IBM

Aptiva

Handbook

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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.

Safety information (in French)

Your Aptiva Handbook is printed in English. The following safety information is included in the Aptiva Handbook and is provided here in French for French speaking users:

Consignes de sécurité pour l'unité de CD-ROM et de DVD-ROM

La présente consigne contient les informations de sécurité relatives à l'unité de CD-ROM de votre ordinateur (le cas échéant). L'unité de CD-ROM est un produit à laser de classe 1. Les produits de classe 1 ne sont pas considérés comme dangereux. Le système à laser et l'unité de CD-ROM ont été conçus de façon telle qu'il n'existe aucun risque d'exposition à un rayonnement laser de niveau supérieur à la classe 1 dans des conditions normales d'utilisation.

Veuillez noter qu'aucune pièce de l'unité de CD-ROM n'est réglable ni réparable. Ne confiez la réparation de cette unité qu'à une personne qualifiée.

Conforme aux normes relatives aux appareils laser, l'unité de CD-ROM est un appareil à laser. Aux États-Unis, l'unité de CD-ROM est certifiée conforme aux normes indiquées dans le sous-chapitre J du DHHS 21 CFR relatif aux produits à laser de classe 1. Dans les autres pays, elle est certifiée être un produit à laser de classe 1 conforme aux normes CDI 825 et CENELEC EN 60 825.

Lorsqu'une unité de CD-ROM est installée, tenez compte des remarques suivantes :

L'ouverture de l'unité de CD-ROM peut entraîner un risque d'exposition au rayon laser. Pour toute intervention, faites appel à du personnel qualifié.

Certaines unités de CD-ROM peuvent contenir une diode à laser de classe 3A ou 3B.

	Caution!	Pour éviter tout risque d'exposition au rayon laser, respectez les consignes de réglage et d'exposition au rayon laser, respectez les consignes de réglage et d'utilisation des commandes, ainsi que les procédures décrites dans le présent manuel.
	Danger!	Rayonnement laser lorsque le carter est ouvert. Évitez toute exposition directe des yeux au rayon laser. Évitez de regarder fixement le faisceau ou de l'observer à l'aide d'instruments optiques.

	Caution!	Si votre ordinateur est équipé de piles au lithium, prenez garde aux risques d'incendie, d'explosion ou de brûlures liés à une mauvaise utilisation des piles. Respectez les consignes de sécurité suivantes : Ne rechargez pas la pile, ne la démontez pas, ne l'exposez pas à la chaleur et ne la faites pas brûler. Ne la remplacez que par une pile identique ou de type équivalent. Pour le recyclage ou la mise au rebut des piles au lithium, reportez-vous à la réglementation en vigueur.
	Danger!	Pour éviter tout risque de choc électrique : Ne manipulez aucun cordon et n'effectuez aucune opération d'installation, de maintenance ou de reconfiguration de ce produit au cours d'un orage. Les cordons d'alimentation du présent produit et de tous les appareils qui lui sont connectés doivent être branchés sur des socles de prise de courant correctement câblés et mis à la terre. Le courant électrique passant dans les câbles d'alimentation, de téléphone et de communication peut être dangereux. Pour éviter tout risque de choc électrique, suivez les instructions décrites ci-contre pour le branchement et le débranchement des câbles lors de l'installation, du déplacement ou de l'ouverture de l'unité centrale.

Regulatory notices

North American 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 2165

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 Reglement sur le matériel brouilleur du Canada.

European Community Directive Conformance statement

This product is in conformity with the protection requirements of EU Council directive 89/336/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility.

A declaration of Conformity with the requirements of the Directive has been signed by IBM United Kingdom Limited, PO BOX 30, Spango Valley, Greenock, Scotland, PA160AH.

IBM cannot accept responsibility for any failure to satisfy the protection requirements resulting from a non-recommanded modification of the product, including the fitting of non-IBM option cards.

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- Scroll Point
- HelpCenter
- HelpWare
- IBM

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Ergonomics

Arranging a comfortable and productive work area

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

- You should adjust your chair so that your things are horizontal and there is support for your lower back. Your feet should rest flat on the floor or a foot rest when you are seated and using your keyboard.

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

Positioning the monitor

- Place the monitor at a comfortable viewing distance. 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

- When you type, the keyboard should be positioned so that your arms are relaxed and comfortable, and your forearms are roughly horizontal. Your shoulders should be relaxed and not hunched up.

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 98 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
Bold	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.
Italic	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.

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:

Internet	http://www.pc.ibm.com/support
Telephone	Please refer to the section entitled **"How and when do I contact the IBM PC HelpCenter?"** 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" on page 2-7. 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/support

Online services

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

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

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_____
(located on the bezel, under the lower left of CD-ROM)

Serial number _____
(located on the bezel, under the lower left of CD-ROM)

Registrationnumber_____
(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 Austria, call 1 546 325 102.

- In Belgium (FLemish), call 02-714-3504.

- In Belgium (French), call 02-714,3503.

- In Denmark, call 35 25 69 04.

- In Finland, call 09-22-943004.

- In France, call 01-6932-4004.

- In Germany, call 069-654-9004.

- In Ireland, call 01-8159208.

- In Italy, call 02-4827-7003.

- In Luxemburg, call 298-977-5058.

- In the Netherlands, call 020-504-0530.

- In Norway, call 2-305-0304.

- In Portugal, call 01 791 5147.

- In Spain, call 91-662-4261.

- In Sweden, call 08-632-0051.

- In Switzerland, call 0848 80 55 00

- In the U.K., call 01475-555 001

- If your country is not listed, please contact your local IBM office.

In the United States and Canada, 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

Note: All of the following support options are available in all countries unless otherwise noted.

In the United States and Canada, 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

.

United States	For using application software and for out of warranty IBM PC products: 1-900-555-HELP(4357)	Monday-Friday 9am to 9pm Eastern Time	$2.99 (US currency) per minute beginning after the first minute
	For installng and configuring in-warranty IBM Aptiva products: 1-900-555-HELP(4357)		

| Canada | 1-900-565-9988 | 24 hours a day | $3.50 (Canada currency) per minute |

Flat rate

You may call the IBM PC HelpCenter to purchase support for a single incident or multiple incidents. To purchase support, refer to"tTo order additional support packages" on page 2-9.

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

In the United States and Canada, 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).

- In Austria, call 1 546 325 102.

- In Belgium (FLemish), call 02-714-3504.

- In Belgium (French), call 02-714,3503.

- In Denmark, call 35 25 69 04.

- In Finland, call 09-22-943004.

- In France, call 01-6932-4004.

- In Germany, call 069-654-9004.

- In Ireland, call 01-8159208.

- In Italy, call 02-4827-7003.

- In Luxemburg, call 298-977-5058.

- In the Netherlands, call 020-504-0530.

- In Norway, call 2-305-0304.

- In Portugal, call 01 791 5147.

- In Spain, call 91-662-4261.

- In Sweden, call 08-632-0051.

- In Switzerland, call 0848 80 55 00

- In the U.K., call 01475-555 001

- Use the following part numbers when you call:

	US Part Number	Canada part Number
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 "Express Maintenance" which is a parts exchange service that allows IBM HelpCenter personnel to replace selected in-warranty hardware parts and ship them directly to your door. This means you will not have to completely disassemble your computer and take it to an authorized IBM servicer for repair. Some servicers function as drop-off points that may send your system to another location for repair.

When you call for Express Maintenance at 1-919-517-2800, your credit card information will be requested, but it will not be billed if you return the defective part to IBM within 30 days of your receipt of the new part. If the part is not returned within 30 days, your card will be charged the full retail price of the part. Credit card information will not be made available to any one outside 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.

Getting started with your Aptiva computer

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.

Note: If the image on your monitor screen is scrolling, blinking, or flashing the first time you turn on your computer, read "Is anything displayed on the monitor" on page 10-4 in the "Diagnosing and revovering from problems" chapter. Also, read "Tips for choosing display properties" on page 4-4.

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.

- If attaching a monitor other than an SVGA monitor, you may need to change the Screen area in Display Properties to 640 x 480 pixels and set the Palette to 16 colors to prevent the image from scrolling, blinking, or flashing. Read "Is anything displayed on the monitor" on page 10-4 in the "Diagnosing and recovering from problems" chapter for the steps to restart your computer in Save mode and reconfigure your monitor.

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 2165 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 2165 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.

Busy Light
Stop/Eject
Emergency Eject Hole
Volume Control
Headphone Jack
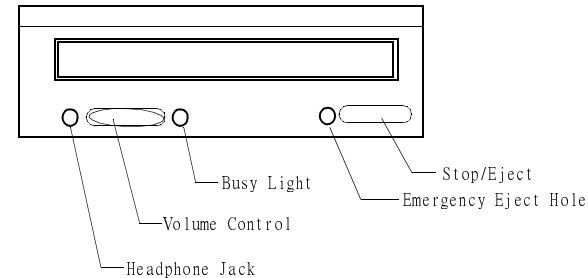
When your headphones are plugged into the headphone jack on the CD-ROM drive, they will pick up only the sound coming from an ordinary audio CD in the CD-ROM drive. The headphones will not pick up other sounds generated from your computer or any external device connected to the computer, such as a MIDI (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 <u>must</u> control the headphone volume through the volume control in the multimedia software on your computer. You <u>cannot</u> 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 4-4 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 <u>only</u>. 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. "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

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

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 updates 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:

- Processor type and speed
- System memory
- Diskette, hard disk, and CD-ROM drives
- Serial and parallel ports
- Plug and Play options
- Startup options
- Model information
- Date and time settings
- Security options
- Power management options

Some of the parameters and related settings in Setup are for reference only, such as those items in the System Summary , Product Data and PC Health Status menus. Refer to the section "Viewing system information and product data" on page 6-5 for details on these menus.

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?

5. When you see the IBM logo and the line 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 "Power-on password" on page 5-22 for information on setting, changing, or removing the password.

When the computer is off

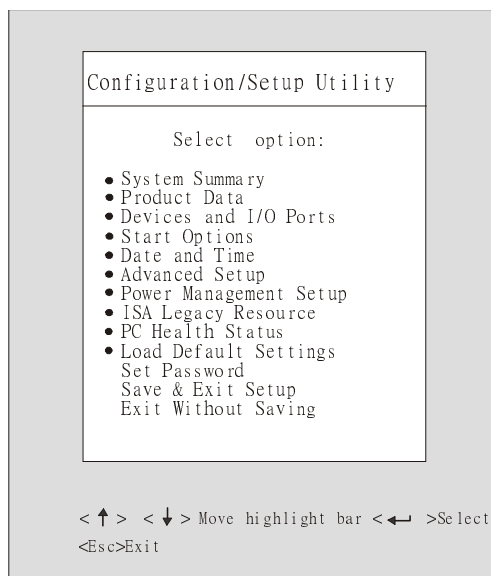Follow these steps to enter Setup when the computer is off:

1. Turn on your monitor.

2. Turn on the system unit.

3. When you see the IBM logo and the line 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 "Set Password" on page 6-16 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

```
Configuration/Setup Utility

        Select  option:

  ● System Summary
  ● Product Data
  ● Devices and I/O Ports
  ● Start Options
  ● Date and Time
  ● Advanced Setup
  ● Power Management Setup
  ● ISA Legacy Resource
  ● PC Health Status
  ● Load Default Settings
    Set Password
    Save & Exit Setup
    Exit Without Saving



< ↑ >  < ↓ > Move highlight bar <←┘ >Select
<Esc>Exit
```

Note: 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 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.)
← →	Use these arrow keys to change a setting. In some menus, you can use these keys to move from one field to another.
F5	Restore the old settings.
F7	Load the factory-default settings.
Enter	Press this key to select a highlighted parameter from a menu.
Esc	After viewing or making changes to the settings on a menu, press this key to exit the menu.
F1	Press this key if you want help for a selected item in a 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.

Viewing system information and product data

To view general hardware information about your computer, select the System Summary option from the Setup main menu. The items displayed in the System Information menu are not configurable.

Setup automatically updates this menu when you do either of the following:

- Add or change hardware on your computer

- Make changes to other menus in Setup and save those changes

To view other computer information such as the model number, serial number, and BIOS version and date, select the Product Data option from the Setup main menu. Like in the System Information menu, the items displayed are not configurable.

Changing parameter settings

In the Setup menus, all configuration information that you can change is enclosed in brackets like these: [ ]. You cannot change any information that is not enclosed in brackets. Use the up- or down-arrow keys to highlight options then press Enter to display a menu. When changing the setting of a particular parameter, highlight the setting then use the left- or right-arrow key to change the setting. Refer to the section "Setup parameters" on page 6-7 for details on the configurable parameters in each menu.

Loading the default settings

When you purchase an Aptiva computer, it is already configured for use. The original configuration settings, also called *factory or default settings*, are stored in the CMOS. Setup includes an option Load Optimized Default Settings that lets you reload the original configuration at any time.

If you have made changes in Setup but would like to restore the default settings, follow these steps:

1. From the main menu, highlight the option Load Optimized Default Settings then press Enter. A dialog box appears confirming if you want to load the default settings.

2. Type "Y" to select Yes, then press Enter.

3. Highlight the option Save & Exit Setup option, then press Enter.

   A dialog box appears saying "SAVE to CMOS and EXIT (Y/N)?

4. Type "Y" to select Yes, then press Enter to save the changes in CMOS .

You must load the Setup default settings in the following instances:

- when you replace the system battery

- when you customize your system configuration settings and some resource assignments conflict causing the computer to stop responding

Aborting setting changes

There may be times when you have made changes in the Setup parameter settings but decided to discard the changes. The option Abort Settings Change allows you to do this without exiting Setup.

To abort the changes that you have made, follow these steps:

1. Return to the Setup main menu

2. Highlight the Exit Without Saving option then press Enter.

BIOS then clears all the changes that you made and resets the parameters to their previous settings. These settings are the settings which were in place when you started Setup.

Exiting Setup

Press Esc to return to the main menu when you have finished viewing settings and making changes. From this location, you can exit Setup and save your changes or exit without saving your changes.

Follow these steps to exit Setup:

1. From the main menu, press the Esc key.

2. The Exit Setup dialog box appears saying "Quit Without Saving(Y/N) ? Type "Y" if you want to quit directly.

You also can Exit the Setup via highlighting the Save & Exit Setup option or Exit without Saving option and follow the dialog box directions.

Setup parameters

Start Options

The start options include some miscelaneous that this BIOS provides.

Start Up Sequence

Determine the system boot up ssequence.

Virus Waring

Determines if the BIOS will monitor the boot sector and partition table of the hard disk drive for any attempt at modification. If any attempt is made, the BIOS will halt the system and an error message will appear.

Afterwards, if necessary, you will be able to run an anti-virus program to locate and remove the problem before any damage is done.

Enabled	Activates automatically when the systemm boots up causing a warning message to appear when anything attempts to access the boot sector or hard disk partition table.
Disabled	No warning message will appear when anything attempts to access the boot sector or hard disk partition table

Note: Many disk diagnostic programs which attempt to access the boot sector table can cause the above warning message. If you will be running such a program, we recommand that you first disable Virus Protection beforehand.

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

Swap Floppy Drive

Determines if the swap fllopy drive is enabled or not.

Choices: Enabled, Disabled.

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

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

Security Option

Determines the access limitation to the system and Setup, or just Setup.

System	The system will not boot and the access to Setup will be denied if the correct password is not entered at the prompt.
Setup	The system will boot, but access to Setup will be denied if the correct password is not entered at the prompt.

Note: To disable security, select PASSWORD SETTING at Main Menu and then you will be asked to enter password. Do not type anything and just press Enter, it will disable security. Once the security is disabled, the system will boot and you can enter Setup freely.

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 "**Devices and I/O Ports**" menu. See page 6-13 for information about integrated peripherals.

Date and Time

Set the date and time and determine the condition to halt BIOS power on self test.

The following are the halt on options.

ALL errors	System halts in case of any errors
No errors	System won't halt in case of any errors
ALL , But keyboard	System halts except the keyboard error
ALL, But diskette	Syetem halts except the diskette error
ALL, But disk/key	System halts except the diskette or keyboard error

Advanced Setup

You can set up some advanced hardware features in this function. If they are configured incorrectly, the system might malfunction.

Cache Control

Determines the internal cache and external cache will be enabled or disabled. If enabled, the memory access will speed up.

ROM Shadowing

Video BIOS Shadow

Determines whether video BIOS will be copied to RAM. However, it is optional depending on chipset design. Video Shadow will increase the video speed

Enabled	Video shadow is enabled
Disabled	Video shadow is disenabled

C8000 - DFFFF Shadow

Determines if the option ROMs will be copied to RAM

Enabled	Optional shadow is enabled
Disabled	Optional shadow is disenabled

Plug and Play Control

PNP OS Installed

The BIOS has the capability 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 98.

Select "Yes" if you are using a Plug and Play Operating system.

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 shch a serious conflict that the operating system cannot boot.

Choices: Enabled, Disabled

Devices and I/O Ports

The options in this menu item are used to configure the devices and the I/O ports that this system has.

Diskette Drive A

Determines the type of Diskette Drive A.

None	No floppy drive installed
720K, 3.5 in	3-1/2 inch double-sided drive; 720 kilobyte capacity
1.2M, 5.25 in	5-1/4 inch AT-type high-density drive; 1.2 megabyte capacity
1.44M, 3.5 in	3-1/2 inch double-sided drive; 1.44 megabyte capacity

PS/2 Mouse function

Determines the PS/2 Mouse function to be enabled or disabled.

On Board Audio

Determines the on board audio function to be enabled or disabled.

On Board Lan

Determines the on board Lan function to be enabled or disabled.

Serial Port Setup

Determines the I/O port address and Interrupt Request Number of serial port

Parallel Port Setup

Determines the I/O port address and Interrupt Request Number of parallel port

USB Setup

The options in this menu item are used to enable the USB(Universal Serial Bus) functions.

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.

IDE drives setup

PIO(Programmed Input/Output)

IDE devices drive controllers can support up to two separate 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-- so you have the ability to install up yo four separate IDE drives.

PIO means Programmed Iuput/Output. Rather than have the BIOS issue a series of commands to effect a transfer to or form the disk drive, PIO allows the BIOS to tell the controller ahat it wants and then let the controller and the CPU perform the complete task by themselves. This simpler and more efficient.

Your system suports five modes, numbered from 0 to 4, which primarily differ in timing. When Auto(default) is selected, the BIOS will select the best available mode. This is true for the next four setup items:

1. IDE Primary Master PIO

2. IDE Primary Slave PIO

3. IDE Secondary Master PIO

4. IDE Secondary Slave PIO

Ultra DMA(Direct Memory Access)

Ultra DMA is a more fast data transfer mode between the IDE devices and your system than the convention DMA mode. You can enable it by selecting the "Auto" option or disbale it by selecting "Disable".

Video Setup

You can set up the video configuration in this function.

VGA shared memroy

Determine the size of VGA shared memory

Init Display First

PCI slot	Specify the video card in the PCI slot to display first
AGP	Specify the on board internal video to display first

PS/2 Mouse Detect Function

Determine to support PS/2 mouse detect.

Onboard FDD Control

Determines the on board FDD control function to be enabled or disabled.

Power Management Setup

The Power Management Setup allows you to configure your system to most effectively save energy while operating in a manner consistent with your own style of computer use.

ACPI Function

Determines the ACPI function to be enabled or not.

APM

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

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.

MODEM Use IRQ

Determines the modem IRQ.

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

HDD Ports Activity

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

COM Ports Activity

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

LPT Ports Activity

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

VGA Activity

When set to "Enabled", 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 : Enabled
- 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)

Automatic Power On

The options in this function item define the method to wake up the system by setting wake up time or by ring.

You also can define power button over ride function. You can make the system power off instantly or after the power button is kept pressed in four seconds.

ISA Legacy Resource

ISA legacy resources(DMA, Interrupts, Memory) are resources that used by ISA adapters which are not Plug-and-Play adapters. Use these menus to indicate which resources are used by ISA legacy adapters.

PC Health Status

You can get some system health information from this function, such as the CPU temperature, Fan speed and voltage change.

Set Passowrd

In this option, you can set up a password to restrict access to the Setup Utility or to your System. You can also change or remove the password.

If you set up a password for entering setup, you must type this password each time you want to enter the Setup utility. If you do not type the correct password, you cannot enter Setup.

If you set up a system password, you must type this password each time you power on your system.

Please refer "Security Option" in page 6-9.

Using other configuration utilities

You can use Setup to view or change configuration settings for most of your factory-installed hardware. If you install new hardware, however, you might need to use other configuration utilities.

Windows 98 includes a Device Manager utility to help you view or change the system resources used by the hardware installed in your computer. See the section "Using the Windows 98 Device Manager" on page 7-4.

When you purchase new hardware to install in your Aptiva computer, a configuration utility or new drivers may come with the new hardware. See the documentation that comes with the new hardware for instructions.

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.

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 7-6

- "Resolving resource conflicts" on page 7-3

Evaluating your new hardware

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 7-1 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 2 screws that secure the top cover at the back of the system unit .
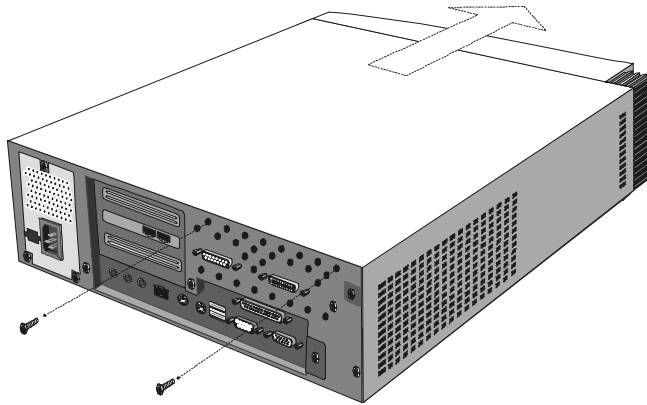
2. Hold both sides of the system unit cover and push it forward about 25 mm.

3. Lift the top 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.

Looking inside the system unit

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

Note: See the next page for a description of the hardware components inside the system unit.
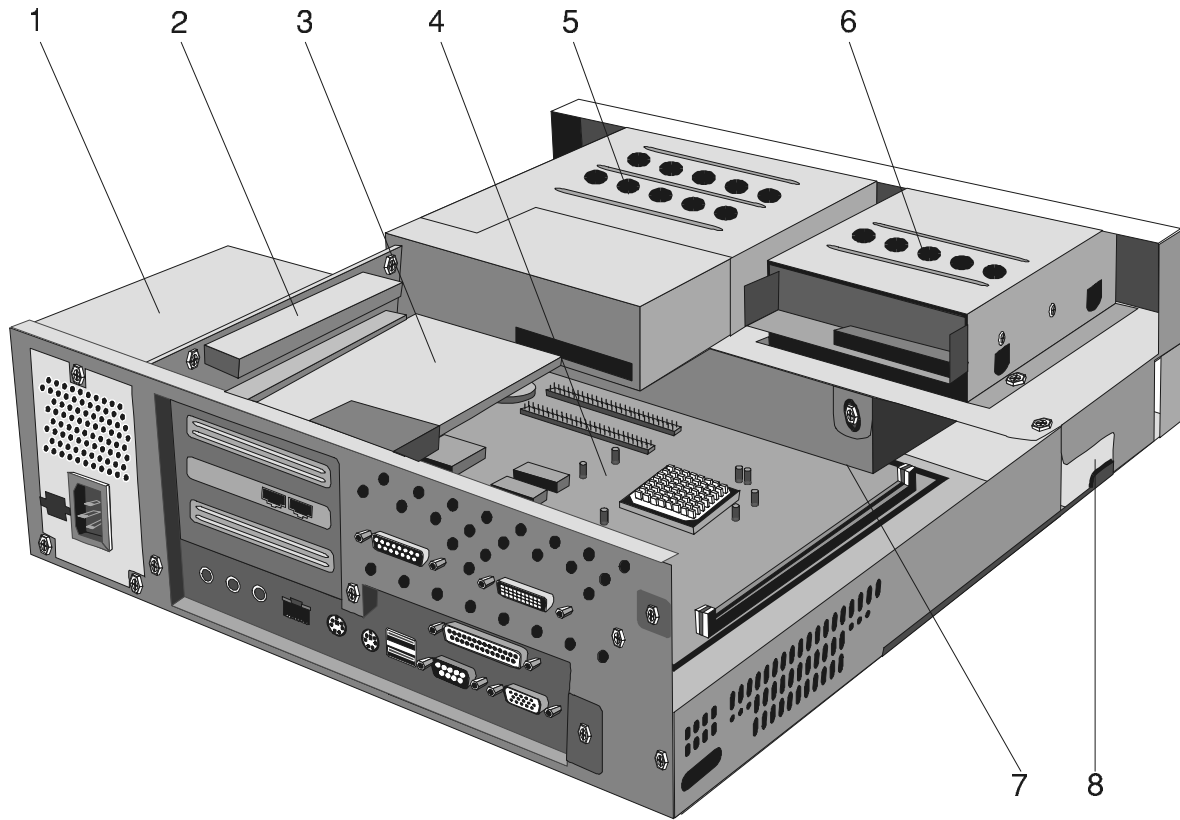
Your computer's system unit has 3 bays that can hold up to one 5.25-inch and two 3.5-inch drives.

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 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 3 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.

8 **Speaker**. 2 speakers are mounted on both sides of the front system unit.

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 8-5

Adding and removing adapter cards

The system board includes three PCI adapter card connectors.

▒ Note: Make sure that you have followed the proper procedure in "Opening the system unit" on page 7-4. 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 retainer and slot cover. Then remove the card retainer and slot cover.
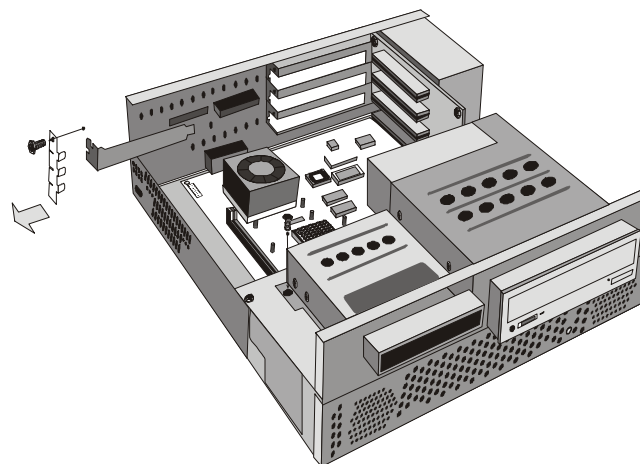
2. Align and insert the adapter card into the adapter card connector.

3. Secure the retainer and card with the screw that you removed in step 1.
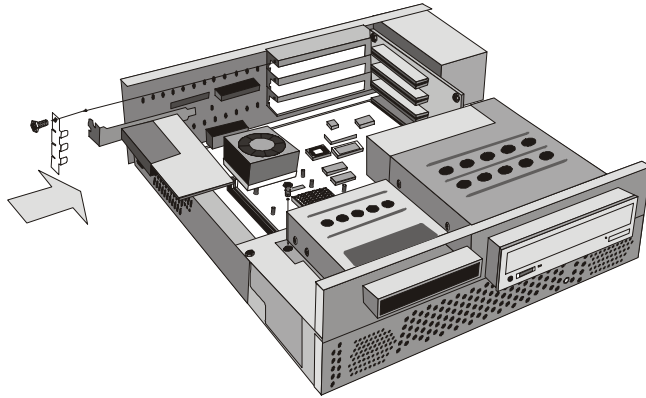
4. Reinstall all hardware (except for the slot cover, which cannot be reinstalled) and screws that you removed prior to the installation of the adapter card.

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.

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 riser card. The following table identifies each connector on the riser card 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:

System board connector	Interface type	Type of drive using the connector
Primary IDE – J101	IDE/ATA ATAPI	Preferred location for the hard disk drives.
Secondary IDE – J104	IDE/ATA ATAPI	Preferred location for a CD-ROM drive.
Diskette – J102	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.

Front of Riser Card

J102(Floppy)

J101(HDD)

Back of Riser Card

J104(CD-DOM)
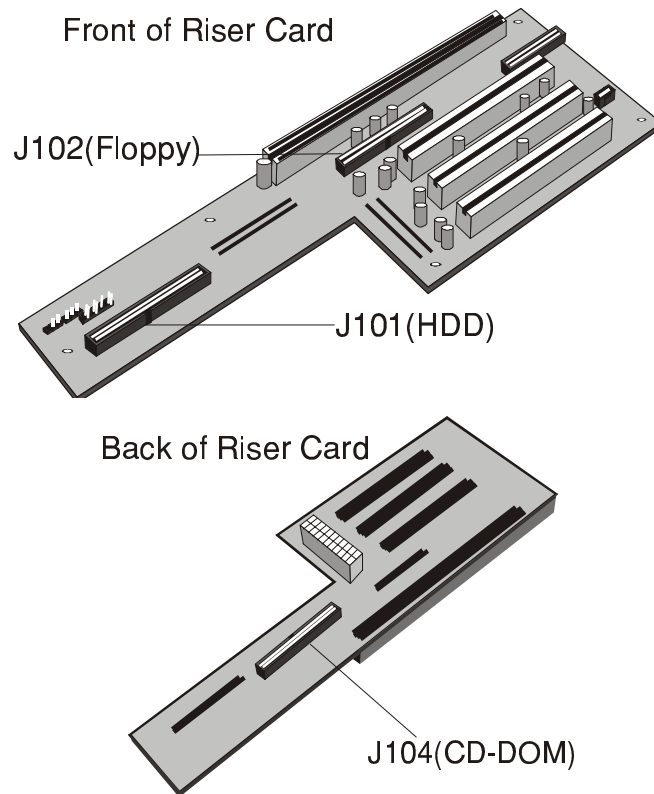
Guidelines for connecting IDE/ATA signal cables

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 **(J101)** on the Riser Card. 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 (J104), follow these guidelines:

- Attach the signal cable from the drive to the secondary IDE connector, which is labeled **CD-ROM** on the Riser Card. 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 Riser Card 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 **J102** on the Riser Card.

- 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.

Removing the diskette drive

If you want to replace the diskette drive, you must follow these steps:

1. Disconnect the power and signal cables from the back of the diskette drive.

2. Remove the screw that secures the diskette drive holder.
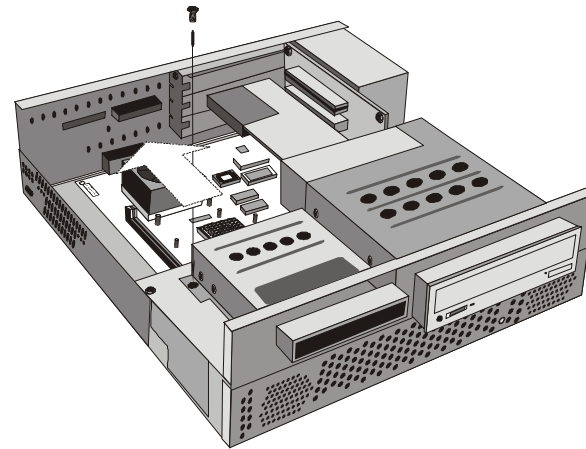
3. Pull the diskette drive holder backward from the system unit and remove it from the securing slide.

4. Remove the 4 securing screws on both sides of the diskette drive holder.
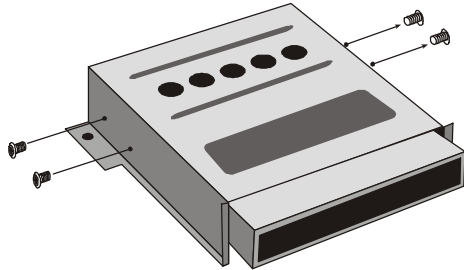
5. Pull the diskette drive forward from the holder to remove it.

Removing the CD-ROM drive

To replace the CD-ROM:

1. See 8-8. Remove the diskette drive along with the diskette drive holder from the system unit.

2. Disconnect the power, sound and signal cables from the CD-ROM.

3. Remove the four screws on both sides of the CD-ROM holder.
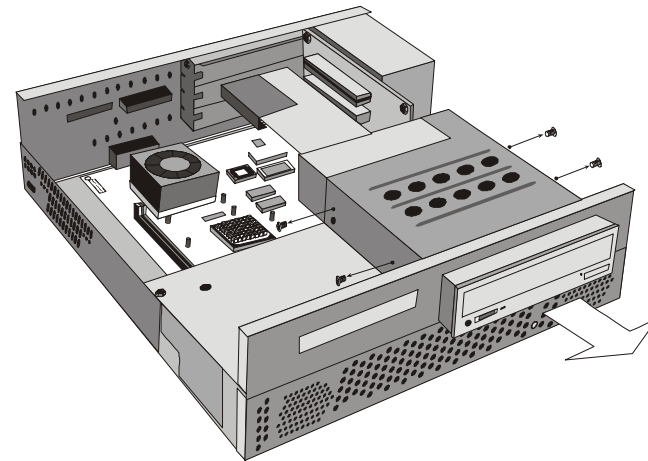
4. Pull the CD-ROM drive forward from the securing holder to remove it.

Removing the hard disk

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

1. Make sure to disconnect the power and signal cables from the CD-ROM drive and the diskette drive.

2. Remove the four screws that secure the bay holder to the metal frame of the systemunit.
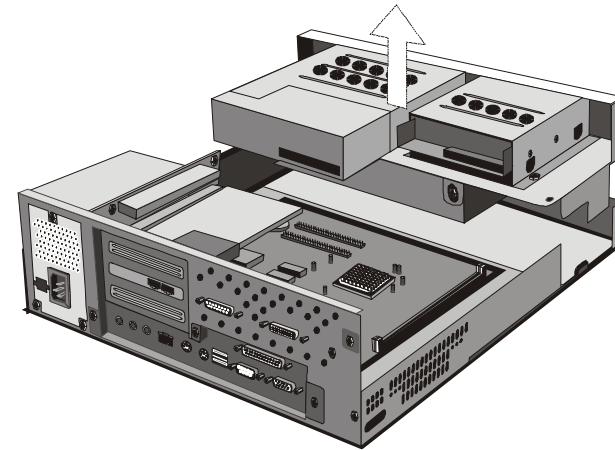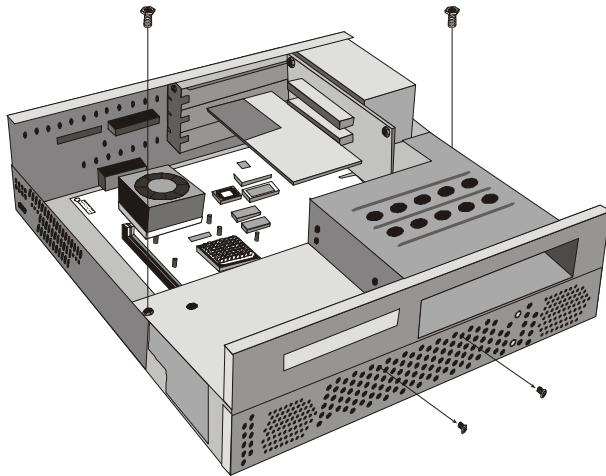
3. Turn the bay holder upward and forward about 60° and disconnect the signal and power cables from the hard disk.

4. Lift the securing base and remove the system unit.

5. Turn the bay holder upside down and put it on the table.

6. Remove the four screws that secure the hard disk to the bay holder.

7. Lift the hard disk and remove it.

Removing the system board

1. Remove the three securing screws of the system board tray and I/O Bracket.

2. Push the I/O Bracket outward from the case to remove it.

3. To remove the system board and the tray, pull the lever so that it rotates toward you.
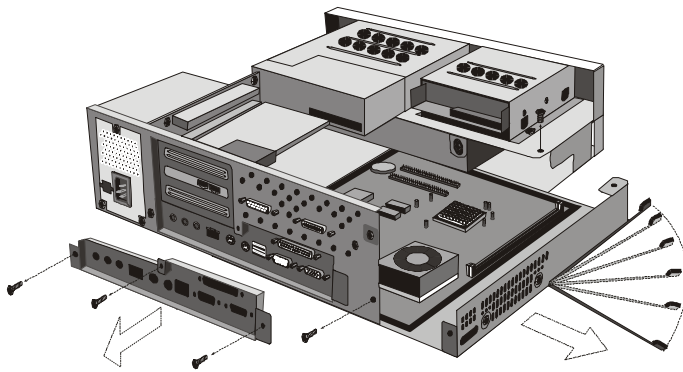
Updating the CMOS settings in Setup

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

From the Advanced Setup menu, select **Plug and Play Control** to view or change PCI adapter card information. See the section "Plug and Play Control" on page 6-10.

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 **Devices and I/O Ports** option in the Setup main menu. See "Diskette Drive A/Diskette Drive B" on page 6-11 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 **Devices and I/O Ports** from the Setup main menu to verify drive settings on page 6-11.

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.


(Front of Riser Card)

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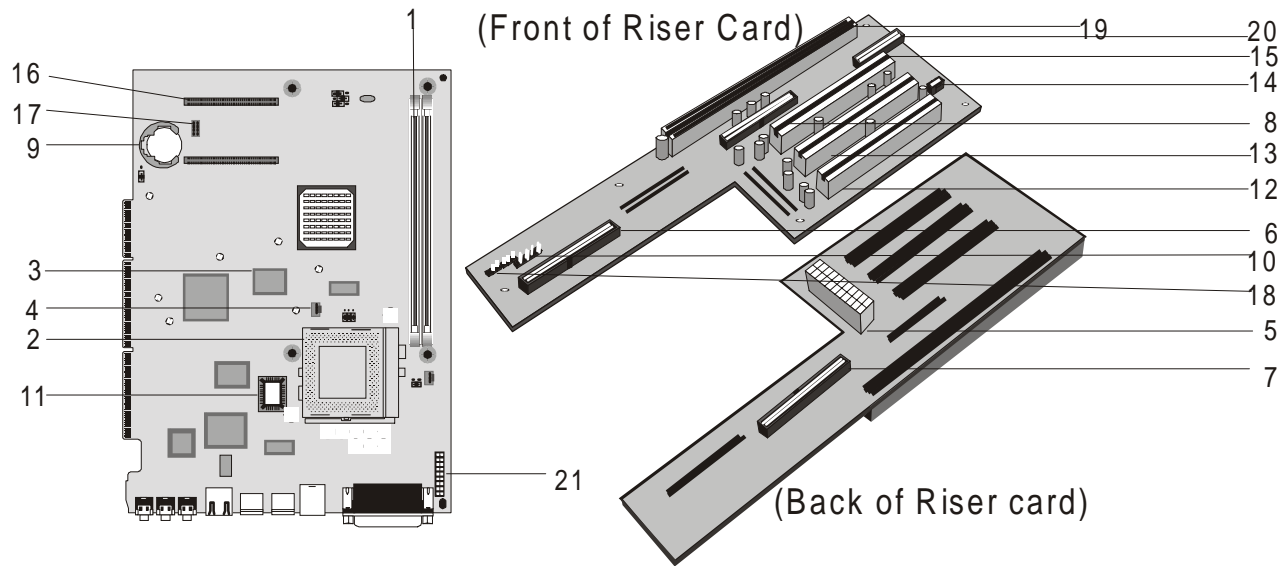
The system board, sometimes called the planar or motherboard, is the main circuit board in the system unit. It supports a variety of devices and provides other basic computer functions that are preinstalled or that you can install later. The system board shown on the previous page has the following parts:

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 (U4).**

3 **Second-level cache (U8, U9) (Only U8 populated).**

4 **CPU fan power connector (J1).**

5 **Power supply connecter (J106).**

6 **Primary IDE connector (J101).** Holds signal cables that attach to IDE channel 1.

7 **Secondary IDE connector(J104) (CD-ROM).** Holds signal cables that attach to IDE channel 2.

8 **Diskette drive connector (J102).**

9 **Battery (BT1).** System battery.

10 **HDD LEP, Power LED and power switch connector (JP9).**

11 **Flash ROM BIOS (U1).**

12 **PCI adapter card connector (J111)(PCI SLOT1).** This is the first PCI adapter card connector.

13 **PCI adapter card connector(J112) (PCI SLOT2).** This is the second PCI adapter card connector.

14 **PCI adapter card connector(J110) (PCI SLOT3).** This is the third adapter card connector.

15 **CD-ROM signal connector.**

16 **Video RAM expansion card connector.**

17 **Digital TFT Daugthter card connector (JP7, JP8, J15)**

18 **Digital TFT Cable Connector (J16)**

19 **Planar Connector (J100)**

20 **Game port connector (J103)**

21 **DFP cable connector (J16)**

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.
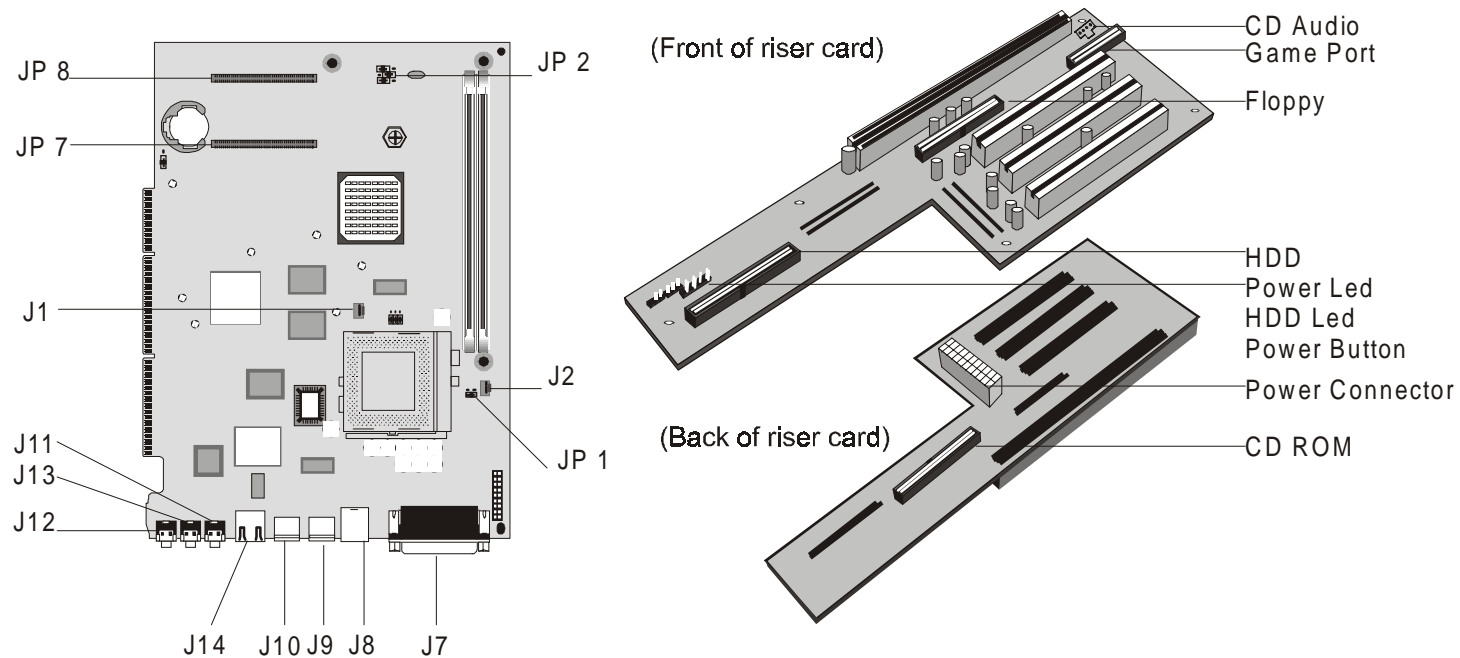
Card connector and jumper information

Identifying adapter card connectors

You can install 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
PCI SLOT1	Can hold a short(175 mm) PCI adapter card.
PCI SLOT2	Can hold a PCI adapter card measuring 165 mm in length (or less).
PCI SLOT3	Can hold a PCI adapter card measuring 236 mm in length (or less).

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.
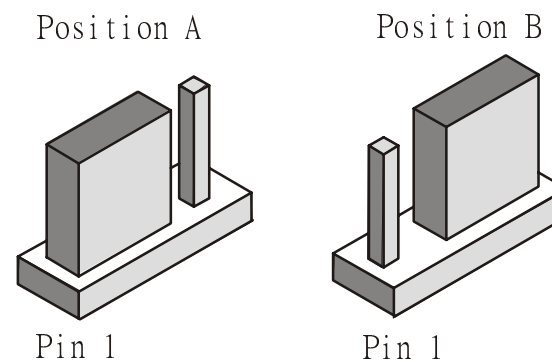
Upgrading the system memory

Your system board has two system memory module sockets: DIMM 0, and DIMM 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 0.

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

DIMM Bank 0

DIMM Bank 1
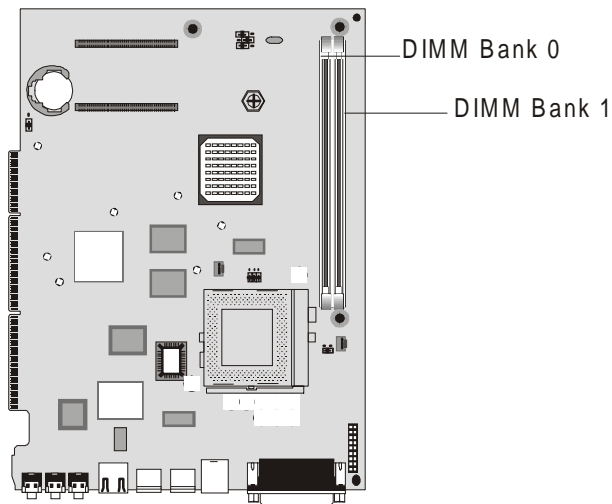
Installing memory modules

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.
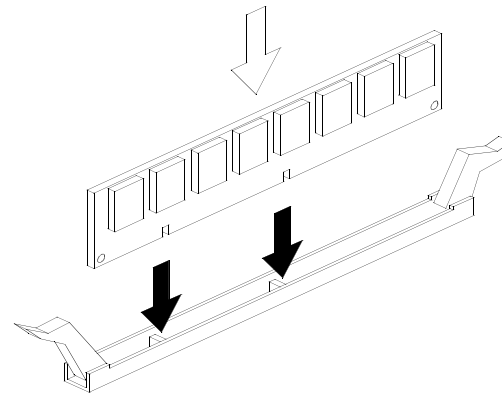
Removing memory modules

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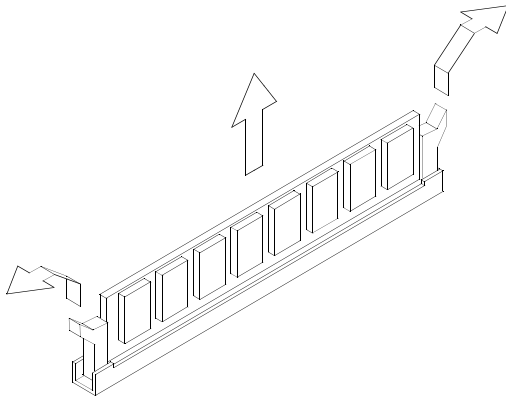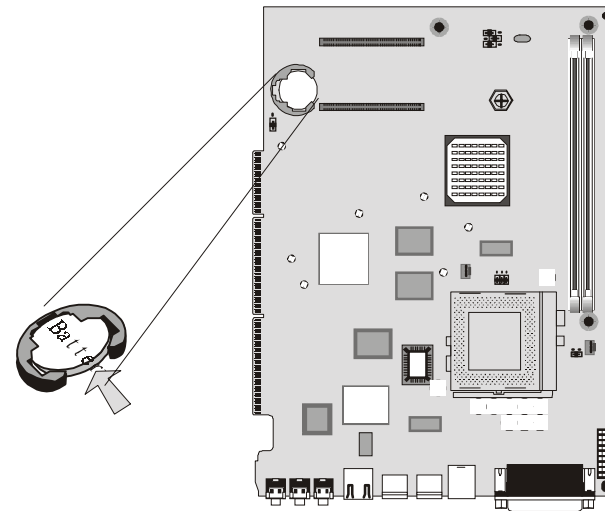

Verifying the system memory

To view the system memory settings in Setup, select **"System Summary"** from the Setup main menu.

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 **"Sandard 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?

Power button

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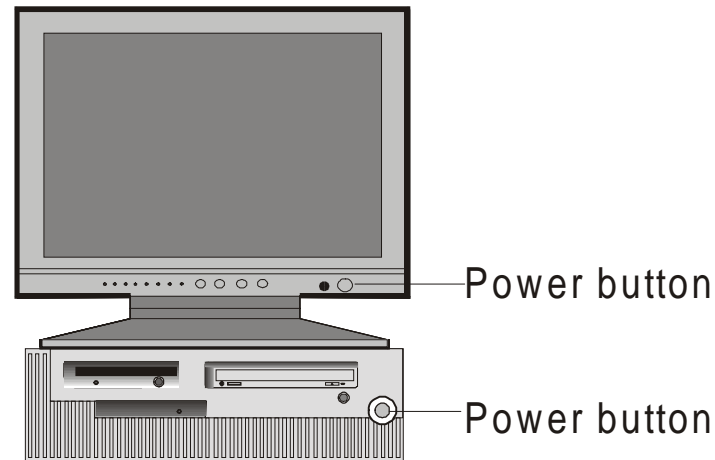
Note: The locations of the power indicator lights may be slightly different from those shown in these pictures.

Yes	Power is reaching the system unit and monitor. Go to Step 2.
No	a. Press the power button on the system unit and monitor to make sure they are turned on. 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 *Setup poster* shows how the cables and cords should be connected. c. Make sure the electrical outlets you are using are not controlled by a wall or dimmer switch. 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. 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?

Yes, once	The system unit has passed the power-on self test (POST). Go to Step 3.
Yes, more than once	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).
No	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?
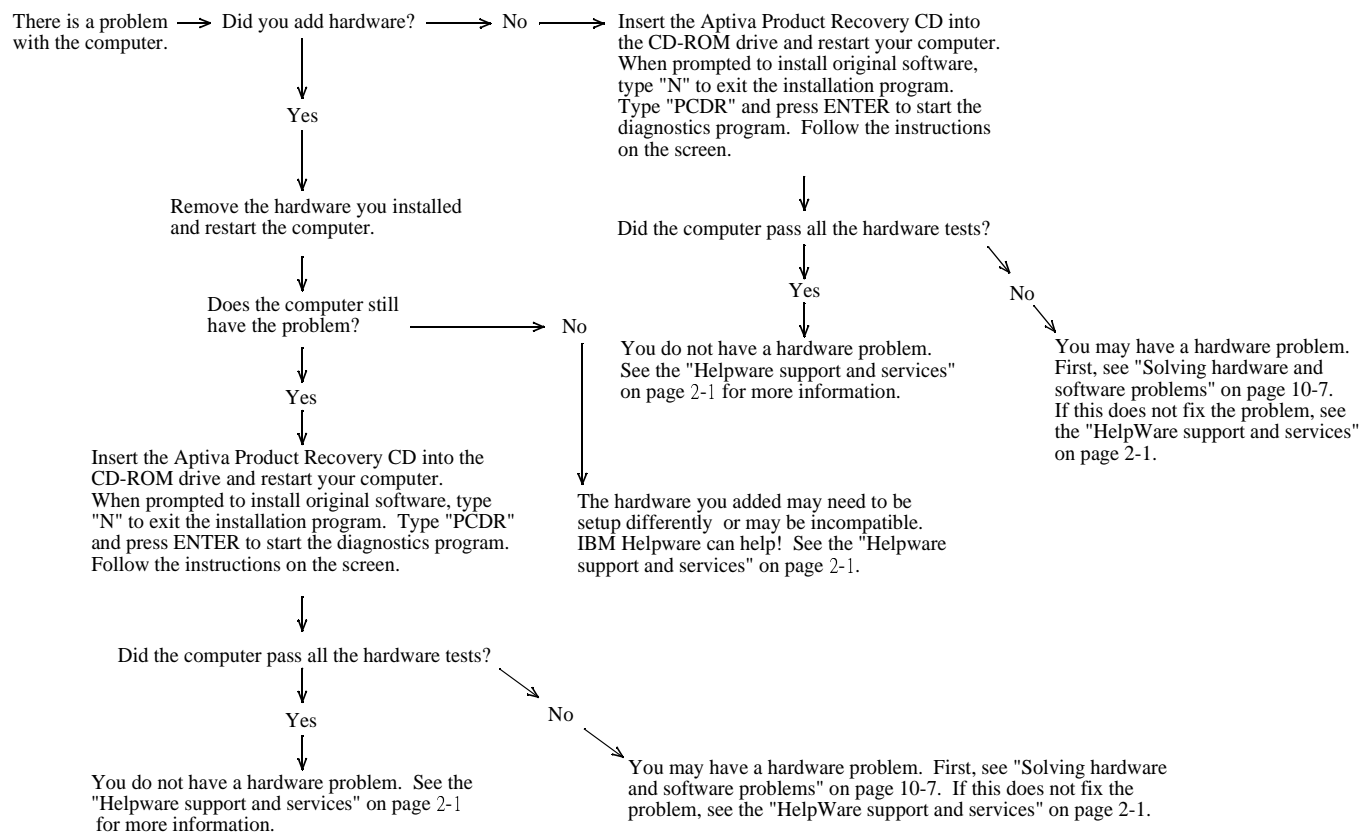
| Yes | There may be a problem with the system unit if: |

- 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).
  1. The monitor you attached may not be an SVGA monitor or 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. If using a VGA monitor, select 640 x 480 pixels in the Screen area and 16 colors in the palette.
     i. Restart the computer. Your computer may take a little longer than usual to restart.
  2. If the monitor you attached is a VGA monitor and not an SVGA monitor (older monitors may be VGA), detach the VGA monitor and attach an SVGA monitor. Using an SVGA monitor allows your computer system to take full advantage of Windows video function.
     a.
     b. (Steps continued on the next page.)

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

- The colors displayed are wrong. Make sure the monitor cable is correctly and securely connected to the system unit. Your *Setup Poster* 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.
- Nothing happens when you use the mouse or keyboard.

  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:

  The mouse port has this symbol next to it:

  b. Turn the system unit off, and then turn it on again.

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

No

- There may be a problem with the monitor.

  a. Make sure your monitor cables are correctly and securely connected. Your *Setup Poster* shows how the cables should be connected.

  b. Adjust the brightness and contrast controls. For more information, refer to the documentation that came with your monitor.
- There may be a problem with the battery on your system board. See "Replacing the system battery" on page 9-7 for instructions on how to replace the battery.

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

Quick problem solving chart

There is a problem with the computer. → Did you add hardware? → No → Insert the Aptiva Product Recovery CD into the CD-ROM drive and restart your computer. When prompted to install original software, type "N" to exit the installation program. Type "PCDR" and press ENTER to start the diagnostics program. Follow the instructions on the screen.

Yes ↓

Remove the hardware you installed and restart the computer.

Did the computer pass all the hardware tests?

Does the computer still have the problem? → No

Yes ↓   Yes ↓   No ↓

You do not have a hardware problem. See the "Helpware support and services" on page 2-1 for more information.

You may have a hardware problem. First, see "Solving hardware and software problems" on page 10-7. If this does not fix the problem, see the "HelpWare support and services" on page 2-1.

Insert the Aptiva Product Recovery CD into the CD-ROM drive and restart your computer. When prompted to install original software, type "N" to exit the installation program. Type "PCDR" and press ENTER to start the diagnostics program. Follow the instructions on the screen.

The hardware you added may need to be setup differently or may be incompatible. IBM Helpware can help! See the "Helpware support and services" on page 2-1.

Did the computer pass all the hardware tests?

Yes ↓   No

You do not have a hardware problem. See the "Helpware support and services" on page 2-1 for more information.

You may have a hardware problem. First, see "Solving hardware and software problems" on page 10-7. If this does not fix the problem, see the "HelpWare support and services" on page 2-1.

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	1. If you have enabled the Standby feature, move the mouse to exit Standby. 2. Make sure that the system unit and monitor power cords are securely plugged into electrical outlets. 3. Make sure that the cables are correctly and securely connected to the system unit. 4. Check for a blown fuse, tripped circuit breaker, or power failure. 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. 6. If you have added hardware inside the system unit, make sure the power cable connectors are securely attached.
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	1. Make sure you are typing the correct password. 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. The keyboard port has this symbol next to it: ▦.
Can't read information on diskette or CD	1. Make sure you are using the correct type of diskette. Make sure the diskette is formatted correctly. 2. Make sure the diskette or CD is inserted into the drive correctly. 3. Make sure the CD is clean and not scratched. 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. 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.
Audio CD does not play when inserted into CD-ROM drive	Make sure you have enabled AutoPlay. To enable AutoPlay: 1. Click on **Start**. 2. Select **Settings** and click on **Control Panel**. 3. Double click on the **System** icon. 4. Click on the **Device Manager** tab. 5. Double click on **CD-ROM** and select the listed CD-ROM option. 6. Click on the **Settings** tab. 7. Under **Options**, click on **Auto insert notification** (a check appears in the box). 8. Click on **OK**.
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 write to diskette	1. Make sure you are using the correct type of diskette. Make sure that the diskette is correctly formatted. 2. Make sure the diskette is not write-protected. 3. Make sure you are sending information to the correct drive. 4. Make sure there is space on the diskette for the information. (Try using a blank, formatted diskette.) 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. 6. Make sure that the Diskette Drive parameter is enabled in Setup under Advanced Options, Security Options.
Can't format diskette	1. Make sure the diskette is not write-protected. 2. Make sure you are using the correct type of diskette. 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. 4. Make sure **Diskette Drive** is not disabled in the BIOS STANDARD CMOS Menu .
Keyboard doesn't work or only some keys work	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: 2. Move your fingers across the keys. Make sure no keys are stuck. 3. If you have a protector over your keyboard, make sure that it allows typing. Some do not. 4. Turn the system unit off, wait 10 seconds, and then turn the system unit on again.

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:

Mouse does not work	1. Move the mouse onto a mouse pad and try using it.
	2. Make sure you are using a screen that allows the use of a mouse. Some screens do not.
	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.
	
	The mouse port has this symbol next to it to help you:
	
	4. Clean the mouse.
	   a. Turn the computer off.
	   b. Disconnect the mouse cable from the system unit.
	   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.
	   d. Using a damp cloth, wipe the outside of the mouse and the retainer. Be sure to wipe the rollers inside the mouse.
	   e. Insert the ball and retainer. Lock the retainer by turning it clockwise.
	   f. Reconnect the mouse cable to the system unit.
	   g. Turn on the computer.
	8. Turn the system unit off, wait 10 seconds, and then turn the system unit on again.

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:
Modem/communications errors	1. Make sure the telephone cord is securely connected. Your *Setup Poster* shows how the cord should be connected. 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. 3. Make sure your modem cord is connected to an analog telephone line. For additional help, see "Setting up communications" on page 4-8. 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. 5. Make sure no one is using the telephone while you are communicating with another computer. 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. 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 8-3.
When the computer is turned on, the message "Insert a system diskette and press Enter to reboot" appears	1. Choose BIOS Features Setup from the Setup main menu, and make sure that the Boot Sequence is set correctly. 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 8-5. 3. Insert the Aptiva *Product Recovery and Diagnostics CD-ROM* 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.
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:
Printer error	1. Make sure the printer is turned on. 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. The printer port has this symbol next to it to help you: 3. Make sure the printer power cord is securely connected to an electrical outlet. 4. Make sure the printer is ready for printing. (If the Ready light is on, but not flashing, the printer is ready.) 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. 6. Make sure the paper and the cartridge containing the print material (ink, ribbon, or toner) are loaded correctly. 7. Turn the printer and system unit off, and wait 10 seconds. Now turn the printer on, and then the system unit. 8. Make sure the On board Parallel Mode option is set properly in the Integrated Peripherals menu in Setup. 9. Make sure the parallel port Operation Mode parameter is set to a mode that matches your printer. 10. For additional help, see the user's guide that came with the printer.
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 software problems

Table 2: Software porblems

If the problem is:	Here's what to do:
Computer doesn't go into standby or automatically power off when the set time has elapsed.	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. 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. 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. 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. 5. Close any open communications programs. Programs which are running may not allow the system to enter standby.
When the parameter Power Switch < 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.	See "Chapter 2: HelpWare support and services" on page 2-1 for information on obtaining service.
When the parameter Power Button Override < 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.	See "Chapter 2: HelpWare support and services" on page 2-1 for information on obtaining service.

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 2-5.

Table 3: Modem problems

If the problem is:	Here's what to do:
Modem does not respond to commands	1. Make sure the modem is not configured with a conflicting COM port and IRQ setting. 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. 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&F as your initialization string.
Modem dials but does not connect	1. Make sure the phone line is working properly. A noisy line will prevent proper modem operation. 2. Check for busy signal, ringback, or a remote answering system.

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	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. 2. Press the Enter key several times. The remote system may be waiting to receive your data before it begins. 3. Make sure the correct terminal emulation mode is used in the software. Refer to the information that came with the software.
You are not able to verify whether the correct terminal emulation mode is being used by your software	1. Make sure the Call Waiting feature is turned off. 2. Make sure the RTS/CTS hardware flow control is enabled (do not use XON/XOFF software flow control). 3. Make sure the data speed is not faster than your computer's capability.

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

Error codes	Error messages	Corrective actions
161	CMOS battery failed	1. Load the default setting in Setup and reboot the system.
162	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.
164	Memory size error	1. Determine if memory has been added or removed since the last boot.
201	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.
301	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.
662	Floppy disk fail (80)	1. Unable to reset floppy subsystem. Load the default Setup setting.
662	Floppy disk(s) fail (40)	1. Floppy Type dismatch. 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	1. Determine if the hard disk is defined correctly in BIOS Setup. 2. Check the hard disk drive cable/connection. 3. Check the hard disk drive.
1762	Primary master IDE has changed Primary slave IDE has changed Secondary master IDE has changed Secondary slave IDE has changed	1. Make sure the System Boot Drive parameter in the Startup Options of BIOS Setup is not set to (Drive A only). 2. Load the default settings in Setup. 3. Insert a system diskette into the diskette drive and reboot the system. 4. Ensure the diskette drive configuration setting in BIOS Setup is correct. 5. Check the power to the hard disk drive. 6. Check the Diskette Drive.
1780	Primary master hard disk fail	1. Load the default settings in Setup. 2. Check the IDE drive jumper. 3. Check the power to the IDE drive. 4. Check the IDE cable/connection. 5. Check the IDE drive.
1781	Primary slave hard disk fail	1. Load the default settings in Setup. 2. Check the IDE drive jumper. 3. Check the power to the IDE drive. 4. Check the IDE cable/connection. 5. Check the IDE drive.
1782	Secondary master hard disk fail	1. Load the default settings in Setup. 2. Check the IDE drive jumper. 3. Check the power to the IDE drive. 4. Check the IDE cable/connection. 5. Check the IDE drive.

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	1. Load the default settings in Setup. 2. Check the IDE drive jumper. 3. Check the power to the IDE drive. 4. Check the IDE cable/connection. 5. Check the IDE drive.
8602	PS/2 Mouse error OR no PS/2 mouse present	1. Determine if the mouse is connected properly and is defined correctly in BIOS Setup.

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. Insert the *Product Recovery and Diagnostics CD-ROM* into your CD-ROM drive.

3. Shut down the operating system and turn off your computer. Wait for the power light to turn off.

4. Turn on your computer.

5. When you see the Main Menu:

   a. Use the cursor movement keys to select Full Recovery or Custom Recovery.

   b. Follow the instructions on the screen and read the messages carefully until the recovery completes.

| Warning! | Full Recovery will format your hard drive. If you choose this option, all data on your hard drive will be erased. if you have data that is not backed up to diskette or another hard drive, exit from this program and make a backup of your data. |

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 C-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 B: Monitor terminology" on page C-1**

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

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 1: 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 2: Memory map

Address range	Description
0~640 KB (000000 ~ 09FFFF)	Main memory
640~768 KB (0A0000 ~ 0BFFFF)	VGA memory
768~816 KB (0C0000 ~ CBFFFF)	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 ~ 0FFFFF)	System BIOS memory
(100000 ~ Upper Limit)	Main memory
(Upper Limit ~ 4 GB)	PCI memory

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 3: System input/output addresses

Address range (hexadecimal)	Function
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 Tiime 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 3: System input/output addresses (Continued)

Address range (hexadecimal)	Function
378-37F	Parallel Printer Port 1
3F0-3F5	Floppy Disk Controller
3F6-3F6	Secondary EIDE
3F7-3F7	Primary EIDE
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 4: System interrupts

Interrupt request (IRQ)	Function
0	Timer
1	Keyboard
2	Cascade Interrupt Control
3	Serial Port
4	Serial Port
5	LAN
6	Diskette
7	Parallel port
8	Real Time Clock
9	ACPI SCI
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 5: DMA channel assignments

DMA channel	Assignment
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 6: 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 7: Connector functions

Connector	Function
J1	CPU FAN connector
J7(Lower Left)	VGA port
J7(Lower Right)	COM 1 connector
J7(Upper)	Printer Port Connector
J8	USB Connector
J9	PS/2 Mouse Connetor
J10	PS/2 Keyboard port
J11	Audio line-out
J12	Microphone-in port
J13	Audio line-in
J16	DFP connector
JP8	Daught card connector
CD Audio	CD-in connector
CD ROM	CD ROM connetor(Secondary IDE)
Floppy	Floppy connector

Table 7: Connector functions (Continued)

Connector	Function
Game port	Game port connector
HDD	HDD connector(Primary IDE)
Power connector	ATX power connector
SPK _L3	Internal Speaker connector (right)
SPK_R3	Internal Speaker connector (left)
Power Led	1-2 Power LED 5-6 HDD LED 7-8 Power button

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
A	Answers incoming call
A/	Repeats the last command given. Note: Do not precede by AT or follow by Enter
D	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
E0	Commands echo disabled
E1	Commands echo enabled
+++	Escape characters - switch from data mode to command mode
H0	Modem on-hook (hang-up)
H1	Modem off-hook (make busy)
I0	Firmware and device ID
I1	Checksum code

Table 1: AT commands (Continued)

Command	Function
I2	ROM test
I3	Firmware and device ID
L0	Low speaker volume
L1	Low speaker volume
L2	Medium speaker volume
L3	High speaker volume
M0	Speaker always off
M1	Speaker on until carrier detected
M2	Speaker always on
O0	Return to data mode
O1	Initiate an equalizer retrain and return to data mode
P	Pulse dial
Q0	Result codes enabled
Q1	Result codes disabled
Sr?	Read S register r, where r=0-95
Sr=n	Set S register r to value n (r=0-95; n=0-255)
T	Tone dial
V0	Numeric responses
V1	Text responses
X0	Hayes Smartmodem 300 compatible responses/blind dialing

Table 1: AT commands (Continued)

Command	Function
X1	Same as X0 plus all CONNECT responses/blind dialing
X2	Same as X1 plus dial tone detection
X3	Same as X1 plus busy signal detection/blind dialing
X4	All responses and dial tone and busy signal detection
Z	Reset and recall user profile

Detail for +MS Controls

Table 2: Detail for +MS Controls

+MS=<carrier>,<automode>,<min transmit rate>,<max transmit rate>,<min receive rate>,<max receive rate>
<carrier>= 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)
<automode>= 0 (for automode OFF) = 1 (for automode ON)
<min transmit rate> = 300 bps to 33600 bps <max transmit rate> = 300 bps to 33600 bps <min receive rate> = 300 bps to 33600 bps <max receive rate> = 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

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

V.42bis commands

Table 4: V.42bis commands

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

Digit code	Word code	Meaning
0	OK	Command was carried out without error
1	Connect	Connected at 300 bits per second (bps)
2	Ring	Ringing signal detected
3	No carrier	Carrier is lost or not heard
4	Error	Error in the command line
		Invalid command
		Command line exceeds buffer
		Invalid character format
6	No dial tone	No dial tone during the time-out period
7	Busy	The line being called is busy
8	No answer	The line being called did not answer within the time-out period
11	Connect xxxx	Connected at 2400 bps
24	Delayed	Dialing delayed
32	Blacklisted	Number is blacklisted
33	Fax	Fax connection
35	Data	Data connection
+F4	+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
S0	Auto-answer ring	0-255 /rings	0
S1	Ring counter	0-255 /rings	0
S2	Escape code character	0-255 /ASCII	43
S3	Carriage return character	0-127 /ASCII	13
S4	Line feed character	0-127 /ASCII	10
S5	Backspace character	0-32 /ASCII	8
S6	Dial tone wait time	2-255 /seconds	2

Table 6: S registers (Continued)

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

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

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