

DIGITAL PC 3010

System Reference

Part Number: ER-F3GWW-UA. A01

Digital Equipment Corporation

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DIGITAL PC 3010 System Reference

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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 tasavirtalitiumpatterit.

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



WARNING! 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 12-41454-05), 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 computers 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.

Energy Star Compliant

The DIGITAL PC 3010 series of computers are ENERGY STAR compliant when used with Windows 95. DIGITAL advises that you do not use the enable Power Management features with operating systems that do not allow for power management, such as SCO UNIX, Windows NT, or OS/2.

To ensure that your entire computer system remains ENERGY STAR compliant, you must use an ENERGY STAR compliant monitor, that is, a monitor that supports the DPMS protocol.

Contents

Preface

Introduction	ix
Related Material.....	ix
Latest Product Information and Updates	x
DIGITAL PC 3010 Computers.....	x
Audience.....	xii
Organization	xii
Conventions.....	xiii
Special Notices	xiv

1

Beyond Quick Setup

Introduction	1-1
Front Panel Controls and Indicators	1-2
Rear Panel Connectors and Voltage Select Switch.....	1-4
Removing your Computer's Outside Cover	1-6
Replacing your Computer's Outside Cover	1-8
Chassis Lockdown.....	1-10
Attaching the Hasp.....	1-11
Connecting a Local Printer.....	1-12
Connecting a Universal Serial Bus (USB) Device.....	1-13
Your Computer's Windows Enhanced Keyboard	1-14
Creating a Comfortable Working Environment	1-15

2

Using the BIOS Setup Utility

What is the BIOS Setup Utility?	2-1
Accessing the BIOS Setup Utility	2-2
Helpful Hints	2-2
Changing Your Computer's Configuration	2-4
Changing Time and Date	2-4
Setting Up Security	2-4
Setting Supervisor and User Passwords	2-4
Enabling Password On Boot	2-6
Eliminating User and Supervisor Passwords	2-6
Protecting Against Boot Sector Viruses	2-7
Fixed Disk Boot Sector	2-7
Other Security Options	2-8
Setting Power Management Options	2-9
Setting up Power Management	2-9
Increasing Your Computer's Video Memory	2-11
Configuring for New Disk Drives	2-12
Diskette Drive Configuration	2-12
Hard Disk Drive Configuration	2-12
Autotyping a Hard Disk	2-13
Manually Defining a Hard Disk	2-14
Changing the Boot Sequence	2-14
Speeding up the Boot Process	2-16
Flash Utility	2-17

3

Inside Your Computer

Introduction	3-1
Improving Computer Performance	3-2
Preparing Your Computer for Expansion	3-2
Your Computer's Components and Connectors	3-2
Computer Components	3-2
Main Logic Board Components and Connectors	3-4
Main Logic Board Connectors (Rear Panel)	3-6
Backplane Components and Connectors	3-8
Removing the Main Logic Board	3-10
Replacing the Main Logic Board	3-10
Replacing the Lithium Battery	3-12
Installing a Higher Performance Processor	3-14

4

Main Logic Board Expansion

Introduction	4-1
Installing Additional Computer Memory	4-1
Memory Configurations	4-4
Installing a DIMM	4-4

5

Adding Expansion Boards

Introduction	5-1
Expansion Slots	5-2
Installing Expansion Boards	5-4
Removing Expansion Boards	5-7

6

Adding Mass Storage Devices

Introduction	6-1
Installing Mass Storage Devices	6-4
Installing a 3½-Inch Device	6-6
Installing a 5¼-Inch Device	6-8
Connecting Diskette and IDE Devices	6-10

Contents

A

Technical Specifications

Introduction	A-1
Computer Specifications	A-1
Features	A-2
Computer Dimensions	A-3
Shipping/Packaging Dimensions	A-3
Environmental Specifications	A-4
ISA Expansion Slots	A-4
PCI Local Bus Expansion Slots	A-4
System Input Power Requirements	A-5
Power Supply Requirements	A-5
Current Requirements	A-6
Power Cord Requirements	A-7
Main Logic Board Jumper Settings	A-7
If You Forget Your Password	A-11

B

Device Mapping

Introduction	B-1
Full Range Processor Memory Address Map	B-2
I/O Address Map	B-3
Computer Interrupt Levels	B-5
DMA Channel Assignment	B-6

C

Video Output Information

Introduction	C-1
Video Resolution Modes and Memory Requirements	C-2

Glossary	GL-1
-----------------------	------

Index	IN-1
--------------------	------

Figures

Typical DIGITAL PC 3010 Computer	xi
1-1. Front Panel Controls and Indicators	1-3
1-2. Rear Panel Connectors and Voltage Select Switch.....	1-5
1-3. Removing the Outside Cover	1-7
1-4. Replacing the Outside Cover.....	1-9
1-5. Attaching the Hasp	1-11
1-6. Connecting a Local Printer	1-12
1-7. Connecting a USB Device	1-13
1-8. Windows Enhanced Keyboard	1-14
1-9. Creating a Comfortable Working Environment.....	1-17
3-1. Computer Components	3-3
3-2. Main Logic Board Components and Connectors.....	3-5
3-3. Main Logic Board Components (Rear Panel).....	3-7
3-4. Backplane Components and Connectors	3-9
3-5. Removing the Main Logic Board	3-11
3-6. Replacing the Battery	3-13
3-7. Installing a Higher Performance Processor	3-17
4-1. DIMM Socket Locations	4-3
4-2. Installing a DIMM.....	4-5
5-1. Expansion Board Slots	5-3
5-2. Removing a Metal Filler Plate.....	5-5
5-3. Installing an Expansion Board	5-6
6-1. Storage Device Bay Locations	6-5
6-2. Installing Drive Rail and 3½-Inch Device Brackets	6-6
6-3. Installing a 3½-Inch Device.....	6-7
6-4. Installing a 5¼-Inch Device.....	6-9
6-5. Diskette Drive Data Cable Connections	6-11
6-6. IDE Drive Data Cable Connections	6-13
A-1. Main Logic Board Jumper Locations.....	A-10

Preface *P*

Introduction

This guide describes how to operate, configure, and upgrade DIGITAL PC 3010 computers. The information presented will help to familiarize you with all aspects of your computer 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* guide. This guide describes how to initially setup your computer.

A *Digital PC Systems Solutions* manual is available to help you troubleshoot your computer 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 computer. Your computer 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 computer. 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 computer. DIGITAL recommends that you read this information first.

Windows 95 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.windows.digital.com>

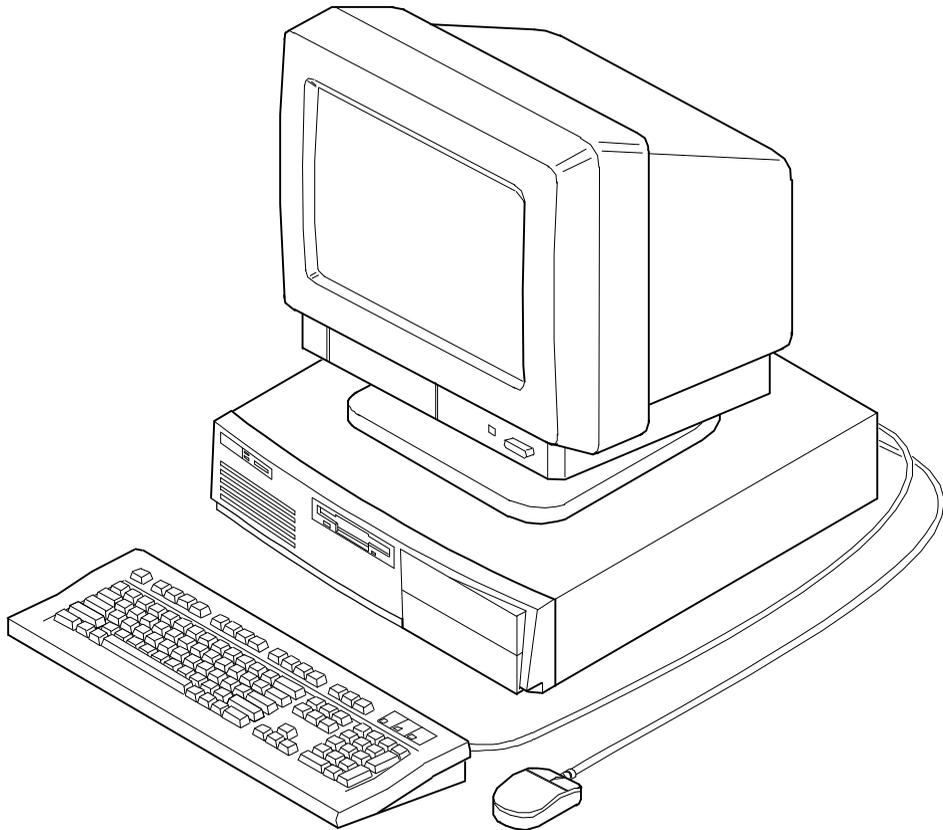
You can also access software updates through DIGITAL's Bulletin Board Service (BBS) by calling:

In the United States: (508) 496-8800

DIGITAL PC 3010 Computers

Your DIGITAL PC 3010 computer features:

- Low-profile enclosure with 100 W power supply
- ZIF Socket 7 compatible processors
- 256 KB level 2 cache
- Up to 256 MB of SDRAM (via two-unbuffered DIMM sockets)
- Unified Memory Architecture (UMA) for video buffering. This architecture enables the video frame buffer to be mapped into computer memory. No additional video memory is required.



DEC01283

Typical DIGITAL PC 3010 Computer

Audience

This guide is written specifically for anyone responsible for configuring and expanding a DIGITAL PC 3010 computer.

Organization

This guide contains the following:

- Chapter 1: *Beyond Quick Setup*— This chapter describes your computer's front and rear panel components, indicators, and connectors. This chapter also explains how to physically secure your computer to a desk or table, connect optional external devices (such as a printer, a USB device, etc.), use your computer's Windows enhanced keyboard, and create a comfortable working environment.
- Chapter 2: *Using the BIOS Setup Utility*—This chapter provides task-based information on how to configure your computer using the BIOS Setup utility.
- Chapter 3: *Inside Your Computer*—This chapter provides internal computer 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 computer memory and video 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 computer operating and performance specifications. Also included is information about your computer'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.
- Appendix C: *Video Output Information*—This appendix describes the video modes supported by your computer's video circuitry.

Conventions

Convention Example	Description
<i>Quick Setup</i>	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 computer 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.



NOTES: are used to provide additional information.

Beyond Quick Setup *1*

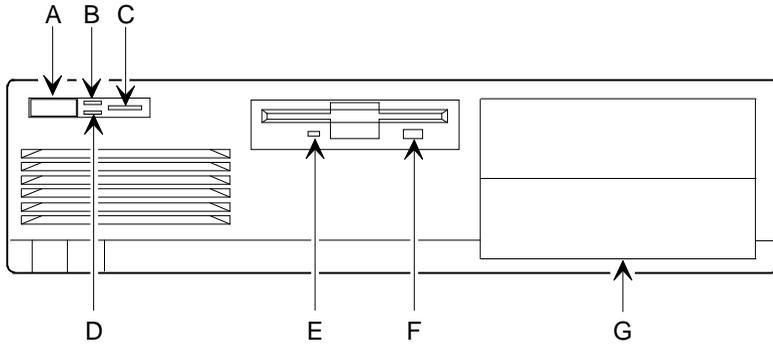
Introduction

This chapter describes your computer's front and rear panel components, indicators, and connectors. This chapter also explains how to physically secure your computer to a desk or table, connect optional external devices (such as a printer, a USB device, etc.), use your computer's Windows enhanced keyboard, and create a comfortable working environment.

Front Panel Controls and Indicators

Figure Legend	Control or Indicator	Function
A	On/off switch	Turns your computer's power on and off.
B	Power LED	Lights when your computer is turned on.
C	Reset switch ⁽¹⁾	Resets your computer and causes POST to run.
D	Hard disk drive activity LED	Lights when your hard disk drive is in use.
E	Diskette activity LED	Lights when the diskette drive is in use.
F	Diskette eject button	Releases a 3½-inch diskette from the diskette drive.
G	Drive bay(s)	Enables you to add additional mass storage device(s) to your computer.

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

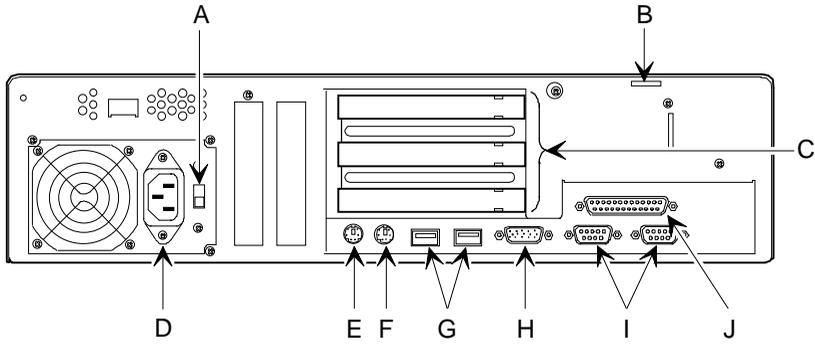


DEC01284-2

Figure 1-1. Front Panel Controls and Indicators

Rear Panel Connectors and Voltage Select Switch

Figure Legend	Connector or Switch	Function
A	Voltage select switch	Enables you to select 115 V ac input power or 230 V ac input power.
B	Chassis lockdown	Enables you to physically anchor your computer to a fixed location.
C	Expansion board slots	Enables you to install additional ISA and PCI expansion boards.
D	ac line connector	Enables you to connect your computer to an ac power source.
E	Keyboard connector	Enables you to connect a Windows enhanced keyboard.
F	Mouse connector	Enables you to connect a PS/2 style mouse.
G	USB ports	Enables you to connect Universal Serial Bus (USB) devices.
H	Video port (VGA connector)	Enables you to connect a high-resolution monitor to your computer.
I	Serial port connector(s)	Enables you to connect serial devices.
J	Parallel port connector	Enables you to connect a standard, Enhanced Parallel Port (EPP), or Enhanced Capabilities Port (ECP) parallel printer.



DEC01285-2

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

Removing your Computer's Outside Cover

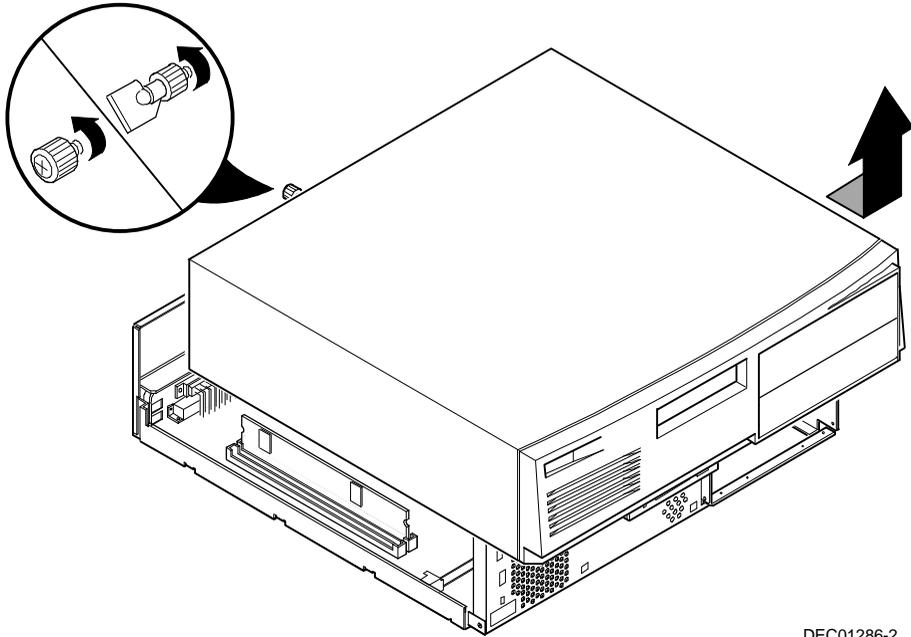
To remove your computer's outside cover:

1. Turn off power to all external devices connected to your computer.
2. Turn your computer off.
3. Unplug your computer and monitor power cord from the wall outlet.
4. For computers without a chassis lock, go to step 4a. For computers with a chassis lock, go to step 4b.
 - a. Release the outside cover by loosening the rear-panel thumbscrew.
 - b. Unlock the outside cover by inserting the key and turning it counter clockwise.
5. Slide the outside cover forward.
6. Carefully lift the outside cover away from the chassis.



CAUTION: 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 computer to discharge any static electricity.
- Keep circuit boards and components away from non-conductors.



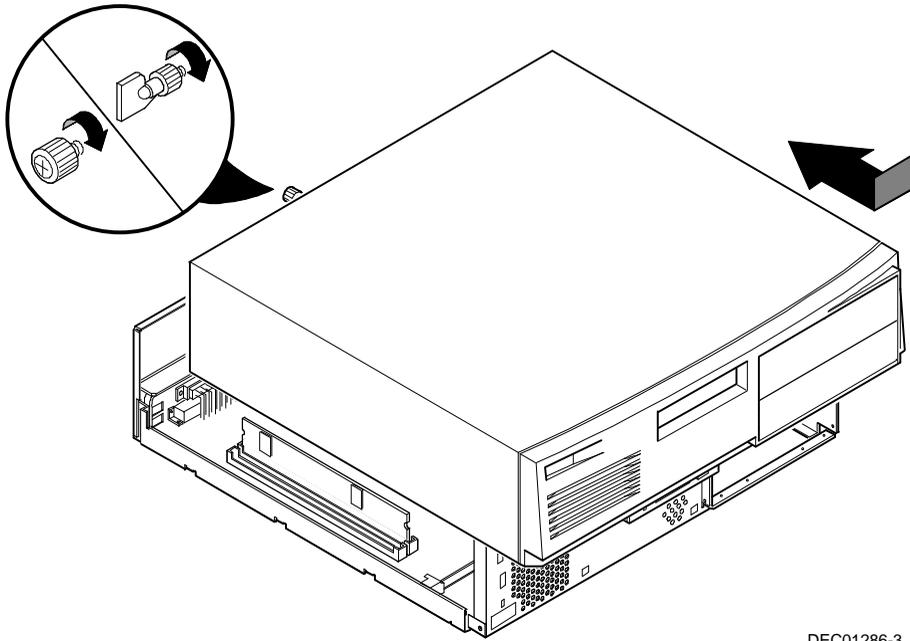
DEC01286-2

Figure 1-3. Removing the Outside Cover

Replacing your Computer's Outside Cover

To replace the outside cover:

1. Replace the outside cover by sliding it onto the chassis.
2. For computers without a chassis lock, go to step 2a. For computers with a chassis lock, go to step 2b.
 - a. Secure the outside cover to the chassis using the rear panel thumbscrew.
 - b. Secure the outside cover to the chassis by inserting the key and turning it clockwise.



DEC01286-3

Figure 1-4. Replacing the Outside Cover

Chassis Lockdown

A chassis lockdown hasp is located at the rear of your computer. It is secured to the outside cover with the hasp opening located near the top-right of the rear panel. When locked, the hasp prevents others from opening and removing the computer's outside cover. With the hasp in place, you can use a chain or cable lock to secure your computer.

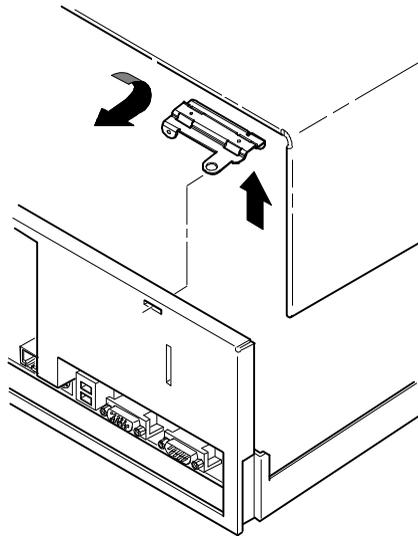
To secure your computer:

1. Turn off the power to all external devices connected to your computer.
2. Turn your computer off.
3. Unplug the computer power cord from the wall outlet.
4. Disconnect the power cord from your computer.
5. Remove the outside cover.

Attaching the Hasp

To attach the hasp:

1. Pull the hasp out from the clip at the rear edge of the cover and turn it around 180 degrees so the hasp is pointing out to the rear of the computer.
2. Insert the cover clip adjacent to the slot in the rear panel into the slots in the rib of the hasp.
3. Slide the hasp toward you and seat the rib atop the hasp securely to the outside cover.
4. Replace the outside cover, carefully sliding the hasp tab through the slot in the rear panel.
5. Connect the power cord to your computer and to a wall outlet.
6. Turn on your computer and then turn on all external devices.



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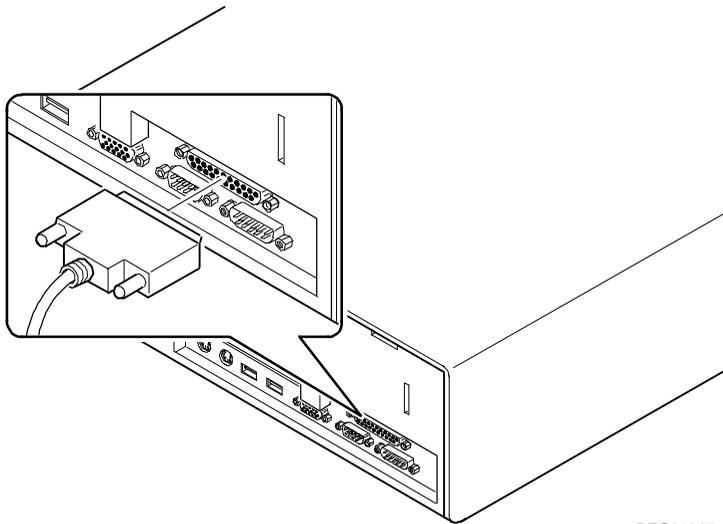
Figure 1-5. Attaching the Hasp

Connecting a Local Printer

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

1. Look over your printer documentation and perform any pre-installation instructions before attempting to connect it to your computer.
2. Make sure your printer and computer 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 your computer and printer on.
5. Configure your printer for operation with your computer.

Refer to your Windows 95 on-line help and printed documentation for instructions on installing your printer's device driver.



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Figure 1-6. Connecting a Local Printer

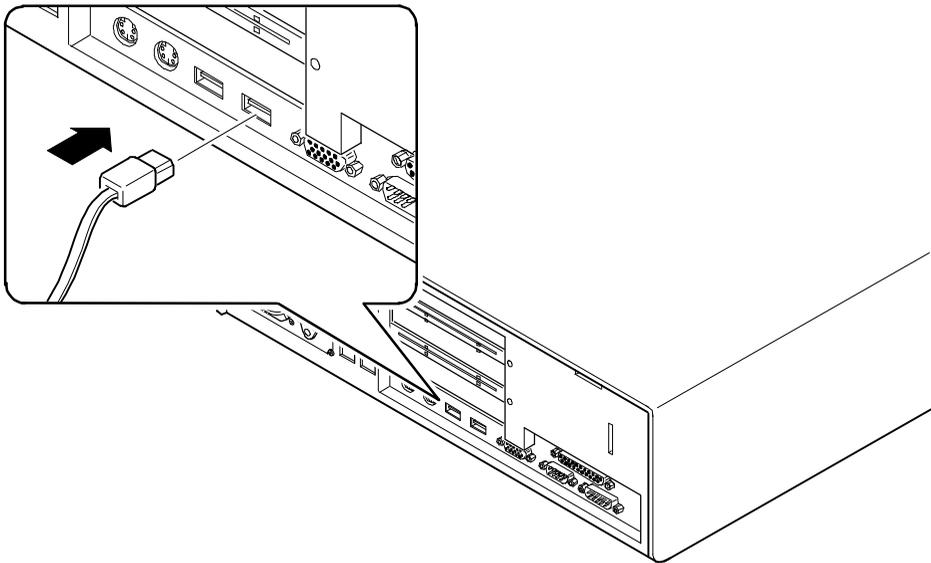
Connecting a Universal Serial Bus (USB) Device

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

If you purchased a USB device for your computer, 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 computer.

Refer to your manufacturer's documentation for installation instructions.



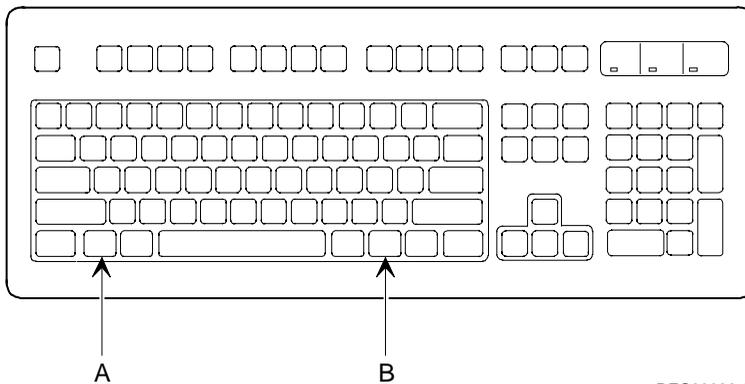
DEC01287-4

Figure 1-7. Connecting a USB Device

Your Computer's Windows Enhanced Keyboard

Your computer comes equipped with a 104-key Windows enhanced keyboard that enables you to communicate with your computer by entering data or commands.

The right and left Windows keys (A and B, Figure 1-8) 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 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 1-8. Windows Enhanced Keyboard

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:

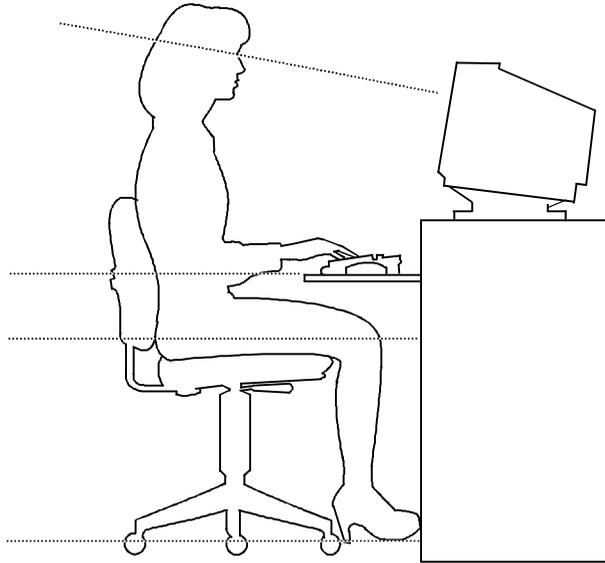
- Be comfortable in your work space.
- Change your posture frequently.
- Proceed according to the recommendations in the following table and figure.

Adjust	So . . .
Chair	<p>Feet are flat on the floor.</p> <p>Legs are vertical forming a right angle to the floor.</p> <p>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.</p> <p>Your upper body is erect and your lower back is supported with a backrest.</p>
Keyboard or mouse	<p>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.</p> <p>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.</p> <p>If you use a mouse, rest your hand on the mouse so your wrist is not on the work surface. Operate the mouse close to your body's centerline.</p>
Head	<p>Avoid neck strain. Your head should incline downward, but no more than 15 to 20 degrees.</p>

Beyond Quick Setup

Adjust	So . . .
Monitor	<p>No higher than the level of your eyes and at the correct distance for your vision.</p> <p>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.</p>
Work breaks	<p>Take periodic work breaks. Morning, lunch, and afternoon breaks during the 8-hour workday meet most recommendations. Take advantage of work breaks to move around and do other activities.</p>
Lighting	<p>Avoid direct lighting or sunlight on the screen, which causes glare and reflections. Place lighting behind or to the side of your work area, and distribute the lighting evenly on your work area.</p> <p>Your computer monitor's screen has an antiglare treatment to reduce glare. Adjust the brightness and contrast controls as needed.</p>
Noise	<p>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.</p>
Temperature	<p>20 to 23 degrees C (68 to 74 degrees F).</p>
Humidity	<p>30% to 70%.</p>
Ventilation	<p>Provide adequate air ventilation to avoid fatigue and to operate the equipment.</p>
Space between set ups	<p>> 70 cm (28 in.) center to center, preferably > 152 cm (60 in.).</p>

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 1-9. 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 computer's hardware and software in the battery-backed memory of the CMOS RAM. This information takes effect each time the computer 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 or if you need to reconfigure or expand your computer.

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



CAUTION: Your computer 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 computer's factory settings. Changing some settings might cause your computer to operate improperly.

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

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

Using the BIOS Setup Utility

- Change the boot options
- Reconfigure power management
- Increase your computer's frame buffer size

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

- Upgrading hardware (such as adding a new hard 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 computer'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 computer and allow the Power-On Self Test (POST) to run.
2. Make a note of any configuration errors listed, and then press [F2], when displayed, to access the Main menu.
3. Follow the instructions on your monitor screen and any on-line help pop-up screens to configure you computer.

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, and are listed in the following table.

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 (Sets all Setup options to factory default values)
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 Computer's Configuration

The following sections provide detailed information on changing your computer'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 computer's BIOS. The following directions show you how this is done.

1. Reboot the computer 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 computer to reboot.

Setting Up Security

Computer security is important to prevent theft or accidental loss of your computer software and data. The following sections describe the BIOS security features available and how to use them.

Setting Supervisor and User Passwords

Your computer has two password levels that can be set to prevent unauthorized access to computer files or to the BIOS Setup utility. If a supervisor password is set, the computer 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 enabled, you need to enter either the supervisor or user password to use the computer. Password on boot limits who accesses the computer and the 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, Advanced, Boot, 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 computer 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].

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].

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

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

If you forget your password, refer to Appendix A “Technical Specifications” 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 password or user password to allow your computer to finish the boot sequence.

Perform the following steps to set “Password On Boot”:

1. Reboot the computer 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 computer so changes immediately take affect.

Eliminating User and Supervisor Passwords

To eliminate your computer’s password(s), follow the directions given below:

1. Reboot the computer 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 computer so changes immediately take affect.

Protecting Against Boot Sector Viruses

Your computer incorporates, in the BIOS Setup utility, selections to protect the BIOS from attacks by viruses.

Fixed Disk Boot Sector

By write-protecting the boot sector, you can protect your computer 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 computer 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 computer to normal).
5. Press [Esc] then [Enter] twice to exit the BIOS Setup utility and to reboot the computer so changes immediately take affect.

Other Security Options

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

- 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 computer from accessing a diskette.



CAUTION: Consider your security needs before using the “Password on Boot” option. While this option is enabled, the contents of the hard disk drive cannot be backed up to diskettes and the computer cannot be booted from a diskette drive.

- *Diskette Access* – This option works in conjunction with the “Password On Boot” setting and can be set to prevent information on the computer’s hard disk drive from being copied to a diskette.

When this option is set to “User” and “Password on boot” is disabled, all users can copy to and from a diskette. When this option is set to “Supervisor” and “Password on boot” is disabled, no one can copy to and from a diskette.

When the “Password on boot” option is enabled and “Diskette Access” is set to “User”, all users can copy to and from a diskette. When this option is set to “Supervisor” and “Password on boot” is enabled, users who log on with a user password cannot copy to and from a diskette; users who log on with a supervisor password can copy to and from a diskette.

- *SETUP Prompt* – Found in the “Main” menu under “Boot Options,” this feature allows disabling the [F2] Setup prompt during the boot sequence. Although this feature does not prevent entering setup if you know the setup key, it will help prevent infrequent users from accessing Setup. This feature could prove useful in a school or retail setting.

Toggle the Setup prompt field (press the [+] key) back to Enabled in the “Boot Options” to redisplay the [F2] Setup prompt during the boot sequence.

Setting Power Management Options

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

Setting up Power Management



NOTE: None of the power management features available in the BIOS Setup utility apply unless the “Power Savings” field is set to one of the power saving options. If the Power Savings field is set to “Disabled” no Power Savings options will be applied.

To initialize the power management features:

1. Reboot the computer and enter Setup.
2. Highlight the “Power” menu.
3. Highlight “Power Savings.”

Using the BIOS Setup Utility

4. Press the [+] key to select one of the available options:
 - Maximum Power Savings $\frac{3}{4}$ settings that conserve the greatest amount of system power
 - Maximum Performance $\frac{3}{4}$ settings that conserve power, while allowing the greatest system performance
 - Customized $\frac{3}{4}$ allows customization of the settings as desired
 - Disabled $\frac{3}{4}$ turns off power management options



NOTE: “Standby Timeout” and “Auto Suspend Timeout” have been preset. By selecting the Customized option, you can change these times by selecting them and pressing the [+] key to sequence through the available options.

In “Standby” mode, peripheral components are put in their lowest active states in addition to reducing the processor speed after the set period of inactivity.

In “System Suspend” mode, peripheral components are shut off, and the CPU speed is further reduced after the set period of inactivity.

5. Choose other Power Standby options as desired.
6. Press [Esc] then [Enter] twice to exit the BIOS Setup utility and to reboot the computer so changes immediately take affect.

Increasing Your Computer's Video Memory

Your computer supports Unified Memory Architecture (UMA) for video buffering. This advanced architecture allows you to map a variety of frame buffer sizes into your computer's memory. UMA replaces traditional video memory by allowing computer memory to be allocated for the video. To increase the amount of memory allocated for video, follow these steps:

1. Reboot the computer and enter Setup.
2. Highlight the "Advanced Settings" menu.
3. Highlight "Video Share Memory."
4. Press the [+] key to select the desired frame buffer size.
5. Press [Esc] then [Enter] twice to exit the BIOS Setup utility and to reboot the computer so changes immediately take affect.

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 computer and enter Setup.
2. Highlight the Main menu.
3. Highlight “Legacy Diskette A” or “Legacy Diskette B” (depending upon how you connected the diskette drive to your computer).
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 computer so changes immediately take affect.

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 computer and enter Setup.
2. Highlight the "Main" menu.
3. Select a "Primary Master/Slave" or "Secondary Master/Slave" field to assign the new hard disk and press [Enter].
4. Change drive type to "Auto."
5. Press [Esc] once to return to the "Main" menu.
6. Press [Esc] once then [Enter] twice to exit the BIOS Setup utility.



NOTE: The BIOS includes an "Autodetect" feature that identifies a newly installed IDE hard disk drive, provided the drive type is set to "Auto" at the time of installation. In addition, if the CMOS is lost, Autodetect allows the computer to identify the installed hard disk drives automatically upon CMOS reset.

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 computer and enter Setup.
2. Highlight the "Main" menu.
3. Select a "Primary Master/Slave" or "Secondary Master/Slave" field to assign the new hard disk and press [Enter].
4. Select the "Type" field and press the [+] key to select "User."
5. Fill-in the parameters of the hard disk in the appropriate fields.
6. Press [Esc] once and verify that the selected "Primary Master/Slave" or "Secondary Master/Slave" field reads correctly for your hard disk. For example: "Primary Master (1282 MB)".
7. Press [Esc], then [Enter] twice to exit the BIOS Setup utility.

Changing the Boot Sequence

It is sometimes necessary to change your computer's boot sequence. To change the boot sequence, proceed as follows:

1. Reboot the computer and enter Setup.
2. Highlight the "Boot" menu.
3. Select "Boot Device Priority" and press [Enter].

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

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

5. If your computer has more than one hard disk drive or you wish to boot from a networked hard drive, use the "Hard Drive" menu to set the boot order for available hard disk drives. Select the "Hard Drive" choice on the "Boot" menu. Use the [-] and [] arrows to locate the field you want to change. Then use the [+] to raise the order and [-] to lower it.
6. Press [Esc] twice then [Enter] twice to exit the BIOS Setup utility and to reboot the computer so changes immediately take effect.

When changing the boot sequence, be aware of the following:

- Some CD-ROM drives do not auto-type correctly. This will be apparent during POST, when the CD-ROM identified message is not displayed. In this case, enter BIOS Setup and manually select the hard disk type for the CD-ROM, instead of allowing Setup to auto-type it.
- Many advanced operating systems, such as Windows 95, Windows NT, OS/2 Warp, UNIX, and others, modify the boot sector of any hard disk drives that are installed in the computer, while the operating system is being installed. This can cause normally bootable hard disk drives to be rendered non-bootable, even though the user did not want this behavior.

In systems where there are two or more bootable hard disk drives, it is recommended that all bootable hard disk drives, other than the target of the new operating system, be removed from the computer before installing the new operating system.

Once installation of the new operating system is complete, the other hard disk drives can then be reinstalled. This simple procedure prevents the operating system from modifying the boot sectors of the other bootable drives, thus preserving the capability of choosing one of several hard disk drives from which to boot.

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 computer 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
Floppy check	Verifies the floppy boot drive.
Summary screen	Displays the computer's configuration, when enabled.
Quiet boot	Displays the POST boot messages during boot, when enabled. When disabled, displays the DIGITAL logo.

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

Field	Speed Up Boot Selection
Floppy check	Disable
Summary screen	Disable
Quiet boot	Disable

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

Flash Utility

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

Your computer comes equipped with flash memory. This means that you can restore your computer's BIOS simply by running the flash utility. If necessary, you can also upgrade your computer'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 computer's BIOS if you are instructed to do so by an authorized DIGITAL support representative. You can download BIOS updates along with the flash utility and instructions on how to flash your computer's BIOS from the Internet or DIGITAL's Bulletin Board Service (BBS).

Refer to the "Preface" for additional access information.

Inside Your Computer **3**

Introduction

This chapter shows the location of your computer's internal components. Expansion information is also covered in this chapter along with illustrations detailing the:

- Main logic board
- Backplane

Each computer 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 a higher-performance processor

Improving Computer Performance

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

- Installing additional computer memory
- Upgrading your hard disk drives
- Installing a higher performance main logic board design

Preparing Your Computer for Expansion

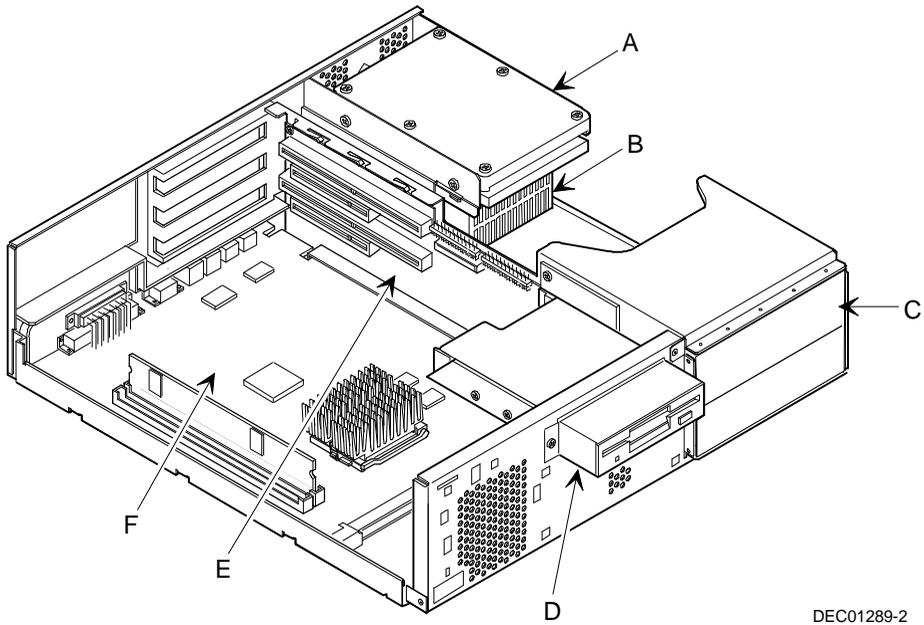
Before you begin to expand your computer, refer to Chapter 1, “Beyond Quick Setup,” for instructions on preventing component damage from static electricity, disconnecting external devices, and removing the outside cover.

Your Computer’s Components and Connectors

The following sections show your computer’s main logic board and backplane component and connector locations. Use the information presented anytime you need to connect external devices, expand, or upgrade your computer.

Computer Components

Figure Legend	Component
A	Internal 3½-inch drive bay(s)
B	Power supply
C	Front access 5¼-inch drive bays
D	3½-inch diskette drive
E	Backplane
F	Main Logic Board (MLB)



DEC01289-2

Figure 3-1. Computer Components

Main Logic Board Components and Connectors

Figure Legend	Component
A	Computer flash and video BIOS
B	Computer battery
C	Fan connector (User option)
D	Onboard 256 KB pipeline burst cache
E	Pentium processor (CPU) socket
F	Two 168-pin, DIMM, 64-bit SDRAM sockets
G	SiS 5597 Pentium PCI/ISA controller
H	Super I/O controller

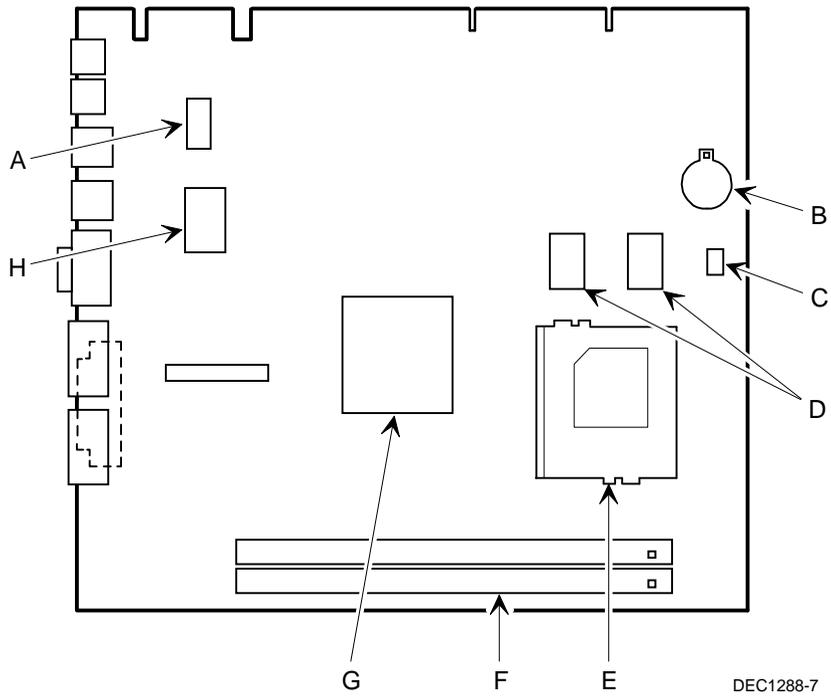
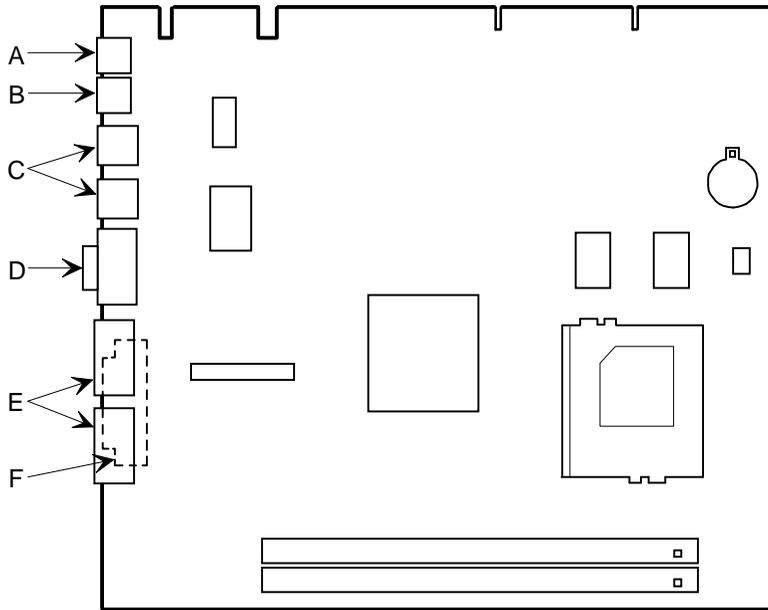


Figure 3-2. Main Logic Board Components and Connectors

Main Logic Board Connectors (Rear Panel)

Figure Legend	Connector
A	Keyboard port
B	Mouse port
C	Two USB ports
D	Video (VGA) port
E	Serial ports
F	Parallel port



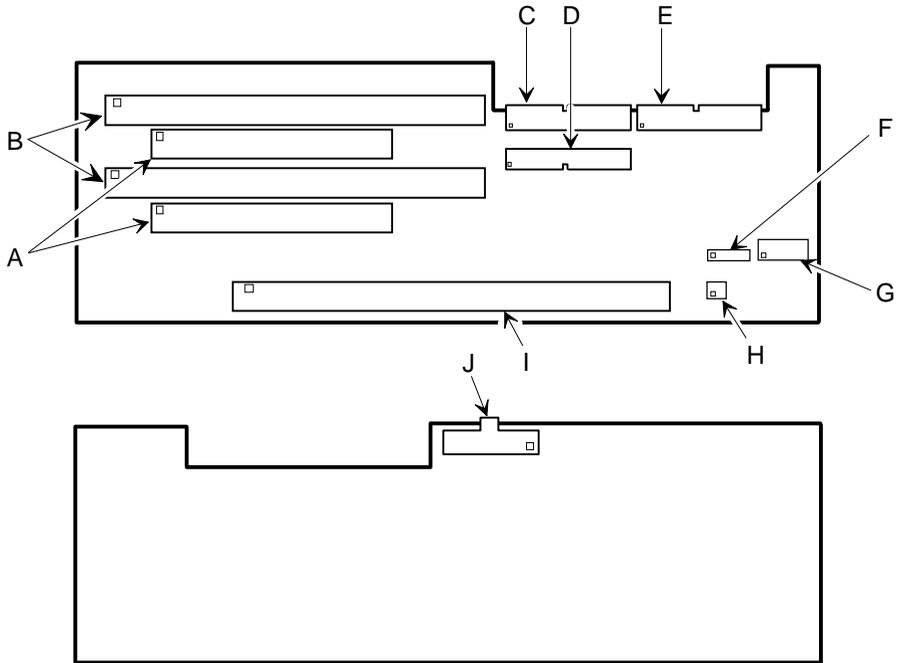
DEC01288-2

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

Backplane Components and Connectors

Figure Legend	Connector
A	PCI expansion board connectors
B	ISA expansion board connectors
C	Primary IDE drive connector
D	Secondary IDE drive connector (recommended for an installed CD-ROM drive)
E	Diskette drive connector
F	SCSI activity connector ⁽¹⁾
G	Control panel connector
H	Fan connector (User option)
I	Main logic board connectors
J	Power connector

(1) The SCSI activity connector is for use only when installing a SCSI drive. This allows SCSI activity to be display on the front panel.



DEC01295-2

Figure 3-4. Backplane Components and Connectors

Removing the Main Logic Board

To remove the main logic board:

1. Turn off your computer and monitor.
2. Disconnect all external devices, ac power, and monitor power.



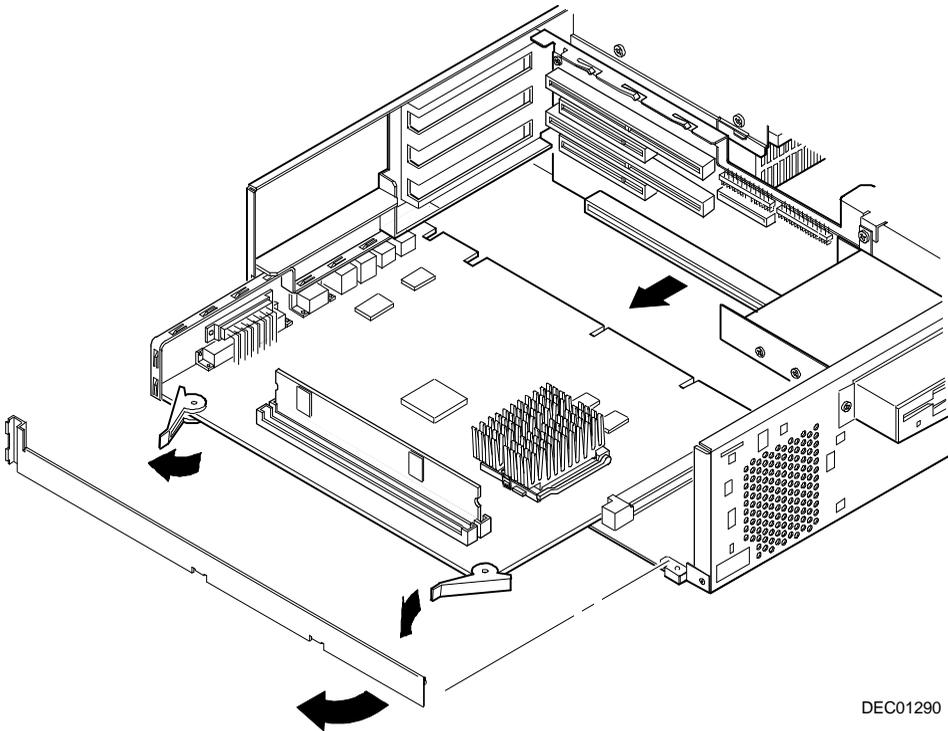
WARNING: Make sure you disconnect the power cords from the computer and monitor or the power cords from the power outlets. When only the front panel switches are turned off, dc logic voltage is still present.

3. Remove the outside cover.
4. Swing the brace away from the chassis.
5. If necessary disconnect the CPU fan connector from the main logic board.
6. Pull out on the two latches attached to the main logic board.
This separates the main logic board from the backplane.
7. Carefully remove the main logic board from the chassis.

Replacing the Main Logic Board

To replace the main logic board:

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 brace.
3. Replace the outside cover.
4. Connect all external devices, ac power, and monitor power.



DEC01290

Figure 3-5. Removing the Main Logic Board

Replacing the Lithium Battery

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

To replace the Lithium battery, perform the following:

1. Record your computer's configuration settings using the BIOS Setup utility.
2. Turn off your computer and monitor.
3. Disconnect all external devices, ac power, and monitor power.
4. Remove the outside cover.
5. Lift the retaining clip slightly and push on the battery from the side to slide it out.



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.

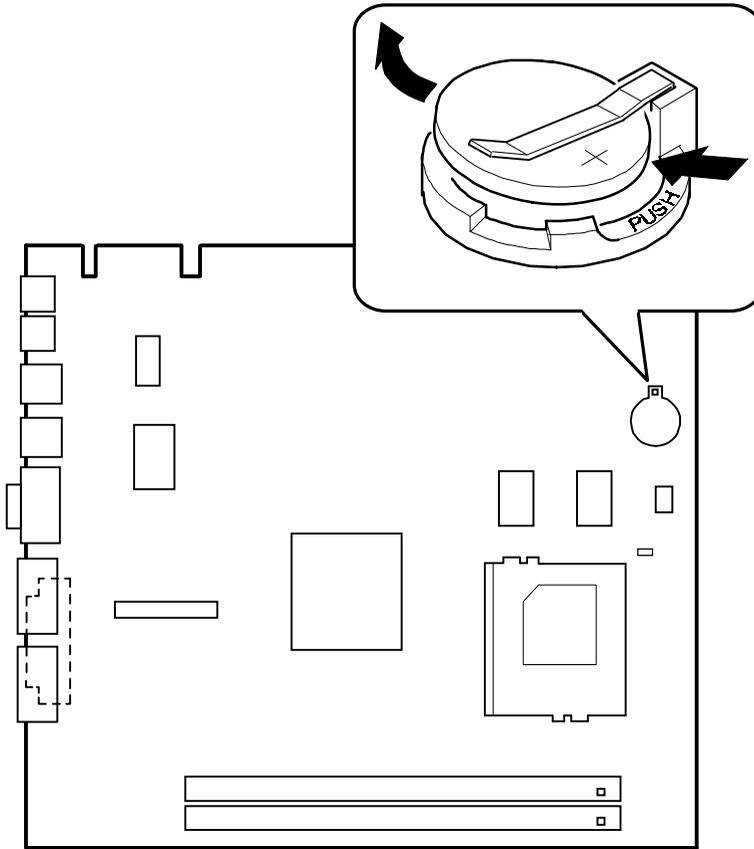
Depending on your locality, your computer's battery might be considered hazardous waste. Make sure you follow any state or local statute to properly dispose of the old battery.

6. Install the new battery.

When installing the new battery, make sure the "+" side faces up.

7. Replace the outside cover.
8. Connect all external devices and restore power.
9. Run the BIOS Setup utility to reconfigure your computer using the recorded configuration settings from step 1.

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



DEC01288-5

Figure 3-6. Replacing the Battery

Installing a Higher Performance Processor

Your computer comes with ZIF Socket 7 compatible processor. Improving overall performance is based on your computer's main logic board design, the amount of L2 cache and computer memory, the video controller type, as well as the performance characteristics of the installed hard disk drive(s). The following main logic board information is important when selecting a higher performance processor:

- SiS 5597 Pentium PCI/ISA controller
- Switch selectable processor clock input frequencies up to 233 MHz (refer to Appendix A for jumper settings)
- Onboard 256 KB L2 cache

When you upgrade the processor, you might need to set a jumper to properly configure your computer for the correct processor voltage (refer to Appendix A for jumper settings).



NOTE: Processor upgrades and voltage requirements change over time. The following table lists Socket 7 compatible processors and required voltages at the time this manual was released.

Processor Type	Clock Speeds	Nominal Voltage
Intel Pentium (P54C)	120/133 MHz	3.3 V dc
	166/200 MHz	3.52 V dc
AMD-K5	All speeds	3.52 V dc
Intel Pentium MMX (P55C)	166/200 MHz	2.8 V dc
AMD-K6	166/200 MHz	2.9 V dc

To install a higher performance processor:

1. Turn off your computer and monitor and then disconnect all external devices, monitor power, and ac power.



CAUTION: 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 computer to discharge any static electricity.
 - Keep circuit boards and components away from non-conductors.
2. Remove the outside cover.
 3. If necessary, disconnect the CPU fan connector from the main logic board.
 4. Using a small screwdriver, release the retaining clip on the heat sink.
Use caution so as to avoid damaging the main logic board.
 5. Separate the heat sink from the processor.
 6. Lift the lever up and out to release the processor.

7. Install the new processor.

Make sure pin 1 on the processor is aligned with pin 1 on the ZIF socket (A, Figure 3-7).

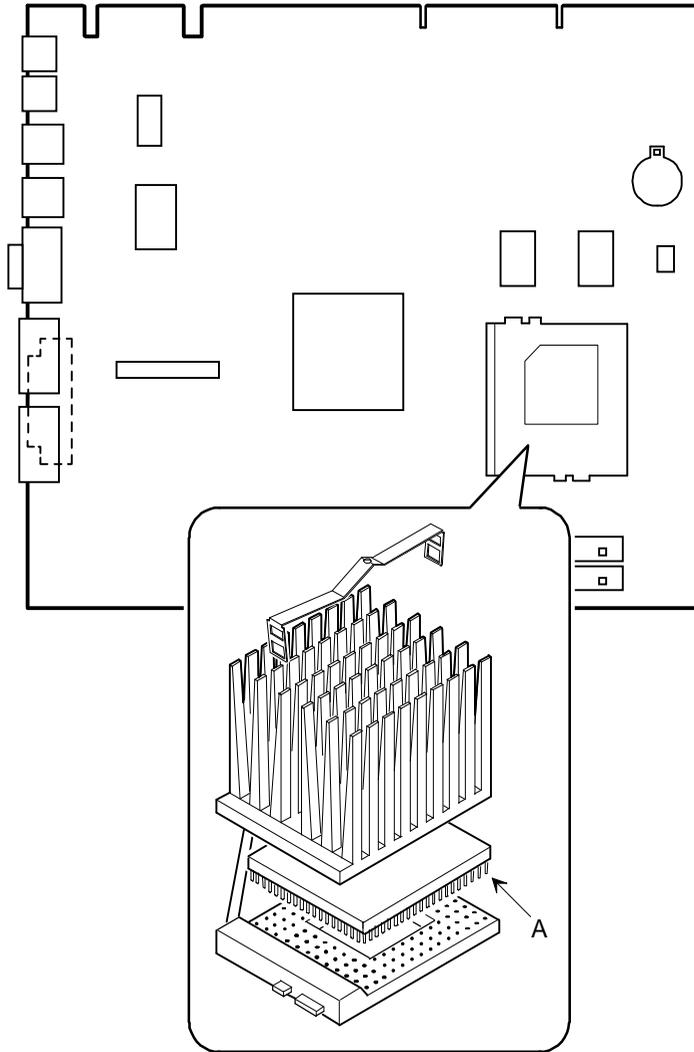
Once the new processor is in place, return the release lever to its original position.

8. Clean the bottom of the heat sink with a clean cloth dampened with isopropyl alcohol.
9. Spread a smooth thin coat of thermal compound on the bottom of the heat sink.



CAUTION: Make sure the coating is thin enough so the thermal compound does not ooze out.

10. Install the heat sink on the processor and then replace the heat sink clip to secure the heat sink.
11. If necessary, connect the CPU fan connector on the main logic board.
12. Set all appropriate processor jumpers on the main logic board.
Refer to Appendix A, "Technical Specifications," for jumper locations.
13. Replace the outside cover, reconnect all external devices, and then restore power.



DEC01288-4

Figure 3-7. Installing a Higher Performance Processor

Main Logic Board Expansion

4

Introduction

This chapter provides detailed instructions on installing additional computer memory

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

Installing Additional Computer Memory

Your computer supports 168-pin DIMM memory modules utilizing Synchronous Dynamic Random Access Memory (SDRAM) technology. SDRAMs operate at speeds of 66 MHz (or greater) over a local memory bus, which is much faster than SIMMs using ECC or EDO memory.

Your computer came with 16 MB of computer memory. Adding more memory enables your computer to run larger, more complicated software and run it more quickly. DIMMs are available in 16 MB, 32 MB, 64 MB, and 128 MB memory module sizes to expand your computer memory up to 256 MB. Contact your local DIGITAL sales representative for ordering information.

Computer memory is installed using the two DIMM sockets located on the main logic board as shown in Figure 4-1. Sockets J2 and J3 can accept either single or dual bank DIMMs.

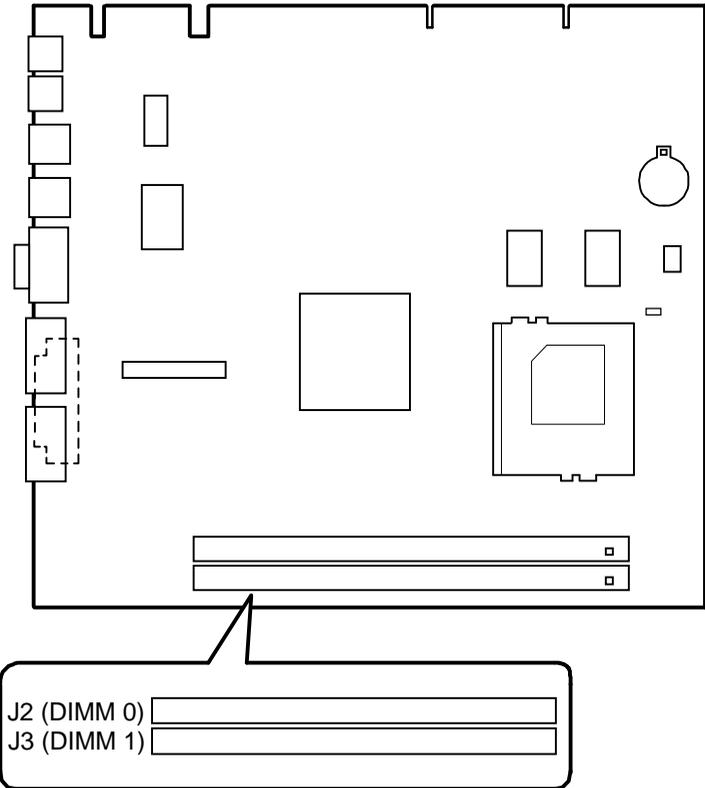
When adding memory make sure you reference the memory configuration table and follow these memory expansion guidelines:

- Install 168-pin DIMMs using 66 MHz (or faster), 64-bit SDRAMs.



NOTE: Install DIMMs supplied by Digital Equipment Corporation and qualified vendors. DIGITAL does not support computer performance, product warranty, or service calls resulting from installation of non-qualified DIMMs.

- Single bank DIMMs are available in 16 MB and 64 MB memory modules. Single bank DIMMs have memory chips on only one side of the module.
- Dual bank DIMMs are available in 32 MB and 128 MB memory modules. Dual bank DIMMs have memory chips on both sides of the module.
- Memory sockets J2 and J3 support both single and dual bank DIMMs.
- If populating only one DIMM socket, DIMM0 must be used. If DIMM1 socket is populated and not DIMM0, the system will not function properly.



DEC01288-3

Figure 4-1. DIMM Socket Locations

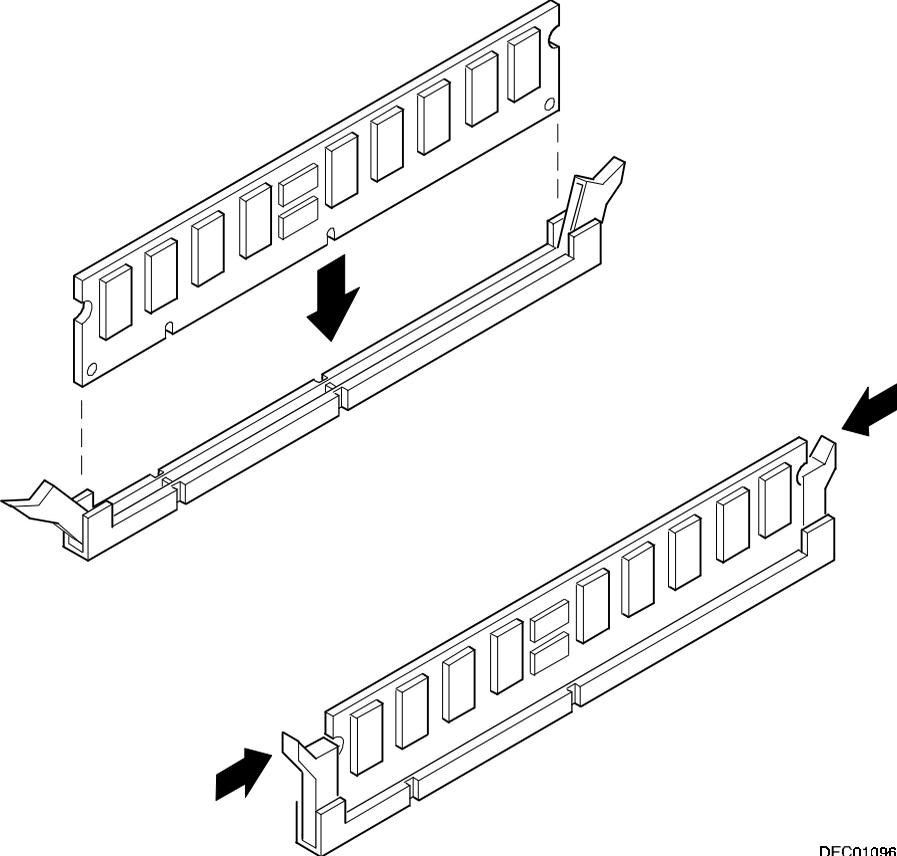
Memory Configurations

DIMM 0 Socket J2	DIMM 1 Socket J3	Total
16 MB		16 MB
16 MB	16 MB	32 MB
32 MB		32 MB
32 MB	16 MB	48 MB
32 MB	32 MB	64 MB
64 MB		64 MB
64 MB	16 MB	80 MB
64 MB	32 MB	96 MB
64 MB	64 MB	128 MB
128 MB		128MB
128 MB	16 MB	144 MB
128 MB	32 MB	160 MB
128 MB	64 MB	192 MB
128 MB	128 MB	256 MB

Installing a DIMM

To install a DIMM, perform the following:

1. Turn off your computer and monitor.
2. Disconnect all external devices, ac power, and monitor power.
3. Remove the outside cover.
4. Align the notches on the DIMM with the key notches in the socket.
5. Insert the DIMM straight down into the socket as shown.
Push down firmly on the DIMM until the two plastic clips snap into place.
6. Replace the outside cover.
7. Connect all external devices and restore power.



DEC01096

Figure 4-2. Installing a DIMM

Adding Expansion Boards 5

Introduction

Your computer's 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 computer. With Plug and Play, your computer'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 95, your computer automatically assigns the necessary resources to any installed Plug and Play-compatible expansion board so it operates at maximum performance.

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

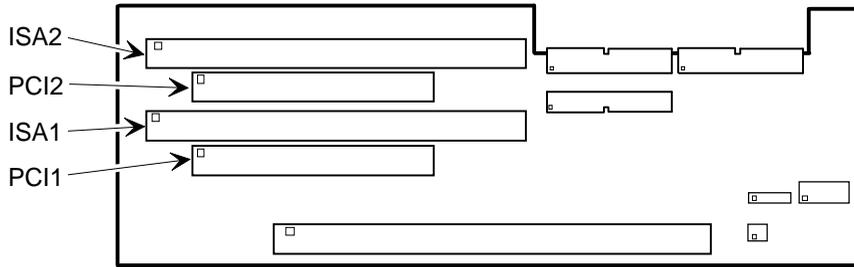
Expansion Slots

Your computer's low profile backplane contains four connectors for installing up to three expansion boards:

- Two ISA expansion boards and one PCI expansion board or
- One ISA expansion board and two PCI expansion boards (refer to the table).

Expansion Slot Designation	Description
ISA2	Supports half-length industry-standard 16-bit ISA expansion boards Uses the top expansion slot at the rear panel
PCI2	Supports full-length 32-bit PCI local bus expansion boards Uses the middle expansion slot at the rear panel Designated as a shared slot with ISA slot ISA1 ⁽¹⁾
ISA1	Supports full-length industry-standard 16-bit ISA expansion boards Uses the middle expansion slot at the rear panel Designated as a shared slot with PCI slot PCI2 ⁽¹⁾
PCI1	Supports half-length 32-bit PCI local bus expansion boards Uses the bottom expansion slot at the rear panel

⁽¹⁾ Only one expansion board can reside in slot PCI2 and ISA1 at any one time. These slots have to share the middle expansion slot opening at the rear panel, thus, a maximum of three expansion boards can be supported at any one time.



DEC01295-3

Figure 5-1. Expansion Board Slots

Installing Expansion Boards

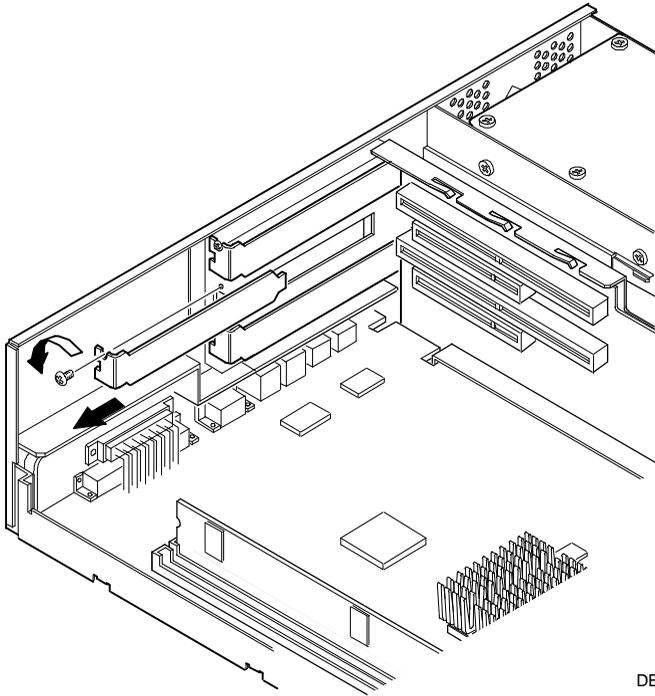
To install an ISA or PCI local bus expansion board:



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 computer and monitor.
2. Disconnect all external devices, ac power, and monitor power.
3. Remove the outside cover.
4. Unscrew the metal filler plate(s) from the selected expansion slot.

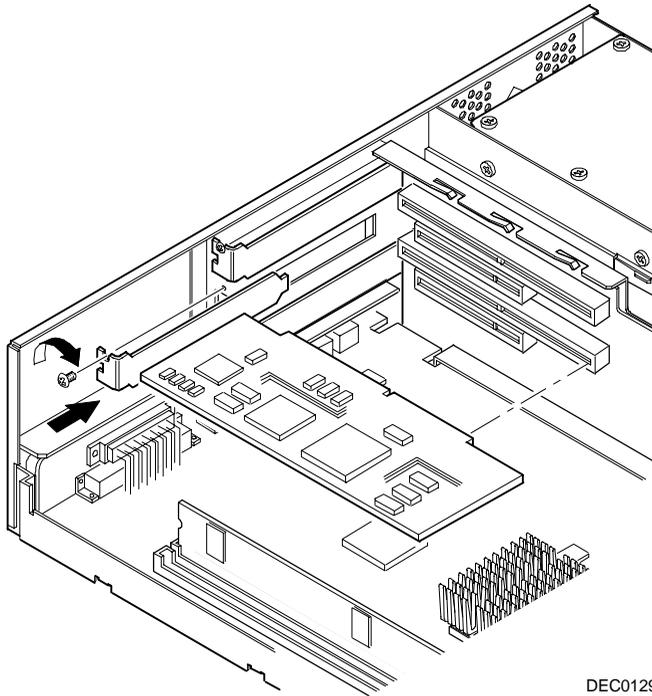


DEC01291-2

Figure 5-2. Removing a Metal Filler Plate

Adding Expansion Boards

5. Insert the new expansion board into the socket.
Push the expansion board firmly into place.
6. Secure the expansion board to the slot with the screw removed in step 4.
7. Replace the outside cover.
8. Connect all external devices and restore power.



DEC01291-3

Figure 5-3. Installing an Expansion Board

Removing Expansion Boards

If you remove a legacy expansion board or remove an expansion board from a computer running Windows NT Workstation, run the ICU. Use the ICU bootable diskette with Windows NT Workstation. Windows 95 users removing legacy expansion boards can use the ICU that is integrated into Windows 95. You can then remove the expansion board from the ICU Configuration menu and thereby free up resources listed in the ICU database.

Windows NT Workstation users should use the ICU program diskette (provided as a disk image on the DIGITAL System Software CD) to run the ICU.

For information on creating an ICU diskette, see the System Software documentation.

Adding Mass Storage Devices

6

Introduction

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



NOTE: Your computer'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.

Adding Mass Storage Devices

Before adding mass storage devices to your computer, 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 computer has two Enhanced IDE (EIDE) drive interface connections labeled “primary” and “secondary” located on the computer backplane.
 - Each IDE drive interface connector supports a maximum of two IDE devices. One device is designated a master and one a slave via jumpers on the IDE drive.
 - 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 should 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 computer has its device ID set to 0.
4. Run the BIOS Setup utility to configure your computer so it recognizes the newly installed mass storage devices.



NOTE: The BIOS includes an “Autodetect” feature that will identify a newly installed IDE hard disk drive, provided the drive type is set to “Auto” at the time of installation. Verify this setting before installing a new IDE hard disk drive. Refer to Chapter 2, “Using the BIOS Setup Utility,” for more information.

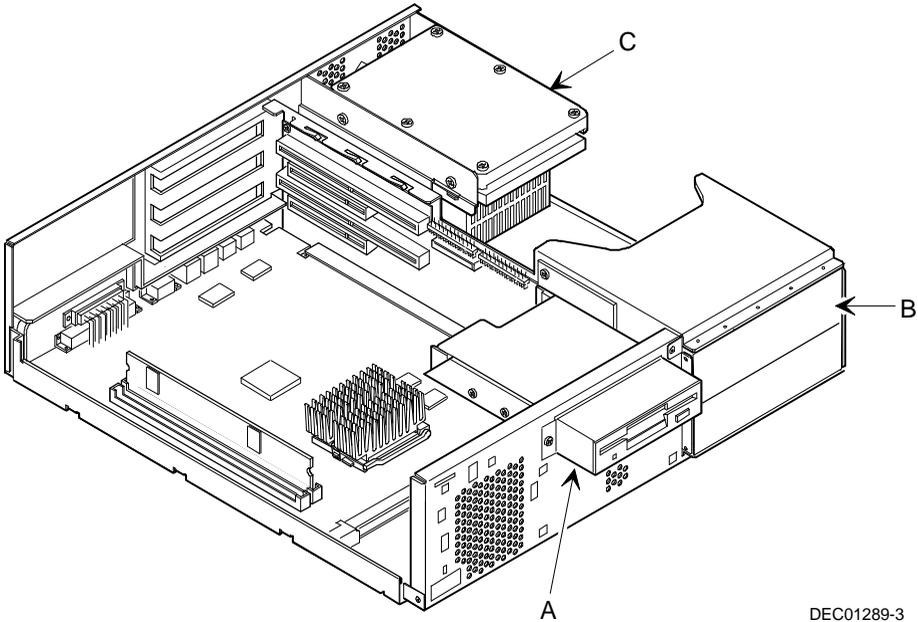
Also, depending on which operating system is installed on your computer, you might be prompted to perform additional installation procedures for CD-ROM or tape backup devices.

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

Installing Mass Storage Devices

Your computer contains four mass storage device bays:

- The middle-front device bay contains a factory installed 3½-inch diskette drive (A, Figure 6-1).
- The bottom-right device bays are accessible from the front of the computer and can hold 3½-inch or 5¼-inch half-height devices (B, Figure 6-1). For example, a diskette drive, CD-ROM, tape backup drive, or hard disk drive.
- The rear device bay (on top of the power supply) is not accessible from the front of the computer. This bay contains a factory installed 3½-inch hard disk drive (C, Figure 6-1).



DEC01289-3

Figure 6-1. Storage Device Bay Locations

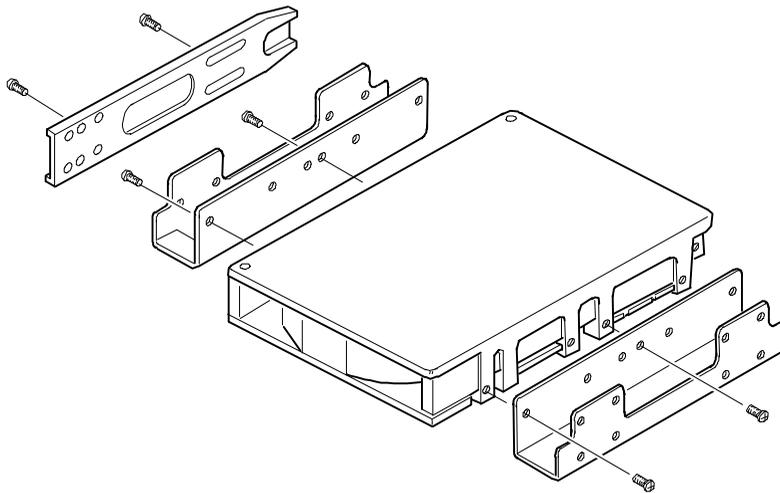
Installing a 3½-Inch Device

The following procedures describe how to install a 3½-inch device into the bottom-right 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.

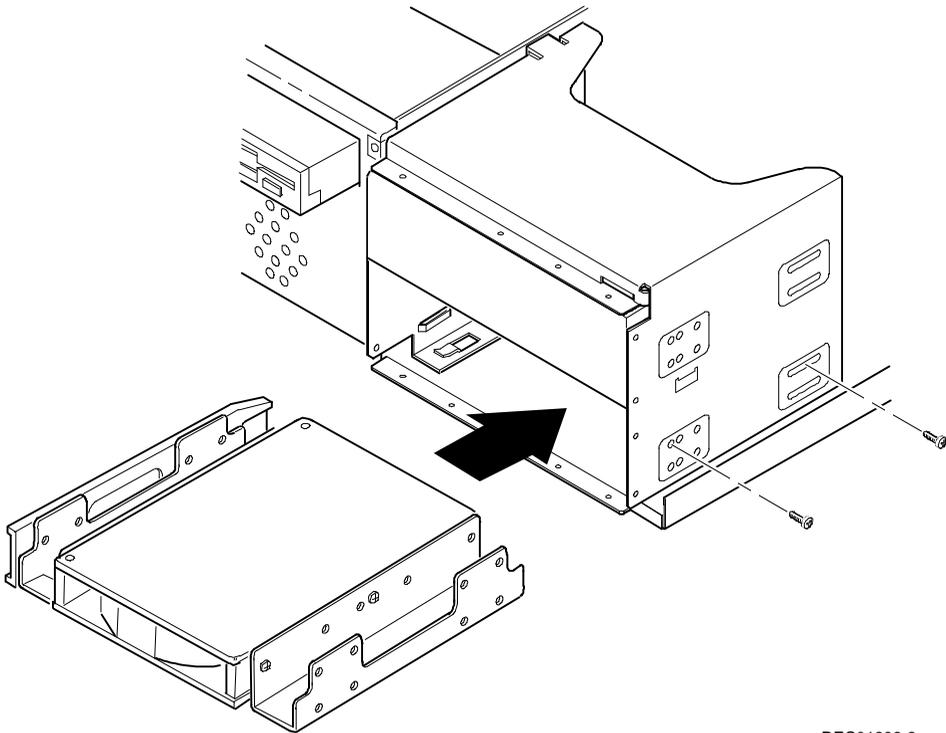
1. Turn off your computer and monitor.
2. Disconnect all external devices, ac power, and monitor power.
3. Remove the outside cover and if necessary, remove the filler panel.
4. Remove the EMI shield filler plate and the drive rail from the inside of the chassis.
5. Install the brackets and the drive rail onto the 3½-inch device.



DEC00723

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

6. Carefully slide the 3½-inch device into the device bay.
Secure the device using the supplied mounting screws.
7. If necessary, replace the filler panel.
8. Connect the power and data cables to the 3½-inch device.
Refer to "Connecting Diskette and IDE Devices" later in this chapter.



DEC01292-2

Figure 6-3. Installing a 3½-Inch Device

Installing a 5¼-Inch Device

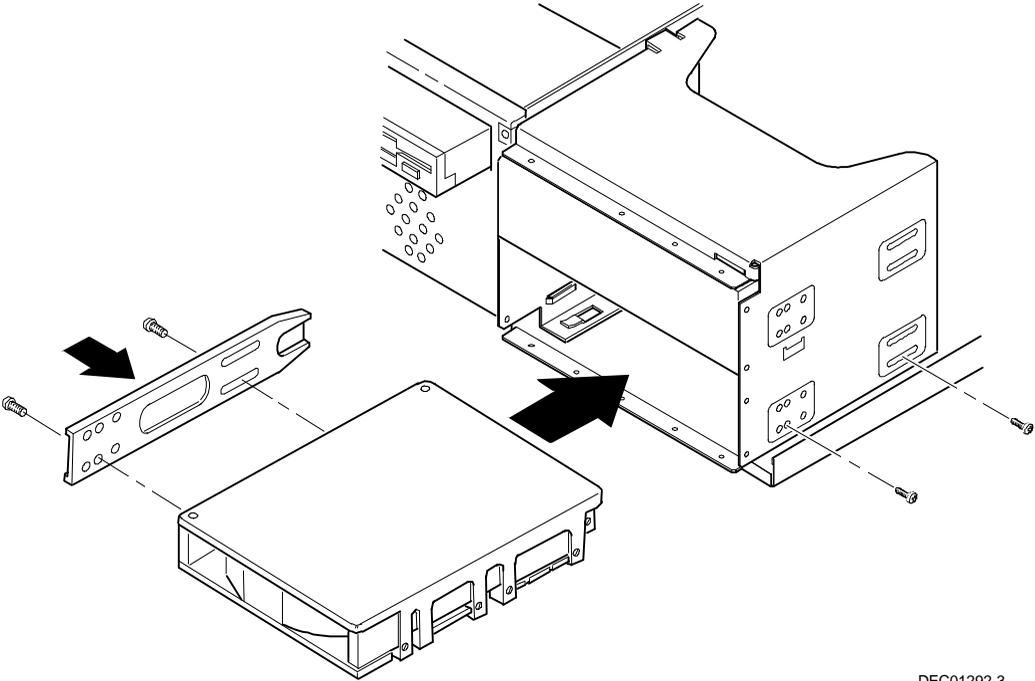
The following procedures describe how to install a 5¼-inch device into the bottom-right device bay.



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 computer and monitor.
2. Disconnect all external devices, ac power, and monitor power.
3. Remove the outside cover.
4. If necessary, remove the filler panel from the front bezel.
5. Remove the EMI shield filler plate and the drive rail from the inside of the chassis.
6. Attach the drive rail onto the 5¼-inch device.
7. Using the attached drive rail and mounting screws, install the 5¼-inch device into the device bay.
8. If necessary, replace the filler panel.
9. Connect the power and data cables to the 5¼-inch device.

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



DEC01292-3

Figure 6-4. Installing a 5 1/4-Inch Device

Connecting Diskette and IDE Devices

To connect diskette and IDE devices, perform the following:

1. Connect the supplied ribbon cable to the appropriate device as shown in figures 6-5 and 6-6.



NOTE: If only one IDE device is installed, make sure you use the ribbon cable connector furthest from the backplane connector. If two hard drives are to be installed, a cable with a second primary connection is required. Contact your local DIGITAL sales representative to order an Ultra DMA IDE cable. This 80-pin cable includes additional ground wires for faster speed hard drives.

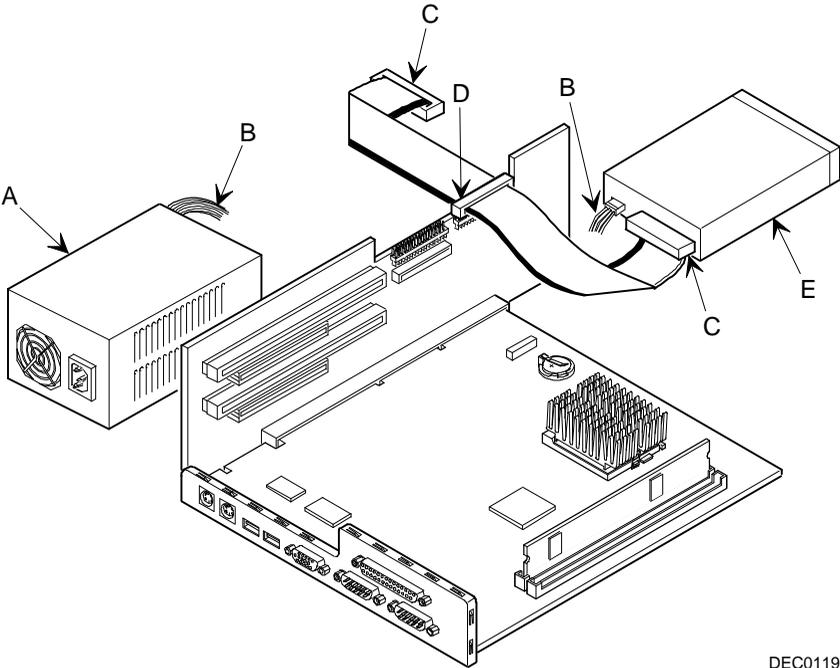
Make sure the cable is connected with the correct orientation. Most cables and sockets are keyed so you cannot connect them backwards. If your cable or device is not keyed, you must connect pin 1 of the cable to pin 1 of the device's socket.

Pin 1 of the cable is on the edge with the colored stripe. Pin 1 of the device's socket should be marked with a number or symbol at one end of 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 the appropriate power cable to the device.
3. Replace the outside cover.
4. Connect all external devices and restore power.
5. Run the BIOS Setup utility to configure your computer.

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

Figure Legend	Diskette Drive Component
A	Power supply
B	Power connections
C	Diskette drive connections
D	Backplane diskette drive connection
E	Diskette drive



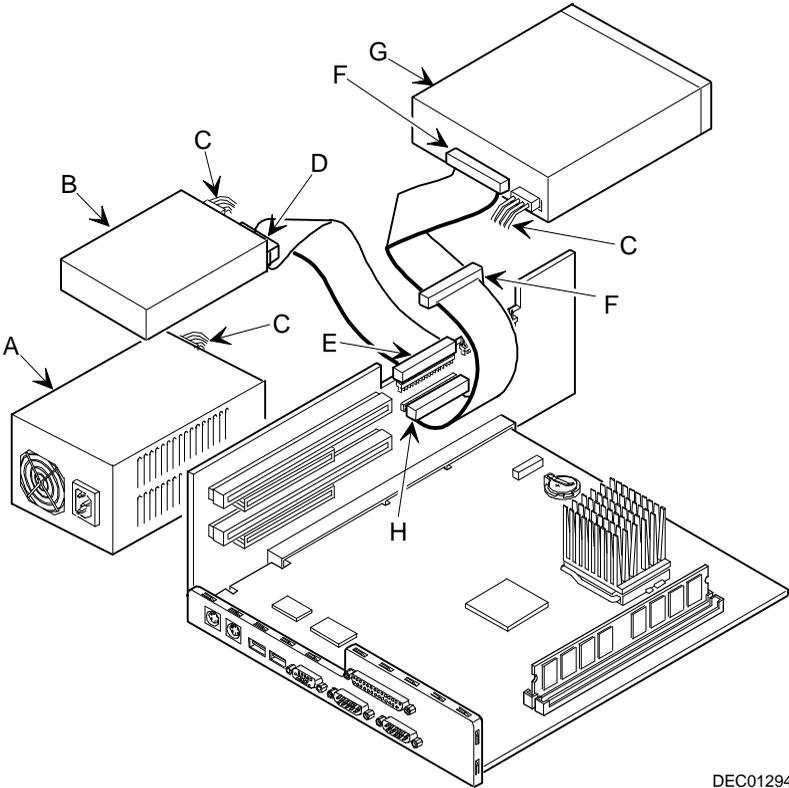
DEC01193

Figure 6-5. Diskette Drive Data Cable Connections

Adding Mass Storage Devices

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

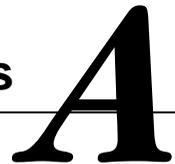
⁽¹⁾ The optional CD-ROM drive is connected to the secondary IDE port and configured as a master drive.



DEC01294

Figure 6-6. IDE Drive Data Cable Connections

Technical Specifications



Introduction

This appendix provides information about the technical characteristics of your computer.

- Computer specifications
- PCI and ISA expansion slots
- Power supply and input power
- Nominal current requirements
- Power supply and power cord requirements
- Main logic board jumpers
- If you forget your password

Computer Specifications

The following sections list your computers performance, dimensions, and environmental specifications.

Features

Feature	Specification
Chipset	SiS 5597 PCI/ISA
External L2 cache	256 KB onboard
ISA clock	7.5/8.33 MHz
PCI clock	30 MHz/33 MHz
Data I/O	
ISA	8-bit and 16-bit
PCI	32-bit
Main logic board memory	168-pin, DIMM, 64-bit SDRAM (66 MHz or greater) 16 MB minimum (expandable up to 256 MB using 128 MB DIMMs)
Computer BIOS	2 megabit Flash ROM
Video BIOS	32 KB included in the Flash ROM
IDE interface	Ultra DMA 33 capabilities

Computer Dimensions

Dimension	Specification
Width	450.8 mm (17.75 in.)
Length	419.1 mm (16.5 in.)
Height	105.7 mm (4.2 in.)
Weight	14.1 kg (31.2 lb)

Shipping/Packaging Dimensions

Specification	Low Profile	Short Tower
Width	535,94mm (21.1 in.)	535,94mm (21.1 in.)
Depth	628,65 mm (24.75 in.)	628,65 mm (24.75 in.)
Height	311,15 mm (12.25 in)	419,1 mm (16.5 in.)
Weight	16,78 Kg (37 lbs.)	18,14 Kg (40 lbs.)

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	3,660 m (12,00 ft) maximum
Nonoperating	12,200 m (40,000 ft) maximum
Nonoperating shock	30 G, 11 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 computer's backplane contains 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 @ 100 W	Operating Frequency Range
100 V ac - 120 V ac	88 V ac - 135 V ac	2.0 A	47 Hz - 63 Hz
220 V ac - 240 V ac	176 V ac - 265 V ac	1.1 A	47 Hz - 63 Hz

Power Supply Requirements

Your computer's power supply provides 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 computer.

Current Requirements

Your computer's power supply provides the following maximum current requirements:

Total power 100 W maximum

- +3.3 V 0 A min, 7.0 A max.
- +5 V 2.0 A min, 7.0 A max.
- +12 V 0 A min, 3.5 A max.
- -5 V 0 A min, 0.3 A max.
- -12 V 0 A min, 0.3 A max.
- 5 VSB 0 A min, 0.5 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 computer 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 computer end is an IEC type CEE-22 female connector.
- The maximum length is 4.5 meters (14.5 feet).

Main Logic Board Jumper Settings

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

Technical Specifications

Feature	Function	Setting	Description
Internal VGA	Disable	W1, ON	Allows you to disable the onboard video controller. Must be set with W22 to select onboard video controller or external, add-on video card.
	Enable	W1, OFF ⁽¹⁾	
CPU bus speed ratio	2.0	W2, ON W3, OFF W4, OFF	Sets processor clock speed x 2
	2.5	W2, ON W3, ON W4, OFF	Sets processor clock speed x 2.5 Default for 166 MHz processors
	3.0	W2, OFF W3, ON W4, OFF	Sets processor clock speed x 3 Default for 200 MHz processors
	3.5	W2, OFF W3, OFF W4, OFF	Sets processor clock speed x 3.5 Must be set with jumpers W5, W6, and W7 to match the CPU clock speed. For example, 66 MHz x 3 = 200 MHz processor.
Clock frequency	50 MHz	W5, pins 2 and 3, ON W6, pins 2 and 3, ON W7, pins 2 and 3, ON	Sets the clock frequency of the CPU. Must be set with jumpers W2, W3, and W4 to match the CPU bus speed ratio. For example, 66 MHz x 3 = 200 MHz processor.
	60 MHz	W5, pins 2 and 3, ON W6, pins 2 and 3, ON W7, pins 1 and 2, ON	
	66 MHz	W5, pins 2 and 3, ON ⁽¹⁾ W6, pins 1 and 2, ON ⁽¹⁾ W7, pins 2 and 3, ON ⁽¹⁾	
Burst mode	Linear burst	W10, ON	Determines the type of burst mode. ON = Linear burst OFF = Interleave (Intel, AMD)
	Interleave	W10, OFF ⁽¹⁾	

⁽¹⁾ Factory default setting

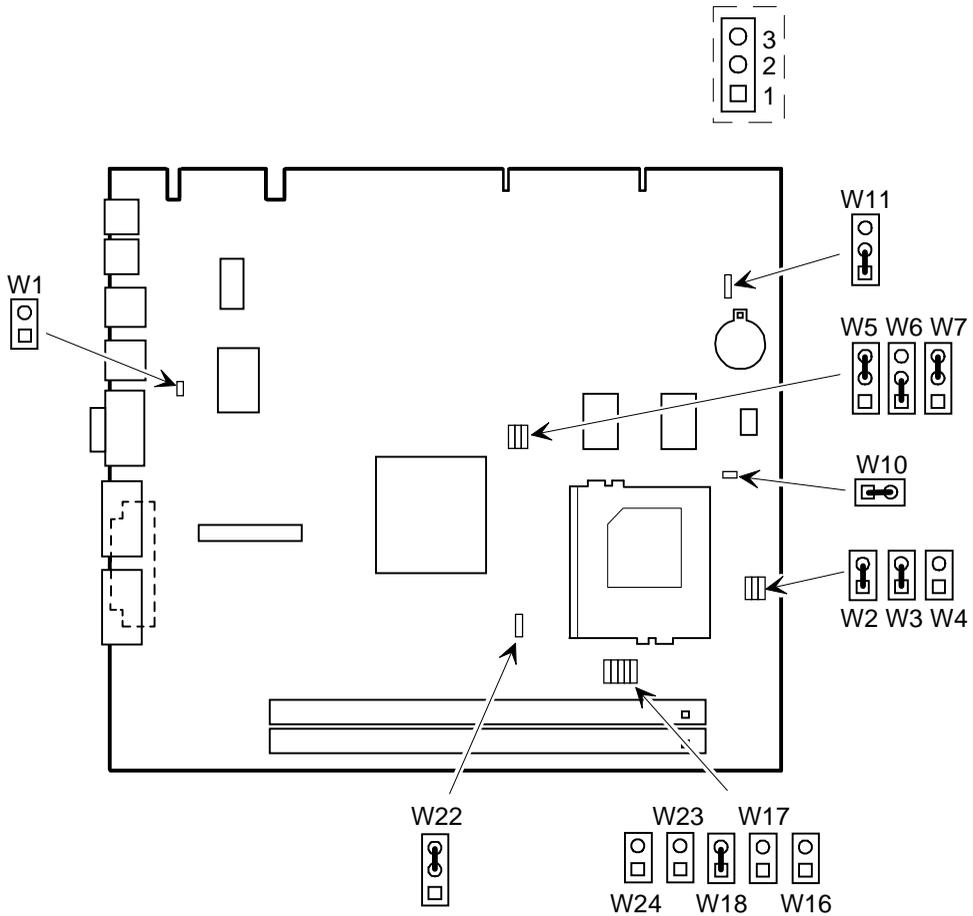
OFF = jumper not installed; ON = jumper installed

continued

Feature	Function	Setting	Description
CMOS /RTC battery	Normal	W11, pins 1 and 2, ON ⁽¹⁾	Clears CMOS of all BIOS setup information. Use the Clear setting when your computer will not boot, and BIOS setup cannot be accessed due to configuration data corruption. This jumper must be set back to Normal before rebooting your computer.
	Clear CMOS	W11, pins 2 and 3, ON	
CPU voltage	Intel Pentium	W16, OFF	Sets the CPU voltage to 3.5 V dc.
		W17, OFF	
		W18, OFF	
		W23, ON	
		W24, OFF	
Intel Pentium w/MMX	W16, ON ⁽¹⁾	Sets the CPU voltage to 2.8 V dc.	
	W17, OFF ⁽¹⁾		
	W18, OFF ⁽¹⁾		
	W23, OFF ⁽¹⁾		
	W24, OFF ⁽¹⁾		
AMD-K6 166/200 MHz	W16, OFF	Sets the CPU voltage to 2.9 V dc.	
	W17, ON		
	W18, OFF		
	W23, OFF		
	W24, OFF		
Reserved for future use	W16, OFF	Sets the CPU voltage to 3.2 V dc.	
	W17, OFF		
	W18, ON		
	W23, OFF		
	W24, OFF		
Reserved for future use	W16, OFF	Sets the CPU voltage to 2.1 V dc.	
	W17, OFF		
	W18, OFF		
	W23, OFF		
	W24, ON		
Internal VGA	Disabled	W22, pins 1 and 2, ON	Allows you to disable the internal video controller. Must be set with W1 to select onboard video controller or external video expansion board.
	Enabled	W22, pins 2 and 3, ON ⁽¹⁾	

(1) Factory default setting

OFF = jumper not installed; ON = jumper installed



DEC1288-6

Figure A-1. Main Logic Board Jumper Locations

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 jumper W11 to Clear CMOS (pins 2 and 3).
3. Wait 10 seconds.

Moving the jumper to pins 2 and 3 erases the existing password(s) and sets all BIOS settings back to their defaults.

4. Move jumper W11 back to Normal (pins 1 and 2).
5. Replace outside cover.
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 computer memory and various main logic board devices (keyboard controller, interrupt controller, DMA controller, etc.).

Your computer'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
0000 to 9FFFFh	Base memory	640 KB
0A0000h to 0BFFFFh	Video RAM	128 KB
0C0000h to 0C7FFFh	Video BIOS	32 KB
0C8000h to 0DFFFFh	BIOS extension ROM (AT bus used)	96 KB
0E0000h to 0FFFFFFh	PnP BIOS/APM BIOS	128 KB
100000h to FFFFFFFh	Extended memory	255 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 - 071	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
278 - 27A	LPT2
2E8 - 2EF	COM4

continued

Device Mapping

Range (hexadecimal)	Function
2F8 - 2FF	COM2
378 - 37A	LPT1
3BC - 3BE	LPT3
3E8 - 3EF	COM3
3F0 - 3F5	Diskette (floppy disk) controller
3F6	Primary/secondary IDE controller (alt status, device address)
3F7	Diskette (floppy disk) controller
3F8 - 3FF	COM1
4D0	Edge/level control register - INTCNTRL1
4D1	Edge/level control register - INTCNTRL2
CF8 - CFF	PCI configure space control register

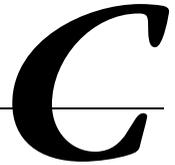
Computer Interrupt Levels

Interrupt Number	Interrupt Source
IRQ0	Timer tick
IRQ1	Keyboard controller
IRQ2	Cascade interrupt
IRQ3	COM2, COM4, if enabled
IRQ4	COM1, COM3, if enabled
IRQ5	Available
IRQ6	Diskette (floppy disk) drive, if enabled
IRQ7	LPT1, LPT3, if enabled
IRQ8	Real Time Clock (RTC)
IRQ9	VGA/USB
IRQ10	Available
IRQ11	Available
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	Available
1	1	Available
2	1	Diskette (floppy disk) controller, if enabled
3	1	ECP, if enabled
4	2	Cascade DMA
5	2	Available
6	2	Available
7	2	Available

Video Output Information



Introduction

Your computer can be used with a variety of industry-standard VGA analog monitors. These computers also support several PCI local bus video adapters as well as many industry-standard ISA video adapters.



CAUTION: Your monitor's capabilities must match the capabilities of the onboard video controller or an optional video adapter if you select a video resolution higher than 640 x 480. Failure to match video capabilities can damage your monitor.

Also, do not connect a low-resolution monitor to a computer that has been configured with high-resolution video drivers. High-resolution drivers can damage a low-resolution monitor.



NOTE: Refer to your monitor's documentation and the following table to determine the maximum video resolution of your monitor and onboard video controller. If you are using an optional video adapter, refer to the documentation supplied with that adapter to determine the maximum video resolution.

Video Resolution Modes and Memory Requirements

Resolution	Video Memory Allocations							
	0.5 MB	1 MB	1.5 MB	2 MB	2.5 MB	3 MB	3.5 MB	4 MB
640 x 480 x 8	*	*	*	*	*	*	*	*
640 x 480 x 16		*	*	*	*	*	*	*
640 x 480 x 24		*	*	*	*	*	*	*
800 x 600 x 4	*	*	*	*	*	*	*	*
800 x 600 x 8	*	*	*	*	*	*	*	*
800 x 600 x 16		*	*	*	*	*	*	*
800 x 600 x 24			*	*	*	*	*	*
1024 x 768 x 4	*	*	*	*	*	*	*	*
1024 x 768 x 8		*	*	*	*	*	*	*
1024 x 768 x 16			*	*		*	*	*
1024 x 768 x 24					*	*	*	*
1280 x 1024 x 4		*	*	*	*	*	*	*
1280 x 1024 x 8			*	*	*	*	*	*
1280 x 1024 x 16						*	*	*

* Amount of memory required

Glossary

address

A specific location or range of locations in your computer'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 computer.

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 computer 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.

Glossary

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 computer
- expansion board - A board which enhances your computer's abilities in some way
- video board - A board which enables your computer to display information on a monitor

booting

The process of self-testing and computer configuration that completes each time your computer 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 computer performance by minimizing the number of processor memory accesses. The computer 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 computer 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 computer application. Because the disk is read only, you cannot write to the disk from your computer's hard drive, floppy drive, or from your computer's memory.

ClientWORKS

ClientWORKS is the family of client management and networking tools that Digital supports on its entire line of desktop personal computers. The Client Management feature provides computer 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 computer'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 computer 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 computer 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 computer boots if they are listed in your CONFIG.SYS file.

DIMM

A Dual In-line Memory Module. DIMMs are small memory cards (sometimes called "sticks") that can be used to increase the amount of Synchronous Dynamic Random Access Memory (SDRAM) in your computer.

Direct Memory Access (DMA)

DMA displays or delivers information from your computer'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 computer 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.

Enhanced Parallel Port (EPP)

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

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 computer, within specified limits, by installing SIMMs.

firmware

Information that is permanently stored in your computer's ROM and cannot be changed. This might consist of application software and/or configuration information about certain aspects of the computer. Your computer'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 computer 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

Computers, 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 computer 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 computer's memory that cannot be easily detected by users.

IRQ

A hardware setting which instructs your computer 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 computer (such as expansion boards), your computer 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 computer 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 computer 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 computer 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 computer'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 computer'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 computer chip that processes electronic information and instructions, such as Intel's Pentium or Pentium Pro computer chips. Note, however, that not all microprocessors are central processing units.

modem

A device for transmitting electronic information from one computer 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 computer 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 computer system. Windows 95 and Windows NT Workstation, OS/2, and UNIX are operating systems.

PCI

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

PeI - 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 computer and a peripheral device, such as a printer, mouse, or SCSI device.

Parallel ports, also called LPT ports, are typically used to connect your computer to a printer. Serial ports, also called COM ports, can be used to connect your computer 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 computer every time it is turned on (but not necessarily every time it is booted).

Random Access Memory (RAM)

Abbreviated as RAM; also called read/write memory. The memory your computer uses to manage information and software while that information and software is in use. Information stored only in RAM is lost when your computer 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 computer is turned off. Note that you cannot move or copy information into ROM from other areas of your computer's memory. In some cases, however, you can copy information from ROM into other areas of your computer's memory.

ROM BIOS

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

SCSI device

Hardware that communicates with your computer 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.

S.M.A.R.T.

Self-Monitoring Analysis and Reporting Technology. A system that monitors the reliability of PC hardware components, such as the hard disk drive, to identify potential failures or problems before they occur.

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 computer's efficiency, determine whether it is operating properly, and/or correct problems that might arise as you use your computer. Some system utility software might be provided with your computer (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.

Unified Memory Architecture (UMA)

This advanced architecture allows you to map a variety of frame buffer sizes into your computer's memory. UMA replaces traditional video memory by allowing computer memory to be allocated for the video.

Universal Serial Bus (USB)

The USB is a new industry standard bi-directional bus designed to work with the PC architecture for connecting slow and medium speed (12 Mb/s) external peripherals to computer systems in a dynamically attachable, consistent, structured and low-cost manner. USB has capabilities similar to today's PC external peripheral connections (serial ports, parallel ports, keyboard and mouse ports), but extends them in several significant ways.

Windows

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

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.

Index

- 3½-inch mass storage devices (bottom bay)
 - installing
 - computer, 6-6
- 5¼-inch mass storage devices
 - installing
 - computer, 6-8

A

- assignment
 - DMA channel, B-6

B

- BIOS setup utility, 2-1
 - accessing, 2-2
 - changing time and date, 2-4
 - configuring diskette drives, 2-12
 - configuring hard disk drives, 2-12
 - eliminating passwords, 2-6
 - enabling password on boot, 2-6
 - executing, 2-2
 - helpful hints, 2-2
 - maneuvering through, 2-4
 - other security options, 2-8
 - setting passwords, 2-4

- setting power management options, 2-9
- speed up boot, 2-16
- virus protection, 2-7

C

- chassis lockdown
 - attaching hasp, 1-11
 - computer, 1-10
- components
 - internal, 3-2
- components and connectors
 - main logic board, 3-4
- components/connectors
 - backplane, 3-8
- computer
 - 5¼-inch mass storage devices
 - installing, 6-8
 - chassis lockdown, 1-10
 - current requirements, A-6
 - disconnecting external devices, 1-6
 - diskette and IDE devices
 - connecting, 6-10
 - expansion slots, 5-1
 - installing DIMMs, 4-1
 - installing mass storage devices, 6-4
 - internal components, 3-2
 - specifications, A-1
 - video output information, C-1
- connecting a local printer, 1-12
- connecting a USB device, 1-13
- current limitation
 - expansion slots, A-4

Index

PCI-bus (local bus) expansion slots, A-4
current requirements
computer, A-6

D

DIMM
installing, 4-4
diskette and IDE devices
connecting
computer, 6-10
display information, C-1
DMA channel assignment, B-6

E

ergonomics
providing a comfortable working environment, 1-15
executing the BIOS Setup utility, 2-2
expansion boards
installing, 5-4
removing, 5-7
expansion slots
computer, 5-1
maximum current limitation, A-4
external devices
disconnecting, 1-6

F

features
DIGITAL PC 3010, viii
flash.exe utility, 2-17
forgetting your password, A-11, A-12
computer components, 3-2

H

higher performance processor
installing, 3-14

I

I/O Address Map, B-3
installing
additional computer memory, 4-1
installing a higher performance processor, 3-14
installing expansion boards, 5-4
installing mass storage devices
computer, 6-4
interrupt levels, B-5
IRQs, B-5

J

jumper settings
main logic board, A-7

L

Lithium battery
replacing, 3-12
local printer
connecting, 1-12
backplane components/connectors, 3-8
system input power requirements, A-5

M

- main logic board
 - removing, 3-10
- main logic board
 - jumper settings, A-7
- main logic board connectors
 - rear panel, 3-6
- maneuvering through BIOS Setup utility, 2-4
- mapping
 - memory, B-2
- memory
 - mapping, B-2
- memory configurations, 4-4
- memory mapping, B-2
- monitor resolution information, C-1

P

- password
 - if you forget, A-11, A-12
- PCI-bus (local bus) expansion slots
 - maximum current limitation, A-4
- power cord requirements, A-7
- power requirements

R

- removing expansion boards, 5-7
- removing the main logic board, 3-10
- replacing computer battery, 3-12

S

- S.M.A.R.T IDE devices, 6-1
- specifications, A-1
 - computer, A-1
 - computer performance, A-1
 - environmental, A-4
 - dimensions, A-3
 - shipping/packaging, A-3

U

- USB device
 - connecting, 1-13
- using a Windows enhanced keyboard, 1-14
- utilities
 - flash.exe, 2-17

V

- video output information
 - computer, C-1

W

- Windows enhanced keyboard
 - using, 1-14