



HP

Vectra VLi 8

Corporate PCs



User's Guide



See Chapter 1 for Quick Setup

Notice

The information contained in this document is subject to change without notice.

Hewlett-Packard makes no warranty of any kind with regard to this material, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. Hewlett-Packard shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of this material.

This document contains proprietary information that is protected by copyright. All rights are reserved. No part of this document may be photocopied, reproduced, or translated to another language without the prior written consent of Hewlett-Packard Company.

Matrox[®] is a registered trademark of Matrox Electronic Systems Ltd.

Adobe[™] and Acrobat[™] are trademarks of Adobe Systems Incorporated.

Microsoft[®], MS[®], MS-DOS[®], Windows[®], and Windows NT[®] are U.S. registered trademarks of Microsoft Corporation.

Hewlett-Packard France
Commercial Computing Division
Outbound Marketing Communications
38053 Grenoble Cedex 9
France

© 1999 Hewlett-Packard Company

User's Guide

This manual is for anyone who wants to:

- Set up the PC for the first time
- Troubleshoot problems on the PC
- Replace system components
- Find out where to get more information and support.

It is strongly recommended that you read the ergonomic information before using your PC. Refer to “Working in Comfort” on page 51 for more information.

Important Safety Information

WARNING

For your safety, never remove the PC's cover without first removing the power cord and any connection to a telecommunication network. Always replace the cover before switching the PC on again.

There is a danger of explosion if the battery is incorrectly installed. For your safety, never attempt to recharge, disassemble, or burn the old battery. Replace only with the same or equivalent type recommended by the manufacturer. The battery in this PC is a lithium battery that does not contain heavy metals. Nevertheless, in order to protect the environment, do not dispose of batteries in household waste. Please return used batteries to the shop from which you bought them, to the dealer from whom you purchased your PC, or to HP so they can either be recycled or disposed of in a sound way. Returned used batteries will be accepted free of charge.

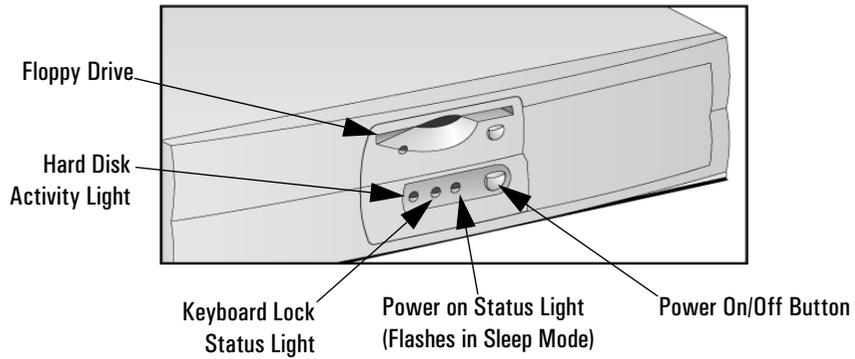
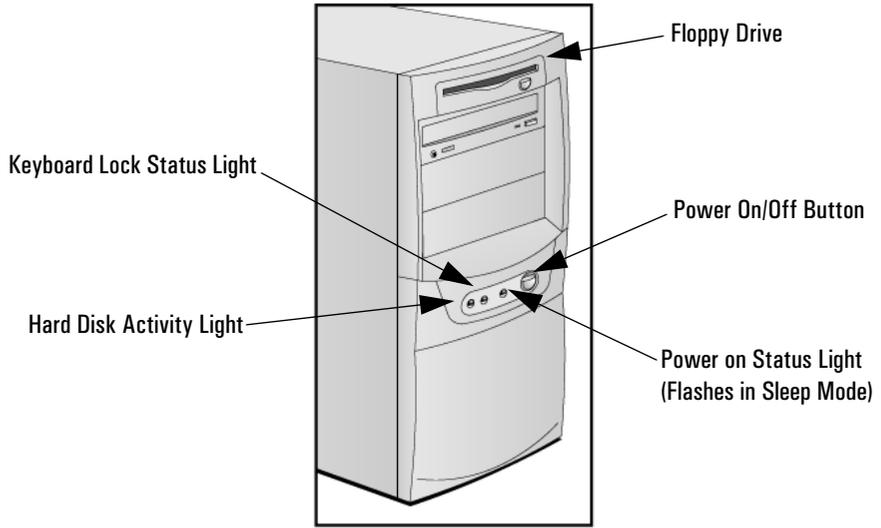
If you have a modem:

Do not attempt to connect this product to the phone line during a lightning storm. Never install telephone jacks in wet locations unless the telephone line has been disconnected at the network interface. Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface. Use caution when installing or modifying telephone lines. Avoid using a telephone (other than a cordless type) during an lightning storm. There may be a risk from lightning.

Do not use the telephone to report a gas leak in the vicinity of the leak. Never touch or remove the Communications board without first removing the connection to the telephone network.

Contents

1	Setting Up and Using Your PC	1
2	Basic Problem Solving	15
3	Replacing Hardware Components	23
4	Working in Comfort	51
	Index	63
	Regulatory Information and Warranty	65



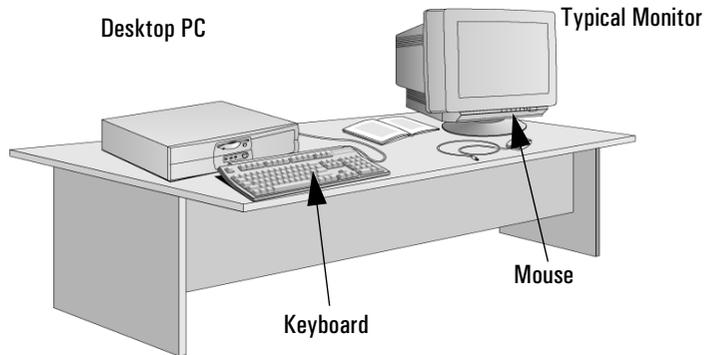
Setting Up and Using Your PC

This chapter provides information about setting up and using your PC.

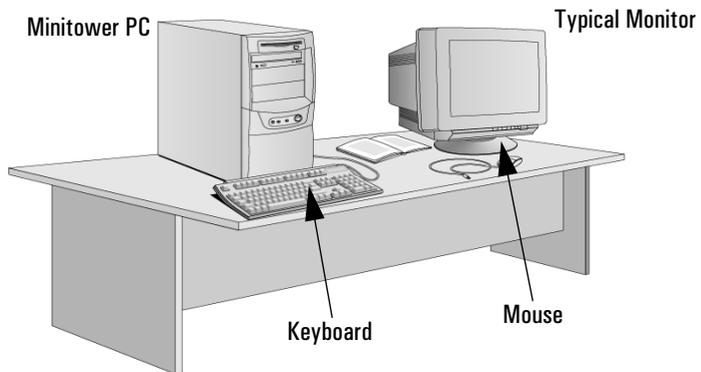
Unpacking Your PC

WARNING

If you have any doubt that you can lift the PC or monitor safely, do not try to move it without help.



How to lift and carry the Minitower PC



Place the PC on a sturdy desk near to easily accessible power outlets, with enough space for the keyboard, mouse, and any other accessories. You can place the minitower either on the desk or on the floor.

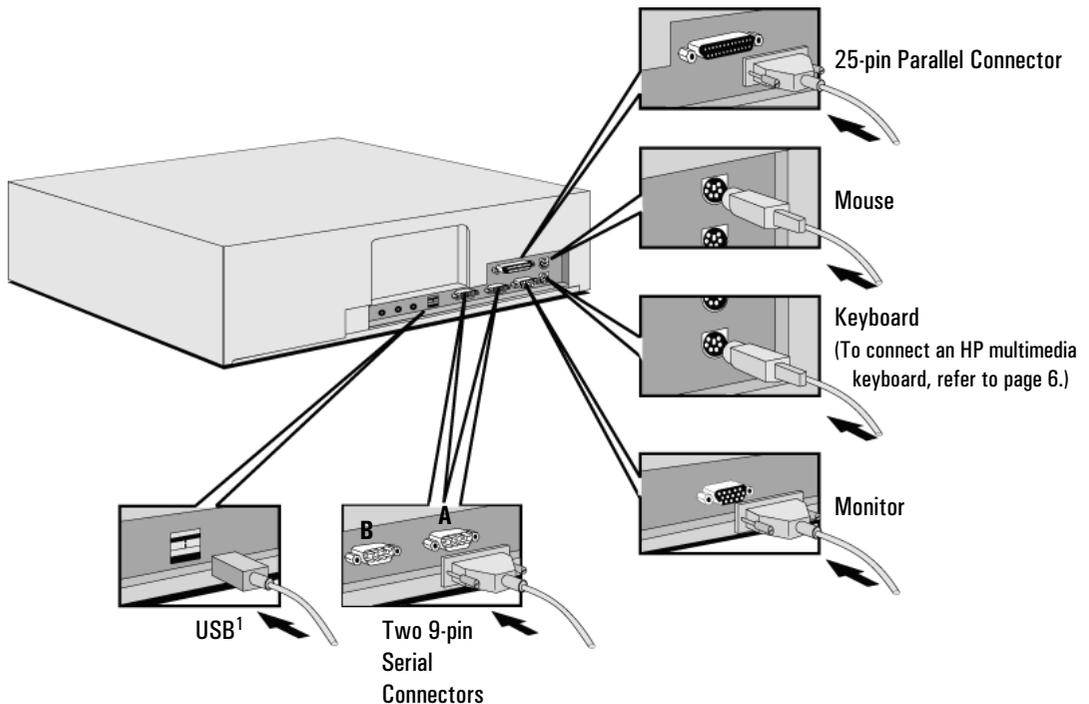
Connecting the Mouse, Keyboard, Monitor and Printer

Connect the mouse, keyboard, monitor and printer to the back of the computer. *The connectors are shaped to go in one way only.*

For more information on connecting the printer to your PC, refer to the manual the came with the printer.

Desktop PC

The connectors are color-coded for easy matching. Match the colors.



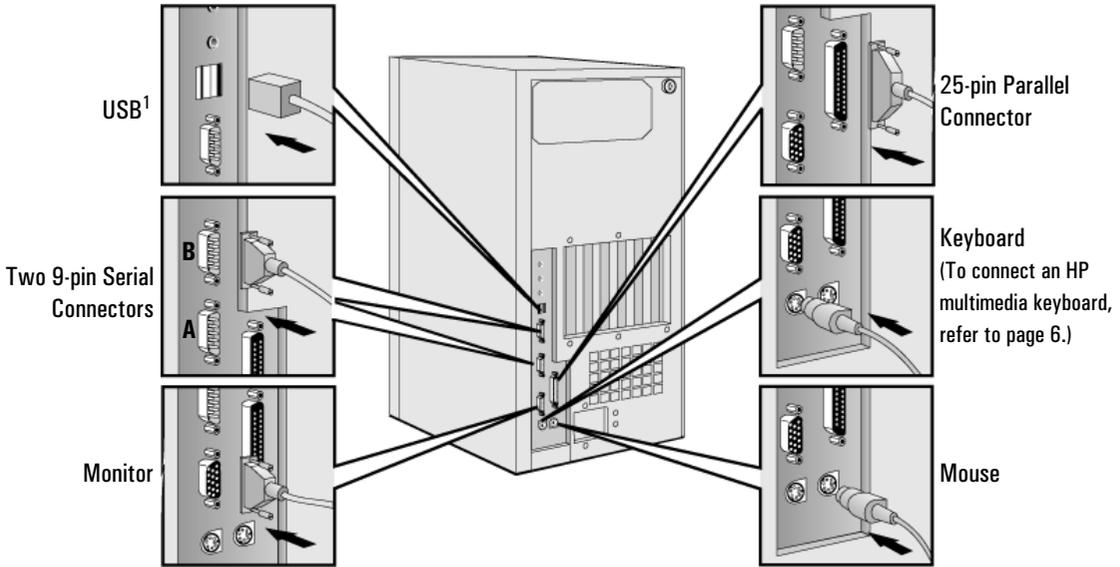
1. USB is supported by: a) the latest version of Windows 95 (preloaded on some models); b) Windows 98.

1 Setting Up and Using Your PC

Connecting the Mouse, Keyboard, Monitor and Printer

Minitower PC

The connectors are color-coded for easy matching. Match the colors.

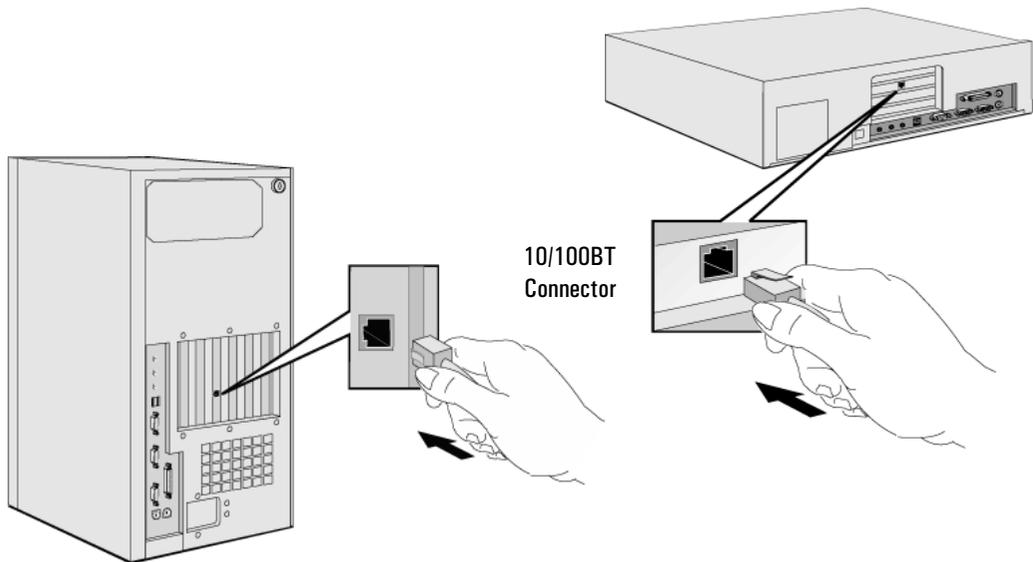


1. USB is supported by: a) the latest version of Windows 95 (preloaded on some models); b) Windows 98.

Connecting to a Network (Some Models Only)

Let your Network Administrator know you are connecting your PC to the network.

Connect the network cable to the RJ-45 UTP (Unshielded Twisted Pair) LAN connector.



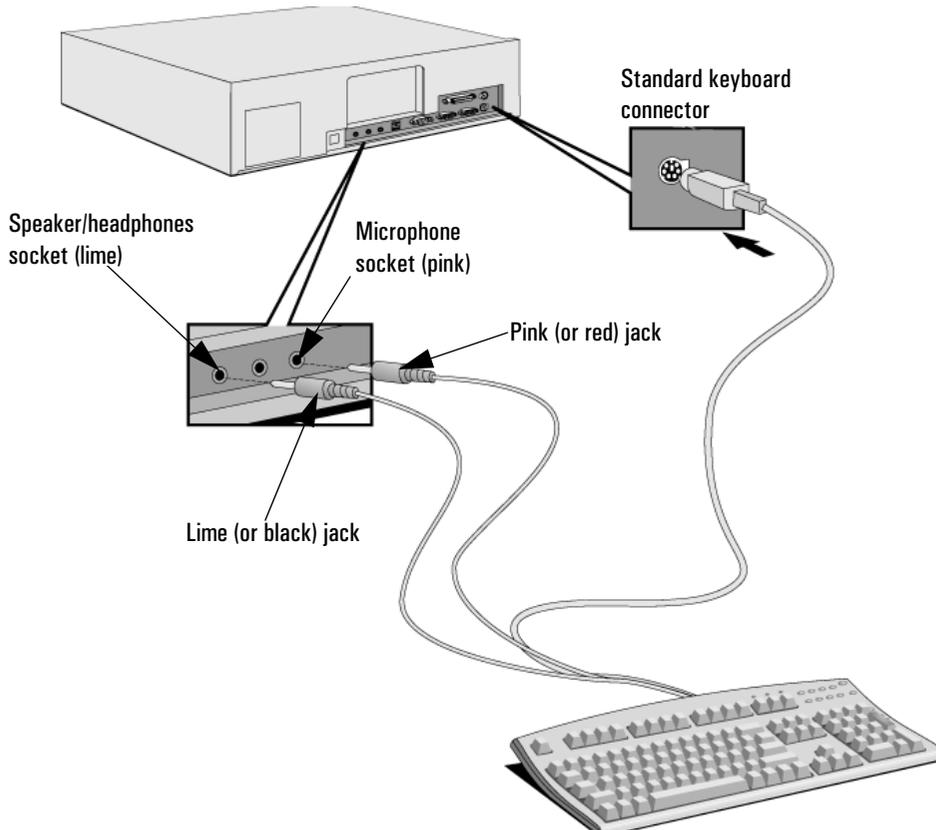
If you install a non-HP network adapter card, refer to the installation and configuration information provided on HP's Support web site. Go to the **LAN Card Ready** section at www.hp.com/go/vectrasupport.

Connecting Multimedia Accessories (Some Models Only)

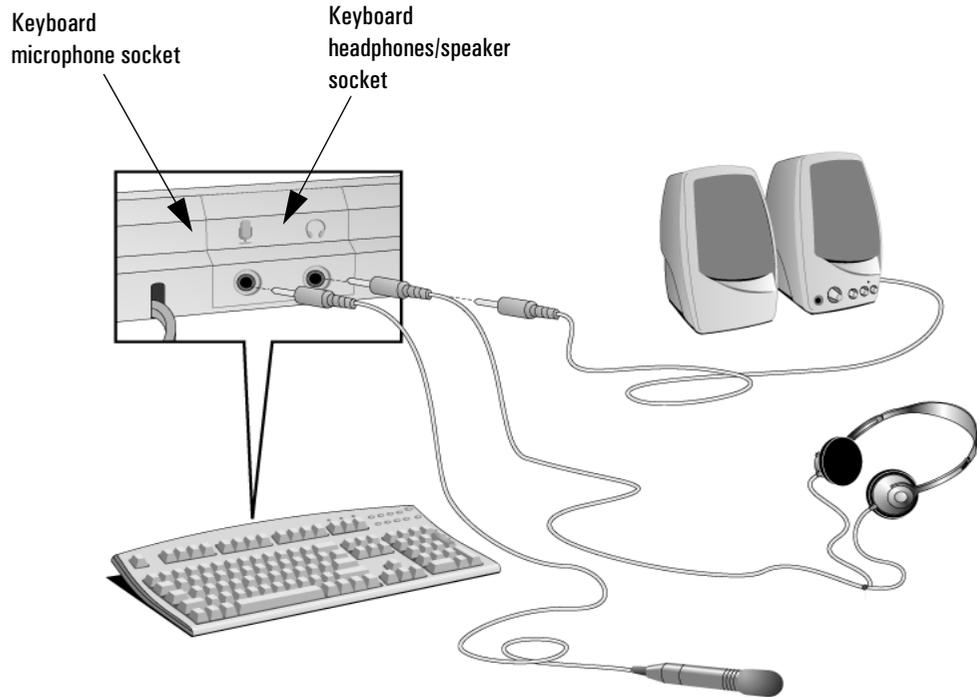
WARNING

Always turn the volume down before connecting headphones or speakers, to avoid discomfort from unexpected noise or static. Listening to loud sounds for prolonged periods of time may permanently damage your hearing. Before putting on headphones, place them around your neck and turn the volume down. When you put on the headphones, slowly increase the volume until you find a comfortable listening level. When you can hear comfortably and clearly, without distortion, leave the volume control in that position.

- 1 Connect the HP multimedia keyboard to the PC. *The connectors are color-coded for easy matching.*



- 2 Connect the microphone and headphones (or amplified speakers) to the keyboard.



- 3 At the rear of the PC, you can connect another audio accessory, such as a CD player, into the remaining audio (light blue input) connector.

NOTE

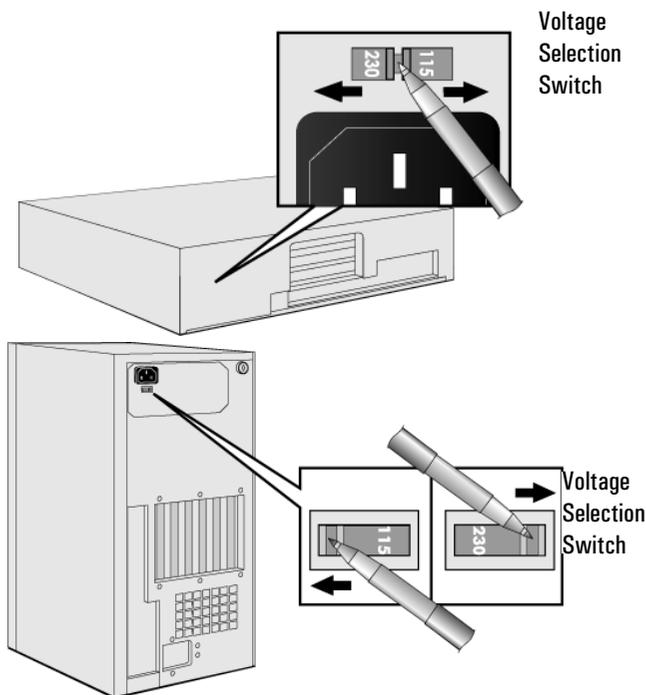
Some models have a DVD drive with a headphones socket and a volume control. However, you should connect the keyboard sockets as shown above to ensure that you can use all your PC's multimedia features.

If you install a sound board, you will need to disable your PC's integrated audio function in the **Advanced** ⇄ **Integrated Audio** section of the *Setup* program. Refer to the *Troubleshooting and Upgrade Guide* available from HP's Support web site.

Connecting the Power Cords

WARNING

For your safety, always connect the equipment to a grounded wall outlet. Always use a power cable with a properly grounded plug such as the one provided with this equipment or in compliance with your national regulations. This PC is disconnected from the power by removing the power cord from the power outlet. This means the PC must be located close to a power outlet that is easily accessible.



- 1 Remove the warning label covering the PC's power connector, and *ensure that the voltage setting is correct for your country.* (The voltage is set during manufacture and should be already correct.)
- 2 Connect the power cords to the monitor and the computer. (*The connectors are shaped to go in one way only.*)
- 3 Connect the monitor's power cord and the computer's power cord to a grounded outlet.

Starting Your PC for the First Time

If your PC has preinstalled software, it is initialized the first time you start the PC. This process sets up the software in your language and sets up your software to use the hardware installed in your computer (you can change the settings after the software has been initialized).

Initializing Your Software

NOTE

Do NOT switch OFF the PC while the software is being initialized—this could cause unexpected results.

- 1 Turn on the monitor first, and then the PC.

When the PC is switched on, the Vectra Logo is displayed. The PC performs a Power-On-Self-Test (POST). Press **Esc** if you want to view the POST details in the HP Summary Screen.

If an error is detected during the Power-On-Self-Test, the PC will automatically display the error. You may be prompted to press **F2** to start the *Setup* program to correct the error.

- 2 The software initialization routine starts.
- 3 After the initialization routine has finished, click on OK and the PC will restart.

1 Setting Up and Using Your PC

Starting Your PC for the First Time

After Your PC Has Restarted

- Set the keyboard to a comfortable position.
- Adjust the monitor's brightness and contrast to suit your needs. If the picture does not fill the screen or is not centered, adjust it using the controls on the monitor. Refer to the monitor's manual for details.
- Arrange your work environment for comfort (refer to **Programs** ⇨ **HP Info** ⇨ **Working Comfortably** for more details).
- Install your application software.
- If you want to connect to the Internet, you must first ensure that your Internet connection is correctly configured (contact your company's technical support or network administrator). You can then use a web browser to connect to the Internet.

Changing the Operating System

If you change the operating system used by your PC, ensure that the **PnP Operating System** field in the **Main** menu of the *Setup* program is correctly set. (To enter the PC's Setup program, restart your PC and press **F2** during start-up.)

- For Plug and Play operating system, such as Windows 95 or Windows 98, set the **PnP Operating System** field to **Yes**.
- For non-Plug and Play operating systems, such as Windows NT 4.0, set this field to **No**.

To check if your operating system is Plug and Play, refer to your operating system's documentation.

Stopping Your PC

To stop the PC, first make sure that you have exited all applications and then use your operating system's shutdown command in the **Start** menu.

Using Power Management

Power management enables you to reduce the PC's overall power consumption by slowing down the PC's activity when it is idle.

- HP Setup Program You can configure power management in the HP *Setup* program. Refer to "Power Menu Items" in the HP *Setup* program. (To enter the PC's *Setup* program, restart your PC and press **F2** during start-up.)
- Operating System Power Management Operating systems such as Windows NT 4.0 and Windows 95 differ in their power management capabilities. Refer to your operating system documentation for more information.
- EPA and Energy Star® Compliance As an Energy Star® partner, HP has determined that this product meets the Energy Star® guidelines for energy efficiency.

Manageability

Your PC is highly manageable. It comes preloaded with HP TopTools, a hardware management tool. For more information about TopTools, connect to HP's web site at: **www.hp.com/toptools**.

Software and Drivers

In the "Software and Drivers" section of the HP support site (**www.hp.com/go/vectrasupport**), you can download the latest drivers and BIOS for your PC.

Additional Information and Help

Information On Your PC's Hard Disk Drive

Additional information about your PC is preloaded on your PC's hard disk drive. This information includes:

- Getting Information —where to get information about your PC, including links to useful HP web site pages.

For Windows users, you can access this page by clicking the **Start** button and then clicking **Programs** ⇨ **HP Info** ⇨ **HP Vectra VL**.

- Working in Comfort —guidance on ergonomic issues.

For Windows users, you can access this page by clicking the **Start** button and then clicking **Programs** ⇨ **HP Info** ⇨ **Working Comfortably**.

Information On HP's Support Web Site

The HP web site contains a wide range of information, including downloadable documentation, service and support options, and the latest versions of drivers and utilities.

Manuals for Your PC

In the "Manuals" section of the HP Vectra Support site (www.hp.com/go/vectrasupport), you can download a wide range of documentation for your PC. Documents provided are in Adobe Acrobat (PDF) format.

The available documents include:

- *Using Sound* —describes how to get the most out of your sound system, including configuration and troubleshooting information.
- *Troubleshooting and Upgrade Guide*—describes in detail how to troubleshoot your PC and install accessories. It also contains information on the technical and security features of your PC. This manual is described in detail in the next section.

- *Service Handbook* Chapters—information on upgrade and replacement parts, including HP part numbers.
- *Technical Reference Manual*—technical information on system components, such as system board, chipset and BIOS.

You can check this web site regularly to download any new documents as they become available for your PC.

The Troubleshooting and Upgrade Guide

This guide is a downloadable document in Acrobat (PDF) format. It contains detailed information about:

- Troubleshooting your PC.
- Installing accessories, including:
 - Installing memory
 - Installing mass storage devices
 - Installing accessory boards
 - Installing a security cable
 - Changing the battery
 - Fitting a security bracket.
- Security and Manageability Features
- Technical information about your PC, including:
 - System board switches
 - IRQs, DMAs, and I/O addresses used by your PC.

The troubleshooting information in the *Troubleshooting and Upgrade Guide* is more detailed than the information provided in this manual.

NOTE

To view and print the *Troubleshooting and Upgrade Guide* you must have Adobe's Acrobat Reader on your PC. If Acrobat Reader is not already installed on your system, you can download it free of charge from Adobe's web site (www.adobe.com).

Downloading The Troubleshooting and Upgrade Guide

To download the *Troubleshooting and Upgrade Guide*, connect to the HP Vectra Support site at www.hp.com/go/vectrasupport, look in the "Manuals" section, and then select your PC.

1 Setting Up and Using Your PC

Additional Information and Help

Basic Problem Solving

This chapter provides help solving problems with your PC. It includes information on:

- Dealing with common PC and hardware problems
- Using HP's hardware diagnostics program, DiagTools
- Frequently Asked Questions
- What to do if you need more help
- Hewlett-Packard's Support and Information Services

For more detailed information, refer to the *Troubleshooting and Upgrade Guide*, available on HP's Web site at

www.hp.com/go/vectrasupport.

2 Basic Problem Solving

If Your PC Does Not Start Properly

If Your PC Does Not Start Properly

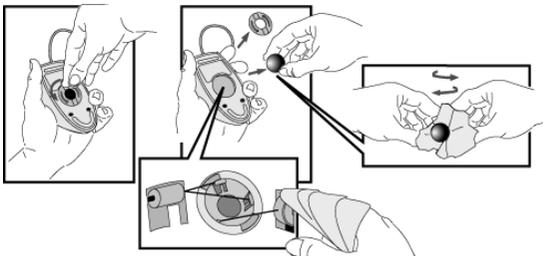
The PC Doesn't Power On	
Have you checked that...	How
The PC's power cord is correctly connected.	Connect the power cord to a working grounded power outlet and the PC.

The Power-On Self Test Results In an Error	
An on-screen error message or a beep code when the PC starts up means there is a configuration problem with your PC.	
Have you checked...	How
The part of your configuration for which the Power-On Self Test has detected an error.	Refer to the <i>Troubleshooting and Upgrade Guide</i> available from HP's Web site at: www.hp.com/go/vectrasupport

If Your PC Has a Hardware Problem

The Monitor Doesn't Work...	
The PC's power indicator light works but the monitor remains blank.	
Have you checked that...	How
The monitor is switched ON (LED is on).	Refer to the monitor manual for an explanation of the LED signals (green, orange, or blinking).
The monitor's power cord is correctly connected.	Connect the power cord – ensure it is plugged into a working grounded power outlet and into the monitor.
The monitor's brightness and contrast settings are correctly set.	Check the settings using the monitor's OSD (on-screen display) or using controls on the front of the monitor.
You see an image during boot but then the screen goes blank	
Have you checked that...	How
The monitor settings in your PC are compatible with your monitor.	<ul style="list-style-type: none">Windows NT: Enter VGA mode when prompted during start-up.Windows 95: Restart the PC. The Vectra screen is displayed. When you hear a beep, press F8 and then start the PC in safe mode. Double-click on the Display icon in your PC's Control Panel, then click on the Settings button. Use the sliding control to reset the resolution.

The Keyboard Doesn't Work...	
Have you checked that...	How
The keyboard cable is correctly connected.	Plug the cable into the correct connector on the back of the PC. Color coding is used for easy matching.
The keyboard is clean and no keys are stuck down.	Check all keys are at the same height, and none are stuck.
The keyboard itself is not defective.	Either replace the keyboard by a known working unit or try the keyboard with another PC.
You are using the correct driver. If you are using HP's multimedia keyboard, ensure that the correct driver is installed. This driver is provided with all Windows NT 4.0 and Windows 95 preloaded systems.	Download the latest driver from HP's Web at: www.hp.com/go/vectrasupport
If the PC starts but you still have a problem...	Run DiagTools. See page 18.

The Mouse Doesn't Work...	
Have you checked that...	How
The mouse cable is correctly connected.	<ol style="list-style-type: none"> 1 Switch off the PC. 2 Plug the cable into the correct connector on the back of the PC. Color coding is used for easy matching.
You are using the correct driver. If you are using HP's enhanced mouse, ensure that the correct driver is installed. This driver is provided with all Windows NT 4.0 and Windows 95 preloaded systems.	Download the latest driver from HP's Web at: www.hp.com/go/vectrasupport
The mouse is clean.	<p>Clean the mouse ball as shown below.</p> 
The mouse itself is not defective.	Replace the mouse by a known working unit or try the mouse with another PC.
If the PC starts but you still have a problem...	Run DiagTools. See page 18.

The Power-On Self Test Displays an Error	
Have you checked...	How
Your <i>Setup</i> program settings.	<ol style="list-style-type: none"> 1 Turn on or restart your PC. 2 When the message F2 Setup appears, press the F2 key.¹
Your PC's Summary Screen	Turn on or restart your PC. When the message F2 Setup appears, press Esc . Then, press Pause to keep the Summary Screen displayed. Press any key to continue.

1. For more information on the *Setup* program, refer to the *Troubleshooting and Upgrade Guide*, available on the HP Web at **www.hp.com/go/vectrasupport**.

HP DiagTools Hardware Diagnostics Utility

DiagTools, the Vectra Hardware Diagnostics utility, helps you diagnose hardware-related problems on HP Vectra PCs and PC Workstations. It is a series of tools designed to help you:

- Check the configuration of your system and verify that it is functioning correctly.
- Diagnose hardware-related problems.
- Provide precise information to HP-dedicated Support Agents so that they can solve any problems quickly and effectively.

For more information about this utility, refer to the *Vectra Hardware Diagnostics User's Guide*, available on the HP web site in PDF (Adobe Acrobat) format.

Where Can I Get DiagTools?

DiagTools is on the *Recovery CD-ROM* that came with your PC. You can also download the latest version of this utility from HP's Web Site at www.hp.com/go/vectrasupport.

Starting DiagTools

To start DiagTools:

- 1 Insert the PC's *Recovery CD-ROM* into the CD-ROM drive. (The *Recovery CD-ROM* is delivered with your PC.)
- 2 Restart the PC.
- 3 The PC will start (boot) from the CD-ROM and display a menu. Select the option to run DiagTools.
- 4 Follow the instructions on-screen to carry out the diagnostic tests.

This utility will automatically detect the complete hardware configuration of your system before any tests can be performed.

Frequently Asked Questions

Q: How can I get help with installing LAN cards in my PC?

A: Refer to the LAN Card Ready section accessible from the support Web site at: www.hp.com/go/vectrasupport. This provides information on commonly installed LAN cards and installation information for LAN card drivers.

Q: Where can I get more information on installing accessories in my PC?

A: The Troubleshooting and Upgrade Guide has detailed information on installing accessories and is available on HP's support Web site at: www.hp.com/go/vectrasupport.

Q: How can I reinstall my PC's operating system?

A: Use the software Recovery CD-ROM provided with your PC.

Q: How can I be sure that the software/hardware I want to install in my PC is compatible?

A: Refer to the Tested Product List at: www.hp.com/go/vectrasupport.

Q: Why is my PC running slowly/producing strange messages?

A: Your PC may have been infected by a virus. Run the antivirus utility preloaded on your PC.

If the problem continues, update your PC's BIOS. You can download the BIOS and updating instructions from www.hp.com/go/vectrasupport.

Q: I've been experiencing problems with my PC ever since I installed some new software. What can I do?

A: Uninstall the software to see whether this solves the problem. If the problem continues, contact the software manufacturer for help or information on known compatibility problems.

Q: How do I disable the integrated sound features on my PC if I install an accessory sound card?

*A: Enter the PC's Setup program by pressing **F2** during startup, then disable the **Integrated Audio Interface** in the **Advanced** menu.*

Q: Can I use USB hardware devices with all the operating systems preloaded on my PC?

A: USB is supported by Windows 95 release 2.x (preloaded), as well as Windows 98.

2 Basic Problem Solving

Frequently Asked Questions

Q: Is my PC year 2000-compliant?

A: All new Vectra PCs are designed to handle the transition to year 2000. For more information, refer to HP's Year 2000 Web site:

www.hp.com/year2000.

Q: How can I find out what hardware and BIOS version are used in my PC?

*A: Restart the PC and press **ESC** during the power on self test. The BIOS version will be displayed at the top of the screen.*

Q: How can I hear sound from my application?

A: Make sure your multimedia accessories are correctly installed (refer to chapter 1). If you have a multimedia keyboard, use the keyboard's volume buttons to adjust the volume.

Make sure your application is correctly configured.

*Select **Start** ⇨ **Programs** ⇨ **Accessories** ⇨ **Multimedia** ⇨ **Volume Control**. Make sure **Mute** is not selected. Adjust the volume until you hear sound.*

Q: Where can I get information about the latest HP drivers?

*A: **www.hp.com/go/vectrasupport**.*

Need More Help?

Refer to the *Troubleshooting and Upgrade Guide* for more detailed help. This manual is available from HP's web site at:

www.hp.com/go/vectrasupport.

Some troubleshooting tips:

- Restart your PC and see if the problem recurs.
- If you have a software problem, refer to the software documentation or help facility. If the problem persists, contact the software provider's support.
- Run HP DiagTools. You can create a hardware profile of your PC (Support Ticket) that can be faxed or mailed to support. See page 18 for information on using DiagTools.
- Visit the HP support Web site (**www.hp.com/go/vectrasupport**) to see whether this is a known problem.
- Update your PC's BIOS (Basic Input/Output System). The latest BIOS for your PC and instructions on updating the BIOS are available from HP's support Web site at: **www.hp.com/go/vectrasupport**.
- Record the details of the problem so that you can describe it accurately. See "Collecting Information on Your PC Before Contacting Support" on page 22.
- Think of anything you may have changed recently on your PC.
- If possible, have your system up and running and close by when you call.
- Contact your HP dealer, or contact HP support outside of peak times (mid-morning and early evening). See "Hewlett-Packard Support and Information Services" on page 22 for more information.

2 Basic Problem Solving

Hewlett-Packard Support and Information Services

Hewlett-Packard Support and Information Services

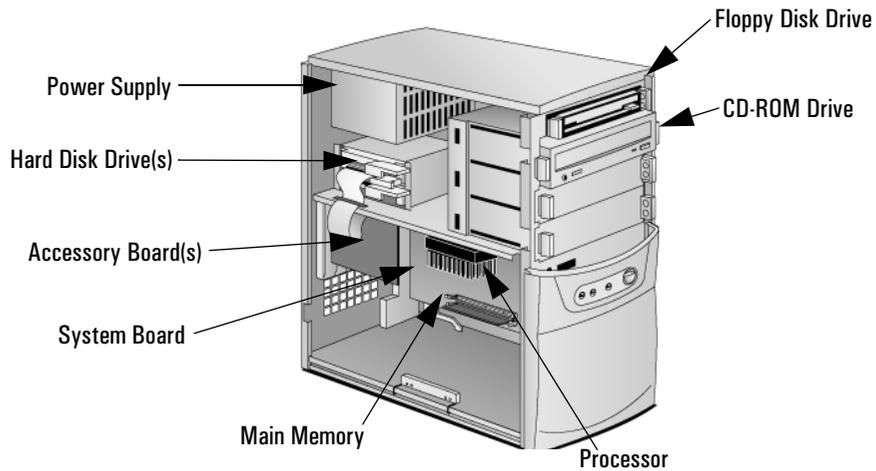
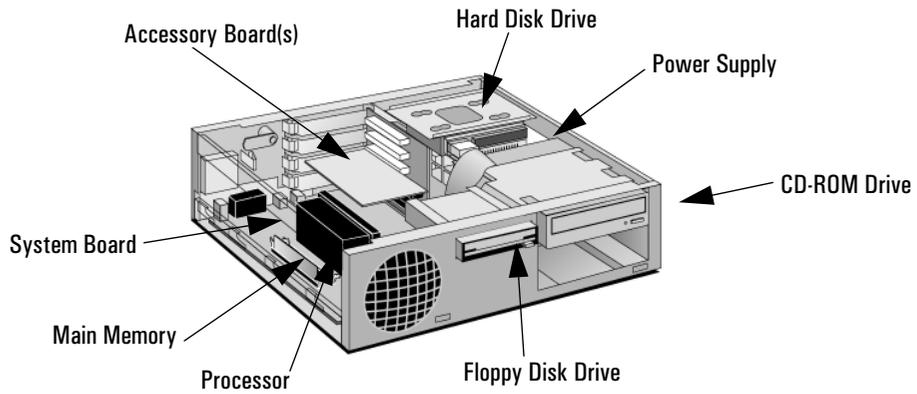
You can learn more about HP service and support from the support Web site:

www.hp.com/go/vectrasupport.

Collecting Information on Your PC Before Contacting Support

Take a piece of paper and note down some of the information mentioned below. This will help HP support deal with your problem quickly and efficiently:

PC Description	
Model number	See label on the right side of your PC.
Serial number	See label on the right side of your PC.
RAM <ul style="list-style-type: none">Number of megabytes installedHP RAM or RAM from another manufacturer	<ul style="list-style-type: none">The amount of RAM is displayed on the Summary Screen, accessed by pressing Esc during start-up.There may be some compatibility problems with non-HP RAM.
Question or Problem	
Write down a brief description of the problem	
Frequency	How often has the problem occurred?
Run OK?	How long has the PC been running normally?
Recent changes to the PC	Have there been any recent changes made to the PC?
Hardware Configuration	
Which BIOS version is used?	The BIOS version is displayed on the Summary Screen, accessed by pressing Esc during start-up.
Any BIOS parameter changes?	Did the problem occur after changes were made to the BIOS using the Setup program?
Make a list of slots and interrupts used by additional cards (for example, LAN, sound and SCSI)	This is to check for interrupt conflicts. You can find IRQs by running DiagTools (see page 18) and slot numbers by looking at the Summary Screen, accessed by pressing Esc during start-up.
Operating System	
Are you using the original operating system software that came preloaded on your PC?	
If no, what is the operating system version?	Select Settings ⇄ Control Panel from the Start menu, then click on the System icon. The operating system version is displayed under System .
Any operating system-generated error messages	Please note down exact text of error message.
Any errors during boot (Power-On Self Test). This test checks all installed components.	Any POST errors will be displayed on your monitor screen or signalled by beep codes.



Replacing Hardware Components

This chapter provides information about replacing hardware components. For information about upgrading your PC and installing accessories, refer to the *Troubleshooting and Upgrade Guide*, available on HP's web site www.hp.com/go/vectrasupport.

3 Replacing Hardware Components

Before Starting

Before Starting

Read this section before replacing any components.

WARNING

For your safety, never remove the PC's cover without first removing the power cord from the power outlet and any connection to a telecommunication network. Always replace the cover before switching the PC on again.

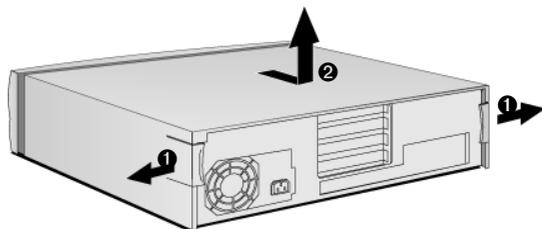
CAUTION

Static electricity can damage electronic components.
Turn all equipment OFF. Don't let your clothes touch the accessory.
To equalize the static electricity, rest the accessory bag on top of the PC while you are removing the accessory from the bag. Handle the accessory as little as possible and with care.

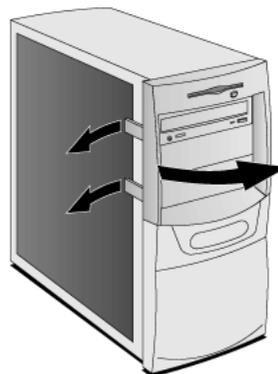
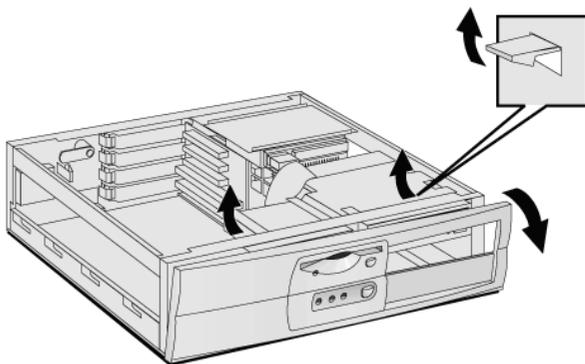
Removing and Replacing the Cover

Removing the Cover

- 1 Switch off the monitor and PC, disconnect all power cords and any telecommunication cables.
- 2 If necessary, unlock the cover (with the key) at the rear of the PC.
- 3 **Desktop:** Open the rear catches **1** and remove the cover **2**.
Minitower: Open the latch and remove the side panel.



- 4 Remove the front panel.

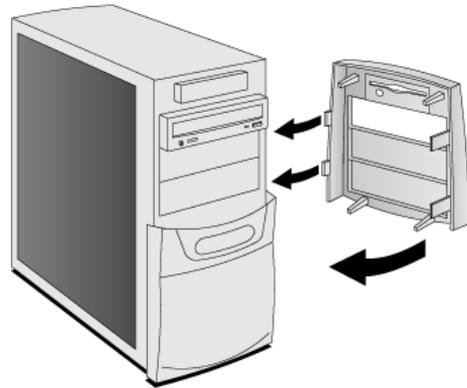
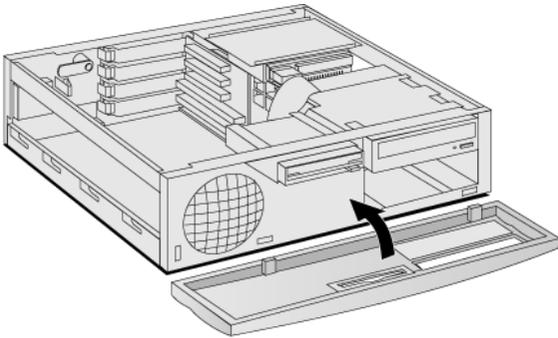


3 Replacing Hardware Components

Removing and Replacing the Cover

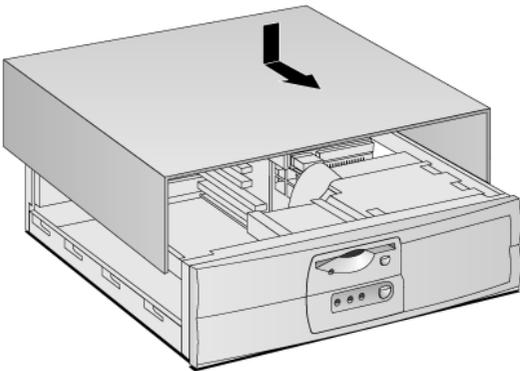
Replacing the Cover

- 1 Ensure that all internal cables are properly connected and safely routed.
- 2 Replace the front panel.



- 3 **Desktop:** lower the cover and slide it into position.

Minitower: Replace the side panel, making sure you align the hinges first.

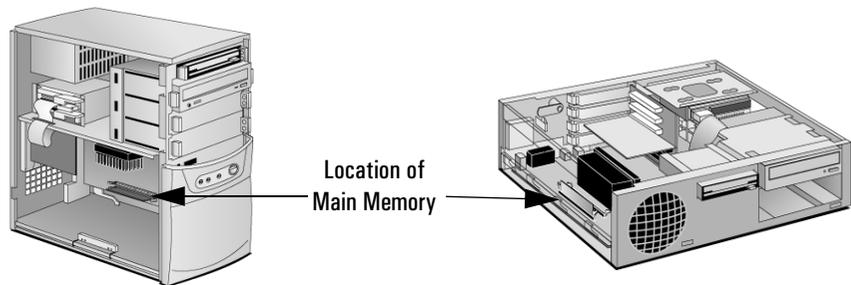


- 4 If required, lock the cover (with the key) at the rear of the PC.

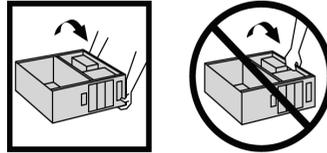
Replacing or Installing a Memory Module

NOTE

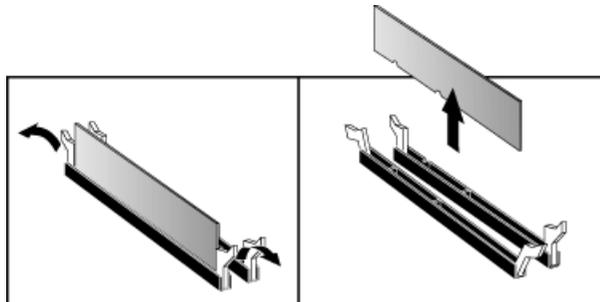
Use only HP memory modules provided for your PC model. The use of other memory modules is not supported. For information about supported HP accessories, connect to the web site www.hp.com/go/vectraaccessories.



- 1 Remove the PC's cover (described in this chapter).
- 2 If you have a minitower, lay it on its side.



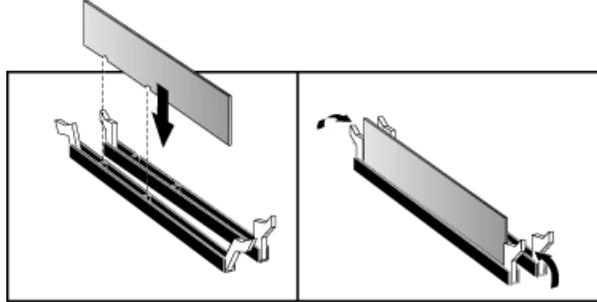
- 3 Open the two tabs and remove the old memory module (if required).



3 Replacing Hardware Components

Replacing or Installing a Memory Module

- 4 Line up the two side notches correctly and insert the new memory module. (You can use either slot.)



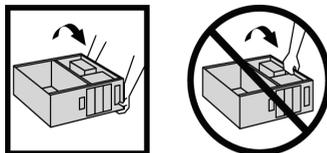
- 5 Replace the cover (described in this chapter).

Replacing an Accessory Board

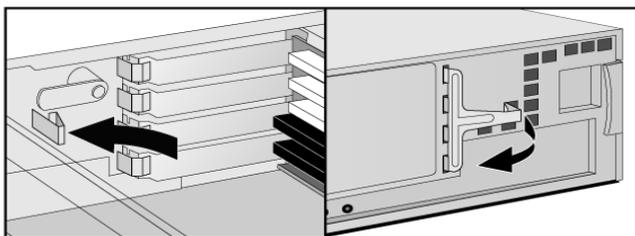
NOTE

In the desktop, use only XT format ISA accessory boards (width less than 10.4 cm or 4.09 inches).

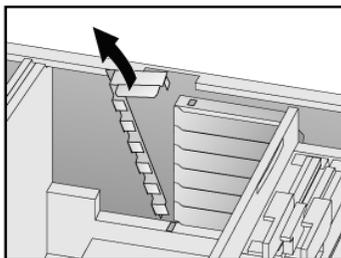
- 1 Remove the computer's cover (described in this chapter).
- 2 If you have a minitower, lay it on its side.



- 3 Remove the retaining bracket.



Desktop

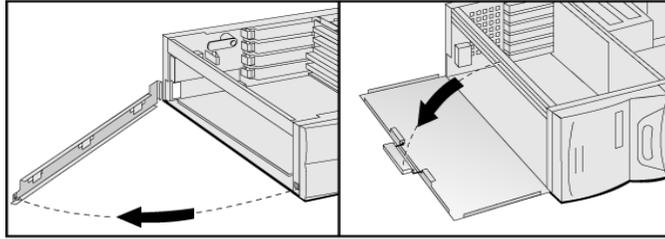


Minitower

3 Replacing Hardware Components

Replacing an Accessory Board

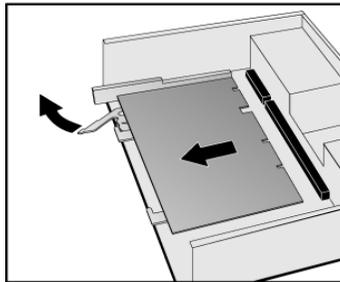
- 4 If the accessory board to remove is located behind the processor, you may need to slide out the system board to allow access:
 - a Open the lower bracket or plate.



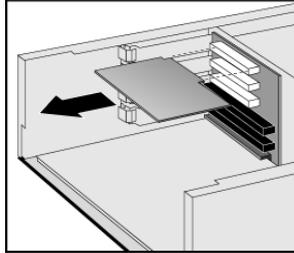
Desktop

Minitower

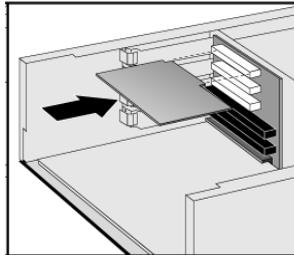
- b Using the lever, slide out the system board to allow better access. For the **minitower**, first lift the lever to release it before pulling it open.



- 5 Hold the old accessory board firmly and carefully pull it out.



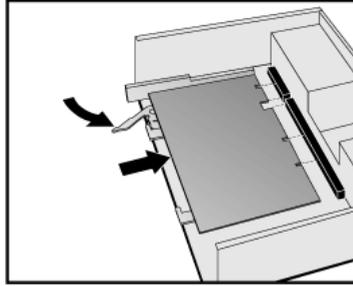
- 6 Aligning the new board carefully, slide it into position and press it firmly into the slot.



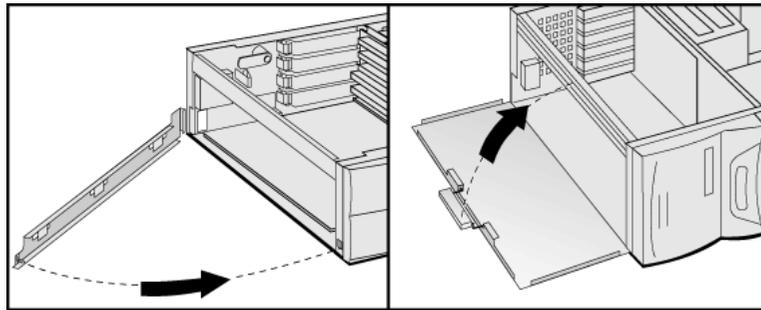
3 Replacing Hardware Components

Replacing an Accessory Board

- 7 If you slid out the system board to allow better access, replace it:
 - a Pushing on the lever and on the system board edge, slide the system board firmly into place. Ensure the connectors are well aligned and fully engaged.



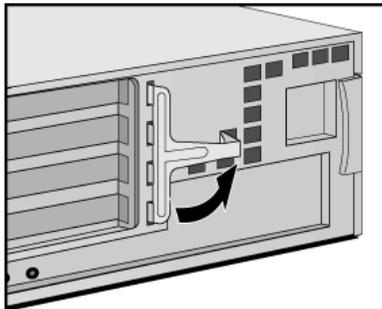
- b Close the lower bracket or plate.



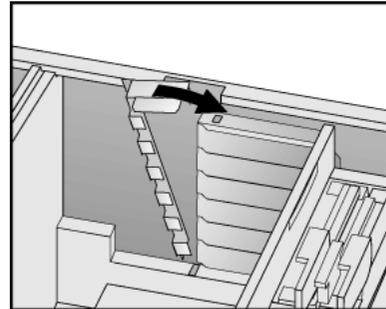
Desktop

Minitower

- 8 Replace the retaining bracket.



Desktop



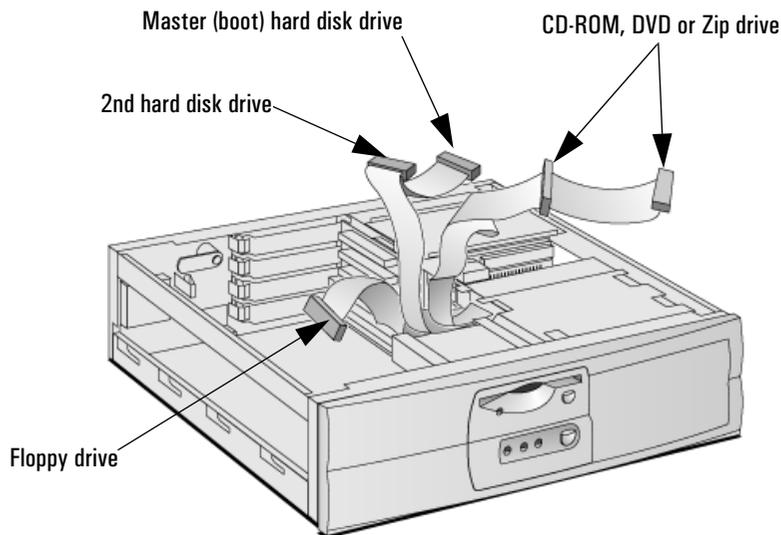
Minitower

- 9 Replace the cover (described in this chapter).

Which Drive Connectors To Use

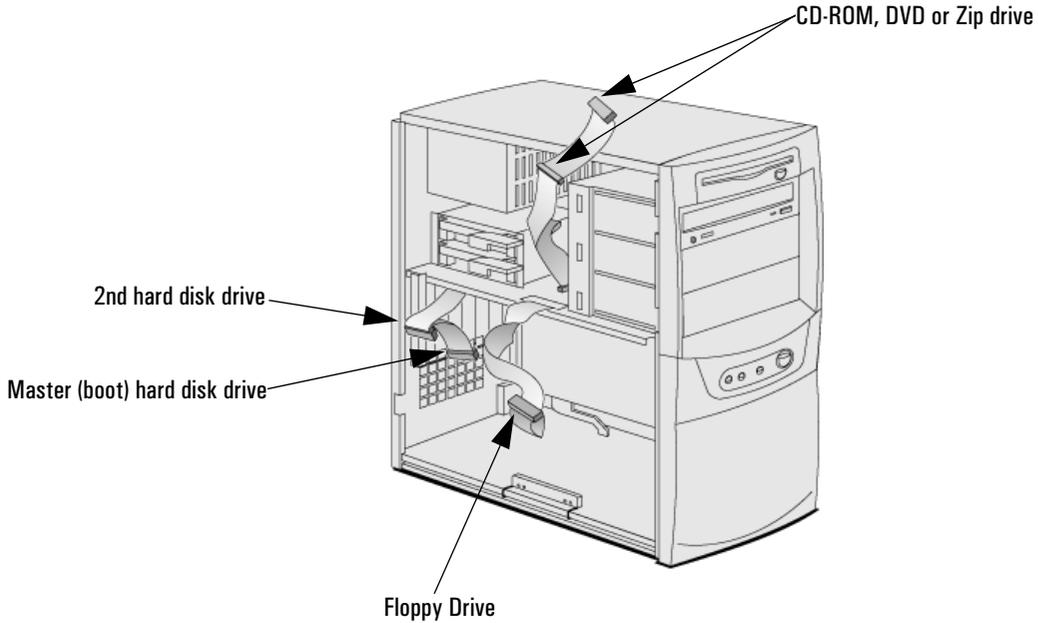
Internal drives, such as hard disk drives, DVD drives, and CD-ROM drives, must be connected to data and power cables. When replacing these drives, ensure you use the correct data and power connectors.

Hard disk drives should always be connected to the primary IDE controller. CD-ROM and CD-R/W drives should always be connected to the secondary IDE controller.



3 Replacing Hardware Components

Which Drive Connectors To Use



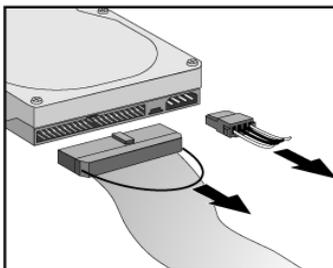
Power Connectors	Number in Desktop	Number in Minitower	Use for
	5 (3 devices max.)	5	Hard disk drives, DVD drives, CD-ROM drives, Zip drives
	1	1	Floppy disk drive

Replacing the Hard Disk Drive

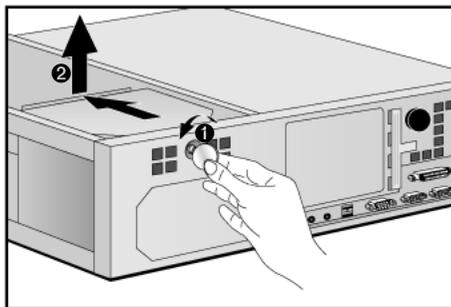
For information about recovering the disk drive contents, refer to the *Troubleshooting and Upgrade Guide*, available on HP's web site www.hp.com/go/vectrasupport.

In the Desktop

- 1 Remove the computer's cover (described in this chapter).
- 2 Remove the drive's connectors.



- 3 Remove the retaining screw ❶ and slide out the drive tray ❷.

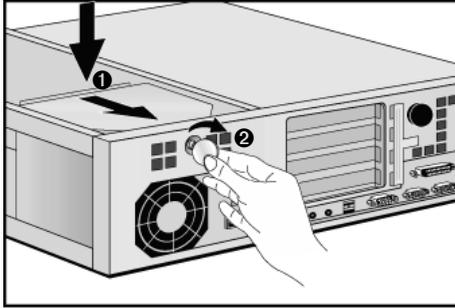


- 4 Loosen the tray's four screws and remove the old hard drive.
- 5 Align the new hard drive in the tray (with the correct orientation) and tighten the screws.

3 Replacing Hardware Components

Replacing the Hard Disk Drive

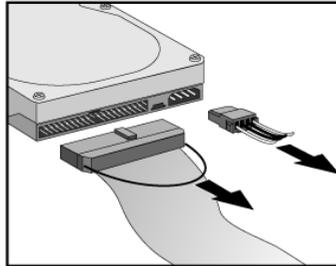
- 6 Replace the drive tray ❶ and retaining screw ❷.



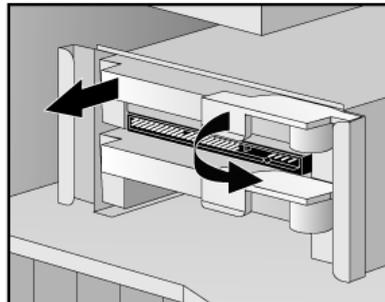
- 7 Attach the data and power connectors.
- 8 Replace the cover (described in this chapter).

In the Minitower

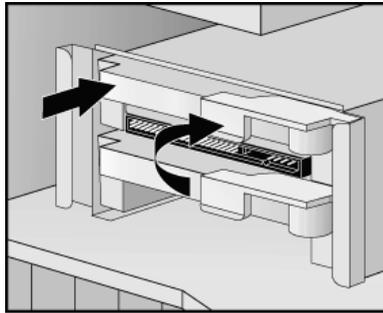
- 1 Remove the computer's cover (described in this chapter).
- 2 Remove the drive's connectors.



- 3 Open the lever and slide out the drive tray.



- 4 Loosen the tray's four screws and remove the old hard drive.
- 5 Align the new hard drive in the tray (with the correct orientation) and tighten the screws.
- 6 Slide the drive tray back into the bay and close the lever.



- 7 Attach the data and power connectors.

CAUTION

Ensure that you route the hard drive power cable correctly. Do not pinch the cable when closing the hard drive tray's lever.

- 8 Replace the cover (described in this chapter).

3 Replacing Hardware Components

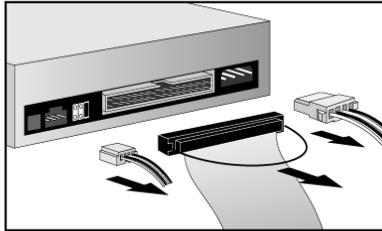
Replacing the CD-ROM Drive (or DVD Drive)

WARNING

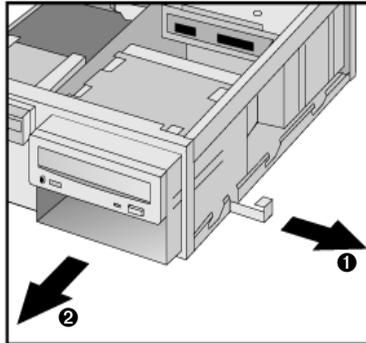
To avoid electrical shock and harm to your eyes by laser, do not open the laser module. The laser module should be serviced by service personnel only. Do not attempt to make any adjustment to the laser unit. Refer to the label on the CD-ROM for power requirements and wavelength. This product is a class 1 laser product.

In the Desktop

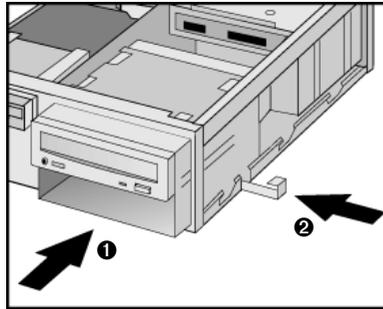
- 1 Remove the computer's cover (described in this chapter).
- 2 Remove the drive's connectors. (If there is another drive in the same bay, remove its connectors too.)



- 3 Pull out the sliding latch **1** and remove the drive bay **2**.



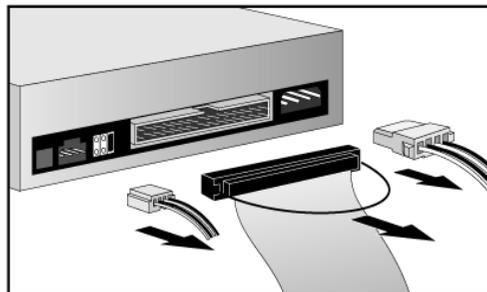
- 4 Remove the four screws that secure the old CD-ROM drive into the tray and remove the drive.
- 5 Align the new CD-ROM drive in the bay (with the correct orientation) and replace the screws.
- 6 Slide the drive bay back into the PC (ensuring the bottom catches engage properly) and replace the sliding latch.



- 7 Attach all data and power connectors.
- 8 Replace the cover (described in this chapter).

In the Minitower

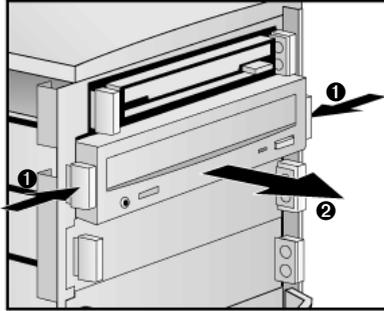
- 1 Remove the computer's cover and front panel (described in this chapter).
- 2 Remove the drive's connectors.



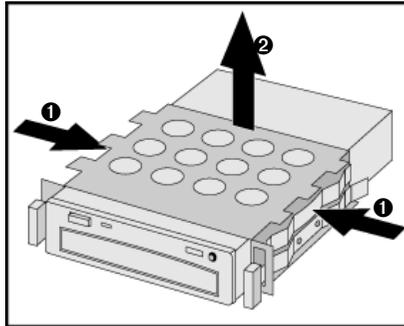
3 Replacing Hardware Components

Replacing the CD-ROM Drive (or DVD Drive)

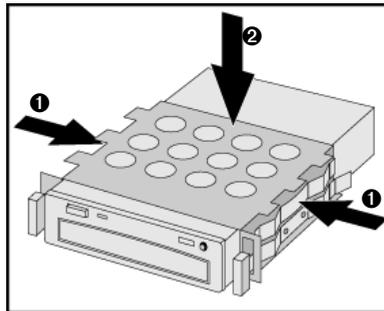
- 3 Press the two latches inward **1** and slide out the drive **2**.



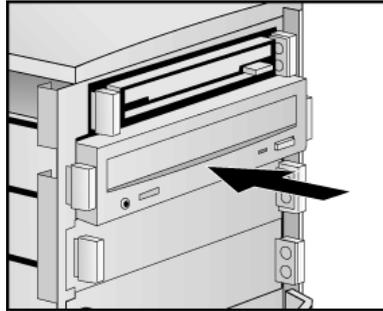
- 4 Place the CD-ROM drive upside down, press the metal strips **1**, and lift off the tray **2**.



- 5 Place the new CD-ROM drive upside down, press the metal strips **1**, and lower the tray into place **2**. Ensure the tray clicks into place.



- 6 Slide the drive back into the PC.



- 7 Attach the data and power connectors.
- 8 Replace the cover (described in this chapter).

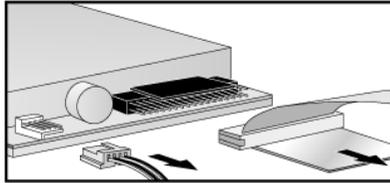
3 Replacing Hardware Components

Replacing the Floppy Drive

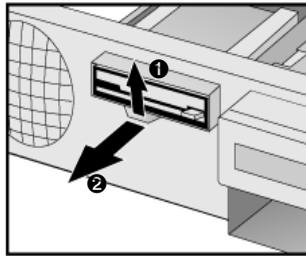
Replacing the Floppy Drive

In the Desktop

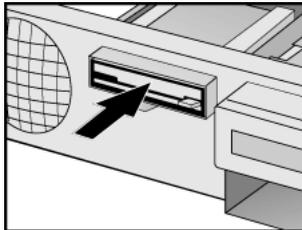
- 1 Remove the computer's cover (described in this chapter).
- 2 Remove the drive's connectors.



- 3 Lift the latch ❶ and slide out the floppy drive tray ❷.



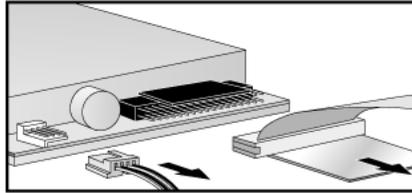
- 4 Remove the tray's screws and remove the old floppy drive.
- 5 Align the new floppy drive in the tray (with the correct orientation) and replace the screws.
- 6 Slide the floppy drive tray back into the PC.



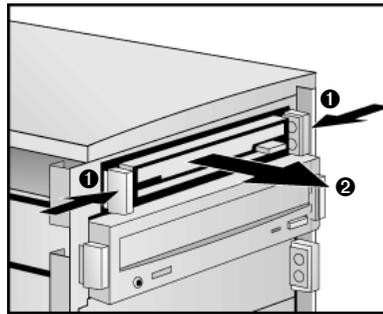
- 7 Attach the data and power connectors.
- 8 Replace the cover (described in this chapter).

In the Minitower

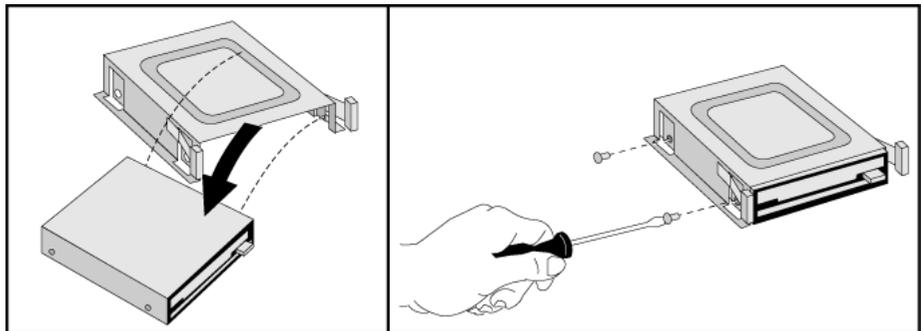
- 1 Remove the computer's cover and front panel (described in this chapter).
- 2 Remove the drive's connectors.



- 3 Press the two latches inward **1** and slide out the floppy drive **2**.



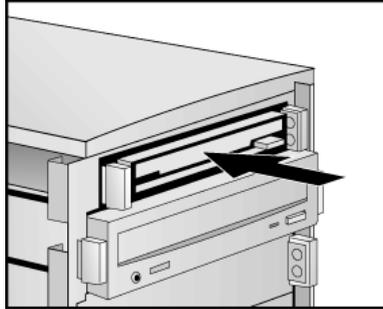
- 4 Place the drive upside down, remove the two side screws, and lift out the drive.
- 5 Insert the new floppy drive (pin side first) then replace the two side screws.



3 Replacing Hardware Components

Replacing the Floppy Drive

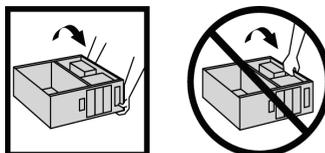
- 6 Slide the floppy drive back into the PC.



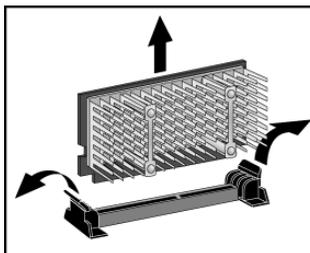
- 7 Attach the data and power connectors.
- 8 Replace the cover (described in this chapter).

Replacing the Processor

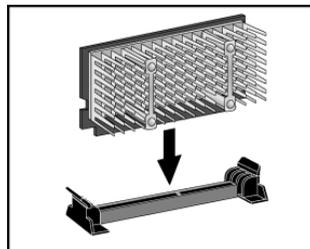
- 1 Remove the computer's cover (described in this chapter).
- 2 If you have a minitower, lay it on its side.



- 3 Remove the old processor.



- 4 Install the new processor and clip it into place.



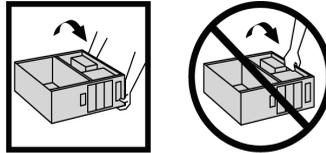
- 5 If the new processor is a different speed, ensure that the system board switches are correctly set for your processor speed. (The correct switch settings are indicated on the system board.)
- 6 Replace the cover (described in this chapter).
- 7 Ensure that the latest version of BIOS is installed on your PC. To learn which version of BIOS is currently installed on your PC, press **ESC** during startup. To get the latest BIOS version for your PC, connect to the web site www.hp.com/go/vectrasupport.

3 Replacing Hardware Components

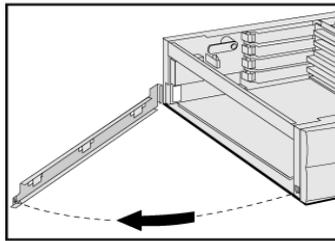
Replacing the System Board

Replacing the System Board

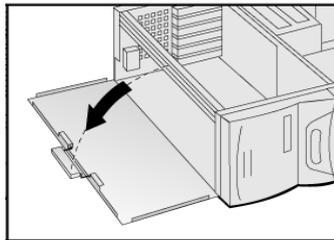
- 1 Remove the computer's cover (described in this chapter).
- 2 If you have a minitower, lay it on its side.



- 3 **Desktop:** Remove the lower bracket.

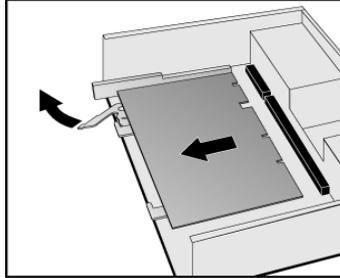


Minitower: Open the bottom plate.

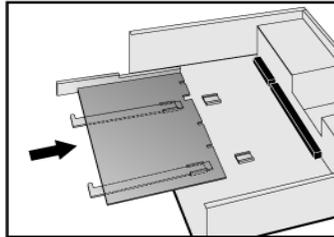


- 4 Remove the main memory and processor from the old system board (described in this chapter).

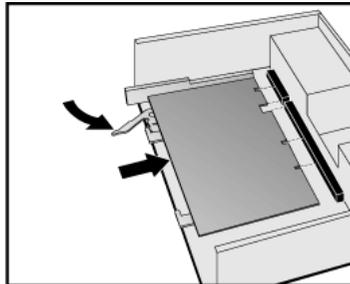
- 5 Remove the old system board. For the **minitower**, first lift the lever to release it before pulling it open.



- 6 First ensure the lever is open, then carefully slide in the new system board, aligning the rails and the rear connector bracket correctly.



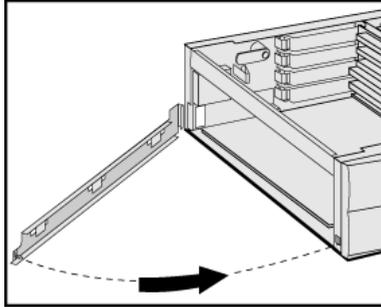
- 7 Pushing on the lever and on the system board edge, slide the system board firmly into place. Ensure the connectors are well aligned and fully engaged.



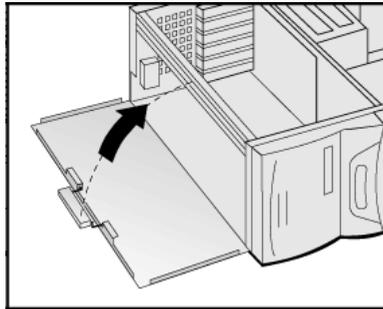
3 Replacing Hardware Components

Replacing the System Board

- 8 Replace the main memory and processor in the new system board (described in this chapter).
- 9 **Desktop:** Replace the lower bracket.



Minitower: Close the bottom plate.



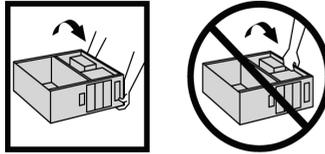
- 10 Replace the cover (described in this chapter).

Replacing the Power Supply

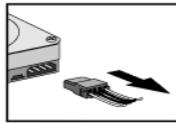
WARNING

To avoid electric shock, do not open the power supply. There are no user-serviceable parts inside.

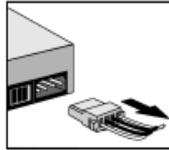
- 1 Remove the computer's cover (described in this chapter).
- 2 If you have a minitower, lay it on its side.



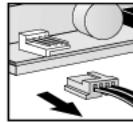
- 3 Remove *all* internal power supply connectors.



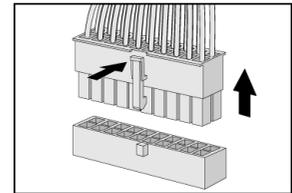
Hard drive(s)



DVD/CD-ROM
drive(s)

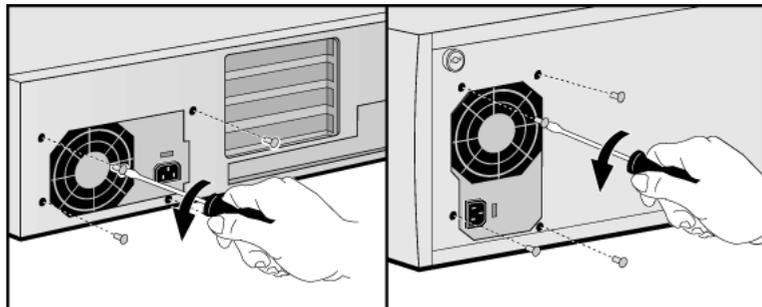


Floppy drive



Main power
(located on backplane near
power supply)

- 4 If you have a desktop, remove the hard drive tray (described in this chapter).
- 5 Remove the four screws securing the power supply.



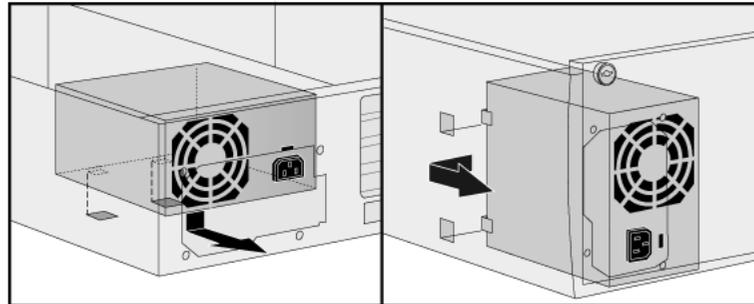
Desktop

Minitower

3 Replacing Hardware Components

Replacing the Power Supply

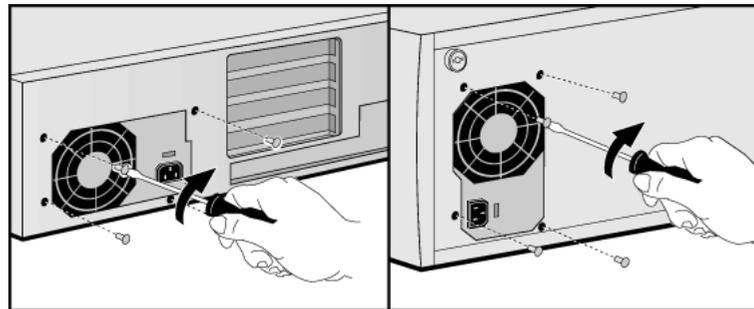
- 6 Slide the old power supply forward and remove it.
- 7 Insert the new power supply (lining up the metal catches).



Desktop

Minitower

- 8 Replace the four screws to secure the power supply.



Desktop

Minitower

- 9 If you have a desktop, re-install the hard drive tray (described in this chapter).
- 10 Reconnect *all* internal power supply connectors.
- 11 Replace the cover (described in this chapter).
- 12 Select the correct voltage setting for your country.

Working in Comfort

Thank you for selecting HP computing equipment. To optimize your comfort and productivity, it is important that you set up your work area correctly and use your HP equipment properly. With that in mind, we have developed some set-up and use recommendations for you to follow based on established ergonomic principles.

Improper and prolonged use of keyboards and input devices are among those tasks that have been associated with repetitive strain injury (RSI) to soft tissues in the hands and arms. If you experience discomfort or pain while using any computing equipment, discontinue use immediately and consult your physician as soon as possible. In addition to the information on RSI given in this chapter, you may also consult the online version of *Working in Comfort* preloaded on the hard disk of the your HP computing equipment, or visit HP's *Working in Comfort* web site at: <http://www.hp.com/ergo/>.

About Repetitive Strain Injury

Because your comfort and safety are our primary concern, we strongly recommend that you use HP computing equipment in accordance with established ergonomic principles and recommendations. Scientific literature suggests that there may be a relationship between injury to soft tissues—especially in the hands and arms—and prolonged improper use of keyboards or other equipment requiring repeated motions of the hands and forearms. This literature also suggests that there are many other risk factors that may increase the chance of such injury, commonly called Repetitive Strain Injury.

What is RSI?

Repetitive Strain Injury (RSI—also known as cumulative trauma disorder or repetitive motion injury) is a type of injury where soft tissues in the body, such as muscles, nerves, or tendons, become irritated or inflamed. RSI has been a reported problem for those who perform repetitive tasks such as assembly line work, meatpacking, sewing, playing musical instruments, and computer work. RSI also has been observed in those who frequently engage in activities such as carpentry, knitting, housework, gardening, tennis, windsurfing and lifting children.

What causes RSI?

The specific causes of RSI have not been established. Nevertheless, the incidence of RSI has been associated with a variety of risk factors, including:

- Too many uninterrupted repetitions of an activity or motion.
- Performing an activity in an awkward or unnatural posture.
- Maintaining static posture for prolonged periods.
- Failing to take frequent short breaks.
- Other environmental and psychosocial factors.

In addition, there have been reports associating the occurrence of RSI with the use of computer keyboards, mice, and other input devices. Also, certain medical conditions, such as rheumatoid arthritis, obesity and diabetes, may predispose some people to this type of injury.

What can I do to avoid RSI?

Some people who use computers may experience physical discomfort during their use. This discomfort may be a symptom of a repetitive strain injury. Properly setting up and using computing equipment can help to minimize your chances of experiencing this discomfort. Well-designed and properly adjusted equipment alone may not be sufficient to eliminate all potential problems. Maintaining good posture and positioning when working on computers also has a significant bearing on your comfort.

What if I experience discomfort?

If you are experiencing any discomfort, seek professional medical advice immediately. Typically, the earlier a problem is diagnosed and treated, the easier it is to resolve.

Preparing Your Work Environment

When using HP computing equipment, it is important that your work environment contribute to your comfort and productivity.

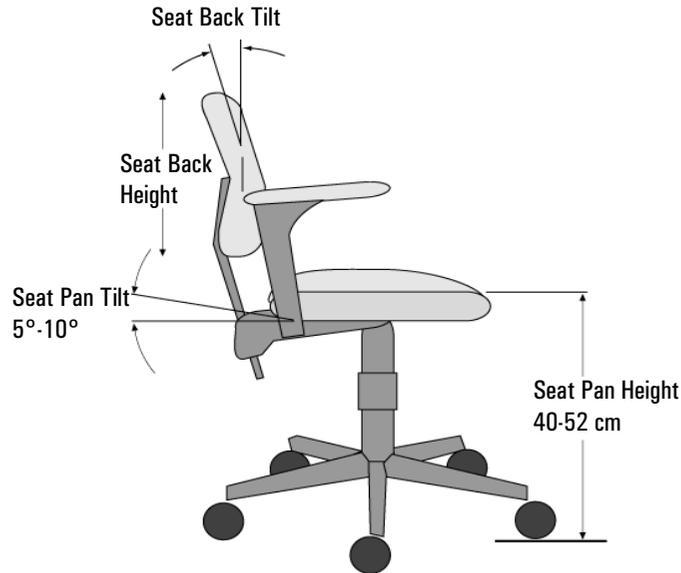
Your Chair

It's very important that your chair provides a comfortable sitting position and offers the following features:

- **A stable base, such as five legs with casters.** Make sure the casters are designed for the type of floor you have in your workspace, whether it is bare or carpeted.
- **A height- and tilt-adjustment feature.** It should be easy to adjust your chair height from 40 cm to 52 cm (15.5 inches to 20.5 inches) as measured from the top of the seat pan to the floor. If you are much taller or shorter than average, you may need a chair that can be adjusted beyond this range. Adjust your chair so that the work surface or keyboard tray is at elbow height and your feet are flat on the floor with your knees slightly bent below your hips. Ideally, the seat pan should be able to tilt both forward (minimum of 5 degrees) and backward (minimum of 10 degrees). If the chair has an adjustable seat pan, inclining the seat slightly forward will transfer some of the pressure from the spine to the thighs and feet. This will relieve pressure on your back.

4 Working in Comfort

- **A curved seat edge.** The front of the seat should be curved and finished in a “waterfall” edge.
- **An adjustable back support** in both height and forward and backward tilt. It is important that the backrest correctly supports the lower part, or lumbar curve, of the back.
- **A freely rotating swivel** so you can move easily from side-to-side.
- **Fully adjustable and padded armrests.** The chair arms should not interfere with adjusting the chair or moving it close to your work surface.



Your Work Surface

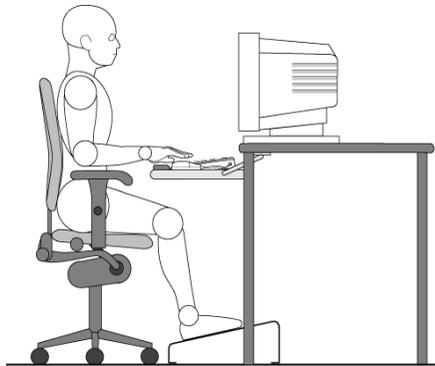
Ideally, you should be able to adjust the height of your work surface.

A simple way to ensure your work surface is at the correct height is to first adjust the height of the seat-pan of your chair. With your chair properly adjusted and your feet firmly on the floor, adjust the work surface height until your forearms are parallel to the floor when you have your fingers on the keyboard or other input device.

Your Work Posture

Sitting in one position for long periods can be uncomfortable. To minimize the potential for physical discomfort or injury, it's important that you maintain proper posture.

- **Back** - While sitting at your work surface, make sure your back is supported by the chair's backrest in an erect position or angled slightly backwards.
- **Arms** - Your arms should be relaxed and loose, elbows close to your sides, with forearms and hands approximately parallel to the floor.
- **Wrists** - Your wrists should be as straight as possible while using the keyboard, mouse or trackball. They should not be bent sideways, or more than 10 degrees up or down.
- **Legs** - Your thighs should be horizontal or angled slightly downward. Your lower legs should be near a right angle to your thighs. Your feet should rest flat on the floor. If necessary, use a footrest, but double check that you have your seat height adjusted correctly before getting a footrest.
- **Head** - Your head should be upright or tilted slightly forward. Avoid working with your head or trunk twisted.
- **Overall** - Change your position frequently and take regular breaks to avoid fatigue.



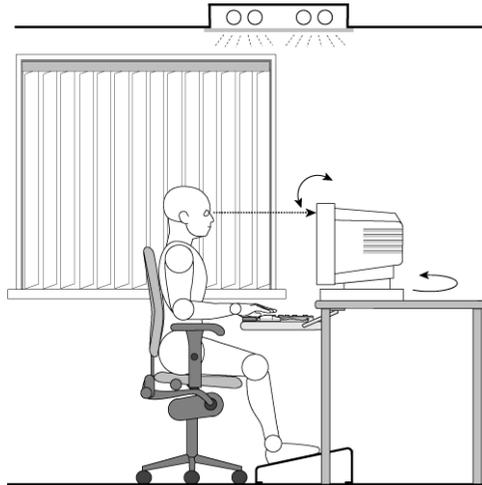
Setting Up Your HP Computing Equipment

Make sure that all the elements of your HP computer system—monitor, document holder, keyboard, mice and other input devices, and headphones and speakers—are optimally arranged and adjusted to meet your personal requirements. The recommendations that follow will help you achieve this.

Your HP Monitor

It is important that your monitor screen be clean and positioned correctly to improve readability and help you work comfortably. Glare, high contrast, reflections, dirt and dust will interfere with what you see on the screen. The recommendations that follow can help you achieve a comfortable arrangement.

- The top of your monitor screen should be at or slightly below eye level. Most HP monitors come with a tilt-and-swivel feature that makes it easy to adjust the screen position.
- To avoid obscuring your view, the screen should be positioned perpendicular to your line of sight; that is, straight on.
- To avoid glare or reflection, try to position the monitor so the screen is at a right angle to your window rather than in front of it. If reflection or glare persists, tilting the screen forward may help.
- Maintain a comfortable viewing distance to the screen. Most people prefer a viewing distance of approximately 46 to 76 cm (18 to 30 inches), depending on monitor size. Character size and the amount of space available on the work surface can affect this distance.
- Text should be easy to read. To help ease eyestrain, adjust text attributes such as character size, spacing, and color. In addition, you will need to use the controls provided with your monitor to adjust the visual settings so that contrast and brightness levels are comfortable for you. High contrast and low brightness is usually the preferable combination.
- The monitor should be free from flicker. If the image on your screen is not stable, the monitor may require repair or adjustment.
- When possible, use a program that has a simple user interface, such as easily identifiable icons and pull-down menus. Also, screen information should be displayed in a structured and well-organized way.



Monitor Use Specifications

- When viewing your monitor, your head should not be tilted more than 15 degrees forward.
- You should not have to look up more than 5 degrees above horizontal or down more than 30 degrees below horizontal for normal work tasks, such as typing or reading.

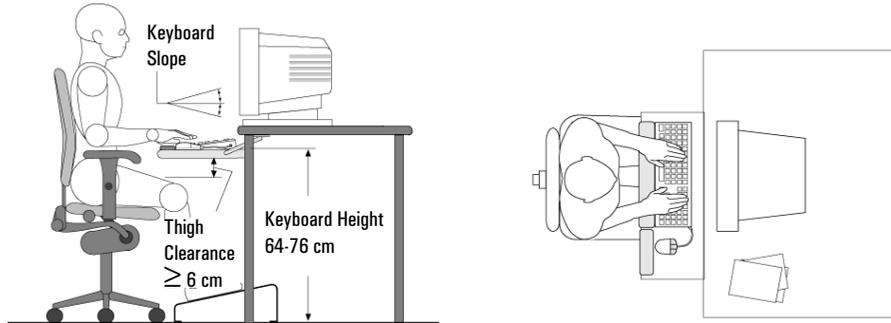
Document Holders

When keying in data from a hard-copy document, placing it in a document holder rather than on a flat surface will make it easier to read. The following recommendations should be observed when using a document holder:

- The document holder should be at approximately the same height and distance from your eyes as the screen, and as close to the monitor as possible to prevent neck twisting. Some users prefer a document holder mounted to the monitor while others prefer the document holder positioned between the screen and keyboard.
- If the primary task is to view documents rather than using the monitor, the document holder may be placed directly in front of the keyboard with the monitor slightly to the side.
- To help reduce stress on your neck and prevent eye fatigue, try to minimize the movement of your head and eyes while using a document holder.

4 Working in Comfort

Your HP Keyboard



The proper positioning and use of your HP keyboard is important when using HP computing equipment. Be sure to observe the following recommendations to optimize your comfort and safety:

- We recommend you place your keyboard in front of the screen or document holder, whichever is viewed the most. Your HP keyboard has long cables so you can place it in the position that is most comfortable for you while you are using your system.
- Because HP keyboards vary in depth, you'll want to be sure that your work surface or keyboard tray has sufficient room to accommodate your model. The keyboard tray should be wide enough to hold both the keyboard and mouse or trackball: 66 to 71 cm (26 to 28 inches).
- Your HP keyboard may have a kickstand that can be opened or closed to raise or lower the keyboard angle. If you are in the correct sitting position with your elbows at about the same level as the work surface, you may not need to use it. However, if your elbows are below the work surface, you may wish to use the kickstand to raise the back of the keyboard.
- An adjustable keyboard tray may be useful if you cannot adjust your chair or work surface to the proper height for typing. It should adjust in height from 64 to 76 cm (25 to 30 inches) above the floor and tilt forward and backward to help you find the most comfortable position. Note that research has shown that there may be less muscle tension in shoulders and forearms with the keyboard tilted away from you.

- When using your HP keyboard, remember it takes very little pressure or force from your fingers to activate the keys. Improper typing style—the use of too much force—can place unnecessary stress on the tendons and muscles in your hands, wrists, and forearms.
- Make sure that your hands are in a neutral position when you use your keyboard. This means that your forearms, wrists, and hands should be in a straight line.
- The keyboard has a low profile to help prevent excessive bending of your wrists while typing. Literature suggests that you should not bend your wrists sideways or more than 10 degrees up or down. Keep your wrists straight by moving your entire hand and forearm over to use the function keys or numeric keypad.
- You may use a palm rest to help keep your hands and wrists in a comfortable and neutral position when you are not typing. Some HP keyboards come with an integrated palm rest. If you use a palm rest, see that it is rounded and padded, and flush in height with the front edge of the keyboard. Note that your palms—not your wrists—should rest on the palm rest. If you don't have a palm rest, try not to rest your wrists on a sharp edge, such as a work surface edge.

Mice and Other Input Devices



Various aspects of using mice and other input devices may increase your risk of discomfort or injury. Observing the following recommendations may reduce that risk:

- As with the keyboard, try to keep your hand, wrist and forearm in a neutral position while using your mouse or other input device.
- When using a stylus or light pen with a graphics tablet, don't grip the stylus tightly. Keep your hand and fingers relaxed and try to maintain a neutral posture in your hand, wrist and forearm.

4 Working in Comfort

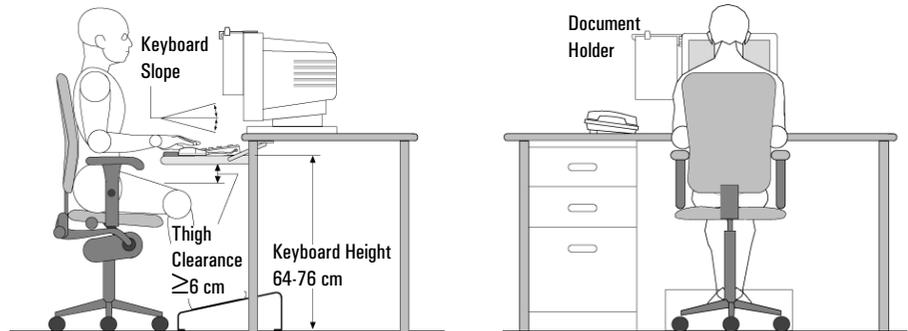
- If you use your thumb to rotate the ball on a trackball or spaceball, keep it in a relaxed, natural shape, and maintain a neutral posture in your hand, wrist and forearm.
- Hold the mouse gently by draping your fingers over it. Keep your hand relaxed and fingers loose. Do not grip the mouse tightly.
- It takes very little pressure or force from your fingers to activate the buttons or scroll wheel on your mouse, scrolling mouse, trackball or other input device. Using too much force can place unnecessary stress on the tendons and muscles in your hands, wrists and forearms.
- If you are using a scrolling mouse, be sure to keep your fingers and hand in a relaxed, neutral position when activating the scroll wheel. Also, this type of mouse features software that can minimize the number of mouse movements or button clicks.
- When using a mouse, trackball, stylus and graphics tablet, or other input device, position it as close to the keyboard as possible, and keep it at the same level so you do not have to stretch while using it.
- Use a good quality mouse pad to enable the mouse to work most effectively and reduce unnecessary hand and wrist movements.
- Be sure to keep your mouse and trackball clean. Regular removal of accumulated dust and dirt helps ensure proper tracking and reduces unnecessary hand and wrist motions.

***WARNING FOR
HEADPHONES &
SPEAKERS***

If your PC is multimedia or if you add a sound card to your PC, always turn the volume down before connecting headphones or speakers, to avoid discomfort from unexpected noise or static. Listening to loud sounds for prolonged periods of time may permanently damage your hearing. Before putting on headphones, place them around your neck and turn the volume down. When you put on the headphones, slowly increase the volume until you find a comfortable listening level. When you can hear comfortably and clearly, without distortion, leave the volume control in that position.

Comfort and Safety Checklist

These recommendations are drawn from the latest available international ergonomic standards and recommendations, including ISO 9241 and ANSI/HFS 100-1988.



General

- **Work Surface Height** - Adjust either your seat height, work surface or both, to position the work surface at approximately elbow height.
- **Work Surface Arrangement** - Make sure frequently used equipment is within easy reach. For example, if you are primarily using the keyboard, place it directly in front of you, not to the side. If you are primarily using the mouse, place it in front of your hand or arm. If you are using both a mouse and keyboard, place them both at the same work surface height and close together. If a palm rest is used, the height should be flush with the front edge of the keyboard. Other items, such as your telephone or notepad, also should be considered.
- **Monitor** - Place your monitor so that the top of the screen is at, or slightly below, eye level (up to 15 degrees).
- **Head** - Do not tilt your head forward by more than 15 degrees, and try not to turn your head toward the side.
- **Back** - While sitting at your work surface, make sure your back is supported by the chair's backrest in an erect position or angled slightly backwards.
- **Arms** - Make sure your arms and elbows are relaxed and loose, with your upper arm perpendicular to the floor or slightly forward. Keep your forearms and hands approximately parallel with the floor with elbows bent between 70 and 115 degrees. Keep your elbows close to your sides (less than 20 degrees away from your body).

4 Working in Comfort

- **Legs** - Your thighs should be horizontal or angled slightly downward. Your lower legs should be near a right angle to your thighs. Make sure there is sufficient room under the work surface for your legs.
- **Feet** - If after adjusting your chair you cannot rest your feet comfortably on the floor, use a footrest, preferably one that can be adjusted in height and angle.

Overall

- Look away from the screen from time-to-time to help reduce eyestrain. Focus on distant objects briefly, and blink periodically to lubricate your eyes. You also should have your eyes checked on a regular basis and ensure your eyeglass prescription is suitable for working on a monitor screen.
- Remember to occasionally shift position and move your body. Keeping your body in one position for long periods is unnatural and stressful. When prolonged work is required, take frequent short breaks. As a rule of thumb, a five or ten minute break every hour is a good idea. Short frequent breaks are more beneficial than longer less frequent breaks. Data show that people who work for long periods of time without a break may be more prone to injury.
- Changing tasks frequently will help prevent muscle stiffness. Examples: alternating between keyboarding, reading, writing, filing, and moving around in your work environment, helps you maintain a relaxed posture. Occasionally stretch the muscles in your hands, arms, shoulders, neck and back. You should stretch at least as often as you take brief task breaks—at least once every hour.
- Discomfort may be alleviated by using alternative ergonomic designs and accessories such as ergonomically personalized chairs, palm rests, keyboard trays, alternative input devices, prescription eyeglasses, anti-glare screens, and more. Seek additional information from the sources available to you, including your employer, doctor, local office supply store, and the *Information Sources* listed in the online version of *Working in Comfort*, preloaded on the hard disk of your HP computing equipment.

Index

A

- accessories
 - installing, 23
- accessory board
 - replacing, 29
- accessory boards
 - installing, 13
- acoustic noise, 73
- acoustic noise emission, 73
- ACPI, 11
- audio
 - connectors, 7

B

- basic problem solving, 15
- battery
 - installing external, 13
 - replacing system board, 13

C

- cables
 - keyboard, 3
- CD-ROM drive
 - replacing, 38
- components
 - replacing, 23
- connecting
 - display, 3
 - keyboard, 3
 - mouse, 3
 - multimedia keyboard, 6
 - power cords, 8
 - printer, 3
- connectors
 - audio, 7
 - headphones, 7
 - internal data, 33
 - internal drive, 33
 - internal power, 33
 - microphone, 7
 - MIDI, 7
- cover
 - removing, 25
 - replacing, 26

D

- data connectors, 33
- diagnosing hardware problems, 18

- DiagTools, 18
- display
 - brightness, 10
 - connecting, 3
 - contrast, 10
- DMAs
 - used by your PC, 13
- documentation
 - downloadable from Web, 12
- drive connectors, 33
- drivers
 - downloading, 11
- DVD drive
 - replacing, 38

E

- Energy Star, 11
- EPA, 11
- ergonomics, 51
- ergonomics web site, 51

F

- floppy drive
 - replacing, 42

H

- hard disk drive
 - installing, 13
 - replacing, 35
- hardware problems
 - diagnosing, 18
- headphones
 - connector, 7
- help
 - online, 12
- HP Setup program, 17
- HP Support and Information Services, 22
- HP Web site, 12

I

- I/O addresses
 - used by your PC, 13
- IDE connectors, 33
- information
 - finding additional, 12
- initializing
 - software, 9

- installing
 - accessories, 23
 - accessory boards, 13
 - external battery, 13
 - hard disk drive, 13
 - security cable, 13
- IRQs
 - used by your PC, 13

K

- keyboard
 - connecting, 3
 - connecting multimedia, 6

L

- line in
 - connector, 7
- line out
 - connector, 7

M

- manageability, 11
- manuals for you PC
 - contents, 12
 - description, 12
- memory
 - replacing, 27
- microphone
 - connector, 7
- MIDI
 - connector, 7
- mouse
 - connecting, 3
- multimedia keyboard
 - connecting, 6

N

- noise, 73

O

- online information, 12

P

- PC
 - starting and stopping, 9
 - unpacking, 2
- physical characteristics, 73
- power

Index

- internal connectors, 33
- power consumption, 73
- power cords
 - connecting, 8
- power management
 - using, 11
- power supply
 - replacing, 49
- Power-On Self-Test
 - screen, 9
- printer
 - connecting, 3
- problem solving, 15
- problems
 - Frequently Asked Questions, 19
 - keyboard, 17
 - mouse, 17
 - PC doesn't start, 16
 - POST error, 17
- processor
 - replacing, 45
- R**
- removing the cover, 25
- repetitive strain injury (RSI), 51
- replacing
 - accessory board, 29
 - CD-ROM drive, 38
 - components, 23
 - DVD drive, 38
 - floppy drive, 42
 - hard disk drive, 35
 - memory, 27
 - power supply, 49
 - processor, 45
 - system board, 46
 - system board battery, 13
- replacing the cover, 26
- S**
- safety, 24
- security cable
 - installing, 13
- software
 - downloading, 11
 - initializing, 9
 - license agreement, 9
- starting

- and stopping PC, 9
- support
 - HP, 22
- system board
 - replacing, 46
- system board switches, 13

- T**
- technical information, 13
- TopTools, 11
- troubleshooting
 - basic, 15
 - Frequently Asked Questions, 19
 - more detailed info, 13
- Troubleshooting & Upgrade Guide
 - description, 13
 - downloading, 13
- Troubleshooting and Upgrade Guide, 23

- U**
- unpacking the PC, 2
- upgrading
 - your PC, 23
- using
 - power management, 11

- V**
- voltage selection, 8

- W**
- Web site HP, 12
- web site HP, 23
- working in comfort, 51

Regulatory Information

DECLARATION OF CONFORMITY According to ISO/IEC Guide 22 and EN 45014

Manufacturer's Name: HEWLETT-PACKARD France
Manufacturer's Address: 5 Avenue Raymond Chanas-Eybens
38053 Grenoble Cedex 09
FRANCE

Declares that the product: **Product Name:** Personal Computer
Model Number: HP VECTRA VLi 8
Models DT and MT

Conforms to the following Product Specifications:

SAFETY International: IEC 60950:1991 + A1 + A2 + A3 + A4 / GB4943-1995
Europe: EN 60950:1992 + A1 + A2 + A3 + A4

EMC CISPR 22:1993 + A1 + A2 / EN 55022:1994 + A1 + A2 Class B ¹⁾
GB9254-1988
EN 50082-1:1992
IEC 801-2:1992 / prEN 55024-2:1992 - 4kV CD, 8kV AD
IEC 801-3:1984 / prEN 55024-3:1991 - 3V/m
IEC 801-4:1988 / prEN 55024-4:1992 - 0.5 kV Signal Lines,
1 kV Power Lines
IEC 555-2:1982 + A1:1985 / EN60555-2:1987
IEC 1000-3-3:1994 / EN61000-3-3:1995

¹⁾ The product was tested in a typical configuration with Hewlett-Packard Personal Computer Systems.

Supplementary information: The product herewith complies with the requirements of the following Directives and carries the CE-marking accordingly: EMC directive 89/336/EEC and Low Voltage Directive 73/23/EEC, both amended by the directive 93/68/EEC.

FCC Title 47 CFR, Part 15 Class B ²⁾ / ICES-003, Issue 2

²⁾ This Device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

VCCI-B
AS / NZ 3548:1992

Grenoble
23 December 1998

Jean-Marc JULIA
Quality Manager



For Compliance Information ONLY, contact:
USA Contact: Hewlett-Packard Company, Corporate Product Regulations Manager,
3000 Hanover Street, Palo Alto, CA 94304. (Phone: (415) 857-1501)

Regulatory Statements

FCC (for USA only)

Federal Communications Commission Radio Frequency Interference Statement

Warning:

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. 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 correct the interference by one or more of the following measures:

- reorient or relocate the receiving antenna
- increase the separation between the equipment and the receiver
- connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- consult the dealer or an experienced radio/TV technician for help.

Hewlett-Packard's FCC Compliance Tests were conducted with HP-supported peripheral devices and HP shielded cables, such as those you receive with your system. Changes or modifications not expressly approved by Hewlett-Packard could void the user's authority to operate the equipment.

Notice for Canada

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la Class B est conforme à la norme NMB-003 du Canada.

Safety Warning for the USA and Canada

If the power cord is not supplied with the computer, select the proper power cord according to your local national electric code.

USA: use a UL listed type SVT detachable power cord.

Canada: use a CSA certified detachable power cord.

Si le cordon secteur n'est pas livré avec votre ordinateur, utiliser un cordon secteur en accord avec votre code électrique national.

Canada: utiliser un cordon secteur certifié CSA.

Notice for the Netherlands



Bij dit apparaat zijn batterijen geleverd. Wanneer deze leeg zijn, moet U ze niet weggooien maar inleveren als KCA.

Hinweis für Deutschland: Geräuschemission

Lärmangabe nach Maschinenlärmverordnung - 3 GSGV (Deutschland):

LpA < 70 dB am Arbeitsplatz bei normalem Betrieb nach DIN 45635 T.19
(under normal use in the workplace, as per ISO 7779).

Notice for Japan

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスB情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。
取り扱い説明書に従って正しい取り扱いをして下さい。

This equipment is in the Class B category information technology equipment based on the rules of the Voluntary Control Council For Interference by Information Technology Equipment (VCCI). Although aimed for residential area operation, radio interference may be caused when used near a radio or TV receiver. Read the instructions for correct operation.

Notice for Korea

사용자 안내문 (B급 기기)

이 기기는 비업무용으로 전자파장해검정을 받은 기기로서, 주거지역에서는 물론 모든 지역에서 사용될 수 있습니다.

Recycling Your PC

HP has a strong commitment toward the environment. Your HP Personal Computer has been designed to respect the environment as much as possible.

HP can also take your old PC back for recycling when it reaches the end of its useful life.

HP has a product take-back program in several countries. The collected equipment is sent to one of HP's recycling facilities in Europe or the USA. As many parts as possible are reused. The remainder is recycled. Special care is taken for batteries and other potentially toxic substances, which are reduced into non-harmful components through a special chemical process.

If you require more details about HP's product take-back program, contact your dealer or your nearest HP Sales Office.

HP General Hardware Warranty

General

This HP General Hardware Warranty statement gives you, the customer, express warranty rights from HP, the Manufacturer. Please refer to the HP Warranty Card included with your product for your *specific* warranty entitlements. In addition, you may also have other legal rights under applicable local law or special written agreement with HP.

FOR CONSUMER TRANSACTIONS IN AUSTRALIA AND NEW ZEALAND, THE WARRANTY TERMS CONTAINED IN THIS STATEMENT, EXCEPT TO THE EXTENT LAWFULLY PERMITTED, DO NOT EXCLUDE, RESTRICT, OR MODIFY BUT ARE IN ADDITION TO THE MANDATORY STATUTORY RIGHTS APPLICABLE TO THE SALE OF THIS PRODUCT TO YOU.

THE LAWS OF YOUR COUNTRY MAY PROVIDE FOR DIFFERENT WARRANTY RIGHTS. IF SO, YOUR AUTHORIZED HP DEALER OR HP SALES AND SERVICE OFFICE CAN PROVIDE YOU WITH DETAILS

Warranty Repair or Replacement

HP Hardware

For the specific warranty period described in the HP Warranty Card included with your product, HP warrants that your HP Hardware, Accessory or Supply will be free from defects in materials and workmanship. Except as indicated above, however, HP does not warrant that any HP Hardware, Accessory or Supply will operate uninterrupted or error-free.

If, during the product warranty period, HP is unable, within a reasonable time, to repair your product to a condition as warranted, you will be entitled to a refund (in the amount of the product purchase price) upon prompt return of the product to your authorized HP dealer or other HP designate. Unless otherwise stated or agreed upon in writing with HP, all hardware components must be returned for refund with the entire system process unit.

The system processor unit, keyboard, mouse, and Hewlett-Packard accessories inside the system processor unit -- such as video adapters, mass storage devices, and interface controllers -- are covered by this warranty.

HP products external to the system processor unit -- such as external storage subsystems, displays, printers, and other peripherals -- are covered by the applicable warranties for those products.

HP software is covered by the HP Software Product Limited Warranty located in your HP product manual.

HP does NOT provide support for this product configured as a network server. We recommend HP NetServers for your network server requirements.

Unless otherwise stated, and to the extent permitted by local law, hardware products may contain remanufactured parts (equivalent to new in performance) or parts which may have been subject to prior incidental use. HP may repair or replace hardware products (i) with products which are equivalent in performance to the products being repaired or replaced but which may have been subject to prior use, or (ii) with products which may contain remanufactured parts equivalent to new in performance or parts which may have been subject to prior incidental use.

Non-HP Hardware

Pre-installed *non-HP* hardware and *non-HP* components installed after the purchase of your HP product may have different warranty conditions than those of the HP product in which they are installed.

All *non-HP* products or peripherals external to the system processor unit -- such as external storage subsystems, displays, printers, and other peripherals -- are covered by the applicable vendor warranties for those products.

Proof of Purchase and Warranty Period

In order to receive service or support for your hardware product for the warranty period specified in the HP Warranty Card included with your product, proof of the original purchase date of the product may be required in order to establish the warranty period starting date for your product. If proof of purchase is not available, the manufacturer's date (located on the product) becomes the beginning of the warranty period.

Exclusions

Warranty does not apply to defects resulting from: (a) improper or inadequate maintenance or calibration; (b) software, interfacing, parts or supplies not supplied by HP; (c) unauthorized repair, maintenance, modification or misuse; (d) operation outside of the published operating specifications for the product; (e) improper site preparation or maintenance; or (f) such other exclusions as may be expressly set forth in this Warranty Statement.

Limitation of Implied Warranties

TO THE EXTENT ALLOWED BY APPLICABLE LOCAL LAW, ANY IMPLIED WARRANTY BY THE MANUFACTURER OF MERCHANTABILITY FOR FITNESS FOR A PARTICULAR PURPOSE OR OTHER IMPLIED WARRANTIES ARE HEREBY LIMITED TO THE DURATION OF THE EXPRESS WARRANTY SET FORTH ABOVE.

Exclusive Remedy

TO THE EXTENT ALLOWED BY APPLICABLE LOCAL LAW, THE REMEDIES IN THIS WARRANTY STATEMENT ARE YOUR SOLE AND EXCLUSIVE REMEDIES. EXCEPT AS INDICATED ABOVE, IN NO EVENT WILL HP BE LIABLE FOR LOSS OF DATA OR FOR DIRECT, SPECIAL, INCIDENTAL, CONSEQUENTIAL (INCLUDING LOST PROFIT) OR OTHER DAMAGE, WHETHER BASED IN CONTRACT, TORT OR OTHERWISE.

(Rev. 30/11/98)

HP Software Product License Agreement and Software Product Limited Warranty

Your HP Vectra PC contains preinstalled software programs. Please read the Software License Agreement before proceeding.

CAREFULLY READ THIS LICENSE AGREEMENT AND LIMITED WARRANTY STATEMENT BEFORE PROCEEDING TO OPERATE THIS EQUIPMENT. RIGHTS IN THE SOFTWARE ARE OFFERED ONLY ON THE CONDITION THAT THE CUSTOMER AGREES TO ALL TERMS AND CONDITIONS OF THE LICENSE AGREEMENT. PROCEEDING TO OPERATE THE EQUIPMENT INDICATES YOUR ACCEPTANCE OF THESE TERMS AND CONDITIONS. IF YOU DO NOT AGREE WITH THE TERMS OF THE LICENSE AGREEMENT, YOU MUST NOW EITHER REMOVE THE SOFTWARE FROM YOUR HARD DISK DRIVE AND DESTROY THE MASTER DISKETTES, OR RETURN THE COMPLETE COMPUTER AND SOFTWARE FOR A FULL REFUND. PROCEEDING WITH CONFIGURATION SIGNIFIES YOUR ACCEPTANCE OF THE LICENSE TERMS.

HP Software Product License Agreement

UNLESS OTHERWISE STATED BELOW, THIS HP SOFTWARE PRODUCT LICENSE AGREEMENT SHALL GOVERN THE USE OF ALL SOFTWARE THAT IS PROVIDED TO YOU, THE CUSTOMER, AS PART OF THE HP COMPUTER PRODUCT. IT SHALL SUPERSEDE ANY NON-HP SOFTWARE LICENSE TERMS THAT MAY BE FOUND ONLINE, OR IN ANY DOCUMENTATION OR OTHER MATERIALS CONTAINED IN THE COMPUTER PRODUCT PACKAGING.

Note: Operating System Software by Microsoft is licensed to you under the Microsoft End User License Agreement (EULA) contained in the Microsoft documentation.

The following License Terms govern the use of the software:

USE. Customer may use the software on any one computer. Customer may not network the software or otherwise use it on more than one computer. Customer may not reverse assemble or decompile the software unless authorized by law.

COPIES AND ADAPTATIONS. Customer may make copies or adaptations of the software (a) for archival purposes or (b) when copying or adaptation is an essential step in the use of the software with a computer so long as the copies and adaptations are used in no other manner.

OWNERSHIP. Customer agrees that he/she does not have any title or ownership of the software, other than ownership of the physical media. Customer acknowledges and agrees that the software is copyrighted and protected under the copyright laws. Customer acknowledges and agrees that the software may have been developed by a third party software supplier named in the copyright notices included with the software, who shall be authorized to hold the Customer responsible for any copyright infringement or violation of this Agreement.

PRODUCT RECOVERY CD-ROM. If your computer was shipped with a product recovery CD-ROM: (i) The product recovery CD-ROM and/or support utility software may only be used for restoring the hard disk of the HP computer with which the product recovery CD-ROM was originally provided. (ii) The use of any operating system software by Microsoft contained in any such product recovery CD-ROM shall be governed by the Microsoft End User License Agreement (EULA).

TRANSFER OF RIGHTS IN SOFTWARE. Customer may transfer rights in the software to a third party only as part of the transfer of all rights and only if Customer obtains the prior agreement of the third party to be bound by the terms of this License Agreement. Upon such a transfer, Customer agrees that his/her rights in the software are terminated and that he/she will either destroy his/her copies and adaptations or deliver them to the third party.

SUBLICENSING AND DISTRIBUTION. Customer may not lease, sublicense the software or distribute copies or adaptations of the software to the public in physical media or by telecommunication without the prior written consent of Hewlett-Packard.

TERMINATION. Hewlett-Packard may terminate this software license for failure to comply with any of these terms provided Hewlett-Packard has requested Customer to cure the failure and Customer has failed to do so within thirty (30) days of such notice.

UPDATES AND UPGRADES. Customer agrees that the software does not include updates and upgrades which may be available from Hewlett-Packard under a separate support agreement.

EXPORT CLAUSE. Customer agrees not to export or re-export the software or any copy or adaptation in violation of the U.S. Export Administration regulations or other applicable regulation.

U.S. GOVERNMENT RESTRICTED RIGHTS. Use, duplication, or disclosure by the U.S. Government is subject to restrictions as set forth in subparagraph (c)(1)(ii) of the Rights in Technical Data and Computer Software clause in DFARS 252.227-7013. Hewlett-Packard Company, 3000 Hanover Street, Palo Alto, CA 94304 U.S.A. Rights for non-DOD U.S. Government Departments and Agencies are as set forth in FAR 52.227-19(c)(1,2).

HP Software Product Limited Warranty

THIS HP SOFTWARE PRODUCT LIMITED WARRANTY SHALL COVER ALL SOFTWARE THAT IS PROVIDED TO YOU, THE CUSTOMER, AS PART OF THE HP COMPUTER PRODUCT, INCLUDING ANY OPERATING SYSTEM SOFTWARE. IT SHALL SUPERSEDE ANY NON-HP WARRANTY TERMS THAT MAY BE FOUND ONLINE, OR IN ANY DOCUMENTATION OR OTHER MATERIALS CONTAINED IN THE COMPUTER PRODUCT PACKAGING.

Ninety-Day Limited Software Warranty. HP warrants for a period of NINETY (90) DAYS from the date of the purchase that the software product will execute its programming instructions when all files are properly installed. HP does not warrant that the software will be uninterrupted or error free. In the event that this software product fails to execute its programming instructions during the warranty period, HP will provide the Customer with non-defective software along with re-installation instructions or assistance.

HP Software

For the applicable Warranty specified in the HP Warranty Card included with your product, HP warrants preloaded HP software against defects in material and workmanship that may result in the failure of HP software to execute when the HP product and HP software are used properly. Except as expressly provided above, HP does not warrant that any HP software will operate uninterrupted or error-free.

If HP receives notice of a defect in an HP software product during the software product's warranty period, HP will, at its option and according to the specified warranty:

1. *assist* in the re-installation of non-defective software OR
2. provide the end-user customer with non-defective software along with written re-installation instructions. *Reloading of the bundled, preloaded HP or non-HP software by HP or any of its designates is not covered by the HP warranty.*

Should HP be unable to replace the software within a reasonable amount of time, the Customer's alternate remedy shall be a refund of the purchase price upon return of the product and all copies. Unless otherwise stated or agreed upon in writing with HP, bundled or pre-installed software may not be returned for *refund* separate from the return of the entire bundled or pre-installed system.

Non-HP Software

All pre-installed and bundled *Non-HP* software is warranted by the software vendor and is *not* warranted by HP.

Removable Media (If supplied). HP warrants the removable media, if supplied, upon which this product is recorded to be free from defects in materials and workmanship under normal use for a period of NINETY (90) DAYS from the date of purchase. In the event the media proves to be defective during the warranty period, Customer's remedy shall be to return the media to HP for replacement. Should HP be unable to replace the media within a reasonable amount of time, Customer's alternate remedy shall be a refund of the purchase price upon return of the product and destruction of all other non removable media copies of the software product.

Notice of Warranty Claims. Customer must notify HP in writing of any warranty claim not later than thirty (30) days after the expiration of the warranty period.

Limitation of Warranty. HP makes no other express warranty, whether written or oral with respect to this product. Any implied warranty of merchantability or fitness for a particular purpose is limited to the 90-day duration of this written warranty. Some states or provinces do not allow limitations on how long an implied warranty lasts, so the above limitation or exclusion may not apply to you. This warranty gives specific legal rights, and you may also have other rights which vary from state to state, or province to province.

Limitation of Liability and Remedies. THE REMEDIES PROVIDED ABOVE ARE CUSTOMER'S SOLE AND EXCLUSIVE REMEDIES. IN NO EVENT SHALL HP BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES (INCLUDING LOST PROFIT) WHETHER BASED ON WARRANTY, CONTRACT, TORT OR ANY OTHER LEGAL THEORY. Some states or provinces do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

Obtaining Warranty Service. Warranty service may be obtained from the nearest HP sales office or other location indicated in the owner's manual or service booklet.

FOR CONSUMER TRANSACTIONS IN AUSTRALIA AND NEW ZEALAND: THE WARRANTY TERMS CONTAINED IN THIS STATEMENT, EXCEPT TO THE EXTENT LAWFULLY PERMITTED, DO NOT EXCLUDE, RESTRICT, OR MODIFY BUT ARE IN ADDITION TO THE MANDATORY STATUTORY RIGHTS APPLICABLE TO THE SALE OF THIS PRODUCT TO YOU.

(Rev. 16/03/98)

Hewlett-Packard Year 2000 Warranty

Subject to all of the terms and limitations of the HP Limited Warranty Statement provided with this HP Product, HP warrants that this HP Product will be able to accurately process date data (including, but not limited to, calculating, comparing, and sequencing) from, into, and between the twentieth and twenty-first centuries, and the years 1999 and 2000, including leap year calculations, when used in accordance with the Product documentation provided by HP (including any instructions for installing patches or upgrades), provided that all other products (e.g. hardware, software, firmware) used in combination with such HP Product(s) properly exchange date data with it. The duration of the Year 2000 warranty extends through January 31, 2001.

(Rev. 21/12/98)

Physical Characteristics

For more information, refer to the PC's data sheet in the library on HP's web site www.hp.com/desktop.

Characteristic	Desktop PC	Minitower PC
Weight (excl. display and keyboard)	10.4 kg (22.9 pounds)	14.8 kg (32.6 pounds)
Dimensions	Width: 44.3 cm (17.4 inches), Height: 13.8 cm (5.4 inches), Depth: 43.5 cm (17.1 inches)	Width: 20.7 cm (8.1 inches), Height: 46.9 cm (18.5 inches), Depth: 45.5 cm (17.9 inches)
Footprint	0.193 m ² (2.07 ft ²)	0.094 m ² (1.01 ft ²)
Storage temperature	-40 °C to 70°C (-40 °F to 158 °F)	-40 °C to 70°C (-40 °F to 158 °F)
Storage humidity	8% to 85% (relative), non-condensing at 40°C (104 °F)	8% to 85% (relative), non-condensing at 40°C (104 °F)
Operating temperature	10 °C to 35 °C (50 °F to 95 °F)	10 °C to 35 °C (50 °F to 95 °F)
Operating humidity	15% to 80% (relative)	15% to 80% (relative)
Power supply	Input voltage: 100 – 127 V 6.0A, 200 – 240V 3.0A ac (voltage selection switch) Input frequency: 50/60 Hz Maximum output power: 200W continuous	Input voltage: 100 – 127 V 6.0A, 200 – 240V 3.0A ac (voltage selection switch) Input frequency: 50/60 Hz Maximum output power: 200W continuous

Power Consumption

Power Consumption (Windows NT 4.0 and Windows 95)	Desktop Models		Minitower Models	
	115V / 60Hz	230V / 50Hz	115V / 60Hz	230V / 50Hz
Operating without I/O	≤ 37.0 W	≤ 37.0 W	≤ 41.0 W	≤ 41.0 W
Standby	≤ 29.0 W	≤ 29.0 W	≤ 29.0 W	≤ 29.0 W
Off	≤ 4.0 W	≤ 4.0 W	≤ 4.0 W	≤ 4.0 W

NOTE

When the PC is turned off with the power button on the front panel, the power consumption falls below 5 Watts, but is not zero. The special on/off method used by this PC considerably extends the lifetime of the power supply and battery. To reach zero power consumption in "off" mode, either unplug the PC from the power outlet or use a power block with a switch.

Acoustic Noise Emission

Acoustic Noise Emission ¹ (Measured according to ISO 7779)	Desktop Models		Minitower Models	
	Sound Power (typical)	Sound Pressure (typical)	Sound Power (typical)	Sound Pressure (typical)
Operating	LwA ≤ 37 dB	LpA ≤ 30 dB	LwA ≤ 36 dB	LpA ≤ 30 dB
Operating with HDD access	LwA ≤ 38 dB	LpA ≤ 31 dB	LwA ≤ 37 dB	LpA ≤ 31 dB
Operating with FDD access	LwA ≤ 42 dB	LpA ≤ 39 dB	LwA ≤ 42 dB	LpA ≤ 38 dB

1. Typical measures with 5400 rpm hard disk drive.

PC Documentation Roadmap

If you want to ...

