

Hardware Maintenance Manual



IBM IntelliStation E Pro Type 6204 and Type 6214

Hardware Maintenance Manual



IBM IntelliStation E Pro Type 6204 and Type 6214

Note

Before using this information and the product it supports, be sure to read the general information under "Notices" on page 165.

Second Edition (June 2002)

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About this manual

This manual contains diagnostic information, a Symptom-to-FRU index, service information, error indications, and configuration information for the IBM IntelliStation E Pro Type 6204 and Type 6214 computer.

Important: This manual is intended for trained servicers who are familiar with IBM PC computer products. Before servicing an IBM product, be sure to review "Safety information" on page 131.

Important safety information

Be sure to read all caution and danger statements in this book before performing any of the instructions.

Leia todas as instruções de cuidado e perigo antes de executar qualquer operação.

注意和危险声明 (简体中文)

重要事项：

本书中的所有注意和危险声明之前都有编号。该编号用于英语的注意或危险声明与 *Safety Information* 一书中可以找到的翻译版本的注意或危险声明进行交叉引用。

例如，如果一个注意声明以编号 1 开始，那么对该注意声明的翻译出现在 *Safety Information* 一书中的声明 1 中。

在按说明执行任何操作前，请务必阅读所有注意和危险声明。

注意及危險聲明 (中文)

重要資訊：

本書中所有「注意」及「危險」的聲明均以數字開始。此一數字是用來作為交互參考之用，英文「注意」或「危險」聲明可在「安全資訊」(Safety Information) 一書中找到相同內容的「注意」或「危險」聲明的譯文。

例如，有一「危險」聲明以數字 1 開始，則該「危險」聲明的譯文將出現在「安全資訊」(Safety Information) 一書的「聲明」1 中。

執行任何指示之前，請詳讀所有「注意」及「危險」的聲明。

Prenez connaissance de toutes les consignes de type Attention et

Danger avant de procéder aux opérations décrites par les instructions.

Lesen Sie alle Sicherheitshinweise, bevor Sie eine Anweisung ausführen.

Accertarsi di leggere tutti gli avvisi di attenzione e di pericolo prima di effettuare qualsiasi operazione.

주의 및 위험 경고문(한글)

중요:

이 책에 나오는 모든 주의 및 위험 경고문은 번호로 시작됩니다.
이 번호는 *Safety Information* 책에 나오는 영문판 주의 및 위험
경고문과 한글판 주의 및 위험 경고문을 상호 참조하는데 사용됩
니다.

예를 들어 주의 경고문이 번호 1로 시작되면 *Safety Information*
책에서 이 주의 경고문은 경고문 1번 아래에 나옵니다.

지시를 따라 수행하기 전에 먼저 모든 주의 및 위험 경고문을 읽
도록 하십시오.

Lea atentamente todas las declaraciones de precaución y peligro ante de llevar a
cabo cualquier operación.

Online support

Use the World Wide Web (WWW) to download diagnostic, BIOS flash, and device
driver files, and documents.

The Web address is:

<http://www.ibm.com/pc/support>

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General checkout

The system diagnostic programs are stored on the *Device Drivers and IBM Enhanced Diagnostics* CD. These programs are the primary method of testing the major components of the workstation: The system board, Ethernet controller, video controller, RAM, keyboard, mouse (pointing device), diskette drive, serial ports, hard drives, and parallel port. You can also use them to test some external devices. See "Diagnostics" on page 11.

Also, if you cannot determine whether a problem is caused by the hardware or by the software, you can run the diagnostic programs to confirm that the hardware is working properly.

When you run the diagnostic programs, a single problem might cause several error messages. When this occurs, work to correct the cause of the first error message. After the cause of the first error message is corrected, the other error messages might not occur the next time you run the test.

A failed system might be part of a shared DASD cluster (two or more systems sharing the same external storage device(s)). Prior to running diagnostics, verify that the failing system is not part of a shared DASD cluster.

A system might be part of a cluster if:

- The customer identifies the system as part of a cluster.
- One or more external storage units are attached to the system and at least one of the attached storage units is additionally attached to another system or unidentifiable source.
- One or more systems are located near the failing system.

If the failing system is suspected to be part of a shared DASD cluster, all diagnostic tests can be run except diagnostic tests which test the storage unit (DASD residing in the storage unit) or the storage adapter attached to the storage unit.

Notes:

1. For systems that are part of a shared DASD cluster, run one test at a time in looped mode. Do not run all tests in looped mode, as this could enable the DASD diagnostic tests.
2. If multiple error codes are displayed, diagnose the first error code displayed.
3. If the computer hangs with a POST error, go to "Symptom-to-FRU index" on page 105.
4. If the computer hangs and no error is displayed, go to "Undetermined problems" on page 119.
5. Power supply problems, see "Symptom-to-FRU index" on page 105.
6. Safety information, see "Safety information" on page 131.
7. For intermittent problems, check the error log; see "POST error codes" on page 114.

001

IS THE SYSTEM PART OF A CLUSTER?

YES. Schedule maintenance with the customer. Shut down all systems related to the cluster. Run storage test.

NO. Go to step **002** .

002

IF THE SYSTEM IS NOT PART OF A CLUSTER:

- Power-off the computer and all external devices.
- Check all cables and power cords.
- Set all display controls to the middle position.
- Power-on all external devices.
- Power-on the computer.
- Record any POST error messages displayed on the screen. If an error is displayed, look up the first error in the "POST error codes" on page 114.
- Check the System Error Log. If an error was recorded by the system, see "Symptom-to-FRU index" on page 105.
- Start the Diagnostic Programs. See "Starting the diagnostic programs" on page 13.
- Check for the following responses:
 1. One beep.
 2. Readable instructions or the Main Menu.

003

DID YOU RECEIVE BOTH OF THE CORRECT RESPONSES?

NO. Find the failure symptom in "Symptom-to-FRU index" on page 105.

YES. Run the Diagnostic Programs. If necessary, refer to "Diagnostic programs and error messages" on page 12.

If you receive an error, go to "Symptom-to-FRU index" on page 105.

If the diagnostics completed successfully and you still suspect a problem, see "Undetermined problems" on page 119.

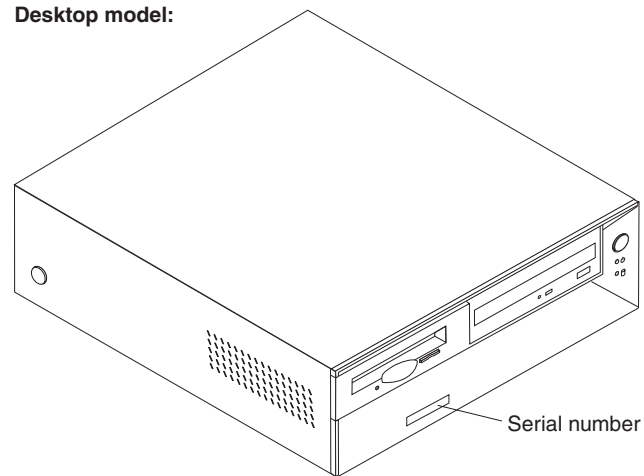
General information

The IBM IntelliStation E Pro computer incorporates many of the latest advances in computing technology and can be expanded and upgraded as needs change. If you have access to the Internet, you can obtain up-to-date information about the computer and other IBM computer products at <http://www.ibm.com/pc/intellistation> on the World Wide Web.

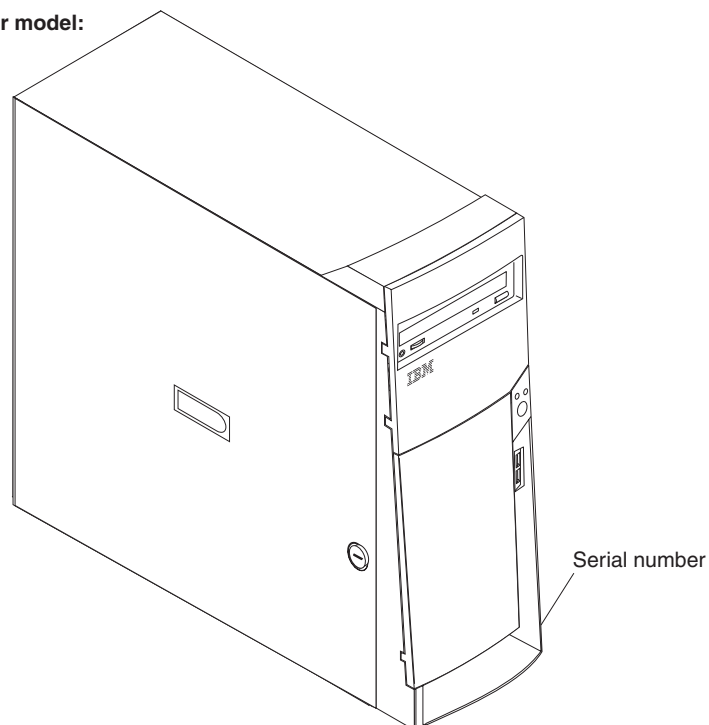
Refer to the following illustrations for the location of the computer model and serial number labels. You will need these numbers to register your computer with IBM.

Note: The illustrations in this document might differ slightly from your hardware.

Desktop model:



Tower model:



Features and specifications for the desktop model

This section describes features and specifications.

Desktop model

The following table provides a summary of the features and specifications of the desktop model. Some features and specifications are not available on all models.

<p>Microprocessor:</p> <p>Depending on model:</p> <ul style="list-style-type: none"> • Intel® Pentium® 4 with 256 KB Level-2 cache • Intel Pentium 4 with 512 KB Level-2 cache <p>Memory:</p> <p>ECC or NP, depending on model:</p> <ul style="list-style-type: none"> • Minimum: 128 MB • Maximum: 1.0 GB • Type: PC133 DIMMs • Slots: two dual inline <p>Internal drives:</p> <ul style="list-style-type: none"> • Hard disk drive: IDE or SCSI • One of the following: <ul style="list-style-type: none"> – CD-ROM: IDE – DVD-ROM: IDE – CD-RW: IDE <p>Power supply:</p> <p>160 watt (90-240 V ac)</p> <p>Expansion bays:</p> <ul style="list-style-type: none"> • Two 5.25-in. bays (one CD-ROM drive installed, one hard disk drive installed) • One 3.5-in. bay (one diskette drive installed) <p>PCI expansion slots:</p> <p>Three 33 MHz/32-bit low-profile slots on the system board</p>	<p>Video adapter:</p> <p>Depending on model:</p> <ul style="list-style-type: none"> • NVIDIA Quadro2 EX LP AGP adapter with 32 MB video memory • NVIDIA Quadro4 LP adapter with 64 MB video memory • Matrox G450 DVI LP adapter with 32 MB video memory <p>Integrated functions:</p> <ul style="list-style-type: none"> • 10BASE-T/100BASE-TX Ethernet controller on the system board with RJ-45 Ethernet port • Two serial ports • One parallel port • Two USB ports • Keyboard port • Mouse port • Audio ports <ul style="list-style-type: none"> – Line out – Line in – Mic • Dual-channel bus mastering IDE controller <p>Size and weight:</p> <ul style="list-style-type: none"> • Height: 104 mm (4.1 in.) • Depth: 412 mm (16.2 in.) • Width: 360 mm (14.2 in.) • Weight: approximately 10.9 kg (24 lb) when fully configured or 6.8 kg (15.0 lb) minimum <p>Acoustical noise emissions:</p> <ul style="list-style-type: none"> • Sound power, idling: 5.1 bel maximum • Sound power, operating: 5.2 bel maximum 	<p>Environment:</p> <ul style="list-style-type: none"> • Air temperature: <ul style="list-style-type: none"> – Computer on: 10° to 35° C (50.0° to 95.0° F). Altitude: 0 to 2133 m (6998.0 ft) – Computer off: 10° to 43° C (50.0° to 109.4° F). Maximum altitude: 2133 m (6998.0 ft) • Humidity: <ul style="list-style-type: none"> – Computer on: 8% to 80% – Computer off: 8% to 80% <p>Heat output:</p> <p>Approximate heat output in British thermal units (Btu) per hour</p> <ul style="list-style-type: none"> • Minimum configuration: 257 Btu (75 watts) • Maximum configuration: 686 Btu (200 watts) <p>Electrical input:</p> <ul style="list-style-type: none"> • Sine-wave input (50-60 Hz) required • Input voltage low range: <ul style="list-style-type: none"> – Minimum: 90 V ac – Maximum: 137 V ac • Input voltage high range: <ul style="list-style-type: none"> – Minimum: 180 V ac – Maximum: 265 V ac • Input kilovolt-amperes (kVA) approximately: <ul style="list-style-type: none"> – Minimum: 0.08 kVA – Maximum: 0.52 kVA
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Tower model

The following table provides a summary of the features and specifications of the tower model. Some features and specifications are not available on all models.

<p>Microprocessor:</p> <p>One of the following:</p> <ul style="list-style-type: none"> • Intel® Pentium® 4 with 256 KB Level-2 cache • Intel Pentium 4 with 512 KB Level-2 cache <p>Memory:</p> <p>ECC or NP, depending on model:</p> <ul style="list-style-type: none"> • Minimum: 128 MB • Maximum: 1.5 GB • Type: PC133 DIMMs • Slots: three dual inline <p>Internal drives:</p> <ul style="list-style-type: none"> • Hard disk drive: IDE or SCSI • One of the following: <ul style="list-style-type: none"> – CD-ROM: IDE – DVD-ROM: IDE – CD-RW: IDE <p>Power supply:</p> <p>340 watt (90-240 V ac)</p> <p>Expansion bays:</p> <ul style="list-style-type: none"> • Two 5.25-in. bays (1 CD-ROM drive installed) • Five 3.5-in. bays (1 diskette drive installed) <p>PCI expansion slots:</p> <ul style="list-style-type: none"> • Three 33 MHz/32-bit slots on the system board • Two 33 MHz/32-bit slots on the adapter extender card 	<p>Video adapter:</p> <p>Depending on model:</p> <ul style="list-style-type: none"> • Matrox G450 AGP adapter with 16 MB SDRAM video memory • Matrox G450 DVI adapter with 32 MB video memory • NVIDIA Quadro2 Pro AGP adapter with 64 MB DDR SDRAM video memory • NVIDIA Quadro4 adapter with 64 MB video memory • Fire GL 8800 video adapter with 128 MB video memory <p>Integrated functions:</p> <ul style="list-style-type: none"> • 10BASE-T/100BASE-TX Ethernet controller on the system board with RJ-45 Ethernet port • Two serial ports • One parallel port • Two USB ports • Keyboard port • Mouse port • Audio ports <ul style="list-style-type: none"> – Line out – Line in – Mic • Dual-channel bus mastering IDE controller <p>Size and weight:</p> <ul style="list-style-type: none"> • Height: 445 mm (17.5 in.) • Depth: 498 mm (19.6 in.) • Width: 165 mm (6.5 in.) • Weight: approximately 19.5 kg (43 lb) when fully configured or 15.9 kg (35 lb) minimum <p>Acoustical noise emissions:</p> <ul style="list-style-type: none"> • Sound power, idling: 5.1 bel maximum • Sound power, operating: 5.2 bel maximum 	<p>Environment:</p> <ul style="list-style-type: none"> • Air temperature: <ul style="list-style-type: none"> – Computer on: 10° to 35° C (50.0° to 95.0° F). Altitude: 0 to 2133 m (6998.0.7 ft) – Computer off: 10° to 43° C (50.0° to 109.4° F). Maximum altitude: 2133 m (6998.0 ft) • Humidity: <ul style="list-style-type: none"> – Computer on: 8% to 80% – Computer off: 8% to 80% <p>Heat output:</p> <p>Approximate heat output in British thermal units (Btu) per hour</p> <ul style="list-style-type: none"> • Minimum configuration: 257 Btu (75 watts) • Maximum configuration: 1455 Btu (425 watts) <p>Electrical input:</p> <ul style="list-style-type: none"> • Sine-wave input (50-60 Hz) required • Input voltage low range: <ul style="list-style-type: none"> – Minimum: 90 V ac – Maximum: 137 V ac • Input voltage high range: <ul style="list-style-type: none"> – Minimum: 180 V ac – Maximum: 265 V ac • Input kilovolt-amperes (kVA) approximately: <ul style="list-style-type: none"> – Minimum: 0.08 kVA – Maximum: 0.52 kVA
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Workstation features

The IntelliStation E Pro takes advantage of advancements in data storage, memory, systems management, and network environments. The computer includes:

- High performance accelerated graphics port (AGP) graphics
The computer comes with an AGP graphics adapter installed. This high-performance adapter supports high resolutions and includes many performance-enhancing features for the operating-system environment.
- Large system memory
The memory bus in the computer supports up to 1.5 GB of system memory. The memory controller provides error code correction (ECC) support for up to three industry-standard PC133, 3.3V, 168-pin, 133 Megahertz (MHz), unregistered, synchronous dynamic random access memory (SDRAM) dual inline memory modules (DIMMs).
- Systems-management capabilities
The computer comes with features that a network administrator or file server can use to remotely manage and control the computer. Some of the features include: Wake on LAN[®], Remote Administration, and System Migration Assistant.
- Integrated network environment support
The computer comes with an Ethernet controller on the system board. This Ethernet controller has an interface for connecting to 10-Mbps or 100-Mbps networks. The computer automatically selects between 10BASE-T and 100BASE-TX environments. The controller provides full-duplex (FDX) capability, which enables simultaneous transmission and reception of data on the Ethernet local area network (LAN).

Reliability, availability, and serviceability features

Three important computer design features are reliability, availability, and serviceability (RAS). The RAS features help to ensure the integrity of the data that is stored on the computer, the availability of the computer when you need it, and the ease with which you can diagnose and repair problems.

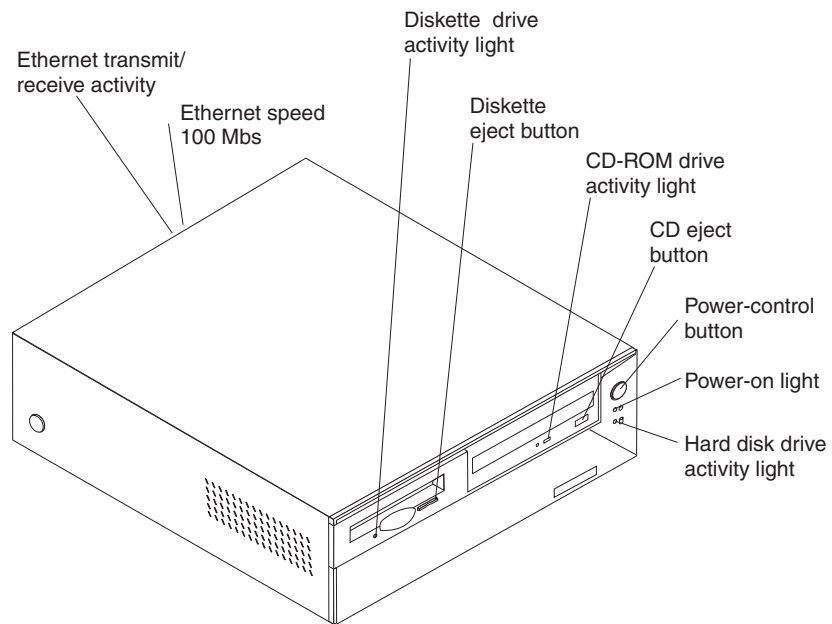
The following is an abbreviated list of the RAS features that the computer supports. Many of these features are explained in later chapters of this publication.

- Reliability features
 - Boot block recovery
 - Cooling fans with speed-sensing capability
 - Error code correction (ECC) front-side buses (FSBs)
 - ECC L2 cache and system memory
 - Parity checking on the small computer system interface (SCSI) and peripheral component interconnect (PCI) buses
 - Advanced configuration and power interface (ACPI)
 - Power-on self-test (POST)
 - Synchronous dynamic random access memory (SDRAM) with serial presence detect (SPD)
- Availability features
 - Advanced Desktop Management Interface (DMI) features
 - Auto-restart initial program load (IPL) power supply
 - Automatic error retry or recovery
 - Automatic computer restart after power failure
 - Built-in, menu-driven configuration and setup programs

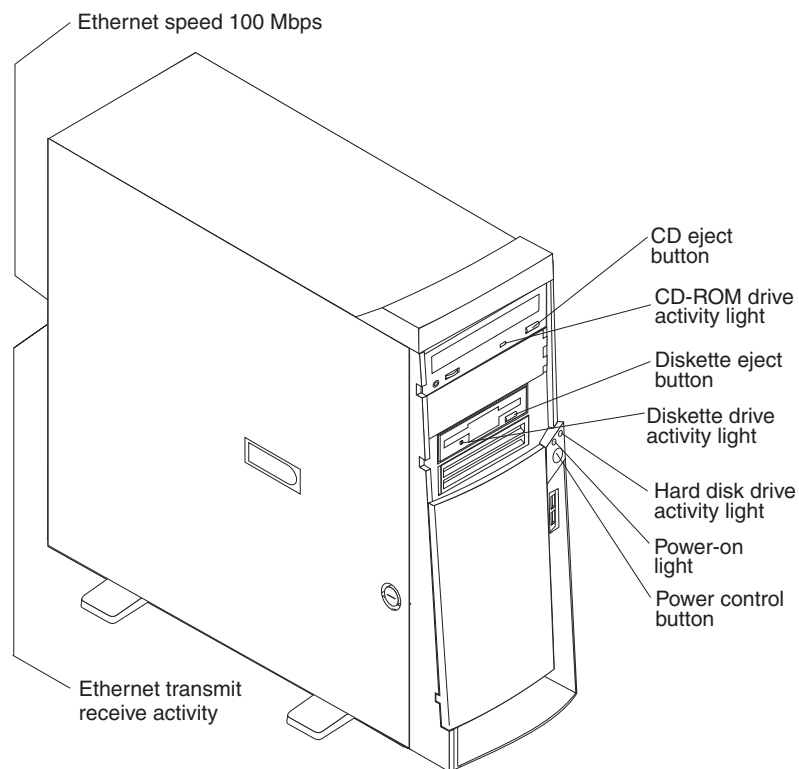
- Built-in, menu-driven SCSI configuration programs (some models)
- Monitoring support for temperatures, voltages, and fan speed
- Upgradable basic input/output system (BIOS), diagnostics and POST
- Wake on LAN (WOL) capability
- Serviceability features
 - 3-year warranty
 - Adaptec built-in self-test (BIST)
 - Preinstalled Ethernet adapter
 - CD-ROM-based diagnostics programs
 - Diagnostic support of Ethernet adapters
 - Error codes and messages
 - Processor serial number access
 - Read-only memory (ROM) checksums
 - Vital product data (VPD); includes serial number information and replacement part numbers, stored in nonvolatile memory, for easier remote maintenance

Controls and indicators

The controls and indicators of the tower and desktop models are identified below.



Note: The front bezel door is not shown here so that the drive bays may be illustrated.



CD-ROM drive eject button: opens and closes the CD tray.

CD-ROM drive activity light: indicates when the CD-ROM drive is in use.

Diskette drive activity light: indicates when the diskette drive is in use.

Diskette drive eject button: releases a diskette from the drive.

Ethernet speed 100 Mbps: when this light is on, the Ethernet speed is 100 Mbps. When this light is off, the Ethernet speed is 10 Mbps.

Ethernet transmit/receive activity: when this light is on, there is activity between the computer and the network.

Power-control button: enables you to turn the computer on or off manually.

Power-on light: indicates when the computer is turned on.

Hard disk drive activity light: indicates when the hard disk drive is in use.

Computer operation

The following sections provide information about operating the workstation.

Turning on the computer

Do the following to start the computer:

1. Turn on all peripheral devices first.
2. Press the power-control button on your computer. For the location of the power-control button, see "Controls and indicators" on page 8.

What you see and hear when you start up your computer depends on the features installed and the settings in the IBM Setup Utility program.

If power-on self-test (POST) detects a problem, there might be a series of beeps or no beep, and a numeric error message might appear on the screen. Write down any beep series and error code numbers with descriptions, then see "Beep symptoms" on page 105 for the explanation of error codes.

During startup, the following messages might be displayed briefly:

- To start the Product Recovery Program, Press F11
- Hit <F2> if you want to run SETUP
- Press CTRL+A for SCSISelect Utility (some models only)

To use these features, press the appropriate function key or keys quickly. The messages appear for only seconds. For more information about these messages, see "Using the IBM Setup Utility program" on page 31 and "Using the SCSISelect Utility program (some models)" on page 36.

During startup, you might not see Hit <F2> if you want to run SETUP. If you want to see the prompt, see instructions for displaying the prompt in "Using the IBM Setup Utility program" on page 31.

The IBM Setup Utility program will help you configure your computer with passwords, PCI adapter configuration, and other options. The IBM Setup Utility

menu is displayed at the top of the screen. To navigate the menu and screen items, follow the directions on the right of the screen.

The operating system and application programs initiate from the hard disk drive. If your computer is attached to a network, the computer will begin attaching to any LANs and remote applications to which you have access. A network administrator can also "wake up" your computer (start it remotely) to download programs or gather information about computer performance.

Turning off the computer

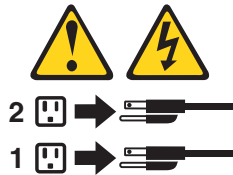
Turn off the computer as follows:

Statement 5:



CAUTION:

The power-control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.



- Press the power control button on the front of the computer. This starts orderly shutdown of the operating system, if this feature is supported by your operating system, and places the computer in standby mode.

Note: After turn off the computer, wait at least 5 seconds before you press the power control button to turn on the computer again.

- Press and hold the power control button for more than 4 seconds to cause an immediate shutdown of the computer and place the computer in standby mode. You can use this feature if the operating system stops functioning.
- If you cannot use the power control button to turn off your computer, disconnect the computer power cords from the electrical outlets.

Note: After disconnecting the power cords, wait approximately 15 seconds for your computer to stop running.

Important: In some circumstances, the computer might not turn off immediately when you press the power control button. If this happens, press and hold the power control button until the computer turns off.

Diagnostics

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Power-on Self Test (POST)

When you turn on the computer, it performs a series of tests to check the operation of system components and some of the options that are installed in the computer. This series of tests is called the power-on self-test or POST.

If POST finishes without detecting any problems, the first window of the operating system or application program appears.

Notes:

1. If you have a user password set, you must type the password and press Enter, when prompted, before the operating system will load.
2. A single problem might cause several error messages. When this occurs, work to correct the cause of the first error message. After you correct the cause of the first error message, the other error messages usually will not occur the next time you run the test.

The possible types of beep codes are as follows:

Repeating long beeps

Indicates that a memory error has occurred. Ensure that all DIMMs are correctly installed.

One long beep and two short beeps

Indicates that a video error has occurred and the BIOS cannot initialize the video screen to display any additional information. Ensure that the video adapter is correctly installed.

For information about specific beep codes, see “Beep symptoms” on page 105.

Small computer system interface messages (some models)

If the computer has an Ultra160 SCSI adapter installed and you receive a SCSI error message when running the SCSISelect Utility program, refer to the following table for actions to take if you receive an error message.

Note: If your system does not have a SCSI hard disk drive, ignore any message that indicates that the BIOS is not installed.

Table 1. SCSI messages

SCSI Messages	Description
All	<p>One or more of the following might be causing the problem.</p> <ul style="list-style-type: none">• A failing SCSI device (adapter or drive)• An improper SCSI configuration• Duplicate SCSI IDs in the same SCSI chain• An improperly installed SCSI terminator• A defective SCSI terminator• An improperly installed cable• A defective cable <p>Action: Verify that:</p> <ul style="list-style-type: none">• The external SCSI devices are turned on. External SCSI devices must be turned on <i>before</i> the computer.• The cables for all external SCSI devices are connected correctly.• The last device in each SCSI chain is terminated properly.• The SCSI devices are configured correctly. <p>If the above items are correct, run the diagnostic programs to obtain additional information about the failing device.</p>

Diagnostic programs and error messages

The system diagnostic programs are stored on the *Device Drivers and IBM Enhanced Diagnostics* CD. These programs are the primary method of testing the major components of the computer.

Diagnostic error messages indicate that a problem exists; they are not intended to be used to identify a failing part. Troubleshooting and servicing of complex problems that are indicated by error messages should be performed by trained service personnel.

Sometimes the first error to occur causes additional errors. In this case, the computer displays more than one error message. Always follow the suggested action instructions for the *first* error message that appears.

The following sections contain the error codes that might appear in the detailed test log and summary log, when running the diagnostic programs.

The error code format is as follows:

fff-ttt-iii-date-cc-text message

where:

- fff** is the three-digit function code that indicates the function being tested when the error occurred. For example, function code 089 is for the microprocessor.
- ttt** is the three-digit failure code that indicates the exact test failure that was encountered.
- iii** is the three-digit device ID.
- date** is the date that the diagnostic test was run and the error recorded.
- cc** are the check digits that are used to verify the validity of the information.
- text message** is the diagnostic message that indicates the reason for the problem.

Text messages

The diagnostic text message format is as follows:

Function Name: Result (test specific string)

where:

Function Name

is the name of the function being tested when the error occurred. This corresponds to the function code (fff) given in the previous list.

Result can be one of the following:

Passed

This result occurs when the diagnostic test completes without any errors.

Failed This result occurs when the diagnostic test discovers an error.

User Aborted

This result occurs when you stop the diagnostic test before it is complete.

Not Applicable

This result occurs when you specify a diagnostic test for a device that is not present.

Aborted

This result occurs when the test could not proceed because of the system configuration.

Warning

This result occurs when a possible problem is reported during the diagnostic test, such as when a device that is to be tested is not installed.

Test Specific String

is additional information that is used to analyze the problem.

Starting the diagnostic programs

The IBM Enhanced Diagnostics programs isolate problems from the computer hardware and software. The programs run independently of the operating system, and *must be run either from a CD or diskette*. This method of testing is generally used when other methods are not accessible or have not been successful in isolating a problem suspected to be hardware related.

A *Device Drivers and IBM Enhanced Diagnostics* CD comes with your computer. You can also download the latest diskette image of the diagnostics from <http://www.ibm.com/pc/support> on the World Wide Web.

Using the Device Driver and IBM Enhanced Diagnostics CD

Be certain that the computer will start up with the CD-ROM drive as the first startup device. If not, use the IBM Setup Utility to change the first startup device (see “Using the IBM Setup Utility program” on page 31). Do the following to run the *Device Driver and IBM Enhanced Diagnostics* CD:

1. Insert the *Device Drivers and Enhanced Diagnostics* CD into the CD-ROM drive.
2. Turn off your computer and any attached devices.
3. Turn on all attached devices; then, turn on your computer.
4. Follow the instructions on the screen.
5. When you finish running the IBM Enhanced Diagnostics and Utilities program, exit from the program and remove the CD from the drive.
6. If you used the IBM Setup Utility to change the first startup device, restore it to the original setting.

Creating an IBM Enhanced Diagnostics diskette

The IBM Enhanced Diagnostics diskette is used to test hardware components on your computer.

You can create an *IBM Enhanced Diagnostics* diskette one of three ways:

- Create a diskette using Access IBM
- Download a program image from the World Wide Web
- Create a diskette from the Product Recovery Program

Do the following to create the diagnostics diskette using Access IBM:

1. From the Access IBM menu, click **Protect data**.
2. Click **Creating emergency diskettes**.
3. Click **Diagnostic diskette**.
4. Follow the instructions on the screen.

To create a startable *IBM Enhanced Diagnostics* diskette from the World Wide Web:

1. Go to <http://www.ibm.com/pc/support/> on the World Wide Web.
2. Download the diagnostics file for your computer to a hard disk drive directory (not to a diskette).
3. Go to a DOS prompt and change to the directory where the file was downloaded.
4. Insert a blank high-density diskette in diskette drive A.
5. Type *filename a:* where *filename* is the name of the file you downloaded from the Web, and press Enter.

The downloaded Web file is self-extracting and will be copied to the diskette. When the copy completes, store the diskette in a safe place.

To create an *IBM Enhanced Diagnostics* diskette from The Product Recovery Program:

1. Shut down the operating system and restart the computer.
2. When the prompt, To start the Product Recovery Program, press F11 is displayed, press F11.

3. From the main menu, select **System Utilities**.
4. Select **Create a diagnostic diskette**.

Using the Enhanced diagnostics diskette

Do the following to start the *IBM Enhanced Diagnostics* diskette:

1. Turn off any attached devices and your computer.
2. Insert the *IBM Enhanced Diagnostics* diskette into the diskette drive.
3. Turn on all attached devices; then turn on your computer.
4. Follow the instructions on the screen.

Viewing the test log

The test log records data about system failures and other pertinent information. The test log will not contain any information until after the diagnostic program has run.

Note: If you already are running the diagnostic program, begin with step 4.

Do the following to view the test log:

1. Insert the *IBM Enhanced Diagnostics* diskette or the *Device Drivers and IBM Enhanced Diagnostics* CD.
2. Shut down your operating system and restart the computer.
3. If a user password is set, the system prompts you for it. Type the password, and press Enter.
4. Run the appropriate diagnostics program and when the Diagnostic Programs screen appears, select **Utility**.
5. Select **View Test Log** from the list that appears; then follow the instructions on the screen.
6. Save the test log to a file on a diskette or to your hard disk.

Note: The system maintains the test-log data while the system is turned on. When you turn off the power to the computer, the test log is cleared.

Diagnostic error messages

Diagnostic error messages are described in “Diagnostic error codes” on page 109.

Important: If diagnostic error messages are displayed that are not listed in “Diagnostic error codes” on page 109, make sure that the system has the latest levels of BIOS code and diagnostics installed.

Other diagnostic programs

The computer contains diagnostic programs designed specifically for the Windows operating environment. Because these diagnostics work with the operating system, they test hardware and analyze certain software components. These diagnostic programs are especially useful for isolating operating system and device driver problems.

Do the following to use PC-Doctor for Windows:

1. On the Windows desktop, click **Start**”**PC-Doctor**.
2. Follow the instructions on the screen. Help is available online.

Software error messages

These messages appear if a problem or conflict is detected by the application program, the operating computer, or both. Error messages for operating system and other software problems are typically text messages, but they also can be numeric codes. For information about these software error messages, see the information supplied with the operating system and application program.

To determine if problems are caused by the software, verify that:

1. The computer has the minimum memory requirements needed to use the software. For memory requirements, see the information that comes with the software.

Note: If you have just installed an adapter or memory, you might have a memory address conflict.

2. The software is designed to operate on your computer.
3. Other software works on your computer.
4. The software that you are using works on another computer.

If you received any error messages when using the software program, see the information that comes with the software for a description of the messages and solutions to the problem.

System programs

System programs include POST, BIOS and the IBM Setup Utility program. IBM may make changes and enhancements to these programs, and makes these updates available as downloadable files on the World Wide Web.

These programs can be updated on individual computers through the system board's flash memory module (electrically erasable programmable read-only memory, or EEPROM) by starting the computer using a flash update diskette. Instructions for using the system program updates are available in a README file that is included in the update files on the World Wide Web at <http://www.ibm.com/pc/support>.

To update system programs (flash the EEPROM):

1. Insert a system program update (flash) diskette into the diskette drive (drive A) in the computer. System program updates are available at <http://www.ibm.com/pc/support>.
2. Turn on the computer. If it is on already, you must turn it off and back on again. The update begins.

Troubleshooting the Ethernet controller

This section provides troubleshooting information for problems that might occur with the 10/100 Mbps Ethernet controller.

Network connection problems

If the Ethernet controller cannot connect to the network, check the following:

- Make sure that the cable is installed correctly.

The network cable must be securely attached at all connections. If the cable is attached but the problem persists, try a different cable.

If you set the Ethernet controller to operate at 100 Mbps, you must use Category 5 cabling.

If you directly connect two workstations (without a hub), or if you are not using a hub with X ports, use a crossover cable.

Note: To determine whether a hub has an X port, check the port label. If the label contains an X, the hub has an X port.

- Determine if the hub supports auto-negotiation. If not, try configuring the integrated Ethernet controller manually to match the speed and duplex mode of the hub.
- Check the LAN activity light on the rear of the computer. The LAN activity light illuminates when the Ethernet controller sends or receives data over the Ethernet network. If the LAN activity light is off, make sure that the hub and network are operating and that the correct device drivers are loaded.
- Make sure that you are using the correct device drivers, supplied with your computer.
- Check for operating system-specific causes for the problem.
- Make sure that the device drivers on your computer and the server are using the same protocol.
- Test the Ethernet controller.

The way you test the Ethernet controller depends on which operating system you are using (see the Ethernet controller device driver README file).

Ethernet controller troubleshooting chart

You can use the following troubleshooting chart to find solutions to 10/100 Mbps Ethernet controller problems that have definite symptoms.

Table 2. Ethernet troubleshooting chart

Ethernet controller problem	Suggested Action
The computer stops running when loading device drivers.	<p>The PCI BIOS IRQ settings are incorrect.</p> <p>Check the following:</p> <ul style="list-style-type: none"> • Determine if the IRQ setting assigned to the Ethernet controller is also assigned to another device in the IBM Setup Utility program. <p>Although interrupt sharing is possible for PCI devices, some devices do not function well when they share an interrupt with a dissimilar PCI device. Try changing the IRQ assigned to the Ethernet controller or the other device.</p> <ul style="list-style-type: none"> • Make sure that you are using the most recent device driver available from the World Wide Web. • Run the network diagnostic program.
The LAN activity light does not light.	<p>Check the following:</p> <ul style="list-style-type: none"> • Make sure that you have loaded the network device drivers. • The network might be idle. Try sending data from this workstation. • Run diagnostics on the LEDs. • The function of this LED can be changed by device driver load parameters. If necessary, remove any LED parameter settings when you load the device drivers.
Data is incorrect.	<p>Check the following:</p> <ul style="list-style-type: none"> • Make sure that you are using Category 5 cables when operating the computer at 100 Mbps. • Make sure that the cables do not run close to noise-inducing sources like fluorescent lights.

Table 2. Ethernet troubleshooting chart (continued)

Ethernet controller problem	Suggested Action
The Ethernet controller stopped working when another adapter was added to the computer.	<p>Check the following:</p> <ul style="list-style-type: none"> • Make sure that the cable is connected to the Ethernet controller. • Make sure that your PCI computer BIOS code is current. • Reseat the adapter. • Determine if the IRQ setting assigned to the Ethernet adapter is also assigned to another device in the IBM Setup Utility program. <p>Although interrupt sharing is possible for PCI devices, some devices do not function well when they share an interrupt with a dissimilar PCI device. Try changing the IRQ assigned to the Ethernet adapter or the other device.</p>
The Ethernet controller stopped working without apparent cause.	<p>Check the following:</p> <ul style="list-style-type: none"> • Run diagnostics for the Ethernet controller. • Try a different connector on the hub. • Reinstall the device drivers. Refer to your operating system documentation and to "Recovering or installing device drivers" on page 25 in this publication.

Ethernet controller messages

The integrated Ethernet controller might display messages from the following device drivers:

- Novell NetWare or IntraNetWare computer open data-link interface (ODI)
- Network driver interface specification (NDIS) adapter for level 4.0 (Windows NT)

Novell NetWare or IntraNetWare computer ODI driver teaming messages

This section provides explanations of the error messages for the Novell NetWare or IntraNetWare computer ODI driver, and suggested actions to resolve each problem.

Table 3. NetWare driver messages for the Ethernet controller

Message	Description
Couldn't allocate resources.	<p>Explanation: An unknown error has occurred when trying to allocate needed resources for the AFT Module.</p> <p>Action:</p> <ul style="list-style-type: none"> • Check the computer configuration. If the problem persists, contact the network administrator. • Verify that the Ethernet controller is enabled. If the Ethernet controller is enabled, run the diagnostic programs.
AFT group for primary adapter in slot <i>nnn</i> already exists.	<p>Explanation: An attempt was made to rebind an adapter already in an AFT group.</p> <p>Action: Check the AFT slot numbers for existing AFT teams. If the problem persists, contact the network administrator</p>
Error locating device control table (DCT) addresses in internal table. Make sure that you have loaded LAN drivers after loading AFT.NLM.	<p>Explanation: The bind command was entered prior to loading the device driver. The device driver must be loaded after loading AFT.NLM, but before any bind command can be issued.</p> <p>Action: Load the driver for the supported adapter and try loading the AFT module again. If the problem persists, contact the network administrator.</p>
Insufficient number of arguments specified.	<p>Explanation: The appropriate or expected number of parameters was not entered in a command.</p> <p>Action: Check the parameters required for the given command. If the problem persists, contact the network administrator.</p>

Table 3. NetWare driver messages for the Ethernet controller (continued)

Message	Description
Duplicate slot numbers detected.	<p>Explanation: An attempt has been made to bind the same slot number more than once.</p> <p>Action: Check the slot numbers entered during the bind. Adapter slot numbers must be valid and unique. If the problem persists, contact the network administrator.</p>
'xxx' is not supported for AFT team.	<p>Explanation: A bind command has been issued for adapters not supported by AFT.NLM.</p> <p>Action: Make sure that you attempt to bind only adapters supported by AFT.NLM.</p>
Primary and Secondary adapters do not match. AFT group is not created.	<p>Explanation: A bind command was entered for an adapter team that is a combination of computer and client adapters. An AFT team must be a grouping of the same classification of adapter.</p> <p>Action: Verify that all the adapters bound in a team are of the same classification.</p>
Requested number of Secondary cards are not found.	<p>Explanation: The number of adapters specified in the bind command could not be located.</p> <p>Action: Verify the numbers and slot locations of the adapters to be bound. If the problem persists, contact the network administrator.</p>
Failed to create AFT group. Make sure that the drivers for supported adapters are loaded, primary adapter is bound to protocols, and secondary adapter is not bound to any protocols.	<p>Explanation: Binding of protocol failed. Protocol is either not bound to any adapter or is bound to more than one adapter in the group.</p> <p>Action: Ensure that the protocol is bound to only one adapter in an AFT team.</p>
Error identifying slot numbers for the specified board names.	<p>Explanation: The mapping between the board name entered and the slot number for an adapter could not be established.</p> <p>Action: Check the board name for the adapter before issuing the bind command. If the problem persists, contact the network administrator</p>
Can't unbind specified slot from AFT group. Make sure that the slot you specified is for the primary adapter in an AFT group.	<p>Explanation: The number entered in the unbind command was not the primary adapter in an AFT group.</p> <p>Action: Reissue the unbind command and specify the slot number for the primary adapter</p>
LAN adapter at slot <i>nnnn</i> (Port <i>0xaa</i>) failed to reset. Check the state of the adapter.	<p>Explanation: The adapter that you specified could not be initialized.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. Load the driver for the supported adapter. 2. Check that the adapter is seated properly in the slot and try loading the AFT module again. <p>If the problem persists, contact the network administrator.</p>
AFT is not supported on this version of NetWare.	<p>Explanation: The NetWare on your computer is not a version supported by AFT.</p> <p>Action: Load and bind AFT only on supported versions of NetWare (currently version 4.11 and above).</p>

Table 3. NetWare driver messages for the Ethernet controller (continued)

Message	Description
Failed to allocate resources tags.	<p>Explanation: An unknown error has occurred when trying to allocate needed resources for the AFT module.</p> <p>Action: Check computer configuration. If the problem persists, contact the network administrator.</p>
Please unload all LAN drivers before unloading AFT.NLM.	<p>Explanation: An attempt was made to unload the AFT.NLM module before unloading the adapter driver.</p> <p>Action: Unload the adapter driver before unloading the AFT module.</p>

NDIS (Windows 2000 and XP) Event Viewer messages

This section contains the error messages for the NDIS 4.0 drivers. The explanation and recommended action are included with each message.

Table 4. NDIS (Windows 2000 or Windows XP) Event Viewer messages for the Ethernet controller

Error code (hex)	Description
0x00	<p>Explanation: The driver could not register the specified interrupt.</p> <p>Action: Contact the network administrator for assistance. The driver may need to be reinstalled. If the problem persists, run diagnostics to determine if the hardware has failed.</p>
0x01	<p>Explanation: One of the PCI adapters did not get the required resources.</p> <p>Action: Contact the network administrator. The driver may need to be reinstalled. If the problem persists, run diagnostics to determine if the hardware has failed.</p>
0x02	<p>Explanation: Bad node address (multicast address).</p> <p>Action: Make sure the locally administered address is valid, if one is specified. The address can not be a multicast address.</p>
0x03	<p>Explanation: Failed self-test.</p> <p>Action: Make sure a cable is attached to the Ethernet connector.</p>
0x0D	<p>Explanation: Could not allocate enough memory for transmit queues.</p> <p>Action:</p> <ul style="list-style-type: none"> • If you have Windows 2000, do the following: <ol style="list-style-type: none"> 1. From the Windows 2000 desktop, click Start”Control Panel”Networks”Adapters. 2. Select your IBM Ethernet adapter from the list. 3. Click Properties”Advanced. 4. Lower the resource values that apply to the transmit queue. • If you have Windows XP Professional, do the following: <ol style="list-style-type: none"> 1. Click Start”Control Panel”Network Connections”Local Area Connection. 2. Select your IBM Ethernet adapter from the list. 3. Click Properties”Advanced. 4. Lower the resource values that apply to the transmit queue.

Table 4. NDIS (Windows 2000 or Windows XP) Event Viewer messages for the Ethernet controller (continued)

Error code (hex)	Description
0x0E	<p>Explanation: Could not allocate enough memory for receive queue.</p> <p>Action:</p> <ul style="list-style-type: none"> • If you have Windows 2000, do the following: <ol style="list-style-type: none"> 1. From the Windows 2000 desktop, click Start”Control Panel”Networks”Adapters. 2. Select your IBM Ethernet adapter from the list. 3. Click Properties”Advanced. 4. Lower the resource values that apply to the transmit queue. • If you have Windows XP Professional, do the following: <ol style="list-style-type: none"> 1. Click Start”Control Panel”Network Connections”Local Area Connection. 2. Select your IBM Ethernet adapter from the list. 3. Click Properties”Advanced. 4. Lower the resource values that apply to the transmit queue.
0x0F	<p>Explanation: Could not allocate enough memory for other structures.</p> <p>Action:</p> <ul style="list-style-type: none"> • If you have Windows 2000, do the following: <ol style="list-style-type: none"> 1. From the Windows 2000 desktop, click Start”Control Panel”Networks”Adapters. 2. Select your IBM Ethernet adapter from the list. 3. Click Properties”Advanced. 4. Lower the resource values that apply to the transmit queue. • If you have Windows XP Professional, do the following: <ol style="list-style-type: none"> 1. Click Start”Control Panel”Network Connections”Local Area Connection. 2. Select your IBM Ethernet adapter from the list. 3. Click Properties”Advanced. 4. Lower the resource values that apply to the transmit queue.
0x10	<p>Explanation: Did not find any Ethernet controllers.</p> <p>Action: Contact the network administrator. The driver may need to be reinstalled. If the problem persists, run diagnostics to determine if the hardware has failed.</p>
0x11	<p>Explanation: Multiple Ethernet controllers found, but none matched the required ID.</p> <p>Action: Contact the network administrator. The driver may need to be reinstalled. If the problem persists, run diagnostics to determine if the hardware has failed.</p>
0x13	<p>Explanation: Did not find any Ethernet controllers that matched the required subven/subdev.</p> <p>Action: Contact the network administrator. The driver may need to be reinstalled. If the problem persists, run diagnostics to determine if the hardware has failed.</p>
0x16	<p>Explanation: Single adapter found, but multiple instances tried to load.</p> <p>Action: Contact the network administrator. The driver may need to be reinstalled. If the problem persists, run diagnostics to determine if the hardware has failed.</p>
0x17	<p>Explanation: Slot parameter not specified in the registry.</p> <p>Action: Contact the network administrator. The driver may need to be reinstalled. If the problem persists, run diagnostics to determine if the hardware has failed.</p>

Table 4. NDIS (Windows 2000 or Windows XP) Event Viewer messages for the Ethernet controller (continued)

Error code (hex)	Description
All other 4-character hexadecimal codes	Action: Contact the network administrator. The driver may need to be reinstalled. If the problem persists, run diagnostics to determine if the hardware has failed.

Ethernet teaming messages

This section displays the messages associated with Ethernet teaming.

Table 5. NDIS (Windows 2000 or Windows XP) driver teaming messages for the Ethernet controller

Event ID	Type	Description
01	Error	Explanation: Team name and physical adapter name are the same. This is an invalid configuration. Action: Reconfigure the adapter team by double-clicking the PROSet icon in the control panel.
02	Error	Explanation: Unable to allocate required resources. Action: Free some memory resources and restart.
03	Error	Explanation: Unable to read required registry parameters. Action: Reconfigure the adapter team by double-clicking the PROSet icon in the control panel.
04	Error	Explanation: Unable to bind to physical adapter. Action: Reconfigure the adapter team by double-clicking the PROSet icon in the control panel.
05	Error	Explanation: Unable to initialize an adapter team. Action: Reconfigure the adapter team by double-clicking the PROSet icon in the control panel.
06	Informational	Explanation: Team <i>nn</i> . Primary adapter is initialized. Action: None.
07	Informational	Explanation: Team <i>nn</i> . Secondary adapter is initialized. Action: None.
08	Informational	Explanation: Team <i>nn</i> . Team is initialized. Action: None.
09	Informational	Explanation: Team <i>nn</i> . Virtual adapter is initialized. Action: None.
10	Informational	Explanation: Team <i>nn</i> . Primary adapter is switching over. Action: None.
11	Warning	Explanation: Team <i>nn</i> . Adapter link down. Action: Make sure the adapter is functioning properly.
12	Informational	Explanation: Team <i>nn</i> . Secondary adapter took over. Action: None.

Table 5. NDIS (Windows 2000 or Windows XP) driver teaming messages for the Ethernet controller (continued)

Event ID	Type	Description
13	Warning	Explanation: Team <i>nm</i> . Secondary adapter is deactivated from the team. Action: Make sure the secondary adapter is functioning properly and that the adapter cable is securely connected to the LAN.
14	Informational	Explanation: Team <i>nm</i> . Secondary adapter has rejoined the team. Action: None.
15	Informational	Explanation: Team <i>nm</i> . Secondary adapter link is working. Action: None.
16	Error	Explanation: Team <i>nm</i> . The last adapter has lost its link. Network connection has been lost. Action: Shut down the computer and replace the adapters; then restart the computer to reestablish the connection.
17	Informational	Explanation: Team <i>nm</i> . An adapter has reestablished the link. Network connection has been restored. Action: None.
18	Informational	Explanation: Team <i>nm</i> . Preferred primary adapter has been detected. Action: None.
19	Informational	Explanation: Team <i>nm</i> . Preferred secondary adapter has been detected. Action: None.
20	Informational	Explanation: Team <i>nm</i> . Preferred primary adapter took over. Action: None.
21	Informational	Explanation: Team <i>nm</i> . Preferred secondary adapter took over. Action: None.
22	Warning	Explanation: Team <i>nm</i> . Primary adapter does not sense any probes. Possible reason: partitioned team. Action: Make sure the cables of the adapter team are connected to the same LAN segment. Reconfigure the team if necessary.
23	Error	Explanation: A virtual adapter failed to initialize. Action: Make sure the cable to the adapter is connected to the LAN. Reconfigure if necessary.
24	Error	Explanation: Adapter failed to join because it lacked IPsec TaskOffLoad capabilities. Action: Replace adapter.
25	Error	Explanation: Adapter failed to join because it lacked TCP CheckSum TaskOffLoad capabilities. Action: Replace adapter.
26	Error	Explanation: Adapter failed to join because it lacked TCP LargeSend TaskOffLoad capabilities. Action: Replace adapter.
27	Error	Explanation: Adapter failed to join because of insufficient PnP capabilities. Action: Reconfigure the adapters.

Table 5. NDIS (Windows 2000 or Windows XP) driver teaming messages for the Ethernet controller (continued)

Event ID	Type	Description
28	Error	Explanation: Adapter failed to join because MaxFrameSize too small. Action: Replace adapter.
29	Error	Explanation: Adapter failed to join because MulticastList too small. Action: Replace adapter.
30	Informational	Explanation: <i>mm</i> has successfully joined to team configuration. Action: None
31	Informational	Explanation: <i>mm</i> has successfully removed from team configuration. Action: None
32	Warning	Explanation: An illegal loopback situation has occurred on the adapter in device <i>mm</i> . Action: Check the configuration to verify that all adapters in the team are connected to 802.3ad compliant switch ports.
33	Warning	Explanation: No 802.3ad response from the link partner of any adapters in the team. Action: Check the configuration to verify that all adapters in the team are connected to 802.3ad compliant switch ports.
34	Warning	Explanation: More than one Link Aggregation Group was found. Only one group will be functional within the team. Action: None.
35	Warning	Explanation: Initializing team <i>nn</i> with <i>xx</i> missing adapters. Action: Check the configuration to verify that all the adapters are present and functioning.
36	Error	Explanation: Initializing Team <i>nn</i> failed not all base drivers have the correct mac address ANS will not load. Action: Reconfigure the adapters and reassign MAC addresses.

Intel Boot Agent messages

The Intel Boot Agent might display one or more of the following messages during initialization:

Table 6. Intel Boot Agent messages

Message	Description
Information messages	
This option has been locked and cannot be changed.	Explanation: This message appears when you try to change a configuration setting that has been locked by your system administrator. This message can appear either from within the PROSet's Boot Agent tab when operating in Windows 2000 or Windows XP or from the configuration setup menu when operating in a stand-alone environment. Action: If you think you should be able to change the configuration setting, consult the system administrator.
Adapter-related error messages	

Table 6. Intel Boot Agent messages (continued)

Message	Description
PXE-04: The LAN adapter is not functioning correctly or the wrong Boot Agent is installed. The Boot Agent cannot continue.	<p>Explanation: The Boot Agent was unable to read one or more of the adapter PCI configuration registers. The adapter might be misconfigured, or the wrong Boot Agent image might be installed on the adapter. The Boot Agent will return control to the BIOS and not attempt to remote boot.</p> <p>Action: Try to update the flash image. If this does not solve the problem, contact the system administrator.</p>
PXE-05: The LAN adapter's configuration is corrupted or has not been initialized. The Boot Agent cannot continue.	<p>Explanation: The Boot Agent determined that the adapter EEPROM checksum is incorrect. The agent will return control to the BIOS and not attempt to remote boot.</p> <p>Action: Try to update the flash image. If this does not solve the problem, contact the system administrator.</p>
Media test failure, check cable.	<p>Explanation: The adapter did not detect a viable network connection.</p> <p>Action: Verify that a network cable has been plugged into the Ethernet connector.</p>

Recovering your operating system and preinstalled software

This section contains instructions for recovering BIOS code, device drivers, operating system, and other support software.

Notes:

1. The Product Recovery Program is provided on the computer hard disk drive to assist with software recovery.
2. The recovery process replaces all information stored on drive C. If possible, back up your data files before starting this process.

Recovering or installing device drivers

Restoring the factory-preinstalled device drivers is part of the Product Recovery program and the *Device Drivers and IBM Enhanced Diagnostics* CD.

On some IBM computers, device drivers are located in the C:\IBMTOOLS\DRIVERS directory. Other device drivers are on the software media that come with individual devices.

Notes:

1. Before you can recover or install device drivers, your operating system must be installed on your computer.
2. Before you start recovering or installing device drivers, make sure that you have the documentation and software media for the device.
3. Device drivers for IBM devices and the instructions to install them (README.TXT) are located on the *Device Drivers and IBM Enhanced Diagnostics* CD and in the C:\IBMTOOLS\DRIVERS directory.
4. The latest device drivers are also available at <http://www.ibm.com/pc/support/> on the World Wide Web.

Recovering the operating system

Your computer has the Product Recovery Program on a hidden partition of the hard disk drive. If the hard disk drive becomes damaged or you replace the hard disk drive, use the IBM Product Recovery CD to recover the operating system, applications, and device drivers.

Performing a partial or full recovery

Attention: The Product Recovery program will erase all files on drive C only. A *full recovery* will restore the operating system, device drivers, and applications. A *partial recovery* will restore your operating system and device drivers without restoring applications.

Important

If you are recovering your operating system from a *Product Recovery CD* and you have more than one CD, always start with *Product Recovery CD 1*.

Do the following to recover the operating system:

1. If you are recovering your software using a *Product Recovery CD*, insert the CD into the CD-ROM or DVD-ROM drive. If you are using the Product Recovery Program on the hard disk drive, continue to the next step.
2. If possible, shut down your operating system normally.
3. If your computer is still on, turn it off.

Note: If the computer will not turn off after you hold down the power button for at least four seconds, unplug the power cord and wait a few seconds before reconnecting it.

4. Turn on your computer. Wait for the prompt:
To start the Product Recovery program, press F11.

Quickly press F11. The prompt displays for only a few seconds. Wait for the program menu.

If the DOS command prompt or the F11 prompt is not displayed, See “Using the Recovery Repair diskette”.

5. You might have a choice of operating systems to recover. Select the operating system you want.
6. Select the recovery options you want and follow the instructions on the screen.
7. When recovery is complete, exit from the program. If necessary, remove the CD from the CD-ROM or DVD-ROM drive.
8. Restart the computer.

Using the Recovery Repair diskette

In some circumstances, files on your hard disk might become unusable so that the F11 prompt is not displayed when you start up your computer. Using the following procedure, you will be able to access the Product Recovery Program on the hard disk drive.

1. Insert the *Recovery Repair* diskette.
2. Turn off your computer.
3. Turn on your computer and follow the directions on the screen.

Note: If the repair operation finishes without error, the F11 prompt will be displayed the next time the computer is restarted. If an error message is displayed during the repair operation and the repair operation cannot be completed, there might be a problem with the Product Recovery Program or the partition that contains the Product Recovery Program. Use a Product Recovery CD to access the Product Recovery Program.

Using ConfigSafe and the Save Our System (SOS) feature

Before making any changes to your computer configuration, use ConfigSafe to take a snapshot of your current operating system configuration. ConfigSafe automatically takes a snapshot of your operating system configuration the first time you start your computer. ConfigSafe can be used as a troubleshooting tool, especially if problems occur after installing a new application or option. ConfigSafe can take regular snapshots of the computer configuration on a schedule of your choosing. You can use the snapshot feature to restore configuration settings.

If you need assistance from an IBM technical support representative, use ConfigSafe to generate a report about recent changes in your configuration before you call the IBM HelpCenter[®]. The IBM technical support representative will use the information in this report to help you.

To use ConfigSafe, do one of the following:

- If you have Windows 2000 Professional:
 1. From the Windows desktop, click **Start "ConfigSafe "ConfigSafe**.
 2. Follow the instructions on the screen.
 3. When finished, exit from ConfigSafe.
- If you have Windows XP Professional:
 1. Click **Start " Access IBM " Data backup and restore " Configuration backup-and-restore**.
 2. Click the shortcut button after the description of ConfigSafe.
 3. Follow the instructions on the screen.

ConfigSafe has an SOS feature that can be used in DOS if your Windows desktop becomes unusable. Do the following to use the SOS feature of ConfigSafe:

1. Access a DOS command prompt.
2. At the command prompt, type `cd/cfgsafe`, and press Enter.
3. Type `sos`, and press Enter.
4. Select the most recent configuration dated before the start of the problem, and press Enter.
5. Restart the computer.

Note: If the problem is not resolved, repeat these steps selecting a different saved configuration.

ConfigSafe has an online help system.

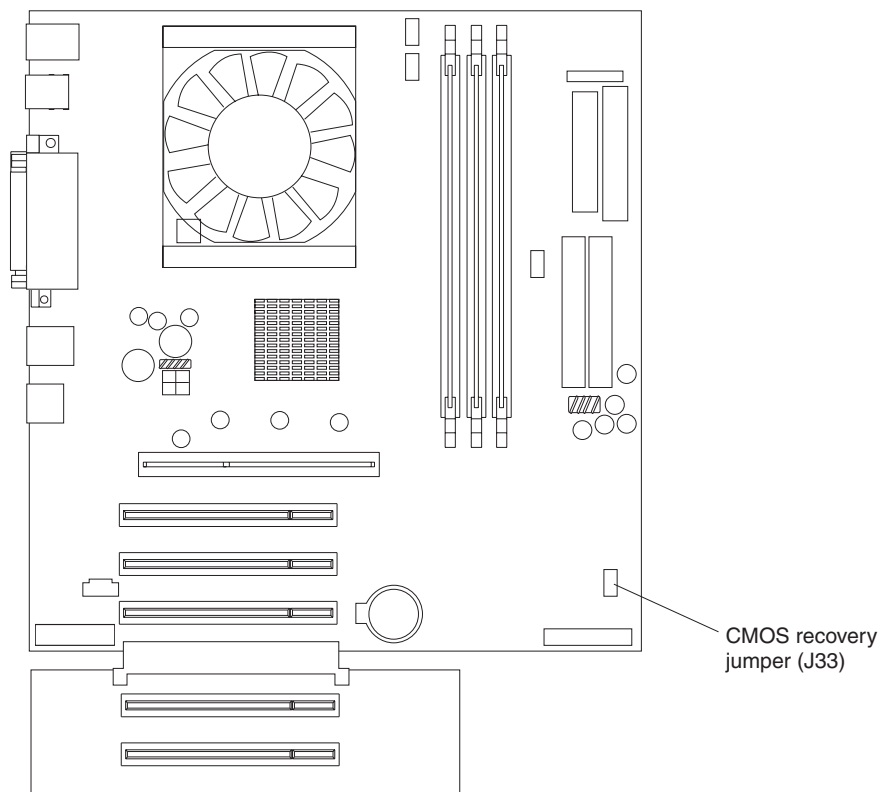
Erasing a lost or forgotten password (clearing CMOS)

This section applies to lost or forgotten passwords. For more information about lost or forgotten passwords, see Access IBM.

To set the CMOS recovery jumper and erase a forgotten password:

1. Review the "Safety information" on page 131.
2. Turn off the computer and all attached devices.
3. Unplug the power cord.
4. Remove the cover. See "Removing the cover" on page 45 or "Side cover removal" on page 63.
5. Locate the clear CMOS/recovery jumper on the system board, removing any adapters that impede access to the jumper. See "System board" on page 43 or "System and PCI extender boards" on page 58 for the location of the jumper.

Note: The following illustration shows the IntelliStation E Pro system board with the PCI extender card. The desktop model does not have this extender card, but it is otherwise identical to the illustration.



6. Move the jumper from pins 1 and 2 to the maintenance, or configure, position (pins 2 and 3).
7. Replace any adapters that were removed and replace the cover. For the desktop model, see "Replacing the cover" on page 56. For the tower model, see "Replacing the cover" on page 77.

Note: You can now startup the computer one time without having to use the power-on password and start the IBM Setup Utility program. At this time, you can either delete the old password or set a new user password. If you do not use the IBM Setup Utility program to change

or delete the password, the next time you start the computer, the original user password will be reinstated.

8. Connect the computer to a power source, keyboard, monitor, and mouse.
9. Turn on the computer. The IBM Setup Utility is displayed.
10. Follow the instructions to erase the existing password or create a new password.
11. Select **Save and exit the Setup Utility** and press Enter.

Note: You must remove the cover again to replace the jumper to the normal setting.

Recovering from a POST/BIOS update failure

If power to your computer is interrupted while POST/BIOS is being updated (flash update), your computer might not restart correctly. If this happens, perform the following procedure:

1. Turn off the computer and all attached devices.
2. Unplug all power cords from electrical outlets and remove the computer cover. For the desktop model, see “Removing the cover” on page 45 and “Removing the frame support bracket” on page 46. For the tower model, see “Side cover removal” on page 63 and “Support bracket removal” on page 64.
3. Locate the clear CMOS recovery jumper on the system board, removing any adapters that impede access to the jumper. See “CMOS recovery jumper” on page 45 for the location of the CMOS recovery jumper.
4. Move the jumper to the adjacent pair of jumper pins.
5. Replace any adapters that were removed and replace the cover. See “Replacing the cover” on page 56 or “Replacing the cover” on page 77. Reconnect the power cords for the computer and monitor to electrical outlets.
6. Insert the POST/BIOS update (flash) diskette into drive A, and turn on the computer and monitor.
7. After the update session completes, there will be no video and the series of beeps will end. Remove the diskette from the diskette drive, and turn off the computer and monitor.
8. Unplug all power cords from electrical outlets, and remove the cover.
9. Remove any adapters that impede access to the CMOS recovery jumper.
10. Replace the clear CMOS recovery jumper to its original position.
11. Replace any adapters that were removed.
12. Replace the cover, and reconnect all cables that were disconnected.
13. Turn on the computer to restart the operating system.

Replacing the battery

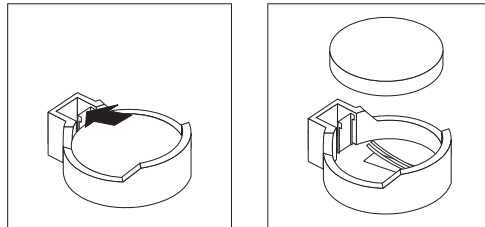
When replacing the battery, you must replace it with a lithium battery of the same type from the same manufacturer. To avoid possible danger, read and follow the information in “Safety information” on page 131.

To order replacement batteries, call 1-800-772-2227 within the United States, and 1-800-465-7999 or 1-800-465-6666 within Canada. Outside the U.S. and Canada, call your IBM reseller or IBM marketing representative.

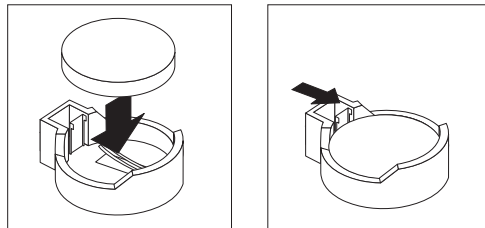
Note: After you replace the battery, you must reconfigure your system and reset the system date and time.

Do the following to replace the battery:

1. Follow any special handling and installation instructions supplied with the replacement battery.
2. Turn off the computer and all attached devices. Disconnect all external cables and power cords; then remove the computer cover.
3. Do the following to remove the battery:
 - a. Use one fingernail to press the top of the battery clip away from the battery. The battery pops up when released.
 - b. Use your thumb and index finger to lift the battery from the socket.



4. Do the following to insert the new battery:
 - a. Tilt the battery so that you can insert it into the socket on the side opposite the battery clip.
 - b. Press the battery down into the socket until it clicks into place. Make sure the battery clip holds the battery securely.



5. Replace the cover and connect the cables.
6. Turn on the system.
7. Start the Configuration/Setup Utility program and set configuration parameters.
 - Set the system date and time.
 - Set passwords if necessary.
 - Save the configuration.

Configuration

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The following configuration programs are available to configure your computer:

- **IBM Setup Utility program**

The IBM Setup Utility program is part of the *basic input/output system (BIOS)* code that comes with your computer. You can use this program to configure serial port assignments, change interrupt request (IRQ) settings, change the device startup sequence, set the date and time, and set passwords.

- **SCSISelect Utility program (some models)**

If your computer comes with a SCSI adapter, you can use the built-in SCSISelect Utility program to configure devices that are attached to the SCSI adapter. Use this program to change default values, resolve configuration conflicts, and perform a low-level format on a SCSI hard disk drive.

- **Intel Boot Agent Utility program**

The Intel Boot Agent Utility program is part of the BIOS code that comes with your computer. You can use this program to change network startup protocols and startup order, and to set menu wait times.

Using the IBM Setup Utility program

This section provides the instructions for starting the IBM Setup Utility program and descriptions of the menu choices that are available.

Starting the IBM Setup Utility program

The IBM Setup Utility program starts automatically when POST detects that newly installed or removed hardware is not reflected in your current configuration. A diagnostic error message is displayed. See “Power-on Self Test (POST)” on page 11 for details about POST and “POST error codes” on page 114 for information about the error messages.

To start the IBM Setup Utility program:

1. Turn on the computer and watch the monitor screen. If your computer is already on when you start this procedure, you must shut down the operating

system, turn off the computer, wait a few seconds until all in-use lights go off, and restart the computer. (Do not use Ctrl+Alt+Del to restart the computer.)

- When the message Press F1 for Setup appears in the lower-left corner of the screen during startup, press F1. (This prompt appears on the screen for only a few seconds. You must press F1 quickly.)

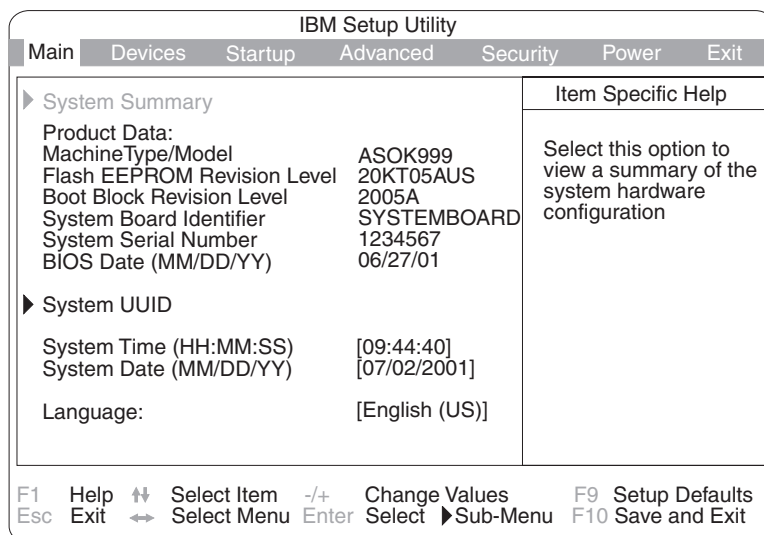
Note: If you have set both user and administrator passwords, you must type the administrator password to access the full IBM Setup Utility menu.

- Follow the instructions that appear on the screen.

Use the left and right arrow keys to select menu choices on the menu bar at the top of the screen. To change a setting on an item, select the item, and press Enter to activate a setting selection dialogue box. Use the up and down arrow keys to select the desired setting, and press Enter again.

IBM Setup Utility main menu choices

The IBM Setup Utility main menu appears at the top of the IBM Setup Utility program screen. Using the items of this menu, you can select settings that you want to change. Item specific Help information for each menu item appears on the right hand side of the IBM Setup Utility program screen. Select the item to view this information. The choices on some menus might differ slightly, depending on the BIOS version on the computer.



The following sections provide descriptions of the choices available from the main menu.

Main

This choice is automatically selected when the IBM Setup Utility program starts. Here, you can view general information about your computer, such as a summary of components and computer configuration.

Information appearing under the Main menu includes the type and speed of the microprocessor, the amount of memory that is installed, the machine type and model number, the computer serial number, and the revision level or issue date of the BIOS code that is stored in the flash electronically erasable programmable ROM (EEPROM). You can also view the language that your computer is set to display.

Changes that you make to configuration settings appear on this summary screen. You cannot edit the fields of the configuration and system information, but you can set the system date and time. The system time is in a 24-hour format: hour:minute:second.

Devices

Select this choice to view or change the assignments for devices and input/output ports.

PS/2 Mouse: Select this choice to set whether a PS/2 pointing device is installed.

Diskette Drive A: Select this choice to set the type of diskette drive installed in your computer. You can disable the diskette drive, or you can enable various types of diskette drives.

Serial Port Setup: Select this choice to configure your computer serial ports. If the port is set to Enabled, you can set the base input/output (I/O) address and the interrupt. If the port is set to Automatic, the operating system automatically configures these settings.

USB Setup: Select this choice to configure the USB ports in your computer. The USB Support setting can be Enabled or Disabled. USB device support determines whether BIOS support for USB devices will be enabled when you startup the computer.

Parallel Port Setup: Select this choice to configure the parallel port of your computer. If the port is set to Enabled, you can set the base input/output (I/O) address, the interrupt, and the direct memory address (DMA). If the port is set to Automatic, the operating system automatically configures these settings.

Video Setup: Select this choice to view the Video Setup menu. Select Active Video determines which video mode will be active when you startup your computer. You can select PCI, AGP, or Integrated in the menu. If the selected video is not available, the computer will select a default video.

IDE Drives Setup: Select this choice to view or change the settings for IDE drives 0, 1, 2, or 3. You can set each drive for Compatible or High Performance. If an IDE device attached to the system board IDE controller does not function properly or causes other IDE devices attached to the same controller to function improperly, set this field to the Compatible mode.

Audio Setup: Select this choice to enable or disable Audio Support.

Network Setup: Select this choice to set the system board Ethernet controller to Enabled or Disabled. You can also enable Intel Boot Agent and PXE base code. The menu also displays the MAC address for the computer.

Startup

Select this choice to view or change the start options. Start options take effect when you start your computer.

You can select keyboard operating characteristics, such as the keyboard speed and whether the computer starts with the keyboard number lock on or off. You also can enable the computer to run without a diskette drive, monitor, or keyboard.

The computer uses a startup sequence to determine the device from which the operating system starts. For example, you can define a startup sequence that

checks for a startable diskette in the diskette drive, then checks the hard disk drive in bay 1, and then checks a network adapter.

You can enable a virus-detection test that checks for changes in the master boot record at startup.

Advanced

Select this choice to change the values for advanced hardware features, such as PCI configuration and Plug and Play operating system settings.

A message appears above the choices on this menu to alert you that the system might malfunction if these options are configured incorrectly. Follow the instructions on the screen carefully.

This choice identifies the microprocessor serial number in the microprocessor. The setting cannot be changed.

Security

This choice appears at the top of the IBM Setup Utility screen. Select this choice to set several security features, including adapter ROM security, security profile by device, remote administration, and password protection. When you select Set Passwords in the Security menu, you can implement either user or administrator password protection.

Adapter ROM Security: Set the field for this choice to Yes to lock the keyboard during adapter ROM initialization. You can use this setting with an administrator password to prevent the use of adapter ROM based utilities.

Security Profile by Device: Select this menu choice to control the level of security for bootable devices.

Remote Administration: Select this choice to enable Remote Administration and Network Boot Integrity Services (BIS) protocol. Enable Remote Administration to run utilities, such as the POST/BIOS Update Utility, without having to type an administrator password.

Select whether to use the network Boot Integrity Services (BIS) protocol prior to startup from the network. Before allowing a network startup, BIS ensures that the startup image is valid and is authorized for your computer.

Set Passwords: Select this choice to set user and administrator passwords and to set password protocols for updating the BIOS code and authorizing password changes.

User password: After you set a user password, you can enable the unattended-start mode. This locks the keyboard and mouse, but enables the computer to start the operating system. The keyboard and mouse remain locked until you type the correct password.

You can use any combination of up to seven characters (A–Z, a–z, 0–9, and blanks) for your user password. Keep a record of your password in a secure place. If you forget the user password, you can regain access to the computer through one of the following methods:

- If an administrator password is set, type the administrator password at the power-on prompt. Start the IBM Setup Utility program and change the user password.

- Change the position of the CMOS recovery jumper. See “Erasing a lost or forgotten password (clearing CMOS)” on page 28.
- Remove the battery and then install the battery.

Administrator password: Select this choice to set an administrator password. The administrator password provides access to all choices on the IBM Setup Utility main menu. You can set, change, or delete both the administrator and user passwords and enable a user to change the user password.

Attention: If you set an administrator password and then forget it, you cannot override or remove it. You must replace the system board.

The following table provides a summary of the password features.

Table 7. Power-on and administrator password features

Type of password	Results
User password	<ul style="list-style-type: none"> • Type the password to complete the system startup. • A limited set of choices is available on the IBM Setup Utility main menu.
Administrator password	<ul style="list-style-type: none"> • No password is required to start the system. • Type the password to access the IBM Setup Utility program. • All choices are available on the IBM Setup Utility main menu.
Administrator <i>and</i> user password	<ul style="list-style-type: none"> • You can type either password to complete the system startup. • The administrator password provides access to all choices on the IBM Setup Utility main menu. You can set, change, or delete both the administrator and user passwords, and enable you to change the user password. • The user password provides access to a limited set of choices on the IBM Setup Utility main menu. This limited access might include changing or deleting the power-on password.

Power

Select this choice to enable or disable system power settings.

ACPI BIOS IRQ: This field controls what IRQ the Advanced Configuration and Power Interface (ACPI) uses.

ACPI Standby Mode: Select which power level your computer uses in standby mode. If S1 is selected, power is maintained to all devices, but all processor activity is halted. If S3 is selected, power is maintained only for the main memory. Exit from the S3 state might not be supported by all installed adapters.

APM BIOS Mode: This field controls the Advanced Power Management (APM) support to the operating system. Enable this setting when your operating system supports APM-enabled computers. When this option is set to disabled, all APM BIOS support is disabled.

Power Savings: Maximum power savings conserves the greatest amount of system power. Maximum performance conserves power but optimizes the performance of the computer. To alter these settings, choose Customized. To turn off power management, choose Disabled.

After Power Failure: This field controls whether the system will stay on after ac power is removed and then restored. Select Power On if you use a power strip to

turn on the computer. Select Stay Off if you want the computer to remain off after power is restored. Select Last State to have the computer return to its previous state.

Low Power Entry and Exit Activity Monitor: Select this choice to set up the system activities that will be monitored for automatic power management.

Automatic Power On: Select this choice to control Automatic Power On when your computer is unattended. You can set the Wake on LAN feature, Serial Port A Ring Detect, PCI Modem Ring Detect, Wake Up on Alarm, and PCI Wakeup.

Exit

When you finish viewing or changing settings, select **Exit** from the menu bar at the top of the IBM Setup Utility screen, then select **Save and exit the Setup Utility** and press Enter. If you do not want to save your changes, select **Exit the Setup Utility without saving** and press Enter.

If you want to save a change, but you do not want to leave the IBM Setup Utility program, select **Save Settings** and press Enter.

You can select Restore Settings to load previous values for all Setup items, or you can **Load Default Settings** for the computer.

Using the SCSISelect Utility program (some models)

SCSISelect is a built-in, menu-driven configuration utility program that you can use for models that come with a SCSI adapter to:

- View the default SCSI IDs
- Locate and correct configuration conflicts
- Perform a low-level format on a SCSI hard disk

The following sections provide the instructions needed to start the SCSISelect Utility program and descriptions of the menu choices available.

Starting the SCSISelect Utility program

To start the SCSISelect utility program:

1. Turn on the computer.
2. When the <<< Press <CTRL><A> for SCSISelect™ Utility! >>> prompt appears, press Ctrl+A.

Note: If an administrator password has been set, a prompt appears asking you to type the password to start the SCSISelect Utility program.

3. When the Would you like to configure the host adapter or run the SCSI disk utility? question appears, make your selection and press Enter.
4. Use the arrow keys to select a choice from the menu.
 - Press Esc to return to the previous menu.
 - Press the F5 key to switch between color and monochrome modes (if your monitor permits).
5. Follow the instructions on the screen to change the settings of the selected items, and press Enter.

SCSISelect menu choices

The following choices appear on the SCSISelect Utility menu:

- **Configure/View Host Adapter Settings**

Select this choice to view or change the SCSI controller settings. To reset the SCSI controller to its default values, press F6; then, follow the instructions that appear on the screen.

You can view or change the following controller settings:

- **Host Adapter SCSI ID**

Select this choice to view the SCSI controller ID, normally 7.

- **SCSI Parity Checking**

Select this choice to view the assigned value of **Enabled**.

- **Host Adapter SCSI Termination**

Select this choice to view the assigned value of **Enabled**.

- **Boot Device Options**

Select this choice to configure startable device parameters. Before you can make updates, you must know the ID of the device for which you want to configure parameters.

- **SCSI Device Configuration**

Select this choice to configure SCSI device parameters. Before you can make updates, you must know the ID of the device whose parameters you want to configure.

Note: The Maximum Sync Transfer Rate represents the transfer rate for Ultra SCSI devices.

- The transfer rate for Ultra3 SCSI LVD devices is 160 MBps
- The transfer rate for Ultra2 SCSI LVD devices is 80 MBps
- The transfer rate for Fast SCSI devices is 20 MBps

- **Advanced Configuration Options**

Select this choice to view or change the settings for advanced configuration options.

- **SCSI Disk Utilities**

Select this choice to view the SCSI IDs that are assigned to each device or to format a SCSI device.

To use the utility program, select a drive from the list. Read the screens carefully before making a selection.

Note: If you press Ctrl+A before the selected drives are ready, an Unexpected SCSI Command Failure screen might appear. Restart the computer and watch the SCSISelect messages as each drive spins up. After the drive that you want to view or format spins up, press Ctrl+A.

Using the Intel Boot Agent Utility program

The Intel Boot Agent Utility program is a built-in, menu-driven configuration utility program that you can use to customize the network and startup protocols of your computer through an operating system independent configuration program contained within the adapter flash ROM.

Attention: If you change the startup order using the Intel Boot Agent Utility program, startup sequence settings in the IBM Setup Utility program might not function properly.

Starting the Intel Boot Agent Utility program

To start the Intel Boot Agent Utility program:

1. Turn on the computer.
2. When the Initializing Intel (R) Boot Agent Version X.X.XX PXE 2.0 Build XXX (WfM 2.0) prompt appears, press Ctrl+S.

Note: By default, you will have 2 seconds after the prompt appears on the screen to press Ctrl+S.

3. Use the arrow keys or press Enter to select a choice from the menu.
 - Press Esc to return to the previous menu.
 - Press the F4 key to exit.
4. Follow the instructions on the screen to change the settings of the selected items, and then press Enter.

Intel Boot Agent Utility menu choices

The following choices appear on the Intel Boot Agent Utility menu:

- **Network Boot Protocol**

PXE is the default value for this menu item. Use this setting for WfM-compatible network management programs, such as Windows 2000 RIS, and Linux. Select RPL for legacy-style remote startup.

- **Boot Order**

Attention: If you change the startup order using the Intel Boot Agent Utility program, startup sequence settings in the IBM Setup Utility program might not function properly.

Select this choice to change the order in which startup devices are queried.

- Try local drives first, and then network (default)
- Try network only
- Try local drives only
- Try network first, then local drives

Note: This option is not supported on this product. To change the startup order, use the IBM Setup Utility program. See “Starting the IBM Setup Utility program” on page 31 for more information.

- **Show Setup Prompt**

Select this choice to either display the PXE setup prompt or disable it. The default setting is **Disable**.

When this choice is enabled, Press Ctrl+S to enter the setup menu appears on the screen under the initializing prompt.

- **Setup Menu Wait Time**

Select this choice to set the amount of time (in seconds) that the system will pause during initialization for a Ctrl+S input.

- 0 seconds
- 2 seconds (default)
- 3 seconds
- 5 seconds

– 8 seconds

- **Legacy OS wake up support**

Select this choice to enable or disable a non-Windows operating system to use the adapter remote wake up capability. The default setting is Disabled.

Notes:

1. Use the default setting for Advanced Configuration and Power Interface (ACPI) aware operating systems, such as Windows 2000 and Windows XP.
2. If your computer is running a non-ACPI operating system, you must set this selection to enable it to use the Wake-on-LAN support.
3. When using a non-ACPI operating system, do not send a wake up packet to the computer while it is turned on. If a wake up packet has been sent while the computer is on, you might be unable to turn the computer off.

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Before you begin

Before you begin to install options in the computer, read the following information:

- Become familiar with the safety and handling guidelines specified under “Handling electrostatic discharge-sensitive devices” on page 134, and read the safety statements in “Safety information” on page 131. These guidelines will help you work safely with the computer or options.
- Make sure that you have an adequate number of properly grounded electrical outlets for the computer, monitor, and any other options that you intend to install.
- Back up all important data before you make changes to hard disk drives.
- Have a small, flat-blade screwdriver available.
- For a list of supported options for the computer, refer to <http://www.ibm.com/pc/support> on the World Wide Web.

System reliability considerations

To help ensure proper cooling and system reliability, make sure:

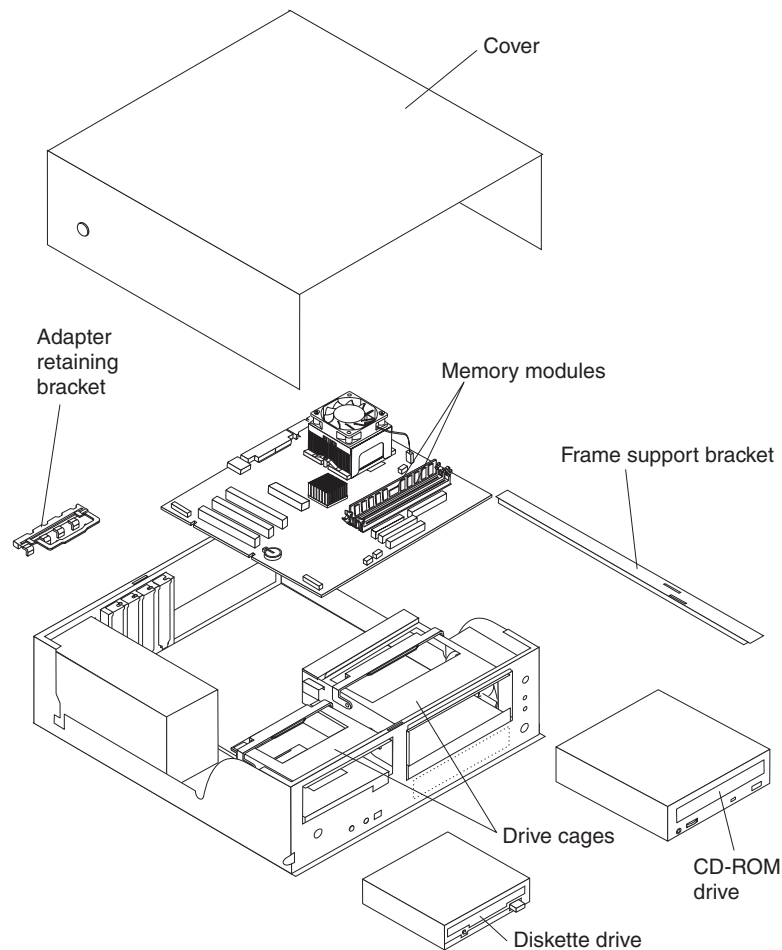
- Each of the drive bays has either a drive or a filler panel and electromagnetic compatibility (EMC) shield installed.
- There is space around the computer to allow the computer cooling system to work properly. Leave about 51 mm (2 in.) of open space around the front and rear of the computer. Do not place objects in front of the fans.
- Cables for optional adapters are routed according to the instructions that are provided with the adapters.
- A failed fan is replaced as soon as possible.

Desktop model

Use the information in the following sections to install options in the desktop model computer.

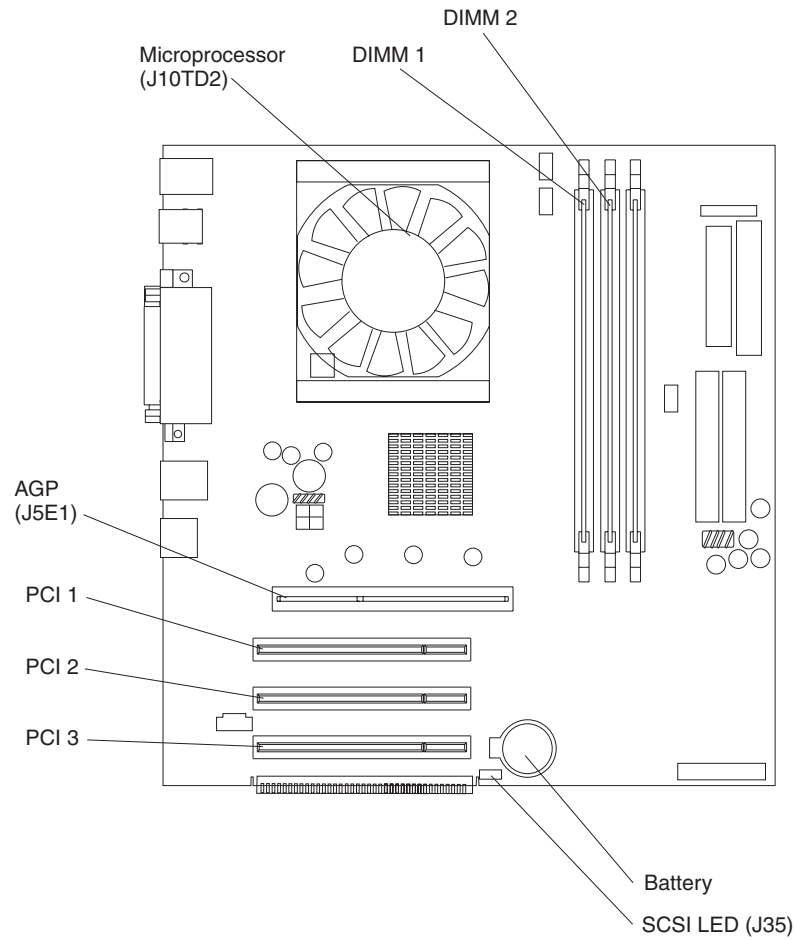
Major components of the desktop model

The following illustration shows the locations of major components in the desktop model computer.



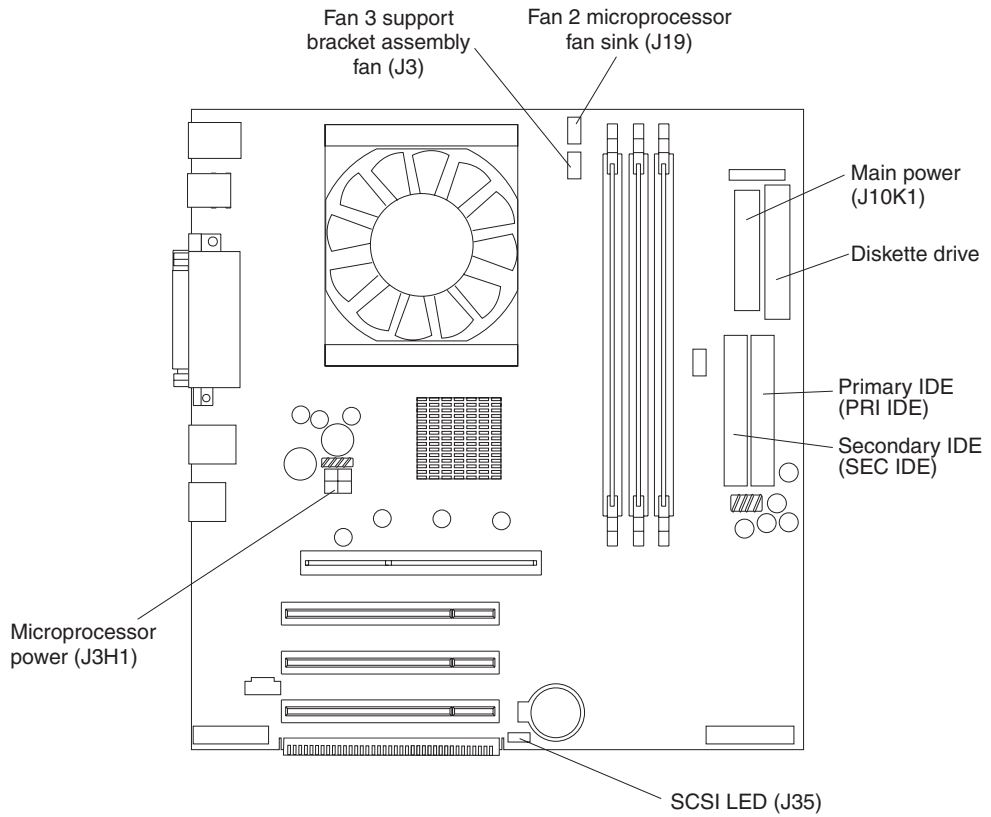
System board

The following illustration identifies parts of the system board. Depending on installed options, your system board might look slightly different.



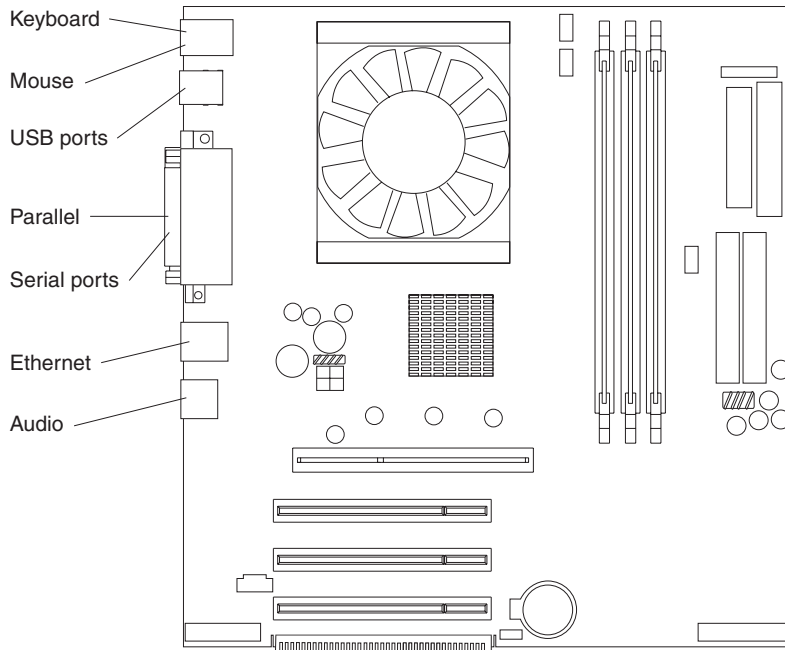
System board internal cable connectors

The following illustration identifies system board connectors for internal cables.



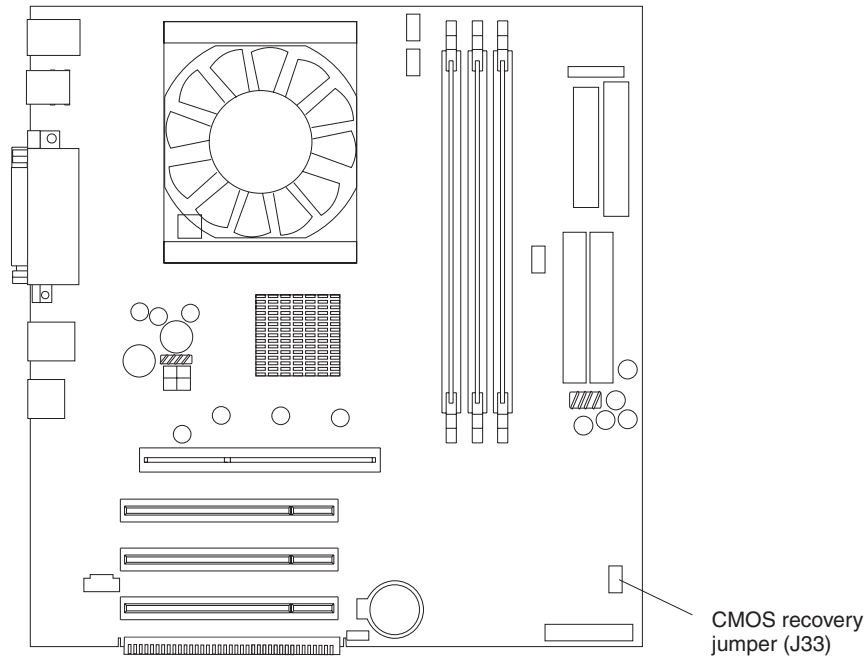
System board external connectors

The following illustration identifies system board connectors for external devices.



CMOS recovery jumper

The following illustration identifies the CMOS recovery jumper on the system board.



The CMOS recovery jumper can be used to clear CMOS memory in the event you lose the user password. See “Erasing a lost or forgotten password (clearing CMOS)” on page 28 for information on how to use the CMOS recovery jumper.

This jumper is also used to recover from a BIOS failure. See “Recovering from a POST/BIOS update failure” on page 29.

Installing options in a desktop model

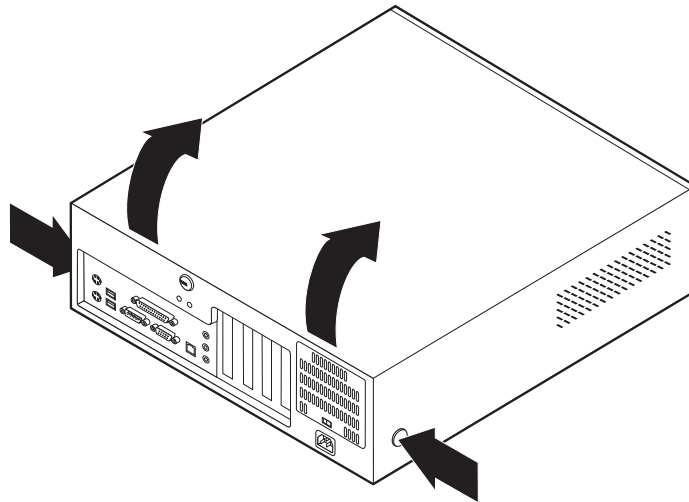
This section provides instructions for installing options in a desktop model.

Removing the cover

To remove the cover from the desktop model computer, do the following:

1. Review the information in “Before you begin” on page 41 and “Safety information” on page 131.
2. Turn off the computer and all attached devices.
3. Disconnect all external cables and power cords.

4. Press the buttons on either side of the computer cover and lift the cover from the computer.

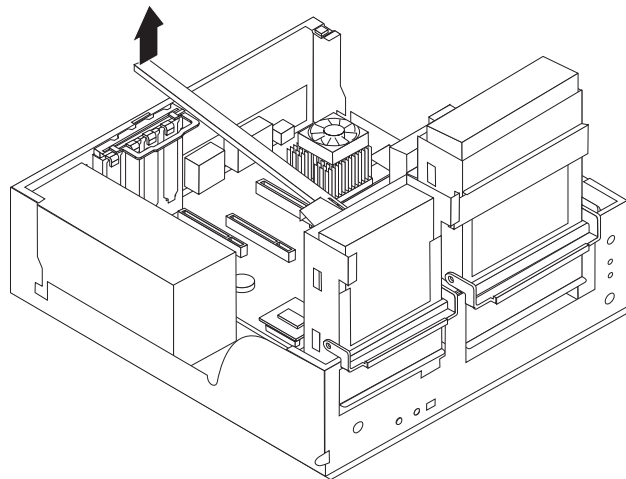


To replace the cover, see “Replacing the cover” on page 56.

Removing the frame support bracket

You must remove the frame support bracket to access many of the components of the desktop model computer. To remove the frame support bracket, perform the following steps:

1. Pivot the drive cages until the pivot locks catch the front of the desktop chassis, holding the drive cages in place.
2. Lift the frame support bracket out of the computer.

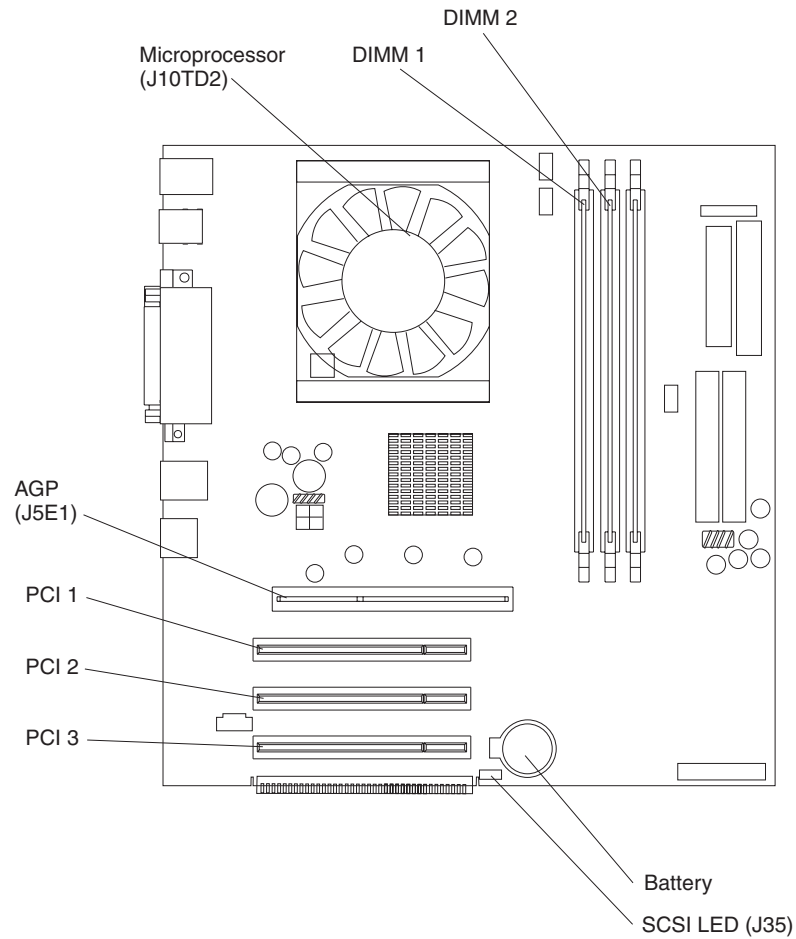


To replace the frame support bracket, reverse the steps.

Working with adapters

The computer comes with adapter connectors or *slots*. The AGP video adapter is installed in the AGP slot. You can install up to three low-profile PCI adapters in PCI slots 1 through 3. All PCI slots are 32-bit, 33 MHz slots.

The following illustration shows the location of expansion slots on the system board.



Adapter considerations: Before you install adapters, review the following:

- Locate the documentation that comes with the adapter and follow those instructions in addition to the instructions provided in this chapter. If you need to change the switch or jumper settings on the adapter, follow the instructions that come with the adapter.
- You can install low-profile adapters in all three PCI slots.
- The computer supports 5.0 V and universal PCI adapters; it does not support 3.3 V adapters.
- The computer uses a rotational interrupt technique to configure PCI adapters. Because of this technique, you can install a variety of PCI adapters that currently do not support PCI interrupt sharing.
- PCI slots 1 through 3 are on PCI bus 0.

The system scans the AGP slot and PCI expansion slots 1 through 3 to assign system resources, then the system starts the PCI devices in the following order: PCI expansion slots 1 and 2, system board integrated drive electronics (IDE) or SCSI devices, and then PCI expansion slot 3.

Note: To change the startup sequence for PCI devices, start the IBM Setup Utility program, select Startup from the main menu, select Startup

Sequence, and select Second device (SCSI) to designate the adapter startup sequence. See "Configuration" on page 31 for details on using the IBM Setup Utility program.

- For a list of supported options for the computer, refer to <http://www.ibm.com/pc/support> on the World Wide Web.

Adapter installation: Do the following to install an adapter in the desktop model:

Attention: When you handle static-sensitive devices, take precautions to avoid damage from static electricity. For details on handling these devices, see "Handling electrostatic discharge-sensitive devices" on page 134.

1. Review the information in "Safety information" on page 131.
2. Turn off the computer and attached devices.
3. Disconnect all external cables and power cords; then remove the cover. See "Removing the cover" on page 45.
4. Determine which PCI slot you will use for the adapter.

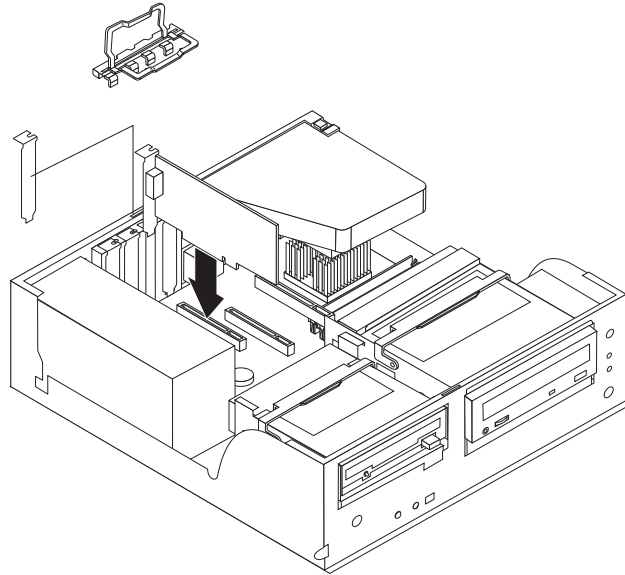
Note: Check the instructions that come with the adapter for any requirements, restrictions, or cabling instructions. It might be easier to route any cables before you install the adapter.

5. Rotate each drive bay cage until the drive cage latches catch the front of the computer chassis.
6. Lift the frame support bracket. See "Removing the frame support bracket" on page 46.
7. Rotate the rear adapter support bracket to the open (unlocked) position and remove it from the computer.
8. Remove the expansion-slot cover. From the rear of the computer, press on the slot cover. Grasp it and pull it out of the expansion slot. Store it in a safe place for future use.

Attention: Expansion-slot covers must be installed on all vacant slots. This maintains the electronic emissions standards of the computer and ensures proper ventilation of computer components.

9. Set any jumpers or switches on the adapter or system board as described by the adapter manufacturer.
10. When you are ready, remove the adapter from the static-protective package. It is best to move the adapter directly from the static-protective package to the adapter slot. If this is not possible, set the adapter down in its static-protective package on a hard surface. Avoid touching the components and gold-edge connectors on the adapter.
11. To install the adapter, carefully grasp the adapter by the top edge or upper corners, and align it with the expansion slot guides; then press the adapter

firmly into the expansion slot.



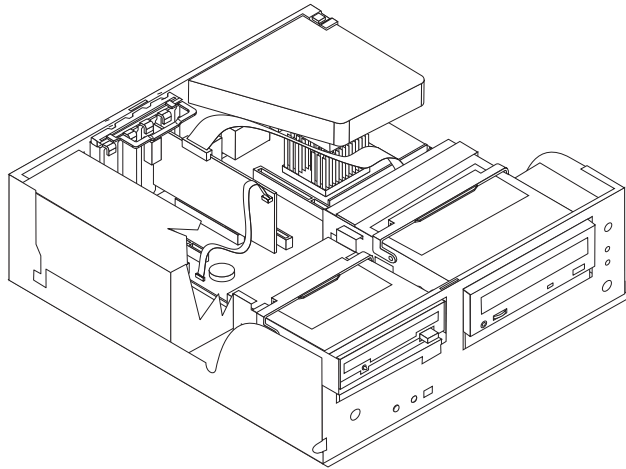
Attention: Be certain that the adapter is correctly seated in the expansion slot before you turn on the computer. Incomplete installation of an adapter might damage the system board or the adapter.

12. Connect required cables to the adapter.
13. If you have another adapter, repeat steps 1 through 12. If you have another option to install, do so now. Otherwise, complete the rest of the steps in this section.
14. Reinstall the rear adapter support bracket; then rotate the bracket to the closed (locked) position.
15. Replace the frame support bracket.
16. Return the drive bay cages to their original positions in the computer.
17. Replace the top cover, see “Replacing the cover” on page 56 for details.
18. Reconnect the external cables and power cords; then turn on the attached devices and the computer.

SCSI adapter installation: Some models come without SCSI adapters. Do the following to install an optional SCSI adapter:

1. If you do not have a preinstalled SCSI adapter, complete steps 1 on page 48 through 12 of “Adapter installation” on page 48.
2. Connect the SCSI signal cable to the adapter and one or more of the signal cable connectors to the rear of the SCSI devices.
3. Connect the SCSI activity indicator cable to the adapter and to the SCSI LED connector (J35) on the system board. See “System board” on page 43 for the

location of the SCSI LED connector.



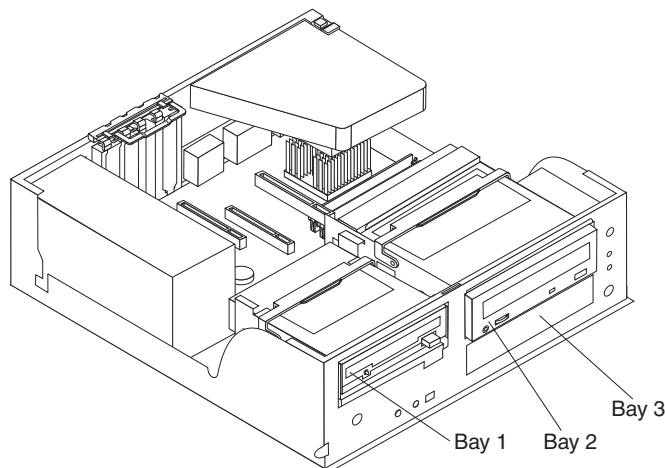
4. If you have other adapters or options to install or remove, do so now.
5. Reinstall the rear adapter support bracket; then rotate it to the closed (locked) position.
6. Replace the frame support bracket.
7. Replace the cover, see “Replacing the cover” on page 56 for details.
8. Reconnect the external cables and power cords; then turn on the attached devices and then computer.

Internal drives

Different types of drives enable the computer to read various types of media and store data in different formats. The computer comes with the following drives preinstalled:

- Diskette
- Hard disk
- CD-ROM or DVD-ROM

Internal drive bays: The desktop model IntelliStation E Pro computer comes with a 3.5-in., 1.44-MB diskette drive in bay 1, an IDE CD-ROM or DVD-ROM drive in bay 2, and a hard disk drive installed in bay 3.



Notes:

1. The IntelliStation E Pro computer supports only one diskette drive.

2. The IntelliStation E Pro Type 6204 does not support the installation of additional internal disk drives. However, you can replace failed internal drives.
3. For a complete list of supported options for the computer, refer to <http://www.ibm.com/pc/support/> on the World Wide Web.

Preinstallation steps: Before you replace drives in the computer, verify that you have all the cables and other equipment specified in the documentation that comes with the drive. You might also need to perform certain preinstallation activities. Some steps are required only during the initial installation of an option.

1. Read “Safety information” on page 131, “Handling electrostatic discharge-sensitive devices” on page 134, and the documentation that comes with the drive.
2. Choose the bay in which you want to install the drive.
3. Check the instructions that come with the drive to see if you need to set any switches or jumpers on the drive. If you are installing a SCSI device, be sure to set the SCSI ID for that device.

CD-ROM or diskette drive installation: To replace drives in the desktop model computer, do the following:

1. Read the information in “Preinstallation steps”.
2. Turn off the computer and attached devices, and disconnect all external cables and power cords.
3. Remove the cover. See “Removing the cover” on page 45 for details.
4. Disconnect power and signal cables to the drive.
5. Rotate the drive bay cage of the drive that you need to replace until the latch catches the front of the computer chassis.
6. Remove the screws holding the drive in place.

Note: It may be easier to remove and replace the drive by lifting the drive cage up and out of the chassis.

7. Slide the drive out of the drive bay.

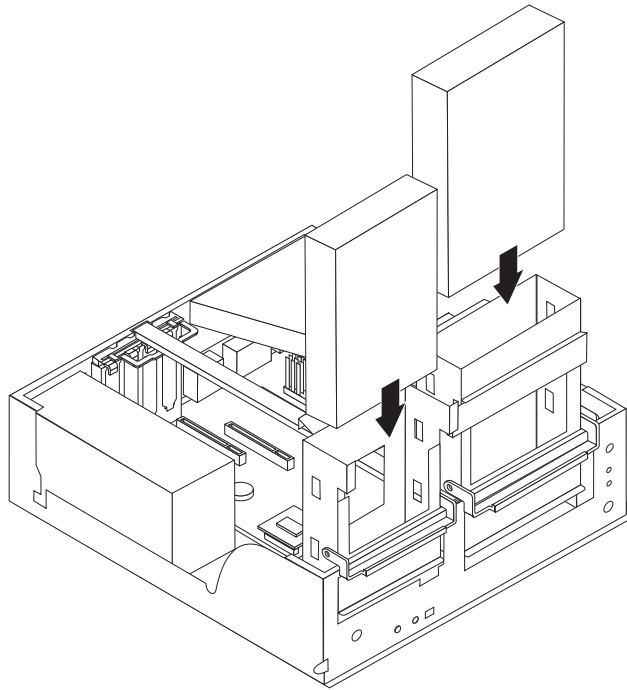
Note: If you are installing a drive that contains a laser, observe the following safety precaution.

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.

8. Touch the static-protective bag containing the drive to any unpainted metal surface on the computer; then remove the drive from the bag and place it on a static-protective surface.
9. Set any jumpers or switches on the drive according to the documentation that comes with the drive.

- Slide the drive into the drive bay, and then attach the drive to the drive cage.



- Connect one end of the diskette or IDE signal cable into the back of the drive and the other end of the cable into the diskette or IDE connector on the system board. For the location of the diskette or IDE connectors, see "System board internal cable connectors" on page 44.

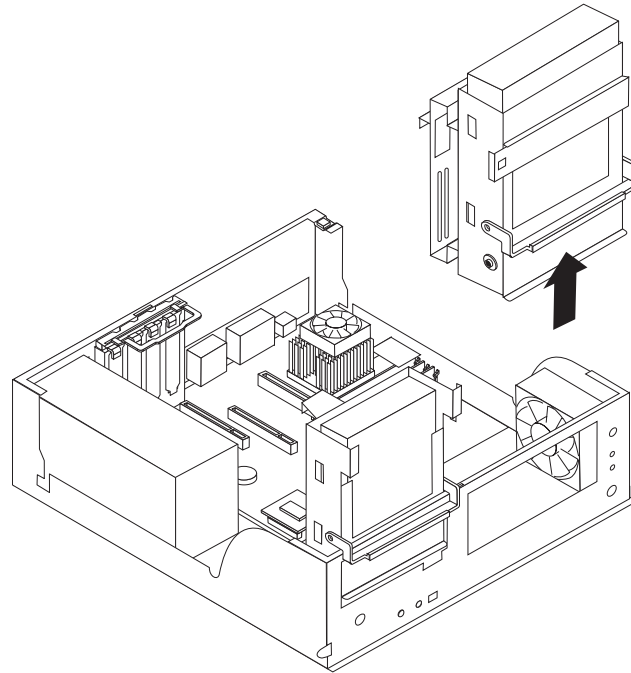
Note: Make sure to route the signal cable so that it does not block the air flow to the rear of the drives or over the microprocessor.

- Connect the power cable to the back of the drive. The connectors are keyed and can be inserted only one way.
- If you have other options to install or remove, do so now.
- Replace the cover. See "Replacing the cover" on page 56 for details.
- Reconnect the external cables and power cords; then turn on the attached devices and the computer.

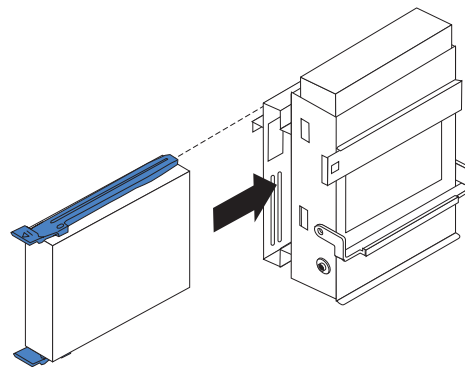
Hard disk drive installation: To replace a hard disk drive in the desktop model computer, do the following:

- Read the information in "Preinstallation steps" on page 51.
- Turn off the computer and attached devices and disconnect the external cables and power cords.
- Remove the cover and frame support bracket. See "Removing the cover" on page 45 and "Removing the frame support bracket" on page 46 for details.
- Disconnect the power and signal cables from both drives in the drive cage.

5. Remove the hard disk drive cage from the computer.



6. Slide the drive out of the drive bay.
7. Once the drive is free of the drive bay, remove the sliding rails and screws from this drive and carefully set them aside for installation on the replacement drive.
8. Touch the static-protective bag containing the drive to any unpainted metal surface on the compute, then remove the drive from the bag and place it on a static-protective surface.
9. Set any jumpers or switches on the drive according to the documentation that comes with the drive.
10. Attach the sliding rails, removed from the old drive in step 7, to the sides of the hard disk drive using screws that were set aside in step 7.
11. Slide the drive into the drive bay until the drive snaps into place, and replace the drive cage.



12. Connect one end of the IDE signal cable into the back of the drive and the other end of the cable into the IDE connector on the system board. For the location of the IDE connectors, see “System board internal cable connectors” on page 44.

Note: Make sure to route the signal cable so that it does not block the air flow to the rear of the drives or over the microprocessor.

13. Connect a power cable to the back of the drive. The connectors are keyed and can be inserted only one way.
14. If you have other options to install or remove, do so now.
15. Replace the cover. See “Replacing the cover” on page 56 for details.
16. Reconnect the external cables and power cords; then turn on the attached devices and the computer.

Power and signal cables for internal drives: The computer uses cables to connect IDE devices to the power supply and to the system board. The following cables are provided:

- Four-wire power cables connect the drives to the power supply. At the end of these cables are plastic connectors that attach to different drives; these connectors vary in size. Also, certain power cables attach to the system board.
- Flat signal cables, also called ribbon cables, connect IDE and diskette drives to the system board. There are two sizes of ribbon cables that come with the computer.
 - The wider IDE signal cable has two or three connectors.
 - If the cable has three connectors, one of these connectors is attached to the drive, one is a spare, and the third attaches to the primary or secondary IDE connector on the system board.
 - If the cable has two connectors, one of these connectors is attached to the hard disk drive, and the other attaches to the primary or secondary IDE connector on the system board.

Note: The CD-ROM drive will have an ATA 66 signal cable. ATA 66 signal cables are color-coded. The blue connector attaches to the system board. The black connector attaches to the primary device. The gray middle connector attaches to the secondary device. If you are installing a hard disk drive, you must change the switch setting on the CD-ROM drive to secondary and change the connector used for the CD-ROM drive to the gray middle connector.

- The narrower signal cable has two connectors, one to attach to the diskette drive, and the other to attach to the connector (FDD1) on the system board.

To locate connectors on the system board, see “System board internal cable connectors” on page 44.

Review the following information before connecting power and signal cables to internal drives:

- The drives that are preinstalled in the computer come with power and signal cables attached. If you replace any drives, it is important to remember which cable is attached to which drive.
- When you install a drive, ensure that the drive connector at the end of the signal cable is always connected to a drive, and ensure that the drive connector at the other end is connected to the system board. This reduces electronic noise from the computer.
- If two IDE devices are used on a single cable, one must be designated as the primary device and the other as the secondary device; otherwise, the computer might not detect some of the IDE devices. The primary and secondary designation is determined by switch or jumper settings on each IDE device.

- If two IDE devices are on a single cable, and only one is a hard disk drive, the hard disk drive must be set as a primary device.
- If you have only one IDE device on a cable, it must be set as a primary device.

Memory module installation

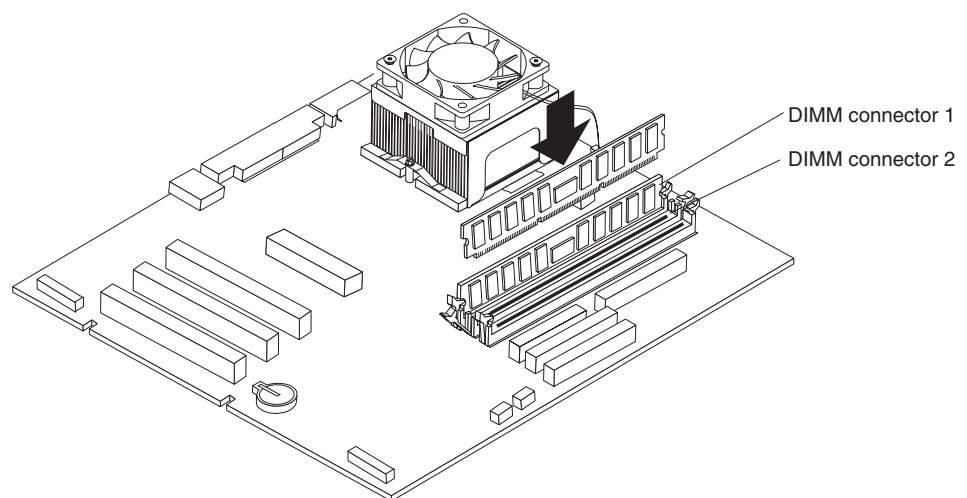
Adding memory to the computer is an easy way to make programs run faster. You can increase the amount of memory in the computer by installing memory modules. The IntelliStation E Pro computer uses industry-standard, dual inline memory modules (DIMMs).

Note: The desktop model does not support installing memory in DIMM connector 3.

Do the following to install a DIMM:

Attention: When handling static-sensitive devices, take precautions to avoid damage from static electricity. For details on handling these devices, see “Handling electrostatic discharge-sensitive devices” on page 134.

1. Review the safety precautions listed in the “Safety information” on page 131.
2. Turn off the computer and all attached devices. Disconnect all external cables and power cords; then remove the cover. See “Removing the cover” on page 45 for details.
3. Lift the frame support bracket. See “Removing the frame support bracket” on page 46.
4. Touch the static-protective package containing the DIMM to any unpainted metal surface on the computer. Then remove the new DIMM from the package.
5. Gently open the retaining clip on each end of the DIMM slot. Turn the DIMM so that the pins align correctly with the connector.
6. Insert the DIMM into the connector. Firmly press the DIMM straight down into the connector by applying pressure on both ends of the DIMM simultaneously. The retaining clips snap into the locked position when the DIMM is firmly seated in the connector.



7. If a gap exists between the DIMM and the retaining clips, the DIMM has not been correctly installed. Open the retaining clips, remove the DIMM, then reinsert it.
8. If you have other options to install or remove, do so now.

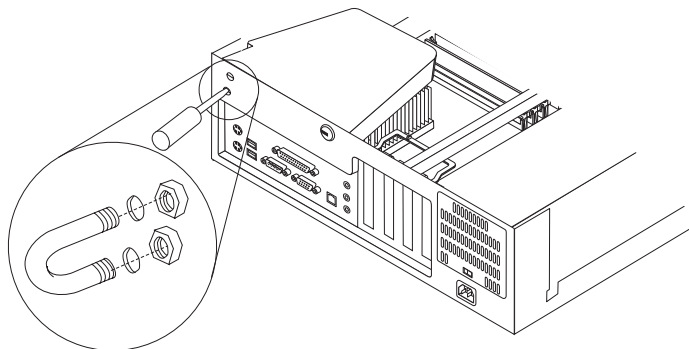
9. Replace the frame support bracket.
10. Replace the cover. See “Removing the cover” on page 45.
11. Reconnect the external cables and power cords. Turn on the attached devices, and turn on the computer.

Security U-bolt installation

To help prevent theft, you can add a security U-bolt and cable to the computer.

Do the following to install the U-bolt:

1. Review the safety precautions listed in “Safety information” on page 131.
2. Turn off the computer and all attached devices. Disconnect all external cables and power cords; then remove the cover. See “Removing the cover” on page 45 or “Side cover removal” on page 63 for details.
3. Use a screwdriver to remove the two metal knockouts.
4. Insert the U-bolt through the rear panel; then attach and tighten the nuts.
5. Thread the cable through the U-bolt and around an object that is not part of or permanently secured to the building structure or foundation, and from which the cable cannot be removed. Fasten the cable ends together with a lock. After you add the security cable, make sure that it does not interfere with other cables connected to the computer.



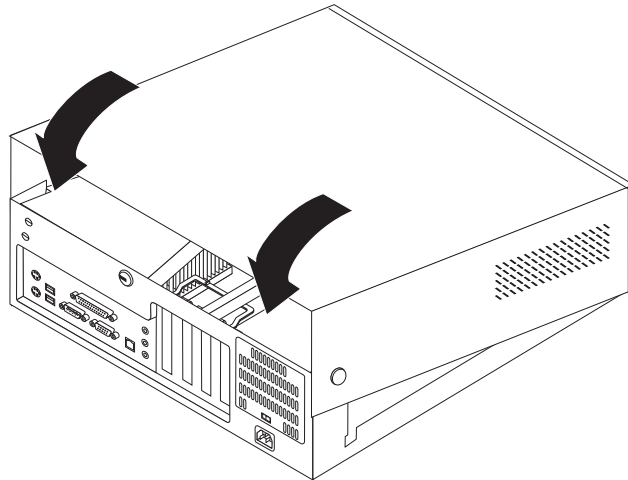
6. Reconnect the external cables and power cords, and turn on the attached devices, then the computer.

Replacing the cover

Do the following to replace the computer cover:

1. Clear any cables that might impede the replacement of the cover.
2. Install the side cover by placing it into position on the computer, with the notches on the underside of the cover matching up to the holes along the sides of the computer. Press down on the cover release latch button as you close the

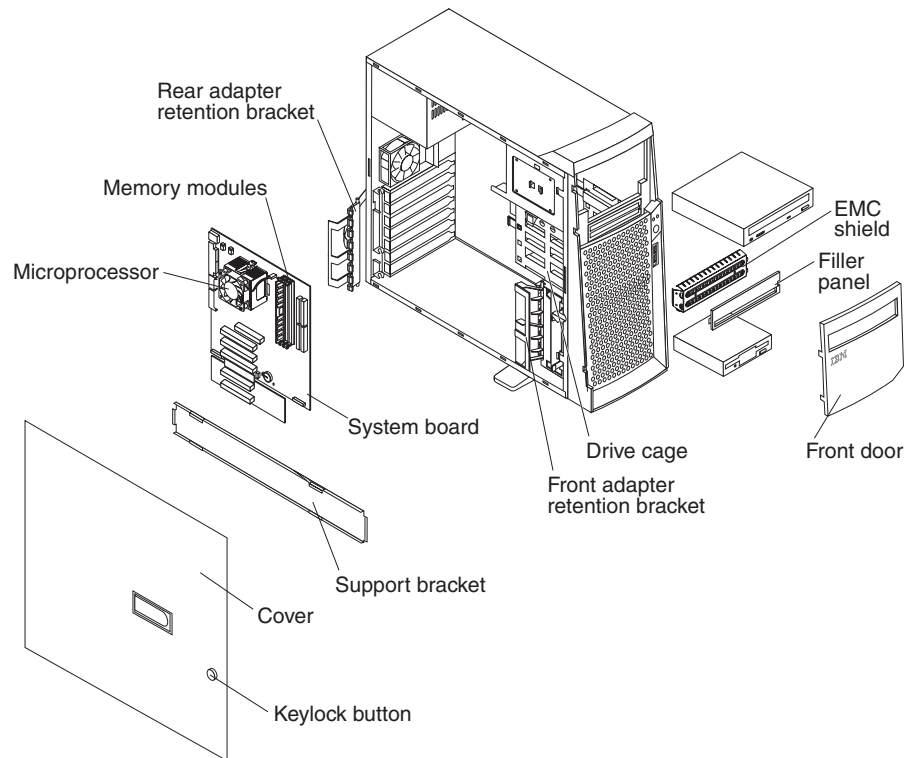
cover release latch to lock the cover.



3. Reconnect the external cables and power cords to the computer; then connect the power cords to electrical outlets.
4. Turn on the attached devices; then turn on the computer.

Tower model

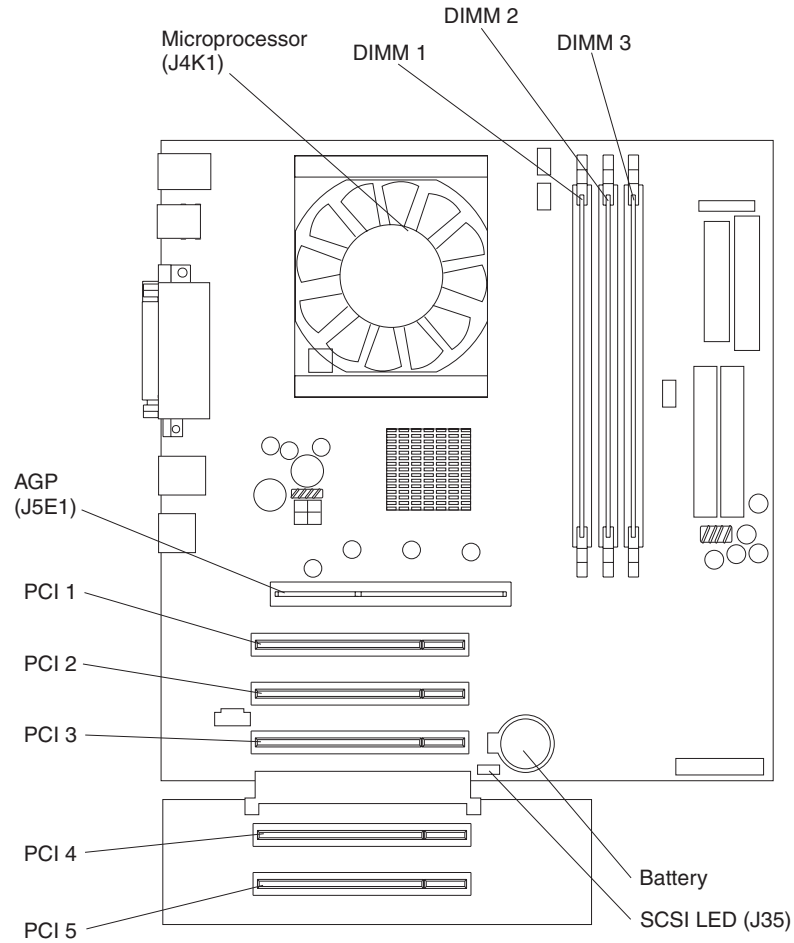
The following illustration shows the locations of major components in the tower model computer.



System and PCI extender boards

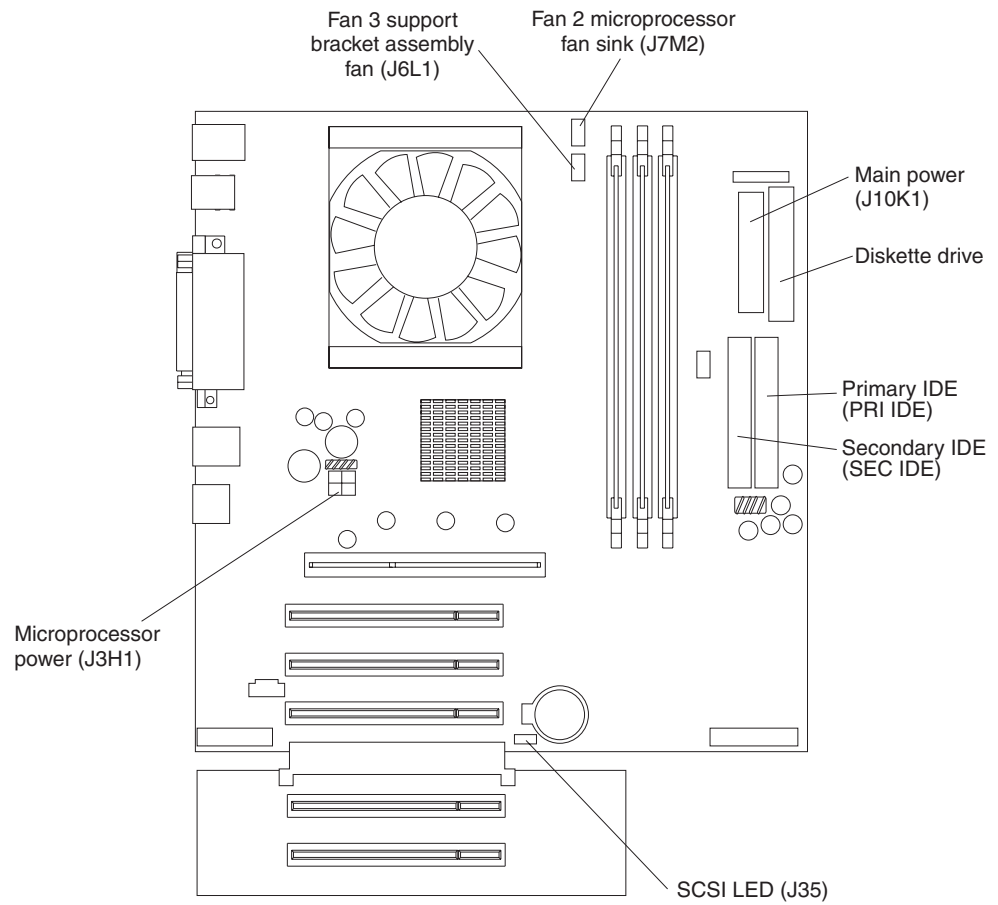
The illustrations in the following sections highlight various components on the system board.

This illustration identifies parts of the system board. Depending on installed options, the system board might look slightly different.



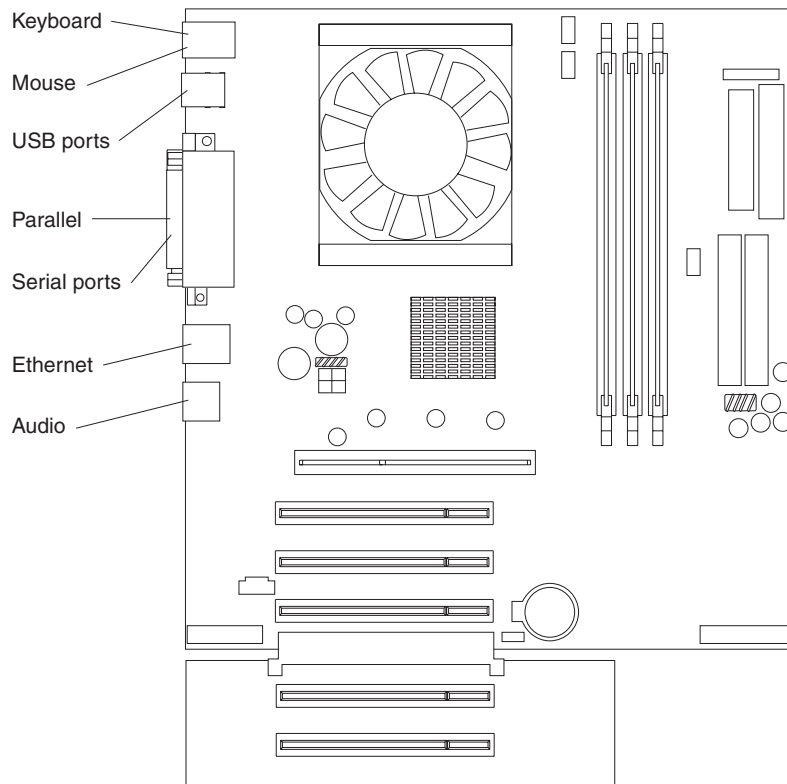
System board internal cable connectors

The following illustration identifies system board connectors for internal cables.



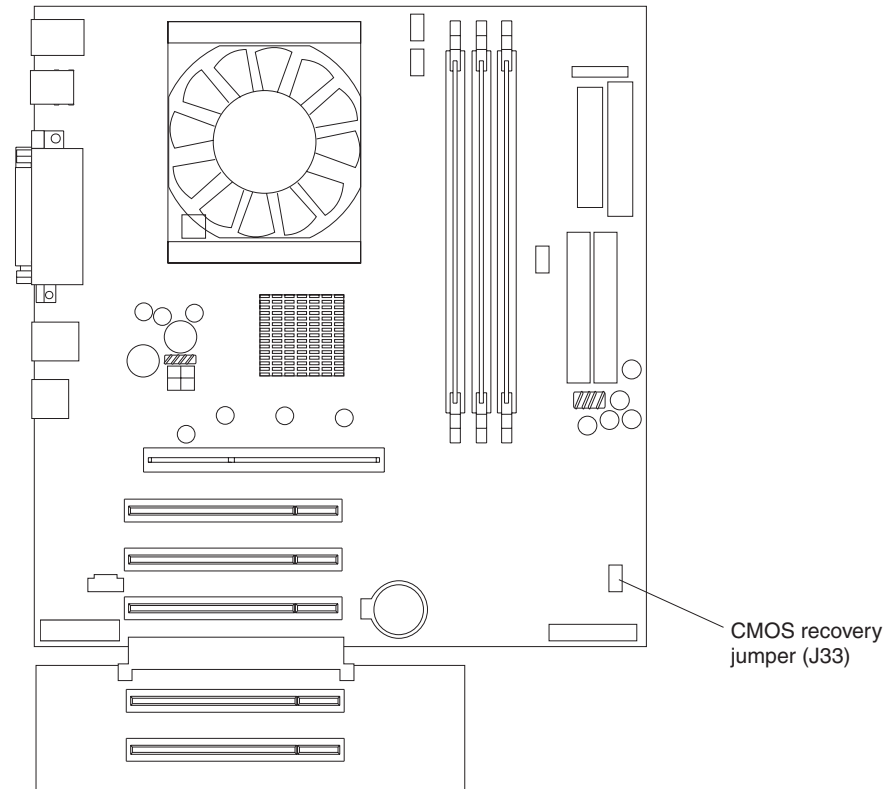
System board external cable connectors

The following illustration identifies system board connectors for external cables.



CMOS recovery jumper

The following illustration identifies the CMOS recovery jumper on the system board.



The CMOS recovery jumper can be used to clear CMOS memory in the event you lose the user password. See “Erasing a lost or forgotten password (clearing CMOS)” on page 28 for information on how to use the CMOS recovery jumper.

This jumper is also used to recover from a BIOS failure. See “Recovering from a POST/BIOS update failure” on page 29.

Installing options in a tower model

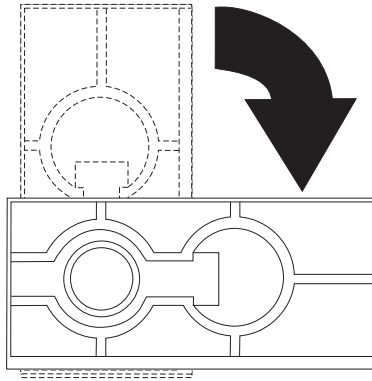
This section provides instructions for installing options in a tower model.

Moving the stabilizing feet

The two front feet attached to the bottom of the workstation rotate 90 degrees to provide additional stability.

When you need to access the inside of the workstation to install options, you might find it easier to lay the workstation on its side. If you do so, rotate the feet in towards the workstation, so they do not break off due to the weight of the

workstation.

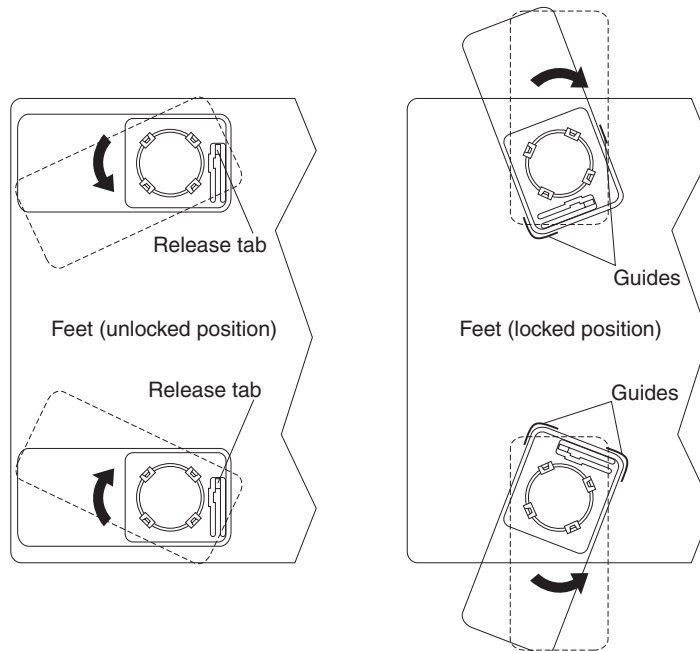


When you are finished installing options and have installed the side cover, turn the two front stabilizing feet a quarter turn out from the workstation and set it carefully back on its feet.

Stabilizing feet with release tabs: Some models have feet that utilize a release tab mechanism. The following instructions explain how to work with this type of stabilizing foot:

1. Place the computer on its side.
2. Locate the release tab inside a foot; then, lift up on the tab.
3. Rotate the foot inward to the unlocked position; then, remove the foot from the computer.
4. Align the post in the center of the foot with the hole on the bottom of the computer and place the foot between the guides indicated on the computer.

5. Rotate the foot outward until the foot locks into place.



6. Complete steps 2 on page 62 through 5 for each foot.

Side cover removal

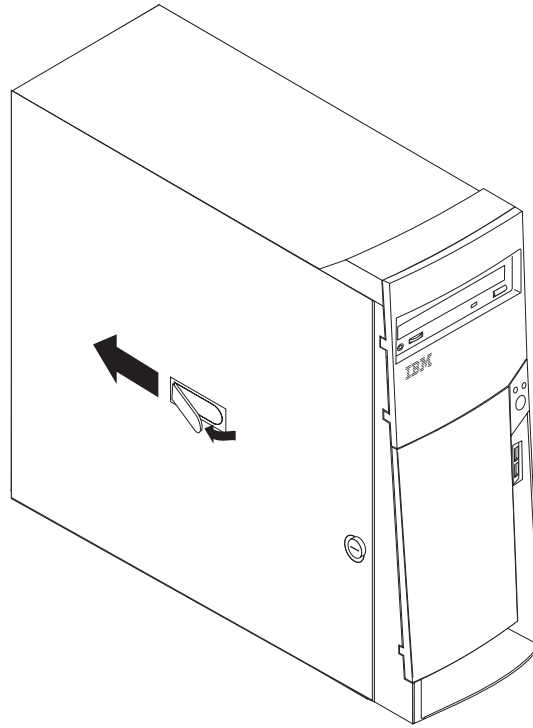
The following information describes how to remove the side cover.

Note: To remove the side cover, you might find it easier to lay the computer on its side.

Do the following to remove the side cover of the computer:

1. Review the information in "Before you begin" on page 41 and "Safety information" on page 131.
2. Turn off the computer and all attached devices.
3. Disconnect all external cables and power cords.

4. Pull the cover release latch away from the computer, and push the cover toward the rear of the computer.



To replace the side cover, see “Replacing the cover” on page 77.

Attention: For proper cooling and airflow, replace the cover before turning on the computer. Operating the computer with the cover removed might damage computer components.

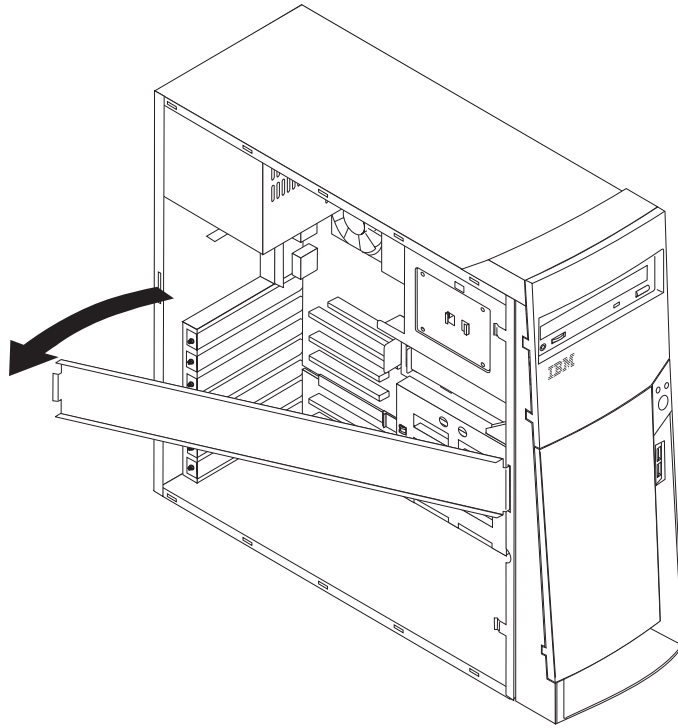
Support bracket removal

When working with some options, such as hard disk drives, adapters, and memory modules, you must first remove the support bracket to access the existing option.

Do the following to remove the support bracket:

1. Pull out on the rear end of the support bracket approximately 150 mm (6 in.).

2. Pull the rear end of the support bracket away from the computer and place the bracket aside.

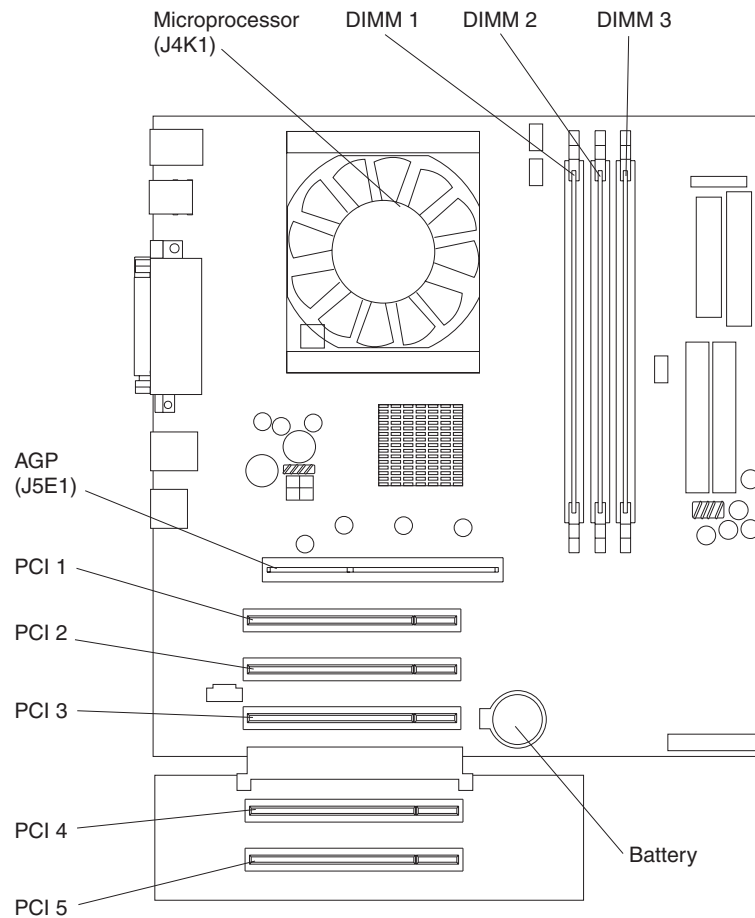


To reinstall the support bracket, reverse the previous steps.

Working with adapters

The computer comes with adapter connectors or *slots*. The AGP video adapter is installed in the AGP slot. You can install up to five PCI adapters in PCI slots 1 through 5. All PCI slots are 32-bit, 33 MHz slots.

The following illustration shows the location of expansion slots on the system board.



Adapter considerations: Before you install adapters, review the following:

- Follow the instructions that come with the adapter in addition to the instructions in this chapter. If you need to change the switch or jumper settings on the adapter, follow the instructions that come with the adapter.
- You can install full-length adapters in all five PCI slots.
- The computer supports 5.0 V and universal PCI adapters; it does not support 3.3 V adapters.
- The computer uses a rotational interrupt technique to configure PCI adapters. Because of this technique, you can install a variety of PCI adapters that currently do not support sharing of PCI interrupts.
- PCI slots 1 through 5 are on PCI bus 0.

The system scans the AGP slot and PCI expansion slots 1 through 5 to assign system resources. Then, the system starts the PCI devices in the following order, if you have not changed the default startup sequence: PCI expansion slots 1 and 2, system board integrated drive electronics (IDE) or SCSI devices, and then PCI expansion slots 3 through 5.

- For a list of supported options for the computer, refer to <http://www.ibm.com/pc/support/> on the World Wide Web.

Adapter installation: Do the following to install an adapter in the tower model:

Attention: When you handle static-sensitive devices, take precautions to avoid damage from static electricity. For details on handling these devices, see “Handling electrostatic discharge-sensitive devices” on page 134.

1. Review the information in “Safety information” on page 131.
2. Turn off the computer and all attached devices.
3. Disconnect all external cables and power cords; then remove the side cover. See “Side cover removal” on page 63.
4. Determine which PCI slot you will use for the adapter.

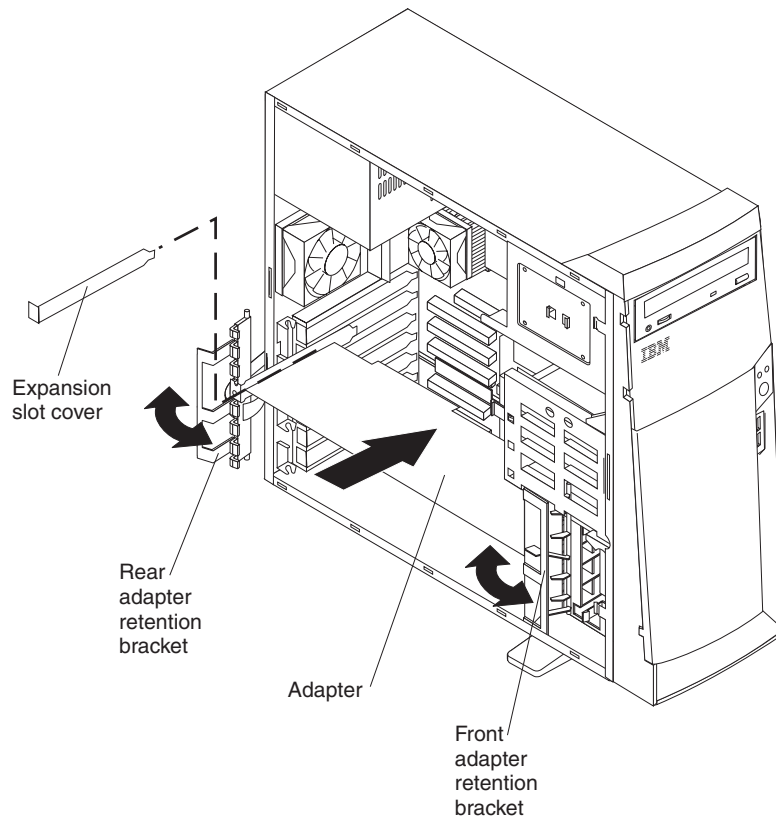
Note: Check the instructions that come with the adapter for any requirements, restrictions, or cabling instructions. It might be easier to route any cables before you install the adapter.

5. For full-length adapters, rotate the rear adapter retention bracket to the open (unlocked) position and remove it from the computer. Rotate the front adapter retention bracket to the open position. If you are installing a smaller adapter, remove only the rear retention bracket.
6. Remove the expansion-slot cover. From the rear of the computer, press on the slot cover. Grasp it and pull it out of the expansion slot. Store it in a safe place for future use.

Attention: Expansion-slot covers must be installed on all vacant slots. This maintains the electronic emissions standards of the computer and ensures proper ventilation of computer components.

7. Set any jumpers or switches on the adapter or system board as described by the adapter manufacturer.
8. Remove the adapter from the static-protective package, and carefully grasp the adapter by the top edge or upper corners, and align it with the expansion slot guides; then press the adapter firmly into place.

Attention: Be certain that the adapter is correctly seated in the expansion slot before you turn on the computer. Incomplete installation of an adapter might damage the system board or the adapter.



9. Connect required cables to the adapter. Route cables so that they do not block the flow of air from the fans.
10. If you have another adapter to install, repeat steps 1 on page 67 through 9. If you have another option to install, do so now.
11. If you have installed a full-length adapter, rotate the front adapter support bracket to the closed (locked) position.
12. Reinstall the rear adapter support bracket; then rotate the bracket to the closed (locked) position.

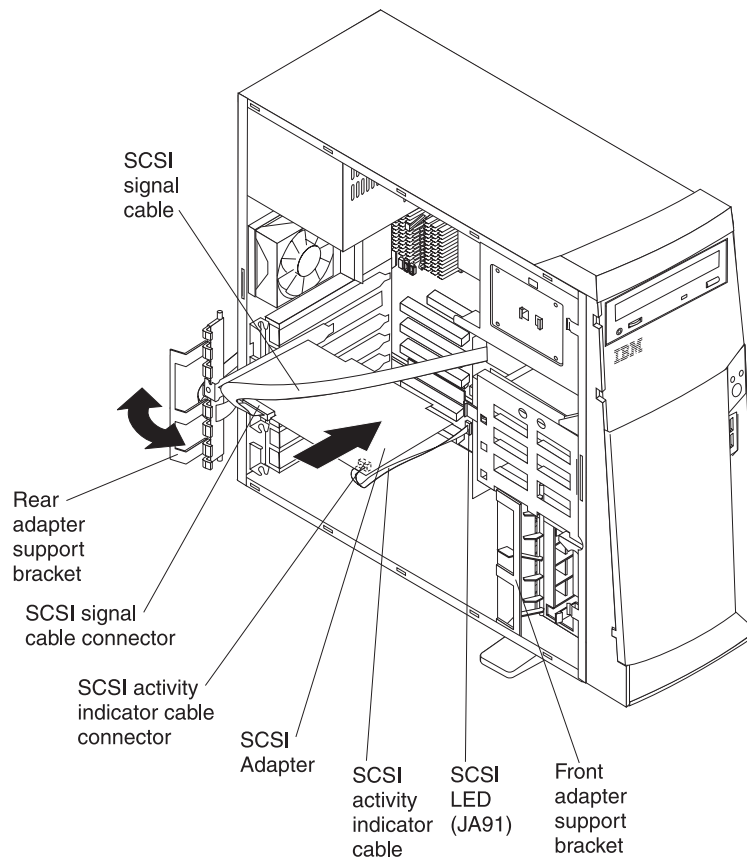
Note: The rear retaining bracket rests against the computer cover. You might find it easier to lay the computer on its side to replace the cover.

13. Replace the support bracket.
14. Replace the side cover, see "Replacing the cover" on page 77 for details.
15. Reconnect the external cables and power cords; then turn on the attached devices and the computer.

SCSI adapter installation: Some models do not come with SCSI adapters. Do the following to install an optional SCSI adapter:

1. If you do not have a preinstalled SCSI adapter, complete steps 1 on page 67 through 9 of "Adapter installation" on page 66.
2. Connect the SCSI signal cable to the adapter and one or more of the signal cable connectors to the rear of the SCSI devices.
3. Connect the SCSI activity indicator cable to the adapter and to the SCSI LED connector (J35) on the system board. See "System board" on page 43 for the

location of the SCSI LED connector.



4. If you have other adapters or options to install or remove, do so now.
5. Rotate the front adapter-support bracket to the closed (locked) position.
6. Reinstall the rear adapter-support bracket; then rotate it to the closed (locked) position.
7. Replace the support bracket.
8. Replace the cover, see "Replacing the cover" on page 77 for details.
9. Reconnect the external cables and power cords; then turn on the attached devices and the computer.

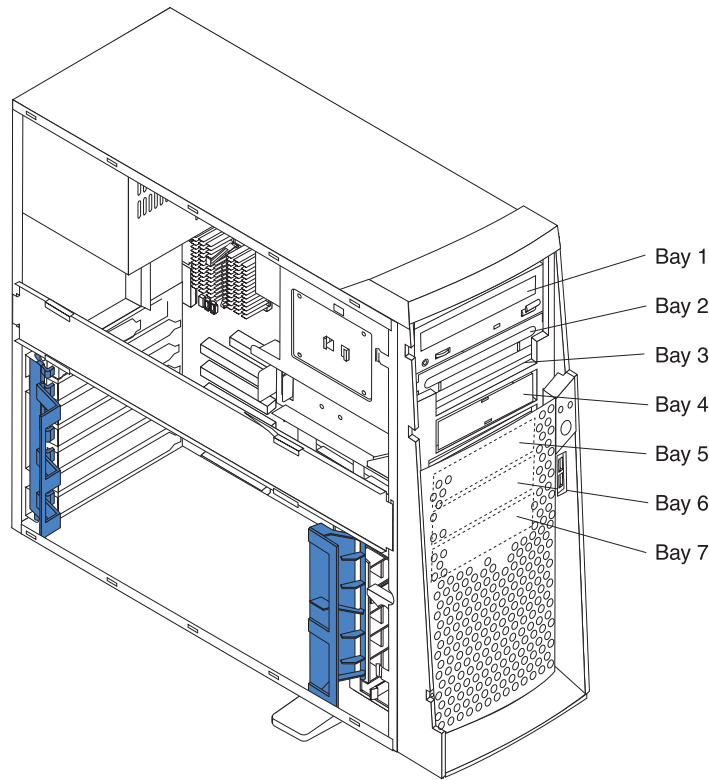
Internal drive installation

Depending on the computer model, you might have one or more of the following drives installed.

- Diskette
- Hard disk
- CD-ROM or DVD-ROM

Internal drive bays: The tower model IntelliStation E Pro computer comes with an IDE CD-ROM or DVD-ROM drive in bay 1, a 3.5-in., 1.44 MB diskette drive in

bay 3, and a hard disk drive installed in bay 4.



Notes:

1. Diskette drives, tape drives, CD-ROM, and DVD-ROM drives are examples of removable-media drives. You can install removable-media drives in bays 1, 2, 3, and 4 only.
2. You can install a 3.5-in. slim-high or a 5.25-in. half-high removable-media drive, such as a tape backup drive, in bay 2.
3. You can only install a 3.5-in. slim-high removable-media drive in bay 4.
4. The IntelliStation E Pro computer supports only one diskette drive.
5. To install a 3.5-in. drive in a 5.25-in. bay, you must use a 5.25 in. conversion kit, supplied with the option.
6. The electromagnetic interference (EMI) integrity and cooling of the computer are protected by having all bays and PCI slots covered or occupied. When you install a drive or PCI adapter, save the EMC shield and filler panel from the bay or the PCI adapter slot cover in the event you later remove the option.
7. For a complete list of supported options for the computer, refer to <http://www.ibm.com/pc/support/> on the World Wide Web.

Preinstallation steps: Before you install drives in the computer, verify that you have all the cables and other equipment specified in the documentation that comes with the drive. You might also need to perform certain preinstallation activities. Some of the steps are required only during the initial installation of an option.

1. Read "Safety information" on page 131, "Handling electrostatic discharge-sensitive devices" on page 134, and the documentation that comes with the drive.
2. Choose the bay in which you want to install the drive.

3. Check the instructions that come with the drive to see if you need to set any switches or jumpers on the drive. If you are installing a SCSI device, be sure to set the SCSI ID for that device.

Bay 2 or 4 drive installation: Do the following to install a drive in bay 2 or 4:

Attention: When handling static-sensitive devices, take precautions to avoid damage from static electricity. For details on handling these devices, see “Handling electrostatic discharge-sensitive devices” on page 134.

1. Read the information in “Preinstallation steps” on page 70.
2. Turn off the computer and attached devices and disconnect the external cables and power cords.
3. Remove the side cover. See “Side cover removal” on page 63 for details.)
4. Remove the support bracket. See “Support bracket removal” on page 64 for details.
5. Use a screwdriver to pry the filler panel and EMC shield away from the computer.

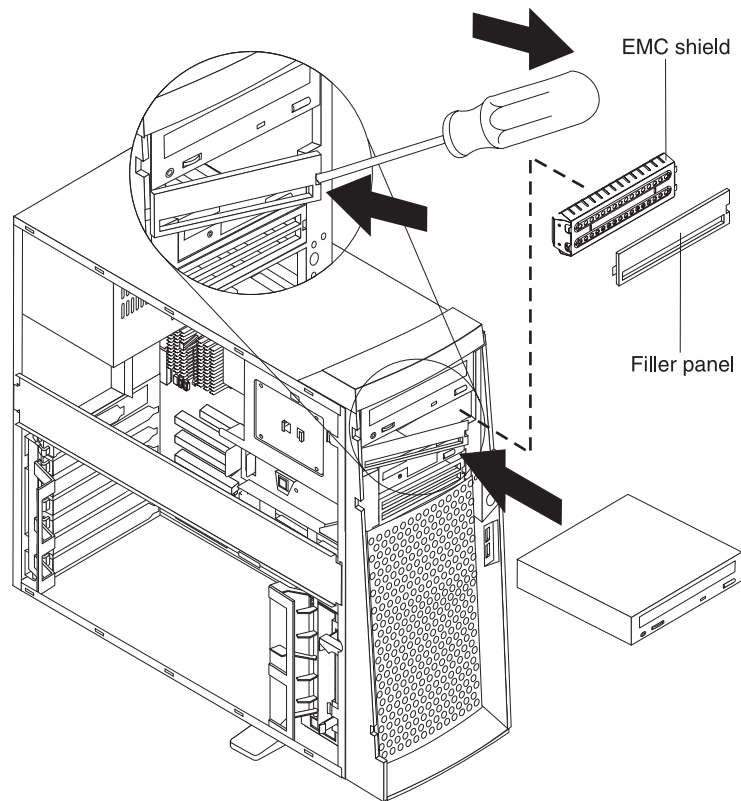
Note: If you are installing a drive that contains a laser, observe the following safety precaution.

DANGER

Laser radiation when open. Do not stare into the beam. Do not view directly with optical instruments. Avoid direct exposure to the beam.

6. Touch the static-protective bag containing the drive to any unpainted metal surface on the computer; then remove the drive from the bag and place it on a static-protective surface.
7. Set any jumpers or switches on the drive according to the documentation that comes with the drive.
8. You might find it easier to install the new drive into the appropriate opening on the front, and then attach the cables.
9. If you are installing a 5.25-in. drive in bay 2, push the drive into the bay; then use the two screws to attach the drive to the drive cage.
10. If you are installing a 3.5-in. drive in bay 2, you must attach the 5.25-in conversion kit, supplied with the option, to the 3.5-in. drive.

Note: You can install only a 3.5-in. device in bay 4.



11. If the drive is an IDE device, connect one end of the IDE signal cable into the back of the drive and the other end of the cable into the IDE connector on the system board. For the location of the IDE connectors, see “System board internal cable connectors” on page 44. If the drive is a SCSI device, connect one end of the SCSI signal cable into the back of the drive and the other end of the cable into the 68-pin connector on the SCSI adapter.

Note: Route the signal cable so that it does not block the air flow to the rear of the drives or over the microprocessor.

12. Connect the power cable to the back of the drive. The connectors are keyed and can be inserted only one way.
13. If you have other options to install or remove, do so now.
14. Replace the support bracket.
15. Replace the side cover, see “Replacing the cover” on page 77 for details.
16. Reconnect the external cables and power cords; then turn on the attached devices and the computer.

Bay 5, 6 or 7 installation: Bays 5, 6, and 7 are in the drive cage. The drive cage is located just above the front adapter-support bracket.

Note: You might find it useful to work with the computer laying on its side.

To install a drive in bay 5, 6, or 7, do the following:

1. Read the information in “Preinstallation steps” on page 70.
2. Turn off the computer and all attached devices. Disconnect all external cables and power cords; then remove the cover. See “Side cover removal” on page 63 for details.

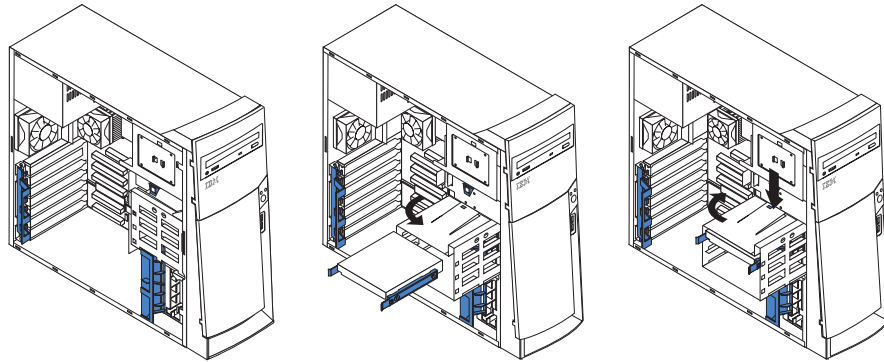
3. Remove the support bracket.
4. If the computer has hard disk drives preinstalled in the drive cage, disconnect the power and signal cables from the rear of the drives.
5. Grasp the drive cage and rotate the cage out (middle view) of the computer until it locks into place with the drive-cage retention tab. The open ends of the drive slots and installed drives will face you.

Note: Ensure that the drive cage locks into place over the drive-cage retention tab by pressing the drive cage all the way up.

6. Attach the guide rails to the side of the drive using the screws and blue rails provided in the drive cage.
7. Slide the drive into the drive cage until the plastic tabs on the drive guide rails lock into place in the drive cage.

Note: Clear any cables that might impede the replacement of the drive cage.

8. Lift the drive cage up, and press in on the drive-cage release tab; then rotate the cage back into the computer (right view).



9. Connect the power and signal cables to the rear of each drive.

Note: Route the signal cable so that it does not block the air flow to the rear of the drives or over the microprocessor.

10. If you have other options to install or remove, do so now.
11. Replace the support bracket.
12. Replace the side cover, see "Replacing the cover" on page 77 for details.
13. Reconnect the external cables and power cords; then turn on the attached devices and the computer.

Power and signal cables for internal drives: The computer uses cables to connect IDE and SCSI devices to the power supply and to the system board. The following cables are provided:

- Four-wire power cables connect the drives to the power supply. At the end of these cables are plastic connectors that attach to different drives; these connectors vary in size. Also, certain power cables attach to the system board.
- Flat signal cables, also called ribbon cables, connect IDE, SCSI, and diskette drives to the system board. Two or three sizes of ribbon cables come with the computer.
 - The wider IDE signal cable has two or three connectors.
 - If the cable has three connectors, one of these connectors is attached to the drive, one is a spare, and the third attaches to the primary or secondary IDE connector on the system board.

- If the cable has two connectors, one of these connectors is attached to the hard disk drive, and the other attaches to the primary or secondary IDE connector on the system board.

Note: The CD-ROM drive is attached to an ATA 66 signal cable. ATA 66 signal cables are color-coded. The blue connector attaches to the system board. The black connector attaches to the primary device. The gray middle connector attaches to the secondary device. If you are installing a hard disk drive, you must change the switch or jumper setting on the CD-ROM drive to secondary and change the connector used for the CD-ROM drive to the gray middle connector.

- The narrower signal cable has two connectors, one to attach to the diskette drive, and the other to attach to the connector (FDD1) on the system board.
- If the computer comes with a SCSI adapter and SCSI hard disk drive, the following cables can be used to attach SCSI devices to the SCSI host adapter:
 - An Ultra160 twisted ribbon cable connects the internal Ultra160 SCSI hard disk drive to the SCSI connector on the SCSI adapter. This cable has five additional connectors for attaching more internal SCSI devices.
 - A round SCSI cable connects external SCSI devices to the SCSI adapter so that you can add external SCSI devices. For more information about connecting SCSI devices, see the SCSI documentation on the *Software Selections* CD that comes with the computer.

Note: To locate connectors on the system board, see “System board internal cable connectors” on page 44.

Review the following information before connecting power and signal cables to internal drives:

- The drives that are preinstalled in the computer come with power and signal cables attached. If you replace any drives, it is important to remember which cable is attached to which drive.
- When you install a drive, ensure that the drive connector at the end of the signal cable is connected to the drive and that the drive connector at the other end is connected to the system board. This reduces electronic noise from the computer.
- If two IDE devices are used on a single cable, one must be designated as the primary device and the other as the secondary device; otherwise, the computer might not recognize some of the IDE devices. The primary and secondary designation is determined by switch or jumper settings on each IDE device.
- If two IDE devices are on a single cable, and only one is a hard disk drive, the hard disk drive must be set as a primary device.
- If you have only one IDE device on a cable, it must be set as a primary device.

Memory module installation

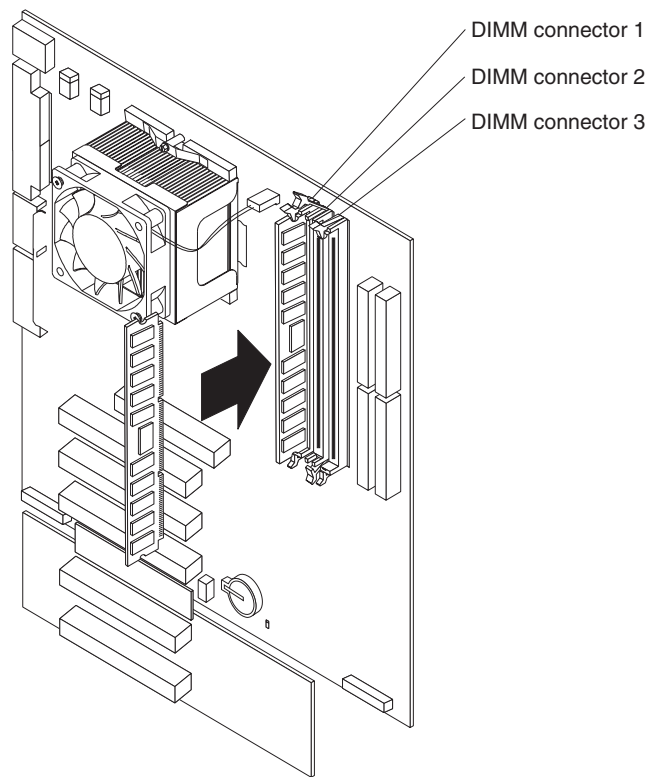
Adding memory to the computer is an easy way to make programs run faster. You can increase the amount of memory in the computer by installing memory modules. The IntelliStation E Pro computer uses industry-standard dual inline memory modules (DIMMs).

Do the following to install a DIMM:

Attention: When handling static-sensitive devices, take precautions to avoid damage from static electricity. For details on handling these devices, see “Handling electrostatic discharge-sensitive devices” on page 134.

1. Review the safety precautions listed in the “Safety information” on page 131.

2. Turn off the computer and all attached devices. Disconnect all external cables and power cords; then remove the cover. See “Side cover removal” on page 63 for details.
3. Remove the support bracket. See “Support bracket removal” on page 64.
4. Touch the static-protective package containing the DIMM to any unpainted metal surface on the computer. Then remove the new DIMM from the package.
5. Open the retaining clips and, if necessary, remove any existing DIMM.
6. Gently open the retaining clip on each end of the DIMM slot. Turn the DIMM so that the pins align correctly with the connector.
7. Insert the DIMM into the connector. Firmly press the DIMM straight down into the connector by applying pressure on both ends of the DIMM simultaneously. The retaining clips snap into the locked position when the DIMM is firmly seated in the connector.



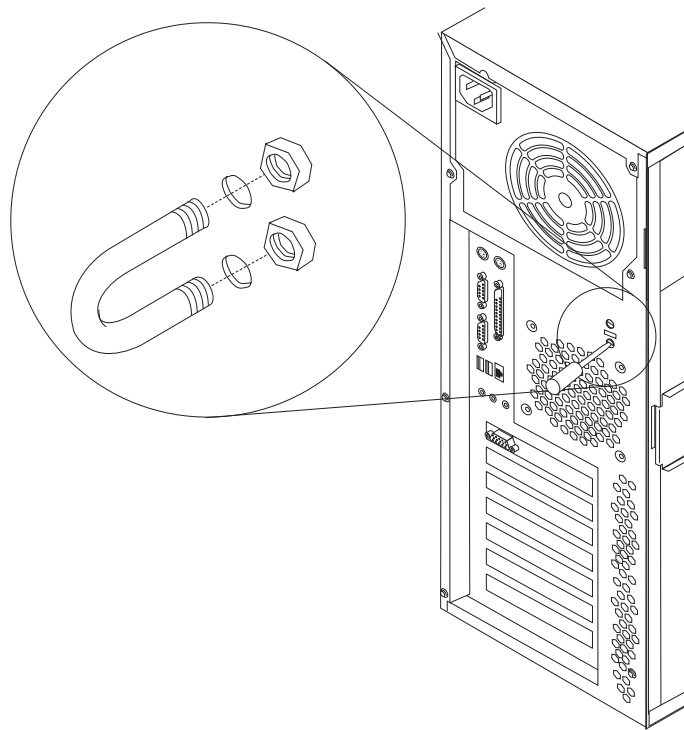
8. If a gap exists between the DIMM and the retaining clips, the DIMM has not been correctly installed. Open the retaining clips, remove the DIMM, then reinsert it.
9. If you have other options to install or remove, do so now.
10. Replace the support bracket.
11. Replace the side cover, see “Replacing the cover” on page 77.
12. Reconnect the external cables and power cords, turn on the attached devices, and then turn on the computer.

Security U-bolt installation

To help prevent theft, you can add a security U-bolt and cable to the computer. This section discusses how to install a security U-bolt.

Do the following to install the U-bolt:

1. Review the safety precautions listed in "Safety information" on page 131.
2. Turn off the computer and all attached devices. Disconnect all external cables and power cords; then remove the cover. See "Removing the cover" on page 45 or "Side cover removal" on page 63 for details.
3. Use a screwdriver to remove the two metal knockouts.
4. Insert the U-bolt through the rear panel; then attach and tighten the nuts.
5. Thread the cable through the U-bolt and around an object that is not part of or permanently secured to the building structure or foundation, and from which the cable cannot be removed. Fasten the cable ends together with a lock. After you add the security cable, be certain it does not interfere with other cables connected to the computer.



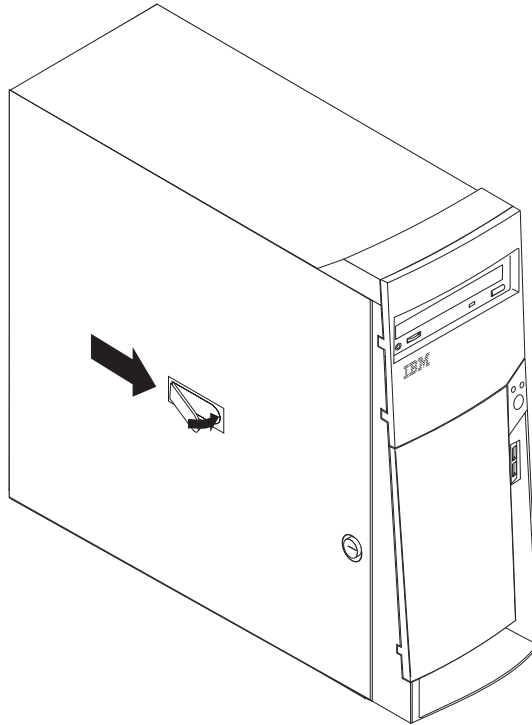
6. Reconnect the external cables and power cords, turn on the attached devices, and then turn on the computer.

Replacing the cover

Do the following to replace the cover of the tower model:

Note: If you removed the support bracket, reinstall it before you replace the cover. See “Support bracket removal” on page 64 for details.

1. Clear any cables that might impede the replacement of the cover.
2. Install the side cover by placing it into position on the computer. Be certain the notches on the underside of the cover match up to the holes along the sides of the computer. Press down on the cover release latch button as you close the cover release latch to lock the cover.



3. If you have not done so already, make sure that the two front stabilizing feet are rotated outward so that they properly support the computer. Rotate each individual foot outward 90 degrees.
4. Reconnect the external cables and power cords to the computer; then connect the power cords to electrical outlets.
5. Turn on the attached devices; then turn on the computer.

Connecting external options

You can connect a number of optional external devices to the connectors on the rear and front of the computer. If the computer comes with a SCSI adapter installed, you can attach a SCSI storage expansion enclosure to the computer.

To attach an external device:

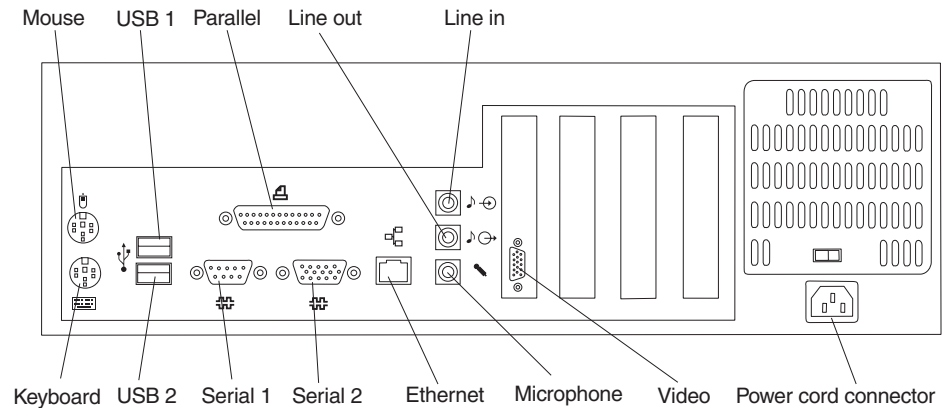
1. Read “Before you begin” on page 41, review the safety precautions listed in Statement 1 and Statement 5 in “Safety notices (multi-lingual translations)” on page 135, and read the documentation that comes with the options.
2. Be sure that the computer and all attached devices are turned off.
3. Follow the instructions that come with the option to prepare it for installation and to connect it to the computer.

Note: If you are attaching a SCSI device, see “Ultra160 SCSI connector” on page 83 for SCSI ID and cabling information.

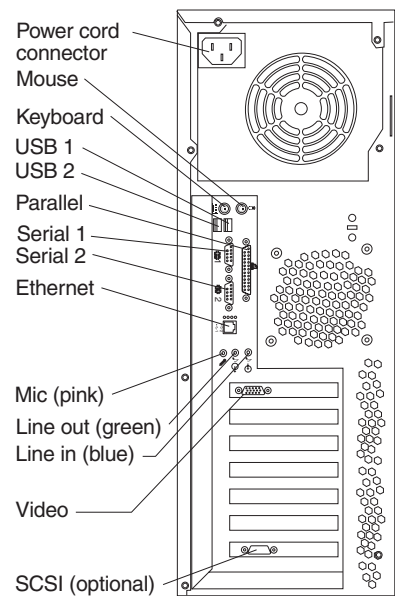
Input/output connector locations

The following illustrations show the input/output connectors and the expansion slots on the rear of the computer.

Desktop model



Tower model



Input/output connectors

This section provides pin and other information about the input/output connectors on the rear of the computer. Refer to “Controls and indicators” on page 8. These connectors are:

- One mouse
- One keyboard
- One parallel
- Two serial
- One Ethernet
- Two USB
- Line in

- Line out
- Microphone
- One video (optional multiple connectors on some models)
- One Ultra160 SCSI (some models)

Video connector

The computer uses an AGP adapter located in the AGP slot on the system board. The video connector is on the adapter and is located on the rear of the computer. See “Input/output connectors” on page 78 for the location of this connector.

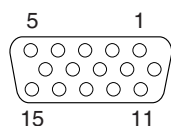


Table 8. Monitor connector-pin assignments

Pin	Signal	I/O	Pin	Signal	I/O
1	Red	O	9	+5 V dc, used by DDC2B	
2	Green	I	10	Ground	
3	Blue	O	11	Monitor ID 0 – not used	
4	Monitor ID 2 – not used	I	12	DDC2B data	I/O
5	Ground		13	Horizontal sync	O
6	Red ground		14	Vertical sync	O
7	Green ground		15	DDC2B clock	I/O
8	Blue ground				

Some models come with a digital video interface (DVI) connector for connecting a digital monitor.

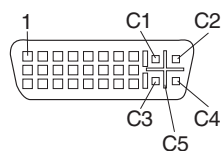


Table 9. DVI monitor connector-pin assignments

Pin	Signal description	Pin	Signal description
1	TMDS Data2-	16	Hot plug detect
2	TMDS Data2+	17	TMDS Data0-
3	Data2/4 shield	18	TMDS Data0+
4	TMDS Data4-	19	Data0/5 shield
5	TMDS Data4+	20	TMDS Data5-
6	DDC clock	21	TMDS Data5+
7	DDC Data	22	Clock shield
8	Analog VSync	23	TMDS clock+
9	PMDS Data1-	24	TMDS Clock-
10	TMDS Data1+	C1	Analog red
11	Data1/3 shield	C2	Analog green
12	TMDS Data3-	C3	Analog blue

Table 9. DVI monitor connector-pin assignments (continued)

Pin	Signal description	Pin	Signal description
13	TMDS Data3+	C4	Analog HSync
14	+5 V power	C5	Analog ground
15	Ground (for +5 V)		

Keyboard connector

The computer has one keyboard connector. See “Input/output connectors” on page 78 for its location.

Note: If you attach a standard (non-USB) keyboard to the keyboard connector, the USB ports and devices are disabled during the power-on self-test (POST).

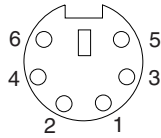


Table 10. Keyboard-connector (6-pin female) pin-number assignments

Pin	I/O	Signal
1	I/O	Data
2	N/A	Reserved
3	N/A	Ground
4	N/A	+5 V dc
5	I/O	Keyboard clock
6	N/A	Reserved

Mouse connector

The computer has one mouse connector that supports a mouse or other pointing device. The mouse connector is located on the rear of the computer. For the location, see “Input/output connectors” on page 78.

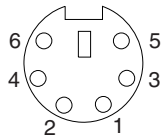


Table 11. Auxiliary or pointing-device connector (6-pin female) pin-number assignments

Pin	Signal
1	Data
2	Not connected
3	Ground
4	+5 V dc
5	Clock
6	Not connected

Parallel connector

The computer has one parallel connector. This connector supports three standard Institute of Electrical and Electronics Engineers (IEEE) 1284 modes of operation: standard parallel port (SPP), enhanced parallel port (EPP), and extended capability port (ECP).

Viewing or changing the connector assignments: Use the IBM Setup Utility program to configure the parallel connector as bi-directional. With this configuration, data can be read from and written to a device. In bidirectional mode, the computer supports the ECP and EPP modes.

Do the following to view or change the parallel-connector assignment:

1. Restart the computer.
2. Press and hold the F1 key to launch the IBM Setup Utility program.
3. On the IBM Setup Utility menu, use the cursor keys on the keyboard to select **Devices/Parallel Port**.

Note: When you configure the parallel connector as bi-directional, use an IEEE 1284-compliant cable. The cable must not exceed 3 meters (9.8 ft.).

4. Follow the instructions on the screen to save the changes and exit from the IBM Setup Utility menu.

Parallel connector pin-assignments: There is a 25-pin, female D-shell parallel connector on the rear of the computer, see "Input/output connectors" on page 78 for the location of this connector.

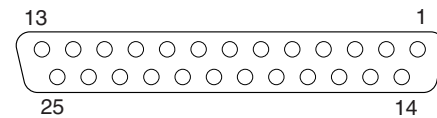


Table 12. Parallel connector-pin assignments

Pin	Signal	I/O	Pin	Signal	I/O
1	STROBE#	I/O	14	AUTO FD XT#	O
2	Data bit 0	I/O	15	ERROR#	I
3	Data bit 1	I/O	16	INIT#	O
4	Data bit 2	I/O	17	SLCT IN#	O
5	Data bit 3	I/O	18	Ground	
6	Data bit 4	I/O	19	Ground	
7	Data bit 5	I/O	20	Ground	
8	Data bit 6	I/O	21	Ground	
9	Data bit 7	I/O	22	Ground	
10	ACK#	I	23	Ground	
11	BUSY	I	24	Ground	
12	PE	I	25	Ground	
13	SLCT	I			

Serial connectors

The computer has two standard 9-pin D-shell serial connectors: Serial connector 1 and Serial connector 2. See “Input/output connectors” on page 78 for their location.

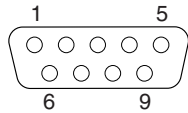


Table 13. Serial-port connectors pin-number assignments

Pin	Signal	Pin	Signal
1	Data carrier detect	6	Data set ready
2	Receive data	7	Request to send
3	Transmit data	8	Clear to send
4	Data terminal ready	9	Ring indicator
5	Signal ground		

Ethernet connector

The computer comes with an integrated Ethernet controller. This controller provides an interface for connecting to 10-Mbps or 100-Mbps networks and provides full-duplex capability, which enables simultaneous transmission and reception of data on an Ethernet local area network (LAN).

To access the Ethernet connector, attach a Category 3, 4, or 5 unshielded twisted-pair (UTP) cable to the RJ-45 connector on the rear of the computer, see “Input/output connectors” on page 78.

Important: To operate the computer within FCC Class A or Class B limits, use a category 5 Ethernet cable.

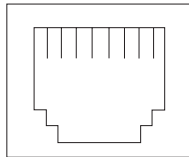


Table 14. Ethernet RJ-45 connector pin-number assignments

Pin	Signal	Pin	Signal
1	Transmit data+	5	Not connected
2	Transmit	6	Receive data –
3	Receive data+	7	Not connected
4	Not connected	8	Not connected

Universal Serial Bus connectors

The computer has two Universal Serial Bus (USB) connectors for optional telephony and multimedia devices. USB devices configure automatically with Plug and Play technology.

Notes:

1. If you attach a standard (non-USB) keyboard to the keyboard connector, the USB connectors and devices will be disabled during the power-on self-test.

- If you install a USB keyboard that has a mouse connector, the USB keyboard emulates a mouse, and you will not be able to disable the mouse settings in the IBM Setup Utility program.

USB cables: Use a 4-pin USB cable to connect external devices to USB connectors.

USB technology transfers data at up to 12 megabits per second (Mbps) with a maximum of 127 external devices and a maximum signal distance of 5 meters (16 ft) per segment.

USB connectors: See “Input/output connectors” on page 78 for the location of the USB connectors.

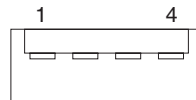
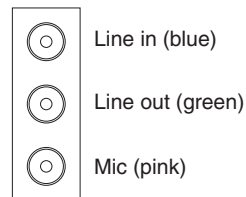


Table 15. USB-port connector pin-number assignments

Pin	Signal
1	VCC
2	-Data
3	+Data
4	Ground

Audio connectors

The audio connectors are used to connect external audio equipment to the computer. See “Input/output connectors” on page 78 for the location of these connectors.



Line out: This connector is used to send audio signals from the computer to external devices, such as powered speakers with built-in amplifiers, headphones, multimedia keyboards, or the audio Line in connector on a stereo system.

Note: The internal speaker in the computer is disabled when any device is attached to this connector.

Line in: This connector is used to accept audio signals from external devices, such as line output from external audio equipment into the computer sound system.

Microphone: This connector is used to connect a microphone to the computer when you want to record sounds on the hard-disk drive or use speech recognition software.

Ultra160 SCSI connector

Some computer models come with a SCSI adapter, which supports an Ultra160 SCSI internal channel in a full-featured PCI 2.1-/2.2-compliant bus master package. This configuration supports zero wait state, 32-bit memory transfers at 160 MB per

second, when low voltage differential (LVD) SCSI peripherals are attached. This channel supports up to 15 SCSI devices. In addition, this adapter uses:

- Double-transition clocking to achieve high transfer rates
- Domain name validation to negotiate compatible data transfer speeds with each device
- Cyclic-redundancy checking for improved data reliability

SCSI cabling requirements: If the computer comes with a SCSI adapter, you can install five internal or external SCSI devices using the SCSI signal cable that comes with the computer. If you plan to attach external SCSI devices, you must order an additional SCSI cable. To select and order the correct cables for use with external devices, contact the IBM reseller or IBM marketing representative. To receive an indication of SCSI hard-disk drive activity, you must also connect the SCSI adapter to the SCSI LED (J35) connector on the system board. See “System board” on page 43 for the location of the SCSI connector.

Setting SCSI IDs: Each SCSI device connected to a SCSI controller must have a unique SCSI ID. This ID enables the SCSI controller to identify the device and ensure that different devices on the same SCSI channel do not attempt to transfer data simultaneously. SCSI devices that are connected to different SCSI channels can have duplicate SCSI IDs. Refer to the information that is provided with the device for instructions on setting its SCSI ID. With a SCSI adapter installed in the computer, you can use its 68-pin SCSI connector to connect different types of SCSI devices.

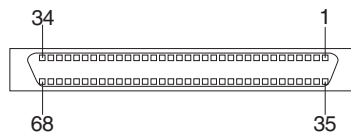


Table 16. SCSI connector-pin assignments

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	+DB (12)	18	TERMPWR	35	-DB (12)	52	TERMPWR
2	+DB (13)	19	RESERVED	36	-DB (13)	53	GROUND
3	+DB (14)	20	GROUND	37	-DB (14)	54	GROUND
4	+DB (15)	21	+ATN	38	-DB (15)	55	-ATN
5	+DB (P1)	22	GROUND	39	-DB (P1)	56	GROUND
6	+DB (0)	23	+BSY	40	-DB (0)	57	-BSY
7	+DB (1)	24	+ACK	41	-DB (1)	58	-ACK
8	+DB (2)	25	+RST	42	-DB (2)	59	-RST
9	+DB (3)	26	+MSG	43	-DB (3)	60	-MSG
10	+DB (4)	27	+SEL	44	-DB (4)	61	-SEL
11	+DB (5)	28	+C/D	45	-DB (5)	62	-C/D
12	+DB (6)	29	REQ	46	-DB (6)	63	-REQ
13	+DB (7)	30	+I/O	47	-DB (7)	64	-I/O
14	+DB (P)	31	+DB (8)	48	-DB (P)	65	-DB (8)
15	GROUND	32	+DB (9)	49	GROUND	66	-DB (9)
16	DIFFSENS	33	+DB (10)	50	GROUND	67	-DB (10)
17	TERMPWR	34	+DB (11)	51	TERMPWR	68	-DB (11)

To install SCSI devices, you must have an optional PCI SCSI adapter installed. Refer to the information that is provided with the device for instructions to set its SCSI ID.

FRU information (service only)

Desktop model	87	Bezel	94
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Air baffle	87	Fan	95
Fan	88	Handle cap	96
Power/LED switch.	88	Hard drive cage	97
Power supply	89	PCI extender board.	97
Processor / fan sink	89	Power/LED switch.	98
Speaker.	90	Power supply	99
System board.	91	Processor / fan sink	100
Tower model	92	Speaker	101
Adapter fan	92	System board	102
Adapter guide	93	Top/side cover	104
Adapter retainer.	93		

Field Replacement Units (FRUs) should be replaced by qualified service personnel only.

Desktop model

The following section contains information on removing components of the desktop model.

Adapter retainer

To remove the adapter retainer, do the following:

Note: Read “Before you begin” on page 41 and the safety notices at “Safety notices (multi-lingual translations)” on page 135.
--

1. Power-off the computer and remove external cables.
2. Remove the cover and support bracket (see “Removing the cover” on page 45 and “Removing the frame support bracket” on page 46).
3. Remove the air baffle (see “Air baffle”).
4. Disconnect all adapter cards from the system board and remove them from the computer (see “Adapter installation” on page 48).
5. Pull the adapter retainer away from the chassis.
6. To install the adapter retainer, reverse the previous steps.

Air baffle

To remove the air baffle, do the following:

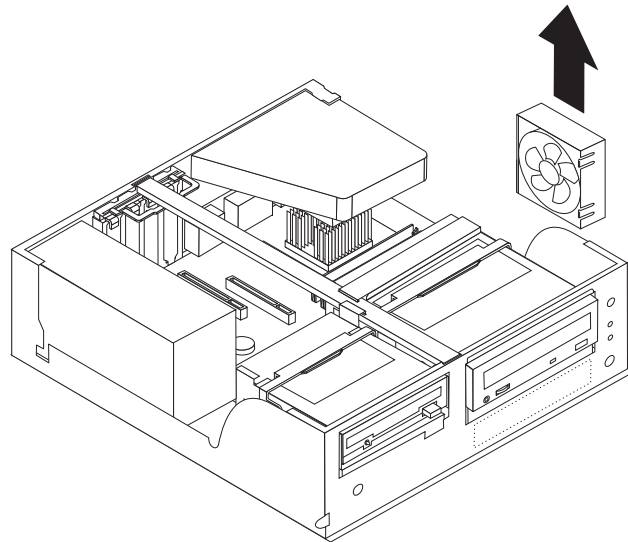
1. Power-off the computer and remove external cables.
2. Remove the cover and support bracket (see “Removing the cover” on page 45 and “Removing the frame support bracket” on page 46).
3. Grasp the air baffle on the top and bottom of the wide end and squeeze gently, then pull the baffle up and away from the back of the chassis.
4. When the baffle is free of the back of the chassis, lift it out of the workstation.

Fan

To remove the fan, do the following:

Note: Read “Before you begin” on page 41 and the safety notices at “Safety notices (multi-lingual translations)” on page 135.

1. Power-off the computer and remove external cables.
2. Remove the cover and support bracket (see “Removing the cover” on page 45 and “Removing the frame support bracket” on page 46).
3. Remove the air baffle (see “Air baffle” on page 87).
4. Disconnect the fan cable from the system board.
5. For the desktop model, push in on the two tabs on the front of the chassis to release the fan.



6. Pull the fan up and out of the chassis.
7. To install the rear fan, reverse the previous steps.

Power/LED switch

To remove the power/LED switch, do the following:

Note: Read “Before you begin” on page 41 and the safety notices at “Safety notices (multi-lingual translations)” on page 135.

1. Power-off the computer and remove external cables.
2. Remove the cover and support bracket (see “Removing the cover” on page 45 and “Removing the frame support bracket” on page 46).
3. Swing the CD-ROM drive cage up.
4. Disengage the lower tab of the power/LED switch by pressing upward on the lower tab of the power/LED switch until it comes loose.

Note: It may be necessary to use the tip of a screwdriver to disengage the lower tab.

5. Push inward on the two tabs of the top section of the power/LED switch until it pops free of the chassis; then, remove it from the computer, making sure that the cable follows freely.

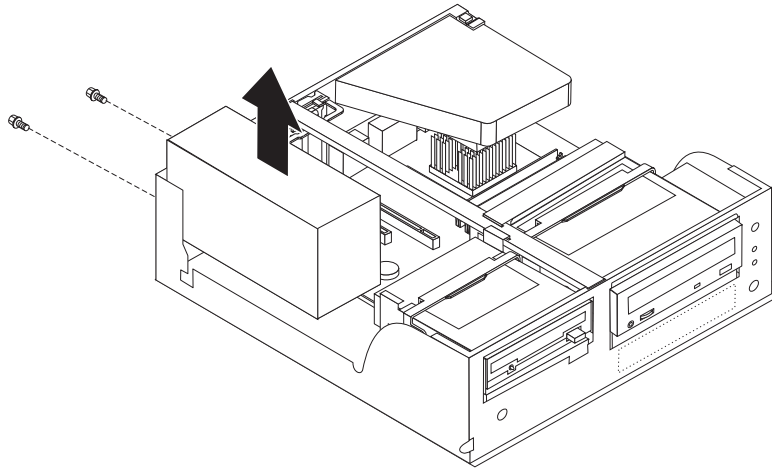
6. To install the power/LED switch, reverse the previous steps.

Power supply

To remove the power supply, do the following:

Note: Read "Before you begin" on page 41 and the safety notices at "Safety notices (multi-lingual translations)" on page 135.

1. Power-off the computer and remove external cables.
2. Remove the cover and support bracket (see "Removing the cover" on page 45 and "Removing the frame support bracket" on page 46).
3. Swing the floppy disk drive cage up.
4. Disconnect the internal power supply cables.



5. Remove the two screws that secure the power supply to the chassis.
6. Lift the power supply out of the chassis.
7. To replace the power supply, reverse the previous steps.

Processor / fan sink

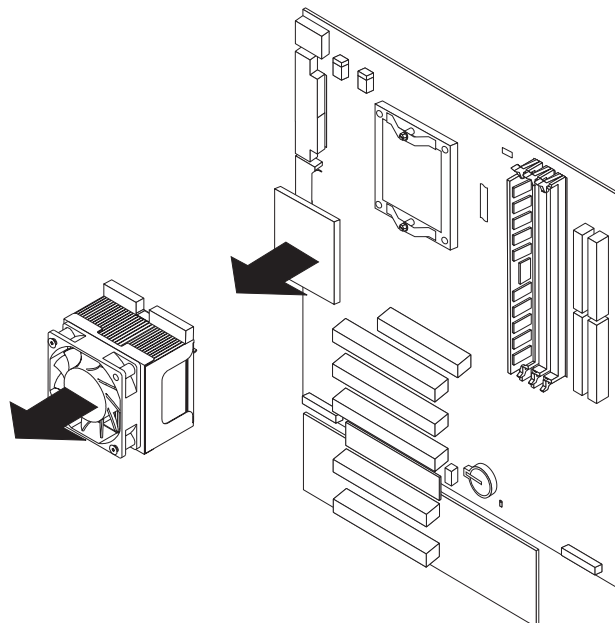
To remove the processor and fan sink, do the following:

Note: Read "Before you begin" on page 41 and the safety notices at "Safety notices (multi-lingual translations)" on page 135.

1. Power-off the computer and remove external cables.
2. Remove the cover and support bracket (see "Removing the cover" on page 45 and "Removing the frame support bracket" on page 46).
3. Remove the air baffle (see "Air baffle" on page 87).
4. Swing the CD-ROM drive cage up (see "CD-ROM or diskette drive installation" on page 51).
5. Disconnect any cables that impede access to the processor.
6. Remove fan sink from processor:

Note: The fansink and underlying heatsink are attached and do not need to be separated from each other. Remove the fansink/heatsink assembly from the processor as a single unit.

- a. Detach the fan sink cable.



- b. Loosen the two captive screws on either side (in leaf spring enclosures) of the fansink.
- c. With the two captive screws loosened, pivot the leaf spring assemblies outward and out of the notches on the fansink assembly.
- d. Lift the fan sink up and out of the computer.

Note: It may be necessary to gently twist the fansink to loosen it from the processor.

Important: Be careful when handling the adhesive material on the processor. If the adhesive material on the processor will be reused, do not contaminate it. If replacement adhesive material is provided with the replacement part, be sure to remove all traces of existing adhesive material from the processor before applying the new adhesive material.

7. Free the processor from the system board by rotating the processor socket lever arm upward to its maximum vertical position.
8. Lift the processor up and out of the computer.
9. To install a processor, reverse the previous steps.

Note: When reconnecting the fansink cable to the system board, be sure to connect the cable to the connector marked "CPU fan".

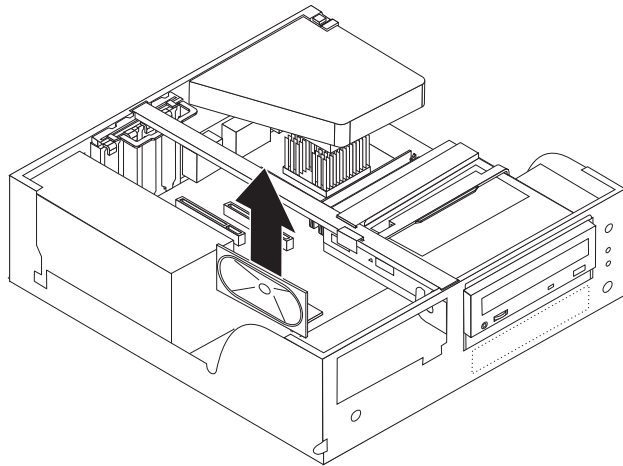
Speaker

To remove the speaker, do the following:

Note: Read "Before you begin" on page 41 and the safety notices at "Safety notices (multi-lingual translations)" on page 135.

1. Power-off the computer and remove external cables.
2. Remove the cover and support bracket (see "Removing the cover" on page 45 and "Removing the frame support bracket" on page 46).

3. Rotate the floppy disk drive cage to its vertical position (see “CD-ROM or diskette drive installation” on page 51).
4. Disconnect the speaker cable from the system board.



5. Lift the speaker up and out of the side brackets.
6. To replace the speaker, reverse the previous steps.

System board

To remove the system board, do the following:

Notes:

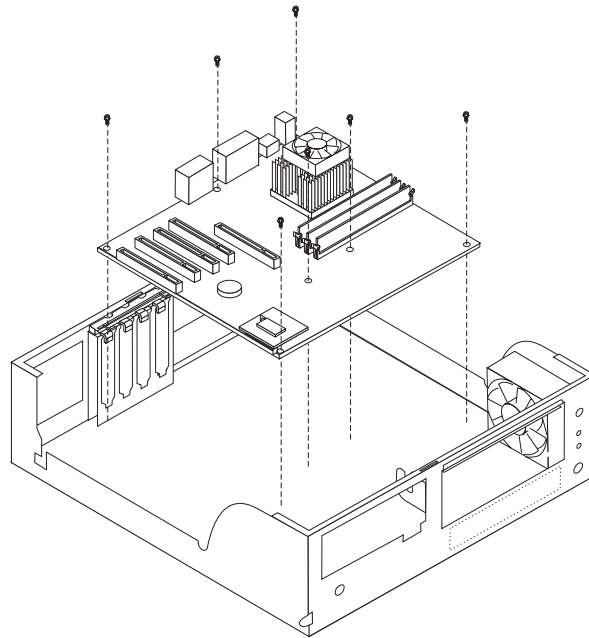
1. Read “Before you begin” on page 41 and the safety notices at “Safety notices (multi-lingual translations)” on page 135.
2. When replacing the system board, you must either update the system with the latest firmware or restore the pre-existing firmware that the customer provides on a diskette or CD image.

1. Power-off the computer and remove external cables.
2. Remove the cover and support bracket (see “Removing the cover” on page 45 and “Removing the frame support bracket” on page 46).
3. Remove the air baffle (see “Air baffle” on page 87).
4. Remove any of the following components that are installed on the system board:
 - Processor (see “Processor / fan sink” on page 89).

Important: If you plan to reinstall an existing processor to the new system board, be careful when handling the adhesive material on the processor. If the adhesive material on the processor will be reused, do not contaminate it. If replacement adhesive material is provided with the replacement system board, be sure to remove all traces of existing adhesive material from the processor before applying the new adhesive material.

- Adapter cards (see “Adapter installation” on page 48).
- DIMMs (“Memory module installation” on page 55).

5. Disconnect all internal system board cables.



Note: The drive cages and power supply have been removed in the illustration above for purposes of clarification. If these installed items impede your ability to easily access the system board, you can remove them from the computer (see “CD-ROM or diskette drive installation” on page 51 and “Power supply” on page 89).

6. Remove the seven screws that secure the system board to the chassis and lift the board up and out of the computer.

Note: The system board for the desktop model has a tab on the bottom which fits into the notch on the floor of the chassis.

7. To install the system board, reverse the previous steps.

Tower model

The following section contains information on removing components of the tower model.

Adapter fan

Note: Not all tower model systems incorporate an adapter fan.

To remove the adapter fan, do the following:

Note: Read “Before you begin” on page 41 and the safety notices at “Safety notices (multi-lingual translations)” on page 135.

1. Power-off the computer and remove external cables.
2. Remove the cover and support bracket (see “Side cover removal” on page 63 and “Support bracket removal” on page 64).
3. Disconnect the fan cable from the system board.

4. Press the two fan retention latches until the fan pops free and gently pull the fan out of the adapter guide, making sure the cable comes free smoothly.
5. To install the adapter fan, reverse the previous steps.

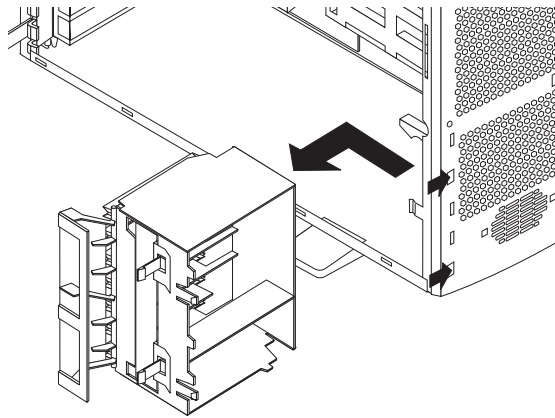
Note: Guide the fan cable through the cutout in the adapter guide before inserting the fan.

Adapter guide

To remove the adapter guide, do the following:

Note: Read “Before you begin” on page 41 and the safety notices at “Safety notices (multi-lingual translations)” on page 135.

1. Power-off the computer and remove external cables.
2. Remove the cover and support bracket (see “Side cover removal” on page 63 and “Support bracket removal” on page 64).
3. Remove the front bezel (see “Bezel” on page 94).
4. Disconnect all adapter cards from the system board and remove them from the computer (see “Adapter installation” on page 66).



5. Push inward on the two tabs on the left and push them toward the inside of the computer until they clear the notches; then, the three tabs on the right will come away from the chassis.
6. Pull the adapter guide away from the chassis.
7. To install the adapter guide, reverse the previous steps.

Note: When installing a new adapter guide, be sure to transfer any existing adapter fan (see “Adapter fan” on page 92); not all models are configured with this fan.

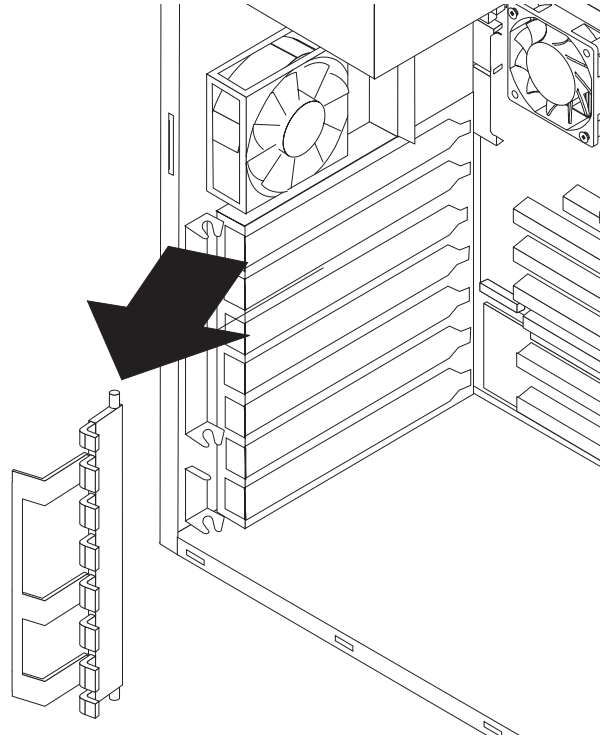
Adapter retainer

To remove the adapter retainer, do the following:

Note: Read “Before you begin” on page 41 and the safety notices at “Safety notices (multi-lingual translations)” on page 135.

1. Power-off the computer and remove external cables.
2. Remove the cover and support bracket (see “Side cover removal” on page 63 and “Support bracket removal” on page 64).

3. Disconnect all adapter cards from the system board and remove them from the computer (see "Adapter installation" on page 66).



4. Pull the adapter retainer away from the chassis.
5. To install the adapter retainer, reverse the previous steps.

Bezel

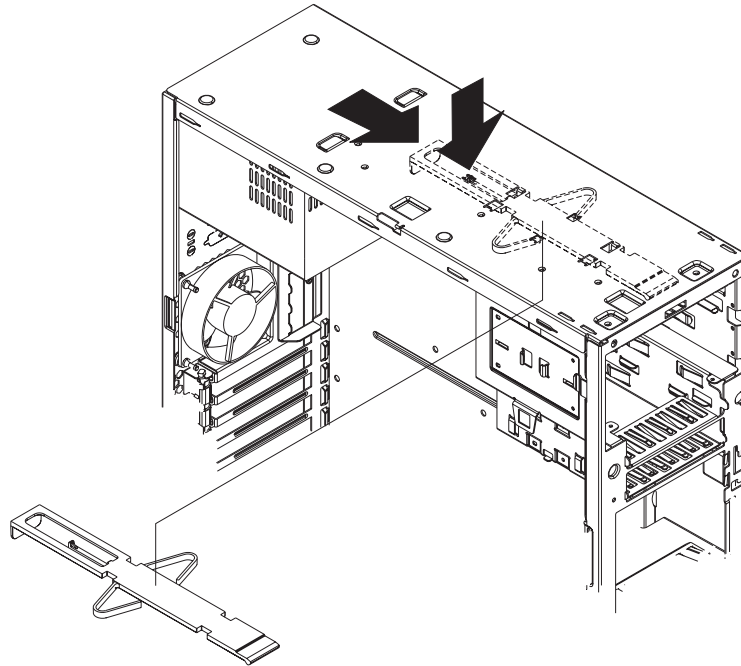
To remove the main bezel on the tower model, do the following:

1. Remove the side cover (see "Side cover removal" on page 63).
2. Push the blue bezel release latch, located on the inside roof of the tower chassis. The bezel will detach from the chassis.
3. To install the bezel, align the tabs at the bottom of the bezel with the slots in the lower front of the chassis; then press the top of the bezel against the chassis until it clicks into place.

Bezel release latch

Note: Read "Before you begin" on page 41 and the safety notices at "Safety notices (multi-lingual translations)" on page 135.

Note: This illustration is for reference purposes only; your hardware may differ.



To remove the bezel release latch, do the following:

1. Power-off the workstation, if it is on.
2. Unplug the workstation.
3. Remove the cover (see “Side cover removal” on page 63).
4. Remove the front bezel (see “Bezel” on page 94).
5. Press down on the tab.
6. From the underside, grasp the bezel release latch in the center and gently pull it back and away from the workstation.

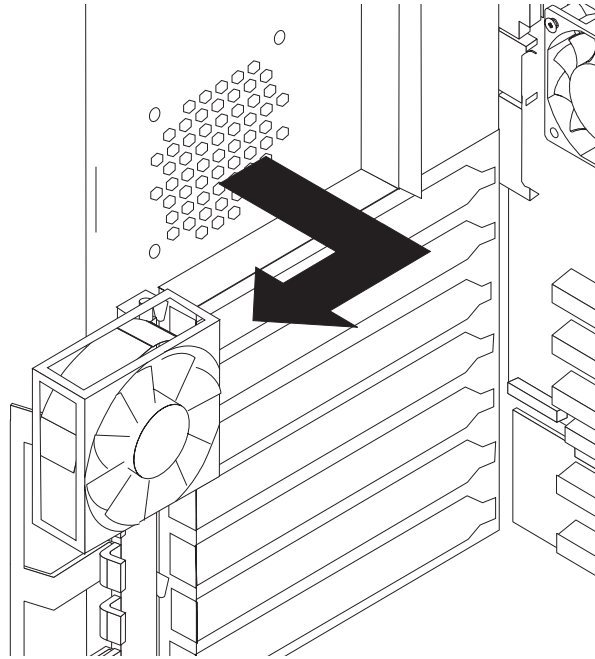
Fan

To remove the rear fan on the tower model, do the following:

Note: Read “Before you begin” on page 41 and the safety notices at “Safety notices (multi-lingual translations)” on page 135.

1. Power-off the computer and remove external cables.
2. Remove the cover and support bracket (see “Side cover removal” on page 63 and “Support bracket removal” on page 64).
3. Disconnect the fan cable from the system board.

4. Use side cutters to sever the fan's four rubber extensions on the outside of the chassis.

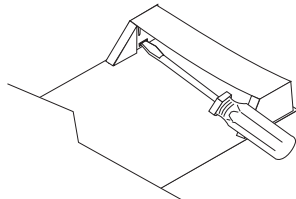


5. Pull the fan away from the chassis.
6. To install the rear fan, reverse the previous steps.

Note: After guiding the four rubber extensions through the apertures on the chassis, use needle-nosed pliers to pull the extensions firmly through.

Handle cap

Note: This illustration is for reference only; your hardware may differ.



Note: Read "Before you begin" on page 41 and the safety notices at "Safety notices (multi-lingual translations)" on page 135.

To remove the handle cap, do the following:

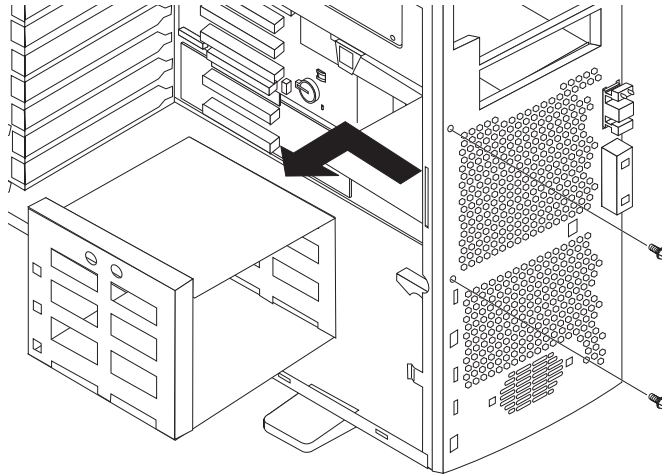
1. Power-off the workstation, if it is on.
2. Unplug the workstation.
3. Use a flathead screwdriver to gently press in and down on the tabs located on the interior side wall of the handle.
4. Lift up on the handle cap to separate it from the handle support.

Hard drive cage

To remove the hard drive cage in the tower model, do the following:

Note: Read “Before you begin” on page 41 and the safety notices at “Safety notices (multi-lingual translations)” on page 135.

1. Power-off the computer and remove external cables.
2. Remove the cover and support bracket (see “Side cover removal” on page 63 and “Support bracket removal” on page 64).
3. If there is a hard drive in the cage, remove it (see “Internal drive installation” on page 69).



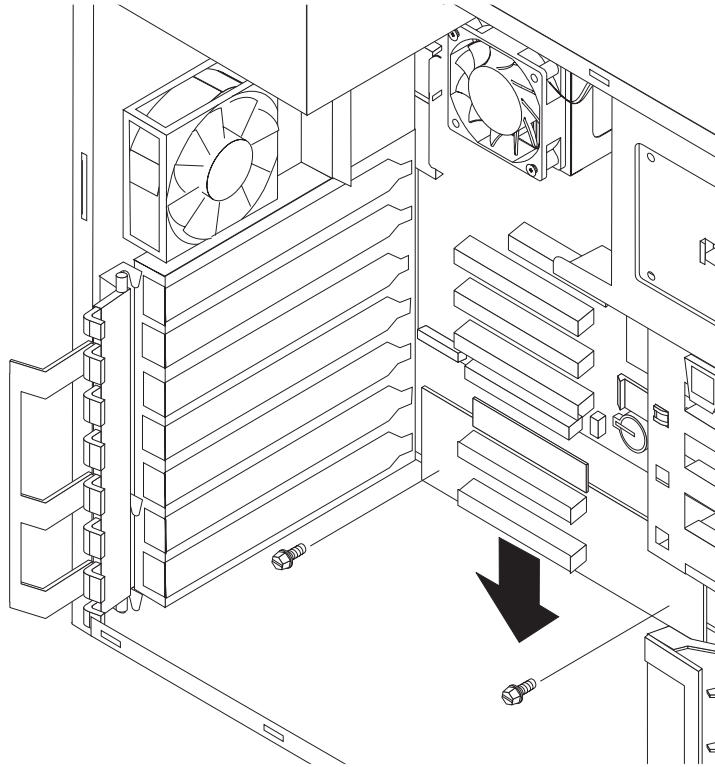
4. Remove the two screws that attach the cage to the chassis and lift it out of the computer.
5. To install the cage, reverse the previous steps.

PCI extender board

To remove the PCI extender board, do the following:

Note: Read “Before you begin” on page 41 and the safety notices at “Safety notices (multi-lingual translations)” on page 135.

1. Remove any adapter cards that are connected to the extender board (see “Adapter installation” on page 66).



2. Remove the two screws that attach the extender board to the chassis.
3. Pull the extender board in the direction of the system feet until it detaches from the system board; then pull it out of the computer.

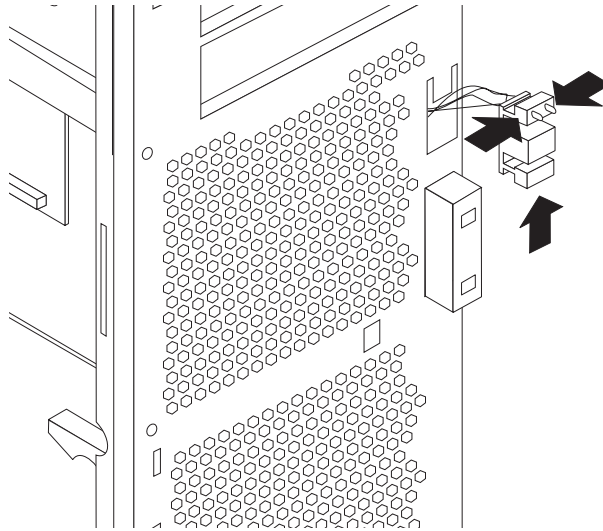
Power/LED switch

To remove the power/LED switch, do the following:

Note: Read “Before you begin” on page 41 and the safety notices at “Safety notices (multi-lingual translations)” on page 135.

1. Power-off the computer and remove external cables.
2. Remove the cover and support bracket (see “Side cover removal” on page 63 and “Support bracket removal” on page 64).
3. Remove the bezel, remove the front bezel (see “Bezel” on page 94).

4. Disconnect the power/LED switch from the system board.



5. Disengage the lower tab of the power/LED switch by pressing upward on the lower tab of the power/LED switch until it comes loose.

Note: It may be necessary to use the tip of a screwdriver to disengage the lower tab.

6. Push inward on the two tabs of the top section of the power/LED switch until it pops free of the chassis; then, remove it from the computer, making sure that the cable follows freely.
7. To install the power/LED switch, reverse the previous steps.

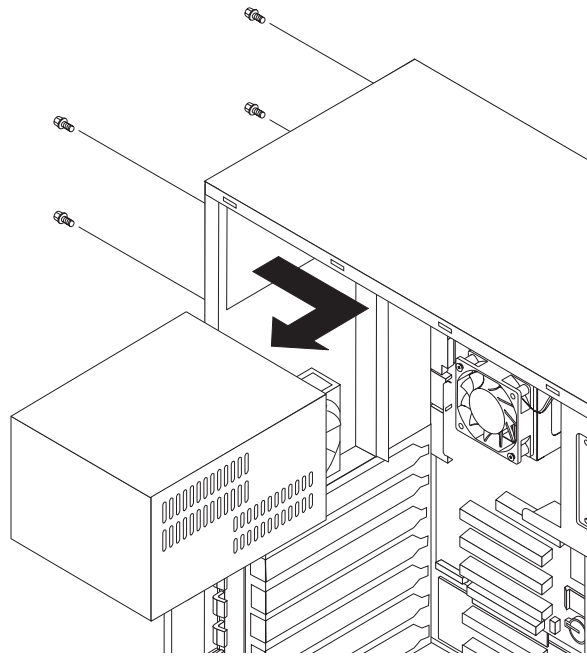
Power supply

To remove the power supply, do the following:

<p>Note: Read “Before you begin” on page 41 and the safety notices at “Safety notices (multi-lingual translations)” on page 135.</p>

1. Power-off the computer and remove external cables.
2. Remove the cover and support bracket (see “Side cover removal” on page 63 and “Support bracket removal” on page 64).

3. Disconnect the internal power supply cables.



4. Remove the 4 screws that secure the power supply to the chassis.
5. Lift the power supply out of the chassis.
6. To replace the power supply, reverse the previous steps.

Processor / fan sink

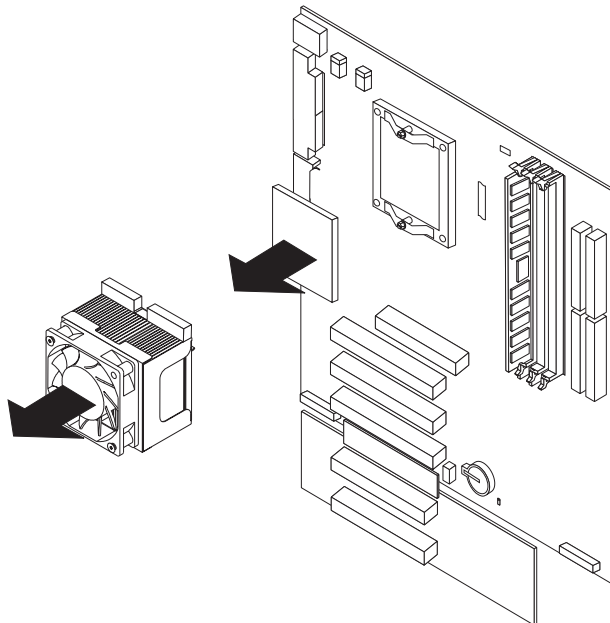
To remove the processor and fan sink, do the following:

Note: Read “Before you begin” on page 41 and the safety notices at “Safety notices (multi-lingual translations)” on page 135.

1. Power-off the computer and remove external cables.
2. Remove the cover and support bracket (see “Side cover removal” on page 63 and “Support bracket removal” on page 64).
3. Remove any components that impede access to the processor.
4. Disconnect any cables that impede access to the processor.
5. Remove fan sink from processor:

Note: The fansink and underlying heatsink are attached and do not need to be separated from each other. Remove the fansink/heatsink assembly from the processor as a single unit.

- a. Detach the fan sink cable.



- b. Loosen the two captive screws on either side (in leaf spring enclosures) of the fansink.
- c. With the two captive screws loosened, pivot the leaf spring assemblies outward and out of the notches on the fansink assembly.
- d. Lift the fan sink up and out of the computer.

Note: It may be necessary to gently twist the fansink to loosen it from the processor.

Important: Be careful when handling the adhesive material on the processor. If the adhesive material on the processor will be reused, do not contaminate it. If replacement adhesive material is provided with the replacement part, be sure to remove all traces of existing adhesive material from the processor before applying the new adhesive material.

6. Free the processor from the system board by rotating the processor socket lever arm upward to its maximum vertical position.
7. Lift the processor up and out of the computer.
8. To install a processor, reverse the previous steps.

Note: When reconnecting the fansink cable to the system board, be sure to connect the cable to the connector marked "CPU fan".

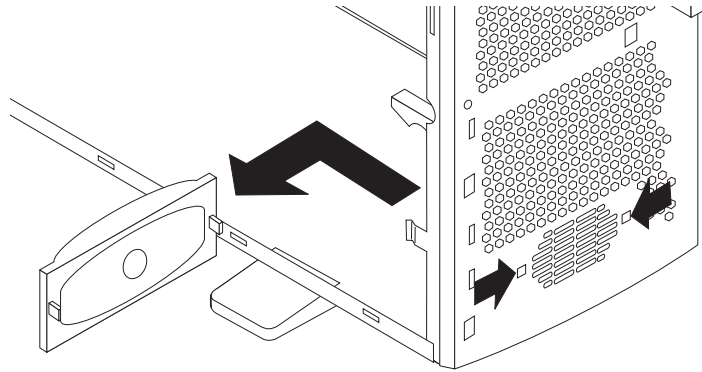
Speaker

To remove the speaker, do the following:

Note: Read "Before you begin" on page 41 and the safety notices at "Safety notices (multi-lingual translations)" on page 135.

1. Power-off the computer and remove external cables.
2. Remove the cover and support bracket (see "Side cover removal" on page 63 and "Support bracket removal" on page 64).

3. Disconnect the speaker cable from the system board.
4. Remove the adapter guide (see "Adapter guide" on page 93).



5. Use the tip of a screwdriver to gently pry the two tabs through the notches until the speaker disengages from the chassis.
6. Lift the speaker out of the computer, making sure the cable follows freely.

Note: It may be easier to disconnect other cables in order to reach the speaker cable. If this is the case, be sure to reattach all cables that were disconnected before reassembling the computer.

7. To replace the speaker, reverse the previous steps.

System board

To remove the system board, do the following:

Notes:

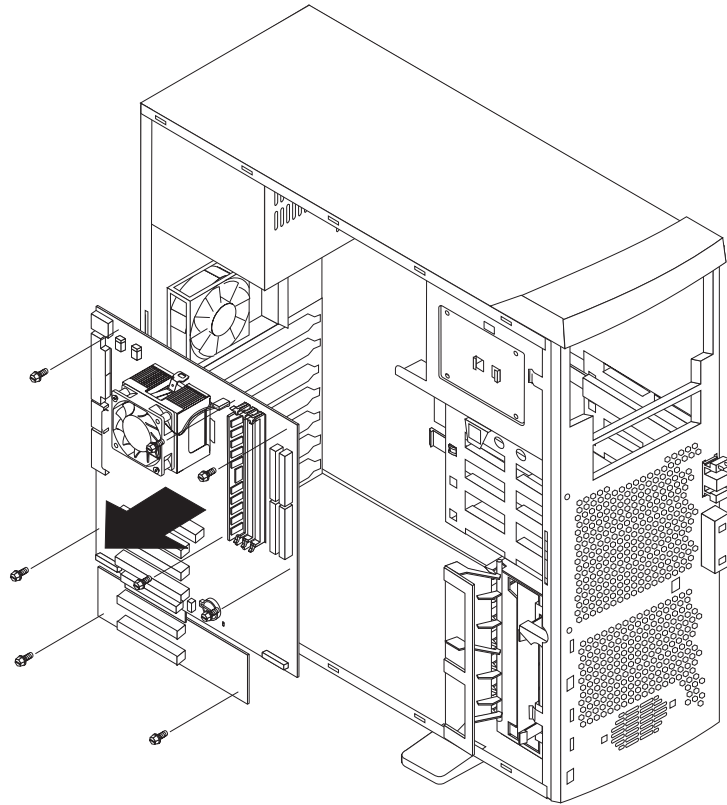
1. Read "Before you begin" on page 41 and the safety notices at "Safety notices (multi-lingual translations)" on page 135.
2. When replacing the system board, you must either update the system with the latest firmware or restore the pre-existing firmware that the customer provides on a diskette or CD image.

1. Power-off the computer and remove external cables.
2. Remove the cover and support bracket (see "Side cover removal" on page 63 and "Support bracket removal" on page 64).
3. Remove any of the following components that are installed on the system board:
 - Processor (see "Processor / fan sink" on page 100).

Important: If you plan to reinstall an existing processor to the new system board, be careful when handling the adhesive material on the processor. If the adhesive material on the processor will be reused, do not contaminate it. If replacement adhesive material is provided with the replacement system board, be sure to remove all traces of existing adhesive material from the processor before applying the new adhesive material.

- Adapter cards (see "Adapter installation" on page 66).
- DIMMs (see "Memory module installation" on page 74).

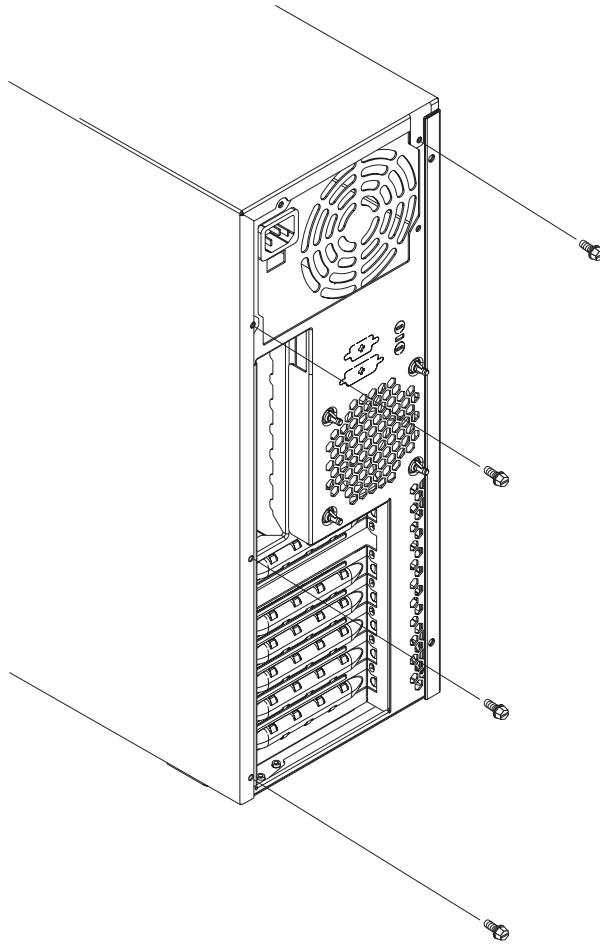
4. Disconnect all internal system board cables.



5. Remove the seven screws that secure the system board to the chassis and lift the board up and out of the computer.
6. To install the system board, reverse the previous steps.

Top/side cover

Note: This illustration is for reference only; your hardware may differ.



Note: Read "Before you begin" on page 41 and the safety notices at "Safety notices (multi-lingual translations)" on page 135.

To remove the top/side cover, do the following:

1. Power-off the workstation, if it is on.
2. Unplug the workstation.
3. Remove the cover (see "Side cover removal" on page 63).
4. Remove the front bezel (see "Bezel" on page 94).
5. Remove the handle assembly (see "Handle cap" on page 96).
6. Remove the four screws from the back of the workstation and put them in a safe place.
7. Using a screwdriver, gently pry the cover away from the workstation in the rear and slide the unit away from the workstation.

Symptom-to-FRU index

Beep symptoms	105	POST error codes	114
No beep symptoms	108	ServeRAID	119
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Error symptoms	112		

This index supports IntelliStation E Pro workstations Type 6204 and Type 6214.

Notes:

1. Check the configuration before you replace a FRU. Configuration problems can cause false errors and symptoms.
2. The default configuration can be loaded by starting the system and then pressing the reset button four times, waiting 15 seconds between each press. Once the configuration has reset to the default, it must be saved in Setup to be stored in CMOS.
3. For IBM devices not supported by index, refer to the manual for that device.
4. Always start with "General checkout" on page 1.

The Symptom-to-FRU lists symptoms, errors, and the possible causes. The most likely cause is listed first. Use this Symptom-to-FRU index to help you decide which FRUs to have available when servicing the computer. The POST BIOS displays POST error codes and messages on the screen.

Beep symptoms

Beep symptoms are short tones or a series of short tones separated by pauses (intervals without sound). See the following examples.

Note: One beep after successfully completing POST indicates the system is functioning properly.

Beeps	Description
1-2-3	<ul style="list-style-type: none"> • One beep • A pause (or break) • Two beeps • A pause (or break) • Three Beeps
4	Four continuous beeps

Beep/Symptom	FRU/Action
1-1-3 (CMOS write/read test failed)	<ol style="list-style-type: none"> 1. Battery 2. System Board
1-1-4 (BIOS EEPROM checksum failed)	<ol style="list-style-type: none"> 1. System Board

Beep/Symptom	FRU/Action
1-2-1 (Programmable Interval Timer failed)	1. System Board
1-2-2 (DMA initialization failed)	1. System Board
1-2-3 (DMA page register write/read failed)	1. System Board
1-2-4 (RAM refresh verification failed)	1. DIMM 2. System Board
1-3-1 (1st 64K RAM test failed)	1. DIMM 2. System Board
1-3-2 (1st 64K RAM parity test failed)	1. DIMM 2. Processor 3. System Board
1-4-3 (Interrupt vector loading test failed)	1. System Board
2-1-1 (Secondary DMA register failed)	1. System Board
2-1-2 (Primary DMA register failed)	1. System Board
2-1-3 (Primary interrupt mask register failed)	1. System Board
2-1-4 (Secondary interrupt mask register failed)	1. System Board
2-2-1 (Interrupt vector loading failed)	1. System Board
2-2-2 (Keyboard controller failed)	1. System Board 2. Keyboard

Beep/Symptom	FRU/Action
2-2-3 (CMOS power failure and checksum checks failed)	1. Battery 2. System board
2-2-4 (CMOS configuration info validation failed)	1. Battery 2. System board
2-3-1 (Screen initialization failed)	1. Jumper on J28 2. System Board
2-3-2 (Screen memory failed)	1. System board
2-3-3 (Screen retrace failed)	1. System board
2-3-4 (Search for video ROM failed)	1. System board
2-4-1 (Video failed, screen believed operable)	1. System board
3-1-1 (Timer tick interrupt failed)	1. System Board
3-1-2 (Interval timer channel 2 failed)	1. System Board
3-1-3 (RAM test failed above address OFFFFH)	1. DIMM 2. Memory card 3. System board
3-1-4 (Time-of-Day clock failed)	1. Battery 2. System Board
3-2-1 (Serial port failed)	1. System board
3-2-2 (Parallel port failed)	1. System board
3-2-3 (Math coprocessor failed)	1. Processor 2. System board

Beep/Symptom	FRU/Action
3-2-4 (Failure comparing CMOS memory size against actual)	<ol style="list-style-type: none"> DIMM Battery System board
3-3-1 (Memory size mismatch occurred, see "IBM Setup Utility main menu choices" on page 32)	<ol style="list-style-type: none"> DIMM System board Battery
3-3-2 (Critical SMBUS error occurred) (I2C bus error)	<ol style="list-style-type: none"> Disconnect the workstation power cord from outlet, wait 30 seconds and retry. System Board DIMMs Power Supply I2C Cable
3-3-3 (No operational memory in system)	<ol style="list-style-type: none"> Install or reseal the memory modules, then do a 3 boot reset. (See "Using the IBM Setup Utility program" on page 31.) DIMMs System Board
Two Short Beeps (Information only, the configuration has changed)	<ol style="list-style-type: none"> Run Diagnostics Run Configuration/Setup
Three Short Beeps	<ol style="list-style-type: none"> DIMM System Board
One Continuous Beep	<ol style="list-style-type: none"> Processor System Board
Repeating Short Beeps	<ol style="list-style-type: none"> Keyboard System Board
One Long and One Short Beep	<ol style="list-style-type: none"> Video adapter (if present) System Board
One Long and Two Short Beeps	<ol style="list-style-type: none"> Video adapter (if present) System Board
Two Long and Two Short Beeps	<ol style="list-style-type: none"> Video adapter

No beep symptoms

No Beep Symptom	FRU/Action
No beep and the system operates correctly.	<ol style="list-style-type: none"> Check speaker cables Speaker System board

No Beep Symptom	FRU/Action
No Beeps occur after successfully completing POST	<ol style="list-style-type: none"> 1. Check speaker connections 2. Speaker 3. System board
No ac power	<ol style="list-style-type: none"> 1. Check the power cord. 2. Power supply.
No beep and no video	1. See "Undetermined problems" on page 119

Diagnostic error codes

Note: In the following error codes, if XXX is 000, 195, or 197, **do not** replace a FRU. The description for these error codes are:

- 000** The test passed.
- 195** The Esc key was pressed to abort the test.
- 197** This is a warning error and may not indicate a hardware failure.

For all error codes, replace/follow the FRU/Action indicated.

Error Code/Symptom	FRU/Action
001-XXX-000 (Failed core tests)	1. System Board
001-XXX-001 (Failed core tests)	1. System Board
001-250-000 (Failed System Board ECC)	1. System Board
001-250-001 (Failed System Board ECC)	1. System Board
005-XXX-000 (Failed Video test)	<ol style="list-style-type: none"> 1. Video Adapter (if installed) 2. System Board
011-XXX-000 (Failed COM1 Serial Port test)	1. System Board
011-XXX-001 (Failed COM2 Serial Port test)	1. System Board
014-XXX-000 (Failed Parallel Port test)	1. System Board
015-XXX-001 (USB interface not found, board damaged)	1. System Board

Error Code/Symptom	FRU/Action
015-XXX-015 (Failed USB External Loopback test)	<ol style="list-style-type: none"> 1. Make sure parallel port is not disabled 2. Re-run USB External Loopback test 3. System Board
015-XXX-198 (USB device connected during USB test)	<ol style="list-style-type: none"> 1. Remove USB devices from USB1 and USB2 2. Re-run test 3. System Board
020-XXX-000 (Failed PCI Interface test)	<ol style="list-style-type: none"> 1. System Board
030-XXX-000 (Failed Internal SCSI interface test)	<ol style="list-style-type: none"> 1. System Board
030-XXX-00N (Failed SCSI test on PCI slot N. Check system error log before replacing a FRU.)	<ol style="list-style-type: none"> 1. Adapter in Slot N
035-XXX-099	<ol style="list-style-type: none"> 1. No adapters were found. 2. If adapter is installed re-check connection.
035-XXX-S99 (Failed RAID test on PCI slot S. S = number of failing PCI slot. Check System Error Log before replacing a FRU.)	<ol style="list-style-type: none"> 1. Adapter 2. SCSI Backplane 3. Cable
035-XXX-SNN (Check System Error Log before replacing a FRU. S = number of failing PCI slot; NN = SCSI ID of failing fixed disk.)	<ol style="list-style-type: none"> 1. Fixed Disk with SCSI ID NN on RAID adapter in PCI slot S.
035-253-S99 (RAID adapter initialization failure)	<ol style="list-style-type: none"> 1. ServeRAID Adapter in slot S is not configured properly. Obtain the basic and extended configuration status and refer to the ServeRAID Hardware Maintenance Manual for more information. 2. Cable 3. Adapter
075-XXX-000 (Failed Power Supply test)	<ol style="list-style-type: none"> 1. Power Supply
089-XXX-001 (Failed Microprocessor test)	<ol style="list-style-type: none"> 1. Microprocessor
180-XXX-003 (Failed System Board LED test)	<ol style="list-style-type: none"> 1. System Board

Error Code/Symptom	FRU/Action
201-XXX-0NN (Failed Memory test, see “IBM Setup Utility main menu choices” on page 32.) NN = DIMM location.	<ol style="list-style-type: none"> 1. DIMM Location J1-J4 2. Memory card
201-XXX-999 (Multiple DIMM failure, see error text.)	<ol style="list-style-type: none"> 1. See error text for failing DIMMs
202-XXX-001 (Failed System Cache test)	<ol style="list-style-type: none"> 1. Microprocessor CPU 1
206-XXX-000 (Failed Diskette Drive test)	<ol style="list-style-type: none"> 1. Cable 2. Diskette Drive 3. System Board
215-XXX-000 (Failed IDE CD-ROM test)	<ol style="list-style-type: none"> 1. CD-ROM Drive Cables 2. CD-ROM Drive 3. System Board
217-198-XXX (Could not establish drive parameters)	<ol style="list-style-type: none"> 1. Check cable and termination 2. SCSI backplane 3. Fixed disk
217-XXX-000 (Failed BIOS Fixed Disk test) Note: If RAID is configured, the fixed disk number refers to the RAID logical array.	<ol style="list-style-type: none"> 1. Fixed Disk 1
217-XXX-001 (Failed BIOS Fixed Disk test) Note: If RAID is configured, the fixed disk number refers to the RAID logical array.	<ol style="list-style-type: none"> 1. Fixed Disk 2
217-XXX-002 (Failed BIOS Fixed Disk test) Note: If RAID is configured, the fixed disk number refers to the RAID logical array.	<ol style="list-style-type: none"> 1. Fixed Disk 3
264-XXX-0NN (NN = SCSI ID of failing Tape Drive)	<ol style="list-style-type: none"> 1. Tape Cartridge, if user executed the Read/Write Tape Drive test (XXX = 256) 2. SCSI or power cable connected to the tape drive with SCSI ID NN 3. Tape drive with SCSI ID NN – refer to Help and Service Information appendix of tape drive’s User Guide. 4. I/O Legacy Board or SCSI Controller – run SCSI Controller diagnostic to determine if SCSI bus is functioning properly.
264-XXX-999 (Errors on multiple tape drives, see error text for more info)	<ol style="list-style-type: none"> 1. See error messages/text in the PC Doctor error log for detailed information on each individual tape drive error.

Error Code/Symptom	FRU/Action
301-XXX-000 (Failed Keyboard test)	1. Keyboard
405-XXX-000 (Failed Ethernet test on controller on the System Board)	1. Verify that Ethernet is not disabled in BIOS. 2. System Board
405-XXX-00N (Failed Ethernet test on adapter in PCI slot N)	1. Adapter in PCI slot N. 2. System Board
415-XXX-000 (Failed Modem test)	1. Cable 2. Modem 3. System Board

Error symptoms

General	FRU/Action
CD is not working properly.	1. Clean the CD. 2. Run CD-ROM diagnostics. 3. CD-ROM Drive
CD-ROM drive tray is not working. (The system must be powered-on.)	1. Insert the end of a paper clip into the manual tray-release opening. 2. Run CD-ROM diagnostics. 3. CD-ROM Drive
CD-ROM drive is not recognized.	1. Run Configuration/Setup, enable primary IDE channel. 2. Check cables and jumpers. 3. Check for correct device driver. 4. Run CD-ROM diagnostics. 5. CD-ROM drive 6. System Board
Power switch does not work.	1. Verify that switch number 5 of switch block is Off. 2. Power Switch Assembly 3. System Board
CD-ROM drive cable is not plugged in.	1. Make sure CD-ROM drive cable is plugged in.
Diskette drive in-use light stays on, or the system bypasses the diskette drive, or the diskette drive does not work.	1. If there is a diskette in the drive, verify that: a. The diskette drive is enabled in the Configuration/Setup utility program. b. The diskette is good and not damaged. (Try another diskette if you have one.) c. The diskette is inserted correctly in the drive. d. The diskette contains the necessary files to start the workstation. e. The software program is OK. f. Cable is installed correctly (proper orientation) 2. Run Diskette Drive Diagnostics. 3. Cable 4. Diskette Drive 5. System Board

General	FRU/Action
Monitor problems (general). Some IBM monitors have their own self-tests. If you suspect a problem with the monitor, refer to the information that comes with the monitor for adjusting and testing instructions.	<ol style="list-style-type: none"> 1. Monitor 2. Run Video Diagnostics. If diagnostics pass, the problem may be a video driver. 3. Display Adapter / System Board
System Error and DIMM X LED on	<ol style="list-style-type: none"> 1. Replace DIMM X
System Error and CPU X LED on	<ol style="list-style-type: none"> 1. Replace CPU X
Not all drives are recognized by fixed disk diagnostic.	<ol style="list-style-type: none"> 1. Remove first drive that does not show up and rerun diagnostic. If remaining drives show up, replace the one that was removed. 2. If remaining drives do not show up, remove successive drives one at a time and rerun diagnostic.
System hangs during fixed disk diagnostic.	<ol style="list-style-type: none"> 1. Remove hard drive being tested at the time of the hang and rerun the diagnostic. If successful, replace drive that was removed.

Setup	Action
Setup and Installation CD won't start.	<ul style="list-style-type: none"> • Be sure the workstation is supported; all systems with a startable (bootable) CD-ROM drive are supported. • If the startup (boot) sequence settings have been altered, be sure the CD-ROM is first in the boot sequence. • If more than one CD-ROM drive is installed, be sure that only one drive is set as the primary drive. Start the CD from the primary drive.
ServeRAID program cannot view all installed drives - or - cannot install NOS.	<ul style="list-style-type: none"> • Be sure there are no duplicate SCSI IDs or IRQ assignments. • Be sure that the hard disk drive is connected properly.
The Operating System Installation program continuously loops.	Free up more space on the hard disk.
ServerGuide won't start the NOS CD.	Be sure the NOS CD you have is supported by ServerGuide. See the <i>Setup and Installation</i> CD label for a list of NOS versions supported.
Can't install NOS - option is grayed out.	Either there is no logical drive defined (ServeRAID systems) or the ServerGuide system partition is not present. Run the setup and configuration program.

TechConnect CD	Action
Can't start TechConnect CD.	Be sure you're starting the CD on a system with Microsoft Windows installed.
Can't view publications from TechConnect CD, or text is unreadable.	Be sure you have the Adobe reader installed (available from the TechConnect CD).

Diskette Factory CD	Action
Get "time out" or "Unknown host" errors	Be sure you have access to the Internet through FTP directly.

POST error codes

In the following error codes, X can be any number or letter.

Error Code/Symptom	FRU/Action
062 (Three consecutive boot failures using the default configuration.)	<ol style="list-style-type: none"> 1. Run Configuration/Setup 2. Battery 3. System Board 4. Microprocessor
101, 102, 106 (System and microprocessor error)	<ol style="list-style-type: none"> 1. System Board
111 (Channel check error)	<ol style="list-style-type: none"> 1. Failing adapter 2. DIMM 3. System board
114 (Adapter read-only memory error)	<ol style="list-style-type: none"> 1. Failing adapter 2. Run diagnostics
129 (Internal cache error)	<ol style="list-style-type: none"> 1. Microprocessor
135 (Fan failure)	<ol style="list-style-type: none"> 1. Run Configuration/Setup 2. Fan 3. System board
151 (Real time clock error)	<ol style="list-style-type: none"> 1. Run Diagnostics 2. Battery 3. System Board
161 (Real time clock battery error)	<ol style="list-style-type: none"> 1. Run Configuration/Setup 2. Battery 3. System Board
162 (Device Configuration Error) Note: Be sure to load the default settings and any additional desired settings; then, save the configuration.	<ol style="list-style-type: none"> 1. Run Configuration/Setup 2. Battery 3. Failing Device 4. System Board
163 (Real-Time Clock error)	<ol style="list-style-type: none"> 1. Run Configuration/Setup 2. Battery 3. System Board
164 (Memory configuration changed, see "IBM Setup Utility main menu choices" on page 32.)	<ol style="list-style-type: none"> 1. Run Configuration/Setup 2. DIMM 3. System Board
166 (Boot block checksum error)	<ol style="list-style-type: none"> 1. System board
167 (No process BIOS update found)	<ol style="list-style-type: none"> 1. Flash to latest BIOS
175 (Hardware error)	<ol style="list-style-type: none"> 1. System Board
176, 177, 178 (Security hardware error)	<ol style="list-style-type: none"> 1. Run Configuration/Setup 2. System Board

Error Code/Symptom	FRU/Action
179 (Boot integrity services segment error)	1. Flash BIOS
184 (Power-on password corrupted)	1. Run Configuration/Setup 2. System Board
185 (Drive startup sequence information corrupted)	1. Run Configuration/Setup 2. System Board
186 (Security hardware control logic failed)	1. Run Configuration/Setup 2. System Board
187 (VPD serial number not set.)	1. Set serial number in Setup 2. System Board
188 (Bad EEPROM CRC #2)	1. Run Configuration/Setup 2. System Board
189 (Three attempts were made to access the workstation with invalid passwords)	1. Run Configuration/Setup, enter the administrator password 2. System Board.
190 (Invalid remote change requested)	1. Run Configuration/Setup 2. System Board
191 (IBM embedded security hardware reset)	1. Run Configuration/Setup 2. System Board
193 (IBM embedded security hardware removed)	1. Run Configuration/Setup 2. System Board
195 (Asset ID antenna has been installed)	1. Run Configuration/Setup 2. System Board
196 (System tampered cleared)	1. Run Configuration/Setup 2. System Board
201 (Memory test error, see "IBM Setup Utility main menu choices" on page 32.) If the workstation does not have the latest level of BIOS installed, update the BIOS to the latest level and run the diagnostic program again.	1. Run memory diagnostics 2. DIMM 3. System Board
229 (Cache error)	1. Microprocessor
289 (DIMM has been disabled by user or system, see "IBM Setup Utility main menu choices" on page 32.)	1. Run Configuration/Setup, if disabled by user 2. Disabled DIMM, if not disabled by user.
301 (Keyboard or keyboard controller error)	1. Keyboard 2. System Board
303 (Keyboard controller error)	1. System Board 2. Keyboard

Error Code/Symptom	FRU/Action
602 (Invalid diskette boot record)	<ol style="list-style-type: none"> Diskette Diskette Drive Cable System Board
604 (Diskette drive error)	<ol style="list-style-type: none"> Run Configuration/Setup and Diagnostics Diskette Drive Drive Cable System Board
662 (Diskette drive configuration error)	<ol style="list-style-type: none"> Run Configuration/Setup and Diagnostics Diskette Drive Drive Cable System Board
962 (Parallel port error)	<ol style="list-style-type: none"> Disconnect external cable on parallel port. Run Configuration/Setup System Board
11XX (System board serial port 1 or 2 error)	<ol style="list-style-type: none"> Disconnect external cable on serial port. Run Configuration/Setup System Board
1162 (Serial port configuration conflict)	<ol style="list-style-type: none"> Disconnect external cable on serial port Run Configuration/Setup System board
1200 (microprocessor machine check)	<ol style="list-style-type: none"> Microprocessor
1762 (Configuration change has occurred)	<ol style="list-style-type: none"> Run Configuration/Setup
1780 (Hard disk error)	<ol style="list-style-type: none"> Run Configuration/Setup Hard disk drive Hard disk drive cable
1781 (Hard disk error)	<ol style="list-style-type: none"> Run Configuration/Setup Hard disk drive Hard disk drive cable
1782 (Hard disk error)	<ol style="list-style-type: none"> Run Configuration/Setup Hard disk drive Hard disk drive cable
1783 (Hard disk error)	<ol style="list-style-type: none"> Run Configuration/Setup Hard disk drive Hard disk drive cable
1800 (No more hardware interrupt available for PCI adapter)	<ol style="list-style-type: none"> Run Configuration/Setup Failing Adapter System Board

Error Code/Symptom	FRU/Action
1801 (Not enough space available to shadow ROM)	<ol style="list-style-type: none"> 1. Run Configuration/Setup 2. Failing Adapter 3. System Board
1802 (Not enough I/O space available)	<ol style="list-style-type: none"> 1. Run Configuration/Setup 2. Failing Adapter 3. System Board
1803 (Not enough memory space available)	<ol style="list-style-type: none"> 1. Run Configuration/Setup 2. Failing Adapter 3. System Board
1804 (Not enough real memory space available)	<ol style="list-style-type: none"> 1. Run Configuration/Setup 2. Failing Adapter 3. System Board
1805 (Adapter ROM checksum error)	<ol style="list-style-type: none"> 1. Run Configuration/Setup 2. Failing Adapter 3. System Board
1962 (Drive does not contain a valid boot sector)	<ol style="list-style-type: none"> 1. Verify a bootable operating system is installed. 2. If RAID system, refer to the Hardware Maintenance Manual for the specific RAID adapter. 3. Run Diagnostics 4. Hard Disk Drive 5. Cable 6. SCSI Backplane 7. System Board
2400 (Video controller test failure)	<ol style="list-style-type: none"> 1. Video Adapter (if installed) 2. System Board
2462 (Video memory configuration error)	<ol style="list-style-type: none"> 1. Video Adapter (if installed) 2. System Board
5962 (IDE CD-ROM configuration error)	<ol style="list-style-type: none"> 1. Run Configuration/Setup 2. CD-ROM Drive 3. CD-ROM Power Cable 4. IDE Cable 5. System Board 6. Battery
8603 (Pointing Device Error)	<ol style="list-style-type: none"> 1. Pointing Device 2. System Board
00012000 (Processor machine check)	<ol style="list-style-type: none"> 1. Update BIOS 2. Replace microprocessor
00019501 (Microprocessor is not functioning - check VRM and processor LEDs)	<ol style="list-style-type: none"> 1. Microprocessor 2. System Board
00019701 (Microprocessor failed BIST)	<ol style="list-style-type: none"> 1. Microprocessor 2. System Board

Error Code/Symptom	FRU/Action
00180100 (No room for PCI option ROM)	<ol style="list-style-type: none"> 1. Run Configuration/Setup 2. Failing Adapter 3. System Board
00180200 (No more I/O space available for PCI adapter)	<ol style="list-style-type: none"> 1. Run Configuration/Setup 2. Failing Adapter 3. System Board
00180300 (No more memory (above 1MB for PCI adapter))	<ol style="list-style-type: none"> 1. Run Configuration/Setup 2. Failing Adapter 3. System Board
00180400 (No more memory (below 1MB for PCI adapter))	<ol style="list-style-type: none"> 1. Run Configuration/Setup 2. Failing Adapter 3. System Board
00180500 (PCI option ROM checksum error)	<ol style="list-style-type: none"> 1. Remove Failing PCI Card 2. System Board
00180600 (PCI device built-in self test failure)	<ol style="list-style-type: none"> 1. Run Configuration/Setup 2. Failing Adapter 3. System Board
00180700 (<i>xxxxyyyy</i> planar PCI device not responding (where <i>xxxx</i> is PCI vendor ID and <i>yyyy</i> is PCI device ID))	<ol style="list-style-type: none"> 1. System Board 2. PCI Card
00180800 (Unsupported PCI device installed)	<ol style="list-style-type: none"> 1. System Board 2. PCI Card
00181000 (PCI error)	<ol style="list-style-type: none"> 1. System Board 2. PCI Card
01295085 (ECC checking hardware test error)	<ol style="list-style-type: none"> 1. System Board 2. Microprocessor
01298001 (No update data for microprocessor)	<ol style="list-style-type: none"> 1. Ensure all microprocessors are the same stepping level and cache size. 2. Microprocessor
01298101 (Bad update data for microprocessor)	<ol style="list-style-type: none"> 1. Ensure all microprocessors are the same stepping level and cache size. 2. Microprocessor
01298200 (Microprocessor speed mismatch)	<ol style="list-style-type: none"> 1. Ensure all microprocessors are the same speed.
I9990301 (Fixed boot sector error)	<ol style="list-style-type: none"> 1. Hard Disk Drive 2. If RAID system, refer to the Hardware Maintenance Manual for the specific RAID adapter. 3. SCSI Backplane 4. Cable 5. System Board
I9990305 (Fixed boot sector error, no operating system installed)	<ol style="list-style-type: none"> 1. Install operating system to hard disk drive.

Error Code/Symptom	FRU/Action
I9990650 (AC power has been restored)	<ol style="list-style-type: none"> 1. Check cable 2. Check for interruption of power supply 3. Power Cable
(Virus warning) (Boot sector has changed)	<ol style="list-style-type: none"> 1. Run Configuration/Setup 2. Run virus detection software
Other numbers	Follow instructions on screen.

ServeRAID

For ServeRAID error codes and procedures, refer to the Hardware Maintenance Manual for the particular RAID adapter in the system being serviced.

Undetermined problems

You are here because the diagnostic tests did not identify the failure, the Devices List is incorrect, or the system is inoperative.

Note: A corrupt CMOS can cause undetermined problems.

If power problems are suspected:

1. Power-off the computer.
2. Be sure the system is cabled correctly.
3. Remove or disconnect the following (one at a time) until you find the failure (power-on the computer and reconfigure each time).
 - Any external devices
 - Surge suppressor device (on the computer)
 - Modem, printer, mouse, or non-IBM devices
 - Each adapter
 - Drives
 - Memory Modules (Minimum requirement = one 128 MB DIMM)

Note: Minimum operating requirements are:

- a. 1 Power Supply
 - b. System Board
 - c. 1 Microprocessor
 - d. 1 Memory Module (minimum of 1 DIMM in slot labeled DIMM 1)
4. Power-on the computer. If the problem remains, suspect the following FRUs in the order listed:
 - Power Supply
 - System Board

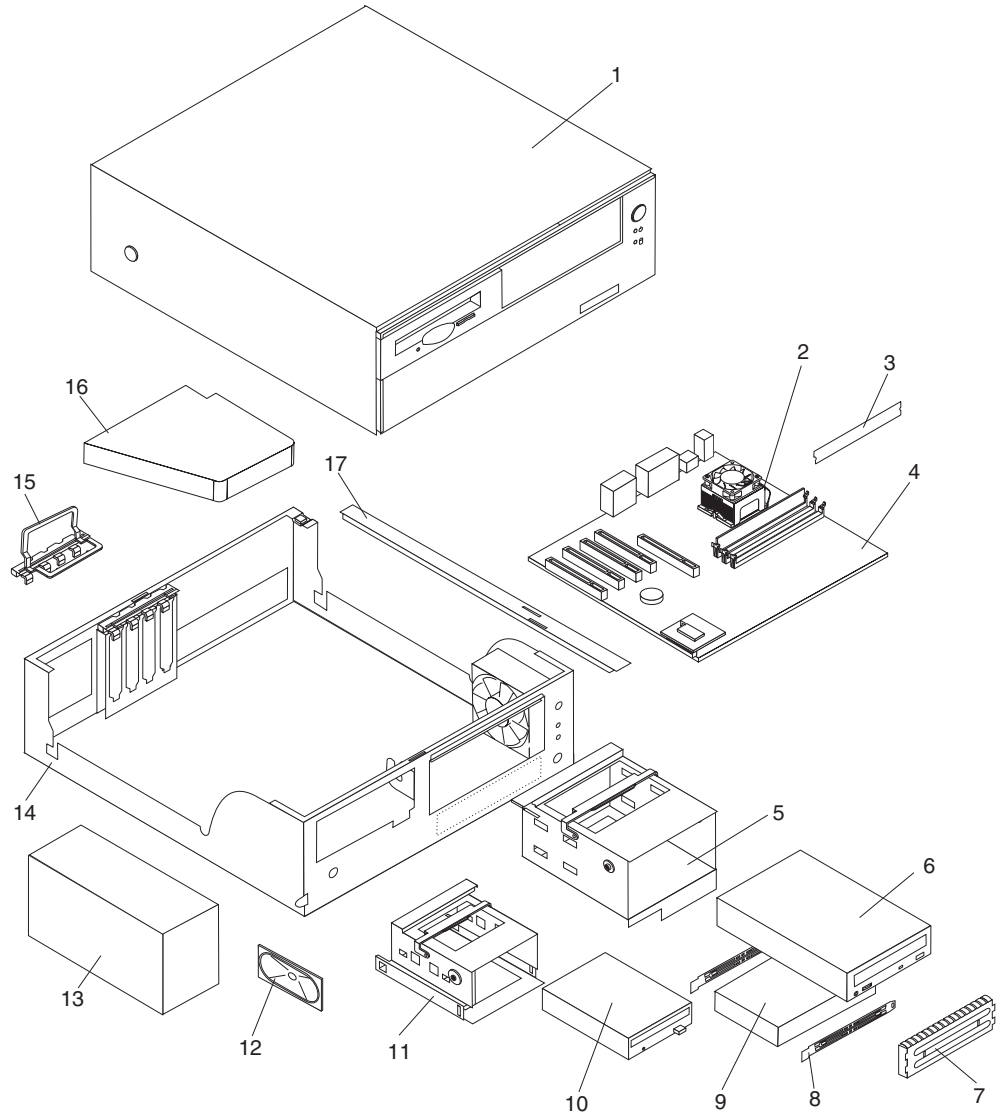
Notes:

1. If the problem goes away when you remove an adapter from the system, and replacing that adapter does not correct the problem, suspect the system board, then the power supply.
2. If you suspect a networking problem and all the system tests pass, suspect a network cabling problem external to the system.

Parts listing Intellistation E Pro

System, Type 6204

This parts listing supports Type 6204 models 10x, 20x, 30x, 1PU, 2PU, 3PU, A0X, B0X, C0X.



Index	System (IntelliStation E Pro – Type 6204, Models 10x, 1PU, 20x, 2PU, 30x, 3PU, 40x, 41x, 43x, 4PU, 50x, 51x, 5PU, A0X, B0X, C0X, F0G, F1G, F3G, G0G, G1G)	FRU No.
1	Cover, top assembly, black (All models)	49P0174
2	Processor, P4 400/1600-256 D0 (Models 10x, 1PU, A0X)	33P0963
2	Processor, P4 400/1800-256 D0 (Models 20x, 2PU, B0X)	33P0965
2	Processor, P4 400/2000-256 (Models 30x, 3PU, C0X)	25P6177
2	Processor, P4 400/2000-256 (Models 40x, 41x, 43x, 4PU, F0G, F1G, F3G)	48P7205
2	Processor, P4 400/2200-256 (Models 50x, 51x, 5PU, G0G, G1G)	48P7206
3	Memory, 128MB PC 133 CL2 ECC SDRAM (Models 40x, 41x, 43x, 50x, 51x, F0G, F1G, F3G, G0G, G1G)	10K0045
3	Memory, 256MB PC 133 CL2 ECC SDRAM (Models 10x, 20x, 30x, 1PU, 2PU, 3PU, A0X, B0X, C0X, 4PU, 5PU)	10K0047
4	Planar, w/o POV or Processor (Models 10x, 1PU, 20x, 2PU, 30x, 3PU, 40x, 41x, 43x, 4PU, 50x, 51x, 5PU, A0x, B0x, C0x, F0G, F1G, F3G, G0G, G1G)	49P4389
5	Pivot lock, 5.25 DASD (All models)	24P9877
6	CD-ROM drive, 48X (primary CD-ROM) (All models)	33P3203
6	CD-ROM drive, 48X, (alternate CD-ROM) (All models)	33P3207
6	CD-ROM drive, 48X (alternate CD-ROM) (All models)	33P3211
6	CD-ROM drive, 48X (alternate CD-ROM) (All models)	33P3215
7	Shield, EMC 5.25 (All models)	19K5548
8	Rail, hard disk drive, 7200 rpm (Models 10x, 1PU, 20x, 2PU, 30x, 3PU, 40x, 41x, 4PU, 50x, 51x, 5PU, A0X, B0X, C0X, F0G, F1G, F3G, G0G, G1G)	19K5331
9	Hard disk drive, 40GB (Models 10x, 20x, 30x, 40x, 41x, 50x, 51x, A0X, B0X, C0X, F0G, F1G, G0G, G1G)	19K1568
9	Hard disk drive, 18.2GB SCSI (primary) (Models 43x, F3G)	06P5365
9	Hard disk drive, 18.2GB (alternate) (Models 43x, F3G)	19K1485
10	Floppy disk drive, 3.5/1.44 (primary floppy disk drive) (All models)	75H9550
10	Floppy disk drive, 3.5/1.44 (secondary floppy disk drive) (All models)	06P5229
11	Pivot lock, 3.5 floppy disk drive (All models)	24P9876
12	Speaker (All models)	00N5151
13	Power supply, 160W, PFC (Models 10x, 1PU, 20x, 2PU, 30x, 3PU, 40x, 41x, 43x, 4PU, 50x, 51x, 5PU, A0X, B0X, C0X, F0G, F1G, F3G, G0G, G1G)	24P6829
13	Power supply, 160W China (Model 10C, 20C, 30C, 40C, 41C, 43C, 50C, 51C)	24P6831
14	Chassis assembly (All models)	49P4686
15	I/O cam bracket (All models)	24P9869
16	Air duct (Models 30x, 3PU, 40x, 41x, 43x, 4PU, 50x, 51x, 5PU, C0X, F0G, F1G, F3G, G0G, G1G)	24P9880
	Baffle (Models 10x, 1PU, 20x, 2PU, A0X, B0X)	49P0163
	Panel, control, power/LED assembly (All models)	37L5092
	Fansink, P4 (1.3-1.8GHZ) (Models 10x, 1PU, 20x, 2PU, A0X, B0X)	32P4002
	Fansink, P4 (1.9GHZ and higher) (Models 30x, 3PU, C0X, 40x, 41x, 43x, 4PU, 50x, 51x, 5PU, F0G, F1G, F3G, G0G, G1G)	32P4004
	Fan (All models)	22P3635
	Bracket, link (All models)	25P5032
	Kit bezel, black (All models)	24P9868
	Stand, black (All models)	25P5033
	Retention module, heatsink (All models)	24P4811
	Foot, bottom black (4) (All models)	03K9655
	Bracket, 3.5 floppy disk drive (All models)	24P9874
	Bracket, 5.25 DASD (All models)	24P9875
	Clip, heatsink retention module (Models 10x, 1PU, 20x, 2PU, A0X, B0X)	25P0867
	Keylock (All models)	25P5031
	Kit, misc. hardware (All models)	24P9878
	NVIDIA Quadro4 (P71) adapter card (Models 40x, 4PU, 50x, 5PU, F0G, G0G)	25P6684
	Matrox G450 DVI card (Models 41x, 43x, 51x, F1G, F3G, G1G)	25P6691

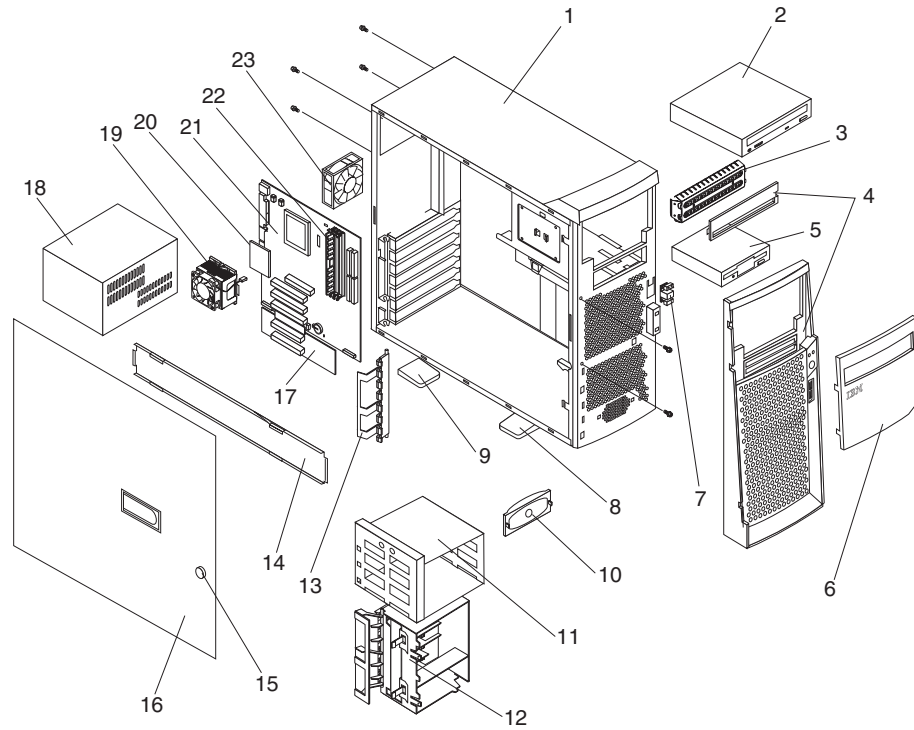
Index	System (IntelliStation E Pro – Type 6204, Models 10x, 1PU, 20x, 2PU, 30x, 3PU, 40x, 41x, 43x, 4PU, 50x, 51x, 5PU, A0X, B0X, C0X, F0G, F1G, F3G, G0G, G1G)	FRU No.
	Video card, NVIDIA Quadro2 EX (Models 10x, 1PU, 20x, 2PU, 30x, 3PU, A0X, B0X, C0X)	25P6321
	SCSI adapter (Models 43x, F3G)	06P2215
	Mouse assembly, Stealth gray (All models)	76H6620
	Battery, 3.0v (All models)	33F8354
	Label, planar loc (All models)	24P9864
	Power cord (All models)	93F2364
	Rail, hard disk drive, 10K RPM (Model 43X)	23P1328
	Cable, IDE 1 drop primary (All models)	24P9870
	Cable, floppy disk drive (All models)	24P9871
	Cable, IDE 1 drop secondary (All models)	24P9872
	Cable, CD-ROM audio (All models)	75H9219
	Cable, Dual USB (All models)	22P1188
	Cable, SCSI 1 drop (Models 43G, F3G)	24P9873
	Cable, LED/HDD (Models 43x, F3G)	76H7344
	Cable, DVI dual VGA pigtail (Models 41x, 43x, 51x, F1G, F3G, G1aG)	48P7583
	Cable, dual VGA pigtail (Models 40x, 4PU, 50x, 5PU, F0G, G0G)	48P7586
	Recovery CD -- see "Recovery CDs, Type 6204" on page 124.	

Recovery CDs, Type 6204

Recovery CD (Win 2000)	FRU No.
US-English (Models 10D, 10U, 20D, 20U, 30D, 30U, 40D, 40U, 41D, 41U, 43D, 43U, 50D, 50U, 51D, 51U)	59P1181
China (All "C" models)	62P8740
French (Models 10G, 20G, 30G, 40G, 41G, 43G, 50G, 51G)	59P1190
German (Models 10G, 20G, 30G, 40G, 41G, 43G, 50G, 51G)	59P1193
Italian (Models 10G, 20G, 30G, 40G, 41G, 43G, 50G, 51G)	59P1202
Spanish (Models 10G, 20G, 30G, 40G, 41G, 43G, 50G, 51G)	59P1208
Dutch (Models 10G, 20G, 30G, 40G, 41G, 43G, 50G, 51G)	59P1211
Danish (Models 10G, 20G, 30G, 40G, 41G, 43G, 50G, 51G)	59P1220
Finnish (Models 10G, 20G, 30G, 40G, 41G, 43G, 50G, 51G)	59P1223
Hong Kong (Traditional) (All "D" models)	62P8742
Japan (All "J" models)	62P4732
Norwegian (Models 10G, 20G, 30G, 40G, 41G, 43G, 50G, 51G)	59P1226
Swedish (Models 10G, 20G, 30G, 40G, 41G, 43G, 50G, 51G)	59P1229
Taiwan (All "V" models)	62P8741
Thai (Models 10G, 20G, 30G, 40G, 41G, 43G, 50G, 51G)	59P1253
Recovery CD (WXPP)	FRU No.
US-English (All "D" and "U" models)	33P1962
China (All "C" models)	46P6880
French (All "G" models)	33P1971
German (All "G" models)	33P1974
Hong Kong (Traditional) (ALL "D" models)	46P6882
Arabic (All "G" models)	33P1998
Italian (All "G" models)	33P1980
Spanish (All "G" models)	33P1989
Dutch (All "G" models)	33P1995
Danish (All "G" models)	33P1992
Finnish (All "G" models)	33P2007
Japan (All "J" models)	46P4027
Norwegian (All "G" models)	33P2010
Swedish (All "G" models)	33P2001
Taiwan (All "V" models)	46P6881
Thai (All "G" models)	33P2037

System, Type 6214

This parts listing supports Type 6214 models 10x, 20x, 23x, 30x, 33x, 40x, 41x, 43x, 45x, 46x, 48x, 50x, 51x, 53x, 55x, 56x, 58x, 77x, 88x, 91x, 96x, A0x, B0x, B3G, C0x, C3G, C3x, D7G, F0G, F1G, F3G, E8G, G0G, G1G, G3G.



Index	System (IntelliStation E Pro – Type 6214, Models 10x, 1PU, 20x, 23x, 2PU, 30x, 33x, 3PU, 40x, 41x, 43x, 4PU, 50x, 51x, 53x, 5PU, 77x, 88x, 91x, A0X, B0X, B3G, C0X, C3G, D7G, E8G, F0G, F1G, F3G, G0G, G1G, G3G)	FRU No.
1	Cover, side/top (All models)	19K4957
2	48X CDROM - primary (All models)	33P3203
2	48X CD-ROM drive, alternate (All models)	33P3207
2	48X CD-ROM drive, alternate (All models)	33P3211
2	48X CD-ROM drive, alternate (All models)	33P3215
3	Shield, 5.25" EMC (All models)	19K5548
4	Floppy disk drive, primary (All models)	76H4091
4	Floppy disk drive, secondary (All models)	06P5227
5	Front bezel (All models)	25P5147
6	Bezel door (All models)	25P0543
7	Perforated panel (All models)	19K4961
8	Kit, power button (All models)	19K4940
9	System feet, kit (All models)	12J4506
10	Feet, snap-in (4) (All models)	01N2196
11	Speaker (All models)	19K4929
12	Cage, DASD rotating (All models)	19K4931
13	Guide, card (All models)	19K4947
14	Retainer, I/O card (All models)	19K4945
15	Lock/key assembly (All models)	24P1751
16	Door assembly (All models)	24P1752
17	PCI extender card (All models)	10K0880
18	Power supply (All models)	24P6801
19	Fansink, P4 (1.3 - 1.8GHZ) (Models 10x, 1PU, 20x, 2PU, 77x, 88x, A0X, B0X, B3G, D7G, E8G)	32P4002
19	Fansink, P4 (1.9GHz and higher) (Models 30x, 33x, 3PU, 40x, 41x, 43x, 45x, 46x, 48x, 4PU, 50x, 51x, 53x, 55x, 56x, 58x, 5PU, 91x, 96x, C0x, C3X, F0G, F1G, F3G, G0G, G1G, G3G)	32P4004
20	Processor, P4 400/1600-256k D0 (Models 10x, 77x, A0X, D7G)	33P0963
20	Processor, P4 400/1800-256k D0 (Models 20x, 23x, 2PU, 88x, B0X, B3G, E8G)	33P0965
20	Processor, P4 400/2000-256k (Models 30x, 33x, 3PU, C0X, C3G)	25P6177
20	Processor, P4 400/2000-512k (Models 40x, 41x, 43x, 4PU, 91x, F0G, F1G, F3G)	48P7205
20	Processor, P4 400/2200-512k (Models 50x, 51x, 53x, 5PU, G0G, G1G, G3G)	48P7206
21	System board, w/o POV 1.8 Processor and below (Models 10x, 1PU, 20x, 23x, 2PU, 30x, 33x, 77x, 88x, A0X, B0X, D7G, E8G)	24P9723
21	System board, w/o POV 2.0 Processor and above (Models 30x, 33x, 3PU, C0X, C3G, 40x, 41x, 43x, 4PU, 50x, 51x, 53x, 5PU, 91x, F0G, F1G, F3G, G0G, G1G, G3G)	49P4389
22	Memory, 128MB, PC 133 CL2 ECC SDRAM (Models 10x, 20x, 23x, 30x, 1PU, 2PU, 3PU, 4PU, 5PU, 91x)	10K0045
22	Memory, 256MB, PC 133 CL2 ECC SDRAM (Model 33x, 40x, 41x, 43x, 50x, 51x, 53x, F0G, F1G, F3G, G0G, G1G, G3G)	10K0047
22	Memory, 128MB, NP (Models 77x, 88x, D7G, E8G)	10K0058
23	Fan, fixed speed, dual bearing 80mm (primary) (All models)	49P0286
23	Fan, fixed speed (alternate) (All models)	22P4447
	Bracket, support (All models)	19K4963
	Bezel kit (All models)	00N7082
	Shield, 3.5" EMC (All models)	19K4943
	Plate, EMC (All models)	24P1750
	Shield, system board EMC (All models)	25P0078
	Kit, USB blank bezel (All models)	19K4951
	Panel, power (All models)	19K4942
	Panel, control (All models)	19K4935
	Retention module, heatsink (All models)	24P4811

Index	System (IntelliStation E Pro – Type 6214, Models 10x, 1PU, 20x, 23x, 2PU, 30x, 33x, 3PU, 40x, 41x, 43x, 4PU, 50x, 51x, 53x, 5PU, 77x, 88x, 91x, A0X, B0X, B3G, C0X, C3G, D7G, E8G, F0G, F1G, F3G, G0G, G1G, G3G)	FRU No.
	Clip, heatsink retention module (All models)	25P0867
	Rail, hard disk drive 7500 RPM (Models 10x, 20x, 30x, 40x, 41x, 50x, 51x, 91x, A0X, B0X, C0X, D7G, E8G, F0G, F1G, G0G, G1G)	19K5331
	Bar, bezel release (All models)	19K4946
	Kit, handle caps (All models)	19K4934
	Handle support (All models)	19K4936
	40.0GB ATA-100 (Models 10x, 20x, 30x, 40x, 41x, 50x, 51x, 77x, 88x, 91x, A0X, B0X, C0X, D7G, E8G, F0G, F1G, G0G, G1G)	19K1568
	18.2 SCSI (primary) (Models 23x, 33x, 43x, 53x, B3G, C3G, F3G, G3G)	06P5365
	18.2 SCSI (alternate) (Models 23x, 33x, 43x, 53x, B3G, C3G, F3G, G3G)	19K1485
	Dongle (Models 43x, 53x, F3G, G3G)	09N3435
	Kit, misc. hardware (All models)	09N5764
	Rail, hard disk drive (Models 23x, 33x, 43x, 53x, B3G, C3G, F3G, G3G)	23P1328
	Video card, NVIDIA Vanta 16 (Models 77x, 88x, 91x, D7G,E8G)	25P4058
	Video card, FGL 8800 (Models 43x, 53x, F3G, G3G)	25P6680
	Video card, NVIDIAQuadro4 (P71) adapter (Models 40x, 4PU, 50x, 5PU, F0G, G0G)	25P6684
	Video card, Matrox G450 DVI (Models 41x, 51x, F1G, G1G)	25P6691
	Video card, Matrox G450 (Models 10x, 1PU, 20x, 2PU, 30x, 3PU, A0X, B0X, C0X, C3X)	22P1987
	Video card, NVIDIA Quadro2 Pro (Models 23x, 33x, B3G)	32P0841
	Adaptec SCSI U160 adapter (Models 23x, 33x, 43x, 53x, B3G, C3G, F3G, G3G)	06P2215
	Ethernet card, 10/100 (All models)	22P4509
	Mouse assembly., Stealth gray (All models)	76H6620
	Chassis (All models)	25P5111
	Service label (All models)	25P5105
	Label, planar LOC (All models)	25P4683
	Power cord (All models)	93F2364
	Cable, SCSI, 5 drop (Models 23x, 33x, 43x, 53x, B3G, C3G, F3G, G3G)	01K1549
	Cable, Ultra ATA, hard disk drive (Models 10x, 1PU, 20x, 2PU, 30x, 3PU, 40x, 41x, 43x, 4PU, 50x, 51x, 53x, 5PU, 77x, 88x, 91x, A0X, B0X, C0X, D7G, E8G, F0G, F1G, F3G, G0G, G1G, G3G)	37L4525
	Cable, ATA-66 2 drop (All models)	37L5098
	Cable, CD-ROM audio (All models)	75H9219
	Cable, floppy disk drive (All models)	76H4228
	Cable, SCSI LED (Models 23x, 33x, 43x, 53x, B3G, C3G, F3G, G3G)	76H7344
	Cable, dual VGA (Models 40x, 4PU, 50x, 5PU, F0G, G0G)	48P7586
	Cable, DVI dual VGA (Models 41x, 51x, F1G, G1G)	48P7583
	Cable, dual USB (Models 40x, 41x, 43x, 4PU, 50x, 51x, 53x, 5PU, 91x, F0G, F1G, F3G, G0G, G1G, G3G)	22P1188
	Recovery CD -- see "Recovery CDs, Type 6214".	

Recovery CDs, Type 6214

Recovery CD (Win 2000)	FRU No.
US-English (All "D" and "U" models)	59P1181
China (All "C" models)	62P8740
French (All "G" models)	59P1190
German (All "G" models)	59P1193
Hong Kong (Traditional) (All "D" models)	62P8742
Italian (All "G" models)	59P1202

Recovery CD (Win 2000)	FRU No.
Japan (All "J" models)	62P4732
Spanish (All "G" models)	59P1208
Dutch (All "G" models)	59P1211
Danish (All "G" models)	59P1220
Finnish (All "G" models)	59P1223
Norwegian (All "G" models)	59P1226
Swedish (All "G" models)	59P1229
Taiwan (All "V" models)	62P8741
Thai (All "G" models)	59P1253

Recovery CD (WXPP)	FRU No.
US-English (All "D" and "U" models)	33P1962
China (All "C" models)	46P6880
French (All "G" models)	33P1971
German (All "G" models)	33P1974
Hong Kong (Traditional) (ALL "D" models)	46P6882
Arabic (All "G" models)	33P1998
Italian (All "G" models)	33P1980
Spanish (All "G" models)	33P1989
Dutch (All "G" models)	33P1995
Danish (All "G" models)	33P1992
Finnish (All "G" models)	33P2007
Japan (All "J" models)	46P4027
Norwegian (All "G" models)	33P2010
Swedish (All "G" models)	33P2001
Taiwan (All "V" models)	46P6881
Thai (All "G" models)	33P2037

Keyboards

Keyboard	FRU No.
Arabic	37L2555
Belgium/French	37L2556
Belgium/UK	37L2557
Bulgarian	37L2558
Czech	37L2559
Chinese/US	37L2585
Danish	37L2560
Dutch	37L2561
French	37L2562
French Canadian	37L0913
French Canadian	37L2552
German	37L2563
Greek	37L2564
Hebrew	37L2565
Hungarian	37L2566
Korean	02K0901
LA Spanish	37L2553
Iceland	37L2567
Italy	37L2568
Norwegian	37L2569
Polish	37L2570
Portuguese	37L2571

Keyboard	FRU No.
Romanian	37L2572
Russian	37L2573
Serbian/Cyrillic	37L2574
Slavic	37L2575
Spanish	37L2576
Swedish/Finn	37L2577
Swiss, F/G	37L2578
Thailand	37L2587
Turkish	37L2579
Turkish	37L2580
UK English	37L2581
US English	37L2551
US English-EMEA	37L2583
Yugosl/Lat	37L2582

Related service information

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Note: The service procedures are designed to help you isolate problems. They are written with the assumption that you have model-specific training on all computers, or that are familiar with the computers, functions, terminology, and service information provided in this manual.

Safety information

The following section contains the safety information that you need to be familiar with before servicing an IBM computer.

General safety

Follow these rules to ensure general safety:

- Observe good housekeeping in the area of the machines during and after maintenance.
- When lifting any heavy object:
 1. Ensure you can stand safely without slipping.
 2. Distribute the weight of the object equally between your feet.
 3. Use a slow lifting force. Never move suddenly or twist when you attempt to lift.
 4. Lift by standing or by pushing up with your leg muscles; this action removes the strain from the muscles in your back. *Do not attempt to lift any objects that weigh more than 16 kg (35 lb) or objects that you think are too heavy for you.*
- Do not perform any action that causes hazards to the customer, or that makes the equipment unsafe.
- Before you start the machine, ensure that other service representatives and the customer's personnel are not in a hazardous position.
- Place removed covers and other parts in a safe place, away from all personnel, while you are servicing the machine.
- Keep your tool case away from walk areas so that other people will not trip over it.
- Do not wear loose clothing that can be trapped in the moving parts of a machine. Ensure that your sleeves are fastened or rolled up above your elbows. If your hair is long, fasten it.
- Insert the ends of your necktie or scarf inside clothing or fasten it with a nonconductive clip, approximately 8 centimeters (3 inches) from the end.
- Do not wear jewelry, chains, metal-frame eyeglasses, or metal fasteners for your clothing.

Remember: Metal objects are good electrical conductors.
- Wear safety glasses when you are: hammering, drilling soldering, cutting wire, attaching springs, using solvents, or working in any other conditions that might be hazardous to your eyes.

- After service, reinstall all safety shields, guards, labels, and ground wires. Replace any safety device that is worn or defective.
- Reinstall all covers correctly before returning the machine to the customer.

Electrical safety



CAUTION:

Electrical current from power, telephone, and communication cables can be hazardous. To avoid personal injury or equipment damage, disconnect the attached power cords, telecommunication systems, networks, and modems before you open the server covers, unless instructed otherwise in the installation and configuration procedures.

Observe the following rules when working on electrical equipment.

Important: Use only approved tools and test equipment. Some hand tools have handles covered with a soft material that does not insulate you when working with live electrical currents.

Many customers have, near their equipment, rubber floor mats that contain small conductive fibers to decrease electrostatic discharges. Do not use this type of mat to protect yourself from electrical shock.

- Find the room emergency power-off (EPO) switch, disconnecting switch, or electrical outlet. If an electrical accident occurs, you can then operate the switch or unplug the power cord quickly.
- Do not work alone under hazardous conditions or near equipment that has hazardous voltages.
- Disconnect all power before:
 - Performing a mechanical inspection
 - Working near power supplies
 - Removing or installing main units
- Before you start to work on the machine, unplug the power cord. If you cannot unplug it, ask the customer to power-off the wall box that supplies power to the machine and to lock the wall box in the off position.
- If you need to work on a machine that has exposed electrical circuits, observe the following precautions:
 - Ensure that another person, familiar with the power-off controls, is near you.

Remember: Another person must be there to switch off the power, if necessary.
 - Use only one hand when working with powered-on electrical equipment; keep the other hand in your pocket or behind your back.

Remember: There must be a complete circuit to cause electrical shock. By observing the above rule, you may prevent a current from passing through your body.
 - When using testers, set the controls correctly and use the approved probe leads and accessories for that tester.
 - Stand on suitable rubber mats (obtained locally, if necessary) to insulate you from grounds such as metal floor strips and machine frames.

Observe the special safety precautions when you work with very high voltages; these instructions are in the safety sections of maintenance information. Use extreme care when measuring high voltages.

- Regularly inspect and maintain your electrical hand tools for safe operational condition.
- Do not use worn or broken tools and testers.
- *Never assume* that power has been disconnected from a circuit. First, *check* that it has been powered-off.
- Always look carefully for possible hazards in your work area. Examples of these hazards are moist floors, nongrounded power extension cables, power surges, and missing safety grounds.
- Do not touch live electrical circuits with the reflective surface of a plastic dental mirror. The surface is conductive; such touching can cause personal injury and machine damage.
- Do not service the following parts with the power on when they are removed from their normal operating places in a machine:
 - Power supply units
 - Pumps
 - Blowers and fans
 - Motor generators

and similar units. (This practice ensures correct grounding of the units.)

- If an electrical accident occurs:
 - Use caution; do not become a victim yourself.
 - Switch off power.
 - Send another person to get medical aid.

Safety inspection guide

The intent of this inspection guide is to assist you in identifying potentially unsafe conditions on these products. Each machine, as it was designed and built, had required safety items installed to protect users and service personnel from injury. This guide addresses only those items. However, good judgment should be used to identify potential safety hazards due to attachment of non-IBM features or options not covered by this inspection guide.

If any unsafe conditions are present, you must determine how serious the apparent hazard could be and whether you can continue without first correcting the problem.

Consider these conditions and the safety hazards they present:

- Electrical hazards, especially primary power (primary voltage on the frame can cause serious or fatal electrical shock).
- Explosive hazards, such as a damaged CRT face or bulging capacitor
- Mechanical hazards, such as loose or missing hardware

The guide consists of a series of steps presented in a checklist. Begin the checks with the power off, and the power cord disconnected.

Checklist:

1. Check exterior covers for damage (loose, broken, or sharp edges).
2. Power-off the computer. Disconnect the power cord.

3. Check the power cord for:
 - a. A third-wire ground connector in good condition. Use a meter to measure third-wire ground continuity for 0.1 ohm or less between the external ground pin and frame ground.
 - b. The power cord should be the appropriate type as specified in the parts listings.
 - c. Insulation must not be frayed or worn.
4. Remove the cover.
5. Check for any obvious non-IBM alterations. Use good judgment as to the safety of any non-IBM alterations.
6. Check inside the unit for any obvious unsafe conditions, such as metal filings, contamination, water or other liquids, or signs of fire or smoke damage.
7. Check for worn, frayed, or pinched cables.
8. Check that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.

Handling electrostatic discharge-sensitive devices

Any computer part containing transistors or integrated circuits (ICs) should be considered sensitive to electrostatic discharge (ESD). ESD damage can occur when there is a difference in charge between objects. Protect against ESD damage by equalizing the charge so that the machine, the part, the work mat, and the person handling the part are all at the same charge.

Notes:

1. Use product-specific ESD procedures when they exceed the requirements noted here.
2. Make sure that the ESD protective devices you use have been certified (ISO 9000) as fully effective.

When handling ESD-sensitive parts:

- Keep the parts in protective packages until they are inserted into the product.
- Avoid contact with other people.
- Wear a grounded wrist strap against your skin to eliminate static on your body.
- Prevent the part from touching your clothing. Most clothing is insulative and retains a charge even when you are wearing a wrist strap.
- Use the black side of a grounded work mat to provide a static-free work surface. The mat is especially useful when handling ESD-sensitive devices.
- Select a grounding system, such as those listed below, to provide protection that meets the specific service requirement.

Note: The use of a grounding system is desirable but not required to protect against ESD damage.

- Attach the ESD ground clip to any frame ground, ground braid, or green-wire ground.
- Use an ESD common ground or reference point when working on a double-insulated or battery-operated system. You can use coax or connector-outside shells on these systems.
- Use the round ground-prong of the ac plug on ac-operated computers.

Grounding requirements

Electrical grounding of the computer is required for operator safety and correct system function. Proper grounding of the electrical outlet can be verified by a certified electrician.

Safety notices (multi-lingual translations)

The caution and danger safety notices in this section are provided in the following languages:

- English
- Brazilian/Portuguese
- Chinese
- French
- German
- Italian
- Korean
- Spanish

Important: All caution and danger statements in this IBM documentation begin with a number. This number is used to cross reference an English caution or danger statement with translated versions of the caution or danger statement in this section.

For example, if a caution statement begins with a number 1, translations for that caution statement appear in this section under statement 1.

Be sure to read all caution and danger statements before performing any of the instructions.

- Statement 1



DANGER

Electrical current from power, telephone and communication cables is hazardous.

To avoid a shock hazard:

- **Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.**
- **Connect all power cords to a properly wired and grounded electrical outlet.**
- **Connect to properly wired outlets any equipment that will be attached to this product.**
- **When possible, use one hand only to connect or disconnect signal cables.**
- **Never turn on any equipment when there is evidence of fire, water, or structural damage.**
- **Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.**

- Connect and disconnect cables as described in the following table when installing, moving, or opening covers on this product or attached devices.

To Connect	To Disconnect
<ol style="list-style-type: none"> 1. Turn everything OFF. 2. First, attach all cables to devices. 3. Attach signal cables to connectors. 4. Attach power cords to outlet. 5. Turn device ON. 	<ol style="list-style-type: none"> 1. Turn everything OFF. 2. First, remove power cords from outlet. 3. Remove signal cables from connectors. 4. Remove all cables from devices.

- Statement 2



CAUTION:

When replacing the lithium battery, use only IBM Part Number 33F8354 or an equivalent type battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type made by the same 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.

- Statement 3



CAUTION:

When laser products (such as CD-ROMs, DVD-ROM drives, fiber optic devices, or transmitters) are installed, note the following:

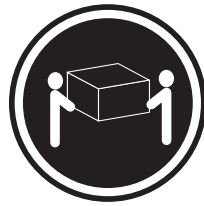
- Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.
- Use of controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.



DANGER: Some laser products contain an embedded Class 3A or Class 3B laser diode. Note the following:

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

- Statement 4



≥18 kg (37 lbs)



≥32 kg (70.5 lbs)



≥55 kg (121.2 lbs)

CAUTION:

Use safe practices when lifting.

- Statement 5



CAUTION:

The power control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.



- Statement 10

CAUTION:

Do not place any object weighing more than 82 kg (180 lbs.) on top of rack-mounted devices.



Importante:

Todas as instruções de cuidado e perigo da IBM documentation começam com um número. Este número é utilizado para fazer referência cruzada de uma instrução de cuidado ou perigo no idioma inglês com as versões traduzidas das instruções de cuidado ou perigo encontradas nesta seção.

Por exemplo, se uma instrução de cuidado é iniciada com o número 1, as traduções para aquela instrução de cuidado aparecem nesta seção sob a instrução 1.

Certifique-se de ler todas as instruções de cuidado e perigo antes de executar qualquer operação.

Instrução 1



PERIGO

A corrente elétrica proveniente de cabos de alimentação, de telefone e de comunicações é perigosa.

Para evitar risco de choque:

- Não conecte ou desconecte cabos e não realize instalação, manutenção ou reconfiguração deste produto durante uma tempestade com raios.
- Conecte todos os cabos de alimentação a tomadas elétricas corretamente instaladas e aterradas.
- Conecte todos os equipamentos ao qual esse produto será conectado a tomadas corretamente instaladas.
- Sempre que possível, utilize apenas uma das mãos para conectar ou desconectar cabos de sinal.
- Nunca ligue qualquer equipamento quando existir evidência de danos por fogo, água ou na estrutura.
- Desconecte cabos de alimentação, sistemas de telecomunicação, redes e modems antes de abrir as tampas dos dispositivos, a menos que especificado de maneira diferente nos procedimentos de instalação e configuração.
- Conecte e desconecte cabos conforme descrito na seguinte tabela, ao instalar ou movimentar este produto ou os dispositivos conectados, ou ao abrir suas tampas.

Para Conectar:	Para Desconectar:
<ol style="list-style-type: none">1. DESLIGUE Tudo.2. Primeiramente, conecte todos os cabos aos dispositivos.3. Conecte os cabos de sinal aos conectores.4. Conecte os cabos de alimentação às tomadas.5. LIGUE os dispositivos.	<ol style="list-style-type: none">1. DESLIGUE Tudo.2. Primeiramente, remova os cabos de alimentação das tomadas.3. Remova os cabos de sinal dos conectores.4. Remova todos os cabos dos dispositivos.

Instrução 2



CUIDADO:

Ao substituir a bateria de lítio, utilize apenas uma bateria IBM, Número de Peça 33F8354 ou uma bateria de tipo equivalente, recomendada pelo fabricante. Se o seu sistema possui um módulo com uma bateria de lítio, substitua-o apenas pelo mesmo tipo de módulo, do mesmo fabricante. A bateria contém lítio e pode explodir se não for utilizada, manuseada e descartada de maneira correta.

Não:

- Jogue ou coloque na água
- Aqueça a mais de 100°C (212°F)
- Conserte nem desmonte

Para descartar a bateria, entre em contato com a área de atendimento a clientes IBM, pelo telefone (011) 889-8986, para obter informações sobre como enviar a bateria pelo correio para a IBM.

Instrução 3



PRECAUCIÓN:

Quando produtos a laser (unidades de CD-ROM, unidades de DVD, dispositivos de fibra ótica, transmissores, etc.) estiverem instalados, observe o seguinte:

- Não remova as tampas. A remoção das tampas de um produto a laser pode resultar em exposição prejudicial à radiação de laser. Nenhuma peça localizada no interior do dispositivo pode ser consertada.
- A utilização de controles ou ajustes ou a execução de procedimentos diferentes dos especificados aqui pode resultar em exposição prejudicial à radiação.

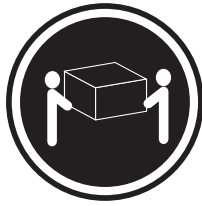
PERIGO

Alguns produtos a laser contêm um diodo laser da Classe 3A ou Classe 3B embutido. Observe o seguinte:

Radiação de laser quando aberto. Não olhe diretamente para o raio a olho nu ou com instrumentos óticos, e evite exposição direta ao raio.

Instrução 4

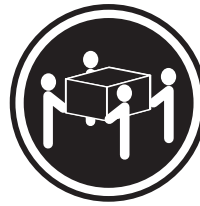




≥18 kg (37 lbs)



≥32 kg (70.5 lbs)



≥55 kg (121.2 lbs)

CUIDADO:

Ao levantar a máquina, faça-o com segurança.

Instrução 5



CUIDADO:

Os botões Liga/Desliga localizados no dispositivo e na fonte de alimentação não desligam a corrente elétrica fornecida ao dispositivo. O dispositivo também pode ter mais de um cabo de alimentação. Para remover toda a corrente elétrica do dispositivo, assegure que todos os cabos de alimentação estejam desconectados da fonte de energia elétrica.



CUIDADO:

Instrução 10



CUIDADO:



Não coloque nenhum objeto com peso superior a 82 kg (180 lbs.) sobre dispositivos montados em rack.

重要:

Server Library 中的所有提醒和危险条款前都有一个数字标识。该数字是用来交叉引用一个英文的提醒和危险条款及本部分中的与之对应的已翻译成其它文字的提醒和危险条款。

例如, 如果一个提醒条款前的数字为 1, 则本部分中相应的译文也带有标号 1。

在执行任何指示的操作之前, 请确保您已经阅读了全部提醒和危险条款。

声明 1



危险

电源、电话和通信电缆中带有危险电流。
为避免电击:
雷电期间不要拆接电缆或安装、维修及重新配置本产品。
将所有电源线连接至正确布线并已安全接地的电源插座上。
将与本产品连接的所有设备连接至正确布线的插座上。
尽量只使用单手拆接信号电缆。
有水、火及结构损坏迹象时, 请勿打开任何设备。
除非在安装配置过程中有明确指示, 否则, 打开设备机盖前应先断开与电源线、远程通信系统、网络和调制解调器的所有连接。
安装、移动或打开本产品及其附带设备的机盖时, 应按下表所述连接和断开电缆。

连接时:

1. 关闭所有设备。
2. 首先将所有电缆连接至设备。
3. 将信号电缆连接至接口。
4. 将电源线连接至插座。

断开连接时:

1. 关闭所有设备。
2. 首先从插座中拔出电源线。
3. 从接口上拔下信号电缆。

声明 2



警告:

更换锂电池时，只能使用 IBM 产品号 33F8354 或者是厂商推荐的等同类型的电池。

如果系统模块中含有锂电池，则只能使用同一厂商制造的同一类型的模块进行更换。电池中含有锂，如果使用、拿放或处理不当，可能会发生爆炸。

请勿对电池进行下列操作：
扔入或浸入水电
加热超过 100 (212 F)
进行修理或分解
请按本地法规要求处理电池。

声明 3



警告:

安装激光产品（如 CD-ROM、DVD 驱动器、光纤设备或送话器）时，应注意以下事项：

不要拆除外盖。拆除激光产品的外盖可能会导致激光辐射的危险，本设备中没有用户可维修的部件。

非此处指定的其它控制、调整或与性能有关的操作都有可能导致激光辐射的危险。



危险

某些激光产品中包含内嵌的 3A 级或 3B 级激光二极管。请注意以下事项。

打开时会产生激光辐射。不要直视光束，不要使用光学仪器直接观看光束，避免直接暴露于光束之下。

声明 4



≥18 kg (37 磅)



≥32 kg (70.5 磅)



≥55 kg (121.2 磅)

警告：
抬起时请采用安全操作方法。

声明 5



警告：
使用设备上的电源控制按钮和电源上的开关都不能断开本设备上的电流。
另外，本设备可能带有多条电源线。如要断开设备上的所有电流，请确
保所有电源线均已与电源断开连接。



声明 6



警告：
如果在电源线连接设备的一端安装了固定松紧夹，则必须将电源线的另一端连接至
使用方便的电源。

声明 7



警告:

如果设备带有外门，则在移动或抬起设备前应将其拆除或固定以避免造成人员伤害。外门支撑不了设备的重量。

声明 8



警告:

不要拆除电源外盖或贴有下列标签的任何部件。



贴有此标签的组件内部存在高电压、高电流的危险。这些组件中没有用户可维修的部件。如果怀疑其中的部件存在问题，应与服务技术人员联系。

声明 9



警告:

为避免人员伤害，拆除设备上的风扇前应拨下热插拔风扇电缆。

声明 10



警告:

机柜安装的设备上面不能放置重于 82kg (180 磅) 的物品。



> 82 kg (180 磅)

声明 11



警告:

下面的标签表明附近有锋利的边、角或接头。



声明 12



警告:

下面的标签表明附近有高热表面。



重要資訊：

Server Library 中所有「注意」及「危險」的聲明均以數字開始。此一數字是用來作為交互參考之用，英文「注意」或「危險」聲明可在本節中找到相同內容的「注意」或「危險」聲明的譯文。

例如，有一「危險」聲明以數字 1 開始，則該「危險」聲明的譯文將出現在本節的「聲明」1 中。

執行任何指示之前，請詳讀所有「注意」及「危險」的聲明。

聲明 1



危險

電源、電話及通信電纜上所產生的電流均有危險性。

欲避免電擊危險：

- 在雷雨期間，請勿連接或切斷本產品上的任何電纜線，或安裝、維修及重新架構本產品。
- 請將電源線接至接線及接地正確的電源插座。
- 請將本產品隨附的設備連接至接線正確的插座。
- 儘可能使用單手來連接或切斷信號電纜線。
- 當設備有火燒或泡水的痕跡，或有結構性損害時，請勿開啓該設備的電源。
- 在安裝及架構之時，若非非常熟悉，在開啓裝置蓋子之前，請切斷電源線、電信系統、網路及數據機。
- 在安裝、移動本產品或附加裝置，或開啓其蓋子時，請依照下表中「連接」及「切斷」電纜線的步驟執行。

連接：

1. 關閉所有開關。
2. 先將所有電纜線接上裝置。
3. 將信號電纜接上接頭。
4. 再將電源線接上電源插座。
5. 開啓裝置的電源。

切斷：

1. 關閉所有開關。
2. 先自電源插座拔掉電源線。
3. 拔掉接頭上的所有信號電纜。
4. 再拔掉裝置上的所有電纜線。

聲明 2



注意：

更換鋰電池時，只可使用 IBM 零件編號 33F8354 的電池，或製造商建議之相當類型的電池。若系統中具有包含鋰電池的模組，在更換此模組時，請使用相同廠商製造的相同模組類型。如未正確使用、處理或丟棄含有鋰的電池時，可能會引發爆炸。

請勿將電池：

- 丟入或浸入水中
- 加熱超過 100 °C (212 °F)
- 修理或拆開

請遵照當地法令規章處理廢棄電池。

聲明 3



注意：

安裝雷射產品(如 CD-ROM、DVD 光碟機、光纖裝置或發射器)時，請注意下列事項：

- 請勿移開蓋子。移開雷射產品的蓋子，您可能會暴露於危險的雷射輻射之下。裝置中沒有需要維修的組件。
- 不依此處所指示的控制、調整或處理步驟，您可能會暴露於危險的輻射之下。



危險

有些雷射產品含有內嵌式 Class 3A 或 Class 3B 雷射二極體。請注意下列事項：

開啓時會產生雷射輻射。請勿凝視光束，不要使用光學儀器直接觀察，且應避免直接暴露在光束下。

聲明 4



≥ 18 公斤 (37 磅) ≥ 32 公斤 (70.5 磅) ≥ 55 公斤 (121.2 磅)

注意：

抬起裝置時，請注意安全措施。

聲明 5



注意：

裝置上的電源控制按鈕及電源供應器上的電源開關均無法關閉裝置上的電流。

本裝置可能有一條以上的電源線。如要移除裝置上的所有電流，請確認所有電源線已與電源分離。



聲明 10



注意：

請勿將任何重量超過 82 公斤 (180 磅) 的物品置於已安裝機架的裝置上方。



>82 公斤 (180 磅)

Important:

Toutes les consignes Attention et Danger indiquées dans la bibliothèque IBM documentation sont précédées d'un numéro. Ce dernier permet de mettre en correspondance la consigne en anglais avec ses versions traduites dans la présente section.

Par exemple, si une consigne de type Attention est précédée du chiffre 1, ses traductions sont également précédées du chiffre 1 dans la présente section.

Prenez connaissance de toutes les consignes de type Attention et Danger avant de procéder aux opérations décrites par les instructions.

Notice n° 1



DANGER

Le courant électrique passant dans les câbles de communication, ou les cordons téléphoniques et d'alimentation peut être dangereux.

Pour éviter tout risque de choc électrique:

- Ne manipulez aucun câble et n'effectuez aucune opération d'installation, d'entretien ou de reconfiguration de ce produit au cours d'un orage.
- Branchez tous les cordons d'alimentation sur un socle de prise de courant correctement câblé et mis à la terre.
- Branchez sur des socles de prise de courant correctement câblés tout équipement connecté à ce produit.
- Lorsque cela est possible, n'utilisez qu'une seule main pour connecter ou déconnecter les câbles d'interface.
- Ne mettez jamais un équipement sous tension en cas d'incendie ou d'inondation, ou en présence de dommages matériels.
- Avant de retirer les carters de l'unité, mettez celle-ci hors tension et déconnectez ses cordons d'alimentation, ainsi que les câbles qui la relie aux réseaux, aux systèmes de télécommunication et aux modems (sauf instruction contraire mentionnée dans les procédures d'installation et de configuration).
- Lorsque vous installez ou que vous déplacez le présent produit ou des périphériques qui lui sont raccordés, reportez-vous aux instructions ci-dessous pour connecter et déconnecter les différents cordons.

Connexion	Déconnexion
1. Mettez les unités hors tension.	1. Mettez les unités hors tension.
2. Commencez par brancher tous les cordons sur les unités.	2. Débranchez les cordons d'alimentation des prises.
3. Branchez les câbles d'interface sur des connecteurs.	3. Débranchez les câbles d'interface des connecteurs.
4. Branchez les cordons d'alimentation sur des prises.	4. Débranchez tous les câbles des unités.
5. Mettez les unités sous tension.	



Notice n° 2

ATTENTION:

Remplacez la pile au lithium usagée par une pile de référence identique exclusivement - voir la référence IBM - ou par une pile équivalente recommandée par le fabricant. Si votre système est doté d'un module contenant une pile au lithium, vous devez le remplacer uniquement par un module identique, produit par le même fabricant. La pile contient du lithium et présente donc un risque d'explosion en cas de mauvaise manipulation ou utilisation.

- Ne la jetez pas à l'eau.
- Ne l'exposez pas à une température supérieure à 100 °C.
- Ne cherchez pas à la réparer ou à la démonter.

Pour la mise au rebut, reportez-vous à la réglementation en vigueur.



Notice n° 3

ATTENTION:

Si des produits laser sont installés (tels que des unités de CD-ROM ou de DVD, des périphériques contenant des fibres optiques ou des émetteurs-récepteurs), prenez connaissance des informations suivantes:

- N'ouvrez pas ces produits pour éviter une exposition directe au rayon laser. Vous ne pouvez effectuer aucune opération de maintenance à l'intérieur.
- Pour éviter tout risque d'exposition au rayon laser, respectez les consignes de réglage et d'utilisation des commandes, ainsi que les procédures décrites dans le présent document.



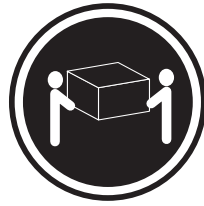
DANGER

Certains produits laser contiennent une diode laser de classe 3A ou 3B. Prenez connaissance des informations suivantes:

Rayonnement laser lorsque le carter est ouvert. évitez de regarder fixement le faisceau ou de l'observer à l'aide d'instruments optiques. évitez une exposition directe au rayon.

Notice n° 4

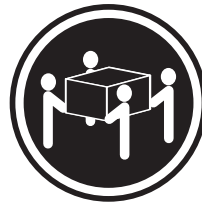




≥18 kg (37 lbs)



≥32 kg (70.5 lbs)



≥55 kg (121.2 lbs)

ATTENTION:

Faites-vous aider pour soulever ce produit.

Notice n° 5



ATTENTION:

Le bouton de mise sous tension/hors tension de l'unité et l'interrupteur d'alimentation du bloc d'alimentation ne coupent pas l'arrivée de courant électrique à l'intérieur de la machine. Il se peut que votre unité dispose de plusieurs cordons d'alimentation. Pour isoler totalement l'unité du réseau électrique, débranchez tous les cordons d'alimentation des socles de prise de courant.



Notice n° 10



ATTENTION:

Ne posez pas d'objet dont le poids dépasse 82 kg sur les unités montées en armoire.

Wichtig:

Alle Sicherheitshinweise in dieser IBM documentation beginnen mit einer Nummer. Diese Nummer verweist auf einen englischen Sicherheitshinweis mit den übersetzten Versionen dieses Hinweises in diesem Abschnitt.

Wenn z. B. ein Sicherheitshinweis mit der Nummer 1 beginnt, so erscheint die Übersetzung für diesen Sicherheitshinweis in diesem Abschnitt unter dem Hinweis 1.

Lesen Sie alle Sicherheitshinweise, bevor Sie eine Anweisung ausführen.

Hinweis 1



VORSICHT

Elektrische Spannungen von Netz-, Telefon- und Datenübertragungsleitungen sind gefährlich.

Aus Sicherheitsgründen:

- Bei Gewitter an diesem Gerät keine Kabel anschließen oder lösen. Ferner keine Installations-, Wartungs- oder Rekonfigurationsarbeiten durchführen.
- Gerät nur an eine Schutzkontaktsteckdose mit ordnungsgemäß geerdetem Schutzkontakt anschließen.
- Alle angeschlossenen Geräte ebenfalls an Schutzkontaktsteckdosen mit ordnungsgemäß geerdetem Schutzkontakt anschließen.
- Signalkabel möglichst einhändig anschließen oder lösen.
- Keine Geräte einschalten, wenn die Gefahr einer Beschädigung durch Feuer, Wasser oder andere Einflüsse besteht.
- Die Verbindung zu den angeschlossenen Netzkabeln, Telekommunikationssystemen, Netzwerken und Modems ist vor dem Öffnen des Gehäuses zu unterbrechen. Es sei denn, dies ist in den zugehörigen Installations- und Konfigurationsprozeduren anders angegeben.
- Nur nach den nachfolgend aufgeführten Anweisungen arbeiten, die für Installation, Transport oder Öffnen von Gehäusen von Personal Computern oder angeschlossenen Einheiten gelten.

Kabel anschließen:	Kabel lösen:
<ol style="list-style-type: none">1. Alle Geräte ausschalten und Netzstecker ziehen.2. Zuerst alle Kabel an Einheiten anschließen.3. Signalkabel an Anschlußbuchsen anschließen.4. Netzstecker an Steckdose anschließen.5. Gerät einschalten.	<ol style="list-style-type: none">1. Alle Geräte ausschalten.2. Zuerst Netzstecker von Steckdose lösen.3. Signalkabel von Anschlußbuchsen lösen.4. Alle Kabel von Einheiten lösen.

Hinweis 2



ACHTUNG:

Eine verbrauchte Batterie nur durch eine Batterie mit der IBM Teilenummer 33F8354 oder durch eine vom Hersteller empfohlene Batterie ersetzen. Wenn Ihr System ein Modul mit einer Lithium-Batterie enthält, ersetzen Sie es immer mit dem selben Modultyp vom selben Hersteller. Die Batterie enthält Lithium und kann bei unsachgemäßer Verwendung, Handhabung oder Entsorgung explodieren.

Die Batterie nicht:

- mit Wasser in Berührung bringen.
- über 100 C erhitzen.
- reparieren oder zerlegen.

Die örtlichen Bestimmungen für die Entsorgung von Sondermüll beachten.

Hinweis 3



ACHTUNG:

Wenn ein Laserprodukt (z. B. CD-ROM-Laufwerke, DVD-Laufwerke, Einheiten mit Glasfaserkabeln oder Transmitter) installiert ist, beachten Sie folgendes.

- Das Entfernen der Abdeckungen des CD-ROM-Laufwerks kann zu gefährlicher Laserstrahlung führen. Es befinden sich keine Teile innerhalb des CD-ROM-Laufwerks, die vom Benutzer gewartet werden müssen. Die Verkleidung des CD-ROM-Laufwerks nicht öffnen.
- Steuer- und Einstellelemente sowie Verfahren nur entsprechend den Anweisungen im vorliegenden Handbuch einsetzen. Andernfalls kann gefährliche Laserstrahlung auftreten.



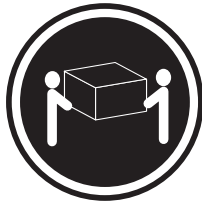
VORSICHT

Manche CD-ROM-Laufwerke enthalten eine eingebaute Laserdiode der Klasse 3A oder 3B. Die nachfolgend aufgeführten Punkte beachten.

Laserstrahlung bei geöffneter Tür. Niemals direkt in den Laserstrahl sehen, nicht direkt mit optischen Instrumenten betrachten und den Strahlungsbereich meiden.

Hinweis 4





≥18 kg



≥32 kg



≥55 kg

ACHTUNG:

Beim Anheben der Maschine die vorgeschriebenen Sicherheitsbestimmungen beachten.

Hinweis 5



ACHTUNG:

Mit dem Betriebsspannungsschalter an der Vorderseite des Servers und dem Betriebsspannungsschalter am Netzteil wird die Stromversorgung für den Server nicht unterbrochen. Der Server könnte auch mehr als ein Netzkabel aufweisen. Um die gesamte Stromversorgung des Servers auszuschalten, muß sichergestellt werden, daß alle Netzkabel aus den Netzsteckdosen herausgezogen wurden.



Hinweis 10



ACHTUNG:



Keine Gegenstände, die mehr als 82 kg wiegen, auf Rack-Einheiten ablegen.

Importante:

Tutti gli avvisi di attenzione e di pericolo riportati nella pubblicazione IBM documentation iniziano con un numero. Questo numero viene utilizzato per confrontare avvisi di attenzione o di pericolo in inglese con le versioni tradotte riportate in questa sezione.

Ad esempio, se un avviso di attenzione inizia con il numero 1, la relativa versione tradotta è presente in questa sezione con la stessa numerazione.

Prima di eseguire una qualsiasi istruzione, accertarsi di leggere tutti gli avvisi di attenzione e di pericolo.

Avviso 1



PERICOLO

La corrente elettrica circolante nei cavi di alimentazione, del telefono e di segnale è pericolosa.

Per evitare il pericolo di scosse elettriche:

- Non collegare o scollegare i cavi, non effettuare l'installazione, la manutenzione o la riconfigurazione di questo prodotto durante i temporali.
- Collegare tutti i cavi di alimentazione ad una presa elettrica correttamente cablata e munita di terra di sicurezza.
- Collegare qualsiasi apparecchiatura collegata a questo prodotto ad una presa elettrica correttamente cablata e munita di terra di sicurezza.
- Quando possibile, collegare o scollegare i cavi di segnale con una sola mano.
- Non accendere qualsiasi apparecchiatura in presenza di fuoco, acqua o se sono presenti danni all'apparecchiatura stessa.
- Scollegare i cavi di alimentazione, i sistemi di telecomunicazioni, le reti e i modem prima di aprire i coperchi delle unità, se non diversamente indicato nelle procedure di installazione e configurazione.
- Collegare e scollegare i cavi come descritto nella seguente tabella quando si effettuano l'installazione, la rimozione o l'apertura dei coperchi di questo prodotto o delle unità collegate.

Per collegare:	Per scollegare:
1. SPEGNERE tutti i dispositivi.	1. SPEGNERE tutti i dispositivi.
2. Collegare prima tutti i cavi alle unità.	2. Rimuovere prima i cavi di alimentazione dalle prese elettriche.
3. Collegare i cavi di segnale ai connettori.	3. Rimuovere i cavi di segnale dai connettori.
4. Collegare i cavi di alimentazione alle prese elettriche.	4. Rimuovere tutti i cavi dalle unità.
5. ACCENDERE le unità.	

Avviso 2



ATTENZIONE:

Quando si sostituisce la batteria al litio, utilizzare solo una batteria IBM con numero parte 33F8354 o batterie dello stesso tipo o di tipo equivalente consigliate dal produttore. Se il sistema di cui si dispone è provvisto di un modulo contenente una batteria al litio, sostituire tale batteria solo con un tipo di modulo uguale a quello fornito dal produttore. La batteria contiene litio e può esplodere se utilizzata, maneggiata o smaltita impropriamente.

Evitare di:

- Gettarla o immergerla in acqua
- Riscaldarla ad una temperatura superiore ai 100°C
- Cercare di ripararla o smontarla

Smaltire secondo la normativa in vigore (D.Lgs 22 del 5/2/9) e successive disposizioni nazionali e locali.

Avviso 3



ATTENZIONE:

Quando si installano prodotti laser come, ad esempio, le unità DVD, CD-ROM, a fibre ottiche o trasmettitori, prestare attenzione a quanto segue:

- Non rimuovere i coperchi. L'apertura dei coperchi di prodotti laser può determinare l'esposizione a radiazioni laser pericolose. All'interno delle unità non vi sono parti su cui effettuare l'assistenza tecnica.
- L'utilizzo di controlli, regolazioni o l'esecuzione di procedure non descritti nel presente manuale possono provocare l'esposizione a radiazioni pericolose.



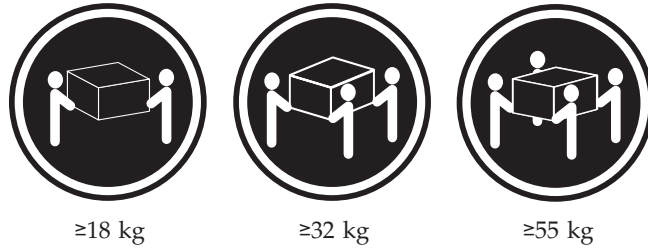
PERICOLO

Alcuni prodotti laser contengono all'interno un diodo laser di Classe 3A o Classe 3B. Prestare attenzione a quanto segue:

Aperto l'unità vengono emesse radiazioni laser. Non fissare il fascio, non guardarlo direttamente con strumenti ottici ed evitare l'esposizione diretta al fascio.

Avviso 4





ATTENZIONE:

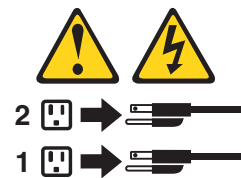
Durante il sollevamento della macchina seguire delle norme di sicurezza.

Avviso 5



ATTENZIONE:

Il pulsante del controllo dell'alimentazione situato sull'unità e l'interruttore di alimentazione posto sull'alimentatore non disattiva la corrente elettrica fornita all'unità. L'unità potrebbe disporre di più di un cavo di alimentazione. Per disattivare la corrente elettrica dall'unità, accertarsi che tutti i cavi di alimentazione siano scollegati dalla sorgente di alimentazione.



Avviso 10



ATTENZIONE:



Non poggiare oggetti che pesano più di 82 kg sulla parte superiore delle unità montate in rack.

중요:

본 *Server Library*에 있는 모든 주의 및 위험 경고문은 번호로 시작합니다. 이 번호는 영문 주의 혹은 위험 경고문과 이 절에 나오는 번역된 버전의 주의 혹은 위험 경고문을 상호 참조하는 데 사용됩니다.

예를 들어, 주의 경고문이 번호 1로 시작하면, 번역된 해당 주의 경고문을 본 절의 경고문 1에서 찾아볼 수 있습니다.

모든 지시사항을 수행하기 전에 반드시 모든 주의 및 위험 경고문을 읽으십시오.

경고문 1



위험

전원, 전화 및 통신 케이블로부터 흘러 나오는 전류는 위험합니다.

전기 충격을 피하려면:

- 뇌우를 동반할 때는 케이블의 연결이나 철수, 이 제품의 설치, 유지보수 또는 재구성을 하지 마십시오.
- 모든 전원 코드를 적절히 배선 및 접지해야 합니다.
- 이 제품에 연결될 모든 장비를 적절하게 배선된 콘센트에 연결하십시오.
- 가능한한 신호 케이블을 한 손으로 연결하거나 끊으십시오.
- 화재, 수해 또는 구조상의 손상이 있을 경우 장비를 켜지 마십시오.
- 설치 및 구성 프로시저에 다른 설명이 없는 한, 장치 덮개를 열기 전에 연결된 전원 코드, 원거리 통신 시스템, 네트워크 및 모뎀을 끊어 주십시오.
- 제품 또는 접속된 장치를 설치, 이동 및 덮개를 열 때 다음 설명에 따라 케이블을 연결하거나 끊도록 하십시오.

연결하려면:

1. 모든 스위치를 끕니다.
2. 먼저 모든 케이블을 장치에 연결합니다.
3. 신호 케이블을 커넥터에 연결합니다.
4. 콘센트에 전원 코드를 연결합니다.
5. 장치 스위치를 켭니다.

연결을 끊으려면:

1. 모든 스위치를 끕니다.
2. 먼저 콘센트에서 전원 코드를 뽑습니다.
3. 신호 케이블을 커넥터에서 제거합니다.
4. 장치에서 모든 케이블을 제거합니다.

경고문 2



주의:

리튬 배터리를 교체할 때는 IBM 부품 번호 33F8354 또는 제조업체에서 권장하는 동등한 유형의 배터리를 사용하십시오. 시스템에 리튬 배터리를 갖고 있는 모듈이 있으면 동일한 제조업체에서 생산된 동일한 모듈 유형으로 교체하십시오. 배터리에 리튬이 있을 경우 제대로 사용, 처리 또는 처분하지 않으면 폭발할 수 있습니다.

다음은 주의하십시오.

- 던지거나 물에 담그지 않도록 하십시오.
- 100°C(212°F) 이상으로 가열하지 마십시오.
- 수리하거나 분해하지 마십시오.

지역 법령이나 규정의 요구에 따라 배터리를 처분하십시오.

경고문 3



주의:

레이저 제품(CD-ROMs, DVD 드라이브, 광 장치 또는 트랜스미터 등과 같은)이 설치되어 있을 경우 다음을 유의하십시오.

- 덮개를 제거하지 마십시오. 레이저 제품의 덮개를 제거했을 경우 위험한 레이저 광선에 노출될 수 있습니다. 이 장치 안에는 서비스를 받을 수 있는 부품이 없습니다.

- 여기에서 지정하지 않은 방식의 제어, 조절 또는 실행으로 인해 위험한 레이저 광선에 노출될 수 있습니다.



위험

일부 레이저 제품에는 클래스 3A 또는 클래스 3B 레이저 다이오드가 들어 있습니다. 다음을 주의하십시오.

열면 레이저 광선에 노출됩니다. 광선을 주시하거나 광학 기계를 직접 쳐다보지 않도록 하고 광선에 노출되지 않도록 하십시오.

경고문 4



≥18 kg (37 lbs)



≥ 32 kg (70.5 lbs)



≥ 55 kg (121.2 lbs)

주의:

기계를 들 때는 안전하게 들어 올리십시오.

경고문 5



주의:

장치의 전원 제어 버튼 및 전원 공급기의 전원 스위치는 장치에 공급되는 전류를 차단하지 않습니다. 장치에 둘 이상의 전원 코드가 연결되어 있을 수도 있습니다. 장치에서 모든 전류를 차단하려면 모든 전원 코드가 전원으로부터 차단되어 있는지 확인하십시오.



경고문 10



주의:

서랍형 모델의 장치 상단에 82 kg(180 lbs.)이 넘는 물체를 올려 놓지 마십시오.



>82 kg (180 lbs)

Importante:

Todas las declaraciones de precaución de esta IBM documentation empiezan con un número. Dicho número se emplea para establecer una referencia cruzada de una declaración de precaución o peligro en inglés con las versiones traducidas que de dichas declaraciones pueden encontrarse en esta sección.

Por ejemplo, si una declaración de peligro empieza con el número 1, las traducciones de esta declaración de precaución aparecen en esta sección bajo Declaración 1.

Lea atentamente todas las declaraciones de precaución y peligro antes de llevar a cabo cualquier operación.

Declaración 1



PELIGRO

La corriente eléctrica de los cables telefónicos, de alimentación y de comunicaciones es perjudicial.

Para evitar una descarga eléctrica:

- No conecte ni desconecte ningún cable ni realice las operaciones de instalación, mantenimiento o reconfiguración de este producto durante una tormenta.
- Conecte cada cable de alimentación a una toma de alimentación eléctrica con conexión a tierra y cableado correctos.
- Conecte a tomas de alimentación con un cableado correcto cualquier equipo que vaya a estar conectado a este producto.
- Si es posible, utilice una sola mano cuando conecte o desconecte los cables de señal.
- No encienda nunca un equipo cuando haya riesgos de incendio, de inundación o de daños estructurales.
- Desconecte los cables de alimentación, sistemas de telecomunicaciones, redes y módems conectados antes de abrir las cubiertas del dispositivo a menos que se indique lo contrario en los procedimientos de instalación y configuración.
- Conecte y desconecte los cables tal como se describe en la tabla siguiente cuando desee realizar una operación de instalación, de traslado o de apertura de las cubiertas para este producto o para los dispositivos conectados.

Para la conexión	Para la desconexión
<ol style="list-style-type: none">1. APÁGUELO todo.2. En primer lugar, conecte los cables a los dispositivos.3. Conecte los cables de señal a los conectores.4. Conecte cada cable de alimentación a la toma de alimentación.5. ENCIENDA el dispositivo.	<ol style="list-style-type: none">1. APÁGUELO todo.2. En primer lugar, retire cada cable de alimentación de la toma de alimentación.3. Retire los cables de señal de los conectores.4. Retire los cables de los dispositivos.

Declaración 2



PRECAUCIÓN:

Cuando desee sustituir la batería de litio, utilice únicamente el número de pieza 33F8354 de IBM o cualquier tipo de batería equivalente que recomiende el fabricante. Si el sistema tiene un módulo que contiene una batería de litio, sustitúyalo únicamente por el mismo tipo de módulo, que ha de estar creado por el mismo fabricante. La batería contiene litio y puede explotar si el usuario no la utiliza ni la maneja de forma adecuada o si no se desprende de la misma como corresponde.

No realice las acciones siguientes:

- Arrojarla al agua o sumergirla
- Calentarla a una temperatura que supere los 100°C (212°F)
- Repararla o desmontarla

Despréndase de la batería siguiendo los requisitos que exija el reglamento o la legislación local.

Declaración 3



PRECAUCIÓN:

Cuando instale productos láser (como, por ejemplo, CD-ROM, unidades DVD, dispositivos de fibra óptica o transmisores), tenga en cuenta las advertencias siguientes:

- No retire las cubiertas. Si retira las cubiertas del producto láser, puede quedar expuesto a radiación láser perjudicial. Dentro del dispositivo no existe ninguna pieza que requiera mantenimiento.
- El uso de controles o ajustes o la realización de procedimientos que no sean los que se han especificado aquí pueden dar como resultado una exposición perjudicial a las radiaciones.

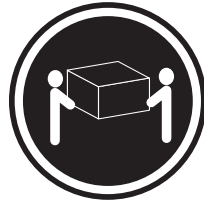


PELIGRO

Algunos productos láser contienen un diodo de láser incorporado de Clase 3A o de Clase 3B. Tenga en cuenta la advertencia siguiente.

Cuando se abre, hay radiación láser. No mire fijamente el rayo ni lleve a cabo ningún examen directamente con instrumentos ópticos; evite la exposición directa al rayo.

Declaración 4



≥18 kg



≥32 kg



≥55 kg

PRECAUCIÓN:

Tome medidas de seguridad al levantar el producto.

Declaración 5



PRECAUCIÓN:

El botón de control de alimentación del dispositivo y el interruptor de alimentación de la fuente de alimentación no apagan la corriente eléctrica suministrada al dispositivo. Es posible también que el dispositivo tenga más de un cable de alimentación. Para eliminar la corriente eléctrica del dispositivo, asegúrese de desconectar todos los cables de alimentación de la fuente de alimentación.



Declaración 10



PRECAUCIÓN:



No coloque ningún objeto que pese más de 82 kg (180 libras) encima de los dispositivos montados en bastidor.

Send us your comments!

We want to know your opinion about this manual (part number 24P2933). Your input will help us to improve our publications.

Please photocopy this survey, complete it, and then fax it to **IBM HMM Survey at 919-543-8167 (USA)**.

Name: _____

Phone number: _____

1. Do you like this manual?

Yes No

2. What would you like to see added, changed, or deleted in this manual?

3. What is your service experience level?

Less than five years

More than five years

4. Which servers do you service most?

Thank you for your response!

Problem determination tips

Due to the variety of hardware and software combinations that can be encountered, use the following information to assist you in problem determination. If possible, have this information available when requesting assistance from Service Support and Engineering functions.

- Machine type and model
- Processor or hard disk upgrades
- Failure symptom
 - Do diagnostics fail?
 - What, when, where, single, or multiple systems?
 - Is the failure repeatable?
 - Has this configuration ever worked?
 - If it has been working, what changes were made prior to it failing?
 - Is this the original reported failure?
- Reference/Diagnostics version
 - Type and version level
- Hardware configuration
 - Print (print screen) configuration currently in use
 - BIOS level
- Operating system software
 - Type and version level

Note: To eliminate confusion, identical systems are considered identical only if they:

1. Are the exact machine type and models
2. Have the same BIOS level
3. Have the same adapters/attachments in the same locations
4. Have the same address jumpers/terminators/cabling
5. Have the same software versions and levels
6. Have the same Reference/Diagnostics Diskette (version)
7. Have the same configuration options set in the system
8. Have the same setup for the operation system control files

Comparing the configuration and software set-up between "working and non-working" systems will often lead to problem resolution.

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GHz, MHz only measures microprocessor internal clock speed, not application performance. Many factors affect application performance.

When referring to hard disk drive capacity, GB equals one billion bytes. Total user-accessible capacity may vary depending on operating environments.

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