Personal Computer

Installing Options in Your Personal Computer

PC 300GL Type 6561

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PC 300GL Type 6561

IBM

Note

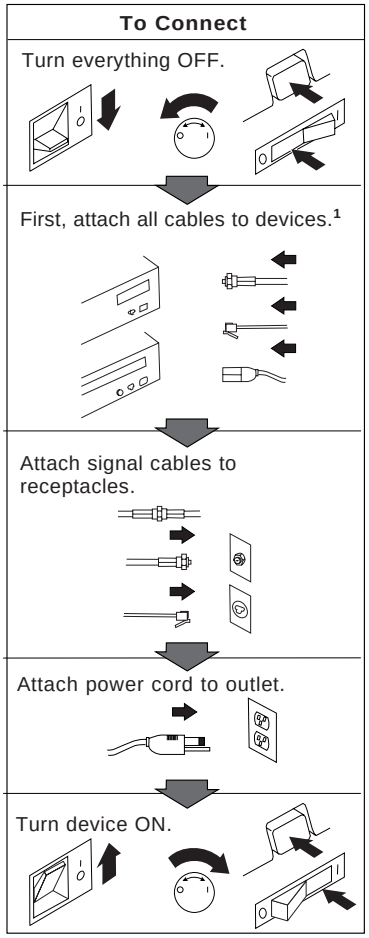
Before using this information and the product it supports, be sure to read the general information under Appendix C, “Notices” on page 82.

Second Edition (January 1998)

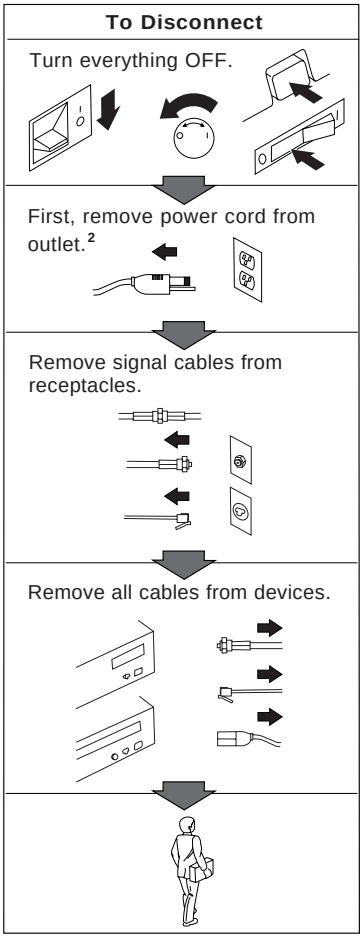
Contents

Safety Information

DANGER:
Electrical current from power, telephone, and communication cables is hazardous. To avoid shock hazard, connect and disconnect cables as shown below when installing, moving or opening the covers of this product or attached devices. The power cord must be used with a properly grounded outlet.



[1] In the U.K., by law, the telephone cable must be connected after the power cord.



[2] In the U.K., by law, the power cord must be disconnected after the telephone line cable.

Laser Compliance Statement

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

When a CD-ROM drive is installed, note the following.

CAUTION:
Use of controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.

Opening the CD-ROM drive could result in exposure to hazardous laser radiation. There are no serviceable parts inside the CD-ROM drive. **Do not open.**

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

DANGER

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

Lithium Battery Notice

CAUTION:
Danger of explosion if battery is incorrectly replaced.

When replacing the battery, use only IBM Part Number 33F8354 or an equivalent type battery recommended by the manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.

Do not:

- **Throw or immerse into water**
- **Heat to more than 100°C (212°F)**
- **Repair or disassemble**

Dispose of the battery as required by local ordinances or regulations.

ATTENTION
Danger d'explosion en cas de remplacement incorrect de la batterie.

Remplacer uniquement par une batterie IBM de type 33F8354 ou d'un type équivalent recommandé par le fabricant. La batterie contient du lithium et peut exploser en cas de mauvaise utilisation, de mauvaise manipulation ou de mise au rebut inappropriée.

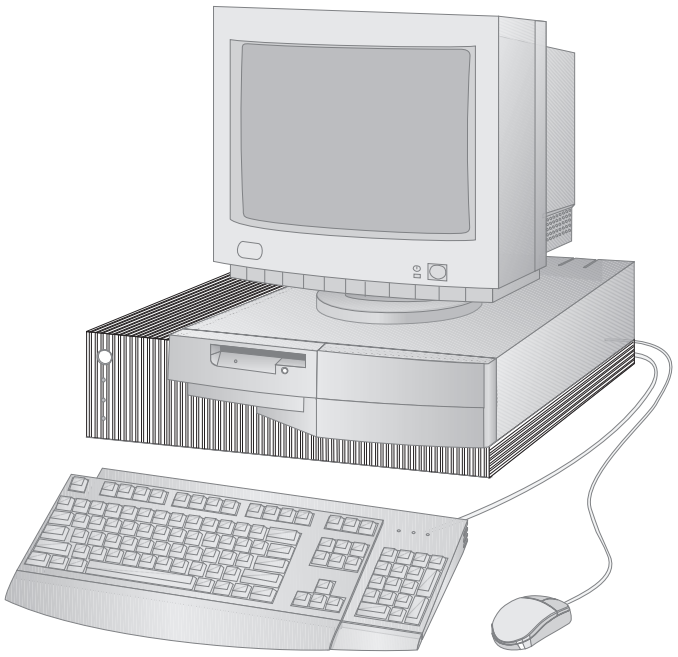
Ne pas :

- **Lancer ou plonger dans l'eau**
- **Chauffer à plus de 100°C (212°F)**
- **Réparer ou désassembler**

Mettre au rebut les batteries usagées conformément aux règlements locaux.

About This Book

Thank you for selecting an IBM Personal Computer.



This book provides instructions for installing, removing, and replacing most options. Also, this book contains information to help you decide which options to add to your computer.

Note: The illustrations in this publication might be slightly different from your hardware.

How This Book Is Organized

This book contains the following chapters and appendixes:

- Chapter 1, “Overview” provides an introduction to the options and features for your computer. Safety precautions and handling techniques are discussed along with the required tools you will need to install and remove options.
- Chapter 2, “Preparing to Install and Remove Options” provides instructions for removing the cover and cables for your computer and for locating the components you want to work with.
- Chapter 3, “Working with Options on the System Board” provides instructions for locating, accessing, and working with options on the system board.
- Chapter 4, “Working with Adapters” provides instructions for installing and removing adapters.
- Chapter 5, “Working with Internal Drives” provides instructions for installing and removing internal drives.
- Chapter 6, “Working with Security Options” describes features such as the security U-bolt and erasing lost or forgotten passwords.
- Chapter 7, “Completing the Installation” provides instructions for reassembling your computer after you have finished installing options. Information about using the Configuration/Setup Utility program is also provided.
- Appendix A, “Changing the Battery” explains how to change your computer backup battery and the precautions to take when handling and disposing of the battery.
- Appendix B, “Interrupt and DMA Resources” contains the default interrupt and direct memory access (DMA) resources for your computer.
- Appendix C, “Notices” contains IBM notices and trademark information.

Related Publications

The following publications, together with this book, contain information about your computer.

- *Setting Up Your Personal Computer*
  This publication contains instructions to help you set up your computer.
- *Using Your Personal Computer*
  This publication contains the following:
  - Instructions for configuring, operating, and maintaining your computer
  - Information on diagnosing and solving computer problems and how to get help and service
  - Warranty information
- *Understanding Your Personal Computer*
  This online publication (provided on the *Ready-to-Configure Utility Program* CD and with the preinstalled software) includes general information about using personal computers and in-depth information about the specific features of your computer.
- *About Your Software*
  This publication (provided only with computers that have IBM-preinstalled software) contains information about the preinstalled software package.
- *Your Ready-to-Configure Utility Program CD*
  This publication contains information about the *Ready-to-Configure Utility Program* CD for your computer. The publication also contains instructions for starting the CD.

The following publications contain more information about your computer.

- *Hardware Maintenance Manual*
  This separately purchased publication contains information for trained service technicians. To obtain a copy, refer to the section on ordering publications in the "Getting Help, Service, and Information" chapter in *Using Your Personal Computer*. Also, this publication is on the World Wide Web at:

  `http://www.us.pc.ibm.com/cdt/hmm.html`

- *Technical Information Manual*
  This publication contains more information about the technical aspects of your computer. It is available on the World Wide Web at:

  `http://www.us.pc.ibm.com/support/desktop_support.html`

Chapter 1. Overview

Adding hardware options to your computer is an easy way to increase its capabilities. Instructions for removing, installing, and replacing options and features are included in this book. When adding an option, use these instructions along with the instructions that come with the option. If you have installed options before, you might be able to perform some activities without detailed instructions.

This chapter provides a brief introduction to the options and features that are discussed in this book. Also, important information about required tools, electrical safety, and static-sensitive devices is discussed.

Important

Before you install or remove any option, read the safety procedures and component-handling guidelines in this chapter. These precautions and guidelines will help you work safely.

Refer to *Using Your Personal Computer* for general information on the use, operation, and maintenance of your computer. *Using Your Personal Computer* also contains information to help you solve problems and get repair service or other technical assistance.

Available Options and Features

The following are some of the available options and features that are discussed in this book:

- System board components
  - System memory, called dual in-line memory modules (DIMMs)
  - Microprocessor upgrades
  - Jumper for clearing CMOS and erasing lost or forgotten passwords
  - Flash recovery jumper
  - Battery
- Adapters
  - Industry standard architecture (ISA) adapters
  - Peripheral component interconnect (PCI) adapters
- Internal drives
- Security U-bolt

Additional options are available from IBM. An options package is available for your computer that includes a floor stand, bottom cover, and rear cover. Although these options are not covered in this book, they come with complete installation instructions.

The following are some other available options and features for your computer. For more information, refer to the documentation that comes with the optional hardware.

- Your computer can be remotely started using a *Wake on LAN* adapter. For more information on Wake on LAN, see *Using Your Personal Computer*.
- In some models, an audio adapter is preinstalled in one of the ISA slots. The audio adapter is SoundBlaster compatible and provides a musical instrument digital interface (MIDI) for connecting optional game controls or electronic musical devices. Also, three ports are provided for connecting powered speakers, an audio input device such as a portable CD-ROM, and a microphone.
- To help with power management, you can add a modem and have your computer start when a ring is detected by the modem. Using an internal modem, you can use the Configuration/Setup Utility program to enable *Modem Ring Detect*, or using an external modem, you can enable *Serial Port Ring Detect*. For more information, see *Using Your Personal Computer*.

IBM provides help in selecting drives, cables, and other options for your computer. For the latest information about available options:

- Within the United States, call 1-800-IBM-2YOU (1-800-426-2968), your IBM reseller, or IBM marketing executive.
- Within Canada, call 1-800-565-3344 or 1-800-465-7999.
- Outside the United States and Canada, contact IBM, your IBM reseller, or IBM marketing executive.

IBM maintains pages on the World Wide Web where you can get information about IBM products and services, find the latest technical information, and download device drivers and updates. Some of these pages are:

`http://www.ibm.com`	Main IBM home page
`http://www.pc.ibm.com`	IBM Personal Computer home page
`http://www.us.pc.ibm.com/desktop/`	IBM Commercial Desktop home page
`http://www.us.pc.ibm.com/servers/`	IBM PC Server and Netfinity Server home page
`http://www.us.pc.ibm.com/options/`	IBM Options home page
`http://www.us.pc.ibm.com/intellistation/world`	IBM IntelliStation home page
`http://www.us.pc.ibm.com/thinkpad/`	IBM ThinkPad home page

Tools Required

To install or remove options in your computer, you will need a flat-head screwdriver. Any additional tools needed depend on the specific option and are noted in the instructions that come with the option.

Electrical Safety

CAUTION:
Electrical current from power, telephone, and communication cables can be hazardous. To avoid any shock hazard, disconnect all power cords and cables as described in the following information.

For your safety, always do the following *before* removing the cover:

1. Shut down all programs as described in your operating-system documentation.
2. Turn off the computer and any attached devices, such as printers, monitors, and external drives.

   Note: Personal computer users in the United Kingdom who have a modem or fax machine attached to their computer must disconnect the telephone line from the computer *before* unplugging any power cords (also known as power cables). When the computer is reassembled, users must reconnect the telephone line *after* plugging in the power cords.
3. Unplug all power cords from electrical outlets.
4. Disconnect all communication cables from external receptacles.
5. Disconnect all cables and power cords from the back of the computer.

   Note: Do not reconnect any cables or power cords until you reassemble the computer and put the cover back on.

CAUTION:
Never remove the cover on the power supply. If you have a problem with the power supply, have your computer serviced.

Handling Static-Sensitive Devices

Have you ever walked across a carpeted floor, then touched an object and received a small electrical shock? That's static electricity, and although harmless to you, it can seriously damage computer components and options.

Important

When you add an option, do *not* open the static-protective package containing the option until you are instructed to do so.

When you handle options and other computer components, take these precautions to avoid static electricity damage:

- Limit your movement. Movement can cause static electricity to build up around you.
- Always handle components carefully. Handle adapters and memory-modules by the edges. Never touch any exposed circuitry.
- Prevent others from touching components.
- When you are installing a new option, touch the static-protective package containing the option to a metal expansion-slot cover or other unpainted metal surface on the computer for at least two seconds. This reduces static electricity in the package and your body.
- When possible, remove the option and install it directly in the computer without setting the option down. When this is not possible, place the static-protective package that the option came in on a smooth, level surface and place the option on it.
- Do not place the option on the computer cover or other metal surface.

Chapter 2. Preparing to Install and Remove Options

This chapter provides instructions for accessing and locating the options you want to install or remove.

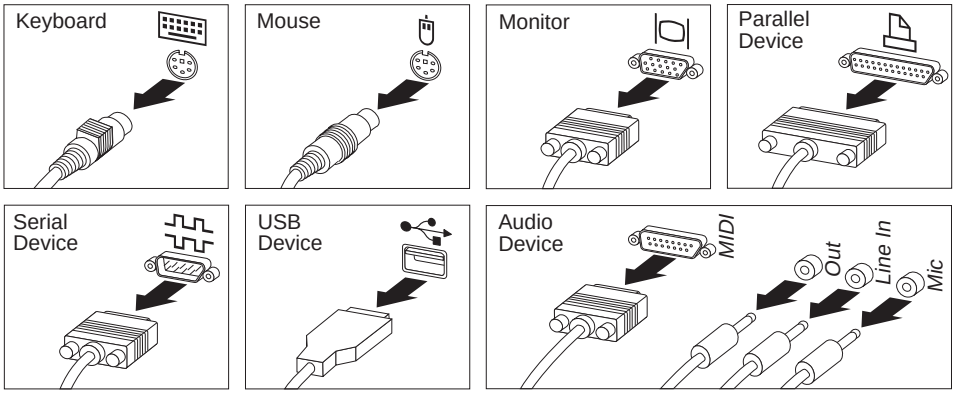
Disconnecting Cables and Removing the Cover

Before you begin

- Read "Electrical Safety" on page 4 and "Handling Static-Sensitive Devices" on page 5.
- Remove any media (diskettes, compact discs, or tapes) from the drives, and then turn off all attached devices and the computer.

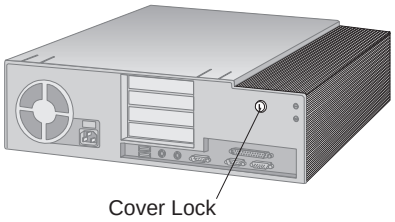
1 Disconnect all cables attached to the computer; this includes power cords, input/output (I/O) cables, and any other cables connected to the computer.

Note: For more information on ports, including universal serial bus (USB), refer to *Understanding Your Personal Computer*. [1]

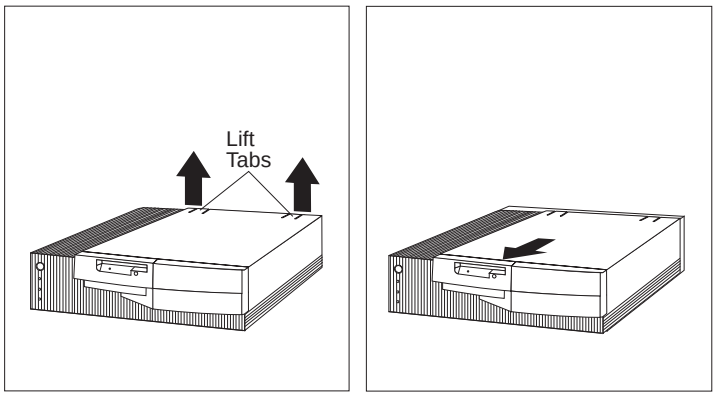


[1] For more information on *Understanding Your Personal Computer*, see "Related Publications" on page x.

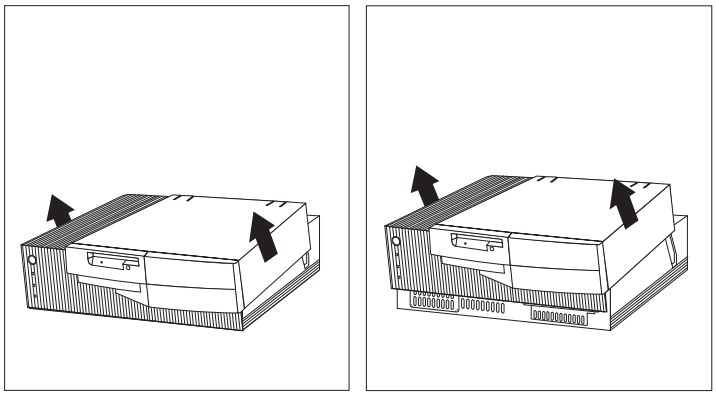
2 If key lock is present, unlock the computer cover. (The cover lock is located on the rear of the computer in some models.)



3 Find the tabs on the rear of the computer cover and lift them up; then gently pull the cover toward you to release the back edge. Next, hold the cover by the sides and pull it forward about half an inch.



4 Lift the back edge and slide the cover forward until it comes free.



Locating Components

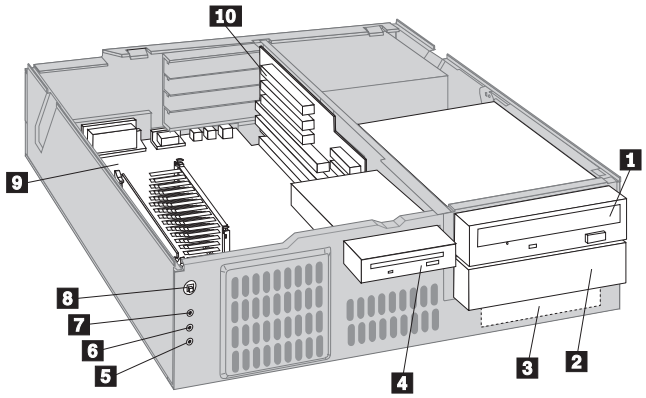
Use the following information to help you locate components. Use it as a reference when you need to install options or connect input/output devices.

Internal View

The following illustration shows the internal view of your computer as seen from the front. For information on removing the cover, see "Disconnecting Cables and Removing the Cover" on page 6.

Note: The following illustration is for reference only.

1. Drive bay 1
2. Drive bay 2
3. Drive bay 3
4. Drive bay 4
5. Client LAN light [2]
6. Hard disk drive light
7. Power-on light
8. On-off switch
9. System board
10. Riser card with expansion slots



Your computer comes with a diskette drive installed in bay 4 and a hard disk drive installed in bay 3. If your computer comes with a CD-ROM drive, it is installed in bay 1.

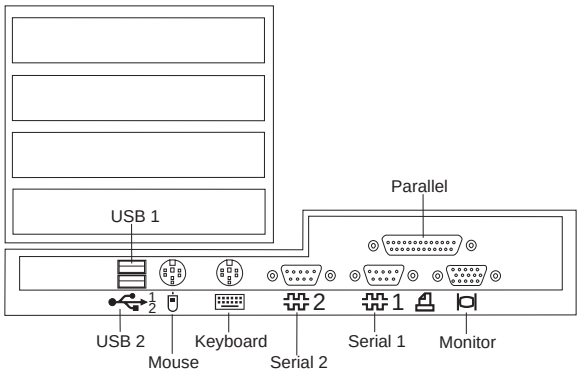
For more information on drive bays, see "Working with Drives in Bays 1, 2, and 3" on page 48 and "Working With Drives in Bay 4" on page 56.

[2] The client LAN light is not used. This light is never activated even though a network adapter can be installed in your computer.

Input/Output Connectors

Input/output (I/O) connectors provide ports for transferring information into and out of your computer. You can connect a variety of I/O devices to your computer, including a monitor, keyboard, mouse, and printer. For more information on the ports and their specific technologies, see *Understanding Your Personal Computer*.

The rear of your computer contains the I/O connectors. Adapters installed in expansion slots might also provide I/O connectors. The following illustration shows the I/O connectors on the rear of your computer.



Chapter 3. Working with Options on the System Board

This chapter provides information about system board options discussed in this book.

The information in this chapter helps you identify parts on the system board. Also, instructions are provided for accessing and installing options on the system board. For example, you must have access to the system board to install system memory.

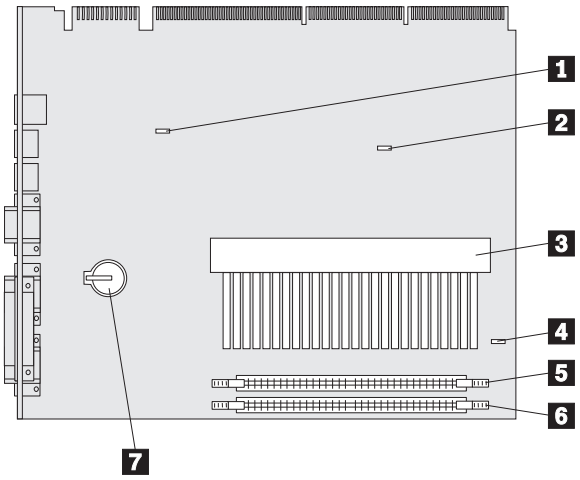
This chapter also provides instructions for installing, removing, and replacing system board components, specifically system memory and the microprocessor. For information on other system board components, see the appropriate section.

Identifying Parts on the System Board

The system board, also called the *planar* or *motherboard*, is the main circuit board in your computer. It provides basic computer functions and supports a variety of devices that are IBM-installed or that you can install later.

If you plan to install, remove, or replace hardware in your computer, you will need to know the layout of the system board. The following illustration shows the layout of the system board in your computer. The numbered pointers show the components that are discussed in this book.

1. Recovery jumper
2. CMOS Clear jumper
3. Microprocessor connector
4. Asset EEPROM write protect jumper
5. Memory Module Connector 0 (Mem 0)
6. Memory Module Connector 1 (Mem 1)
7. Battery



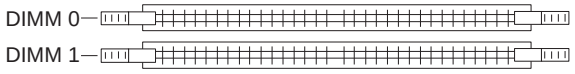
Notes:

1. An illustration of the system board is provided on a label on the underside of the computer cover.
2. The asset EEPROM write protect jumper is normally on pins 2 and 3. In this position, the asset EEPROM is not write protected.

Working with System Memory

You can add memory to your computer to increase system performance. Your computer has two connectors for installing system-memory modules. The maximum amount of system memory your computer supports is 256 MB.

Note: To locate the memory connectors inside your computer, see "Identifying Parts on the System Board" on page 11.



The memory modules your computer uses are *dual inline memory modules (DIMMs)*. The IBM-installed DIMMs that come with your computer are nonparity (NP) or ECC (error correcting code) SDRAM (synchronous dynamic random access memory) modules.

Note: If a mixture of nonparity (NP) and ECC DIMMs are installed, ECC will be disabled.

When installing or replacing DIMMs, follow these rules:

- Use only 3.3 V unbuffered DIMMs.
- Each memory connector supports a maximum of 128 MB of SDRAM.
- Install only ECC SDRAM DIMMS to enable ECC.

Memory Configuration

When you are adding or removing memory, you can use any combination of DIMM sizes 16, 32, 64, or 128 MB. A basic rule to follow is to fill each system memory connector sequentially, starting at *Mem 0*.

The following table shows suggested memory configurations for your computer; this table and additional information are also found on the underside of the computer cover.

Note: Values in the following table are represented in megabytes (MB).

Table 1. Memory Configurations

Total Memory (MB)	Mem 0	Mem 1
16	16	0
32	32	0
32	16	16
48	16	32
64	32	32
80	16	64
96	32	64
128	64	64
144	16	128
160	32	128
192	64	128
256	128	128

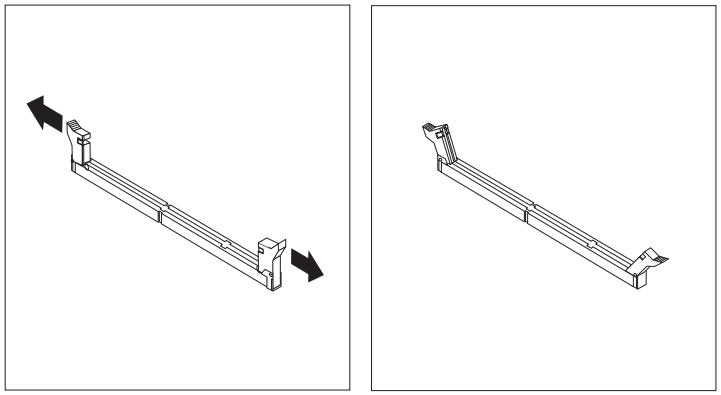
Installing a Memory Module

Before you begin

- Read "Electrical Safety" on page 4 and "Handling Static-Sensitive Devices" on page 5.
- Read the instructions that come with the new system memory.
- Turn off the computer and all other connected devices.
- Disconnect all cables attached to the computer and remove the computer cover (see "Disconnecting Cables and Removing the Cover" on page 6).

Note: For information on memory configuration, see Table 1 on page 13.

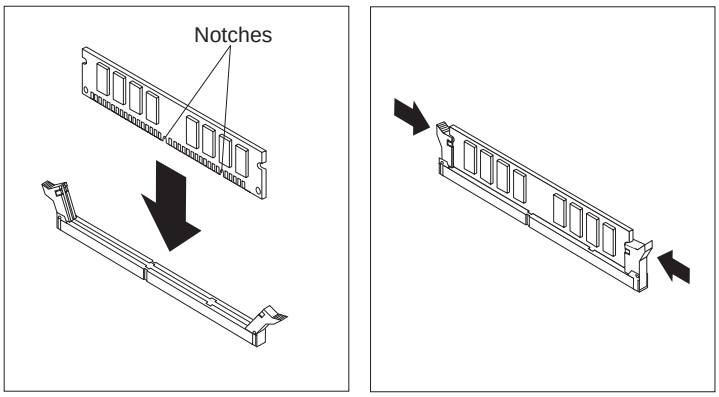
1 Be sure the retaining clips are in the open position, as shown in the second illustration below. If the retaining clips are perpendicular with the connector, push outward on them until they click open.



2 Touch the static-protective package containing the memory module to any *unpainted* metal surface in the computer, and then remove the module.

3 Position the module above the connector so that the two notches on the bottom edge of the module align properly with the connector.

4 Firmly push the module straight down into the connector until the retaining clips pop up and snugly fit around both ends of the module.



5 To install another memory module, repeat steps 1–4.

6 Go to the device-record form in *Using Your Personal Computer* and record this installation.

What to do next

- To work with another option, go to the appropriate section.
- To complete the installation, go to Chapter 7, “Completing the Installation” on page 68.

Removing a Memory Module

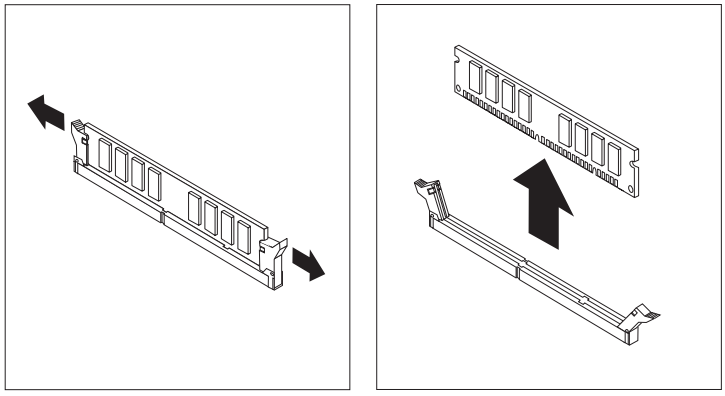
Before you begin

- Read "Electrical Safety" on page 4 and "Handling Static-Sensitive Devices" on page 5.
- Turn off the computer and all other connected devices.
- Disconnect all cables attached to the computer and remove the computer cover (see "Disconnecting Cables and Removing the Cover" on page 6).

1 At both ends of the memory module connector, push outward on the retaining clips until the module is loosened.

Note: Be careful not to push too hard on the retaining clips because the module may abruptly eject from the connector.

2 Lift the memory module out of the connector.



3 Store the module in a static-protective package.

What to do next

- To work with another option, go to the appropriate section.
- To complete the installation, go to Chapter 7, "Completing the Installation" on page 68.

Replacing a Microprocessor

Attention: The presence of 5 V standby power might result in damage to your hardware unless you disconnect the power cord from the wall before opening the computer.

Your computer comes with an Intel® Pentium®II microprocessor installed on the system board.

For the latest information on microprocessor upgrades available for your computer, contact your IBM reseller or IBM marketing representative. If you do upgrade the microprocessor, use the instructions that come with the upgrade along with the instructions in this publication.

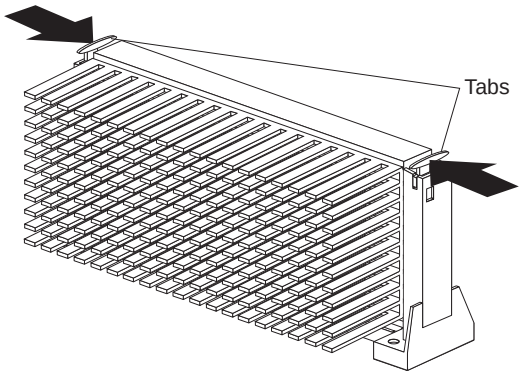
CAUTION:
The microprocessor and heat sink will be hot if the computer has been running. To avoid the possibility of a burn, if the computer has been on, let the microprocessor and heat sink cool for 10 minutes before continuing with the procedure.

Before you begin

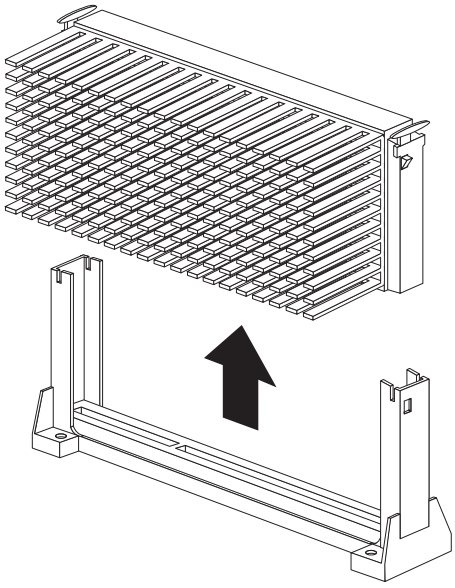
- Read "Electrical Safety" on page 4 and "Handling Static-Sensitive Devices" on page 5.
- Obtain a flash diskette for updating the system BIOS. If you do not have a flash diskette, refer to *Updating the System BIOS* in *Using Your Personal Computer*.
- Read the instructions that come with the new microprocessor.
- Turn off the computer and all other connected devices.
- Disconnect all cables attached to the computer and remove the computer cover (see "Disconnecting Cables and Removing the Cover" on page 6).

1 See “Identifying Parts on the System Board” on page 11 to locate the microprocessor socket.

2 Place your index fingers on the small tabs on the top of the microprocessor. Push in toward the microprocessor until the tabs release.



3 Carefully place one hand on the computer frame and with the other hand pull the microprocessor up and out of the connector.

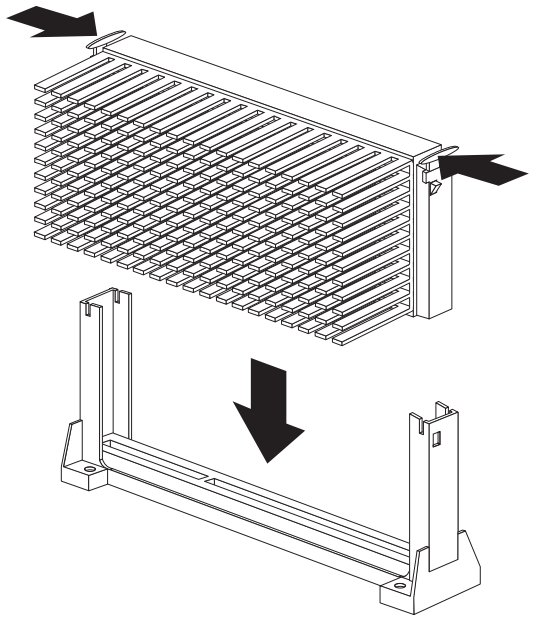


4 Store the old microprocessor in a static-protective package.

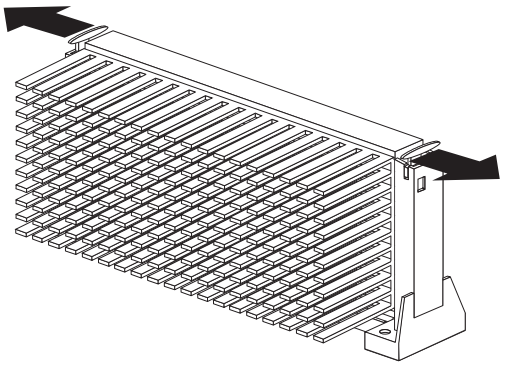
5 Touch the static-protective package containing the new microprocessor to any *unpainted* metal surface in the computer, and then remove the new microprocessor.

6 Press in on the retainer tabs until they click into place.

7 Align the new microprocessor with the connector on the system board and slide it into the guides. Press the microprocessor down until it seats in the connector.



8 Pull outward on the retainer tabs.



9 When you replace the microprocessor with one of a different speed, you must change the microprocessor speed setting by using the Configuration/Setup Utility program. Do not select a speed setting that is faster than the speed the microprocessor is designed for. Unpredictable results or hardware damage might occur. See "Updating the Computer Configuration" on page 71 and "Setting the Microprocessor Speed" on page 78.

Note: If a 167 POST error occurrs when you start your computer, refer to *Updating the System BIOS* in *Using Your Personal Computer* and perform a flash update of the system programs.

What to do next

- To work with another option, go to the appropriate section.
- To complete the installation, go to Chapter 7, "Completing the Installation" on page 68.

Chapter 4. Working with Adapters

This chapter provides information and instructions for installing and removing adapters.

When you are installing or removing adapters, it is important to resolve any resource conflicts that might arise. For example, if you install an ISA legacy adapter, you might need to manually configure the adapter by setting a variety of switches on the adapter and by using the Configuration/Setup Utility program.

Important Information

- Run ConfigSafe (or a similar application) to take a *snapshot* of your computer configuration before installing an adapter. This allows you to view and compare the changes in the computer configuration after you install an adapter. Also, if you have problems configuring the adapter after it is installed, ConfigSafe allows you to restore the configuration to the previous settings.

  ConfigSafe is part of the preinstalled software in your computer. For more information, see *About Your Software* that comes with your computer.
- Be careful when working near the microprocessor. Under normal use, the microprocessor can become very hot.

Many adapters now use *Plug and Play* technology which enables the computer to automatically configure the adapter, provided that the required resources are available. Refer to the instructions that come with your adapter to determine if it is Plug and Play. For more information, see "Adapter Configuration" on page 23.

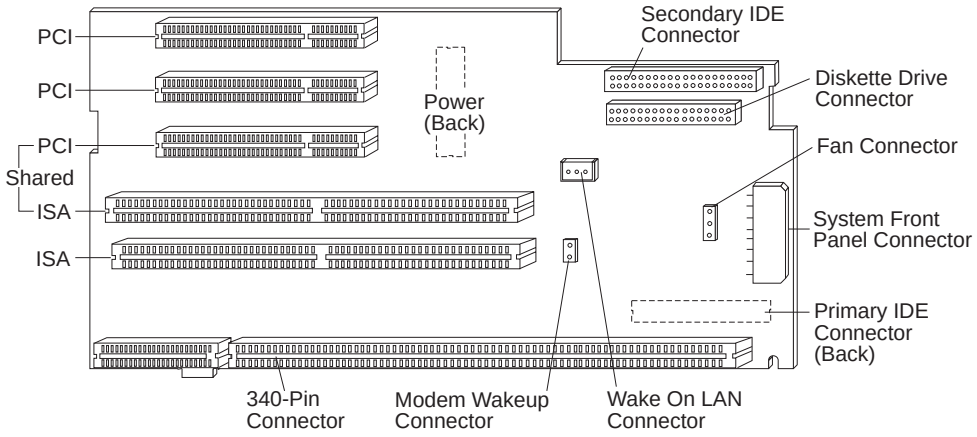
Adapters and the Riser Card

Your computer uses a riser card for expansion. The riser card contains expansion slots that connect adapters to the industry standard architecture (ISA) and peripheral component interconnect (PCI) buses.

You can install a variety of adapters in the expansion slots on the riser card. For information on locating the riser card, see "Locating Components" on page 8.

The riser card in your computer has two ISA slots and three PCI slots. The third PCI connector from the top shares a slot with the ISA connector directly *below* it. The other slots are dedicated to either the ISA or PCI bus. You can install only one adapter in the shared slot, for a total of four slots.

The following illustration shows the expansion slots and connectors on the riser card.



Notes:

1. The diskette and IDE drive connectors are also on the riser card. When installing optional drives, refer to this illustration.
2. If you attach a 4-position cable connector to the 2-pin modem wakeup connector, ensure that the unused positions (of the cable connector) are *next to the bottom of the riser card*. If you incorrectly attach the cable connector to the modem wakeup feature, the computer might automatically restart each time you power down.

Adapter Configuration

Along with the documentation that comes with your adapter, use the following information to help with adapter configuration.

Plug and Play Adapters

Plug and Play is a configuration method that makes expanding your computer easier. Support for Plug and Play is built into the system board of your computer.

If an adapter is Plug and Play, there are no switches or jumpers that must be set on the adapter. A Plug and Play adapter comes with configuration specifications set in memory to provide installation information to the computer during startup. When you install or remove Plug and Play adapters, this information is interpreted by the *basic input/output system (BIOS)*, which supports Plug and Play technology. If the required resources are available, the BIOS software automatically configures the adapter around the resources already in use by other devices.

Adapters designed for PCI slots are Plug and Play devices; many ISA adapters are not Plug and Play devices.

Notes:

1. If a resource conflict arises after installing a Plug and Play adapter, you might need to change the default resource settings on the adapter. For more information, refer to the documentation that comes with the adapter.
2. For information on error messages from resource conflicts, see *Using Your Personal Computer*.

Legacy Adapters

Adapters that are not Plug and Play compatible are known as *legacy devices*. If you install a legacy adapter, you must manually configure it by setting switches on the adapter and by allocating system resources using the Configuration/Setup Utility program.

In the Configuration/Setup Utility program, the ISA Legacy Resources screen shows the computer resources that are typically required by adapters:

- Memory resources
- I/O port resources
- DMA resources
- Interrupt resources

From the appropriate screens, you can select available resources for the adapter you are installing. Resources not being used by ISA legacy adapters are listed as [**Available**]. You must set the resources used by the newly installed ISA legacy adapter to [**ISA Resource]**; this reserves the resources for the legacy adapter and prevents the BIOS from using these resources for the system or other Plug and Play adapters.

Just as you change system resources when you install an ISA legacy adapter, you must also change resources when you remove an ISA legacy adapter. If you remove a legacy adapter, change the resources it formerly used to [**Available**]. This allows the Plug and Play software to automatically use these resources for future configurations, or you can use these resources for future manual configurations.

Note: Refer to the documentation that comes with the adapter for information on required system resources.

For information on configuring ISA legacy adapters, see "Configuring an ISA Legacy Adapter" on page 75 or refer to *Using Your Personal Computer*. For information on error messages from resource conflicts, see *Using Your Personal Computer*.

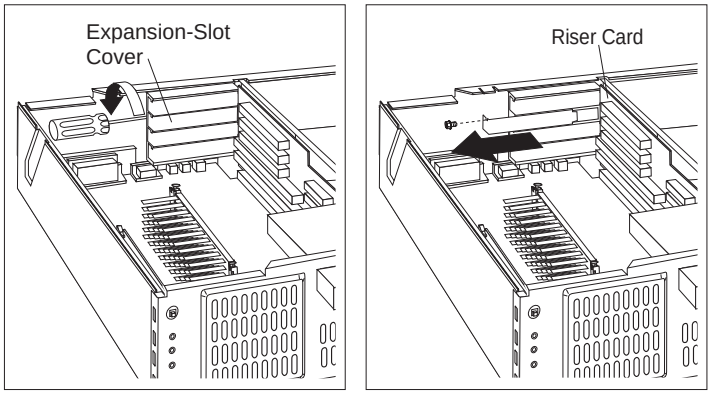
Installing Adapters

Before you begin

- Read "Electrical Safety" on page 4 and "Handling Static-Sensitive Devices" on page 5.
- Read the instructions that come with the new adapter.
- Turn off the computer and all other connected devices.
- Disconnect all cables attached to the computer and remove the computer cover (see "Disconnecting Cables and Removing the Cover" on page 6).

1 Review the instructions that come with the adapter to determine if it must be installed in an ISA or PCI slot.

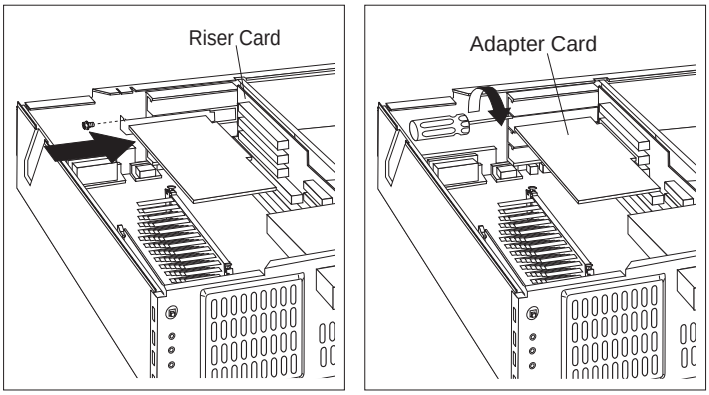
2 Remove the screw and cover for the appropriate expansion slot. If you cannot access the expansion slot screw, see "Removing the Side Cover" on page 28.



3 Touch the static-protective package containing the adapter to any *unpainted* metal surface in the computer; then, remove the adapter from the package.

4 Install the adapter into the appropriate slot on the riser card. The components of a PCI adapter face down toward the system board and the components of an ISA adapter face up. If a component in the computer or on the adapter interferes with the installation, use another slot.

If you are installing a full-sized ISA adapter in the bottom expansion slot, you must remove the side cover, the system board, and the fan assembly. See "Removing the Side Cover" on page 28 and "Removing and Replacing the System Board" on page 30.



Notes:

a. If you need to attach a cable from the adapter to a drive in bay 1, 2, or 3, see "Rotating the Drive Cage" on page 48 for instructions on how to rotate the drive cage to access the drive connector. Also, see "Routing a Cable from an Adapter to a Drive in Bay 1, 2, or 3" on page 27 for information on routing the cable inside the computer.

b. If you are installing an internal modem and plan to use the modem wakeup feature, see "Notes" on page 22 for important information on cabling.

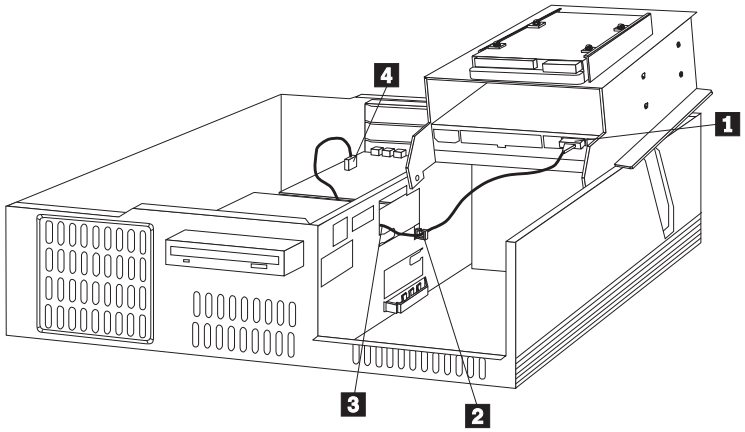
What to do next

- Go to the device-record form in *Using Your Personal Computer*, and write the adapter name next to the slot into which you installed it.
- If you removed the side cover, the system board and the fan, see "Replacing the Side Cover" on page 29 and "Removing and Replacing the System Board" on page 30.
- To work with another option, go to the appropriate section.
- To complete the installation, go to Chapter 7, "Completing the Installation" on page 68.

Routing a Cable from an Adapter to a Drive in Bay 1, 2, or 3

Use the following instructions to route a cable from a drive installed in bay 1, 2, or 3 to an adapter. To access the connector on the drives, rotate the drive cage using the instructions in “Rotating the Drive Cage” on page 48.

The following illustration shows a cable being routed from a CD-ROM drive installed in bay 1 to an audio adapter. (The drive cage is shown in the rotated position.)



1. Connect the cable to the drive.
2. Route the cable through the small, plastic clamp.
3. Route the cable through the drive bracket and around the riser card.
4. Connect the cable to the adapter.

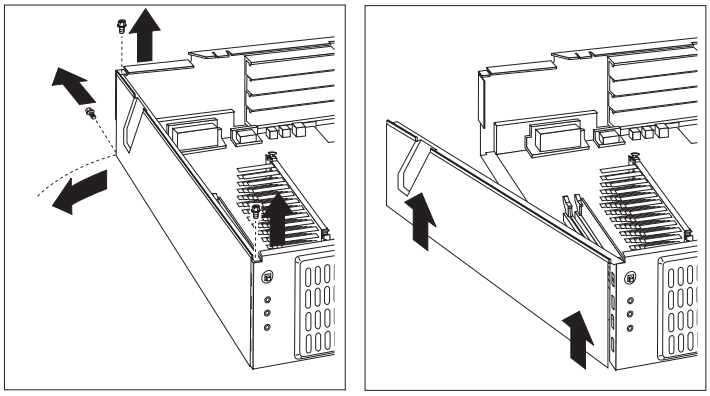
What to do next

- If you removed the side cover, the system board and the fan, see “Replacing the Side Cover” on page 29 and “Removing and Replacing the System Board” on page 30.
- To work with another option, go to the appropriate section.
- To complete the installation, go to Chapter 7, “Completing the Installation” on page 68.

Removing the Side Cover

If you cannot access the expansion slot screw, you must remove the computer side cover.

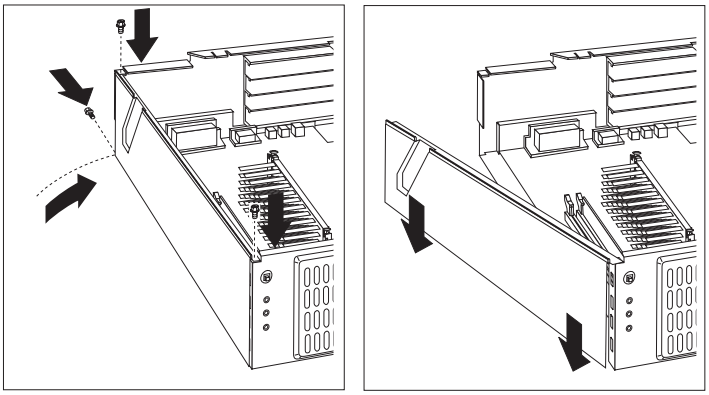
1. Remove the screws (maximum three) from the side cover. Your computer might not use three screws to attach the side cover.
2. Swing open the plain end of the side cover like a gate.
3. Once the side cover is standing open, lift up slightly on the pronged end and remove the side cover.



Replacing the Side Cover

1 Hold the side cover at an angle and align the pronged end with the slots.

2 Fit the prongs into the slots and swing the side cover closed.



3 Align the holes and insert the screws.

What to do next

- To work with another option, go to the appropriate section.
- To complete the installation, go to Chapter 7, “Completing the Installation” on page 68.

Removing and Replacing the System Board

To install some adapters you might have to remove the system board.

The system board is mounted on two rails which allow you to slide it in and out of the computer. The rail and latching mechanism on the left-hand rail is the same on all models. You might encounter two different styles of rails on the right-hand side of the system board.

- Style 1 has no latching mechanism
- Style 2 has a tab that engages in an opening in the chassis to hold the system board in the proper position.

The following procedures address both styles.

To remove the system board:

1. Unplug the power supply before removing the system board.
2. Remove the side cover. (See “Replacing the Side Cover” on page 29.)

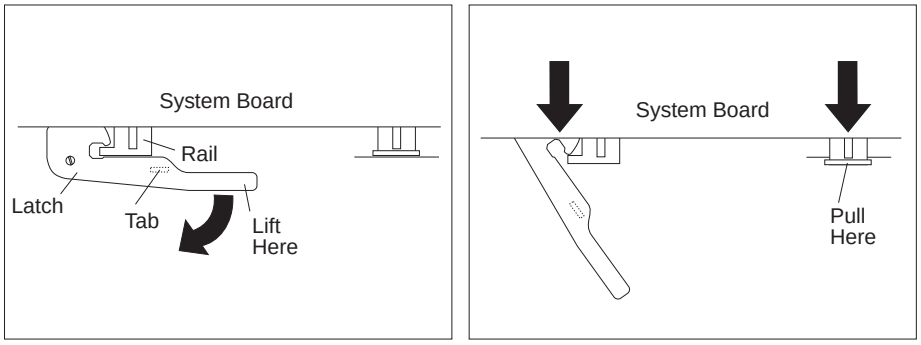
Style 1

1 On the left-hand rail, lift the system-board latch handle upward to disengage the plastic tab on the bottom of the handle from the chassis.

2 Grasp and turn the latch clockwise to the extended position. This releases the system board from the riser card.

3 Grasp both rails supporting the system board and carefully slide the system board out and set it aside.

CAUTION:
Do not pull on the microprocessor, memory modules, memory sockets, or other system-board components to remove the system board.



Style 2

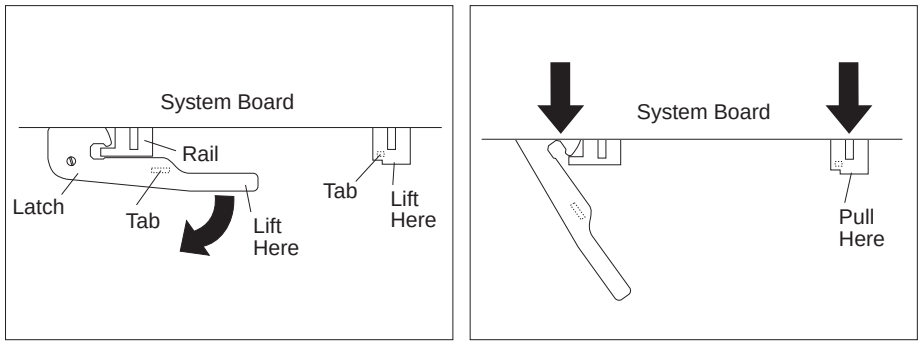
1. On the the left-hand rail, lift the system-board latch handle upward to disengage the plastic tab on the bottom of the handle from the chassis.

2. Lift the end of the right-hand rail to disengage the plastic tab from the bottom of the chassis.

3. Grasp and turn the latch clockwise to the extended position. This releases the system board from the riser card.

4. Grasp the rails supporting the system board and carefully slide the system board out and set it aside.

   CAUTION:
   Do not pull on the microprocessor, memory modules, memory sockets, or other system-board components to remove the system board.



To reinstall the system board:

Style 1

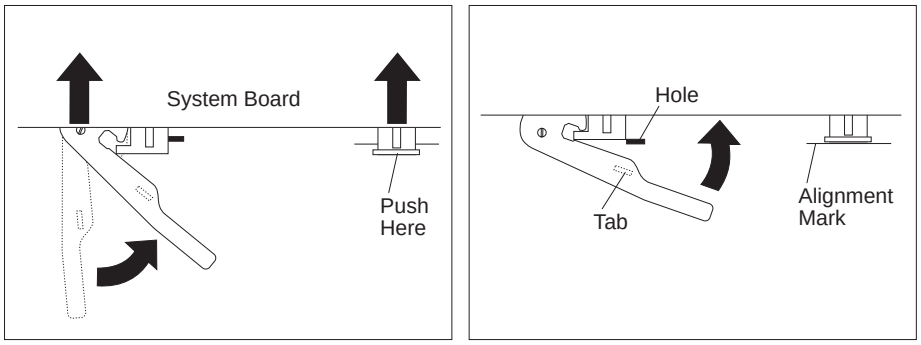
1. Make sure the system-board latch handle is in the extended position.

2. Align the system-board rails with the tracks on the chassis. Grasp the rails and slide the board in until it is approximately 6 mm. (0.25 in.) from the riser card edge connector.

3. Rotate the latch handle counter-clockwise until the system board is properly aligned with the riser card edge connector. Continue rotating the latch handle counter clockwise while firmly pushing on the end of the right-hand rail. When the system board is fully seated the alignment mark on the chassis is visible.

   CAUTION:
   Do not push on the microprocessor, memory modules, memory sockets, or other system-board components to install the system board.

4. Push down on the latch handle to engage the tab on the under side into the opening in the chassis. This holds the latch handle in the latched position.



Note: You cannot see the connection with a full-sized adapter in place. To make sure the system board is fully seated, it is important that the alignment mark on the right-hand rail is visible.

Style 2

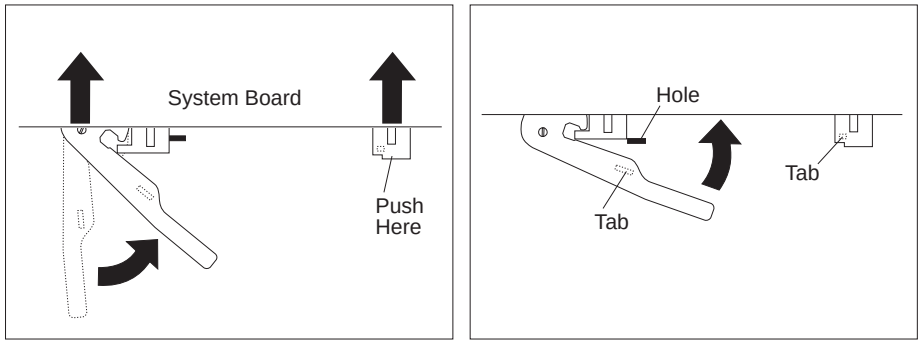
1. Make sure the system-board latch handle is in the extended position.

2. Align the system-board rails with the tracks on the chassis. Grasp the rails and slide the board in until it is approximately 6 mm. (0.25 in.) from the riser card edge connector.

3. Rotate the latch handle counter-clockwise until the system board is properly aligned with the riser card edge connector. Continue rotating the latch handle counter clockwise while firmly pushing on the end of the right-hand rail. When the system board is fully seated the tab on the right-hand rail is engaged in an opening in the chassis.

   CAUTION:
   Do not push on the microprocessor, memory modules, memory sockets, or other system-board components to install the system board.

4. Push down on the latch handle to engage the tab on the under side into the opening in the chassis. This holds the latch in the latched position.

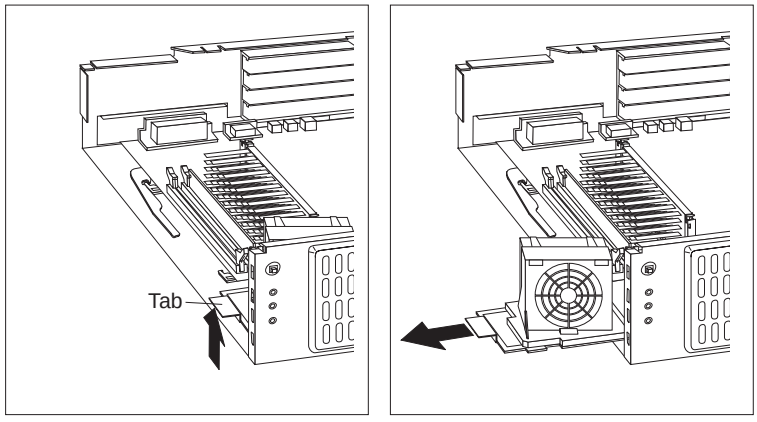


Note: You cannot see the connection with a full-sized adapter in place. To make sure the system board is fully seated, it is important that the tab on the right-hand rail is engaged in the opening in the chassis.

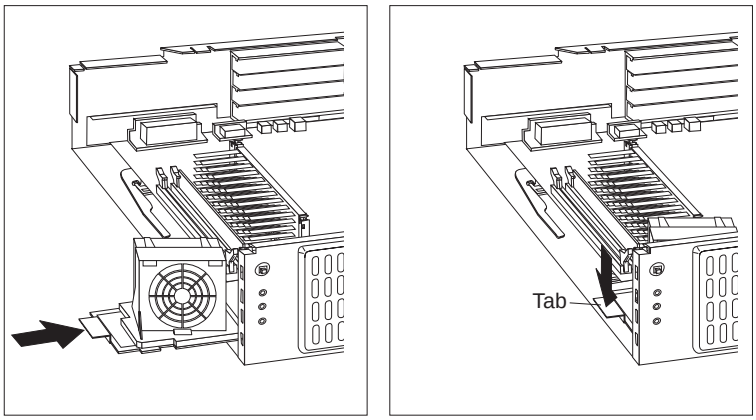
Removing and Replacing the Fan Assembly

To install an adapter you might have to remove the side cover, the system board, and the fan assembly.

1. Remove the side cover. (See “Removing the Side Cover” on page 28.)
2. Locate the fan assembly (to the right of the system board).
3. Unplug the cable from the fan connector on the riser card. To locate the fan connector, see “Adapters and the Riser Card” on page 22.
4. Lift the tab that holds the back edge of the fan assembly in the chassis.
5. Grasp and pull the tab. Carefully, slide the fan assembly out of the chassis and set it aside. There is no need to disassemble the fan from the assembly.



6 After you have installed or removed the full-sized adapter, replace the fan assembly as shown in the following illustration. The tab clicks into place when the fan assembly is seated. Plug the fan connector back into the riser card.



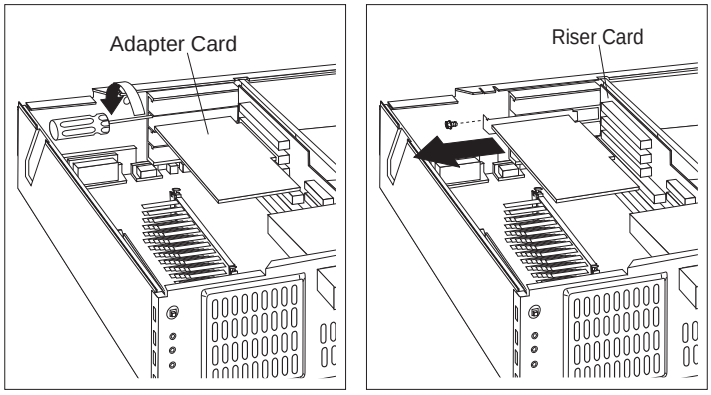
Removing Adapters

Before you begin

- Read "Electrical Safety" on page 4 and "Handling Static-Sensitive Devices" on page 5.
- Turn off the computer and all other connected devices.
- Disconnect all external cables and power cords, and then remove the computer cover (see "Disconnecting Cables and Removing the Cover" on page 6).

To remove some adapters, you must remove the side cover, the fan assembly, and the system board.

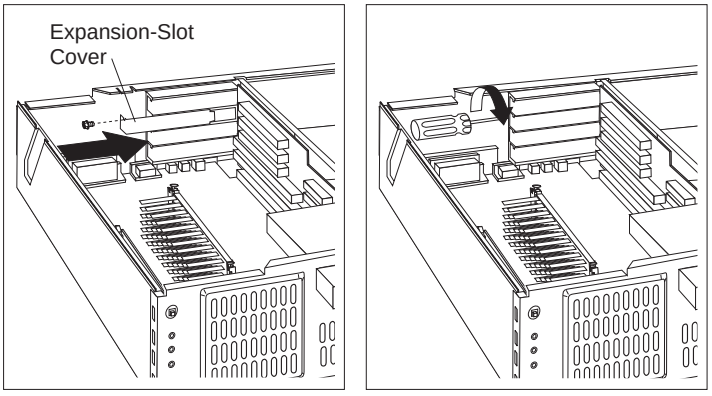
1 Locate the adapter and remove the screw.



2 Remove the adapter and insert it into a static-protective package.

If you cannot access the expansion slot screw, you must remove the computer side cover; see "Removing the Side Cover" on page 28.

3 If you are not installing another adapter in this slot, install an expansion-slot cover.



4 Go to the device-record form in *Using Your Personal Computer* and delete the name of the adapter you removed.

Note: Removing an adapter frees up system resources. If you remove an ISA legacy adapter, you must use the Configuration/Setup Utility program to set the previously used resources to [**Available**]. For more information, see Chapter 7, "Completing the Installation" on page 68.

What to do next

- To work with another option, go to the appropriate section.
- To complete the installation, go to Chapter 7, "Completing the Installation" on page 68.

Chapter 5. Working with Internal Drives

This chapter provides information and instructions for installing and removing internal drives.

Important Information

- Run ConfigSafe (or a similar application) to take a *snapshot* of your computer configuration before installing a drive. This allows you to view and compare the changes in the computer configuration after you install a drive. Also, if you have problems configuring the drive after it is installed, ConfigSafe allows you to restore the configuration to the previous settings.

  ConfigSafe is part of the preinstalled software in your computer. For more information, see *About Your Software* that comes with your computer.

- Be careful when working near the microprocessor. Under normal use, the microprocessor can become very hot.

When you are installing an internal drive, it is important to note which type of drive you can install in each bay and the height restrictions imposed by each drive bay. Also, it is important to correctly connect the internal drive cables to the installed drive. For more information, see "Working with Drives in Bays 1, 2, and 3" on page 48 and "Working With Drives in Bay 4" on page 56.

Internal drives are devices that your computer uses to read and store data. You can add drives to your computer to increase storage capacity and to enable your computer to read other types of media. Some types of drives available for your computer are:

- Diskette drives
- Hard disk drives
- Tape drives
- CD-ROM drives

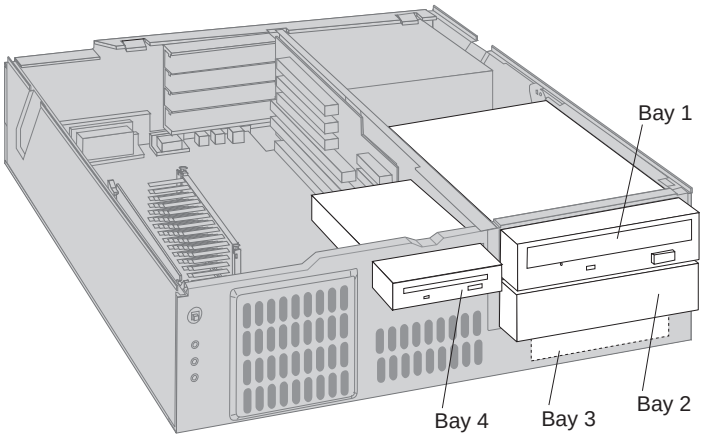
Internal drives are installed in *bays* at the front of your computer. The bays are referred to as bay 1, bay 2, and so on.

Your computer comes with the following IBM-installed drives:

- A 3.5-inch diskette drive in bay 4.
- A 3.5-inch hard disk drive in bay 3.

If your computer has a preinstalled CD-ROM drive, it is installed in bay 1.

The following illustration shows the location of the drive bays in your computer.



If you are adding a drive to your computer, you might need a drive bay conversion kit. If you plan to add 3.5-inch drive to a 5.25-inch bay, you must mount a conversion kit in the bay to hold the drive. Also, you need a cable to connect a hard disk drive. For information about ordering these parts, see page 3.

Drive Specifications

The following table describes the drives you can install in each bay and their height requirements.

Table 2. Drive Specifications

Bay	Drives	Max. Height mm (in.)	Min. Height mm (in.)
1	5.25-inch CD-ROM Tape backup drive 3.5-inch or 5.25-inch hard disk drive	41.3 (1.6)	—
2	5.25-inch CD-ROM Tape backup drive 3.5-inch or 5.25-inch hard disk drive	25.4 (1.0)	25.4 (1.0)
3	Hard disk drive	25.4 (1.0)	25.4 (1.0)
4	3.5-inch diskette drive	25.4 (1.0)	—

Notes:

- You cannot install drives that are greater than 41.3 mm (1.6 in.) high.
- You must install drives that require removable media (diskettes, tapes, or CDs) in the accessible bays: bay 1, 2, or 4.
- You can install only one diskette drive in the PC 300GL.
- To properly mount a 3.5-inch drive into bay 1 or 2, you must use a 3.5-inch conversion kit for a 5.25-inch bay. For more information, contact your IBM reseller or IBM marketing representative.

Power and Signal Cables

Your computer uses cables to connect the power supply to the riser card and to integrated drive electronics (IDE) drives. The diskette drive is powered through the power supply. The following cables are provided:

- Four-wire *power cables* connect most drives to the power supply. At the ends of these cables are plastic connectors that attach to different drives; these connectors vary in size. Also, certain power cables attach to the riser card.
- Flat *signal cables* connect IDE drives to the riser card; signal cables are sometimes called *ribbon cables*. There are two sizes of signal cables that come with your computer:
  - The wider signal cable attaches to the installed drive and the primary IDE connector on the back side of the riser card.
  - The narrower signal cable connects to the diskette drive and the diskette drive connector on the riser card.

Note: To locate connectors on the riser card, see "Adapters and the Riser Card" on page 22.

The following are some important points to remember when connecting power and signal cables to internal drives:

- You can install only one diskette drive in the PC 300GL.
- The diskette drive and hard disk drive that are preinstalled in your computer come with power and signal cables attached. Also, if your computer comes with a CD drive, cables are attached. If you replace any drives, it is important to remember which cables are attached to which drives and how the cables are routed through the computer.
- When you install a drive, ensure that the drive connector at the end of the signal cable is connected to the drive; also, ensure that the drive connector at the other end is connected to the riser card.
- If more than one IDE device is used on a single cable, one must be designated as the master device and the other as a slave or subordinate device; otherwise, some of the IDE devices might not be recognized by the system. The master or slave designation is determined by switch or jumper settings on each IDE device.

- To optimize performance when installing more than two hard disk drives, be sure to attach hard disk drives with faster data transfer speeds (Mode 1 or higher) to the primary hard disk drive signal cable (hard disk drives 0 and 1).
- On some models, to install more than one IDE hard disk drive, you must purchase an additional signal cable. The cable must meet the following specifications:
  - Maximum length: 0.46 meters (18 inches)
  - Wire size: 28 AWG
  - Cable capacitive loading: 200 pF maximum

Accessing Drive Bays

Your computer comes with drives preinstalled in bays 3 and 4. Your computer might also come with drives preinstalled in bays 1 or 2. Any drive bay that lacks a preinstalled drive has a metal shield mounted on the computer frame and a bay panel mounted in the cover of the computer. Before installing any drive, you must remove the metal shield. Unless you are installing a hard disk drive, you must also remove the bay panel. If you are installing or removing a drive in bays 1, 2, or 3, you must also rotate the drive cage.

Before you begin

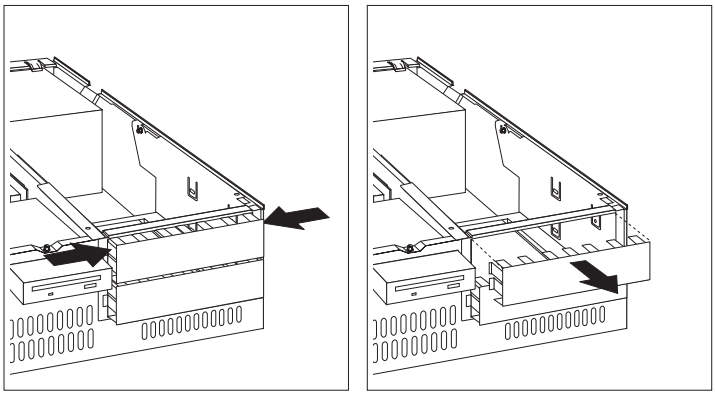
- Read "Electrical Safety" on page 4 and "Handling Static-Sensitive Devices" on page 5.
- Read the instructions that come with the option you want to install or replace.
- Turn off the computer and all other connected devices.
- Disconnect all cables attached to the computer and remove the computer cover (see "Disconnecting Cables and Removing the Cover" on page 6).

Removing the Metal Shield

Note: Your computer might not be equipped with metal shields.

1. Have the front of the computer facing you.
2. Push in the tabs on the sides of the metal shield until it flexes.
3. Lift off one side, then the other.

   Note: You might need to remove the shield from bay 1 to get to the shield covering bay 2.



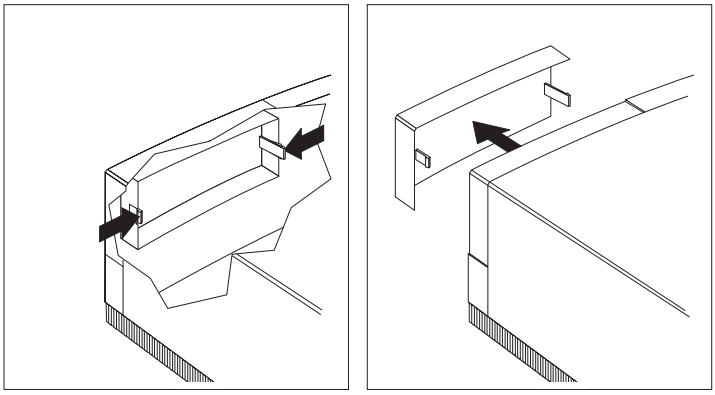
What to do next

- To remove a bay panel, go to "Removing a Bay Panel" on page 46.
- To rotate the drive cage up and rest it on the power supply, go to "Rotating the Drive Cage" on page 48.
- To install a drive, go to "Installing a Drive in Bay 1, 2, or 3" on page 50.
- To remove a drive, go to "Removing a Drive from Bay 1, 2, or 3" on page 53.

Removing a Bay Panel

1. Locate the appropriate bay panel in the computer cover.
2. Remove the cover (see “Disconnecting Cables and Removing the Cover” on page 6) and look inside at the back of the bay panel.
3. Use the tip of a screwdriver if necessary to flex the plastic tabs holding the bay panel in the cover.

   If you are planning to install a CD-ROM drive in bay 1, you must release the tab nearest the outside edge first.
4. Flex the bay panel a little, until both tabs are released.
5. Remove the bay panel. The following illustrations show a bay panel being removed from bay 1.



6. Save the removed bay panel for possible future use.
7. If applicable, repeat steps 1–3 to remove another bay panel.

What to do next

- Remove the metal shield covering the bay.
- To remove a drive, go to “Removing a Drive from Bay 1, 2, or 3” on page 53.
- To install the drive cage, go to “Rotating the Drive Cage Back into Fixed Position” on page 55.

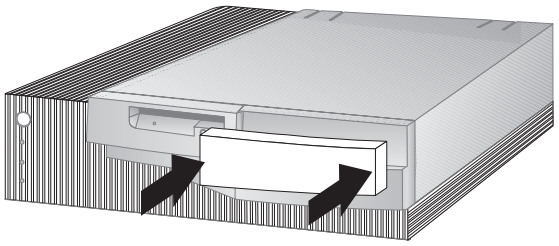
Installing a Bay Panel

Bay panels for drives 1 and 2 snap into the computer cover from the outside. (You do not have to take the cover off when installing a bay panel.)

The bay panels snap into place from the outside of the computer cover.

1 Align the bay panel with the opening in the computer cover.

2 Install the bay panel by pressing it in until you hear the tabs click into place. The following illustration shows a bay panel being installed in bay 1.



3 If applicable, repeat steps 1 and 2 to install another bay panel.

What to do next

- To install a drive, go to "Installing a Drive in Bay 1, 2, or 3" on page 50.
- If you have installed a drive, go to Chapter 7, "Completing the Installation" on page 68.

Working with Drives in Bays 1, 2, and 3

To install or remove drives in bays 1, 2, or 3, you must rotate the drive cage up over the power supply of your computer. When you are facing the computer, the drive cage is located at the front, right corner.

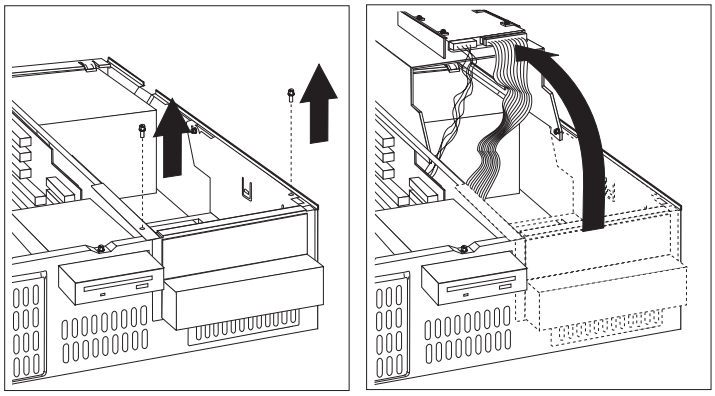
Before you begin

- Read "Electrical Safety" on page 4 and "Handling Static-Sensitive Devices" on page 5.
- Read the instructions that come with the drive you want to install or replace.
- Turn off the computer and all other connected devices.
- Disconnect all cables attached to the computer and remove the computer cover (see "Disconnecting Cables and Removing the Cover" on page 6).

Rotating the Drive Cage

To rotate the drive cage up from the computer and over the power supply:

1. Remove the two screws that attach the drive cage to the computer frame.
2. Carefully rotate the cage out of the computer toward the power supply. The cage will pivot back until it rests on top of the computer frame.



3 Leave the cables attached.

What to do next

- To install a drive, go to “Installing a Drive in Bay 1, 2, or 3” on page 50.
- To remove a drive, go to “Removing a Drive from Bay 1, 2, or 3” on page 53.

Installing a Drive in Bay 1, 2, or 3

Before you begin

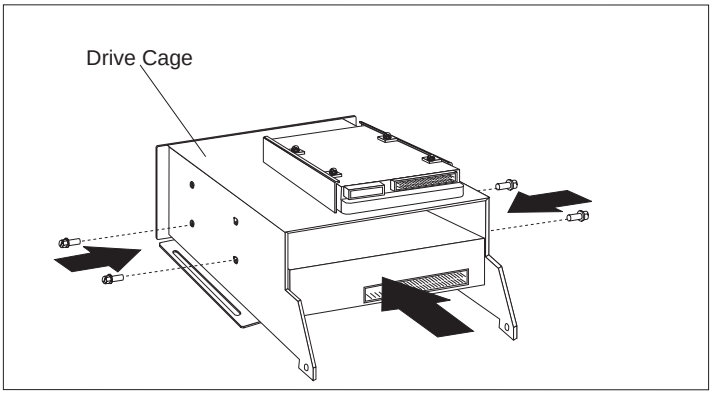
- Read "Working with Drives in Bays 1, 2, and 3" on page 48.
- Read "Rotating the Drive Cage" on page 48.
- Read the documentation that comes with the drive.

Notes:

- To install a 3.5-inch drive into drive bay 1 or 2, you must install a conversion kit. (For more information, contact your IBM reseller or IBM marketing representative.) You will also need a cable to connect to the hard disk drive.
- Remove the metal shield that covers the bay you want to use. See "Accessing Drive Bays" on page 44.

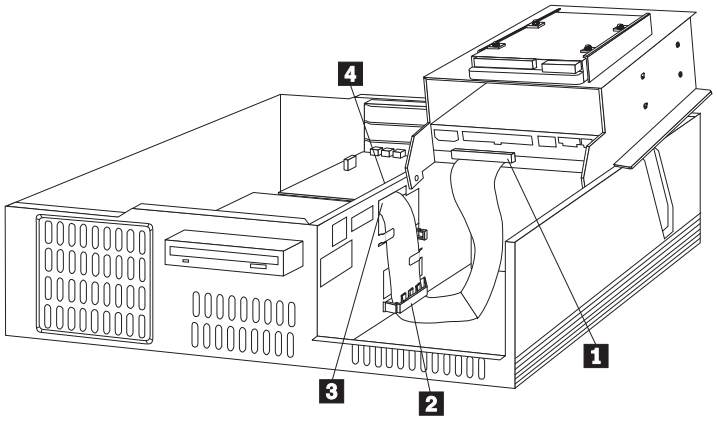
1 Touch the static-protective package containing the new drive to any *unpainted* metal surface and then remove the drive.

2 Insert the drive into the desired unoccupied drive bay. Remember the cage is upside down, so you must also put the drive in upside down. Then insert and tighten the screws to hold it in place. The following illustration shows a drive being installed in bay 1.



3 If applicable, repeat steps 1 and 2 to install another drive.

4 Route the signal cable inside the computer. The following illustration shows a signal cable being routed from a drive installed in bay 1 to the secondary IDE connector on the riser card.



1. The signal cable connects to the drive here.
2. Route the signal cable through the plastic clamp. A detailed illustration on using this clamp is shown on page 52.
3. Route the signal cable around the drive bracket.
4. Connect the signal cable to the IDE connector.

Notes:

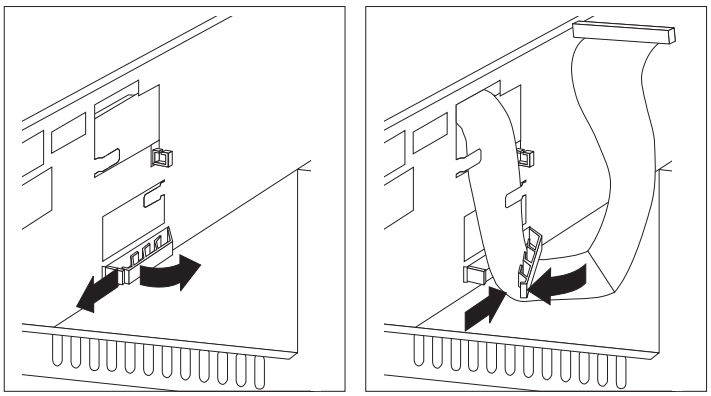
a. The preceding steps should be used with all signal cables that are routed from drives in the drive cage to connectors on the opposite side of the riser card.

   If you are connecting a drive to the primary IDE connector on the riser card (on the same side as the drive cage), also route the signal cable through the plastic clamp and then attach it to the primary IDE connector.

   Refer to "Adapters and the Riser Card" on page 22 for an illustration showing the locations of the connectors on the riser card.

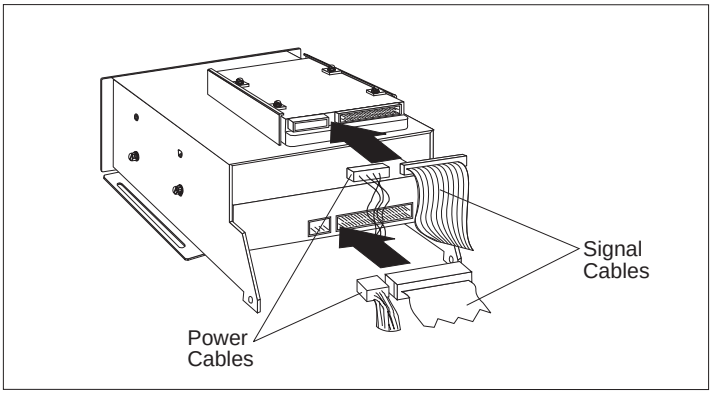
b. If you added a CD-ROM drive and want to connect it to an audio adapter, see "Routing a Cable from an Adapter to a Drive in Bay 1, 2, or 3" on page 27. This section provides information about routing a cable from an audio adapter to a drive installed in bay 1, 2, or 3.

The following illustration shows how to open and close the clamp used for securing signal cables.



5 Attach all cables to the drive.

Note: If more than one drive is installed, attach cables to the lowest drive first and work your way up.



What to do next

- Go to the device-record form in *Using Your Personal Computer* and record the new installation.
- Rotate the drive cage back. For details, see "Rotating the Drive Cage Back into Fixed Position" on page 55.

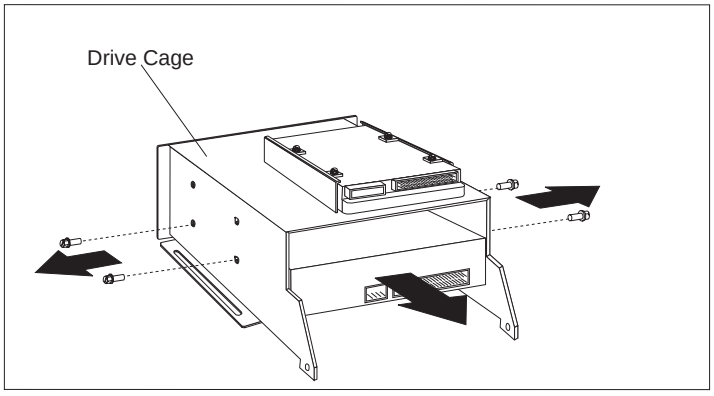
Removing a Drive from Bay 1, 2, or 3

Before you begin

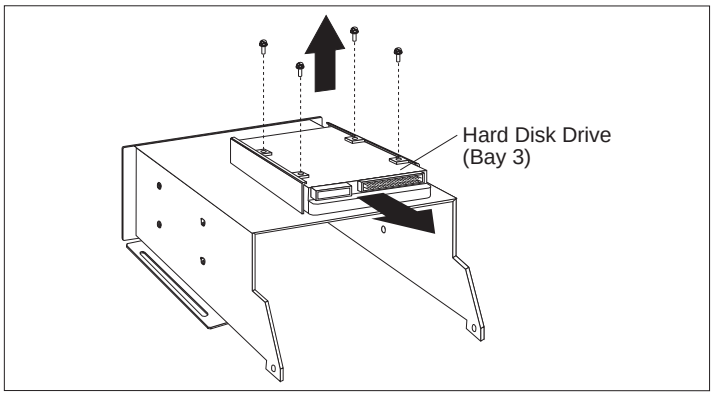
- Read “Working with Drives in Bays 1, 2, and 3” on page 48.
- Read “Rotating the Drive Cage” on page 48.

After you have rotated the drive cage from the computer frame:

1. Disconnect the cables from the drive that you want to remove.
2. Loosen and remove the screws holding the drive in the drive cage, and then slide the drive out of the bay.
   a. The following illustration shows a 5.25-inch drive (a CD-ROM) being removed from bay 1.



b. To remove a 3.5-inch hard disk drive from bay 3, you must remove the screws from the bottom of the drive, then slide the drive out of the bay. The following illustration shows the screws being removed from the drive and the drive cage.



3 Place the removed drive in a static-protective package.

What to do next

- If you are leaving the drive bay empty, or if you are replacing a removed drive with a drive that does not have removable media, install a bay panel and a metal shield. For more information, go to "Installing a Bay Panel" on page 47.
- To install a drive, go to "Installing a Drive in Bay 1, 2, or 3" on page 50.

Rotating the Drive Cage Back into Fixed Position

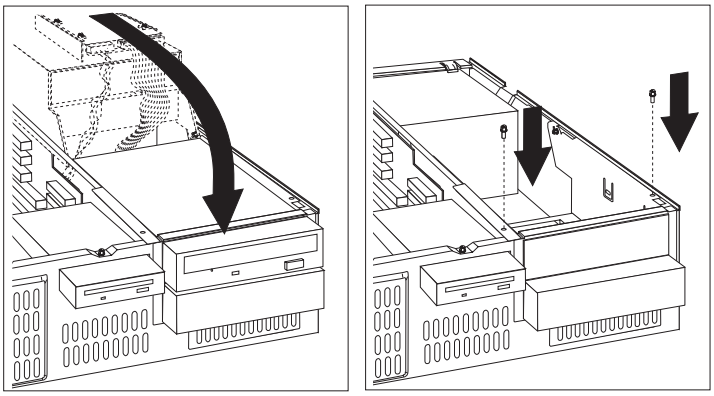
Before you begin

- Ensure that all cables are routed correctly inside the computer. For more information on routing signal cables to drives, step 4 on page 51 on page 51.
- Ensure that you have properly connected all cables to the drives in the drive cage.

1 Push the drive power and signal cables towards the power supply and out of the way.

2 Carefully rotate the drive cage towards the front of the computer.

3 Insert and tighten the screws on top of the drive cage and computer frame.



What to do next

- To work with a drive in bay 4, go to "Installing a Drive in Bay 4" on page 58 or "Removing a Drive from Bay 4" on page 56.
- To complete the installation, go to Chapter 7, "Completing the Installation" on page 68.

Working With Drives in Bay 4

This section discusses removing and installing a drive in bay 4. Normally, the diskette drive is installed in bay 4.

Removing a Drive from Bay 4

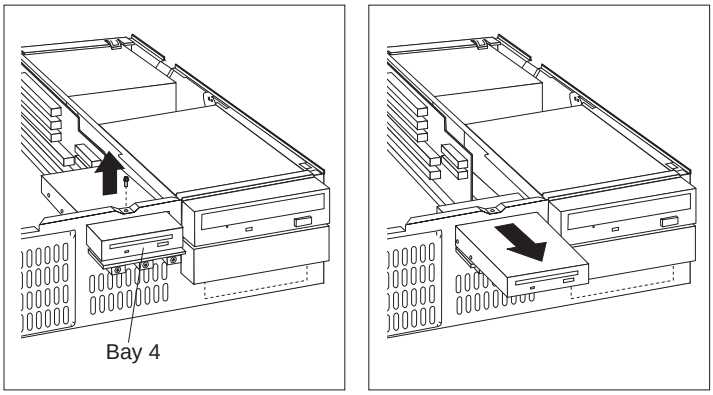
If you remove a drive that has removable media and you do not intend to install a new drive immediately, replace the bay panel and the metal shield.

Before you begin

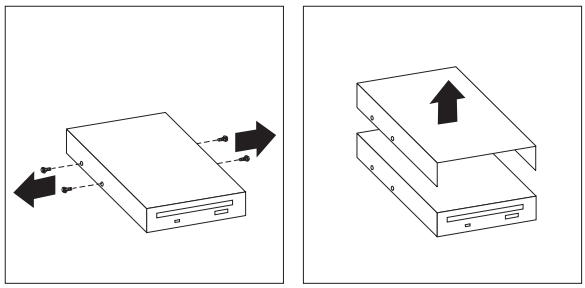
- Read "Electrical Safety" on page 4 and "Handling Static-Sensitive Devices" on page 5.
- Turn off the computer and all other connected devices.
- Disconnect all cables attached to the computer and remove the computer cover (see "Disconnecting Cables and Removing the Cover" on page 6).

1 Loosen and remove the screw from the top of the diskette drive bracket, and disconnect the power and signal cables.

2 Slide the drive and bracket forward and out of the computer.



3 Disassemble the drive from the bracket outside of the computer, loosening and removing the screws from the sides of the diskette drive bracket.



4 Place the reserved drive in a static-protective package.

What to do next

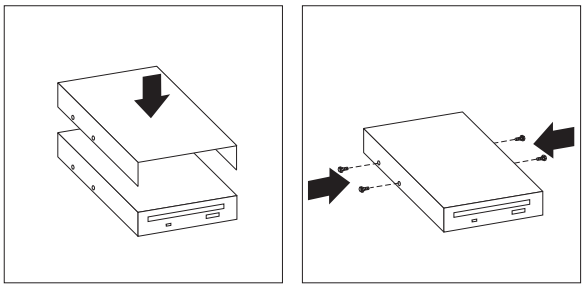
- Go to the device-record form in *Using Your Personal Computer* and record the removal.
- To replace a metal shield over the unused bay, go to "Removing the Metal Shield" on page 45.
- To replace a bay panel over the unused bay, go to "Installing a Bay Panel" on page 47.
- To install a drive, go to "Installing a Drive in Bay 4" on page 58.
- To install the drive-bracket assembly and complete the installation, go to Chapter 7, "Completing the Installation" on page 68.

Installing a Drive in Bay 4

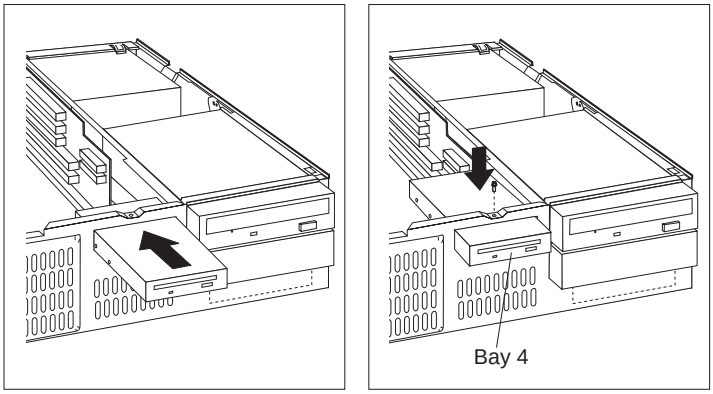
Before you begin

- Read "Electrical Safety" on page 4 and "Handling Static-Sensitive Devices" on page 5.
- Turn off the computer and all other connected devices.
- Disconnect all cables attached to the computer and remove the computer cover (see "Disconnecting Cables and Removing the Cover" on page 6).

1 Working outside the computer, insert the drive into the diskette drive bracket, then insert and tighten the side screws.



2 Insert the diskette drive bracket into the computer and tighten the top screw.



3 Attach the power and signal cables. Refer to "Adapters and the Riser Card" on page 22 for an illustration showing the locations of the connectors on the riser card.

What to do next

- Go to the device-record form in *Using Your Personal Computer* and record the installation.
- To add a drive from bay 1, 2, or 3, see "Rotating the Drive Cage" on page 48 and "Installing a Drive in Bay 1, 2, or 3" on page 50.
- To remove a drive from bay 1, 2, or 3, see "Rotating the Drive Cage" on page 48 and "Removing a Drive from Bay 1, 2, or 3" on page 53.
- To complete the installation, go to Chapter 7, "Completing the Installation" on page 68.

Chapter 6. Working with Security Options

This chapter describes some of the security options that are available for your computer.

To help prevent hardware theft, you can add a security U-bolt and cable to your computer. To erase lost or forgotten passwords, you can move the CMOS clear (password) jumper on the system board.

Note: Use the Configuration/Setup Utility program to set, change, or delete passwords. For more information, see *Using Your Personal Computer*.

The following list is a quick reference to these procedures:

Installing a U-Bolt

You can add a U-bolt to the rear of your computer. Adding a U-bolt enables you to add a security cable and lock which helps prevent hardware theft. After you add the security cable, make sure that it does not interfere with other cables that are connected to the computer.

Note: Where you can install the U-bolt can vary by computer.

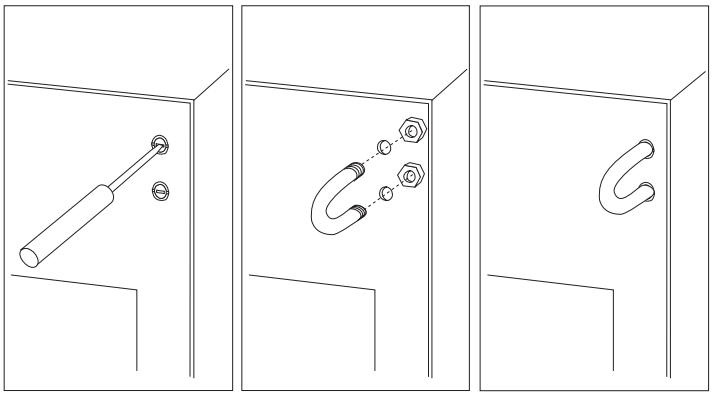
Before you begin

- U-bolts vary in size. To determine the correct size U-bolt for your computer, locate the U-bolt holes on the computer rear panel, and obtain one of the following:
  - A 19-mm (3/4 in.) U-bolt, if the U-bolt holes on your computer are located at the top-right corner of the rear panel. These holes allow the U-bolt to be installed in a vertical position.
  - A 15-mm (9/16 in.) U-bolt, if the U-bolt holes on your computer are located just right of the expansion slots on the rear panel. These holes allow the U-bolt to be installed in a horizontal position.
- Obtain the following:
  - A security cable
  - A lock, such as a combination lock or padlock
  - An adjustable wrench
- Read "Electrical Safety" on page 4 and "Handling Static-Sensitive Devices" on page 5.
- Turn off the computer and all connected devices.

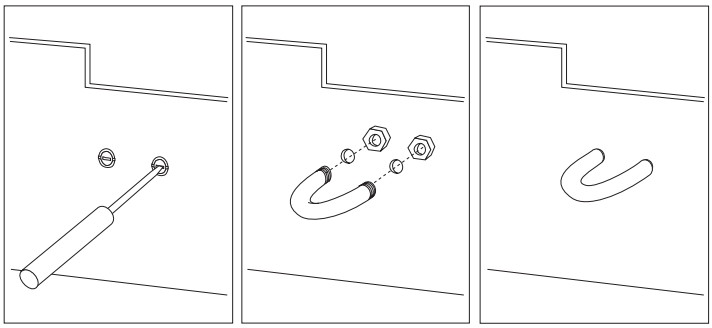
1 Locate the two holes for the U-bolt on the rear panel of the computer. The location of these holes differ by computer.

2 Use a screwdriver to remove the metal tabs that cover the holes. Next, insert the U-bolt through the holes and attach and tighten the nuts with an adjustable wrench.

- The following illustration shows a 19-mm U-bolt being installed.



- The following illustration shows a 15-mm U-bolt being installed.

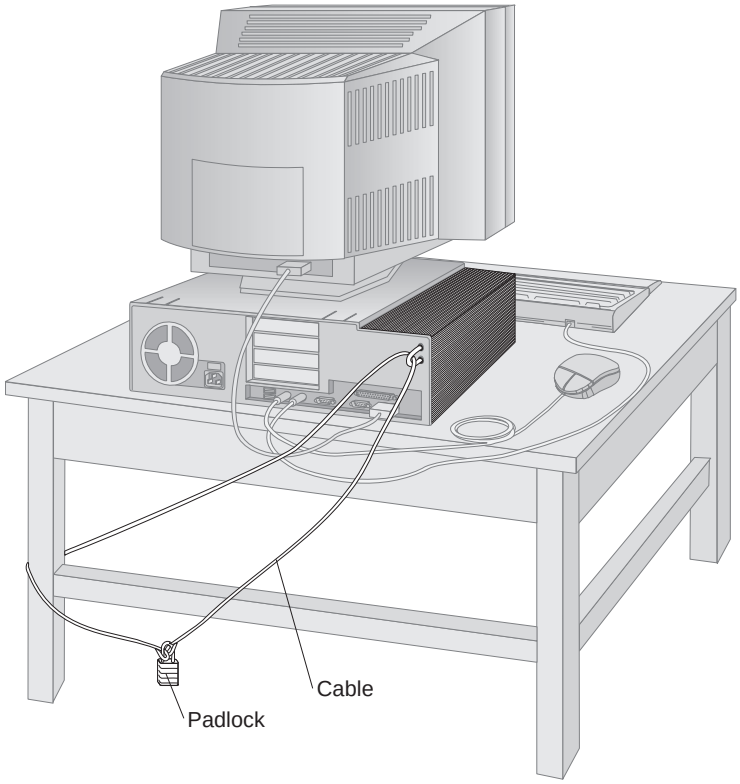


3 If you cannot access the nuts with the wrench, you will need to remove the side cover. See “Disconnecting Cables and Removing the Cover” on page 6.

4 Replace the computer cover. For more information, see “Replacing the Cover and Connecting the Cables” on page 69.

5 Thread the cable through the U-bolt and around an object that is not a part of or permanently secured to the building structure or foundation, and from which it cannot be removed, then fasten the cable ends together with a lock.

The following illustration shows an example of how this might work after a 19-mm U-bolt has been installed.



Erasing Lost or Forgotten Passwords

Note: To set a password, see "Setting Passwords" on page 77. To change or delete a password, see *Using Your Personal Computer*.

Your computer uses *complementary metal-oxide semiconductor (CMOS)* memory on the system board for storing configuration and setup information. CMOS memory maintains information about:

- Date and time
- Security features
- Power-management devices
- Storage devices
- Keyboard and mouse
- ISA legacy configuration information
- Plug and Play configuration information
- Port assignments
- I/O addresses and interrupts
- Other selectable features

Within the security features are the settings for the power-on and administrator passwords. If you need to *erase* a lost or forgotten password, you must move the jumper designated for CMOS memory.

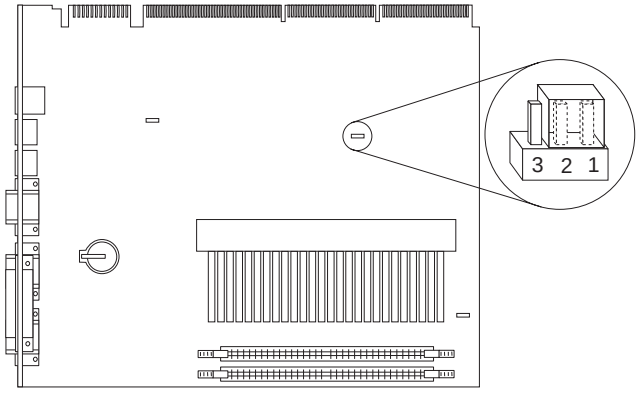
Important

Clearing CMOS memory sets the configuration of your computer to the default settings. Because you need to reconfigure the computer after clearing CMOS memory, if possible, record the configuration information of your computer *before* moving the Clear CMOS jumper.

Before you begin

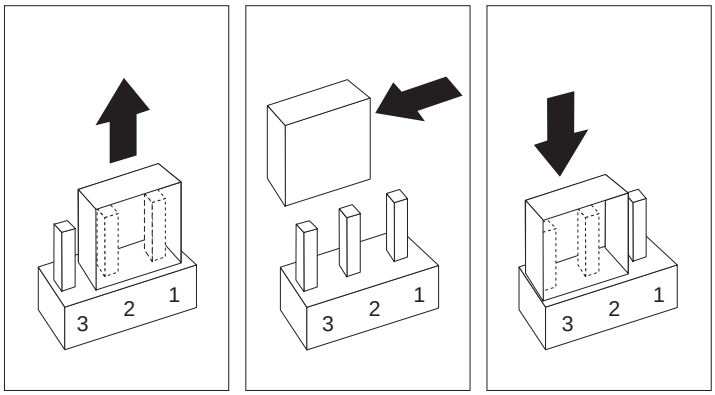
- Using the Configuration/Setup Utility program, record all configuration information.
- Read "Electrical Safety" on page 4 and "Handling Static-Sensitive Devices" on page 5.
- Turn off the computer and disconnect the power cord from the rear of the chassis. Leave the other cables connected.
- Remove the computer cover (see "Disconnecting Cables and Removing the Cover" on page 6).

The jumper is located on the system board (shown in the following illustration). The jumper is labeled J6C1.



Note: A label on the underside of the computer cover also shows the location of this jumper and other computer components.

1 Move the jumper from its normal position (pins 1 and 2) to pins 2 and 3. It might be helpful to use needle-nose pliers to move the jumper, but be careful not to scrape any system board components or crush the jumper.



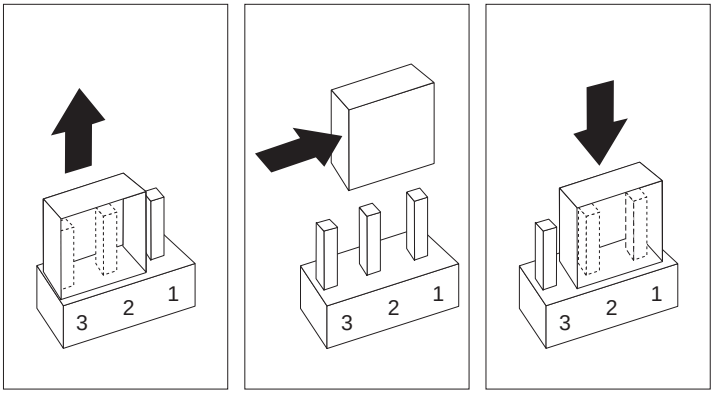
2 Reconnect the power cord and turn the computer back on. CMOS memory is now cleared and the passwords have been erased. After the POST completes, configuration error messages are displayed.

3 Follow the instructions on the screen to continue.

4 When the Configuration/Setup Utility starts, make the necessary changes, save the settings, and exit setup. Refer to "Updating the Computer Configuration" on page 71. When the message is displayed that instructs you to move the jumper to the normal position, turn power off.

5 Disconnect the power cord from the rear of the chassis.

6 Move the jumper back to its normal position (pins 1 and 2).



What to do next

After reassembling the computer (go to Chapter 7, "Completing the Installation" on page 68), use the Configuration/Setup Utility program to set any passwords or other configuration parameters. For more information, refer to "Setting Passwords" on page 77 and *Using Your Personal Computer*.

Chapter 7. Completing the Installation

After working with options, you need to install any removed parts, replace the cover, and reconnect any cables, including power cords and telephone lines. Also, depending on the option installed, you might need to update information in the Configuration/Setup Utility program.

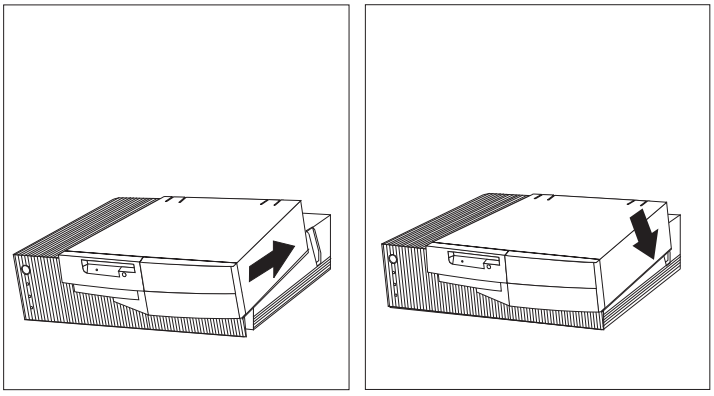
The following list is a quick reference to these procedures:

Replacing the Cover and Connecting the Cables

Before you begin

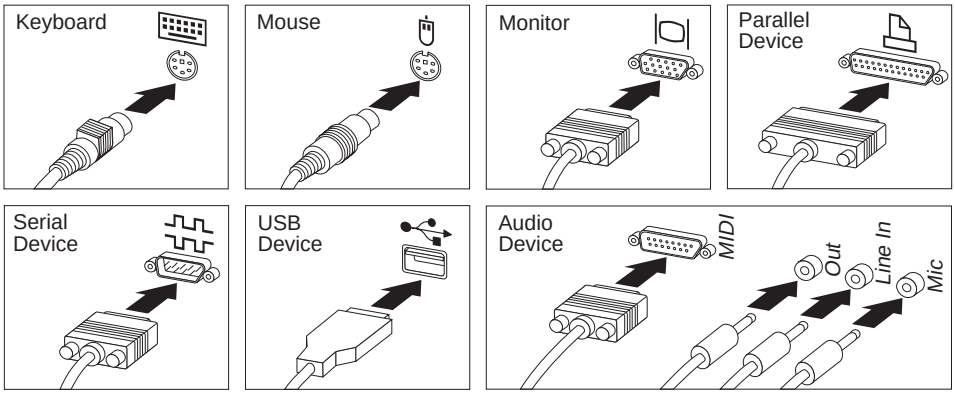
Read “Electrical Safety” on page 4 and “Handling Static-Sensitive Devices” on page 5.

1. Ensure that all components have been reassembled correctly and that no tools or loose screws are left inside your computer.
2. Clear any cables that might impede the replacement of the cover.
3. With a hand on either side of the top cover, set the front edge on the table in front of the computer and prop the back edge on top of the computer. Push the cover toward the rear of the computer until the back of the cover drops down.



4. If a lock is present at the back of the computer, lock the cover.

5 Reconnect the external cables and cords to the computer.



6 If you have a modem or fax machine attached to the computer, reconnect the telephone line to the wall outlet and the computer. Plug the power cords into properly grounded electrical outlets.

7 Update the computer configuration. See "Updating the Computer Configuration" on page 71.

Important

In the United Kingdom, by law, the telephone cable must be connected after the power cord.

Updating the Computer Configuration

Important

The configuration information in this section applies to installing options. For more information on using the Configuration/Setup Utility program, see *Using Your Personal Computer*.

Also, you might need to install device drivers after updating the configuration settings. For more information, see the instructions that come with the option to determine if device drivers are required and how to install them. Also, video device drivers are on the *Ready-to-Configure Utility Program*. CD

After adding, removing, or replacing options, you must update the configuration settings. This reconfiguration is performed automatically by the computer or *manually* by you. When the computer automatically configures an option, it uses system programs. If the system programs do not update the settings, you can use the Configuration/Setup Utility program to reconfigure the appropriate settings.

For example, when you start your computer after adding most internal hard disk drives, the settings are automatically updated and you use the Configuration/Setup Utility program to save those changes. However, if a resource conflict arises after an ISA legacy adapter is installed or removed, you must manually update the computer configuration and save the information.

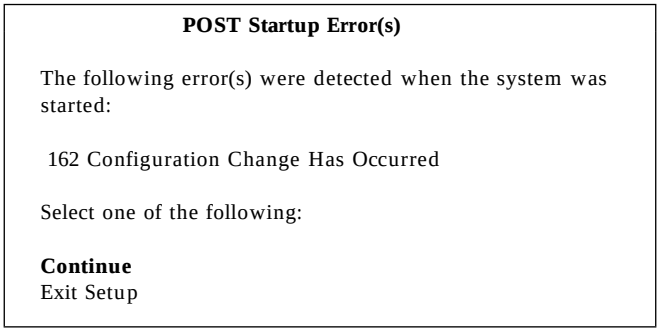
Notes:

1. Make a record of all customized settings before you make any modifications.
2. For more information on error messages from resource conflicts, see *Using Your Personal Computer*.

Starting the Configuration/Setup Utility Program

When you restart the computer for the first time after working with most options, a message appears indicating that a configuration change has occurred. You are then prompted to enter the Configuration/Setup Utility program to manually update the configuration settings or to confirm and save the settings that were automatically updated by the system programs.

After you change an option and restart the computer, the following screen might appear.



Note: Depending on the configuration changes that occurred, the error message you see might be different from the one shown here.

If the preceding screen appears, select **Continue** until you reach the Configuration/Setup Utility menu.

If the preceding screen does not appear, use the following procedures to access the Configuration/Setup Utility menu.

To access the Configuration/Setup Utility program:

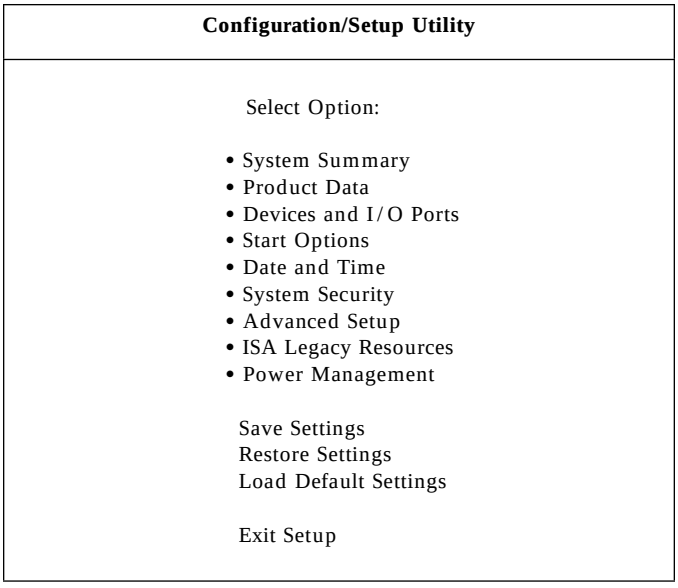
1 Turn on the computer.

If your computer is on when you start this procedure, you must shut down the operating system, turn off the computer and wait a few seconds, and then restart the computer. Do not use **Ctrl+Alt+Del** to restart the computer.

2 When the Configuration/Setup Utility prompt appears in the lower left corner of the screen, press **F1**.

a. If you have *not* set an administrator password, the Configuration/Setup Utility program menu appears. If you have set an administrator password, type the administrator password and press **Enter**.

b. If you have set both an administrator and a power-on password, you can type either of the passwords at the password prompt. However, if you type your power-on password, you can *view* limited information in the Configuration/Setup Utility program, but you cannot *change* settings. To change settings in the Configuration/Setup Utility program, type your administrator password at the password prompt.



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

Changing Settings and Exiting

In the Configuration/Setup Utility menus, you can accept the configuration changes by viewing and saving the changes, or you can make manual changes and then save the settings.

The following is a quick reference for identifying symbols in the Configuration/Setup Utility program. For information on the function of keys, see *Using Your Personal Computer*.

- If a bullet (•) is beside a menu item, then an additional menu is available.
- Most information enclosed in brackets ([ ]) can be changed. You cannot change information that is not surrounded by [ ].
- A right arrowhead (►) beside a menu item indicates that a configuration change occurred in that category. The ► might also appear in subsequent menus.
- If an asterisk (*) is beside a menu item, then a resource conflict is detected.

When you complete your changes or finish viewing information, return to the Configuration/Setup Utility menu and select **Save Settings** to save the changes. From this location, you can exit the Configuration/Setup Utility program.

To exit from the Configuration/Setup Utility program, follow these steps:

1. From the Configuration/Setup Utility menu, press **Esc**.
2. The Exit Setup menu appears. You can save your changes, exit from the Configuration/Setup Utility program without saving your changes, or return to the Configuration/Setup Utility menu. Use the arrow keys to select the desired option and press **Enter**.

Configuring an ISA Legacy Adapter

To configure an installed ISA legacy adapter, you might need to alter switch or jumper settings on the adapter. If there is a conflict, you must use the Configuration/Setup Utility program to set the ISA legacy resource information, such as memory locations, I/O assignments, and DMA and interrupt assignments.

Note: For more information about required resources and switch settings, refer to the documentation that comes with the adapter.

To set the legacy resource information for an installed adapter:

1. Start the Configuration/Setup Utility program (see "Starting the Configuration/Setup Utility Program" on page 72).
2. Select **ISA Legacy Resources** from the Configuration/Setup Utility menu.
3. As needed, select **Memory Resources, I/O Port Resources, DMA Resources,** or **Interrupt Resources**.
4. Set the appropriate resource to **ISA Resource**.
5. Press **Esc** to return to the main menu.
6. Select **Save Settings** and press **Enter**.

If you remove an ISA legacy adapter, you must reset to **Available** the system resources that are no longer being used. To do this, follow the above procedures and select **Available** at step 4.

Note: For more information on adapters and resolving conflicts, see "Adapter Configuration" on page 23 and Appendix B, "Interrupt and DMA Resources" on page 81.

Configuring Startup Devices

Startup devices are devices where the computer looks for an operating system when it is powered on. After adding new devices to the computer, you might want to change the sequence of the startup devices. You can use the Configuration/Setup Utility program to configure startup devices.

To configure startup devices:

1. Start the Configuration/Setup Utility program (see "Starting the Configuration/Setup Utility Program" on page 72).
2. Select **Start Options** from the Configuration/Setup Utility menu.
3. Select **First Startup Device**.
4. Use the arrow keys to make your selection.
5. If necessary, repeat the above steps for **Second Startup Device**, **Third Startup Device**, and **Fourth Startup Device**.
6. Remember to save the changes when you exit from the Configuration/Setup Utility program.
7. Press **Esc** to return to the main menu.
8. Select **Save Settings** and press **Enter**.

Setting Passwords

If you used the CMOS-clear jumper to erase the computer configuration and setup information, you must reconfigure the computer, set the date and time, and reset the power-on or administrator passwords.

Note: For more information on password protection and setting the date and time, see *Using Your Personal Computer*.

To reset the power-on or administrator passwords:

1. Start the Configuration/Setup Utility program (see "Starting the Configuration/Setup Utility Program" on page 72).
2. Select **System Security** from the Configuration/Setup Utility menu.
3. Select **Administrator Password** or **Power-on Password**.
4. Follow the instructions to change the password. For more information, see the passwords section of *Using Your Personal Computer*.
5. Press **Esc** to return to the main menu.
6. Select **Save Settings** and press **Enter**.

Note: For information on clearing CMOS memory, see "Erasing Lost or Forgotten Passwords" on page 64.

Setting the Microprocessor Speed

If you replaced the microprocessor with one of a different speed, you must change the microprocessor speed setting by using the Configuration/Setup Utility program. Do not select a speed setting that is faster than the speed the microprocessor is designed for. Unpredictable results or hardware damage might occur.

For more information about the microprocessor speed, see *Using Your Personal Computer*.

To set the microprocessor speed:

1. Start the Configuration/Setup Utility program (see "Starting the Configuration/Setup Utility Program" on page 72).
2. Select **Advanced Setup** from the Configuration/Setup Utility menu.
3. Select the correct microprocessor speed from the choices provided.
4. Press **Esc** to return to the main menu.
5. Select **Save Settings** and press **Enter**.

Appendix A. Changing the Battery

If you replace the original lithium battery with a heavy-metal battery or a battery with heavy-metal components, be aware of the following environmental consideration. Batteries and accumulators that contain heavy metals must not be disposed of with normal domestic waste. They will be taken back free of charge by the manufacturer, distributor, or representative, to be recycled or disposed of in a proper manner.

Before you begin

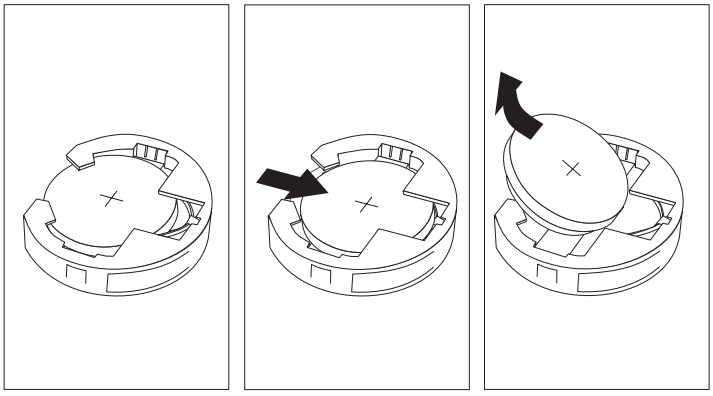
- Read "Electrical Safety" on page 4 and "Handling Static-Sensitive Devices" on page 5.
- Read the instructions that come with the replacement battery.
- Turn off the computer and all connected devices.
- Disconnect all external cables attached to the computer and then remove the computer cover (see "Disconnecting Cables and Removing the Cover" on page 6 if you need additional information).

For information on locating the battery, see "Identifying Parts on the System Board" on page 11.

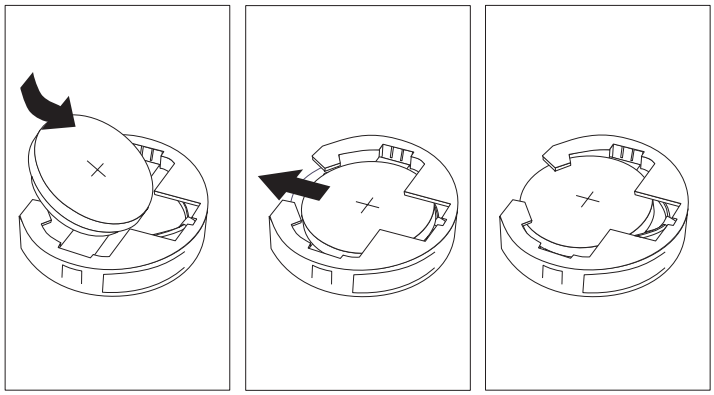
1 If necessary, remove any adapters or cables that might impede access to the battery. For instructions, see "Removing Adapters" on page 37.

2 Read "Lithium Battery Notice" on page vii.

3 Remove the old battery.



4 Install the new battery.



Note: When the computer is turned on for the first time after the battery has been replaced, an error message might be displayed. This is normal.

What to do next

- To work with another option, go to the appropriate section.
- To complete the replacement, go to Chapter 7, "Completing the Installation" on page 68.
- Use the Configuration/Setup Utility program to set the date and time and any passwords. For information on setting the date and time, refer to *Using Your Personal Computer*. For information on setting passwords, see "Setting Passwords" on page 77.
- Dispose of the old battery as required by local ordinances or regulations.

Appendix B. Interrupt and DMA Resources

This appendix lists the settings for the default interrupt and direct memory access (DMA) resources for your computer.

Note: The interrupt and DMA settings might change under configuration control.

Table 3. Interrupt Resources

Interrupt Request	System Resource
0	Timer
1	Keyboard
2	Interrupt Controller
3[3]	Serial Port 2
4[3]	Serial Port 1
5[3]	Audio Adapter (If installed)
6	Diskette
7[3]	Parallel Port
8	Real Time Clock
9	Available
10	Available
11	Available
12[3]	Mouse
13	Coprocessor
14	IDE Drives (0, 1) if installed
15	IDE Drives (2, 3) if installed

Table 4. DMA Resources

DMA Request	Data Width	System Resource
0	8 bits	Audio adapter (if installed)
1	8 bits	Audio adapter (if installed)
2	8 bits	Diskette
3[3]	8 bits	Parallel Port
4	–	Available
5	16 bits	Available
6	16 bits	Available
7	16 bits	Available

[3] Can be modified to alternative settings or disabled.

Appendix C. Notices

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