

IBM IntelliStation Z Pro Type 6221



Hardware Maintenance Manual

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Note

Before using this information and the product it supports, read "Notices," on page 151.

Fifth Edition (April 2004)

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About this manual

This manual contains diagnostic information, a Symptom-to-FRU index, service information, error codes, error messages, and configuration information for the IBM® IntelliStation® Z Pro Type 6221 computer.

Important: The field replaceable unit (FRU) procedures are intended for trained servicers who are familiar with IBM products. Before servicing an IBM product, be sure to review “Safety information” on page 117.

Important safety information

Be sure to read all caution and danger statements in this book before performing any of the instructions. See “Safety information” on page 117.

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

在安装本产品之前，请仔细阅读 **Safety Information** (安全信息)。

安裝本產品之前，請先閱讀「安全資訊」。

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.

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

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

Online support

You can download the most current diagnostic, BIOS flash, and device driver files from <http://www.ibm.com/pc/support> on the World Wide Web.

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General checkout

The computer 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: the system board, Ethernet controller, video controller, RAM, keyboard, mouse (pointing device), diskette drive, serial ports, hard disk drives, and parallel port. You can also use them to test some external devices. See “Diagnostics” on page 15.

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 computer might be part of a shared DASD cluster (two or more computers sharing the same external storage devices). Prior to running diagnostics, verify that the failing computer is not part of a shared DASD cluster.

A computer might be part of a cluster if:

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

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

Notes:

1. For computers 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, because 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 “POST error codes” on page 96.
4. If the computer is suspended and no error message is displayed, see “Undetermined problems” on page 106.
5. For information about power supply problems, see “Symptom-to-FRU index” on page 83.
6. For safety information, see “Safety information” on page 117.
7. For intermittent problems, check the error log; see “POST error log” on page 16 and “Undetermined problems” on page 106.

001

IS THE COMPUTER PART OF A CLUSTER?

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

NO. Go to step **002** .

002

IF THE COMPUTER IS NOT PART OF A CLUSTER:

- Turn off the computer and all external devices.
- Check all cables and power cords.
- Set all display controls to the middle position.
- Turn on all external devices.
- Turn on the computer.
- Record any POST error messages displayed on the screen. If an error is displayed, look up the first error in “POST error codes” on page 96.
- Check the System Error Log. If an error was recorded by the computer, see “Symptom-to-FRU index” on page 83.
- Start the Diagnostic Programs (see “Starting the diagnostic programs and viewing the test log” on page 18).
- 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 83.

YES. Run the diagnostic programs. If necessary, see “Diagnostic programs and error messages” on page 16.

If you receive an error, see “Symptom-to-FRU index” on page 83.

If the diagnostics were completed successfully and you still suspect a problem, see “Undetermined problems” on page 106.

General information

The IBM IntelliStation Z Pro Type 6221 computer incorporates many of the latest advances in computing technology and can be expanded and upgraded as your 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.

The computer model and serial numbers are on labels on the bottom of the computer and on the lower-right side of the bezel.

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

Notices and statements used in this book

The caution and danger statements used in this book also appear in the multilingual *Safety Information* book that is viewable through Access IBM and on the IBM *IntelliStation Documentation* CD. Each statement is numbered for reference to the corresponding statement in the *Safety Information* book.

The notices and statements are:

- **Notes:** These notices provide important tips, guidance, or advice.
- **Important:** These notices provide information or advice that might help you avoid inconvenient or problem situations.
- **Attention:** These notices indicate potential damage to programs, devices, or data. An attention notice is placed just before the instruction or situation in which damage could occur.
- **Caution:** These statements indicate situations that can be potentially hazardous to you. A caution statement is placed just before the description of a potentially hazardous procedure step or situation.
- **Danger:** These statements indicate situations that can be potentially lethal or extremely hazardous to you. A danger statement is placed just before the description of a potentially lethal or extremely hazardous procedure step or situation.

Features and specifications

The following table provides a summary of the features and specifications of the IntelliStation Z Pro Type 6221 computer. Some features are not available on all models.

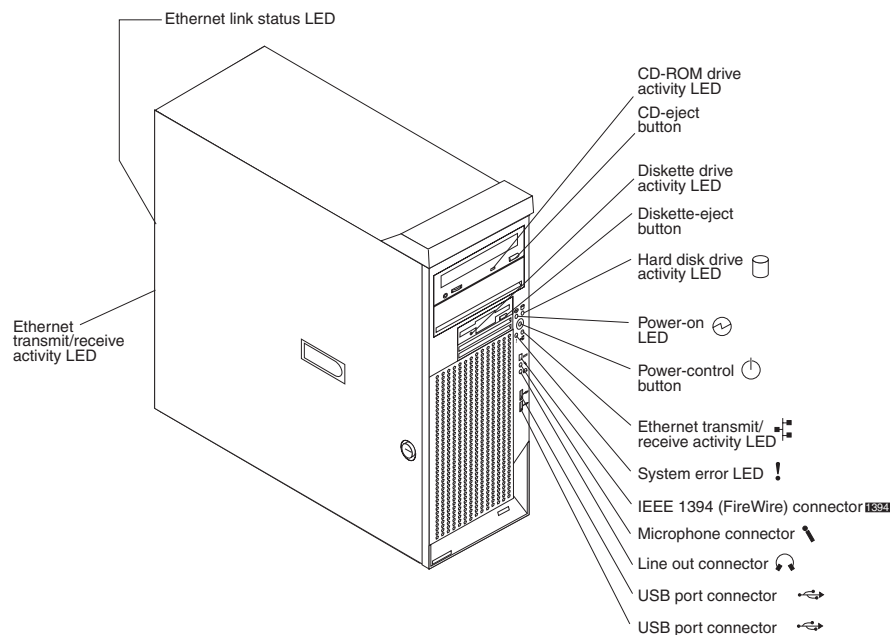
Note: You can use the Configuration/Setup Utility program in the computer to determine the specific type of microprocessor on your system board.

Table 1. Features and specifications

<p>Microprocessor:</p> <ul style="list-style-type: none"> • Intel™ Xeon™ Processor • 512 KB Level-2 cache • 533 MHz front-side bus (FSB) • Support for up to two microprocessors <p>Memory:</p> <ul style="list-style-type: none"> • Minimum: 256 MB • Maximum: 8 GB • Type: PC2100, double-data-rate (DDR) • Connectors: four dual inline memory module (DIMM) connectors, two-way interleaved <p>Internal Drives:</p> <ul style="list-style-type: none"> • Diskette: 1.44 MB (two mode) • Hard disk drive: IDE or SCSI • One of the following optical drives: <ul style="list-style-type: none"> – CD-ROM: IDE – DVD/CD-RW combo: IDE – CD-RW: IDE <p>Expansion bays:</p> <ul style="list-style-type: none"> • Three slim-high, 3.5-inch drive bays (one hard disk drive installed in some models) • Two 5.25-inch bays (optical drive installed in one bay) • One 3.5-inch removable-media drive bay (diskette drive installed) <p>PCI expansion slots:</p> <ul style="list-style-type: none"> • Four PCI-X 100 MHz/64-bit • One PCI 33 MHz/32-bit <p>Power supply:</p> <p>One 425 watt output (115-230 V ac)</p> <p>Cooling:</p> <p>Two speed-controlled system fans</p>	<p>Integrated functions:</p> <ul style="list-style-type: none"> • Broadcom 5703 10/100/1000 Ethernet controller on the system board with RJ-45 Ethernet port • Two serial ports • One parallel port • (Some models) Two IEEE 1394 (FireWire) ports (four-pin on front, six-pin on rear) • Integrated SCSI controller with RAID capabilities and two Ultra 320 SCSI ports (one internal, one optional external) • Four Universal Serial Bus (USB) v2.0 ports (two on front and two on rear of enclosure) • Keyboard port • Mouse port • Audio ports <ul style="list-style-type: none"> – Line out (front and rear) – Mic (front and rear) – Line in (rear) • ATA-100 dual-channel IDE controller <p>Video adapter: Accelerated graphics port (AGP) Pro 50 video with one of the following:</p> <ul style="list-style-type: none"> • Matrox Millennium G450 (DVI-I) 4X with 32 MB double-data-rate (DDR) synchronous dynamic random access memory (SDRAM) video memory and a single DVI-I or dual analog connectors (or dual VGA monitor capability with the pigtail cable that came with the system) • NVIDIA Quadro4 280NVS (LFH-60), AGP 8X, with 64 MB double-data-rate (DDR) SDRAM video memory and dual analog connectors (or dual digital monitor capability with the purchase of an additional pigtail cable) • NVIDIA Quadro4 980XGL (DVI-I), AGP 8X, with 128 MB double-data-rate (DDR) SDRAM video memory and dual DVI-I connectors • 3DLabs Wildcat4 7110 (DVI-I), AGP 8X, with 128 MB texture buffer DDR SDRAM video memory and 128 MB frame buffer video memory, and dual DVI-I connectors 	<p>Electrical input:</p> <ul style="list-style-type: none"> • Sine-wave input (50 or 60 Hz) required • Input voltage and frequency ranges automatically selected • Input voltage low range: <ul style="list-style-type: none"> – Minimum: 100 V ac – Maximum: 127 V ac • Input voltage high range: <ul style="list-style-type: none"> – Minimum: 200 V ac – Maximum: 240 V ac • Input kilovolt-amperes (kVA) approximately: <ul style="list-style-type: none"> – Minimum: 0.15 kVA – Maximum: 0.80 kVA <p>Heat output:</p> <p>Approximate heat output in British thermal units (Btu) per hour</p> <ul style="list-style-type: none"> • Minimum configuration: 341 Btu/hour (100 watts) • Maximum configuration: 2082 Btu/hour (607 watts) <p>Environment:</p> <ul style="list-style-type: none"> • Air temperature: <ul style="list-style-type: none"> – Computer on: 10° to 35°C (50° to 95°F) Altitude: 0 to 2134 m (7000 ft) – Computer off: -40° to +60°C (-40° to 140°F) Maximum altitude: 2133 m (7000 ft) • Humidity (operating and storage): 8% to 80% <p>Acoustical noise emissions:</p> <ul style="list-style-type: none"> • Declared sound power, idle: 5.0 bels • Declared sound power, operating: 5.5 bels <p>Size:</p> <ul style="list-style-type: none"> • Height: 438 mm (17.25 in.) • Depth: 483 mm (19 in.) • Width: 165 mm (6.5 in.) • Weight: 16.3 kg (36 lb) to 20.8 kg (45.8 lb) depending upon configuration
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Controls and indicators

This section identifies the controls and indicators on the front and rear of your computer.



CD-eject button

Press this button to release a CD from the CD-ROM drive.

CD-ROM drive activity LED

When this LED is lit, it indicates that the CD-ROM drive is in use.

Diskette drive activity LED

When this LED is lit, it indicates that the diskette drive is in use.

Diskette-eject button

Press this button to release a diskette from the diskette drive.

Ethernet link status LED

This LED is on the Ethernet connector on the back of the computer. When this LED is lit, it indicates that there is an active connection on the Ethernet port.

Ethernet transmit/receive activity LED

When this LED is lit, it indicates that there is activity between the computer and the network. There are two Ethernet transmit/receive activity LEDs: one on the front bezel and the other on the Ethernet connector on the rear of the computer.

Hard disk drive activity LED

When this LED is flashing, it indicates that a hard disk drive is in use.

IEEE 1394 (FireWire) connector (some models)

This connector is used to connect IEEE 1394 devices to your computer.

Line-out connector (green)

This connector sends stereo audio signals from the computer to external devices, such as speakers with built-in amplifiers, headphones, or the audio line-in jack on a stereo system.

Microphone connector (pink)

This connector is used to connect a microphone to record voice or other sounds on the hard disk. You can also use this connector (and a microphone) with speech recognition software.

Power-control button

Press this button to turn the computer on and off manually. You can install a circular disk, called the power-control button shield, over the power-control button to prevent accidental manual power-off. This disk is provided with your computer.

Power-on LED

When this LED is lit and does not flash, it indicates that the computer is turned on. When this LED is flashing, it indicates that the computer is off and still connected to an ac power source (standby mode).

System error LED

When this LED is lit, it indicates that a system error has occurred. An LED on the system board might also be lit to help isolate the error. See “System-board error LEDs” on page 21 and “Diagnostics” on page 15 for additional information.

USB ports

Use these automatically configured ports to connect universal serial bus (USB) v2.0 devices to your computer, using Plug and Play technology.

Turning on the computer

When the computer is connected to an ac power source but is not turned on, the operating system does not run, and all core logic is shut down; however, the computer can respond to remote requests to turn on the computer. The power-on LED flashes to indicate that the computer is connected to an ac power source but is not turned on (standby mode).

Notes:

1. Turn on all external devices, such as the monitor, before turning on the computer.
2. The power-on LED on the front of the computer is lit when the computer is on and while it is powering-up.
3. You can install a circular disk over the power-control button to prevent accidental manual power-off. This disk, known as the power-control button shield, comes with your computer.

Approximately 20 seconds after the computer is connected to ac power, the power-control button becomes active, and you can turn on the computer and start the operating system by pressing the power-control button. The computer can also be turned on in any of the following ways:

- If a power failure occurs while the computer is turned on, the computer will restart automatically when power is restored.
- When you plug in your computer for the first time, Wake on LAN[®] can turn on the computer.
- If your computer was previously turned on, it must be properly turned off for the Wake on LAN feature to turn on the computer.

What you see and hear when you start your computer depends on the features that are installed and the settings in the Configuration/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, and then see “Symptom-to-FRU index” on page 83 for the explanation of error codes and “Diagnostics” on page 15 for the explanation of error codes.

During startup, the following messages might be displayed briefly:

- To start the Product Recovery Program, Press F11
- Press F1 for Configuration/Setup
- <<< Press <CTRL><C> to start LSI Logic Configuration Utility >>>

To use any of these features, press the appropriate function key or keys quickly. The messages appear for only a few seconds. For more information about the programs listed in these messages, see “Using the Configuration/Setup Utility program” on page 9.

During startup, you might not see Press F1 for Configuration/Setup. If you want to see the prompt, see instructions for displaying the prompt in “Using the Configuration/Setup Utility program” on page 9.

Use the Configuration/Setup Utility program to configure your computer with passwords, PCI adapter configuration, and other options. The Configuration/Setup Utility menu is displayed at the top of the screen. To navigate the menu and screen items, follow the instructions on the right of the screen.

The operating system and application programs start from the hard disk. 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

When you turn off the computer and leave it connected to ac power, the computer can respond to remote requests to turn on the computer. To remove all power from the computer, you must disconnect it from the power source.

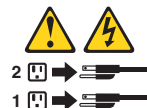
Some operating systems require an orderly shutdown before you turn off the computer. See your operating-system documentation for information about shutting down the operating system.

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.



The computer can be turned off in any of the following ways:

- You can turn off your computer from the operating system. If this feature is supported by your operating system, it will turn off the computer after performing an orderly shutdown of the operating system.

To turn off the computer from the Microsoft® Windows® XP operating system, click **start** → **Turn Off Computer**; then, select **Turn Off**.

- You can press the power-control button on the front of the computer. If this feature is supported by your operating system, it will turn off the computer after performing an orderly shutdown of the operating system.

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

- You can press and hold the power-control button for more than 4 seconds to cause an immediate shutdown of the computer. You can use this feature to turn off the computer if the operating system stops functioning.
- The computer can turn itself off as an automatic response to a critical system failure.

Configuration

The following configuration programs are available to configure your computer:

- **Configuration/Setup Utility program**

The Configuration/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, set passwords, and set the chassis-intrusion alert. See “Using the Configuration/Setup Utility program.”

- **LSI Logic Configuration Utility**

With the built-in LSI Logic Configuration Utility program, you can configure the integrated SCSI controller with RAID capabilities and the devices that are attached to it. See “Using the LSI Logic Configuration Utility program” on page 12.

- **ServeRAID Manager**

The ServeRAID™ programs come with your computer. If your computer has a ServeRAID controller installed, or if you are using the integrated SCSI controller with RAID capabilities as a RAID controller, you must use the ServeRAID Manager program to define and configure your disk-array subsystem *before* you install your operating system. See “Using ServeRAID Manager” on page 13 for more information.

- **Ethernet controller configuration process**

To configure the integrated Ethernet controller, see “Configuring the Gigabit Ethernet controller” on page 14.

Using the Configuration/Setup Utility program

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

Starting the Configuration/Setup Utility program

Complete the following steps to start the Configuration/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 LEDs go off, and restart the computer.
2. When the message Press F1 for Configuration/Setup appears on the screen during startup, press F1. (This prompt appears on the screen for only a few seconds. You must press F1 quickly.)

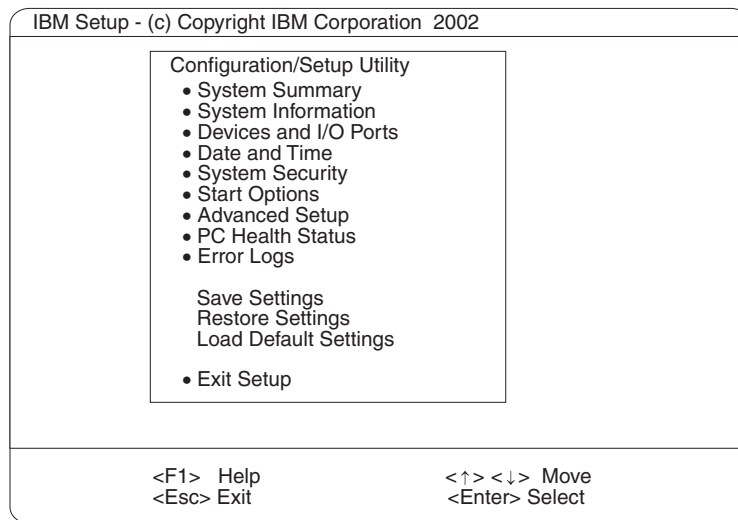
Note: If you have set both administrator and user passwords, you must type the administrator password to access the full Configuration/Setup Utility menu.

3. Follow the instructions that appear on the screen.

Configuration/Setup Utility menu choices

From the Configuration/Setup Utility main menu, you can select settings that you want to change. A typical Configuration/Setup Utility main menu is shown in the

following illustration.



Notes:

1. You can press F1 to display Help information for a selected menu item.
2. The choices on some menus might differ slightly, depending on the BIOS version in your computer.

The following choices are available from the main menu:

- **System Summary**

This choice contains general information about your computer, such as a summary of components and computer configuration. You can view information about the type and speed of the microprocessor and the amount of memory that is installed. System summary information appears on both the full and limited Configuration/Setup Utility menus.

Changes that you make to configuration settings appear on this summary screen. You cannot edit the fields of the configuration and system information.

- **System Information**

Select this choice to display information about your computer. Changes that you make on other menus might appear on this summary screen. You cannot edit any fields. The **System Information** choice appears only on the full Configuration/Setup Utility main menu.

- **Product Data**

Select this choice to view system information, such as the machine type and model, the computer serial number, and the revision level or issue date of the BIOS and diagnostics code stored in the electrically erasable programmable ROM (EEPROM).

- **System Card Data**

Select this choice to view information about the system board.

- **Devices and I/O Ports**

Select this choice to view or change the assignments for devices and input/output (I/O) ports. This choice appears only on the full Configuration/Setup Utility main menu.

You can use this choice also to enable or disable the integrated SCSI controller with RAID capabilities and Ethernet (LAN) controllers, and standard ports (serial, parallel, and so on).

- The default setting is **Enabled** for all the controllers you can control from this menu. If you select **Disabled**, the system will not configure the disabled device and the operating system will not detect the device. (This is equivalent to unplugging the device.)
- If the integrated SCSI controller with RAID capabilities is disabled and no SCSI adapter is installed, the computer will have no SCSI capability.
- If the on-board Ethernet controller is disabled and no Ethernet adapter is installed, the computer will have no Ethernet capability.
- **Date and Time**
Use this menu choice to set the system date and time. The system time is in a 24-hour format: hour:minute:second.
- **System Security**
Select this choice to set a power-on or an administrator password. See “Using passwords” on page 12 for more information. You also can enable the chassis-intrusion detector to alert you each time the computer cover is removed.
- **Start Options**
Select this choice to view or change the start options. Start options take effect when you start your computer. You can designate keyboard operating characteristics, such as the keyboard speed, or specify whether the computer starts with the keyboard number lock on or off.

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, and then checks a network adapter. You can enable a virus-warning test that checks for changes in the master boot record at startup. You also can choose to run POST in the quick mode, or read the microprocessor serial number.
- **Advanced Setup**
Select this choice to change values for advanced hardware features, such as Cache Control and PCI configuration.

A message displays 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.
 - **Power Management Setup**
Select this choice to enable or disable system power settings. This includes automatic power-on settings such as Wake on LAN.
 - **Chipset Feature**
Select this choice to modify settings that control features of the core chip set on the system board.

Attention: Do not make changes to the Chipset Feature unless directed to do so by an IBM authorized service representative.
 - **Processor Control**
Select this choice to enable or disable the microprocessor cache and hyper-threading.

Attention: Do not make changes to the Processor Control unless directed to do so by an IBM authorized service representative.
- **PC Health Status**
Select this choice to display the computer temperature and voltage status, and fan speeds.
- **Error Logs**

Select **POST Error Log** to view the three most recent error codes and messages that the system generated during POST.

Select **Clear event/error logs** from the **POST Error Log** menu to clear the POST Error Log.

- **Save Settings**

Select this choice to save your customized settings.

- **Restore Settings**

Select this choice to delete your changes.

- **Load Default Settings**

Select this choice to cancel your changes.

- **Exit Setup**

If you have made any changes and not saved them, the program will prompt you to save the changes or exit without saving the changes.

Using passwords

You can use any combination of up to seven characters (A–Z, a–z, and 0–9) for the user (power-on) password or the administrator password. When you have set one or both of the passwords, record the passwords and keep them in a secure place.

If both a user and administrator password are set, you can type either password at the password prompt that appears as you start your computer. However, if you want to change the settings in the Configuration/Setup Utility program, you must type the administrator password to access the full configuration menus. If you type the user password, you can only view limited information in the Configuration/Setup Utility program.

Keep a record of your password in a secure place. If you forget the user or administrator password, you can regain access to the computer through one of the following methods:

- If you have forgotten the user password and an administrator password is set, type the administrator password at the power-on prompt. Start the Configuration/Setup Utility program and change the user password.
- Clear CMOS settings by changing the position of the CMOS recovery jumper (JBAT1). See “Erasing a lost or forgotten password (clearing CMOS)” on page 24 for instructions.
- Remove the battery and then install the battery. See “Replacing the battery” on page 32 for instructions.

Using the LSI Logic Configuration Utility program

LSI Logic Configuration is a built-in, menu-driven configuration utility program that you can use to:

- Perform a low-level format of a SCSI hard disk drive
- Set a SCSI device scan order
- Set a SCSI ID for a controller

Notes:

1. The integrated SCSI controller with RAID capabilities in your computer supports redundant array of independent disks (RAID). You can use the LSI Logic Configuration Utility program built into your computer to configure RAID level 1 for a single pair of attached devices.

2. If you install a different type of RAID adapter in your computer, use the configuration method supplied with the RAID adapter to view or change SCSI settings for attached devices.

The following sections provide the instructions needed to start the LSI Logic Configuration Utility program and to format a SCSI hard disk drive.

Starting the LSI Logic Configuration Utility program

Complete the following steps to start the LSI Logic Configuration Utility program:

1. Turn on the computer.
2. When the <<< Press <CTRL><C> to start LSI Logic Configuration Utility >>> prompt appears, press Ctrl+C.
If an administrator password has been set, you are prompted to type the password to start the LSI Logic Configuration Utility program.
3. Use the arrow keys to select a controller (channel) from the list of adapters; then, press Enter.
4. Follow the instructions on the screen to change the settings of the selected items; then, press Enter. The **Device Properties** and **Mirroring Properties** choices produce additional screens of parameters to review or change.

Formatting a SCSI hard disk drive

Low-level formatting removes all data from the hard disk. If there is data you want to save, back up the hard disk before performing this procedure. Complete the following steps to format a drive.

Note: Before you format a SCSI hard disk, make sure that it is not part of a mirrored pair. From the list of adapters, select the controller (channel) for the drive to format. Select **Mirroring Properties** and make sure the mirroring value for the drive is set to **None**.

1. From the list of adapters, select the controller (channel) for the drive to format.
2. Select **Device Properties**.
3. Use the arrow keys (↑ or ↓) to highlight the drive to format.
4. Use the arrow keys (← or →) or the End key to scroll to the right.
5. Select the **Format**; then, press Enter to begin the low-level formatting operation.

Using ServeRAID Manager

You can use the ServeRAID Manager program, provided on the *IBM ServeRAID Support CD*, to:

- Configure a redundant array of independent disks (RAID)
- Restore a SCSI hard disk to factory-default settings, erasing all data
- View your RAID configuration and associated devices
- Monitor operation of your RAID controllers

The ServeRAID Manager program operates in two ways:

- Startable-CD mode
- As an installed software program

See the ServeRAID documentation on the *IBM ServeRAID Support CD* for additional information about RAID technology and instructions for using ServeRAID

Manager. The *Installation Guide* for your computer also contains instructions for using ServeRAID Manager to configure your integrated SCSI controller with RAID capabilities.

Attention:

1. When setting up RAID mirroring, you must set the hard disk drive containing the operating system as the primary drive. Failure to do so will erase the operating system and applications that came pre-installed on your computer.
2. Installing an optional RAID adapter in your computer will require that you reload the operating system and applications.

Notes:

1. The integrated SCSI controller with RAID capabilities in your computer supports only RAID level 1.
2. If you install a different type of RAID adapter in your computer, use the configuration method supplied with the RAID adapter to view or change SCSI settings for attached devices.

Before you install your operating system, you must configure the controller that is attached to the hard disk drives. You must use the configuration program on the *IBM ServeRAID Support* CD to configure the integrated SCSI controller with RAID capabilities or to configure an optional IBM ServeRAID controller.

Notes:

1. You cannot use the *ServerGuide™ Setup and Installation* CD to configure the optional controllers.
2. To update the firmware and BIOS for an optional ServeRAID controller, you must use the *IBM ServeRAID Support* CD that comes with the ServeRAID option.

Configuring the Gigabit Ethernet controller

The Ethernet controller is integrated on the system board. It provides an interface for connecting to a 10-Mbps, 100-Mbps, or 1000-Mbps network and provides full duplex (FDX) capability, which enables simultaneous transmission and reception of data on the network. If the Ethernet port in the computer supports auto-negotiation, the controller detects the data-transfer rate of the network (10BASE-T, 100BASE-TX, or 1000BASE-T) and automatically operates at that rate, in full-duplex or half-duplex mode, as appropriate. The Ethernet controller supports optional modes, such as teaming, priority packets, load balancing, fault tolerance, and virtual LANs, which provide better performance, security, and throughput. These modes apply to the integrated Ethernet controller and to controllers on supported Ethernet adapters.

You do not need to set any jumpers or configure the controller. However, you must install a device driver to enable the operating system to address the controller. The device drivers are available on the *Device Drivers and IBM Enhanced Diagnostics* CD. For the latest device drivers and information about configuring your Ethernet controller, go to the IBM Support Web site at <http://www.ibm.com/pc/support>.

Diagnostics

This section provides basic troubleshooting information to help you identify and resolve some problems that might occur.

If you cannot locate and correct the problem using the information in this chapter, see “Symptom-to-FRU index” on page 83 for more information.

Diagnostic tools overview

The following tools are available to help you identify and resolve hardware-related problems:

- **POST beep codes, error messages and error logs**

The power-on self-test (POST) generates beep codes and messages to indicate successful test completion or the detection of a problem. See “POST” for more information.

- **Diagnostic programs**

The system diagnostic programs are stored on the *Device Drivers and IBM Enhanced Diagnostics* CD. These programs are the primary methods of testing the major components of the computer. See “Diagnostic programs and error messages” on page 16 for more information.

- **Error symptom charts**

This charts lists problem symptoms and steps to correct each problem. See the “Error symptom charts” on page 21 for more information.

- **System-board error LEDs**

An LED on the system board might be lit to help isolate an error indicated by the system error LED on the front of the computer. See the “System-board error LEDs” on page 21 for more information.

POST

When you turn on the computer, the power-on self-test (POST) performs a series of tests to check the operation of system components and some of the installed options.

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

If POST detects a problem, more than one beep might sound, and an error message appears on the screen, or both.

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 resolve the next time you run the test.

POST beep codes

Beep codes are sounded in a series of beeps. For example, a 1-2-4 beep code sounds like one beep, a pause, two consecutive beeps, another pause, and four more consecutive beeps.

- No beep indicates the successful completion of POST.
- One or more beeps indicates that POST detected a problem. For more information, see “Beep symptoms” on page 83.

POST error messages

POST error messages occur during startup when POST finds a problem with the hardware or detects a change in the hardware configuration. For a list of POST errors, see “POST error codes” on page 96.

POST error log

The POST error log contains the three most recent error codes and messages that the system generated during POST.

To view the contents of the error logs, start the Configuration/Setup Utility program (see “Starting the Configuration/Setup Utility program” on page 9); then, select **Error Logs** from the main menu.

Small computer system interface (SCSI) messages

If you receive a SCSI error message when running the SCSISelect Utility program, see “SCSI error codes” on page 106.

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

Diagnostic programs and error messages

The system diagnostic programs are stored on the *Device Drivers and IBM Enhanced Diagnostics* CD that comes with the computer. These programs are the primary method of testing the major components of the computer and assist in isolating problems in the computer hardware and software. The diagnostic programs run independently of the operating system and *must be run from either a CD or diskette*.

This diskette, known as an IBM Enhanced Diagnostics diskette, can be created using Access IBM. You can also download the latest version of the diagnostics programs from <http://www.ibm.com/pc/support> on the World Wide Web and use the downloaded file to create an IBM Enhanced Diagnostics diskette. See “IBM Enhanced Diagnostics diskette” on page 19 for instructions.

Note: When using diagnostics with a USB keyboard and mouse attached, first go into the Configuration/Setup Utility and enable USB emulation.

1. Restart the computer and press F1 to access the Configuration/Setup Utility.
2. Select Devices and I/O Ports.
3. Select USB Setup.
4. Make sure USB Keyboard and Mouse are enabled.

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 be displayed 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 201 is for memory.

ttt is the three-digit failure code for the exact test failure. (These codes are for trained service personnel; see “Symptom-to-FRU index” on page 83.)

iii is the three-digit device ID. (These codes are for trained service personnel; see “Symptom-to-FRU index” on page 83..)

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 is completed 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 and 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.

Complete the following steps 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.

Notes:

- a. To save the test log to a diskette, you must use a diskette that you have formatted yourself; this function does not work with preformatted diskettes. If the diskette has sufficient space for the test log, the diskette may contain other data.
- b. 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

For descriptions of the error messages that might appear when you run the diagnostic programs, see "Diagnostic error codes" on page 86.

Important: Make sure that the computer has the latest level of BIOS code, ServeRAID, and diagnostics microcode installed.

PC-Doctor for Windows

The computer contains PC-Doctor for Windows, which is 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.

Complete the following steps to use PC-Doctor for Windows:

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

IBM Enhanced Diagnostics diskette

Note: This procedure requires one formatted diskette.

The IBM Enhanced Diagnostics diskette is used to test hardware components on the computer. Use the following information and instructions to create and use an IBM Enhanced Diagnostics diskette.

Creating an IBM Enhanced Diagnostics diskette

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

- Create a diskette using Access IBM
- Create a diskette from the CD
- Download a program image from the World Wide Web

Creating a diagnostics diskette using Access IBM

Complete the following steps to create the diagnostics diskette using Access IBM:

1. From the Access IBM **Welcome** window, click **How do I...**; then, click **Protect data**.
2. Click **Creating emergency diskettes**.
3. Click **Diagnostic diskette**.
4. Follow the instructions on the screen.

Creating a diagnostics diskette from the CD

To create a startable IBM Enhanced Diagnostics diskette from the CD, be sure to have a formatted diskette available and complete the following steps:

1. Insert the IBM Enhanced Diagnostics CD into the CD-ROM drive.
2. From a command prompt, switch to the CD-ROM drive letter. For example, if the CD-ROM drive is named "E", type E: and press Enter.
3. Change to the PCDR directory by typing CD PCDR; then, press Enter.
4. Type MAKEDIAG, and press Enter.
5. Follow the prompts to complete the procedure.

The diagnostics CD can then be removed and the system rebooted with the newly created diskette.

Creating a diagnostics diskette from the World Wide Web

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 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 into the diskette drive.
5. Type filename x:

where *filename* is the name of the file you downloaded from the Web, and x is the letter of the diskette drive containing the blank diskette; then, 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.

Using the Enhanced Diagnostics diskette

Complete the following steps to start the IBM Enhanced Diagnostics diskette:

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

When the tests have been completed, you can view the test log by selecting **Utility** from the top of the screen.

Emergency recovery-repair diskette

At your earliest opportunity, create a recovery-repair diskette and store it in a safe place. In the unlikely event that the Windows desktop becomes unusable, you can use the recovery-repair diskette to access the Product Recovery program. Additional information about the diskette is in Access IBM. For information about using this diskette, see “Using the emergency recovery-repair diskette.”

Creating the emergency recovery-repair diskette

Complete the following steps to create a recovery-repair diskette:

1. From Access IBM, click the **How do I...** tab; then, click **Protect data**.
2. Click **Creating emergency diskettes**.
3. Click **Recovery Repair diskette**.
4. Follow the instructions on the screen.

Using the emergency 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 the computer. You can use the recovery-repair diskette to access the Product Recovery program and attempt to restore system function. For instructions on how to create this diskette, see “Creating the emergency recovery-repair diskette.”

Complete the following steps to access the Product Recovery program on the hard disk:

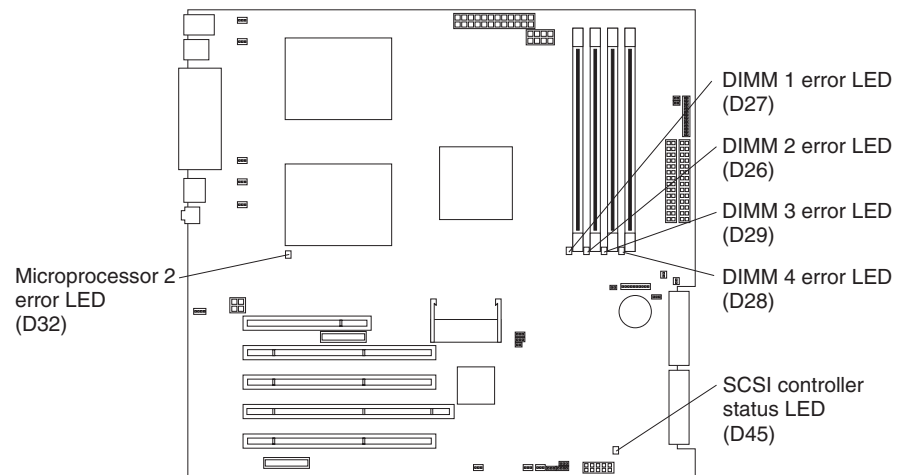
1. Insert the recovery-repair diskette.
2. Turn off the computer.
3. Turn on the computer, and follow the directions on the screen.

Note: If the repair operation finishes without error, the F11 prompt will be displayed the next time you restart the computer.

If an error message is displayed during the repair operation and the repair operation cannot be completed, you might have a problem with the Product Recovery program or the partition that contains the Product Recovery program. Use a *Product Recovery* CD (see “Recovery CD (Windows XP)” on page 112) to access the Product Recovery program.

System-board error LEDs

The following illustration shows the location of the LEDs on the system board. You might need to refer to this illustration when solving problems with the computer.



Each error LED turns on to indicate a problem with a specific component. After a problem is corrected its LED will not turn on the next time the computer is restarted; if the problem remains the LED will turn on again. For information on how to correct problems indicated by the error LEDs, see the “Diagnostic error messages” on page 18 and the “Error symptom charts.”

Error symptom charts

You can use the error symptom charts to find solutions to problems that have definite symptoms; see “Error symptoms” on page 89.

Important: If diagnostic error messages are displayed that are not listed in the error symptom charts, make sure that your system has the latest levels of BIOS code installed.

Software error messages

These messages appear if a problem or conflict is detected by the application program, the operating system, 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:

- 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.

- The software is designed to operate on your computer.
- Other software works on your computer.
- 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.

If the problem remains, contact your place of purchase.

Power checkout

Power problems can be difficult to troubleshoot. For instance, a short circuit can exist anywhere on any of the power distribution busses. Usually a short circuit will cause the power subsystem to shut down because of an overcurrent condition.

A general procedure for troubleshooting power problems is as follows:

1. Power off the system and disconnect the ac cord(s).
2. Check for loose cables in the power subsystem. Also check for short circuits, for instance if there is a loose screw causing a short circuit on a circuit board.
3. Remove adapters and disconnect the cables and power connectors to all internal and external devices until system is at minimum configuration required to turn on the system (see "Minimum operating requirements" on page 106).
4. Reconnect the ac cord and power on the system. If the system turns on successfully, replace adapters and devices one at a time until the problem is isolated. If system does not power on from minimal configuration, replace FRUs of the minimum configuration one at a time until the problem is isolated.

To use this method it is important to know the minimum configuration required for a system to turn on (see page 106).

Recovering your operating system and preinstalled software

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

Recovering the operating system

The computer has the Product Recovery program on a hidden partition of the hard disk drive. The Product Recovery program reinstalls your operating system and preinstalled software. The Product Recovery program runs independently of the operating system.

If you are using FDISK, Disk Management, or another utility to reformat the hard disk, you might see the partition where the Product Recovery program is stored. Do not delete this partition or the Product Recovery program will be lost.

If your hard disk drive, including the partition where the Product Recovery program resides, becomes damaged or you replace the hard disk drive, you can use the *IBM Product Recovery CD* (see "Recovery CD (Windows XP)" on page 112) to recover the preinstalled operating system, application programs, and device drivers.

Attention: The Product Recovery program will erase all files on drive C only. A *full recovery* will restore the operating system, device drivers, and all original applications that came with the computer from IBM.

Complete the following steps to recover the operating system.

Note: The recovery process replaces all information stored on drive C. If possible, back up your data files before starting this process.

1. If possible, shut down your operating system normally.
2. If the 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 4 seconds, unplug the power cord and wait a few seconds before reconnecting it.

3. Turn on the computer, and wait for the prompt:
To start the Product Recovery program, press F11.
If the DOS command prompt or the F11 prompt is not displayed, see “Emergency recovery-repair diskette” on page 20.
4. Quickly press F11, and wait for the program menu.
5. Select the recovery options you want and follow the instructions on the screen.
6. When recovery is complete, exit from the program. Remove the CD from the CD-ROM or DVD-ROM drive, if you have not already done so.
7. Restart the computer.

Recovering or installing device drivers

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

Notes:

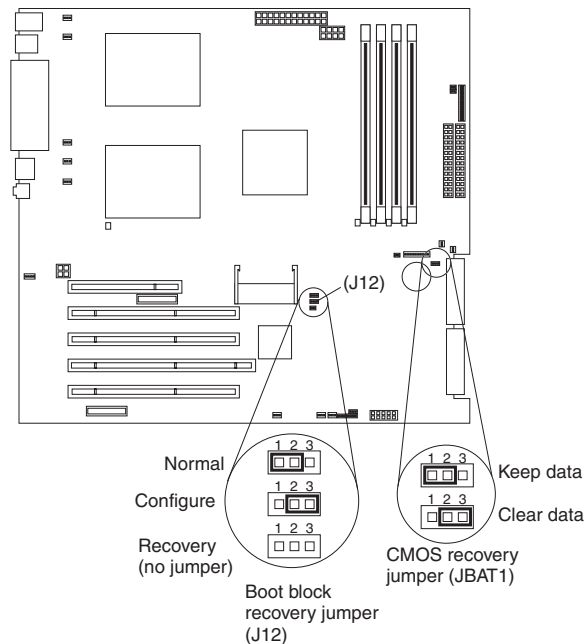
1. Before you can recover or install device drivers, your operating system must be installed on the computer.
2. Before you start recovering or installing device drivers, make sure that you have the documentation and software media for the device.
3. The latest device drivers are also available at <http://www.ibm.com/pc/support> on the World Wide Web.

Recovering from a POST/BIOS update failure

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

1. Review “Handling electrostatic discharge-sensitive devices” on page 120 and “Safety notices (multilingual translations)” on page 120.
2. Turn off the computer and all attached devices.
3. Unplug the power cord.
4. Remove the side cover and support bracket. (See “Removing the side cover” on page 39 and “Removing and installing the support bracket” on page 42.)
5. Locate the boot block recovery jumper (J12) on the system board, removing any adapters that impede access to the jumper. The following illustration

shows the location of the jumper on the system board.



6. Remove the boot block recovery jumper from pins 1 and 2.
7. Replace any adapters that were removed; then, replace the support bracket and replace the side cover. (See “Removing and installing the support bracket” on page 42 and “Replacing the side cover” on page 62.)
8. Connect the computer to a power source, keyboard, monitor, and mouse.
9. Insert the POST/BIOS update (flash) diskette into the diskette drive. You can download a file to create this diskette from <http://www.ibm.com/pc/support> on the World Wide Web.
10. Turn on the computer and the monitor.
11. After the update session completes, turn off the computer and monitor.
12. Remove the diskette from the diskette drive.
13. Disconnect all power cords; then, remove the computer cover.
14. Return the boot block recovery jumper to pins 1 and 2.
15. Reinstall the computer cover; then, reconnect all external cables and power cords and turn on the peripheral devices.
16. Turn on the computer to restart the operating system.

Erasing a lost or forgotten password (clearing CMOS)

This section applies to lost or forgotten passwords. More information about lost or forgotten passwords is available in Access IBM.

Complete the following steps to set the CMOS recovery jumper and erase a forgotten password:

1. Review “Handling electrostatic discharge-sensitive devices” on page 120 and “Safety notices (multilingual translations)” on page 120.
2. Turn off the computer and all attached devices.
3. Unplug the power cord.
4. Remove the side cover and support bracket. (See “Removing the side cover” on page 39 and “Removing and installing the support bracket” on page 42.)

5. Locate the CMOS recovery jumper (JBAT1) on the system board, removing any adapters that impede access to the jumper. An illustration showing the location of the jumper on the system board appears at “Recovering from a POST/BIOS update failure” on page 23.
6. Move the CMOS recovery jumper from pins 1 and 2 to pins 2 and 3.
7. Wait 60 seconds; then, return the CMOS recovery jumper to pins 1 and 2
8. Replace any adapters that were removed; then, replace the support bracket and replace the side cover. (See “Removing and installing the support bracket” on page 42 and “Replacing the side cover” on page 62.)

You can now start the computer one time, and start the Configuration/Setup Utility program, without having to use the power-on password. At this time, you can either delete the old password or set a new user password. If you do not change or delete the password, the next time you start the computer the original user password will be reinstated.
9. Connect the computer to a power source, keyboard, monitor, and mouse.
10. Turn on the computer. The Configuration/Setup Utility program starts.
11. Follow the instructions to erase the existing password or create a new password.
12. Select **Save Settings** and press Enter.

Troubleshooting the Ethernet controller

The Ethernet controller documentation on the *Device Drivers and IBM Enhanced Diagnostics* CD contains information about problems that might occur with the 1 Gbps Ethernet controller.

This section provides troubleshooting information for some of the problems that might occur with the 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 server. 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 the server.
- Check for operating system-specific causes for the problem.
- Make sure that the device drivers on the client and server are using the same protocol.

Ethernet controller troubleshooting chart

Use the following troubleshooting chart to find solutions to 10/100/1000 Mbps Ethernet controller problems that have definite symptoms.

Ethernet controller problem	FRU/actions
The computer stops running when loading device drivers.	<p>The PCI BIOS interrupt settings are incorrect.</p> <p>Check the following:</p> <ul style="list-style-type: none"> • Determine if the interrupt (IRQ) setting assigned to the Ethernet controller is also assigned to another device in the Configuration/Setup Utility program. <p>Although interrupt sharing is allowed 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. For example, for NetWare Versions 3 and 4, it is recommended that disk controllers not share interrupts with LAN controllers.</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 diagnostics. • Reseat or replace the adapter.
Ethernet link status LED does not work.	<p>Check the following:</p> <ul style="list-style-type: none"> • Make sure that the hub is turned on. • Check all connections at the Ethernet controller and the hub. • Use another port on the hub. • If the hub does not support auto-negotiation, manually configure the Ethernet controller to match the hub. • If you manually configured the Duplex mode, make sure that you also manually configure the speed. • Run diagnostics on the LEDs. • Reseat or replace the adapter.
Data is incorrect or sporadic.	<p>Check the following:</p> <ul style="list-style-type: none"> • Make sure that you are using Category 5 or higher cabling when operating the computer at 100 Mbps or at 1000 Mbps. • Make sure that the cables do not run close to noise-inducing sources like fluorescent lights.
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 the PCI system BIOS code is current. • Reseat the adapter. • Determine if the interrupt (IRQ) setting assigned to the Ethernet adapter is also assigned to another device in the system. Use the Configuration/Setup Utility program to determine if this is the case. <p>Although interrupt sharing is allowed 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> <ul style="list-style-type: none"> • Reseat or replace the adapter.
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. See the operating-system documentation and the ServerGuide information. • Reseat or replace the adapter.

Ethernet controller messages

The integrated Ethernet controller might display messages from certain device drivers. The information in this section might be helpful. The latest information

available concerning these messages will be made available at the IBM Support Web site at <http://www.ibm.com/pc/support>.

Note: Although the term "adapter" is used in these messages, the messages might also apply to the integrated Ethernet controller on the system board.

Novell NetWare or IntraNetWare system ODI driver messages

This section explains the error messages for the Novell NetWare or IntraNetWare system ODI driver, and suggested actions to resolve each problem.

Message	Description
Could not 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 system configuration. If the problem remains, contact the network supplier. • 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 remains, contact the network supplier.</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 remains, contact the network supplier.</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 remains, contact the network supplier.</p>
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 remains, contact the network supplier.</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 system 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 remains, contact the network supplier.</p>

Message	Description
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 remains, contact the network supplier.</p>
Cannot 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 0xaa) 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 remains, contact the network supplier.</p>
AFT is not supported on this version of NetWare.	<p>Explanation: The NetWare on the computer is not a version supported by AFT.</p> <p>Action: Load and bind AFT only on supported versions of NetWare (currently version 5.1 and above).</p>
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 system configuration. If the problem remains, contact the network supplier.</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 4.0 (Windows NT) driver messages

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

Note: Although the term "adapter" is used in these messages, the messages might also apply to the integrated Ethernet controller on the system board.

Error code (hex)	Description
0x00	<p>Explanation: The driver could not register the specified interrupt.</p> <p>Action: Using the Configuration/Setup Utility program, make sure that a PCI interrupt is assigned to the Ethernet card, and that Ethernet is enabled.</p>
0x01	<p>Explanation: One of the PCI/PCI-X cards did not get the required resources.</p> <p>Action: Using the Configuration/Setup Utility program, make sure that a PCI interrupt is assigned to the Ethernet card, and that Ethernet is enabled.</p>

Error code (hex)	Description
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 cannot 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>For Windows NT:®</p> <p>Action:</p> <ol style="list-style-type: none"> 1. From the Windows NT desktop, click Start → Control Panel → Networks → Adapters. 2. Select an IBM Ethernet adapter from the list. 3. Click Properties → Advanced. 4. Lower the resource values that apply to the transmit queue. <p>For Windows 2000:</p> <p>Action:</p> <ol style="list-style-type: none"> 1. From the Windows 2000 desktop, click Start → Settings → Control Panel → Network and Dial-up Connections. 2. Right-click an IBM Ethernet adapter in the list and click Properties. 3. Select a component and click Configure. 4. Click the Advanced tab and lower the resource values that apply to the transmit queue.
0x0E	<p>Explanation: Could not allocate enough memory for receive queue.</p> <p>For Windows NT:</p> <p>Action:</p> <ol style="list-style-type: none"> 1. From the Windows NT desktop, click Start → Control Panel → Networks → Adapters. 2. Select an IBM Ethernet adapter from the list. 3. Click Properties → Advanced. 4. Lower the value for the resource named in the message. <p>For Windows 2000:</p> <p>Action:</p> <ol style="list-style-type: none"> 1. From the Windows 2000 desktop, click Start → Settings → Control Panel → Network and Dial-up Connections. 2. Right-click an IBM Ethernet adapter in the list and click Properties. 3. Select a component and click Configure. 4. Click the Advanced tab and lower the value for the resource named in the message.

Error code (hex)	Description
0x0F	<p>Explanation: Could not allocate enough memory for other structures.</p> <p>For Windows NT:</p> <p>Action:</p> <ol style="list-style-type: none"> 1. From the Windows NT desktop, click Start → Control Panel → Networks → Adapters. 2. Select an IBM Ethernet adapter from the list. 3. Click Properties → Advanced. 4. Lower the resource values that apply to the transmit queue. <p>For Windows 2000:</p> <p>Action:</p> <ol style="list-style-type: none"> 1. From the Windows 2000 desktop, click Start → Settings → Control Panel → Network and Dial-up Connections. 2. Right-click an IBM Ethernet adapter in the list and click Properties. 3. Select a component and click Configure. 4. Click the Advanced tab and lower the resource values that apply to the transmit queue.
0x10	<p>Explanation: Did not find any Ethernet controllers.</p> <p>Action: Using the Configuration/Setup Utility program, make sure that Ethernet is enabled.</p>
0x11	<p>Explanation: Multiple Ethernet controllers found, but none matched the required ID.</p> <p>Action: Using the Configuration/Setup Utility program, make sure that Ethernet is enabled.</p>
0x13	<p>Explanation: Did not find any Ethernet controllers that matched the required subven/subdev.</p> <p>Action: Using the Configuration/Setup Utility program, make sure that Ethernet is enabled.</p>
0x16	<p>Explanation: Single adapter found, but multiple instances tried to load.</p> <p>Action: Using the Configuration/Setup Utility program, make sure that Ethernet is enabled, and that the integrated 10/100 Ethernet controller or the optional Ethernet PCI adapter are enabled.</p>
0x17	<p>Explanation: Slot parameter not specified in the registry.</p> <p>Action: Remove the adapter driver and reinstall it.</p>
All other 4-character hexadecimal codes	<p>Action: See supplementary documentation, such as http://www.ibm.com/pc/support, for more information.</p>

Ethernet Windows NDIS teaming messages

This section explains the the messages associated with Ethernet teaming.

Event ID	Type	Description
01	Error	<p>Explanation: Team name and physical adapter name are the same. This is an invalid configuration.</p> <p>Action: Reconfigure the adapter team by double-clicking the PROSet icon in the Control Panel.</p>
02	Error	<p>Explanation: Unable to allocate required resources.</p> <p>Action: Free some memory resources and restart.</p>

Event ID	Type	Description
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> . Virtual adapter or Team is initialized. Action: None.
09	Informational	Explanation: Team <i>nn</i> . Primary adapter is switching over. Action: None.
10	Warning	Explanation: Team <i>nn</i> . Adapter link down. Action: Make sure the adapter is functioning properly.
11	Informational	Explanation: Team <i>nn</i> . Secondary adapter took over. Action: None.
12	Warning	Explanation: Team <i>nn</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.
13	Informational	Explanation: Team <i>nn</i> . Secondary adapter has rejoined the Team. Action: None.
14	Informational	Explanation: Team <i>nn</i> . Secondary adapter link is up. Action: None.
15	Error	Explanation: Team <i>nn</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.
16	Informational	Explanation: Team <i>nn</i> . An adapter has reestablished the link. Network connection has been restored. Action: None.
17	Informational	Explanation: Team <i>nn</i> . Preferred primary adapter has been detected. Action: None.
18	Informational	Explanation: Team <i>nn</i> . Preferred secondary adapter has been detected. Action: None.

Event ID	Type	Description
19	Informational	Explanation: Team <i>nn</i> . Preferred primary adapter took over. Action: None.
20	Informational	Explanation: Team <i>nn</i> . Preferred secondary adapter took over. Action: None.
21	Warning	Explanation: Team <i>nn</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.

Replacing the battery

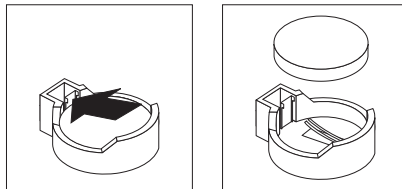
When replacing the battery, you must replace it with a lithium battery of the same type from the same manufacturer. To avoid possible danger, read and follow the information in “Safety information” on page 117.

To order replacement batteries, call 1-800-426-7378 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.

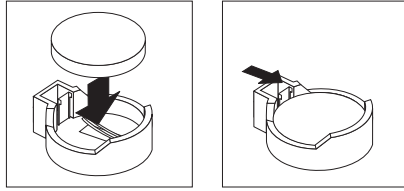
Note: After you replace the battery, you must reconfigure the computer and reset the system date and time.

Complete the following steps to replace the battery:

1. Review “Safety information” on page 117, “Installation guidelines” on page 35, and “Handling electrostatic discharge-sensitive devices” on page 120.
2. Follow any special handling and installation instructions supplied with the replacement battery.
3. Turn off the computer and all attached devices. Disconnect all power cords; then, disconnect all external cables, and remove the side cover and support bracket. (See “Removing the side cover” on page 39 and “Removing and installing the support bracket” on page 42.)
4. Remove the battery:
 - a. Use a 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.



5. 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.



6. Replace the support bracket and side cover; then, connect all external cables.
(See “Removing and installing the support bracket” on page 42 and “Replacing the side cover” on page 62.)
7. Turn on the computer.
8. Start the Configuration/Setup Utility program and set configuration parameters.
 - Set the system date and time.
 - Set passwords if necessary.
 - Save the configuration.

Installing options

This chapter provides instructions for installing or replacing options in the computer. For a list of supported options for the computer, go to <http://www.ibm.com/pc/> on the World Wide Web; then, select your country and navigate to the list of options for your computer.

Installation guidelines

Before you begin installing options in your computer, read the following information:

- Review “Safety information” on page 117, “Installation guidelines,” and “Handling electrostatic discharge-sensitive devices” on page 120. These guidelines will help you work safely with the computer and options.
- Make sure that you have an adequate number of properly grounded electrical outlets for your computer, monitor, and other devices that you will connect to the computer.
- Back up all important data before you make changes to disk drives.
- Have a small flat-blade screwdriver available.
- When you need to access the inside of the computer to install options, you might find it easier to lay the computer on its side. Before laying the computer on its side, rotate the two front stabilizing feet a quarter turn inward toward the computer, so that they do not break. Before returning the computer to an upright position, rotate the front stabilizing feet a quarter turn outward from the computer. See “Moving the stabilizing feet” on page 39 for more information.
- The blue color on components and labels identifies touch points where you can grip a component, move a latch, and so on.
- For a list of supported options for your computer, go to <http://www.ibm.com/pc/> on the World Wide Web; then, select your country and navigate to the list of options for your computer.

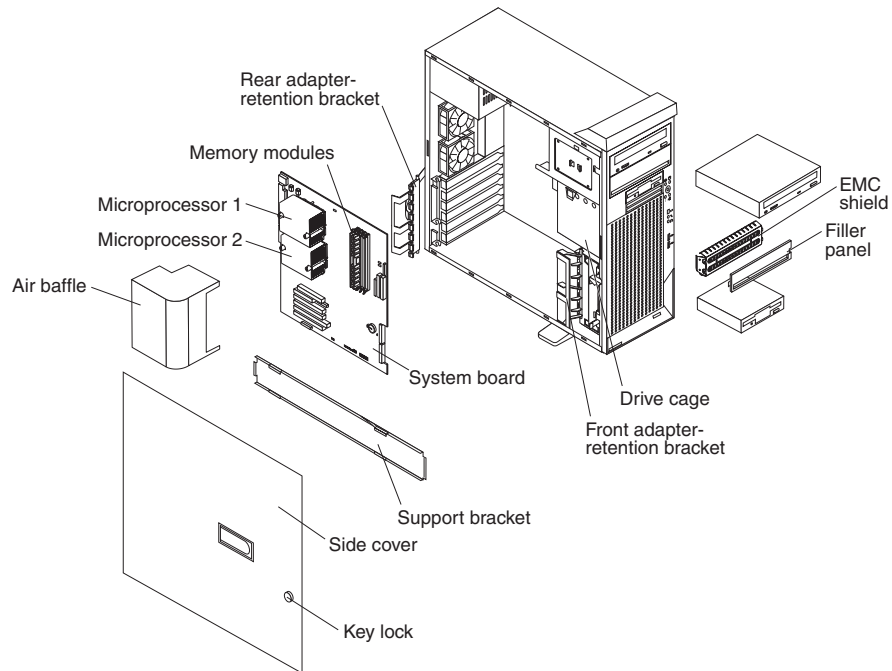
System reliability considerations

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

- Each of the drive bays has a drive or a filler panel and electromagnetic compatibility (EMC) shield installed.
- There is adequate space around the computer to allow the computer cooling system to work properly. Leave approximately 50 mm (2 in.) of open space around the front and rear of the computer. Do not place objects in front of the fans. For proper cooling and airflow, replace the computer cover before turning on the computer. Operating the computer for extended periods of time (over 30 minutes) with the computer cover removed might damage computer components.
- You have followed the cabling instructions that come with optional adapters.
- You have replaced a failed fan as soon as possible.
- Do not remove the air baffle when the computer is operational. Operating the computer without the air baffle might cause the microprocessor to overheat.
- Microprocessor socket 2 always contains either a microprocessor baffle or a microprocessor and heatsink.

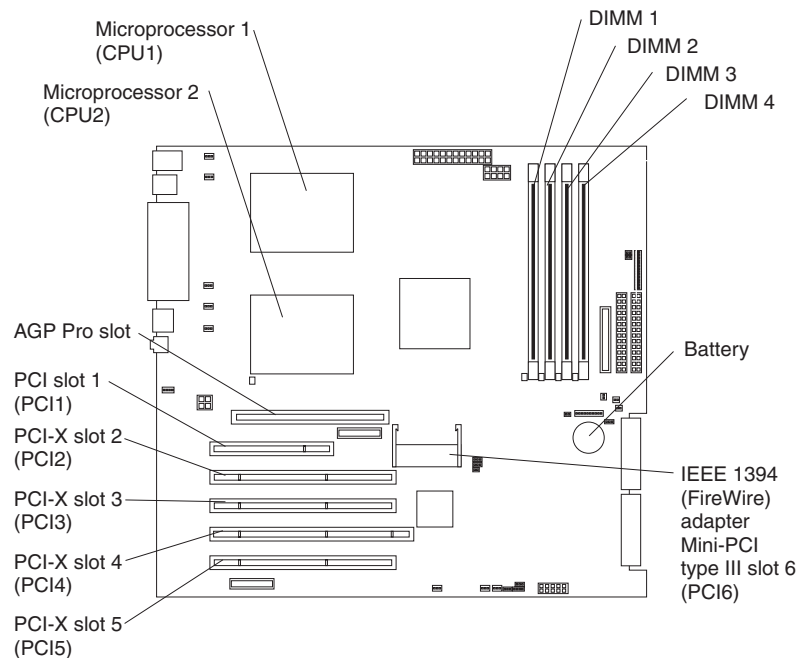
Major components of the computer

The following illustration shows the major components in the computer.



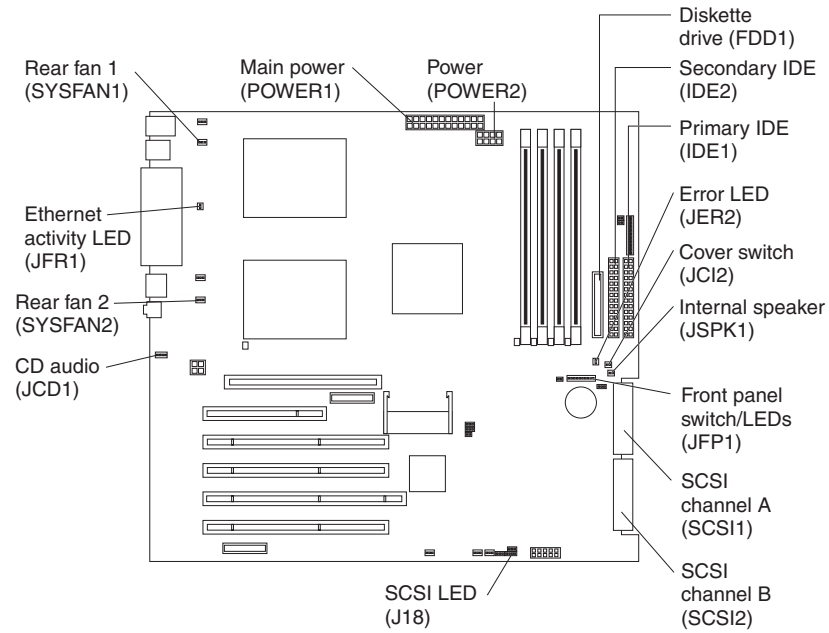
System-board option connectors

The following illustration shows the system-board connectors for user-installable options.



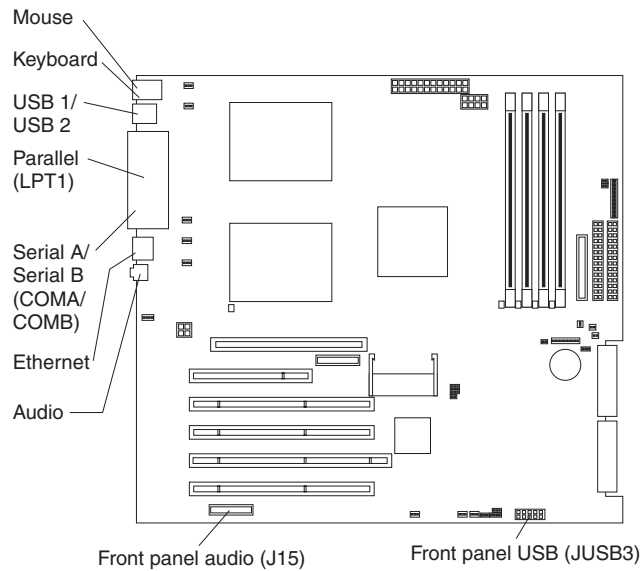
System-board internal connectors

The following illustration shows the internal connectors on the system board.

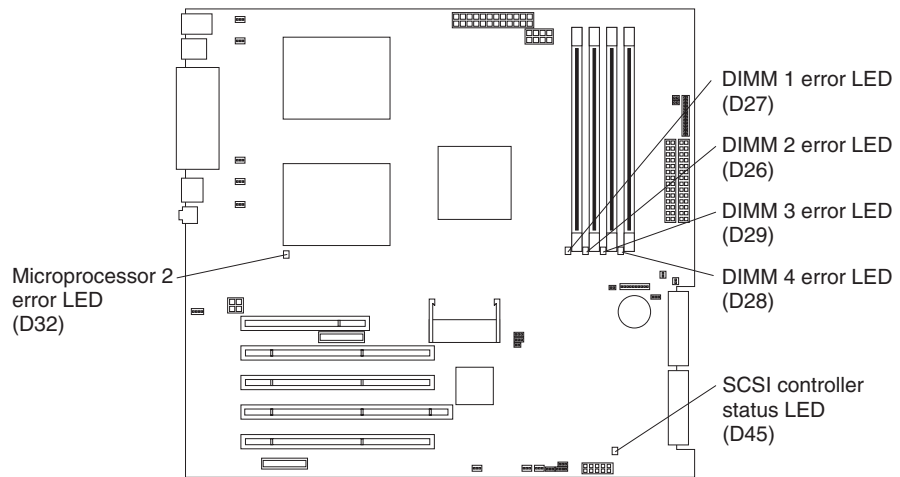


System-board external connectors

The following illustration shows the external input/output port connectors on the system board.



System-board error LEDs



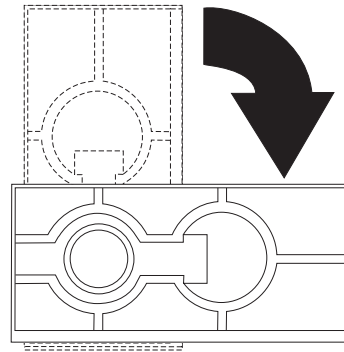
Installing options

This section provides instructions for installing hardware options in the computer.

Moving the stabilizing feet

The two front feet on the bottom of the computer rotate 90 degrees to provide additional stability.

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



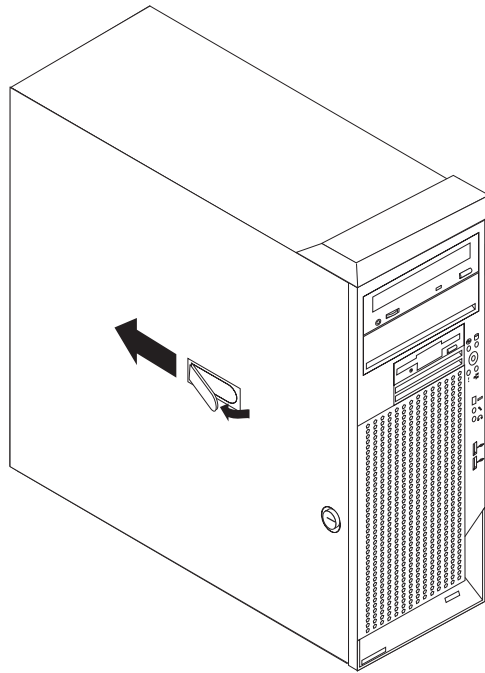
Removing the side cover

To remove the side cover, you might find it easier to lay the computer on its side. If you do, move the stabilizing feet so that they do not break (see “Moving the stabilizing feet”).

Complete the following steps to remove the side cover of the computer:

1. Review “Safety notices (multilingual translations)” on page 120.
2. Turn off the computer and all attached devices (see “Turning off the computer” on page 7).
3. Disconnect all power cords; then disconnect all external cables.
4. Unlock the side cover; then, pull the cover release latch away from the computer, and push the cover toward the rear of the computer. Lift the side

cover off the computer and set it aside.



For instructions for replacing the side cover, see “Replacing the side cover” on page 62.

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.

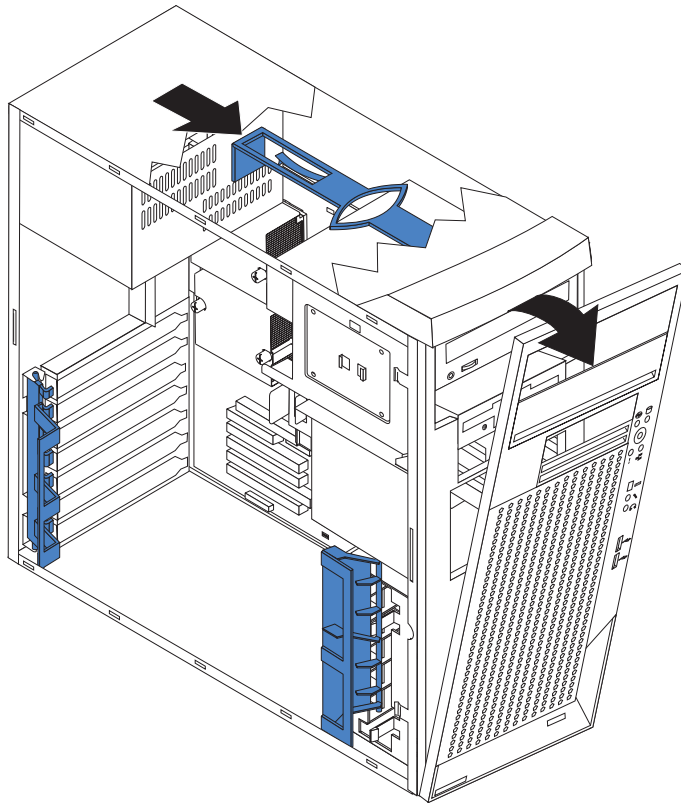
Front bezel

Note: Read “Installation guidelines” on page 35 and the safety notices at “Safety information” on page 117.

Complete the following steps to remove the bezel:

1. Remove the side cover and locate the bezel-release lever.

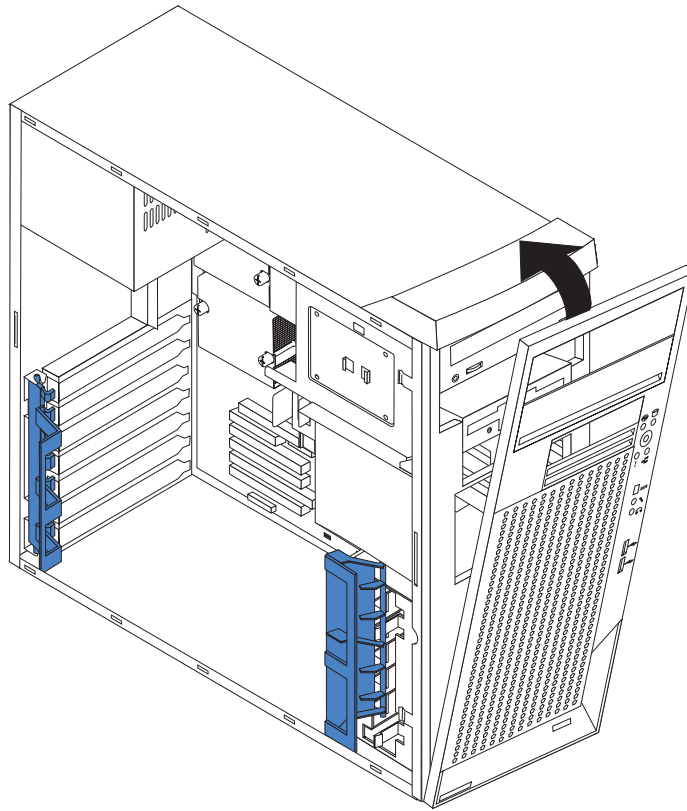
2. Press the bezel-release lever toward the front of the computer.



3. Pull the top of the bezel away from the chassis; then, lower the bezel to disengage the bottom tabs.
4. Remove the bezel from the computer and store the bezel in a safe place.

Complete the following steps to install the bezel:

1. Insert the two tabs on the bottom of the bezel into the matching holes on the computer chassis.



2. Push the top of the bezel toward the computer until the two tabs at the top of the bezel snap into place.

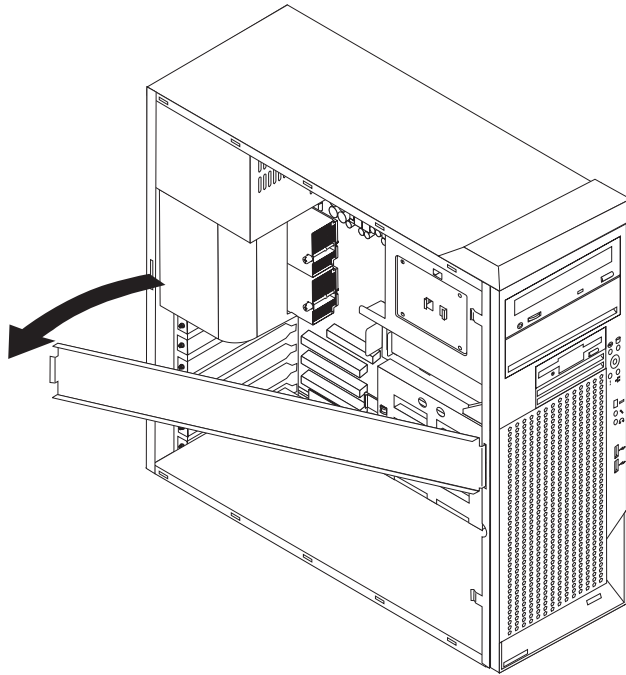
Removing and installing the support bracket

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

Complete the following steps to remove the support bracket:

1. Remove the side cover (see “Removing the side cover” on page 39).
2. Pull out on the rear end of the support bracket approximately 150 mm (6 in.).

3. Disengage the front end of the support bracket from the computer and set the bracket aside.



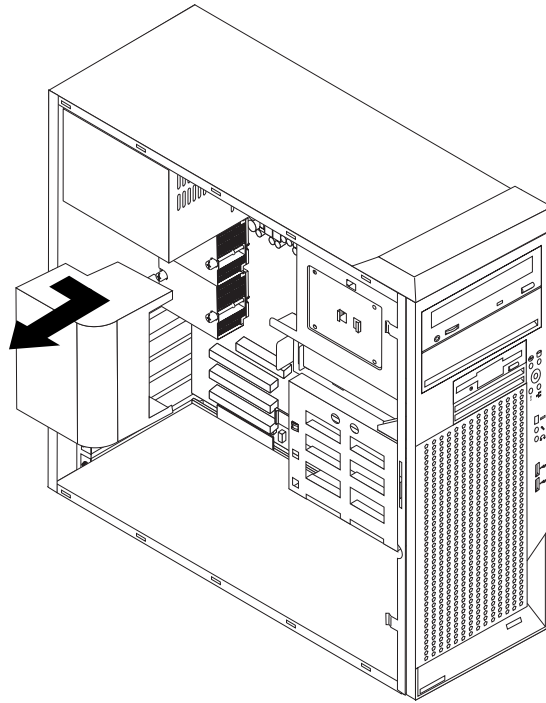
To reinstall the support bracket, reverse the previous steps.

Air baffle

Complete the following steps to remove the air baffle:

1. Review “Safety notices (multilingual translations)” on page 120, “Installation guidelines” on page 35, and “Handling electrostatic discharge-sensitive devices” on page 120.
2. Turn off the computer and all attached devices.
3. Disconnect all power cords; then disconnect all external cables.
4. Remove the side cover (see “Removing the side cover” on page 39).

5. Remove the support bracket (see “Removing and installing the support bracket” on page 42).



6. Unhook the air baffle from its retaining tabs and lift it out of the chassis.

Note: Use care in removing the air baffle; do not damage the tabs above the heat sinks.

Working with adapters

Your computer comes with adapter connectors or *slots*. The AGP video adapter is installed in the AGP Pro slot, and some models have an IEEE 1394 (FireWire) adapter installed in mini-PCI slot 6 (PCI6). You can install up to five additional optional adapters in your computer in PCI slot 1 (PCI1) and PCI-X slots 2 through 5 (PCI2 through PCI5).

See “System-board option connectors” on page 36 for the locations of expansion slots on the system board.

Adapter considerations

Before you install an adapter, review the following information:

- Read the documentation that comes with your operating system.
- Locate the documentation that comes with the adapter and follow those instructions in addition to the instructions in this chapter. If you need to change the switch or jumper settings on your adapter, follow the instructions that come with the adapter.
- You can install only a 32-bit adapter in the 32-bit PCI slot 1; 64-bit adapters can be installed only in the 64-bit PCI-X slots 2 through 5.
- You can install full-length adapters in all five expansion slots; however, full-length double-width adapters will not fit in slot 5 and are not supported. None of the expansion slots are hot-plug.
- The 32-bit PCI slot 1 supports 5.0 V signaling PCI adapters; it does not support 3.3 V signaling adapters or 64-bit adapters.

- The 64-bit PCI-X slots 2 through 5 support 3.3 V signaling PCI or PCI-X adapters; they do not support 5.0 V signaling adapters.
- The PCI bus configuration is as follows:
 - The 32-bit PCI slot 1 and mini-PCI slot 6 (for the IEEE 1394 controller) are on the 33 MHz PCI bus.

Note: If your computer did not come with a IEEE 1394 (FireWire) adapter installed in mini-PCI slot 6, do not install an adapter in this slot. It is not supported.
 - The 64-bit PCI-X slots 2 and 3 and the integrated Ethernet controller are on the 100 MHz PCI-X bus, channel A.
 - The 64-bit PCI-X slots 4 and 5 and the integrated SCSI controller with RAID capabilities are on the 100 MHz PCI bus, channel B.
- To provide failover protection, an optional Ethernet adapter can be installed only in PCI-X slots 2 through 5.
- Installing an optional RAID adapter in your computer will require that you reload the operating system and applications that came pre-installed on your computer.
- The system scans the AGP slot, mini-PCI slot 6, PCI expansion slot 1, and PCI-X expansion slots 2 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: AGP slot, mini-PCI slot 6, PCI expansion slot 1, system-board integrated drive electronics (IDE) or SCSI devices, and then PCI-X expansion slots 2 through 5.
- For a list of supported options for your computer, go to <http://www.ibm.com/pc/> on the World Wide Web; then, select your country and navigate to the list of options for your computer.

Installing an adapter

Note: The AGP Pro slot and PCI slot 1 must be empty for you to access the IEEE 1394 (FireWire) adapter in mini-PCI slot 6. If you are replacing the IEEE 1394 adapter, the optional PCI adapter and the AGP video adapter will need to be temporarily removed.

Complete the following steps to install an adapter in your computer:

1. Review “Safety notices (multilingual translations)” on page 120, “Installation guidelines” on page 35, and “Handling electrostatic discharge-sensitive devices” on page 120.
2. Turn off the computer and all attached devices.
3. Disconnect all power cords; then disconnect all external cables.
4. Remove the side cover (see “Removing the side cover” on page 39).
5. Determine which slot you will use for the adapter. Check the instructions that come with the adapter for any requirements, restrictions, or cabling instructions. It might be easier to route cables before you install the adapter.
6. 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 adapter-retention bracket.
7. If there is an adapter already installed in the slot, remove it and place it on a static-protective surface.

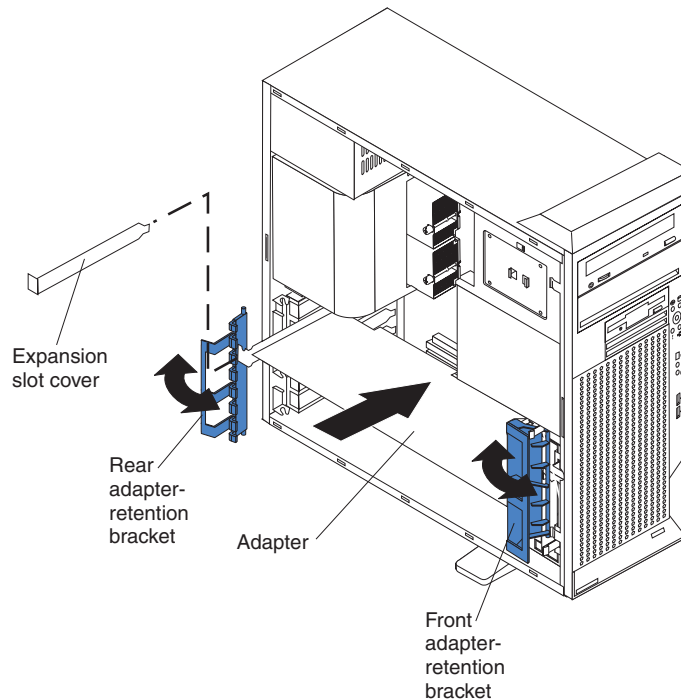
If the slot is empty, remove the expansion-slot cover. From the rear of the computer, press on the slot cover. Grasp it and pull it out of the expansion slot. Store it in a safe place for future use.

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.

8. Set any jumpers or switches on the adapter or system board according to the documentation that comes with the adapter.

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. Remove the adapter from the static-protective package, 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. Move the adapter directly from the static-protective package to the adapter slot. Avoid touching the components and gold-edge connectors on the adapter.



10. Connect required cables to the adapter. Route cables so that they do not block the flow of air from the fans. If you are installing an optional SCSI adapter, see “Cabling an optional SCSI adapter” on page 47 for additional information.
11. If you have another adapter to install, repeat steps 5 through 10.
12. If you have installed a full-length adapter, rotate the front adapter-support bracket to the closed (locked) position.
13. Reinstall the rear adapter-retention bracket; then, rotate the bracket to the closed (locked) position.

Note: If any adapters in your computer are large or have heavy cables attached to them, you can remove the rear adapter-retention bracket and secure all of the adapters with expansion-slot screws. The expansion-slot screws are stored on the back of the computer next to slot 1.

14. If you have other options to install, do so now; otherwise, continue with step 15.
15. Replace the support bracket (see “Removing and installing the support bracket” on page 42).
16. Replace the side cover (see “Replacing the side cover” on page 62).
17. Reconnect the external cables and power cords; then, turn on the attached devices and the computer.

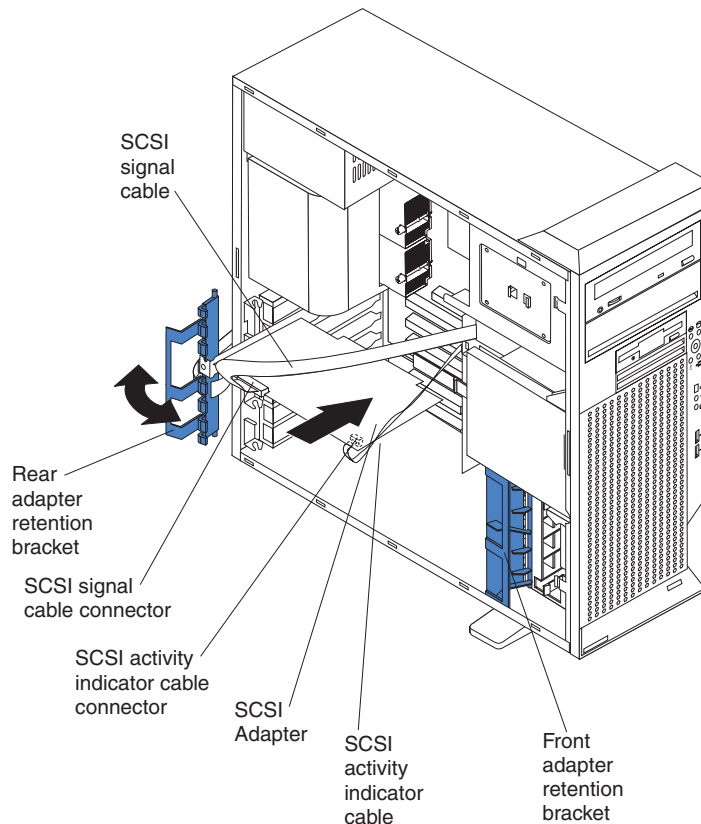
Cabling an optional SCSI adapter

You can install an optional SCSI adapter in your computer to control the internal hard disk drives. With a SCSI adapter installed you can configure the internal hard disk drives into disk arrays. You can also cable a SCSI adapter to external hard disk drives. See your SCSI adapter option documentation for complete instructions for installing a SCSI adapter in your computer and for additional information about SCSI adapters.

Note: An optional SCSI adapter or cable option is required to connect external SCSI devices.

Complete the following steps to cable an optional SCSI adapter:

1. Install the SCSI adapter (see “Installing an adapter” on page 45).
2. Connect the SCSI-signal cable to the adapter and to 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 (J18) on the system board. See “System-board internal connectors” on page 37 for the location of the SCSI-LED connector.



4. Complete the installation of the optional SCSI adapter.

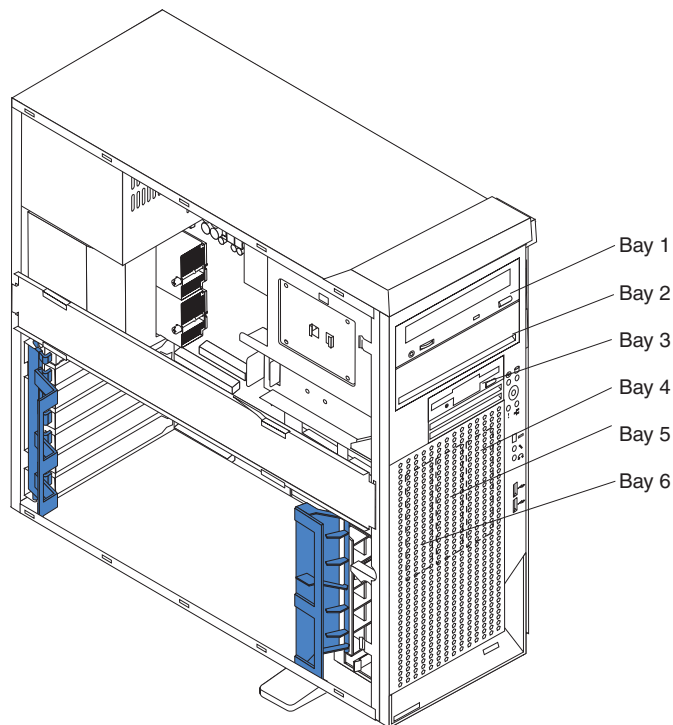
Installing internal drives

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

- Diskette
- Hard disk
- CD-ROM, CD-RW, or DVD/CD-RW combo

Internal drive bays

Your IntelliStation Z Pro computer comes with an IDE CD-ROM, CD-RW, or DVD/CD-RW combo 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, DVD/CD-RW, and DVD-ROM drives are examples of removable-media drives. You can install removable-media drives in bays 1, 2, and 3 only.
2. The integrated IDE controller in your computer supports the connection of up to four IDE devices.
3. You can install a 3.5-in. slim-high or 5.25-in. half-high removable-media drive, such as a tape backup, CD-RW, or DVD drive, in bay 2.
4. The IntelliStation Z Pro computer supports only one diskette drive.
5. To install a 3.5-in. drive in a 5.25-in. bay, you must use the 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 your computer, go to <http://www.ibm.com/pc/> on the World Wide Web; then, select your country and navigate to the list of options for your computer.

Preinstallation steps

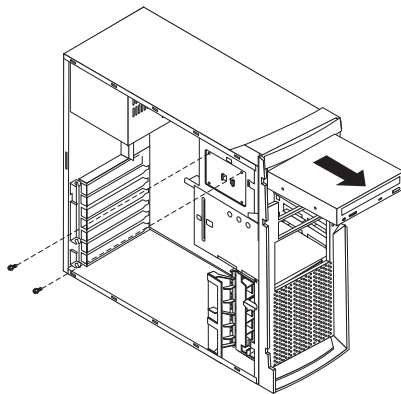
Some of these steps are required only during the initial installation of an internal drive.

1. Review “Safety notices (multilingual translations)” on page 120, “Installation guidelines” on page 35, and the documentation that comes with your drive.
2. Verify that you have all the cables and other equipment specified in the documentation that comes with the drive.
3. Choose the bay in which you want to install the drive.
4. 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.

Removing a CD-ROM drive in bay 1 or bay 2

Complete the following steps to remove a CD-ROM drive in bay 1 or bay 2:

1. Follow the instructions in “Preinstallation steps” on page 49.
2. Turn off the computer and all attached devices.
3. Disconnect all power cords; then disconnect all external cables.
4. Remove the side cover (see “Removing the side cover” on page 39).
5. Disconnect the CD-ROM connector and power cables.
6. Remove the two screws from the CD-ROM drive cage.
7. Gently slide the CD-ROM drive toward the front of the computer and lift it out.



To replace the CD-ROM drive, reverse the steps.

Installing a drive in bay 2

Complete the following steps to install a drive in bay 2:

1. Follow the instructions in “Preinstallation steps” on page 49.
2. Turn off the computer and all attached devices.
3. Disconnect all power cords; then disconnect all external cables.
4. Remove the side cover (see “Removing the side cover” on page 39).
5. Remove the support bracket (see “Removing and installing the support bracket” on page 42).
6. 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.

Statement 3



CAUTION:

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

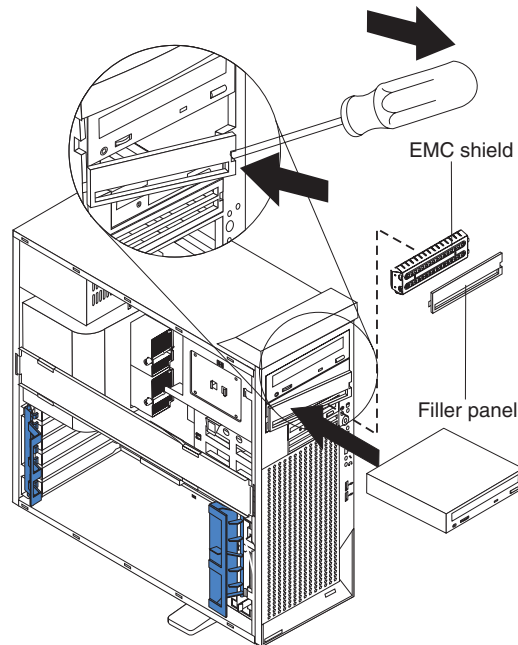
- Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.
- Use of controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation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



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

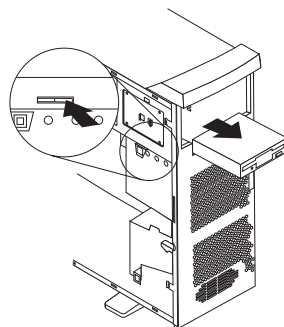
Note: You might find it easier to install the new drive into the appropriate opening on the front, and then attach the cables.

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. If you are installing a 3.5-in. drive in bay 2, you must attach the 5.25-in. conversion kit, supplied with your option, to the 3.5-in. drive.
10. Determine whether the drive is an IDE or SCSI device; then, connect one end of the appropriate signal cable into the back of the drive and make sure that the other end of this cable is connected into the appropriate IDE or SCSI connector on the system board. See “Power and signal cables for internal drives” on page 53 for additional information about cabling drives and “System-board internal connectors” on page 37 for the location of IDE and SCSI connectors on the system board. If there are open connectors on the cables connecting an existing IDE drive, this cable can be used to connect the new drive. The 3-connector SCSI cable that comes with your computer cannot be used to connect a SCSI drive in bay 2.
11. Route the signal cable so that it does not block the air flow to the rear of the drives or over the microprocessor and memory.
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 (see “Removing and installing the support bracket” on page 42).
15. Replace the side cover (see “Replacing the side cover” on page 62).
16. Reconnect the external cables and power cords; then, turn on the attached devices and the computer.

Replacing a diskette drive in bay 3

Complete the following steps to replace a diskette drive in bay 3:

1. Follow the instructions in “Preinstallation steps” on page 49.
2. Turn off the computer and all attached devices.
3. Disconnect all power cords; then disconnect all external cables.
4. Remove the side cover (see “Removing the side cover” on page 39).
5. Remove the front bezel (see “Front bezel” on page 40).
6. Remove the support bracket (see “Removing and installing the support bracket” on page 42).
7. Rotate the drive cage out.



8. Remove the existing drive by disconnecting the cables in the rear of the diskette drive; then, press on the oval cutout to release the drive and gently pull it out the front.

9. Remove the retainer from the left side of the diskette drive and place it on the new diskette drive.
10. Install the diskette drive by sliding the drive into the bay so that the metal tab of the drive aligns with the oval cutout and the drive locks into place; then, connect the cables at the rear of the drive.
11. If you have other options to install or remove, do so now.
12. Replace the support bracket (see “Removing and installing the support bracket” on page 42).
13. Replace the bezel (see “Front bezel” on page 40).
14. Replace the side cover (see “Replacing the side cover” on page 62).
15. Reconnect the external cables and power cords; then, turn on the attached devices and the computer.

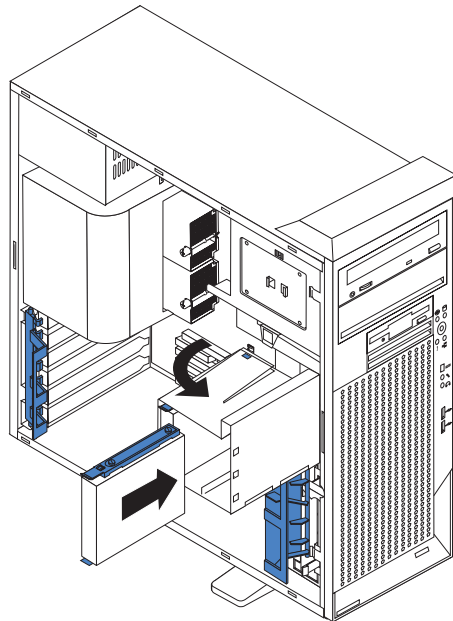
Installing a hard disk drive in bay 4, 5, or 6

Bays 4, 5, and 6 are in the drive cage. The drive cage is behind the front of the adapter-support bracket.

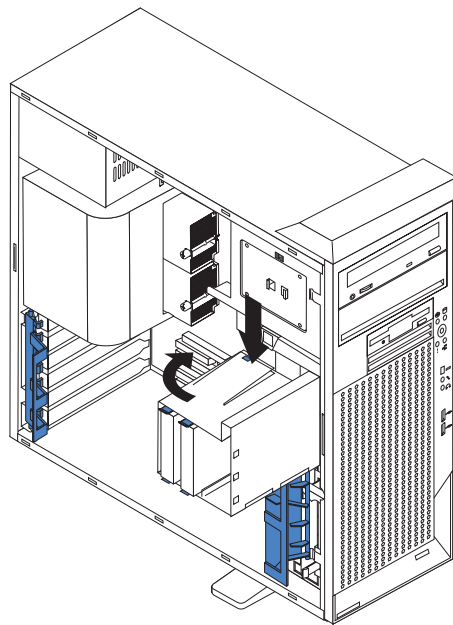
Note: You might find it useful to work with the computer laying on its side.

Complete the following steps to install a drive in bay 4, 5, or 6:

1. Follow the instructions in “Preinstallation steps” on page 49.
2. Turn off the computer and all attached devices.
3. Disconnect all power cords; then disconnect all external cables.
4. Remove the side cover (see “Removing the side cover” on page 39).
5. Remove the support bracket (see “Removing and installing the support bracket” on page 42).
6. Grasp the drive cage and rotate the cage out of the computer until it locks into place with the drive-cage retention tab and the open ends of the drive slots and installed drives are facing you. Ensure that the drive cage locks into place over the drive-cage retention tab by rotating the drive cage all the way out of the computer.



7. Attach the blue guide rails to the side of the drive using the screws that are provided.
8. Slide the drive into the drive cage until the plastic tabs on the drive guide rails lock into place in the drive cage. Clear any cables that might impede the replacement of the drive cage.
9. Determine whether the drive is an IDE or SCSI device; then, connect one end of the appropriate signal cable into the back of the drive and make sure that the other end of this cable is connected into the appropriate IDE or SCSI connector on the system board. See “Power and signal cables for internal drives” for additional information about cabling drives and “System-board internal connectors” on page 37 for the location of IDE and SCSI connectors on the system board. If there are open connectors on the cables connecting existing IDE or SCSI drives, these cables can be used to connect the new drive.
10. Route the signal cable so that it does not block the air flow to the rear of the drives or over the microprocessor and memory.
11. Connect the power cable to the back of the drive. The connectors are keyed and can be inserted only one way.
12. Push the drive cage outward, and press in on the drive-cage release tab; then, rotate the cage back into the computer.



13. If you have other options to install or remove, do so now.
14. Replace the support bracket (see “Removing and installing the support bracket” on page 42).
15. Replace the side cover (see “Replacing the side cover” on page 62).
16. Reconnect the external cables and power cords; then, turn on the attached devices and the computer.

Power and signal cables for internal drives

Your computer uses cables to connect IDE and SCSI devices to the power supply and to the system board. (See “System-board internal connectors” on page 37 for the location of system-board connectors.) Review the following information before connecting power and signal cables to internal drives:

- The drives that are preinstalled in your computer come with power and signal cables attached. If you replace any drives, remember which cable is attached to which drive.
- When you install a drive, ensure that one of the drive connectors of the signal cable is connected to the drive and that the connector at the other end of the signal cable is connected to the system board.
- The computer has two IDE buses, primary and secondary. Each of these buses supports up to two IDE devices. The primary IDE bus uses connector IDE1 on the system board and the secondary IDE bus uses connector IDE2.
- If you have only one IDE device on a cable, it must be set as a master device.
- If two IDE devices are used on a single cable, one must be designated as the master device and the other as the subordinate device; otherwise, the computer might not recognize some of the IDE devices. The master and subordinate 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 master device.

The following cables are provided:

- **Power cables:** Four-wire power cables connect the drives to the power supply. At the end of these cables are plastic connectors that can be attached to different drives; these connectors vary in size.
- **Signal cables:** Signal cables are typically flat cables, also called ribbon cables, that connect IDE, SCSI, and diskette drives to the system board. Two or three types of signal cable come with your computer.
 - **IDE:** The wider IDE signal cable has three connectors. One of these connectors is attached to the drive, one is a spare, and the third is attached to the primary or secondary IDE connector on the system board. The spare connector can be used to connect additional IDE drives to your computer. The CD-ROM drive is attached to an ATA100 signal cable. ATA100 signal cables are color-coded. The blue connector is attached to the system board. The black connector is attached to the master IDE device. The gray middle connector is attached to the subordinate IDE device. If you are installing an additional hard disk drive, you must change the switch or jumper setting on the CD-ROM drive to make the drive a subordinate device, set the switch or jumper setting on the new drive to master, and change the connector used for the CD-ROM drive to the gray middle connector. The new drive will be connected to the black master IDE device connector.
 - **Diskette drive:** The narrower signal cable has two connectors. One is attached to the diskette drive, and the other is attached to the connector (FDD1) on the system board.
 - **SCSI:** A round SCSI cable connects SCSI devices to the integrated SCSI controller with RAID capabilities on the system board. For more information about connecting SCSI devices, see the SCSI documentation.

Installing memory modules

Adding memory to your computer is an easy way to make programs run faster. You can increase the amount of memory in your computer by installing memory modules. Your IntelliStation Z Pro computer uses industry-standard PC2100 double-data-rate (DDR) dual inline memory modules (DIMMs).

Notes:

1. The system board contains four DIMM connectors and supports two-way memory interleaving.

2. The DIMM options available for your computer are 128 MB, 256 MB, 512 MB, 1 GB, and 2 GB. Your computer supports a minimum of 256 MB and a maximum of 8 GB of system memory.
3. The amount of usable memory will be reduced depending on the system configuration. A certain amount of memory must be reserved for system resources. The BIOS will display the total amount of installed memory and the amount of configured memory.
4. Your computer comes with two 256 MB or 512 MB DIMMs (for a total of 512 MB or 1024 MB) installed in the DIMM 3 and DIMM 4 memory connectors. When you install additional DIMMs, be sure to install them as a pair in DIMM connectors 1 and 2.
5. DIMMs must be installed in matched pairs. The first pair of DIMMs you install in DIMM 3 and DIMM 4 memory connectors must be the same size, speed, type, and technology. You can mix compatible DIMMs from various manufacturers. If you install a second pair of DIMMs in DIMM 1 and DIMM 2 memory connectors, they do not have to be the same size, speed, type, and technology as the DIMMs you installed in DIMM 3 and DIMM 4 memory connectors. However, the size, speed, type, and technology of the DIMMs you install in DIMM 1 and DIMM 2 memory connectors must match each other.
6. Install only 133 MHz (memory bus), 2.5 V, 184-pin, double-data-rate (DDR), PC2100, registered synchronous dynamic random-access memory (SDRAM) with error correcting code (ECC) DIMMs. These DIMMs must be compatible with the latest PC2100 SDRAM Registered DIMM specification. For a list of supported options for your computer, go to <http://www.ibm.com/pc/> on the World Wide Web; then, select your country and navigate to the list of options for your computer.
7. Your computer supports Chipkill™ memory if the DIMMs are all type x4 and are 256 MB or larger. Using any 128 MB DIMMs or DIMMs that are not type x4 on your computer disables Chipkill memory.

Complete the following steps to install a DIMM:

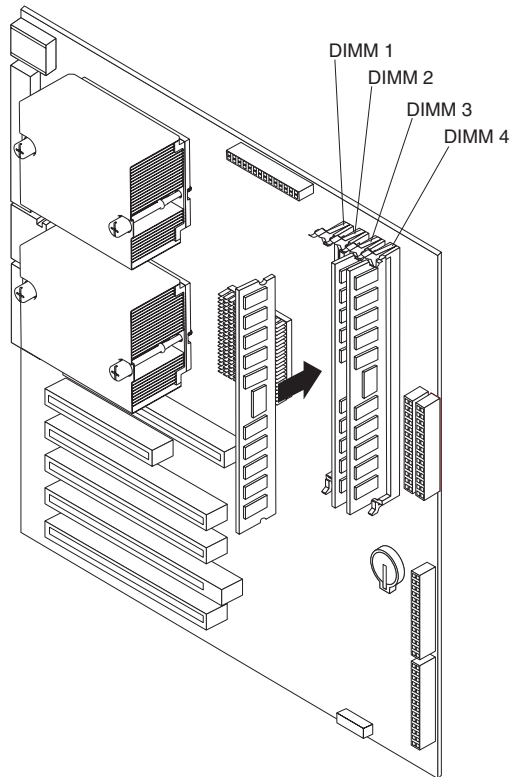
1. Review “Safety notices (multilingual translations)” on page 120, “Installation guidelines” on page 35, and “Handling electrostatic discharge-sensitive devices” on page 120.
2. Turn off the computer and all attached devices.
3. Disconnect all power cords; then disconnect all external cables.
4. Remove the side cover (see “Removing the side cover” on page 39).
5. Remove the support bracket (see “Removing and installing the support bracket” on page 42).
6. You might find it easier to install memory modules if you rotate the drive cage out of the computer. Grasp the drive cage and rotate until it locks into place. See the illustration on page 52 for additional information.
7. Locate the DIMM connectors on the system board. Determine the connectors into which you will install the DIMMs. Install the DIMMs in the order shown in the following table.

Table 2. DIMM installation sequence

Installation order	DIMM connectors	Diagnostic reference
First	DIMM 3 and DIMM 4	Bank 2
Second	DIMM 1 and DIMM 2	Bank 1

8. Open the retaining clips and, if necessary, remove any existing DIMM.

9. Touch the static-protective package containing the DIMM to any unpainted metal surface on the computer. Then remove the new DIMM from the package.
10. Gently open the retaining clip on each end of the DIMM slot. Turn the DIMM so that the pins align correctly with the connector.
11. 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. If there is a gap between the DIMM and the retaining clips, the DIMM has not been correctly installed. Open the retaining clips, remove the DIMM, then reinsert it.



12. If you have other options to install or remove, do so now.
13. Push the drive cage outward, and press in on the drive-cage release tab; then, rotate the cage back into the computer.
14. Replace the support bracket (see “Removing and installing the support bracket” on page 42).
15. Replace the side cover (see “Replacing the side cover” on page 62).
16. Reconnect the external cables and power cords. Turn on the attached devices, and turn on the computer.

Installing an additional microprocessor

Your computer comes with one microprocessor installed on the system board. Your computer supports up to two microprocessors. With two microprocessors, your computer can operate as a symmetric multiprocessing (SMP) computer. With SMP, certain operating systems and application programs can distribute the processing load among the microprocessors.

Before you begin:

- Thoroughly review the documentation that comes with the microprocessor to determine the required BIOS update. The latest level of BIOS code for your computer is available through the World Wide Web at <http://www.ibm.com/pc/support>.
- (Optional) Obtain an SMP-capable operating system. For a list of supported operating systems and other options for your computer, go to <http://www.ibm.com/pc/> on the World Wide Web; then, select your country and navigate to the list of options for your computer.

Attention: To ensure proper computer operation when you install an additional microprocessor, use microprocessors that have the same cache size and type, and the same clock speed. Microprocessor internal and external clock frequencies must be identical. You can use the Configuration/Setup Utility program in your computer to determine the specific type of microprocessor on your system board.

Important: A microprocessor must always be installed in socket CPU1 of the system board.

Notes:

1. To order additional microprocessor options, see “Parts listing for the IntelliStation Z Pro” on page 109.
2. Terminator cards are not required for empty microprocessor sockets. However, for airflow, an empty microprocessor socket must contain a microprocessor baffle.
3. The microprocessor speeds are automatically set for this computer; therefore, you do not need to set any microprocessor frequency-selection jumpers or switches.
4. If you need to replace a microprocessor, “Microprocessor and heat sink” on page 78.
5. For additional illustrations of the system-board components, see “System-board option connectors” on page 36.

Configuring the operating system

The Microsoft Windows XP operating system that comes preinstalled on your computer automatically configures itself when an additional microprocessor is installed. Other operating systems might need to be manually configured to support an additional microprocessor.

Installing an additional microprocessor on Windows NT:

If Windows NT is preinstalled on the computer, follow these steps:

1. Backup the hard disk.
2. Run the Multiprocessor Upgrade Option program, *addcpu.exe* before you install the second microprocessor. The Multiprocessor Upgrade Option program is at <http://www.ibm.com/pc/support> on the World Wide Web. From the IBM support

page, type **addcpu** in the Search field and press Enter. In addition, download and read the addcpu.pdf file for instructions about adding a second microprocessor.

3. Continue with step 1 of “Installing the additional microprocessor” on page 59.

Installing a additional microprocessor on Windows 2000:

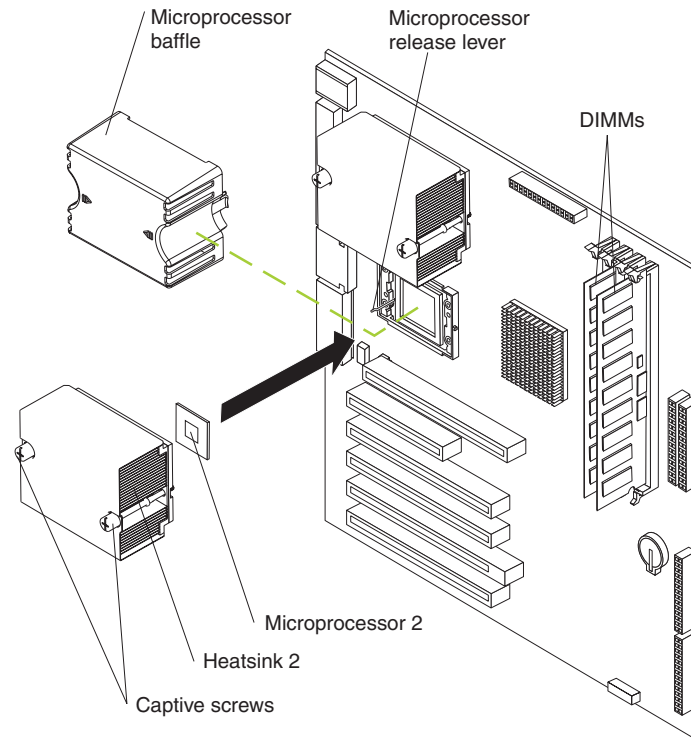
If Windows 2000 is preinstalled on the computer, follow these steps:

Note: Be sure to check the Microsoft web page at <http://www.microsoft.com> for updates to these instructions. From the Microsoft web page, type **multiprocessor support** in the Search field and press Enter.

1. Backup the hard disk.
2. Do the following:
 - a. From the desktop, click **Start → Settings → Control Panel**.
 - b. On the Control Panel window, double-click the **System** icon.
 - c. On the System Properties window, select the **Hardware** tab; then, click the **Device Manager** button.
 - d. On the Device Manager window, click on the plus sign (+) next to the Computer node to expand the list; then, double-click on **ACPI Uniprocessor PC**.
 - e. On the Advanced Configuration and Power Interface (ACPI) PC Properties window, select the **Driver** tab; then, click the **Update Driver** button.
 - f. On the Update Device Driver Wizard window, click **Next**.
 - g. On the next window, click the **Display a known list of drivers for this device so that I can choose a specific driver** radio button; then, click **Next**.
 - h. On the next window, click the **Show all hardware of this device class** radio button. Under the Models field, select **ACPI Multiprocessor PC**; then, click **Next**.
 - i. If the configuration shown in the wizard is satisfactory, click **Next** to save the configuration.
 - j. Click **Finish** to complete the process.
 - k. When prompted as to whether you want to restart your computer, select **Yes**.
3. Continue with step 1 of “Installing the additional microprocessor” on page 59.

Installing the additional microprocessor

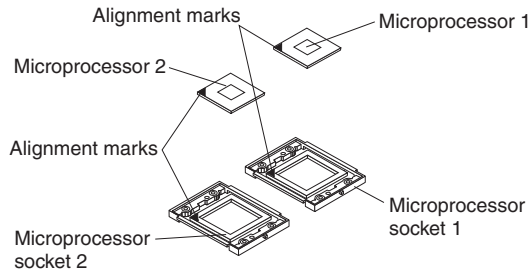
Complete the following steps to install an additional microprocessor.



1. Review “Installation guidelines” on page 35, “Handling electrostatic discharge-sensitive devices” on page 120 and “Safety notices (multilingual translations)” on page 120.
2. Turn off the computer and all attached devices.
3. Disconnect all power cords; then disconnect all external cables.
4. Remove the side cover (see “Removing the side cover” on page 39).
5. Remove the support bracket (“Removing and installing the support bracket” on page 42).
6. Remove the air baffle by unhooking it from its retaining tabs and lifting it off the chassis.
7. Locate the second microprocessor socket (connector CPU2) on the system board.
8. Remove the microprocessor baffle from the second microprocessor socket.
9. If the second microprocessor socket is covered with protective film, peel and remove the film.
10. Install the microprocessor:
 - a. Touch the static-protective package containing the new microprocessor to any *unpainted* metal surface on the computer; then, remove the microprocessor from the package.
 - b. Pull out and lift up on the microprocessor-release lever to unlock the microprocessor socket.

Attention:

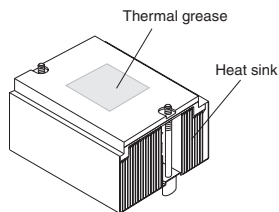
- 1) Do not use excessive force when pressing the microprocessor into the socket.
- 2) Make sure that the microprocessor is oriented and aligned correctly with pin number 1 in the socket before you try to close the microprocessor-release lever. The following illustration shows the alignment marks for both microprocessors and sockets.



- c. Center the microprocessor over the microprocessor socket. Align the triangle on the corner of the microprocessor with the triangle on the corner of the socket and carefully press the microprocessor into the socket.
- d. Carefully close the microprocessor-release lever to secure the microprocessor in the socket.

Attention: Do not set the heat sink down after you remove the plastic cover and do not touch the thermal grease on the bottom of the heat sink. Touching the thermal grease will contaminate it. If the thermal grease on the microprocessor or heat sink becomes contaminated, contact your service technician.

11. Install the heat sink on the microprocessor:



- a. Remove the plastic cover from the bottom of the heat sink.
- b. Align and place the heat sink on top of the microprocessor, grease side down, in the retention bracket. Press firmly on the heat sink.

Attention: Alternate the tightening of the two captive screws to prevent damage to the microprocessor. Ensure that the screws are completely tightened (until they stop); otherwise, damage to the microprocessor will occur.

- c. Secure the heat sink to the microprocessor by tightening the captive screws. Alternate between the two captive screws in the heat sink while tightening them.

12. Install the air baffle.
13. If you have other options to install or remove, do so now.
14. Replace the support bracket (see "Removing and installing the support bracket" on page 42).
15. Replace the side cover (see "Replacing the side cover" on page 62).

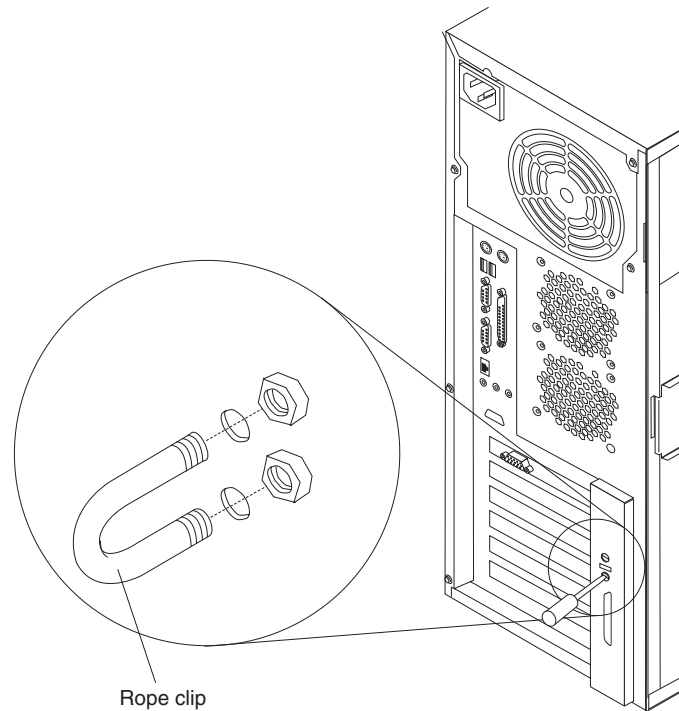
16. Reconnect the external cables and power cords. Turn on the attached devices, and turn on the computer.

Installing a security rope clip

To help prevent theft, you can add a security rope clip and cable to your computer.

Complete the following steps to install a rope clip:

1. Turn off the computer and all attached devices.
2. Disconnect all power cords; then disconnect all external cables.
3. Remove the side cover (see “Removing the side cover” on page 39).
4. Use a screwdriver to remove the two metal knockouts.
5. Insert the rope clip through the rear panel; then, attach and tighten the nuts.
6. Thread a cable through the rope clip 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.



7. If you have other options to install or remove, do so now.
8. Replace the side cover (see “Replacing the side cover” on page 62).
9. Reconnect the external cables and power cords. Turn on the attached devices, and turn on the computer.

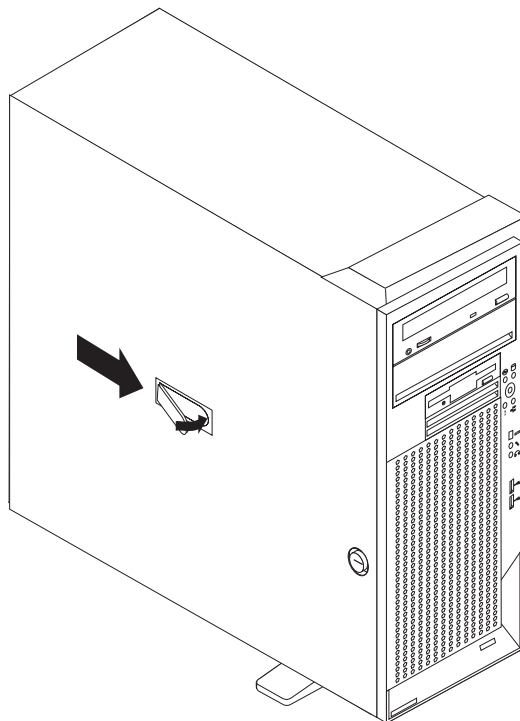
Replacing the side cover

If you removed the support bracket, reinstall it before you replace the side cover. See “Removing and installing the support bracket” on page 42.

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

Complete the following steps to replace the side cover:

1. Before installing the cover, check that all cables, adapters, and other components are installed and seated correctly and that you have not left loose tools or parts inside the computer.
2. Place the bottom lip of the side cover over the bottom edge of the computer chassis.
3. Rotate the side cover to a vertical position, inserting the tabs at the top of the side cover into the matching slots in the computer chassis.
4. Slide the side cover forward until it locks in place. Press down on the cover-release-latch button as you close the cover-release latch to lock the side cover.



5. 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 foot outward 90 degrees (see “Moving the stabilizing feet” on page 39).
6. Reconnect the external cables and power cords to the computer; then, connect the power cords to electrical outlets.
7. Turn on the attached devices; then, turn on the computer.

Connecting external options

If you install an optional SCSI adapter, or use the secondary channel on the integrated SCSI controller for external devices, you can attach external SCSI devices, such as a SCSI storage expansion enclosure, to the computer. To use secondary channel for external SCSI devices, remove the SCSI knockout from the rear of the computer and secure the free end of the secondary channel cable in the new opening.

You can connect a number of optional external devices to the connectors on the rear and front of the computer.

Complete the following steps to attach an external device:

1. Review the “Installation guidelines” on page 35, “Safety notices (multilingual translations)” on page 120, and the documentation that comes with your 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 “Ultra320 SCSI connector” on page 66 for SCSI ID and cabling information.

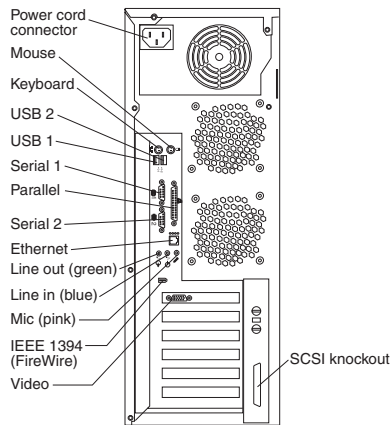
Input/output connectors

Connect optional external devices to the connectors on the front and rear of the computer.

Your computer has the following input/output (I/O) connectors:

- One audio line in (rear of computer)
- Two audio line out (front and rear of computer)
- Two audio microphone (front and rear of computer)
- One Ethernet (RJ-45)
- Two IEEE 1394 (FireWire) (some models)
- One keyboard
- One mouse
- One parallel
- Two serial
- One Ultra320 SCSI (some models)
- Four universal serial bus (USB) v2.0 ports
- One video

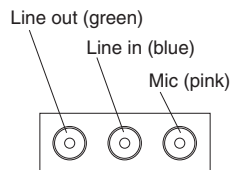
The following illustration shows the locations of these connectors.



The following sections describe these connectors.

Audio connectors

The audio connectors are used to connect external audio equipment to the computer.



Microphone

There are two microphone connectors, one on the front and one on the rear of the computer. Connect a microphone to this connector to record sounds onto the hard disk or to use speech recognition software.

Line in

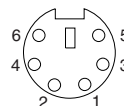
There is one line-in connector on the rear of the computer. The computer receives audio signals through this connector from an external audio device.

Line out

There are two line-out connectors, one on the front and one on the rear of the computer. The computer sends audio signals through this connector to powered speakers with built-in amplifiers, headphones, a multimedia keyboard, or the audio line-in connector on a stereo system. The internal speaker in your computer is disabled when any device is attached to either the front or rear line-out connector. Connecting devices to the front line-out connector disables the rear line-out connector.

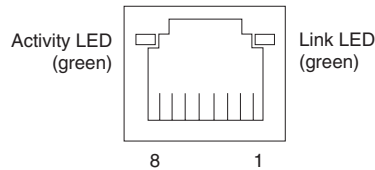
Auxiliary-device (pointing-device) connector

There is one auxiliary-device connector on the rear of the computer. Use this connector to connect a mouse or other pointing device. The following illustration shows an auxiliary-device connector.



Ethernet (RJ-45) connector

There is one Ethernet connector on the rear of the computer. Use this connector to connect the computer to a 10-Mbps, 100-Mbps, or 1000-Mbps network. The following illustration shows an Ethernet connector.



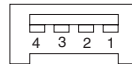
Connect a Category 3, 4, or 5 unshielded twisted-pair (UTP) cable to this connector. The 100BASE-TX and 1000BASE-T Fast Ethernet standards require Category 5 or higher cabling.

The Ethernet connector has two LEDs, one that indicates Ethernet-link status and one that indicates transmit/receive activity. When the Ethernet-link status LED is lit, it indicates that there is an active connection on the Ethernet port. Activity between the computer and the network is indicated by the Ethernet transmit/receive activity LEDs on the front and rear of the computer (see “Controls and indicators” on page 5).

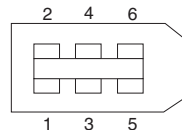
IEEE 1394 (FireWire) connectors

There is one 4-pin IEEE 1394 connector on the front of the computer and one 6-pin IEEE 1394 connector on the rear of the computer. Use these connectors to connect IEEE 1394 devices. The following illustrations show the IEEE 1394 connectors.

4-pin IEEE 1394 (FireWire) connector (front):

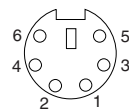


6-pin IEEE 1394 (FireWire) connector (rear):



Keyboard connector

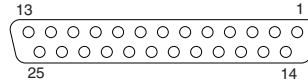
There is one keyboard connector on the rear of the computer. Use this connector to connect a PS/2[®] (non-USB) keyboard. The following illustration shows a keyboard connector.



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

Parallel connector

There is one parallel connector on the rear of the computer. Use this connector to connect a parallel device. The following illustration shows a parallel connector.



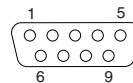
The parallel connector supports three standard Institute of Electrical and Electronics Engineers (IEEE) 1284 modes of operation: standard parallel port (SPP), enhanced parallel port (EPP), and extended capability port (ECP). If you configure the parallel port to operate in bidirectional mode, it supports the ECP and EPP modes. When the parallel connector is configured as bidirectional, use an IEEE 1284-compliant cable that does not exceed 3 meters (9.8 ft). Use the Configuration/Setup Utility program to configure the parallel connector as bidirectional.

Complete the following steps to view or configure the parallel connector:

1. Restart the computer.
2. Press and hold the F1 key to launch the Configuration/Setup Utility program.
3. On the Configuration/Setup Utility menu, use the cursor keys on the keyboard to select **Devices** → **Parallel Port**.
4. Follow the instructions on the screen to save your changes and exit from the Configuration/Setup Utility menu.

Serial connectors

There are two serial connectors on the rear of the computer. Use these connectors to connect serial devices. The following illustration shows a serial connector.



Ultra320 SCSI connector

An optional external SCSI connector might be installed on the rear of the computer. Use this connector to connect external SCSI devices. The following illustration shows the SCSI standard 68-pin, female D-shell SCSI connector.



Your computer has an integrated SCSI controller with RAID capabilities. This dual-channel controller supports two independent, Ultra320 SCSI channels. The SCSI connectors for both channels are on the system board. Each channel supports up to 15 SCSI devices. This controller uses:

- Double-transition clocking to achieve up to 320 MB-per-second data-transfer rates
- Domain name validation to negotiate compatible data-transfer speeds with each device
- Cyclic-redundancy checking (CRC), instead of the usual parity checking, to improve data reliability
- An active terminator for SCSI bus termination

SCSI cabling requirements

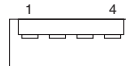
You can install three internal SCSI devices using the SCSI signal cable that comes with some computer models. If you plan to attach external SCSI devices, you must order an additional SCSI cable, remove the SCSI knockout from the rear of the computer, and connect the new cable from the system board to this opening. To select and order the correct cables for use with external devices, contact your IBM reseller or IBM marketing representative. When using an optional SCSI adapter, you must also connect the SCSI adapter to the SCSI LED (J18) connector on the system board receive an indication of SCSI hard-disk drive activity. See "System-board internal connectors" on page 37 for the location of the SCSI connectors.

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. See the information that is provided with the device for instructions about setting its SCSI ID.

Universal Serial Bus connectors

There are four Universal Serial Bus (USB) v2.0 connectors, two on the front of the computer and two on the rear of the computer. Use the USB connectors to connect optional telephony and multimedia devices. USB 2.0 technology transfers data at up to 480 megabits per second (Mbps) with a maximum of 127 external devices and a maximum signal distance of 5 meters (16 ft) per segment (if the device that is attached to the computer is a USB 2.0 device). If the computer has multiple USB devices attached to it, the USB hub must be USB 2.0, otherwise, all USB 2.0 devices will transfer data at 12 Mbps. Using Plug and Play technology, USB devices are configured automatically. The following illustration shows a USB connector.



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

If you connect a PS/2 (non-USB) keyboard to the keyboard connector, USB ports and devices are disabled during power-on self-test (POST).

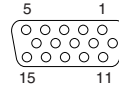
If you connect a USB keyboard that has a mouse port, the keyboard emulates a mouse, and you cannot disable the mouse settings in the Configuration/Setup Utility program.

Video connector

The Accelerated Graphics Port (AGP) adapter, which is in the AGP slot on the system board, provides the video connector. This connector is on the rear of the computer. Use the video connector to connect a monitor or other display. The following illustrations show the different types of video connector that can come with your computer.

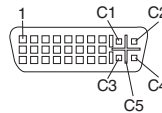
Analog video connector:

This connector is on the Matrox DVI-I to dual VGA pigtail cable and on the NVIDIA LFH-60 to dual VGA pigtail cable.



Digital (DVI-I) video connector:

This connector is on the Matrox Millennium G450, NVIDIA Quadro4 980XGL, and 3DLabs Wildcat4 7110 video adapters.



Low force helical-60 (LFH-60) video connector:

This connector is on the NVIDIA Quadro4 280NVS video adapter.



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

Models with the Matrox Millennium G450 DVI-I video adapter come with a DVI-I to dual-analog monitor pigtail cable.

Models with the Wildcat4 7110 or NVIDIA Quadro4 980XGL video adapter come with a DVI-I to VGA style analog converter for each DVI-I connector.

Attention: On the Wildcat4 7110 video adapter, the first or only monitor must be connected to the bottom connector (connector number 1).

Models with the NVIDIA Quadro4 280NVS video adapter come with a low force helical-60 (LFH-60) to dual-analog monitor pigtail cable. If you want to setup two digital monitors, you will need to purchase a separate dual-digital monitor cable.

FRU information (service only)

The field replaceable unit (FRU) procedures are intended for trained servicers who are familiar with IBM products.

IntelliStation Z Pro Type 6221

The following section contains information about removing components of the IntelliStation Z Pro Type 6221.

Front adapter-retention bracket assembly

Note: Read “Installation guidelines” on page 35 and the safety notices at “Safety information” on page 117.

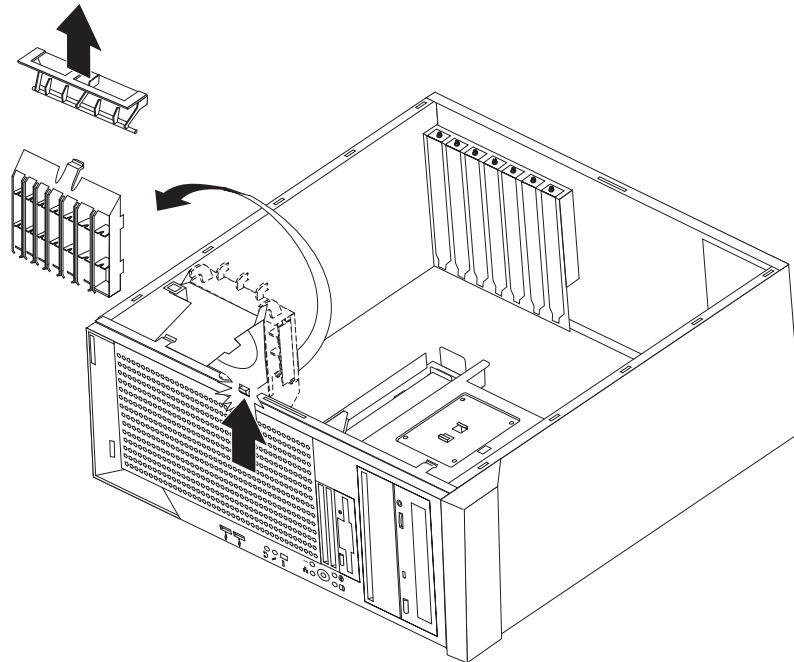
Complete the following steps to remove the front adapter-retention bracket assembly:

1. Turn off the computer and attached devices; then, disconnect all power cords and external cables.
2. Remove the cover and support bracket (see “Removing the side cover” on page 39 and “Removing and installing the support bracket” on page 42).

Note: It may be easier to complete this procedure if the computer is laying on its side.

3. Pivot the card guide to the raised position; then, remove all adapters (see “Installing an adapter” on page 45).

Note: In the following illustration, the drive cage is not shown.



4. Slide the bar out of the circular slots and pull the card guide out of the chassis.

5. Grasp the main portion of the bracket and press in on the tab located on the bottom of the bracket upward slightly to release the bracket; then, pivot the lower portion away from the chassis and disengage the two notches at the top until the component detaches.

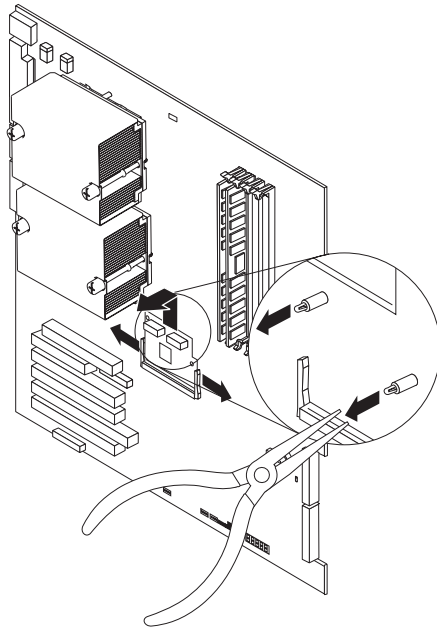
To install the adapter retainer, reverse the previous steps.

IEEE 1394 (FireWire) adapter

Note: Read “Installation guidelines” on page 35, “Handling electrostatic discharge-sensitive devices” on page 120, and the safety notices at “Safety information” on page 117.

Complete the following steps to remove the IEEE 1394 (FireWire) adapter:

1. Turn off the computer and attached devices; then, disconnect all power cords and external cables.
2. Remove the cover, support bracket and baffle (see “Removing the side cover” on page 39 and “Removing and installing the support bracket” on page 42).
3. Remove any adapters that impede access to the IEEE 1394 adapter.
4. Disconnect the cables on the adapter.
5. Disengage the two retaining clips securing the adapter.
6. Gently grasp the IEEE 1394 (FireWire) adapter and pull it until it comes loose from the adapter slot.



7. Gently pull up on the IEEE 1394 (FireWire) adapter until it disengages from the plastic stand-offs. If the stand-offs come away from the system board with the adapter, gently pull them out of the adapter and push them back into their apertures on the system board.

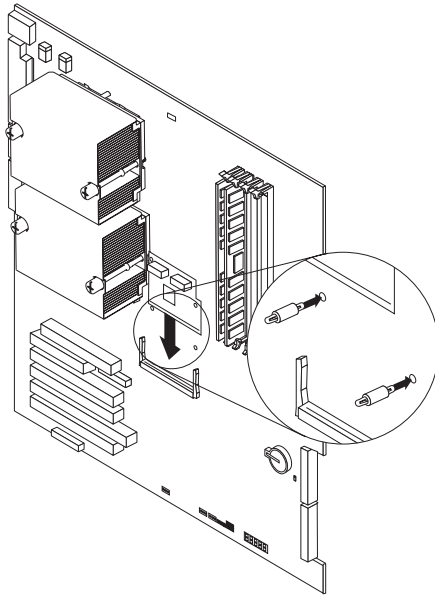
Note: You can also gently pinch the top of each standoff using pliers and then pull the adapter away.

Complete the following steps to install a IEEE 1394 (FireWire) adapter in the mini-PCI type III slot of the computer:

1. Turn off the computer and attached devices; then, disconnect all power cords and external cables.

Note: The AGP Pro slot and PCI slot 1 must be empty for you to install an optional IEEE 1394 (FireWire) adapter in the mini-PCI Type III slot. Install the optional IEEE 1394 (FireWire) adapter before installing an optional PCI adapter; the AGP video adapter will also need to be temporarily removed.

2. Remove the cover, support bracket and baffle (see “Removing the side cover” on page 39 and “Removing and installing the support bracket” on page 42).
3. Temporarily remove any adapters installed in the AGP Pro slot and PCI slot 1 (see “Installing an adapter” on page 45). Temporarily store these adapters in a static-protective location.
4. Locate the mini-PCI slot on the system board (see “System-board option connectors” on page 36). 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. Set any jumpers or switches on the adapter or system board according to the documentation that comes with the adapter.
6. Press each of the two plastic stand-offs that come with the IEEE 1394 (FireWire) option kit into the holes provided for them on the system board, making sure that they snap into place firmly.



7. Remove the adapter from the static-protective package. Move the adapter directly from the static-protective package to the adapter slot. Avoid touching the components and gold-edge connectors on the adapter.
8. Turn the adapter so that the adapter keys align correctly with the mini-PCI type III connector (PCI2) on the system board.
Attention: To avoid breaking the retaining clips or damaging the connectors, handle the clips gently.
9. Insert the adapter into the connector at a slight angle and then press it toward the system board, allowing the two plastic stand-offs from step 6 to snap into place in the holes provided for them on the IEEE 1394 (FireWire) card. The two retaining clips must snap into the closed position.

Note: If there is a gap between the adapter and the retaining clips, the adapter has not been properly installed. In this case, open the retaining clips and remove the adapter; then, reinsert the adapter. You might need to disengage the locking clips on the two stand-offs to remove the adapter.

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.

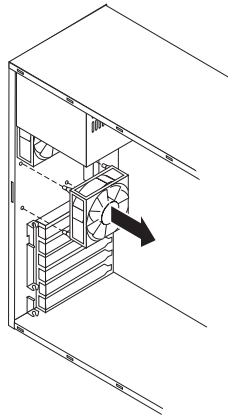
10. Connect required cables to the adapter. Route cables so that they do not block the flow of air from the fans.

Rear fan

Note: Read “Installation guidelines” on page 35 and the safety notices at “Safety information” on page 117.

Complete the following steps to remove a rear fan:

1. Turn off the computer and attached devices; then, disconnect all power cords and external cables.
2. Remove the cover, support bracket and baffle (see “Removing the side cover” on page 39 and “Removing and installing the support bracket” on page 42).
3. Disconnect the fan cable from the system board.



4. Grasp the fan with both hands and pull firmly, extending the rubber grommets; the grommets will be pulled through the holes in either the fan or the chassis and can then be removed.
5. Pull the fan up and out of the chassis.

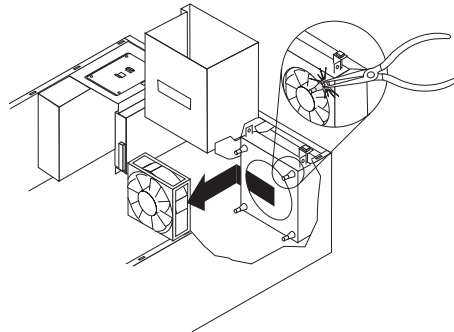
To install the rear fan, reverse the previous steps, attaching the rubber grommets to the fan and then pulling them through the holes on the chassis.

Front fan

Note: Read “Installation guidelines” on page 35 and the safety notices at “Safety information” on page 117.

The front fan is available on only certain models of the IntelliStation Z Pro. On those models that contain this component, complete the following steps to remove the front fan:

1. Turn off the computer and attached devices; then, disconnect all power cords and external cables.
2. Remove the cover, support bracket and baffle (see “Removing the side cover” on page 39 and “Removing and installing the support bracket” on page 42).
3. Rotate the drive cage up.
4. Disconnect the fan cable from the system board.



5. Reaching under the drive cage, grasp the fan and slide it toward the drive cage until it pulls free of the chassis.
6. Pull the fan up and out of the chassis.

To install the front fan, reverse the previous steps, sliding the fan into place.

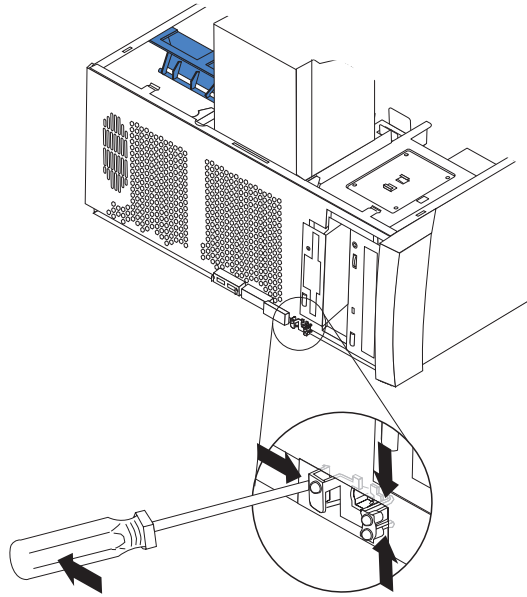
Operator information panel

Note: Read “Installation guidelines” on page 35 and the safety notices at “Safety information” on page 117.

Complete the following steps to remove the operator information panel:

1. Turn off the computer and attached devices; then, disconnect all power cords and external cables.
2. Remove the cover, support bracket and baffle (see “Removing the side cover” on page 39 and “Removing and installing the support bracket” on page 42).
3. Remove the front bezel (see “Front bezel” on page 40).
4. Rotate the drive cage up.

5. Disconnect the operator information panel cables from the system board.



6. From the inside of the chassis, press the latches on the operator information panel and loosen the panel from the chassis; then, pull the operator information panel out of the chassis through the front, making sure that the cable follows freely.

To install the operator information panel, reverse the previous steps, snapping the operator information panel into place.

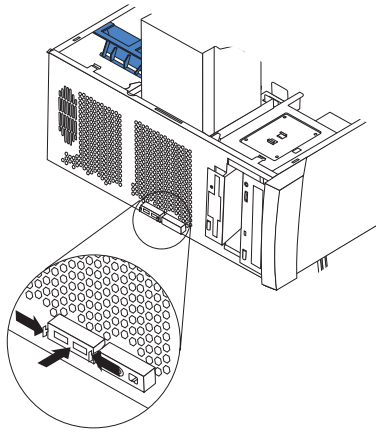
Front USB connector assembly

Note: Read “Installation guidelines” on page 35 and the safety notices at “Safety information” on page 117.

Complete the following steps to remove the front USB connector assembly:

1. Turn off the computer and attached devices; then, disconnect all power cords and external cables.
2. Remove the cover, support bracket and baffle (see “Removing the side cover” on page 39 and “Removing and installing the support bracket” on page 42).
3. Remove the front bezel (see “Front bezel” on page 40).
4. Rotate the drive cage up.

5. Disconnect the front USB connector assembly cable from the system board.



6. From the outside of the chassis, press the two tabs on the front USB connector assembly and squeeze gently; then, push the assembly toward the inside of the chassis and remove it.

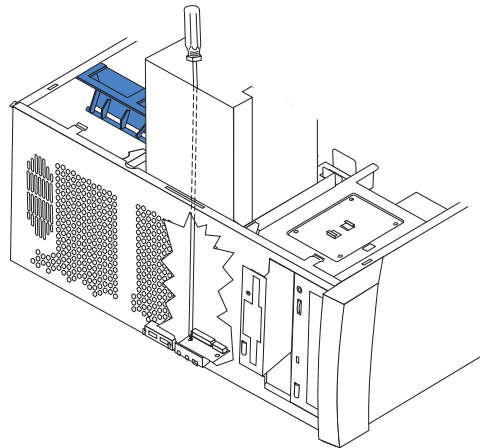
To install the front USB connector assembly, reverse the previous steps, snapping the front USB connector assembly into place.

Front audio/1394 card assembly

Note: Read “Installation guidelines” on page 35 and the safety notices at “Safety information” on page 117.

Complete the following steps to remove the front audio/1394 card assembly:

1. Turn off the computer and attached devices; then, disconnect all power cords and external cables.
2. Remove the cover and the support bracket (see “Removing the side cover” on page 39 and “Removing and installing the support bracket” on page 42).
3. Remove the front bezel (see “Front bezel” on page 40).
4. Rotate the drive cage up and remove any hard disk drives it contains (see “Installing a hard disk drive in bay 4, 5, or 6” on page 52).
5. Disengage the front audio/1394 card assembly cables from the system board.



6. Insert a long-bladed screwdriver through the empty drive cage and loosen the two screws that secure the front audio/1394 card assembly to the chassis.

7. Reach under the drive cage and remove the two screws; then, gently pull the front audio/1394 card assembly out of the computer.

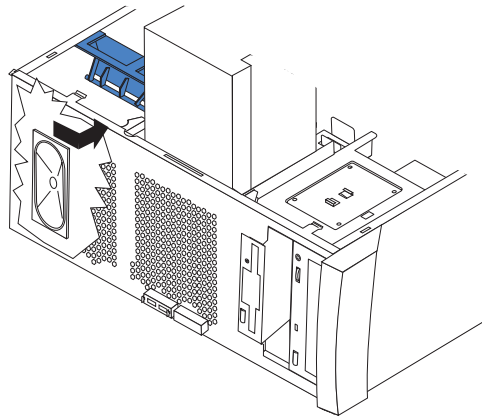
To install the front audio/1394 card assembly, reverse the previous steps.

Speaker

Note: Read “Installation guidelines” on page 35 and the safety notices at “Safety information” on page 117.

Complete the following steps to remove the speaker:

1. Turn off the computer and attached devices; then, disconnect all power cords and external cables.
2. Remove the cover and the support bracket (see “Removing the side cover” on page 39 and “Removing and installing the support bracket” on page 42).
3. Rotate the drive cage to its vertical position.
4. Remove the front fan, if one is installed (see “Front fan” on page 72).
5. Disconnect the speaker cable from the system board.



6. Reaching under the drive cage, grasp the speaker and slide it towards the drive cage; then, remove it from the computer.

Note: The speaker can also be accessed by rotating the adapter retention bracket to its upright position (see “Front adapter-retention bracket assembly” on page 69) and reaching through the front fan area.

To replace the speaker, reverse the previous steps.

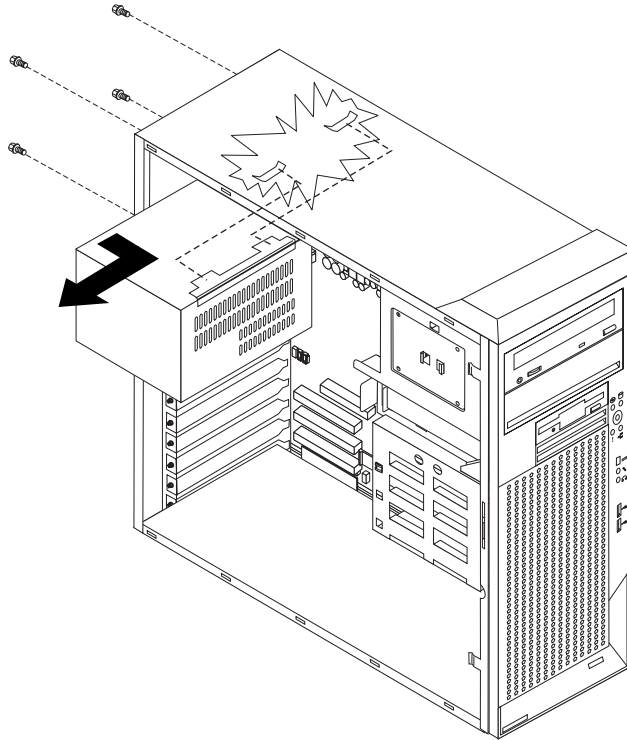
Power supply

Note: Read “Installation guidelines” on page 35 and the safety notices at “Safety information” on page 117.

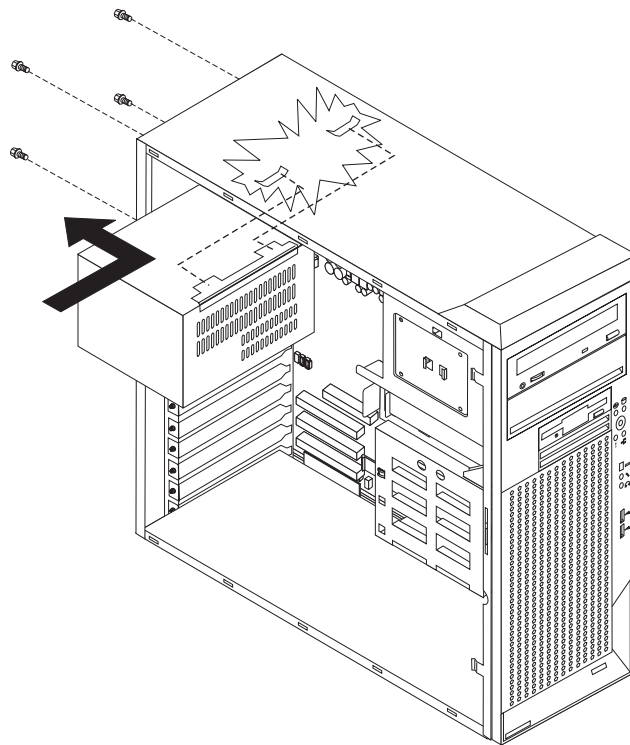
Complete the following steps to remove the power supply:

1. Turn off the computer and attached devices; then, disconnect all power cords and external cables.
2. Remove the cover, support bracket and baffle (see “Removing the side cover” on page 39 and “Removing and installing the support bracket” on page 42).

3. Disconnect the internal power supply cables.



4. Remove the four screws that secure the power supply to the chassis.
5. Lift the power supply out of the chassis, disengaging it from the two connectors on at the top of the power supply.



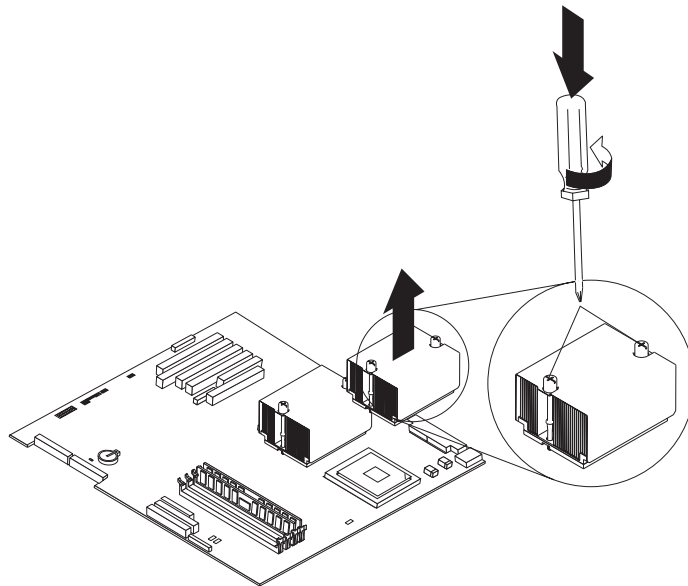
To replace the power supply, reverse the previous steps, making sure to engage the hooks on the power supply to the chassis.

Microprocessor and heat sink

Note: Read “Installation guidelines” on page 35, “Handling electrostatic discharge-sensitive devices” on page 120, and the safety notices at “Safety information” on page 117.

Complete the following steps to remove the microprocessor and fan-sink assembly:

1. Turn off the computer and attached devices; then, disconnect all power cords and external cables.
2. Remove the cover, support bracket and baffle (see “Removing the side cover” on page 39 and “Removing and installing the support bracket” on page 42).
3. Disconnect any cables that impede access to the microprocessor.



Note: It might be necessary to gently twist the heat sink to loosen it from the microprocessor.

4. Loosen the two captive screws on the heat sink and remove the heat sink.

Important: Be careful when handling the adhesive material on the microprocessor. If the adhesive material on the microprocessor 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 microprocessor before applying the new adhesive material.

5. Free the microprocessor from the system board by rotating the microprocessor socket lever arm upward to its maximum vertical position.
6. Lift the microprocessor up and out of the computer.

To install a microprocessor and heat sink, see “Installing an additional microprocessor” on page 57.

Thermal grease

This section contains information about removing and replacing the thermal grease between the heat sink and the microprocessor. The thermal grease must be replaced anytime the heat sink has been removed from the top of the microprocessor and is going to be reused, or when debris is found in the grease.

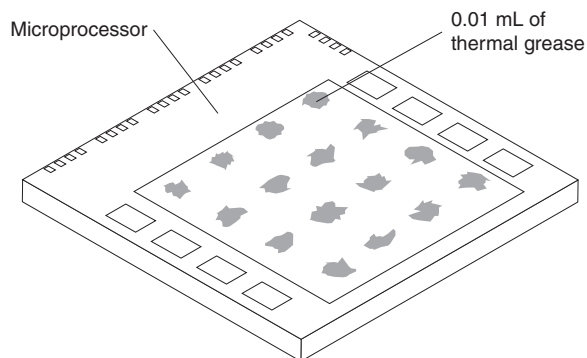
Note: Read “Installation guidelines” on page 35, “Handling electrostatic discharge-sensitive devices” on page 120, and “Safety information” on page 117.

Complete the following steps to replace damaged or contaminated thermal grease on the microprocessor and heat sink:

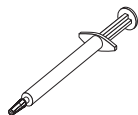
1. Place the heat sink on a clean work surface.
2. Remove the cleaning pad from its package and unfold it completely.
3. Use the cleaning pad to wipe the thermal grease from the bottom of the heat sink.

Note: Be sure that all of the thermal grease is removed.

4. Use a clean area of the cleaning pad to wipe the thermal grease from the microprocessor; then, dispose of the cleaning pad after all of the thermal grease is removed.



5. Use the thermal grease syringe to place 16 uniformly spaced dots of 0.01 mL each on the top of the microprocessor.



Note: 0.01 mL is one tick mark on the syringe. If the grease is properly applied, approximately half of the grease will remain in the syringe.

6. Install the heat sink onto the microprocessor as described in “Installing an additional microprocessor” on page 57.

System board

Notes:

1. Read “Installation guidelines” on page 35, “Handling electrostatic discharge-sensitive devices” on page 120, and “Safety information” on page 117.

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.

Complete the following steps to remove the system board:

1. Turn off the computer and attached devices; then, disconnect all power cords and external cables.
2. Remove the cover, support bracket and baffle (see “Removing the side cover” on page 39 and “Removing and installing the support bracket” on page 42).
3. Disconnect all cables on the system board.
4. Pivot the drive cage up.
5. Remove any of the following components that are installed on the system board and put them in a safe, static-protective place:
 - Battery (see “Replacing the battery” on page 32).
 - Microprocessor and heat sink (see “Microprocessor and heat sink” on page 78).

Important: If you plan to reinstall an existing microprocessor to the new system board, be careful when handling the adhesive material on the microprocessor. If the adhesive material on the microprocessor 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 microprocessor before applying the new adhesive material.

Note: If only one microprocessor is installed on the system board, be sure to remove the heat sink on the vacant microprocessor socket. This heat sink must be replaced on the new system board for proper air flow dispersal.

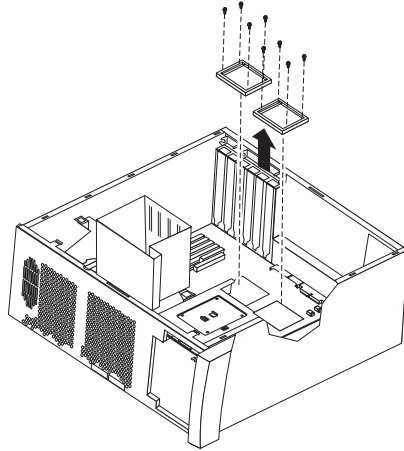
- Adapters (see “Working with adapters” on page 44).

Note: Do not overlook removing the IEEE 1394 FireWire adapter (see “IEEE 1394 (FireWire) adapter” on page 70).

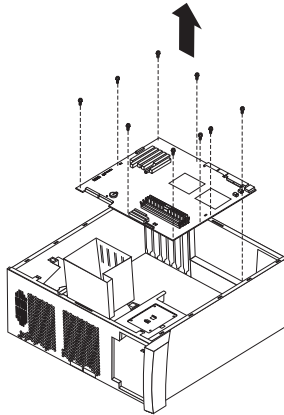
- DIMMs (“Installing memory modules” on page 54).

Note: The power supply has been removed in the illustration for purposes of clarification (see “Power supply” on page 76). If any installed items impede your ability to easily access the system board, remove them before proceeding.

6. Pull the diskette drive forward slightly (see “Replacing a diskette drive in bay 3” on page 51) to access the system board screw beneath it.



7. Remove the heat sink retention modules by removing the eight screws that secure it to the system board.



8. Remove the 9 remaining screws that secure the system board to the chassis and put them in a safe place.

Note: Eight of the screws described in step 8 secure the two heat-sink retention modules to the system board.

9. Gently slide the system board towards the front of the system; then, lift it up and out of the computer.

To install the system board, reverse the previous steps.

Symptom-to-FRU index

This index supports IntelliStation Z Pro Type 6221 servers.

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.

The initial column or columns of the tables in this index lists error codes or messages, and the final column lists one or more suggested actions or FRUs to replace. Take the action (or replace the FRU) suggested first in the list of the entries in the final column, and then restart the computer to see if the problem has been corrected.

Note: Try reseating a suspected component or reconnecting a cable before replacing the component.

Beep symptoms

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

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

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

Beep/symptom	FRU/action
1-1-2 (Microprocessor register test failed)	<ol style="list-style-type: none">1. Microprocessor2. System board
1-1-3 (CMOS write/read test failed)	<ol style="list-style-type: none">1. Battery2. System board

Beep/symptom	FRU/action
1-1-4 (BIOS EEPROM checksum failed)	1. Reflash BIOS code. 2. System board.
1-2-1 (Programmable Interval Timer failed)	• System board
1-2-2 (DMA initialization failed)	• System board
1-2-3 (DMA page register write/read test failed)	• 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. Microprocessor 3. System board
1-4-3 (Interrupt vector loading test failed)	• System board
2-1-1 (Secondary DMA register failed)	• System board
2-1-2 (Primary DMA register failed)	• System board
2-1-3 (Primary interrupt mask register failed)	• System board
2-1-4 (Secondary interrupt mask register failed)	• System board
2-2-1 (Interrupt vector loading failed)	• System board
2-2-2 (Keyboard controller failed)	1. System board 2. Keyboard
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
2-3-2 (Screen memory failed)	• Video board

Beep/symptom	FRU/action
2-3-3 (Screen retrace failed)	• Video board
2-3-4 (Search for video ROM failed)	• Video board
2-4-1 (Video failed; screen believed operable)	• Video board
3-1-1 (Timer tick interrupt failed)	• System board
3-1-2 (Interval timer channel 2 failed)	• System board
3-1-3 (RAM test failed above address OFFFFH)	1. DIMM 2. System board
3-1-4 (Time-of-Day clock failed)	1. Battery 2. System board
3-2-1 (Serial port failed)	• System board
3-2-2 (Parallel port failed)	• System board
3-2-4 (Failure comparing CMOS memory size against actual)	1. DIMM 2. Battery 3. System board
3-3-1 (Memory size mismatch occurred)	1. DIMM 2. System board 3. Battery
3-3-3 (No operational memory in system)	1. Install or reseal the memory modules, then do a 3 boot reset. (See “Using the Configuration/Setup Utility program” on page 9.) 2. DIMMs. 3. System board. Attention: In some memory configurations, the 3-3-3 beep code might sound during POST followed by a blank display screen. If this occurs and the Boot Fail Count feature in the Start Options of the Configuration/Setup Utility program is set to Enabled (its default setting), you must restart the computer three times to force the system BIOS to reset the memory connector from Disabled to Enabled .
One continuous beep	1. Microprocessor 2. Optional microprocessor (if installed) 3. System board

No beep symptoms

No beep symptom	FRU/action
No beep and the system operates correctly	<ul style="list-style-type: none"> System board
No beeps occur after successfully completing POST	<ul style="list-style-type: none"> System board
No ac power	<ol style="list-style-type: none"> Check the power cord. Power supply.
No beep and no video	<ul style="list-style-type: none"> See “Undetermined problems” on page 106.

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)	<ul style="list-style-type: none"> System board
001-XXX-001 (Failed core tests)	<ul style="list-style-type: none"> System board
001-250-000 (Failed System Board ECC)	<ul style="list-style-type: none"> System board
001-250-001 (Failed System Board ECC)	<ul style="list-style-type: none"> System board
005-XXX-000 (Failed Video test)	<ol style="list-style-type: none"> Video adapter (if installed) System board
011-XXX-000 (Failed COM1 Serial Port test)	<ul style="list-style-type: none"> System board
011-XXX-001 (Failed COM2 Serial Port test)	<ul style="list-style-type: none"> System board
014-XXX-000 (Failed Parallel Port test)	<ul style="list-style-type: none"> System board
015-XXX-001 (USB interface not found, board damaged)	<ul style="list-style-type: none"> 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. Verify wrap plug is installed. 3. Re-run USB External Loopback test. 4. System board.
015-XXX-198 (USB device connected during USB test)	<ol style="list-style-type: none"> 1. Remove USB devices from USB1, USB2, USB3, and USB4. 2. Re-run test. 3. System board.
020-XXX-000 (Failed PCI Interface test)	<ul style="list-style-type: none"> • System board
030-XXX-000 (Failed Internal SCSI interface test)	<ul style="list-style-type: none"> • System board
030-XXX-00N (Failed SCSI test on PCI slot N.)	<ol style="list-style-type: none"> 1. If N>0, adapter in slot N 2. If N=0, system board
035-XXX-099 (No adapters were found)	<ul style="list-style-type: none"> • If adapter is installed, re-check connection.
035-XXX-S99 (Failed RAID test on PCI slot S. S = number of failing PCI slot.)	<ol style="list-style-type: none"> 1. Adapter 2. Cable
035-XXX-SNN (S = number of failing PCI slot; NN = SCSI ID of failing fixed disk.)	<ul style="list-style-type: none"> • Fixed disk (hard disk drive) 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 <i>ServeRAID Hardware Maintenance Manual</i> for more information. 2. Cable. 3. Adapter.
075-XXX-000 (Failed Power Supply test)	<ul style="list-style-type: none"> • Power supply
089-XXX-001 (Failed Microprocessor test)	<ul style="list-style-type: none"> • Verify microprocessor is installed and seated correctly. • Verify latest version of BIOS code is installed. • Microprocessor.
089-XXX-002 (Failed Optional Microprocessor test)	<ul style="list-style-type: none"> • Verify optional microprocessor 2 is installed and seated correctly. • Verify latest version of BIOS code is installed. • Optional microprocessor 2.
180-XXX-001 (Failed Front LED Panel test)	<ol style="list-style-type: none"> 1. Power switch assembly 2. Power switch assembly cable 3. System board
180-XXX-003 (Failed System Board LED test)	<ul style="list-style-type: none"> • System board

Error code/symptom	FRU/action
180-XXX-005 (Failed SCSI Backplane LED test)	<ol style="list-style-type: none"> SCSI backplane SCSI backplane cable System board
201-XXX-0NN (Failed Memory test) NN = DIMM location.	<ul style="list-style-type: none"> DIMM location 1-4
201-XXX-999 (Multiple DIMM failure, see error text.)	<ul style="list-style-type: none"> See error text for failing DIMMs.
202-XXX-001 (Failed System Cache test)	<ul style="list-style-type: none"> Verify microprocessor is installed and seated correctly. Verify latest version of BIOS code is installed. Microprocessor.
202-XXX-002 Failed System Cache test)	<ul style="list-style-type: none"> Verify optional microprocessor 2 is installed and seated correctly. Verify latest version of BIOS code is installed. Optional microprocessor 2.
206-XXX-000 (Failed Diskette Drive test)	<ol style="list-style-type: none"> Try test with a different diskette Cable Diskette drive System board
215-XXX-000 (Failed IDE CD-ROM test)	<ol style="list-style-type: none"> Rerun test with a different CD. CD-ROM drive cables. CD-ROM drive. System board.
217-198-XXX (Could not establish drive parameters)	<ol style="list-style-type: none"> Check cable and termination. Fixed disk (hard disk drive).
217-XXX-000 (Failed BIOS Fixed Disk test) Note: If RAID is configured, the fixed disk number refers to the RAID logical array.	<ul style="list-style-type: none"> Fixed disk 1 (hard disk drive 1)
217-XXX-001 (Failed BIOS Fixed Disk test) Note: If RAID is configured, the fixed disk number refers to the RAID logical array.	<ul style="list-style-type: none"> Fixed disk 2 (hard disk drive 2)
217-XXX-002 (Failed BIOS Fixed Disk test) Note: If RAID is configured, the fixed disk number refers to the RAID logical array.	<ul style="list-style-type: none"> Fixed disk 3 (hard disk drive 3)
264-XXX-0NN (NN = SCSI ID of failing Tape Drive)	<ol style="list-style-type: none"> Tape cartridge, if user executed the Read/Write Tape Drive test (XXX = 256). SCSI or power cable connected to the tape drive with SCSI ID NN. Tape drive with SCSI ID NN – refer to Help and Service Information appendix of tape drive's User Guide.

Error code/symptom	FRU/action
264-XXX-999 (Errors on multiple tape drives, see error text for more info)	<ul style="list-style-type: none"> • See error messages/text in the PC-Doctor error log for detailed information on each individual tape drive error.
301-XXX-000 (Failed Keyboard test)	<ul style="list-style-type: none"> • Verify keyboard is plugged into correct (keyboard) port. • Keyboard. • System board.
302-XXX-000 (Failed Keyboard test)	<ul style="list-style-type: none"> • Verify mouse is plugged into correct (mouse) port. • Mouse. • System board.
405-XXX-000 (Failed Ethernet test on controller on the System Board)	<ol style="list-style-type: none"> 1. Verify that Ethernet is not disabled in BIOS. 2. System board.
405-XXX-00N (Failed Ethernet test on adapter in PCI slot N)	<ol style="list-style-type: none"> 1. Adapter in PCI slot N 2. System board
415-XXX-000 (Failed Modem test)	<ol style="list-style-type: none"> 1. Cable 2. Modem 3. System board

Error symptoms

You can use the error symptom table to find solutions to problems that have definite symptoms.

If you cannot find the problem in the error symptom charts, go to “Starting the diagnostic programs and viewing the test log” on page 18 to test the computer.

If you have just added new software or a new option and the computer is not working, complete the following steps before using the error symptom charts:

1. Remove the software or device that you just added.
2. Run the diagnostic tests to determine if the computer is running correctly.
3. Reinstall the new software or new device.

In the following table, if the entry in the FRU/action column is a suggested action, perform that action; if it is the name of a component, reseal the component and replace it if necessary. The most likely cause of the symptom is listed first.

CD-ROM drive problems	
Symptom	FRU/action
CD-ROM drive is not recognized.	<ol style="list-style-type: none"> Verify that: <ul style="list-style-type: none"> The IDE channel to which the CD-ROM drive is attached (primary or secondary) is enabled in the Configuration/Setup Utility program. All cables and jumpers are installed correctly. The correct device driver is installed for the CD-ROM drive. Run CD-ROM drive diagnostics. CD-ROM drive.
CD is not working properly.	<ol style="list-style-type: none"> Clean the CD. Run CD-ROM drive diagnostics. CD-ROM drive.
CD-ROM drive tray is not working. (The computer must be turned on.)	<ol style="list-style-type: none"> Insert the end of a straightened paper clip into the manual tray-release opening. Run CD-ROM drive diagnostics. CD-ROM drive.

Diskette drive problems	
Symptom	FRU/action
Diskette drive activity LED stays on, or the system bypasses the diskette drive.	<ol style="list-style-type: none"> If there is a diskette in the drive, verify that: <ul style="list-style-type: none"> The diskette drive is enabled in the Configuration/Setup utility program. The diskette is good and not damaged. (Try another diskette if you have one.) The diskette is inserted correctly in the drive. The diskette contains the necessary files to start the computer. The software program is working properly. The cable is installed correctly (in the proper orientation). To prevent diskette drive read/write errors, be sure the distance between monitors and diskette drives is at least 76 mm (3 in.). Run diskette drive diagnostics. Cable. Diskette drive. System board.

Expansion enclosure problems	
Symptom	FRU/action
The SCSI expansion enclosure used to work but does not work now.	<ol style="list-style-type: none"> Verify that: <ul style="list-style-type: none"> The cables for all external SCSI options are connected correctly. The last option in each SCSI chain, or the end of the SCSI cable, is terminated correctly. Any external SCSI option is turned on. You must turn on an external SCSI option before turning on the computer. For more information, see your SCSI expansion enclosure documentation.

Hard disk drive problems	
Symptom	FRU/action
Not all drives are recognized by the hard disk drive diagnostic test (Fixed Disk test).	<ol style="list-style-type: none"> 1. Remove the first drive not recognized and try the hard disk drive diagnostic test again. 2. If the remaining drives are recognized, replace the drive you removed with a new one.
System stops responding during hard disk drive diagnostic test.	<ol style="list-style-type: none"> 1. Remove the hard disk drive being tested when the computer stopped responding and try the diagnostic test again. 2. If the hard disk drive diagnostic test runs successfully, replace the drive you removed with a new one.

General problems	
Symptom	FRU/action
Problems such as broken cover locks or indicator LEDs not working	<ul style="list-style-type: none"> • Broken CRU/FRU

Intermittent problems	
Symptom	FRU/action
A problem occurs only occasionally and is difficult to detect.	<ul style="list-style-type: none"> • Verify that: <ul style="list-style-type: none"> – All cables and cords are connected securely to the rear of the computer and attached options. – When the computer is turned on, air is flowing from the rear of the computer at the fan grill. If there is no airflow, the fan is not working. This causes the computer to overheat and shut down. – Ensure that the SCSI bus and devices are configured correctly and that the last external device in each SCSI chain is terminated correctly.

Keyboard, mouse, or pointing-device problems	
Symptom	FRU/action
All or some keys on the keyboard do not work.	<ol style="list-style-type: none"> 1. Verify that: <ul style="list-style-type: none"> • The keyboard cable is securely connected to the system, and the keyboard and mouse cables are not reversed. • Both the computer and the monitor are turned on. 2. Keyboard. 3. System board.
The mouse or pointing device does not work.	<ol style="list-style-type: none"> 1. Verify that: <ul style="list-style-type: none"> • The mouse or pointing-device cable is securely connected, and that the keyboard and mouse cables are not reversed. • The mouse device drivers are installed correctly. • Both the computer and the monitor are turned on. 2. Mouse or pointing device. 3. System board.

Memory problems	
Symptom	FRU/action
The amount of system memory displayed is less than the amount of physical memory installed.	<ol style="list-style-type: none"> 1. Verify that: <ul style="list-style-type: none"> • The memory modules are seated properly. • You have installed the correct type of memory. • If you changed the memory, you updated the memory configuration with the Configuration/Setup Utility program. • All banks of memory on the DIMMs are enabled. The computer might have automatically disabled a DIMM bank when it detected a problem or a DIMM bank could have been manually disabled. 2. Check POST error log for error message 289: <ul style="list-style-type: none"> • If the DIMM was disabled by a system-management interrupt (SMI), replace the DIMM. • If the DIMM was disabled by the user or by POST: <ol style="list-style-type: none"> a. Start the Configuration/Setup Utility program. b. Enable the DIMM. c. Save the configuration and restart the computer. 3. DIMM. 4. System board.

Microprocessor problems	
Symptom	FRU/action
The computer emits a continuous tone during POST. (The startup (boot) microprocessor is not working properly.)	<ol style="list-style-type: none"> 1. Verify that the startup microprocessor is seated properly. 2. Startup microprocessor.

Monitor problems	
Symptom	FRU/action
Testing the monitor.	<ul style="list-style-type: none"> • See the information that comes with the monitor for adjusting and testing instructions. (Some IBM monitors have their own self-tests.)

Monitor problems	
Symptom	FRU/action
The screen is blank.	<ol style="list-style-type: none"> Verify that: <ul style="list-style-type: none"> The computer power cord is plugged into the computer and a working electrical outlet. The monitor cables are connected properly. The monitor is turned on and the Brightness and Contrast controls are adjusted correctly. If the computers are C2T chained together, verify that: <ul style="list-style-type: none"> The C2T chain cables are securely connected to the computers. The C2T breakout cable is connected properly. A computer that is turned on is selected. <p>Important: In some memory configurations, the 3-3-3 beep code might sound during POST followed by a blank display screen. If this occurs and the Boot Fail Count feature in the Start Options of the Configuration/Setup Utility program is set to Enabled (its default setting), you must restart the computer three times to force the system BIOS to reset the CMOS values to the default configuration (memory connector or bank of connectors enabled).</p> <ol style="list-style-type: none"> If you have verified these items and the screen remains blank, replace: <ol style="list-style-type: none"> Monitor Video adapter, if installed System board
Only the cursor appears.	<ul style="list-style-type: none"> See "Undetermined problems" on page 106.
The monitor works when you turn on the computer but goes blank when you start some application programs.	<ol style="list-style-type: none"> Verify that: <ul style="list-style-type: none"> The application program is not setting a display mode higher than the capability of the monitor. The primary monitor cable is connected to the C2T device breakout cable. You installed the necessary device drivers for the applications. If you have verified these items and the screen remains blank, replace the monitor. Video adapter. System board.
The screen is wavy, unreadable, rolling, distorted, or has screen jitter.	<ol style="list-style-type: none"> If the monitor self-tests show the monitor is working properly, consider the location of the monitor. Magnetic fields around other devices (such as transformers, appliances, fluorescent lights, and other monitors) can cause screen jitter or wavy, unreadable, rolling, or distorted screen images. If this happens, turn off the monitor. (Moving a color monitor while it is turned on might cause screen discoloration.) Then move the device and the monitor at least 305 mm (12 in.) apart. Turn on the monitor. <p>Notes:</p> <ol style="list-style-type: none"> To prevent diskette drive read/write errors, be sure the distance between monitors and diskette drives is at least 76 mm (3 in.). Non-IBM monitor cables might cause unpredictable problems. An enhanced monitor cable with additional shielding is available for the 9521 and 9527 monitors. For information about the enhanced monitor cable, contact your IBM reseller or IBM marketing representative. Monitor. Video adapter, if installed. System board.

Monitor problems	
Symptom	FRU/action
Wrong characters appear on the screen.	<ol style="list-style-type: none"> 1. If the wrong language is displayed, update the BIOS code with the correct language. 2. Monitor. 3. Video adapter, if installed. 4. System board.
No video.	<ol style="list-style-type: none"> 1. Make sure the correct machine is selected, if applicable. 2. Make sure all cables are locked down.

Option problems	
Symptom	FRU/action
An IBM option that was just installed does not work.	<ol style="list-style-type: none"> 1. Verify that: <ul style="list-style-type: none"> • The option is designed for the computer (see the ServerProven® list on the World Wide Web at http://www.ibm.com/pc/compat/). • You followed the installation instructions that came with the option. • The option is installed correctly. • You have not loosened any other installed options or cables. • You updated the configuration information in the Configuration/Setup Utility program. Whenever memory or an option is changed, you must update the configuration. 2. Option you just installed.
An IBM option that used to work does not work now.	<ol style="list-style-type: none"> 1. Verify that all of the option hardware and cable connections are secure. 2. If the option comes with its own test instructions, use those instructions to test the option. 3. If the failing option is a SCSI option, verify that: <ul style="list-style-type: none"> • The cables for all external SCSI options are connected correctly. • The last option in each SCSI chain, or the end of the SCSI cable, is terminated correctly. • Any external SCSI option is turned on. You must turn on an external SCSI option before turning on the computer. 4. Failing option.

Power problems	
Symptom	FRU/action
Power switch does not work and reset button, if supported, does work.	<ol style="list-style-type: none"> 1. Reseat connector. 2. Power switch card. 3. System board.

Power problems	
Symptom	FRU/action
The computer does not turn on.	<ol style="list-style-type: none"> 1. Verify that: <ul style="list-style-type: none"> • The power cables are properly connected to the computer. • The electrical outlet functions properly. • The type of memory installed is correct. • If you just installed an option, remove it, and restart the computer. If the computer now turns on, you might have installed more options than the power supply supports. 2. Override front panel power button: <ol style="list-style-type: none"> a. Disconnect computer power cords. b. Reconnect power cords. <p>If computer turns on:</p> <ol style="list-style-type: none"> a. Operator information panel <p>If computer does not turn on:</p> <ul style="list-style-type: none"> • System board 3. See “Undetermined problems” on page 106.
The computer does not turn off.	<ol style="list-style-type: none"> 1. Verify whether you are using an ACPI or non-ACPI operating system. If you are using a non-ACPI operating system: <ol style="list-style-type: none"> a. Press Ctrl+Alt+Delete. b. Turn off the system by holding the power-control button for 4 seconds. c. If computer fails during BIOS POST and power-control button does not work, remove the AC power cord. 2. If the problem remains or if you are using an ACPI-aware operating system, suspect the system board.

Serial port problems	
Symptom	FRU/action
The number of serial ports identified by the operating system is less than the number of serial ports installed.	<ol style="list-style-type: none"> 1. Verify that: <ul style="list-style-type: none"> • Each port is assigned a unique address by the Configuration/Setup Utility program and none of the serial ports is disabled. • The serial-port adapter, if you installed one, is seated properly. 2. Failing serial port adapter.
A serial device does not work.	<ol style="list-style-type: none"> 1. Verify that: <ul style="list-style-type: none"> • The device is compatible with the computer. • The serial port is enabled and is assigned a unique address. • The device is connected to the correct port (see “Input/output connectors” on page 63). 2. Failing serial device. 3. Serial adapter, if installed. 4. System board.

Software problem	
Symptom	FRU/action
Suspected software problem.	<ol style="list-style-type: none"> To determine if problems are caused by the software, verify that: <ul style="list-style-type: none"> The computer has the minimum memory 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. The software is designed to operate on the computer. Other software works on the computer. The software that you are using works on another system. <p>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 suggested solutions to the problem.</p> If you have verified these items and the problem remains, contact your place of purchase.

Universal Serial Bus (USB) port problems	
Symptom	FRU/action
A USB device does not work.	<ul style="list-style-type: none"> Verify that: <ul style="list-style-type: none"> You are not trying to use a USB device during POST if you have a standard (non-USB) keyboard attached to the keyboard port. Note: If a standard (non-USB) keyboard is attached to the keyboard port, the USB is disabled and no USB device will work during POST. The correct USB device driver is installed. The operating system supports USB devices.

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"> Run Configuration/Setup. Battery. System board. Microprocessor.

Error code/symptom	FRU/action
101, 102, 106 (System and microprocessor error)	• System board
111 (Channel check error)	1. Failing adapter 2. DIMM 3. System board
114 (Adapter read-only memory error)	1. Failing adapter. 2. Run diagnostics.
129 (Internal cache error)	1. Microprocessor 2. Optional microprocessor (if installed)
151 (Real time clock error)	1. Run diagnostics. 2. Battery. 3. System board.
161 (Real time clock battery error)	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.	1. Run Configuration/Setup. 2. Battery. 3. Failing device. 4. System board.
163 (Real-Time Clock error)	1. Run Configuration/Setup. 2. Battery. 3. System board.
164 (Memory configuration changed)	1. Run Configuration/Setup. 2. DIMM. 3. System board.
175 (Hardware error)	• System board
176, 177, 178 (Security hardware error)	1. Run Configuration/Setup. 2. System board. 3. C2 security switch.
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.

Error code/symptom	FRU/action
188 (Bad EEPROM CRC #2)	<ol style="list-style-type: none"> 1. Run Configuration/Setup. 2. System board.
189 (Three attempts were made to access the server with invalid passwords)	<ol style="list-style-type: none"> 1. Run Configuration/Setup, enter the administrator password. 2. System board.
201 (Memory test error) If the server does not have the latest level of BIOS installed, update the BIOS to the latest level and run the diagnostic program again.	<ol style="list-style-type: none"> 1. Run memory diagnostics. 2. DIMM. 3. System board.
229 (Cache error)	<ol style="list-style-type: none"> 1. Microprocessor 2. Optional microprocessor (if installed)
262 (DRAM parity configuration error)	<ol style="list-style-type: none"> 1. Run Configuration/Setup. 2. Battery. 3. System board.
289 (DIMM has been disabled by user or system)	<ol style="list-style-type: none"> 1. Run Configuration/Setup, if disabled by user. 2. Disabled DIMM, if not disabled by user.
301 (Keyboard or keyboard controller error)	<ol style="list-style-type: none"> 1. Keyboard 2. System board
303 (Keyboard controller error)	<ol style="list-style-type: none"> 1. System board 2. Keyboard
602 (Invalid diskette boot record)	<ol style="list-style-type: none"> 1. Diskette 2. Diskette drive 3. Cable 4. System board
604 (Diskette drive error)	<ol style="list-style-type: none"> 1. Run Configuration/Setup and diagnostics. 2. Diskette drive. 3. Drive cable. 4. System board.
605 (Unlock failure)	<ol style="list-style-type: none"> 1. Diskette drive 2. Drive cable 3. System board
662 (Diskette drive configuration error)	<ol style="list-style-type: none"> 1. Run Configuration/Setup and diagnostics. 2. Diskette drive. 3. Drive cable. 4. System board.
762 (Coprocessor configuration error)	<ol style="list-style-type: none"> 1. Run Configuration/Setup. 2. Battery. 3. Microprocessor.

Error code/symptom	FRU/action
962 (Parallel port error)	<ol style="list-style-type: none"> 1. Disconnect external cable on parallel port. 2. Run Configuration/Setup. 3. System board.
998 (Automatic Restart or AC power restored)	<ul style="list-style-type: none"> • No action required.
999 (System recovered from backup BIOS)	<ul style="list-style-type: none"> • Reflash BIOS code.
11XX (System board serial port 1 or 2 error)	<ol style="list-style-type: none"> 1. Disconnect external cable on serial port. 2. Run Configuration/Setup. 3. System board.
1162 (Serial port configuration conflict)	<ol style="list-style-type: none"> 1. Disconnect external cable on serial port. 2. Run Configuration/Setup. 3. System board.
1301 (I2C cable to front panel not found)	<ol style="list-style-type: none"> 1. Cable 2. Front panel 3. Power switch assembly 4. System board
1302 (I2C cable from system board to power on and reset switches not found)	<ol style="list-style-type: none"> 1. Cable 2. Power switch assembly 3. System board
1303 (I2C cable from system board to power backplane not found)	<ol style="list-style-type: none"> 1. Cable 2. Power backplane 3. System board
1304 (I2C cable to diagnostic LED board not found)	<ol style="list-style-type: none"> 1. Power switch assembly 2. System board
1600 (Advanced System Management processor is not functioning)	<ol style="list-style-type: none"> 1. Verify system-management processor jumpers are set correctly. 2. Disconnect computer from power source, wait 30 seconds, reconnect, and retry. 3. System board.
1601 (Advanced System Management flash update is needed)	<ol style="list-style-type: none"> 1. Flash update Advanced System Management processor. 2. System board.
1762 (Fixed Disk Configuration error)	<ol style="list-style-type: none"> 1. Fixed disk drive. 2. Fixed disk cable. 3. Run Configuration/Setup. 4. Fixed disk adapter. 5. SCSI backplane. 6. System board.

Error code/symptom	FRU/action
178x (Fixed disk error)	<ol style="list-style-type: none"> 1. Fixed disk cables. 2. Run diagnostics. 3. Fixed disk adapter. 4. Fixed disk drive. 5. System board.
1800 (No more hardware interrupt available for PCI adapter)	<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 <i>Hardware Maintenance Manual</i> 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 1 is not functioning - check VRM and processor LEDs)	<ol style="list-style-type: none"> 1. Microprocessor 1 2. System board
00019502 (Microprocessor 2 is not functioning - check VRM and processor LEDs)	<ol style="list-style-type: none"> 1. Microprocessor 2 2. System board
00019701 (Microprocessor 1 failed BIST)	<ol style="list-style-type: none"> 1. Microprocessor 1 2. System board
00019702 (Microprocessor 2 failed BIST)	<ol style="list-style-type: none"> 1. Microprocessor 2 2. System board

Error code/symptom	FRU/action
00180100 (A PCI adapter has requested memory resources that are not available.)	<ol style="list-style-type: none"> <li data-bbox="535 224 1458 401">1. If the PCI adapter that is requesting the memory resources is the start (boot) device, you might need to change the order of the adapters in the PCI slots. Memory is allocated to devices in the order that is specified in the Boot Priority option in the Start Options menu in the Configuration/Setup Utility. Ensure that the adapter is early in the boot priority so that it is allocating the necessary memory resources. <li data-bbox="535 411 1458 499">2. Make sure that the PCI adapter and all other adapters are set correctly in the Configuration/Setup Utility program. If the memory resource settings are not correct, change the settings. <li data-bbox="535 510 1458 619">3. If all memory resources are being used, you might need to remove an adapter to make memory resources available to the PCI adapter. Disabling the adapter BIOS on the adapter might correct the error. Refer to the documentation provided with the adapter.
00180200 (A PCI adapter has requested an I/O address that is not available, or the PCI adapter might be defective.)	<ol style="list-style-type: none"> <li data-bbox="535 640 1458 701">1. Make sure that the I/O address for the PCI adapter and all other programs are set correctly in the Configuration/Setup Utility program. <li data-bbox="535 711 1458 737">2. If the I/O port resource settings are correct, the PCI adapter might be defective.
00180300 (A PCI adapter has requested a memory address that is not available, or the PCI adapter might be defective.)	<ol style="list-style-type: none"> <li data-bbox="535 798 1458 886">1. Make sure that the memory address for all other adapters are set correctly in the Configuration/Setup Utility program. If the memory resource settings are not correct, change the settings. <li data-bbox="535 896 1458 921">2. If the memory settings are correct, the PCI adapter might be defective.
00180400 (A PCI adapter has requested a memory address that is not available.)	<ul style="list-style-type: none"> <li data-bbox="535 955 1458 1071">• If all memory addresses are being used, you might need to remove an adapter to make memory address space available for the PCI adapter. Disabling the adapter BIOS on the adapter might correct the error. Refer to the documentation provided with the adapter.
00180500 (A PCI adapter ROM error occurred.)	<ul style="list-style-type: none"> <li data-bbox="535 1092 1458 1180">• Remove the PCI adapters. If you can start the server without the adapters, reinstall each adapter one at a time and restart after each is reinstalled. When an adapter fails, replace it.
00180600 (A PCI-to-PCI bridge error occurred. More than one PCI bus tried to access memory below 1 MB.)	<ul style="list-style-type: none"> <li data-bbox="535 1201 1458 1262">• Remove the PCI adapter that has the PCI bridge. If you can start the server without the adapter, reinstall and restart the adapter. If the adapter fails, replace it.
00180700 (xxxxyyyy planar PCI device not responding (where xxxx is PCI vendor ID and yyyy is PCI device ID))	<ul style="list-style-type: none"> <li data-bbox="535 1358 1458 1419">• Start the Configuration/Setup Utility program, select Devices and I/O Ports, and make sure that the device is enabled.
00180800 (Unsupported PCI device installed)	<ul style="list-style-type: none"> <li data-bbox="535 1495 1458 1583">• Remove the PCI adapters. If you can start the server without the adapters, reinstall each adapter one at a time and restart after each one is reinstalled. If an adapter fails, replace it.
00181000 (PCI error)	<ol style="list-style-type: none"> <li data-bbox="535 1604 1458 1629">1. System board <li data-bbox="535 1640 1458 1665">2. PCI card
01295085 (ECC checking hardware test error)	<ol style="list-style-type: none"> <li data-bbox="535 1686 1458 1711">1. System board <li data-bbox="535 1722 1458 1747">2. Microprocessor
01298001 (No update data for microprocessor 1)	<ol style="list-style-type: none"> <li data-bbox="535 1768 1458 1793">1. Ensure all microprocessors are the same cache size. <li data-bbox="535 1803 1458 1829">2. Microprocessor 1.
01298002 (No update data for microprocessor 2)	<ol style="list-style-type: none"> <li data-bbox="535 1850 1458 1875">1. Ensure all microprocessors are the same cache size. <li data-bbox="535 1885 1458 1911">2. Microprocessor 2.

Error code/symptom	FRU/action
01298101 (Bad update data for microprocessor 1)	<ol style="list-style-type: none"> 1. Ensure all microprocessors are the same cache size. 2. Microprocessor 1.
01298102 (Bad update data for microprocessor 2)	<ol style="list-style-type: none"> 1. Ensure all microprocessors are the same cache size. 2. Microprocessor 2.
01298200 (Microprocessor speed mismatch)	<ul style="list-style-type: none"> • 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, RAID adapter 3. SCSI backplane 4. Cable 5. System board
I9990305 (Fixed boot sector error, no operating system installed)	<ul style="list-style-type: none"> • Install operating system to hard disk drive.
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.
Other numbers	<ul style="list-style-type: none"> • Follow instructions on screen.

System board LEDs

If the system error LED on the front panel is not lit and no LEDs on the system board are lit, the LEDs have not detected a system error.

If the system error LED on the front panel is lit and one or more system board LEDs are lit, take the action described in the following table:

System board LED	FRU/action
Fan	<ul style="list-style-type: none"> • Replace the fan assembly indicated by lit fan LED.
Memory	<ul style="list-style-type: none"> • Replace the DIMM indicated by the lit DIMM LED.
Microprocessor	<ol style="list-style-type: none"> 1. Turn off the server, reseal the microprocessor, and restart the server. 2. Replace the microprocessor.

POST (ISPR) error procedures

Use the ISPR error procedures to help you solve ServeRAID problems. A complete list of error codes is listed at "ServeRAID error codes" on page 104.

Note: Where the ISPR Error Procedures refer to a hard disk drive backplane, see the chapter of this publication that concerns field replaceable units.

EF10 (Default ISPR)

1. No ISPR error present.

9ZXX through BZXX (SCSI bus error caused by cables, termination, or defective drives.)

1. Isolate the SCSI subsystem from the controller by disconnecting all hard disk drive cables from the suspect adapter, and restart the computer.

CAUTION:

Do not press F5. Doing so changes the configuration of the server.

If an ISPR error is still present, perform the following actions until the error is no longer present:

- a. Reseat the controller
- b. Replace the controller

Notes:

- a. SCSI channel cable details, if any, appear elsewhere in this publication.
 - b. The adapter/controller detects a configuration change. *Do not* select **Save Changes**. Instead, press F10 to bypass any options to this effect.
2. If ISPR error is **EF10** after disconnecting cables:
 - a. Identify which channel is causing the error by the second digit (Z) of the original ISPR code as indicated in the following table:

Note: ServeRAID-4H controllers have four channels; ServeRAID-4L and -4Lx controllers have only one channel; and ServeRAID-4M and -4Mx controllers have two channels. ServeRAID-5i controllers have no channels. The ServeRAID-5i uses the channel connectors of the integrated SCSI controller of the server.

Table 3. SCSI identifier

SCSI channel code	Descriptions
1	Channel 1
2	Channel 2
3	Channel 1 and 2
4	Channel 3
5	Channel 1 and 3
6	Channel 2 and 3
7	Channel 1, 2, and 3
8	Channel 4
9	Channel 1 and 4
A	Channel 2 and 4
B	Channel 1, 2, and 4
C	Channel 3 and 4
D	Channel 1, 3, and 4
E	Channel 2, 3, and 4
F	Channel 1, 2, 3, and 4

- b. Confirm that the channels identified from the error in step 2a are the cause of the error by verifying that the error presents itself *only* when the offending channel is reconnected.
- c. Check the termination of the identified channel.

Note: SCSI channel termination details, if any, appear elsewhere in this publication.

- d. Check for proper backplane jumper configuration.

Note: SCSI channel jumper details, if any, appear elsewhere in this publication.

- e. Check for proper cabling configuration in systems that use hard disk drive status cables. Reconnect all cables removed in step 1 on page 103.
- f. Disconnect one drive at a time attached to the channel identified in step 2a on page 103; then, restart the computer to determine which drive is causing the error.
- g. Replace the hard disk drive cable.
- h. Replace the hard disk drive backplane.

FFFF or other code not listed

1. Place download jumpers on the controller and try to flash the firmware code to the adapter.
2. Isolate the SCSI subsystem from the controller by disconnecting all hard disk drive cables attached to the suspect adapter, and restart the computer.

CAUTION:

Do not press F5. Doing so will change the configuration of the server.

If ISPR code is **EF10** after disconnecting cables, complete the following steps until the error is eliminated:

- a. Identify which channel is causing the error by reconnecting cables one at a time and restarting the computer until the error returns.
- b. Check the termination of the channel that was identified in step 2a.

Note: SCSI channel termination details, if any, appear elsewhere in this publication.

- c. Disconnect one drive at a time attached to the channel identified in step 2a and reboot each time to determine which drive is causing the problem.
- d. Replace the hard disk drive cable attached to the channel identified in step 2a.
- e. Replace the backplane attached to the channel identified in step 2a.
3. If original ISPR code is still present after disconnecting all hard disk drive cables and restarting the computer, perform the following actions until the error is no longer present:
 - Reseat the controller
 - Replace the controller

ServeRAID error codes

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

Error code/symptom	FRU/action
1xxx (Microcode checksum error)	1. ServeRAID controller
2xxx (Code DRAM error)	1. Install download jumpers, flash latest level BIOS code and firmware for controller. Remove jumpers. 2. ServeRAID controller.
3000-31XX (Code DRAM error)	1. Install download jumpers, flash latest level BIOS code and firmware for controller. Remove jumpers. 2. ServeRAID controller.

Error code/symptom	FRU/action
3200 (Code DRAM error)	<ol style="list-style-type: none"> 1. Install download jumpers, flash latest level BIOS code and firmware for controller. Remove jumpers. 2. ServeRAID controller.
3300 (ServeRAID-5i only)	<ol style="list-style-type: none"> 1. Install ServeRAID-5i controller in an extended PCI option slot. See the documentation that came with the server for more information.
3E20 (ServeRAID-5i only)	<ol style="list-style-type: none"> 1. Remove the ServeRAID-5i controller from its slot and install it in the proper PCI option slot. 2. Verify that the ServeRAID-5i controller is supported in this server. 3. ServeRAID-5i controller. 4. System board.
3E2x	<ol style="list-style-type: none"> 1. Reseat the ServeRAID controller. 2. Flash latest level of BIOS code and firmware for controller. 3. ServeRAID-5i controller. 4. Integrated RAID controller on server).
4xxx thru 5xxx (Code DRAM error)	<ol style="list-style-type: none"> 1. Install download jumpers, flash latest level BIOS code and firmware for controller; then, remove jumpers. 2. ServeRAID controller.
6xxx (Cache DRAM error) (ServeRAID-4H only)	<ol style="list-style-type: none"> 1. Reseat adapter. 2. Install download jumpers, flash latest level BIOS code and firmware for controller; then, remove jumpers. 3. ServeRAID controller.
7xxx thru 8xxx (Host/local PCI bus interface error)	<ol style="list-style-type: none"> 1. Flash latest level of BIOS code and firmware for controller. 2. If ServeRAID-4x controller, replace controller. 3. If ServeRAID-5i controller, integrated RAID controller on the server.
9003	<ol style="list-style-type: none"> 1. Flash latest level of BIOS code and firmware for controller. 2. Confirm that this controller is a supported option for this system. 3. ServeRAID controller. 4. Integrated RAID controller on the server).
9xxx thru BZxx (SCSI bus error caused by cables, termination, defective drives, etc.). Z refers to the specific channel or channels that cause the error.	<ol style="list-style-type: none"> 1. Follow indications at "POST (ISPR) error procedures" on page 102. Follow those instructions before continuing with the next steps listed in this index. 2. Hard disk drive cable. 3. Hard disk drive backplane. 4. Hard disk drive. 5. ServeRAID controller.
EFFE (Firmware code corrupt or download jumpers are in place)	<ol style="list-style-type: none"> 1. Flash latest level BIOS code and firmware for controller; then, remove jumpers. 2. ServeRAID controller.

Error code/symptom	FRU/action
FFFF or other code not listed	<ol style="list-style-type: none"> 1. Follow indications at "POST (ISPR) error procedures" on page 102. 2. Hard disk drive cable. 3. Hard disk drive backplane. 4. Hard disk drive. 5. ServeRAID controller.

SCSI error codes

Error code	FRU/action
<p>All SCSI Errors One or more of the following might be causing the problem:</p> <ul style="list-style-type: none"> • A failing SCSI device (adapter, drive, controller) • An improper SCSI configuration or SCSI termination jumper setting • Duplicate SCSI IDs in the same SCSI chain • A missing or improperly installed SCSI terminator • A defective SCSI terminator • An improperly installed cable • A defective cable 	<ol style="list-style-type: none"> 1. Make sure that external SCSI devices are turned on before you turn on the computer. 2. Make sure that the cables for all external SCSI devices are connected correctly. 3. If you have attached an external SCSI device to the computer, make sure the external SCSI termination is set to automatic. 4. Make sure that the last device in each SCSI chain is terminated correctly. 5. Make sure that the SCSI devices are configured correctly.

Undetermined problems

Use the information in this section if the diagnostic tests did not identify the failure, the devices list is incorrect, or the system is inoperative.

Notes:

1. Damaged data in CMOS can cause undetermined problems.
2. Damaged data in BIOS code can cause undetermined problems.

If power problems are suspected:

1. Turn off the computer.
2. Be sure the computer is cabled correctly.
3. Remove or disconnect the following devices (one at a time) until you find the failure (turn 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 = 256 MB (two banks of 128 MB DIMMs))

Note: Minimum operating requirements are:

- a. One power supply
- b. System board
- c. One microprocessor and VRM

- d. Memory (with a minimum of two 128 MB DIMMs)
4. Turn on the computer. If the problem remains, suspect the following FRUs in the order listed:
 - Power supply
 - System board

Notes:

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

Problem determination tips

Because of 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
- Microprocessor 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?
- Diagnostics version
 - Type and version level
- Hardware configuration
 - Print (print screen) configuration currently in use
 - BIOS level
- Operating system software
 - Type and version level

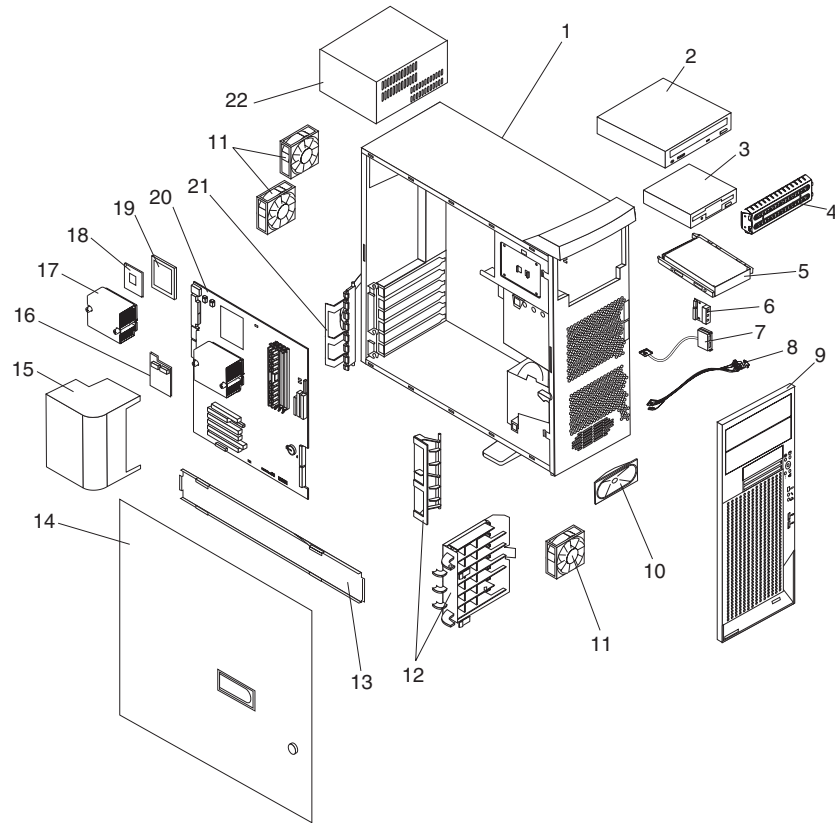
Note: To eliminate confusion, identical systems are considered identical only if they:

- Are the exact machine type and models
- Have the same BIOS level
- Have the same adapters/attachments in the same locations
- Have the same address jumpers/terminators/cabling
- Have the same software versions and levels
- Have the same diagnostics code (version)
- Have the same configuration options set in the system
- Have the same setup for the operating system control files

Comparing the configuration and software setup between working and non-working computers will often lead to problem resolution.

Parts listing for the IntelliStation Z Pro

This parts listing supports the IntelliStation Z Pro Type 6221.



System

Field replaceable units (FRUs) should be serviced only by qualified field service technicians.

Index	System (IntelliStation Z Pro, Type 6221, Models 10X 1PU 22X 29X B2G B9G 2PU 33X 36X 37X 38X 3PU 40X 42X 46X 47X 48X 49X 52X 53X 56X 57X 58X 59X 5PU 67X 68X 69X 91X 92X A0G C3G C6G C7G C8G D0G D2G D6G D7G D8G D9G E2X E3X E6X E7X E9X E8X F7X F9X)	FRU	FRU/CRU
1	Chassis (all models)	49P1963	FRU
2	CD-RW drive, 40/12/40 (models 36X 91X C6G)	33P3269	CRU
2	CD-ROM drive, 48X (primary) (models 10X 22X 33X 40X 42X 47X 52X A0G B2G C3G D0G D2G D7G E2X)	33P3207	CRU
2	CD-ROM drive, 48X (alternate) (models 10X 22X 33X 40X 42X 47X 52X A0G B2G C3G D0G D2G D7G E2X)	33P3211	CRU
2	CD-ROM read/write (primary) (models 29X 37X B9G C7G)	33P3251	CRU
2	CD-ROM read/write (alternate) (models 53X 56X 59X E3X E6X E9X)	71P7349	CRU
2	CD-ROM/DVD combination drive (models 29X 37X B9G C7G)	33P3251	CRU
2	CD-ROM/DVD combination drive, 48X (models 49X D9G)	33P3259	CRU
2	DVD-ROM drive, (models 46X 48X 57X 58X D6G D8G E7X E8X)	33P3301	CRU
2	CD-RW drive, 48X (models 38X 47X 92X C8G D7G)	33P3289	CRU
2	CD-RW drive, 48X (primary) (models 53X 56X 59X E3X E6X E9X)	71P7347	CRU
2	CD-RW drive, 48X (alternate) (models 53X 56X 59X E3X E6X E9X)	71P7349	CRU
3	Diskette drive (alternate) (all models except "J" models)	06P5227	CRU
3	Diskette drive (primary) (all models except "J" models)	76H4091	CRU
3	Diskette drive, 3 mode ("J" models)	06P5291	CRU
4	EMC shield, 5.25 (all models)	19K5548	CRU
4	EMC shield, 5.25 (all models)	32P8503	CRU
5	Hard disk drive, 36.4 SCSI (models 29X 33X 36X 37X 38X 46X 47X 48X 49X 56X 57X 59X B9G C3G C6G C7G C8G D6G D7G D8G D9G E6X E7X E9X)	24P3704	CRU
5	Hard disk drive, 40GB IDE (models 10X 22X 52X 53X 58X A0G B2G 40X 42X D0G D2G E2X E3X E8X)	19K1568	CRU
5	Hard disk drive, 80 GB IDE (models 91X 92X)	24P3665	CRU
6	Audio/1394 card assembly (all models)	49P1752	FRU
7	Cable, dual USB (all models)	49P4365	FRU
8	LED holder assembly (all models)	59P8500	FRU
9	Front bezel (all models)	49P1966	FRU
10	Speaker assembly (all models)	19K4929	FRU
11	Fan assembly, 80x38mm BB fixed speed (all models)	59P2572	FRU
12	Card guide assembly (all models)	49P1971	CRU
13	Bracket, support cam (all models)	19K4963	CRU
14	Cover, side/top (all models)	49P1965	CRU
15	Air baffle (all models)	73P9558	CRU
15	Air baffle (models 91X 92X)	24P1284	CRU
16	Adapter, IEEE 1394 (models 29X 36X 37X 38X 46X 47X 48X 49X 53X 56X 57X 58X 59X 91X B9G C6G C7G C8G D6G D7G D8G D9G E3X E6X E7X E8X E9X)	59P2701	FRU
17	Heat sink (all models)	25P6309	FRU
18	Microprocessor, 533/2.4-512 (models 10X A0G 1PU)	59P4937	FRU
18	Microprocessor, 533/2.67-512 (models 22X 29X 2PU B2G B9G)	59P4840	FRU
18	Microprocessor, 533/2.8B-512 (models 33X 36X 37X 38X 3PU 91X C3G C6G C7G C8G)	59P4845	CRU
18	Microprocessor, 5.33/3.06-512 (models 40X 42X 46X 47X 48X 49X 92X D0G D2G D6G D7G D8G D9G)	71P8340	FRU
18	Microprocessor, 5.33/3.2-1M (models 52X 53X 56X 57X 58X 59X E2X E3X E6X E7X E8X E9X 5PU 66X 67X 68X F7X)	90P0969	FRU
18	Microprocessor, 5.33/3.2-2M (models 69X F9X)	13N1510	FRU

System (IntelliStation Z Pro, Type 6221, Models 10X 1PU 22X 29X B2G B9G 2PU 33X 36X 37X 38X 3PU 40X 42X 46X 47X 48X 49X 52X 53X 56X 57X 58X 59X 5PU 67X 68X 69X 91X 92X A0G C3G C6G C7G C8G D0G D2G D6G D7G D8G D9G E2X E3X E6X E7X E9X E8X F7X F9X)		FRU	FRU/CRU
19	Retention module, 533 FSB (all models)	71P8107	FRU
20	System board (all models)	59P2607	FRU
21	Adapter retainer (all models)	59P4790	FRU
22	Power supply, 425 watt (all models)	49P2042	FRU
	Bezel kit (all models)	00N7082	FRU
	Bezel release latch (all models)	59P4791	FRU
	Adapter, graphic, 980XGL (models 36X 38X 46X 53X 56X 66X C6G C8G D6X E3X E6X)	59P4991	CRU
	Adapter, graphic, G450 DVI (models 10X 40X A0G D0G)	25P6691	CRU
	Adapter, graphic, NVIDIA Q4 280NS (models 1PU 22X 29X 2PU 33X 42X 49X 3PU 4PU 52X 5PU B2G B9G C3G D2G D9G E2X)	59P4994	CRU
	Adapter, graphic, Wildcat 4 7110 (models 37X 47X C7G D7G)	59P5000	CRU
	Adapter, graphic, NVIDIA FX 1000 (model 48X 57X 58X 92X D8G E7X E8X)	71P8380	CRU
	Adapter, graphic, NVIDIA FX 1100 (model 67X 68X 69X F7X F9X)	73P9613	CRU
	Adapter, graphic, NVIDIA FX 3000 (model 59X E9X)	71P8522	CRU
	Cover assembly, power/LED/USB/audio (all models)	49P1967	FRU
	Connector, DVI-A, digital to analog (models 36X 37X 38X 46X 47X 48X 53X 56X 91X C6G C7G C8G D3G D4G D6G D7G D8G E3X E6X)	09N3435	FRU
	Door assembly, sliding (all models)	49P1964	FRU
	Fan duct assembly (all models)	59P4888	FRU
	Handle cap (all models)	49P1968	FRU
	Handle support (all models)	49P1969	FRU
	Memory, 256MB (models 10X 1PU 22X 29X 2PU 33X 3PU 40X 42X 4PU 52X 53X 56X 5PU A0X B2X B9X C3X D0G D2G E2X E3X E6X)	09N4306	CRU
	Memory, 512MB (models 37X C7X 38X 46X 47X 48X 49X 57X 58X 59X C8G D6G D7G D8G D9G E7X E8X E9X)	09N4307	CRU
	Memory, 1 GB (66X 68X 91X 92X)	09N4308	CRU
	Nameplate kit (all models)	59P8525	CRU
	Feet (all models)	59P8537	CRU
	Miscellaneous hardware kit (contains: M3.5 screw (7); EMC two-position gasket (1); I/O blank bracket (1); power support bracket (1); blank isolator (4); key holder bracket (1); slotted M3x5 screw (4); RFID clip (1); system board spacer (4); SCSI cable clamp (1); slotted M3.5 screw (6)) (all models)	09N5764	CRU
	Rail, hard disk drive (all models)	23P1328	CRU
	Retainer assembly (all models)	13N2970	CRU
	C2 switch cable (all models)	09K9827	FRU
	Cable, IEEE 1394, rear (models 29X 36X 37X 38X 46X 47X 48X 49X 91X 92X B9G C6G C7G C8G D6G D7G D8G D9G)	49P1975	FRU
	Cable, 2-drop (2 per) (all models except 56X 57X 59X 5PU E6X E7X E9X)	37L5098	FRU
	Cable, 1394, front (models 29X 36X 37X 38X 46X 47X 48X 49X 91X 92X B9G C6G C7G C8G D6G D7G D8G D9G)	49P1995	FRU
	Cable, front audio (all models)	49P1933	FRU
	Cable, CD-ROM drive audio (all models)	75H9219	CRU
	Cable, diskette drive (all models)	76H4228	CRU
	Cable, DVI dual VGA (models 10X 40X A0G D0G)	48P7583	FRU
	Cable, SCSI, U320, 1-drop (models 29X 33X 36X 37X 49X B9G C3G C6G C7G D9G)	59P5007	FRU
	Cable, SCSI, U320, 3-drop (models 1PU 29X 2PU 33X 36X 37X 3PU 46X 47X 48X 49X 4PU 56X 57X 59X 5PU B9G C3G C6G C7G D6G D7G D8G D9G E6X E7X E9X)	49P1953	FRU
	Cable, VGA pigtail (models 1PU 22X 29X 2PU 33X 3PU 42X 49X 4PU 52X 53X 56X 57X 58X 59X 5PU B2G B9G C3G D2G D9G E2X E3X E6X E7X E8X E9X)	48P7586	FRU

	System (IntelliStation Z Pro, Type 6221, Models 10X 1PU 22X 29X B2G B9G 2PU 33X 36X 37X 38X 3PU 40X 42X 46X 47X 48X 49X 52X 53X 56X 57X 58X 59X 5PU 67X 68X 69X 91X 92X A0G C3G C6G C7G C8G D0G D2G D6G D7G D8G D9G E2X E3X E6X E7X E9X E8X F7X F9X)	FRU	FRU/CRU
Index	Battery, 3V (all models)	33F8354	CRU
	Power cord (all models)	93F2364	CRU
	Mouse (all models)	76H6620	CRU
	Lock assembly (all models)	49P1970	FRU

Recovery CD (Windows XP)

Recovery CD (IntelliStation Z Pro, Type 6221 Models 10X 22X 29X 33X 36X 37X 1PU 2PU 3PU 10G 12G B2G B9G C3G C6G C7G.	FRU No.
English, Windows XP (all A, G and U models)	59P5779
French, Windows XP (all G models)	59P5780
German, Windows XP (all G models)	59P5781
Italian, Windows XP (all G models)	59P5782
Spanish, Windows XP (all G models)	59P5783
Norwegian, Windows XP (all G models)	59P5784
Dutch, Windows XP (all G models)	59P5785
Danish, Windows XP (all G models)	59P5786
Swedish, Windows XP (all G models)	59P5788
Finnish, Windows XP (all G models)	59P5789
Japanese, Windows XP (all J models)	59P5790
Chinese, Windows XP (all C models)	59P5792
Chinese, Hong Kong, Windows XP (all D models)	59P5793
Chinese, Taiwan, Windows XP (all V models)	59P5794

Recovery CD (Windows XPP)

Recovery CD (IntelliStation Z Pro, Type 6221, Models 38X 40X 42X 46X 48X 49X	FRU No.
English, Windows XPP (all A, G and U models)	02R3103
French, Windows XPP (all G models)	02R3104
German, Windows XPP (all G models)	02R3105
Italian, Windows XPP (all G models)	02R3106
Spanish, Windows XPP (all G models)	02R3107
Norwegian, Windows XPP (all G models)	02R3110
Dutch, Windows XPP (all G models)	02R3109
Danish, Windows XPP (all G models)	02R3108
Swedish, Windows XPP (all G models)	02R3111
Finnish, Windows XPP (all G models)	02R3112
Japanese, Windows XPP (all J models)	02R3113
Chinese, Hong Kong, Windows XPP (all H models)	02R3116
Chinese, Traditional, Windows XPP (all B & V models)	02R3117
Chinese, Simplified Windows XPP (all C models)	02R3115
Korean, Windows XPP (all K models)	02R3114

Recovery CD (Windows XPP)

Recovery CD (IntelliStation Z Pro, Type 6221, Models 52X 53X 56X 57X 58X 59X 5PU.	FRU No.
English, Windows XPP (all A, G and U models)	88P8992

Recovery CD (IntelliStation Z Pro, Type 6221, Models 52X 53X 56X 57X 58X 59X 5PU.

	FRU No.
French, Windows XPP (all G models)	88P8993
German, Windows XPP (all G models)	88P8994
Italian, Windows XPP (all G models)	88P8995
Spanish, Windows XPP (all G models)	88P8996
Norwegian, Windows XPP (all G models)	88P8999
Dutch, Windows XPP (all G models)	88P8998
Danish, Windows XPP (all G models)	88P8997
Swedish, Windows XPP (all G models)	88P9000
Finnish, Windows XPP (all G models)	88P9001
Japanese, Windows XPP (all J models)	88P9002
Chinese, Hong Kong, Windows XPP (all H models)	88P9005
Chinese, Traditional, Windows XPP (all B & V models)	88P9006
Chinese, Simplified Windows XPP (all C models)	88P9004
Korean, Windows XPP (all K models)	88P9003

Keyboards

Keyboard	FRU No.
US English	37L2551
French Canadian	37L2552
LA Spanish	37L2553
Arabic	37L2555
Belgium/French	37L2556
Belgium/UK	37L2557
Bulgarian	37L2558
Czech	37L2559
Danish	37L2560
Dutch	37L2561
French	37L2562
German	37L2563
Greek	37L2564
Hebrew	37L2565
Hungarian	37L2566
Korean	02K0901
Iceland	37L2567
Italy	37L2568
Norwegian	37L2569
Polish	37L2570
Portuguese	37L2571
Romanian	37L2572
Russian	37L2573
Serbian/Cyrillic	37L2574
Slavic	37L2575
Spanish	37L2576
Swedish/Finn	37L2577
Swiss, French/German	37L2578
Turkish	37L2579
Turkish	37L2580
UK English	37L2581
Yugosl/Lat	37L2582
US English-EMEA	37L2583
Chinese/US	37L2585

Keyboard
 Thailand
 French Canadian

FRU No.
 37L2587
 37L0913

Power cords

For your safety, IBM provides a power cord with a grounded attachment plug to use with this IBM product. To avoid electrical shock, always use the power cord and plug with a properly grounded outlet.

IBM power cords used in the United States and Canada are listed by Underwriter's Laboratories (UL) and certified by the Canadian Standards Association (CSA).

For units intended to be operated at 115 volts: Use a UL-listed and CSA-certified cord set consisting of a minimum 18 AWG, Type SVT or SJT, three-conductor cord, a maximum of 15 feet in length and a parallel blade, grounding-type attachment plug rated 15 amperes, 125 volts.

For units intended to be operated at 230 volts (U.S. use): Use a UL-listed and CSA-certified cord set consisting of a minimum 18 AWG, Type SVT or SJT, three-conductor cord, a maximum of 15 feet in length and a tandem blade, grounding-type attachment plug rated 15 amperes, 250 volts.

For units intended to be operated at 230 volts (outside the U.S.): Use a cord set with a grounding-type attachment plug. The cord set should have the appropriate safety approvals for the country in which the equipment will be installed.

IBM power cords for a specific country or region are usually available only in that country or region.

IBM power cord part number	Used in these countries and regions
02K0546	China
13F9940	Australia, Fiji, Kiribati, Nauru, New Zealand, Papua New Guinea
13F9979	Afghanistan, Albania, Algeria, Andorra, Angola, Armenia, Austria, Azerbaijan, Belarus, Belgium, Benin, Bosnia and Herzegovina, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo (Democratic Republic of), Congo (Republic of), Cote D'Ivoire (Ivory Coast), Croatia (Republic of), Czech Republic, Dahomey, Djibouti, Egypt, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Finland, France, French Guyana, French Polynesia, Germany, Greece, Guadeloupe, Guinea, Guinea Bissau, Hungary, Iceland, Indonesia, Iran, Kazakhstan, Kyrgyzstan, Laos (People's Democratic Republic of), Latvia, Lebanon, Lithuania, Luxembourg, Macedonia (former Yugoslav Republic of), Madagascar, Mali, Martinique, Mauritania, Mauritius, Mayotte, Moldova (Republic of), Monaco, Mongolia, Morocco, Mozambique, Netherlands, New Caledonia, Niger, Norway, Poland, Portugal, Reunion, Romania, Russian Federation, Rwanda, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, Slovakia, Slovenia (Republic of), Somalia, Spain, Suriname, Sweden, Syrian Arab Republic, Tajikistan, Tahiti, Togo, Tunisia, Turkey, Turkmenistan, Ukraine, Upper Volta, Uzbekistan, Vanuatu, Vietnam, Wallis and Futuna, Yugoslavia (Federal Republic of), Zaire

IBM power cord part number	Used in these countries and regions
13F9997	Denmark
14F0015	Bangladesh, Lesotho, Maceo, Maldives, Namibia, Nepal, Pakistan, Samoa, South Africa, Sri Lanka, Swaziland, Uganda
14F0033	Abu Dhabi, Bahrain, Botswana, Brunei Darussalam, Channel Islands, China (Hong Kong S.A.R.), Cyprus, Dominica, Gambia, Ghana, Grenada, Iraq, Ireland, Jordan, Kenya, Kuwait, Liberia, Malawi, Malaysia, Malta, Myanmar (Burma), Nigeria, Oman, Polynesia, Qatar, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Seychelles, Sierra Leone, Singapore, Sudan, Tanzania (United Republic of), Trinidad and Tobago, United Arab Emirates (Dubai), United Kingdom, Yemen, Zambia, Zimbabwe
14F0051	Liechtenstein, Switzerland
14F0069	Chile, Italy, Libyan Arab Jamahiriya
14F0087	Israel
1838574	Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Brazil, Caicos Islands, Canada, Cayman Islands, Costa Rica, Colombia, Cuba, Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Jamaica, Japan, Mexico, Micronesia (Federal States of), Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Taiwan, United States of America, Venezuela
24P6858	Korea (Democratic People's Republic of), Korea (Republic of)
34G0232	Japan
36L8880	Argentina, Paraguay, Uruguay
49P2078	India
49P2110	Brazil
6952300	Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Caicos Islands, Canada, Cayman Islands, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Jamaica, Mexico, Micronesia (Federal States of), Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Thailand, Taiwan, United States of America, Venezuela

Related service information

The service procedures are designed to help you isolate problems. They assume that you have model-specific training on all computers, or that you 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. Turn 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 server, 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 in the following list, 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 (multilingual translations)

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

- English
- Brazilian/Portuguese

- Chinese
- French
- German
- Italian
- Japanese
- 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
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.	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:

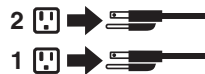
Use safe practices when lifting.

- 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 23

CAUTION:

Do not place any object weighing more than 50 kg (110 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:

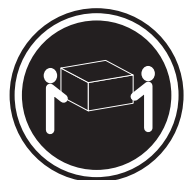
- Não remova as tampas. A remoção das tampas de um produto a laser pode resultar em exposição prejudicial à radiação de laser. Nenhuma peça localizada no interior do dispositivo pode ser consertada.
- A utilização de controles ou ajustes ou a execução de procedimentos diferentes dos especificados aqui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

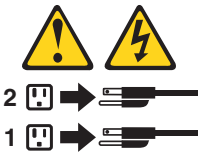
Ao levantar a máquina, faça-o com segurança.

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 23



CUIDADO:



Não coloque nenhum objeto com peso superior a 50 kg (110 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:	断开连接时:
1. 关闭所有设备。	1. 关闭所有设备。
2. 首先将所有电缆连接至设备。	2. 首先从插座中拔出电源线。
3. 将信号电缆连接至接口。	3. 从接口上拔下信号电缆。
4. 将电源线连接至插座。	

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：

扔入或浸入水中

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产生激光辐射的危险。



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 23



警告：

机柜安装的设备上面不能放置重于 50kg (110 磅) 的物品。



> 50 kg (110 磅)

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. 將信號電纜線接上接頭。
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



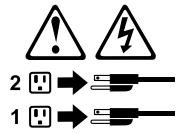
≥ 18 公斤 (37 磅) ≥ 32 公斤 (70.5 磅) ≥ 55 公斤 (121.2 磅)

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 23



注意：
請勿將任何重量超過 50 公斤 (110 磅) 的物品置於已安裝機架的裝置上方。



> 50 公斤 (110 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 relient 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:

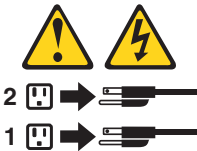
Faites-vous aider pour soulever ce produit.

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° 23



ATTENTION:

Ne posez pas d'objet dont le poids dépasse 50 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.

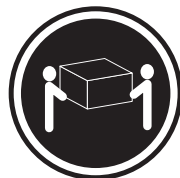


VORSICHT

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:

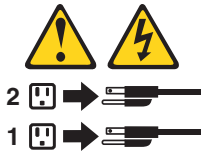
Beim Anheben der Maschine die vorgeschriebenen Sicherheitsbestimmungen beachten.

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 23



ACHTUNG:



Keine Gegenstände, die mehr als 50 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



≥18 kg



≥32 kg



≥55 kg

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 23



ATTENZIONE:



Non poggiare oggetti che pesano più di 50 kg sulla parte superiore delle unità montate in rack.

重要：

Nefinity Server ライブラリーにあるすべての注意および危険の記述は数字で始まります。この数字は、英語版の注意および危険の記述と翻訳された注意および危険の記述を相互参照するために使用します。

例えば、もし注意の記述が数字の 1 で始まっている場合は、その注意の翻訳は、記述 1 の下にあります。

手順を実施する前に、すべての注意：

・記述 1

危険

感電を防止するため、雷の発生時には、いかなるケーブルの取り付けまたは取り外しも行わないでください。また導入、保守、再構成などの作業も行わないでください。

感電を防止するため：

- 電源コードは正しく接地および配線が行われている電源に接続してください。
- 本製品が接続されるすべての装置もまた正しく配線された電源に接続されている必要があります。

できれば、信号ケーブルに取り付けまたは取り外しのときは片方の手のみで行うようにしてください。これにより、電位差がある二つの表面に触ることによる感電を防ぐことができます。

電源コード、電話ケーブル、通信ケーブルからの電流は身体に危険を及ぼします。設置、移動、または製品のカバーを開けたり装置を接続したりするときには、以下のようにケーブルの接続、取り外しを行ってください。

接続するには

1. すべての電源を切る
2. まず、装置にすべてのケーブルを接続する。
3. 次に、通信ケーブルをコネクタに接続する
4. その後、電源コンセントに電源コードを接続する
5. 装置の電源を入れる。

取り外すには

1. すべての電源を切る
2. まず、電源コンセントから電源コードを取り外す
3. 次に、通信ケーブルをコネクタから取り外す。
4. その後、装置からすべてのケーブルを取り外す

・記述 2

⚠ 注意

本製品には、システム・ボード上にリチウム電池が使用されています。電池の交換方法や取り扱いを誤ると、発熱、発火、破裂のおそれがあります。

電池の交換には、IBM部品番号33F8354の電池またはメーカー推奨の同等の電池を使用してください。

交換用電池の購入については、お買い求めの販売店または弊社の営業担当までお問い合わせください。

電池は幼児の手の届かない所に置いてください。

万一、幼児が電池を飲み込んだときは、直ちに医師に相談してください。

以下の行為は絶対にしないでください。

- 水にぬらすこと
- 100度C 以上の過熱や焼却
- 分解や充電
- ショート

電池を廃棄する場合、および保存する場合にはテープなどで絶縁してください。他の金属や電池と混ざると発火、破裂の原因となります。電池は地方自治体の条例、または規則に従って廃棄してください。ごみ廃棄場で処分されるごみの中に捨てないでください。

・記述 3

⚠ 注意

レーザー製品 (CD-ROM、DVD、または光ファイバー装置または送信器など) が組み込まれている場合は、下記に御注意ください。

- ここに記載されている制御方法、調整方法、または性能を超えて使用すると、危険な放射線を浴びる可能性があります。
- ドライブのカバーを開けると、危険な放射線を浴びる可能性があります。ドライブの内部に修理のために交換可能な部品はありません。カバーを開けないでください。

⚠ 危険

一部 CD-ROM ドライブは、Class 3A または Class 3B レーザー・ダイオードを使用しています。次の点に注意してください。

CD-ROM ドライブのカバーを開けるとレーザーが放射されます。光線を見つめたり、光学器械を使って直接見たりしないでください。また直接光線を浴びないようにしてください。

・記述 4

⚠ 注意



18Kg 以上



32Kg 以上



55Kg 以上

装置を持ち上げる場合は、安全に持ち上げる方法に従ってください。

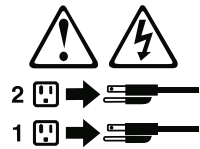
・記述 5

注意

サーバーの前面にある電源制御ボタンは、サーバーに供給された電流を遮断しません。

サーバーには、複数の電源コードが接続されているかもしれません。

サーバーから電流を完全に遮断するために、すべての電源コードが電源から取り外されていることを確認してください。



・記述 23

注意

ラック・モデルのサーバーの上に 50 Kg 以上の物を置かないでください。



> 50 Kg

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.
- 가능한 한 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:	연결을 끊으려면:
1. 모든 스위치를 끕니다.	1. 모든 스위치를 끕니다.
2. 먼저 모든 케이블을 장치에 연결합니다.	2. 먼저 콘센트에서 전원 코드를 뽑습니다.
3. 신호 케이블을 커넥터에 연결합니다.	3. 신호 케이블을 커넥터에서 제거합니다.
4. 콘센트에 전원 코드를 연결합니다.	4. 장치에서 모든 케이블을 제거합니다.
5. 장치 스위치를 켭니다.	

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.

- 먼지거나 물에 닿지 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 주의하십시오.

- 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 23



주의:

서랍형 모델의 장치 상단에 50 kg(110 lbs.)이 넘는 물체를 올려 놓지 마십시오.



> 50 kg (110 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:

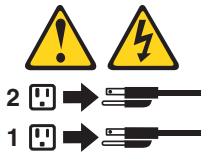
Tome medidas de seguridad al levantar el producto.

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 23



PRECAUCIÓN:



No coloque ningún objeto que pese más de 50 kg (110 libras) encima de los dispositivos montados en bastidor.

Appendix. Notices

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OS/2 WARP	

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Important notes

Processor speeds indicate the internal clock speed of the microprocessor; other factors also affect application performance.

CD-ROM drive speeds list the variable read rate. Actual speeds vary and are often less than the maximum possible.

When referring to processor storage, real and virtual storage, or channel volume, KB stands for approximately 1000 bytes, MB stands for approximately 1 000 000 bytes, and GB stands for approximately 1 000 000 000 bytes.

When referring to hard disk drive capacity or communications volume, MB stands for 1 000 000 bytes, and GB stands for 1 000 000 000 bytes. Total user-accessible capacity may vary depending on operating environments.

Maximum internal hard disk drive capacities assume the replacement of any standard hard disk drives and population of all hard disk drive bays with the largest currently supported drives available from IBM.

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Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

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This Class A digital apparatus complies with Canadian ICES-003.

Avis de conformité à la réglementation d'Industrie Canada

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

Australia and New Zealand Class A statement

Attention: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

United Kingdom telecommunications safety requirement

Notice to Customers

This apparatus is approved under approval number NS/G/1234/J/100003 for indirect connection to public telecommunication systems in the United Kingdom.

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Part Number: 71P7639

(1P) P/N: 71P7639

