DIGITAL PC 3400/5400

System Reference

Part Number: ER-B00WW-UA. B01

Digital Equipment Corporation

The FCC wants you to know...

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

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

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

- Reorient or relocate the receiving antenna

- Increase the separation between the equipment and receiver

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected

- Consult the dealer or an experienced radio/TV technician for help

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

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

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

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.

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.

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

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

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

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

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

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

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

VARNING! Det kan förekomma en batteriexplosion om ett litium-jonbatteri byts ut på felaktigt sätt. Förhindra att datorn skadas genom att se till att plussidan (+) är uppåtvänd när du sätter i ett nytt batteri. Det gamla batteriet får endast bytas ut mot ett DIGITAL-batteri (artikelnummer 12-41454-05), 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.

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Introduction

This guide describes how to operate, configure, and upgrade DIGITAL PC 3400/5400 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 System Software CD that can be used to restore your system software. Refer to the CD-INFO.TXT file on the CD 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. This information can help you setup, configure, and operate your computer. *DIGITAL* recommends that you read this information first.

Windows 95 or Windows NT Workstation documentation is provided as an on-line help file and in printed form.

Latest Product Information and Updates

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

- **http://www.pc.digital.com**

- **http://www.pc.digital.com/~ftp**

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

In the United States: (508) 496-8800

DIGITAL PC 3400/5400 Computers

A variety of DIGITAL PC 3400/5400 computers, using two chassis variations, are discussed in this guide. The following sections provide brief descriptions of each chassis version and model.

Chassis Versions

Two chassis versions are available: the DIGITAL PC 5400 (low profile) and DIGITAL PC 3400/5400 (short tower) as shown in the following two figures. Note that your monitor, keyboard, and mouse might look different.
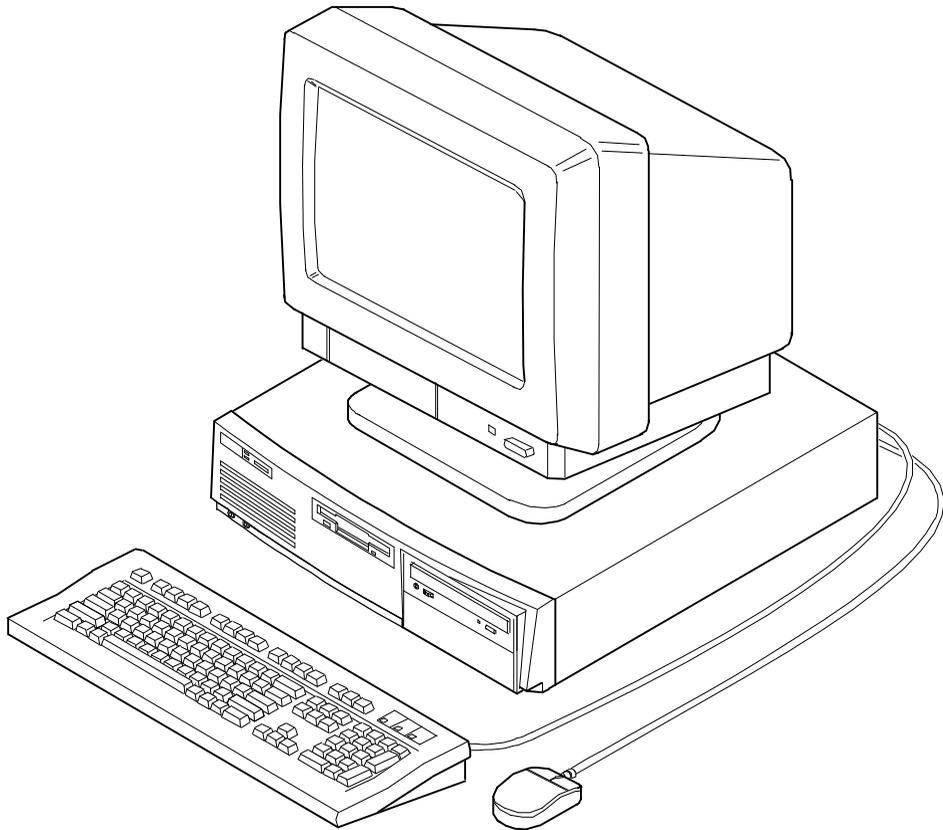
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Typical *DIGITAL PC 5400 Low Profile* Computer
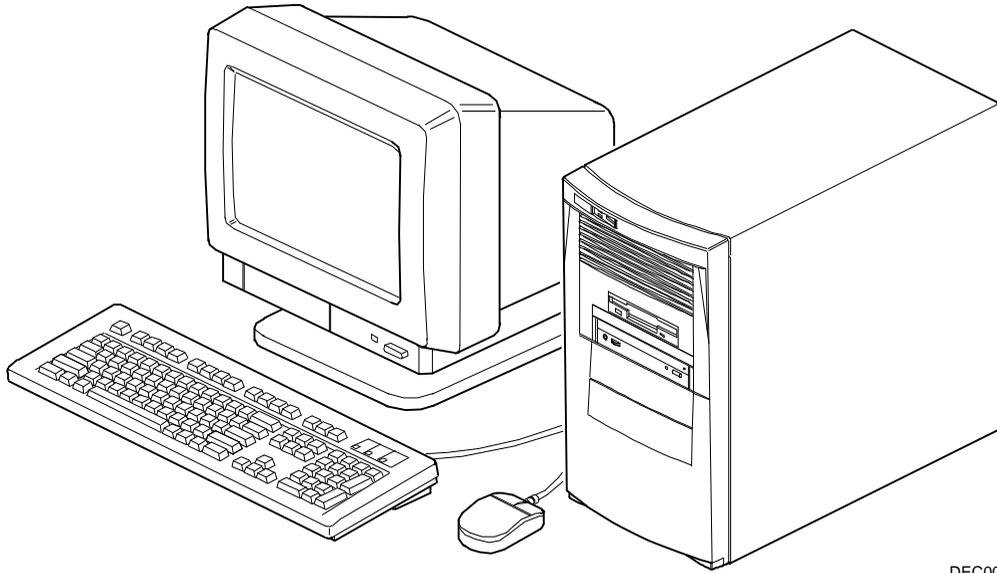
DEC00746-2

Typical *DIGITAL PC 3400/5400 Short Tower* Computer

Models

The *DIGITAL PC 3400/5400* computer models are:

- *DIGITAL PC 3400* — This model is only available in the short tower version and offers a 180 or 200 MHz Pentium Pro processor with 16 KB level 1 and 256 KB level 2 on-chip cache, up to 192 MB of EDO memory (via six SIMM sockets), and a 2D or 2D/3D integrated graphics accelerator with 1 MB of DRAM or 2 MB of Window Random Access Memory (WRAM).

- *DIGITAL PC 5400* — This model is available in both the low profile and short tower versions and offers a 180 or 200 MHz Pentium Pro processor with 16 KB level 1 and 256 KB level 2 on-chip cache, up to 192 MB of EDO memory (via six SIMM sockets), integrated 2D/3D graphics accelerator with 2 MB of WRAM, 16-bit stereo-quality audio (not available on all models), and an integrated 32-bit PCI Ethernet controller (10Base-T/10Base-2 standard, 100Base-T ready). SCSI-based configurations are also available.

Audience

This guide is written specifically for anyone responsible for configuring and expanding a DIGITAL PC 3400/5400 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 headphones, microphone, printer, etc.), use your computer's Windows 95 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, video memory, and an optional video memory (WRAM) or MPEG daughter card.

- 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 DIGITAL PC 3400/5400 computer's video circuitry.

Conventions

Convention Example	Description
Quick Setup	Italics are typically used for titles, comments, and references to other sections of this document or other documents.
`c:\windows>`	Monospaced text indicates information that your 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 headphones, microphone, printer, etc.), use your computer's Windows 95 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	Resets your computer and causes POST to run.
D	CD-ROM headphone jack[1]	This jack enables you to connect standard stereo headphones so you can listen to audio output from your CD-ROM drive.
E	CD-ROM volume dial[1]	This dial enables you to control the volume of the CD-ROM headphone audio output from your CD-ROM drive. Volume decreases as the dial is turned to the left, and increases as it is turned to the right.
F	CD-ROM activity light[1]	This LED lights during power up and when accessing the CD-ROM disk.
G	CD-ROM eject button[1]	Pressing this button opens and closes the CD-ROM drive cavity so you can insert or remove CD-ROM disks from the drive.
H	Microphone jack[1]	This jack enables you to connect a standard microphone to your computer.
I	Headphone jack[1]	This jack enables you to connect standard stereo headphones to your computer.
J	Hard disk drive activity LED	Lights when your hard disk drive is in use.
K	Diskette activity LED	Lights when the diskette drive is in use.
L	Diskette eject button	Releases a 3½-inch diskette from the diskette drive.
M	Drive bay(s)	Enables you to add additional mass storage device(s) to your computer.

[1] Not available on all models
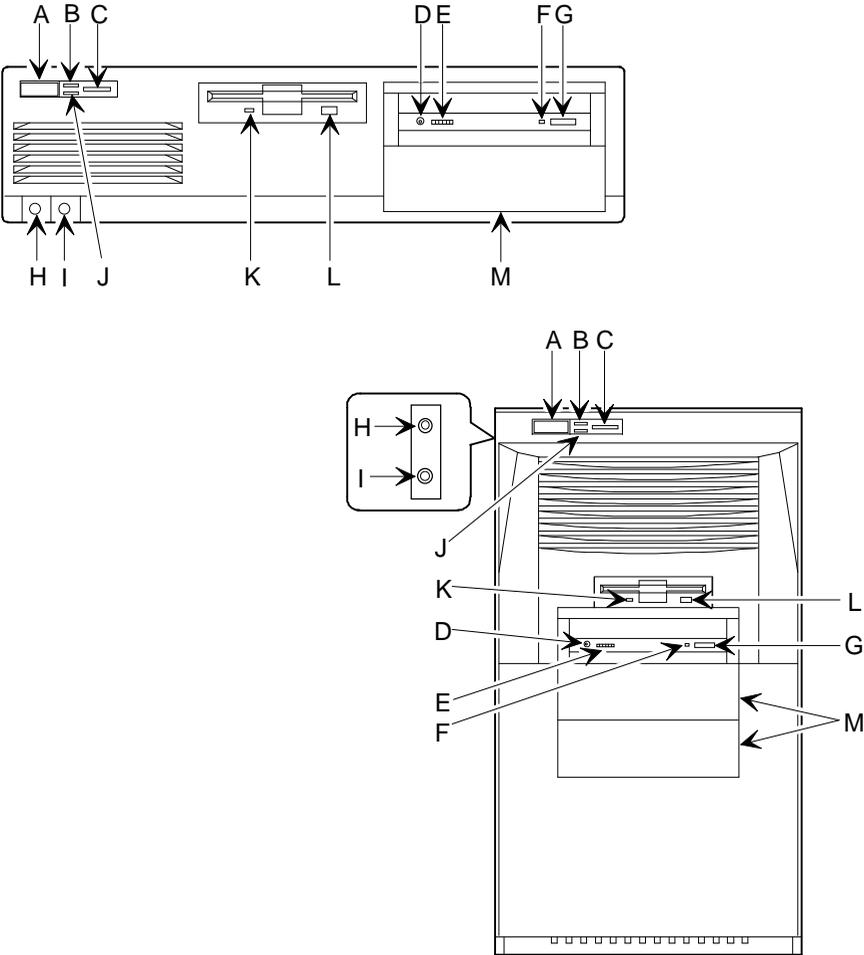
DEC00913-2

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	Line in[1]	This jack enables you to connect an audio device to your computer.
C	10Base-2 port (BNC connector)[1]	Enables you to connect to a 10Base-2 (Ethernet ThinWire) network.
D	Chassis lockdown	Enables you to physically anchor your computer to a fixed location.
E	Expansion board slots	Enables you to install additional ISA and PCI expansion boards.
F	ac line connector	Enables you to connect your computer to an ac power source.
G	MIDI/joystick port[1]	Enables you to connect a MIDI/joystick device to your computer.
H	Speaker out[1]	This jack enables you to connect a set of speakers to your computer.
I	10Base-T port (RJ45 connector)[1]	Enables you to connect to a 10Base-T (Twisted-Pair) network.
J	Parallel port connector	Enables you to connect a standard, Enhanced Parallel Port (EPP), or Enhanced Capabilities Port (ECP) parallel printer.
K	Keyboard connector	Enables you to connect a 104-key keyboard.
L	Mouse connector	Enables you to connect a PS/2 style mouse.
M	Video port (VGA connector)[2]	Enables you to connect a high-resolution monitor to your computer.
N	USB ports[1]	Enables you to connect Universal Serial Bus (USB) devices.
O	Serial port connectors	Enables you to connect serial devices.

[1] Not available on all models

[2] Location of the VGA connector might vary with model.
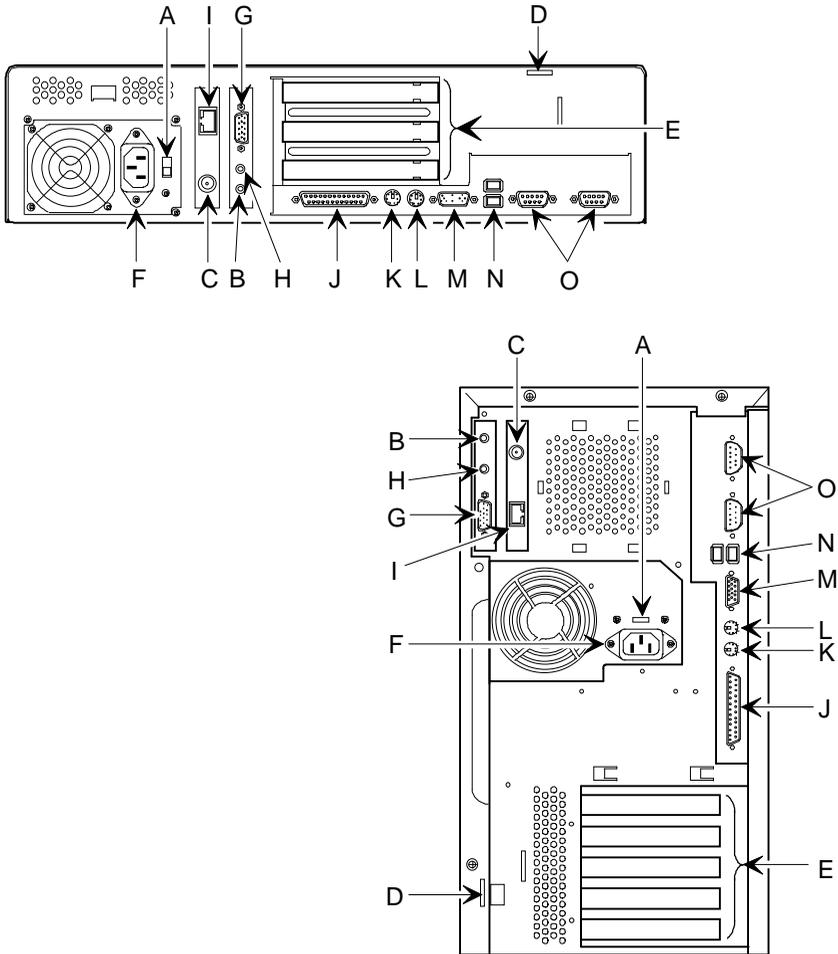
Figure 1-2. Rear Panel Connectors and Voltage Select Switch

DEC00914-2

Removing your Computer's Outside Cover

To remove your computer's outside cover:

1. Remove the outside cover by loosening the thumbscrew(s) at the rear of your computer.

2. Slide the outside cover forward for the low profile and backwards for the short tower.

3. Carefully lift the outside cover away from the chassis.
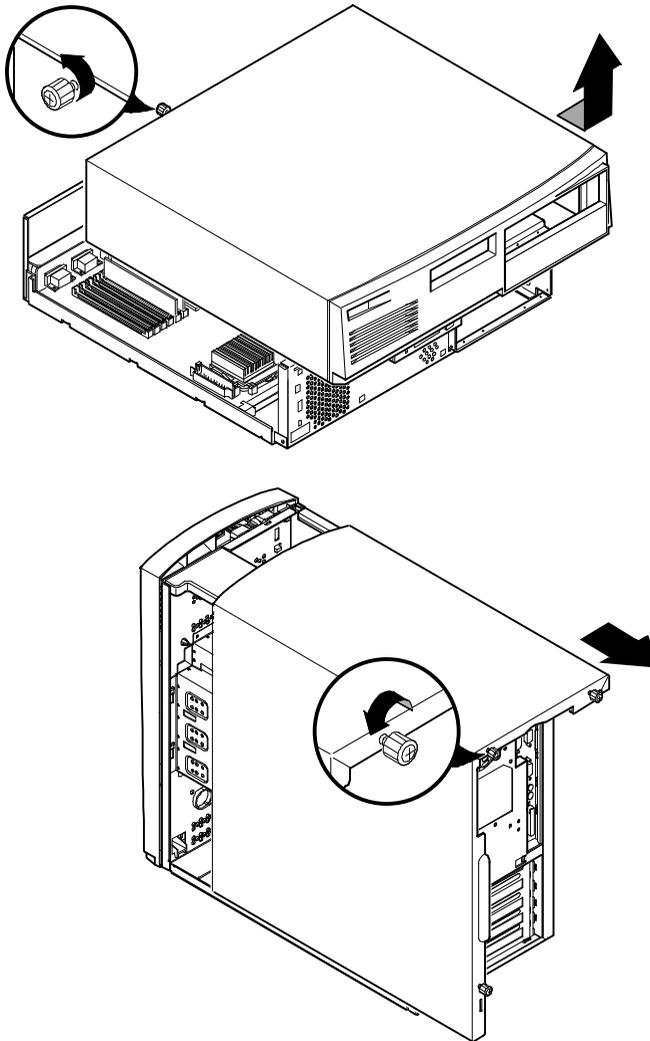
DEC00866-2

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. Secure the outside cover to the chassis using the thumbscrew(s).
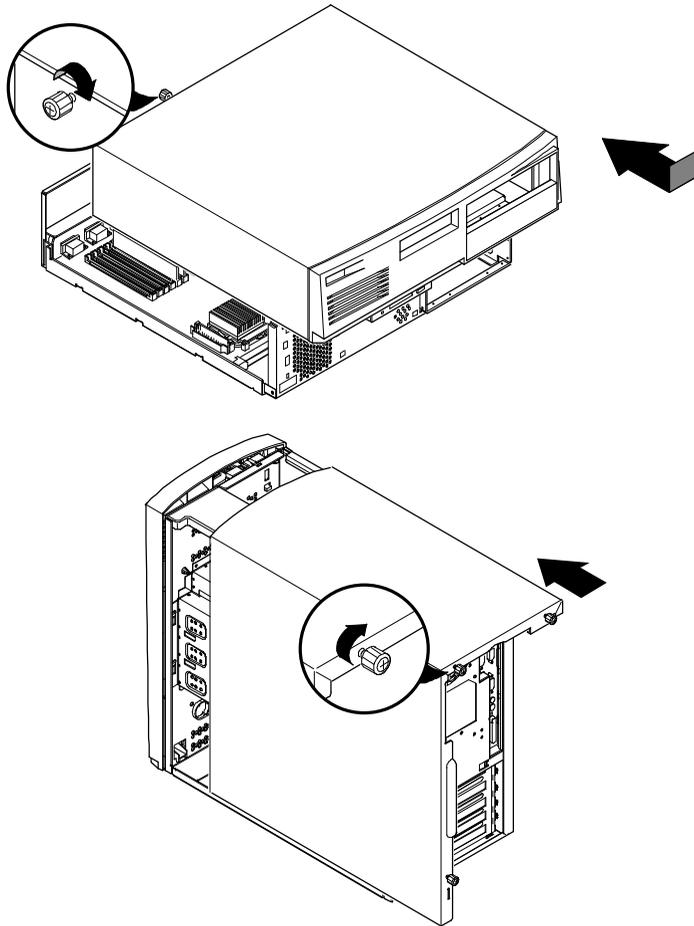
DEC00866-3

Figure 1-4. Replacing the Outside Cover

Chassis Lockdown

A chassis lockdown hasp is located at the rear of your computer. It is either secured to the outside cover or to the side of the chassis. The hasp for DIGITAL PC 5400 low profile computers is near the top-right of the rear panel. The hasp for DIGITAL PC 3400/5400 short tower computers is at the lower-left of the rear panel. When locked, these hasps prevent 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.

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.

Attaching the Hasp (DIGITAL PC 5400 Low Profile)

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 all external devices and then turn on your computer.
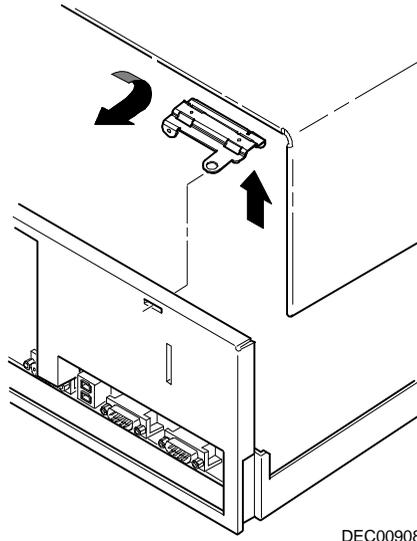
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Figure 1-5. Attaching the Hasp (DIGITAL PC 5400 Low Profile)

Attaching the Hasp (DIGITAL PC 3400/5400 Short Tower)

To attach the hasp:

1. Insert the hasp tab, with the lock/cable hole, through the slot in the rear panel.

2. Slide the foot of the hasp behind the rear panel tongue and seat the foot securely.

3. Replace the outside cover, carefully sliding the left, rear-edge slot over the hasp.

4. Connect the power cord to your computer and to the wall outlet.

5. Turn on all external devices and then turn on your computer.
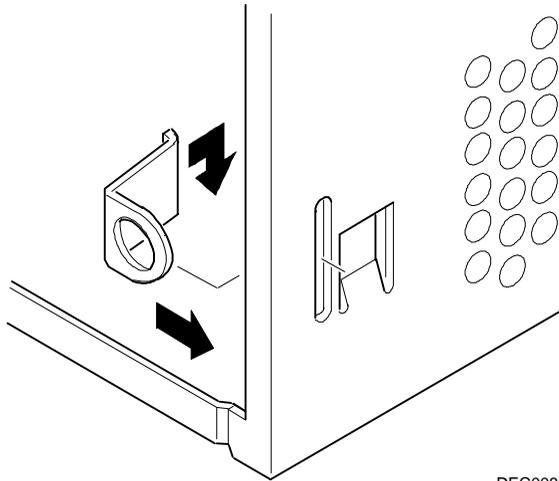
DEC00881

Figure 1-6. Attaching the Hasp (DIGITAL PC 3400/5400 Short Tower Computers)

Connecting Speakers (DIGITAL PC 5400 Only)

If you purchased speakers for your computer, perform the following instructions to connect them:

1. Unpack the speakers.

2. Plug the slave speaker cable into the master speaker "Speaker Output" (A, Figure 1-7 or 1-8).

3. Connect the other cable to the master speaker "Audio Input" (B, Figure 1-7 or 1-8) and to the adapter card "Speaker Out" (C, Figure 1-7 or 1-8).

4. Connect the ac-to-dc adapter cord to the master speaker (D, Figure 1-7 or 1-8).

5. Plug the speaker ac-to-dc adapter into a power outlet.
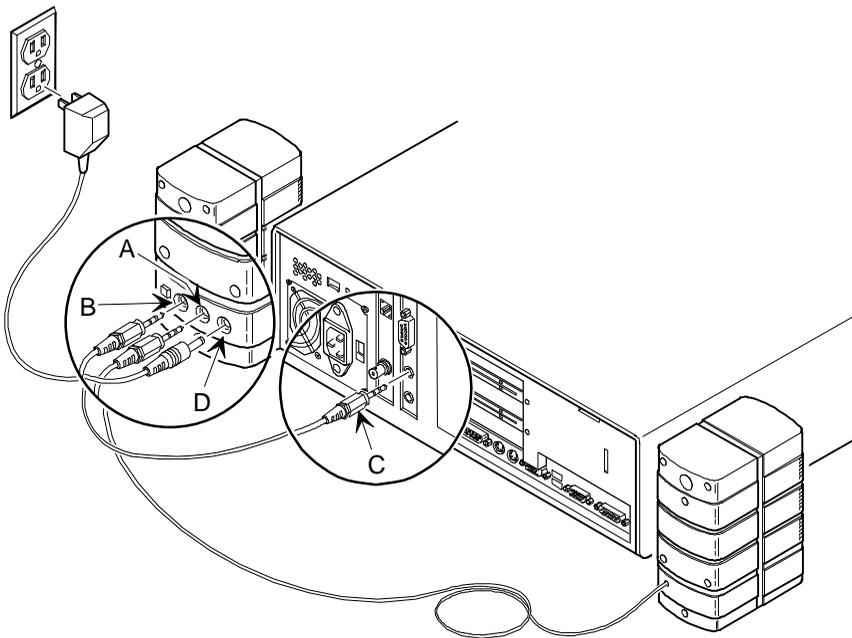
DEC00896

Figure 1-7. Connecting Speakers (DIGITAL PC 5400 Low Profile Only)
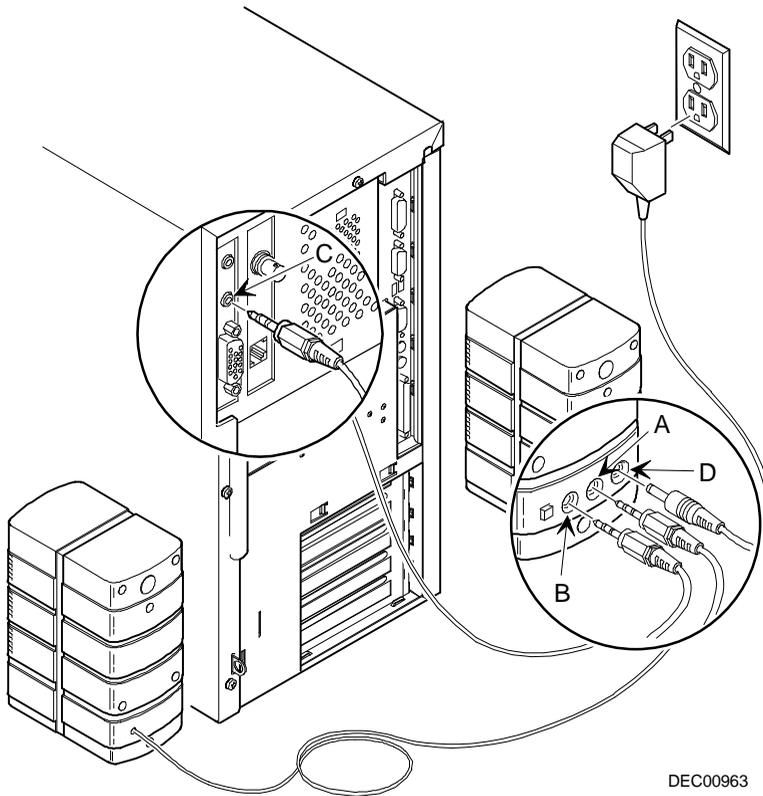
DEC00963

Figure 1-8. Connecting Speakers (DIGITAL PC 5400 Short Tower Only)

Connecting Headphones (DIGITAL PC 5400 Only)

If you purchased headphones for your computer, perform the following instructions to connect them:

1. Unpack the headphones.

2. Connect the headphones cable into the connector at the left/front of your computer.
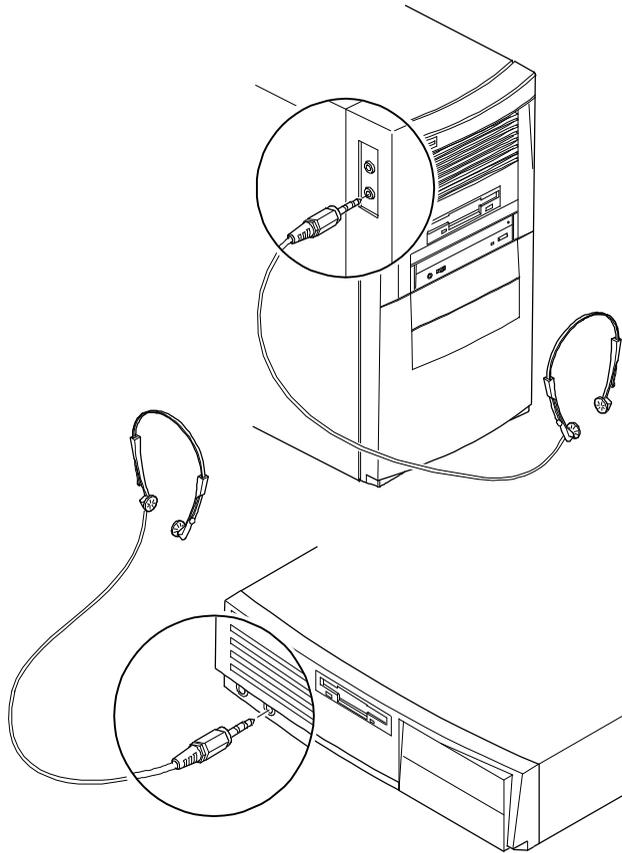
DEC00897-2

Figure 1-9. Connecting Headphones (DIGITAL PC 5400 Only)

Connecting a Microphone (DIGITAL PC 5400 Only)

If you purchased a microphone for your computer, perform the following instructions to connect it:

1. Unpack the microphone and assemble the base.

2. Connect the microphone cable into the connector at the left/front of your computer.
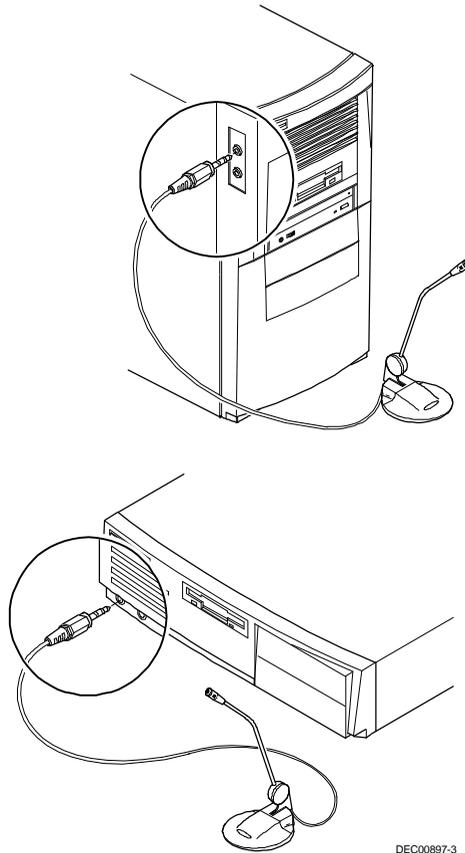
DEC00897-3

Figure 1-10. Connecting a Microphone (DIGITAL PC 5400 Only)

Connecting a MIDI/Joystick Device (DIGITAL PC 5400 Only)

If you purchased a MIDI/joystick device for your computer, perform the following instructions to connect it:

1. Unpack the MIDI/joystick device.

2. Connect the MIDI/joystick device cable into the MIDI port connector on the adapter card.
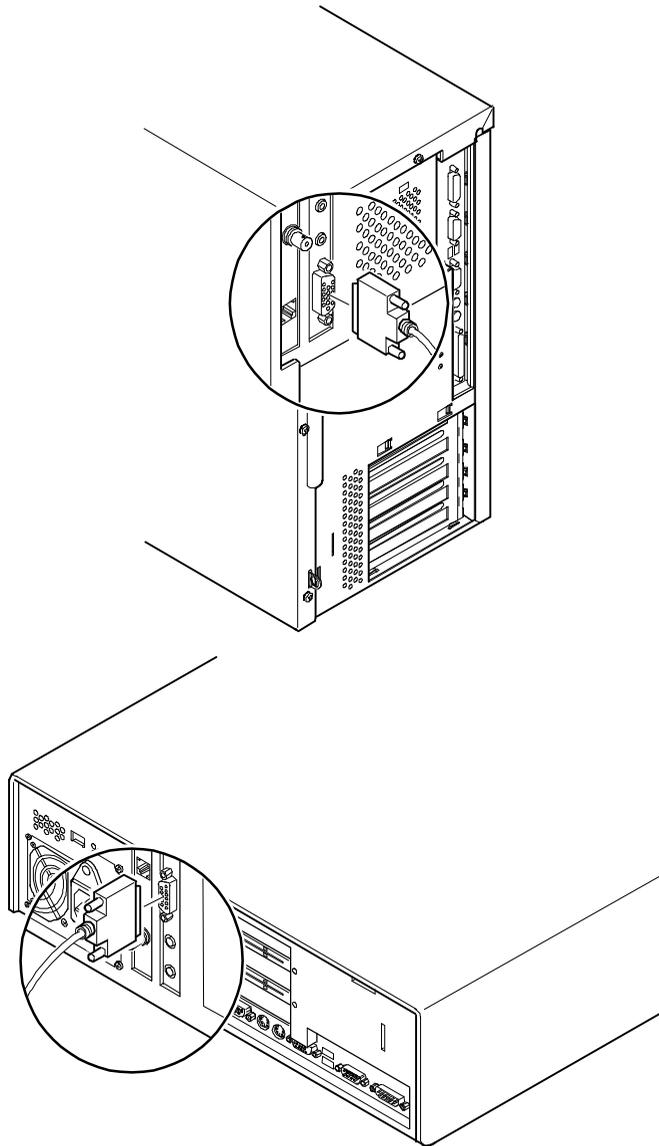
DEC00924

Figure 1-11. Connecting a MIDI/Joystick Device (DIGITAL PC 5400 Only)

Connecting a Printer

Perform the following steps to connect a 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 printer and computer on.

5. Configure your printer for operation with your computer.

   Refer to your Windows 95 or Windows NT Workstation on-line help and printed documentation for instructions on installing your printer's device driver.
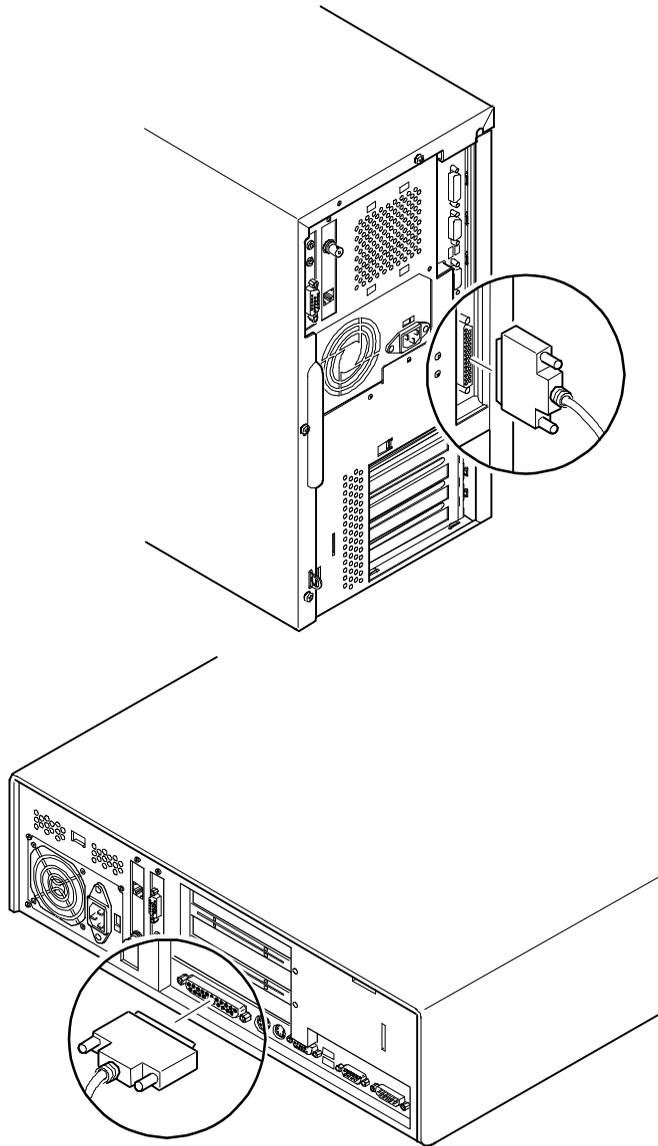
DEC00923-2

Figure 1-12. Connecting a Printer

Connecting a Universal Serial Bus (USB) Device

USB simplifies connectivity requirements for plug and play external devices by consolidating ports and eliminating the need to open the 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.
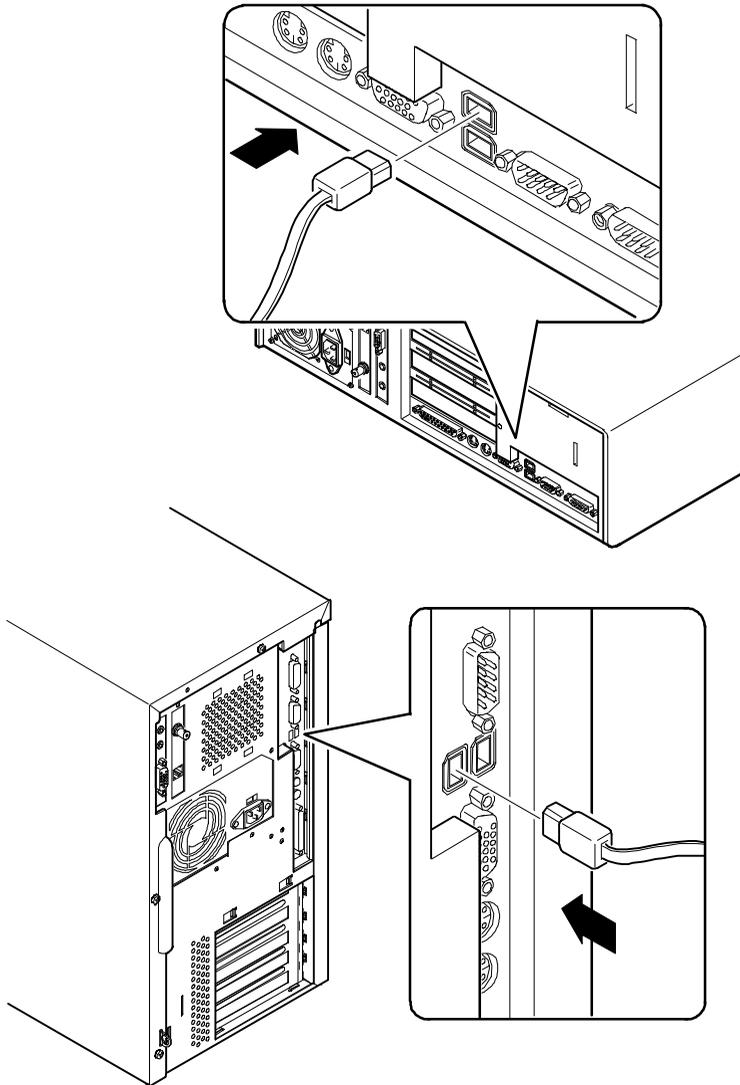
DEC00915-2

Figure 1-13. Connecting a USB Device

Your Computer's Windows 95 Keyboard

Your computer comes equipped with a 104-key enhanced Windows 95 keyboard that allows you to communicate with your computer by entering data or commands.

The right and left Windows 95 function keys bring up the Start menu much like pointing and clicking the left mouse button on the Start button. These keys can be used at any time you are in the Windows 95 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.

Creating a Comfortable Working Environment

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

- Be comfortable in your work space.

- Change your posture frequently.

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

Adjust	So . . .
Chair	Feet are flat on the floor.
	Legs are vertical forming a right angle to the floor.
	Your weight is off your thighs and they are horizontal. Keep the back of your knees away from the seat so you do not compress the area behind them, which could restrict the blood flow.
	Your upper body is erect and your lower back is supported with a backrest.

continued

Adjust	So . . .
Keyboard or mouse	Your wrists are straight and do not bend more than 15 degrees. They may be supported when resting but not on sharp edges. Type comfortably, with no more key pressure than needed to feel the contact point.
	Upper arms are straight down at your sides, elbows are close to your sides and support your arm weight. Forearms are at a 70 degree to 90 degree angle.
	If you use a mouse, rest your hand on the mouse so your wrist is not on the work surface. Operate the mouse close to your body's centerline.
Head	Avoid neck strain. Your head should incline downward, but no more than 15 to 20 degrees.
Monitor	No higher than the level of your eyes and at the correct distance for your vision.
	Avoid eye fatigue, which can be caused by glare, image quality, uncomfortable furniture, eye height, and uncorrected vision. If you cannot focus to read at different distances, you may need special glasses. Relax your eyes periodically by looking at distant objects.
Work breaks	Take periodic work breaks. Morning, lunch, and afternoon breaks during the 8-hour workday meet most recommendations. Take advantage of work breaks to move around and do other activities.
Lighting	Avoid direct lighting or sunlight on the screen, which causes glare and reflections. Place lighting behind or to the side of your work area, and distribute the lighting evenly on your work area.
	Your computer monitor's screen has an antiglare treatment to reduce glare. Adjust the brightness and contrast controls as needed.
Noise	Keep background noise at a minimum. Background noise above 65 dBA is tiring. Sound-absorbing materials (curtains, carpeting, and acoustic tile) can help reduce background noise.
Temperature	20 to 23 degrees C (68 to 74 degrees F).

Adjust	So . . .
Humidity	30% to 70%.
Ventilation	Provide adequate air ventilation to avoid fatigue and to operate the equipment.
Space between set ups	> 70 cm (28 in.) center to center, preferably > 152 cm (60 in.).

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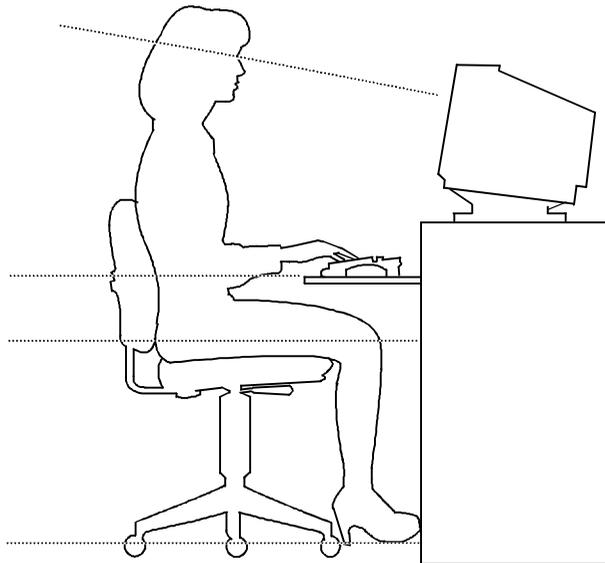
DEC00454

Figure 1-14. Creating a Comfortable Working Environment

Using the BIOS Setup Utility 2

What is the BIOS Setup Utility?

The BIOS Setup utility enables you to select and store permanently information about your 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

- Change the boot options

- Reconfigure power management

- Setup your keyboard for your comfort and use

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

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]. (Notice that "Supervisor Password Is" field now indicates Enabled.)

If desired, set a user password as follows:

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

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

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

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

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

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, a selection to write protect the 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.

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

- *Diskette Access* – While enabled, this option prevents information on the computer's hard disk drive from being copied to a diskette drive. In this state, the computer reads information from diskettes inserted into the diskette drive, but no information can be copied from the computer's memory or hard disk drive onto diskettes.

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

- *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.

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

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

Setting Power Management Options

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

NOTE: You can use DIGITAL's Power Management utility to set your computer's power management features (Windows 95 only).

Windows NT Workstation does not support power management. Your computer's BIOS has power management features but Windows NT Workstation does not support them.

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 `Enabled`.

To initialize the power management features:

1. Reboot the computer and enter Setup.

2. Highlight the "Power" menu.

3. Highlight "Power Management."

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

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

In "Standby" mode, perpheral 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 Management 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.

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 "Diskette A" or "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 an "IDE Adapter" field to assign the new hard disk and press [Enter].

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

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

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

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

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

Manually Defining a Hard Disk

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

1. Reboot the computer and enter Setup.

2. Highlight the "Main" menu.

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

4. Fill-in the parameters of the hard disk in the appropriate fields.

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

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

Changing the Boot Sequence

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

To change the boot sequence, proceed as follows:

1. Reboot the computer and enter Setup.

2. Highlight the "Boot" menu.

   Diskette drive, Hard Disk, and CD-ROM Drive are displayed. The number shows the current ordering. For example, if CD-ROM Drive is 1 and Diskette Drive is 2, the 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.

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

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

Speeding up the Boot Process

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

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

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

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

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

Resetting Keyboard Features

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

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

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

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

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

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

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

Changing the Keyboard Features

To change the keyboard features:

1. Reboot the computer and enter Setup.

2. Highlight the "Main" menu.

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

If you wish to leave "NumLock" on, skip steps 6 and 7, otherwise:

4. Highlight "NumLock."

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

If you wish to leave "Key Click" disabled, skip steps 8 and 9, other otherwise:

6. Select "Key Click."

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

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

8. Highlight "Keyboard Auto-Repeat Rate."

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

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

10. Highlight "Keyboard Auto-Repeat Delay."

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

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

Setting Your Computer's Volume Control

If your computer has an onboard ESS sound chip, you must enable the "Integrated Audio" option using the BIOS Setup utility. If your computer does not have an onboard ESS sound chip, leave this option "Disabled."

To enable this option, proceed as follows:

1. Reboot the computer and enter Setup.

2. Highlight the Advanced menu and press [Enter].

3. Highlight Integrated Peripherals and press [Enter].

4. Highlight "Integrated Audio" and select `Enabled`.

5. Highlight "System Speaker Volume," choose an appropriate volume setting, and then press [Enter].

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

NOTE: You can also adjust your computer's speaker volume using an audio application within Windows 95 or Windows NT Workstation. Refer to the Windows 95 or Windows NT Workstation on-line help for more information.

Flash Utility

All DIGITAL PC 3400/5400 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).

Inside Your Computer 3

Introduction

This chapter shows the location of the DIGITAL PC 3400/5400 computer's internal components. Expansion information is also covered in this chapter along with illustrations detailing the:

- Main logic board

- Backplanes

Each computer contains a main logic board and a backplane. The main logic board provides most of the chips and components. For those DIGITAL PC 3400/5400 computers that have a Matrox MGA Millennium video controller, a connector on the main logic board is available for installing an optional video memory (WRAM) or MPEG daughter card. The backplane contains slots for connecting expansion boards. For those DIGITAL PC 3400 computers that have a S3 Trio64V+ video controller, connectors on the backplane are available for installing additional video memory.

The chapter concludes with instructions on how to:

- Remove the main logic board (required when installing an optional video memory (WRAM) and MPEG daughter card)

- Replace the battery

- Install a higher-performance processor

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, backplane, and adapter card 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	Main Logic Board (MLB)
B	Internal 3½-inch drive bay(s)
C	Backplane
D	Power supply
E	Front access 5¼-inch drive bay with CD-ROM (not available on all models)
F	Front access 5¼-inch drive bay(s)
G	3½-inch diskette drive
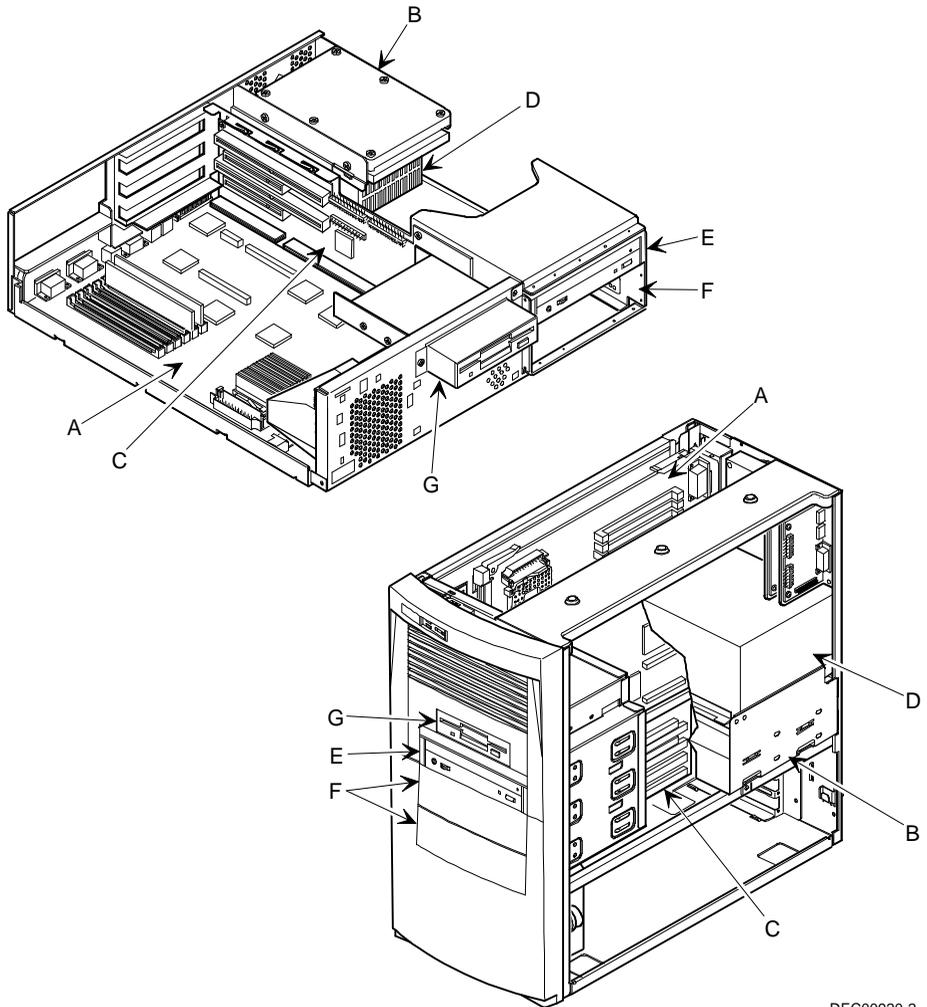
DEC00920-2

Figure 3-1. Computer Components

Main Logic Board Components

Figure Legend	Component
A	Video RAMDAC
B	Super input/output controller
C	Onboard video memory (not available on all models)
D	Matrox MGA Millennium video controller (not available on all models)
E	PCI/ISA/IDE Xcellerator (PIIX3)
F	Computer battery
G	Computer flash and video BIOS
H	Dip switch
I	Intel 440FX chip
J	Pentium Pro processor (CPU)
K	Voltage regulator module (VRM)
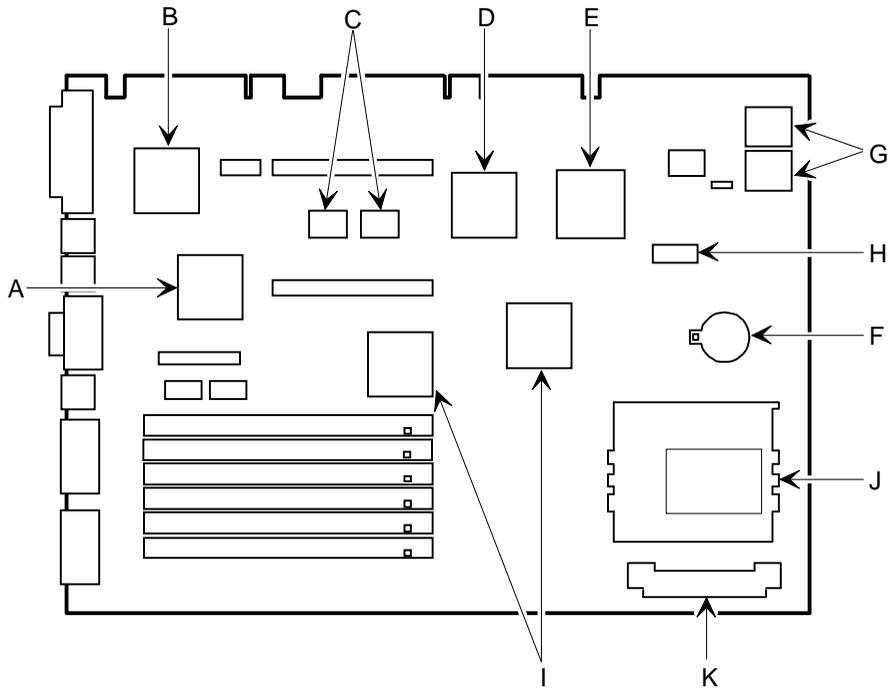
DEC00869-2

Figure 3-2. Main Logic Board Components

Main Logic Board Connectors (Rear Panel)

Figure Legend	Connector
A	Parallel port
B	Keyboard port
C	Mouse port
D	Video (VGA) port (not available on all models)
E	Two USB ports
F	Two serial ports
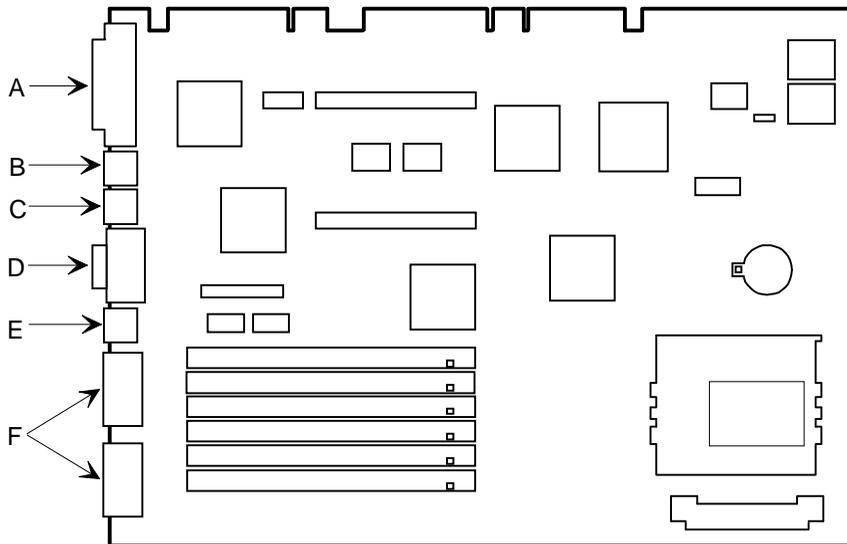
DEC00869-14

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

Main Logic Board Connectors

Figure Legend	Connector
A	Six 72-pin, 32-bit SIMM sockets
B	VGA feature connector (output only)
C	Video memory (WRAM) and MPEG upgrade connectors (not available on all models)
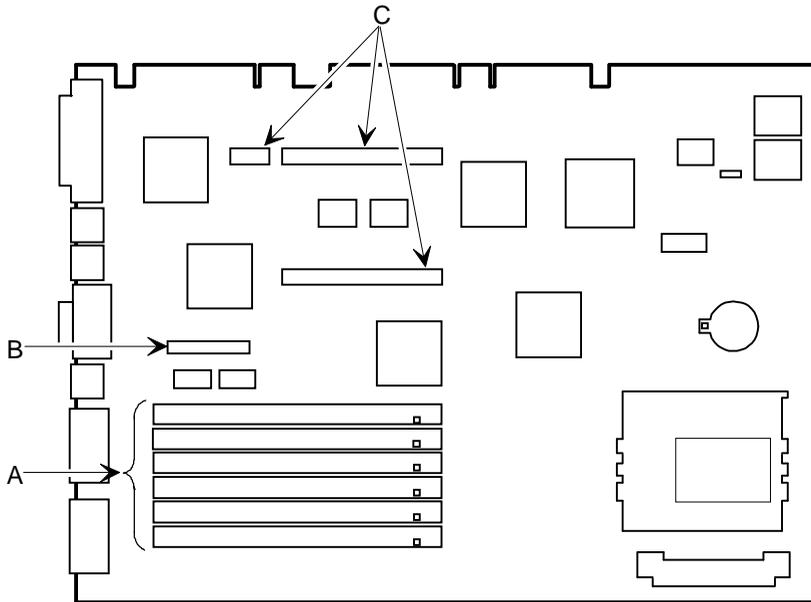
DEC00869-3

Figure 3-4. Main Logic Board Connectors

DIGITAL PC 5400 Low Profile Backplane Components and Connectors

Figure Legend	Connector
A	PCI expansion board connectors
B	ISA expansion board connectors
C	Video IN connector
D	Primary IDE drive connector
E	Secondary IDE drive connector (recommended for an installed CD-ROM drive)
F	Diskette drive connector
G	10Base-T/10Base-2 LAN connector
H	Audio connector (not available on all models)
I	Control panel connector
J	CD-ROM audio input connector (CD-IN)
K	Fax/modem audio input connector (F/M IN)[1]
L	MIDI/game port (not available on all models)
M	SCSI LED connector
N	ESS 1888 AudioDrive controller (not available on all models)
O	100Base-T LAN connector (MII)
P	DIGITAL 21142 PCI Ethernet controller
Q	Power connector
R	Main logic board connectors

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

DIGITAL PC 5400 Low Profile Fax/Modem Audio Input Connector (F/M IN)

Item K, Figure 3-5	Description
Pin 1	Audio in (fax/modem)
Pin 2	Ground
Pin 3	Ground
Pin 4	Microphone in (fax/modem)
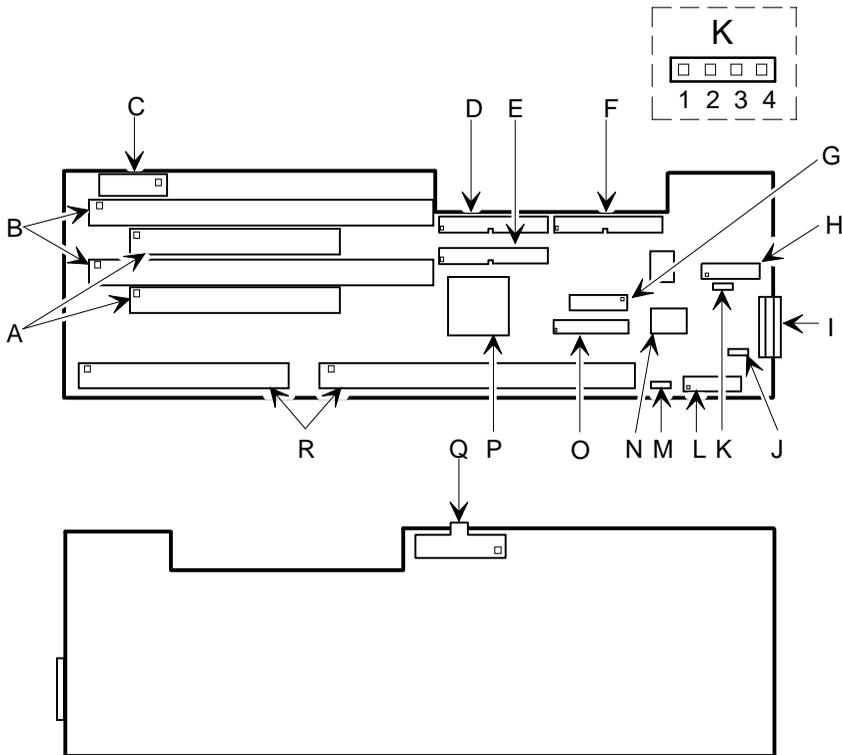
DEC00871-2

Figure 3-5. DIGITAL PC 5400 Low Profile Backplane Components and Connectors

DIGITAL PC 5400 Short Tower Backplane Components and Connectors

Figure Legend	Connector
A	Audio connector (not available on all models)
B	Fax/modem audio input connector (F/M IN)[1]
C	CD-ROM audio input connector (CD-IN)
D	Control panel connector
E	MIDI/game port (not available on all models)
F	SCSI LED connector
G	Primary IDE drive connector
H	Secondary IDE drive connector (recommended for an installed CD-ROM drive)
I	Main logic board connectors
J	Power connector
K	PCI expansion board connectors
L	Video IN connector[2]
M	ISA expansion board connectors
N	Diskette drive connector
O	DIGITAL 21142 PCI Ethernet controller
P	100Base-T LAN connector (MII)
Q	10Base-T/10Base-2 LAN connector
R	Fan connector
S	ESS AudioDrive controller (not available on all models)

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

(2) Upgrade connector for Matrox Media XL option card.

DIGITAL PC 5400 Short Tower Fax/Modem Audio Input Connector (F/M IN)

Item B, Figure 3-6	Description
Pin 1	Audio in (fax/modem)
Pin 2	Ground
Pin 3	Ground
Pin 4	Microphone in (fax/modem)
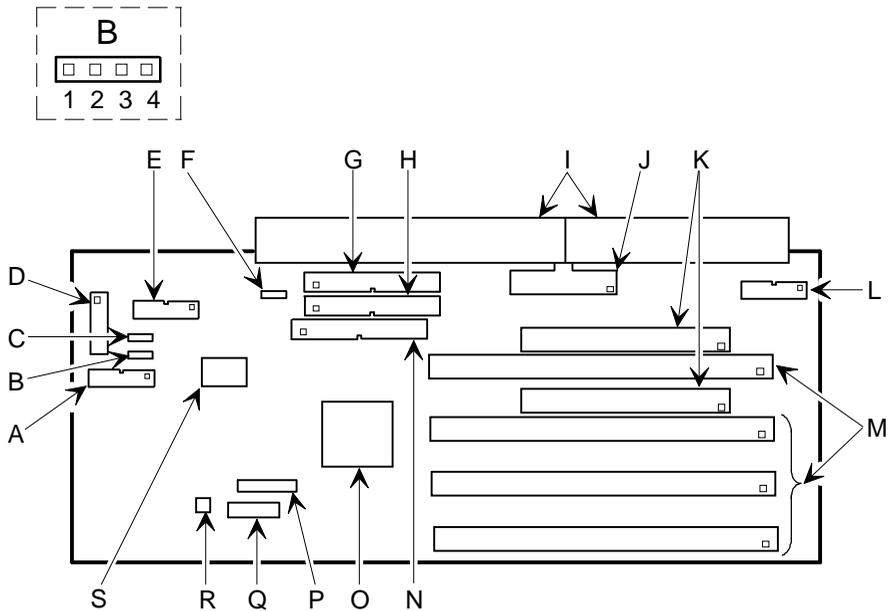
DEC00870-2

Figure 3-6. DIGITAL PC 5400 Short Tower Backplane Components and Connectors

DIGITAL PC 3400 Short Tower Backplane Components and Connectors

Figure Legend	Connector
A	Fan
B	Control panel connector
C	SCSI LED connector
D	Diskette drive connector
E	Secondary IDE drive connector (recommended for an installed CD-ROM drive)
F	Primary IDE drive connector
G	Power connector
H	Main logic board connectors
I	Video IN connector
J	PCI expansion board connectors
K	ISA expansion board connectors
L	S3 Trio 64V+ video controller (not available on all models)
M	Video (VGA) connector (not available on all models)
N	Feature connector (not available on all models)
O	Video memory upgrade sockets (not available on all models)
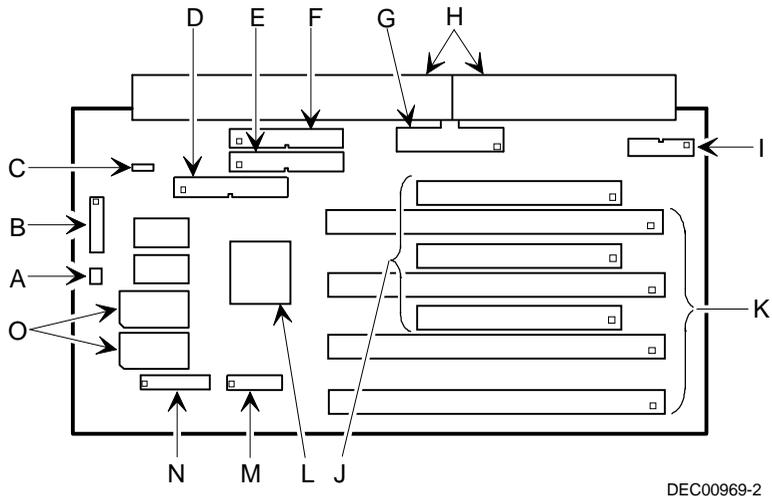
Figure 3-7. DIGITAL PC 3400 Short Tower Backplane Components and Connectors

DIGITAL PC 5400 Network Adapter Card Connectors

DIGITAL PC 5400 computers are network ready. You can use 10Base-2 (A, Figure 3-8) or 10Base-T (B, Figure 3-8) ports at the rear of your computer to connect your external network cables. The internal network cables are already installed for you. Note that an optional 100Base-T network card is also available.

NOTE: The location of this adapter card might vary depending on your computer model.
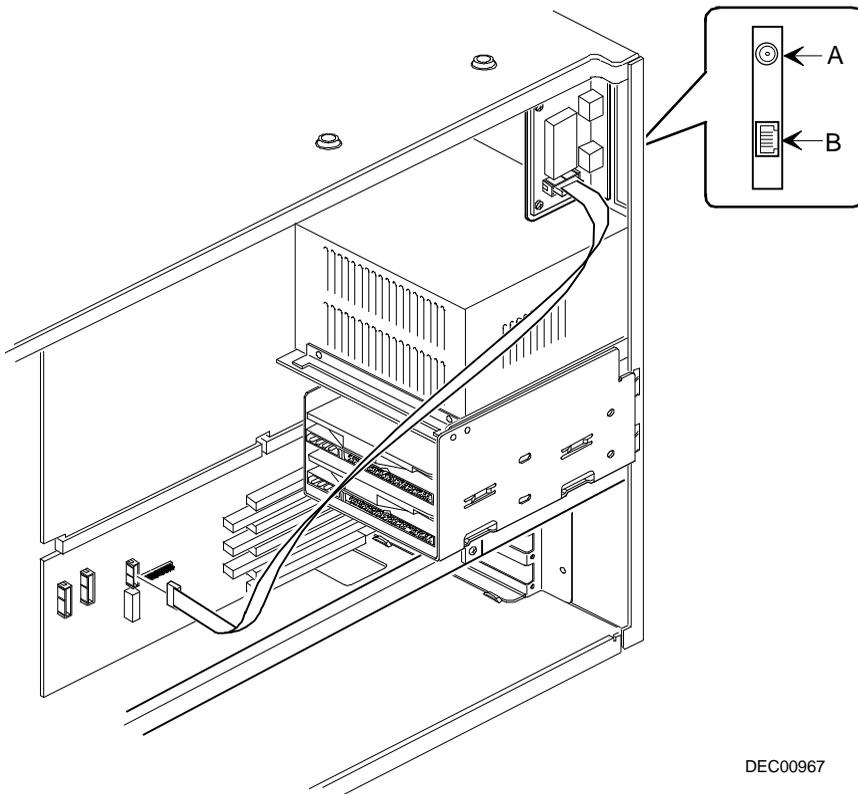
DEC00967

Figure 3-8. DIGITAL PC 5400 Network Adapter Card Connectors (Short Tower Only)

Audio/MIDI Adapter Card Connectors (Not Available on Some Models)

DIGITAL PC 5400 computers with the ESS sound chip come with an audio/MIDI adapter card installed. This card allows you to connect a MIDI device and speakers to your computer.

NOTE: The location of this adapter card might vary depending on your computer model.

Figure Legend	Connector
A	Line in
B	Speaker out
C	MIDI port/joystick port
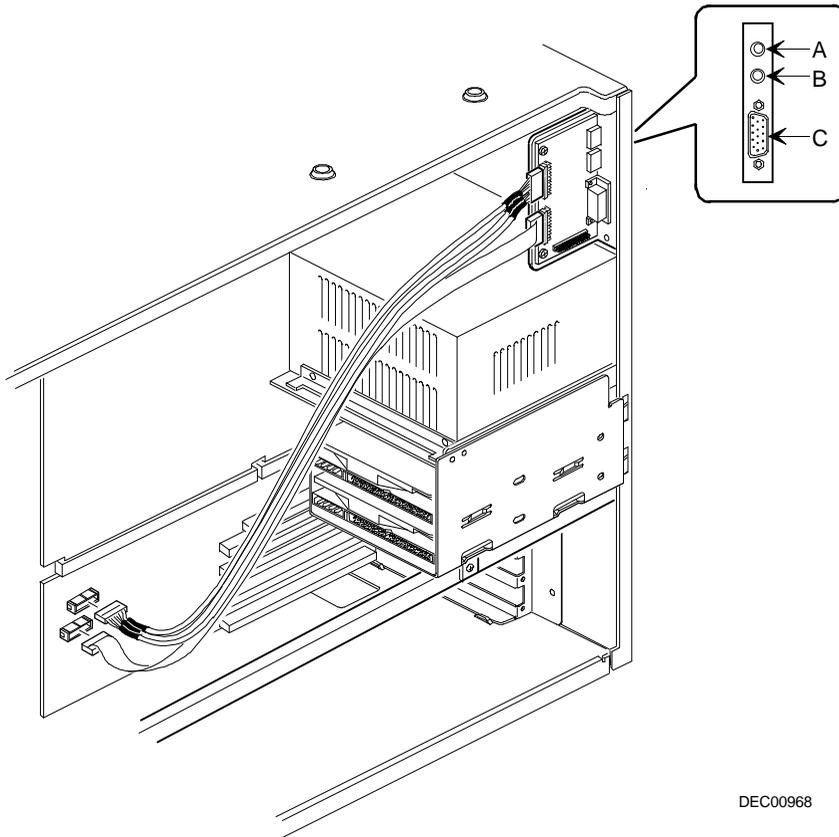
DEC00968

Figure 3-9. Audio/MIDI Adapter Card Connectors

Video Adapter Card Connection (Not Available on Some Models)

Some DIGITAL PC 3400 computers come with onboard S3 Trio 64V+ video graphics. Connect your monitor to the video connector (A, Figure 3-10). The internal cables are already connected for you.

NOTE: The location of this video adapter card might vary depending on your computer model.
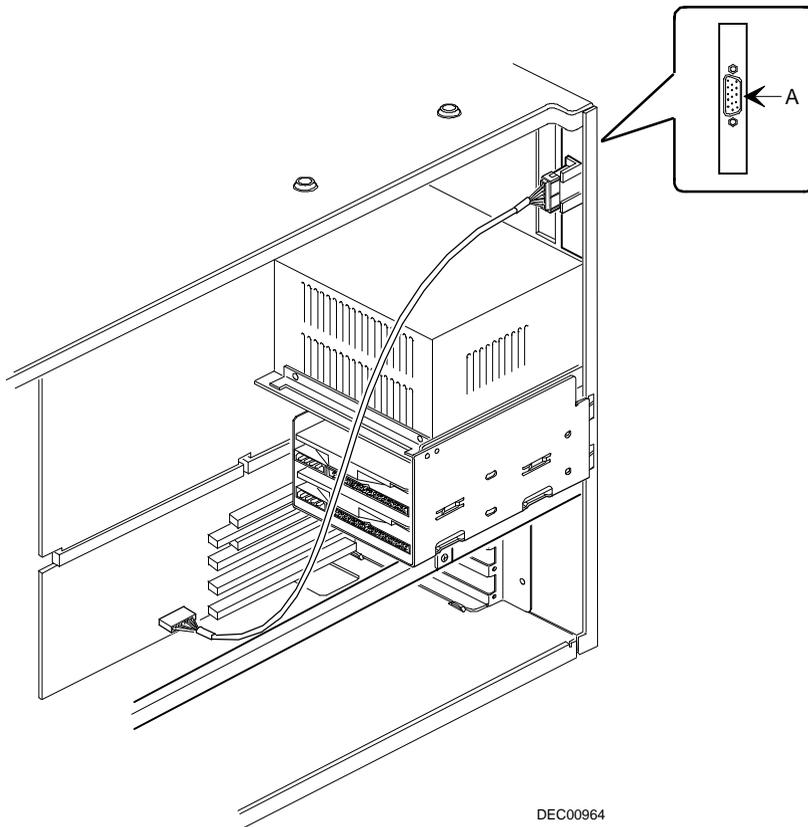
DEC00964

Figure 3-10. Video Adapter Card Connections (Not Available on Some Models)

Removing the Main Logic Board

If you plan on installing an optional video memory (WRAM) or MPEG daughter card, you need to remove 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.

3. Remove the outside cover.

4. Lift up on the right side of the brace and then swing it away from the chassis (DIGITAL PC 5400 low profile only).

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

   This separates the main logic board from the backplane.

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

After installing an optional video memory (WRAM) or MPEG daughter card, replace the main logic board as follows:

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 (DIGITAL PC 5400 low profile only).

3. Replace the outside cover.

4. Connect all external devices, ac power, and monitor power.
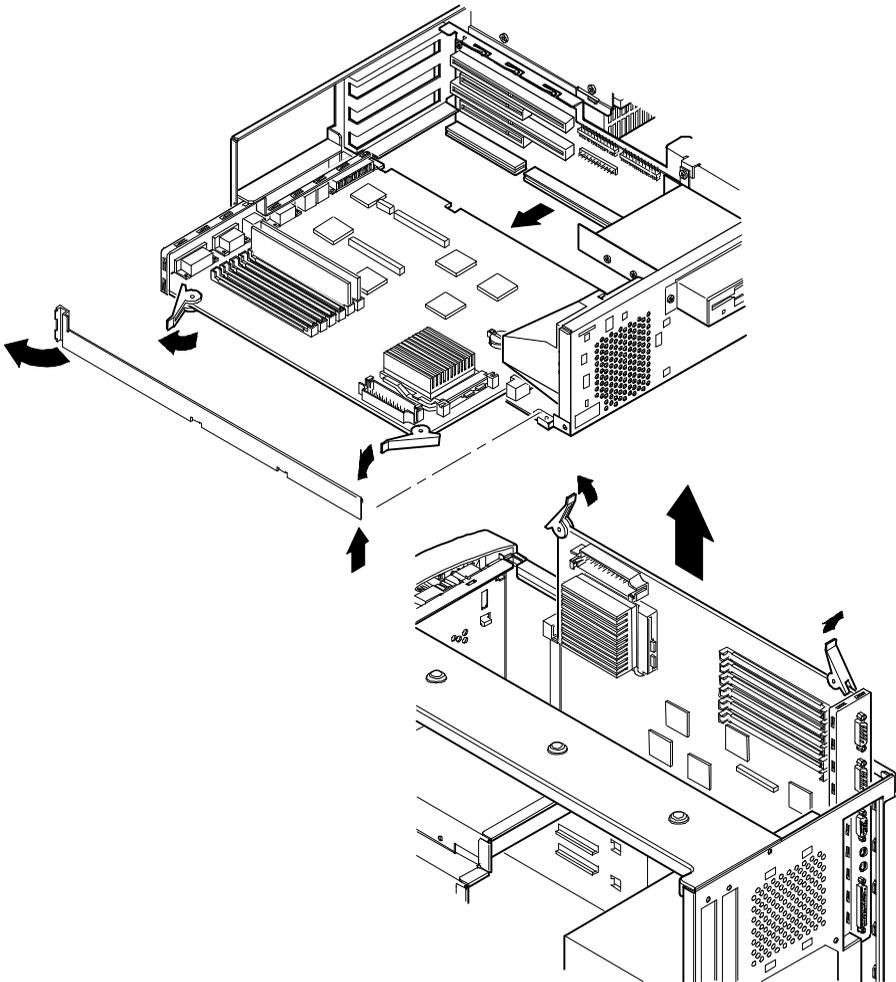
DEC00872

Figure 3-11. 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."
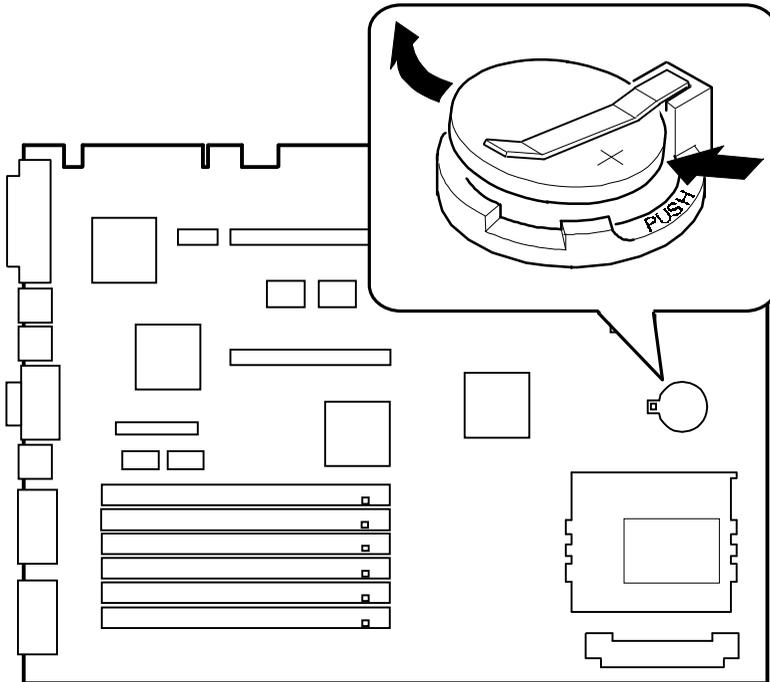
DEC00869-7

Figure 3-12. Replacing the Battery

Installing a Higher Performance Processor

Your computer comes with an Intel Pentium Pro processor installed in a ZIF socket. Contact your DIGITAL sales representative or reseller for future processor upgrade availability and ordering information for your computer.

To install a higher performance processor:

1. Turn off your computer and monitor.

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

3. Remove the outside cover.

4. Remove the heat sink clips and the heat sink.

5. Lift up on the lever to release the old processor.

    Remove the old processor.

6. Install the new processor.

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

    Make sure pin 1 on the processor is aligned with pin 1 on the ZIF socket (A, Figure 3-13).

7. Return the lever to its original position.

8. Apply thermal compound or thermal tape on the top of the processor. The thermal compound or thermal tape seals the heat sink to the processor.

9. Install the heat sink on the processor and then secure it using the heat sink clips.

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

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

11. Replace the outside cover.

12. Connect all external devices and restore power.
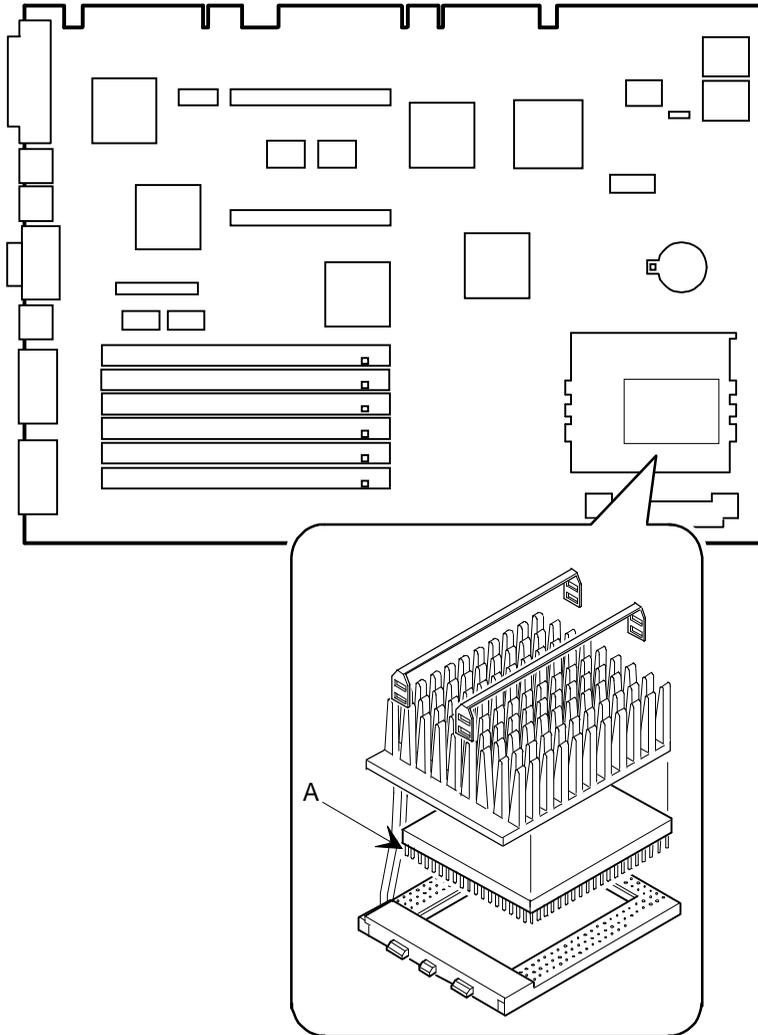
DEC00869-11

Figure 3-13. Installing a Higher Performance Processor

Main Logic Board Expansion *4*

Introduction

This chapter provides detailed instructions on installing the following main logic board options:

- Computer memory

- Video memory (DIGITAL PC 3400 models with S3 Trio 64V+ video controller)

- Video memory (WRAM) daughter card (DIGITAL PC 3400/5400 models with Matrox MGA Millennium video controllers)

- Optional MPEG daughter card (DIGITAL PC 3400/5400 models with Matrox MGA Millennium video controllers)

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

Installing Additional Computer Memory

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

DIGITAL PC 3400/5400 computers come with at least 16 MB of Extended Data Out (EDO) memory. Memory is installed as two 4 MB SIMMs in bank 0, socket J13 and J14. When adding memory, you need to use 72-pin SIMMs (see Figure 4-1).

You can increase the amount of computer memory up to 192 MB using the six SIMM sockets on the main logic board.

All DIGITAL PC 3400/5400 computers support EDO memory. EDO memory, in SIMM pairs of 4 MB, 8 MB, 16 MB, or 32 MB, is faster than standard non-parity Fast Page memory. Contact your local DIGITAL sales representative for ordering information.

When adding SIMMs make sure you:

- Install 32-bit SIMMs having an access time of 70 ns (60 ns for EDO DRAM) or less. Supported SIMM sizes: 4 MB, 8 MB, 16 MB, and 32 MB.

- SIMMs must be installed in pairs and use the same type and size SIMM within a bank. For example, if you add 8 MB of EDO memory in J15, and decide to add another 8 MB, you must use 8 MB of EDO memory in J16.

- You can mix EDO and fast paged memory. However, if you populate both SIMM sockets in a given bank, you must use the same type of memory. You cannot mix EDO and fast paged memory in the same bank.

Refer to "Memory Configurations" for a list of SIMM combinations supported by your DIGITAL PC 3400/5400 computer and to " Installing a SIMM" for detailed instructions on installing SIMMs.
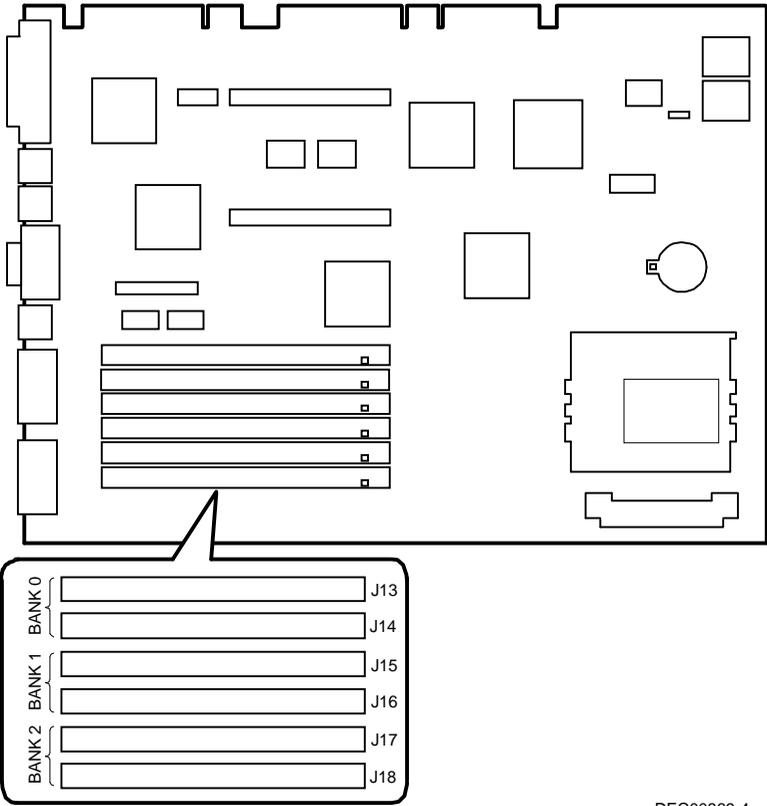
DEC00869-4

Figure 4-1. SIMM Socket Locations

Memory Configurations

Socket J13	Socket J14	Socket J15	Socket J16	Socket J17	Socket J18	Total
4 MB	4 MB					8 MB
4 MB	4 MB	4 MB	4 MB			16 MB
8 MB	8 MB					16 MB
4 MB	4 MB	4 MB	4 MB	4 MB	4 MB	24 MB
4 MB	4 MB	4 MB	4 MB	8 MB	8 MB	32 MB
8 MB	8 MB	8 MB	8 MB			32 MB
16 MB	16 MB					32 MB
4 MB	4 MB	8 MB	8 MB	8 MB	8 MB	40 MB
8 MB	8 MB	8 MB	8 MB	8 MB	8 MB	48 MB
4 MB	4 MB	4 MB	4 MB	16 MB	16 MB	48 MB
4 MB	4 MB	8 MB	8 MB	16 MB	16 MB	56 MB
8 MB	8 MB	8 MB	8 MB	16 MB	16 MB	64 MB
16 MB	16 MB	16 MB	16 MB			64 MB
32 MB	32 MB					64 MB
4 MB	4 MB	16 MB	16 MB	16 MB	16 MB	72 MB
4 MB	4 MB	4 MB	4 MB	32 MB	32 MB	80 MB
8 MB	8 MB	16 MB	16 MB	16 MB	16 MB	80 MB
4 MB	4 MB	8 MB	8 MB	32 MB	32 MB	88 MB
8 MB	8 MB	8 MB	8 MB	32 MB	32 MB	96 MB
16 MB	16 MB	16 MB	16 MB	16 MB	16 MB	96 MB
4 MB	4 MB	16 MB	16 MB	32 MB	32 MB	104 MB
4 MB	4 MB	32 MB	32 MB	32 MB	32 MB	136 MB
8 MB	8 MB	16 MB	16 MB	32 MB	32 MB	112 MB
16 MB	16 MB	16 MB	16 MB	32 MB	32 MB	128 MB
32 MB	32 MB	32 MB	32 MB			128 MB
8 MB	8 MB	32 MB	32 MB	32 MB	32 MB	140 MB
16 MB	16 MB	32 MB	32 MB	32 MB	32 MB	160 MB
32 MB	32 MB	32 MB	32 MB	32 MB	32 MB	192 MB

Table does not list all possible configurations.

Installing a SIMM

To install a SIMM, 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. Install the SIMM into the socket at a 45 degree angle.

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

5. Replace the outside cover.

6. Connect all external devices and restore power.

DEC00921

Figure 4-2. Installing a SIMM

Installing Video Memory

If your computer came with an S3 Trio 64V+ video controller and 1 MB of video memory. You can upgrade to 2 MB of video memory by installing two industry standard EDO 40-pin, 256 KB x 16, 50 ns video memory DRAM chips on your computer's backplane.

To install the video memory upgrade chips:

1. Turn off your computer and monitor.

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

3. Remove the outside cover.

4. Install each video memory DRAM chip.

> **CAUTION:** Make sure pin 1 on each video DRAM chip is correctly aligned with the location on the socket (A, Figure 4-3). Incorrect installation can cause faulty computer operation.

5. Replace the outside cover.

6. Connect all external devices and restore power.

DEC00969-4

Figure 4-3. Video Memory Installation

Installing an Optional Video Memory (WRAM) Daughter Card

If your computer came with a Matrox MGA Millennium video controller and 2 MB of video memory (WRAM). You can upgrade to 8 MB of video memory (WRAM) by installing an optional video memory (WRAM) daughter card.
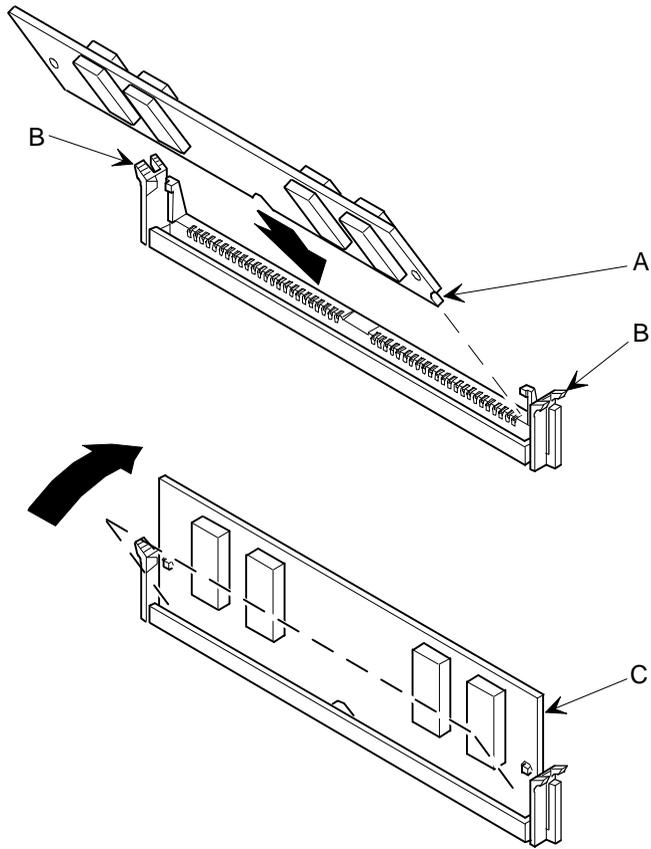
To install an optional video memory (WRAM) daughter card:

1. Turn off your computer and monitor.

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

3. Remove the outside cover.

4. Remove the main logic board (refer to Chapter 3).

5. Install an optional video memory (WRAM) daughter card.

   NOTE: Make sure the male and female connectors are correctly aligned with the mating connectors on the main logic board.

6. Replace the main logic board (refer to Chapter 3).

7. Replace the outside cover.

8. Connect all external devices and restore power.
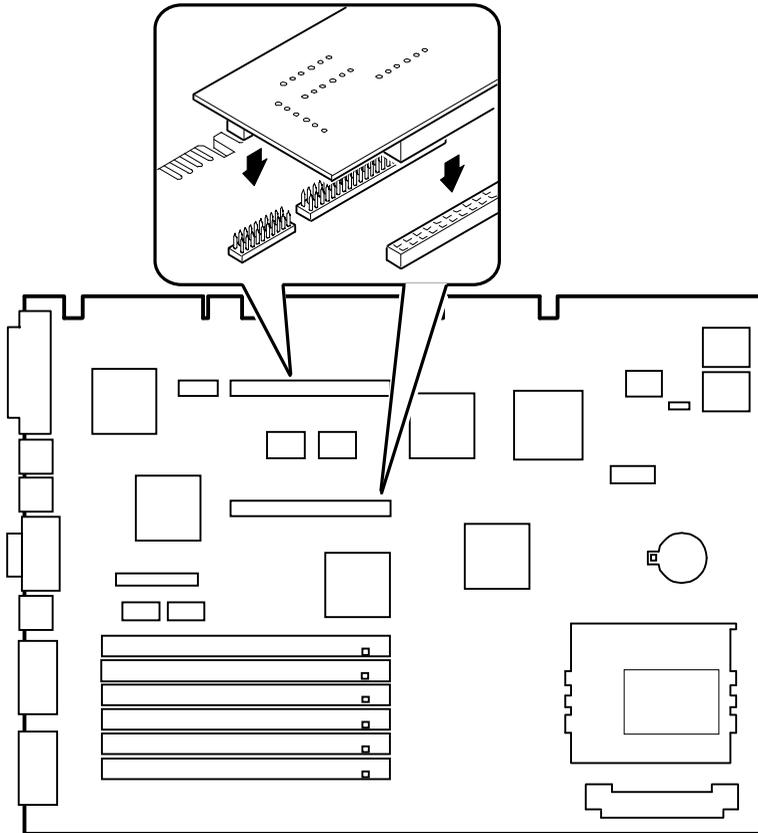
DEC00869-9

Figure 4-4. Video Memory (WRAM) Daughter Card Installation

Installing an Optional MPEG Daughter Card

For DIGITAL PC 3400/5400 computers with a Matrox MGA Millennium video controller, you can install an optional MPEG daughter card to greatly enhance your computer's video and video capture capabilities.

To install an optional MPEG daughter card:
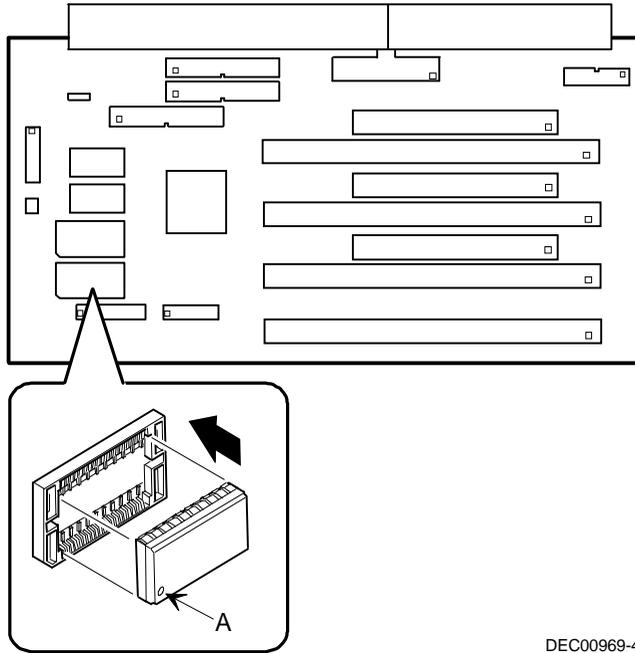
1. Turn off your computer and monitor.

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

3. Remove the outside cover.

4. Remove the main logic board (refer to Chapter 3).

5. Install the MPEG daughter card as shown in Figure 4-5.

   NOTE: Make sure the male and female connectors are correctly aligned with the mating connectors on the main logic board..

6. Replace the main logic board (refer to Chapter 3).

7. Replace the outside cover.

8. Connect all external devices and restore power.

   Refer to the documentation that came with MPEG daughter card for information on connecting it and installing any associated software.
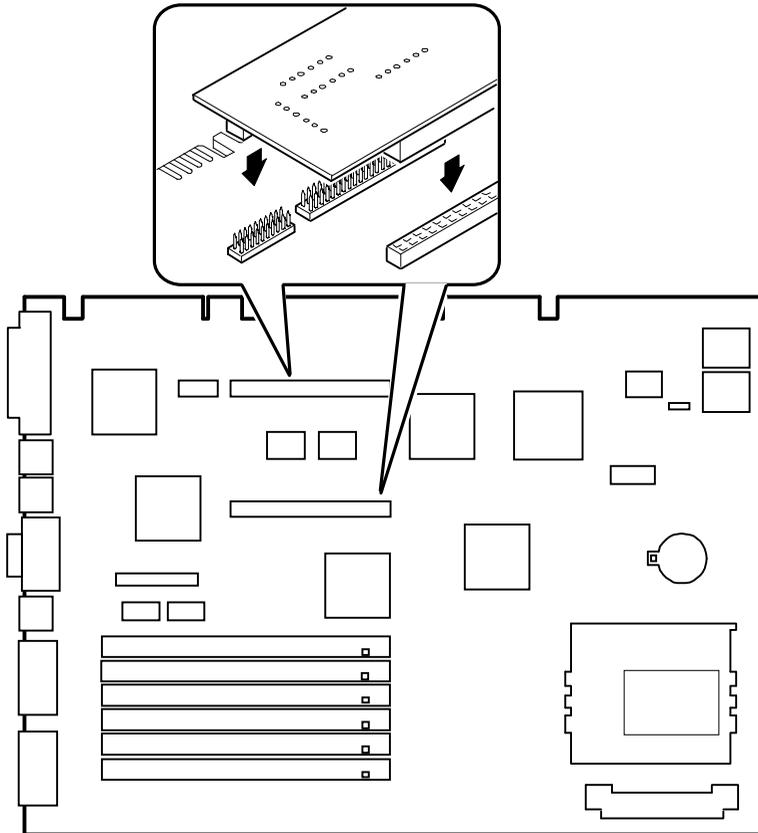
DEC00869-15

Figure 4-5. MPEG Daughter Card Installation

Adding Expansion Boards **5**

Introduction

For all DIGITAL PC 3400/5400 computers, 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 (DIGITAL PC 5400 Low Profile)

Your DIGITAL PC 5400 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.
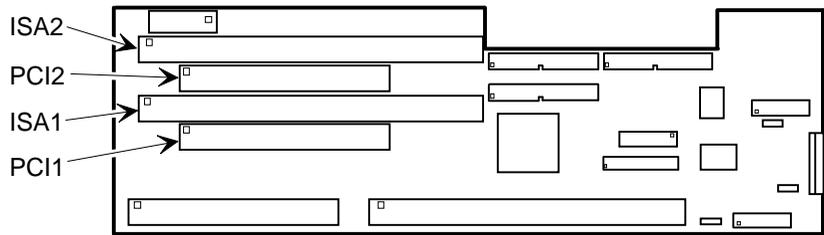
DEC00871-3

Figure 5-1. Expansion Board Slots (DIGITAL PC 5400 Low Profile)

Expansion Slots (DIGITAL PC 5400 Short Tower)

Your DIGITAL PC 5400 short tower backplane contains six connectors for installing up to five expansion boards:

- Four ISA expansion boards and one PCI expansion board or

- Three ISA expansion boards and two PCI expansion boards (refer to the table).

Expansion Slot Designation	Description
ISA2-ISA3	Supports full-length industry-standard 16-bit ISA expansion boards
	Uses the second and third expansion slots at the rear panel
ISA4	Supports half-length industry-standard 16-bit ISA expansion boards
	Uses the first (bottom) expansion slots at the rear panel
PCI2	Supports full-length 32-bit PCI local bus expansion boards
	Uses the fourth expansion slot at the rear panel
	Designated as a shared slot with ISA slot ISA1[1]
ISA1	Supports half-length industry-standard 16-bit ISA expansion boards
	Uses the fourth expansion slot at the rear panel
	Designated as a shared slot with PCI slot PCI2[1]
PCI1	Supports half-length 32-bit PCI local bus expansion boards
	Uses the fifth (top) 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 fourth expansion slot opening at the rear panel, thus, a maximum of five expansion boards can be supported at any one time.

PCI1
ISA1
PCI2
ISA2
ISA3
ISA4

DEC00870-3

Figure 5-2. Expansion Board Slots (DIGITAL PC 5400 Short Tower)
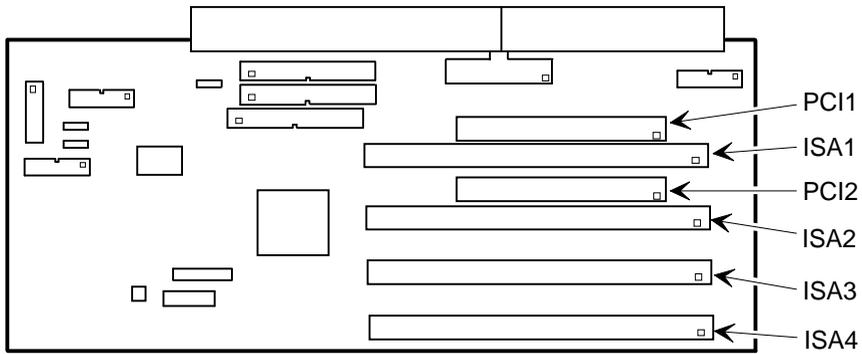
Expansion Slots (DIGITAL PC 3400 Short Tower)

Your DIGITAL PC 3400 short tower backplane contains seven connectors for installing up to five expansion boards:

- Four ISA expansion boards and one PCI expansion board or

- Two ISA expansion boards and three PCI expansion boards (refer to the table).

Expansion Slot Designation	Description
ISA3	Supports full-length industry-standard 16-bit ISA expansion boards
	Uses the second expansion slots at the rear panel
ISA4	Supports half-length industry-standard 16-bit ISA expansion boards
	Uses the first (bottom) expansion slots at the rear panel
PCI3	Supports full-length 32-bit PCI local bus expansion boards
	Uses the third expansion slot at the rear panel
	Designated as a shared slot with ISA slot ISA2[1]
ISA2	Supports full-length industry-standard 16-bit ISA expansion boards
	Uses the third expansion slot at the rear panel
	Designated as a shared slot with PCI slot PCI3[1]
PCI2	Supports full-length 32-bit PCI local bus expansion boards
	Uses the fourth expansion slot at the rear panel
	Designated as a shared slot with ISA slot ISA1[1]
ISA1	Supports half-length industry-standard 16-bit ISA expansion boards
	Uses the fourth expansion slot at the rear panel
	Designated as a shared slot with PCI slot PCI2[1]
PCI1	Supports half-length 32-bit PCI local bus expansion boards
	Uses the fifth (top) expansion slot at the rear panel

[1] Only one expansion board can reside in slot PCI3 and ISA2 or PCI2 and ISA1 at any one time. These slots have to share the third and fourth expansion slot openings at the rear panel, thus, a maximum of five expansion boards can be supported at any one time.

DEC00969-3

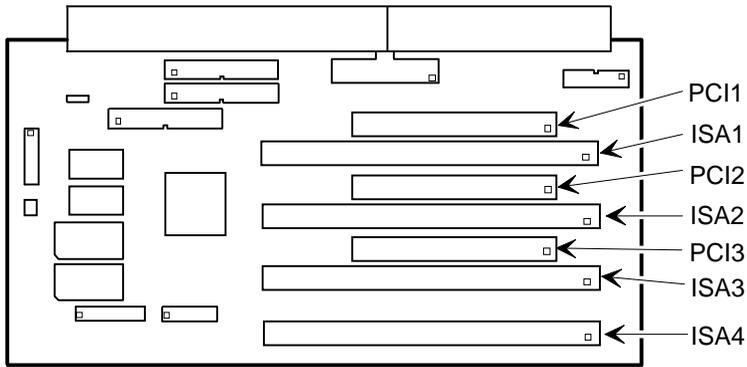**Figure 5-3. Expansion Board Slots (DIGITAL PC 3400 Short Tower)**

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. For short tower models, you can rotate the disk drives to make the area more accessible.

5. Unscrew the metal filler plate(s) from the selected expansion slot.
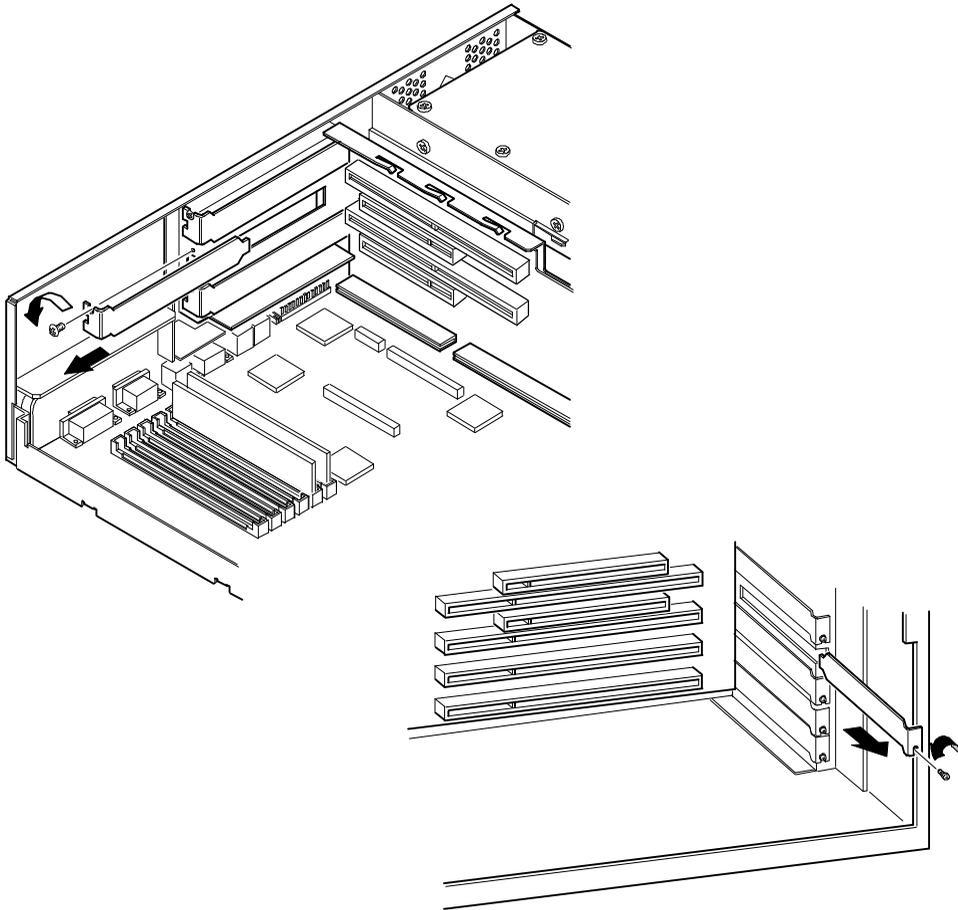
DEC00874-2

Figure 5-4. Removing a Metal Filler Plate

6. Insert the new expansion board into the socket.

    Push the expansion board firmly into place.
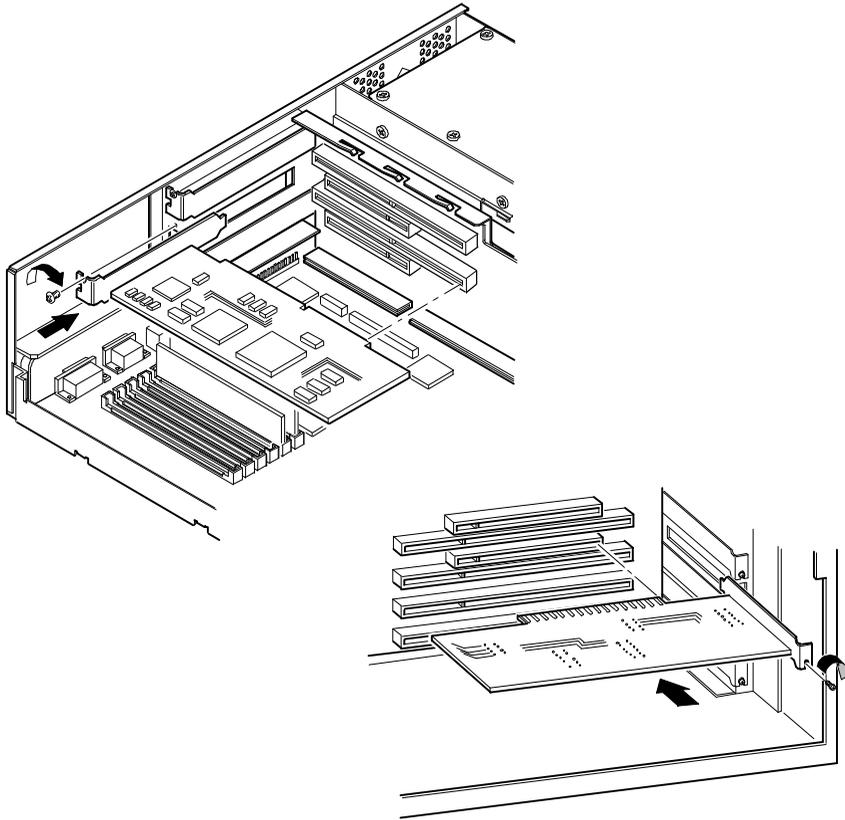
DEC00874-3

Figure 5-5. Installing an Expansion Board

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

8. Replace the outside cover.

9. Connect all external devices and restore power.

Adding Mass Storage Devices *6*

Introduction

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

Installing Mass Storage Devices (DIGITAL PC 5400 Low Profile)

Your DIGITAL PC 5400 low profile computer contains four mass storage device bays:

- The middle-front device bay contains a factory installed 3½-inch diskette drive.

- The top-right device bay contains a factory installed CD-ROM (not available on all models).

- The bottom-right device bay is accessible from the front of the computer and can hold a 3½-inch or 5¼-inch half-height device. For example, a diskette drive, 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.

Installing Mass Storage Devices (DIGITAL PC 3400/5400 Short Tower)

Your DIGITAL PC 3400/5400 short tower computer contains six mass storage device bays:

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

- The second device bay contains a factory installed CD-ROM (not available on all models).

- The third and fourth device bays can hold a 3½-inch or 5¼-inch half-height device. For example, a diskette drive, tape backup drive, or hard disk drive.

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

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

Installing a 3½-Inch Device into the Bottom-Right Device Bay (DIGITAL PC 5400 Low Profile)

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 drive rail from the inside of the chassis.

5. Install the brackets and the drive rail onto the 3½-inch device.

DEC00723

Figure 6-1. Installing Drive Rail and 3½-Inch Device Brackets (DIGITAL PC 5400 Low Profile)

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.
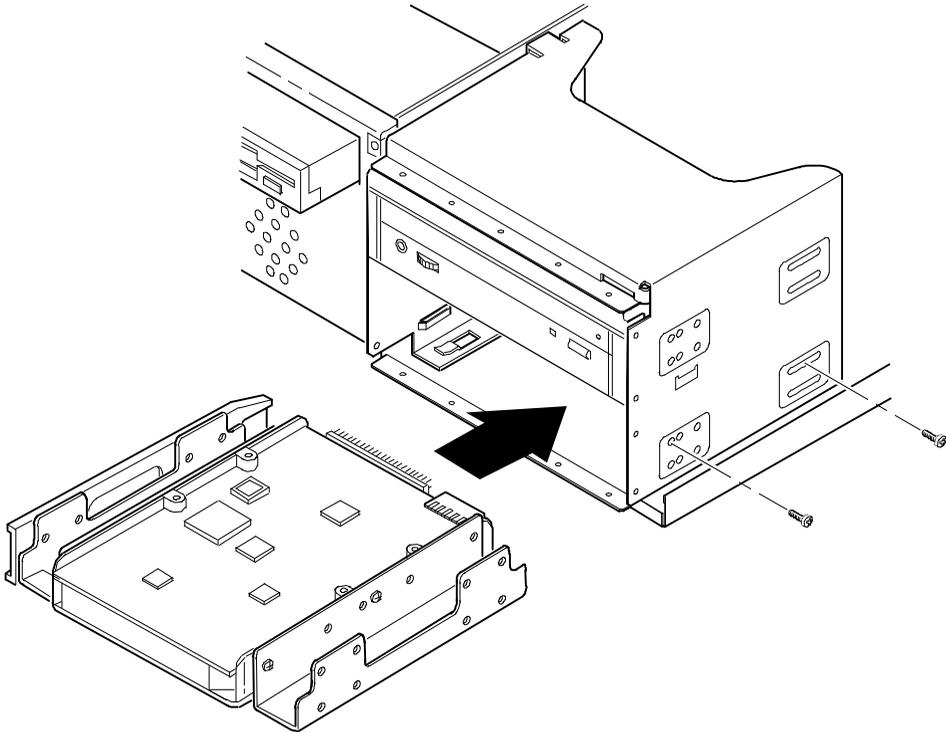
DEC00757-6

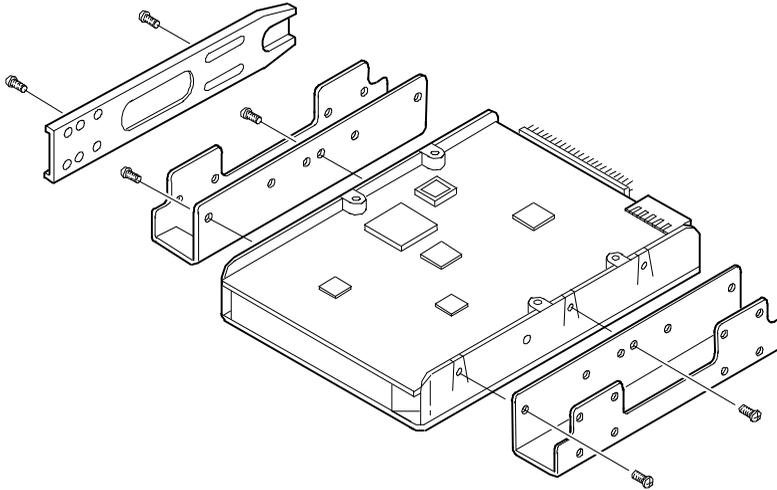**Figure 6-2. Installing a 3½-Inch Device (DIGITAL PC 5400 Low Profile)**

Installing a 5¼-Inch Device into the Bottom-Right Device Bay (DIGITAL PC 5400 Low Profile)

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.
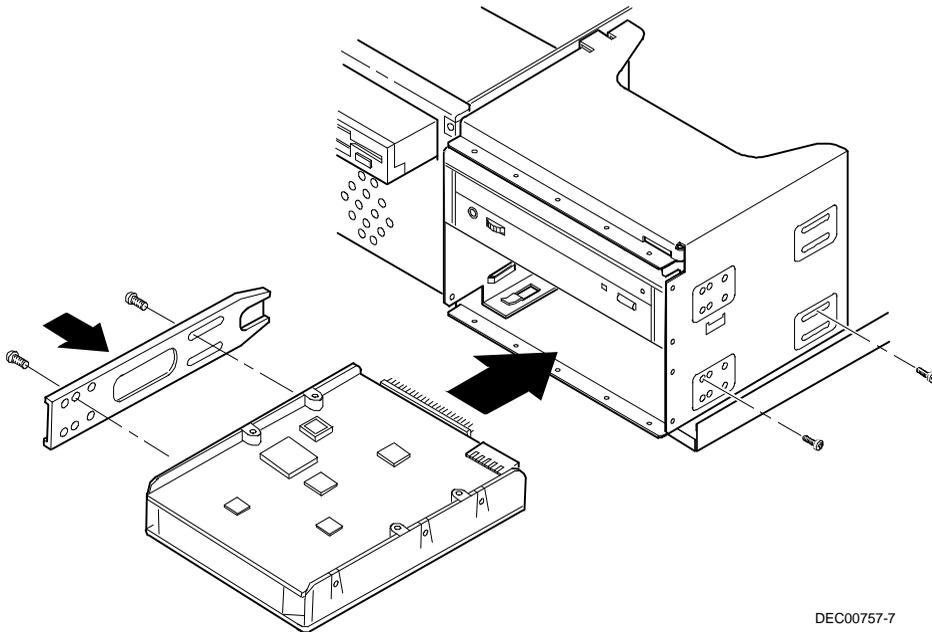
DEC00757-7

Figure 6-3. Installing a 5¼-Inch Device (DIGITAL PC 5400 Low Profile)

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.

Removing the Front Bezel (DIGITAL PC 3400/5400 Short Tower)

The following procedures describe how to remove the front bezel.

1. Turn off your computer and monitor.

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

3. Remove the outside cover.

4. From the top of the computer, looking down towards the bottom of the front of the chassis, you should see two tabs from the front bezel that hold the bezel in place and secure it to the chassis. Find both tabs (one on the left and one on the right).

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

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

7. Gently but firmly, pull up on the bezel to detach the bottom bezel mounts.
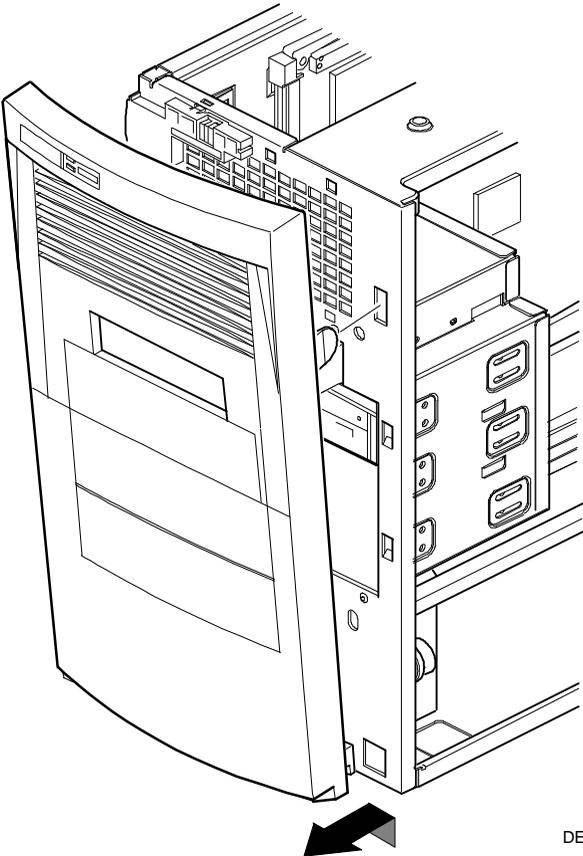
DEC00758-11

Figure 6-4. Removing the Front Bezel

Installing a 3½-Inch Device into a Front Device Bay (DIGITAL PC 3400/5400 Short Tower)

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

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

1. Turn off your computer and monitor.

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

3. Remove the outside cover.

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

5. Remove the EMI shield filler plate.

6. Install the brackets onto the 3½-inch device (see Figure 6-1).

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

    Secure the device using the supplied mounting screws.

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

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

DEC00758-8

Figure 6-5. Installing a 3½-Inch Device (DIGITAL PC 3400/5400 Short Tower)

Installing a 5¼-Inch Device Into a Front Device Bay (DIGITAL PC 3400/5400 Short Tower)
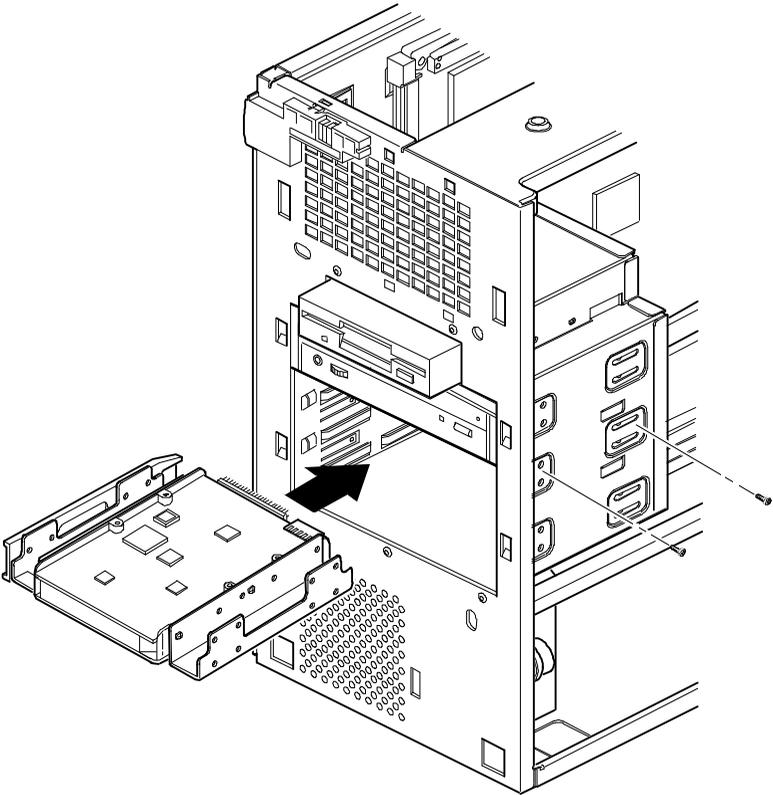
The following procedures describe how to install 5¼-inch device into a front-access device bay.

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

1. Turn off your computer and monitor.

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

3. Remove the outside cover.

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

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

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

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

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

9. If necessary, replace the filler panel.

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

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

DEC00758-9

Figure 6-6. Installing 5¼-Inch Device (DIGITAL PC 3400/5400 Short Tower)

Installing a 3½-Inch Device into the Internal Device Bay (DIGITAL PC 3400/5400 Short Tower)
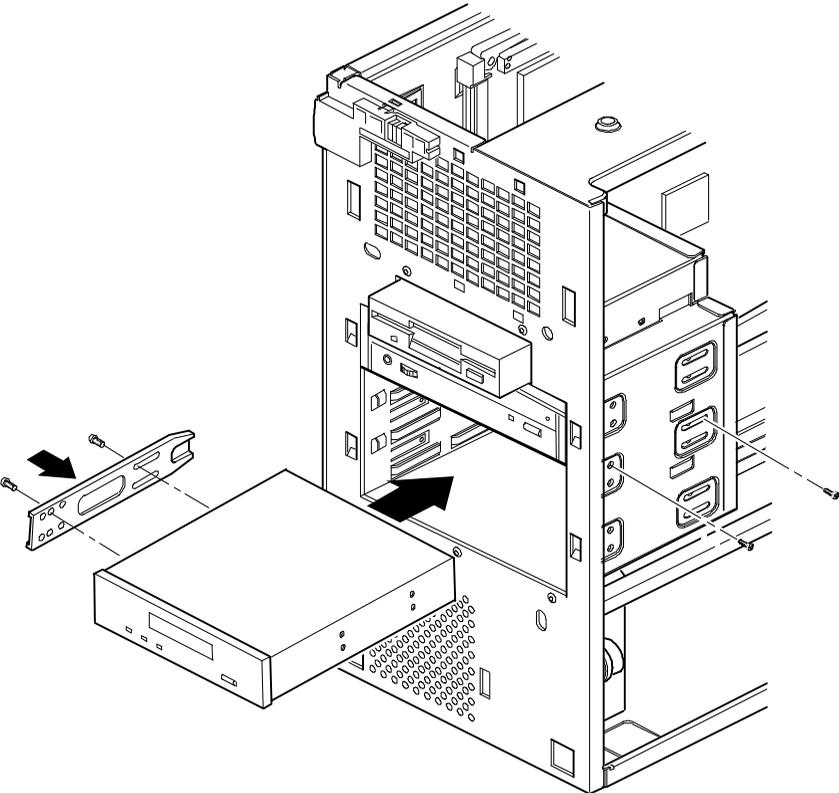
The following procedures describe how to install a low profile, 1-inch high, 3½-inch mass storage device into the internal device bay.

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

1. Turn off your computer and monitor.

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

3. Remove the outside cover.

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

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

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

6. Swing the device bay away from the chassis to gain access to the upper bay.
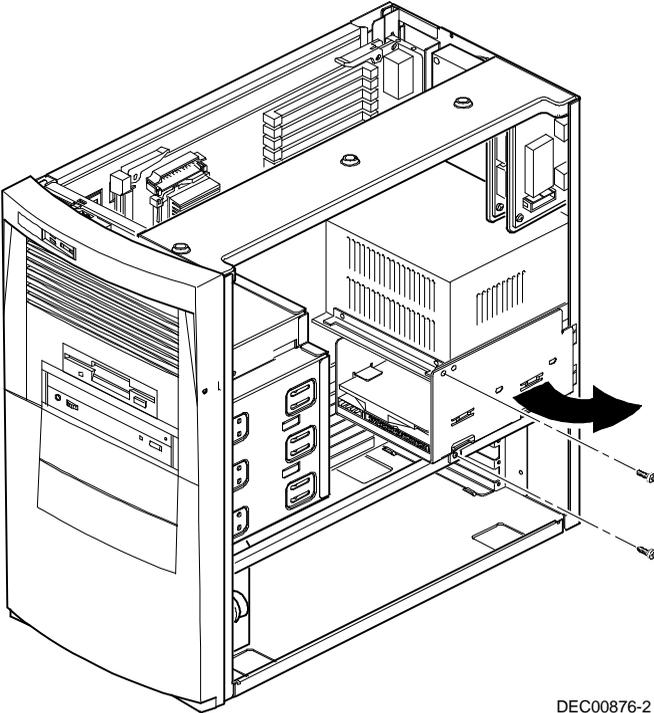
DEC00876-2

Figure 6-7. Accessing the Internal 3½-Inch Device Bay (DIGITAL PC 3400/5400 Short Tower)

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

    Secure the device using the supplied mounting screws.
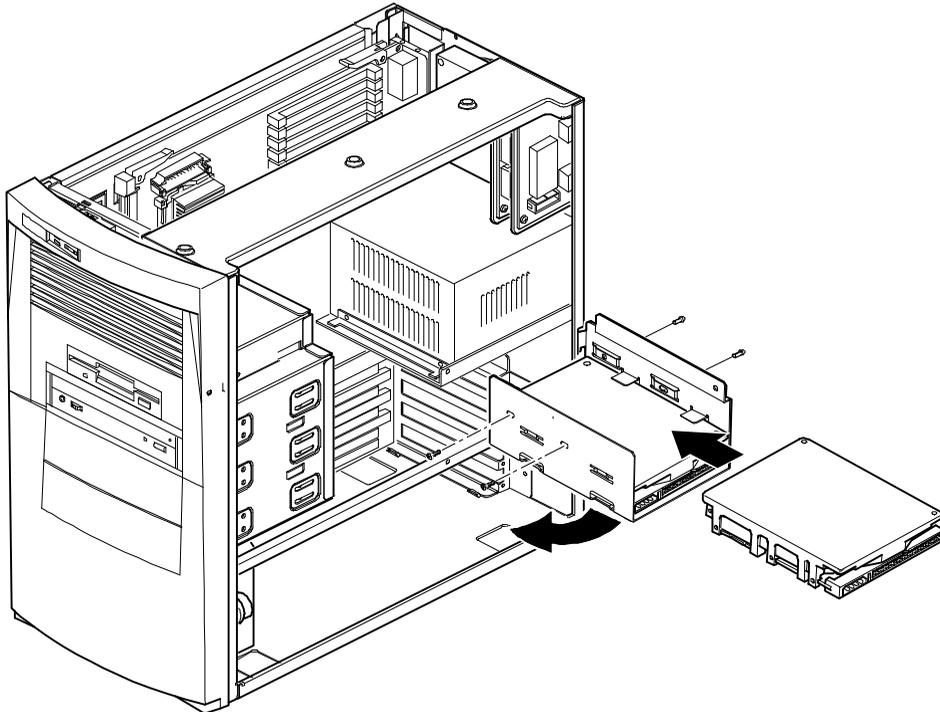
DEC00876-3

**Figure 6-8. Attaching a 3½-Inch Device to the Internal 3½-inch Device Bay
(DIGITAL PC 3400/5400 Short Tower)**

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

9. Connect the power and data cables.

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

Connecting Diskette and IDE Devices (DIGITAL PC 5400 Low Profile)

To connect diskette and IDE devices, perform the following:

1. Connect the supplied ribbon cable to the appropriate device as shown in figures 6-9 and 6-10.

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

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

   Pin 1 of the cable is on 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
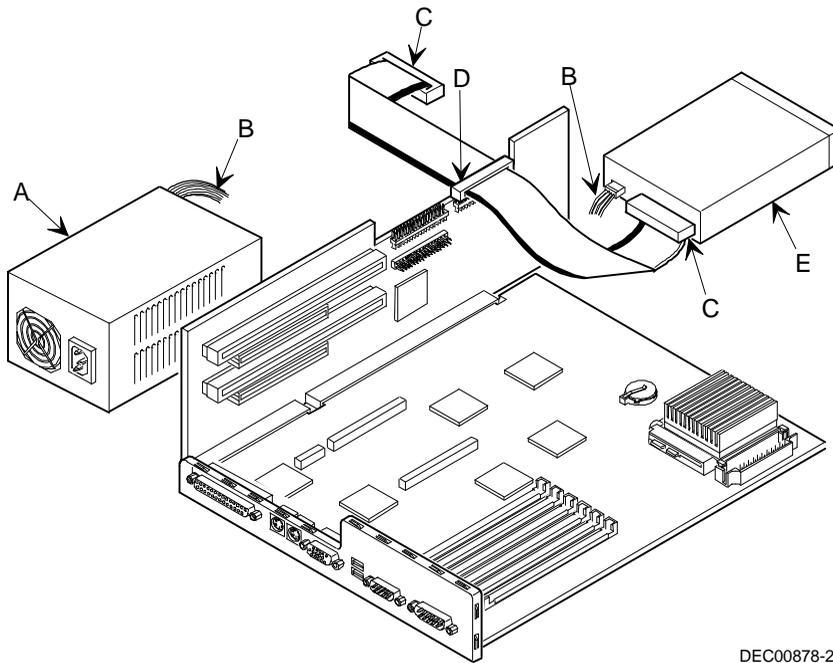
DEC00878-2

Figure 6-9. Diskette Drive Data Cable Connections (DIGITAL PC 5400 Low Profile)

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]	CD-ROM drive (not available on all models)
H	Backplane IDE drive connection (secondary)

[1] The CD-ROM drive is connected to the secondary IDE port and configured as a master drive.
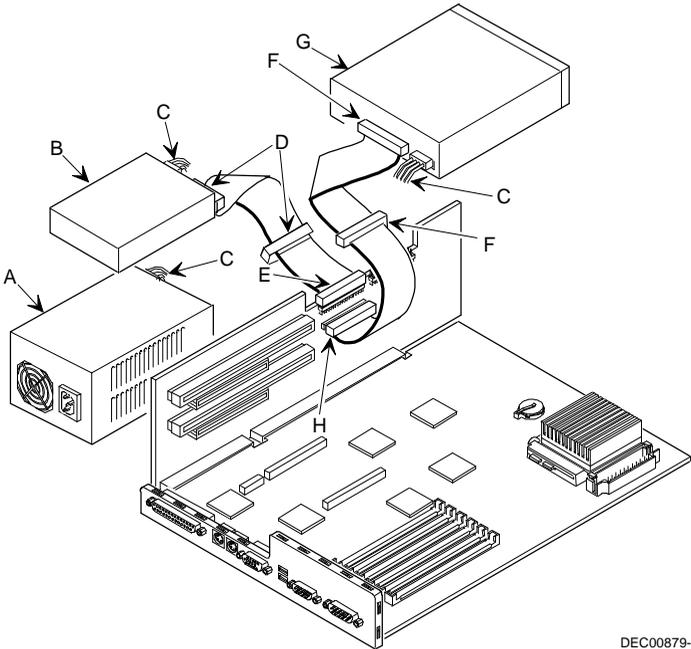
DEC00879-2

Figure 6-10. IDE Drive Data Cable Connections (DIGITAL PC 5400 Low Profile)

Connecting Diskette and IDE Devices (DIGITAL PC 3400/5400 Short Tower)

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

1. Connect the supplied ribbon cable to the device as shown in Figure 6-11 and 6-12.

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

    Make sure the cable is connected with the correct orientation. Most cables and connectors 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 connector.

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

2. Connect a power cable to device.

3. Replace the outside cover.

4. Connect all external devices and restore power.

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

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

Figure Legend	Diskette Drive Component
A	Power connection
B	Diskette drive
C	Diskette drive connections
D	Backplane diskette drive connection
E	Power supply
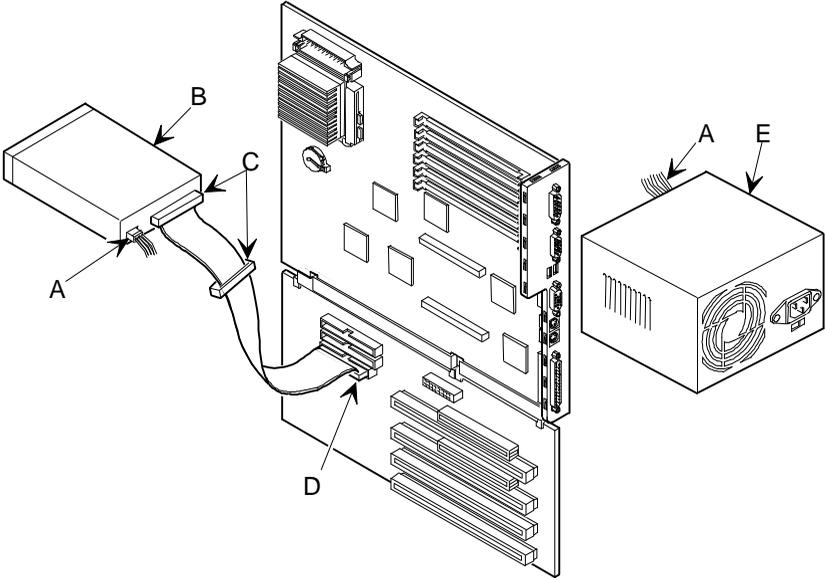
DEC00880-2

**Figure 6-11. Diskette Device Data Cable Connections
(DIGITAL PC 5400 Short Tower Shown)**

Figure Legend	IDE Drive Component
A	Backplane IDE drive connection (primary)
B	Power connections
C	Power supply
D	Primary IDE hard disk drive
E	Primary IDE hard disk drive connections
F	Backplane IDE drive connection (secondary)
G	Secondary IDE hard disk drive connections
H[1]	CD-ROM drive (not available on all models)

[1] The CD-ROM drive is connected to the secondary IDE port and configured as a master drive.
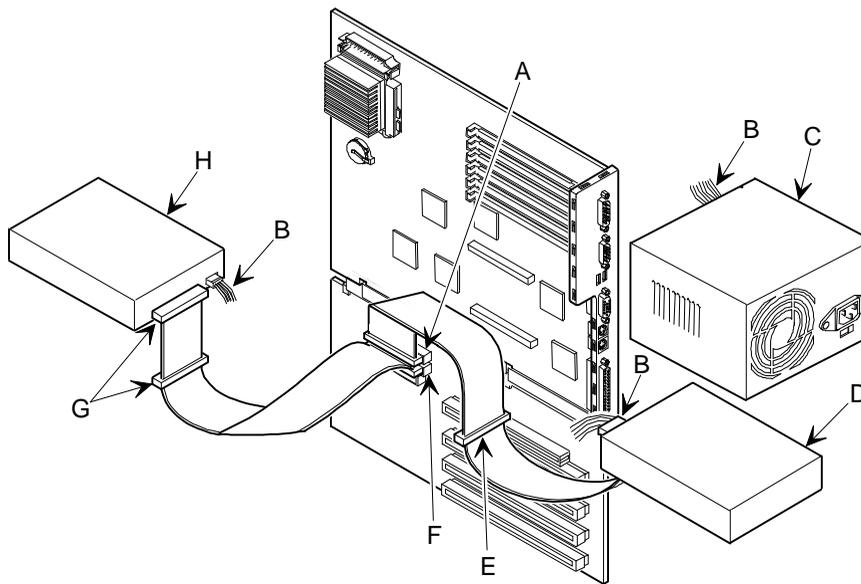
DEC00922-2

Figure 6-12. IDE Device Data Cable Connections (DIGITAL PC 5400 Short Tower Shown)

Connecting SCSI Devices (DIGITAL PC 5400 Short Tower Only)

If your DIGITAL PC 5400 short tower computer came with integrated SCSI, an Adaptec 2940UW SCSI adapter is installed in one of the two PCI local bus expansion board slots on the backplane. The DIGITAL PC 5400 short tower supports up to five internal SCSI devices. Additional SCSI devices can be added to your computer by using the SCSI adapter's external connector. The Adaptec 2940UW supports up to 16 devices (including the host adapter).

The SCSI adapter also supports industry-standard 8-bit (narrow 50-pin) and 16-bit (wide and ultra-wide 68-pin) SCSI devices. Separate SCSI interface connectors are provided on the SCSI adapter to connect the appropriate SCSI interface cable. In most cases your computer has been supplied with a standard 50-pin SCSI ribbon cable installed at the factory.

Contact your DIGITAL sales representative for ordering information on SCSI cables and devices.

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

- Fast and wide SCSI supports up to 16 devices.

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

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

- SCSI device drivers are required to operate your SCSI devices. These device drivers have been factory installed for you.

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

- If your computer boots from a disk drive other than SCSI, make sure all SCSI device drivers are installed on that disk drive. SCSI devices can be used with an IDE drive only if the IDE drive is configured as drive C.

- Make sure the proper BIOS Setup utility options are set for SCSI operation.

- Run the SCSI configuration utility to change host adapter settings to fit your specific configuration. You can start the SCSI configuration utility by pressing [Ctrl] + [A] when the BIOS banner appears during the boot process.

  Refer to the supplied Adaptec SCSI documentation for more information.

To connect SCSI devices, perform the following:

1. Connect the supplied ribbon cable to the appropriate device(s) as shown in Figure 6-13.

   Make sure the cable is connected with the correct orientation. Most cables and connectors 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 connector.

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

2. Connect a power cable to device.

3. Replace the outside cover.

4. Connect all external devices and restore power.

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

   Refer to the supplied Adaptec SCSI documentation for more information.

| Figure Legend	Component
A	SCSI hard disk drives
B	Power connection
C	Single-ended active terminator
D	SCSI drive connectors
E	SCSI adapter connector (50-pin narrow)
F	External SCSI connector (68-pin wide)
G	Power supply
H	SCSI adapter connector (68-pin wide)
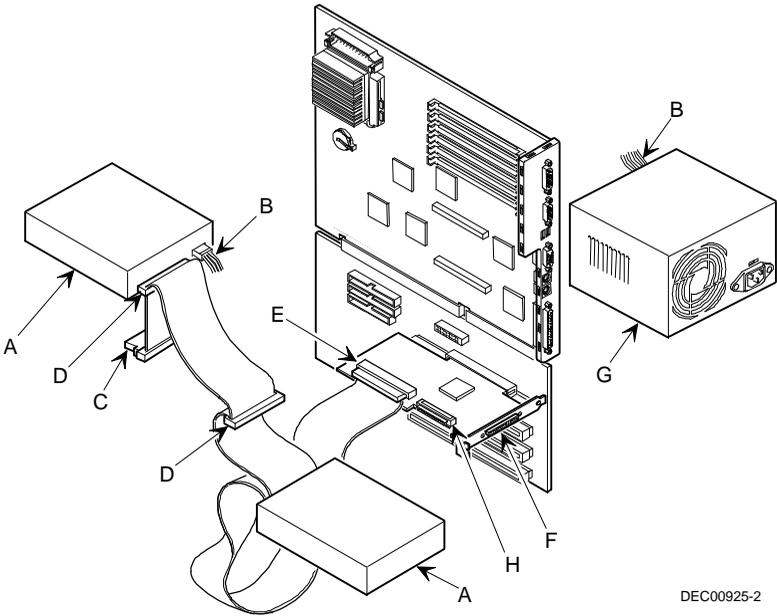
DEC00925-2

Figure 6-13. SCSI Device Data Cable Connections (DIGITAL PC 5400 Short Tower Only)

Technical Specifications A
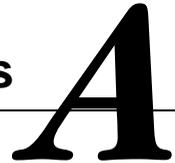
Introduction

This appendix provides information about the technical characteristics of the DIGITAL PC 3400/5400 computers.

- 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 and switches
- If you forget your password

Computer Specifications

The following sections list the DIGITAL PC 3400/5400 computer performance, dimensions, and environmental specifications by model.

Features

Feature	Specification
Internal cache	16 KB level 1, 256 KB lever 2 on-chip
Video memory	1 MB DRAM or 2 MB WRAM
Network	Single-chip controller for PCI bus (not available on all models)
	Supports 10Base-T (Twisted-Pair) and 10Base-2 (Ethernet ThinWire) connections
Audio	ESS single-chip controller with 16-bit stereo audio and 20-voice FM music synthesizer (not available on all models)

Performance Specifications

Attributes	Specification
ISA clock	7.5/8.33 MHz
PCI clock	25 MHz/33 MHz

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

Main logic board DRAM	72-pin, EDO memory 16 MB minimum (expandable up to 192 MB, using 32 MB SIMMs)
Computer BIOS	2 MB Flash ROM
Video BIOS	32 KB included in the second 1 MB Flash ROM

Computer Dimensions (DIGITAL PC 5400 Low Profile)

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)

Computer Dimensions (DIGITAL PC 3400/5400 Short Tower)

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

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)	20% to 80% 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 Nonoperating	2,000 m (6,562 ft) maximum 3,600 m (12,000 ft) maximum
Shipping vibration	IAW Federal Standard 101, method 5019
Nonoperating shock	30 G, 25 ms halfsine

ISA Expansion Slots

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

- Power supply capacity

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

- The +5 V dc requirements of the peripherals

- The power demands of all other slots in use

PCI Local Bus Expansion Slots

Your computer's backplane contains two or three 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

DIGITAL PC 5400 Low Profile System Input Power Requirements

Rated Voltage Range	Maximum Range	Rated Input Current @ 145 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

DIGITAL PC 3400/5400 Short Tower System Input Power Requirements

Rated Voltage Range	Maximum Range	Rated Input Current @ 200 W	Operating Frequency Range
100 V ac - 120 V ac	88 V ac - 135 V ac	2.5 A	47 Hz - 63 Hz
220 V ac - 240 V ac	176 V ac - 265 V ac	1.3 A	47 Hz - 63 Hz

Power Supply Requirements

DIGITAL PC 3400/5400 computer power supplies provide six dc voltages: +12 V dc, −12 V dc, +5 V dc, -5 V dc, 5 VSB, and +3.3 V dc. These voltages are used by the various components within the computer.

Current Requirements

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

DIGITAL PC 5400 Low Profile (145 W)

Total power 145 W maximum

- +3.3 V   0 A min, 7.0 A max.
- +5 V   2.0 A min, 18.5 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, 0.05 A max.

DIGITAL PC 3400/5400 Short Tower (200 W)

Total power 200 W maximum

- +3.3 V   0 A min, 13.0 A max.
- +5 V   2.0 A min, 22.0 A max.
- +12 V   0 A min, 6.0 A max.
- -5 V   0 A min, 0.5 A max.
- −12 V   0 A min, 0.5 A max.
- 5 VSB   0 A min, 0.05 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).
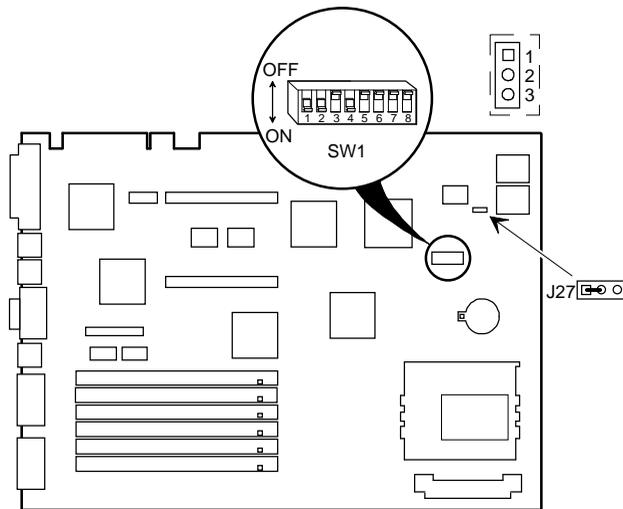
Main Logic Board Jumper and Switch Settings

Feature	Function	Setting	Description
Processor/ bus clock speed	66 MHz[1] 60 MHz	SW1-1, on[1] SW1-1, off	Determines the processor and PCI clock speed for the installed processor(s). For example: 200 MHz processor = 66 MHz x 3 180 MHz processor = 60 MHz x 3
CPU bus speed (60 MHz)	2.5x bus speed	SW1-2, off SW1-3, on SW1-4, on	Processor speed: 150 MHz
	3x bus speed	SW1-2, on SW1-3, off SW1-4, on	Processor speed: 180 MHz
	3.5x bus speed	SW1-2, off SW1-3, off SW1-4, on	Processor speed: 210 MHz
	4x bus speed	SW1-2, on SW1-3, on SW1-4, off	Processor speed: 240 MHz
CPU bus speed (66 MHz)	2.5x bus speed	SW1-2, off SW1-3, on SW1-4, on	Processor speed: 166 MHz
	3x bus speed[1]	SW1-2, on[1] SW1-3, off[1] SW1-4, on[1]	Processor speed: 200 MHz[1]
	3.5x bus speed	SW1-2, off SW1-3, off SW1-4, on	Processor speed: 233 MHz
	4x bus speed	SW1-2, on SW1-3, on SW1-4, off	Processor speed: 266 MHz
Password clear	Disabled[1] Enabled	SW1-5, off[1] SW1-5, on	If you forget your password, set this switch to ON and then restart your computer.

[1] Factory default

continued

Feature	Function	Setting	Description
Recovery mode	Enabled Disabled[1]	SW1-6, on SW1-6, off[1]	If your BIOS upgrade failed, refer to the README.TXT file that came with the BIOS upgrade.
CMOS clear	Enabled Disabled [1]	SW1-7, on SW1-7, off[1]	Set this switch to on and then restart your computer to clear all CMOS data. Enter the BIOS Setup utility to enter new or default settings.
Factory setting	Factory setting	SW1-8, on[1] SW1-8, off	Always leave this switch in the ON position.
Boot block update	Enabled Disabled[1]	J27, pins 2 and 3 J27, pins 1 and 2[1]	Disabling this jumper prevents corruption of the boot block when a boot block update is not required.

[1] Factory default

DEC00869-13

Figure A-1. Main Logic Board Jumper and Switch Settings

If You Forget Your Password

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

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

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

3. Turn on your computer.

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

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

6. Reconnect your computer and turn it on.

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

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

Device Mapping B

Introduction

This appendix provides a series of tables listing mapping and address information related to 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
0 to 9FFFFh	Base memory	640 KB
A0000h to BFFFFh	Video RAM	128 KB
C0000h to C7FFFh	Video BIOS	32 KB
C8000h to DFFFFh	BIOS extension ROM (AT bus used)	96 KB
E0000h to FFFFFh	PnP BIOS/APM BIOS	128 KB
100000h to BFFFFFFh	Extended memory	191 MB

I/O Address Map

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

continued

Range (hexadecimal)	Function
2F8 - 2FF	COM2
378 - 37A	LPT1
388 - 38B	Audio, FM music synthesizer
3BC - 3BE	LPT3
3E8 - 3EF	COM3
3F0 - 3F7	Diskette (floppy disk) controller
3F6 - 3F7	Primary/secondary IDE controller (alt status, device address)
3F8 - 3FF	COM1
4D0	Edge/level control register - INTCNTRL1
4D1	Edge/level control register - INTCNTRL2
CF8 - CFF	PCI configure space control register
FF0H	Programming chip select
22 - 3F	Programming chip select

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	Audio, if enabled
IRQ6	Diskette (floppy disk) drive, if enabled
IRQ7	LPT1, LPT3, if enabled
IRQ8	Real Time Clock (RTC)
IRQ9	(PCI device or reserved) default video
IRQ10	(PCI device or reserved) default SCSI
IRQ11	(PCI device or reserved) default audio, if enabled
IRQ12	Mouse interrupt, if enabled
IRQ13	Math co-processor
IRQ14	IDE primary, if enabled
IRQ15	IDE secondary, if enabled

DMA Channel Assignment

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

Video Output Information *C*
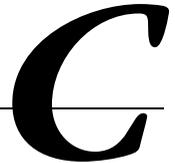
Introduction

DIGITAL PC 3400/5400 computers 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 (DIGITAL PC 3400/5400 Computers with Matrox Video Controller)

Resolution	Bits/Pixel (2 MB)	Bits/Pixel (4 MB)	Bits/Pixel (8 MB)	Maximum Refresh (Hz)
640 x 480	8	8	8	120
	16	16	16	120
	24	24	24	120
800 x 600	8	8	8	120
	16	16	16	120
	24	24	24	120
1024 x 768	8	8	8	120
	16	16	16	120
		24	24	76
1152 x 882	8	8	8	100
	16	16	16	100
		24	24	76
1280 x 1024	8	8	8	90
		16	16	90
		24	24	76

Video Resolution Modes (DIGITAL PC 3400 Computers with S3 Video Controller)

Resolution Mode	Horizontal Freq (kHz)	Vertical Freq (Hz)	Dot Clock (MHz)	Video Memory Size
640 x 480 x 8	31.5	60 (NI)	25.175	1 MB/2 MB
640 x 480 x 8	37.9	72 (NI)	31.500	1 MB/2 MB
640 x 480 x 8	37.5	75 (NI)	31.500	1 MB/2 MB
640 x 480 x 8	43.3	85 (NI)	36.000	1 MB/2 MB
640 x 480 x 15	31.5	60 (NI)	25.175	1 MB/2 MB
640 x 480 x 15	37.9	72 (NI)	31.500	1 MB/2 MB
640 x 480 x 15	37.5	75 (NI)	31.500	1 MB/2 MB
640 x 480 x 15	43.3	85 (NI)	36.000	1 MB/2 MB
640 x 480 x 16	31.5	60 (NI)	25.175	1 MB/2 MB
640 x 480 x 16	37.9	72 (NI)	31.500	1 MB/2 MB
640 x 480 x 16	37.5	75 (NI)	31.500	1 MB/2 MB
640 x 480 x 16	43.3	85 (NI)	36.000	1 MB/2 MB
640 x 480 x 24	31.5	60 (NI)	75.000	1 MB/2 MB
640 x 480 x 32	31.5	60 (NI)	25.175	2 MB
640 x 480 x 32	37.9	72 (NI)	31.500	2 MB
640 x 480 x 32	37.5	75 (NI)	31.500	2 MB
640 x 480 x 32	43.3	85 (NI)	36.000	2 MB

NI = Noninterlaced

Video Output Information

Resolution Mode	Horizontal Freq (kHz)	Vertical Freq (Hz)	Dot Clock (MHz)	Video Memory Size
800 x 600 x 4	37.9	60 (NI)	40.000	1 MB/2 MB
800 x 600 x 4	48.1	72 (NI)	50.000	1 MB/2 MB
800 x 600 x 4	46.9	75 (NI)	49.500	1 MB/2 MB
800 x 600 x 4	53.7	85 (NI)	56.600	1 MB/2 MB
800 x 600 x 8	37.9	60 (NI)	40.000	1 MB/2 MB
800 x 600 x 8	48.1	72 (NI)	50.000	1 MB/2 MB
800 x 600 x 8	46.9	75 (NI)	49.500	1 MB/2 MB
800 x 600 x 8	53.7	85 (NI)	56.600	1 MB/2 MB
800 x 600 x 15	37.9	60 (NI)	40.000	1 MB/2 MB
800 x 600 x 15	48.1	72 (NI)	50.000	1 MB/2 MB
800 x 600 x 15	46.9	75 (NI)	49.500	1 MB/2 MB
800 x 600 x 15	53.7	85 (NI)	56.500	1 MB/2 MB
800 x 600 x 16	37.9	60 (NI)	40.000	1 MB/2 MB
800 x 600 x 16	48.1	72 (NI)	50.000	1 MB/2 MB
800 x 600 x 16	46.9	75 (NI)	49.500	1 MB/2 MB
800 x 600 x 16	53.7	85 (NI)	56.500	1 MB/2 MB

NI = Noninterlaced

Resolution Mode	Horizontal Freq (kHz)	Vertical Freq (Hz)	Dot Clock (MHz)	Video Memory Size
1024 x 768 x 4	35.5	43 (I)	44.900	1 MB/2 MB
1024 x 768 x 4	48.4	60 (NI)	65.000	1 MB/2 MB
1024 x 768 x 4	56.5	70 (NI)	75.000	1 MB/2 MB
1024 x 768 x 4	60.0	75 (NI)	78.750	1 MB/2 MB
1024 x 768 x 4	68.7	85 (NI)	94.500	1 MB/2 MB
1024 x 768 x 8	35.5	43 (I)	44.900	1 MB/2 MB
1024 x 768 x 8	48.4	60 (NI)	65.000	1 MB/2 MB
1024 x 768 x 8	56.5	70 (NI)	75.000	1 MB/2 MB
1024 x 768 x 8	60.0	75 (NI)	78.750	1 MB/2 MB
1024 x 768 x 8	68.7	85 (NI)	94.500	1 MB/2 MB
1024 x 768 x 15	35.5	43 (I)	44.900	2 MB
1024 x 768 x 15	48.4	60 (NI)	65.000	2 MB
1024 x 768 x 15	56.5	70 (NI)	75.000	2 MB
1024 x 768 x 15	60.0	75 (NI)	78.750	2 MB
1024 x 768 x 15	68.7	85 (NI)	94.500	2 MB
1024 x 768 x 16	35.5	43 (I)	44.900	2 MB
1024 x 768 x 16	48.4	60 (NI)	65.000	2 MB
1024 x 768 x 16	56.5	70 (NI)	75.000	2 MB
1024 x 768 x 16	60.0	75 (NI)	78.750	2 MB
1024 x 768 x 16	68.7	85 (NI)	94.500	2 MB

NI = Noninterlaced
I = Interlaced

Video Output Information

Resolution Mode	Horizontal Freq (kHz)	Vertical Freq (Hz)	Dot Clock (MHz)	Video Memory Size
1152 x 864 x 8	55.0	60 (NI)	80.000	1 MB/2 MB
1280 x1024 x 4	46.4	43 (I)	78.750	1 MB/2 MB
1280 x1024 x 4	64	60 (I)	180.00	1 MB/2 MB
1280 x1024 x 8	46.4	43 (I)	78.750	2 MB
1280 x1024 x 8	64	60 (NI)	108.00	2 MB
1280 x1024 x 8	77.6	72 (NI)	130.00	2 MB
1280 x1024 x 8	80.0	75 (NI)	135.00	2 MB

NI = Noninterlaced
I = Interlaced

Glossary G

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.

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.

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.

EDO

See Extended Data Out.

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 Data Out (EDO)

A DRAM feature that allows for fast, main memory access timing. EDO memory is faster than Fast Page memory (which was the former industry standard) and is available in 4, 8, 16, and 32-bit SIMMs.

extended memory (XMS)

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

fast ethernet

Fast Ethernet is a new technology that can be integrated into current 10Base-T Local Area Networks (LANs) and allow them to scale easily to 100 Mb/s. Fast Ethernet provides higher bandwidth without a major change in infrastructure.

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.

JPEG

Joint Photographic Experts Group, pronounced "jay-peg" - An image-compression algorithm that can reduce a bitmapped image by a factor of 10 or more. Because of the nature of the compression, there is little or no discernible image degradation. Also see MPEG and LPB.

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).

LPB

Live Play Back. This is a feature of some multimedia video playback, video adapters that allows fast-frame digital video. Also see JPEG and MPEG.

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.

MPEG

Motion Picture Experts Group, pronounced "em-peg." This group of motion picture professionals established the standards for the display of animated or motion pictures on your computer. This multimedia video playback standard allows digital video compression using JPEG image compression and other encoding for video sequences. Also see JPEG and LPB.

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.

onboard video

Video controller circuitry that is incorporated into a computer's main logic board, so that you do not need a separate video adapter to display information on a monitor.

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.

Pel - Picture Element, also known as Pixel

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

port

The physical connection between your 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).

quiet boot

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

Random Access Memory (RAM)

Abbreviated as RAM; also called read/write memory. The memory your 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.

SIMM

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

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.

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.

video adapter

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

video controller

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

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.

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