

**IBM**

*Aptiva*

**Handbook**

**First Edition (October 1998)**

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# Notice

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## Safety information

### Installation

The construction of the IBM Aptiva Personal Computer provides extra protection against the risk of electrical shock. The IBM Aptiva PC has a power cord with a three-prong plug that is required to ground metal parts. It is the responsibility of the person installing the computer to connect it to a properly grounded electrical outlet. Seek professional assistance before using an adapter or extension cord; these devices could interrupt the grounding circuit.

If the computer is connected to an electrical outlet that is incorrectly connected to the building wiring, serious electrical shock could result.

#### CONTINUED PROTECTION AGAINST THE RISK OF ELECTRICAL SHOCK:

For continued protection against the risk of electrical shock, follow these steps:

- Connect your computer only to an electrical outlet of the correct voltage. If you are unsure about the voltage of the electrical outlet you are using, contact your local power company.
- If your computer has cables other than the power cords, you must connect them before plugging the power cords into an

electrical outlet. Before removing these cables, you must first unplug the power cords from the outlet.

- If your computer has a telephone connection, do not touch the telephone cords when there is lightning in the area.
- Do not use or store the computer in an area where it can become wet.
- Make sure all replacement parts have characteristics identical or equivalent to the original parts. Other parts may not have the same safety features.
- Personal injury or electrical shock may result if you undertake actions other than those specifically described in this book. This is particularly true if you try to service or repair the power supply, monitor, or built-in modem. Always refer service or repairs to qualified service personnel.



**Caution!**

Your computer uses lithium batteries. There may be a risk of fire, explosion, or burns if the batteries are handled incorrectly. To ensure safety:

- Do not recharge, disassemble, heat, or incinerate a lithium battery.
- Replace the battery with an identical or equivalent type lithium battery.
- Discard used lithium batteries according to local country dispositions.

## Safety while working with hardware

Each time you open your computer, you must follow specific safety procedures to ensure that you do not damage your computer. For your safety, and the safety of your equipment, follow the steps for "Disconnecting your computer" on page ix before you remove the cover of the system unit (if included with the model you purchased).

### Connecting your computer

To connect your computer:

1. Turn off the computer and any component you are going to attach to it that may have its own power switch.
2. Attach cords (such as a monitor cord) to the computer.
3. Attach signal cables (such as a telephone cord) to properly grounded outlets.
4. Attach power cables to properly grounded electrical outlets.
5. Turn on the computer and any attached components that may have their own power switch.

**Danger! To avoid shock hazard:**

---



**Danger!**

- Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.
- The power cord must be connected to a properly wired and grounded receptacle.
- Any equipment to which this product will be attached must also be connected to properly wired electrical outlets.
- Electrical current from power, telephone, and communications cables is hazardous. To avoid shock hazard, use the steps described in this section to connect and disconnect cables when installing, moving, or opening the cover of this product.

## Disconnecting your computer

To disconnect your computer:

- 1.** Turn off the computer and any attached component that may have its own power switch.
- 2.** Unplug all power cables from electrical outlets.
- 3.** Remove all signal cables (such as a telephone cord) from their receptacles.
- 4.** Disconnect all cables attached to the computer; this includes power cords, input/output cables, and any other cables attached to the computer.

## Regulatory safety notice for the CD-ROM and DVD-ROM drive

This notice contains required safety information about the CD-ROM/DVD-ROM drive in your computer (if included with the model you purchased). The CD-ROM/DVD-ROM drive is a Class 1 laser product, and Class 1 laser products are not considered to be hazardous. The design of the laser system and CD-ROM/DVD-ROM drive ensures that during normal operation, there is no exposure to laser radiation above Class 1 level.

Please note that the CD-ROM/DVD-ROM drive does not contain any user adjustable or serviceable parts. Service on this drive should only be performed by a trained service provider.

## Laser compliance statement

Some IBM Personal Computer models are equipped from the factory with a CD-ROM or DVD-ROM drive. CD-ROM/DVD-ROM drives are also sold separately as options. The CD-ROM/DVD-ROM drive is a laser product. The CD-ROM/DVD-ROM drive is certified in the U.S. to conform to the requirements of the Department of Health and Human Services 21 Code of Federal Regulations (DHHS 21 CFR) Subchapter J for Class 1 laser products. Elsewhere, the drive is certified to conform to the requirements of the International Electrotechnical Commission (IEC) 825 and CENELEC EN 60 825 for Class 1 laser products.

When a CD-ROM/DVD-ROM drive is installed, note the following:

**Caution!** Use of controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.

Removing the covers of the CD-ROM/DVD-ROM drive could result in exposure to hazardous laser radiation. There are no serviceable parts inside the CD-ROM/DVD-ROM drive covers.

Some CD-ROM/DVD-ROM drives contain an embedded Class 3A or Class 3B laser diode. Note the following:

**Danger!** Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam.

# Regulatory notices

## FCC and telephone company requirements

If your IBM Aptiva Personal Computer comes with a modem already installed, the following Federal Communications Commission (FCC) and telephone company requirements apply:

- 1.** The modem adapter card is located in the back of the system unit. It complies with Part 68 of the FCC rules. A label is affixed to the built-in modem that contains, among other things, the FCC registration number, USOC, and Ringer Equivalency Number (REN) for this equipment. If these numbers are requested, see page 7-4 "Opening the system unit" to open the unit to get the FCC registration number on the modem card. Provide this information to your telephone company.
- 2.** The REN is useful to determine the quantity of devices you may connect to your telephone line and still have those devices ring when your number is called. In most, but not all areas, the sum of the RENs of all devices should not exceed five (5.0). To be certain of the number of devices you may connect to your line, as determined by the REN, you should call your local telephone company to determine the maximum REN for your calling area.

3. If the built-in modem causes harm to the telephone network, the telephone company may discontinue your service temporarily. If possible, they may notify you in advance; if advance notice isn't practical, you will be notified as soon as possible. You may be advised of your right to file a complaint with the FCC.
4. Your telephone company may make changes in its facilities, equipment, operations, or procedures that could affect the proper operation of your equipment. If they do, you may be given advance notice so as to give you an opportunity to maintain uninterrupted service.
5. If you experience trouble with this built-in modem, contact your Authorized Seller, or the IBM HelpCenter-Aptiva PC, IBM Corporation, 3039 Cornwallis Rd., Bldg, 203, Research Triangle Park, NC 27709-2195 1-919-517-2800, for repair/warranty information. The telephone company may ask you to disconnect this equipment from the network until the problem has been corrected, or until you are sure the equipment is not malfunctioning.
6. No customer repairs are possible to the modem.
7. The modem may not be used on coin service provided by the telephone company. Connection to party lines is subject to state tariffs. Contact your state public utility commission or corporation commission for information.
8. When ordering network interface (NI) service from the Local Exchange Carrier, specify service arrangement USOC RJ11C.

## Federal Communications Commission (FCC) Statement

### IBM Aptiva PC 2156

The following statement applies to this IBM product. The statement for other IBM products intended for use with this product will appear in their accompanying manuals.

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 try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult an IBM authorized dealer or service representative for help.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. Proper cables and connectors are available from IBM authorized dealers. IBM is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

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.

Responsible Party:

International Business Machines Corporation  
New Orchard Road  
Armonk, NY 10504  
Telephone: 1-919-543-2193

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

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- Scroll Point
- HelpCenter
- HelpWare
- IBM

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Microsoft and the Windows logo are trademarks or registered trademarks of Microsoft Corporation.

# Ergonomics

## Arranging a comfortable and productive work area



Note: The computer you purchased may have components which are different from those shown here.

## Arranging your work area

When you arrange your computer, position your monitor and keyboard directly in front of you. Place the mouse close to the keyboard so that you can use it without stretching or leaning over to one side.

The system unit is usually kept on the desk beside your monitor. Be sure to place it in an area that will not block the space you need for the keyboard and your work surface.

Organize your desk to reflect the way you use work materials and equipment. Place the things that you use most regularly, such as a mouse or telephone, within the easiest reach.

## Choosing a chair

- Use a chair that gives you good back support.
- When you sit, make sure your things are parallel to the floor and your feet are resting flat on the floor or on a footrest. Your knees should form a 90 degree angle.

## Positioning the monitor

- Place the monitor at a comfortable viewing distance, usually 20 to 24 inches away. You can also use the length of your arm to determine a comfortable viewing distance.
- Adjust your monitor so the top of the screen is at, or slightly below, eye level.
- Keep the screen clean. For cleaning instructions, refer

to the documentation that came with your monitor.

- If you place the monitor near window, consider using curtains or blinds to minimize glare from sunlight. Also be sure to keep the monitor perpendicular to the windows to reduce glare when the curtains or blinds are open. Try to avoid placing the monitor directly in front of a window.
- Use dim room lighting. If you need more light on your work, you should position the light so it shines on your work surface but not onto the monitor screen.
- Use the monitor controls to adjust the screen's brightness and contrast levels to a comfortable level. You may have to do this more than once a day if the light in the room changes. For monitor control adjustment instructions, refer to the documentation that came with your monitor.
- When your eyes focus on a specific object for a long period of time, they may become tired. If you spend a lot of time looking at your screen, remember to take frequent breaks. Look up periodically and focus on an object that is further away. This will give the muscles in your eyes a chance to relax.

## Positioning the keyboard

- Make sure the keyboard height is comfortable for typing.
- When you type, keep your forearms parallel to the floor and relax your shoulders and upper arms. Your elbows should form a 90 degree angle.
- Type with a light touch, keeping your hands and fingers

relaxed. Your wrists should also be straight.

- If your computer came with a wristrest and you choose to use it, do not rest your hands on the wristrest or desktop while you are typing. Instead, use the wristrest only when resting. If you prefer not to use the wristrest, you may remove it and use the keyboard without it.

## Positioning the mouse

- Position your mouse on the same surface as your keyboard so that they are at the same level. Allow enough space so that you can use your mouse without stretching or leaning over.
- When you use the mouse, hold it lightly with all your fingers and click gently. Move the mouse with your entire arm instead of only using your wrist.
- For more detailed information and tips about how to use your computer, refer to the online help on your computer or visit the IBM Healthy computing Web site at

**<http://www.pc.ibm.com/us/healthycomputing>**

# Learning about this book **Part 1**

This part contains an introduction to the *Aptiva Handbook*. Read this part to understand how to use this book and where to go if you need additional information.

This part contains the following chapter:

- **“Chapter 1: Using this book” on page 1-1**

This chapter explains how the book is organized. It also points you to additional sources of information that are not contained in this book.



# Using this book **1**

The Aptiva Handbook contains general information for all users of an IBM Aptiva Personal Computer. Once you have taken your computer out of the box and connected all the components, you can use this book as a guide to your computer's hardware and as a problem-solving tool.

The topics in this book range from an introduction of important Aptiva hardware features to instructions for reconfiguring or upgrading your computer. In addition, if you experience a problem with your Aptiva computer, this book can guide you to a solution.

This book may include information for several Aptiva models. If the model you purchased did not come with some of the hardware mentioned in this book, you will not be able to use the software functions associated with that hardware.

## How this book is organized

This book contains the following parts and chapters:

### Part 1: Learning about this book

This part contains information to help you use the *Aptiva Handbook*. It contains the following chapter:

- "Chapter 1: Using this book" on page 1-1

This chapter contains information about the book's contents and organization. It also points you to other documents or online resources for more information.

### Part 2: Support information

This part contains the general information that you should know before installing the Aptiva Personal Computer.

- "Chapter 2: HelpWare support and services" on page 2-1

This chapter describes the HelpWare offerings, when you might need to use them, and the telephone numbers for obtaining service.

- "Chapter 3: Express maintenance" on page 3-1

This chapter contains information about the Express maintenance service available in some countries.

## Part 3: Controlling system settings

This part contains information to help you configure or reconfigure the hardware and hardware features that were installed in your computer at the factory. It includes the following chapters:

- "Chapter 4: Getting started with your Aptiva computer" on page 4-1

This chapter contains instructions for making adjustments to the monitor and the system volume settings on your Aptiva computer. It also provides information to help you connect your computer to a printer or to the Internet.

- "Chapter 5: Power management features" on page 5-1

This chapter describes the software shutdown and suspend features of your Aptiva computer for more efficient power management. It also tells about the monitor standby feature under Windows 98.

- "Chapter 6: BIOS Setup configuration" on page 6-1

This chapter provides instructions for using the Setup Utility, where you can view or change your system's configuration.

## Part 4: Upgrading and replacing hardware

This part contains information to help you add to or change the hardware that was installed in your computer at the factory. It contains the following chapters:

- "Chapter 7: Preparing to upgrade" on page 7-1

This chapter contains information to help you prepare to add or replace adapter cards, drives, and system board components in your system unit.

- "Chapter 8: Adding and removing adapter cards and drives" on page 8-1

This chapter contains instructions for adding and removing adapter cards and drives.

- "Chapter 9: Adding and replacing system board components" on page 9-1

This chapter contains instructions for adding and replacing hardware components on your system board.

## Part 5: Troubleshooting

This part contains information to help you respond to problems with the hardware, software, and features installed in your computer at the factory. It contains the following chapter:

- "Chapter 10: Diagnosing and recovering from problems" on page 10-1

This chapter provides troubleshooting information, including error code and message interpretations. It also includes information to help you recover factory-installed programs and files.

## Part 6: Technical reference

This part contains technical information that you might need if you upgrade your computer's hardware or use a modem. It contains the following appendices:

- "Appendix A: Specification tables" on page A-1

This appendix contains specific memory, address, interrupt, channel, and port specifications. It also includes connector information.

- "Appendix B: Modem information" on page B-1

This appendix contains information about modems, including AT command set information that you can use if you decide to operate your modem from a Windows 95 DOS box prompt.

- "Appendix C: Monitor terminology" on page C-1

This appendix contains definitions of some of the terms generally used to describe monitor characteristics.

The book also contains an index.

# Conventions used in this book

## Symbol

The following list contains an explanation of the symbols used in this document.



Note:

This symbol is used when there is information you might find especially useful. The information may also warn you about possible problems you could encounter.



Attention!

This symbol is used when there is important information that can help you avoid damage to the hardware or software that came with your computer.



Caution!

This symbol is used when there is important information that can help you avoid potential injury.



Danger!

This symbol is used when there is important information that can help you avoid the risk of serious personal injury or death.

# Highlighting

There are several ways that text is highlighted in this book. Each highlighting convention has a specific purpose.

Highlight	Purpose
<b>Bold</b>	Bold font is used to identify items on the screen you are instructed to click or double-click. Bold font is also used in headings, table titles, and numbered lists.
Example	Example font is used to show text that you need to type from your keyboard.
<i>Italic</i>	Italic font is used to show proper names of programs or books. Italic font is also used in table footnotes and sidenotes.
"Quotes"	Quotation marks are used to identify window, screen, and heading names.
<u>Underline</u>	Underline font is used to call special emphasis to a particular word or instruction.

# Where to find more information

The following publications and online documentation contain more information about your computer:

**Setup Poster.** This poster contains instructions to help you unpack, set up, and start using your computer.

**Program License and Limited Warranty Agreement.** This book contains information about the warranty and license agreement you accept with your use of your computer and the software that came with it.

**Online documentation.** Your computer comes with different types of online documentation. The software that came preloaded on your computer may include online tutorials and exercises that can help you learn how to use your computer. Help is also available as you use your software. In most software, you can press **F1** for help.

From the Windows 98 desktop, you can search for specific help topics about your computer.

To start the Windows 98 help system, follow these steps:

1. Click on the **Start** button on your desktop.
2. Move your mouse pointer to the **Help** option and click on it.

# Support information **Part 2**

This part contains the various support and services the IBM HelpCenter provides.

This part contains the following chapters:

- “Chapter 2: HelpWare Support and Services” on page 2-1

This chapter contains details on the IBMHelpWare support and services. It tells you what to do in case you need computer-related assistance or information.

- “Chapter 3: Express maintenance” on page 3-1

This chapter contains information about the Express maintenance service available in some countries.

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# HelpWare support and services **2**

## What do I do first?

### What is IBM HelpWare?

IBM HelpWare is a comprehensive set of technical support and service options. These include:

- 24-hour help, 365 days a year
- information by Internet

From 30 day "Up and Running" support to help with popular programs, IBM HelpWare has a variety of services and solutions for you. These options are available from IBM whenever you need help for as long as you own your IBM Aptiva Personal Computer. Even when your warranty period expires, HelpWare will still be there to support you with services available for purchase.

Read on to find out when and what methods of support are available at no additional charge and when charges will apply.

## Need quick help?

There are two ways to get help quickly from IBM:

- |                  |  |
|------------------|--|
| <b>Internet</b>  | <a href="http://www.pc.ibm.com/us/aptiva/support">http://www.pc.ibm.com/us/aptiva/support</a>  |
| <b>Telephone</b> | Please refer to the section entitled " <b>How and when do I contact the IBM PC HelpCenter?</b> " on page 2-5 for information about the telephone services of HelpWare. |

## What can I do on my own?

Sometimes you can quickly solve problems that you may have with your computer. We have given you several different methods you can use to solve problems on your own. If you need to, you can still contact IBM for support. There is more information about telephone support in "How and when do I contact the IBM PC HelpCenter?" on page 2-5.

## Printed documentation

The documentation that came with your computer contains information about solving hardware and software problems. This information begins with the quick step-by-step guide on page 10-6 which can help you diagnose hardware and software problems. Once you know the nature of the problem, you can follow the instructions in the "Solving hardware and software problems" section on page 10-7. Just match the description or error code with your question and follow the instructions to solve the problem!

## Online documentation

Your computer also came with several online resources that you can use to solve problems.

### ***Help files***

The operating system and most preloaded programs in your computer contain online help files. These files may contain information about upgrading hardware, using software and many other common computer tasks.

### ***Readme files***

Most operating systems and software programs also come with a file named README.TXT. This is a text file that contains important information about the program. You can read README.TXT files by opening them in any text editor on your computer.

## Software

Your computer comes with several software programs which can help you solve problems or find answers to your questions.

### ***Diagnostics***

Your computer comes with a diagnostic program which can help identify problems you may have with your system. You can run the *PC Doctor* diagnostic program from the AptivaWare folder in Windows or the Product Recovery and Diagnostics disc.

### ***IBM Update Connector***

This program allows you to connect to the IBM PC HelpCenter to receive updates for some of the software that came with your system and download them. Once you have received the files, you can begin the automated installation process. IBM Update Connector is available to registered Aptiva customers during the warranty period at no additional charge. Telephone line charges may apply.

# How do I get help electronically?

## Electronic support

There are many different ways to receive technical support and information if you have questions or problems. Electronic support is easy to use, quick, and very thorough. Best of all, the only charges that typically apply are the ones you pay to your telephone company or the company you use to log onto the World Wide Web. Here are some of the electronic support options that you can use.

### Internet

You can use the Universal Resource Locator (URL) to contact us on the Internet. When you link to the IBM Aptiva PC support home page, you can search for technical tips, download updated drivers and find out about many other things.

You can visit the IBM Aptiva PC support Internet site at this URL:

**<http://www.pc.ibm.com/us/aptiva/support>**

## Online services

Online services are companies which provide a wide variety of services like electronic mail, newsgroup, and special forums. These companies provide IBM forums where customers can receive technical support and information about IBM products.

### ***America Online***

If you want to use America Online to find information related to IBM products and services, use the "Go to" keyword **IBM Connection**.

### ***Prodigy***

If you want to use Prodigy to find information related to IBM products and services, use the Jump command. Type **IBM club** and then select **PC Product Support**.

### ***CompuServe***

If you want to use CompuServe to find information related to IBM products and services, use the "GO" word **IBM**. Then, from the main area, type **APTIVA** to get to the Aptiva support forum.

## Bulletin boards

You can use a Bulletin Board System (BBS) to look at public messaging areas, electronic conferences, and searchable databases. You can also download files for Operating System updates and drivers. There are many other areas of the BBS that contain helpful information and answers to frequently-asked questions. You might find some of these topics on a BBS:

- PC user groups
- PC questions and answers
- Problem-solving
- Technical information

## Automated fax

In the United States and Canada, if you have a touch-tone telephone and access to a fax machine, you can receive information by fax 24 hours a day, 7 days a week.

To access the Automated Fax System:

- In the United States, call 1-800-426-3395.
- In Canada, call 1-800-465-3299.

Follow the recorded instructions, and the information you request will be sent to the fax machine you specify.

A catalogue (approximately 40 pages) of Automated Fax topics is available.



Note:

For help with installing or "how to" questions for software, see "How and when do I purchase additional support?" on page 2-8.

# How and when do I contact the IBM PC HelpCenter?

## What help can I get by telephone?

Sometimes you may have a problem that you just can't solve and we understand that it can be frustrating. This document contains several problem-solving options you can use. See the "Quick problem solving chart" on page 10-6 for troubleshooting information before you call the IBM PC HelpCenter. If you have completed the problem-solving steps in the "Troubleshooting" chapter and you still need help, you may need to call the IBM PC HelpCenter.

System experts are available to help answer your questions. Depending upon the type of problem, there may be charges for some calls and not for others. This section contains information about which calls you will be charged for and which calls you will not. You will be required to register your computer to receive telephone support.



Note:

Make sure you write down your date of purchase and keep your receipt in a safe place. You may be required to present your proof of purchase to receive service under your limited warranty.

## 30-day "Up and Running" support

If you have questions about setting up your system, we're here to help. Within the first 30 days that you have your computer, you can call us at no additional charge to ask questions about:

- setting up your system and attaching a monitor and printer
- starting the preloaded operating system
- starting the preloaded and bundled software programs

Long distance telephone charges may apply. We will calculate the 30 days from the date of purchase.

## Software technical support

If you need help setting up or installing the preloaded or bundled software programs during the 30-day "Up and Running" support period, technical support representatives will help you install (or reinstall) the software that came with your computer if necessary. HelpWare support will ensure that the program is successfully loaded so that you can start the program. Support for your "How to" questions about software programs is available for a fee. For more information, see "How and when do I purchase additional support?" on page 2-8.



Note:

To find your machine and model type as well as your serial number, open the door below the CD-ROM slot and look in the left corner inside the door.

## Additional support

There are times you may need additional assistance after the 30-day "Up and Running" support period. You may also require "How to" help and support as you use your Aptiva PC. IBM PC HelpCenter technicians can assist you for a fee. For more information, see "How and when do I purchase additional support?" on page 2-8.

## Hardware warranty service

In some cases, the Aptiva PC that you purchased may not function as warranted. If this happens, during the period of your warranty, the IBM PC HelpCenter will provide warranty service for IBM factory-installed hardware.

Your Aptiva is subject to the terms of the *IBM Statement of Limited Warranty* and *IBM Program License Agreement* which are included with your computer. Read these terms carefully.

If your computer needs to be serviced, please provide the servicer with the Aptiva *Product Recovery and Diagnostics* disc that came with your computer. This will help the servicer to complete the required service.

If your computer is having a problem that is not covered by the warranty, see "How and when do I purchase additional support?" on page 2-8.



Note:

If your call is not covered by 30-day "Up and Running" support or the warranty, you will be required to provide a major credit card number for support.

## Before you call...

The information in the following three steps will provide the IBM PC HelpCenter technical support representative with valuable information that will assist him/her when handling your call. It will also help reduce the amount of time it takes to diagnose problems and answer questions.

1. Register your computer with the online IBM Registration form that came installed on your computer.
2. If you are able to run the *PC Doctor* diagnostics, locate the log file (the file type will be named.log) and have it available for the technical support representative to review.
3. If you have not already done so, you will be required to register your computer the first time you contact IBM. You will be required to provide the following information:

Name \_\_\_\_\_

Address \_\_\_\_\_  
\_\_\_\_\_

Telephone number \_\_\_\_\_

Machine type and model \_\_\_\_\_

Serial number \_\_\_\_\_

Registration number \_\_\_\_\_  
(when you receive one)

Date of purchase \_\_\_\_\_

- description of the problem
- exact wording of any error messages
- system hardware and software configuration information for your system

If your call is not covered by 30 day "Up and Running" support or the Limited Warranty, you may be required to provide a major credit card number for support. You will not be billed if it is determined that your call is covered under the "Up and Running" support or the Limited Warranty.

Please be at your computer when you call.

HelpWare services are available 24 hours a day, 365 days a year (response times may vary).

- In the United States and Puerto Rico, call **1-919-517-2800**.
- In Canada, call **1-800-565-3344** (excluding holidays).
- In all other countries, contact your IBM reseller or IBM marketing representative for telephone numbers, services and hours of operation.

The support representative can also fax or mail additional technical or product information to you, such as:

- sales information
- product brochures
- locations of IBM resellers
- services available through IBM

If you need help with a specific program or if you need help after your warranty has ended, these services are available for a fee. For more information about additional services, see "How and when do I purchase additional support?" on page 2-8.

# How and when do I purchase additional support?

## Purchasing additional HelpWare services

During and after the warranty period for your computer, you can purchase additional HelpWare services. Our Enhanced PC Support service includes assistance with the following items:

- assistance with installing, configuring, and using selected applications
- using the operating system
- tuning performance (e.g. memory management)
- setting up and using multimedia drivers
- installing and configuring out-of-warranty IBM PC products

You can purchase support in the following ways:

### **900 number**

To receive immediate support from an IBM PC HelpCenter technical support representative, you can call the 900 number. Your local telephone company will bill by the minute for each call. Persons under age 18 must have permission of a parent or legal guardian prior to placing the call.

<b>United States</b>	<b>1-900-555-HELP(4357)</b>	Monday-Friday 9am to 9pm Eastern Time	\$2.99 (US currency) per minute beginning after the first minute
<b>Canada</b>	<b>1-900-565-9988</b>	24 hours a day	\$3.50 (Canada currency) per minute after the first minute

### **Flat rate**

You may call the 919 number to purchase support for a single incident or multiple incidents.

### **Single incident**

The single call option allows you to pay a flat fee for each individual problem you need to resolve. This option is payable only by credit card.

### ***3-incident pack***

The 3-incident pack allows you to purchase a block of problem resolutions at a discount from the single incident price. This option is payable only by credit card. The 3-incident pack expires one year from the date of purchase.

### ***10-incident pack***

The 10-incident pack allows you to purchase a block of problem resolutions at a discount from the single incident price. This option is payable only by credit card. The 10-incident pack expires one year from the date of purchase.

An incident is a request for telephone assistance about a single question or problem. An incident may involve multiple conversations or actions which may include (but are not limited to):

- your initial request
- research by IBM
- a call back from IBM to you

Requests for assistance on multiple questions or problems will be considered as multiple incidents.

## To order additional support packages:

- In the United States, call 1-919-517-2800.
- In Canada, call 1-800-565-3344 (excluding holidays).
- Use the following part numbers when you call:

	<b>US Part Number</b>	<b>Canada part Number</b>
single incident	2419720	EPCS1
3-incident pack	2419721	EPCS3
10-incident pack	2419722	EPCS10

## For more information

The Enhanced PC Support service is available for products on the Supported Products list. To receive a brochure of the Enhanced PC Support service or a Supported Products list from our automated fax system:

- In the United States:
    1. Call 1-800-426-3395.
    2. Select option 1.
    3. Select option 1.
    4. Enter one of the following document numbers:
      - For a brochure, enter 11690 and press the # key.
      - For a supported products list, enter 11682 and press the # key.
    5. When you have finished, press 1.
    6. Enter your fax number and press the # key.
  - In Canada, contact IBM Helpfax:
    1. Call 1-800-465-3299.
    2. Select the appropriate language.
    3. Select option 1.
    4. Select option 1.
    5. Enter one of the following document numbers:
      - For a brochure, enter 16129.
      - For a supported products list, enter 16130.
    6. Follow the instructions given to complete the call.
- In all other countries, contact your IBM reseller or IBM marketing representative.

# Express maintenance 3

Some countries have the ability to dispatch a hardware part directly to you. With Express Maintenance, you can call 1-919-517-2800 to receive select hardware items, for you to install in your computer. This allows a faster up-time for your computer and you avoid having to disassemble your entire system and carry it to an authorized IBM servicer. Some servicers are drop off points that may send your system to another location for repair. This means system repair could take up to 2 weeks. With Express Maintenance, parts are dispatched within 3 business days.

When you call for Express Maintenance, your credit card information will be requested but will be discarded if the defective part is returned to IBM within 30 days after the new part was sent to you. If the part is not returned, your card will be charged the full retail price of the part. Credit card information is not made available to anyone outside of IBM.

# Controlling system settings **Part 3**

This part contains information to help you configure or reconfigure the hardware and hardware features that were installed in your computer at the factory. It contains the following chapters:

- **“Chapter 4: Getting started with your Aptiva computer” on page 4-1**

This chapter contains instructions for making adjustments to monitor and volume settings on your Aptiva computer. It also provides information to help you connect your computer to a printer or to other computer systems, such as the Internet.

- **“Chapter 5: Power management features” on page 5-1**

This chapter describes the software shutdown and Standby features of your Aptiva computer for more efficient power management. It also tells about the monitor standby feature under Windows 98.

- **“Chapter 6: BIOS Setup configuration” on page 6-1**

This chapter provides instructions for using the Configuration/Setup Utility, through which you can view or change your system's configuration.

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# Getting started with your Aptiva computer 4

When you purchased and set up your IBM Aptiva Personal Computer, it was ready for you to use the first time you turned it on. However, as you begin to use your computer, you might want to make adjustments to your monitor and volume settings for optimal comfort and performance. You might also connect your computer to a printer or the Internet.

This chapter contains the following sections to help you make these adjustments and connections:

- "Controlling monitor settings" on page 4-1
- "Controlling volume" on page 4-5
- "Getting ready to print" on page 4-7
- "Setting up communications" on page 4-8
- "Configuring your Aptiva computer for a connection to the Internet" on page 4-10

## Controlling monitor settings

When you connected your monitor to your system unit and turned your computer on for the first time, your computer automatically selected settings for monitor performance. Depending on the monitor you have, you might want to change some of these settings for optimal performance. Using Windows 98, you can customize the screen resolution, number of colors, and the size of the screen, and other properties.

If you have not done so already, follow the setup instructions on the *Setup Poster* to connect the monitor to the system unit. Refer to the documentation that came with your monitor for model-specific monitor information and configuration settings.

## Getting the best performance from your monitor

Follow these guidelines to get the best performance from your monitor:

- Place your monitor away from sources of magnetic interference, such as other monitors, unshielded speakers, and electric power lines. (If your computer came with speakers, those speakers are shielded.)
- Keep the monitor screen clean by using a nonabrasive screen or glass cleaner. Do not spray the cleaner directly onto the screen.
- Under some conditions, interference patterns, such as curved, shadowy lines can occur. If these patterns appear on your screen, change your software program's background color or design.
- To extend the life of your monitor, turn it off at the end of each day.
- Check the documentation that came with your software programs to see if it will let you select combinations of resolution and color. This could make viewing the screen more comfortable.

## Power saver feature

Your monitor documentation should indicate whether your monitor has a power saver feature. This feature may be called Display Power Management Signaling (DPMS). With DPMS, the monitor's display goes blank if you have not used your computer for a predetermined period of time. To redisplay the screen, press the **shift** key on your keyboard or move the mouse.

If your monitor has a power saver feature, you can set the energy saving features of the monitor in the Control Panel in Windows 98. See "Monitor standby" on page 5-3 for instructions on using this feature.

# Changing display settings

The first time you turn on your computer, it automatically selects common settings for your monitor. If your monitor supports Display Data Channel (DDC), the computer automatically selects the best refresh rate your monitor can support. The refresh rate determines how quickly the screen image is drawn on the screen. This setting can be changed.

If you purchased a monitor that does not support DDC, you may want to change your monitor's refresh rate setting. With any monitor, you may want to customize one or more display properties.

## Customizing display properties

In Windows 98, you can change display options such as screen resolution, number of colors, refresh rate, and the size of displayed characters.

If you need assistance in selecting display properties, highlight an area of the Display Properties window and press the **F1** key to read about the selected topic.

To customize your display properties:

1. Double-click on the **My Computer** icon on your desktop.
2. In the My Computer window, double-click on the **Control Panel** folder.
3. In the Control Panel window, double-click on the **Display** icon.

4. In the Display Properties window, click on the **Settings** tab.

In the Settings tab of the Display Properties window, you can set the display properties. Some of the properties you can set are:

- Colors

Lets you specify the number of colors that can be displayed on the screen.

- Font size

Lets you specify the size of the characters displayed on the screen.

You should generally use the default setting for font size since some programs were not designed to work with large fonts.

- Screen area

Lets you specify the screen resolution. The resolution setting determines the amount of information that can be displayed on your screen. The larger the resolution setting numbers, the more you can see on your screen, but the smaller the images on the screen appear.

The values you can choose for screen area (resolution) and colors will be limited by:

- Your monitor's maximum horizontal and vertical frequencies.
- The amount of memory dedicated to video on the computer's system memory.

4 MB of system memory is dedicated for video memory.

## Tips for choosing display properties

Of the settings that your monitor supports, you should select the ones that are most comfortable for you to work with. The highest resolution and color settings are not always best. For example:

- Higher resolutions display more pels (picture elements). While this allows more text and graphics to be displayed, it makes them appear smaller. For most users, 640x480 or 800x600 is a comfortable resolution setting.
- When you select more colors, most software programs will slow down. Choose only as many colors as you need.
- You can determine which settings are most comfortable to work with by selecting and trying each one.
- While your monitor resolution may allow you to change the font size, some programs do not support large fonts. Large fonts may cause words to appear cut off or pushed together.

## Using the Windows Help function to select display properties

Windows Help provides instructions for choosing monitor settings. To select display properties, follow these steps:

1. From the Windows 98 desktop, click on the **Start** button.
2. Click on **Help**.

The Windows Help folder appears.

3. Click on the **Index** tab.
4. In the first box, type:

`monitor`

5. The second box will automatically display a list of tasks related to the monitor. Select the task you want and click on the **Display** button for instructions.

## Controlling volume

Your computer may have a volume control in up to three different locations:

- On one of the speakers

Your Aptiva type 2156 has two internal speakers inside the system unit. There are no volume controls on your speakers.

- In the multimedia software that came with your system

This is the only control that will affect the volume of the internal speakers on your Aptiva 2156 system.

- On the CD-ROM drive at the front of the system unit

Your system may not have this volume control. If your system has this control, it will only control the headphone volume if the headphones are plugged into the CD-ROM drive front panel jack. This control has no effect on the speakers.

If you add external speakers to your system, the standard internal speakers are automatically disabled. Multimedia software controls the volume for external speakers.

The control you use depends on whether you are listening to sound through the speakers or the headphones.

## Adjusting the speaker volume

The volume control of the speaker is affected by the volume control setting in the multimedia software that came with your computer. For example, if no sound comes out of the speakers, the volume setting in your multimedia software might be too low. The multimedia software volume controls are located in the multimedia mixer programs.

## Adjusting the headphone volume

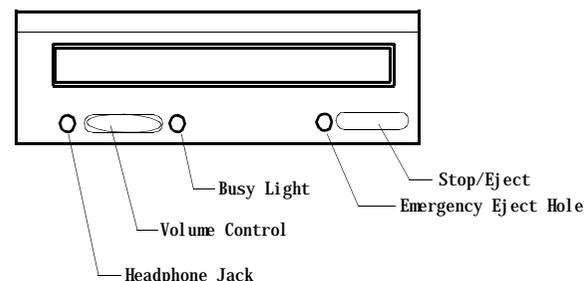
You may be able to plug headphones into the headphone jack on the CD-ROM drive (not available on all systems) or into the line-out jack on the back of the computer's system unit. The line-out jack is marked with the icon .

- On some IBM Aptiva PCs, a headphone jack and a volume control are located on the CD-ROM drive on the front of the computer's system unit.



Note:

The CD-ROM drive in the computer that you purchased may not include all of these lights and controls.



When your headphones are plugged into the headphone jack on the CD-ROM drive, they will pick up only the sound coming from an ordinary audio CD in the CD-ROM drive. The headphones will not pick up other sounds generated from your computer or any external device connected to the computer, such as a MIDI (Musical Instrument Digital Interface) keyboard.

When your headphones are plugged into this jack, use the volume control on the CD-ROM drive to adjust the volume of the headphones. This volume control adjusts the volume of the headphones, but not the speakers. If you want to turn the speaker volume down while using the headphones, use the multimedia software to do it.

- On all models of the IBM Aptiva PC, the headphones can be plugged into the line-out jack on the back of the system unit. This is the same jack you could plug external speakers into. You must disconnect your speakers to use this jack with your headphones.

If you plug your headphones into the jack on the back of the system unit, the headphones will pick up all sounds generated from your computer and any external devices connected to the computer, such as a MIDI (musical) keyboard. The headphones will also pick up sound coming from a CD in the CD-ROM drive.



Note:

When your headphones are plugged into the jack on the back of the system unit, you must control the headphone volume through the volume control in the multimedia software on your computer. You cannot control the headphone volume from the volume control on the CD-ROM drive.

When using this jack, a few sounds may not be audible through the headphones, such as the beep when you turn on your computer.

## Getting ready to print

After you have attached your printer to your computer as described on the *Setup poster*, you need to install the correct printer driver for the operating system you are using. A *printer driver* is a file that describes the characteristics of your printer to the software. The software then uses the file to convert your text and graphics into a form that your printer can understand.

Windows 98 contains printer drivers for many popular printers. If you find that Windows 98 does not have the driver for your printer, use the printer drivers provided with the printer.

Windows Help provides instructions for installing the driver for your printer. To access these instructions, follow these steps:

1. From the Windows 98 desktop, click on the **Start** button.
2. Click on **Help**.
3. The "Windows Help" folder appears.
4. Click on the **Index** tab at the top of the folder.
5. In the first box, type:

`printer`

6. The second box automatically displays a list of tasks related to the printer. Select "Printer setup" and click on the **Display** button for instructions.
7. As you follow the instructions, you will need to indicate:
  - The manufacturer and the model of your printer. If you do not see the manufacturer or model name of your printer in the list, see if your printer came with a diskette that has a driver for Windows 98. If so, follow the instructions for using the diskette.

Or, your printer may have an emulation mode that allows it to print like one of the printers in the list. Look in the documentation that came with your printer to find information on emulation modes. Then select the name of one of the printers it can emulate in this list.
  - The default port for your printer. Select the LPT1: Printer port option.

## Setting up communications

If your computer has a fax/data modem, it can communicate with other computers, fax machines, and telephones.

Some IBM Aptiva computers have a modem already installed. However, if your computer package comes with a modem but it is not installed, open the system and install the modem first. Refer to sections "Opening the system unit" on page 7-4 and "Adding and removing adapter cards" on page 8-3 for instructions.

Before your computer can use its modem, you must complete two procedures in the following sections:

- Connecting your modem to the telephone network
- Configure your communications software

# Connecting your modem to the telephone network

Modems are designed to operate over the *public switched telephone network* (PSTN or PSN). This is an *analog network* commonly used by most households. Connect the modem to an analog network *only*. If you are not sure about your telephone line, contact your local telephone company.

Before you connect your modem to a telephone network, read the safety notices in "Safety information" on page vii.



Attention!

- Excessive voltages can occur on telephone lines, especially during lightning storms. To avoid any possible damage to sensitive electronic parts, unplug the computer and the telephone cords during such storms.
- Some businesses, schools, and buildings have digital telephone systems, known as digital private branch exchange (PBX) systems. These systems do not work with the modem. Connecting your modem to a digital telephone system might damage the modem.

The telephone line your modem uses cannot be used for any other purpose while the modem is operating. Any interruption on the line your computer is using will stop computer communications. You should not pick up a telephone on the same line your computer is using. You must also disable any Call Waiting features on your telephone service. Contact your local telephone company for information about how to disable Call Waiting. Your telephone company might have a dialing sequence procedure that lets you temporarily suspend Call Waiting.

If your computer's telephone line connection is interrupted during modem operation, you must clear the telephone line and restart the communication. If you were sending a fax, you must resend the fax. If you were dialed into a network (communicating with other computers), you must redial.

## Configuring your communications software

Your Aptiva computer can run software that allows you to use the system as a telephone or a fax machine. To configure your computer to operate as a fax machine, see the Windows 98 online help.

Your Aptiva also comes with software that lets you connect to the Internet. Proceed to the next section "Configuring your Aptiva computer for a connection to the Internet".

If you decide not to use a communications software program, you can still use your modem. See "Modem commands" on page B-4 for information about typing AT commands in a Windows 98 Terminal program or a Windows 98 DOS box. If you need more information about modems, see "Modem features" on page B-1.

# Configuring your Aptiva computer for a connection to the Internet

If your Aptiva computer is equipped with a modem, you can connect to the Internet. First, you must connect your computer to the telephone network and configure your communications software. See the preceding section "Setting up communications" on page 4-8 for information about these tasks.

You can connect to the Internet using the IBM Global Network, The Microsoft Network, or any other Internet service provider. Internet service provider and line charges may apply.

## The IBM Global Network

The IBM Global Network is IBM's online service that gives you easy access to the Internet. Once you have configured your Aptiva to connect to the Internet, you can access a wide variety of online information. Other online services include electronic mail, news groups (BBS), World Wide Web, and a lot more.

If you find Netscape in any of the following places,

- Netscape icon on your Windows 98 desktop
- Netscape icon in the Online Services folder on your Windows 98 desktop
- Netscape item in the Windows 98 Start menu

Follow these steps to connect to the Internet through the IBM Global Network.

- 1.** Click on the **Netscape** icon or on the **Internet Explorer** icon on your Windows 98 desktop.

If you don't find the Netscape icon on your desktop, proceed to the next section "The Microsoft Network."

- 2.** When the IBM Global Network screen appears, click on the text **Sign up...** to display the online instructions on how to set up your computer.
- 3.** Follow the onscreen instructions. If you need assistance, press the **F1** key to display the online help.

## The Microsoft Network

You can also use a Windows 98 program to configure a dial-up connection to The Microsoft Network. Follow these steps if you want to become a member of The Microsoft Network.

1. From the Windows 98 desktop, double-click on the **The Microsoft Network** icon.

If this icon does not appear on your desktop, click on **Start** then on **Programs**. From the list of programs, select **The Microsoft Network** option.

2. Follow the onscreen instructions. If you need assistance, press the **F1** key to display the online help.

## The Internet Connection Wizard

Your Aptiva computer comes with a program that guides you through the steps for connecting to the Internet. You can use this program, called a wizard, to set up an Internet connection using The Microsoft Network or any other service provider.

Follow these steps to use the Internet Connection Wizard:

1. From the Windows 98 desktop, click on the **Start** button.
2. Move your mouse pointer to the **Programs** menu, then to the **Internet Explorer** menu.
3. Click on the **Internet Connection Wizard** option.

The wizard lists the information that you need to collect for your connection and then takes you through the steps required to connect. Follow the onscreen instructions. If you need assistance, press **F1** to display the online help.



# Power management features **5**

Your Aptiva computer is compliant to ACPI (Advance Control Power Interface) and the APM (Advance power Management) functions. It will enter a power saving mode according to the power management option you specify.

You can set up the power management option in the BIOS (Basic Input Output system) Setup menu or in Windows 98. See "Power Management Setup" on page 6-10 for setting power management through the BIOS.

Your Aptiva computer supports the following power management features:

- **Software shutdown.** Your computer can be powered off using either Windows 98 or the power button on the front of the system. To avoid data loss, it is recommended that you use Windows 98 when you shut down the computer. The power indicator light is off when the computer is shut down.
- **System standby.** This feature allows you to put your computer into a low power state and then resume operation from where you left off. You can put the system into standby mode using the Windows 98 Start menu or using the power button. The system also will enter the standby mode using the setting in the "Power Management" function of your Windows 98.
- **Monitor standby.** This feature allows the monitor to save energy when you are using Windows 98 Standby.

## Software shutdown

### Using the software shutdown feature

Follow these steps to use the software shutdown feature:

1. Click on the **Start** button on the lower left corner of the Windows 98 screen.



Note:

Make sure that you have saved your work before doing the next step. Selecting **Shut Down...** completely turns off the computer and all unsaved data will be lost.

2. Click on **Shut down...** to display a confirmation screen with a list of options.
3. Select the option **Shut down**. Then click on **OK**.

# System Standby

Your computer supports the system Standby feature. This feature lets the computer enter a low power state. You can put the system in Standby mode in two ways:

- using the Windows 98 Start menu
- using the power button

Under standby mode, programs that are running will go to a standby state but will not shut down. The power indicator light will flash approximately once per second.

## Using the Windows 98 Start menu

Follow these steps to bring the system in standby mode using Windows 98:

1. From your Windows 98 desktop, click on the **Start** button.
2. Click on the option standby.

To bring your system out of Standby mode, press the **Shift** key on the keyboard or move the mouse.

## Using the power button

By default, the power button simply turns the system on or off. However, setting the Power switch < 4 sec. parameter to Standby allows you to use the power button to put the system in Standby mode.

After making the necessary setting change in Setup, you can use the power button to enter system Standby mode by pressing the button for less than four seconds while the computer is on.



Note:

The above step works only when the system is already on.

To bring the system out of Standby mode, press any key on the keyboard or move the mouse.

An incoming modem access while the system is in Standby mode also wakes the system up.

Take note of the following when using the power button for the system Standby feature.

### ***When the system is in "normal on" state***

- Pressing the power button for **more than four** seconds turns off the system power.
- Pressing the power button for **less than four** seconds brings the system into Standby mode

### ***When the system is in "normal on" state***

- Pressing the power button for **more than four** seconds turns off the system power.

- Any normal IRQ event, such as keyboard or mouse movement or a modem ring in, wakes up the system from Standby mode and turns it to the "normal on" state.



Note:

Take note that, while the system is in Standby mode, pressing the power button for less than four seconds does not wake the system up.

#### ***When the system is in "normal off" state***

- Pressing the power button, regardless of the length of time you press it (less than or more than four seconds), simply turns the system power on.

## Using the Power Management feature in Windows 98

Follow these steps for power management:

1. Double-click on the **My computer** icon.
2. Double click on the **Control Panel** icon.
3. Double-click on the **Power Management** icon.

The power management options are available from this menu.

## Monitor standby

Windows 98 provides a monitor energy saving feature. If your monitor supports this function (see your monitor documentation for information), perform the following steps to set the power saving features of your monitor.

1. Click on the **Start** button on your desktop.
2. Select **Settings**, then click on **Control Panel**.

You can also double-click on **My Computer** icon to display the My Computer window. Double-click on the **Control Panel** icon.

3. From the Control Panel window, double-click on the **Display** icon to show the Display Properties window.
4. Select the tab **Screen Saver**.
5. On the lower section where you see Energy saving features of monitor, click on the setting boxes. The **Power Management Properties** window will appear.
6. Specify the number of minutes before the monitor enters standby or completely shuts off. To re-display the screen, press the **Shift** key or move the mouse.

# BIOS Setup configuration 6

## Configuration/Setup Utility overview

Your IBM Aptiva Personal Computer is already configured for immediate use. You can view your computer's configuration settings using the Configuration/Setup Utility and the Windows 98 Device Manager.

You can also use these configuration utilities to change some configuration settings. For instance, if you add or replace hardware inside your system unit, you might need to verify or update specific settings. For information about working with your system unit's hardware, see "Part 4: Upgrading and replacing hardware".

This chapter contains the following sections to help you reconfigure and optimize your computer:

- "Configuration/Setup Utility overview" on page 6-1
- "Entering Setup" on page 6-3
- "Working with the Setup menus" on page 6-4
- "Standard CMOS Setup" on page 6-5
- "BIOS Features Setup" on page 6-7
- "Power Management Setup" on page 6-10
- "PNP/PCI Configuration Setup" on page 6-12
- "Integrated Peripherals" on page 6-13
- "Password Setting" on page 6-14
- "In Case of Problem" on page 6-15

The Configuration/Setup Utility lets you view and change important information about your computer and its hardware. You might need to use Setup if you upgrade the hardware in your computer or if you get an error message while using your computer.



Note:

For simplification, the Configuration/Setup Utility will be referred to simply as "Setup" throughout this handbook.

In most circumstances, when you add or replace hardware in your system unit, your computer's Basic Input/Output System (BIOS) detects the hardware changes and then updates the Setup parameters automatically. In some cases, however, especially if you purchase hardware that does not meet Plug and Play requirements, you might need to manually change the configuration information in Setup. If you add or remove hardware, an online message may ask you to check Setup to verify that automatic detection made the correct configuration changes.

You can use the Setup menus to view information about your system's hardware configuration. In general, the Setup menus contain information on the following:

- System memory
- Diskette, hard disk, and CD-ROM drives
- Serial and parallel ports
- Plug and Play options
- Startup options
- Date and time settings
- Security options
- Power management options
- Video mode options
- Cache memory access options
- Typematic options
- DRAM setting option

Some of the parameters and related settings in Setup are for reference only.

The configurable options allow you to control how your computer operates. For example, you can use Setup to:

- Configure hard disk or CD-ROM drives
- Select and configure I/O devices
- Enable or disable the power management mode
- Customize startup options
- Set date and time
- Create or change a power-on password
- Enable or disable cache options
- Set resource assignments for PCI adapter cards and other system devices
- Load Setup default settings

# Entering Setup

## When the computer is on

Follow these steps to enter Setup when the computer is on:

1. Save all open files and close all running applications.
2. Click on the **Start** button from your Windows 98 desktop.
3. Click on the **Shut Down...** option.
4. From the window that appears, click on the option **Restart the computer?** Then click **OK**.
5. When you see the IBM logo and the message "Press F1 to enter Setup", press **F1** to enter Setup and display the main menu.



Note:

You cannot enter Setup after the Power On Self Test (POST) is complete.

If you have previously set a power-on password, you are prompted to type in the password after you press the F1 key. See the section "Password Setting" on page 6-14 for information on setting, changing, or removing the password.

## When the computer is off

Follow these steps to enter Setup when the computer is off:

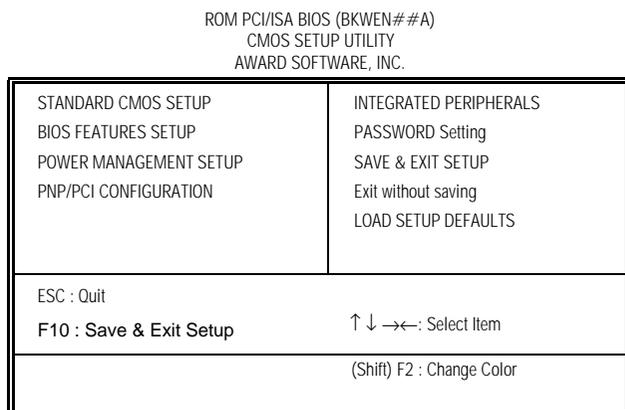
1. Turn on your monitor.
2. Turn on the system unit.
3. When you see the IBM logo and the message "Press F1 to enter Setup" press **F1** to enter Setup and display the main menu.

If you have previously set a power-on password, you are prompted to type in the password after you press the F1 key. See the section "Password Setting" on page 6-14 for information on setting, changing, or removing the password.

# Working with the Setup menus

The Setup main menu appears immediately after you press F1.

## Setup main menu



Note:

A brief description of each highlighted selection appears at the bottom of the screen.

The main menu that you see on your computer may look slightly different from the menu shown here, but the options will operate just the same.

The "##" in the "BKWEN##A" character string means the BIOS revision level.

The Setup main menu lists system configuration options. When you select one of these options, a menu for that option appears.

An option usually has only one menu, although some can have more than one. In options with multiple menus, use the **PgDn** and **PgUp** keys to move from one menu to another.

The following table lists specific keys on the keyboard that will help you move through the Setup menus:

Keys	Function
↑ ↓	Use these arrow keys to highlight a parameter in a menu. (Press the Enter key to choose the option.)
← →	
<b>PgUp</b>	Press this key to move from an option to the options immediately preceding it.
<b>PgDn</b>	Press this key to move from an option to the option immediately following it.
<b>Esc</b>	After viewing or making changes to the settings on a menu, press this key to exit the menu.
<b>F10</b>	Save the setting and exit the main menu.



Note:

Not all of the above keys are available on every menu. The available keys in a menu appear on the bottom of that menu.

# Standard CMOS Setup

The items in the Standard CMOS Setup menu are divided into 10 categories. Each category may include one or more setup items. Use the arrow keys to highlight the item and then use the **PgUp** or **PgDn** keys to select the value you want in each item.

ROM PCI/ISA BIOS (BKWEN##A)  
STANDARD CMOS SETUP  
AWARD SOFTWARE, INC.

Date (mm: dd: yy) : Fri, Aug 16 1996								
Time (hh: mm: ss) : 11: 9: 4								
HARD DISKS	TYPE	SIZE	CYLS	HEAD	PRECOMP	LANDZ	SECTOR	MODE
Primary Master	: Auto	0	0	0	0	0	0	Auto
Primary Slave	: Auto	0	0	0	0	0	0	Auto
Secondary Master	: Auto	0	0	0	0	0	0	Auto
Secondary Slave	: Auto	0	0	0	0	0	0	Auto
Drive A : 1.44M, 3.5 in.				Base Memory: 640K				
Drive B : None				Extended Memory: 27648K				
Floppy 3 Mode Support: Drive A				Other Memory: 384K				
FVideo : EGA/VGA				Total Memory: 28672K				
Halt On: All Errors								
ESC : Quit			↑↓→← : Select Item			PU/PD/+/- : Modify		
F2 : Help			(Shift) F2 : Help					

## Date

The date format is <day>, <date><month><year>. Press <F3> to show the calendar.

day	The day, from Sun to Sat, determined by the BIOS and is display-only.
date	The date, from 1 to 31 (or the maximum allowed in the month)
month	The month, Jan through Dec.
year	The year, from 1900 through 2079

## Time

The time format is <hour>, <minute><second>. The time is calculated based on the 24-hour military-time clock. For example, 1 p.m. is 13:00:00.

## Hard Disks

If you select "auto" as the type, BIOS will auto-detect the hard disk drive during POST and show the IDE for the hard disk drive and CD-ROM drive.

If you select "user" as the type, you will need to know the following information. Enter the information directly from the keyboard and press <Enter>. This information should be included in the documentation from your hard disk vendor or the system manufacturer.

TYPE	drive type
CYLS.	number of cylinders
HEADS	number of heads
PRECOMP	write precom
LANDZONE	landing zone
SECTORS	number of sectors
MODE	mode type

**If a hard disk has not been installed select NONE and press <Enter>.**

## Drive A Type/Drive B Type

Identifies the types of floppy disk drive A or drive B that has been installed in the computer.

None	No floppy drive installed
360K, 5.25 in	5-1/4 inch PC-type standard drive; 360 kilobyte capacity
1.2M, 5.25 in	5-1/4 inch AT-type high-density drive; 1.2 megabyte capacity

720K, 3.5 in	3-1/2 inch double-sided drive; 720 kilobyte capacity
1.44M, 3.5 in	3-1/2 inch double-sided drive; 1.44 megabyte capacity

## Halt On

Determines whether the computer will stop if an error is detected during power up.

No errors	Whenever the BIOS detects a non-fatal error, the system will be stopped and you will be prompted.
All errors	The system boot will not be stopped for any error that may be detected.
All, But Key- board	The system boot will not stop for a keyboard error; it will stop for all other errors.
All, But Diskette	The system boot will not stop for a disk error; it will stop for all other errors.
All, But Disk/Key	The system boot will not stop for a keyboard or disk error; it will stop for all other errors.

## Base Memory

The POST will determine the amount of base (conventional) memory installed in the system. The value of the base memory is typically 640K for systems with 640K or more memory installed on the system board.

## Extended Memory

The BIOS determines how much extended memory is present during the POST. This is the amount of memory located above 1MB in the CPU's memory address map.

## Other Memory

This refers to the memory located in the 640K to 1024K address space. This memory can be used for different applications. DOS uses this area to load device drivers in an effort to keep as much base memory free for application programs. The BIOS is the most frequent user of this RAM area since this is where it shadows RAM.

## BIOS Features Setup

Allows you to configure your system for basic operation. You have the opportunity to select the system default speed, boot-up sequence, keyboard operation, shadowing, and security.

### CPU Internal Cache/External Cache

Speeds up memory access. The default value is Enabled.

Enabled	Enable cache
Disabled	Disable cache

### Quick Power On Self Test

Speeds up Power On Self Test (POST) after you power up the computer. If it is set to Enabled, BIOS will shorten or skip some check items during POST.

Enabled	Enable quick POST
Disabled	Normal POST

### Boot Sequence

Determines which drive to search first for the disk operating system (i.e.,DOS). Default value is CDROM, A, C.

C,A	System will first search for the hard disk drive then the floppy disk drive.
A,C	System will first search for the floppy disk drive then the hard disk drive.
CDROM,C,A	System will first search for the CDROM drive, then the hard disk drive, and then the floppy disk drive.
C,CDROM,A	System will first search for the hard disk drive, then the CDROM drive, and then the floppy disk drive.

### Boot Up NumLock Status

Determines the default state of the numeric keypad. By default, the system boots up with NumLock on.

On	Keypad is number keys
Off	Keypad is arrow keys

### Boot Up System Speed

Selects the default system speed--the normal operating speed at power up.

High	Set the speed to high
Low	Set the speed to low

### Gate A20 Option

Allows you to select how the gate A20 (a device used to address memory above 1MB) is handled. Initially, the gate A20 was handled via a pin on the keyboard. Today, while keyboards still provide this support, it is more common, and much faster, for the system chipset to provide support for gate A20.

Normal	Keyboard
Fast	Chipset

### Memory Parity check

Allows you to determine whether Memory Parity Check is enabled.

Enabled	Enable Memory Parity Check
Disabled	Disable Memory Parity Check

## Typematic Rate Setting

Determines if the typematic rate is to be used. When disabled, continually holding down a key on your keyboard generates only one instance. In other words, the BIOS will only report that the key is down. When the typematic rate is enabled, the BIOS will report as before, but will wait a moment. If the key is still down, it will report that the key has been depressed repeatedly. You might use this feature to accelerate cursor movements with the arrow keys.

Enabled	Enable typematic rate
Disabled	Disable typematic rate

## Typematic Rate(Chars/Sec)

When the typematic rate is enabled, you can select the rate at which the keys are accelerated.

6	6 characters per second
8	8 characters per second
10	10 characters per second
12	12 characters per second
15	15 characters per second
20	20 characters per second
24	24 characters per second
30	30 characters per second

## Typematic Delay (Msec)

When the typematic rate is enabled, you can select the delay between when the key was first depressed and when the acceleration begins.

250	250 msec
500	500 msec
750	750 msec
1000	1000 msec

## PCI/VGA Palette Snoop

Determines whether the MPEG ISA/VESA VGA cards can work with PCI/VGA or not.

Enabled	When PCI/VGA is working with MPEG ISA/VESA VGA card.
Disabled	When PCI/VGA is not working with MPEG ISA/VESA VGA card.

## Report no FDD for Win 95

Select "YES" to release IRQ6 (Interrupt Request) when the system contains no floppy drive for compatibility with Windows 95 logo certification. Also select "Disabled" for the Onboard FDC Control Field in the "**Integrated Peripherals**" menu. See page 6-13 for information about integrated peripherals.

## PS/2 Mouse Detect Function

Determines whether the PS/2 Mouse Detect function is to be used. When enabled, BIOS will detect whether a PS/2 mouse is connected during POST. If a PS/2 mouse is not connected, BIOS displays an error message on the screen. When disabled, BIOS displays no error message.

Enabled	Enable PS/2 Mouse Detect function
Disabled	Disable PS/2 Mouse Detect function

## Multiple Monitor Support

Determines the support for multiple monitors when you install a video adapter card in your system (primary video support is installed on the system board).

Enabled	Can run multiple monitors
Disabled	Can not run multiple monitors

If multiple monitor support is Disabled (the default), once you install a video adapter card in your system, all video functions will be supported by this card. 4 MB of main memory that was previously allocated as video memory will now be available to run system applications.

If multiple monitor support is Enabled and you have two monitors, all system information, including POST, error codes, and BIOS Setup information will be displayed from your primary video connector on your system board. Additional video will be available through the second monitor attached to your video adapter card after Windows 98 is started.

## Video BIOS Shadow

Determines whether video BIOS will be copied to RAM. Video Shadow will increase the video speed.

Enabled	Video shadow is enabled
Disabled	Video shadow is disabled

# Power Management Setup

Power Management Setup allows you to configure your system to save energy while considering your own style of computer use.

## Power Management

Allows you to select the type (or degree) of power saving while in the following modes:

1. Doze Mode
2. Standby Mode
3. Suspend Mode
4. HDD Power Down

There are four selections for Power Management, three of which have fixed mode settings.

Disable (default)	No power management
Min. Power Saving	Minimum power management. Doze Mode = 1 hr. Standby Mode = 1hr., Suspend Mode = 1hr., and HDD Power Down = 15 min.
Max. Power Saving	Maximum power management--ONLY AVAILABLE FOR SL CPU'S. Doze Mode = 1 min., Standby Mode = 1 min., Suspend Mode = 1 min., and HDD Power Down = 1 min.
User Defined	Allows you to set each mode individually. When not disabled, each of the ranges are from 1 min. to 1 hr. except for HDD Power Down, which ranges from 1 min. to 15 min, and disable.

## PM Control APM

Activates an Advanced Power Management device to enhance the Max. Power Saving mode and stop the CPU internal clock. If Advanced Power management (APM) is installed on your system, selecting "Yes" gives better power saving.

If the Max. Power Saving is not enabled, this will be preset to No.

## MODEM Use IRQ

Determines the modem IRQ.

Choices: 3, 4, 5, 7, 9, 10, 11, NA

## PM Timers

The following four modes are Green PC power saving functions which are user configurable when User Defined Power Management has been selected. See the table under "Power Management Setup" for the selectable options.

## HDD Off After

The default is Disabled, which means the hard drive will remain ready irregardless of the mode set for the rest of the system. Your hard disk drive can be turned off after a selected number of minutes or when the rest of the system goes into Suspend mode.

Choices: 1 to 15 min., or Suspend

## Doze Mode

Allows the CPU to run at a slower speed after a specified period of inactivity.

## Standby Mode

Shuts down the hard drive and video after a specified period of inactivity.

## Suspend Mode

Shuts down all devices after a specified period of inactivity.

## PM Events

I/O events that can prevent the system from entering a power saving mode or awaken the system from a power saving mode. The system remains alert for anything that may occur to a device that is configured as On, even when the system is in a powered down state.

### COM Ports Activity

When set to "On", any event occurring at a COM (serial) port will awaken the system from a powered down state.

### LPT Ports Activity

When set to "On", any event occurring at an LPT (printer) port will awaken the system from a powered down state.

### HDD Ports Activity

When set to "On", any event occurring at a hard or floppy drive port will awaken a system from a powered down state.

### VGA Activity

When set to "On", any event occurring at VGA will awaken a system from a powered down state.

The following list of IRQs can be specified as exempt from causing the system to enter or awaken from a power management state. An I/O device signals the operating system by causing an IRQ to occur. When the operating system is ready to respond to the request, it interrupts itself and performs the service.

Choice : On

- IRQ3 (COM2)
- IRQ4 (COM1)
- IRQ5 (LPT2)
- IRQ6 (Floppy disk)
- IRQ7 (LPT1)
- IRQ8 (RTC Alarm)
- IRQ9 (IRQ2 Redir)
- IRQ10 (Reserved)
- IRQ11 (Reserved)
- IRQ12 (P/S 2 Mouse)
- IRQ13 (Coprocessor)
- IRQ14 (Hard disk)
- IRQ15 (Reserved)

## PNP/PCI Configuration Setup

This section describes configuring the PCI bus system. PCI, or **P**ersonal **C**omputer **I**nterconnect, is a system which allows I/O devices to operate at speeds nearing the speed of the CPU itself when communicating with its own special components. This section covers some very technical items and it is strongly recommended that only experienced users make any changes to the default settings.

### Resource controlled by

The BIOS has the capacity to automatically configure all of the boot and Plug and Play compatible devices. However, this capability applies only when you are using a Plug and Play operating system such as Windows<sup>®</sup> 98.

Choices: Auto, Manual

### Reset Configuration Data

Normally, you leave this field Disabled. Select Enabled to reset Extended System Configuration Data (ESCD) when you exit Setup if you have installed a new add-on and the system reconfiguration has caused such a serious conflict that the operating system cannot boot.

Choices: Enabled, Disabled

### PCI IRQ Activated by

Sets the method by which the PCI bus recognizes that an IRQ service is being requested by a device. Under all circumstances, you should retain the default configuration unless advised otherwise by an authorized technician.

Choices: Level, Edge

# Integrated Peripherals

## Internal PCI/IDE

This chipset contains an internal PCI IDE interface with support for two IDE channels.

Choices: Primary, Secondary, Both

## IDE/PIO

IDE hard drive controllers can support up to two separate hard drives. These drives have a master/slave relationship which are determined by the cabling configuration used to attach them to the controller. Your system supports two IDE controllers--a primary and a secondary.

PIO (Programmed Input/Output). Rather than have the BIOS issue a series of commands to affect a transfer to or from the disk drive, PIO allows the BIOS to tell the controller what it wants and then lets the controller and the processor perform the task. This is simpler, more efficient, and faster.

## IDE Burst Mode

Reduces latency between each drive read/write cycle, but may cause instability in IDE subsystems that cannot support such fast performance. If you are getting disk drive errors, try setting this value to Disabled.

Choices: Enabled, Disabled

## IDE Data Port Post Write

Speeds up processing of drive reads and writes, but may cause instability in IDE subsystems that cannot support fast performance. If you are getting disk drive errors, try setting this value to Disabled.

## IDE HDD Block Mode

Block mode is also called block transfer, multiple commands, or multiple sector read/write. If your IDE hard drive supports block mode (most new drives do), select Enabled for automatic detection of the optimal number of block read/writes per sector the drive can support.

## On board FDD Controller

Allows you to disable your floppy drive.

## Onboard serial port 1

Allows you to specify the I/O port address and the IRQ for serial port 1.

## Onboard Parallel Port

Select a logical LPT port address and corresponding interrupt for the physical parallel port.

## Onboard parallel Mode

Select an operating mode for the onboard parallel (Printer) port. Be sure that your hardware and software support the mode that you choose.

Choices: SPP, ECP/EPP, ECP, EPP/SPP

## USB Controller

Select enabled if your system contains a Universal Serial Bus (USB) controller and you have USB peripherals.

## USB Keyboard Support

Select Enabled if you have a USB controller and USB keyboard.

## Power Button Override

Use to specify the amount of time you want the system to wait before shutting down after the power button is pressed.

## Ring Power Up control

Allows your system to power on when your system is in Standby and when the modem rings.

Choices: Enabled, Disabled

## Power Up by Alarm

When you select Enabled, fields appear that let you set the alarm that returns the system to a full On state.

# Password Setting

For security, you can specify a password for getting into the BIOS Setup utility.

When you select this function, the following message will appear at the center of the screen to assist you in creating a password.

ENTER PASSWORD:

Type the password, up to eight characters in length, and press **Enter**. The password you type will clear any previously entered password from CMOS memory. You will be asked to confirm the password. Type the password again and press **Enter**. You may also press **Esc** to cancel the selection and not enter a password.

To disable a password, just press **Enter** when you are prompted to enter the password. A message will confirm the password will be disabled. Once the password is disabled, the system will boot and you can enter Setup freely.

PASSWORD DISABLED.

When a password has been enabled, you will be prompted to enter it every time you try to enter Setup. This prevents an unauthorized person from changing any part of your system configuration.

Additionally, when a password is enabled, you can also require the BIOS to request a password every time your system is rebooted. This would prevent unauthorized use of your computer.

You determine when the password is required within the BIOS Features Setup Menu and its Security option. If the Security option is set to "System", the password will be required both at boot and at entry to Setup. If you see "Setup", you will be prompted only when trying to enter Setup.

## In Case of Problems

If your computer won't boot after you've made and saved changes within Setup, you can override to the CMOS settings and reset your system to the defaults.

Do not alter settings unless you thoroughly understand what you are doing. The defaults have been carefully chosen to provide the maximum performance and reliability. Even a seemingly small change to the Setup has the potential to cause your system to not boot.

# Preparing to upgrade **7**

## Evaluating your new hardware

To upgrade your computer's hardware, you can add or replace cards, drives, or some system board components. If you take the time to evaluate your new hardware and plan your hardware changes, you can reduce the effort required to make the changes.

For instance, the type of hardware you plan to add or replace determines whether you begin with your computer turned on or off.

As you prepare to add or replace hardware in your system unit, follow the instructions in these sections:

- "Evaluating your new hardware" on page 7-1
- "Planning your hardware changes" on page 7-3
- "Opening the system unit" on page 7-4
- "Looking inside the system unit" on page 7-7
- "Resolving resource conflicts" on page 7-3

The documentation that came with your new hardware should contain information about required settings and the instructions on how to install the hardware. Study the documentation carefully.

If the documentation refers you to information about your computer's I/O addresses, system interrupt requests (IRQs), or DMA channel assignments, see "Appendix A: Specification tables".

## For conflicts with system resources used by adapter cards

If you install new hardware in your system, it might attempt to use a system resource that is already assigned.

If you install a PCI adapter card, the system BIOS automatically detects it, assigns an available system resource to it, and configures your computer to use the card. However, some ISA Plug and Play adapter cards require specific system resources. If you install this kind of card, BIOS detects the card but there is a possibility of resource conflict between the new ISA Plug and Play card and a previously installed card. In this case, you will have to manually assign the system resources.

Follow the procedure in the section "Resolving resource conflicts" on page 7-3.

## For conflicts with other system resources

If you install hardware that creates conflicts with other system resources, you may receive an error message the first time you turn on your computer after you have installed the new hardware. If you receive an error message, use the Windows 98 Device Manager to reassign system resources. See the section "Using the Windows 98 Device Manager" on page 7-4 for instructions.

Refer also to "Appendix A: Specification tables" for information on system resources.

## Planning your hardware changes

You should understand how your new hardware will work with your existing hardware before you unplug your system unit, pull the cover off, and start removing or adding hardware. You should also record your changes as you work.

Make sure that you have read the preceding section "Evaluating your new hardware" on page 8-1 before you proceed.

## Recording your changes

When you add or replace hardware, you should record the changes you make. The information you need to record as you work includes, but is not limited to:

- Changes to jumper positions
- Connection of drive and adapter card cables to the system board
- Changes to CMOS settings in Setup
- Changes to settings in other online configuration utilities, such as the Windows 98 Device Manager or a configuration utility that might come with your new hardware.

## Resolving resource conflicts

### Using Setup

Your computer's Basic Input/Output System (BIOS) automatically detects most hardware changes and then updates the related CMOS configuration settings in Setup. In cases when the CMOS settings are not automatically updated, you receive a message reminding you to manually update the settings.

To resolve resource conflicts between system devices in Setup, follow these steps:

1. Enter Setup. See "Entering Setup" on page 6-3 for instructions.
2. From the Setup main menu, select **PnP/PCI Option**.
3. Highlight the **Reset configuration Data** parameter and set it to **Enabled** to clear the resource assignments of all installed cards.

After the above steps, proceed to the next section on how to use the Windows 98 Device Manager to assign system resources to your hardware devices.

## Using the Windows 98 Device Manager

Use the Windows 98 Device Manager to verify system device settings or to resolve system resource conflicts, such as those that might occur with Interrupt Requests (IRQ) and Direct Memory Access (DMA) resources.

Follow these steps to start the Device Manager and change device settings:

1. From the Windows 98 desktop, double-click on the **My Computer** icon.
2. In the My Computer window, double-click on the **Control Panel** icon.
3. In the Control Panel window, double-click on the **System** icon.
4. In the System Properties window, click on the **Device Manager** tab.
5. Select a device item, then click on the **Properties** button. A display box appears showing the properties of the device.
6. Make the necessary changes in the settings that will not conflict with other devices.
7. Click on **OK**.

## Opening the system unit

Each time you open your system unit, you must follow specific safety procedures to ensure that you do not damage your computer.

## Taking safety precautions

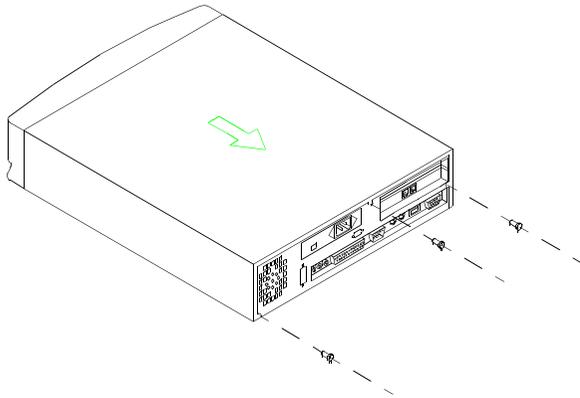
For your safety and the safety of your equipment, follow these steps before you remove the system unit cover:

1. If your computer is on, or in other power saving modes, shut down the machine.
2. Turn off the monitor and any external components, such as a printer.
3. Unplug all cables from the system unit except the system unit power cord. Be sure to disconnect any telephone line connections as well.
4. Proceed to the next section for instructions on removing the cover.

# Removing the top cover

Follow these steps to remove the system unit top cover:

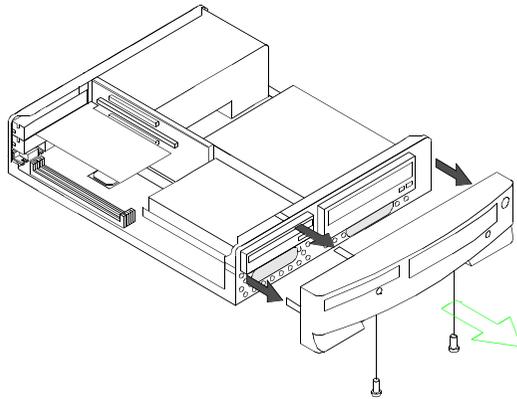
1. Remove the 3 screws that secure the top cover at the back of the system unit .
2. Hold the top of the cover and push it backward about 1/4 of an inch.
3. Lift the cover up to remove it completely.
4. Touch the bare metal frame of your system unit to dissipate the static electricity from your body. Do not touch any of the components inside the frame before you touch the frame. Do not touch any of the components that have a voltage warning label.
5. Disconnect the system unit power cord.



## Removing the front cover

After removing the top cover, you may need to remove the front cover. For example, you would remove the front cover to replace the internal speakers.

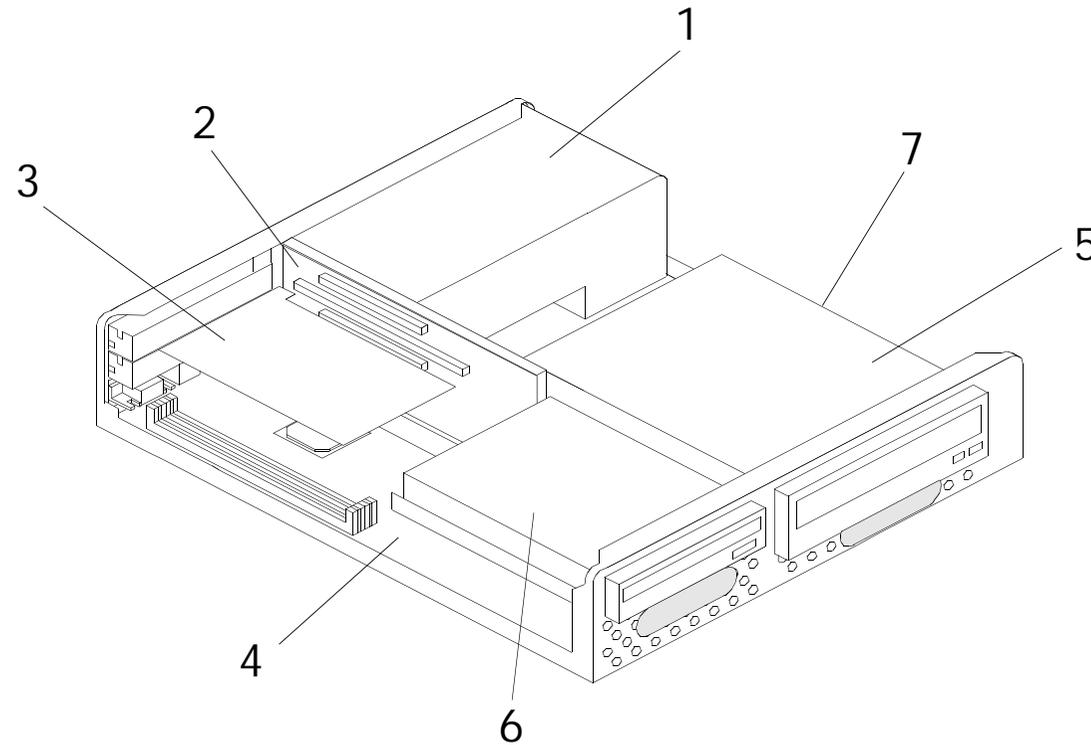
1. Uncouple the three tabs on the front cover of the system unit's metal frame.
2. Remove the two screws from the bottom of the cover.
3. Pull the front cover from the system unit.



# Looking inside the system unit

After you remove the system unit top and front covers, the system unit looks like the following figure.

Note: See the next page for a description of the hardware components inside the system unit.



Your computer's system unit has 3 bays that can hold up to one 5.25-inch and two 3.5-inch drives.

Diskette drives use the standard diskette Advanced Technology (AT) interface. Hard disks use an Integrated Drive Electronics (IDE) AT interface. Your computer supports the American National Standards Institute (ANSI) standard for AT attachment disk drives.

Your computer has adapter card slots for installation of additional expansion cards. You can install Industry Standard Architecture (ISA) and Peripheral Component Interconnect (PCI) adapter cards into the system.

The components inside your system unit are depicted in a graphic on the previous page. The following list describes each hardware component:

- 1** **Switching power supply.** The system comes with a switching power supply.
- 2** **Expansion slots.** On the rear panel of the system unit are 2 slot openings for installation of adapter cards. When installing an adapter card, you must remove the cover of the slot that you intend to use.
- 3** **Modem card.** The system may include a V.90 Data/Fax modem. See "Appendix B: Modem information" on page B-1 for details on modems.
- 4** **System board.** The system board is secured by screws on the inner base of the chassis.
- 5** **Bay 1.** This drive bay can accommodate a 5.25-inch half-high drive such as a diskette, hard disk, tape, or CD-ROM. Normally, this bay holds a factory-installed CD-ROM drive.
- 6** **Bay 2.** This drive bay can accommodate a 3.5-inch slim

drive such as a diskette or tape. Normally, this bay holds a factory-installed diskette drive.

**7**

**Bay 3.** This drive bay can accommodate a 3.5-inch slim IDE device, such as a hard disk. Normally, this bay holds a factory-installed hard disk drive. This drive is beneath Bay 1.

# Upgrading and replacing hardware **Part 4**

This part contains information to help you add to or change the hardware that was installed in your Aptiva computer at the factory. It contains the following chapters:

- **“Chapter 7: Preparing to upgrade” on page 7-1**

This chapter contains information to help you plan and prepare to add or replace adapter cards, drives, and system board components in your system unit.

- **“Chapter 8: Adding and removing adapter cards and drives” on page 8-1**

This chapter contains instructions for working with adapter cards and drives.

- **“Chapter 9: Adding and replacing system board components” on page 9-1**

This chapter contains instructions for working with the hardware components on your system board.

---

# Adding and removing adapter cards and drives 8

Before you begin working with the hardware inside your system unit, read the following sections:

- "Evaluating your new hardware" on page 7-1

This section contains the information you need to understand about potential system resource conflicts. Your new hardware might attempt to use a resource that is already assigned to other hardware.

- "Planning your hardware changes" on page 7-3

This section contains important information about planning for hardware changes and recording changed hardware settings. You can avoid repeated steps if you follow the recommendations in this section.

- "Resolving resource conflicts" on page 7-3

This section will help you prevent potential system resource conflicts when you install additional adapter cards or drives.

## Resolving conflicts with installed adapter cards

If you purchased a computer with an installed modem card, this section can help you resolve some potential conflicts between your new hardware and the card.

Using the Windows 98 Device Manager and the documentation that came with your new hardware, compare the resources used by the installed modem card and the new hardware. If both devices attempt to use the same resource, refer to the new hardware's documentation to change the resource used by the new hardware.

If the resource for the new hardware cannot be changed, change the resource for the modem card in the Device Manager.

## Setting modem card configurations

If your system is equipped with a modem, follow these steps to view or change I/O addresses and interrupt request resources for a port on an installed modem card:

1. Right click on the **My Computer** icon and select **Properties**.
2. In the System Properties window, click on the **Device Manager** tab.
3. Click on **View devices by type**.
4. Double-click on the modem list item to expand the list underneath this item.
5. Double-click on the **Modem** item appearing in the expanded list.
6. In the Modem **Properties** window, click on the **Resources** tab.

If you need help in using the Device Manager, press the **F1** key to view the online help.

You must restart your computer before any Device Manager changes can take effect.

## Working with the hardware in the system unit

If you have not removed the cover from your system unit, see "Opening the system unit" on page 7-4.

If you plan to add both an adapter card and a drive, install or replace the drive before you install or replace the adapter card. If you also plan to make hardware changes on the system board, see Chapter 9 and finish your work with the system board before continuing to work with the drives and adapter cards.

To add or remove adapter cards or drives in the system unit, complete the instructions in the following sections:

- "Adding and removing adapter cards" on page 8-3
- "Removing and adding drives" on page 8-6

# Adding and removing adapter cards

The system board includes one PCI and one ISA/PCI shared adapter card connectors. You can install a maximum of two adapter cards in the system unit.



Note:

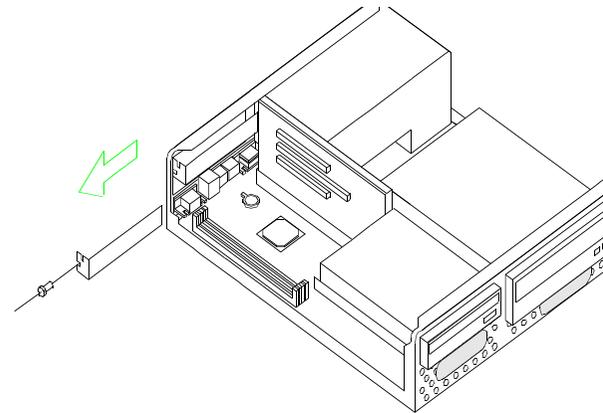
Make sure that you have followed the proper procedure in "Opening the system unit" on page 8-4. This ensures that you discharge the static electricity that you may have accumulated.

# Installing adapter cards

See "Identifying adapter card connectors" on page 9-5 for information on which adapter card connector to use.

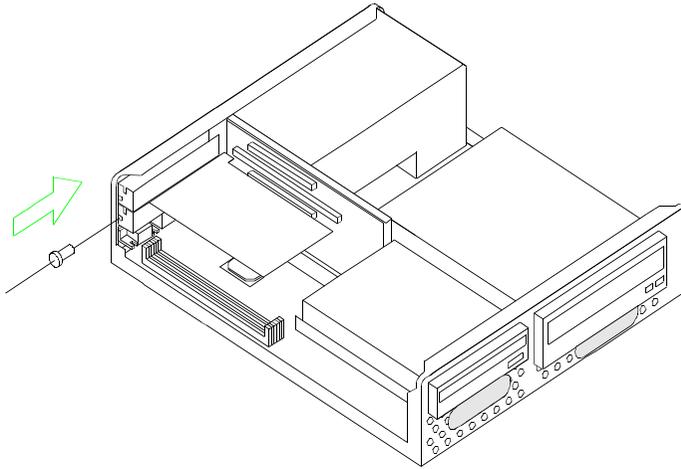
Follow these steps to install an adapter card:

1. Remove the screw that secures the adapter card slot cover. Then remove the slot cover.



2. Align and insert the adapter card into the adapter card connector.

3. Secure the card with the screw that you removed in step 1.



4. Reinstall all hardware (except for the slot cover, which cannot be reinstalled) and screws that you removed prior to the installation of the adapter card.

For more information on the types of adapter cards that you can install to the specific card connectors, refer to the section "Identifying adapter card connectors" on page 9-5.

## Connecting card cables

If your card has cables, connect the cable or cables from the adapter card to the correct connection on the system board or CD-ROM drive.

If you disconnected any cables to gain access to the adapter card connector on the system board, reconnect the cables.

## Removing adapter cards

Follow these steps to remove an adapter card:

1. Position the system unit so that the card is accessible to you.
2. If the adapter card has cables, disconnect them. Be sure to take note of where the cables are connected. You will have to reconnect these cables when you reinstall the card.
3. Remove the adapter card screw.
4. Firmly hold the adapter card and carefully pull it from the card connector.
5. If you are not reinstalling the card, reinstall all other hardware and screws that you removed prior to the removal of the adapter card.

# Installing ISA cards

Both Plug and Play and non-Plug and Play ISA cards require specific IRQs. When installing ISA cards, make sure that the IRQs required by these cards are not previously assigned to PCI devices to avoid resource conflicts.

Follow these steps when installing ISA cards:

1. Remove all Plug and Play cards installed in the system.
2. Enter Setup and set the Reset Configuration Data parameter to **Enable** to clear the resource data assigned to the Plug and Play devices. Refer to "PnP/PCI configuration setup" on page 6-12.
3. Turn off the system.
4. Install non-Plug and Play ISA cards.
5. Turn on the system.
6. Use Windows 98, or the ISA Configuration Utility (ICU) if your ISA card came with it, to manually assign the appropriate IRQs to the cards. This ensures that BIOS will not use the resources assigned to the non- Plug and Play ISA cards.



Note: BIOS configures only Plug and Play cards.

7. Turn off the system.
8. Install Plug and Play ISA and PCI cards.

9. Turn on the system. This time, BIOS automatically configures the Plug and Play ISA and PCI cards with the remaining free IRQs.

# Removing and adding drives

The system unit has three drive bays to accommodate various types of drives. All the of these bays hold drives that were installed at the factory.

When you purchase a new drive, make sure that you also purchase the appropriate power and signal cables.

See the section "Looking inside the system unit" on page 7-7 for the location and description of the drive bays.

# Identifying signal cable connectors

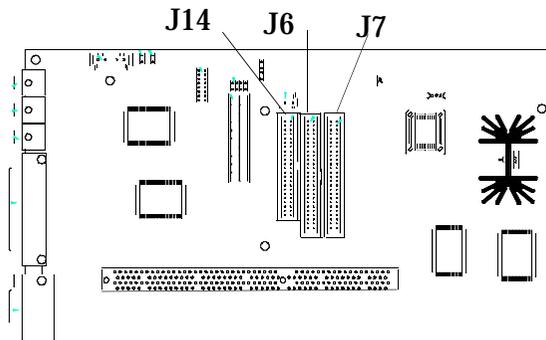
When you install a drive of any type, you must attach the signal cable (also called the data cable) from the drive to a connector on the system board. The following table identifies each connector on the system board and the type of drive that uses the connection. Note that the first two connectors are for IDE/ATA ATAPI drives (such as hard disk drives and CD-ROM drives), while the third connector is for diskette interface drives (such as diskette drives or tape drives).

Use the following illustration to identify the signal cable connectors on your system board:

<b>System board connector</b>	<b>Interface type</b>	<b>Type of drive using the connector</b>
<b>Primary IDE – J6</b>	IDE/ATA ATAPI	Preferred location for the hard disk drives.
<b>Secondary IDE – J7</b>	IDE/ATA ATAPI	Preferred location for a CD-ROM drive.
<b>Diskette – J14</b>	Standard diskette	Should be used for diskette drives or tape drives.

When attaching a drive signal cable to any of these connectors, take note of the pin 1 indicator (usually marked by colored stripes or dots) on the cable to ensure that it matches the pin 1 on the connector.

In your computer, the IDE and Diskette connectors on the system board all have guides for you to connect the signals cables.



## Guidelines for connecting IDE/ATA signal cables

Your system board has two connectors for attaching IDE/ATA signal cables. You can install two IDE/ATA drives to each of these connectors if you have the proper cables. When two drives are attached to one connector, one drive must be the master device, and the other the slave device. Jumper settings on the drives determine which drive is the master and which is the slave.

The hard disk that came installed in your computer is attached to IDE connector 1 and is set as a master device. If your computer came with a CD-ROM drive, it is attached to IDE connector 2 and is set as a slave device.

These are the general guidelines for IDE/ATA signal cable connections:

- If only one drive is attached to a connector, it typically must be set as a master device.
- On each connector, there can be only one drive set as the master device and one drive set as the slave device.
- A maximum of two IDE drives can be attached to your computer: two on the primary IDE connector; or two on the secondary IDE connector; or one on the primary IDE connector and one on the secondary IDE connector.
- If a hard disk shares the same connector with a drive that requires a software device driver (such as a CD-ROM drive), the hard disk must be set as the master device and the CD-ROM must be set as the slave device.

If you are installing a drive to the **Primary IDE** connector, follow these guidelines:

- Attach the signal cable from the drive to the primary IDE connector (**J6**) on the system board. Refer to "Card connector and jumper information" on page 9-5.
- Set the newly installed drive as a master device if one of these conditions exists:
  - The new drive is the only drive attached to the connector.
  - Another drive that is not a hard disk drive (such as a CD-ROM) is already attached to the connector. Set the drive that is already attached to the connector as the slave device. Jumpers for setting CD-ROM drives as master or slave devices are typically located at the back of the drive.
- Set the newly installed hard disk as a slave device if another hard disk is already attached to the connector.

If you are installing a drive to the **Secondary IDE** connector, follow these guidelines:

- Attach the signal cable from the drive to the secondary IDE connector, which is labeled **J7** on the system board. Refer to "Card connector and jumper information" on page 9-5.
- Set the newly installed drive as a master device if one of these conditions exists:
  - The new drive is the only drive attached to the connector.
  - Another drive that is not a hard disk drive (such as a CD-ROM) is already attached to the connector. Set

the drive that is already attached to the connector as the slave device. Jumpers for setting CD-ROM drives as master or slave devices are typically located at the back of the drive.

- Set the newly installed hard disk as a slave device if another hard disk is already attached to the connector.

## Guidelines for connecting diskette interface signal cables

Your system board has one connector for attaching diskette interface signal cables, but you can install two diskette interface drives to this connector if you have the proper cables.

If you are installing a second diskette drive or a tape drive, follow these guidelines:

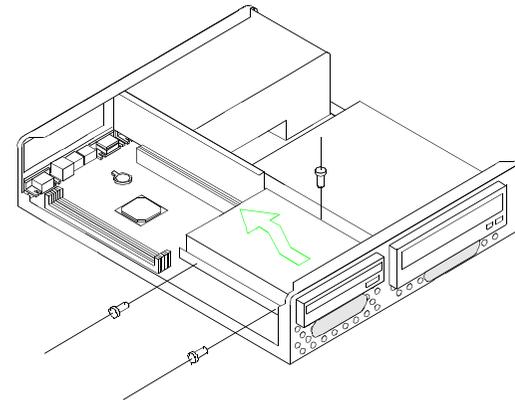
- Attach the signal cable from the drive to the diskette drive connector labeled **FLOPPY (J14)** on the system board.
- Do not change any settings on a diskette drive that is already installed.

When you have finished installing the diskette drive, enter Setup to make sure that the drive parameter setting is correct. See "Standard CMOS Setup" on page 6-5 for instructions.

## Removing the diskette drive

If you want to replace the diskette drive or replace the system board component under the diskette drive bay, you must follow these steps:

- 1.** Disconnect the three cord and signal cables from the back of the diskette drive.
- 2.** Remove the three screws that secure the diskette drive.



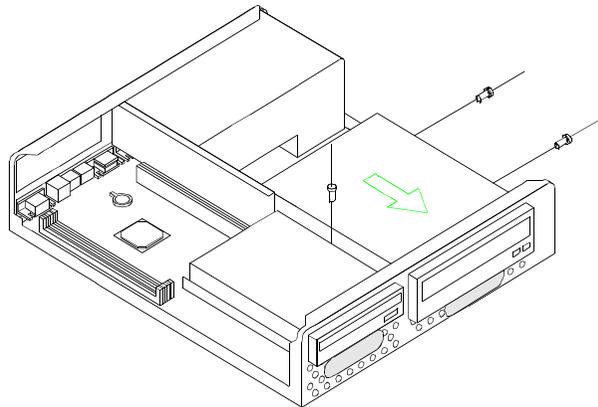
- 3.** Slide the diskette drive backward from the front of the system unit and lift it up to remove it.

# Removing the CD-ROM drive

To replace the CD-ROM or the BIOS chip on the system board (which is beneath the CD-ROM bay), do the following:

Before beginning these steps, read "Removing the top cover" on page 7-5 and "Removing the front cover" on page 7-6.

1. Disconnect the power and signal cables from the CD-ROM.
2. Remove the three screws that secure the CD-ROM drive.

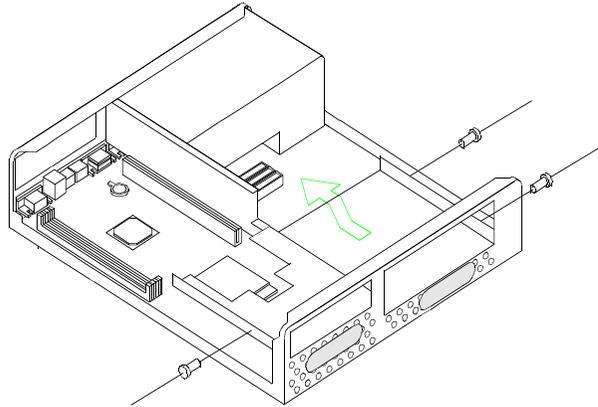


3. Slide the CD-ROM drive toward the front of the system unit to remove it.

# Removing the hard disk

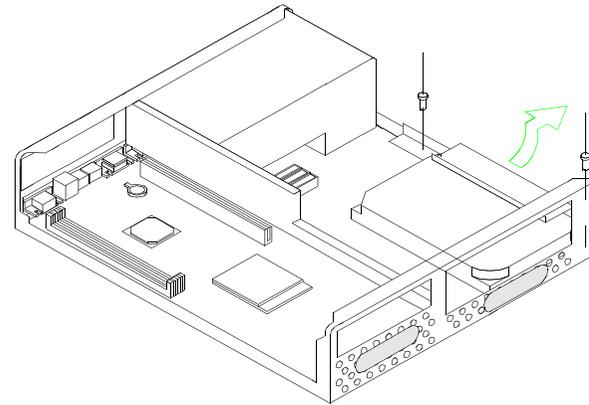
To replace or remove the hard disk drive, do the following:

1. Follow the steps in "Removing the diskette drive" on page 8-9 and "Removing the CD-ROM drive" on page 8-10.
2. Remove the three screws that secure the system unit's metal frame and the bay holder, which holds the diskette and CD-ROM drive.



3. Hold both sides of the bay holder and push it towards the back of the system unit to unlatch it from the system unit's metal frame.
4. Remove the bay holder from the system unit.

5. Disconnect the power and signal cables from the hard disk.
6. Remove the two screws that connect the hard disk bay to the system unit's metal frame.



# Updating the CMOS settings in Setup

When you add Plug and Play adapter cards and drives, your system's Basic Input/Output System (BIOS) detects the hardware changes and updates the CMOS settings automatically.

When you add devices that are not Plug and Play, you have to enter Setup to manually assign resources (IRQs) to the devices.

## For adapter cards

When you install a new adapter card, you can select the "PnP/PCI configurations setup" from the Setup main menu. From the Advanced Options menu, select **PCI Options** to view or change PCI adapter card information. See the section "PnP/PCI configurations setup" on page 6-12.

For other Plug and Play and non-Plug and Play adapter cards, go to the Windows 98 Device Manager for information.

## For drives

When you install a diskette drive, you should check the size and storage capacity of the drive and make any required changes in Setup. To specify the diskette drive size and capacity, select the **Standard CMOS Setup** option in the Setup main menu. See "Drive A Type/Drive B Type" on page 6-5 for information about this option.

If you remove a diskette drive, hard disk drive, or CD-ROM drive, the POST generates an error message. In Setup, verify that the information the BIOS automatically recorded is correct. Use this opportunity to verify that the remaining drives are installed as intended.

Select **Standard CMOS Setup** from the Setup main menu to verify drive settings. See "Standard CMOS Setup" on page 6-5.

Normally, BIOS will auto-detect the HDD and CD-ROM drive at the POST stage and show them on the screen.

# Adding and replacing system board components **9**

To work with the hardware components on the system board, you must first unplug the system and remove the system unit cover. If you have not removed the cover from your system unit, see "Opening the system unit" on page 7-4.

To access the section of the system board that you need to work with, you may have to remove adapter cards and drives. With the system board exposed, you can work with the connectors, system memory modules, and the system battery.

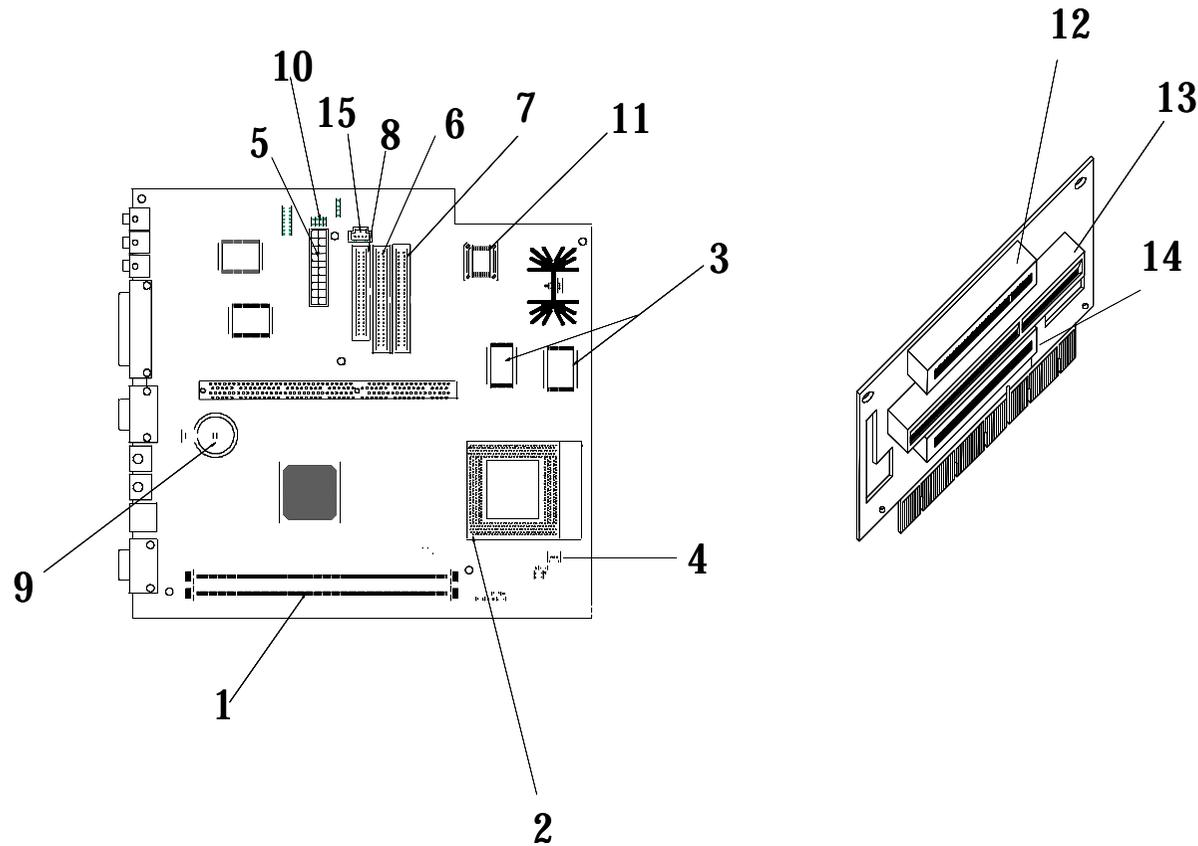
Once you have completed your hardware changes and put the cover back on your system unit, you might need to enter the BIOS Configuration/Setup Utility to update the settings. For information about whether this is a step you should take, see "Updating the CMOS settings in Setup" on page 9-8.

The following sections contain instructions for working with the hardware components on your system board:

- "Identifying the parts of the system board" on page 9-2
- "Locating the system board jumpers and connectors" on page 9-4
- "Card connector and jumper information" on page 9-5
- "Upgrading the system memory" on page 9-6
- "Replacing the system battery" on page 9-7
- "Updating the CMOS settings in Setup" on page 9-8

# Identifying the parts of the system board

If you plan to add or replace hardware in your computer, you need to know the layout of the system board. This figure shows an example of the system board in your computer. The items on the next page correspond to the numbered locations on the figure.

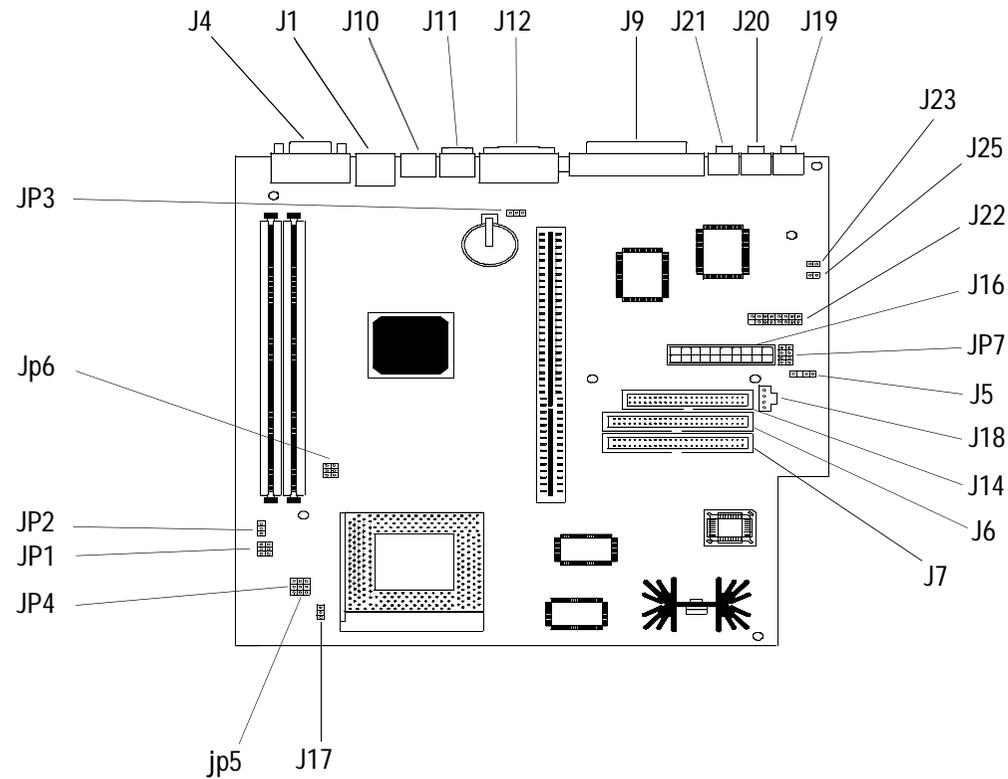


The system board, sometimes called the planar or motherboard, is the main circuit board in the system unit. It supports a variety of devices and provides other basic computer functions that are preinstalled or that you can install later. The system board shown on the previous page has the following parts:

- 1** **Memory module sockets (for DIMMs).** Your system board has two 168-pin sockets labeled DIMM Bank 0 and DIMM Bank 1 for Dual Inline Memory Modules (DIMMs). The DIMM sockets support 3.3V single-or double-sided Synchronous DRAM (SDRAM). The maximum system memory is 256 MB.
- 2** **CPU FAN, CPU and heat sink (U1).**
- 3** **Second-level cache (U5, U6).**
- 4** **CPU fan power connector (J17).**
- 5** **Power supply connector (J16).**
- 6** **Primary IDE connector (J6).** Holds signal cables that attach to IDE channel 1.
- 7** **Secondary IDE connector (J7).** Holds signal cables that attach to IDE channel 2.
- 8** **Diskette drive connector (J14).**
- 9** **Battery (BT1).** System battery.
- 10** **HDD LEP, Power LED and power switch connector (JP7).**
- 11** **Flash ROM BIOS (U18).**
- 12** **PCI adapter card connector (PCI1).** This is the first PCI adapter card connector.
- 13** **ISA adapter card connector.** This is the only ISA adapter card connector. It is shared with the following PCI connector.
- 14** **PCI adapter card connector (PCI2).** It is shared with the above ISA connector.
- 15** **CD-ROM signal connector (J18).**

# Locating the system board jumpers and connectors

The following figure shows the locations of the jumpers and connectors on the system board. The jumpers are preset in the factory. Do not change these default jumper settings. For a list of connectors with their corresponding functions, see the section "Connector functions" on page A-9.



# Card connector and jumper information

## Identifying adapter card connectors

You can install ISA or PCI adapter cards into the card connectors on the system board. Use the following table to help you determine the type and length of adapter cards that you can install in the card connectors.

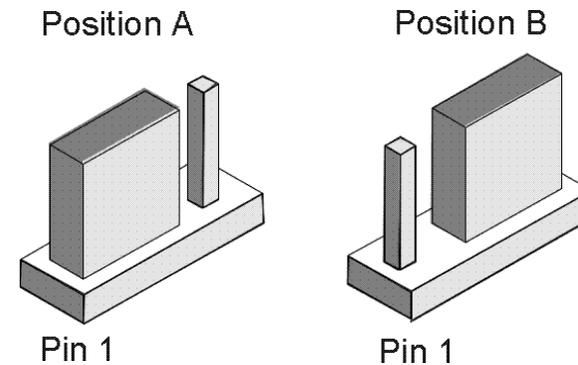
Adapter card connector	Type of adapter card you can install
<b>PCI1</b>	Can hold a half-length or full-length PCI adapter card.
<b>PCI2</b>	Can hold a half-length or full-length PCI adapter card (if ISA is empty).
<b>ISA</b>	Can hold a half-length, three quarter-length, or full-length ISA adapter card (if PCI is empty).

Refer to the section "Adding and removing adapter cards" on page 8-3 for instructions on adding or removing cards.

## Setting a jumper

When you install an adapter card, you may have to set switches or move jumpers to make the card work properly. Plug and Play cards normally require no changes, but other cards might. Refer to the documentation that came with the new hardware to determine if changes to jumper or switch settings are required.

The following figures show how to set a jumper. Position A shows closing pins 1-2 while position B shows closing pins 2-3. Pin 1 of a jumper is usually marked by a solid white line beside the pin.



# Upgrading the system memory

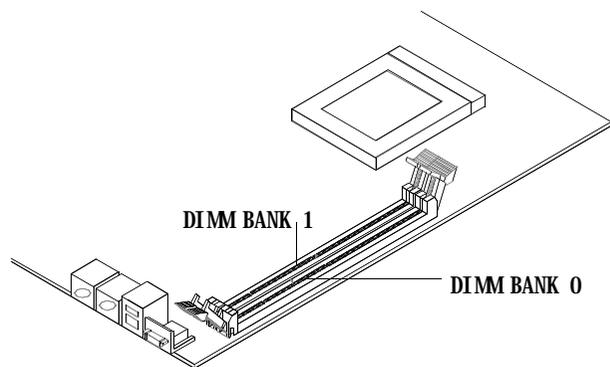
Your system board has two system memory module sockets: DIMM Bank 0, and DIMM Bank 1. These sockets hold Dual Inline Memory Modules (DIMMs) that contain 3.3V single- or double-sided synchronous DRAM (SDRAM). You may install up to a maximum of 256 MB of system memory into these sockets. For possible memory address configurations, see the table "Memory map" on page A-3.



Note:

You must always have memory installed in DIMM Bank 0.

The following figure shows the location of the DIMM sockets on the system board.



# Installing memory modules

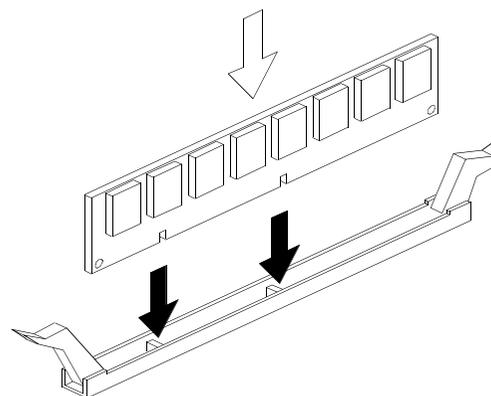
To install a DIMM:

1. Open the clips on the socket.
2. Align the DIMM with the socket.
3. Press the DIMM into the socket until the clips lock into the DIMM.



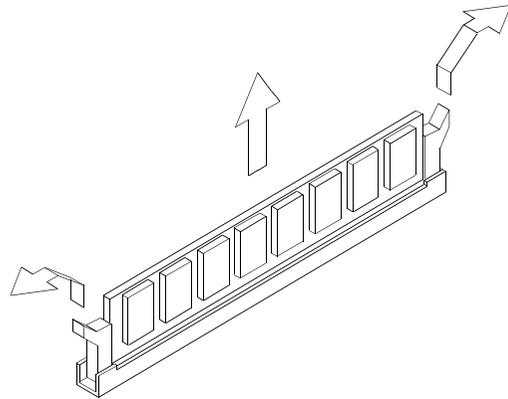
Note:

The DIMM socket is slotted to ensure proper installation. If you insert a DIMM but it does not fit easily into the socket, you may have inserted it incorrectly. Turn the DIMM around and try to insert it again.



## Removing memory modules

To remove a DIMM, press the holding clips on both sides of the socket outward to release the DIMM.



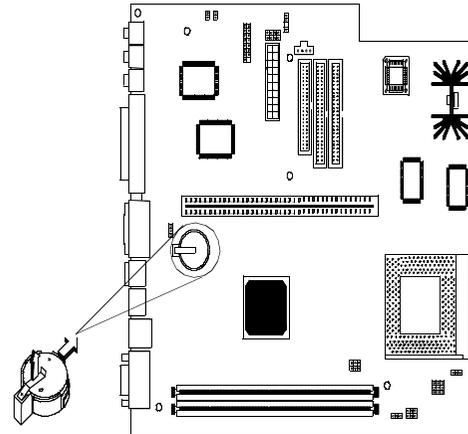
## Verifying the system memory

To view the system memory settings in Setup, select "**Standard CMOS Setup**" from the Setup main menu. See the section "Standard CMOS Setup" on page 6-5 for information about this option. Replacing the system battery

## Replacing the system battery

Follow these steps to replace the battery:

1. Press the securing clip on the battery socket to release the battery.
2. Lift the battery from the socket.



3. Insert a new 3V lithium battery (CR2032) into the socket and press it down until the securing clip clicks and locks the battery in. If you replace the system



Important:

Make sure you insert the battery with the positive side on top. A plus (+) sign indicates the positive side.

battery, you need to reset the system date and time in Setup.

Follow these steps:

1. Enter Setup. See "Entering Setup" on page 6-3.
2. From the Setup main menu, select "**Standard CMOS Setup**".
3. Set the date and the time.
4. Exit Setup and save the change.
5. Use the left arrow key to select **Yes**, then press **Enter** to save the settings in CMOS.

You can also change the time and date from the Windows 98 desktop.

1. Double-click on the **My Computer** icon.
2. Double-click on the **Control Panel** icon.
3. From the Control Panel, double-click on the **Date/Time** icon to display the items for changing the date and time.
4. Make the necessary changes then click on the **OK** button.

## Updating the CMOS settings in Setup

When you add system board components, such as system memory modules, your system's Basic Input/Output System (BIOS) detects the hardware changes and updates the CMOS settings automatically. However, if you replace or remove components, you might receive a message that asks you to verify if the automatic detection changed the configuration correctly.

To verify or correct the system configuration settings, enter Setup. See the section "Entering Setup" on page 6-3.

# Troubleshooting **Part 5**

This part contains information to help you respond to problems with the hardware, software, and features installed in your computer at the factory.

This part contains the following chapter:

- **“Chapter 10: Diagnosing and recovering from problems” on page 10-1**

This chapter provides troubleshooting information, including error code interpretations. It also includes information to help you recover factory-installed programs and files.

# Diagnosing and recovering from problems **10**

This chapter can help you if your computer stops operating or displays error messages. It covers the following major topics:

- "Before you panic: some simple fixes" on page 10-2

This section lists some common problems that you might encounter while operating your computer.

- "Quick problem solving chart" on page 10-6

This flow chart will help you diagnose system problems that you may have with your computer.

- "Solving hardware and software problems" on page 10-7

The tables in this section list some common hardware and software problems. It includes corrective actions for each problem.

- "Error codes and messages" on page 10-16

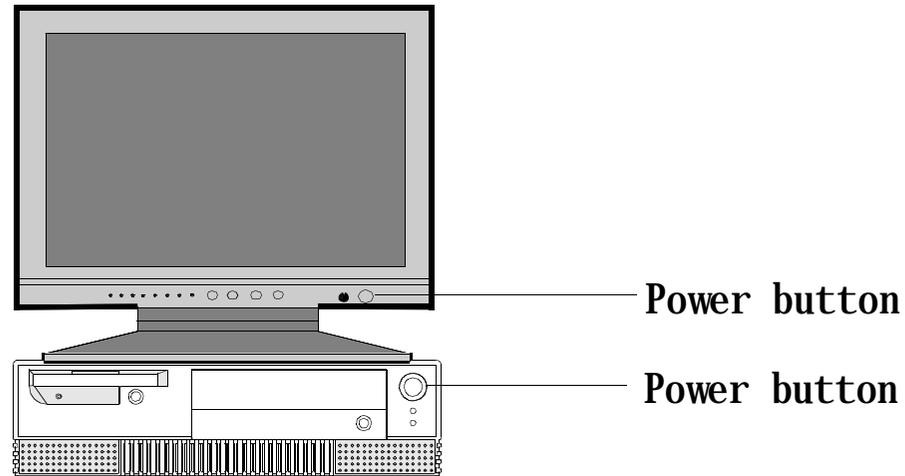
This section lists the BIOS error codes and messages and their respective corrective actions.

- "Recovering factory-installed programs and files" on page 10-19

This section tells you how to use the Aptiva Product Recovery and Diagnostics CD if you lose the factory-installed programs in your computer.

# Before you panic: some simple fixes

Step 1 Are the power indicator lights on the system unit and monitor lit?



Note: The locations of the power indicator lights may be slightly different from those shown in these pictures.

Yes	Power is reaching the system unit and monitor. Go to Step 2.
No	<ul style="list-style-type: none"><li>a. Press the power button on the system unit and monitor to make sure they are turned on.</li><li>b. Make sure your system unit and monitor cables are correctly and securely connected. Make sure the system unit and monitor power cords are plugged into electrical outlets. The <i>Setup poster</i> shows how the cables and cords should be connected.</li><li>c. Make sure the electrical outlets you are using are not controlled by a wall or dimmer switch.</li><li>d. If you are using a multiple outlet device (for example, a power surge protector or power strip), make sure it is plugged in and turned on.</li></ul>

If the problem continues, refer to the "Quick problem solving chart" on page 10-6.

Step 2 Did the system unit beep after it was turned on?

<b>Yes, once</b>	The system unit has passed the power-on self test (POST). Go to Step 3.
<b>Yes, more than once</b>	There is a problem with the system unit. Find the error code or message in the section "Error codes and messages" on page 10-16 and take the action listed.  Note: If the beep is a single long beep followed by two short beeps, a video error has occurred and the BIOS cannot initialize the video screen to display additional information.  If the beep is a repeating single long beep, there's a problem with the dynamic random access memory (DRAM).
<b>No</b>	There is a hardware problem. If you added hardware, remove it and restart the computer to see if the problem is corrected. If the problem is corrected, you may have installed your hardware incorrectly. Reinstall your hardware.  For instructions on installing hardware in the system unit, see "Working with the hardware in the system unit" on page 8-2. For instructions on installing options on your system board, see Chapter 9.  If the problem continues, refer to the "Quick problem solving chart" on page 10-6.

Step 3 Is anything displayed on the monitor?

Yes

There may be a problem with the system unit if:

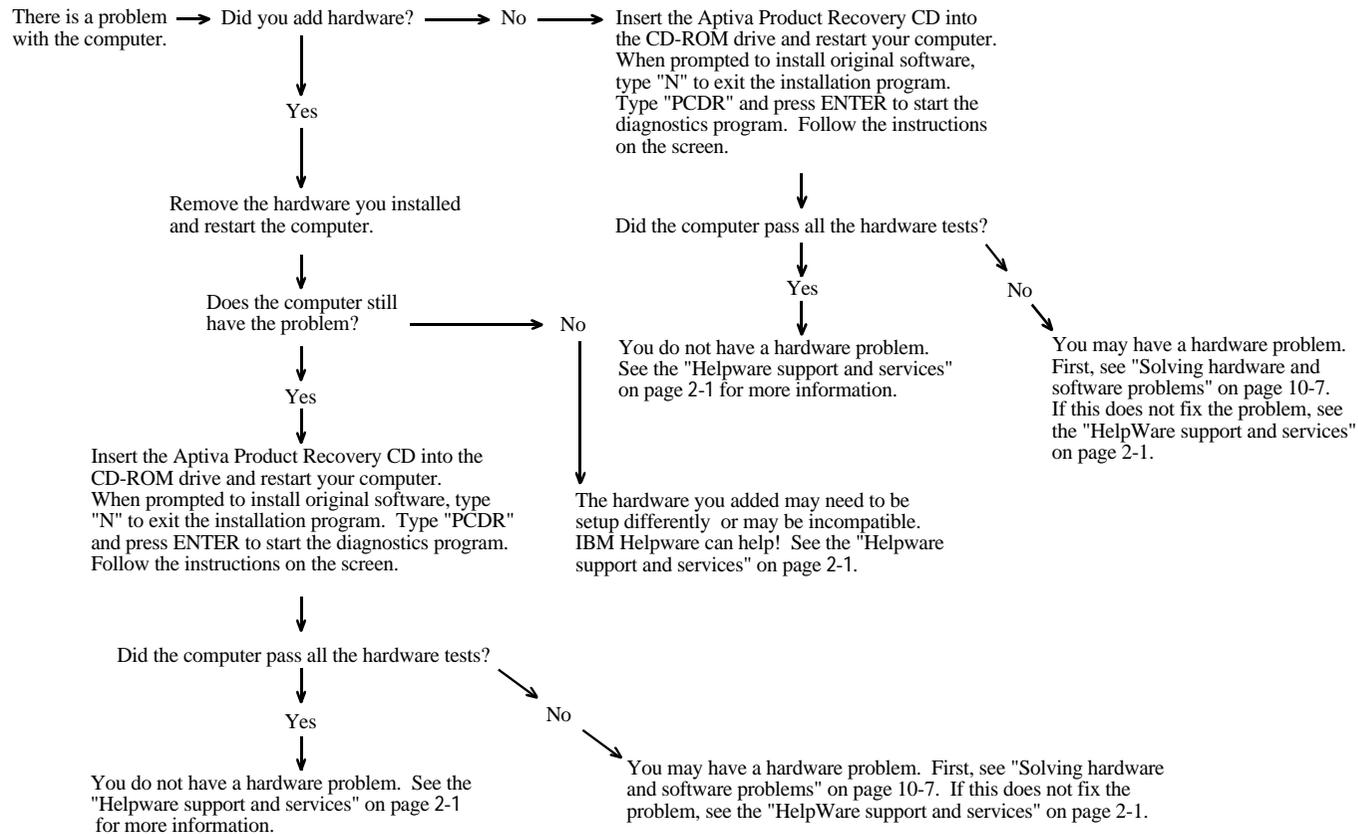
- An error message appears. Find the error message in the section "Error codes and messages" on page 10-16 and take the action listed.
- A box containing an error code and message appears. Follow the instructions in the message. For instructions on using Setup, see "Entering Setup" on page 6-3.
- The image on the screen is unreadable (the image is scrolling, blinking, or flashing). You may have selected a monitor setting that your monitor does not support. Follow these steps to reconfigure your monitor:
  - a. Restart the computer. If necessary, turn the system unit off, pause for 15 seconds, and then turn the system unit back on.
  - b. When you see "Starting Windows 98" appear on the screen during startup, press **F8**. This opens the Microsoft Windows 98 Startup Menu.
  - c. Select Choice 3 for Safe Mode and press **Enter**. This starts your computer using the factory configuration settings.
  - d. When your computer has completed startup, double-click on the **My Computer** desktop icon.
  - e. In the My Computer window, double-click on the **Control Panel** icon.
  - f. In the Control Panel window, double-click on the **Display** icon.
  - g. In the Display Properties window, click on the **Settings** tab.
  - h. See "Customizing display properties" on page 4-3 for instructions on selecting new monitor settings.
  - i. Restart the computer. Your computer may take a little longer than usual to restart.

(Steps continued on the next page.)

Step 3 Is anything displayed on the monitor? (Continued)

	<ul style="list-style-type: none"><li>• The colors displayed are wrong. Make sure the monitor cable is correctly and securely connected to the system unit. Your <i>Setup Poster</i> shows how the cable should be connected. If the problem continues, refer to "Solving hardware and software problems" on page 10-7 and take the action listed.</li><li>• Nothing happens when you use the mouse or keyboard.<ol style="list-style-type: none"><li>a. Make sure the keyboard and mouse cables are correctly and securely connected to the ports on the back of the system unit. The keyboard port has this symbol next to it: </li><li>The mouse port has this symbol next to it: </li><li>b. Turn the system unit off, and then turn it on again.</li></ol></li></ul> <p>If the problem continues, refer to the "Quick problem solving chart" on page 10-6.</p>
<p>No</p>	<ul style="list-style-type: none"><li>• There may be a problem with the monitor.<ol style="list-style-type: none"><li>a. Make sure your monitor cables are correctly and securely connected. Your <i>Setup Poster</i> shows how the cables should be connected.</li><li>b. Adjust the brightness and contrast controls. For more information, refer to the documentation that came with your monitor.</li></ol></li><li>• There may be a problem with the battery on your system board. See "Replacing the system battery" on page 9-6 for instructions on how to replace the battery.</li></ul> <p>If the problem continues, refer to the "Quick problem solving chart" on page 10-6.</p>

# Quick problem solving chart



# Solving hardware and software problems

## Solving hardware problems

Table 1: Hardware problems

If the problem is:	Here's what to do:
Screen is black (no error code); beep during power on self-test (POST).	If you installed memory modules or adapter cards, make sure you installed them correctly. For instructions on installing memory modules on your system board, see "Installing memory modules" on page 9-6. For instructions on installing adapter cards in your system unit, see "Adding and removing adapter cards" on page 8-3.
Error code (and description), more than one beep in self-test, or continuous beep occurs	If an error code or message appears, refer to the section "Error codes and messages" on page 10-16.
Computer turns off without warning	<ol style="list-style-type: none"><li>1. If you have enabled the Standby feature, move the mouse to exit Standby.</li><li>2. Make sure that the system unit and monitor power cords are securely plugged into electrical outlets.</li><li>3. Make sure that the cables are correctly and securely connected to the system unit.</li><li>4. Check for a blown fuse, tripped circuit breaker, or power failure.</li><li>5. Unplug the system unit power cord from the electrical outlet, wait 10 seconds, and then plug the power cord back into the electrical outlet. If the computer does not start immediately, push the power button on the system unit.</li><li>6. If you have added hardware inside the system unit, make sure the power cable connectors are securely attached.</li></ol>
Note: If any of these problems continue after taking the actions listed, see "Chapter 2: HelpWare support and services" on page 2-1 for information on obtaining service.	

Table 1: Hardware problems (Continued)

If the problem is:	Here's what to do:
Can't enter password	<p>1. Make sure you are typing the correct password.</p> <p>2. Make sure the keyboard cable is correctly and securely connected to the keyboard port (not the mouse port) on the back of the system unit.</p> <p>The keyboard port has this symbol next to it: .</p>
Can't read information on diskette or CD	<p>1. Make sure you are using the correct type of diskette. Make sure the diskette is formatted correctly.</p> <p>2. Make sure the diskette or CD is inserted into the drive correctly.</p> <p>3. Make sure the CD is clean and not scratched.</p> <p>4. Try to read a diskette or CD that you know is good. If it works, the first diskette or CD is damaged. If you can't read the information on the good diskette or CD, there may be a problem with your diskette or CD-ROM drive.</p> <p>5. Make sure the drive power and signal cables are securely attached to the back of the drive. For instructions on working in the system unit, see "Working with the hardware in the system unit" on page 8-2.</p>
Audio CD does not play when inserted into CD-ROM drive	<p>Make sure you have enabled AutoPlay. To enable AutoPlay:</p> <ol style="list-style-type: none"> <li>1. Click on <b>Start</b>.</li> <li>2. Select <b>Settings</b> and click on <b>Control Panel</b>.</li> <li>3. Double click on the <b>System</b> icon.</li> <li>4. Click on the <b>Device Manager</b> tab.</li> <li>5. Double click on <b>CD-ROM</b> and select the listed CD-ROM option.</li> <li>6. Click on the <b>Settings</b> tab.</li> <li>7. Under <b>Options</b>, click on <b>Auto insert notification</b> (a check appears in the box).</li> <li>8. Click on <b>OK</b>.</li> </ol>
<p>Note: If any of these problems continue after taking the actions listed, see "Chapter 2: HelpWare support and services" on page 2-1 for information on obtaining service.</p>	

Table 1: Hardware problems (Continued)

If the problem is:	Here's what to do:
Can't write to diskette	<ol style="list-style-type: none"> <li>1. Make sure you are using the correct type of diskette. Make sure that the diskette is correctly formatted.</li> <li>2. Make sure the diskette is not write-protected.</li> <li>3. Make sure you are sending information to the correct drive.</li> <li>4. Make sure there is space on the diskette for the information. (Try using a blank, formatted diskette.)</li> <li>5. Make sure the drive power and signal cables are securely attached to the back of the drive. For instructions on working in the system unit, see "Working with the hardware in the system unit" on page 8-2.</li> <li>6. Make sure that the Diskette Drive parameter is enabled in Setup under Advanced Options, Security Options.</li> </ol>
Can't format diskette	<ol style="list-style-type: none"> <li>1. Make sure the diskette is not write-protected.</li> <li>2. Make sure you are using the correct type of diskette.</li> <li>3. Make sure the drive power and signal cables are securely attached to the back of the drive. For instructions on working in the system unit, see "Working with the hardware in the system unit" on page 8-2.</li> <li>4. Make sure <b>Diskette Drive</b> is not disabled in the BIOS STANDARD CMOS Menu .</li> </ol>
Keyboard doesn't work or only some keys work	<ol style="list-style-type: none"> <li>1. Make sure the keyboard cable is correctly and securely connected to the keyboard port (not the mouse port) on the back of the system unit.  The keyboard port has this symbol next to it to help you: </li> <li>2. Move your fingers across the keys. Make sure no keys are stuck.</li> <li>3. If you have a protector over your keyboard, make sure that it allows typing. Some do not.</li> <li>4. Turn the system unit off, wait 10 seconds, and then turn the system unit on again.</li> </ol>
<p>Note: If any of these problems continue after taking the actions listed, see "Chapter 2: HelpWare support and services" on page 2-1 for information on obtaining service.</p>	

Table 1: Hardware problems (Continued)

If the problem is:	Here's what to do:
<p>Mouse does not work</p>	<ol style="list-style-type: none"> <li>1. Move the mouse onto a mouse pad and try using it.</li> <li>2. Make sure you are using a screen that allows the use of a mouse. Some screens do not.</li> <li>3. Make sure the mouse cable is correctly and securely connected to the mouse port (not the keyboard port) on the back of the system unit.</li> </ol> <p>The mouse port has this symbol next to it to help you: </p> <ol style="list-style-type: none"> <li>4. Clean the mouse.               <ol style="list-style-type: none"> <li>a. Turn the computer off.</li> <li>b. Disconnect the mouse cable from the system unit.</li> <li>c. Turn the mouse upside down. Unlock the retainer on the bottom of the mouse by turning it counterclockwise. Now turn the mouse right-side up, and the retainer and the ball will drop out.</li> <li>d. Using a damp cloth, wipe the outside of the mouse and the retainer. Be sure to wipe the rollers inside the mouse.</li> <li>e. Insert the ball and retainer. Lock the retainer by turning it clockwise.</li> <li>f. Reconnect the mouse cable to the system unit.</li> <li>g. Turn on the computer.</li> </ol> </li> <li>8. Turn the system unit off, wait 10 seconds, and then turn the system unit on again.</li> </ol>
<p>Note: If any of these problems continue after taking the actions listed, see "Chapter 2: HelpWare support and services" on page 2-1 for information on obtaining service.</p>	

Table 1: Hardware problems (Continued)

If the problem is:	Here's what to do:
Modem/communications errors	<ol style="list-style-type: none"> <li>1. Make sure the telephone cord is securely connected. Your <i>Setup Poster</i> shows how the cord should be connected.</li> <li>2. Make sure the telephone line works by plugging a working telephone into the same telephone outlet that the computer was plugged into. Then make sure you can place a call.</li> <li>3. Make sure your modem cord is connected to an analog telephone line. For additional help, see "Setting up communications" on page 4-8.</li> <li>4. Make sure you are calling the correct number, and that you are using the correct communications settings. For additional help, see the user's guide for your communications software.</li> <li>5. Make sure no one is using the telephone while you are communicating with another computer.</li> <li>6. If some communications programs work but others do not, there may be a configuration problem. For additional help, see the user's guide for your communications software.</li> <li>7. Make sure the modem adapter card is installed correctly. For instructions on installing adapter cards in the system unit, see "Adding and removing adapter cards" on page 8-6.</li> </ol>
When the computer is turned on, the message "Insert a system diskette and press Enter to reboot" appears	<ol style="list-style-type: none"> <li>1. Choose BIOS Features Setup from the Setup main menu, and make sure that the Boot Sequence is set correctly.</li> <li>2. Make sure the drive power and signal cables are securely attached to the back of the hard disk drive. For instructions on working in the system unit, see "Removing and adding drives" on page 8-6.</li> <li>3. Insert the <i>Aptiva Product Recovery and Diagnostics CD-ROM</i> into the CD-ROM drive, and restart the computer. Follow the instructions on your screen to restore the operating system files to your computer's hard disk.</li> </ol>
<p>Note: If any of these problems continue after taking the actions listed, see "Chapter 2: HelpWare support and services" on page 2-1 for information on obtaining service.</p>	

Table 1: Hardware problems (Continued)

If the problem is:	Here's what to do:
Printer error	<ol style="list-style-type: none"> <li>1. Make sure the printer is turned on.</li> <li>2. Make sure the printer cable is correctly and securely connected to the printer and to the parallel (printer) port on the back of the system unit.</li> </ol> <p style="text-align: center;">The printer port has this symbol next to it to help you: </p> <ol style="list-style-type: none"> <li>3. Make sure the printer power cord is securely connected to an electrical outlet.</li> <li>4. Make sure the printer is ready for printing. (If the Ready light is on, but not flashing, the printer is ready.)</li> <li>5. Make sure the correct printer driver is selected in the software, if required. For instructions on selecting a printer driver, see "Getting ready to print" on page 4-7.</li> <li>6. Make sure the paper and the cartridge containing the print material (ink, ribbon, or toner) are loaded correctly.</li> <li>7. Turn the printer and system unit off, and wait 10 seconds. Now turn the printer on, and then the system unit.</li> <li>8. Make sure the On board Parallel Mode option is set properly in the Integrated Peripherals menu in Setup.</li> <li>9. Make sure the parallel port Operation Mode parameter is set to a mode that matches your printer.</li> <li>10. For additional help, see the user's guide that came with the printer.</li> </ol>
<p>Note: If any of these problems continue after taking the actions listed, see "Chapter 2: HelpWare support and services" on page 2-1 for information on obtaining service.</p>	

# Solving software problems

Table 2: Software problems

If the problem is:	Here's what to do:
<p>Computer doesn't go into standby or automatically power off when the set time has elapsed.</p>	<ol style="list-style-type: none"> <li>1. Make sure you don't touch the mouse or keyboard, and don't start a program that involves using the hard disk, such as File Manager or a Windows 98 screen saver. These activities make the timer start over.</li> <li>2. Make sure AutoPlay is disabled. When AutoPlay is enabled, the system detects activity in the CD-ROM drive and keeps the computer from going into Standby.</li> <li>3. If the computer does not automatically turn off, make sure the Power Management mode is enabled, then check the set time parameter. For instructions on using Setup, see "Entering setup" on page 6-3.</li> <li>4. Allow a few minutes more than the specified time. Windows 98 periodically accesses the hard disk for memory swapping and this activity resets the Standby timer. Windows 98 might access the hard disk for a short time after you last touched your computer.</li> <li>5. Close any open communications programs. Programs which are running may not allow the system to enter standby.</li> </ol>
<p>When the parameter Power Switch &lt; 4 sec. under the Setup Power Management menu is set to Power Off, and the system does not turn off when you press the power button.</p>	<p>See "Chapter 2: HelpWare support and services" on page 2-1 for information on obtaining service.</p>
<p>When the parameter Power Button Override &lt; 4 sec. under the Setup Power Management menu and the system does not turn off when you press the power button for more than four seconds.</p>	<p>See "Chapter 2: HelpWare support and services" on page 2-1 for information on obtaining service.</p>

Note: If any of these problems continue after taking the actions listed, see "Chapter 2: HelpWare support and services" on page 2-1 for information on obtaining service.

# Solving modem problems

Your modem is designed to provide reliable and trouble-free service. However, should you experience any difficulty, the information in this section can help you determine and resolve the source of the problem. If you cannot resolve the problem after reading this section, contact your IBM PC HelpCenter for assistance. See "How and when do I contact the IBM PC HelpCenter?" on page 3-5.

Table 3: Modem problems

If the problem is:	Here's what to do:
Modem does not respond to commands	<ol style="list-style-type: none"><li data-bbox="965 523 1823 580">1. Make sure the modem is not configured with a conflicting COM port and IRQ setting.</li><li data-bbox="965 587 1823 708">2. Make sure the communications software is configured with the correct COM and IRQ settings (same COM port and IRQ line as the modem). Your communications software will not be able to send and receive data if it does not have the correct COM and IRQ settings of the modem.</li><li data-bbox="965 715 1823 932">3. Make sure the modem is properly initialized by the communications software. The modem can be improperly initialized if you have selected an incorrect modem type. Select "Hayes Compatible" modem type and "Rockwell" in your data communications software. Select "Generic class 1" and "Rockwell" in your fax and voice software, respectively. You may also be prompted by the software to enter an initialization string. Use AT&amp;F as your initialization string.</li></ol>
Modem dials but does not connect	<ol style="list-style-type: none"><li data-bbox="965 967 1823 1024">1. Make sure the phone line is working properly. A noisy line will prevent proper modem operation.</li><li data-bbox="965 1031 1823 1056">2. Check for busy signal, ringback, or a remote answering system.</li></ol>

Note: If any of these problems continue after taking the actions listed, see "Chapter 2: HelpWare support and services" on page 2-1 for information on obtaining service.

Table 3: Modem problems (Continued)

If the problem is:	Here's what to do:
Modem makes a connection but no data appears on the screen	<ol style="list-style-type: none"> <li>1. Make sure all communication parameters (baud rate, data, stop, and parity bits) are properly configured and identical on both sides. Also make sure the hardware control flow (RTS/CTS) is enabled in both the modem and the communications software.</li> <li>2. Press the Enter key several times. The remote system may be waiting to receive your data before it begins.</li> <li>3. Make sure the correct terminal emulation mode is used in the software. Refer to the information that came with the software.</li> </ol>
You are not able to verify whether the correct terminal emulation mode is being used by your software	<ol style="list-style-type: none"> <li>1. Make sure the Call Waiting feature is turned off.</li> <li>2. Make sure the RTS/CTS hardware flow control is enabled (do not use XON/XOFF software flow control).</li> <li>3. Make sure the data speed is not faster than your computer's capability.</li> </ol>

Note: If any of these problems continue after taking the actions listed, see "Chapter 2: HelpWare support and services" on page 2-1 for information on obtaining service.

# Error codes and messages

When you see error codes and messages on your screen, find the error code or message in the following table, then take the applicable corrective action or actions.

Table 4: Error codes and messages

<b>Error codes</b>	<b>Error messages</b>	<b>Corrective actions</b>
<b>161</b>	CMOS battery failed	1. Load the default setting in Setup and reboot the system.
<b>162</b>	CMOS checksum error	1. Make sure the equipment (diskette drive, hard disk drive, keyboard, mouse, etc.) are connected properly and are defined correctly in BIOS Setup. 2. Load default settings in setup. 3. Replace the CMOS battery.
<b>164</b>	Memory size error	1. Determine if memory has been added or removed since the last boot.
<b>201</b>	Memory test fail	1. Determine if the memory modules are properly seated in the DIMM sockets, then reboot the system. 2. Replace the memory module.
<b>301</b>	Keyboard error or no Keyboard present	1. Determine if the keyboard cable is connected properly and is defined correctly in BIOS Setup. 2. If the error still shows after doing option 1, change your keyboard. It may be defective.
<b>662</b>	Floppy disk fail (80)	1. Unable to reset floppy subsystem. Load the default Setup setting.
<b>662</b>	Floppy disk(s) fail (40)	1. Floppy Type mismatch. Check the BIOS Setting.

Note: If any of the errors persist after performing the listed corrective actions, see "Chapter 2: HelpWare support and services" on page 2-1 for information on obtaining service.

Table 4: Error codes and messages (Continued)

Error codes	Error messages	Corrective actions
1701	Hard disk(s) diagnostics fail	<ol style="list-style-type: none"> <li>1. Determine if the hard disk is defined correctly in BIOS Setup.</li> <li>2. Check the hard disk drive cable/connection.</li> <li>3. Check the hard disk drive.</li> </ol>
1762	Primary master IDE has changed Primary slave IDE has changed Secondary master IDE has changed Secondary slave IDE has changed	<ol style="list-style-type: none"> <li>1. Make sure the System Boot Drive parameter in the Startup Options of BIOS Setup is not set to (Drive A only).</li> <li>2. Load the default settings in Setup.</li> <li>3. Insert a system diskette into the diskette drive and reboot the system.</li> <li>4. Ensure the diskette drive configuration setting in BIOS Setup is correct.</li> <li>5. Check the power to the hard disk drive.</li> <li>6. Check the Diskette Drive.</li> </ol>
1780	Primary master hard disk fail	<ol style="list-style-type: none"> <li>1. Load the default settings in Setup.</li> <li>2. Check the IDE drive jumper.</li> <li>3. Check the power to the IDE drive.</li> <li>4. Check the IDE cable/connection.</li> <li>5. Check the IDE drive.</li> </ol>
1781	Primary slave hard disk fail	<ol style="list-style-type: none"> <li>1. Load the default settings in Setup.</li> <li>2. Check the IDE drive jumper.</li> <li>3. Check the power to the IDE drive.</li> <li>4. Check the IDE cable/connection.</li> <li>5. Check the IDE drive.</li> </ol>
1782	Secondary master hard disk fail	<ol style="list-style-type: none"> <li>1. Load the default settings in Setup.</li> <li>2. Check the IDE drive jumper.</li> <li>3. Check the power to the IDE drive.</li> <li>4. Check the IDE cable/connection.</li> <li>5. Check the IDE drive.</li> </ol>

Note: If any of the errors persist after performing the listed corrective actions, see "Chapter 2: HelpWare support and services" on page 2-1 for information on obtaining service.

Table 4: Error codes and messages (Continued)

Error codes	Error messages	Corrective actions
1783	Secondary slave hard disk fail	<ol style="list-style-type: none"> <li>1. Load the default settings in Setup.</li> <li>2. Check the IDE drive jumper.</li> <li>3. Check the power to the IDE drive.</li> <li>4. Check the IDE cable/connection.</li> <li>5. Check the IDE drive.</li> </ol>
8602	PS/2 Mouse error OR no PS/2 mouse present	<ol style="list-style-type: none"> <li>1. Determine if the mouse is connected properly and is defined correctly in BIOS Setup.</li> </ol>

Note: If any of the errors persist after performing the listed corrective actions, see "Chapter 2: HelpWare support and services" on page 2-1 for information on obtaining service.

# Recovering factory-installed programs and files

Your Aptiva comes with preinstalled system and program files. If you accidentally erase any of these files, or if some of these files become corrupted when you install a new program, you can recover them. To recover lost or corrupted files that were installed at the factory, you need the Aptiva *Product Recovery and Diagnostics CD-ROM* that came with your computer.

The preinstalled software is licensed, not sold. The licenses to preinstalled software allow you to make a backup copy to prevent accidental loss or destruction of the software.

To protect your personal data and any special system configuration, you should make regular backups of your data and configuration files. You will need these backup copies if you ever need to recover your system. In some cases, the recovery process formats the hard drive, erasing all the files there, and then installs new copies of the system and program files on the clean drive.

It's a good idea to duplicate the directory structure that is on your hard drive when you make backup copies of files. Otherwise, you need to keep notes about where your files belong on the hard drive. If you ever have to recover your system, you will need to copy your personal data and configuration files back to their original hard drive location.

To recover the factory installed system and program files, follow these steps:

1. Make sure your computer is turned on.
2. Put the Aptiva *Product Recovery and Diagnostics CD-ROM* into your CD-ROM drive.
3. Shut down your system.
4. Wait for 30 seconds.
5. Turn on your monitor and computer.
6. Follow the instructions on the screen.
7. After the Aptiva software has been reinstalled, copy your personal configuration and data files back into their original directories on the hard drive.



Note:

If you have entered Setup and selected a hard disk to boot before your CD-ROM drive as your startup device, you might not be able to use the Aptiva Product Recovery CD and Diagnostics to recover lost files.

Refer to the section "Boot Sequence" on page 6-7.

# Technical reference **Part 6**

This part contains technical information you might need if you upgrade your computer's hardware. It contains the following appendices:

- **“Appendix A: Specification tables” on page A-1**

This appendix contains specific memory, address, interrupt, channel, and port specifications. It also includes a list of the system board connectors and their corresponding functions.

- **“Appendix B: Modem information” on page B-1**

This appendix contains descriptive information about modems, including AT command set information you can use if you decide to operate your modem from a DOS command line.

- **“Appendix C: Monitor terminology” on page C-1**

This appendix contains definitions of some of the terms generally used to describe monitor characteristics.

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## Memory module placement

This memory module placement table shows you how to place dual inline Memory modules (DIMMs) into the sockets labeled DIMM1 Bank 0 and DIMM Bank 1. Refer to the section "Identifying the parts of the system board" on page 9-2 for the location of the DIMM sockets.

Table 4: Memory module placement

DIMM Bank 0	DIMM Bank 1	TOTAL Memory
16M	NONE	16M
32M	NONE	32M
64M	NONE	64M
128M	NONE	128M
16M	16M	32M
32M	16M	48M
64M	16M	80M
128M	16M	144M
16M	32M	48M
32M	32M	64M
64M	32M	96M

DIMM Bank 0	DIMM Bank 1	TOTAL Memory
128M	32M	160M
16M	64M	80M
32M	64M	96M
64M	64M	128M
128M	64M	192M
16M	128M	144M
32M	128M	160M
64M	128M	192M
128M	128M	256M

# Memory map

This table shows the hexadecimal addresses for the system memory regions. You may use this information for adapter cards that require you to set up memory regions.

Table 1: Memory map

Address range	Description
0~640 KB (000000 ~ 09FFFF)	Main memory
640~768 KB (0A0000 ~ 0BFFFF)	PCI/ISA video buffer memory
768~816 KB (0C0000 ~ 0CBFFF)	Video BIOS Memory
816~896 KB (0CC000 ~ 0DFFFF)	ISA Card BIOS & Buffer Memory
896~960 KB (0E0000 ~ 0EFFFF)	BIOS Extension Memory Setup and Post Memory PCI Development BIOS
960~1024 KB (0F0000 ~ 0FFFFFF)	System BIOS memory
(100000 ~ Upper Limit)	Main memory
(Upper Limit ~ 4 GB)	PCI memory

UPPER LIMIT means the maximum size of installed memory.  
The Main Memory Maximum size are 768MB.

Note: Upper Limit means the maximum size of installed memory.  
The Main Memory Maximum size is 256 MB.

# System input/output addresses

This table shows the hexadecimal addresses for each of the system board Input/Output (I/O) functions. You may want to use this information if you install an adapter card that requires you to set I/O addresses.

Table 6: System input/output addresses

<b>Address range (hexadecimal)</b>	<b>Function</b>
000-00F	DMA controller-1
020-021	Interrupt controller-1
040-043	System timer
060-060	Keyboard controller 8742
061-061	System Speaker
070-071	CMOS RAM Address and Real Time Clock
081-08F	DMA controller-2
0A0-0A1	Interrupt controller-2
0C0-0DF	DMA controller-2
0F0-0FF	Math Co-Processor
170-177	Secondary IDE
1F0-1F7	Primary IDE
200-207	Game Port
278-27F	Parallel Printer Port 2
2F8-2FF	Serial Asynchronous Port 2

Table 6: System input/output addresses (Continued)

Address range (hexadecimal)	Function
378-37F	Parallel Printer Port 1
3F0-3F5	Floppy Disk Controller
3F6-3F6	Secondary IDE
3F7-3F7	Primary IDE
3F8-3FF	Serial Asynchronous Port 1
0CF8	Configuration Address Register
0CFC	Configuration Data Register
778-77A	Parallel Printer Port 1

# System interrupts

This table shows the system Interrupt Requests (IRQs) and their functions. You may use this information if you install an adapter card that requires you to set IRQs. An IRQ function which has a device name in parenthesis may not be available on all models. In some cases, the device listed uses the IRQ.

Table 7: System interrupts

<b>Interrupt request (IRQ)</b>	<b>Function</b>
0	Timer
1	Keyboard
2	Cascade Interrupt Control
3	Serial Port
4	Serial Port
5	Parallel Port (Alternate)
6	Diskette
7	Parallel port
8	Real Time Clock
9	Available
10	Audio
11	Modem
12	PS/2 Mouse
13	Math Coprocessor
14	Primary IDE
15	Secondary IDE

# DMA channel assignments

This table shows the channel assignments for Direct Memory Access (DMA). DMA allows I/O devices to transfer data directly to and from memory. You may need to select an available DMA channel if you add an I/O device that uses DMA.

Table 8: DMA channel assignments

<b>DMA channel</b>	<b>Assignment</b>
0	Audio
1	Available
2	Floppy Diskette
3	Available
4	Cascade
5	Available
6	Available
7	Available

# Serial port addresses

IBM Aptiva PCs have a built-in external serial port already installed in the computer. The connector for this port is located at the back of your computer. This port can be used to connect a serial mouse, serial printer, or other serial device and to transfer data between computers.

The built-in serial port supports the following addresses and interrupts.

Table 9: Serial port addresses

Address	COM#	Interrupt	Default
3F8	COM1	IRQ 4	Serial port

Conflicts may arise if you add adapter cards with serial ports or if you change the address settings on your modem if you are using an operating system other than Windows 98. You can resolve most of these conflicts by using Setup or the Windows 98 Device Manager to change serial port addresses. See "Onboard serial port 1 " on page 6-13 or "Resolving resource conflicts" on page 7-3 for more information.

# Connector functions

The following table includes the specific functions of the connectors. Refer to the section "Locating the system board jumpers and connectors" on page 9-4 for an illustration of the connector locations.

Table 10: Connector functions

<b>Connector</b>	<b>Function</b>
J1	USB connector
J4	VGA port
J5	On board enable/disable pin header
J6	HDD connector (Primary IDE)
J7	CD-ROM connector (Secondary IDE)
J9	Printer port
J10	PS/2 Keyboard port
J11	PS/2 Mouse Port
J12	COM 1 port
J14	Floppy Disk Drive connector
J16	ATX Power connector
J17	CPU fan connector
J18	CD-in connector
J19	Audio line-out

Table 10: Connector functions (Continued)

Connector	Function
J20	Audio line-in
J21	Microphone-in port
J22	Game port pin header
J23	Internal Speaker connector (left)
J25	Internal Speaker connector (right)
JP 7	Power button (pins 1, 3) ACP LED (pins 4, 6) HDD LED (pins 5, 7)

# Modem information

## Appendix B

### Modem features

Using a telephone network, a modem allows your computer to communicate with other computers, fax machines, or telephones. For information about connecting your modem to a telephone network, see "Connecting your modem to the telephone network" on page 4-9.



Attention!

Before you plug your modem into a telecommunications system outside the country in which it was purchased, make sure your modem is designed to work with that telecommunications system. Otherwise, you could damage your computer. Read the guidelines in "Safety information" on page vii before you plug your modem into any telecommunications system.

Some IBM Aptiva PCs have a modem already installed. If your computer came with a modem, all you have to do is connect the modem to a telephone line. (You may also connect a telephone to the modem if it has two RJ11C jacks). The system firmware is already configured to load the modem drivers and software once you have made the connections.

If your computer does not have a modem but you intend to install one, see the documentation that came with the modem for installation instructions and reference information.

If present, the modem that came with your computer is a V.90 bps modem. It serves as a communications peripheral capable of high-speed data transfer and fax. Your modem is compatible with the following standards:

- V.90
- K56 Flex
- V.34 (33600 bps)
- V.32bis (14400 bps)
- V.32 (9600 bps)
- V.22bis (2400 bps)
- V.22 (1200 bps)
- Bell 212A (1200 bps)
- V.23 (1200/75 bps)
- V.21 (300 bps)
- Bell 103 (300 bps)
- V.17 (14400 bps FAX)
- V.29 (9600 bps FAX)
- V.27ter (4800 bps FAX)
- V.21 channel-2 (300 bps FAX)
- TIA/EIA 578 Class 1 fax command set
- IS-101 voice command set
- V.42bis (data compression)
- V.42 (error correction)

- MNP5 (data compression)
- TIA/EIA 602 AT command set
- V.8 start-up sequence
- MNP2-4 error correction
- PC 98 logo

## Operating your modem

You can perform common modem functions such as dialing, file transfer, and faxing using the modem communications software that came with your computer. For information about configuring communications software, see "Configuring your communications software" on page 4-9.

It is still possible for you to perform the basic modem functions using the AT commands from the Windows 98 DOS box prompt. A list and description of all the AT commands appear in the section "AT commands"

We strongly recommend, however, that you perform all modem operations through the modem communications software since it is designed to eliminate the inconvenience of using the AT commands. Modem software allows you to operate the modem by simply selecting command items from onscreen menus.



Note:

Most modem communications software programs also allow you to send specific AT commands to the modem.

## Using the Auto Answer feature

If you use a modem communications software program, it may require your modem to be set for *Auto Answer*. The Auto Answer feature lets your computer answer calls from another computer automatically.

Your modem communications software determines how the modem operates with Auto Answer. Some fax programs do not require you to type an AT command to turn Auto Answer on or off. For specific instructions, see the user's guide that came with the communications software.

To start the Auto Answer feature from your communications software, use the command: **ATS0=n**. This command tells the modem to answer a call after a certain number of rings. To set the number of rings, replace **n** with any number from 1 to 255.

If you do not have a voice modem, turn Auto Answer off when you are not using your modem. Otherwise, callers will be greeted with the modem tone. To turn Auto Answer off, use the command: **ATS0=0**.

In some communications software programs, you may need to select the "Auto Answer On" or "Auto Answer Off" option to turn off the auto answer feature.



Note:

If you are using Auto Answer with a fax software program, setting a high number of rings will allow you to answer the telephone before the fax modem does.

If your computer came with fax software already installed, use the fax software documentation included in the fax software online Help for additional information.

## Disabling Call Waiting

If you use the Call Waiting feature on your telephone, you may want to disable it while using your modem. With Call Waiting, communications can be interrupted when a second call is waiting to be answered.

To disable Call Waiting, contact your telephone company. Different telephone companies have different procedures for disabling this feature. Also, some telephone companies cannot disable Call Waiting. Your telephone company business office should be able to tell you the procedures and *dialing sequence* required to disable Call Waiting.

A dialing sequence is similar to a command you type on your computer. For example, in some areas the following dialing sequence disables Call Waiting:

**(# or \*)70,,,(complete telephone number)**

The dialing sequence you type on your computer may look like this: **\*70,,5554343**. The commas (,,) pause the modem until the command is carried out, then the telephone number is dialed automatically.

Call Waiting will be disabled **only** for the duration of your modem's current call and only from the calling end. For incoming calls, you may find it helpful to change the value of register S10 to a higher number. For more information on S registers, see "S registers" on page B-12.

Your modem communications software determines how your modem operates with Call Waiting. For specific instructions, see the user's guide or online Help that came with the communications software.

If your computer came with a fax software already installed, use the fax software documentation included in your computer package or the fax software online help for additional information.

## Modem commands

This section provides information on the modem commands if you operate your modem from the DOS prompt using the AT command strings.

## Executing commands

Your modem is in the Command Mode when powered-on and is ready to receive and execute AT commands. The modem remains in the Command Mode until it makes a connection with a remote modem. Commands may be sent to the modem from an attached terminal or a PC running a communication program.

The modem is designed to operate at common DTE speeds ranging from 115.2K bps (or 57.6K bps) to 300K bps. All commands and data must be issued to the modem using one of the valid DTE speeds.

## Command format

All commands must begin with the **AT** prefix, followed by the command letter and ended with the **Enter** key. Spaces are allowed in the command string to increase command readability but are ignored by the modem during command execution. All commands may be typed in either upper or lower case, but not mixed. A command issued without any parameters is considered as specifying the same command with a parameter "0".

Example:

**ATL [ Enter ]**

This command causes your modem to lower its speaker volume.

# AT commands

Table 1: AT commands

Command	Function
<b>A</b>	Answers incoming call
<b>A/</b>	Repeats the last command given. Note: Do not precede by AT or follow by Enter
<b>B0</b>	+MS=V22,0,1200,1200 (See page B-8 for +MS Control detail.)
<b>B1</b>	+MS=V212,0,1200,1200 (See page B-8 for +MS Control detail.)
<b>B15</b>	+MS=V21,0,300,300 (See page B-8 for +MS Control detail.)
<b>B16</b>	+MS=V103,0,300,300
<b>D</b>	0-9, A-D, # and * L = last number redial P = pulse dial T = tone dial W = wait for second dial tone V = switch to speakerphone mode , = pause @ = wait for five seconds of silence ! = flash ;= return to command mode after dialing
<b>E0</b>	Commands echo disabled
<b>E1</b>	Commands echo enabled
<b>+++</b>	Escape characters - switch from data mode to command mode

Table 1: AT commands (Continued)

<b>Command</b>	<b>Function</b>
<b>H0</b>	Modem on-hook (hang-up)
<b>H1</b>	Modem off-hook (make busy)
<b>I0</b>	Firmware and device ID
<b>I1</b>	Checksum code
<b>I2</b>	ROM test
<b>I3</b>	Firmware and device ID
<b>L0</b>	Low speaker volume
<b>L1</b>	Low speaker volume
<b>L2</b>	Medium speaker volume
<b>L3</b>	High speaker volume
<b>M0</b>	Speaker always off
<b>M1</b>	Speaker on until carrier detected
<b>M2</b>	Speaker always on
<b>N0</b>	+MS=<xxx>,0,<max>,<min>
<b>N1</b>	+MS=<xxx>,1,<max>,<min>
<b>O0</b>	Return to data mode
<b>O1</b>	Initiate an equalizer retrain and return to data mode
<b>P</b>	Pulse dial
<b>Q0</b>	Result codes enabled
<b>Q1</b>	Result codes disabled

Table 1: AT commands (Continued)

Command	Function
<b>Sr?</b>	Read S register r, where r=0-95
<b>Sr=n</b>	Set S register r to value n (r=0-95; n=0-255)
<b>T</b>	Tone dial
<b>V0</b>	Numeric responses
<b>V1</b>	Text responses
<b>X0</b>	Hayes Smartmodem 300 compatible responses/blind dialing
<b>X1</b>	Same as X0 plus all CONNECT responses/blind dialing
<b>X2</b>	Same as X1 plus dial tone detection
<b>X3</b>	Same as X1 plus busy signal detection/blind dialing
<b>X4</b>	All responses and dial tone and busy signal detection
<b>Z</b>	Reset and recall user profile

## Detail for +MS Controls

Table 2: Detail for +MS Controls

<code>+MS=&lt;carrier&gt;,&lt;automode&gt;,&lt;min transmit rate&gt;,&lt;max transmit rate&gt;,&lt;min receive rate&gt;,&lt;max receive rate&gt;</code>
<code>&lt;carrier&gt;=</code> B103 for Bell 103 (300 bps) B212 for Bell 212 (1200 bps) V21 for V.21 (300 bps) V22 for V.22 (1200 bps) V22B for V.22bis (1200-2400 bps) V23C for V.23 V32 for V.32 (4800 & 9600 bps) V32B for V.32bis (7200, 12000, 14400 bps) V34 for V.34 (2400-33600 bps) K56 for K56flex (28000-56000 bps) V90 for V.90 (28000-56000 bps)
<code>&lt;automode&gt;</code> = 0 (for automode OFF) =1 (for automode ON)
<code>&lt;min transmit rate&gt;</code> = 300 bps to 33600 bps <code>&lt;max transmit rate&gt;</code> = 300 bps to 33600 bps <code>&lt;min receive rate&gt;</code> = 300 bps to 33600 bps <code>&lt;max receive rate&gt;</code> = 300 bps to 56000 bps

An example of a command is **AT+MS = V90, 1, 24000, 33600, 28000, 56000**

## Extended AT commands

Table 3: Extended AT commands

<b>Command</b>	<b>Function</b>
<b>&amp;C0</b>	Carrier Detect (CD) always on
<b>&amp;C1</b>	Turn on CD when remote carrier is present
<b>&amp;D0</b>	DTR signal ignored
<b>&amp;D1</b>	Modem returns to Command Mode after DTR toggle
<b>&amp;D2</b>	Modem hangs up and returns to the command mode after DTR toggle
<b>&amp;F</b>	Load factory default configuration
<b>&amp;G0</b>	Guard tone disabled
<b>&amp;G1</b>	550 Hz guard tone enabled
<b>&amp;G2</b>	1800 Hz guard tone enabled
<b>&amp;V</b>	View active profiles

## V.42bis commands

Table 4: V.42bis commands

Command	Function
<b>+IFC = 0,0</b>	Disable flow control
<b>+IFC = 2,2</b>	Enable RTS/CTS hardware flow control (data mode default)
<b>+IFC = 1,1</b>	Enable XON/OFF software flow control
<b>+DS = 0,0,2048,32</b>	Data compression disable
<b>+DS =3,0,2048,32</b>	V.42bis/MNP5 data compression enabled
<b>+ES = 0,0,1</b>	Normal mode (speed buffering) only
<b>+ES = 4,4,6</b>	MNP mode only
<b>+ES =3,3,5</b>	V.42/MNP/Normal auto-mode
<b>+ES = 3,0,2</b>	V.42 mode only
<b>\Q3</b>	Enable CTS/RTS flow control (same as &K3)
<b>+1LRR = 0</b>	Disable protocol result code appended to DCE speed
<b>+1LRR = 1</b>	Enable protocol result code appended to DCE speed

# Modem response codes

The following table lists the basic codes that the modem sends to your computer in response to the commands you type. They are called response codes.

Table 5: Basic Response codes

<b>Digit code</b>	<b>Word code</b>	<b>Meaning</b>
<b>0</b>	OK	Command was carried out without error
<b>1</b>	Connect	Connected at 300 bits per second (bps)
<b>2</b>	Ring	Ringing signal detected
<b>3</b>	No carrier	Carrier is lost or not heard
<b>4</b>	Error	Error in the command line Invalid command Command line exceeds buffer Invalid character format
<b>6</b>	No dial tone	No dial tone during the time-out period
<b>7</b>	Busy	The line being called is busy
<b>8</b>	No answer	The line being called did not answer within the time-out period
<b>11</b>	Connect xxxx	Connected at 2400 bps
<b>24</b>	Delayed	Dialing delayed
<b>32</b>	Blacklisted	Number is blacklisted
<b>33</b>	Fax	Fax connection
<b>35</b>	Data	Data connection
<b>+F4</b>	+FC error	Fax error

# S registers

S registers are information storage areas inside the modem. The AT command set uses the S registers to configure modem options. Some S registers have default settings. For normal modem operations, the default settings are usually adequate. However, special circumstances may require you to change some defaults. To change or read the value of an S register, begin the command with the letters **AT**.

## To read the value of an S register:

- Use the **ATSr?** command (**r**=register number 0-28).

For example, to read the value of S register 0, type **ATS0?** and press **Enter**.

## To change the value of an S register:

- Use the **ATSr=n** command (**r**=register number 0-28, **n**=the new value you want to assign).

For example, to change the value of S register 0 to 20 rings, type **ATS0=20** and press **Enter**.

The following table lists the S Registers summary.

Table 6: S registers

Register	Function	Range/units	Default
<b>S0</b>	Auto-answer ring	0-255 /rings	0
<b>S1</b>	Ring counter	0-255 /rings	0
<b>S2</b>	Escape code character	0-255 /ASCII	43
<b>S3</b>	Carriage return character	0-127 /ASCII	13
<b>S4</b>	Line feed character	0-127 /ASCII	10
<b>S5</b>	Backspace character	0-32 /ASCII	8
<b>S6</b>	Dial tone wait time	2-255 /seconds	2

Table 6: S registers (Continued)

<b>Register</b>	<b>Function</b>	<b>Range/units</b>	<b>Default</b>
<b>S7</b>	Remote carrier wait time	1-255 /seconds	50
<b>S8</b>	Comma pause time	0-255 /seconds	2
<b>S10</b>	Carrier loss time	1-255 /10ths of a second	14
<b>S11</b>	Touch-tone dialing speed	50-255 /milliseconds	95
<b>S12</b>	Escape character detect time	0-255 /50ths of a second	50
<b>S29</b>	Flash dial modifier time	0-255 /10 milliseconds	70

# Monitor terminology

## Appendix C

As you read the documentation that came with your monitor and the monitor information provided in this chapter, you might find a few technical terms. If you change your monitor settings, refer to the following table to understand some of the terms used to describe monitor characteristics.

Table 1: Monitor terms and definitions

<b>Term</b>	<b>Definition</b>
<b>display mode</b>	A resolution setting associated with a vertical frequency setting (and sometimes a color setting). For example, 640x480 at 75 Hz, 256 colors.
<b>horizontal frequency</b>	Rate (in kilohertz [kHz]) at which each line on the screen is drawn.
<b>interlaced</b>	Method of producing an image by drawing only alternating lines until the entire image is completed.
<b>noninterlaced</b>	Method of producing an image by drawing each line, one after the other, until the entire image is completed. This method produces less flicker than the interlaced method.
<b>pel (or pixel)</b>	A picture element. A small rectangle or portion of an image that together with other pels make up the entire image.
<b>resolution</b>	The number of pels required to display an image horizontally and vertically. For example, 640x480 means 640 pels horizontally and 480 pels vertically.
<b>SVGA</b>	Super video graphics array. A video standard that provides some of the higher text and graphics resolutions.
<b>vertical frequency/refresh rate</b>	Rate (in hertz [Hz]) at which the entire image is drawn on the screen. Also called "refresh rate."

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