IBM

Aptiva

Handbook

First Edition (August 1996)

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Safety information

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.

FOR CONTINUED PROTECTION AGAINST THE RISK OF ELECTRICAL SHOCK:

- 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.*

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- HelpCenter
- HelpWare
- IBM
- Mwave
- Rapid Resume

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Microsoft, Windows, and the Windows 95 logo are trademarks or registered trademarks of Microsoft Corporation.

Hardware and software assistance

See “Chapter 8: Diagnosing and recovering from problems” on page 103 or the online help that came with your computer. If you need additional assistance, look in the *HelpWare* book for more information.

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 3

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

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 includes information for several Aptiva models. Your model may not have some of the hardware mentioned in this book.

How this book is organized

This book contains the following parts and chapters:

"Part 1: Learning about this book" on page 1

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

- "Chapter 1: Using this book" on page 3

  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: Controlling system settings" on page 9

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

- "Chapter 2: Getting started with your Aptiva computer" on page 11

  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 3: Understanding the Rapid Resume features” on page 23

  This chapter provides instructions for finding the Rapid Resume Manager on your Windows 95 desktop and describes each of the Rapid Resume features.

- “Chapter 4: Viewing and changing Aptiva configuration” on page 31

  This chapter provides instructions for using the Setup Utility, where you can view or change your system’s configuration. It also provides information to help you locate other configuration utilities.

“Part 3: Upgrading and replacing hardware” on page 53

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 5: Before you unplug and open the tower” on page 55

  This chapter contains information to help you plan and prepare to add or replace adapter cards, drives, and system board components in your tower. It contains instructions for planning hardware changes, preventing and preparing for possible resource conflicts, and removing the cover from the tower.

- “Chapter 6: Adding and replacing system board components” on page 63

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

- “Chapter 7: Adding and removing adapter cards and drives” on page 81

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

“Part 4: Troubleshooting” on page 101

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 8: Diagnosing and recovering from problems” on page 103

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

“Part 5: Technical reference” on page 143

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

- “Appendix A: Specification tables” on page 145

  This appendix contains specific memory, address, interrupt, channel, and port specifications.

- “Appendix B: Audio and video cards” on page 155

  This appendix contains descriptive information about sound, Mwave, and television cards.

- “Appendix C: Modem information” on page 157

  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.

This book also contains an index.

Presentation conventions used in this book

This book uses the following highlighting conventions to associate special meaning with text:

`Example`

Example font indicates text you should type at your keyboard.

Italics

Italics indicate a new technical term. A definition or explanation of the term follows its first use.

Titles of books and some other printed materials are also shown in italics.

Bold

Bold indicates the names of keys you should press on the keyboard or screen elements you should click on with the mouse.

Bold also emphasizes hardware labels, such as those used to identify jacks or jumpers.

This book uses the following character conventions to indicate how to press combinations of keys:

+

The plus sign (+) between two key names indicates that you should press the two keys simultaneously. Hold the first key down. While holding the first key down, press and release the second key. Then release the first key.

If the plus sign appears between each key name in a string of three key names, then press and release the third key while holding down the first two keys.

For instance, if you see an instruction to press Ctrl + Alt + Delete, then press and hold down the Ctrl and Alt keys. While you hold down these two keys, press and release the Delete key. After you release the Delete key, release the Ctrl and Alt keys.

Where to find more information

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

Read me first. This book contains instructions to help you unpack, set up, and start using your computer.

IBM Statement of Limited Warranty, IBM Program License Agreement, and Limited Warranty for Programs. This booklet contains information about the use of your computer and the software that came with it. It also has information about the terms and conditions of the limited warranty.

HelpWare. This book contains information about:

- Hardware service and software support for your computer
- Electronic support
- The 1-800-number (for hardware assistance) and IBM support services (for answers to questions about your new computer)

Be sure to read this information to take full advantage of all the IBM Aptiva Personal Computer offerings.

Aptiva Guide. Your computer comes with a program called the "Aptiva Guide." This interactive demonstration helps you learn about the features and programs that were installed on your computer at the factory. You can start and use some programs from the demonstration.

To start the Aptiva Guide demonstration, follow these steps:

1. Click on the Start button on your Windows 95 desktop.

2. Move your mouse pointer to the Programs menu and then to the AptivaWare menu.

3. Click on the Aptiva Guide option.

For more information about the Aptiva Guide, see the *Read me first* book.

Aptiva Helper. Your computer comes with a program called the "Aptiva Helper." This program helps you answer questions and solve problems. It contains information to help you register your computer, back up operating system and data files, run computer diagnostics, and obtain IBM support.

To start the Aptiva Helper, follow these steps:

1. Click on the Start button on your Windows 95 desktop.

2. Move your mouse pointer to the Aptiva Helper option and click on it.

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

From the Windows 95 desktop, you can search for specific help topics about your computer.

To start your computer's help system, follow these steps:

1. Click on the Start button on your Windows 95 desktop.

2. Move your mouse pointer to the Help option and click on it.

IBM Update Connector. Your computer comes with a tool to help you obtain updates to the software that came with your computer. This tool is called the "Update Connector." Using your connection to the Internet, the Update Connector examines your current software and then lets you automatically install appropriate updates.

To access the Update Connector, follow these steps:

1. Click on the Start button on your Windows 95 desktop.

2. Move your mouse pointer to the Programs menu and then to the AptivaWare menu.

3. Click on the IBM Update Connector option.

Controlling system settings Part 2

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

- "Chapter 2: Getting started with your Aptiva computer" on page 11

  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 3: Understanding the Rapid Resume features" on page 23

  This chapter provides instructions for finding the Rapid Resume Manager on your Windows 95 desktop and describes each of the Rapid Resume features.

- "Chapter 4: Viewing and changing Aptiva configuration" on page 31

  This chapter provides instructions for using the Setup Utility, where you can view or change your system's configuration. It also provides information to help you locate other configuration utilities.

Getting started with your Aptiva computer 2

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. As you begin to use your computer, though, you might want to make adjustments to your monitor and volume settings for optimal comfort and performance. You might also want to connect your computer to a printer or to other computer systems, such as the Internet.

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

- "Controlling monitor settings" on page 11
- "Controlling volume" on page 15
- "Getting ready to print" on page 17
- "Setting up communications" on page 18
- "Configuring your Aptiva computer for a connection to the Internet" on page 20

Controlling monitor settings

When you connected your monitor to your tower and turned on your computer for the first time, your computer automatically selected settings for your monitor. Depending on the monitor you have, you might want to change some of these settings for optimal performance. Using Windows 95, you can customize the refresh rate, screen resolution, number of colors, and the size of displayed characters.

If you have not done so already, follow the setup instructions in the *Read me first* book to connect the monitor to the tower. Refer to the documentation that came with your monitor for model-specific monitor information and configuration settings.

Getting the best performance from your monitor

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

- Place your monitor away from sources of magnetic interference, such as other monitors, unshielded speakers, and electric power lines. (If your computer came with speakers, or if your speakers are built into your monitor, your 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 they 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 the monitor you purchased has a power saver feature, such as 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, your monitor can work with some of the Rapid Resume features, such as Automatic Power Off and Standby. For information about these features, see "Chapter 3: Understanding the Rapid Resume features" on page 23.

Changing display settings

The first time you turn on your computer, it automatically selects common settings for your monitor. The IBM monitor sold for use with your Aptiva computer supports Data Display Channel (DDC). With DDC, your computer automatically selects the correct horizontal frequency and the best refresh rate your monitor can support.

The horizontal frequency is the number of lines drawn on the screen each second. This setting is changed automatically when the refresh rate is changed. The refresh rate determines how quickly the screen image is drawn on the screen. See "Changing refresh rate settings" on page 14 for instructions on changing this setting.

Customizing display properties

In Windows 95, 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. From the Windows 95 desktop, double-click on the My Computer icon.
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.

On the Settings page of the Display Properties window, you can set the following display properties:

- Color palette

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

- Screen display 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.

- Desktop display area

  Lets you specify the total viewable area. If you select a desktop display area that is larger than the screen display area, only a portion of the desktop appears on the monitor's display. To scroll a hidden area of the desktop into view, move the mouse pointer off the edge of the display in the direction of the area you want to view.

  Note: *Windows 95 may reset the desktop display area to the size of the screen when you restart the system or complete a Rapid Resume cycle.*

- 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.

The values you can choose for desktop display area (resolution) and colors depend on:

- Your monitor's horizontal frequency.
- The amount of video memory available on the computer's system board.

  To find out how much video memory your system uses, view the Video Information menu in the Setup Utility. For these instructions, see "Viewing video configuration" on page 35.

Changing refresh rate settings

The refresh rate determines how quickly the screen image is drawn on the screen. Since you purchased a monitor that supports DDC, this rate is automatically selected for optimal performance. If you need to manually select a monitor refresh rate, follow these steps:

1. See "Customizing display properties" on page 13 for instructions on viewing the Display Properties window.
2. From the Display Properties window, click on the Adjustment tab.
3. Click on Change Refresh Rate...
4. From the Change Refresh Rate window, click on the refresh rate you want your monitor to use.
5. Click Change, then click OK.

If you apply a setting that does not match the capabilities of your monitor, the image may become distorted. To clear an unsupported setting, click on the Cancel button. If you cannot read the screen, wait ten seconds. Ten seconds after you select an unsupported setting, the computer will return to the last supported setting.

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. Only choose as many colors as you need. A color setting of 256 typically provides the fastest performance.
- You can determine which settings are most comfortable to work with by selecting and trying each one.
- While your monitor resolution may allow you to change the font size, some programs do not support large fonts. Large fonts may cause words to appear cut off or pushed together.

Using the Windows Help function to select display properties

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

1. From the Windows 95 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.

   If you want to return to the Index list, click on the Help Topics button.

Controlling volume

Your computer may have volume controls in up to four different locations:

- On the monitor.
- In the Windows 95 multimedia accessory program for volume control. This program is the Speaker Mixer program.
- In the multimedia software that came with your system.
- On the front of the CD-ROM drive. (Your system may not have this volume control.) This volume control is used only to control headphone volume and has no effect on the speakers.

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

Adjusting the speaker volume

If your computer came with speakers that are part of your monitor, use the monitor volume controls to adjust the volume. Refer to the documentation that came with your monitor for instructions on adjusting the volume.

The speaker volume is also affected by the volume control setting in the multimedia software that came with your computer. For example, if you use the monitor

controls to turn up the speaker volume and 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.

You can also adjust the speaker volume using the Speaker Mixer volume control program provided with Windows 95. To start this program, follow these steps:

1. From the Windows 95 desktop, click on the Start button.
2. Move your mouse pointer to the Programs menu, then to the Accessories menu, and finally to the Multimedia menu.
3. Click on the Volume Control option.
4. In the Speaker Mixer window, use the Speaker Mixer volume control to adjust the speaker volume.

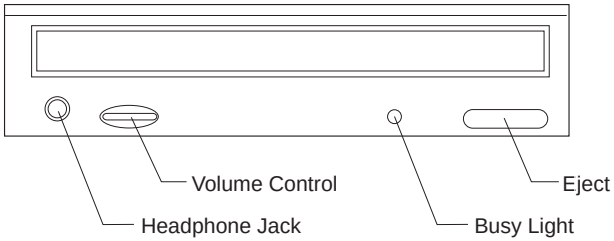
The Speaker Mixer volume control might also be available from the Windows 95 System Tray. If a volume control icon appears at the bottom right corner of your desktop, you can click on the icon to set your system volume.

Note: *If you set the Speaker Mixer volume control too low, or if you mute the Speaker Mixer volume control, you might not be able to get enough volume from your multimedia or audio applications or from the volume control on your speakers.*

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 Out jack on the sound card on the back of the tower.

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



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 volume control on the speaker.

- On all models of the IBM Aptiva PC, the headphones can be plugged into the Out jack on the sound card on the back of the tower. This is the same jack you plug your speakers into. You must disconnect your speakers to use this jack with your headphones.

  If you plug your headphones into the jack on the sound card, the headphones will pick up all sounds generated from your computer and any external devices connected to the computer, such as a MIDI 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 sound card, you must control the headphone volume through the volume control in the multimedia software on your computer. You cannot control the headphone volume from the volume control on the CD-ROM drive or from the volume control on the monitor.

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

Getting ready to print

After you have attached your printer to your computer as described in the *Read me first* book, 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 95 contains printer drivers for many popular printers. If you find that Windows 95 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 95 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 will automatically display a list of tasks related to the printer. Select “printer drivers, installing” and click on the Display button for instructions.

Note: *If you want to return to the Index list after reading the printer drivers entry, click on the Help Topics button.*

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 95. 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

Your IBM Aptiva computer has a modem already installed. Using this modem, your computer can communicate with other computers and telephones. If your computer has a fax/data modem, your computer can also communicate with fax machines.

Before your computer can use its modem, you must complete two procedures:

- Connect the modem to the telephone network
- Configure your computer’s communications software

Your communications software uses the Hayes AT command set to send and receive data over telephone lines. If you decide not to use a communications software program, you can still use your modem. See “Operating your modem” on page 157 for information about typing AT commands at your DOS prompt. If you need more information about modems, see “Appendix C: Modem information” on page 157.

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 and businesses. Connect the modem to an analog network only. If you are not sure about your telephone line, contact your local telephone company.

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

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 cannot 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 programs that let you use your computer as a telephone, a telephone answering machine, and a fax machine. To configure your computer to operate as one of these machines, follow the instructions provided with your communications software programs.

To configure your computer to use a dial-up connection over telephone lines, follow these steps:

1. From the Windows 95 desktop, double-click on the My Computer icon.
2. In the My Computer window, double-click on the Dial-Up Networking icon.
3. Follow the on-screen instructions. If you need assistance, press the F1 key to view the online help.

You can also use a Windows 95 program to configure a dial-up connection to The Microsoft Network. If you want to become a member of The Microsoft Network, follow these steps:

1. From the Windows 95 desktop, double-click on the icon for The Microsoft Network.

   If this icon does not appear on your desktop, open the Programs menu and click on the option for The Microsoft Network.

2. Follow the on-screen instructions. If you need assistance, press the F1 key to view the online help.

Configuring your Aptiva computer for a connection to the Internet

Before you can connect to the Internet, you must connect your computer to the telephone network. See the *Read me first* book for instructions on connecting cables. See "Connecting your modem to the telephone network" on page 19 for additional information.

You can connect to the Internet using the IBM Internet Connection, The Microsoft Network program, or another service provider. Your Aptiva computer comes with some software and all of the hardware required to connect to the Internet.

The IBM Internet Connection

Your Aptiva computer is already configured to use the IBM Internet Connection. To access the IBM Internet Connection, follow these steps:

1. From the Windows 95 desktop, double-click on the Information Superhighway icon.

2. In the Information Superhighway window, double-click on the Internet Registration icon.

3. Follow the on-screen instructions. If you need assistance, press the F1 key to view the online help.

The Internet Setup Wizard

Your Aptiva computer also 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.

To start the Internet Setup Wizard, follow these steps:

1. From the Windows 95 desktop, click on the Start button.

2. Move your mouse pointer to the Programs menu, then the Accessories menu, and finally the Internet Tools menu.

3. Click on the Internet Setup Wizard option.

   The wizard lists the information you need to collect for your connection and then takes you through the steps required to connect. Follow the on-screen instructions. If you need assistance, press the F1 key to view the online help.

Note: *You can also set up your connection to The Microsoft Network using the instructions in "Configuring your communications software" on page 19.*

Understanding the Rapid Resume features 3

The IBM Aptiva Personal Computer comes with a set of energy-saving features, called the Rapid Resume features. Using the Rapid Resume features, your computer can perform certain tasks unattended or in less time. For example, you can set up your computer to automatically turn on, run a program, and turn back off again. You can also reduce the amount of time required to start your computer.

You can view or change the current settings for the Rapid Resume features in two locations. On your Windows 95 desktop, you can open the Rapid Resume Manager. In the Setup Utility, you can open a menu for Rapid Resume settings.

In the Rapid Resume Manager, you can work with the basic Rapid Resume features. See the following sections for descriptions of these features:

- "Rapid Resume" on page 24
- "Automatic Power Off" on page 25
- "Standby" on page 26
- "Snapshot" on page 26
- "Scheduler" on page 27
- "Automatic Power On" on page 27
- "Wake Up on Ring" on page 28
- "Ring Indicator" on page 28

In the Setup Utility, you can work with all the features that are available in the Rapid Resume Manager except the Scheduler. In addition, you can work with the following Rapid Resume options:

- APM BIOS mode
- Initialize adapter cards
- Halt CPU when idle
- Blink power light
- Check keyboard activity
- Check mouse activity
- Check disk drive 1 and 2 activity
- Check disk drive 3 and 4 activity
- Check disk drive 5 activity
- Check diskette drive activity
- Check serial port activity
- Check USB port activity
- Check parallel port activity
- On/off button mode

For general instructions on using the Setup Utility, see "Using the Setup Utility" on page 31. See "Changing Rapid Resume features configuration" on page 40 for descriptions of all of the Rapid Resume features that are available from the Setup Utility.

Starting the Rapid Resume Manager

To start the Rapid Resume Manager, follow these steps:

1. Double-click on the AptivaWare icon on your desktop.

2. When the AptivaWare window appears, double-click on the Rapid Resume Manager icon.

The Rapid Resume Manager window contains these four icons:

- Rapid Resume
- Standby
- Scheduler
- Wake Up on Ring

Click on any of these icons to view or change Rapid Resume features. Note that some of the Rapid Resume features work only when you have enabled other Rapid Resume features.

This book describes the Rapid Resume features and tells you how to find each of these features in the Rapid Resume Manager. For help with configuring Rapid Resume features, see the online instructions and help screens in each window.

To view an online tutorial about the Rapid Resume features, follow these steps:

1. In the Rapid Resume Manager window, double-click on the Rapid Resume icon.

2. When the Rapid Resume window opens, click on the Tutorial button to learn about the Rapid Resume features.

Rapid Resume features

In the Rapid Resume window, you can work with settings for these features:

- Rapid Resume
- Automatic Power Off

Rapid Resume

The Rapid Resume feature works like a bookmark for your desktop. It saves the state of your computer when you turn it off and returns to that state the next time you turn your computer on. Your software programs and any open data files appear just as you left them. This feature reduces the amount of time required for your computer to start up.

As part of a normal routine, each time you use your computer, your computer stores information about the programs you have running and any data you are

working on in those programs in working memory. Your computer can access this working memory very quickly, but it does not automatically keep the data when you turn your computer off. If you want to continue working where you left off the next time you turn on your computer, you must start your software programs again and reopen your data files. Any personal data you did not save to a file before you turned your computer off is lost. (Saved files are not lost.)

If you enable Rapid Resume before you turn off your computer, Rapid Resume stores the program information and unsaved personal data from the working memory area to a special file on your hard disk. (This is called *suspending*.) Then when you turn on your computer again, Rapid Resume uses this special file to restore your desktop. (This is called *resuming*.) Personal data you did not save to file before you turned off your computer is also restored.

Note: *It is always a good idea to save all personal data to a file periodically and before you turn your computer off.*

To enable (turn on) or disable (turn off) the Rapid Resume feature, follow these steps:

1. Double-click on the Rapid Resume icon in the Rapid Resume Manager window.

2. In the Rapid Resume window, follow the instructions on the screen. If you need help, press F1.

With the Rapid Resume feature enabled, you can save your desktop by selecting Suspend from the Start button on your desktop when you are ready to turn off your computer. Suspend saves your desktop and then turns off your computer. To specify whether the system on/off button saves your desktop before turning off the power, you must use the Setup Utility. See “On/off button mode” on page 45 for these instructions.

For more technical information about the Rapid Resume feature, refer to the README.TXT file located in the IBMTOOLS directory of your computer.

Automatic Power Off

The Automatic Power Off feature automatically turns off your computer when you have not used your computer for an amount of time you specify. If you have an energy saving monitor, this feature can also turn off your monitor.

In the Setup Utility, you can specify which devices your computer checks to determine whether you are using your computer. For these instructions, see “Rapid Resume advanced options” on page 43.

You can enable the Automatic Power Off feature only after you enable the Rapid Resume feature. Rapid Resume saves the state of your desktop when Automatic Power Off turns off your computer.

To enable or disable the Automatic Power Off feature, follow these steps:

1. Double-click on the Rapid Resume icon in the Rapid Resume Manager window.
2. In the Rapid Resume window, enable Rapid Resume.
3. Click on the Set Options button.
4. In the Rapid Resume Options window, follow the instructions on the screen. If you need help, press F1.

Standby features

In the Standby window, you can work with settings for these features:

- Standby
- Snapshot

Standby

The Standby feature puts your computer into a state of reduced power consumption (as if it were napping) when you have not used the computer for an amount of time you specify. If you have an energy saving monitor, then the monitor's display goes blank when the computer enters Standby.

In the Setup Utility, you can specify which devices your computer checks to determine whether you are using your computer. For these instructions, see "Rapid Resume advanced options" on page 43.

Once your computer enters Standby, you can use any of the checked devices to return to your desktop. For instance, unless you turn off checking for the mouse and the keyboard in the Setup Utility, you can press any key or move the mouse at any time to return to your desktop.

Note: *If you are using the Automatic Power Off feature, the time you set for Standby must be less than the time you set for Automatic Power Off. Otherwise, your computer will turn off before it can enter Standby.*

To enable or disable the Standby feature, follow these steps:

1. Double-click on the Standby icon in the Rapid Resume Manager window.
2. In the Standby window, follow the instructions on the screen. If you need help, press F1.

Snapshot

The Snapshot feature saves the state of your computer when it enters Standby. With this feature, if the power supply to your computer is interrupted while your computer is in Standby, your desktop is restored when power is returned.

To enable or disable the Snapshot feature, follow these steps:

1. Double-click on the Standby icon in the Rapid Resume Manager window.
2. In the Standby window, select the number of minutes before the computer enters Standby.
3. Click on the Snapshot option under the Options menu.

   You can enable the Snapshot feature only after you enable the Standby feature. If you need help, press F1.

Scheduler features

In the Scheduler window, you can work with settings for these features:

- Scheduler
- Automatic Power On

Scheduler

The Scheduler feature performs activities you specify at times you specify. If you use Scheduler with Rapid Resume, you can schedule activities to occur even when your computer is turned off. This feature can turn on your computer, run a program, and then turn off your computer. You can schedule activities to occur once, hourly, daily, during weekdays, and weekly.

To enable or disable the Scheduler feature, follow these steps:

1. Double-click on the Scheduler icon in the Rapid Resume Manager window.
2. In the Scheduler window, follow the instructions on the screen. If you need help, press F1.

Automatic Power On

The Automatic Power On feature turns on your computer at a time you specify. If you want to turn on your computer automatically without scheduling any other activity, you can use the Automatic Power On feature.

To enable or disable the Automatic Power On feature, follow these steps:

1. Double-click on the Scheduler icon in the Rapid Resume Manager window.
2. In the Scheduler window, click on the Automatic Power On button.
3. In the Automatic Power On window, follow the instructions on the screen. If you need help, press F1.

Wake Up on Ring features

In the Wake Up on Ring window, you can work with settings for these features:

- Wake Up on Ring
- Ring Indicator

To use these features, your computer must have an Mwave card, an internal modem that supports Wake Up on Ring, or an external modem connected to serial port A. The modem must be connected to the telephone line.

Wake Up on Ring

The Wake Up on Ring feature turns on your computer when the telephone rings. With this feature, you can receive phone calls, messages, faxes, and data at any time without leaving your computer on.

If you need to receive critical phone calls or faxes, you may want to leave your computer in Standby instead of suspending your computer or using Automatic Power Off. Some people might not stay on the line long enough for your computer to answer the call with Wake Up on Ring. In addition, when some fax machines attempt to send a fax, they hang up after a limited number of rings. Though many of the newer fax machines and fax computer programs will redial if your computer does not answer quickly enough the first time, you may not want to rely on that possibility.

Note: *With Wake Up on Ring, your computer may turn on automatically when you dial out on a rotary or pulse telephone. If this occurs, disable the Wake Up on Ring feature and use it only when you know you will have incoming fax communications.*

To enable or disable the Wake Up on Ring feature, follow these steps:

1. Double-click on the Wake Up on Ring icon in the Rapid Resume Manager window.
2. In the Wake Up on Ring window, follow the instructions on the screen. If you need help, press F1.

Ring Indicator

The Ring Indicator feature works with the Automatic Power Off feature. If both features are enabled, then the system power light flashes after your computer turns on to answer a telephone ring and then turns off again.

To enable or disable the Ring Indicator feature, follow these steps:

1. Double-click on the Wake Up on Ring icon in the Rapid Resume Manager window.
2. In the Wake Up on Ring window, enable the Wake Up on Ring feature.

3. Click on the Ring Indicator option under the Options menu.

   You can enable the Ring Indicator feature only after you enable the Wake Up on Ring feature. If you need help, press F1.

How Rapid Resume features affect your computer's operation

The following table describes the way your computer normally operates when each of the Rapid Resume features is enabled (turned on).

Table 1: Rapid Resume features activity

Activity:	Feature and explanation:
System and monitor are on, but nothing is displayed on the screen.	Feature: Standby This is a normal activity of the Standby feature. To exit Standby, use any of the devices your computer checks for activity. For information about these checked devices, see "Standby" on page 26.

Table 1: Rapid Resume features activity

Activity:	Feature and explanation:
Delay before mouse works.	Feature: Standby When your computer comes out of Standby, and the desktop reappears, it may take a few seconds for the mouse to become active.
Computer waits before turning off.	Feature: Rapid Resume It can take up to several seconds before Rapid Resume saves the desktop and turns off the computer.
Computer comes on when you haven't pushed the on/off button.	Feature: Scheduler or Automatic Power On This is a normal activity of the Scheduler and Automatic Power On features. You can schedule your computer to come on at a specific date and time.
Computer comes on when the phone rings.	Feature: Wake Up on Ring This is a normal activity of the Wake Up on Ring feature. You can set up your computer to turn itself on when the phone rings to receive data, a fax, or a voice message.

Table 1: Rapid Resume features activity

Activity:	Feature and explanation:
System power light is blinking while the system is on.	Feature: Blink power light setting in Standby This is a normal activity of the blink power light setting in the Standby feature. The blinking light indicates that your computer is in Standby. You can turn this setting on and off only in the Setup Utility. For information on the blink power light setting, see “Standby” on page 41.
System power light is blinking, but system is turned off.	Feature: Ring Indicator feature in Wake Up on Ring This is a normal activity of the Ring Indicator feature in Wake Up on Ring. The blinking light indicates that Wake Up on Ring turned on your computer to receive data, a fax, or a voice message.
Computer does not automatically go into Standby when AutoPlay is enabled. (In Windows 95, you can turn on AutoPlay for CDs. With AutoPlay enabled, audio CDs start to play automatically when you put them into the CD-ROM drive.)	Feature: Standby If AutoPlay is enabled, your computer will not enter Standby unless you disable hard drive and CD-ROM drive checking in the Setup Utility. For information about these Setup Utility options, see “Rapid Resume advanced options” on page 43.

Table 1: Rapid Resume features activity

Activity:	Feature and explanation:
Computer won’t start from diskette if Rapid Resume is enabled.	Feature: Rapid Resume After you turn on the computer, press Ctrl + Alt + Delete when you see the Rapid Resume screen. There may be a slight delay before the computer restarts. Note that using Ctrl + Alt + Delete will cause the loss of your saved desktop. If possible, first start your computer without the diskette and save any unsaved information. Then shut down your computer and restart in MS-DOS mode. From DOS, insert the diskette and press Ctrl + Alt + Delete.

Viewing and changing Aptiva configuration 4

Your IBM Aptiva Personal Computer comes from the factory configured for immediate use. You can view your computer's configuration settings using the Setup Utility and the Windows 95 Device Manager.

You can also use these configuration utilities to change some configuration settings. For instance, if you add or replace hardware inside your tower, you might need to verify or update specific settings.

This chapter contains the following sections to help you personalize or reconfigure your computer:

- "Using the Setup Utility" on page 31
- "Using other configuration utilities" on page 51

Using the Setup Utility

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

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

Of course, you can always use the Setup Utility just to view information about your system's hardware configuration. In general, the Setup Utility contains the following hardware and configuration information:

- Processor speed
- System, cache, and video memory
- Diskette, hard disk, and CD-ROM drives
- Serial and parallel ports
- Rapid Resume features
- PnP and ISA Legacy resource assignments

- Startup options
- Model information
- Date and time
- Security options

Some of the options in the Setup Utility are strictly informational, such as system and model information. Other options let you control how your computer operates. For example, you can use the Setup Utility to:

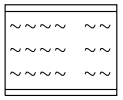
- Create or change a power-on password.
- Reduce energy consumption with Rapid Resume features, such as Rapid Resume, Standby, or Automatic Power Off.
- Enable or disable the system memory test.
- Enable or disable the virus detection provided with your BIOS. (You cannot use the Setup Utility to turn off the IBM AntiVirus program or any antivirus protection that is provided with additional products.)

Starting the Setup Utility

Sometimes, when you get an error message, your computer displays a message window with an error code and a description of the problem. When this occurs, you can press the Enter key to get the Setup Utility Main Menu. Otherwise, to access the Setup Utility, you must either start or restart your computer.

To start the Setup Utility when your computer is on, follow these steps:

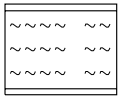
1. Save all open files and close all software programs.
2. Click on the Start button on your Windows 95 desktop.
3. Click on the Shut Down option.
4. From the Shut Down Windows window, restart the computer.
5. When the following symbol appears at the top right corner of the screen, press F1:



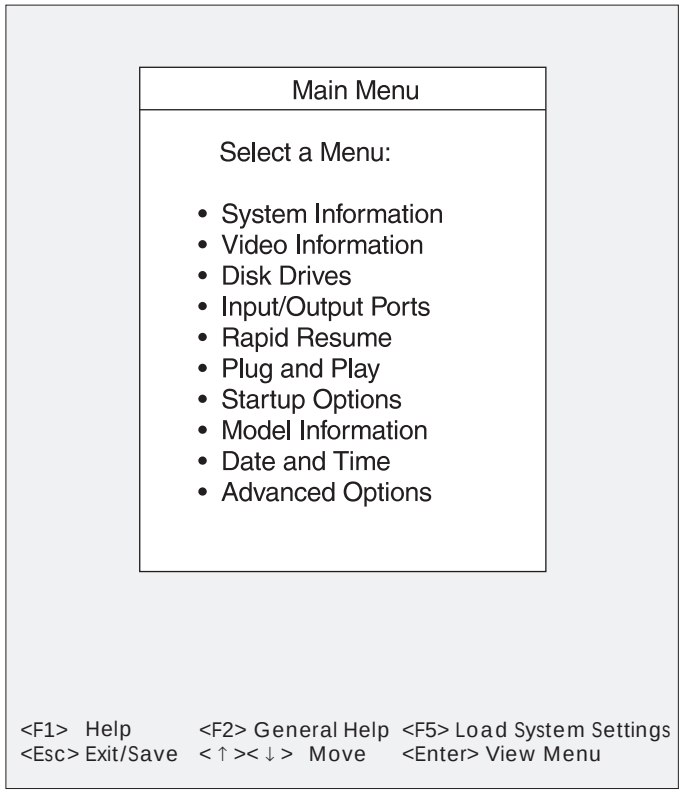
To start the Setup Utility when your computer is off, follow these steps:

1. Turn on your monitor.
2. Turn on your system.

3. When the following symbol appears at the top right corner of the screen, press F1:



The Setup Utility Main Menu appears:



Note: *The Main Menu you see on your computer may look slightly different from the menu shown here, but it will operate the same way.*

Working with the Setup Utility menus

The Setup Utility Main Menu lists options that identify system configuration topics. When you select one of these options, an additional menu appears.

To select and move through Setup Utility options, you must use the keyboard. To move through menus, press the down (↓) or up (↑) arrow key on the keyboard until the option you want is highlighted. To select a highlighted menu option, press the Enter key.

To move through menus, use the following keys:

Keys	Function
↑ ↓	Use these arrow keys to highlight an option on the menu. (Press the Enter key to choose the option.)
← →	Use these arrow keys to make a selection and change an option's setting. On some menus, you can use these keys to move from one field to another.
+	Use this key on some menus to increase the numerical value of a setting.
–	Use this key (the minus or hyphen key) on some menus to decrease the numerical value of a setting.

Keys	Function
F1	Press this key if you want help for a selected menu option.
F2	Press this key if you want general information on using the Setup Utility.
F5	Press this key if you want to return the Setup Utility settings to the factory defaults (the original settings that were installed at the factory).
Esc	After viewing or making changes to the settings on a menu, press this key to exit the menu.
Enter	Press this key to choose a highlighted option from a menu.

Note: *Not all of these keys are available on every menu. The keys that are available on each menu are displayed at the bottom of the menu.*

Changing and restoring settings

In Setup Utility menus, the configuration information you can change is enclosed in brackets like these: [ ]. You cannot change information that is not surrounded by brackets.

When you make a change, the ▶ symbol or an asterisk (*) appears next to the changed option. If you return the changed option to its original setting, the symbol disappears.

When you complete your changes or finish viewing information, return to the Main Menu. From this location, you can exit the Setup Utility and save your changes or exit without saving your changes.

To exit the Setup Utility, follow these steps:

1. From the Main Menu, press the Esc key.
2. The Exit Setup Utility menu appears. If you have made changes in the Setup Utility, it will contain an option for saving your changes.
   - If you would like to save your changes, highlight the option to save your changes and exit the Setup Utility, then press Enter.
   - If you do not want to save your changes, highlight the option to exit the Setup Utility without saving, then press Enter.

Restoring factory settings

When you purchase an Aptiva computer, it is already configured for use. The Setup Utility stores these original configuration settings, called *factory settings*, so that you can return to the original configuration at any time. If you have made changes in the Setup Utility and you would like to restore the factory settings, follow these steps:

1. From the Main Menu, press the F5 key.

   The Load System Settings menu appears.
2. Highlight the option to reload the factory settings, then press Enter.
3. Exit from the Setup Utility and save your changes.

Viewing system information

From the Setup Utility Main Menu, select the System Information option to view information about the hardware installed on your computer. You cannot use this menu to change settings. The Setup Utility automatically updates this menu when you:

- Add or change hardware on your computer
- Make changes to other menus in the Setup Utility and save those changes

The System Information menu contains information about the processor, memory, drives, and ports installed in your system. This menu also shows if the mouse is installed.

Viewing video configuration

From the Setup Utility Main Menu, select the Video Information option to view video configuration settings. The Video Information menu appears. This menu contains information-only options.

Video controller

This option displays the name of the video controller installed on your system.

Video memory

This option displays the amount of video memory installed on your system board. You may be able to install additional video memory if your system board came with empty video memory sockets. The maximum video memory you can have installed on your system board is 2 MB.

Changing disk drive configuration

If you install a new CD-ROM, hard disk, or diskette drive, you should enter the Setup Utility to identify or verify the type of drive you installed.

From the Setup Utility Main Menu, select the Disk Drives option to view or change disk drive configuration settings. The Disk Drives menu appears. It shows the size of the drives installed in your computer and indicates what additional drives can be installed.

Diskette drive (A: or B:)

These options display the size and storage capacity of the currently installed diskette drive or drives. Empty drive bays are indicated with a “Not installed” setting.

Your Aptiva computer comes with a diskette drive A: installed in the media console. If you add a diskette drive to the tower, you must enter the Setup Utility to select the correct drive type in the Diskette Drive B: option.

System board diskette controller

This option lets you enable or disable the diskette controller on your system board. If you install a diskette drive B: in your tower, this option is automatically enabled.

If a diskette drive is not installed in your tower and you install a tape drive, you need to enable this option. Enable this option after you have connected the tape drive's signal cable to the diskette connector on the system board and turned your computer back on.

Hard disk drive and CD-ROM drive

These options display information about the CD-ROM drive in your media console and the hard disk and CD-ROM drives that either are already installed or can be installed in your tower. You can have a maximum of five IDE drives installed.

A drive's connection to the system board and its setting as a master or slave device determines how the Setup Utility identifies the drive. The drives are identified as follows:

- *Hard Disk Drive 1* is attached to Local Bus connector 1 on the system board and set as the master device. This is the hard disk that comes preinstalled with your computer.
- *Hard Disk Drive 2* (if installed) is attached to Local Bus connector 1 on the system board and set as the slave device.
- *Hard Disk Drive 3* (if installed) is attached to Local Bus connector 2 on the system board and set as the master device.
- *Hard Disk Drive 4* (if installed) is attached to Local Bus connector 2 on the system board and set as the slave device.
- *CD-ROM Drive 5* is attached to the media console connector on the system board through the media console interface card. This is the CD-ROM drive that comes preinstalled with your computer.

To see if a drive is installed, highlight the option for that drive and press Enter. The screen for that drive appears. This screen can have all or some of the following options:

- Size
- Local bus IDE mode
- Read prefetch
- Disk BIOS translation
- IDE controller address

Size

If your computer does not have a drive connected at this location, this option is the only option in the menu and the setting is "Not installed."

If a hard disk drive is installed at this location, this option displays the size of the drive. If a CD-ROM drive is installed at this location, the setting is "Installed."

Local bus IDE mode

If a drive is installed at this location, this option lets you set the speed (performance) at which the drive will transfer data. To get the best disk performance, run a new IDE drive (such as a hard disk or CD-ROM drive) in High Performance mode.

If you install an older hard disk drive, it may not work properly in High Performance mode. For an older hard disk, select Compatible mode.

Read prefetch

If a hard disk drive is installed at this location and if the Local Bus IDE Mode setting is High Performance, you can enable this option for maximum hard disk performance. This option is not available for CD-ROM drives.

Note: *Some operating systems, such as Windows NT and OS/2, may require this option to be disabled.*

Disk BIOS translation

With most operating systems, this option lets your computer use IDE hard disks larger than 528 MB.

You can choose to have a hard disk use Logical Block Addressing (LBA) format or Cylinder/Head/Sector (CHS) format translation. You can also disable translation.

If you purchase a new hard disk and it supports LBA, you should select the LBA format for that disk. You should not select the LBA format option if the hard disk you are using is formatted in CHS. Do not disable this option unless you install an older hard disk that is larger than 528 MB and you have problems booting or reading files from it.

IDE controller address

This option lets you view or change the address used by the media console controller. If you add an adapter card to your tower, you may need to change this address to release resources needed by the adapter card.

This option is available only for the CD-ROM drive in the media console. The Setup Utility identifies this drive as CD-ROM drive 5.

Changing input/output port configuration

From the Setup Utility Main Menu, select the Input/Output Ports option to view or change port configuration settings. The Input/Output Ports menu appears. This menu lets you configure serial and parallel ports. It also displays whether a mouse is installed and lets you configure specific keyboard settings.

Serial port A

This option displays the current address for the serial port on your system board. Your computer comes with one serial port.

If you install an adapter card with a serial port, an error message will notify you if you have an address conflict among the serial ports. Use this menu to make sure that each serial port has a different address. If you change serial port addresses in this menu, you might also need to make changes in all software that uses serial port A. For instructions on changing your software, see the documentation or online information that came with the software.

Universal serial bus port

This option lets you enable or disable the universal serial bus (USB) port on your system board. If you do not have a USB device plugged into this port, disable the port to release system resources. The Disabled setting releases I/O ports and interrupts so they can be assigned to other devices.

Parallel port

This option displays the current address for the parallel port on your system board. Your computer comes with one parallel port.

If you install an adapter card with a parallel port, an error message will notify you if you have an address conflict between the parallel ports. Use this menu to make sure that each parallel port has a different address. If you change parallel port addresses in this menu, you might also need to make changes in all software that uses the parallel port. For instructions on changing your software, see the documentation or online information that came with the software.

Parallel port mode

As long as the Parallel Port setting is not Disabled, this option lets you choose an operational mode for the parallel port.

You can choose either the Compatible mode or one of the extended modes (ECP, EPP, or PS/2 Bidirectional) for a parallel port. The parallel port extended modes will increase the efficiency of your parallel port; however, the extended modes use recent technology and are only supported by newer hardware, such as an Iomega Zip drive.

The available extended modes are:

- PS/2 Bidirectional

  This mode is used for data transfer to other PC systems and supported devices.

- ECP

  The Extended Capabilities Port mode (ECP) provides higher speed data transfers than the Compatible mode. It is used for high-speed printers and other devices.

- ECP and EPP 1.7

  This mode combines the capabilities of the Extended Capabilities Port (ECP) and Enhanced Parallel Port (EPP) modes. This mode is not compatible with the ECP and EPP 1.9 mode.

- ECP and EPP 1.9

  This mode combines the capabilities of the Extended Capabilities Port (ECP) and Enhanced Parallel Port (EPP) modes. This mode is not compatible with the ECP and EPP 1.7 mode.

If you change the mode of a parallel port on an adapter card, you might need to make changes to the port's adapter card and its software. See the documentation or online information that came with the adapter card.

Mouse

This option shows if a mouse is installed.

Keyboard NumLock state

This option displays whether the NumLock function on the keyboard turns on automatically each time you turn your computer on. You can change this setting to On or Off.

Keyboard speed

This option displays the speed at which your keyboard responds when you hold down a key. The Normal rate is 10 characters per second. The Fast rate is 30 characters per second.

If your keyboard speed is set for the Fast rate and you hold down one of the arrow keys, the cursor moves three times faster than it would if your keyboard speed were set for the Normal rate. You can select the speed that is most comfortable for you.

Changing Rapid Resume features configuration

The Rapid Resume features are a set of IBM energy-saving features that lets you set up your computer to perform certain tasks unattended. For information about these features and how to enable and disable them from your desktop, see “Chapter 3: Understanding the Rapid Resume features” on page 23.

The Setup Utility lets you configure additional settings you cannot configure from your Windows 95 desktop. From your desktop, you can enable and disable Rapid Resume features and specify how they work. In the Setup Utility, you can enable and disable some of the same features and configure specific hardware settings.

The changes you make in the Setup Utility appear in the Rapid Resume Manager windows on your desktop. The changes you make in the Rapid Resume Manager windows on your desktop also appear in the Setup Utility.

From the Setup Utility Main Menu, select the Rapid Resume option to view or change Rapid Resume features settings. The Rapid Resume menu appears.

APM BIOS mode

The Basic Input/Output System (BIOS) controls the basic hardware operations in your computer. The APM BIOS Mode option allows you to enable or disable communications between the BIOS and the operating system’s advanced power management (APM) driver.

You must have APM BIOS mode enabled to use Rapid Resume features. Disable this option only if you experience problems using older DOS games.

Rapid Resume

This option lets you enable or disable the Rapid Resume feature. With this feature, you can set up your computer to suspend, which saves your desktop when you turn off your computer. For more information about the Rapid Resume feature, see “Rapid Resume” on page 24.

Enable the Rapid Resume option to change the following options:

- Automatic Power Off
- Initialize Adapter Cards

Automatic Power Off

If the Rapid Resume option is enabled, you can use the Automatic Power Off feature to set up your computer to turn itself off when you leave it on but unused for a specified period of time. If you enable this feature, you can specify up to 90 minutes for the delay between the time you stop using your computer and the time it turns itself off. For more information about the Automatic Power Off feature, see “Automatic Power Off” on page 25.

For information about how you can define which devices your computer checks to determine whether you are using your computer, see “Rapid Resume advanced options” on page 43.

Initialize adapter cards

If the Rapid Resume option is enabled, you can use the Initialize Adapter Cards option to indicate whether your adapter cards will be restarted (initialized) when you turn on your computer. When adapter cards are initialized, the device drivers for the cards are reloaded.

This option might be required for adapter cards that do not support power management.

Standby

This option lets you enable or disable the Standby feature. With this feature, you can set up your computer to consume less power if you leave it on but unused for a specified period of time. If you enable this feature, you can specify up to 90 minutes for the delay between the time you stop using your computer and the time it enters Standby. For more information about the Standby feature, see “Standby” on page 26.

Note: *If you are using the Automatic Power Off feature, the time you set for Standby must be less than the time you set for Automatic Power Off. Otherwise, your computer will turn off before it enters Standby.*

For information about how you can define which devices your computer checks to determine whether you are using your computer, see “Rapid Resume advanced options” on page 43.

Enable the Standby option to change the following options:

- Snapshot
- Halt CPU When Idle
- Blink Power Light

Snapshot

If the Rapid Resume and Standby options are enabled, you can use the Snapshot option to save the state of your desktop when your computer enters Standby. For more information about the Snapshot feature, see “Snapshot” on page 26.

Halt CPU when idle

If the Standby option is enabled, you can use the Halt CPU When Idle option to stop the central processing unit (CPU) during Standby. This conserves power without affecting the operation of your computer.

Blink power light

If the Standby option is enabled, you can use the Blink Power Light option to specify whether you want the system power light to blink when your computer is in Standby.

Wake Up on Ring

This option lets you enable or disable the Wake Up on Ring feature. With this feature, you can set up your computer to turn itself on when the telephone rings. For more information about the Wake Up on Ring feature, see “Wake Up on Ring” on page 28.

Enable the Wake Up on Ring option to change the following option:

- Ring Indicator

To use this feature, you must have an Mwave card, an internal modem that supports Wake Up on Ring, or an external modem connected to serial port A. The modem must be connected to the telephone line.

Note: *With Wake Up on Ring, your computer may turn on automatically when you dial out on a rotary or pulse telephone. If this occurs, disable the Wake Up on Ring feature and use it only when you know you will have incoming fax communications.*

Ring Indicator

If the Wake Up on Ring option is enabled, you can use the Ring Indicator option to specify whether your system power light flashes after your computer turns itself on to answer a telephone ring and then turns itself off again. For more information about the Ring Indicator feature, see “Ring Indicator” on page 28.

Automatic Power On

This option lets you enable or disable the Automatic Power On feature. With this feature, you can schedule your computer to turn itself on at a specified date and time. For more information about the Automatic Power On feature, see “Automatic Power On” on page 27.

Enable the Automatic Power On option to change the following options:

- Power On Date
- Power On Time

You can schedule your computer to turn itself on just once or on a daily basis.

Power on date

When you enable the Automatic Power On option, use the Power On Date option to specify the date on which you want your computer to turn itself on.

Power on time

When you enable the Automatic Power On option, use the Power On Time option to specify the time at which you want your computer to turn itself on.

Enter the date in the format shown on the screen. Enter the time in 24-hour format (hours and minutes). For example:

- 12 midnight is 00:00
- 12 noon is 12:00
- 1 p.m. is 13:00

Rapid Resume advanced options

Select this option to open the Rapid Resume Advanced Options menu. In this menu, you can define which devices your computer checks to determine whether you are using your computer. You can also control how the system on/off button works with the Rapid Resume feature.

Check keyboard activity

Use this option to specify whether your computer checks the keyboard to determine whether you are using your computer.

If the Standby feature is enabled and you enable this setting, your computer will not enter Standby while you are using the keyboard. You can also return to your desktop from Standby if you press a key on the keyboard.

If the Automatic Power Off feature is enabled and you enable this setting, your computer will not turn itself off while you are using the keyboard.

Check mouse activity

Use this option to specify whether your computer checks the mouse to determine whether you are using your computer.

If the Standby feature is enabled and you enable this setting, your computer will not enter Standby while you are using the mouse. You can also return to your desktop from Standby if you move the mouse.

If the Automatic Power Off feature is enabled and you enable this setting, your computer will not turn itself off while you are using the mouse.

Check drive 1 and 2 activity

Use this option to specify whether your computer checks drive 1 and drive 2 to determine whether you are using your computer.

If the Standby feature is enabled and you enable this setting, your computer will not enter Standby while drive 1 or drive 2 is active. If your computer enters Standby, it will return to the desktop when drive 1 or drive 2 becomes active.

If the Automatic Power Off feature is enabled and you enable this setting, your computer will not turn itself off while drive 1 or drive 2 is active.

Check drive 3 and 4 activity

Use this option to specify whether your computer checks drive 3 and drive 4 to determine whether you are using your computer.

If the Standby feature is enabled and you enable this setting, your computer will not enter Standby while drive 3 or drive 4 is active. If your computer enters Standby, it will return to the desktop when drive 3 or drive 4 becomes active.

If the Automatic Power Off feature is enabled and you enable this setting, your computer will not turn itself off while drive 3 or drive 4 is active.

Check drive 5 activity

Use this option to specify whether your computer checks drive 5 to determine whether you are using your computer.

If the Standby feature is enabled and you enable this setting, your computer will not enter Standby while drive 5 is active. If your computer enters Standby, it will return to the desktop when drive 5 becomes active.

If the Automatic Power Off feature is enabled and you enable this setting, your computer will not turn itself off while drive 5 is active.

Check diskette drive activity

Use this option to specify whether your computer checks your diskette drive to determine whether you are using your computer.

If the Standby feature is enabled and you enable this setting, your computer will not enter Standby while the diskette drive is active. If your computer enters Standby, it will return to the desktop when the diskette drive becomes active.

If the Automatic Power Off feature is enabled and you enable this setting, your computer will not turn itself off while the diskette drive is active.

Check serial port activity

Use this option to specify whether your computer monitors the serial port on the system board to determine whether you are using your computer.

If the Standby feature is enabled and you enable this setting, your computer will not enter Standby while the serial port is active. If your computer enters Standby, it will return to the desktop when the serial port becomes active.

If the Automatic Power Off feature is enabled and you enable this setting, your computer will not turn itself off while the serial port is active.

Check USB port activity

Use this option to specify whether your computer monitors the universal serial bus (USB) port on the system board to determine whether you are using your computer.

If the Standby feature is enabled and you enable this setting, your computer will not enter Standby while the USB port is active.

If the Automatic Power Off feature is enabled and you enable this setting, your computer will not turn itself off while the USB port is active.

Check parallel port activity

Use this option to specify whether your computer checks the parallel port to determine whether you are using your computer.

If the Standby feature is enabled and you enable this setting, your computer will not enter Standby while the parallel port is active. If your computer enters Standby, it will return to the desktop when the parallel port becomes active.

If the Automatic Power Off feature is enabled and you enable this setting, your computer will not turn itself off while the parallel port is active.

On/off button mode

Use this option to control whether the Rapid Resume feature works with the system on/off button.

If you select the Rapid Resume setting, then when you use the system on/off button to turn off your computer, your computer saves the state of your desktop and then turns your system off. The next time you turn your computer on, the desktop appears the way you left it.

If you select the Power Off setting, then when you use the system on/off button to turn off your computer, your computer turns off immediately and does not save the state of your desktop. You can still have Rapid Resume save your desktop, however, by selecting Suspend from the Start button on your desktop when you are ready to turn off your computer.

As with all Setup Utility settings, you must save your changes and exit the Setup Utility before the new settings can take effect. If you change the On/Off Button Mode setting from Power Off to Rapid Resume and then press the system on/off button before you save and exit from the Setup Utility, Rapid Resume will not be set to work with your system on/off button.

Changing adapter card device information

When you install a new Plug and Play (PnP) adapter card, the Basic Input/Output System (BIOS) can automatically detect it and configure your computer to use it. If you install a non-PnP or a non-Peripheral Component Interconnect (PCI) adapter card, the BIOS does not detect it. Instead, you must enter the Setup Utility to dedicate Industry Standard Architecture (ISA) Legacy resources for the card.

From the Setup Utility Main Menu, select the Plug and Play option to view or change adapter card configuration settings. The Plug and Play menu appears. This menu indicates how many PnP cards are installed. It also provides access to another menu for configuring non-PnP or non-PCI adapter cards.

Plug and Play cards detected

This option indicates the number of PnP adapter cards installed in your computer.

ISA Legacy resources

This option lets you allocate resources for non-PnP adapter cards, which are not automatically detected by your computer. You must identify the following Industry Standard Architecture (ISA) Legacy resources as dedicated to your new adapter card so the BIOS does not attempt to assign them to PnP cards:

- Memory Resources
- I/O Port Resources
- DMA Resources
- Interrupt Resources

Each of the options on the ISA Legacy Resources menu opens another menu.

Memory resources

Select this option to open the Memory Resources menu, where you can allocate system memory regions for the adapter card. This menu lists the hexadecimal addresses of the available memory regions. You allocate memory to an adapter card by selecting the Not Available setting for a particular hexadecimal address.

Be sure to read the documentation that came with your new adapter card. You may need to make changes to the card to accommodate the selections you make for Memory Resources. For example, you may have to move jumpers or switches on the adapter card, or make changes to the software that came with the adapter card.

I/O port resources

Select this option to open the I/O Port Resources menu, where you can allocate input/output ports for the adapter card. This menu lists the hexadecimal addresses of the available I/O ports. You allocate I/O Ports to an adapter card by selecting the Not Available setting for a particular hexadecimal address.

Be sure to read the documentation that came with your new adapter card. You may need to make changes to the card to accommodate the selections you make for I/O Port Resources. For example, you may have to move jumpers or switches on the adapter card, or make changes to the software that came with the adapter card.

DMA resources

Select this option to open the DMA Resources menu, where you can allocate direct memory access (DMA) channels for the adapter card. This menu lists the channel assignments for DMA. DMA allows I/O devices to transfer data to and from memory. You allocate DMA channels to an adapter card by selecting the Not Available setting for a particular channel.

Be sure to read the documentation that came with your new adapter card. You may need to make changes to the card to accommodate the selections you make for DMA Resources. For example, you may have to move jumpers or switches on the adapter card, or make changes to the software that came with the adapter card.

Interrupt resources

Select this option to open the Interrupt Resources menu, where you can allocate interrupt requests (IRQs) for the adapter card. This menu lists the system IRQs and their functions. You allocate IRQs to an adapter card by selecting the Not Available setting for a particular IRQ.

Be sure to read the documentation that came with your new adapter card. You may need to make changes to the card to accommodate the selections you make for Interrupt Resources. For example, you may have to move jumpers or switches on the adapter card, or make changes to software that uses the adapter card.

Configuring startup options

From the Setup Utility Main Menu, select the Startup Options option to view or change startup configuration settings. The Startup Options menu appears. This menu identifies the startup devices and provides options for enabling and disabling the system memory test and virus detection.

Startup devices (first - fourth)

When you turn your computer on, it searches for the operating system files. Your computer can search for these files on a hard disk, a CD-ROM, a diskette, an adapter card, or a network. The Startup Devices options let you specify the order in which the computer searches devices for the operating system files.

For example, if you select diskette drive A: as the First Startup Device, and Hard Disk 1 as the Second Startup Device, your computer will search for the operating system files on diskette drive A: first and hard disk 1 second.

Note: *Hard disk 1 is the hard disk that came preinstalled in your computer. For more information on drive designations, see "Changing disk drive configuration" on page 35.*

If you select a hard disk drive as your first startup device and your system becomes corrupted, your computer might not be able to access the CD-ROM drive. You might need to start the Setup Utility and designate the CD-ROM drive as the first startup device before you can use the *Product Recovery CD-ROM*. See "Recovering factory installed programs and files" on page 141 for recovery instructions.

System memory test

This option lets you enable or disable the system memory test, which is part of the *power-on self test (POST)*. The POST is a series of tests that check components of your computer for proper operation each time you turn your computer on. Disabling the system memory test saves time when you turn on your computer. Your operating system and programs become available sooner.

Virus detection

This option lets you specify whether you want the virus checker that comes with your computer's BIOS to check for viruses each time you turn on your computer.

When this virus detection is enabled, your computer checks the master boot record to see if the information there has changed since the last time you turned on the computer. If the information has changed, the BIOS displays a message that warns that your computer may have a virus.

Note: *This option does not have an effect on the IBM AntiVirus program or on additional virus checking programs you may have purchased. It also does not remove viruses from your computer.*

Viewing model information

From the Setup Utility Main Menu, select the Model Information option to view information about your computer model. You cannot change any information in this menu. The Setup Utility automatically updates this screen only if the Basic Input/Output System (BIOS) is upgraded.

The Model Information menu contains the following information:

- Model Number
- Serial Number
- BIOS Version
- BIOS Date

Setting the date and time

From the Setup Utility Main Menu, select the Date and Time option to view or change the system clock. The Date and Time menu appears.

If you change the system date, enter the date in the format shown on the screen. If you change the time, enter the time in 24-hour format (hours, minutes, seconds). For example:

- 12 midnight is 00:00:00
- 12 noon is 12:00:00
- 1 p.m. is 13:00:00

Configuring advanced options

From the Setup Utility Main Menu, select the Advanced Options option to view or change a variety of configuration settings. The Advanced Options menu appears, with the following options:

- Security Options
- Cache Options
- ROM Shadowing
- PCI Card Options
- Memory Timing

Each of these options opens an additional menu.

Security options

The Security Options menu lets you configure the following options:

- Power-on Password
- IDE Drive Access
- Diskette Drive Access
- Operate without Keyboard
- Operate without Diskette Drive(s)

Power-on password

Select this option to open the Power-on Password menu. In this menu, you can set up a password to restrict the use of your computer. You can also change or remove the password.

If you set up a power-on password, you must type this password each time your computer is turned on. If you do not type the correct password, you cannot use your computer.

Note: *The power-on password does not appear on the screen when you type it.*

The power-on password can be up to seven characters long (letters, numbers, or both). Once you create your password, be sure to write it down and put it in a secure place.

In addition, you can choose to display or not display a password prompt. If you turn on the prompt, your computer will ask you for your password before it starts the operating system. If you turn off the prompt, your computer starts the operating system and then locks the keyboard until you enter the password.

IDE drive access

This option lets you enable or disable access to the IDE drives attached to the system board and in the media console.

Diskette drive access

This option lets you enable or disable access to the diskette drive(s) attached to the system board and in the media console.

Operate without keyboard

This option lets you operate your computer with the keyboard unplugged. You can enable this option when you want to restrict access to your computer. For example, you might want the computer to be used only for viewing an ongoing demonstration or some other system activity.

With this option enabled, you also avoid a POST error when the keyboard is disconnected.

Operate without diskette drive(s)

This option lets you operate your computer with the diskette drive unplugged. You can enable this option when you want to restrict access to your computer. For example, you might not want others to boot your computer from diskette or to copy files from the hard drive.

With this option enabled, you also avoid a POST error when the diskette drive is disconnected.

Cache options

The Cache Options menu shows how much cache memory is installed on your computer and lets you enable or disable it.

Cache size

This option identifies how much cache memory is installed on your computer. You can install a maximum of 512 KB cache memory.

Cache memory is special buffer storage that holds frequently used instructions and data. It works faster than system memory.

Cache state

This option lets you specify whether your computer uses its cache memory. With cache memory enabled, your programs run faster. If you run programs that require slower speeds, such as older game programs, you can disable cache memory to slow down your computer.

Enable the Cache State option to change the following option:

- Cache System BIOS

Cache system BIOS

If the Cache State option is enabled, you can use the Cache System BIOS option to specify whether your computer runs the system BIOS region in cache memory. With this option enabled, your computer's performance improves.

You might need to disable this option when you are using a program that attempts to write to the BIOS. Some older virus checking programs may attempt to write to the BIOS.

ROM shadowing

The ROM Shadowing menu shows which system devices are using read-only memory (ROM) shadowing. With *ROM shadowing*, your computer stores data from the specified device in random access memory (RAM). Since your computer can access data in RAM faster than it can access data from ROM, programs run faster when ROM shadowing is enabled.

If you install an adapter card that has its own ROM, you can enable the ROM shadowing option for that card so the card will run faster. PnP and PCI cards have their own ROM.

Note: *The ROM Shadowing option may not work on cards that use memory-mapped I/O, such as network cards.*

PCI card options

The PCI Card Options menu lets you enable or disable bus mastering for the Peripheral Component Interconnect (PCI) adapter cards installed in your computer. *Bus mastering* lets installed bus master PCI cards process information without using the microprocessor.

If PCI cards do not operate properly, you might need to disable this option.

Memory timings

When your computer comes from the factory, the default value in the Memory Timings menu is the correct setting for the installed system memory.

If you install additional system memory, refer to the documentation that came with the new memory to determine its timing. If after installing additional memory, you have any 70 nanosecond (ns) system memory installed, select the 70 ns setting.

If your computer came with 60 ns memory and you install 70 ns memory, the system memory performance will decrease slightly.

Attention!	*Do not select the 60 ns timing if your computer has any 70 ns memory installed. Selecting a lower setting could result in lost data.*

Using other configuration utilities

You can use the Setup Utility that comes with your Aptiva computer 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 95 provides the Device Manager to help you view or change the system resources used by the hardware installed in your computer. You typically do not need to use this utility unless you upgrade your hardware. See “Starting and using the Windows 95 Device Manager” on page 60 for a description of the Device Manager and instructions for using it.

When you purchase new hardware to install in your Aptiva computer, a configuration utility might come with the new device. See the documentation provided with the new hardware for instructions on using any included configuration utility. The instructions might be printed or online.

Upgrading and replacing hardware Part 3

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 5: Before you unplug and open the tower" on page 55

  This chapter contains information to help you plan and prepare to add or replace adapter cards, drives, and system board components in your tower. It contains instructions for planning hardware changes, preventing and preparing for possible resource conflicts, and removing the cover from the tower.

- "Chapter 6: Adding and replacing system board components" on page 63

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

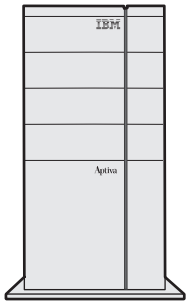
- "Chapter 7: Adding and removing adapter cards and drives" on page 81

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

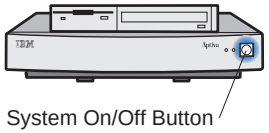
Before you unplug and open the tower 5

Before you begin to upgrade or replace your computer's hardware, it's important to know that the *tower* contains replaceable components and several open connectors and bays. You can add or replace adapter cards, drives, and some system board components in the tower.

The *media console* contains factory installed drives that can be serviced only by a trained service provider. See the *HelpWare* book for information on obtaining service.



Tower



Media Console

If you take the time to plan your hardware changes, you can reduce the effort required to complete your work. You can avoid repeated handling of some hardware components and you can anticipate, and perhaps prevent, some online configuration.

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

- "Planning your hardware changes" on page 56
- "Viewing and reconfiguring system resources" on page 57
- "Opening the tower" on page 61
- "Inside the tower" on page 62

Planning your hardware changes

Before you unplug your tower and pull the cover off, you should understand how your new hardware will work with your existing hardware. You should also plan a sequence for your changes and then keep records as you work.

Planning a sequence for hardware changes

If you plan to work with more than one piece of hardware, you can avoid repeated steps if you follow the recommended sequence for hardware changes. Keeping in mind that you also need to follow the instructions that came with your new hardware, follow these steps when you upgrade or replace your hardware:

1. Make sure you understand how to resolve conflicts that may arise when you install the new hardware. This information is contained in “Anticipating potential conflicts” on page 57.

   You may need to work with one or more online configuration utilities before you unplug your computer.

2. Turn off your computer and remove the tower cover as instructed in “Opening the tower” on page 61.

3. Complete your hardware changes as instructed in “Chapter 6: Adding and replacing system board components” on page 63 and “Chapter 7: Adding and removing adapter cards and drives” on page 81.

   If you plan to make more than one hardware change while you have the tower cover off, make changes in the following order:

   a. Make all changes on the system board.

   b. Add or replace any drives.

   c. Add or replace any adapter cards.

   If you follow this sequence, you will not need to remove components you just installed to access other components.

4. When you have finished working with the hardware, reassemble your computer.

5. Turn on your computer.

   - If you worked with system board components and you receive any messages telling you to check the Setup Utility, follow the instructions in “Updating the Setup Utility” on page 78 to verify correct configuration.

   - If you worked with adapter cards or drives and you receive any messages telling you to check the Setup Utility, follow the instructions in “Updating the Setup Utility” on page 98 to verify correct configuration.

- If you receive any other messages, see “Chapter 8: Diagnosing and recovering from problems” on page 103 for troubleshooting information and error code corrective actions.

Recording your changes

As you work, keep records of all hardware and configuration changes you make. These records will be useful if you upgrade your computer more than once or if you have trouble with the new hardware.

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 Setup Utility settings
- Changes to settings in other online configuration utilities, such as the Windows 95 Device Manager or a configuration utility that might come with your new hardware

Viewing and reconfiguring system resources

System resources are data processing elements, such as storage locations or input/output units, that are controlled by the system and assigned for use in basic computer operations. Some system resources are used as needed, while others are assigned for use by specific devices or programs. When one device attempts to use a resource that has already been assigned to another device, your computer has a resource conflict.

If you install new hardware in your tower, the new device might attempt to use a system resource that is already assigned to hardware that was installed at the factory.

Anticipating potential conflicts

Since some system resource conflicts can interrupt basic computer operations, it’s important to prevent conflicts that can be prevented before you install your new hardware. You can also prepare for conflicts that may occur without warning.

Preventing specific conflicts between Plug and Play and non-Plug and Play hardware

If you install non-PnP hardware in a computer that has any PnP hardware already installed, or if you install PnP hardware in a computer that has only non-PnP hardware already installed, you must enter the Setup Utility before you install the new hardware to prevent resource conflicts.

In the Setup Utility, you must assign the following Industry Standard Architecture (ISA) Legacy resources for the non-PnP hardware so that your computer's Basic Input/Output System (BIOS) does not attempt to assign those resources to PnP hardware:

- System memory regions
- Input/output (I/O) ports
- Direct memory access (DMA) channels
- Interrupt requests (IRQs)

For information about the hardware combinations that require you to assign ISA Legacy resources, see the following table.

Note: *All adapter cards installed at the factory are PnP cards.*

Table 2: Adapter card combinations requiring manual resource assignments

If the adapter card or cards currently installed are...	And the adapter card you are installing is...	Then do you assign resources for the non-PnP card?
None	PnP	No
	Non–PnP	No
PnP	PnP	No
	Non–PnP	Yes
Non–PnP	PnP	Yes
	Non–PnP	No
Both PnP and non–PnP	PnP	No
	Non–PnP	Yes
Note: ISA PnP adapter cards should be clearly labelled as PnP cards. PCI adapter cards should be considered PnP cards.		

For instructions on starting the Setup Utility, see "Using the Setup Utility" on page 31. For instructions on assigning ISA Legacy resources in the Setup Utility, see "Changing adapter card device information" on page 45.

Preparing for other possible conflicts

If you purchase hardware that is not PnP, you may not discover a possible resource conflict until you install the new hardware and receive an error message. To help prevent this problem, the new hardware's manufacturer might provide an online configuration utility or documentation to help with your installation.

A configuration utility provided by the new hardware's manufacturer can prevent conflicts if it evaluates your computer's current resource assignments before assigning resources for the new hardware. Look in any included documentation for information about any provided configuration utility's evaluation capabilities. If this information is not provided, look in the documentation for specification of resources required by the new hardware.

If you need information about your computer's default settings for input/output (I/O) addresses, system board interrupt requests (IRQs), or direct memory access (DMA) channel assignments, you can find this information in "Appendix A: Specification tables" on page 145. Note that the information in this appendix applies for computers that have not been upgraded since leaving the factory.

If you need information about the adapter cards installed in your computer, refer to the documentation that came with the cards. This documentation might be printed or online.

As a precaution, you may want to record the resources that are already assigned before you install your new hardware. You can use the Windows 95 Device Manager to record assigned resources. For information about the Device Manager, see "Starting and using the Windows 95 Device Manager" on page 60.

If you record assigned resources before you install the new hardware, then if the hardware creates a resource conflict after you install it, you might be able to properly assign resources without removing and reinstalling the new hardware.

Working with online configuration utilities

You can use the Setup Utility and the Windows 95 Device Manager to view and correct system resource settings. You may also be able to use other configuration utilities provided with new hardware.

Automatic and manual updates to the Setup Utility

Your computer's Basic Input/Output System (BIOS) automatically detects most hardware changes and then updates the related configuration settings in the Setup Utility. If the Setup Utility is not automatically updated, then you usually receive a message reminding you to check the Setup Utility.

The following chapters contain instructions for manually updating the Setup Utility when changes are not automatically detected:

- “Chapter 6: Adding and replacing system board components” on page 63
- “Chapter 7: Adding and removing adapter cards and drives” on page 81

“Chapter 4: Viewing and changing Aptiva configuration” on page 31 contains instructions for working with the Setup Utility.

Starting and using the Windows 95 Device Manager

You can use the Windows 95 Device Manager to record, verify, or change resource settings for many of the hardware devices installed on your computer. You can resolve resource conflicts, such as those that might occur with input/output (I/O) address, interrupt request (IRQ), and direct memory access (DMA) resources.

Device Manager lists the hardware devices installed in your computer at the factory, such as a modem or Mwave card, and many devices you might install later, such as sound and musical instrument digital interface (MIDI) devices and video and game devices.

If you reassign resources in Device Manager, you may receive a message instructing you to restart your computer.

To start the Device Manager, follow these steps:

1. From the Windows 95 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.

You can print resource reports from Device Manager. These reports can include information about all the resources used by your computer or information about the resources used by selected devices or groups of devices. You can send these reports to the printer or save them to files.

For help with the Device Manager, including instructions for printing information about your hardware, follow these steps:

1. From your Windows 95 desktop, click on the Start button.
2. Click on the Help option.
3. Click on the Index tab.
4. Search on Device Manager.

If you need help once you have started the Device Manager, press the F1 key to view the online help. You can also click on the window’s help icon (the question

mark in the upper right corner) and then click on a window area to get help for that area.

Opening the tower

When you are ready to upgrade or replace hardware, make sure you work with the tower, and not the media console. The media console is serviceable only by a trained service provider. Any other attempt to service the media console can void the warranty.

To open the tower, you need a screwdriver. Depending on which hardware components you work with inside the tower, you might need a set of small screwdrivers.

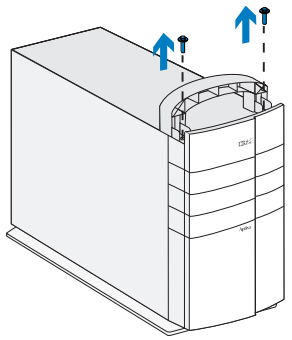
Each time you open your tower, you must follow specific safety procedures to ensure you do not damage your computer. For your safety and the safety of your equipment, follow these steps when you remove the tower cover:

1. If your computer is on, turn off the system, the monitor, and any external components, such as a printer.

2. Unplug all cables and cords from the tower except the tower power cord. Be sure to disconnect any telephone line connections too.

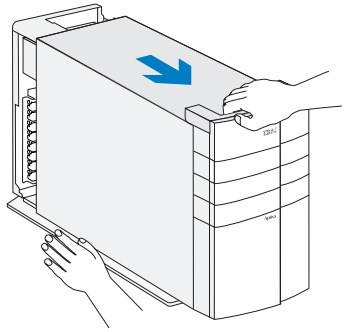
3. Remove the tower cover. The cover on the tower is attached to the frame with two screws. It also slides along grooves that run along the sides of the frame. Follow these steps:

   a. Raise the handle and remove the screws.



(Front View)

   b. Slide the cover forward and completely remove it from the tower.



(Front View)

4. Touch the bare metal frame of your tower to dissipate the static electricity from your body. Do not touch any of the components inside the frame before you touch the frame. Be careful not to touch any component displaying a voltage warning label, such as the power supply.

5. Disconnect the tower power cord.

Inside the tower

So that you can recognize the smaller hardware components in your Aptiva computer, you need to know the location of the following major hardware components inside your tower:

- The *system board*

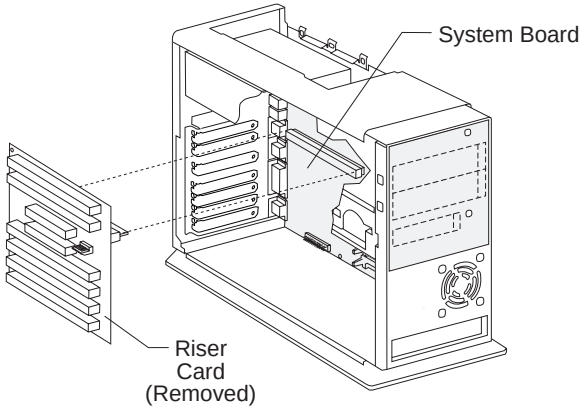
  The system board has a socket for the *processor*, also known as the central processing unit (CPU). It also has sockets for drive cable connectors, memory modules, the system battery, and the riser card.

- The *riser card*

  The riser card has connectors for adapter cards.

Inside the tower, the system board is positioned up against the right wall. The riser card is attached to the system board, parallel and very close to the system board.

With the tower cover removed, the tower looks like this:



If you plan to work with the hardware inside your tower, read “Planning your hardware changes” on page 56 and “Opening the tower” on page 61 before you remove the tower cover.

Adding and replacing system board components 6

To work with the hardware components on the system board, you must first unplug the system and remove the tower cover. If you have not removed the cover from your tower, see “Opening the tower” on page 61.

Before you can begin work with system board components, you might need to remove adapter cards, drives, and the riser card. Then once you have completed your hardware changes and put the cover back on the tower, you might need to verify or update Setup Utility configuration.

To access, work with, and update configuration for the hardware components on your system board, complete the instructions in the following sections:

- “Accessing the system board” on page 63
- “If you need to remove the riser card” on page 64
- “Identifying the parts of the system board” on page 65
- “Installing an upgrade processor” on page 68
- “Installing cache memory modules” on page 69
- “Installing system memory modules” on page 71
- “Upgrading video memory” on page 76
- “Replacing the system battery” on page 77
- “Updating the Setup Utility” on page 78

Accessing the system board

To access the section of the system board you need to work with, you might need to remove adapter cards and drives. You might also need to remove the riser card. With the system board exposed, you can work with the processor, cache and system memory modules, video memory, and the system battery.

If you need to remove adapter cards and drives, see “Chapter 7: Adding and removing adapter cards and drives” on page 81 for these instructions. If you need to remove the riser card, see “If you need to remove the riser card” on page 64.

If you need to remove the riser card

To access some system board components, such as video memory and system memory sockets, you must remove the riser card. The riser card contains all the adapter card connectors.

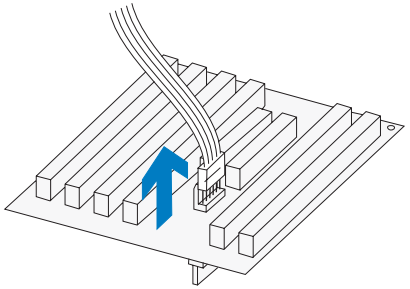
To remove the riser card, follow these steps:

1. If any of your adapter cards have cable connections to the system board or to one of your drives, disconnect the cables. Take note of all cable connector locations so that you can reconnect them without error.

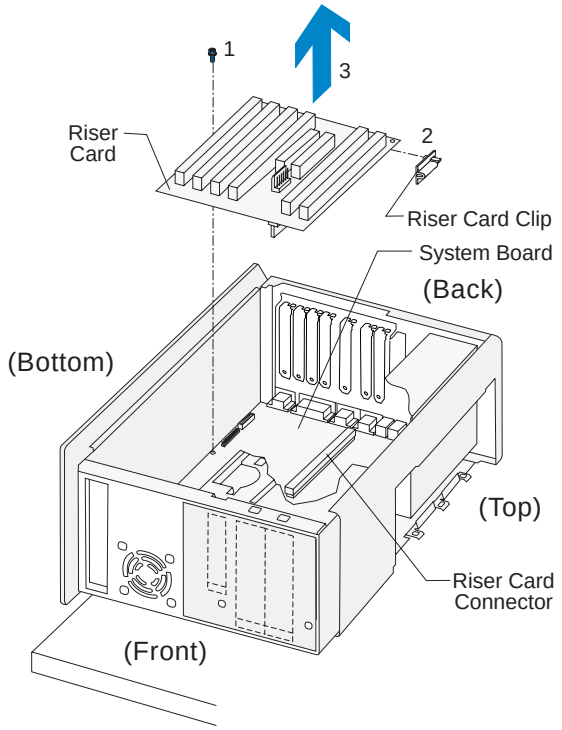
2. Remove all the adapter cards from the riser card.

   For instructions on removing adapter cards, see “Removing adapter cards” on page 87.

3. Disconnect the power cable from the riser card.



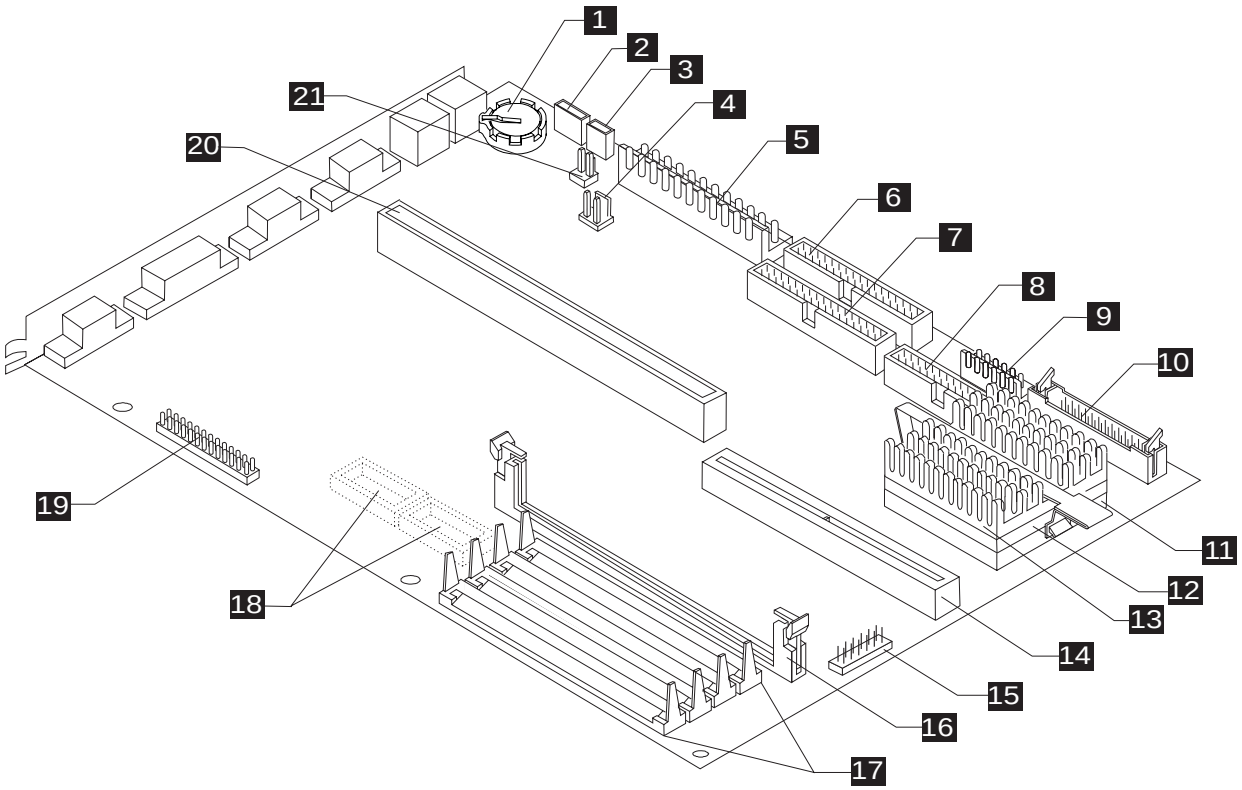
4. Remove the riser card screw and the riser card clip. Then remove the riser card.



Note: *To reinstall the riser card, reverse the removal procedure. Reconnect any adapter card cables you disconnected when you removed the adapter cards from the riser card.*

Identifying the parts of the system board

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



The *system board*, sometimes called the *planar* or *motherboard,* is the main circuit board in the tower. 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 page 65 has the following parts:

1 Battery. A 3-volt (CR2032) lithium battery. If you replace the battery, you must use the same type.

2 Power supply connector. Holds the three wire connector from the power supply.

3 Power switch connector. Holds the connector from the power switch.

4 Wake Up on Ring connector. Holds the Wake Up on Ring cable that attaches to the internal modem.

5 Power supply connector. Holds connectors P1 and P2 from the power supply.

6 Local Bus IDE connector 1. Holds signal cables that attach to drives 1 and 2.

7 Local Bus IDE connector 2. Holds signal cables that attach to drives 3 and 4.

8 Diskette connector. Holds signal cables that attach to diskette and tape drives.

9 Power supply connector. Holds connector P11 from the power supply; connector P10 attaches to the riser card.

10 Regulator socket. Holds the processor regulator or programming block, if installed.

11 Processor socket. Holds the processor (CPU).

12 Processor. A Pentium class central processing unit.

13 Heat sink. Prevents the processor from overheating.

14 Cache memory module socket. Can hold a 256 KB or 512 KB cache memory module. Any cache memory module you install must meet the following specifications.

Specifications: 160-pin; 64-bit; 256 KB (32 KB x 64) or 512 KB (64 KB x 64); 9 nanosecond (ns); synchronous pipeline burst SRAM.

15 Media console connector. Holds the connector from the media console interface card, providing control for the media console's CD-ROM and diskette drives.

16 System memory module socket (for DIMM). Holds a dual inline memory module (DIMM).

Specifications: 168-pin; 64-bit; 16 MB; 60 nanosecond (ns); gold contacts; extended data out (EDO); unbuffered; dynamic random access memory (DRAM).

17 System memory module sockets (for SIMMs). Hold single inline memory modules (SIMMs). The sockets are numbered 1 through 4, with socket 4 at the edge of the board.

You can upgrade the memory on your system board to a maximum of 128 MB. Before you remove modules from or insert modules into any of the sockets, see "Installing system memory modules" on page 71 for guidelines you must follow. For possible module placement configurations, see the specification table in "Memory module placement" on page 145. Any SIMM you install must meet the following specifications.

Specifications: 72-pin; 32-bit; 4 MB, 8 MB, 16 MB, or 32 MB; 60 or 70 nanosecond (ns); tin-lead contacts; fast-page mode or extended data out (EDO); dynamic random access memory (DRAM).

18 Video memory sockets. If your system board has empty sockets here, you can upgrade the video memory to a maximum of 2 MB by putting 512 KB in each socket.

Specifications: 40-pin, surface mount package (SOJ), 256 KB x 16, 60 nanosecond (ns), dual CAS, extended data out (EDO), dynamic random access memory (DRAM).

19 VESA feature connector. Used for motion video adapter cards, such as a television card.

If you are installing a feature connector cable that came with your computer, the cable will cover all the pins on this connector. If you are installing a feature connector cable that did not come with your system, the cable may not use all of the pins on this connector. If it does not use all the pins, you should align the cable with pin 1 on the system board (closest to the monitor connector).

20 Riser card connector. Holds the riser card, which contains connectors for adapter cards.

21 12V speaker connector. Holds the connector for 12V speakers.

Installing an upgrade processor

Instructions for removing your old processor are given in this section. Instructions for installing an upgrade processor should come packaged with the processor.

To remove the old processor:

1. Remove the heat sink retaining clip by pressing the release tab (square end) of the clip.

   Attention! *The heat sink retaining clip is under tension and may disengage suddenly if not held while being removed.*

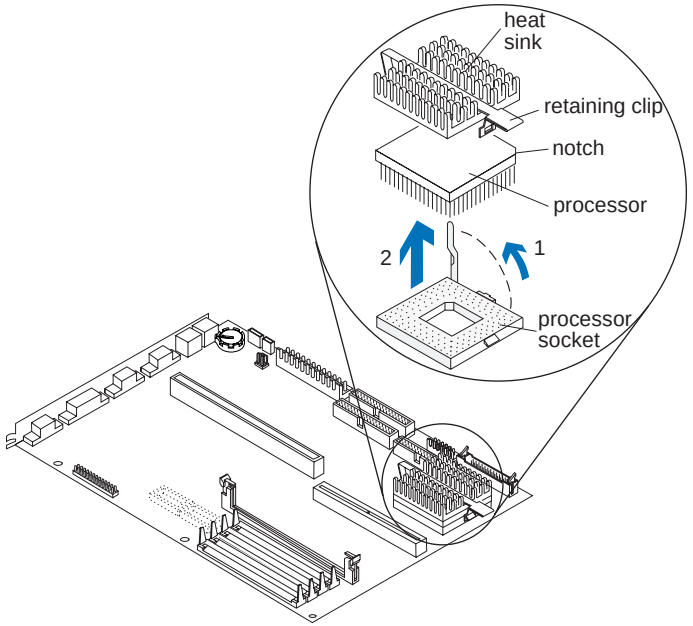
   If pressing the tab does not release the clip, press the tab while using the tip of a thin bladed screwdriver or other similar object to gently push out the leg that is hooked on the catch underneath the tab. Take extreme care not to push the leg too hard, or you might accidentally damage surrounding parts.

2. Remove the heat sink by lifting it straight up.

   Note: *If the heat sink is permanently cemented to the processor, you should remove both the heat sink and the processor after you lift the handle in step 3.*

3. Unlatch the handle on the side of the processor socket and lift it all the way up.

4. Lift the processor out of the processor socket.



5. Install the new processor by following the instructions that came with it.

Installing cache memory modules

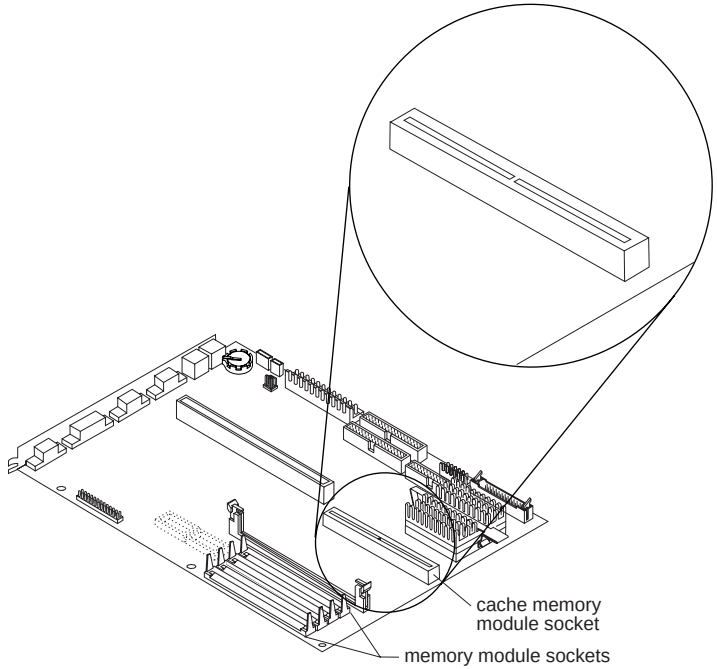
You can install either 256 KB or 512 KB of cache memory on your system board. If a 256 KB module is already installed, you must remove it before you can install a 512 KB module.

Note: *Each cache memory module you install must have these specifications: 160-pin; 64-bit; 256 KB (32 KB x 64) or 512 KB (64 KB x 64); 9 nanosecond (ns); synchronous pipeline burst SRAM.*

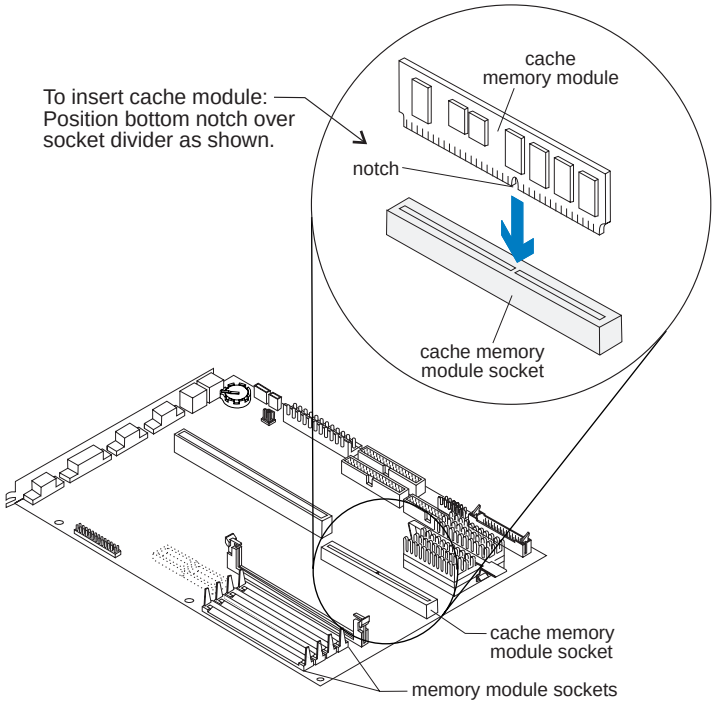
Inserting a new module

To install a cache memory module into an empty socket, follow these steps:

1. Locate the single cache memory module socket on the system board.



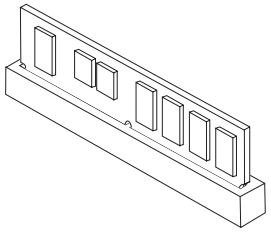
2. Position the new cache module over the cache socket so that the notch at the bottom of the module lines up over the divider in the socket. As shown in the next picture, match the wide part of the module to the wide part of the opening in the socket.



Important: *The module can be installed only when the notch is aligned correctly.*

3. Push the module straight down into the socket.

A properly-inserted module looks like this:



Replacing an existing module

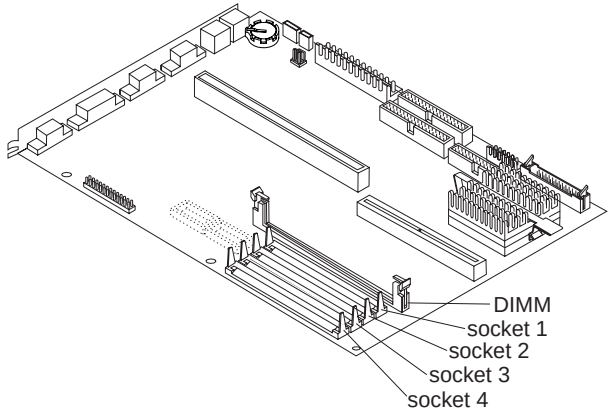
If you want to upgrade from 256 KB of cache memory to 512 KB of cache memory, you must replace the existing 256 KB module with a 512 KB module.

To replace an existing module, remove the installed module by pulling straight up on the module. Then follow the instructions in “Inserting a new module” on page 69 to install the new module.

Installing system memory modules

Your system board has four system memory module sockets that hold *single inline memory modules* (SIMMs). These sockets are labeled as socket 1 through socket 4, with socket 4 at the edge of the system board.

Your system board also has one system memory module socket that holds a *dual inline memory module* (DIMM).



You can install additional memory modules in any open socket. You can also replace the existing memory modules with modules that have higher memory capacity. The maximum amount of memory you can install is 128 MB. If you install four 32 MB SIMMs and one 16 MB DIMM, the DIMM will be disabled.

If you add or replace system memory modules, you must follow these guidelines:

- You can install a 16 MB DIMM in the DIMM socket.

  Note: *Each DIMM you install must have these specifications: 168-pin; 64-bit; 16 MB; 60 nanosecond (ns); gold contacts; extended data out (EDO); dynamic random access memory (DRAM).*

- If you install a SIMM in socket 1, you must also install a SIMM with the same specifications in socket 2.
- If you install a SIMM in socket 3, you must also install a SIMM with the same specifications in socket 4.
- The size (in MB) of the modules in sockets 3 and 4 does not have to match the size (in MB) of the modules in sockets 1 and 2.

  Note: *Each SIMM you install must have these specifications: 72-pin; 32-bit; 4 MB, 8 MB, 16 MB, or 32 MB; 60 or 70 nanosecond (ns); tin-lead contacts; fast-page mode or extended data out (EDO); dynamic random access memory (DRAM).*

If you install SIMMs with different system memory timings (60 or 70 ns), you should check the Setup Utility to make sure the timings are configured correctly. For more information on setting system memory timings, see “Configuring advanced options” on page 48.

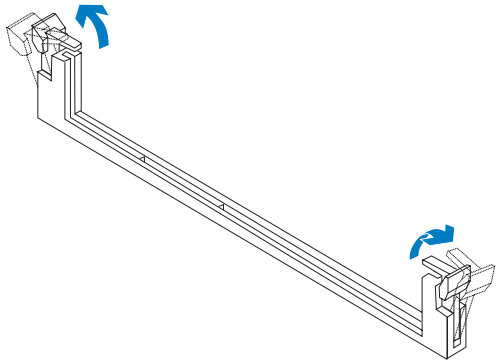
For possible module placement configurations, see the reference table in “Memory module placement” on page 145.

Installing a dual inline memory module

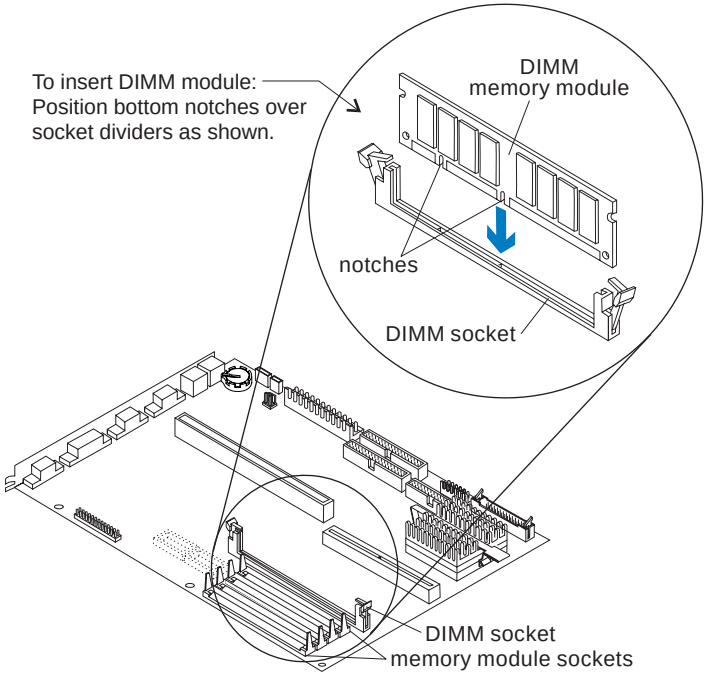
If your system board did not come with a dual inline memory module (DIMM) installed, you can install a 16 MB DIMM. To install a DIMM, follow these steps:

1. Locate the two clips that hold the memory module in place. One clip holds the left edge of the module and the other clip holds the right edge.

2. Push both clips away from the socket.



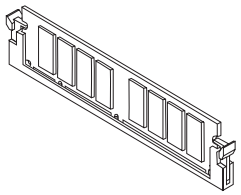
3. Position the DIMM over the socket so that the notch at the bottom of the module lines up over the divider in the socket. As shown in the next picture, match the wide part of the module to the wide part of the opening in the socket.



Important: *The module can be correctly installed only when the wide set of contacts is inserted into the wide socket opening.*

4. Push the module straight down into the socket.

   A properly-inserted module looks like this:



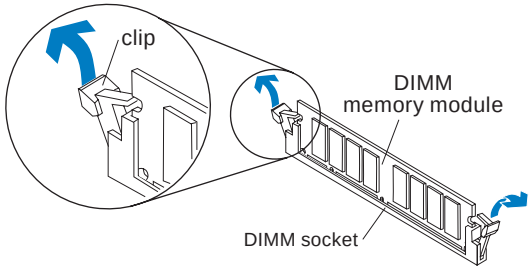
   The clips on the right and left sides of the socket should automatically lock into the notches on both sides of the DIMM. If the clips do not lock, make sure you have inserted the DIMM correctly and have pushed it all the way down.

Replacing a dual inline memory module

To replace a DIMM, follow these steps:

1. Locate the two clips that hold the memory module in place. One clip holds the left edge of the module and the other clip holds the right edge.

2. Push one clip away from the module. Then, while holding the module with one hand, push the other clip away from the module.



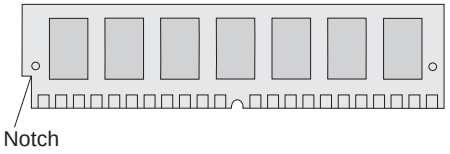
3. Lift the module out of the socket.

4. To install the new DIMM, see “Installing a dual inline memory module” on page 72.

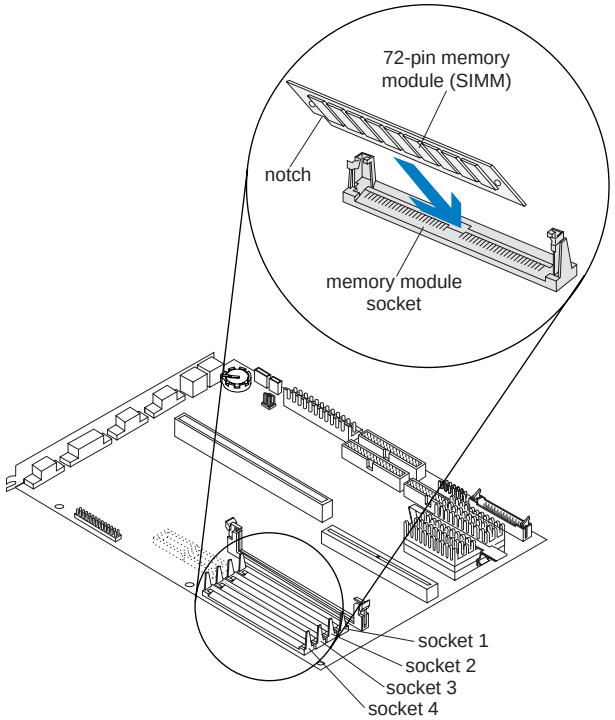
Installing single inline memory modules

To install an additional single inline memory module (SIMM) in an empty socket, follow these steps:

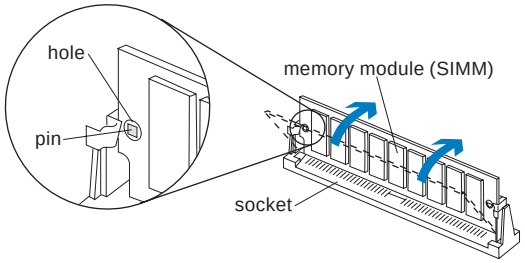
1. Find the notched edge of the module and position it as shown here.



2. Insert the module into the socket at a 45-degree angle as shown. Make sure the connectors line up and the module is firmly held in the socket at approximately a 45-degree angle.



3. Press forward firmly on the memory module to move it into a vertical position. Both sides of the module will “click” when the module locks into place. The newly installed memory module will be locked into the socket in a vertical position with pins showing through the holes on each side.

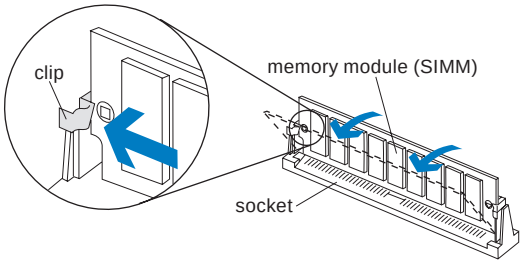


Removing single inline memory modules

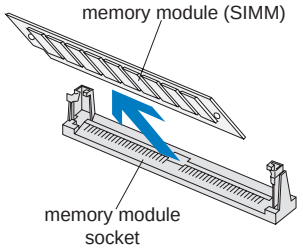
To remove a SIMM, follow these steps:

1. Locate the two clips that hold the memory module in place. One clip holds the left edge of the module and the other clip holds the right edge.

2. At the same time, push both clips downward. The module will release and move forward.



3. Lift the module out of the socket.



Upgrading video memory

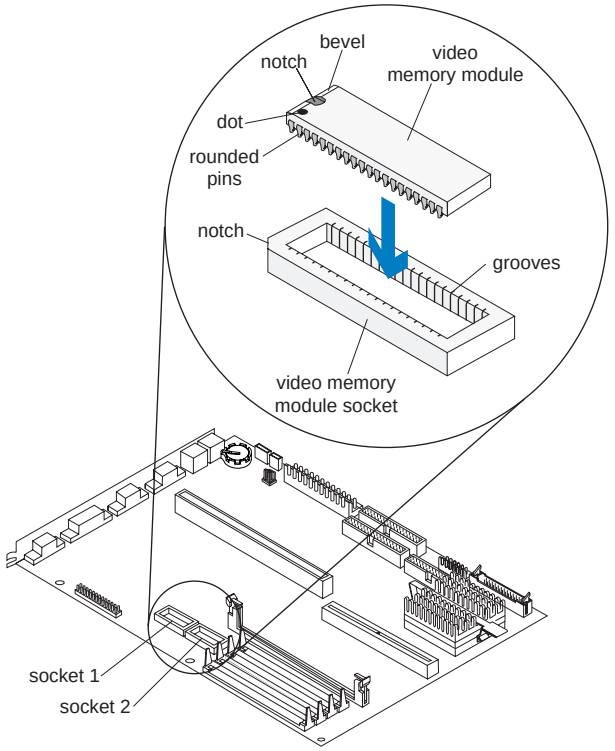
Your system board may come with two external video memory module sockets (socket 1 and socket 2 in the picture). If your system board came with sockets, you can upgrade the video memory to a maximum of 2 MB. To upgrade video memory, you must install two video memory modules. You cannot install a video memory module in one socket and leave the other socket empty.

Note: *Each video memory module you install must have these specifications: 40-pin, surface mount package (SOJ), 256 KB x 16, 60 ns, dual CAS, extended data out (EDO), dynamic random access memory (DRAM).*

To upgrade video memory, follow these steps:

1. One end of the video memory module will have a dot, notch, bevel, or any combination of these. Locate the dot, notch, or bevel on the video memory module.

2. Position the end of the memory module with the dot, notch, or bevel as shown.



3. Align the rounded pins on the sides of the memory module with the grooves in the memory module socket.

4. Press straight down firmly on the module to insert it into the socket. A properly inserted module will sit completely inside the socket.

5. Repeat these steps to install the second video memory module.

6. Reinstall all hardware you removed to access the video memory module sockets.

Replacing the system battery

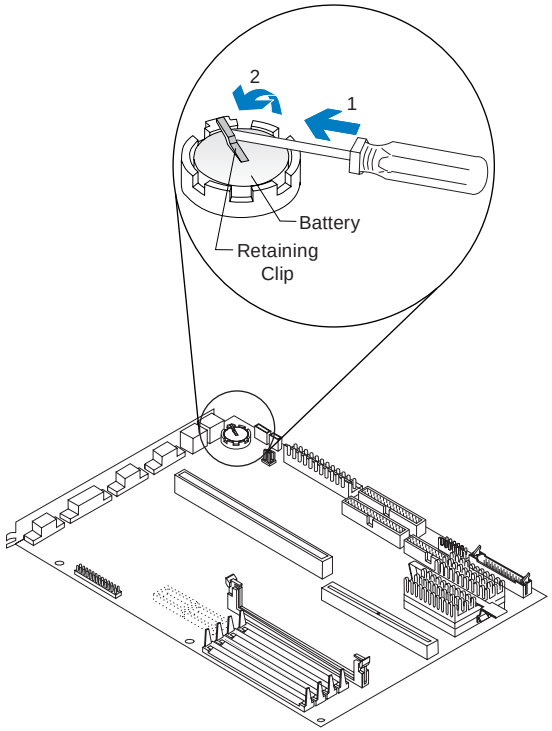
To replace the battery, follow these steps:

1. Place the blade of a small, flat-blade screwdriver under the edge of the retaining clip.

2. Turn the screwdriver one quarter turn, raising the clip while pressing down on the old battery to remove it.

3. Raise the retaining clip, and insert a new 3-volt (CR2032) lithium battery in its place.

Note:	*Make sure the positive side of the battery (the side with a + symbol printed on it) is facing up when you insert the battery into the socket.*



Updating the Setup Utility

When you add system board components, such as an upgrade processor and system or cache memory modules, the Basic Input/Output System (BIOS) detects the hardware changes and updates the Setup Utility automatically. If you replace or remove components, you might receive an online message that asks you to verify that the BIOS made the correct configuration changes.

To verify or correct configuration settings in the Setup Utility, see "Using the Setup Utility" on page 31 for information about how to start and update the Setup Utility.

For a cache memory module

If you remove cache memory, the power-on self test (POST) generates an error message. In the Setup Utility, verify that the information the BIOS automatically recorded is correct.

To view the cache memory settings in the Setup Utility, select the following options from the Setup Utility's Main Menu:

- System Information

  See "Viewing system information" on page 35 for information about this option.

- Advanced Options and then Cache Options

  See "Configuring advanced options" on page 48 for information about these options.

For system memory modules

If you remove system memory, the power-on self test (POST) generates an error message. In the Setup Utility, verify that the information the BIOS automatically recorded is correct. Use this opportunity to verify that any remaining memory modules are installed as intended.

To view the system memory settings in the Setup Utility, select the System Information option from the Setup Utility's Main Menu. See "Viewing system information" on page 35 for information about this option.

If you install SIMMs with different system memory timings (60 or 70 ns), you should check the Setup Utility to make sure the timings are configured correctly. For more information on setting system memory timings, see "Configuring advanced options" on page 48.

For the system battery

If you replace the system battery, you need to reset the system date and time. You can perform this task from the Windows 95 desktop or from the Setup Utility.

To reset the system date and time in the Setup Utility, select the Date and Time option from the Setup Utility's Main Menu. See "Setting the date and time" on page 48 for information about this option.

Adding and removing adapter cards and drives 7

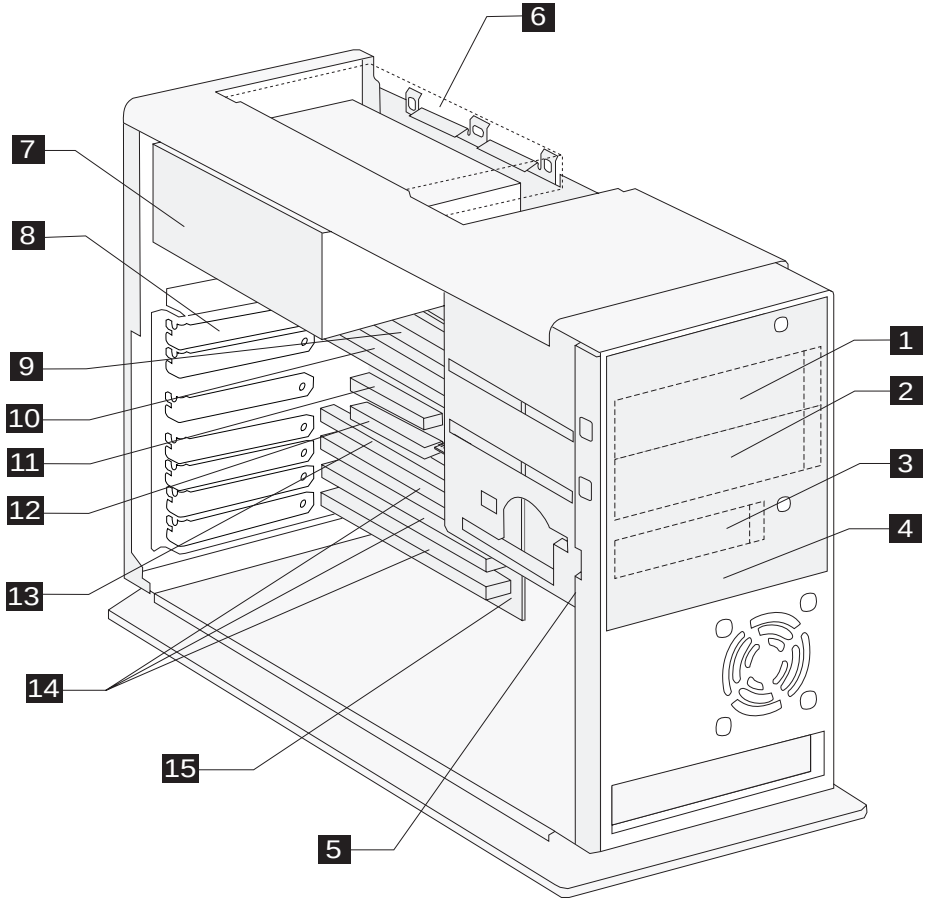
To work with the hardware components in the tower, you must first unplug the system and remove the tower cover. If you have not removed the cover from your tower, see “Opening the tower” on page 61.

If you plan to add or replace both an adapter card and a drive, install the drive before you install the adapter card. If you also plan to make hardware changes on the system board, see “Chapter 6: Adding and replacing system board components” on page 63 and finish your work with the system board before continuing to work with drives and adapter cards.

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

- “Identifying the parts of the tower” on page 82
- “Adding and removing adapter cards” on page 84
- “Adding and removing drives” on page 87

Identifying the parts of the tower



Your computer's tower has five drive bays and can hold up to five drives. It also has seven adapter card slots and eight adapter card connectors and can hold up to seven adapter cards. You can purchase a drive to install in any empty bay or an adapter card to install in any empty slot.

You can install Industry Standard Architecture (ISA) Advanced Technology (AT) adapter cards and Peripheral Component Interconnect (PCI) adapter cards. You can install an AT adapter card in any AT adapter card connector. You can install a PCI adapter card in any PCI adapter card connector.

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.

1 Bay 1. This bay can hold up to a 5.25-inch half high drive, such as a diskette, tape, or CD-ROM drive.

2 Bay 2. This bay can hold up to a 5.25-inch half high drive, such as a diskette, tape, or CD-ROM drive.

3 Bay 3. This bay can hold up to a 3.5-inch half high drive, such as a diskette or tape drive.

4 Static shield. Cover for bays 1 through 3 with cutouts for drive installation

5 Bay 4. This bay can hold a 3.5-inch slim hard disk drive. (No external access.)

6 Bay 5. This bay can hold a 3.5-inch slim hard disk drive. (No external access.)

7 Power supply. Capable of providing at least 145 watts of power to the tower.

8 Adapter card slots. Seven openings for adapter cards.

9 AT adapter card connector 1 (AT – 1). Holds an AT adapter card.

10 AT adapter card connector 2 (AT – 2). Holds an AT adapter card.

11 PCI adapter card connector 1 (PCI – 1). Holds a PCI adapter card.

12 PCI adapter card connector 2 (PCI – 2). Holds a PCI adapter card. This connector shares a slot with the AT – 3 connector. If you install a card in this connector, you cannot install a card in connector AT – 3.

13 AT adapter card connector 3 (AT – 3). Holds an AT adapter card. This connector shares a slot with the PCI – 2 connector. If you install a card in this connector, you cannot install a card in connector PCI – 2.

14 AT adapter card connectors 4 - 6 (AT – 4 - 6). Holds AT adapter cards.

15 Riser card. Holds the adapter card connectors.

Adding and removing adapter cards

The tower has seven slots and eight connectors for adapter cards. A maximum of seven adapter cards can be installed in the tower at one time.

Identifying adapter card connectors

You can install ISA AT or PCI adapter cards. Use the following table to help you determine what type and length adapter card you can install in each adapter card connector. Adapter card connectors are identified in "Identifying the parts of the tower" on page 82.

Adapter card connector	Type of adapter card you can install
AT – 1	Can hold a half-length ISA AT adapter card.
AT – 2	Can hold a half-length, three-quarter-length, or full-length ISA AT adapter card.
PCI – 1	Can hold a half-length or full-length PCI adapter card.
PCI – 2	Can hold a half-length or full-length PCI adapter card.
AT – 3	Can hold a half-length, three-quarter-length, or full-length ISA AT adapter card.
AT – 4 - 6	Can hold a half-length, three-quarter-length, or full-length ISA AT adapter card.

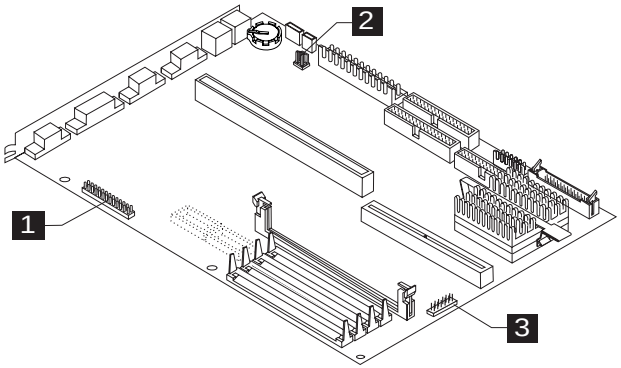
Note: *You can install a PCI adapter card in connector PCI – 2 or an AT adapter card in connector AT – 3. You cannot install adapter cards in connectors PCI – 2 and AT – 3 at the same time.*

Identifying card cable connectors

Depending on the type of adapter card you install, you might need to attach cables from the card to connectors on the system board or to connectors on the CD-ROM drive. The following table identifies each connector on the system board and the type of card that might have a cable you need to connect:

System board connector	Type of card or feature using the connector	Number in picture
J17	Television or video card	1
J25	Wake Up on Ring feature (on Mwave or modem card)	2
J30	Media console interface card	3

Use the following picture to identify card cable connectors on your system board:



Note whether the location of the cable connector you need to use is beneath the riser card. If it is, follow the instructions in “If you need to remove the riser card” on page 64 before you install the new adapter card.

Setting jumpers

When you install an adapter card, you might have to set switches or move jumpers to make the card work properly with any cards that are already installed. If you install a Plug and Play (PnP) adapter card, however, you typically do not have to change any switch or jumper settings after you install it. The computer and the card automatically work together to make sure the settings are correct.

Refer to the documentation that came with the new hardware to determine if you need to set any switches or move any jumpers.

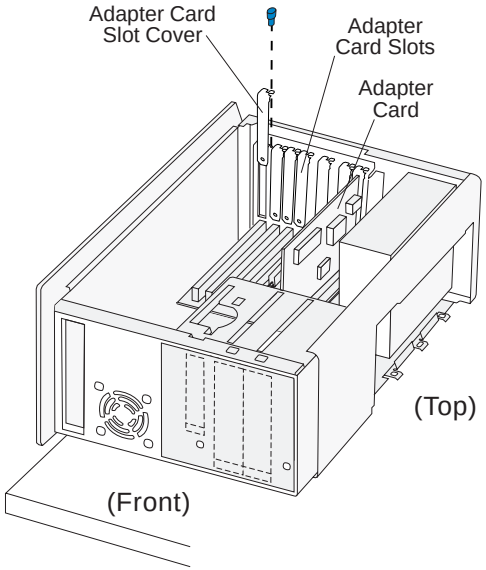
If you install a video adapter card, the built-in video controller should be disabled automatically.

Installing adapter cards

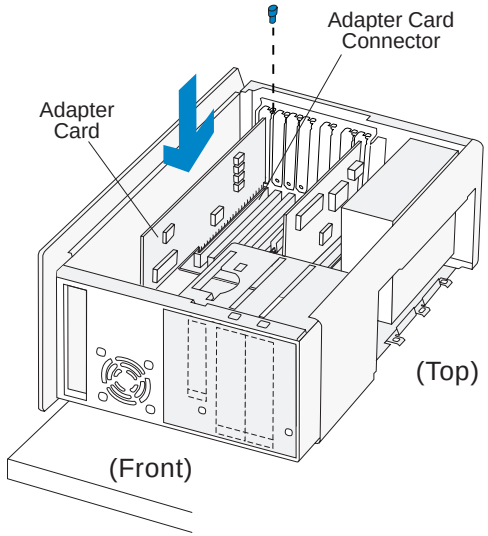
To install an adapter card, position the tower for access to the riser card:

1. Rest your system on a sturdy, flat surface. Turn the tower on its side so that the system board faces you. To ensure that the tower lays flat, make sure the base (bottom) of the tower hangs over the edge of your work surface as shown in the illustration for step 2.

2. Remove the adapter card slot cover screw. Then remove the slot cover.



3. Align and insert the adapter card into the adapter card connector. Insert the screw.



4. Reinstall all hardware and screws you removed to install the adapter card.

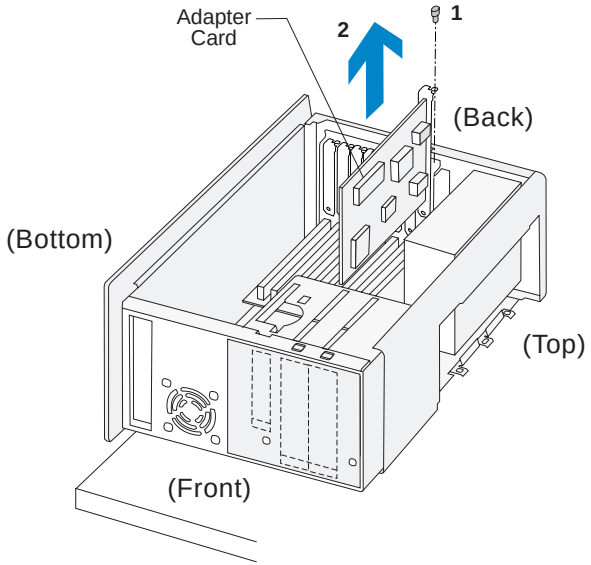
Connecting card cables

If you have not already done so, connect the cable or cables from the adapter card to the correct connection on the system board or CD-ROM drive. Verify your connections using the information in “Identifying card cable connectors” on page 84.

If you had to disconnect any cables to access the adapter card connector on the riser card or to access a section of the system board, reconnect the cables.

Removing adapter cards

If you need to remove an adapter card, follow the instructions in step 1 on page 86 to position the tower. Remove the adapter card screw. Carefully pull the adapter card straight out of the slot so that the card's components do not bend. If an adapter card has cables, disconnect them. Be sure to notice where the cables connect to the cards. You will have to reconnect these cables if you reinstall the card.



Adding and removing drives

The tower has five bays for various types of drives. Some of these bays already hold drives that were installed at the factory.

The media console holds the CD-ROM and 3.5-inch slim diskette drive. Drives that are installed in the media console are serviceable only by a trained service provider. See the *HelpWare* book for information on obtaining service.

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

Identifying drive bays

The tower can accommodate 3.5-inch slim and 3.5-inch half high drives, such as diskette and tape drives. The tower can also accommodate 5.25-inch half high drives, such as diskette, hard disk, tape, and CD-ROM drives. Three of the bays in your tower have external access. Two do not.

You can install a drive in any empty bay that accommodates the drive's size. Use the following table to help you determine where to install a new drive.

Bay	Drive Specifications	Bay Capacity
1	Can hold up to a 5.25-inch half high drive, such as a diskette, tape, or CD-ROM drive.	149 x 41.3 mm (5.87 x 1.625 in.)
2	Can hold up to a 5.25-inch half high drive, such as a diskette, tape, or CD-ROM drive.	149 x 41.3 mm (5.87 x 1.625 in.)
3	Can hold up to a 3.5-inch half high drive, such as a diskette or tape drive.	101.6 x 41.3 mm (4.0 x 1.625 in.)
4	Can hold a 3.5-inch slim hard disk. (No external access.)	101.6 x 25.4 mm (4.0 x 1.0 in.)
5	Can hold a 3.5-inch slim hard disk. (No external access.)	101.6 x 25.4 mm (4.0 x 1.0 in.)

Note: Using the appropriate installation hardware, you can install smaller drives than those listed here.

To identify drive bays in the tower, see "Identifying the parts of the tower" on page 82.

Accessing drive bays and replacing bay panels

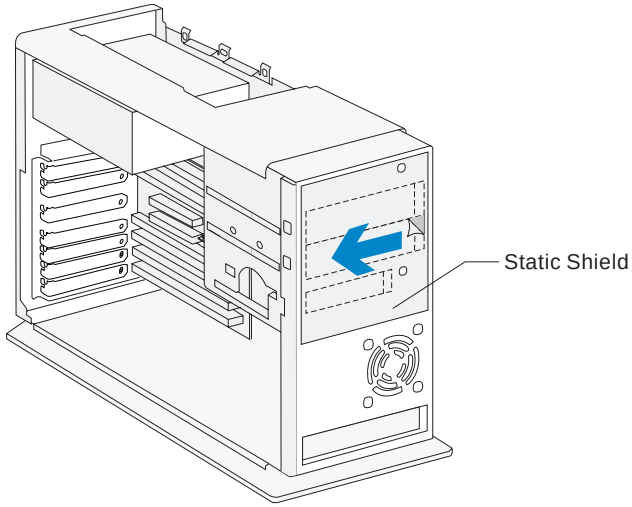
When you first unpack your computer, all external drive bays that do not contain drives are covered with a static shield on the tower and bay panels in the tower cover. To install a drive in a previously unoccupied external bay, first remove the static shield that covers the bay you want to use. Then remove the bay panel from the tower cover. If you remove a drive from an external bay and you do not intend to install a new drive immediately, replace the bay panel in the tower cover.

To access a drive bay, follow these steps:

1. Remove the tower cover, if you haven't already. For these instructions, see "Opening the tower" on page 61.

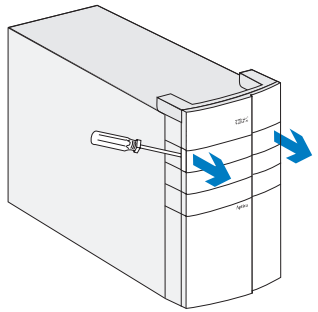
2. With the front of the tower facing you, remove only the section of the static shield that covers the bay you want to use. Grasp the edge of the shield at the right edge of the bay opening. Gently pull the

shield from right to left, tearing along the perforated lines.



(Front View)

3. With the front of the tower cover facing you, remove the bay panel from the bay you want to use. Wedge a narrow sturdy tool, such as a coin or a flat-blade screwdriver, behind one side of the panel. Move the selected tool close to the top of the panel. Carefully pry the panel straight out, using the tool on one side and your fingers on the other side. Be careful not to deface the surface of the tower cover with the tool.



(Front View)

To replace a bay panel, follow these steps:

1. Insert the panel into the opening at the front of the cover.

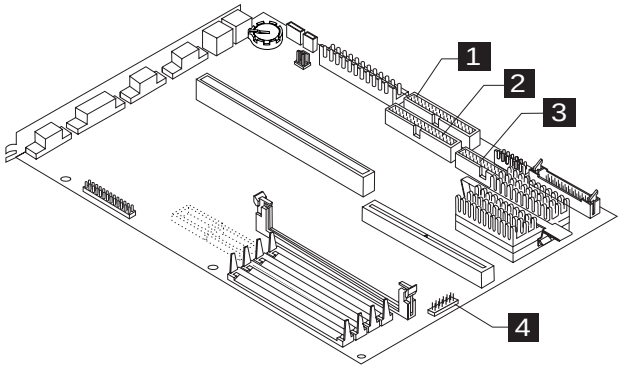
2. Push the panel into place until you hear the latches click.

Identifying signal cable connectors

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

System board connector	Interface type	Type of drive using the connector	Number in picture
Local Bus connector 1 – J5	IDE/ATA Local Bus	Preferred location for first and second hard disk drives. A CD-ROM drive can also be attached here.	1
Local Bus connector 2 – J6	IDE/ATA Local Bus	Preferred location for a third or fourth hard disk drive. A CD-ROM drive can also be attached here.	2
Diskette connector – J21	Standard diskette AT	Should be used for diskette drives or diskette AT interface tape drives.	3
Media console connector – J30	Media console	Used to control the CD-ROM and diskette drive in the media console.	4

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



Guidelines for connecting IDE/ATA signal cables

Your system board has two connectors for attaching IDE/ATA signal cables, but 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 Local Bus connector 1 and is set as a master device.

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

- If only one drive is attached to a connector, it 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 four IDE drives can be installed in your tower, two on Local Bus connector 1, and two on Local Bus connector 2.
- 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.

If you are installing a drive on Local Bus connector 1, follow these guidelines:

- Attach the signal cable from the drive to Local Bus connector 1, which is labeled J5 on the system board.
- 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 on Local Bus connector 2, follow these guidelines:

- Attach the signal cable from the drive to Local Bus connector 2, which is labeled J6 on the system board.
- 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 CD-ROM drive (or any drive that requires a software device driver), follow these guidelines:

- Attach the signal cable from the drive to Local Bus connector 1 (labeled J5) or Local Bus connector 2 (labeled J6).
- Set the newly installed drive as a master device if it is the only drive attached to the connector. Otherwise, set the new drive as a slave device. For instructions on changing a drive setting, see the documentation that came with the new drive.

Guidelines for connecting diskette AT interface signal cables

Your system board has one connector for attaching diskette AT interface signal cables. You can install one diskette AT interface drive to this connector if you are using the media console.

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

- Attach the signal cable from the drive to the Diskette connector, which is labeled J21 on the system board.
- Do not change any settings on a diskette drive that is already installed.

- If you are installing a 5.25-inch drive, you must purchase a signal cable with a “card edge” connector. Attach the card edge connector to the 5.25-inch drive.

- If you are installing a 3.5-inch device, you will need to purchase a signal cable.

When you have finished installing the diskette drive, check the Setup Utility to make sure that the drive is set up correctly. For these instructions, see “Changing disk drive configuration” on page 35.

Tip for proper drive alignment

To ensure that a drive is aligned properly in a bay, do the following:

1. Insert each screw and tighten loosely.

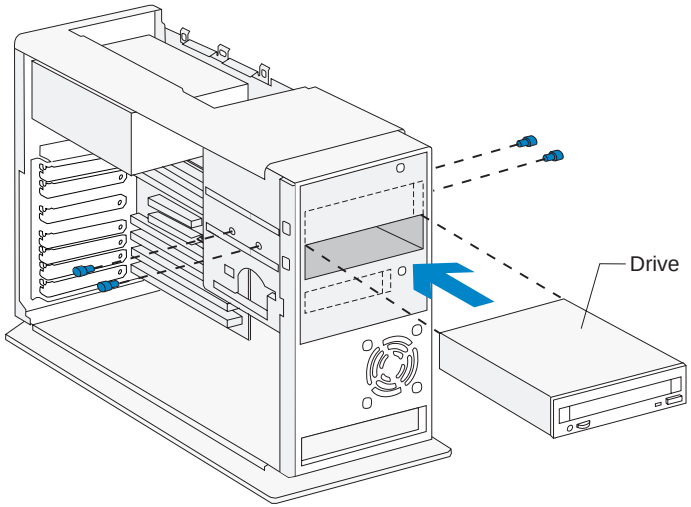
2. After all screws are properly set in their correct positions, tighten each screw securely.

Installing a drive in bay 1 or 2

Bay 1 or 2 can hold up to a 5.25-inch half high drive, such as a diskette, tape, or CD-ROM drive.

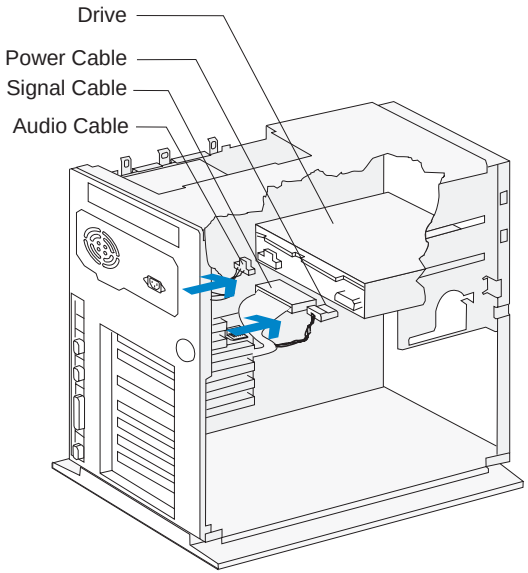
1. See "Accessing drive bays and replacing bay panels" on page 88 if you have not removed the static shield and the bay panel to access the drive bay. The static shield is in the tower. The bay panel is in the tower cover.

2. Insert the drive into the bay. Align the screw holes and insert the four screws.



(Front View)

3. Connect the power and signal cables to the drive. If you are installing a CD-ROM drive, also connect the audio cable.



(Back View)

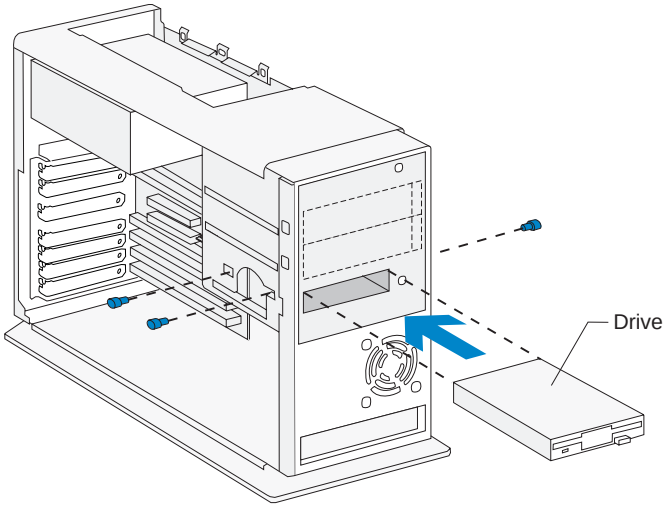
Note: *If you add a diskette drive or tape drive that attaches to the Diskette connector, make sure the signal cable you plug into the drive is attached to the Diskette connector on the system board. If you add a CD-ROM, it is recommended that you attach the signal cable to Local Bus connector 2 on the system board. To identify the connectors, see "Identifying signal cable connectors" on page 90.*

Installing a drive in bay 3

Bay 3 can hold up to a 3.5-inch half high drive, such as a diskette or tape drive.

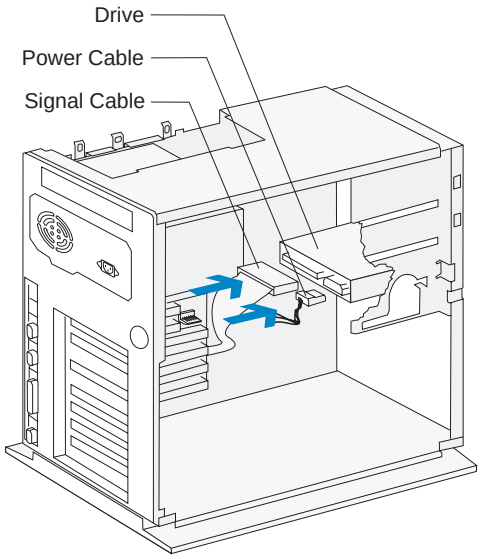
1. See “Accessing drive bays and replacing bay panels” on page 88 if you have not removed the static shield and the bay panel to access the drive bay. The static shield is in the tower. The bay panel is in the tower cover.

2. Insert the drive into the bay. Align the screw holes and insert the three screws.



(Front View)

3. Connect the power and signal cables to the drive.



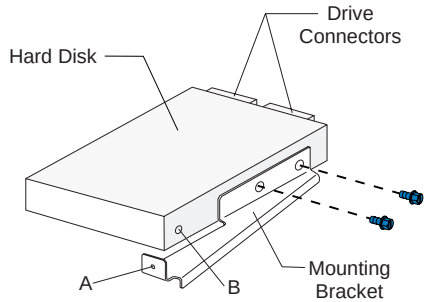
(Back View)

Note: *If you add a diskette drive or a tape drive that attaches to the Diskette connector, make sure the signal cable you plug into the drive is attached to the Diskette connector on the system board. To identify the Diskette connector on the system board, see “Identifying signal cable connectors” on page 90.*

Installing a drive in bay 4

Bay 4 can hold a 3.5-inch slim hard disk.

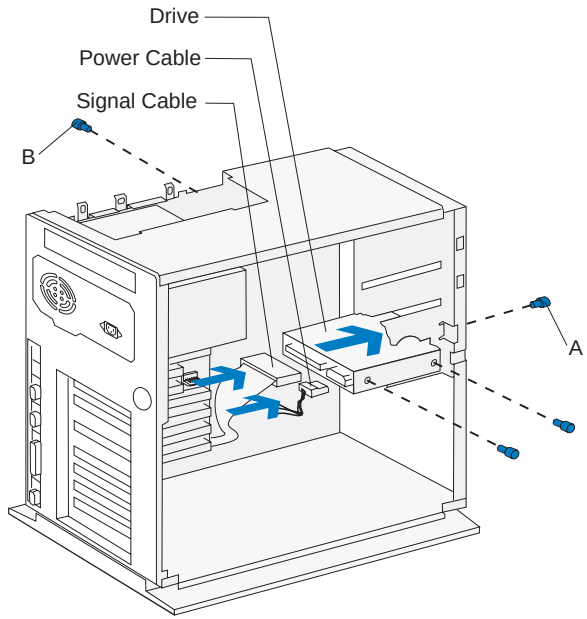
1. To attach the mounting bracket, align the screw holes and insert the two screws.



(Front View)

Note: *The drive is drawn in this position to show bracket attachment. Once the bracket is installed on the drive, rotate the drive 180 degrees so that the front of the drive faces the front of the tower.*

2. Insert the hard disk (with the bracket attached) into the bay. Align the screw holes and insert the four screws. Connect the power and signal cables. (To ensure that your hard drive functions properly, read “Guidelines for connecting IDE/ATA signal cables” on page 91 before connecting the cables.)

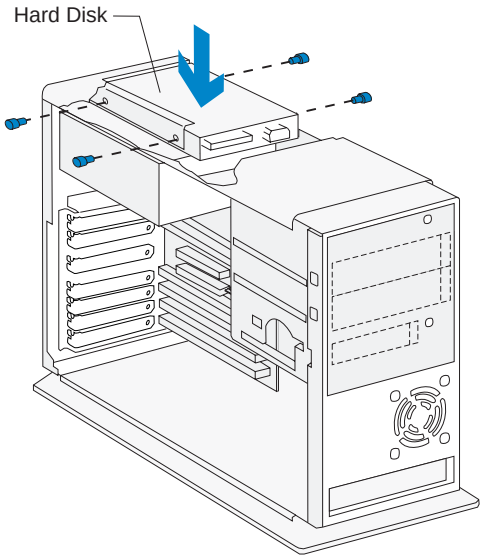


(Back View)

Installing a drive in bay 5

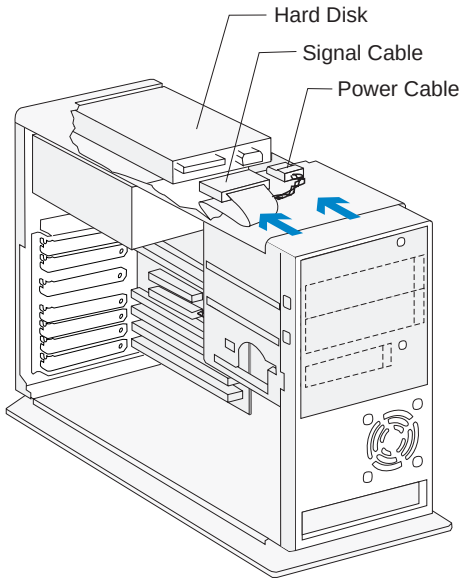
Bay 5 can hold a 3.5-inch slim hard disk.

1. Insert the drive into the bay. Align the screw holes and insert the four screws.



(Front View)

2. Connect the power and signal cables. (To ensure that your hard drive functions properly, read “Guidelines for connecting IDE/ATA signal cables” on page 91 before connecting the cables.)



Connecting signal cables

If you have not already done so, connect the signal cable from the drive to the correct connection on the system board. Verify your connections using the information in “Identifying signal cable connectors” on page 90.

If you had to disconnect any cables to access a section of the system board, reconnect the cables.

Removing drives

To remove a drive from a specific bay, reverse the steps for installing a drive in that bay.

Updating the Setup Utility

When you add Plug and Play (PnP) adapter cards and drives, the Basic Input/Output System (BIOS) detects the hardware changes and updates the Setup Utility automatically. When you add devices that are not PnP, the BIOS might still detect the new hardware. In a few cases, however, you might need to enter the Setup Utility to verify or correct configuration settings.

If you need to verify or correct configuration settings in the Setup Utility, see “Using the Setup Utility” on page 31 for information about how to start and update the Setup Utility.

For adapter cards

When you install a new adapter card, you can select the following options from the Setup Utility’s Main Menu to view or change adapter card information:

- Plug and Play

  Select this option to view the system resources assigned to non-PnP adapter cards. See “Changing adapter card device information” on page 45 for information about this option.

  “Preventing specific conflicts between Plug and Play and non-Plug and Play hardware” on page 58 contains instructions for using the Plug and Play menu before you install specific adapter cards.

- Advanced Options and then PCI Cards

  Select this option to see if bus mastering is enabled for PCI cards. See “Configuring advanced options” on page 48 for information about these options.

For drives

If you install a diskette drive B: in your tower, you must select the correct size and storage capacity for the new drive in the Setup Utility.

To specify the diskette drive size and capacity, select the Disk Drives option on the Setup Utility Main Menu. See “Changing disk drive configuration” on page 35 for information about this option.

If you install a tape drive in your tower, you must use the Setup Utility to enable the system board diskette controller. See “System board diskette controller” on page 36 for information about the Setup Utility option.

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

Select the following options from the Setup Utility’s Main Menu to verify drive setup:

- System Information

  See “Viewing system information” on page 35 for information about this option.

- Disk Drives

  See “Changing disk drive configuration” on page 35 for information about this option.

- Startup Options

  See “Configuring startup options” on page 47 for information about this option.

Troubleshooting Part 4

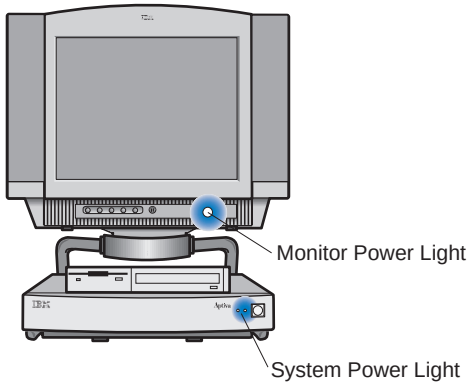
This part contains information to help you respond to problems with the hardware, software, and features installed in your computer at the factory. It contains the following chapter:

- “Chapter 8: Diagnosing and recovering from problems” on page 103

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

Before you panic: some simple fixes

Step 1 Are the power lights on the media console and monitor lit?



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

Yes Power is reaching the tower, media console, and monitor. Go to Step 2.

No

1. Press the on/off buttons on the media console and monitor to make sure they are turned on.
2. Make sure your tower, media console, and monitor cables are correctly and securely connected. Make sure the tower and monitor power cords are plugged into electrical outlets. Your *Read me first* book shows how the cables and cords should be connected.
3. Make sure the electrical outlets you are using are not controlled by a wall or dimmer switch.
4. 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, see the *HelpWare* book for information on obtaining service.

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

Yes, once	The system has passed the power-on self test (POST). Go to Step 3.
Yes, more than once	There is a problem with the tower or media console. Find the code displayed on your screen in “Responding to error codes” on page 129 and take the action listed.
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 your tower, see “Chapter 7: Adding and removing adapter cards and drives” on page 81. For instructions on installing hardware on your system board, see “Chapter 6: Adding and replacing system board components” on page 63. If the problem continues, see the *HelpWare* book for information on obtaining service.

Step 3 Is anything displayed on the monitor?

Yes

There may be a problem with the tower or media console if:

- A three or four digit error code appears. Find the code in "Responding to error codes" on page 129 and take the action listed.
- A box containing an error code and message appears. Follow the instructions in the message. For instructions on using the Setup Utility, see "Using the Setup Utility" on page 31.
- A blinking cursor appears. See the *HelpWare* book for information on obtaining service.
- The image on the screen is unreadable (the image is scrolling, blinking, or flashing). You may have selected a monitor setting that your monitor does not support. Follow these steps to reconfigure your monitor:
  a. Restart the computer. If necessary, turn off the system, pause for 15 seconds, and then turn the system back on.
  b. When you see "Starting Windows 95" appear on the screen during startup, press F5. This starts Safe Mode. Safe Mode runs your computer using a subset of device drivers.
  c. When your computer has completed startup, double-click on the My Computer desktop icon.
  d. In the My Computer window, double-click on the Control Panel icon.
  e. In the Control Panel window, double-click on the Display icon.
  f. In the Display Properties window, click on the Settings tab.
  g. See "Changing display settings" on page 12 for instructions on selecting new monitor settings.
  h. Restart the computer again. Your computer may take a little longer than usual to restart.
- The colors displayed are wrong. Check to make sure the monitor cable is correctly and securely connected to the tower. Your *Read me first* book shows how the cable should be connected.

(Steps continued on the next page.)

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

- 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 media console.

     The keyboard port has this symbol next to it:

     The mouse port has this symbol next to it:

  b. Turn off the system, pause for 15 seconds, and then turn it on again.

If the problem you are having continues, or if it does not appear in this list, look for a description of the problem in the troubleshooting tables that begin on page 107.

No

- There may be a problem with the monitor.
  a. Make sure your monitor cables are correctly and securely connected. Your *Read me first* book shows how the cables should be connected.
  b. Adjust the brightness and contrast controls on the monitor. For instructions, 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 77 for instructions on replacing the battery.

If the problem continues, see the *HelpWare* book for information on obtaining service.

Solving hardware problems

Table 3: Troubleshooting: Hardware problems

If the problem is:	Here's what to do:
No beep during power-on self test (POST).	Make sure that the system is turned on. For information about POST, see "System memory test" on page 47.
Either of the following: • Screen is black (no error code) • More than one beep occurs in self test	• 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 system memory modules" on page 71. For instructions on installing adapter cards in your tower, see "Adding and removing adapter cards" on page 84. • If you did not install memory modules or adapter cards, see the *HelpWare* book for information on obtaining service.
Any of the following: • Error code is displayed • More than one beep occurs in self test • Continuous beep occurs	If an error code: • Is displayed, find the code in "Responding to error codes" on page 129 and take the action listed. • Is not displayed, see the *HelpWare* book for information on obtaining service.
Note: If any of these problems continue after taking the actions listed, see your online Aptiva Helper for information on running diagnostics. If you need service, see the *HelpWare* book.	

Table 3: Troubleshooting: Hardware problems (Continued)

If the problem is:	Here's what to do:
Computer turns off without warning.	1. If the Standby feature is enabled, move the mouse to exit Standby. 2. If the Rapid Resume feature is enabled and you have set up the Automatic Power Off option, or set the Scheduler feature to turn off the system, turn the system back on. 3. Make sure that the tower and monitor power cords are securely plugged into electrical outlets. 4. Make sure that the cables are correctly and securely connected to the tower and the media console. 5. Check for a blown fuse, tripped circuit breaker, or power failure. 6. Unplug the tower power cord from the electrical outlet, wait 15 seconds, and then plug the power cord back into the electrical outlet. If the computer does not start immediately, push the system on/off button.
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 media console. The keyboard port has this symbol next to it: 3. If you have forgotten your password, see the *HelpWare* book for information on obtaining service.
Note: If any of these problems continue after taking the actions listed, see your online Aptiva Helper for information on running diagnostics. If you need service, see the *HelpWare* book.	

Table 3: Troubleshooting: Hardware problems (Continued)

If the problem is:	Here's what to do:
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. If the drive you are using is in the tower and not the media console, make sure the drive power and signal cables are securely attached to the back of the drive. For instructions on working in the tower, see "Chapter 7: Adding and removing adapter cards and drives" on page 81. 6. If the drive you are using is in the media console, see the *HelpWare* book for information on obtaining service.
Audio CD does not play when inserted into CD-ROM drive.	Make sure you have enabled AutoPlay. To enable AutoPlay, follow these steps: 1. From the Windows 95 desktop, double-click on the My Computer icon. 2. In the My Computer window, double-click on the Control Panel folder. 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. Double-click on the CD-ROM list item and then double-click on the listed CD-ROM option. 6. In the Properties window, click on the Settings tab. 7. Under Options, click on the Auto insert notification check box to add a check to the box. 8. Click on OK. Note: If you enable AutoPlay, then Standby and Automatic Power Off might not work properly.
Note: If any of these problems continue after taking the actions listed, see your online Aptiva Helper for information on running diagnostics. If you need service, see the *HelpWare* book.	

Table 3: Troubleshooting: Hardware problems (Continued)

If the problem is:	Here's what to do:
Can't send information (write) to diskette.	1. Make sure you are using the correct type of diskette. Make sure the diskette is formatted correctly. 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. In the Setup Utility, make sure the Diskette Drive Access option is enabled. For information about this Setup Utility option, see "Configuring advanced options" on page 48. 6. If the drive you are using is in the tower and not the media console, make sure the drive power and signal cables are securely attached to the back of the drive. For instructions on working in the tower, see "Chapter 7: Adding and removing adapter cards and drives" on page 81. 7. If the drive you are using is in the media console, see the *HelpWare* book for information on obtaining service.
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. In the Setup Utility, make sure the Diskette Drive Access option is enabled. For information about this Setup Utility option, see "Configuring advanced options" on page 48. 4. If the drive you are using is in the tower and not the media console, make sure the drive power and signal cables are securely attached to the back of the drive. For instructions on working in the tower, see "Chapter 7: Adding and removing adapter cards and drives" on page 81. 5. If the drive you are using is in the media console, see the *HelpWare* book for information on obtaining service.
Note: If any of these problems continue after taking the actions listed, see your online Aptiva Helper for information on running diagnostics. If you need service, see the *HelpWare* book.	

Table 3: Troubleshooting: Hardware problems (Continued)

If the problem is:	Here's what to do:
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 media console. The keyboard port has this symbol next to it: 2. Move your fingers across the keys. Make sure no keys are stuck. 3. Make sure you are using a screen that allows typing. Some screens do not. 4. Turn off the system, wait 15 seconds, and then turn the system on again.
Mouse does not move the cursor.	1. Move the mouse onto a mouse pad and try using the pad. 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 media console. The mouse port has this symbol next to it: 4. Clean the mouse. To clean the mouse, follow these steps: a. Turn off the computer. b. Disconnect the mouse cable from the media console. 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 media console. 5. Turn off the system, wait 15 seconds, and then turn the system on again.
Note: If any of these problems continue after taking the actions listed, see your online Aptiva Helper for information on running diagnostics. If you need service, see the *HelpWare* book.	

Table 3: Troubleshooting: 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 *Read me first* book 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 you are calling the correct number, and that you are using the correct communications settings. For additional help, refer to the documentation for your communications software. 4. Make sure no one is using the telephone while you are communicating with another computer. 5. If some communications programs work but others do not, there may be a configuration problem. For additional help, refer to the documentation for your communications software. 6. Make sure your modem cord is connected to an analog telephone line. For additional help, see "Setting up communications" on page 18. 7. Make sure the modem adapter card is installed correctly. For instructions on installing adapter cards, see "Adding and removing adapter cards" on page 84.
Note: If any of these problems continue after taking the actions listed, see your online Aptiva Helper for information on running diagnostics. If you need service, see the *HelpWare* book.	

Table 3: Troubleshooting: Hardware problems (Continued)

If the problem is:	Here's what to do:
When the computer is turned on, a picture appears indicating a diskette should be inserted into drive A:.	1. Use the Setup Utility to make sure that startup devices are set correctly. For information about these Setup Utility options, see "Configuring startup options" on page 47. 2. Make sure the drive power and signal cables are securely attached to the back of the hard disk drive in the tower. For instructions on working in the tower, see "Adding and removing drives" on page 87. 3. Insert the *Product Recovery CD-ROM* into the CD-ROM drive and press Ctrl + Alt + Delete. Follow the instructions on the screen to restore the operating system files to your computer's hard disk. Attention! This recovery process formats your hard drive, erasing all files. 4. If you are not able to restore the operating system files to your computer's hard disk, see the *HelpWare* book for information on obtaining service.
Note: If any of these problems continue after taking the actions listed, see your online Aptiva Helper for information on running diagnostics. If you need service, see the *HelpWare* book.	

Table 3: Troubleshooting: Hardware problems (Continued)

If the problem is:	Here's what to do:
Printer error.	1. Make sure the printer cable is correctly and securely connected to the printer and to the parallel (printer) port on the back of the tower. The printer port has this symbol next to it: 2. Make sure the printer power cord is securely connected to an electrical outlet. 3. Make sure the printer is ready for printing. (If the ready light is on, but not flashing, the printer is ready.) 4. If a printer driver is required, make sure the correct printer driver is selected in the software. For instructions on selecting a printer driver, see "Getting ready to print" on page 17. 5. Make sure the paper and the cartridge containing the print material (ink, ribbon, or toner) are loaded correctly. 6. Turn off the printer and computer and wait 15 seconds. Then turn on the printer first, followed by the computer. 7. If you are printing from Windows 95, look in the Device Manager to see if any error symbols appear for the port used by the printer. For information on Device Manager, see "Starting and using the Windows 95 Device Manager" on page 60. 8. If you are printing from DOS, make sure the Parallel Port option is not disabled in the Setup Utility. For information about this Setup Utility option, see "Changing input/output port configuration" on page 38. 9. Make sure the Parallel Port Mode option in the Setup Utility is set to a mode that matches your printer. For information about this Setup Utility option, see "Changing input/output port configuration" on page 38. 10. For additional help, refer to the documentation that came with the printer.
Note: If any of these problems continue after taking the actions listed, see your online Aptiva Helper for information on running diagnostics. If you need service, see the *HelpWare* book.	

Solving software problems

Table 4: Troubleshooting: Software problems

If the problem is:	Here's what to do:
Computer automatically turns off instead of entering Standby.	Make sure the Standby timer is set to a shorter period of time than the Automatic Power Off timer.
You hear 3 beeps when you turn off the computer or try to suspend.	Sometimes installing new software changes the information your computer uses to start. If you installed new software, make sure the following line is still in the AUTOEXEC.BAT file, and "REM" does not appear at the beginning of the line: C:\IBMTOOLS\IBMPFILE.EXE

Notes:

1. Periodically use the IBM Update Connector to look for updates for the software that came from the factory with your computer. For information about the IBM Update Connector, see "Where to find more information" on page 6.
2. If any of these problems continue after taking the actions listed, see your online Aptiva Helper for information on running diagnostics. If you need service, see the *HelpWare* book.

Table 4: Troubleshooting: Software problems (Continued)

If the problem is:	Here's what to do:
Computer doesn't enter Standby or Automatic 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 a Windows 95 screen saver. These activities make the timer start over. 2. Make sure you leave the mouse on a surface that does not vibrate. Leaving the mouse on top of your computer or on top of another machine may reset the timer before the set time has elapsed. 3. Make sure AutoPlay is disabled or BIOS checking of hard disk and CD-ROM drives is disabled. When both hard disk and CD-ROM drive checking and AutoPlay are enabled, Rapid Resume detects activity in the CD-ROM drive and keeps the computer from going into Standby and Automatic Power Off. For information about hard disk and CD-ROM checking, see "Rapid Resume advanced options" on page 43. 4. If the computer does not automatically turn off, make sure the Automatic Power Off option is enabled in the Rapid Resume Manager or on the Rapid Resume menu of the Setup Utility. For instructions on working in the Rapid Resume Manager, see "Chapter 3: Understanding the Rapid Resume features" on page 23. For instructions on configuring Rapid Resume features in the Setup Utility, see "Changing Rapid Resume features configuration" on page 40. 5. Allow a few minutes more than the specified time. Windows 95 periodically accesses the hard disk for memory swapping and this activity resets the Standby timer. Windows 95 might access the hard disk for a short time after you last touched your computer.
The Rapid Resume features menu does not appear in the Setup Utility and the Rapid Resume Manager icon does not appear in the AptivaWare window.	See the *HelpWare* book for information on obtaining service.

Notes:

1. Periodically use the IBM Update Connector to look for updates for the software that came from the factory with your computer. For information about the IBM Update Connector, see "Where to find more information" on page 6.
2. If any of these problems continue after taking the actions listed, see your online Aptiva Helper for information on running diagnostics. If you need service, see the *HelpWare* book.

Table 4: Troubleshooting: Software problems (Continued)

If the problem is:	Here's what to do:
When you turn on the computer, the desktop is not as you left it when you turned off the computer.	1. Make sure another person hasn't used the computer and changed the desktop. 2. Make sure Rapid Resume is enabled. 3. In the Setup Utility, make sure the APM BIOS Mode option is set correctly for the operating system you are using. For information about this Setup Utility option, see "Changing Rapid Resume features configuration" on page 40.
Computer turns off without saving desktop.	1. Make sure Rapid Resume is enabled. 2. Make sure Windows 95 is running when you turn off or suspend your computer. If you are running DOS instead of Windows, Rapid Resume will not work. 3. Make sure the APM BIOS Mode option in the Setup Utility is set to Rapid Resume. For information about this option, see "Changing Rapid Resume features configuration" on page 40. 4. Make sure the On/Off Button Mode option in the Setup Utility is set to Rapid Resume. For information about this option, see "Rapid Resume advanced options" on page 43. 5. EMM386 or an upper memory manager program may not be set up properly.
You pressed the system on/off button, but the computer has not turned off after 5 minutes.	See the *HelpWare* book for information on obtaining service.
A program you were using when you suspended your computer is not active when you turn on the computer to resume working.	Restart the program. Some programs will not operate correctly with Rapid Resume.

Notes:

1. Periodically use the IBM Update Connector to look for updates for the software that came from the factory with your computer. For information about the IBM Update Connector, see "Where to find more information" on page 6.
2. If any of these problems continue after taking the actions listed, see your online Aptiva Helper for information on running diagnostics. If you need service, see the *HelpWare* book.

Table 4: Troubleshooting: Software problems (Continued)

If the problem is:	Here's what to do:
Adapter cards don't work after you turn on the computer to resume working.	In the Setup Utility, make sure the Initialize Adapter Cards option is set to Reload Device Drivers. Some adapter cards do not operate correctly with Rapid Resume. For information about this Setup Utility option, see "Changing Rapid Resume features configuration" on page 40.
Computer turns off or screen goes blank during activity (for example, when using a joystick).	1. Press the system on/off button. 2. Increase the Automatic Power Off time. 3. Disable Rapid Resume and Standby during long periods of activity, such as when using a joystick.
The game or program you were using does not have sound after a Rapid Resume.	You were probably playing a game or using a program that communicates directly to the sound card, instead of communicating through the driver to the sound card. The game or program must communicate with the driver in order for Rapid Resume to restore the game or program. 1. Restart the program. 2. Restart the computer.
You need to reset your computer because it does not respond to input from the keyboard and you cannot reset because Rapid Resume is enabled for the system on/off button.	1. Press the system on/off button. 2. Press Ctrl + Alt + Delete when you see the Rapid Resume screen. There may be a slight delay before the computer restarts. Attention! Any data that is not saved before you press Ctrl + Alt + Delete will be lost.

Notes:

1. Periodically use the IBM Update Connector to look for updates for the software that came from the factory with your computer. For information about the IBM Update Connector, see "Where to find more information" on page 6.
2. If any of these problems continue after taking the actions listed, see your online Aptiva Helper for information on running diagnostics. If you need service, see the *HelpWare* book.

Table 4: Troubleshooting: Software problems (Continued)

If the problem is:	Here's what to do:
You added hardware or installed new software and you want to cancel Rapid Resume and restart the computer.	1. Turn on the monitor. 2. Turn on the system. 3. Press Ctrl + Alt + Delete when you see the Rapid Resume screen. There may be a slight delay before the computer restarts. Attention! Any data that is not saved before you press Ctrl + Alt + Delete will be lost.
Computer shuts off without press of the system on/off button.	1. In Rapid Resume Manager, check the Scheduler feature and the Automatic Power Off option of the Rapid Resume feature to see if either of them is set to turn off the computer. 2. Check to see if the Automatic Power Off feature is enabled in the Setup Utility. For information about this Setup Utility option, see "Changing Rapid Resume features configuration" on page 40.
You set the computer to start when the phone rings so you can receive a fax, but the computer receives a regular phone call instead.	If you have an Mwave card: • Make sure that RingCentral is running. If your sound card and modem are separate: • Either disable the Wake Up on Ring feature in the Setup Utility or disable the Auto Answer feature in your fax software. Use Wake Up on Ring only when you know you will have incoming fax communications. For information on the Setup Utility's Wake Up on Ring option, see "Changing Rapid Resume features configuration" on page 40.

Notes:

1. Periodically use the IBM Update Connector to look for updates for the software that came from the factory with your computer. For information about the IBM Update Connector, see "Where to find more information" on page 6.
2. If any of these problems continue after taking the actions listed, see your online Aptiva Helper for information on running diagnostics. If you need service, see the *HelpWare* book.

Table 4: Troubleshooting: Software problems (Continued)

If the problem is:	Here's what to do:
You click on the Suspend option in the Start menu and your computer does not turn off.	Rapid Resume must be enabled for the Suspend option in the Start menu to work properly. Use the Rapid Resume Manager to make sure Rapid Resume is enabled. For instructions on starting the Rapid Resume Manager, see "Starting the Rapid Resume Manager" on page 24. For instructions on enabling Rapid Resume, see "Rapid Resume" on page 24.
Your computer turns on automatically when you dial out on a rotary or pulse telephone.	Either disable the Wake Up on Ring feature in the Setup Utility or disable the Auto Answer feature in your fax software. Use Wake Up on Ring only when you know you will have incoming fax communications. For information on the Setup Utility's Wake Up on Ring option, see "Changing Rapid Resume features configuration" on page 40.
The phone rings and the computer turns on, but a fax isn't received.	1. The fax software must be open and set to receive faxes. Refer to the documentation that came with your fax software to make sure it is set up to answer the phone. 2. Some people or fax machines may not let the phone ring long enough for your computer to turn itself on and answer the phone. If you need to receive critical phone calls or faxes, you may want to leave your computer in Standby instead of suspending your computer or using Automatic Power Off.
Snapshot is enabled (turned on), but the computer does not Rapid Resume after a power failure.	So Snapshot can work properly after a power failure, make sure that: 1. Rapid Resume is enabled. 2. Standby is enabled. 3. Snapshot is enabled. 4. Your computer is in Standby when the power failure occurs. For information on the Rapid Resume feature, see "Rapid Resume" on page 24. For information on the Standby and Snapshot features, see "Standby features" on page 26.

Notes:

1. Periodically use the IBM Update Connector to look for updates for the software that came from the factory with your computer. For information about the IBM Update Connector, see "Where to find more information" on page 6.
2. If any of these problems continue after taking the actions listed, see your online Aptiva Helper for information on running diagnostics. If you need service, see the *HelpWare* book.

Table 4: Troubleshooting: Software problems (Continued)

If the problem is:	Here's what to do:
A POST error code appears after you turn on your computer using Rapid Resume.	1. Record the error code. 2. Press the system on/off button to turn off the computer. 3. If you have not installed or removed hardware, find the error code in "Responding to error codes" on page 129 and take the action listed. If you have installed or removed hardware, follow these steps: a. Return the computer to its previous hardware configuration. b. Turn on the computer. c. If the error does not reoccur, save any work you want to keep. d. Use the Setup Utility to verify that the On/Off Button Mode option is set to Power Off. For information about this Setup Utility option, see "Rapid Resume advanced options" on page 43. e. After you have saved your Setup Utility changes, wait until the Windows 95 desktop is displayed. Then use the system on/off button to turn off the computer again. f. Try updating your computer's hardware again. If you are working with the hardware in your tower, make sure you follow the instructions in "Chapter 7: Adding and removing adapter cards and drives" on page 81. If you are working with the components on your system board, make sure you follow the instructions in "Chapter 6: Adding and replacing system board components" on page 63. g. If the error occurs again, see the *HelpWare* book for information on obtaining service.

Notes:

1. Periodically use the IBM Update Connector to look for updates for the software that came from the factory with your computer. For information about the IBM Update Connector, see "Where to find more information" on page 6.
2. If any of these problems continue after taking the actions listed, see your online Aptiva Helper for information on running diagnostics. If you need service, see the *HelpWare* book.

Table 4: Troubleshooting: Software problems (Continued)

If the problem is:	Here's what to do:
You receive an error stating that the CD-ROM is not present after you insert the CD-ROM into the drive and start the application on the CD-ROM.	1. Make sure the media console is plugged into the back of the tower. Refer to the *Read me first* book for information about plugging in your media console. 2. Look in the Windows 95 Device Manager for the CD-ROM drive. If the CD-ROM is not present, see the *HelpWare* book for information on obtaining service. 3. See the System Information menu in the Setup Utility. If the menu does not show the CD-ROM Drive 5 option and also identify the drive as installed, see the *HelpWare* book for information on obtaining service. For information on the System Information menu in the Setup Utility, see "Viewing system information" on page 35.

Notes:

1. Periodically use the IBM Update Connector to look for updates for the software that came from the factory with your computer. For information about the IBM Update Connector, see "Where to find more information" on page 6.
2. If any of these problems continue after taking the actions listed, see your online Aptiva Helper for information on running diagnostics. If you need service, see the *HelpWare* book.

Solving monitor problems

Table 5: Troubleshooting: Monitor problems

If the problem is:	Here's what to do:
Discolored screen.	1. Make sure that your monitor controls are adjusted correctly. 2. Move the monitor away from any equipment that might cause magnetic interference; for example, other monitors, external audio speakers, or microphones. (Some models of the computer come with microphones and speakers, which are shielded to prevent magnetic interference.) Turn off the monitor, wait 30 minutes, and then turn on the monitor again. 3. Select a new color depth setting.
Picture shape on monitor screen is poor.	Adjust the monitor controls. For instructions, refer to the documentation that came with the monitor.
Display fonts appear cut off or pushed together.	While your monitor resolution may let you change the font size, some programs do not support large fonts. Large fonts may cause words to appear cut off or pushed together. Check the display properties settings to verify that small fonts are selected. For instructions on working with display properties, see "Changing display settings" on page 12.
White screen.	1. Make sure the monitor cable is correctly and securely connected to the tower. 2. Make sure the system is turned on. 3. If another monitor is available, connect it to your tower. If the problem is corrected, something may be wrong with your monitor.
Flickering or unsteady picture on monitor screen.	1. Select display settings for a lower resolution, fewer colors, or a higher refresh rate. For instructions on working with display properties, see "Changing display settings" on page 12. 2. If your monitor is located close to another monitor, move the two monitors farther away from each other.
Note: If any of these problems continue after taking the actions listed, refer to the documentation that came with your monitor. If you need service, see the *HelpWare* book.	

Table 5: Troubleshooting: Monitor problems (Continued)

If the problem is:	Here's what to do:
Screen is an intense yellow, magenta (purple or red-blue), or cyan (blue-green) color.	Refer to the documentation that came with your monitor. If you need service, see your *HelpWare* book.
Adjustments from earlier use were not saved.	You may have selected more user-definable modes than the monitor can save. When this occurs, the newest mode replaces the oldest mode. Use the monitor controls to adjust the image for the display mode you are using.
Image control lights on the monitor flash consecutively.	1. Make sure the monitor cable is correctly and securely connected to the tower. 2. The monitor is using settings that have not yet been stored in its memory. Adjust the monitor controls so that the screen is adjusted the way you want it. The settings will be saved and the indicator lights will not flash.
Any of the following: • Totally blank screen • No cursor is displayed • Only the cursor is displayed • Screen is unreadable • Other monitor problems	1. If you have enabled the Standby feature, press the Shift key or move the mouse to exit Standby. 2. If you have enabled the Rapid Resume and Automatic Power Off features, turn the system back on. If necessary, turn the monitor back on. 3. Make sure the monitor cable is correctly and securely connected to the tower. 4. Make sure the tower and monitor power cords are securely plugged into electrical outlets. 5. Make sure the system and monitor are turned on. (The power lights on the media console and the monitor are lit when the power is on.) 6. Adjust the monitor controls. 7. Change the background colors in your software program or try using a different software program. 8. Unplug the tower power cord from the electrical outlet, wait 15 seconds, and then plug the power cord back into the electrical outlet. If the computer does not start immediately, push the system on/off button.
Note: If any of these problems continue after taking the actions listed, refer to the documentation that came with your monitor. If you need service, see the *HelpWare* book.	

Solving audio, multimedia, and modem problems (Mwave)

Table 6: Troubleshooting: Mwave multimedia problems

If the problem is:	Here's what to do:
You don't hear sound from the audio program when you start the modem.	Set the modem to operate at a lower transfer rate. For help with setting modem transfer rates, follow these steps: 1. From the Windows 95 desktop, click on the Start button. 2. Move your mouse pointer to the Programs menu and then the Mwave menu. 3. Click on the Mwave Help option. 4. Look for troubleshooting information.
You don't hear sound when you play DOS games or use DOS programs.	1. Make sure the game or program is configured to use SoundBlaster emulation. Refer to the documentation that came with your DOS program for instructions on selecting sound card settings. 2. Shut down and restart your computer in MS-DOS mode. Then try to run the program again. 3. Use the Mwave FASTCFG utility to set the Mwave card for SoundBlasterPro. For help with the FASTCFG utility, follow these steps: a. From the Windows 95 desktop, click on the Start button. b. Move your mouse pointer to the Programs menu and then the Mwave menu. c. Click on the Mwave Help option.
Note: If any of these problems continue after taking the actions listed, refer to the documentation that came with your Mwave card or your modem and audio cards. If you find no solution there, see your online Aptiva Helper for information on running diagnostics. If you need service, see the *HelpWare* book.	

Table 6: Troubleshooting: Mwave multimedia problems (Continued)

If the problem is:	Here's what to do:
Your modem doesn't work when you play DOS games or use DOS programs.	Make sure the Mwave FASTCFG utility is set for TELEGAME applications. This setting lets your computer use SoundBlaster emulation and 14.4 Kbps modem connections simultaneously. For help with the FASTCFG utility, follow these steps: 1. From the Windows 95 desktop, click on the Start button. 2. Move your mouse pointer to the Programs menu and then the Mwave menu. 3. Click on the Mwave Help option.
You don't hear sound in Windows 95.	1. Make sure your speakers are connected properly. If your speakers have a power light, make sure the light is lit. For instructions on connecting your speakers, refer to the *Read me first* book. 2. Make sure the program you are using is configured to use SoundBlaster emulation. 3. Use the Mwave QuickTests utility to test your audio configuration. To start the Mwave QuickTests utility, follow these steps: a. From the Windows 95 desktop, click on the Start button. b. Move your mouse pointer to the Programs menu and then the Mwave menu. c. Click on the Mwave Quick Test option.
Note: If any of these problems continue after taking the actions listed, refer to the documentation that came with your Mwave card or your modem and audio cards. If you find no solution there, see your online Aptiva Helper for information on running diagnostics. If you need service, see the *HelpWare* book.	

Table 6: Troubleshooting: Mwave multimedia problems (Continued)

If the problem is:	Here's what to do:
When you try to use the modem, your computer is unable to detect the modem.	1. Use the Mwave QuickTests utility to test your audio configuration. To start the Mwave QuickTests utility, follow these steps: a. From the Windows 95 desktop, click on the Start button. b. Move your mouse pointer to the Programs menu and then the Mwave menu. c. Click on the Mwave Quick Test option. 2. Make sure your communications program is configured correctly. The following settings are suggested for compatibility: • Modem type: - Mwave modem - Generic Hayes-type modem - Hayes compatible error correcting - Hayes compatible high speed - User-defined modem - Hayes SmartModem 2400 - Hayes modem - Other If you select a modem type of Other, you must include the proper modem initialization string. For most applications, the initialization string AT&F will work. For more information, see the Mwave modem online help. • Baud rate: - 57.6 Kbps or the maximum setting offered by your communications software • COM port: - COM1
Note: If any of these problems continue after taking the actions listed, refer to the documentation that came with your Mwave card or your modem and audio cards. If you find no solution there, see your online Aptiva Helper for information on running diagnostics. If you need service, see the *HelpWare* book.	

Table 6: Troubleshooting: Mwave multimedia problems (Continued)

If the problem is:	Here's what to do:
When you try to use the modem, your computer or modem is unable to detect a dial tone.	1. Make sure the telephone line is correctly connected to your computer. For instructions on connecting your computer to the telephone network, refer to the *Read me first* book. 2. Use the Mwave QuickTests utility to test the modem and phone line. To start the Mwave QuickTests utility, follow these steps: a. From the Windows 95 desktop, click on the Start button. b. Move your mouse pointer to the Programs menu and then the Mwave menu. c. Click on the Mwave Quick Test option. 3. Add the modem command x3 to the initialization string for the communications program you are using. For help with changing the initialization string, refer to the documentation that came with your communications program.
Note: If any of these problems continue after taking the actions listed, refer to the documentation that came with your Mwave card or your modem and audio cards. If you find no solution there, see your online Aptiva Helper for information on running diagnostics. If you need service, see the *HelpWare* book.	

Responding to error codes

Table 7: Error codes, descriptions, and corrective actions

Error Code	Description	Here's what to do:
	No beep during power-on self test (POST)	Make sure that the system is turned on. For information about POST, see "System memory test" on page 47.
	Either of the following: • Screen is black (no error code) • More than one beep occurs in self test	• 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 system memory modules" on page 71. For instructions on installing adapter cards in your tower, see "Adding and removing adapter cards" on page 84. • If you did not install memory modules or adapter cards, see the *HelpWare* book for information on obtaining service.
10X 129	System Board Error	Turn off the system, wait 15 seconds, and then turn on the system again.
110	System Board Parity Error	1. Make sure all system memory modules are installed correctly. For instructions on installing system memory modules, see "Installing system memory modules" on page 71. 2. Turn off the system, wait 15 seconds, and then turn on the system again.
111 114	I/O Channel Parity Error Adapter ROM Error	1. Make sure all adapter cards are installed correctly. For instructions on installing adapter cards in your tower, see "Adding and removing adapter cards" on page 84. 2. Turn off the system, wait 15 seconds, and then turn on the system again.

Notes:

1. An X shown as part of the error code in this table represents any number between 0 and 9.
2. If any of these problems continue after taking the actions listed, see your online Aptiva Helper for information on running diagnostics. If you need service, see the *HelpWare* book.

Table 7: Error codes, descriptions, and corrective actions (Continued)

Error Code	Description	Here's what to do:
127	Processor Speed Error	• If you changed the processor, it may not be fully supported by the BIOS. The computer will operate normally but you will always see this error when you turn on the computer. • If you did not change the processor, turn off the system, wait 15 seconds, and then turn on the system again.
129	System Board Error	See error code 10X on page 129.
151	Date and Time Incorrect	See error code 163 on page 132.
161	Bad CMOS Battery	Make sure the battery is installed correctly. If the error continues, install a new battery. For instructions on installing the battery, see "Replacing the system battery" on page 77.

Notes:

1. An X shown as part of the error code in this table represents any number between 0 and 9.
2. If any of these problems continue after taking the actions listed, see your online Aptiva Helper for information on running diagnostics. If you need service, see the *HelpWare* book.

Table 7: Error codes, descriptions, and corrective actions (Continued)

Error Code	Description	Here's what to do:
162	Configuration Error Configuration Change Has Occurred	If you are using Rapid Resume, and if you have not installed or removed hardware, see the *HelpWare* book for information on obtaining service. Any work that you did not save before the computer was turned off cannot be retrieved. If you are using Rapid Resume, and if you have installed or removed hardware, follow these steps: 1. Press the system on/off button to turn off the computer. 2. Return the computer to its previous hardware configuration. 3. Turn on the computer. 4. If the error does not reoccur, save any work you want to keep. 5. Use the Setup Utility to verify that the On/Off Button Mode option is set to Power Off. For information about this Setup Utility option, see "Rapid Resume advanced options" on page 43. 6. After you have saved your Setup Utility changes, wait until the Windows 95 desktop is displayed. Then use the system on/off button to turn off the computer again. 7. Try updating your computer's hardware again. If you are working with the hardware in your tower, make sure you follow the instructions in "Chapter 7: Adding and removing adapter cards and drives" on page 81. If you are working with the components on your system board, make sure you follow the instructions in "Chapter 6: Adding and replacing system board components" on page 63. 8. If the error occurs again, see the *HelpWare* book for information on obtaining service. *(Steps continued on the next page.)*

Notes:

1. An X shown as part of the error code in this table represents any number between 0 and 9.
2. If any of these problems continue after taking the actions listed, see your online Aptiva Helper for information on running diagnostics. If you need service, see the *HelpWare* book.

Table 7: Error codes, descriptions, and corrective actions (Continued)

Error Code	Description	Here's what to do:
162 (cont)		If you are not using Rapid Resume, follow these steps: 1. Press Enter while the error message is displayed. This starts the Setup Utility. 2. Look through the Setup Utility and verify that the options with ▶ next to them were supposed to change. 3. If the settings are correct, save the settings when you exit the Setup Utility. 4. If options changed that were not supposed to change, see the *HelpWare* book for information on obtaining service. For more information on using the Setup Utility, see "Using the Setup Utility" on page 31.
163 151	Date and Time Incorrect	1. The clock module on the system board may not be set correctly. To set the correct date and time, press Enter while the error message is displayed. This starts the Setup Utility. For instructions on using the Setup Utility to set the date and time, see "Setting the date and time" on page 48. 2. You may need to replace the system battery. For these instructions, see "Replacing the system battery" on page 77.

Notes:

1. An X shown as part of the error code in this table represents any number between 0 and 9.
2. If any of these problems continue after taking the actions listed, see your online Aptiva Helper for information on running diagnostics. If you need service, see the *HelpWare* book.

Table 7: Error codes, descriptions, and corrective actions (Continued)

Error Code	Description	Here's what to do:
164	Memory Size Error	If you are using Rapid Resume and you have installed or removed hardware, follow these steps: 1. Press the system on/off button to turn off the computer. 2. Return the computer to its previous hardware configuration. 3. Turn on the computer. 4. If the error does not reoccur, save any work you want to keep. 5. Use the Setup Utility to verify that the On/Off Button Mode option is set to Power Off. For information about this Setup Utility option, see "Rapid Resume advanced options" on page 43. 6. After you have saved your Setup Utility changes, wait until the Windows 95 desktop is displayed. Then use the system on/off button to turn off the computer again. 7. Try updating your computer's hardware again. If you are working with the hardware in your tower, make sure you follow the instructions in "Chapter 7: Adding and removing adapter cards and drives" on page 81. If you are working with the components on your system board, make sure you follow the instructions in "Chapter 6: Adding and replacing system board components" on page 63. 8. If the error occurs again, see the *HelpWare* book for information on obtaining service. If you are not using Rapid Resume and you have added or removed system memory in your computer, press Enter while the error message is displayed. This starts the Setup Utility. See "Viewing system information" on page 35 for information to help you verify that the new memory size is correct. If you are not using Rapid Resume and you have not added or removed system memory in your computer, see the *HelpWare* book for information on obtaining service.

Notes:

1. An X shown as part of the error code in this table represents any number between 0 and 9.
2. If any of these problems continue after taking the actions listed, see your online Aptiva Helper for information on running diagnostics. If you need service, see the *HelpWare* book.

Table 7: Error codes, descriptions, and corrective actions (Continued)

Error Code	Description	Here's what to do:
201	Memory Error	Make sure the system memory modules (SIMMs) are installed correctly and securely. For instructions on installing SIMMs, see "Installing system memory modules" on page 71.
229	External Cache Error	If you have added any external cache modules, make sure they are installed correctly and securely. For instructions on installing cache memory modules, see "Installing cache memory modules" on page 69.
264	External Cache Size Error	• If you have removed cache memory from your computer, press Enter while the error message is displayed. This starts the Setup Utility. See "Viewing system information" on page 35 for information to help you verify that the new cache memory size is correct. • If you have not removed cache memory from your computer, see the *HelpWare* book for information on obtaining service.
30X	Keyboard Error	1. Make sure the keyboard and mouse cables are correctly and securely connected to the ports on the back of the tower. The keyboard port has this symbol next to it: The mouse port has this symbol next to it: 2. Make sure that a keyboard key or a mouse button is not being held down.
602	Diskette Boot Error	Make sure the diskette has been formatted. If you don't want to use the diskette to boot (start) your computer, remove the diskette from the drive.

Notes:

1. An X shown as part of the error code in this table represents any number between 0 and 9.
2. If any of these problems continue after taking the actions listed, see your online Aptiva Helper for information on running diagnostics. If you need service, see the *HelpWare* book.

Table 7: Error codes, descriptions, and corrective actions (Continued)

Error Code	Description	Here's what to do:
662	Diskette Drive Configuration Error	1. If you added or removed a diskette drive, press Enter while the error message is displayed. This starts the Setup Utility. See "Changing disk drive configuration" on page 35 for information to help you verify that the diskette drive settings are correct. If the settings are not correct, change the settings. 2. Make sure the diskette drive cables are connected correctly and securely. See "Adding and removing drives" on page 87 for information to help you check these connections.
762	Math Coprocessor Configuration Error	See the *HelpWare* book for information on obtaining service.
962	Parallel Port Configuration Error	If you installed or removed hardware, press Enter while the error message is displayed. This starts the Setup Utility. See "Changing input/output port configuration" on page 38 for information to help you verify that the parallel port settings are correct. If the settings are not correct, change the settings.
1162	Serial Port Configuration Error	If you installed or removed hardware, press Enter while the error message is displayed. This starts the Setup Utility. See "Changing input/output port configuration" on page 38 for information to help you verify that the serial port settings are correct. If the settings are not correct, change the settings.
1762	Hard Disk Configuration Error	1. Make sure the cables to all drives in the tower are securely connected. See "Adding and removing drives" on page 87 for information to help you check these connections. 2. Press Enter while the error message is displayed. This starts the Setup Utility. See "Changing disk drive configuration" on page 35 for information to help you verify that the drive settings are correct. If the settings are not correct, change the settings.

Notes:

1. An X shown as part of the error code in this table represents any number between 0 and 9.
2. If any of these problems continue after taking the actions listed, see your online Aptiva Helper for information on running diagnostics. If you need service, see the *HelpWare* book.

Table 7: Error codes, descriptions, and corrective actions (Continued)

Error Code	Description	Here's what to do:
1780 1781 1782 1783	Drive 1 (Hard Disk) Error Drive 2 (Hard Disk) Error Drive 3 (Hard Disk) Error Drive 4 (Hard Disk) Error	1. Make sure the cables to all drives in the tower are securely connected. See "Adding and removing drives" on page 87 for information to help you check these connections. 2. Press Enter while the error message is displayed. This starts the Setup Utility. See "Viewing system information" on page 35 for information to help you verify that the processor speed setting is correct. (Find the processor speed [in MHz] on the label attached to the front of your tower.) If the setting is not correct, see the *HelpWare* book for information on obtaining service. 3. In the tower, make sure the hard disk signal cable is attached to the correct connector on the system board. Also make sure the master/slave jumper settings on the hard disk are correct. For information about drive connectors and master/slave jumper settings in the tower, see "Adding and removing drives" on page 87.
180X	PCI or Plug and Play (PnP) Adapter Card Resource Error	1. If you installed a new PCI or PnP adapter card, use the Setup Utility to verify that the resources allocated to any other installed adapter cards are actually required by the other cards. For information about assigning ISA Legacy resources in the Setup Utility, see "Changing adapter card device information" on page 45. 2. If you need to provide resources for the adapter card, follow these steps: a. From the Windows 95 Device Manager, remove the COM and LPT ports. b. In the Setup Utility, disable serial port A and the parallel port. c. Restart Windows. The serial and parallel ports will be enabled when they are needed. 3. If you have not installed a new PCI or PnP adapter card, see the *HelpWare* book for information on obtaining service.

Notes:

1. An X shown as part of the error code in this table represents any number between 0 and 9.
2. If any of these problems continue after taking the actions listed, see your online Aptiva Helper for information on running diagnostics. If you need service, see the *HelpWare* book.

Table 7: Error codes, descriptions, and corrective actions (Continued)

Error Code	Description	Here's what to do:
24XX	Video Error	1. Make sure the monitor cables are correctly and securely connected to the tower. For instructions on connecting the monitor, refer to the *Read me first* book. 2. If a video adapter card is installed, make sure it is installed correctly. For instructions on installing adapter cards, see "Adding and removing adapter cards" on page 84. For installation information specific to the adapter card, refer to the documentation that came with the adapter card. 3. If the error continues, remove the video adapter card. If removing the card corrects the error, replace the card with a new one.
2462	Video Configuration Error	1. Make sure the monitor cables are correctly and securely connected to the tower. For instructions on connecting the monitor, refer to the *Read me first* book. 2. If you installed a video adapter card, press Enter while the error message is displayed. This starts the Setup Utility. See "Viewing video configuration" on page 35 for information to help you verify that the settings for the video controller and video memory are correct. If the settings are correct, save when you exit the Setup Utility. If the settings are not correct, or if settings changed that were not supposed to change, see the *HelpWare* book for information on obtaining service.
5803	Keyboard Error	1. Make sure the keyboard and mouse cables are correctly and securely connected to the ports on the back of the media console. The keyboard port has this symbol next to it: The mouse port has this symbol next to it: 2. Make sure that a keyboard key or a mouse button is not being held down.

Notes:

1. An X shown as part of the error code in this table represents any number between 0 and 9.
2. If any of these problems continue after taking the actions listed, see your online Aptiva Helper for information on running diagnostics. If you need service, see the *HelpWare* book.

Table 7: Error codes, descriptions, and corrective actions (Continued)

Error Code	Description	Here's what to do:
5806	Diskette Drive Configuration Error	1. Make sure the media console is securely connected to the back of the tower. For instructions on connecting the media console, refer to the *Read me first* book. 2. Make sure the media console host card is securely connected to the riser card and the riser card is securely connected to the system board. For the location of the riser card connector on the system board, see "Identifying the parts of the system board" on page 65. For information about adapter card connectors on the riser card, see "Identifying the parts of the tower" on page 82. 3. Make sure the cable connecting the media console host card to connector J30 on the system board is securely connected at both ends. To identify the system board connector, see "Identifying the parts of the system board" on page 65. 4. If all these connections are secure and you still receive the error, see the *HelpWare* book for information on obtaining service.
5859	CD-ROM Configuration Error	See the *HelpWare* book for information on obtaining service.

Notes:

1. An X shown as part of the error code in this table represents any number between 0 and 9.
2. If any of these problems continue after taking the actions listed, see your online Aptiva Helper for information on running diagnostics. If you need service, see the *HelpWare* book.

Table 7: Error codes, descriptions, and corrective actions (Continued)

Error Code	Description	Here's what to do:
5862	Configuration Change Has Occurred	1. Make sure the media console is securely connected to the back of the tower. For instructions on connecting the media console, refer to the *Read me first* book. 2. Make sure the media console host card is securely connected to the riser card and the riser card is securely connected to the system board. For the location of the riser card connector on the system board, see "Identifying the parts of the system board" on page 65. For information about adapter card connectors on the riser card, see "Identifying the parts of the tower" on page 82. 3. Make sure the cable connecting the media console host card to connector J30 on the system board is securely connected at both ends. To identify the system board connector, see "Identifying the parts of the system board" on page 65. 4. If all these connections are secure and you still receive the error, see the *HelpWare* book for information on obtaining service.
5886	Pointing Device Error	1. Make sure the keyboard and mouse cables are correctly and securely connected to the ports on the back of the media console. The keyboard port has this symbol next to it: The mouse port has this symbol next to it: 2. Make sure that a keyboard key or a mouse button is not being held down.

Notes:

1. An X shown as part of the error code in this table represents any number between 0 and 9.
2. If any of these problems continue after taking the actions listed, see your online Aptiva Helper for information on running diagnostics. If you need service, see the *HelpWare* book.

Table 7: Error codes, descriptions, and corrective actions (Continued)

Error Code	Description	Here's what to do:
5962	CD-ROM Configuration Error	1. Make sure all CD-ROM drive cables are correctly and securely connected. See "Adding and removing drives" on page 87 for information to help you check these connections. 2. If you added, removed, or moved any drives in your tower, press Enter while the error message is displayed. This starts the Setup Utility. See "Changing disk drive configuration" on page 35 for information to help you verify that the drive settings are correct. If the settings are correct, save when you exit the Setup Utility. If the settings are not correct, or if settings changed that were not supposed to change, see the *HelpWare* book for information on obtaining service.
86XX	Pointing Device Error	1. Make sure the keyboard and mouse cables are correctly and securely connected to the ports on the back of the tower. The keyboard port has this symbol next to it: The mouse port has this symbol next to it: 2. Make sure that a keyboard key or a mouse button is not being held down.

Notes:

1. An X shown as part of the error code in this table represents any number between 0 and 9.
2. If any of these problems continue after taking the actions listed, see your online Aptiva Helper for information on running diagnostics. If you need service, see the *HelpWare* book.

Recovering factory installed programs and files

Your Aptiva computer comes with factory installed 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 *Product Recovery CD-ROM*.

The recovery process formats the hard drive, erasing all the files there, and then installs new copies of the original system and program files on the clean drive.

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 beyond the factory settings. See the online Aptiva Helper for help with backing up system files.

When manually backing up files, it's a good idea to duplicate the directory structure that is on your hard drive. 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 CD-ROM* into your CD-ROM drive.
3. Make sure you do not have a diskette or CD-ROM in any other drive.
4. Shut down and turn off your computer.
5. Wait 15 seconds.
6. Turn on your monitor and computer system.
7. When you see the Aptiva Product Recovery CD message, read and follow the displayed instructions. Be sure to remove the CD-ROM before you restart your computer at the end of the recovery.
8. After the Aptiva software has been reinstalled, copy your personal configuration and data files back into their original directories on the hard drive.

Depending on how your startup devices are defined, you might not be able to use the *Product Recovery CD-ROM* to recover a system that will not start on its own. For example, your computer might not attempt to read the CD-ROM at all if it reads first from the hard drive that contains corrupted operating system files. For instructions on selecting startup devices in the Setup Utility, see "Configuring startup options" on page 47.

See the online Aptiva Helper for instructions on recovering specific files, such as Mwave drivers and files your computer uses to create the graphical user interface (your desktop).

Technical reference Part 5

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

- "Appendix A: Specification tables" on page 145

  This chapter contains specific memory, address, interrupt, channel, and port specifications.

- "Appendix B: Audio and video cards" on page 155

  This chapter contains descriptive information about sound, Mwave, and television cards.

- "Appendix C: Modem information" on page 157

  This chapter 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.

Specification tables Appendix A

Memory module placement

This memory module placement table shows you how to place single inline memory modules (SIMMs) on your system board. Use this information when adding or removing system memory. If you want to use dual inline memory modules (DIMMs) in addition to SIMMs, you may do so but the total amount of memory installed on your system board should not exceed 128 MB. If you install more than 128 MB (four 32 MB SIMMs and one 16 MB DIMM), the DIMM will be disabled.

If you install memory modules in specific configurations, the computer may add a “wait state” to all memory accesses. The wait state slightly increases memory access time. The configurations that may add a wait state are:

- One 16 MB DIMM and four 8 MB SIMMS
- One 16 MB DIMM, two 8 MB SIMMS, and two 32 MB SIMMS
- One 16 MB DIMM and four 32 MB SIMMS

To keep your computer from adding a wait state, you should either remove the DIMM or choose a different memory configuration.

Table 8: Memory module placement

Total memory	Socket 1	Socket 2	Socket 3	Socket 4
8 MB	4 MB	4 MB		
8 MB			4 MB	4 MB
16 MB	4 MB	4 MB	4 MB	4 MB
16 MB	8 MB	8 MB		
16 MB			8 MB	8 MB
24 MB	4 MB	4 MB	8 MB	8 MB

Table 8: Memory module placement

Total memory	Socket 1	Socket 2	Socket 3	Socket 4
24 MB	8 MB	8 MB	4 MB	4 MB
32 MB	8 MB	8 MB	8 MB	8 MB
32 MB	16 MB	16 MB		
32 MB			16 MB	16 MB
40 MB	4 MB	4 MB	16 MB	16 MB
40 MB	16 MB	16 MB	4 MB	4 MB
48 MB	8 MB	8 MB	16 MB	16 MB
48 MB	16 MB	16 MB	8 MB	8 MB
64 MB	16 MB	16 MB	16 MB	16 MB
64 MB	32 MB	32 MB		
64 MB			32 MB	32 MB
72 MB	4 MB	4 MB	32 MB	32 MB
72 MB	32 MB	32 MB	4 MB	4 MB
80 MB	8 MB	8 MB	32 MB	32 MB
80 MB	32 MB	32 MB	8 MB	8 MB
96 MB	16 MB	16 MB	32 MB	32 MB
96 MB	32 MB	32 MB	16 MB	16 MB
128 MB	32 MB	32 MB	32 MB	32 MB

Memory map

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

Additional resources may be taken by Plug and Play (PnP) devices. Resources for installed PnP devices, such as the Mwave card, can be reassigned by the BIOS or the Windows 95 Device Manager.

Table 9: Memory map

Address range	Description
0-640 KB (0-9FFFFH)	Base memory
640-768 KB (A0000-BFFFFH)	VGA mode video memory
768-800 KB (C0000-C7FFFH)	Video BIOS
800-896 KB (C8000-DFFFFH)	Adapter card memory or upper memory
896-960 KB (E0000-EFFFF)	System POST and Rapid Resume BIOS (available for upper memory)
960-1024 KB (F0000-FFFFFH)	System BIOS (some may be available for upper memory)
1024 KB-128 MB (100000-7FFFFFFH)	Extended memory
192 MB-193 MB (C000000H-C0FFFFFH)	Linear video memory

System input/output addresses

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

Additional resources may be taken by Plug and Play (PnP) devices. Resources for installed PnP devices, such as the Mwave card, can be reassigned by the BIOS or the Windows 95 Device Manager.

Note: If your computer came with a joystick, the I/O address for this joystick should not be changed.

Table 10: System I/O addresses

Address range (hexadecimal)	Function
0000-001F	DMA controller
0020-0021	Interrupt controller 1
0040-0043	System timers
0060	Keyboard/mouse controller
0061	System control port B
0064	Keyboard/mouse controller
0070-0071	RTC/CMOS and NMI mask
0080-008F	DMA controller
00A0-00A1	Interrupt controller 2
00B2-00B3	Reserved
00C0-00DF	DMA controller
00EA-00ED	Reserved

Table 10: System I/O addresses (Continued)

Address range (hexadecimal)	Function
00F0-00FF	Math coprocessor
0170-0177, 0376	Secondary IDE controller
01E0-01E7, 03E6	Tertiary IDE controller
01F0-01F7, 03F6	Primary IDE controller
0278-027F, 67B-67A	Parallel port 3
02E8-02EF	Serial port 4
02F8-02FF	Serial port 2
0370-0371	Reserved
0378-037F, 77B-77A	Parallel port 2
03BC-03BF, 7BC-7BE	Parallel port 1
03C0-03CF, 3D4, 3D5, 03DA	SVGA controller
03E8-03EF	Serial port 3
03F2-03F5, 03F7	Diskette controller
03F8-03FF	Serial port 1
04D0-04D1	Reserved
0CF8-0CFC	Reserved
FE80-FE8F	Bus master IDE controller
FF00-FFFF	SVGA controller
200H-207H	Joystick

System interrupts

This table shows the default system interrupt requests (IRQs) and their functions. You may use this information if you install an adapter card that requires you to set IRQs.

Additional resources may be taken by Plug and Play (PnP) devices. Resources for installed PnP devices, such as the Mwave card, can be reassigned by the BIOS or the Windows 95 Device Manager.

Table 11: System board interrupts

Interrupt request (IRQ)	Function
SMI	Power management
NMI	Parity error or I/O channel check
0	Timer
1	Keyboard
2	Cascade to IRQ8-IRQ15
3	Serial port A
4	Mwave modem
5	Mwave sound
6	Diskette
7	Parallel port
8	Real-time clock
9	User available
10	Mwave DSP
11	User available or tertiary IDE
12	Mouse
13	Math coprocessor

Table 11: System board interrupts

Interrupt request (IRQ)	Function
14	Primary IDE
15	Secondary IDE

DMA channel assignments

This table shows the default 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 open DMA channel if you add an I/O device that uses DMA.

Additional resources may be taken by Plug and Play (PnP) devices. Resources for installed PnP devices, such as the Mwave card, can be reassigned by the BIOS or the Windows 95 Device Manager.

Table 12: DMA channel assignments

DMA channel	Assignment
0	User available
1	Mwave sound
2	Diskette
3	ECP parallel port (default)
4	Cascade
5	User available
6	User available
7	Mwave system

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.

This table shows the addresses and interrupts supported by the built-in serial port.

Table 13: Serial port addresses and interrupts

Windows 95	Address	Interrupt	Default
COM1	3F8	IRQ 4	Modem
COM2	2F8	IRQ 3	Serial port A
COM3	3E8	IRQ 4	none
COM4	2E8	IRQ 3	none

If you are using an operating system other than Windows 95, conflicts may arise if you add adapter cards with serial ports or if you change the address settings on your modem. You can resolve most of these conflicts by using the Setup Utility to change serial port addresses. See “Changing input/output port configuration” on page 38 for more information.

Audio and video cards Appendix B

About sound cards

Some IBM Aptiva PCs come with a sound card already installed.

Many software programs use the sound card for sound effects and music. The sound card processes audio data files and works with the CD-ROM drive to play audio compact discs

Most sound cards have the following connections:

Line in	This connector is designed to receive the output from another device, such as a stereo receiver or tape recorder.
Mic	This connector is designed to receive input from an external microphone.
Line out	This connector is designed to transmit audio output from the sound card to another device, such as amplified speakers, a stereo, a tape recorder, or headphones.
MIDI	This connector is designed to transmit or receive MIDI (Musical Instrument Digital Interface) signals to or from a MIDI device, such as a keyboard. This connector may also be used with an input device for games, such as a joystick. If you use an industry standard MIDI/joystick expansion cable, you can connect up to two joysticks and one MIDI device at the same time.

If you need more information about the sound card that came installed in your computer, refer to the documentation that came with the sound card. This documentation may be online or in a printed book.

About Mwave cards

Some IBM Aptiva PCs come with an Mwave card already installed.

The Mwave adapter card combines the features of a sound card and modem. The Mwave card works with the software and hardware to provide:

- A sound system with CD quality stereo playback and recording
- Operation of many programs that are written for SoundBlaster sound cards
- A joystick port

- A set of telephone functions that include:
  - Speaker phone
  - Telephone answering machine
  - Fax modem
  - Data modem

If you need more information about the Mwave card that came installed in your computer, refer to the documentation that came with the Mwave card. This documentation may be online or in a printed book.

About television cards

Some IBM Aptiva PCs come with a television (TV) card already installed.

The TV card is designed to work with many devices. Some examples of devices you might be able to attach to the TV card are a TV antenna, cable TV, a VCR, a laser-disc player, or a video camera. You can also attach speakers to the audio output connector.

If you need more information about the TV card that came installed in your computer, refer to the documentation that came with the TV card. This documentation may be online or in a printed book.

Modem information Appendix C

Some IBM Aptiva PCs have a modem already installed. 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 19.

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 xiii before you plug your modem into any telecommunications system.

If you need specific information about the modem installed in your computer, see the online documentation or online help that came with your modem. If your computer has an Mwave modem, follow these steps to view the online help for Mwave modems:

1. From your Windows 95 desktop, click on the Start button.
2. Move your mouse pointer to the Programs menu and then to the Mwave menu.
3. Click on the Modem Command Reference option.

Operating your modem

You can operate your modem either through a modem communications software program or from your DOS prompt. For information about configuring communications software, see "Configuring your communications software" on page 19.

Most people use a communications software program to operate their modem. An example of one of these software programs is Windows HyperTerminal. These programs let you operate your modem without typing modem commands at your DOS (C:>) prompt. With these software programs, you operate your modem by choosing menu items from a screen on your computer. If you use a communications software program, see the documentation that came with the software for detailed instructions on operating your modem.

Note: *The commands that modems understand belong to the Hayes AT command set. Most modem communication software programs also let you send specific AT commands directly to the modem.*

Generally, only experienced modem users should attempt to operate the modem from the DOS prompt. With DOS, you must type long AT command strings and you may need to send a variety of commands for each transmission. Also, you do not always receive feedback that your commands have been received and executed by the modem.

To communicate with a modem from DOS, use the ECHO command. Direct these commands to the port your modem is connected to. For example, type the following command at the DOS prompt and press Enter:

```
C:\> echo ATS0=0&W0&W1>COM1
```

This AT command contains these instructions:

- `ATS0=0`

  This part of the command stores a 0 into S register 0 to turn Auto Answer off. *S registers* are storage areas inside the modem. The S registers hold values that the command set uses to control modem operations. For more information on S registers, see "S registers" on page 169.

- `&W0&W1`

  This part of the command stores `ATS0=0` into memory (NVRAM locations 0 and 1) for future use.

- `>COM1`

  This part of the command directs the entire command to the modem's port.

Whether you use DOS or a modem communications software program, you can send a wide variety of commands to your modem. For a detailed listing of modem commands, see "Modem commands" on page 164.

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 documentation 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.

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`.

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, refer to the provided fax software documentation or fax software online help for additional information.

Disabling Call Waiting

If you use Call Waiting, 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 might 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 169.

Your modem communications software determines how your modem operates with Call Waiting. For specific instructions, see the documentation or online help that came with the communications software.

If your computer came with fax software already installed, the fax software documentation was included in the box your computer came in.

How modems work

Modems are classified into two functional categories: data modems and fax modems. Data modems can communicate with other data modems, and fax modems can communicate with other fax modems. Some data modems can also function as fax modems.

The modem in your Aptiva computer is a data modem that also works as a fax modem.

Data modems

Data modems send and receive data in the form of codes that represent individual letters, numbers, and spaces. This data travels in a stream, one character right after another. Special programs, like word processors, use additional code sequences to indicate font type, bold, italic, and other text attributes.

You use the *Attention* command set (sometimes called the *AT* or *Hayes* command set) to send commands to your data modem. The AT command set, default

modem settings, and many of the more sophisticated modem commands have evolved over the years.

Fax modems

Fax modems send and receive images of what is displayed or printed on a page. As long as the text and pictures on the page are displayed or printed in black and white, without variations of gray or addition of color, a receiving fax modem can fairly accurately reproduce the image sent by the sending fax modem.

A sending fax machine, as well as fax software that works with word processing programs, scans a page one line at a time, breaking the page down into hundreds of lines. Each line is translated into a series of dots. Black dots represent the areas of the page that contain a piece of an image. White dots represent blank areas on the page. These dots are then converted into codes that can be sent through telephone lines to other fax machines or computers.

At the other end of the line, the receiving fax machine, or fax software, reverses the process. The page is reconstructed one line at a time.

Note: *The number of lines a fax machine or program uses to scan a page affects the quality of the reproduced image and the time required to transmit the facsimile. The more lines per page, the higher the image quality and the longer the transmission time.*

Many fax software programs offer an option for changing this scanning resolution.

Modem connections and standards

When two modems first start to communicate, they negotiate to establish a connection through which both the sending modem and the receiving modem can dependably transmit and receive data. Each modem identifies the highest speed at which it can transmit and receive data. If the speeds do not match, the lower of the two speeds is agreed upon as the *transmission rate*.

Note: *If two modems do not have any transmission speeds in common, they cannot successfully establish a connection. Otherwise, they communicate using the highest transmission rate at which they both can operate reliably.*

Before the digital data on a computer can be transmitted through analog telephone lines, the modem must convert it to analog signals. Methods for this conversion, and the associated transmission rates, have been standardized so that modems manufactured by different companies can work with each other. These standards are called *modulation protocols*. Primarily, modulation protocols have been set by three standards organizations:

- AT&T set the Bell standards.
- The International Telegraph and Telephone Consultative Committee (CCITT) set the V. (Vee Dot) recommendations.
- The International Telecommunication Union (ITU) has superceded the CCITT and continues to set standards.

Newer modems, like your Aptiva modem, incorporate a variety of protocols so they can connect to other modems at various transmission speeds (*baud rates*). Data modems use these modulation protocols for baud rates of up to 28,800 bits per second (bps):

- Bell 103
- Bell 212A
- ITU V.21, V.22, V.22bis, V.23, V.32, V.32bis, and V.34

Similarly, a modem that also has fax capabilities may also support these protocols:

- ITU V.17, V.29, and V.29ter

Usually a modem attempts a connection using the modulation protocol that provides the best performance. However, the protocol actually used depends upon the protocols the two modems have in common. When a higher-speed modem agrees to communicate using a lower speed modulation protocol, the process is called *auto negotiation*. For example, a 28,800 bps (V.34) modem that connects with a 14,400 bps (V.32bis) modem will only be able to send and receive data at 14,400 bps.

The transmission rate at which two modems agree to communicate can also be affected by a noisy telephone line. If the phone line that connects the two modems is noisy, the modems may negotiate to communicate using a slower modulation protocol so the integrity of the transmitted data is preserved.

Telephone line noise can cause loss of data and connection when modem speeds rise above 9600 bps. Over time, many different file transfer protocols have been developed solely to detect and correct the errors caused by phone line noise.

Connecting with other data modems

When you use your computer's data modem functions to communicate with another computer or communications service, you may need to choose a file transfer protocol in your software communications program. For example, when you connect to a bulletin board, you must choose a file transfer protocol before downloading a file.

The *file transfer protocol* determines how the data that travels between computers is packaged and transferred through the lines. This protocol ensures that the data is interpreted the same way at both ends of the line. For example, the protocol determines how the data might be broken up into chunks (called "blocks" or "frames") and how the communications software finds and corrects transmission errors.

Your data modem and the data modem on the other end of the line must use the same file transfer protocol to transfer data. For example, if your data modem uses Z-modem, the modem you are connecting to must also use Z-modem.

Many different file transfer protocols are commonly used today. Examples of these protocols include X-modem, Y-modem, and Kermit. Z-modem is currently the most commonly used transfer protocol.

Microcom Network Protocol (MNP) levels 1 through 4 were created to correct errors created by noisy telephone lines. V.42, which was adopted later, more effectively corrects these errors.

MNP 5 and V.42bis were established to provide high data throughput. With V.42bis, it is possible to achieve a 4:1 data compression ratio. MNP 5, however, should be used only with uncompressed data. MNP 5 attempts to compress data that has already been compressed and this slows the transfer process significantly.

If you cannot connect to another modem, it may be because the file transfer protocol you are using is not compatible with the protocol used by the other modem. If you are having trouble connecting to other modems, try following these guidelines.

- If you know what protocols are available on the modem you are connecting to, enable a protocol on your modem that is supported by the other modem. Usually V.42 works best if both modems support it.
- If you frequently connect to bulletin boards, buy a modem communications software program that includes many different software protocols. Different bulletin boards use different protocols.
- Many network services have their own proprietary protocols. To connect to these services, you often have to buy the protocol from the service. Other network services rely on V.42 or MNP 4.

Connecting with other fax modems

Fax machines and fax modems are classified into *Groups*. Each Group classification indicates the modem's transmission rate and level of technological advancement. The first fax machines were Group 1 machines. These machines, being the slowest, are almost obsolete today. Group 2 machines, which are faster than Group 1 machines and slower than Group 3 machines, are also nearly obsolete. Most fax machines sold today are Group 3 machines.

Generally, a Group 3 fax machine can connect most efficiently to another Group 3 machine and may also be able to connect to many Group 2 machines. However, a Group 2 machine cannot connect to a Group 3 machine. The modem in your computer works with most Group 3 fax machines, but not with Group 2 or Group 1 fax machines.

If you want to buy additional fax software

If your computer came with factory installed fax software, you can use this software to operate your modem. You can also purchase additional fax software. If you purchase another fax program, you must configure this software with the settings used by any factory installed fax software.

To communicate with a fax modem (or the fax portion of a data modem), the fax software sends commands from

a specified command set. One of these command sets is a revised version of the AT command set. This revised version includes two different sets of commands: *Class 1* and *Class 2*. Some modems support one class while others support both. The modem in your computer supports both Class 1 and Class 2 fax commands.

Note: *CAS and SENDFAX are two other commonly used command sets. These command sets are not supported by the modems already installed in IBM Aptiva PCs.*

Communications settings

The modems already installed in IBM Aptiva PCs are preset to COM1 SERIAL PORT 1. The addresses and interrupts supported by your computer are:

COM #	Address	Interrupt
COM1	3F8	IRQ 4
COM2	2F8	IRQ 3
COM3	3E8	IRQ 4
COM4	2E8	IRQ 3

Changing modem addresses for the Mwave adapter card

The modem address in your communications software must match the address setting of your modem. If you purchased a computer with an Mwave card, use Windows 95 Device Manager to verify the address used by your Mwave card. See “Starting and using the Windows 95 Device Manager” on page 60 for information about Device Manager.

Changing modem addresses for non-Mwave adapter cards

If you purchased a computer that does not have Mwave modem support or if your computer has a non-Mwave modem, refer to the documentation that came with the modem for instructions on changing modem addresses.

If the modem device is Plug and Play (PnP), you should use Windows 95 Device Manager to change resources for the modem. See “Starting and using the Windows 95 Device Manager” on page 60 for information about Device Manager.

Modem commands

Table 14 lists common modem commands. The modem that is already installed in your computer is compatible with the Hayes AT command set. All commands in this table must be preceded by the letters AT unless otherwise indicated.

For example, locate Ds in the Code/Command column of Table 14. To tell your modem to dial a telephone number using touch-tone dialing, type ATDT followed by the telephone number and then press Enter. The complete command might look like this: ATDT5554242. To dial the same telephone number using pulse dialing, you would type ATDP5554242. Spaces are not required in the commands unless otherwise indicated.

All of the AT commands used by your computer may not be listed in this table. If you purchased a computer with an Mwave adapter card, then some additional AT commands are listed in the online Mwave Modem help. To view additional AT commands in the Mwave Modem help, follow these steps:

1. From your Windows 95 desktop, click on the Start button.
2. Move your mouse pointer to the Programs menu and then to the Mwave menu.
3. Click on the Modem Command Reference option.
4. From the Mwave Modem Help window, click on the AT Command Summary option.

If you purchased a computer with a modem card instead of an Mwave card, look for additional AT commands in the documentation provided with the modem card. This documentation may be printed or online.

Table 14: Modem commands

Code/Command	Function
AT	Begins the command line. The modem is ready to accept a command.
A/	Repeats the last command given, if it is not preceded by AT or followed by a carriage return.
A	Answers the call immediately.

Table 14: Modem commands (Continued)

Code/Command	Function
Dsn	The modem automatically dials a telephone number “n” where “n” is a complete telephone number. The command may also include the following codes: s=P Pulse dialing s=R Dial an “originate-only” modem s=T Touch-tone dialing s=, Pause while dialing s=@ Wait 30 seconds for a valid ringback followed by 5 seconds silence before next symbol s=; Return to command state after dialing s=! Go off-hook 0.5 seconds s=W Wait for dial tone
Ds=n	Dials one of four stored telephone numbers.
En	Sets Echo on or off: n=0 Echo off n=1 Echo on
Hn	On/Off hook: n=0 On hook n=1 Off hook
Ln	Sets the volume of the speaker on the modem: n=0 Low volume n=1 Low volume n=2 Medium volume n=3 High volume
Mn	Controls when the modem speaker is in use: n=0 Speaker off n=1 Speaker is on except when receiving n=2 Speaker on n=3 Speaker is off when dialing or receiving

Table 14: Modem commands (Continued)

Code/Command	Function
On	Online: n=0 Go online n=1 Retrain at 2400 bps
Qn	Sends result codes: n=0 Result codes sent n=1 Result codes not sent
Vn	Determines whether the result code is sent as numbers or words: n=0 Result code is sent as numbers n=1 Result code is sent as words
Xn	Sets the type of result code sent: n=0 Basic result code sent (0 to 4) n=1 Extended result code sent (0 to 5, and 10) n=2 Extended result code sent (0 to 6, and 10) n=3 Extended result code sent (0 to 7, and 10) n=4 Whole result code sent (0 to 10)
Z	Resets the modem to the defaults.
Z0	Recalls modem profile 1.
Z1	Recalls modem profile 2.
&Zn=	Stores up to four telephone numbers in the modem's memory.
&V	The modem answers with the active profile and the phone numbers stored in NVRAM.
&W0	Saves the current register setting as profile 1.
&W1	Saves the current register setting as profile 2.
&F&W0&W1	Returns a modem profile to the original factory setting.
+++	Escape sequence. Return to command state.

Table 14: Modem commands (Continued)

Code/Command	Function
+FCLASS=?	Shows which class of fax commands the modem supports. If the modem answers: 0,1 it supports Class 1 commands 0,1,2 it supports Class 1 or Class 2 commands 0,2 it supports Class 2 commands

Modem return codes

The following table lists some codes that the modem sends to your computer in response to the commands you type. They are called return codes. Not all of the return codes are listed here.

Table 15: Return codes

Digit code	Word code	Meaning
0	OK	Command was carried out without error
1	Connect 2400	Connected at 2400 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
5	Connect 14400	Connected at 14,400 bps
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
10	Connect 28800	Connected at 28,800 bps
	WORD FORM	Preceded and terminated by CR LF

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.

If you purchased a computer with an Mwave adapter card, then not all of the S registers used by your computer are listed in this table. Some additional S registers are listed in the online Mwave Modem help. To view additional S registers in the Mwave Modem help, follow these steps:

1. From your Windows 95 desktop, click on the Start button.
2. Move your mouse pointer to the Programs menu and then to the Mwave menu.
3. Click on the Modem Command Reference option.
4. From the Mwave Modem Help window, click on the S Register Summary option.

Table 16: 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	0-127 /ASCII	43
S3	Carriage return character	0-127 /ASCII	13
S4	Line feed character	0-127 /ASCII	10
S5	Backspace character	0-32, 127 /ASCII	8
S6	Dial tone wait time	0-255 /seconds	2
S7	Remote carrier wait time	1-255 /seconds	45
S8	Comma pause time	0-255 /seconds	2
S9	Carrier detect response time	0-255 /10ths of a second	6
S10	Carrier loss time	0-255 /10ths of a second	14
S11	Touch-tone dialing speed	50-255 /milliseconds	95
S12	Escape character detect time	0-25 /50ths of a second	50
S13	Reserved (Do not use)		None
S14	Echo, response, dialing, originate/answer	Bit-mapped register	None
S15	Reserved (Do not use)		None
S16	RDL, Clear-Down, Retrain Response	Bit-mapped register	None
S17	Reserved (Do not use)		None
S18	Modem test timer	0-255 /seconds	0
S19	Reserved (Do not use)		None
S20	Reserved (Do not use)		None

Table 16: S registers (Continued)

Register	Function	Range/units	Default
S21	Originate-only, line, DTR, DCD, DSR, and Long Space Disconnect	Bit-mapped register	None
S22	Speaker, M/B ratio and response	Bit-mapped register	None
S23	DTE data rate, parity, and guard tone	Bit-mapped register	None
S24	Calling tone		None
S25	Data Terminal Ready delay	0-100 seconds	5
S26	RTS to CTS delay interval	0-255 /100ths of a second	1
S27	Async/Sync operation, clock source, DCE speed	Bit-mapped register	None
S28	Line speed control register		None

United States modem regulations

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 inside the back of the tower. 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, slide the tower cover forward to see the label, and 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. The REN for the factory installed modem in your computer is 0.8B.
3. If the built-in modem causes harm to the telephone network, the telephone company may discontinue your service temporarily. If possible, they will notify you in advance; if advance notice isn't practical, you will be notified as soon as possible. You will 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 will 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, check the "FCC and Telephone Company Requirements" section of the *IBM Statement of Limited Warranty, IBM Program License Agreement, and Limited Warranty for Programs* document for information on obtaining service. 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.
9. The Telephone Consumer Protection Act of 1991 makes it unlawful for any person to user a computer or other electronic device to send a message via a telephone fax machine unless such message clearly contains, in a margin at the top or bottom of each transmitted page, or on the first page of the transmission, the date and time it is sent and an identification of the business, or other entity, or other individual sending the message and the telephone number of the sending machine of such business, other entity, or individual. In order to program this information into your computer, you should be sure to follow the installation instructions for your fax software package.

Canadian modem regulations

Canadian Department of Communications certification label

Notice: The Canadian Department of Communications label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational, and safety requirements. The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines, and internal water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

CAUTION:

Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

LOAD NUMBER (LN)

The load number (LN) assigned to each terminal device denotes the percentage of the total load to be connected to a telephone loop which is used by the device, to prevent overloading. The termination on a loop may consist of any combination of devices subject only to the requirement that the total of the load of all the devices does not exceed 100. The load number of the built-in modem is 10.

Étiqueete d'homologation du Ministère des Communications du Canada

AVIS: L'étiquette du ministère des Communications du Canada identifie le matériel homologué. Cette étiquette certifie que le matériel est conforme à certaines normes de protection, d'exploitation et de sécurité des réseaux de télécommunications. Le ministère n'assure toutefois pas que le matériel fonctionnera à la satisfaction de l'utilisateur.

Avant d'installer ce matériel, l'utilisateur doit s'assurer qu'il est permis de le raccorder aux installations de l'entreprise locale de télécommunications. Le matériel doit également être installé en suivant une méthode acceptée de raccordement. L'abonné ne doit pas oublier qu'il est possible que la conformité aux conditions énoncées ci-dessus n'empêchent pas la dégradation du service dans certaines situations.

Les réparations de matériel homologué doivent être effectuées par un centre d'entretien canadien autorisé désigné par le fournisseur. La compagnie de télécommunications peut demander à l'utilisateur de débrancher un appareil à la suite de réparations ou de modifications effectuées par l'utilisateur ou à cause d'un mauvais fonctionnement.

Pour sa propre protection, l'utilisateur doit s'assurer que tous les fils de mise à la terre de la source d'énergie électrique, des lignes téléphoniques et des canalisations d'eau métalliques, s'il y en a, sont raccordés ensemble. Cette précaution est particulièrement importante dans les régions rurales.

CAUTION:

L'utilisateur ne doit pas tenter de faire ces raccordements lui-même, il doit avoir recours à un service d'inspection des installations électriques ou à un électricien, selon le cas.

LINDICE DE CHARGE (IC)

L'INDICE DE CHARGE (IC) assigné à chaque dispositif terminal indique, pour éviter toute surcharge, le pourcentage de la charge totale qui peut être raccordé à un circuit téléphonique bouclé utilisé par ce dispositif. L'extrémité du circuit bouclé peut consister en n'importe quelle combinaison de dispositifs pourvu que la somme des INDICES DE CHARGE de l'ensemble des dispositifs ne dépasse pas 100. L'indice de charge du modem intégré est de 10.

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