provides a parallel port with the expansion bus ability to support up to 64 external devices, such as: disk drives, tape drives, CD-ROM drives, and other mass-storage devices.

expanded memory (EMS)

Memory beyond 640 KB that can only be accessed by use of expanded memory manager software. Expanded memory can be provided by installing an expanded memory expansion board, or by using software that enables extended memory to simulate expanded memory. Some application software requires expanded memory in order to operate correctly.

Extended Capabilities Port (ECP)

An option available in your workstation's BIOS which affects the way a printer attached to your parallel port communicates with your workstation. If your printer supports this standard, enabling the ECP option will allow faster printing.

Extended Data Out (EDO)

A DRAM feature that allows for fast, main memory access timing. EDO memory is faster than Fast Page memory (which is an older industry standard) and is available in 8-MB, 16-MB, and 32-bit SIMMs.

extended memory (XMS)

Memory beyond 1 MB that can only be accessed by use of extended memory manager software (such as HIMEM.SYS, included with MS-DOS and Windows). Some application software, including Windows and Windows-based software, requires extended memory in order to operate correctly. Extended memory can be added to your workstation, within specified limits, by installing SIMMs.

firmware

Information that is permanently stored in your workstation's ROM and cannot be changed. This might consist of application software and/or configuration information about certain aspects of the workstation. Your workstation's BIOS (see Basic Input/Output System) is an example of firmware.

graphical user interface

Abbreviated as GUI. The visual "desktop" image generated by software such as Windows, that allows you to operate your workstation by using a mouse or other pointing device to manipulate icons that might represent application software, files containing data, and/or operating system commands. An alternative to a command line.

hardware

Workstations, printers, modems and other physical devices for managing electronically stored information.

icon

A symbol or picture on your monitor screen that represents a file, a software application, an operating system command, or some other form of stored information. Groups of icons might sometimes be referred to as button bars or toolbars.

interrupt

An event, condition, or instruction which causes your workstation to temporarily stop performing a task, but does so in a way that permits the task to be resumed and completed later. For example, not using your keyboard or mouse for several minutes might cause a screen saver program to interrupt another software application. Interrupts also occur within your workstation's memory that cannot be easily detected by users.

IRQ

A hardware setting which instructs your workstation how to allocate memory resources between various components of the system. For example, serial ports COM1 and COM3 are often assigned to the same IRQ setting. If IRQ settings are not properly allocated to the various components of your workstation (such as expansion boards), your workstation might not be able to operate all of the affected components.

An IRQ setting on a given component establishes an interrupt condition for that component.

jumper

Jumper pins allow you to set specific workstation parameters. They are set by changing the pin location of jumper blocks. A jumper block is a small, plastic-encased conductor (shorting plug) that slips over the pins. To change a jumper setting (make sure that your workstation is turned OFF), remove the jumper from its current location with your fingers. Position the jumper over the two pins designated for the desired setting. Press the jumper evenly onto the pins; being careful not to bend the pins.

Kbyte

A Kilobyte (Kbyte, KB) is a unit, usually of workstation storage space, equal to 1,024 bytes. Also see byte and bit.

legacy

A legacy expansion board is any ISA board that does not comply with the new Plug and Play ISA Board Specification. Legacy ISA boards must be configured using the ISA Configuration Utility (ICU).

mapping

The process of identifying specific addresses and locations within your workstation's memory, and describing what kinds of information might be found at those locations. Sometimes referred to as device mapping or memory mapping.

media

Physical objects or devices used for storing information. These might include floppy disks, hard disk drives, CD-ROM disks, and PCMCIA cards.

memory

The electronic space in which information can be stored and/or processed. Types of memory include Random Access Memory (RAM), Read-Only Memory (ROM), expanded memory (EMS) and extended memory (XMS).

memory-resident

A condition in which software remains loaded in your workstation's memory but does not operate until and unless it is activated by the user or by another software application. For example, a virus-detection program might be memory-resident.

microprocessor

A chip that processes electronic information and instructions, such as Intel's Pentium-Pro processors. Note, however, that not all microprocessors are central processing units.

modem

A device for transmitting electronic information from one workstation to another at high speeds over telephone lines.

multimedia

A form of electronic information that combines pictures, sounds, and text in an integrated manner. CD-ROM hardware and software is usually required to make use of information stored in the form of multimedia.

operating system

The software that tells your workstation how to manage and process electronically stored information, enables it to run application software, and controls the flow of information between various parts of your workstation system. MS-DOS, OS/2, and UNIX are operating systems.

PCI

Peripheral Component Interconnect - provides fast, 32-bit, I/O data transfer.

Pel - Picture Element, also known as Pixel

The smallest graphic unit that can be displayed on the screen of your monitor. This unit is usually a single-colored dot; the size of the dot is determined by the dot pitch of your monitor (typically .25 mm to .42 mm).

port

The physical connection between your workstation and a peripheral device, such as a printer, mouse, or SCSI device.

Parallel ports, also called LPT ports, are typically used to connect your workstation to a printer. Serial ports, also called COM ports, can be used to connect your workstation to a variety of devices, including a mouse, a modem, and some printers. Other types of ports can include keyboard ports, mouse ports, and SCSI ports. See EPP.

Power-On Self Test (POST)

A series of diagnostic tests performed by your workstation every time it is turned on (but not necessarily every time it is booted).

quiet boot

Inhibits the display of POST messages. Quiet boot, when enabled, displays the Digital logo, instead of POST messages.

Random Access Memory (RAM)

Abbreviated as RAM; also called read/write memory. The memory your workstation uses to manage information and software while that information and software is in use. Information stored only in RAM is lost when your workstation is turned off.

Read-Only Memory (ROM)

Abbreviated as ROM. Information or software stored in ROM is permanent, cannot be altered, and remains intact when your workstation is turned off. Note that you cannot move or copy information into ROM from other areas of your workstation's memory. In some cases, however, you can copy information from ROM into other areas of your workstation's memory.

ROM BIOS

See Basic Input/Output System and Read-Only Memory. ROM BIOS software enables your workstation to control major input/output devices such as the keyboard and disk drives.

SCSI device

Hardware that communicates with your workstation via a specific data-transmission technology (Small Computer System Interface). Devices that use the SCSI interface include CD-ROM drives and some hard disk drives.

SIMM

A Single In-line Memory Module. SIMMs are small memory cards (sometimes called "sticks") that can be used to increase the amount of random access memory (RAM) in your workstation.

software

A program or set of programs that operate in conjunction with an operating system, also called "application software." Categories of application software include word processors, databases, spreadsheets, and telecommunications software. Specific examples of application software include Word for Windows, MS Excel, and Procomm Plus.

system utilities

Software designed to increase your workstation's efficiency, determine whether it is operating properly, and/or correct problems that might arise as you use your workstation. Some system utility software might be provided with your workstation (such as a Setup program). Other utility software is available from various commercial and non-commercial sources. Examples of utility software include Stacker, PKZip, and Norton Utilities.

upper memory

The area of memory between base memory (640 KB) and 1 MB. When properly configured, Windows 95 or Windows NT Workstation can load device drivers, and memory-resident software into upper memory. While the upper memory area can be configured as expanded memory, expanded memory is not limited to the upper memory area.

video adapter

Also called a video controller or video board. A board that enables your workstation to display information on a monitor screen.

video controller

The electronic circuitry which enables your workstation to display information on a monitor screen. This might be provided on a video adapter or on the main logic board. In the latter case, it is referred to as onboard video.

WaveTable

An audio (sound) synthesis device that provides life-like sound because it is based on actual recordings of real instruments. The WaveTable is usually a small adapter (daughter card) that attaches to the sound card or built-in sound circuitry on the main logic board.

Windows NT Workstation

Software that provides a graphical user interface for use in operating your workstation.

ZIF socket

Zero Insertion Force socket - These sockets are provided for easy upgrade of processors. They require no tools for removing and replacing the processor chip.

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