ThinkCentre™

IBM

Hardware Maintenance Manual
Types 2296, 8191, 8198, 8199, 8316, and 8434

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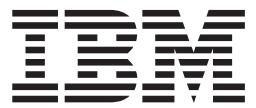
Hardware Maintenance Manual Types 2296, 8191, 8198, 8199, 8316, and 8434

> **Note:** Before using this information and the product it supports, be sure to read the general information under "Notices" on page 183.

Fourth Edition (July 2004)

This publication could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements or changes in the products or the programs described in this publication at any time.

Requests for technical information about IBM products should be made to your IBM Authorized Dealer or your IBM Marketing Representative.

Contents

Chapter 1. About this manual

This manual contains service and reference information for IBM® computer Types 2296, 8191, 8198, 8199, 8316, and 8434.

This manual is divided into product service sections and a related service section, as follows:

- The product service sections include procedures for isolating problems to a FRU, a Symptom-to-FRU Index, additional service information and an illustrated parts catalog.
- The related service section includes safety notices and safety information, and problem determination tips.

> **Note:**
>
> This manual is intended for trained servicers who are familiar with IBM Personal Computer products. Use this manual along with advanced diagnostic tests to troubleshoot problems effectively.
>
> Before servicing an IBM product, be sure to review the "Safety information" on page 149.

Important Safety Information

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

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.

주의 및 위험 경고문(한글)

중요:

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

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

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

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

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

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

注意和危险声明(简体中文)

重要事项：

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

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

在按说明执行任何操作前，请务必阅读所有注意和危险声明。

注意及危險聲明 （中文）

重要資訊：

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

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

執行任何指示之前，請詳讀所有「注意」及「危險」的聲明。

Chapter 2. General information

This IBM® computer incorporates many of the latest advances in computer technology and can be upgraded as your needs change.

Go to Access IBM for general information about the use, operation, and maintenance of the computer. Access IBM also contains information to help solve problems and get repair service or other technical assistance.

Features

> **System information**
>
> The following information covers a variety of models. For information about your specific model, use the IBM Setup Utility. See Chapter 5, "IBM Setup Utility program," on page 21.

This section provides an overview of the computer features and preinstalled software.

Microprocessor (varies by model type)
- Intel® Celeron® microprocessor with 256 KB of internal L2 cache memory
- Intel® Pentium® 4 microprocessor with 512 KB of internal L2 cache memory and Intel NetBurst™ micro-architecture

Memory
- Support for two dual inline memory modules (DIMMs)
- 512 KB flash memory for system programs

Internal drives
- 3.5-inch, 1.44 MB diskette drive
- Internal hard disk drive
- EIDE CD-ROM drive or DVD-ROM drive (some models)

Video subsystem
- Intel Extreme™ graphics
- Accelerated graphics port (AGP) video adapter slot on the system board (some models)

Audio subsystem
Integrated SoundMAX 3 audio

Connectivity
- 10/100 Mbps integrated Intel Ethernet controller that supports the Wake on LAN® feature
- Soft modem V.90/V.44 (some models)

System management features
- Remote Program Load (RPL) and Dynamic Host Configuration Protocol (DHCP)

- Wake on LAN
- Wake on Ring (in the IBM Setup Utility program, this feature is called Serial Port Ring Detect for an external modem and Modem Ring Detect for an internal modem)
- Remote Administration
- Automatic power-on startup
- System Management (SM) BIOS and SM software
- Ability to store POST hardware test results

Input/output features
- 25-pin, Extended Capabilities Port (ECP)/Extended Parallel Port (EPP)
- 9-pin serial connector (2 connectors on some models)
- Six 4-pin, USB connectors
- PS/2® mouse connector
- PS/2 keyboard connector
- Ethernet connector
- VGA monitor connector
- Three audio connectors (line in, line out, and microphone)
- Front connectors for headphone, microphone, IEEE 1394, and S/PDIF (some models)

Expansion
- Open drive bays for additional drives (varies by model)
- Three 32-bit peripheral component interconnect (PCI) adapter slots (supports low-profile adapters only)
- One accelerated graphics port (AGP) expansion slot (supports low-profile adapters only)

Power
- 200 W power supply with manual voltage selection switch
- Automatic 50/60 Hz input frequency switching
- Advanced Power Management support
- Advanced Configuration and Power Interface (ACPI) support

Security features
- User and administrator passwords
- Support for the addition of a rope clip and lockable cable
- Support for the addition of an integrated cable lock
- Startup sequence control
- Startup without diskette drive, keyboard, or mouse
- Unattended start mode
- Diskette and hard disk I/O control
- Serial and parallel port I/O control
- Security profile by device

IBM preinstalled software
The computer might come with preinstalled software. If it does, an operating system, device drivers to support built-in features, and other support programs are included.

Operating systems (preinstalled) (varies by model type)

Note: Not all countries or regions will have these operating systems.
- Microsoft® Windows® XP Home
- Microsoft Windows XP Professional
- Microsoft Windows 2000 Professional

Physical specifications

This section details the physical specifications for each computer Type.

Type 8316

Dimensions	Heat output (approximate) in British thermal units (Btu) per hour:

Dimensions

Height: 104 mm (4.1 in.)

Width: 360 mm (14.2 in.)

Depth: 412 mm (16.2 in.)

Weight

Minimum configuration as shipped: 8.1 kg (18 lb)

Maximum configuration: 9.1 kg (20 lb)

Environment

Air temperature:

System on: 10° to 35°C (50° to 95° F)
System off: 10° to 43°C (50° to 110° F)

Maximum altitude: 2134 m (7000 ft)
Note: The maximum altitude, 2134 m (7000 ft), is the maximum altitude at which the specified air temperatures apply. At higher altitudes, the maximum air temperatures are lower than those specified.

Humidity:

System on: 8% to 80%

System off: 8% to 80%

Electrical input

Input voltage:

Low range:

Minimum: 90 V ac

Maximum: 180 V ac

Input frequency range: 47–53 Hz

Voltage switch setting: 115 V ac

High range:

Minimum: 137 V ac

Maximum: 265 V ac

Input frequency range: 57–63 Hz

Voltage switch setting: 230 V ac

Input kilovolt-amperes (kVA) (approximate):

Minimum configuration as shipped: 0.08 kVA

Maximum configuration: 0.25 kVA

Note: Power consumption and heat output vary depending on the number and type of optional features installed and the power-management optional features in use.

Heat output (approximate) in British thermal units (Btu) per hour:

Minimum configuration: 257 Btu/hr (75 watts)

Maximum configuration: 683 Btu/hr (200 watts)

Airflow

Approximately 0.45 cubic meters per minute (16 cubic feet per minute) maximum

Acoustical noise-emission values

For microprocessors less than 2.8 GHz:

Average sound-pressure levels:

At operator position:

Idle: 28 dBA

Operating: 30 dBA

At bystander position - 1 meter (3.3 ft):

Idle: 27 dBA

Operating: 29 dBA

Declared (upper limit) sound-power levels:

Idle: 4.2 bels

Operating: 4.3 bels

For microprocessors greater than or equal to 2.8 GHz:

Average sound-pressure levels:

At operator position:

Idle: 29 dBA

Operating: 31 dBA

At bystander position - 1 meter (3.3 ft):

Idle: 28 dBA

Operating: 29 dBA

Declared (upper limit) sound-power levels:

Idle: 4.3 bels

Operating: 4.4 bels

Note: These levels were measured in controlled acoustical environments according to the procedures specified by the American National Standards Institute (ANSI) S12.10 and ISO 7779 and are reported in accordance with ISO 9296. Actual sound-pressure levels in a given location might exceed the average values stated because of room reflections and other nearby noise sources. The declared sound-power levels indicate an upper limit, below which a large number of computers will operate.

Type 8191

Dimensions

   Height: 140 mm (5.5 in.)

   Width: 425 mm (16.7 in.)

   Depth: 425 mm (16.7 in)

Weight

   Minimum configuration as shipped: 10.0 kg (22 lb)

   Maximum configuration: 11.4 kg (25.0 lb)

Environment

   Air temperature:

      System on: 10° to 35°C (50° to 95° F)
      System off: 10° to 43°C (50° to 110° F)

      Maximum altitude: 2134 m (7000 ft)
      Note: The maximum altitude, 2134 m (7000 ft), is the maximum altitude at which the specified air temperatures apply. At higher altitudes, the maximum air temperatures are lower than those specified.

   Humidity:

      System on: 8% to 80%

      System off: 8% to 80%

Electrical input

   Input voltage:

      Low range:

         Minimum: 90 V ac

         Maximum: 180 V ac

         Input frequency range: 47–53 Hz

         Voltage switch setting: 115 V ac

      High range:

         Minimum: 137 V ac

         Maximum: 265 V ac

         Input frequency range: 57–63 Hz

         Voltage switch setting: 230 V ac

   Input kilovolt-amperes (kVA) (approximate):

      Minimum configuration as shipped: 0.08 kVA

      Maximum configuration: 0.3 kVA

Note: Power consumption and heat output vary depending on the number and type of optional features installed and the power-management optional features in use.

Heat output (approximate) in British thermal units (Btu) per hour:

   Minimum configuration: 257 Btu/hr (75 watts)

   Maximum configuration: 785 Btu/hr (230 watts)

Airflow

   Approximately 0.51 cubic meters per minute (18 cubic feet per minute) maximum

Acoustical noise-emission values

   Average sound-pressure levels:

      At operator position:

         Idle: 30 dBA

         Operating: 32 dBA

      At bystander position - 1 meter (3.3 ft):

         Idle: 26 dBA

         Operating: 30 dBA

   Declared (upper limit) sound-power levels:

      Idle: 4.0 bels

      Operating: 4.3 bels

Note: These levels were measured in controlled acoustical environments according to the procedures specified by the American National Standards Institute (ANSI) S12.10 and ISO 7779 and are reported in accordance with ISO 9296. Actual sound-pressure levels in a given location might exceed the average values stated because of room reflections and other nearby noise sources. The declared sound-power levels indicate an upper limit, below which a large number of computers will operate.

Types 2296 and 8434

Dimensions

Height: 398 mm (15.67 in.)

Width: 180 mm (7.08 in.)

Depth: 402 mm (15.82 in.)

Weight

Minimum configuration as shipped: 7.6 kg (16.8 lb)

Maximum configuration: 9.97 kg (22 lb)

Environment

Air temperature:

System on: 10° to 35°C (50° to 95° F)
System off: 10° to 43°C (50° to 110° F)

Maximum altitude: 2134 m (7000 ft)
Note: The maximum altitude, 2134 m (7000 ft), is the maximum altitude at which the specified air temperatures apply. At higher altitudes, the maximum air temperatures are lower than those specified.

Humidity:

System on: 8% to 80%

System off: 8% to 80%

Electrical input

Input voltage:

Low range:

Minimum: 90 V ac

Maximum: 180 V ac

Input frequency range: 47–53 Hz

Voltage switch setting: 115 V ac

High range:

Minimum: 137 V ac

Maximum: 265 V ac

Input frequency range: 57–63 Hz

Voltage switch setting: 230 V ac

Input kilovolt-amperes (kVA) (approximate):

Minimum configuration as shipped: 0.08 kVA

Maximum configuration: 0.30 kVA

Note: Power consumption and heat output vary depending on the number and type of optional features installed and the power-management optional features in use.

Heat output (approximate) in British thermal units (Btu) per hour:

Minimum configuration: 257 Btu/hr (75 watts)

Maximum configuration: 785 Btu/hr (230 watts)

Airflow

Approximately 0.68 cubic meters every minute (24 cubic feet every minute) maximum

Acoustical noise-emission values

For microprocessors less than 2.8 GHz:

Average sound-pressure levels:

At operator position:

Idle: 28 dBA

Operating: 35 dBA

At bystander position - 1 meter (3.3 ft):

Idle: 25 dBA

Operating: 33 dBA

Declared (upper limit) sound-power levels:

Idle: 4.0 bels

Operating: 4.7 bels

For microprocessors greater than or equal to 2.8 GHz:

Average sound-pressure levels:

At operator position:

Idle: 33 dBA

Operating: 35 dBA

At bystander position - 1 meter (3.3 ft):

Idle: 30 dBA

Operating: 33 dBA

Declared (upper limit) sound-power levels:

Idle: 4.4 bels

Operating: 4.7 bels

Note: These levels were measured in controlled acoustical environments according to the procedures specified by the American National Standards Institute (ANSI) S12.10 and ISO 7779 and are reported in accordance with ISO 9296. Actual sound-pressure levels in a given location might exceed the average values stated because of room reflections and other nearby noise sources. The declared sound-power levels indicate an upper limit, below which a large number of computers will operate.

Types 8198 and 8199

Dimensions
 	
   Height: 413 mm (16.25 in.)
 	
   Width: 191 mm (7.5 in.)
 	
   Depth: 406 mm (16 in.)
 	
Weight
 	
   Minimum configuration as shipped: 9.1 kg (20 lb)
 	
   Maximum configuration: 11.4 kg (25.0 lb)
 	
Environment
 	
   Air temperature:
 	
      System on: 10° to 35°C (50° to 95° F)
      System off: 10° to 43°C (50° to 110° F)
 	
      Maximum altitude: 2134 m (7000 ft)
      Note: The maximum altitude, 2134 m (7000 ft), is the maximum altitude at which the specified air temperatures apply. At higher altitudes, the maximum air temperatures are lower than those specified.
 	
   Humidity:
 	
      System on: 8% to 80%
 	
      System off: 8% to 80%
 	
Electrical input
 	
   Input voltage:
 	
      Low range:
 	
         Minimum: 90 V ac
 	
         Maximum: 180 V ac
 	
         Input frequency range: 47–53 Hz
 	
         Voltage switch setting: 115 V ac
 	
      High range:
 	
         Minimum: 137 V ac
 	
         Maximum: 265 V ac
 	
         Input frequency range: 57–63 Hz
 	
         Voltage switch setting: 230 V ac
 	
   Input kilovolt-amperes (kVA) (approximate):
 	
      Minimum configuration as shipped: 0.08 kVA
 	
      Maximum configuration: 0.3 kVA
 	
Note: Power consumption and heat output vary depending on the number and type of optional features installed and the power-management optional features in use.
	Heat output (approximate) in British thermal units (Btu) per hour:
	
	   Minimum configuration: 257 Btu/hr (75 watts)
	
	   Maximum configuration: 785 Btu/hr (230 watts)
	
	Airflow
	
	   Approximately 0.68 cubic meters per minute (24 cubic feet per minute) maximum
	
	Acoustical noise-emission values
	
	   Average sound-pressure levels:
	
	      At operator position:
	
	         Idle: 28 dBA
	
	         Operating: 30 dBA
	
	      At bystander position - 1 meter (3.3 ft):
	
	         Idle: 26 dBA
	
	         Operating: 29 dBA
	
	   Declared (upper limit) sound-power levels:
	
	      Idle: 4.1 bels
	
	      Operating: 4.3 bels
	
	Note: These levels were measured in controlled acoustical environments according to the procedures specified by the American National Standards Institute (ANSI) S12.10 and ISO 7779 and are reported in accordance with ISO 9296. Actual sound-pressure levels in a given location might exceed the average values stated because of room reflections and other nearby noise sources. The declared sound-power levels indicate an upper limit, below which a large number of computers will operate.

Chapter 3. General Checkout

This general checkout procedure is for Type 2296, 8191, 8198, 8199, 8316, and 8434 computers.

Note: The fans in this system may turn off under normal operation. This is a noise-level reduction feature, and should not be taken to mean there is something wrong with the system.

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

- IBM Setup Utility program
- Power-On Self-Test (POST)
  - POST Beep Codes
  - Error Code Format
- IBM Enhanced Diagnostics program
- Product recovery utility
  - Factory Contents
  - Partial recovery
- Repair utility

Attention:

The drives in the computer you are servicing might have been rearranged or the drive startup sequence changed. Be extremely careful during write operations such as copying, saving or formatting. Data or programs can be overwritten if you select an incorrect drive.

Diagnostic error messages appear when a test program finds a problem with a hardware option. For the test programs to properly determine if a test *Passed*, *Failed* or *Aborted*, the test programs check the error-return code at test completion. See Chapter 4, "IBM Enhanced Diagnostics," on page 15.

General error messages appear if a problem or conflict is found by an application program, the operating system, or both. For an explanation of these messages, refer to the information supplied with that software package.

> **Notes:**
> - Type 2296, 8191, 8198, 8199, 8316, and 8434 computers default to come up quiet (no beep and no memory count and checkpoint code display) when no errors are detected by POST.
> - To enable beep and memory count and checkpoint code display when a successful POST occurs, do the following:
>   1. Select **Start Options** in the IBM Setup Utility program (see Chapter 5, "IBM Setup Utility program," on page 21).
>   2. Set **Power-On Self-Test** to **Enhanced**.
> - Before replacing any FRUs, ensure that the latest level of BIOS is installed on the system. A down-level BIOS might cause false errors and unnecessary replacement of the system board. For more information on how to determine and obtain the latest level BIOS, see "BIOS levels" on page 111.
> - If multiple error codes are displayed, diagnose the first error code displayed.
> - If the computer hangs with a POST error, go to Chapter 7, "Symptom-to-FRU Index," on page 69.
> - If the computer hangs and no error is displayed, go to "Undetermined problems" on page 108.
> - If an installed device is not recognized by the diagnostics program, that device might be defective.

001

1. Power-off the computer and all external devices.
2. Check all cables and power cords.
3. Make sure the system board is seated properly.
4. Set all display controls to the middle position.
5. Power-on all external devices.
6. Power-on the computer.
7. Check for the following response:
    - Readable instructions or the Main Menu.

DID YOU RECEIVE THE CORRECT RESPONSE?

If NO, continue to **002** .

If YES, proceed to **003** .

002

If the Power Management feature is enabled, do the following:
1. Start the IBM Setup Utility program (see Chapter 5, "IBM Setup Utility program," on page 21).
2. Select **Power Management** from the IBM Setup Utility program menu.
3. Select **APM**.
4. Be sure **APM BIOS Mode** is set to **Disabled**. If it is not, press Left Arrow (←) or Right Arrow (→) to change the setting.
5. Select **Automatic Hardware Power Management**.
6. Set **Automatic Hardware Power Management** to **Disabled**.
7. If the problem persists, continue to **003** .

003

Run the Diagnostic programs. If necessary, refer to Chapter 4, "IBM Enhanced Diagnostics," on page 15.

- If you receive an error, replace the part that the diagnostic program calls out or go to Chapter 7, "Symptom-to-FRU Index," on page 69.
- If the test stops and you cannot continue, replace the last device tested.

Chapter 4. IBM Enhanced Diagnostics

The IBM Enhanced Diagnostics program uses a full range of diagnostic utilities to determine the operating condition of the computer's hardware components.

For a complete list of error codes and messages, see Chapter 7, "Symptom-to-FRU Index," on page 69.

Diagnostics program download

To download the Diagnostics program, do the following:
- Go to **http://www.ibm.com/**.
- Select **Support**.
- Select **Personal computing** from the "Get product support for" pull-down menu.
- Search for the machine type in the "Quick Path" box on the left.
- Select **Downloadable files** from the options on the left.
- Select **Diagnostics** from the pull down menu.

   Note: You can download either a diskette image or a startable CD-ROM image (.iso file) of the diagnostics.

Navigating through the diagnostics programs

Use the cursor movement keys to navigate within the menus.
- The **Enter** key is used to select a menu item.
- The **Esc** key is used to back up to the previous menu.
- For online help select **F1**.

Running diagnostics tests

There are four ways to run the diagnostic tests.
1. Using the cursor movement keys, highlight **Run Normal Test** or **Run Quick Test** from the Diagnostics menu and then press **Enter**.

   This will automatically run a pre-defined group of tests from each test category. Run **Normal Test** runs a more extensive set of tests than does **Run Quick Test** and takes longer to execute.
2. Press F5 to automatically run all selected tests in all categories. See "Test selection" on page 16.
3. From within a test category, press Ctrl-Enter to automatically run only the selected tests in that category. See "Test selection" on page 16.
4. Using the cursor movement keys, highlight a single test within a test category, then press Enter. This will run only that test.

Press Esc at any time to stop the testing process.

Test results, (N/A, PASSED, FAILED, ABORTED), are displayed in the field beside the test description and in the test log. See "Viewing the test log" on page 19.

Test selection

To select one or more tests, use the following procedure.

1. Open the corresponding test category.
2. Using the cursor movement keys, highlight the desired test.
3. Press the space bar.

   A selected test is marked by **>>**. Pressing the space bar again de-selects a test and removes the chevron.
4. Repeat steps 2 and 3 above to select all desired tests.

Test results

Diagnostics test results will produce the following error code format:

Function Code	Failure Type	DeviceID	Date	ChkDigits	Text

- **Function Code:**

  Represents the feature or function within the PC.
- **Failure Type:**

  Represents the type of error encountered.
- **DeviceID:**

  Contains the component's unit-ID which corresponds to either a fixed disk drive, removable media drive, serial or parallel port, processor, specific DIMM, or a device on the PCI bus.
- **Date:**

  Contains the date on which the diagnostic test was run. The date is retrieved from CMOS and displayed using the YYYYMMDD format.
- **ChkDigits:**

  Contains a 2-digit check-digit value to ensure the following:
  - Diagnostics were run on the specified date.
  - Diagnostics were run on the specified IBM computer.
  - The diagnostic error code is recorded correctly.
- **Text:**

  Description of the error.

Note: See "Diagnostic error codes" on page 70 for error code listings.

Fixed disk advanced test (FDAT)

PC-Doctor's (PCDR) Fixed-Disk Advanced Test module (FDAT) is a full-featured highly configurable fixed-disk test suite. The configurable capabilities of FDAT allow users to enable or disable specific tests, enable or disable testing features, control the test log detail, alter testing parameters, etc. FDAT will test for and report most commonly found errors on a fixed-disk drive and is able to test up to 128 SCSI and 4 IDE drives (up to 132 total drives). Drive information is gathered through FDAT's enumeration of available devices and user specific configuration parameters located in the FDAT.INI. FDAT uses information supplied by these features to indicate specifically what devices are available for test, what tests are available for the device, device properties, etc. Modify the FDAT.INI file in PC Doctor for DOS to change testing parameters

FDAT consists of the following subtests and features.

Fixed-Disk Tests:
- *Seek Tests* - checks the physical operation of the drive head.
  - Linear Seek
  - Random Seek
  - Min-Max Seek
  - Butterfly Seek
- *Verify Tests* - checks the integrity of the data present on the media.
  - Linear Verify
  - Random Verify
- *Surface Scan Tests* - checks the drive media for defects.
  - Surface Scan (Linear)
  - Surface Scan (Aggressive) - this is disabled for normal customer use.
  - Surface Scan (Random)
- *SMART* - checks the SMART functionality for drives that support SMART.
  - Start SMART Self-Test
  - Get SMART test results

Other Test Features:
- *Write-Splice Repair* - detects and corrects Error Correction Code errors during Verify tests.
- *Auto Spin Down* - a gradual spin down of the drive platters to avoid damaging the media.
- *Manufacturer Log* - an in-depth manufacturer supported log of errors on the drive.

Multitasking:

To allow simultaneous testing of multiple hard drives whenever possible, the FDAT module is written as a set of multitasking functions. Each drive under test can run the same test or run a different test at the same time. Each subtest is written to handle a single test pass and all test variables are kept track of in a structure unique for each drive. However, when testing IDE drives, FDAT will not perform simultaneous testing of IDE drives that are attached to the same IDE cable. For example, if FDAT is testing four IDE drives on a PC, it will perform simultaneous testing on drives 1 and 3 first (master drives), then perform tests on 2 and 4 (slave drives). FDAT will also perform simultaneous testing on a master and slave that are on separate IDE cables, but will not perform simultaneous tests on a master and slave on the same IDE cable. This generally increases the amount of time needed to test multiple IDE drives. Another limitation of FDAT'S multitasking capability is the use of Ultra DMA (UDMA). Only one drive at a time can access the UDMA channel and the UDMA channel buffer must be kept high in order to maintain a speed advantage over other data transfer modes. In order to use the UDMA channel during testing, users must disable the multitasking feature.

Destructive vs non-destructive testing:

Most of the tests found in FDAT are non-destructive. This means that PCDR will preserve any data that is present on the tested media prior to beginning any destructive operations (i.e. write operations). However, users can run certain tests in destructive mode (i.e. surface scan tests). Destructive tests will speed up testing because FDAT does not preserve the data on the media prior to the test beginning.

Unlike non-destructive tests, any data present on the media prior to the test beginning is lost. FDAT allows for enabling or disabling destructive tests, as well as specifying a range of destructive and non-destructive sectors on the tested drive. This is done through the configuration of the FDAT.INI. If destructive and non-destructive ranges somehow overlap, then the overlapped area is considered non-destructive. For example, if users specify both destructive and non-destructive ranges as the same, then the entire drive is tested as non-destructive.

Quick and Full erase - hard drive

The Diagnostics program offers two hard drive format utilities:

- Quick Erase Hard Drive
- Full Erase Hard Drive

The Quick Erase Hard Drive provides a DOS utility that performs the following steps.

- Destroys the Master Boot Record (MBR) on the hard drive.
- Destroys all copies of the FAT Table on all partitions (both the master and backup).
- Destroys the partition table.
- Provides messages that warn the user that this is a non-recoverable process.

The Full Erase Hard Drive provides a DOS utility that performs the following steps.

- Performs all the steps in Quick Erase.
- Provides a DOS utility that writes random data to all sectors of the hard drive.
- Provide an estimate of time to completion along with a visual representation of completion status.
- Provides messages that warn the user about non-recoverable process.

> **Important:** Make sure that all data is backed up before using the Quick or Full Erase functions.

To select the Quick Erase or Full Erase Hard Drive utility, use the following procedure.

1. Select the UTILITY option on the toolbar and press Enter.
2. Select either the QUICK ERASE or FULL ERASE HARD DISK option and follow the instructions.

Viewing the test log

Errors reported by the diagnostic test will be displayed by the program as a failed test.

To view details of a failure or to view a list of test results, use the following procedure from any test category screen.

- Press F3 to activate the log file.
- Press F3 again to save the file to diskette or F2 to print the file.

Chapter 5. IBM Setup Utility program

> **Attention**
>
> A customized setup configuration (other than default settings) might exist on the computer you are servicing. Running the IBM Setup Utility program might alter those settings. Note the current configuration settings and verify that the settings are in place when service is complete.

The IBM Setup Utility program is stored in the electrically erasable programmable read-only memory (EEPROM) of the computer. The IBM Setup Utility program is used to view and change the configuration settings of the computer, regardless of which operating system you are using. However, the operating-system settings might override any similar settings in the IBM Setup Utility program.

This program includes settings for the following:
- System Summary
- Product Data
- Devices and I/O Ports
- Start Options
- Date and Time
- System Security
- Advanced Setup
- Power Management

Starting the IBM Setup Utility program

To start the IBM Setup Utility program, do the following:

1. Power-off the computer and wait for a few seconds until all in-use lights go off.
2. Power-on the computer.
3. When the IBM Setup Utility prompt appears on the screen during start-up, press F1. The IBM Setup Utility menu will appear.
4. Follow the instructions on the screen.
5. When finished, select **System Summary** to verify that any configuration changes have been accepted.

The IBM Setup Utility might start automatically when POST detects that hardware has been removed or new hardware has been installed in the computer.

Viewing and changing settings

The IBM Setup Utility program menu lists items that identify system configuration topics.

When working with the IBM Setup Utility program menu, you must use the keyboard. The keys used to perform various tasks are displayed at the bottom of each screen.

Exiting from the IBM Setup Utility program

When you finish viewing or changing settings, press Esc to return to the IBM Setup Utility program menu (you might have to press Esc several times). If you want to save the new settings, select **Save Settings** or **Save and exit the Setup Utility**. Otherwise, your changes will not be saved.

Using passwords

You can use passwords to provide security for the computer and data. There are two kinds of passwords: a user password and an administrator password. You do not have to set a password of either type to use the computer. However, if you decide to set either one, read the following sections.

User password

The user password feature deters unauthorized persons from gaining access to the computer.

Administrator password

Setting an administrator password deters unauthorized persons from changing configuration settings. If you are responsible for maintaining the settings of several computers, you might want to set an administrator password.

After you set an administrator password, a password prompt is displayed each time you try to access the IBM Setup Utility program. If you type the wrong password, you will see an error message. If you type the wrong password three times, you must turn the computer off and start again.

If both the user and administrator passwords are set, you can type either password. However, to change any configuration settings, you must use your administrator password.

Setting, changing, and deleting a password

To set, change, or delete a password, do the following:

Note: A password can be any combination of up to seven characters (A- Z, a-z, and 0-9).

1. Start the IBM Setup Utility program (see "Starting the IBM Setup Utility program" on page 21).
2. From the IBM Setup Utility program menu, select **Security → Set Passwords**. Read the information displayed on the right side of the screen.

Using Security Profile by Device

Security Profile by Device is used to enable or disable user access to the following devices:

IDE controller	When this feature is set to **Disable**, all devices connected to the IDE controller (such as hard disk drives or the CD-ROM drive) are disabled and will not be displayed in the system configuration.
Diskette Drive Access	When this feature is set to **Disable**, the diskette drive cannot be accessed.
Diskette Write Protect	When this feature is set to **Enable**, all diskettes are treated as if they are write-protected.

To set Security Profile by Device, do the following:

1. Start the IBM Setup Utility program (see "Starting the IBM Setup Utility program" on page 21).
2. From the IBM Setup Utility program menu, select **Security**.
3. Select **Security Profile by Device**.
4. Select the desired devices and settings and press Enter.
5. Return to the IBM Setup Utility program menu and select **Exit** and then **Save Settings** or **Save and exit the Setup Utility**.

   Note: If you do not want to save the settings, select **Exit the Setup Utility without saving**.

Selecting a startup device

If the computer does not start up (boot) from a device such as the CD-ROM, diskette, or hard disk as expected, use one of the following procedures to select a startup device.

Selecting a temporary startup device

Use this procedure to startup from any boot device.

Note: Not all CDs, hard disks, and diskettes are startable (bootable).

1. Turn off the computer.
2. Turn on the computer and look for the following prompt on the logo screen: (To interrupt normal startup, press Enter)
3. Press the Enter key.
4. When the Startup Interrupt Menu displays, press F12.
5. Double click the desired startup device from the Alternate startup devices.

Note: Selecting a startup device from this list does not permanently change the startup sequence.

Changing the startup device sequence

To view or permanently change the configured startup device sequence, do the following:

1. Start the IBM Setup Utility program (see "Starting the IBM Setup Utility program" on page 21).
2. Select **Startup**.

3. Select **Startup Sequence**. See the information displayed on the right side of the screen.

4. Select the devices for the Primary Startup Sequence, the Automatic Startup Sequence, and the Error Startup Sequence.

5. Select **Exit** from the IBM Setup Utility menu and then **Save Settings** or **Save and exit the Setup Utility**.

If you have changed these settings and want to return to the default settings, select **Load Default Settings** on the Exit menu.

Chapter 6. Replacing FRUs

> **Important:** Before you install or remove any option, read "Safety information" on page 149. These precautions and guidelines will help you work safely.

FRU replacements are to be done by trained service technicians only.

Locating connectors on the front

Types 2296 and 8434

The following illustration shows the locations of the USB connectors on the front of the computer.
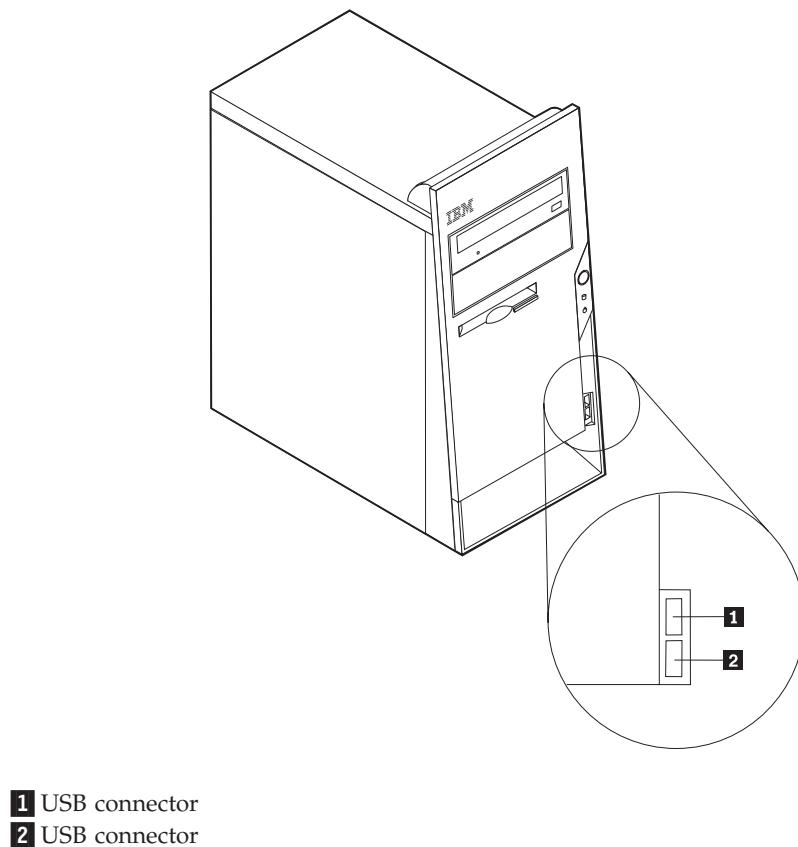
1 USB connector
2 USB connector

Type 8191

The following illustration shows the locations of the connectors on the front of the computer.
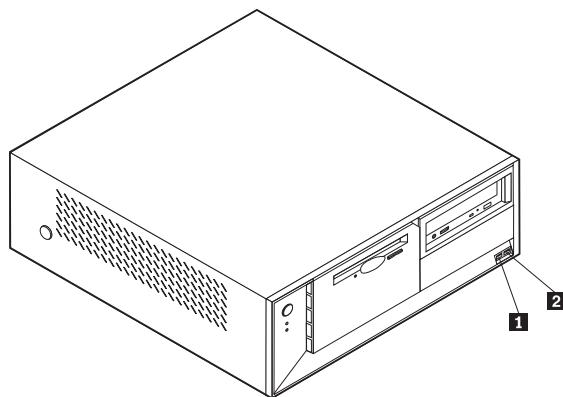
1 USB connector
2 USB connector

Types 8198 and 8199

The following illustration shows the locations of the connectors on the front of the computer.

Note: Not all computer models will have the following connectors.
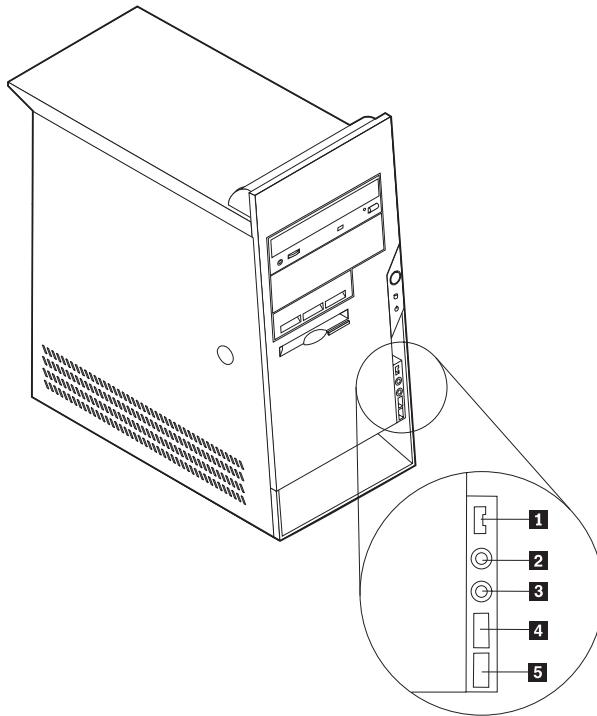
1 IEEE 1394 connector		**4** USB connector	
2 Microphone connector		**5** USB connector	
3 Headphone connector			

Type 8316

The following illustration shows the locations of the connectors on the front of the computer.
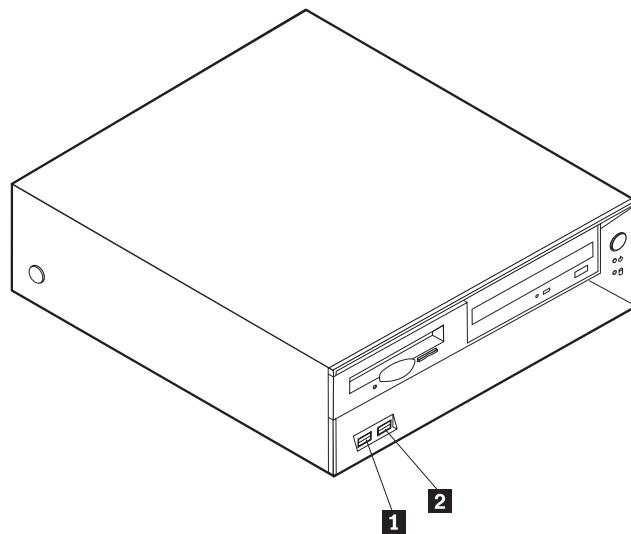
1 USB connector
2 USB connector

Locating the connectors on the rear

Types 2296 and 8434

The following illustration shows the locations of the connectors on the rear of the computer.
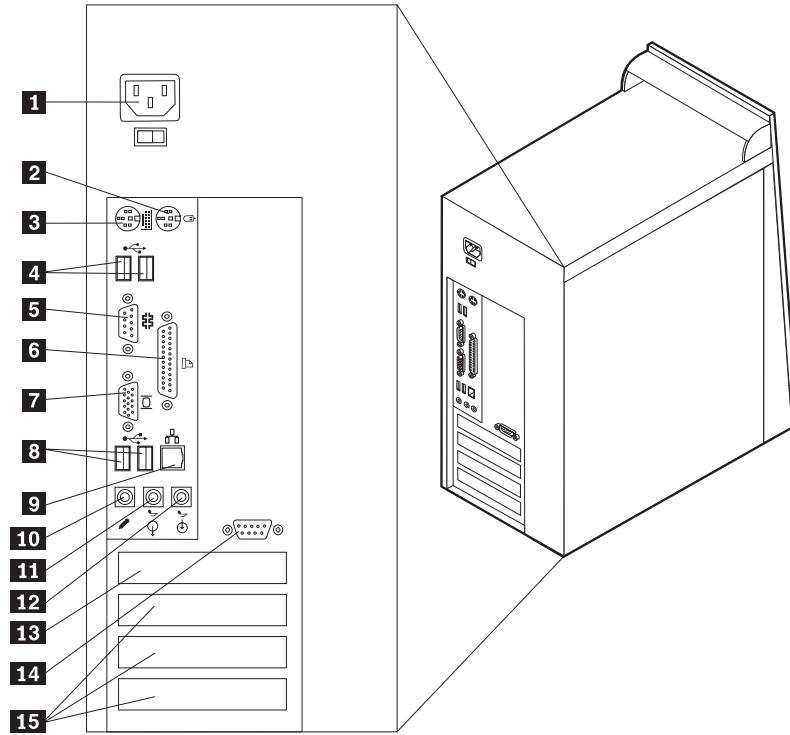
1	Power connector	9	Ethernet connector
2	Mouse connector	10	Microphone connector
3	Keyboard connector	11	Audio line out connector
4	USB connectors	12	Audio line in connector
5	Serial connector	13	AGP slot (some models)
6	Parallel connector	14	Serial connector (some models)
7	Monitor connector	15	PCI slots (In some models, other devices, such as a modem, might be installed here.)
8	USB connectors		

Note: Some connectors on the rear of the computer are color-coded to help you to determine where to connect the cables on the computer.

Type 8191

The following illustration shows the locations of the connectors on the rear of the computer.

1 Power connector	9 Audio line out connector
2 Serial connector (some models)	10 Microphone connector
3 Mouse connector	11 USB connectors
4 Parallel connector	12 VGA monitor connector
5 Ethernet connector	13 Serial connector
6 Audio line in connector	14 USB connectors
7 PCI slots	15 Keyboard connector
8 AGP slot (some models)	

Note: Some connectors on the rear of the computer are color-coded to help you to determine where to connect the cables on the computer.

Types 8198 and 8199

The following illustration shows the locations of the connectors on the rear of the computer.

1 Power connector
2 Serial connector (some models)
3 Mouse connector
4 Keyboard connector
5 USB connectors
6 Serial connector
7 Parallel connector
8 VGA monitor connector
9 USB connectors
10 Ethernet connector
11 Microphone connector connector
12 Audio line out connector
13 Audio line in connector
14 AGP slot
15 PCI slots

Note: Some connectors on the rear of the computer are color-coded to help you to determine where to connect the cables on the computer.

Type 8316

The following illustration shows the locations of the connectors on the rear of the computer.
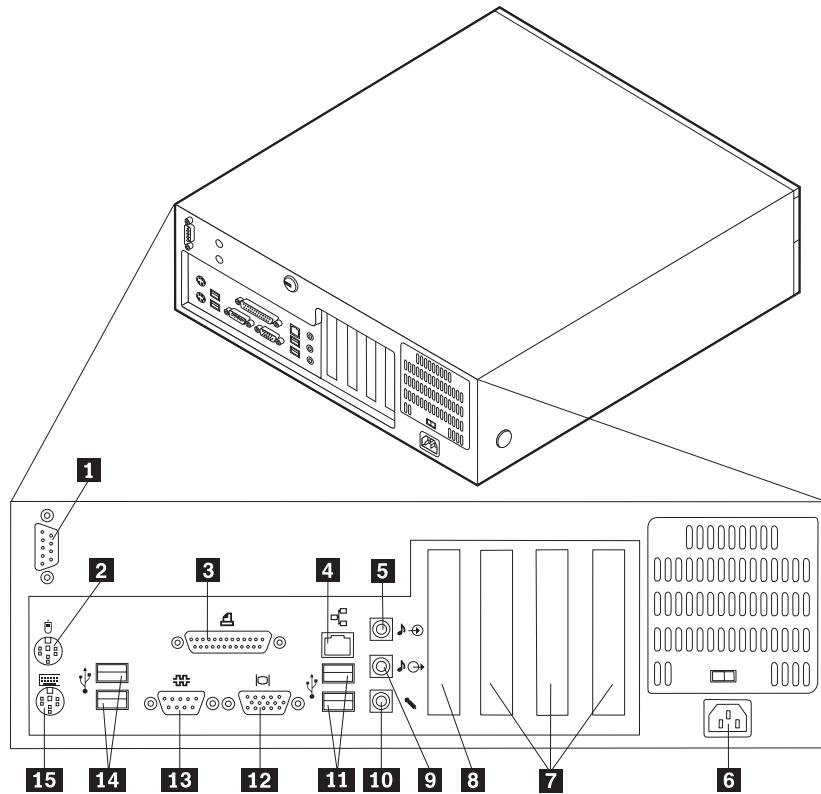
|	
1 Serial connector (some models)	**9** Audio line out connector
2 Mouse connector	**10** Microphone connector
3 Parallel connector	**11** USB connectors
4 Ethernet connector	**12** VGA monitor connector
5 Audio line in connector	**13** Serial connector
6 Power connector	**14** USB connectors
7 PCI slots	**15** Keyboard connector
8 AGP slot (some models)	

Note: Some connectors on the rear of the computer are color-coded to help you to determine where to connect the cables on the computer.

Removing the cover

Important: Read "Safety information" on page 149 and "Handling electrostatic discharge-sensitive devices" on page 152 before removing the cover.

Types 2296 and 8434

1. Shut down your operating system, remove any media (diskettes, CDs, or tapes) from the drives, and turn off all attached devices and the computer.
2. Unplug all power cords from electrical outlets.
3. Disconnect all cables attached to the computer. This includes power cords, input/output (I/O) cables, and any other cables that are connected to the computer.

4. Remove the two screws at the rear of the left side cover and slide the cover to the rear to remove.
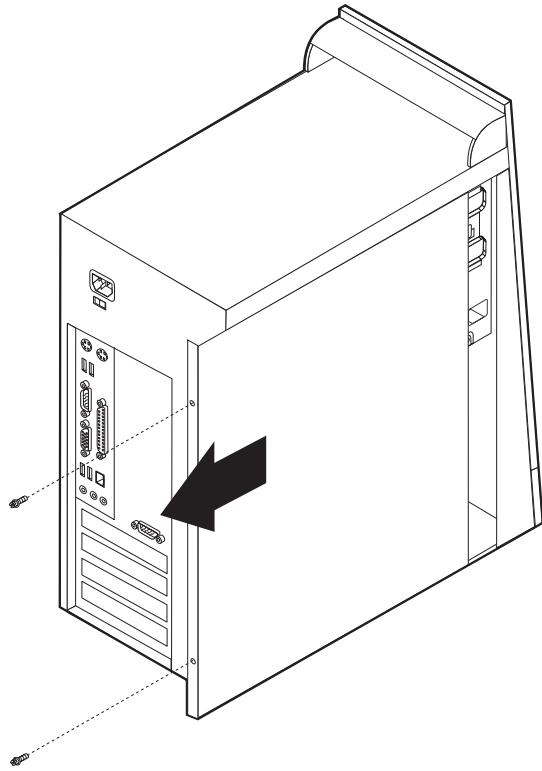
Type 8191

1. Shut down your operating system, remove any media (diskettes, CDs, or tapes) from the drives, and turn off all attached devices and the computer.
2. Unplug all power cords from electrical outlets.
3. Disconnect all cables attached to the computer. This includes power cords, input/output (I/O) cables, and any other cables that are connected to the computer.
4. Press the buttons on the sides of the computer and pivot the rear end of the cover up toward the front of the computer.
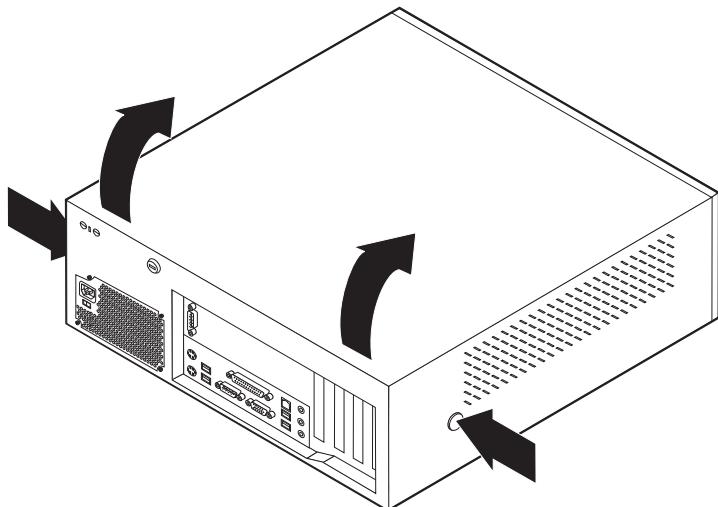
Types 8198 and 8199

1. Shut down your operating system, remove any media (diskettes, CDs, or tapes) from the drives, and turn off all attached devices and the computer.
2. Unplug all power cords from electrical outlets.
3. Disconnect all cables attached to the computer. This includes power cords, input/output (I/O) cables, and any other cables that are connected to the computer.
4. Press the cover-release button on the left side cover and remove the cover.
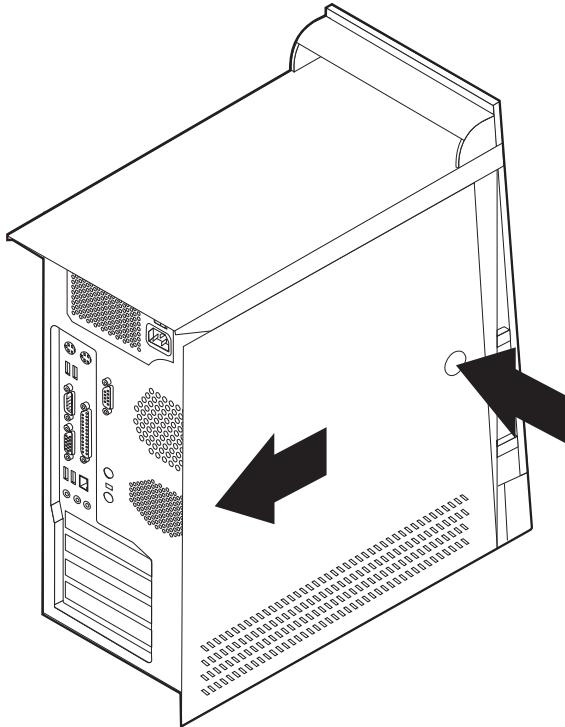
Type 8316

1. Shut down your operating system, remove any media (diskettes, CDs, or tapes) from the drives, and turn off all attached devices and the computer.
2. Unplug all power cords from electrical outlets.
3. Disconnect all cables attached to the computer. This includes power cords, input/output (I/O) cables, and any other cables that are connected to the computer.

4. Press the buttons on the sides of the computer and pivot the rear end of the cover up toward the front of the computer.
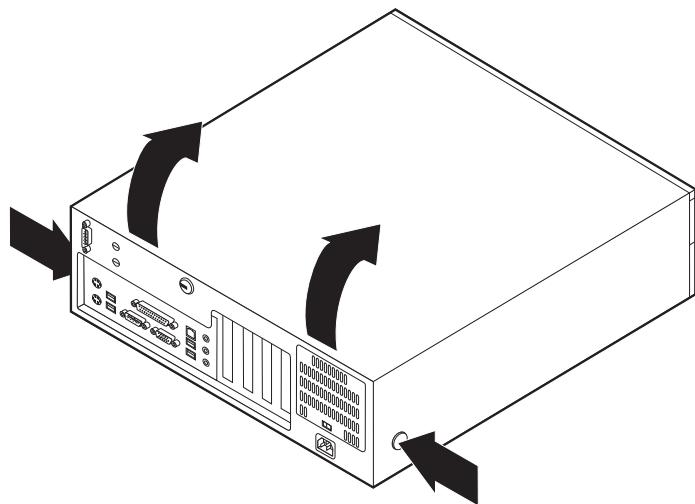
Locating components

Types 2296 and 8434

The following illustration will help you locate the various components in the computer.
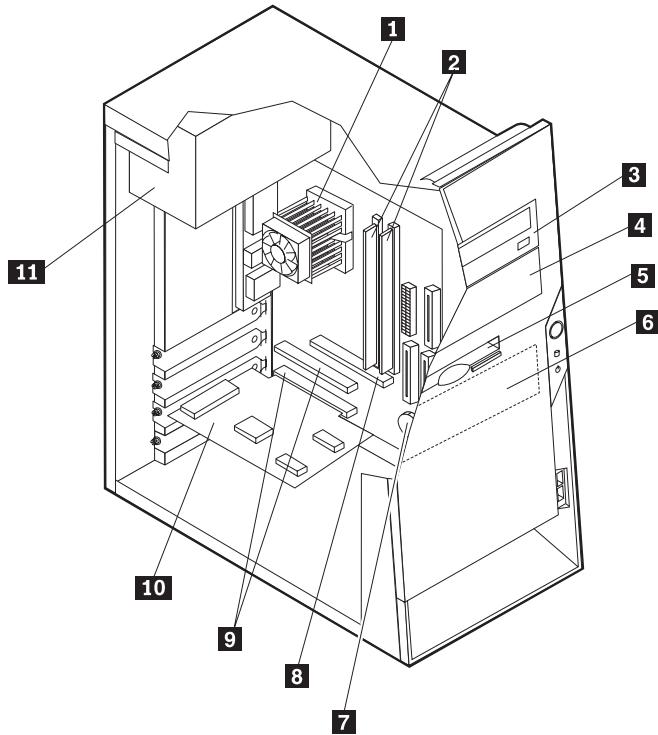
1 Microprocessor and heat sink
2 DIMMs
3 CD drive
4 Optional drive
5 Diskette drive
6 Hard disk drive

7 Battery
8 AGP slot (some models)
9 PCI slots
10 PCI adapter
11 Power supply

Type 8191

The following illustration will help you locate the various components in the computer.
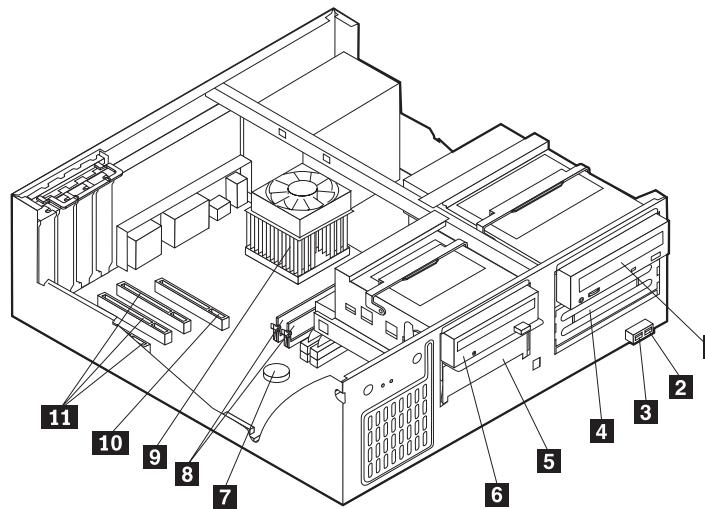
1	CD drive or DVD drive	**7**	Battery
2	USB connector	**8**	DIMMs
3	USB connector	**9**	Microprocessor and heat sink
4	Optional drive bay	**10**	AGP slot (some models)
5	Hard disk drive	**11**	PCI slots
6	Diskette drive		

Types 8198 and 8199

The following illustration will help you locate the various components in the computer.
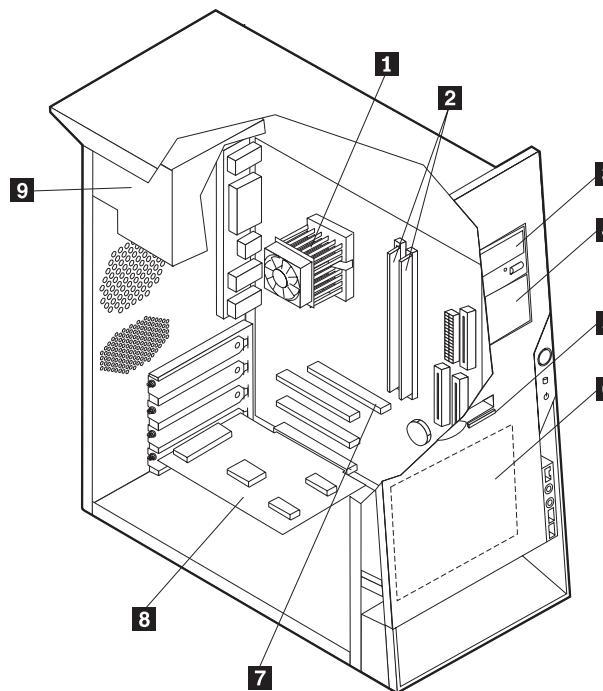
1 Microprocessor and heat sink	**6** Hard disk drive
2 DIMMs	**7** AGP slot
3 CD drive	**8** PCI adapter
4 Optional drive	**9** Power supply
5 Battery	

Type 8316

The following illustration will help you locate the various components in the computer.
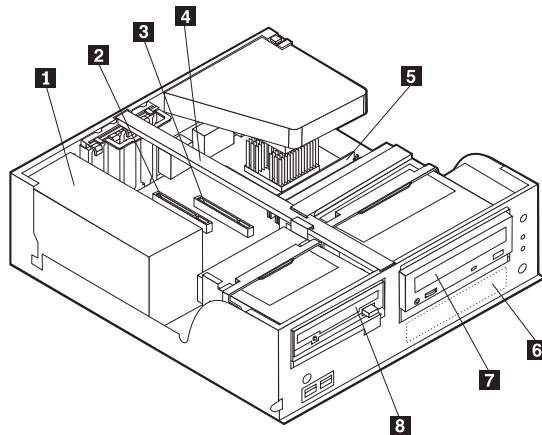
1	Power supply	**5**	DIMM
2	PCI slot	**6**	Hard disk drive
3	AGP slot	**7**	CD-ROM drive or DVD-ROM drive
4	Support bar	**8**	Diskette drive

Identifying parts on the system board (all machine types)
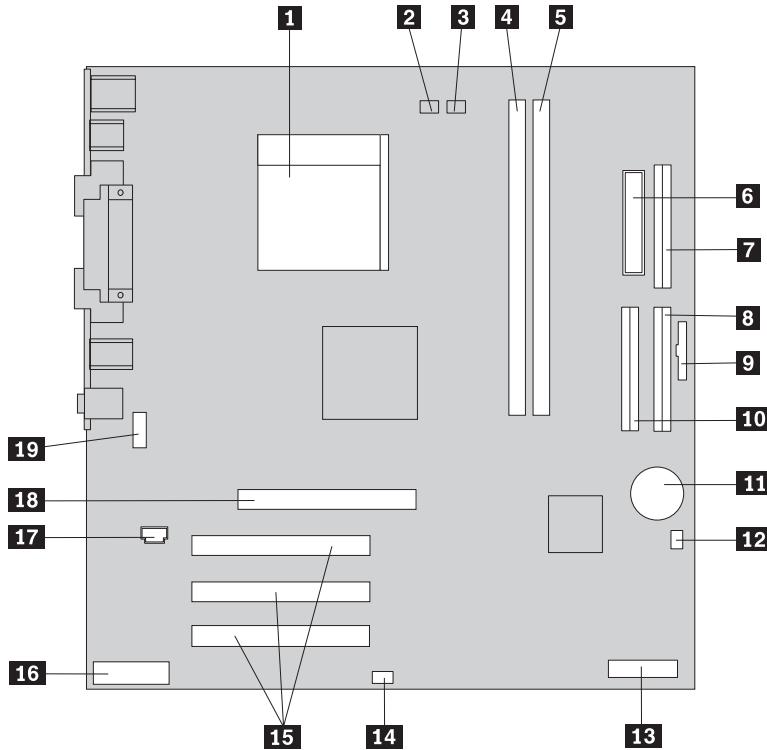
1	Microprocessor	**11**	Battery
2	Rear fan connector	**12**	Clear CMOS/Recovery jumper
3	Microprocessor fan connector	**13**	POV card (some models)
4	DIMM connector 1	**14**	SCSI LED connector
5	DIMM connector 2	**15**	PCI slots
6	Power connector	**16**	Front panel audio connector
7	Diskette drive	**17**	CD-ROM audio connector
8	Primary IDE connector	**18**	AGP slot (some models)
9	Front panel connector	**19**	Serial connector
10	Secondary IDE connector		

Replacing memory (all machine types)

The computer has four connectors for installing dual inline memory modules (DIMMs) that provide up to a maximum of 4.0 GB of system memory.

When installing DIMMs, the following rules apply:

- Fill each DIMM connector sequentially, starting at DIMM connector 1.
- Use 2.5 V, 184-pin, 333 MHz double data rate synchronous dynamic random access memory (DDR SDRAM).
- Use 128 MB, 256 MB, 512 MB or 1.0 GB DIMMs in any combination.
- DIMMs are 38.1 mm (1.5 inches) in height.

Note: Only DDR SDRAM DIMMs can be used.

To replace a DIMM:

1. Remove the cover. See "Removing the cover" on page 32.
2. To locate the DIMM connectors. See "Identifying parts on the system board (all machine types)" on page 40.
3. Remove the DIMM being replaced by opening the retaining clips as shown.
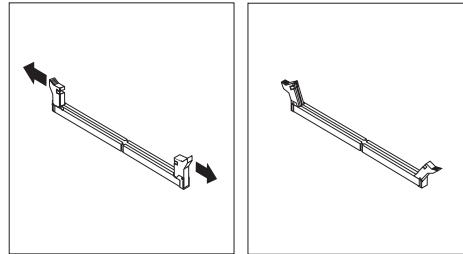
4. Make sure the notches in the new DIMM align with the tabs on the connector. Push or insert the DIMM straight down into the connector until the retaining clips close.
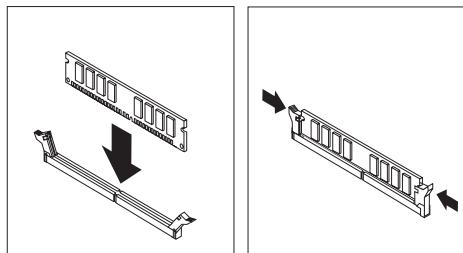
5. Go to "Replacing the cover and connecting the cables" on page 64.

Replacing adapters

Types 2296 and 8434

These computers have three expansion slots for PCI adapters. You can install an adapter up to 228 mm (9 inches) long.

1. Remove the cover. See "Removing the cover" on page 32.
2. Remove the adapter being replaced.
3. Remove the new adapter from its static-protective package.
4. Install the adapter into the appropriate slot on the system board.

5. Secure the adapter with the screw as shown.
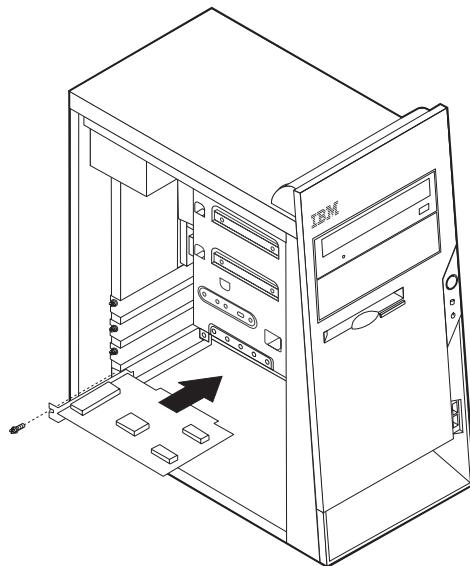
6. Go to "Replacing the cover and connecting the cables" on page 64.

Type 8191

This computer has three expansion slots for PCI adapters and one slot used for an AGP adapter. You can install an adapter up to 340 mm (13.4 inches) long.

1. Remove the cover. See "Removing the cover" on page 32.
2. Remove the adapter being replaced.
3. Remove the new adapter from its static-protective package.
4. Install the adapter into the appropriate slot on the system board.
5. Install the adapter-slot-cover latch.
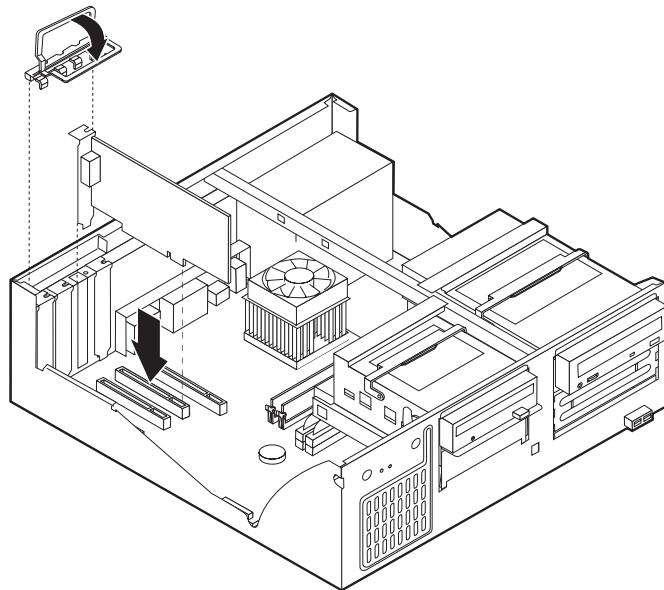
6. Go to "Replacing the cover and connecting the cables" on page 64.

Types 8198 and 8199

These computers have three expansion slots for PCI adapters and one slot used for an AGP adapter. You can install an adapter up to 228 mm (9 inches) long.

1. Remove the cover. See "Removing the cover" on page 32.
2. Remove the adapter being replaced.
3. Remove the new adapter from its static-protective package.
4. Install the adapter into the appropriate slot on the system board.
5. Install the adapter-slot-cover latch.
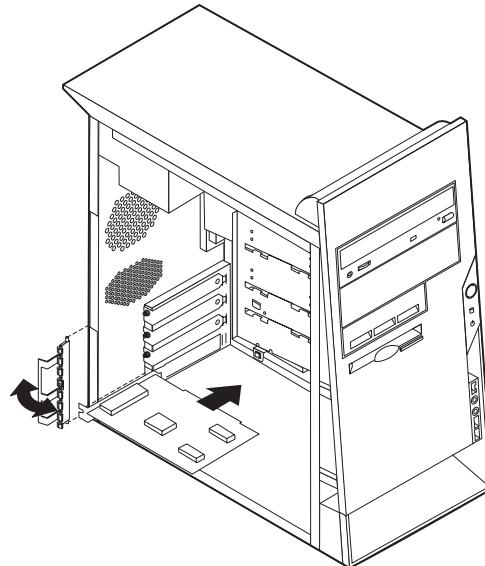
6. Go to "Replacing the cover and connecting the cables" on page 64.

Type 8316

This computer has three expansion slots for PCI adapters and one slot used for an AGP adapter. Adapters must be low profile. The computer supports adapters up to 168 mm (6.6 inches) long.

1. Remove the cover. See "Removing the cover" on page 32.

2. Pivot one of the drive bay latch handles toward the front of the computer and then pivot the drive bay cage upward, as shown, until it is latched in the up position. Repeat this procedure for the remaining drive bay.
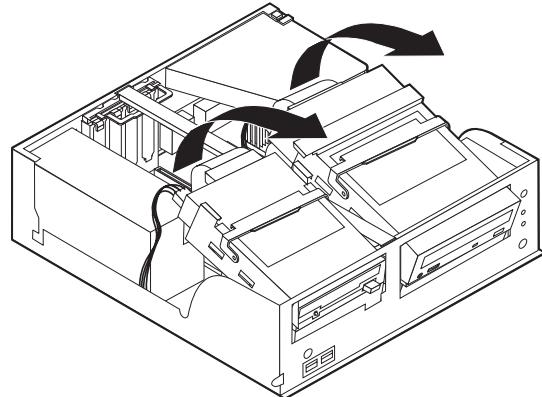
3. Remove the support bar by pulling it outward from the computer.
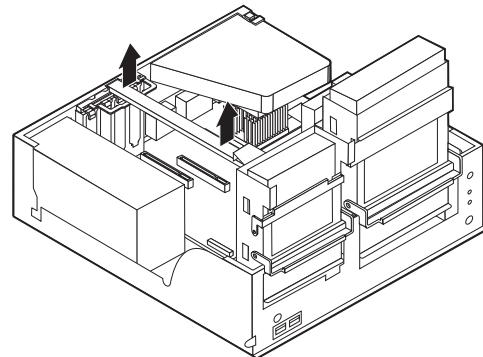
4. Remove the adapter-slot-cover latch.
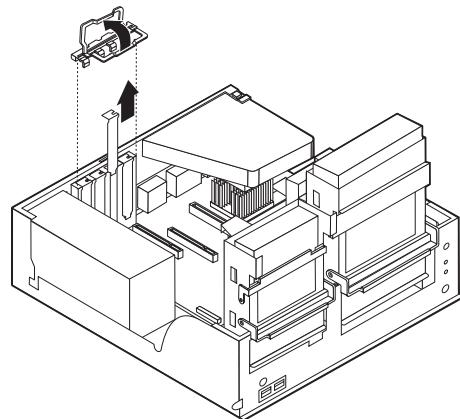
5. Remove the adapter being replaced.
6. Remove the new adapter from its static-protective package.
7. Install the new adapter into the appropriate slot on the system board.

8. Install the adapter-slot-cover latch.
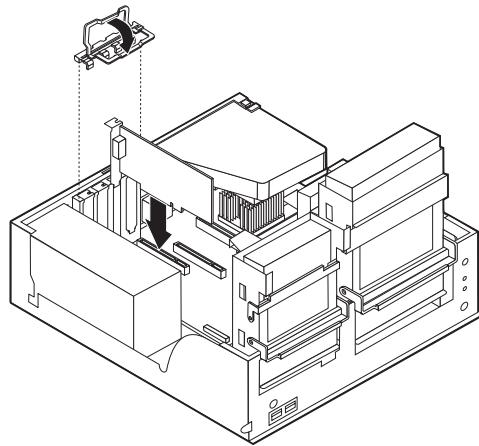
9. Clear any cables that might impede the replacement of the drive bays.
10. Replace the support bar and pivot the two drive bays back to their original positions.
11. Go to "Replacing the cover and connecting the cables" on page 64.

Replacing internal drives

This section provides information and instructions for replacing internal drives.

- Hard disk drives
- CD drives or DVD drives
- Removable media drives

Note: These different drives are also referred to as integrated drive electronics (IDE) drives.

Internal drives are installed in *bays*. In this book, the bays are referred to as bay 1, bay 2, and so on.

When you install an internal drive, it is important to note what type and size of drive that you can install in each bay. Also, it is important to correctly connect the internal drive cables to the installed drive.

Types 2296 and 8434

Drive bay information

The following illustration shows the locations of the drive bays.
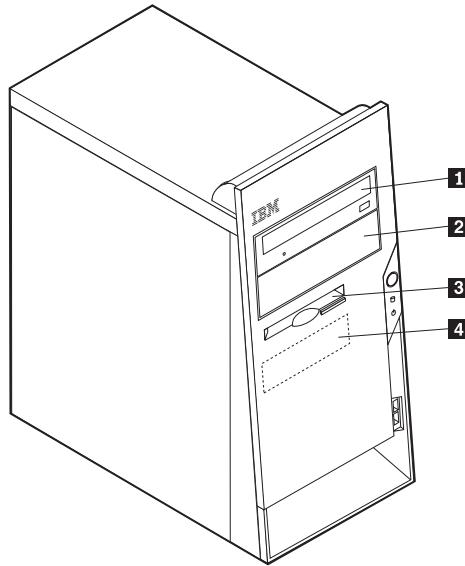
The following table describes the drive height limitation for each drive bay.

Bay **1** and bay **2** - Maximum height: 43.0 mm (1.7 in.)
Bay **3** and bay **4** - Maximum height: 25.8 mm (1.0 in.)

Removing a drive

1. Remove the cover. See "Removing the cover" on page 32.

2. If you are removing the hard disk drive or diskette drive, remove the front bezel by releasing the four plastic tabs inside the chassis and pressing down on the top of the bezel.
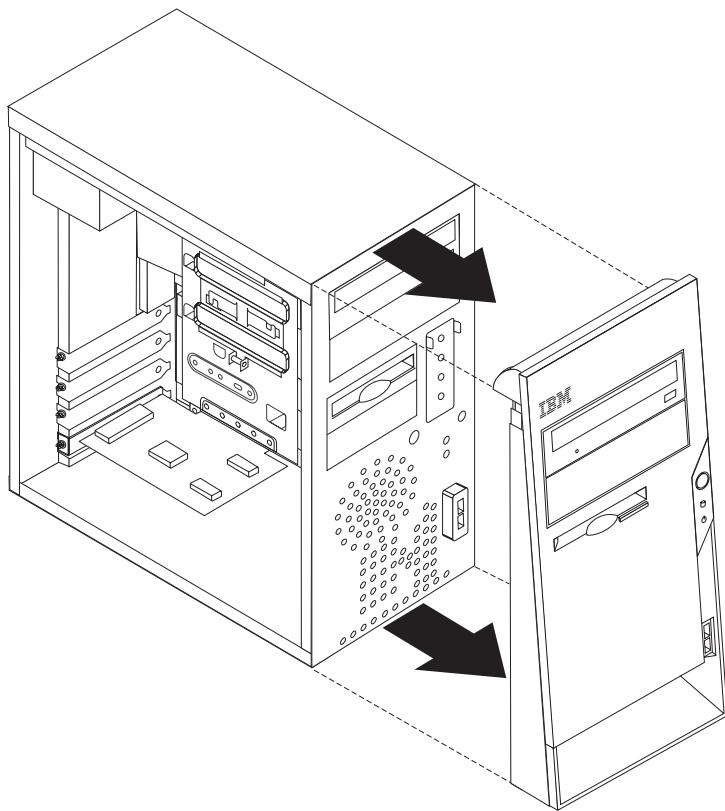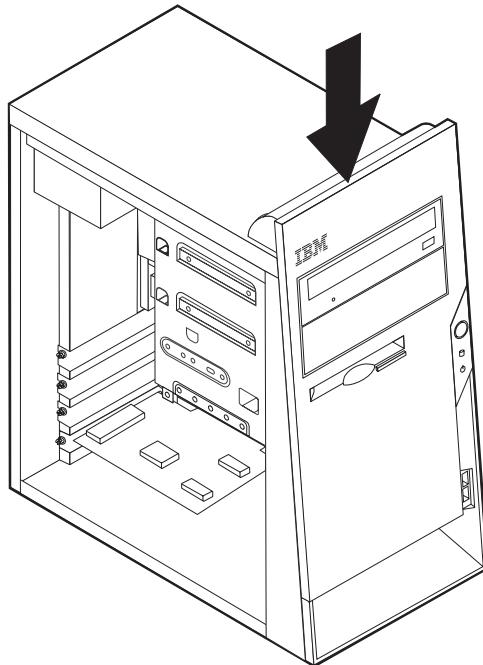
3. Disconnect the signal and power cables from the drive being removed.

Note: Take note of the location of any cables you disconnect. You might have to disconnect cables to other drives to gain access to the drive you are removing.

4. Remove the screws that secure the drive being removed.
5. Slide the drive out the front of the computer.
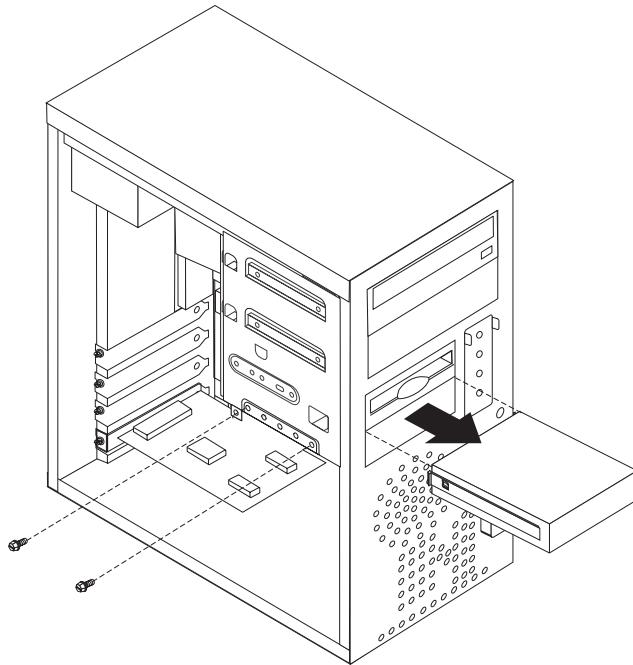
Note: This illustration shows the hard disk drive being removed. All drives are removed in the same manner. However, it is only necessary to remove the front bezel when removing the hard disk drive or diskette drive.

Installing a drive

1. Make sure the drive that you are installing is set correctly as either a master or a slave device. Jumper the new drive the same as the drive being replaced.

   Refer to the documentation that comes with your drive for master/slave jumper information.

2. Install the drive into the bay. Align the screw holes and install two screws to secure the drive.
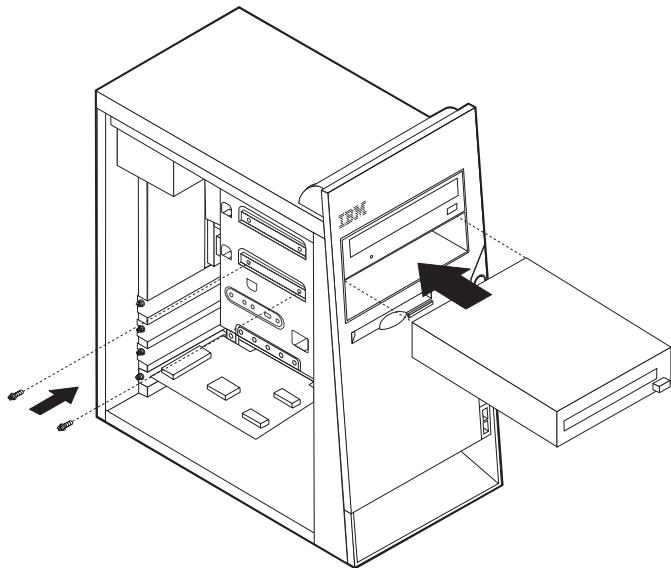
Note: This illustration shows a CD drive installation. The hard disk drive and diskette drive is installed in the same manner except that the front bezel is not in place.

3. If the front bezel was removed, replace it by aligning the four plastic tabs and pressing the bezel into position.

4. Go to "Connecting the drive" on page 56.

Type 8191

Drive bay information

Any bay that does not have a drive installed has a static shield and bay panel installed.

The following illustration shows the locations of the drive bays.
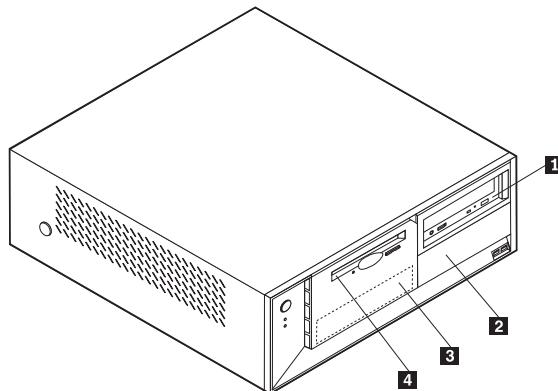
The following table describes the drive height limitation for each drive bay.

Bay **1** and Bay **2** - Maximum height: 43.0 mm (1.7 in.)
Bay **3** and Bay **4** - Maximum height: 25.8 mm (1.0 in.)

Removing a drive

1. Remove the cover. See "Removing the cover" on page 32.
2. Pivot the drive-bay latch handle toward the front of the computer and then pivot the appropriate drive-bay cage upward, as shown, until latched in the upright position.
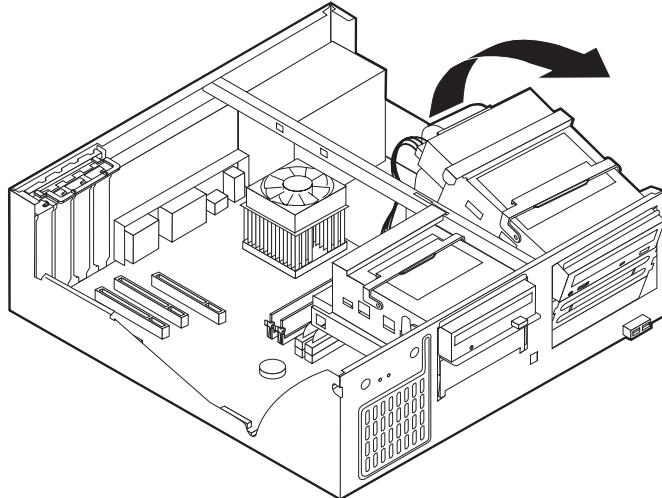
   Notes:
   a. Both drive-bay cages pivot in the same manner.
   b. You can lift the drive-bay cages out of the chassis to make it easier to remove and install the drives.
   c. Take note of the location of any cables you disconnect. You might have to disconnect cables to other drives to gain access to the drive you are removing.
3. Disconnect the signal cable and power supply cable from the drive being replaced.
4. Remove any screws that secure the drive. Not all drives have screws.
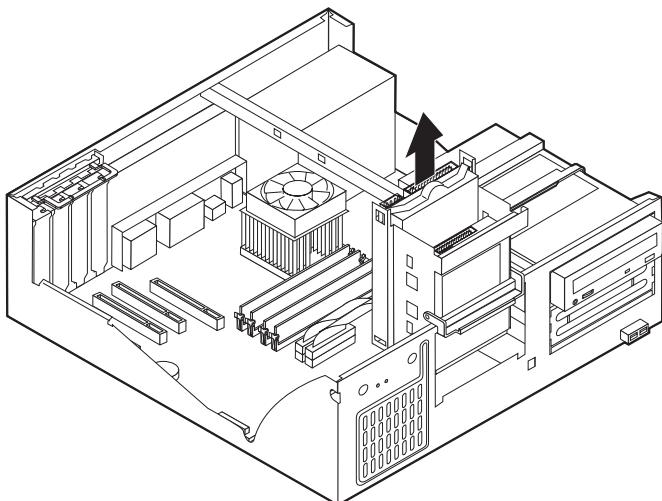
Installing a drive

1. Make sure the drive that you are installing is set correctly as either a master or a slave device. Jumper the new drive the same as the drive being replaced.

Refer to the documentation that comes with your drive for master/slave jumper information.

2. Install the drive into the bay as shown.
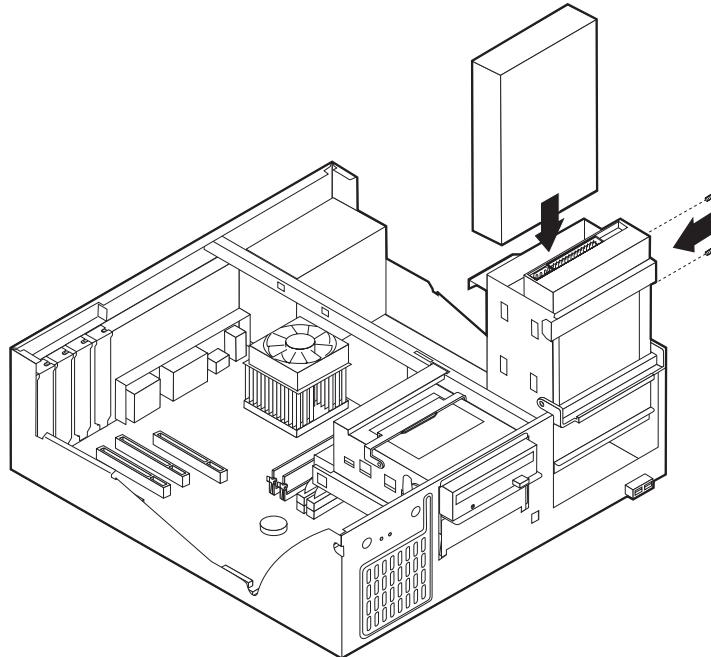
3. Secure the new drive (if necessary) with the screws that were removed.
4. If necessary, place the drive-bay cages back into the chassis.
5. Continue at "Connecting the drive" on page 56.

Types 8198 and 8199

Drive bay information

Any bay that does not have a drive installed has a static shield and bay panel installed.

The following illustration shows the locations of the drive bays.
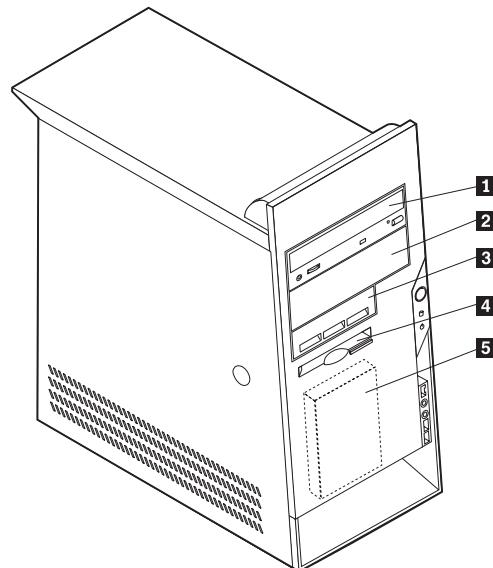
The following table describes the drive height limitation for each drive bay.

Bay **1** and Bay **2** - Maximum height: 43.0 mm (1.7 in.)
Bay **3** , Bay **4** , and Bay **5** - Maximum height: 25.8 mm (1.0 in.)

Removing the drive

1. Remove the cover. See "Removing the cover" on page 32.
2. If you are removing a drive from bay 1 or bay 2, skip the next step.
3. Remove the front bezel by pushing in on the blue plastic tab at the rear of the chassis.
4. Disconnect the signal and power cables from the drive being removed.

   Note: Take note of the location of any cables you disconnect. You might have to disconnect cables to other drives to gain access to the drive you are removing.

5. For all drives except the hard disk drive, push in on the metal tab that secures the drive being removed. The hard disk drive tray pivots out toward the front of the computer for removal of the hard disk drive. See the following illustrations.
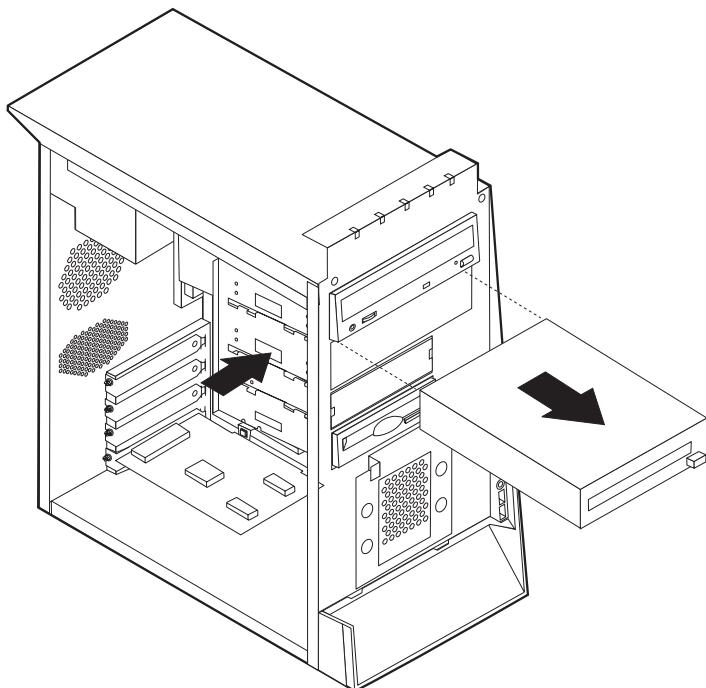
For the hard disk drive, see the illuastration below.
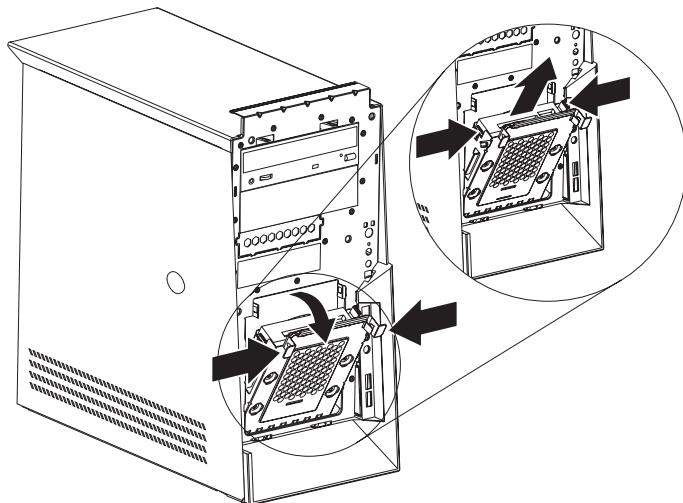
6. Slide the drive out the front of the computer.

Installing a drive

1. Make sure the drive that you are installing is set correctly as either a master or a slave device. Jumper the new drive the same as the drive being replaced.

   Refer to the documentation that comes with your drive for master/slave jumper information.

2. Slide the drive into the appropriate bay.

3. For bay 5 (hard disk drive), pivot the drive cage to the closed position.

4. If the front bezel was removed, replace it by aligning and pressing the bezel into position. Continue at "Connecting the drive" on page 56.

Type 8316

Drive bay information

Any bay that does not have a drive installed has a static shield and bay panel installed.

The following illustration shows the locations of the drive bays.
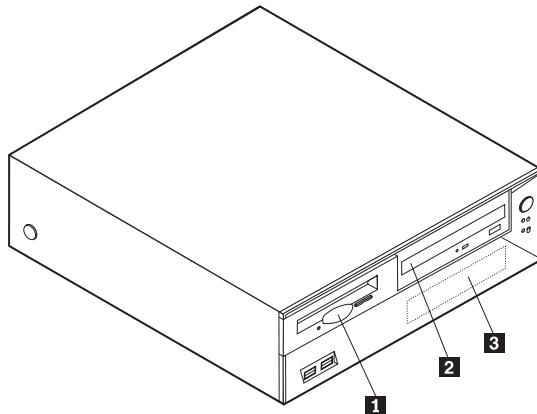
The following table describes the drive height limitation for each drive bay.

Bay **1** and Bay **3** - Maximum height: 25.8 mm (1.0 in.)
Bay **2** - Maximum height: 43.0 mm (1.7 in.)

Removing a drive

1. Remove the cover. See "Removing the cover" on page 32.
2. Pivot the drive-bay latch handle toward the front of the computer and then pivot the drive-bay cages upward, as shown, until latched in the upright position.
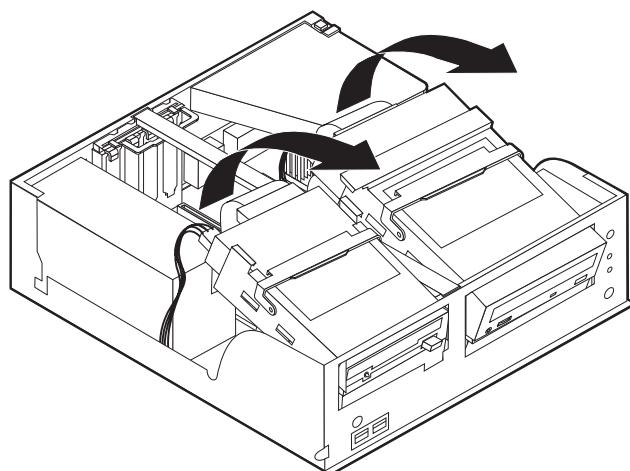
3. Disconnect the signal cable and power supply cable from the drive being replaced.

> **Note:** Take note of the location of any cables you disconnect. You might have
> to disconnect cables to other drives to gain access to the drive you are
> removing.

4. For the hard disk drive, you can lift the tray out of the computer.
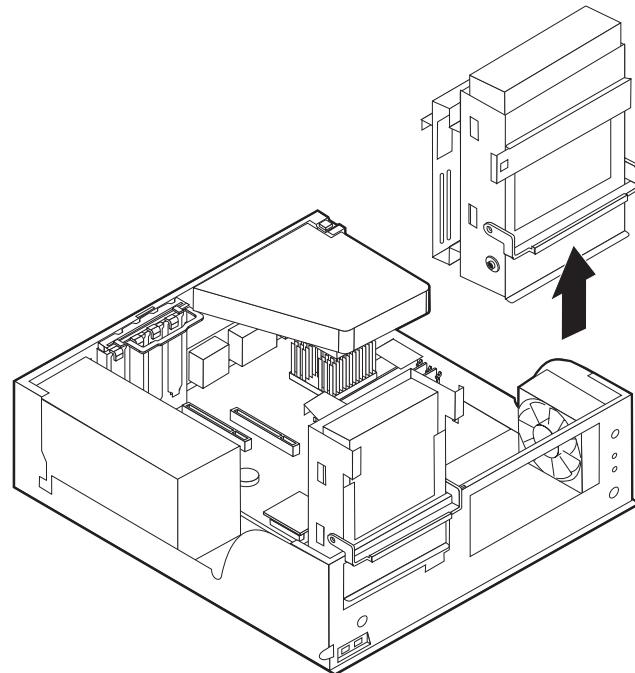
5. Remove any screws that secure the drive. Not all drives have screws.

Installing a drive

1. Make sure the drive that you are installing is set correctly as either a master or
   a slave device. Jumper the new drive the same as the drive being replaced.

   Refer to the documentation that comes with your drive for master/slave
   jumper information.

2. Install the drive into the bay and secure with any screws that were removed.
   This illustration shows the hard disk drive installation.
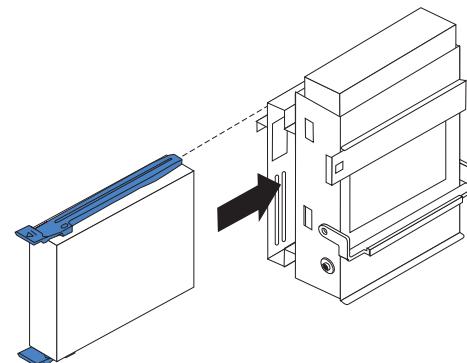
3. Pivot the drive-bay cage back into place.
4. Continue at "Connecting the drive" on page 56.

Connecting the drive

Internal drives require two cables; a power cable that connects to the power supply and a signal cable that connects to the system board.
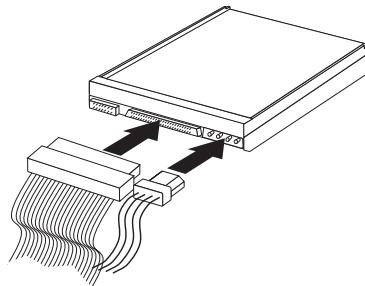
1. Locate the three-connector signal cable.
2. Connect the signal cable to the new drive.
3. Connect the power connector to the new drive.
4. Reconnect any other cables that were disconnected.
5. Pivot the drive bay cages (for desktop models) downward into the normal position.
6. Go to "Replacing the cover and connecting the cables" on page 64.

Replacing the battery (all machine types)

The computer has a special type of memory that maintains the date, time, and settings for built-in features, such as parallel-port assignments (configuration). A battery keeps this information active when you turn off the computer.

The battery normally requires no charging or maintenance throughout its life; however, no battery lasts forever. If the battery fails, the date, time, and configuration information (including passwords) are lost. An error message is displayed when you turn on the computer.

Refer to "Safety notices (multi-lingual translations)" on page 153 for information about replacing and disposing of the battery.

To change the battery:
1. Turn off the computer and all attached devices.
2. Remove the cover. See "Removing the cover" on page 32.
3. Locate the battery. See "Identifying parts on the system board (all machine types)" on page 40.
4. If necessary, remove any adapters that impede access to the battery. See "Replacing adapters" on page 41 for more information.
5. Remove the old battery.
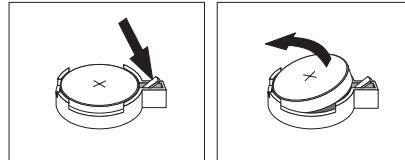
6. Install the new battery.
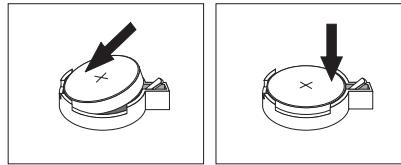
7. Replace any adapters that were removed to gain access to the battery. See "Replacing adapters" on page 41 for instructions for replacing adapters.

8. Replace the cover, and plug in the power cord. See "Replacing the cover and connecting the cables" on page 64.

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

9. Turn on the computer and all attached devices.

10. Use the IBM Setup Utility program to set the date and time and any passwords. See Chapter 5, "IBM Setup Utility program," on page 21.

Replacing the power supply

Types 2296 and 8434

Before performing any removals or replacements, turn off the computer and peripheral devices and disconnect all external cables and power cords.

To remove the power supply, do the following:

1. Turn off the computer and peripheral devices and disconnect all external cables and power cords; then, remove the cover. See "Removing the cover" on page 32.

2. Disconnect all power supply cables from the system board and the drives. See "Identifying parts on the system board (all machine types)" on page 40.

3. Remove the four screws that hold the power supply in place.

4. Lift the power supply out.

To replace the power supply, do the following:
1. Install the new power supply and insert the four screws that hold the power supply in place.
2. Reconnect all power supply cables to the system board and the drives. See "Identifying parts on the system board (all machine types)" on page 40.
3. Go to "Replacing the cover and connecting the cables" on page 64

Type 8191

Before performing any removals or replacements, turn off the computer and peripheral devices and disconnect all external cables and power cords.

To remove the power supply, do the following:
1. Turn off the computer and peripheral devices and disconnect all external cables and power cords; then, remove the cover. See "Removing the cover" on page 32.
2. Disconnect all power supply cables from the system board and the drives. See "Identifying parts on the system board (all machine types)" on page 40.
3. Remove the four screws that hold the power supply in place.

4. Lift the power supply out.

To replace the power supply, do the following:

1. Install the new power supply and insert the four screws that hold the power supply in place.
2. Reconnect all power supply cables to the system board and the drives. See "Identifying parts on the system board (all machine types)" on page 40.
3. Go to "Replacing the cover and connecting the cables" on page 64.

Types 8198 and 8199

Before performing any removals or replacements, turn off the computer and peripheral devices and disconnect all external cables and power cords.

To remove the power supply, do the following:

1. Turn off the computer and peripheral devices and disconnect all external cables and power cords; then, remove the cover. See "Removing the cover" on page 32.
2. Disconnect all power supply cables from the system board and the drives. See "Identifying parts on the system board (all machine types)" on page 40.
3. Remove the four screws that hold the power supply in place.

4. Lift the power supply out.

To replace the power supply, do the following:
1. Install the new power supply and insert the four screws that hold the power supply in place.
2. Reconnect all power supply cables to the system board and the drives. See "Identifying parts on the system board (all machine types)" on page 40.
3. Go to "Replacing the cover and connecting the cables" on page 64.

Type 8316

Before performing any removals or replacements, turn off the computer and peripheral devices and disconnect all external cables and power cords.

To remove the power supply, do the following:
1. Turn off the computer and peripheral devices and disconnect all external cables and power cords; then, remove the cover. See "Removing the cover" on page 32.
2. Disconnect all power supply cables from the system board and the drives. See "Identifying parts on the system board (all machine types)" on page 40.
3. Remove the two screws that hold the power supply in place.

4. Lift the power supply out.
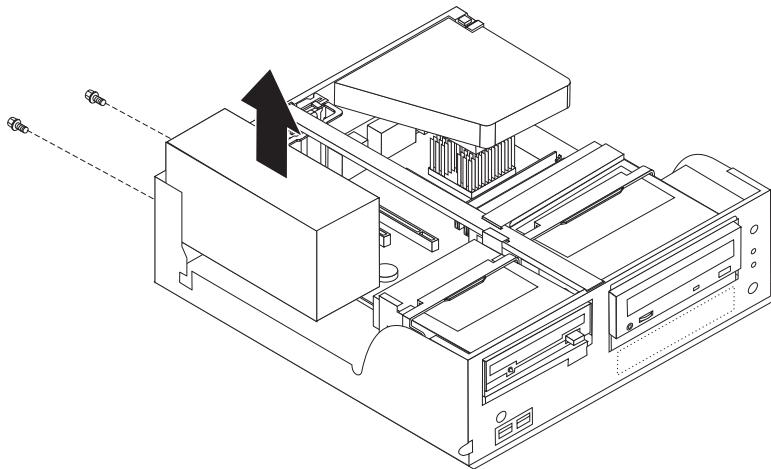
To replace the power supply, do the following:

1. Install the new power supply and insert the two screws that hold the power supply in place.
2. Reconnect all power supply cables to the system board and the drives. See "Identifying parts on the system board (all machine types)" on page 40.
3. Go to "Replacing the cover and connecting the cables" on page 64.

Replacing a microprocessor (all machine types)

To remove the microprocessor, do the following:

1. Turn off the computer and peripheral devices and disconnect all external cables and power cords; then, remove the cover. See "Removing the cover" on page 32.
2. Remove any air baffles or ducts that cover the microprocessor.
3. Disconnect the heat sink fan cable from the system board. Refer to "Identifying parts on the system board (all machine types)" on page 40.
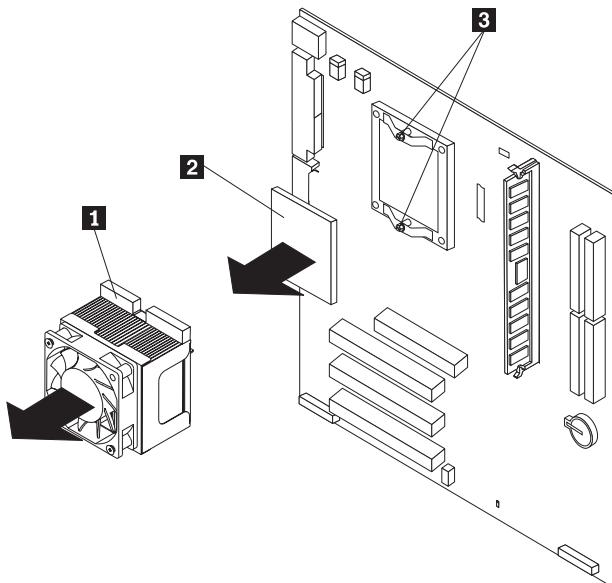
4. Loosen the two captured screws **3** holding the fan and heat sink in place, and pivot them to the side.
5. To remove the fan and heat sink **1** from the microprocessor **2** , gently twist the fan and heat sink to break the seal formed by the thermal grease and remove.

> **Note:** If the thermal grease seal cannot be broken, you may want to start up the system to heat the processor and loosen the thermal grease.

6. Place the heat sink on a clean work surface.
7. Take notice of the orientation of the beveled corner on the microprocessor. This is important when reinstalling the microprocessor on the system board.
8. Release the microprocessor from the system board by pulling outward and lifting the small handle on the microprocessor socket to its maximum vertical position. Carefully lift the microprocessor off the socket.

To replace the microprocessor, do the following:

1. Make sure that the microprocessor socket handle is fully in the vertical position. Otherwise the microprocessor pins might be damaged when installing the microprocessor.
2. Position the microprocessor so that the pins are aligned with the socket and with the beveled corner in the correct orientation.
3. Lower the handle until it is fully in the down position and locked into the socket. This secures the microprocessor in the socket.
4. Remove the cleaning pad from its package and use the cleaning pad to wipe the thermal grease from the bottom of the heat sink.

   Notes:

   a. The cleaning pad and thermal grease are separate FRUs and are not included with the system board or microprocessor FRUs. These must be ordered separately and shipped along with the FRUs being replaced.

   b. Be sure that all of the thermal grease is removed.

   > **Note:** 0.01ML is one tick mark on the syringe. If the grease is properly applied, approximately half (0.22ML) of the grease will remain in the syringe.

5. Use the thermal grease syringe to place 16 uniformly spaced dots of 0.01ML each on the top of the microprocessor.
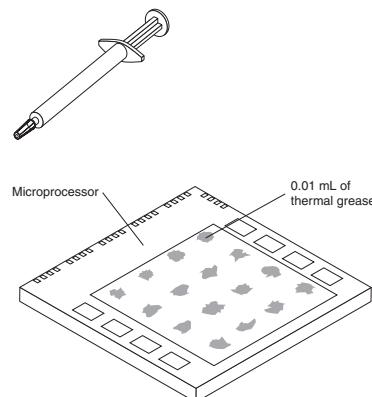
6. Place the fan and heat sink into position on the microprocessor.
7. When tightening the screws that clamp the heat sink, do not overtighten. Tighten the clamp screws evenly by tightening one side some and then the other until they are both snug.

8. Reconnect the fan to the system board connector.
9. Go to "Replacing the cover and connecting the cables" on page 64.

Replacing the system board

Note: The computer might look slightly different than the following illustrations

Types 2296, 8198, 8199, and 8434
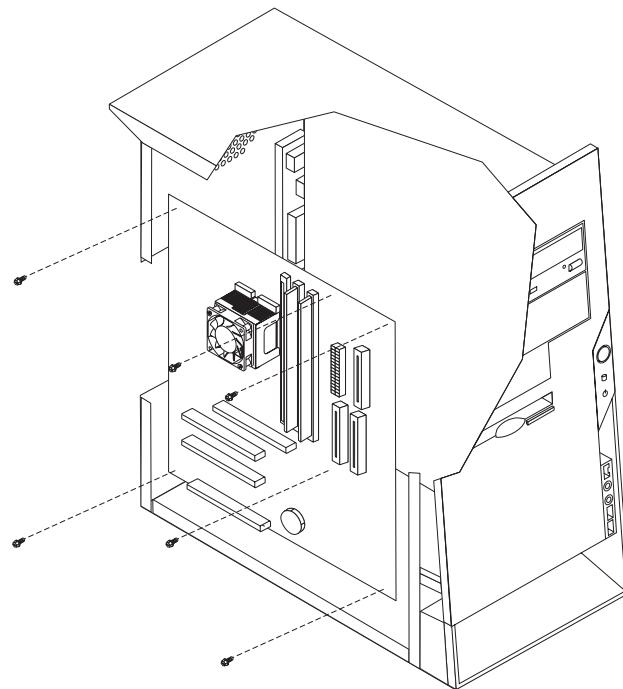
Type 8191
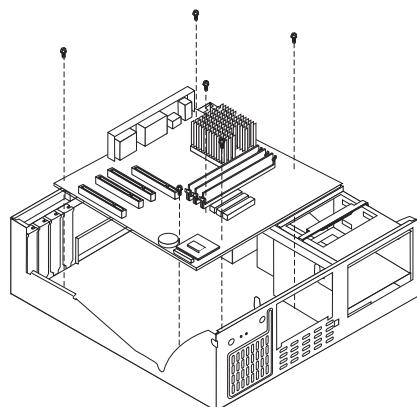
Type 8316
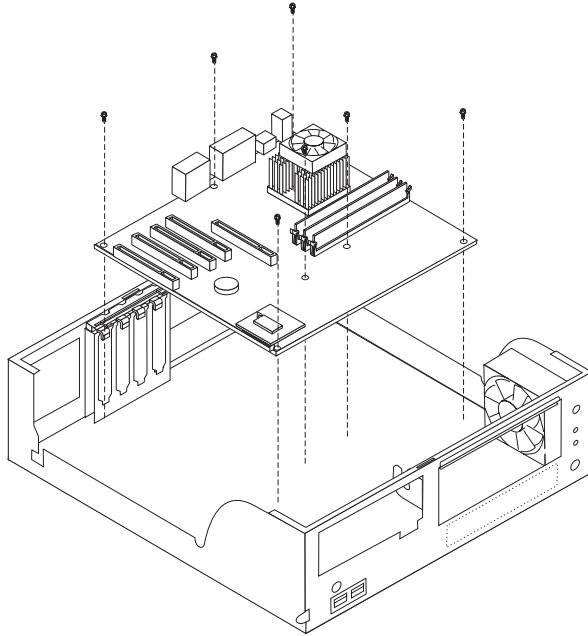
To remove the system board, do the following:

1. Turn off the computer and peripheral devices and disconnect all external cables and power cords; then, remove the cover. See "Removing the cover" on page 32.
2. Disconnect all cables connected to the system board.
3. Remove the screws that secure the system board to the chassis and lift out the system board.
4. Remove the DIMMs from the system board. Refer to "Replacing memory (all machine types)" on page 40.
5. Remove the microprocessor from the system board. Refer to "Replacing a microprocessor (all machine types)" on page 61.

To replace the system board, do the following:

1. Install the microprocessor on the new system board. Refer to "Replacing a microprocessor (all machine types)" on page 61.
2. Install the DIMMs on the new system board. Refer to "Replacing memory (all machine types)" on page 40.
3. Place the new the system board into the chassis and install the screws that secure the system board to the chassis.
4. Reconnect all cables that connect to the system board. Refer to "Identifying parts on the system board (all machine types)" on page 40.
5. Go to "Replacing the cover and connecting the cables."

Replacing the cover and connecting the cables

Types 2296 and 8434

After replacing FRUs, you need to install any removed parts, replace the cover, and reconnect any cables, including telephone lines and power cords. Also, depending on the FRU that is replaced, you might need to confirm the updated information in the IBM Setup Utility program.

To replace the cover and connect cables to the computer:

1. Ensure that all components have been reassembled correctly and that no tools or loose screws are left inside the computer.
2. Clear any cables that might impede the replacement of the cover.
3. Position the cover on the chassis so that the guides on the top and bottom of the cover engage the chassis and push the cover to the closed position. Insert the screws that secure the cover.
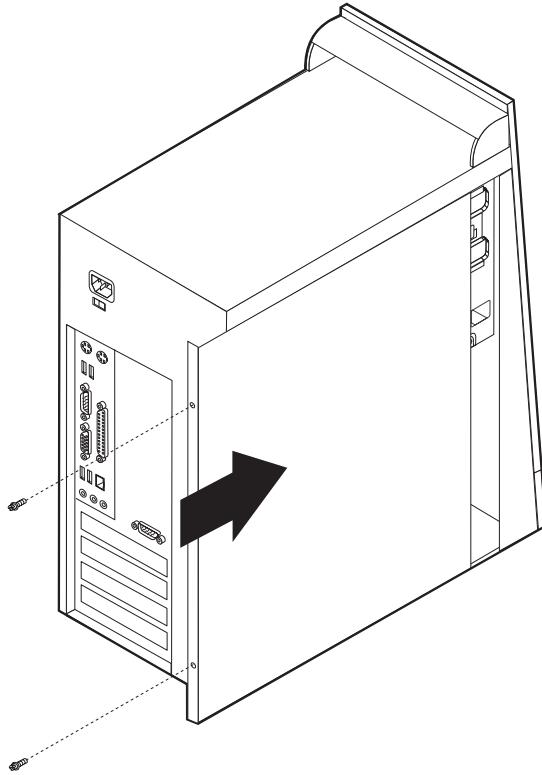
4. Reconnect the external cables and power cords to the computer.
5. To update the configuration, see Chapter 5, "IBM Setup Utility program," on page 21.

Note: When the power cord is first plugged in, the computer might appear to turn on for a few seconds and then turn off. This is a normal sequence to enable the computer to initialize.

Type 8191

After replacing FRUs, you need to install any removed parts, replace the cover, and reconnect any cables, including telephone lines and power cords. Also, depending on the FRU that is replaced, you might need to confirm the updated information in the IBM Setup Utility program.

To replace the cover and connect cables to the computer:

1. Ensure that all components have been reassembled correctly and that no tools or loose screws are left inside the computer.
2. Clear any cables that might impede the replacement of the cover.

3. Position the cover over the chassis and pivot it down over the computer until it snaps into place.

4. Reconnect the external cables and power cords to the computer.
5. To update the configuration, see Chapter 5, "IBM Setup Utility program," on page 21.

Types 8198 and 8199

After replacing FRUs, you need to install any removed parts, replace the cover, and reconnect any cables, including telephone lines and power cords. Also, depending on the FRU that is replaced, you might need to confirm the updated information in the IBM Setup Utility program.

To replace the cover and connect cables to the computer:

1. Ensure that all components have been reassembled correctly and that no tools or loose screws are left inside the computer.
2. Clear any cables that might impede the replacement of the cover.

3. Position the cover on the chassis so that the rail guides on the bottom of the cover engage the rails and push the cover closed until it latches.
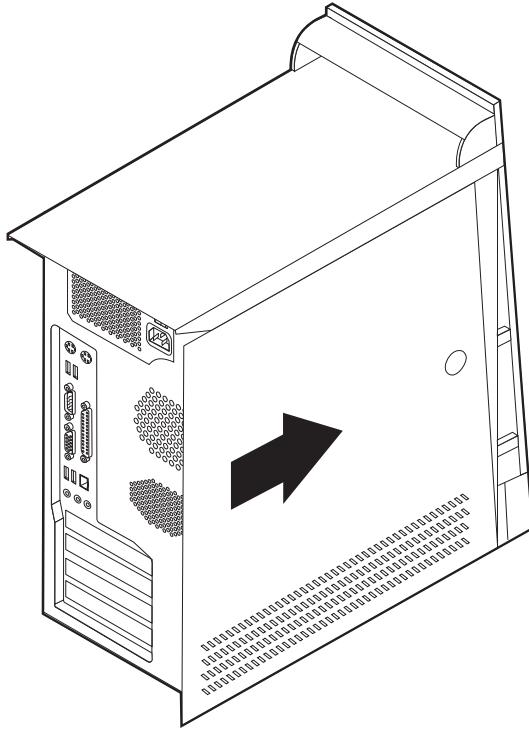
4. Reconnect the external cables and power cords to the computer.
5. To update the configuration, see Chapter 5, "IBM Setup Utility program," on page 21.

Note: When the power cord is first plugged in, the computer might appear to turn on for a few seconds and then turn off. This is a normal sequence to enable the computer to initialize.

Type 8316

After replacing FRUs, you need to install any removed parts, replace the cover, and reconnect cables, including telephone lines and power cords. Also, depending on the FRU that is replaced, you might need to confirm the updated information in the IBM Setup Utility program.

To replace the cover and connect cables to the computer:
1. Ensure that all components have been reassembled correctly and that no tools or loose screws are left inside the computer.
2. Clear any cables that might impede the replacement of the cover.

3. Position the cover over the chassis and pivot it down over the computer until it snaps into place.

4. Reconnect the external cables and power cords to the computer.
5. To update the configuration, see Chapter 5, "IBM Setup Utility program," on page 21.

Chapter 7. Symptom-to-FRU Index

The Symptom-to-FRU index lists error symptoms and possible causes. The most likely cause is listed first. Always begin with Chapter 3, "General Checkout," on page 11. This index can also be used to help you decide which FRUs to have available when servicing a computer. If you are unable to correct the problem using this index, go to "Undetermined problems" on page 108.

> **Notes**:
> - If you have both an error message and an incorrect audio response, diagnose the error message first.
> - If you cannot run the diagnostic tests or you get a diagnostic error code when running a test, but did receive a POST error message, diagnose the POST error message first.
> - If you did not receive any error message, look for a description of your error symptoms in the first part of this index.
> - Check the hard disk drive jumper settings before you replace a hard disk drive.

Hard disk drive boot error

A hard disk drive boot error (error codes 1962 and I999030X) can have the following causes.

Error	FRU/Action
The start-up drive is not in the boot sequence in configuration.	Check the configuration and ensure the start-up drive is in the boot sequence.
No operating system installed on the boot drive.	Install an operating system on the boot drive.
The boot sector on the start-up drive is corrupted.	The drive must be formatted, do the following: 1. Attempt to access and recover (back-up) the failing hard disk drive. 2. Using the operating systems programs, format the hard disk drive.
The drive is defective.	Replace the hard disk drive.

Power Supply Errors

If the power-on indicator is not on, the power supply fan is not running, or the computer will not power-off, use the following procedures.

Check/Verify	FRU/Action
Check the following for proper installation. • Power Cord • On/Off Switch connector • On/Off Switch Power Supply connector • System Board Power Supply connectors • Microprocessor(s) connection	Reseat connectors
Check the power cord for continuity.	Power Cord

Check/Verify	FRU/Action
Check the power-on switch for continuity.	Power-on Switch

Diagnostic error codes

Refer to the following diagnostic error codes when using the diagnostic tests. See Chapter 4, "IBM Enhanced Diagnostics," on page 15 for information about the Diagnostic programs.

In the following index, *X* can represent any number.

Diagnostic Error Code	FRU/Action
000-000-XXX BIOS Test Passed	1. **No action**
000-002-XXX BIOS Timeout	1. **Flash the system** 2. System board
000-024-XXX BIOS Addressing test failure	1. **Flash the system** 2. System board
000-025-XXX BIOS Checksum Value error	1. **Flash the system** 2. Boot block 3. System board
000-026-XXX FLASH data error	1. **Flash the system** 2. Boot block 3. System board
000-027-XXX BIOS Configuration/Setup error	1. **Run Setup** 2. Flash the system 3. Boot block 4. System board
000-034-XXX BIOS Buffer Allocation failure	1. **Reboot the system** 2. Flash the system 3. Run memory test 4. System board
000-035-XXX BIOS Reset Condition detected	1. **Flash the system** 2. System board
000-036-XXX BIOS Register error	1. **Flash the system** 2. Boot block 3. System board
000-038-XXX BIOS Extension failure	1. **Flash the system** 2. Adapter card 3. System board
000-039-XXX BIOS DMI data error	1. **Flash the system** 2. System board
000-195-XXX BIOS Test aborted by user	1. **Information** 2. Re-start the test, if necessary

Diagnostic Error Code	FRU/Action
000-196-XXX BIOS test halt, error threshold exceeded	1. **Press F3 to review the log file** 2. Re-start the test to reset the log file
000-197-XXX BIOS test warning	1. **Make sure the component that is called out is connected and/or enabled** 2. Re-run test 3. Component that is called out in warning statement 4. Component under test
000-198-XXX BIOS test aborted	1. **If a component is called out, make sure it is connected and/or enabled** 2. Flash the system and re-test 3. Go to "Undetermined problems" on page 108.
000-199-XXX BIOS test failed, cause unknown	1. **Go to "Undetermined problems" on page 108.** 2. Flash the system and re-test 3. Replace component under function test
000-250-XXX BIOS APM failure	1. **Flash the system** 2. System board
000-270-XXX BIOS ACPI failure	1. **Flash the system** 2. System board
001-000-XXX System Test Passed	1. **No action**
001-00X-XXX System Error	1. **System board**
001-01X-XXX System Error	1. **System board**
001-024-XXX System Addressing test failure	1. **System board**
001-025-XXX System Checksum Value error	1. **Flash the system** 2. System board
001-026-XXX System FLASH data error	1. **Flash the system** 2. System board
001-027-XXX System Configuration/Setup error	1. **Run Setup** 2. Flash the system 3. System board
001-032-XXX System Device Controller failure	1. **System board**
001-034-XXX System Device Buffer Allocation failure	1. **Reboot the system** 2. Flash the system 3. Run memory test 4. System board
001-035-XXX System Device Reset condition detected	1. **System board**

Diagnostic Error Code	FRU/Action
001-036-XXX System Register error	1. **System board**
001-038-XXX System Extension failure	1. **Adapter card** 2. System board
001-039-XXX System DMI data structure error	1. **Flash the system** 2. System board
001-040-XXX System IRQ failure	1. **Power-off/on system and re-test** 2. System board
001-041-XXX System DMA failure	1. **Power-off/on system and re-test** 2. System board
001-195-XXX System Test aborted by user	1. **Information** 2. Re-start the test, if necessary
001-196-XXX System test halt, error threshold exceeded	1. **Press F3 to review the log file** 2. Re-start the test to reset the log file
001-197-XXX System test warning	1. **Make sure the component that is called out is connected and/or enabled** 2. Re-run test 3. Component that is called out in warning statement 4. Component under test
001-198-XXX System test aborted	1. **If a component is called out, make sure it is connected and/or enabled** 2. Flash the system and re-test 3. Go to "Undetermined problems" on page 108
001-199-XXX System test failed, cause unknown	1. Go to "Undetermined problems" on page 108 2. Flash the system and re-test 3. Replace component under function test
001-250-XXX System ECC error	1. **System board**
001-254-XXX **001-255-XXX** **001-256-XXX** **001-257-XXX** System DMA error	1. **System board**
001-260-XXX **001-264-XXX** System IRQ error	1. **System board**
001-268-XXX System IRQ1 failure	1. **Device on IRQ1** 2. System board
001-269-XXX System IRQ2 failure	1. **Device on IRQ2** 2. System board

Diagnostic Error Code	FRU/Action
001-270-XXX System IRQ3 failure	1. **Device on IRQ3** 2. System board
001-271-XXX System IRQ4 failure	1. **Device on IRQ4** 2. System board
001-272-XXX System IRQ5 failure	1. **Device on IRQ5** 2. System board
001-273-XXX System IRQ6 (diskette drive) failure	1. **Diskette Cable** 2. Diskette drive 3. System board
001-274-XXX System IRQ7 failure	1. **Device on IRQ7** 2. System board
001-275-XXX System IRQ8 failure	1. **Device on IRQ8** 2. System board
001-276-XXX System IRQ9 failure	1. **Device on IRQ9** 2. System board
001-277-XXX System IRQ10 failure	1. **Device on IRQ10** 2. System board
001-278-XXX System IRQ11 failure	1. **Device on IRQ11** 2. System board
001-279-XXX System IRQ12 failure	1. **Device on IRQ12** 2. System board
001-280-XXX System IRQ13 failure	1. **Device on IRQ13** 2. System board
001-281-XXX System IRQ14 (hard disk drive) failure	1. **Hard disk drive cable** 2. Hard disk drive 3. System board
001-282-XXX System IRQ15 failure	1. **Device on IRQ15** 2. System board
001-286-XXX **001-287-XXX** **001-288-XXX** System Timer failure	1. **System board**
001-292-XXX System CMOS RAM error	1. **Run Setup and re-test** 2. System board
001-293-XXX System CMOS Battery	1. **Battery** 2. System board
001-298-XXX System RTC date/time update failure	1. **Flash the system** 2. System board
001-299-XXX System RTC periodic interrupt failure	1. **System board**

Diagnostic Error Code	FRU/Action
001-300-XXX System RTC Alarm failure	1. **System board**
001-301-XXX System RTC Century byte error	1. **Flash the system** 2. System board
005-000-XXX Video Test Passed	1. **No action**
005-00X-XXX Video error	1. **Video card, if installed** 2. System board
005-010-XXX **005-011-XXX** **005-012-XXX** **005-013-XXX** Video Signal failure	1. **Video card, if installed** 2. System board
005-016-XXX Video Simple Pattern test failure	1. **Video Ram** 2. Video card, if installed 3. System board
005-024-XXX Video Addressing test failure	1. **Video card, if installed** 2. System board
005-025-XXX Video Checksum Value error	1. **Video card, if installed** 2. System board
005-027-XXX Video Configuration/Setup error	1. **Run Setup** 2. Video drivers update 3. Video card, if installed 4. System board
005-031-XXX Video Device Cable failure	1. **Video cable** 2. Monitor 3. Video card, if installed 4. System board
005-032-XXX Video Device Controller failure	1. **Video card, if installed** 2. System board
005-036-XXX Video Register error	1. **Video card, if installed** 2. System board
005-038-XXX System BIOS extension failure	1. **Video card, if installed** 2. System board
005-040-XXX Video IRQ failure	1. **Video card, if installed** 2. System board
005-195-XXX Video Test aborted by user	1. **Information** 2. Re-start the test, if necessary
005-196-XXX Video test halt, error threshold exceeded	1. **Press F3 to review the log file** 2. Re-start the test to reset the log file

Diagnostic Error Code	FRU/Action
005-197-XXX Video test warning	1. **Make sure the component that is called out is connected and/or enabled** 2. Re-run test 3. Component that is called out in warning statement 4. Component under test
005-198-XXX Video test aborted	1. **If a component is called out, make sure it is connected and/or enabled** 2. Flash the system and re-test 3. Go to "Undetermined problems" on page 108
005-199-XXX Video test failed, cause unknown	1. Go to "Undetermined problems" on page 108 2. Flash the system and re-test 3. Replace component under function test
005-2XX-XXX **005-3XX-XXX** Video subsystem error	1. **Video card, if installed** 2. System board
006-000-XXX Diskette interface Test Passed	1. **No action**
006-0XX-XXX Diskette interface error	1. **Diskette drive Cable** 2. Diskette drive 3. System board
006-195-XXX Diskette interface Test aborted by user	1. **Information** 2. Re-start the test, if necessary
006-196-XXX Diskette interface test halt, error threshold exceeded	1. **Press F3 to review the log file** 2. Re-start the test to reset the log file
006-197-XXX Diskette interface test warning	1. **If a component is called out, make sure it is connected and/or enabled** 2. Re-run test 3. Component that is called out in warning statement 4. Component under test
006-198-XXX Diskette interface test aborted	1. **If a component is called out, make sure it is connected and/or enabled** 2. Flash the system and re-test 3. Go to "Undetermined problems" on page 108
006-199-XXX Diskette interface test failed, cause unknown	1. Go to "Undetermined problems" on page 108 2. Flash the system and re-test 3. Replace component under function test
006-25X-XXX Diskette interface Error	1. **Diskette drive cable** 2. Diskette drive 3. System board

Diagnostic Error Code	FRU/Action
011-000-XXX Serial port Interface Test Passed	1. **No action**
011-001-XXX Serial port Presence	1. **Remove external serial device, if present** 2. Run setup, enable port 3. System board
011-002-XXX **011-003-XXX** Serial port Timeout/Parity error	1. **System board**
011-013-XXX **011-014-XXX** Serial port Control Signal/Loopback test failure	1. **System board**
011-015-XXX Serial port External Loopback failure	1. **Wrap plug** 2. System board
011-027-XXX Serial port Configuration/Setup error	1. **Run Setup, enable port** 2. Flash the system 3. System board
011-03X-XXX **011-04X-XXX** Serial port failure	1. **System board**
011-195-XXX Serial port Test aborted by user	1. **Information** 2. Re-start the test, if necessary
011-196-XXX Serial port test halt, error threshold exceeded	1. **Press F3 to review the log file** 2. Re-start the test to reset the log file
011-197-XXX Serial port test warning	1. **Make sure the component that is called out is connected and/or enabled** 2. Re-run test 3. Component that is called out in warning statement 4. Component under test
011-198-XXX Serial port test aborted	1. **If a component is called out, make sure it is connected and/or enabled** 2. Flash the system and re-test 3. Go to "Undetermined problems" on page 108
011-199-XXX Serial port test failed, cause unknown	1. Go to "Undetermined problems" on page 108 2. Flash the system and re-test 3. Replace component under function test
011-2XX-XXX Serial port signal failure	1. **External serial device** 2. System board
014-000-XXX Parallel port Interface Test Passed	1. **No action**

Diagnostic Error Code	FRU/Action
014-001-XXX Parallel port Presence	1. **Remove external parallel device, if present** 2. Run setup, enable port 3. System board
014-002-XXX **014-003-XXX** Parallel port Timeout/Parity error	1. **System board**
014-013-XXX **014-014-XXX** Parallel port Control Signal/Loopback test failure	1. **System board**
014-015-XXX Parallel port External Loopback failure	1. **Wrap plug** 2. System board
014-027-XXX Parallel port Configuration/Setup error	1. **Run Setup, enable port** 2. Flash the system 3. System board
014-03X-XXX **014-04X-XXX** Parallel port failure	1. **System board**
014-195-XXX Parallel port Test aborted by user	1. **Information** 2. Re-start the test, if necessary
014-196-XXX Parallel port test halt, error threshold exceeded	1. **Press F3 to review the log file** 2. Re-start the test to reset the log file
014-197-XXX Parallel port test warning	1. **Make sure the component that is called out is connected and/or enabled** 2. Re-run test 3. Component that is called out in warning statement 4. Component under test
014-198-XXX Parallel port test aborted	1. **If a component is called out, make sure it is connected and/or enabled** 2. Flash the system and re-test 3. Go to "Undetermined problems" on page 108
014-199-XXX Parallel port test failed, cause unknown	1. **Go to "Undetermined problems" on page 108** 2. Flash the system and re-test 3. Replace component under function test
014-2XX-XXX **014-3XX-XXX** Parallel port failure	1. **External parallel device** 2. System board
015-000-XXX USB port Interface Test Passed	1. **No action**
015-001-XXX USB port Presence	1. **Remove USB device(s) and re-test** 2. System board

Diagnostic Error Code	FRU/Action
015-002-XXX USB port Timeout	1. **Remove USB device(s) and re-test** 2. System board
015-015-XXX USB port External Loopback failure	1. **Remove USB device(s) and re-test** 2. System board
015-027-XXX USB port Configuration/Setup error	1. **Flash the system** 2. System board
015-032-XXX USB port Device Controller failure	1. **System board**
015-034-XXX USB port buffer allocation failure	1. **Reboot the system** 2. Flash the system 3. Run memory test 4. System board
015-035-XXX USB port Reset condition detected	1. **Remove USB device(s) and re-test** 2. System board
015-036-XXX USB port Register error	1. **System board**
015-040-XXX USB port IRQ failure	1. **Run setup and check for conflicts** 2. Flash the system 3. System board
015-195-XXX USB port Test aborted by user	1. **Information** 2. Re-start the test, if necessary
015-196-XXX USB port test halt, error threshold exceeded	1. **Press F3 to review the log file** 2. Re-start the test to reset the log file
015-197-XXX USB port test warning	1. **Make sure the component that is called out is connected and/or enabled** 2. Re-run test 3. Component that is called out in warning statement 4. Component under test
015-198-XXX USB port test aborted	1. **If a component is called out, make sure it is connected and/or enabled** 2. Flash the system and re-test 3. Go to "Undetermined problems" on page 108
015-199-XXX USB port test failed, cause unknown	1. Go to "Undetermined problems" on page 108 2. Flash the system and re-test 3. Replace component under function test
018-000-XXX PCI Card Test Passed	1. **No action**
018-0XX-XXX PCI Card Failure	1. **Riser card, if installed** 2. System board

Diagnostic Error Code	FRU/Action
018-195-XXX PCI Card Test aborted by user	1. **PCI card** 2. Information 3. Re-start the test, if necessary
018-196-XXX PCI Card test halt, error threshold exceeded	1. **Press F3 to review the log file** 2. Re-start the test to reset the log file
018-197-XXX PCI Card test warning	1. **Make sure the component that is called out is connected and/or enabled** 2. Re-run test 3. Component that is called out in warning statement 4. Component under test
018-198-XXX PCI Card test aborted	1. **Make sure the component that is called out is connected and/or enabled** 2. Flash the system and re-test 3. Go to "Undetermined problems" on page 108
018-199-XXX PCI Card test failed, cause unknown	1. Go to "Undetermined problems" on page 108 2. Flash the system and re-test 3. Replace component under function test
018-250-XXX PCI Card Services error	1. **PCI card** 2. Riser card, if installed 3. System board
020-000-XXX PCI Interface Test Passed	1. **No action**
020-0XX-XXX PCI Interface error	1. **PCI card** 2. Riser card, if installed 3. System board
020-195-XXX PCI Test aborted by user	1. **Information** 2. Re-start the test, if necessary
020-196-XXX PCI test halt, error threshold exceeded	1. **Press F3 to review the log file** 2. Re-start the test to reset the log file
020-197-XXX PCI test warning	1. **Make sure the component that is called out is connected and/or enabled** 2. Re-run test 3. Component that is called out in warning statement 4. Component under test
020-198-XXX PCI test aborted	1. **If a component is called out, make sure it is connected and/or enabled** 2. Flash the system and re-test 3. Go to "Undetermined problems" on page 108

Diagnostic Error Code	FRU/Action
020-199-XXX PCI test failed, cause unknown	1. Go to "Undetermined problems" on page 108 2. Flash the system and re-test 3. Replace component under function test
020-262-XXX PCI system error	1. **PCI card** 2. Riser card, if installed 3. System board
025-000-XXX IDE interface Test Passed	1. **No action**
025-00X-XXX **025-01X-XXX** IDE interface failure	1. **IDE signal cable** 2. Check power supply 3. IDE device 4. System board
025-027-XXX IDE interface Configuration/Setup error	1. **IDE signal cable** 2. Flash the system 3. IDE device 4. System board
025-02X-XXX **025-03X-XXX** **025-04X-XXX** IDE Interface failure	1. **IDE signal cable** 2. Check power supply 3. IDE device 4. System board
025-195-XXX IDE interface Test aborted by user	1. **Information** 2. Re-start the test, if necessary
025-196-XXX IDE interface test halt, error threshold exceeded	1. **Press F3 to review the log file** 2. Re-start the test to reset the log file
025-197-XXX IDE interface test warning	1. **Make sure the component that is called out is connected and/or enabled** 2. Re-run test 3. Component that is called out in warning statement 4. Component under test
025-198-XXX IDE interface test aborted	1. **If a component is called out, make sure it is connected and/or enabled** 2. Flash the system and re-test 3. Go to "Undetermined problems" on page 108
025-199-XXX IDE interface test failed, cause unknown	1. Go to "Undetermined problems" on page 108 2. Flash the system and re-test 3. Replace component under function test
030-000-XXX SCSI interface Test Passed	1. **No action**

Diagnostic Error Code	FRU/Action
030-00X-XXX **030-01X-XXX** SCSI interface failure	1. **SCSI signal cable** 2. Check power supply 3. SCSI device 4. SCSI adapter card, if installed 5. System board
030-027-XXX SCSI interface Configuration/Setup error	1. **SCSI signal cable** 2. Flash the system 3. SCSI device 4. SCSI adapter card, if installed 5. System board
030-03X-XXX **030-04X-XXX** SCSI interface error	1. **SCSI signal cable** 2. Check power supply 3. SCSI device 4. SCSI adapter card, if installed 5. installed System board
030-195-XXX SCSI interface Test aborted by user	1. **Information** 2. Re-start the test, if necessary
030-196-XXX SCSI interface test halt, error threshold exceeded	1. **Press F3 to review the log file** 2. Re-start the test to reset the log file
030-197-XXX SCSI interface test warning	1. **Make sure the component that is called out is connected and/or enabled** 2. Re-run test 3. Component that is called out in warning statement 4. Component under test
030-198-XXX SCSI interface test aborted	1. **If a component is called out, make sure it is connected and/or enabled** 2. Flash the system and re-test 3. Go to "Undetermined problems" on page 108
030-199-XXX SCSI interface test failed, cause unknown	1. Go to "Undetermined problems" on page 108 2. Flash the system and re-test 3. Replace component under function test
035-000-XXX RAID interface Test Passed	1. **No action**
035-0XX-XXX RAID interface Failure	1. **RAID signal cable** 2. RAID device 3. RAID adapter card, if installed 4. System board
035-195-XXX RAID interface Test aborted by user	1. **Information** 2. Re-start the test, if necessary

Diagnostic Error Code	FRU/Action
035-196-XXX RAID interface test halt, error threshold exceeded	1. **Press F3 to review the log file** 2. Re-start the test to reset the log file
035-197-XXX RAID interface test warning	1. **Make sure the component that is called out is connected and/or enabled** 2. Re-run test 3. Component that is called out in warning statement 4. Component under test
035-198-XXX RAID interface test aborted	1. **If a component is called out, make sure it is connected and/or enabled** 2. Flash the system and re-test 3. Go to "Undetermined problems" on page 108
035-199-XXX RAID interface test failed, cause unknown	1. **Go to "Undetermined problems" on page 108** 2. Flash the system and re-test 3. Replace component under function test
071-000-XXX Audio port Interface Test Passed	1. **No action**
071-00X-XXX **071-01X-XXX** **071-02X-XXX** Audio port error	1. **Run Setup** 2. Flash the system 3. System board
071-03X-XXX Audio port failure	1. **Speakers** 2. Microphone 3. Audio card, if installed 4. System board
071-04X-XXX Audio port failure	1. **Run Setup** 2. Audio card, if installed 3. System board
071-195-XXX Audio port Test aborted by user	1. **Information** 2. Re-start the test, if necessary
071-196-XXX Audio port test halt, error threshold exceeded	1. **Press F3 to review the log file** 2. Re-start the test to reset the log file
071-197-XXX Audio port test warning	1. **Make sure the component that is called out is connected and/or enabled** 2. Re-run test 3. Component that is called out in warning statement 4. Component under test
071-198-XXX Audio port test aborted	1. **If a component is called out, make sure it is connected and/or enabled** 2. Flash the system and re-test 3. Go to "Undetermined problems" on page 108

Diagnostic Error Code	FRU/Action
071-199-XXX Audio port test failed, cause unknown	1. Go to "Undetermined problems" on page 108 2. Flash the system and re-test 3. Replace component under function test
071-25X-XXX Audio port failure	1. **Speakers** 2. Audio card, if installed 3. System board
080-000-XXX Game Port interface Test Passed	1. **No action**
080-XXX-XXX Game Port interface Error	1. **Remove the game port device and re-test the system**
080-195-XXX Game Port interface Test aborted by user	1. **Information** 2. Re-start the test, if necessary
080-196-XXX Game Port interface test halt, error threshold exceeded	1. **Press F3 to review the log file** 2. Re-start the test to reset the log file
080-197-XXX Game Port interface test warning	1. **Make sure the component that is called out is connected and/or enabled** 2. Re-run test 3. Component that is called out in warning statement 4. Component under test
080-198-XXX Game Port interface test aborted	1. **If a component is called out, make sure it is connected and/or enabled** 2. Flash the system and re-test 3. Go to "Undetermined problems" on page 108
080-199-XXX Game Port interface test failed, cause unknown	1. Go to "Undetermined problems" on page 108 2. Flash the system and re-test 3. Replace component under function test
086-000-XXX Mouse Port interface Test Passed	1. **No action**
086-001-XXX Mouse Port interface Presence	1. **Mouse** 2. System board
086-032-XXX Mouse Port interface Device controller failure	1. **Mouse** 2. System board
086-035-XXX Mouse Port interface Reset	1. **Mouse** 2. System board
086-040-XXX Mouse Port interface IRQ failure	1. **Run Setup** 2. Mouse 3. System board
086-195-XXX Mouse Port interface Test aborted by user	1. **Information** 2. Re-start the test, if necessary

Diagnostic Error Code	FRU/Action
086-196-XXX Mouse Port interface test halt, error threshold exceeded	1. **Press F3 to review the log file** 2. Re-start the test to reset the log file
086-197-XXX Mouse Port interface test warning	1. Make sure the component that is called out is connected and/or enabled 2. Re-run test 3. Component that is called out in warning statement 4. Component under test
086-198-XXX Mouse Port interface test aborted	1. If a component is called out, make sure it is connected and/or enabled 2. Flash the system and re-test 3. Go to "Undetermined problems" on page 108
086-199-XXX Mouse Port interface test failed, cause unknown	1. Go to "Undetermined problems" on page 108 2. Flash the system and re-test 3. Replace component under function test
089-000-XXX Microprocessor Test Passed	1. **No action**
089-XXX-XXX Microprocessor failure	1. **Microprocessor(s)** 2. System board
089-195-XXX Microprocessor Test aborted by user	1. **Information** 2. Re-start the test, if necessary
089-196-XXX Microprocessor test halt, error threshold exceeded	1. **Press F3 to review the log file** 2. Re-start the test to reset the log file
089-197-XXX Microprocessor test warning	1. **Make sure the component that is called out is connected and/or enabled** 2. Re-run test 3. Component that is called out in warning statement 4. Component under test
089-198-XXX Microprocessor test aborted	1. **Flash the system and re-test** 2. Go to "Undetermined problems" on page 108
089-199-XXX Microprocessor test failed, cause unknown	1. **If a component is called out, make sure it is connected and/or enabled** 2. Go to "Undetermined problems" on page 108. 3. Flash the system and re-test 4. Replace component under function test
170-000-XXX Voltage Sensor(s) Test Passed	1. **No action**
170-0XX-XXX Voltage Sensor(s) failure	1. **Flash system** 2. System board

Diagnostic Error Code	FRU/Action
170-195-XXX Voltage Sensor(s) Test aborted by user	1. **Information** 2. Re-start the test, if necessary
170-196-XXX Voltage Sensor(s) test halt, error threshold exceeded	1. **Press F3 to review the log file** 2. Re-start the test to reset the log file
170-197-XXX Voltage Sensor(s) test warning	1. **Make sure the component that is called out is connected and/or enabled** 2. Re-run test 3. Component that is called out in warning statement 4. Component under test
170-198-XXX Voltage Sensor(s) test aborted	1. **If a component is called out, make sure it is connected and/or enabled** 2. Flash the system and re-test 3. Go to "Undetermined problems" on page 108
170-199-XXX Voltage Sensor(s) test failed, cause unknown	1. **Go to "Undetermined problems" on page 108** 2. Flash the system and re-test 3. Replace component under function test
170-250-XXX **170-251-XXX** Voltage Sensor(s) Voltage limit error	1. **Power supply** 2. System board
170-254-XXX Voltage Sensor(s) Voltage Regulator Module error	1. **Voltage Regulator Module (VRM)** 2. Microprocessor 3. System board
175-000-XXX Thermal Sensor(s) Test Passed	1. **No action**
175-0XX-XXX Thermal Sensor(s) failure	1. **Flash system** 2. System board
175-195-XXX Thermal Sensor(s) Test aborted by user	1. **Information** 2. Re-start the test, if necessary
175-196-XXX Thermal Sensor(s) test halt, error threshold exceeded	1. **Press F3 to review the log file** 2. Re-start the test to reset the log file
175-197-XXX Thermal Sensor(s) test warning	1. **Make sure the component that is called out is connected and/or enabled** 2. Re-run test 3. Component that is called out in warning statement 4. Component under test
175-198-XXX Thermal Sensor(s) test aborted	1. **If a component is called out, make sure it is connected and/or enabled** 2. Flash the system and re-test 3. Go to "Undetermined problems" on page 108

Diagnostic Error Code	FRU/Action
175-199-XXX Thermal Sensor(s) test failed, cause unknown	1. Go to "Undetermined problems" on page 108 2. Flash the system and re-test 3. Replace component under function test
175-250-XXX **175-251-XXX** Thermal Sensor(s) limit error	1. **Check fans** 2. Check Power supply 3. Microprocessor 4. System board
185-000-XXX Asset Security Test Passed	1. **No action**
185-XXX-XXX Asset Security failure	1. **Flash system** 2. System board
185-278-XXX Asset Security Chassis Intrusion	1. **Assure Asset Security Enabled** 2. C2 Cover Switch 3. System board
201-000-XXX System Memory Test Passed	1. **No action**
201-XXX-XXX System Memory error	1. **Replace the memory module called out by the test** 2. System board
202-000-XXX System Cache Test Passed	1. **No action**
202-XXX-XXX System Cache error	1. **Cache, if removable** 2. System board 3. Microprocessor
206-000-XXX Diskette Drive Test Passed	1. **No action**
206-XXX-XXX Diskette Drive error	1. **Diskette Drive Cable** 2. Check power supply voltages 3. Diskette drive 4. System board
215-000-XXX CD-ROM Drive Test Passed	1. **No action**
215-XXX-XXX CD-ROM Drive error	1. **CD-ROM Drive Cable** 2. Check power supply voltages 3. CD-ROM drive 4. System board
217-000-XXX Hard Disk Drive Test Passed	1. **No action**
217-25X-XXX **217-26X-XXX** Hard Disk Drive (IDE) error	1. **Hard Disk Drive Cable** 2. Check power supply voltages 3. Hard Disk drive (IDE) 4. System board

Diagnostic Error Code	FRU/Action
217-28X-XXX **217-29X-XXX** Hard Disk Drive (SCSI) error	1. **Hard Disk Drive Cable** 2. Check power supply voltages 3. Hard Disk drive (SCSI) 4. SCSI adapter card 5. System board
220-000-XXX Hi-Capacity Cartridge Drive Test Passed	1. **No action**
220-XXX-XXX Hi-Capacity Cartridge Drive error	1. **Remove the Hi-Capacity Cartridge Drive and re-test the system**
301-XXX-XXX Keyboard error	1. **Keyboard** 2. Check and test mouse 3. System board
301-000-XXX Keyboard Test Passed	1. **No action**
302-000-XXX Mouse Test Passed	1. **No action**
302-XXX-XXX Mouse error	1. **Mouse** 2. Check and test Keyboard 3. System board
303-000-XXX Joystick Test Passed	1. **No action**
303-XXX-XXX Joystick error	1. **Remove the Joystick and re-test the system**
305-000-XXX Monitor DDC Test Passed	1. **No action**
305-250-XXX Monitor DDC self test failure	1. **Run Setup to enable DDC** 2. Cable 3. Monitor 4. Video card 5. System board
415-000-XXX Modem Test Passed	1. **No action**
415-XXX-XXX Modem error	1. **Remove the Modem and re-test the system**

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-X	• One beep • A pause (or break) • Two beeps • A pause (or break) • Any number of breaks
4	Four continuous beeps

Use the following table to diagnose beep symptoms.

Beep Symptom	FRU/Action
1-1-3 CMOS read-write error	1. **Run Setup** 2. System Board
1-2-2-3 ROM BIOS check error	1. **System Board**
1-2-1 Programmable Interval Timer failed	1. **System Board**
1-2-2 DMA Initialization failed	1. **System Board**
1-2-3 DMA page register write/read failed	1. **System Board**
1-2-4 RAM refresh verification failed	1. **DIMM** 2. System Board
1-3-3-1 1st 64K RAM test failed	1. DIMM 2. System Board
1-3-2 1st 64K RAM parity test failed	1. **DIMM** 2. Processor 3. System Board
2-2-3-1 Interrupt vector loading test failed	1. **System Board**
2-1-1 Secondary DMA register failed	1. **System Board**
2-1-2 Primary DMA register failed	1. **System Board**
2-1-3 Primary interrupt mask register failed	1. **System Board**
2-1-4 Secondary interrupt mask register failed	1. **System Board**
2-2-1 Interrupt vector loading failed	1. **System Board**
1-3-1-3 Keyboard controller failed	1. **System Board** 2. Keyboard
2-2-3 CMOS power failure and checksum checks failed	1. **Battery** 2. System Board

Beep Symptom	FRU/Action
2-2-4 CMOS configuration info validation failed	1. **Battery** 2. System Board
2-3-1 Screen initialization failed	1. **Jumper on J28** 2. System Board
2-3-2 Screen memory failed	1. **System Board**
2-3-3 Screen retrace failed	1. **System Board**
1-2 Search for video ROM failed	1. **System Board**
All other beep code sequences	1. **System Board**
Continuous beep	1. **System Board**
Repeating short beeps	1. **Keyboard stuck key** 2. Keyboard Cable 3. System Board

No-beep symptoms

Symptom/Error	FRU/Action
No beep during POST but computer works correctly.	1. **System Board**
No beep during POST.	1. **See "Undetermined problems" on page 108.** 2. System Board 3. Memory Module 4. Any Adapter or Device 5. Riser Card 6. Power Cord 7. Power Supply

POST error codes

Each time you power-on the system, it performs a series of tests that check the operation of the system and some options. This series of tests is called the *Power-On Self-Test*, or *POST*. POST does the following operations.

- Checks some basic system-board operations
- Checks the memory operation
- Starts the video operation
- Verifies that the diskette drive is working
- Verifies that the hard disk drive is working

If the POST finishes without detecting any problems, a single beep sounds and the first screen of the operating system or application program appears.

Note:
Some computers default to come up quiet (no beep and no memory count and checkpoint code display) when no errors are detected by POST.
To enable beep and memory count and checkpoint code display when a successful POST occurs, do the following:
1. Select **Start Options** in the IBM Setup Utility program (see Chapter 5, "IBM Setup Utility program," on page 21).
2. Set **Power-On Self-Test** to **Enhanced**.

If the POST detects a problem, an error message appears on the screen. A single problem can cause several error messages to appear. When you correct the cause of the first error message, the other error messages probably will not appear on the screen the next time you turn on the system.

In the following index, *X* can represent any number.

POST Error Code	FRU/Action
000 SCSI Adapter not enabled	1. **Verify adapter device and Bus Master fields are enabled in the IBM Setup Utility program. See documentation shipped with computer.**
02X	1. **SCSI Adapter**
08X Check SCSI terminator installation.	1. **SCSI Cable** 2. SCSI Terminator 3. SCSI Device 4. SCSI Adapter
101 System board interrupt failure	1. **System Board**
102 System board timer error	1. **System Board**
106	1. **System Board**
110 System board memory parity error	1. **Memory Module** 2. System Board

POST Error Code	FRU/Action
111 I/O channel parity error	1. **Reseat adapters** 2. Any adapter 3. Riser card 4. System Board
114 Adapter ROM error	1. **Adapter Memory** 2. System Board 3. Riser card
129 Internal cache test error	1. **Processor** 2. L2 Cache Memory 3. System Board
135 Fan failure	1. **Fan** 2. System board
151 System board failure	1. **System Board**
161 Bad CMOS battery	1. **Run Setup** 2. CMOS Backup Battery. Go to "Replacing the battery (all machine types)" on page 56 3. System Board
162 Configuration mismatch	1. **Run Setup and verify Configuration** 2. Had a device been added, removed, changed location? If not, suspect that device. 3. Power-on external devices first, then power-on computer 4. CMOS Backup Battery. Go to "Replacing the battery (all machine types)" on page 56 5. System Board
163 Date and Time Incorrect	1. **Time and Date Set** 2. CMOS Backup Battery. Go to "Replacing the battery (all machine types)" on page 56 3. System Board
164 Memory Size Error	1. **Run Setup. Check System Summary menu for memory size change. (See Chapter 5, "IBM Setup Utility program," on page 21.)** 2. Run the Extended Memory Diagnostic tests
166 Boot Block Check Sum Error	1. **Run Flash Recovery using Boot Block. See "Recovering from a POST/BIOS update failure" on page 112.** 2. System Board

POST Error Code	FRU/Action
167 No Processor BIOS Update Found	1. **Run Setup. Check Stepping level for the BIOS level needed, then perform the flash update.** 2. Processor
168 Alert on LAN error	1. **Run Setup. Check to see that Ethernet and Alert on LAN are enabled.** 2. System Board
17X, 18X	1. **C2 Security**
175 Primary Copy of Secure Data is damaged	1. **Run Setup. See Chapter 5, "IBM Setup Utility program," on page 21.** 2. System Board
176 The System has been tampered with	1. **Covers were removed from the computer**
177 Corrupted Administrator Password	1. **System Board**
178	1. **System Board**
179 Boot Integrity Services Segment Error	1. **System Board**
183	1. **Enter the administrator password**
184 Asset Control Antenna not detected	1. **Make sure Asset Care and Asset ID are enabled in the IBM Setup Utility program.** 2. RFID Antenna 3. System Board
185 Corrupted boot sequence	1. **Set configuration and reinstall the boot sequence**
186 Security Hardware Control Logic Error	1. **System Board**
187	1. **Clear Administration password** 2. System Board
189	1. **More than three password attempts were made to access the computer**
190 System Security: Invalid Remote Change Requested	1. **System Board**
191 System Security: IBM Embedded Security Hardware Reset	1. **System Board**
193 System Security: IBM Embedded Security Hardware Removed	1. **System Board**
194 System Security: Asset ID Antenna has been Removed	1. **System Board**
195 System Security: Asset ID Antenna has been Installed	1. **System Board**
196 System Tampered Cleared	1. **System Board**
1XX Not listed above	1. **System Board**

POST Error Code	FRU/Action
201, 20X Memory data error	1. **Run Enhanced Diagnostics Memory Test** 2. Memory Module 3. System Board
225	1. **Unsupported Memory**
229 External cache test error	1. **L2 Cache Memory** 2. System Board
262 POST detected a base memory or extended memory type error	1. **Run Setup. Check System Summary menu for memory. (See Chapter 5, "IBM Setup Utility program," on page 21.)** 2. Run the Extended Memory Diagnostic tests.
301 Keyboard Error	1. **Keyboard** 2. Keyboard Cable 3. System Board
303 With an 8603 error	1. **Mouse** 2. Keyboard 3. Keyboard Cable 4. System Board
303 With no 8603 error	1. **Keyboard** 2. Keyboard Cable 3. System Board
3XX Not listed above	1. **Keyboard** 2. Keyboard Cable 3. System Board
5XX	1. **Video Adapter (if installed)** 2. System Board
601	1. **Diskette Drive A** 2. Diskette Drive Cable 3. System Board 4. Riser card
602	1. **Bad Diskette?** 2. Verify Diskette and retry
604 And able to run diagnostics	1. **Run Setup and verify diskette configuration settings** 2. Diskette Drive A/B 3. Diskette Drive Cable 4. System Board 5. Riser card
605 POST cannot unlock the diskette drive	1. **Diskette Drive** 2. Diskette Drive Cable 3. System Board 4. Riser card

POST Error Code	FRU/Action
662 Configuration Change has occurred	1. **Diskette drive configuration error or wrong diskette drive type; run Setup.**
6XX Not listed above	1. **Diskette Drive** 2. System Board 3. Riser card 4. External Drive Adapter 5. Diskette Drive Cable 6. Power Supply
762 Math coprocessor configuration error	1. **Run Setup**. 2. Processor 3. System Board
7XX Not listed above	1. **Processor** 2. System Board
962 Parallel port configuration error	1. **Run Setup.** 2. Parallel Adapter (if installed) 3. System Board
9XX	1. **Printer** 2. System Board
1047	1. **16-Bit AT™ Fast SCSI Adapter**
107X Check SCSI terminator installation	1. **Check SCSI terminator installation** 2. SCSI Cable 3. SCSI Terminator 4. SCSI Device 5. SCSI Adapter
1101 Serial connector error, possible system board failure	1. **Run Enhanced Diagnostics**
1101, 1102, 1106, 1108, 1109	1. **System Board** 2. Any Serial Device
1107	1. **Communications Cable** 2. System Board
1102 Card selected feedback error	1. **Run Enhanced Diagnostics**
1103 Port fails register check	1. **Run Enhanced Diagnostics** 2. System Board
1106 Serial option cannot be turned off	1. **Run Enhanced Diagnostics** 2. System Board
1107	1. **Serial Device Cable** 2. System Board
1110 Register test failed	1. **Run Enhanced Diagnostics** 2. System Board

POST Error Code	FRU/Action
1116 Interrupt error	1. **Run Enhanced Diagnostics**
1117 Failed baud rate test	1. **Run Enhanced Diagnostics**
1162 Serial port configuration error	1. **Run Setup.** 2. Serial Adapter (if installed) 3. System Board
11XX Not listed above	1. **System Board**
1201	1. **System Board** 2. Any Serial Device
1202, 1206, 1208, 1209, 12XX	1. **Dual Async Adapter/A** 2. System Board 3. Any Serial Device
1207	1. **Communications Cable** 2. Dual Async Adapter/A
13XX	1. **Game Adapter**
1402 Printer not ready	Information only
1403 No paper error, or interrupt failure	Information only
1404 System board timeout failure	1. **Run Enhanced Diagnostics**
1405 Parallel adapter error	1. **Run Enhanced Diagnostics**
1406 Presence test error	1. **Run Enhanced Diagnostics**
14XX Not listed above. Check printer before replacing system board	1. **Printer** 2. System Board
15XX	1. **SDLC Adapter**
1692 Boot sequence error	1. **Run FDISK to ensure at least one active partition is set active**
16XX	1. **36/38 Workstation Adapter**
1762 Hard disk drive configuration error	1. **Run Setup. (See Chapter 5, "IBM Setup Utility program," on page 21.)**
1780 (Disk Drive 0) **1781** (Disk Drive 1) **1782** (Disk Drive 2) **1783** (Disk Drive 3)	1. **Hard Disk Drive** 2. System Board 3. Riser card 4. Hard Disk Cable 5. Power Supply

POST Error Code	FRU/Action
1800 PCI/PnP Error! No Hardware Interrupt Available	1. **Run Setup and verify PCI/ISA configuration settings.** 2. Rerun diagnostics. 3. PCI Adapter
1801 PCI/PnP Error! No Space Available to Shadow ROM	1. **Run Setup and verify PCI/ISA configuration settings.** 2. Rerun diagnostics. 3. PCI Adapter
1802 PCI/PnP Error! Not Enough I/O Space Available	1. **Run Setup and verify PCI/ISA configuration settings.** 2. Rerun diagnostics. 3. PCI Adapter
1803 PCI/PnP Error! Not Enough Memory Space Available	1. **Run Setup and verify PCI/ISA configuration settings.** 2. Rerun diagnostics. 3. PCI Adapter
1804 PCI/PnP Error! Not Enough Real Memory Space Available	1. **Run Setup and verify PCI/ISA configuration settings.** 2. Rerun diagnostics. 3. PCI Adapter
1805 PCI/PnP Error! Adapter ROM Checksum Error	1. **Run Setup and verify PCI/ISA configuration settings.** 2. Rerun diagnostics. 3. PCI Adapter
180X, 188X PCI configuration or resource error	1. **Run Setup and verify PCI/ISA configuration settings.** 2. Rerun diagnostics. 3. PCI Adapter
1962 No operating system found	1. **Press F1 to repeat boot sequence.**
209X	1. **Diskette Drive** 2. Diskette Cable
20XX Not listed above	1. **BSC Adapter**
21XX	1. **SCSI Device** 2. 16-bit AT Fast SCSU adapter 3. Alternate BSC adapter
2401, 2402 If screen colors change	1. **Display**
2401, 2402 If screen colors are OK	1. **System Board** 2. Display
2409	1. **Display**
2410	1. **System Board** 2. Display

POST Error Code	FRU/Action
2462 Video memory configuration error	1. **Check cable connections** 2. Run Setup and verify video configuration settings 3. Video Memory Modules 4. Video Adapter (if installed) 5. System Board
4611, 4630	1. **Multiport/2 Interface Board** 2. Multiport/2 Adapter
4612, 4613, 4640, 4641	1. **Memory Module Package** 2. Multiport/2 Adapter
4650	1. **Multiport/2 Interface Cable**
46XX Not listed above	1. **Multiport/2 Adapter** 2. Multiport/2 Interface Board 3. Memory Module
5600	1. **Financial System Controller Adapter**
5962 An IDE device (other than hard drive) configuration error	1. **Run Setup.** 2. CD-ROM Drive 3. CD-ROM Adapter 4. Zip or other ATAPI device 5. System Board 6. Riser card
62XX	1. **1st Store Loop Adapter** 2. Adapter Cable
63XX	1. **2nd Store Loop Adapter** 2. Adapter Cable
64XX	1. **Network Adapter**
71XX	1. **Voice Adapter**
74XX	1. **Video Adapter (if installed)**
76XX	1. **Page Printer Adapter**
78XX	1. **High Speed Adapter**
79XX	1. **3117 Adapter**
80XX	1. **PCMCIA Adapter**
84XX	1. **Speech Adapter** 2. Speech Control Assembly.
8601, 8602	1. **Pointing Device (Mouse)** 2. System Board
8603, 8604 Pointing Device Error	1. **System Board** 2. Pointing Device (Mouse)

POST Error Code	FRU/Action
86XX Not listed above	1. **Mouse** 2. System Board
89XX	1. **PC Music Adapter** 2. MIDI Adapter Unit
91XX	1. **Optical Drive** 2. Adapter
96XX	1. **SCSI Adapter** 2. Any SCSI Device 3. System Board 4. Riser card
10101, 10102, 10104, 10105, 10106, 10107, 10108, 10109, 10111, 10112, 10113, 10114, 10115, 10116	1. **Have customer verify correct operating system device drivers are installed and operational.** 2. Modem
10103, 10110, 101171	1. **System Board** 2. Data/Fax Modem 3. Riser card
10117	1. **Check system speaker** 2. Check PSTN cable 3. External DAA (if installed) 4. Modem
10118	1. **Run Diagnostics and verify the correct operation of the modem slot** 2. Modem
10119	1. **Diagnostics detected a non-IBM modem** 2. Modem
10120	1. **Check PSTN Cable** 2. External DAA (if installed) 3. Modem
10132, 10133, 10134, 10135, 10136, 10137, 10138, 10139, 10140, 10141, 10142, 10143, 10144, 10145, 10146, 10147, 10148, 10149, 10150, 10151, 10152	1. **Modem**
10153	1. **Data/Fax Modem** 2. System Board 3. Riser card

POST Error Code	FRU/Action
101XX Not listed above	1. **Modem Adapter/A** 2. Data/Fax Modem 3. System Board 4. Riser card
10450, 10451, 10490, 10491, 10492, 10499 Read/write error	1. **Run Enhanced Diagnostics** 2. Hard Disk Drive 3. System Board 4. Riser card
10452 Seek test error	1. **Run Enhanced Diagnostics**
10453 Wrong drive type?	Information only
10454 Sector buffer test error	1. **Run Enhanced Diagnostics**
10455, 10456 Controller error	1. **Run Enhanced Diagnostics**
10459 Drive diagnostic command error	Information only
10461 Drive format error	1. **Run Enhanced Diagnostics**
10462 Controller seek error	1. **Run Enhanced Diagnostics**
10464 Hard Drive read error	1. **Run Enhanced Diagnostics**
10467 Drive non-fatal seek error	1. **Run Enhanced Diagnostics**
10468 Drive fatal seek error	1. **Run Enhanced Diagnostics**
10469 Drive soft error count exceeded	1. **Run Enhanced Diagnostics**
10470, 10471, 10472 Controller wrap error	1. **Run Enhanced Diagnostics**
10473 Corrupt data. Low level format might be required	Information only
10480	1. **Hard Disk Drive (ESDI)** 2. Drive Cable 3. System Board
10481 ESDI drive D seek error	1. **Run Enhanced Diagnostics**
10482 Drive select acknowledgement bad	1. **Run Enhanced Diagnostics**
106X1	1. **Check Configuration** 2. Ethernet Adapter

POST Error Code	FRU/Action
10635	1. **Power-off computer, wait ten seconds then power-on the computer** 2. Ethernet Adapter
10651, 10660	1. **Check Cables** 2. Ethernet Adapter
106XX Not listed above	1. **Ethernet Adapter**
107XX	1. **5.25-inch External Diskette Drive** 2. 5.25-inch Diskette Drive Adapter/A
109XX Check the adapter cables	1. **ActionMedia Adapter/A** 2. System Board 3. Riser card
112XX This adapter does not have cache	1. **SCSI Adapter** 2. Any SCSI Device 3. System Board 4. Riser card
119XX	1. **3119 Adapter**
121XX	1. **Modem Adapter** 2. Any Serial Device 3. System Board 4. Riser card
136XX	1. **ISDN Primary Rate Adapter** 2. System Board 3. Riser card
137XX	1. **System Board**
141XX	1. **Realtime Interface Coprocessor Portmaster Adapter/A**
143XX	1. **Japanese Display Adapter** 2. System Board 3. Riser card
14710, 14711	1. **System Board Video Adapter** 2. Adapter Video Memory
148XX	1. **Video Adapter**
14901, 14902, 1491X, 14922	1. **Video Adapter (if installed)** 2. System Board 3. Riser card 4. Display (any type)

POST Error Code	FRU/Action
14932	1. **External Display** 2. Video Adapter
161XX	1. **FaxConcentrator Adapter**
164XX	1. **120 MB Internal Tape Drive** 2. Diskette Cable 3. System Board 4. Riser card
16500	1. **6157 Tape Attachment** 2. Adapter
16520, 16540	1. **6157 Streaming Tape Drive** 2. 6157 Tape Attachment Adapter
166XX, 167XX	1. **Token Ring Adapter** 2. System Board 3. Riser card
18001 to 18029	1. **Wizard Adapter** 2. Wizard Adapter Memory
18031 to 18039	1. **Wizard Adapter Cable**
185XXXX	1. **DBCS Japanese Display Adapter/A** 2. System Board 3. Riser card
20001 to 20003	1. **Image Adapter/A** **Image-I Adapter/A** 2. Memory Module DRAM, VRAM
20004	1. **Memory Module DRAM, VRAM** 2. Image Adapter/A Image-I Adapter/A
20005 to 20010	1. **Image Adapter/A** **Image-I Adapter/A** 2. Memory Module DRAM, VRAM
200XX Not listed above	1. **Image Adapter/A** 2. Image-I Adapter/A 3. Memory Module DRAM, VRAM 4. System Board 5. Riser card
20101 to 20103	1. **Printer/Scanner Option** 2. Image Adapter/A 3. Memory Module DRAM, VRAM
20104	1. **Memory Module DRAM, VRAM** 2. Printer/Scanner Option 3. Image Adapter/A

POST Error Code	FRU/Action
20105 to 20110	1. **Printer/Scanner Option** 2. Image Adapter/A 3. Memory Module DRAM, VRAM
Image Adapter/A Memory Test failure indicated by graphic of adapter	1. **Replace memory module (shown in graphic)**
206XX	1. **SCSI-2 Adapter** 2. Any SCSI Device 3. System Board 4. Riser card
208XX Verify there are no duplicate SCSI ID settings on the same bus.	1. **Any SCSI Device**
210XXXX Internal bus, size unknown **210XXX1** External bus, size unknown	1. **SCSI Hard Disk Drive** 2. SCSI Adapter or System Board 3. SCSI Cable 4. SCSI ID Switch (on some models)
Tape Drive amber LED remains on	1. **Tape Drive** 2. SCSI Cable (internal) 3. SCSI Adapter or System Board
Tape Drive green "in use" LED fails to come on	1. **Tape Drive** 2. SCSI Adapter or System Board 3. SCSI Cable (internal) 4. SCSI Cable (external)
Tape automatically ejected from drive	1. **Tape Cassette Drive**
SCSI ID on rotary switch does not match SCSI ID set in configuration. Verify drive switches inside cover are set to zero	1. **Rotary Switch Circuit Board** 2. Circuit Board Cable 3. Tape Drive
Tape sticks or breaks in drive. Verify that the tapes used meet ANSI standard X3B5	1. **Tape Cassette**
212XX	1. **SCSI Printer** 2. Printer Cable
213XX	1. **SCSI Processor**
214XX	1. **WORM Drive**
215XXXC, 215XXXD, 215XXXE, 215XXXU If an external device, and power-on LED is off, check external voltages	1. **CD-ROM Drive I** 2. CD-ROM Drive II Enhanced CD-ROM Drive II Any CD-ROM Drive 3. SCSI Cable 4. SCSI Adapter or System Board
216XX	1. **Scanner**

POST Error Code	FRU/Action
217XX If an external device, and power-on LED is off, check external voltages	1. **Rewritable Optical Drive** 2. SCSI Adapter or System Board 3. SCSI Cable
218XX Check for multi CD tray or jukebox	1. **Changer**
219XX	1. **SCSI Communications Device**
24201Y0, 24210Y0 Be sure wrap plug is attached	1. **ISDN/2 Adapter** 2. ISDN/2 Wrap Plug 3. ISDN/2 Communications Cable
273XX	1. **1 Mbps Micro Channel** 2. Infrared LAN Adapter
27501, 27503, 27506, 27507	1. **ServerGuard Adapter** 2. System Board 3. Riser card
27502, 27504, 27510, 27511, 27533, 27534, 27536, 27537	1. **ServerGuard Adapter**
27509	1. **Remove redundant adapters, run the IBM Setup Utility program, then retest.**
27512	1. **WMSELF.DGS diagnostics file is missing** 2. WMSELF.DGS diagnostics file is incorrect
27535	1. **3V Lithium Backup Battery** 2. ServerGuard Adapter
27554	1. **Internal Temperature out of range** 2. ServerGuard Adapter
27555, 27556	1. **ServerGuard Adapter** 2. Power Supply
27557	1. **7.2V NiCad Main Battery Pack** 2. ServerGuard Adapter
27558, 27559, 27560, 27561	1. **PCMCIA Type II Modem** 2. ServerGuard Adapter
27562	1. **External Power Control not connected** 2. External Power Control 3. ServerGuard Adapter
27563, 27564	1. **External Power Control** 2. ServerGuard Adapter
275XX	1. **Update Diagnostic Software**
27801 to 27879	1. **Personal Dictation System** 2. Adapter 3. System Board

POST Error Code	FRU/Action
27880 to 27889	1. **External FRU (Speaker, Microphone)**
999030X Hard disk reset failure	1. **Possible hard disk drive problem; see "Hard disk drive boot error" on page 69.**

Miscellaneous error messages

Message/Symptom	FRU/Action
CMOS Backup Battery inaccurate	1. **CMOS Backup Battery (see "Replacing the battery (all machine types)" on page 56)** 2. System Board
Changing colors	1. **Display**
Computer will *not* power-off. See "Power Supply Errors" on page 69.	1. **Power Switch** 2. System Board 3. Riser card
Computer will *not* RPL from server	1. **Ensure that network is in startup sequence as first device or first device after diskette** 2. Ensure that network adapter is enabled for RPL 3. Network adapter (Advise network administrator of new MAC address)
Computer will *not* Wake On LAN (if applicable)	1. **Check power supply and signal cable connections to network adapter** 2. Ensure that the operating system settings are set to enable Wake on LAN 3. Ensure Wake On LAN feature is enabled in the IBM Setup Utility program. See Chapter 5, "IBM Setup Utility program," on page 21). 4. Ensure network administrator is using correct MAC address 5. Ensure no interrupt or I/O address conflicts 6. Network adapter (advise network administrator of new MAC address)
Dead computer. See "Power Supply Errors" on page 69.	1. **Power Supply** 2. System Board 3. Riser card
Diskette drive in-use light remains on or does not light when drive is active.	1. **Diskette Drive** 2. System Board 3. Diskette Drive Cable 4. Riser card
Flashing cursor with an otherwise blank display.	1. **System Board** 2. Primary Hard Disk Drive 3. Hard Disk Drive Cable 4. Riser card
Incorrect memory size during POST	1. **Run the Memory tests** 2. Memory Module 3. System Board

Message/Symptom	FRU/Action
"Insert a Diskette" icon appears with a known-good diagnostics diskette in the first 3.5-inch diskette drive.	1. **System Board** 2. Diskette Drive Cable 3. Riser card 4. Network Adapter
Intensity or color varies from left to right of characters and color bars	1. **Display** 2. System Board
No power or fan not running	1. **See "Power Supply Errors" on page 69.**
Non-system disk or disk error-type message with a known-good diagnostic diskette.	1. **Diskette Drive** 2. System Board 3. Diskette Drive Cable 4. Riser card
Other display symptoms not listed above (including blank or illegible display)	1. **Display** 2. System Board
Power-on indicator or hard disk drive in-use light not on, but computer works correctly	1. **Power Supply** 2. System Board 3. LED Cables
Printer problems	1. **Printer**
Program loads from the hard disk with a known-good diagnostics diskette in the first 3.5-inch diskette drive	1. **Run Setup** 2. Diskette Drive 3. Diskette Drive Cable 4. System Board 5. Riser card 6. Power Supply

RPL computer cannot access programs from its own hard disk.	1. **If network administrator is using LCCM Hybrid RPL, check startup sequence:**
	  a. **First device - network**
	  b. **Second device - hard disk**
	2. Hard disk drive

RPL computer does not RPL from server	1. **Check startup sequence** 2. Check the network adapter LED status
Serial or parallel port device failure (system board port)	1. **External Device Self-Test OK?** 2. External Device 3. Cable 4. System Board
Serial or parallel port device failure (adapter port)	1. **External Device Self-Test OK?** 2. External Device 3. Cable 4. Alternate Adapter 5. System Board

Message/Symptom	FRU/Action
Some or all keys on the keyboard do not work	1. **Keyboard** 2. Keyboard Cable 3. System Board

Undetermined problems

Check the power supply voltages (see "Power Supply Errors" on page 69). If the voltages are correct, return here and continue with the following steps.

1. Power-off the computer.
2. Remove or disconnect the following components (if installed) one at a time.
   a. Non-IBM devices
   b. External devices (modem, printer, or mouse)
   c. Any adapters
   d. Riser card
   e. Memory modules
   f. Extended video memory
   g. External Cache
   h. External Cache RAM
   i. Hard disk drive
   j. Diskette drive
3. Power-on the computer to re-test the system.
4. Repeat steps 1 through 3 until you find the failing device or adapter.

If all devices and adapters have been removed, and the problem continues, replace the system board (see "Replacing the system board" on page 63).

Chapter 8. Additional Service Information

Security features

Security features in this section include the following:
- Passwords
- Vital Product Data
- Alert on LAN

Passwords

The following section provides information about computer hardware and software-related passwords.
- Power-on Password
- Administrator Password
- Operating System Password

Power-on and Administrator passwords are set in the Setup Utility program. See Chapter 5, "IBM Setup Utility program," on page 21 for information about running the Setup Utility.

Power-on password

A power-on password denies access to the computer by an unauthorized user when the computer is powered on. When a power-on password is active, the password prompt appears on the screen each time the computer is powered on. The computer starts after the proper password is entered.

Removing a power-on password

To service a computer with an active and unknown power-on password, power-off the computer and use the following procedure.

> **Note:** On some models, this procedure will also remove the administrator password.

1. Unplug the power cord and remove the top cover.
2. Refer to "Identifying parts on the system board (all machine types)" on page 40 to find the Virtual clear CMOS/Recovery jumper.
3. Move the recovery jumper from **normal** to **ROM recovery**.
4. Power-on the computer. The system senses the change in the position and erases the password.
5. Wait 30 seconds for beeps to sound, and then power down by holding the power button for 10 seconds.
6. Return the jumper to normal position.
7. Reset the date and time and remind the user to enter a new password when service is complete.

Administrator password

The administrator password is used to restrict access to the IBM Setup Utility program. If the administrator password is activated, and you do not enter the administrator password, the configuration can be viewed but not changed.

> **Note:**
>
> Type 2296, 8191, 8198, 8199, 8316, and 8434 computers have Enhanced Security Mode. If Enhanced Security mode is enabled and there is no password given, the computer will act as if Enhanced Security is disabled.
>
> If Enhanced Security is Enabled and an administrator password is given, the administrator password must be entered to use the computer. If the administrator password is lost or forgotten, the system board in the computer must be replaced in order to regain access to the IBM Setup Utility program.

Administrator password control

The Administrator password is set in the IBM Setup Utility program. Refer to Chapter 5, "IBM Setup Utility program," on page 21.

Operating system password

An operating system password is very similar to a power-on password and denies access to the computer by an unauthorized user when the password is activated. The computer is unusable until the password is entered and recognized by the computer.

Vital product data

Each computer has a unique Vital Product Data (VPD) code stored in the nonvolatile memory on the system board. After you replace the system board, the VPD must be updated. To update the VPD, see "Flash update procedures" on page 111.

Erasing a lost or forgotten password (clearing CMOS)

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

To erase a forgotten password:
1. Turn off the computer and all attached devices.
2. Remove the cover. See "Removing the cover" on page 32.
3. Locate the Clear CMOS/Recovery jumper on the system board. See "Identifying parts on the system board (all machine types)" on page 40.
4. If necessary, see "Replacing adapters" on page 41 to remove any adapters that impede access to the Clear CMOS/Recovery jumper.
5. Move the jumper from the standard position (pins 1 and 2) to the maintenance or configure position (pins 2 and 3).
6. Replace the cover and connect the power cord. See "Replacing the cover and connecting the cables" on page 64.
7. Restart the computer, leave it on for approximately 10 seconds. Turn off the computer by holding the power switch for approximately 5 seconds. The computer will turn off.
8. Repeat steps 2 through 4 on page 110..
9. Move the jumper back to the standard (pins 1 and 2).
10. Replace the cover and connect the power cord. See "Replacing the cover and connecting the cables" on page 64.

BIOS levels

An incorrect level of BIOS can cause false errors and unnecessary FRU replacement. Use the following information to determine the current level of BIOS installed in the computer, the latest BIOS available for the computer, and where to obtain the latest level of BIOS.

- Current Level BIOS information
  - Run the IBM Setup Utility program to determine the level of BIOS installed.
- Sources for determining the latest level BIOS available
  1. IBM PC support web site

     http://www.ibm.com/pc/support/
  2. PC PartnerInfo-Technical Database (CTSTIPS.NSF)
  3. IBM Support Center
  4. Levels 1 and 2 Support
  5. RETAIN®
- Sources for obtaining the latest level BIOS available
  1. IBM PC support web site

     http://www.ibm.com/pc/support/
  2. PC PartnerInfo-Technical Database (CTSTIPS.NSF)
  3. IBM Support Center
  4. Levels 1 and 2 Support

To update (flash) the BIOS, see "Flash update procedures."

Flash update procedures

This section details how to flash (update) the BIOS. Flash updates are available at http://www.ibm.com/pc/support/ on the World Wide Web.

Updating (flashing) BIOS from a diskette or CD-ROM

1. Shut down the operating system and turn off the computer.
2. Insert the flash update diskette or CD-ROM.
3. Turn on the computer. The update begins.

Updating (flashing) BIOS from your operating system

Note: Due to constant improvements being made to the IBM Web site, Web page content (including the links referenced in the following procedure) is subject to change.

1. From your browser, type http://www.ibm.com/pc/support/ in the address field and press Enter.
2. Locate the Downloadable files for your machine type.
3. Under Select your product, choose your machine type and click **Go**.
4. In Downloadable file by category, click **BIOS**.
5. Under Download files - BIOS by date, click your machine type.
6. Scroll down and look for a .txt file that has instructions for Flash BIOS update from the operating system. Click the .txt file.
7. Print these instructions. This is very important since they are not on the screen after the download begins.

8. From your browser, Click **Back** to return to the list of files. Carefully follow the printed instructions to download, extract, and install the update.

Recovering from a POST/BIOS update failure

Attention: If an interruption occurs during a Flash/BIOS upgrade, the BIOS might be left in an unusable state. The Boot Block jumper enables you to restart the system and recover the BIOS.

To perform a Flash/BIOS recovery using the recovery jumper, use the following procedure.

1. Power-off the computer and remove the cover.
2. Move the system board recovery jumper to the clear position. Refer to "Identifying parts on the system board (all machine types)" on page 40 for more information.
3. Place the cover back on the system.
4. Place the BIOS flash recovery diskette in the floppy disk drive.
5. Restore power to the system by plugging in the power cord.
6. During the recovery process, there will be a sequence of short beeps. This sequence of beeps will be followed by a single long beep and then silence from the system speaker. During this process there will be no video. After the last long beep, hold the power button in for approximately ten seconds to turn the system off.
7. Remove the BIOS flash recovery diskette, power cord and cover.
8. Return the boot block recovery jumper to its original position, replace the cover and reinsert the BIOS flash recovery diskette in the floppy disk drive.
9. Connect the power cord back to the system and power the system on. When the system POST tests, it will report several POST errors. These errors can be ignored. The standard POST/BIOS Update Utility screen will appear after a pause.
10. Select the desired language from the list and press Enter.
11. Enter the serial number of the system and press Enter.
12. Enter the Machine Type and model number of the system and press Enter.
13. If a prompt appears stating that the BIOS ROM is older than (or the same as) the BIOS ROM image, press Y to continue.
14. When the flash programming is complete, remove the diskette from the drive and press any key to restart the system.

Power management

Power management reduces the power consumption of certain components of the computer such as the system power supply, processor, hard disk drives, and some monitors. Advanced Power Management and Rapid Resume™ Manager are features of some personal computers.

Automatic configuration and power interface (ACPI) BIOS

Being an ACPI BIOS system, the operating system is allowed to control the power management features of the computer and the setting for Advanced Power Management (APM) BIOS mode are ignored. Not all operating systems support ACPI BIOS mode.

Advanced Power Management

Energy-saving settings can be viewed and changed by using the Advanced Power Management menu in the IBM Setup Utility program.

> **Attention:**
>
> If a device, such as a monitor, does not have power-management capabilities, it can be damaged when exposed to a reduced-power state. Before making energy-saving selections for the monitor, check the documentation supplied with the monitor to see if it supports Display Power Management Signaling (DPMS).

Automatic Hardware Power Management features

Automatic Hardware Power Management can reduce the power states of the computer, processor, and monitor (if the monitor supports DPMS) if they are inactive for a predetermined length of time.

Set the time for the system to enter a low-power state.

You can define the amount of energy savings by specifying values for the following options.

- **System Power**
  - Select **On** for the computer to remain on.
  - Select **Off** for the computer to shut down.
- **Display**

  Set display to be disabled or to be reduced at these power states:
  - **Standby:** Screen is blank, but can be restored immediately when any activity is detected.
  - **Suspend:** Monitor uses less power than in Standby mode. Screen image is restored after a few seconds when any activity is detected.
  - **Off:** Monitor power is off. Press Monitor power button to restore power. On some monitors, you might have to depress the power button twice.

Setting Automatic Hardware Power Management features

1. Start the IBM Setup Utility program (see Chapter 5, "IBM Setup Utility program," on page 21).
2. Select **Power Management** from the IBM Setup Utility program menu.

3. Select **APM BIOS Mode** within the APM sub menu and be sure it is set to **Enabled**. If it is not, press Left Arrow (←)or Right Arrow (→) to change the setting.

4. Select **Automatic Hardware Power Management**.

5. Set **Automatic Hardware Power Management** to **Enabled**.

6. Select values for the three categories of power management (system power, processor speed, and display), as necessary.

7. Set **Hard Disk** to **Enabled** or **Disabled**.

   Note: This does not apply to SCSI drives.

8. Press **Esc** twice to return to the IBM Setup Utility program menu.

9. Before you exit from the program, select **Save Settings** from the IBM Setup Utility program menu.

10. To exit from the IBM Setup Utility program, press **Esc** and follow the instructions on the screen.

Automatic Power-On features

The Automatic Power-On features within the Power Management menu allow you to enable and disable features that turn on the computer automatically.

- **Serial Port A Ring Detect**: With this feature set to **Enabled** and an external modem connected to serial port (COM1), the computer will turn on automatically when a ring is detected on the modem.

- **PCI Modem Ring Detect**: With this feature set to **Enabled**, the computer will turn on automatically when a ring is detected on the internal modem.

- **PCI Wake Up:** This feature allow PCI cards that support this capability to wake the system.

- **Wake Up on Alarm**: You can specify a date and time at which the computer will be turned on automatically. This can be either a single event or a daily event.

- **Wake on LAN**: If the computer has a properly configured token-ring or Ethernet LAN adapter card that is Wake on LAN-enabled and there is remote network management software, you can use the IBM-developed Wake on LAN feature. When you set Wake on LAN to **Enabled**, the computer will turn on when it receives a specific signal from another computer on the local area network (LAN).

Product Recovery Program

The product recovery program is on a separate hard drive partition.

At startup, the machine displays the following prompt:
To start the Product Recovery Program, press F11

Attention: Make sure all data is backed up to avoid loss when the Product Recovery program is used.

After depressing F11, you are given the following options.

- **Factory Contents**

  This utility reformats the hard drive and restores all original files.

- **System utilities**

  1. **Repair (Windows NT 4.0 and 2000 Only)**

     This runs the Windows NT 4.0 emergency repair utility.

  2. **Run Diagnostics**

     Runs the IBM Enhanced Diagnostic Program.

  3. **Create a Diagnostics Diskette**

     Creates a bootable diagnostic diskette.

  4. **System Information**

     Displays information about the computer configuration and allows the user to gather system information that would be needed during a Help Center call.

  5. **Create Recovery/Repair Diskette (Disk to Disk Solution Only)**

     Creates a startable diskette to restore access to the IBM Product Recovery program on the hard disk.

  6. **Recovery CD**

     In the event of a Hard Disk Drive failure, a Recovery CD can be used to restore the Hard Disk Drive to the original factory preset. Be sure to use the Recovery CD FRU list to obtain the proper recovery CD for the computer model you are servicing.

Chapter 9. Parts listing

Note: A CRU (Customer Replaceable Unit) is identified by a single asterisk (*) or two asterisks (**) in the CRU ID column. An N in the CRU ID Column means that the part is not a CRU. A single asterisk (*) means that the part is a Tier 1 CRU; two asterisks (**) mean that the part is a Tier 2 CRU.

Machine Type 2296
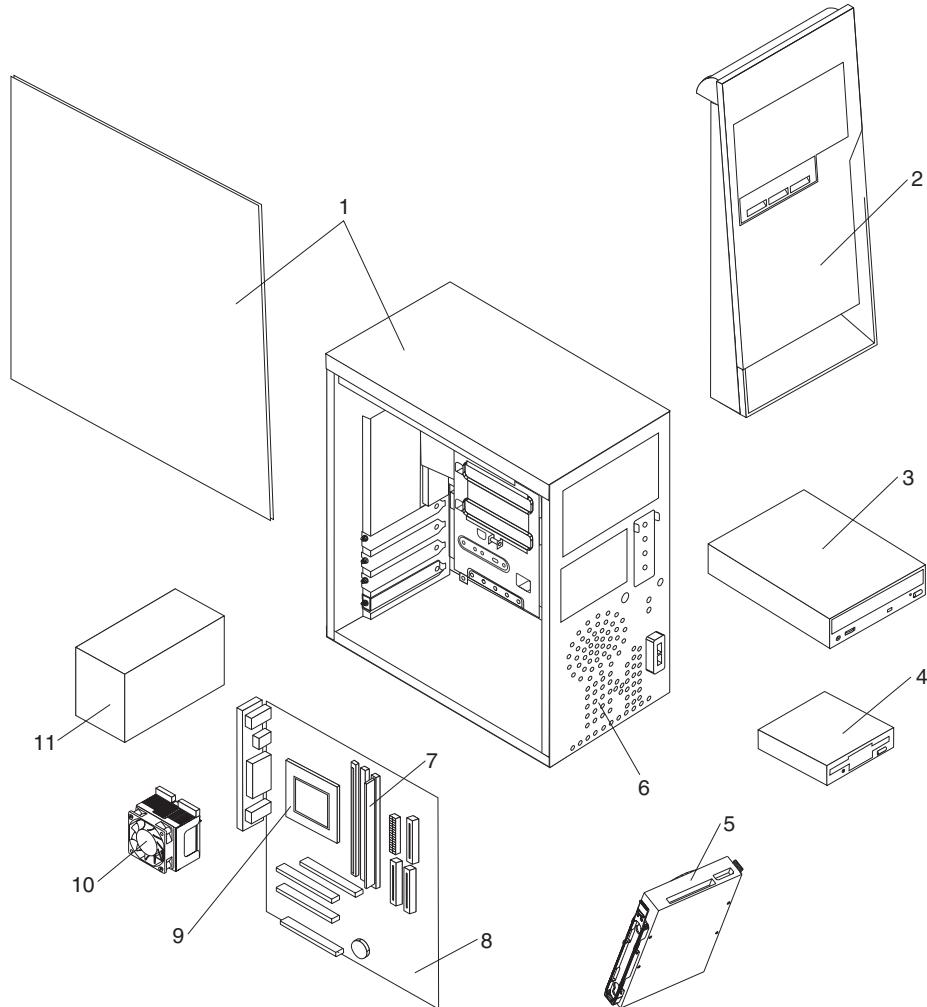
Item #	2296 FRUs	FRU#	CRU
1	Chassis assembly (all models)	74P2256	*
2	Bezel and shield kit (all models)	74P2257	*
3	48X CD-ROM Drive (Black) (models 41C 42A)	33P3203	* *
3	48X CD-ROM Drive (Black) (models 41C 42A)	33P3207	* *
3	48X CD-ROM Drive (Black) (models 41C 42A)	33P3211	* *
3	48X CD-ROM Drive (Black) (models 41C 42A)	33P3215	* *

Item #	2296 FRUs	FRU#	CRU
3	DVD-ROM 16X/48X (Black) (models 61C 64B 62A 43C 64C 64H 67C 68C 69C 82C 83C)	33P3297	* *
3	DVD-ROM 16X/48X (Black) (models 61C 64B 62A 43C 64C 64H 67C 68C 69C 82C 83C)	33P3281	* *
3	DVD-ROM 16X/48X (Black) (models 61C 64B 62A 43C 64C 64H 67C 68C 69C 82C 83C)	71P7357	* *
3	DVD-ROM 16X48X (Black) -- C3 only (models 68C 82C 83C)	33P3237	* *
3	48X24X48X CD-RW (Black) (models 64B 64C 64H)	33P3289	* *
3	48X24X48X CD-RW (Black) (models 64B 64C 64H)	33P3293	* *
3	48X CDROM (Black) (models 41C 42A)	71P7353	* *
3	48X24X48X16X DVD-ROM/CD-RW combo drive (Black) (models 63V 81C)	33P3301	* *
4	FDD, 3.5 1.44MB (models 61C 62A 63V 64B 41C 42A 43C 64C 64H 67C 81C 68C 69C 82C 83C)	76H4091	* *
5	HDD, 40GB EIDE (models 62A 41C 42A 67C)	19K1568	* *
5	HDD, 80GB EIDE (models 61C 63V 64B 43C 64C 64H 81C 68C 69C 82C 83C)	24P3665	* *
6	Speaker Asm. Soldered Terminals (all models)	00N5151	* *
7	128 MB SDRAM (models 41C 67C 68C 69C 82C)	33L3303	* *
7	256 MB SDRAM (models 61C 62A 63V 64B 42A 43C 64C 64H 81C 83C)	33L3305	* *
8	System board, 10/100 E-net, w/o POV (models 61C 62A 63V 64B 41C 42A 43C 64C 64H 67C 81C 68C 69C 83C)	02R4084	**
8	System board, 10/100 E-net, w/o POV (models 61C 62A 63V 64B 41C 42A 43C 64C 64H 67C 81C 68C 69C 83C) (optional to 02R4084)	88P8474	**
8	System board, (845GV/GL) 10/100Mb Ethernet, w/AGP plug - w/o POV (model 82C)	02R4637	**
8	System board, 10/100 @400/533FSB, w/AGP plug, wo-POV **Only use if 533FSB and AGP plug req'd** -- optional to 02R4637 (Model 82C)	88P8477	**
9	Intel P4 2.4 GHz (models 41C 42A 43C)	74P1625	* *
9	Intel P4 2.66 GHz (models 61C 62A 63V 64B 64C 64H 67C 68C)	74P1629	* *
9	Intel P4 2.66 GHz (model 69C)	58P9961	* *
9	Intel P4 2.66 GHz (optional to 58P9961) (model 69C)	73P0574	* *
9	Intel P4 2.8 GHz (models 81C 82C 83C)	74P1631	* *
10	Fan sink (models 61C 62A 63V 64B 41C 42A 43C 64C 64H 67C 81C 68C 69C 82C 83C)	32P4004	* *
11	Power supply, 230W (models 62A 63V 64B 42A 64H)	74P4300	N
11	Power supply, 230W (China) (models 61C 41C 43C 64C 67C 81C 68C 69C 82C 83C)	74P4301	N

The FRUs listed in the following table are not illustrated.

2296 FRUs	FRU#	CRU
Cable, FDD (all models)	59P8568	*
Cable, audio (all models)	75H9219	*
Cable, IDE (ATA66 1 drop) (all models)	37L4525	*
Cable, IDE (ATA66 2 drop) (all models)	37L5098	*
Planar shield (all models)	49P4646	*
Dual USB 1.1 cable (top channel) (all models)	22P2400	*
Audio cable assembly (ATA) (all models)	49P1933	*
Front panel label kit (all models)	09N6708	*
Access panel (all models)	49P3386	*
Cable, power/LED (all models)	09N6709	*
Screw kit (all models)	49P3387	*
Cable, serial port (all models)	49P4530	*
Bracket, second hardfile mount & 6-32 screw (all models)	74P2254	*
Cable, serial ATA (all models)	88P5927	*
System fan (includes bracket) (models 67C 81C 68C 69C 82C 83C)	88P8585	*
Battery, 3.0 V (all models)	33F8354	*
Mouse, optical wheel (models 61C 62A 63V 64B 41C 42A 43C 64C 64H 67C 81C 68C 69C 82C 83C)	89P5089	*
Soft modem V.92/V.44 (ATX) (models 64B 62A 61C 41C 42A 43C 64C 64H 67C 81C 68C 69C 82C 83C)	22P7943	*
Video adapter, Nvidia 64Mb (models 63V 64B 64C 64H 81C)	73P0715	*
Speakers, Infinity Active T1 (Black) (models 63V 64B 62A 61C 41C 43C 42A 64H 64C 67C 81C 68C 69C 82C 83C)	25P4726	*
Speaker Power brick - India, South Africa (models 62A 42A)	32P3181	*
Speaker Power brick - UK, Hong Kong (3 prong) (models 64B 64H)	25P5703	*
Speaker Power brick (newer 2 prong) - China, Thailand, Philippines (models 62A 61C 41C 43C 42A 64C 67C 81C 68C 69C 82C 83C)	10K2597	*
Speaker Power brick - Taiwan (model 63V)	10K2587	*
Korean label (models 68C 69C 82C 83C)	13R9162	*
RJ11 connector adapter (Spain, Ireland) (All ″G″ models)	60H6043	*
RJ11 connector adapter (Austria) (All ″G″ models)	60H6045	*
RJ11 connector adapter (Belgium) (All ″G″ models)	60H6046	*
RJ11 connector adapter (Denmark) (All ″G″ models)	60H6047	*
RJ11 connector adapter (Norway, Finland) (All ″G″ models)	60H6048	*
RJ11 connector adapter (France) (All ″G″ models)	60H6049	*
RJ11 connector adapter (Germany) (All ″G″ models)	60H6050	*
RJ11 connector adapter (UK, NZ, HK) (All ″G″, ″M″, ″B″, ″H″ models)	60H6051	*
RJ11 connector adapter (Italy) (All ″G″ models)	60H6052	*
RJ11 connector adapter (Netherlands) (All ″G″ models)	60H6053	*
RJ11 connector adapter (Sweden) (All ″G″ models)	60H6054	*
RJ11 connector adapter (Switzerland) (All ″G″ models)	60H6055	*

2296 Windows XP Home Recovery CDs	FRU#	CRU
US (models 62A 42A 64H)	13R9714	*
SC (models 61C 41C 43C 64C 81C 83C)	13M6469	*
TW (model 63V)	13M6473	*
HK (model 64B)	13M6477	*

2296 Keyboards RAK III Lite	FRU#	CRU
US English (models 61C 62A 41C 42A 43C 64C 64H 67C 81C 68C 69C 82C 83C)	19K1910	*
Chinese/US (models 63V 64B)	19K1915	*

2296 Power Cords	FRU#	CRU
Power Cord (model 42A)	6952301	*
Power Cord (model 42A)	13F9939	*
Power Cord (model 42A)	13F9978	*
Power Cord (models 42A 64H)	14F0032	*
Power Cord (models 41C 43C 64C 64H 67C 81C 68C 69C 82C 83C)	02K0545	*
Power Cord (models 42A)	14F0014	*

Machine Type 8191

This section lists the replaceable FRUs for Machine Type 8191.

Item #	8191 FRUs	FRU#	CRU
1	Top cover assembly (all models)	88P5962	*
2	Power supply, 230W (models 11U 11S 11P 11D 11Y 12U 13G 14S 14P 14Y 15M 21U 21S 21P 21D 21Y 22U 22S 22P 22Y 23M 31U 31S 31P 31D 31Y 32U 33S 33P 33Y 41S 41P 41Y 51G 61S 61P 61Y 62M 71G 72G 73G 74G CTO CAU CBU CCU CDU 16G 42M 34M B1M B2U 53G 54U 63M 64G 81M 82M 83G 91G 75G 76G 77G 78G D1U D1S D1P D1Y 54S 54P 54Y 35G B3G 65S 65P 65Y 85S 85P 85Y 66G 79G 7BG D2M D3G 86M 87M 92S 92Y 7CG 7DG 7EG 7FG 7GG B2S B2Y 83S 83Y 91S 91Y)	74P4300	N
3	5.25 DASD locking handle bracket (all models)	09N5747	*
4	CD-ROM Drive 48X - Black (models 11U 11S 11P 11D 11Y 12U 13G 14S 14P 14Y 15M 21U 21S 21P 21D 21Y 22U 22S 22P 22Y 23M 31U 31S 31P 31D 31Y 32U 33S 33P 33Y 41S 41P 41Y 51G 61S 61P 61Y 62M 71G 72G 73G 74G 16G 42M)	33P3203	* *
4	CD-ROM Drive 48X - Black w/o jack & vol (models 34M B1M B2U 53G 54U 64G 81M 83G 91G 75G 76G 77G 78G D1U D1S D1P D1Y 54S 54P 54Y 35G B3G 65S 65P 65Y 85S 85P 85Y 66G 79G 7BG D2M D3G 86M 92S 92Y 7CG 7DG 7EG 7FG 7GG B2S B2Y 83S 83Y 91S 91Y)	71P7367	* *
4	CD-ROM Drive 48X - Black w/o jack & vol (models 34M B1M B2U 53G 54U 64G 81M 83G 91G 75G 76G 77G 78G D1U D1S D1P D1Y 54S 54P 54Y 35G B3G 65S 65P 65Y 85S 85P 85Y 66G 79G 7BG D2M D3G 86M 92S 92Y 7CG 7DG 7EG 7FG 7GG B2S B2Y 83S 83Y 91S 91Y)	71P7369	* *

Item #	8191 FRUs	FRU#	CRU
4	CD-ROM Drive 48X - Black w/o jack & vol (models D1U D1S D1P D1Y 35G B3G 65S 65P 65Y 85S 85P 85Y 7BG D2M D3G 86M 92S 92Y 7CG 7DG 7EG 7FG 7GG B2S B2Y 83S 83Y 91S 91Y)	71P7371	* *
4	CD-ROM Drive 48X - Black w/o jack & vol (models 34M B1M B2U 53G 54U 64G 81M 83G 91G 75G 76G 77G 78G D1U D1S D1P D1Y 54S 54P 54Y 35G B3G 65S 65P 65Y 85S 85P 85Y 66G 79G 7BG D2M D3G 86M 92S 92Y 7CG 7DG 7EG 7FG 7GG B2S B2Y 83S 83Y 91S 91Y)	71P7375	* *
4	CD-ROM Drive 48X - Black w/o jack & vol (models D1U D1S D1P D1Y 35G B3G 65S 65P 65Y 85S 85P 85Y 7BG D2M D3G 86M 92S 92Y 7CG 7DG 7EG 7FG 7GG B2S B2Y 83S 83Y 91S 91Y)	71P7385	* *
4	CD-RW Drive (48X/32X/48X) (models 63M 82M 87M)	71P7347	* *
4	CD-RW Drive (48X/32X/48X) (models 63M 82M 87M)	71P7349	* *
4	48X CDROM (Black) (models 11U 11S 11P 11D 11Y 12U 13G 14S 14P 14Y 15M 21U 21S 21P 21D 21Y 22U 22S 22P 22Y 23M 31U 31S 31P 31D 31Y 32U 33S 33P 33Y 41S 41Y 51G 61S 61P 61Y 62M 71G 72G 73G 74G 16G 42M)	71P7353	* *
5	HDD, 40GB EIDE (models 11U 11S 11P 11D 11Y 12U 13G 14S 14P 14Y 15M 21U 21S 21P 21D 21Y 22U 22S 22P 22Y 23M 31U 31S 31P 31D 31Y 32U 33S 33P 33Y 41S 41P 41Y 51G 61S 61P 61Y 62M 71G 72G 73G 74G 16G 42M 34M B1M B2U 53G 54U 63M 64G 81M 82M 83G 91G 75G 76G 77G 78G D1U D1S D1P D1Y 54S 54P 54Y 35G B3G 66G 79G 7BG D2M D3G 86M 87M 7CG 7DG 7EG 7FG 7GG B2S B2Y 83S 83Y 91S 91Y)	19K1568	*
5	HDD, 80GB EIDE (models 65S 65P 65Y 85S 85P 85Y 92S 92Y)	24P3665	*
6	FDD, 3.5 1.44MB (with bezel) (models 11U 11S 11P 11D 11Y 12U 13G 14S 14P 14Y 15M 21U 21S 21P 21D 21Y 22U 22S 22P 22Y 23M 31U 31S 31P 31D 31Y 32U 33S 33P 33Y 41S 41P 41Y 51G 61S 61P 61Y 62M 71G 72G 73G 74G CTO CAU CBU CCU CDU 16G 42M 34M B1M B2U 53G 54U 63M 64G 81M 82M 83G 91G 75G 76G 77G 78G D1U D1S D1P D1Y 54S 54P 54Y 35G B3G 65S 65P 65Y 85S 85P 85Y 66G 79G 7BG D2M D3G 86M 87M 92S 92Y 7CG 7DG 7EG 7FG 7GG B2S B2Y 83S 83Y 91S 91Y)	76H4091	* *
7	Speaker assembly (all models)	00N5151	*
8	3.5 DASD locking handle bracket (all models)	09N5748	*
9	Chassis assembly (all models)	88P5963	*
10	128 MB SDRAM (models 11U 11S 11P 11D 11Y 12U 13G 21U 21S 21P 21D 21Y 22U 22S 22P 22Y 31U 31S 31P 31D 31Y 32U 71G 72G 73G 74G CAU CBU CCU CDU 16G B2U 53G 54U 75G 76G 77G 78G D1U D1S D1P D1Y 54S 54P 54Y 35G B3G)	33L3303	*
10	256 MB SDRAM (models 14S 14P 14Y 15M 23M 33S 33P 33Y 41S 41P 41Y 51G 61S 61P 61Y 62M 42M 34M B1M 63M 64G 81M 82M 83G 91G 65S 65P 65Y 85S 85P 85Y 66G 79G 7BG D2M 86M 87M 92S 92Y 7CG 7DG 7EG 7FG 83S 83Y 91S 91Y)	33L3305	*
11	System board, 10/100 E-net, w/o POV (models 15M 23M 62M CTO 42M 34M B1M 63M 81M 82M 86M 87M)	02R4084	N
11	System board, 10/100 E-net, w/o POV (models 15M 23M 62M CTO 42M 34M B1M 63M 81M 82M 86M 87M) (optional to 02R4084)	88P8474	N
11	System board, 10/100 E-net, w/o POV (models 41S 41P 41Y 51G 61S 61P 61Y 11U 11S 11P 11D 11Y 12U 13G 14S 14P 14Y 21U 21S 21P 21D 21Y 22U 22S 22P 22Y 31U 31S 31P 31D 31Y 32U 33S 33P 33Y 71G 72G 73G 74G CAU CBU CCU CDU 16G B2U 53G 54U 64G 83G 91G 75G 76G 77G 78G D1U D1S D1P D1Y 54S 54P 54Y 35G B3G 65S 65P 65Y 85S 85P 85Y 66G 79G 7BG D2M D3G 92S 92Y 7CG 7DG 7EG 7FG 7GG B2S B2Y 83S 83Y 91S 91Y)	02R4637	N

Item #	8191 FRUs	FRU#	CRU
11	System board, 10/100 E-net, w/o POV (models 41S 41P 41Y 51G 61S 61P 61Y 11U 11S 11P 11D 11Y 12U 13G 14S 14P 14Y 21U 21S 21P 21D 21Y 22U 22S 22P 22Y 31U 31S 31P 31D 31Y 32U 33S 33P 33Y 71G 72G 73G 74G CAU CBU CCU CDU 16G B2U 53G 54U 64G 83G 91G 75G 76G 77G 78G D1U D1S D1P D1Y 54S 54P 54Y 35G B3G 65S 65P 65Y 85S 85P 85Y 66G 79G 7BG D2M D3G 92S 92Y 7CG 7DG 7EG 7FG 7GG B2S B2Y 83S 83Y 91S 91Y)	88P8477	N
12	Intel Celeron 2.0 GHz (models 11U 11S 11P 11D 11Y 12U 13G 14S 14P 14Y 15M 71G 74G CAU 16G)	74P1617	* *
12	Intel Celeron 2.1 GHz (models 21U 21S 21P 21D 21Y 22U 22S 22P 22Y 23M CBU)	74P1619	* *
12	Intel Celeron 2.2 GHz (models 31U 31S 31P 31D 31Y 32U 33S 33P 33Y 34M 72G 73G CCU 35G)	74P1621	* *
12	Intel Celeron 2.3 GHz (model CDU)	88P5866	* *
12	Intel Celeron 2.4 GHz (models B1M B2U 75G 76G B3G 7BG D2M B2S B2Y)	88P7699	* *
12	Intel Celeron 2.5 GHz (model 77G)	13R8905	* *
12	Intel Celeron 2.6 GHz (models53G 54U 78G 54S 54P 54Y 7CG)	13R8907	* *
12	Intel Celeron 2.8 GHz (modelsD1U D1S D1P D1Y D3G 7DG 7GG)	13R8963	* *
12	Intel P4 2.4 GHz (models 41S 41P 41Y 42MJ)	74P1625	* *
12	Intel P4 2.53 GHz (model 51G)	74P1627	* *
12	Intel P4 2.66 GHz (models 61S 61P 61Y 62M 63M 64G 65S 65P 65Y)	74P1629	* *
12	Intel P4 2.66 GHz (models 66G 79G)	58P9961	* *
12	Intel P4 2.66 GHz (optional to 58P9961) (models 66G 79G)	73P0574	* *
12	Intel P4 2.8 GHz (models 81M 82M 83G 85S 85P 85Y 86M 87M 7FG 83S 83Y)	74P1631	* *
12	Intel P4 3.06 GHz (models 91G 92S 92Y 91S 91Y)	74P1633	* *
13	Fan sink (model 91G)	01R3330	* *
13	Fan sink (models 11U 11S 11P 11D 11Y 12U 13G 14S 14P 14Y 15M 21U 21S 21P 21D 21Y 22U 22S 22P 22Y 23M 31U 31S 31P 31D 31Y 32U 33S 33P 33Y 41S 41P 41Y 51G 61S 61P 61Y 62M 71G 72G 73G 74G CAU CBU CCU CDU 16G 42M 34M B1M B2U 75G 63M 64G 81M 82M 83G 54S 54P 54Y 35G B3G 65S 65P 65Y 85S 85P 85Y 66G 79G 7BG D2M 7CG D3G 7DG 7GG 86M 87M 7FG 7EG B2S B2Y 83S 83Y)	32P4004	* *

The FRUs listed in the following table are not illustrated.

| 8191 FRUs	FRU#	CRU
HDD mounting bracket assembly (all models)	88P5916	*
Bezel kit (all models)	49P4371	*
Cable, FDD (all models)	88P6515	*
Cable, dual USB 2 (all models)	49P4365	*
Cable, ATA 66 1-drop (all models)	88P5967	*
Cable, secondary IDE (all models)	88P5971	*
Cable, FDD (all models)	88P6515	*
Cable, serial port (all models)	49P4530	*
Control panel (power switch) (all models)	37L5092	*
Cable, CD_ROM audio (all models)	75H9219	*
Misc. hardware kit (all models)	88P5965	*
5.25 EMC shield (all models)	19K5548	*
Fan Bracket Asm for processors >2.8GHz (models 34M B1M B2U 53G 54U 63M 64G 81M 82M 83G 91G 75G 76G 77G 78G D1U D1S D1P D1Y 54S 54P 54Y 35G B3G 65S 65P 65Y 85S 85P 85Y 66G 79G D2M D3G 86M 87M 92S 92Y 7CG 7DG 7EG 7FG 7GG B2S B2Y 83S 83Y 91S 91Y)	89P6700	*
Battery, 3.0 V (all models)	33F8354	*
Mouse, 2 button, black (models 13G 14S 14P 14Y 33S 33P 33Y 41S 41P 41Y 51G 61S 61P 61Y 71G 72G 73G 74G 16G 53G 64G 83G 91G 75G 76G 77G 78G 35G B3G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG 83S 83Y 91S 91Y)	24P0383	*
Mouse, 3-button, wheel (models 15M 23M 42M 62M 34M B1M 63M 81M 82M)	24P0491	*
Mouse, optical wheel (models 11U 11S 11P 11D 11Y 12U 21U 21S 21P 21D 21Y 22U 22S 22P 22Y 31U 31S 31P 31D 31Y 32U CAU CBU CCU CDU B2U 54U D1U D1S D1P D1Y 54S 54P 54Y 65S 65P 65Y 85S 85P 85Y D2M 86M 87M 92S 92Y B2S B2Y)	89P5089	*
Soft Modem V.92/V.44 (ATX) (models 11U 11S 11P 11D 11Y 21U 21S 21P 21D 21Y 31U 31S 31P 31D 31Y)	22P7943	*
Speakers, active infinity T1 (models 11U 11P 11D 11S 11Y 21U 21P 21D 21S 21Y 31U 31P 31D 31S 31Y)	25P4726	*
Speaker power brick US, CE, CF, LA, Taiwan (models 11U 11P 11D 11S 11Y 21U 21P 21D 21S 21Y 31U 31P 31D 31S 31Y)	10K2587	*
Speaker power brick Argentina (models 11S 11Y 21S 21Y 31S 31Y)	01R2253	*
RJ11 connector adapter (Spain, Ireland) (All "G" models)	60H6043	*
RJ11 connector adapter (Austria) (All "G" models)	60H6045	*
RJ11 connector adapter (Belgium) (All "G" models)	60H6046	*
RJ11 connector adapter (Denmark) (All "G" models)	60H6047	*
RJ11 connector adapter (Norway, Finland) (All "G" models)	60H6048	*
RJ11 connector adapter (France) (All "G" models)	60H6049	*
RJ11 connector adapter (Germany) (All "G" models)	60H6050	*
RJ11 connector adapter (UK, NZ, HK) (All "G", "M", "B", "H" models)	60H6051	*
RJ11 connector adapter (Italy) (All "G" models)	60H6052	*
RJ11 connector adapter (Netherlands) (All "G" models)	60H6053	*
RJ11 connector adapter (Sweden) (All "G" models)	60H6054	*
RJ11 connector adapter (Switzerland) (All "G" models)	60H6055	*

8191 Windows 2000 Recovery CDs	FRU#	CRU
US (models 71G 73G 76G)	13R9673	*
FR (models 71G 73G 76G)	13R9674	*
GR (models 71G 73G 76G)	13R9675	*
IT (models 71G 73G 76G)	13R9677	*
SP (models 71G 73G 76G)	13R9676	*
DK (models 71G 73G 76G)	13R9680	*
NL (models 71G 73G 76G)	13R9683	*
AE (models 71G 73G 76G)	13R9687	*
SV (models 71G 73G 76G)	13R9679	*
HE (models 71G 73G 76G)	13R9684	*
FI (models 71G 73G 76G)	13R9681	*
NO (models 71G 73G 76G)	13R9682	*
PL (models 71G 73G 76G)	13R9685	*
PO (models 71G 73G 76G)	13R9691	*
RU (models 71G 73G 76G)	13R9688	*
HU (models 71G 73G 76G)	13R9690	*
CZ (models 71G 73G 76G)	13R9686	*
TR (models 71G 73G 76G)	13R9689	*
GK (models 71G 73G 76G)	13R9692	*

8191 Windows XP Pro Recovery CDs	FRU#	CRU
US (Models 35G B3G D1U 12U 13G 15M 22U 23M 32U 42M 51G 62M 72G 74G 34M B1M B2U 53G 54U 63M 64G 81M 82M 83G 91G 75G 77G 78G 66G 79G 7BG D2M D3G 86M 87M 7CG 7DG 7EG 7FG 7GG)	13R9693	*
FR (models 35G B3G 13G 51G 72G 74G 53G 64G 83G 91G 75G 77G 78G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG)	13R9694	*
GR (models 35G B3G 13G 51G 72G 74G 53G 64G 83G 91G 75G 77G 78G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG)	13R9695	*
IT (models 35G B3G 13G 51G 72G 74G 53G 64G 83G 91G 75G 77G 78G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG)	13R9697	*
SP (models 35G B3G 65S 65Y 85S 85Y D1S D1Y 13G 14S 14Y 22S 22Y 33S 33Y 41S 41Y 51G 61S 61Y 72G 74G 53G 64G 83G 91G 75G 77G 78G 54S 54Y 66G 79G 7BG D3G 92S 92Y 7CG 7DG 7EG 7FG 7GG B2S B2Y 83S 83Y 91S 91Y)	13R9696	*
BR (models 65P 85P D1P 14P 22P 33P 41P 61P 54P)	13R9698	*
DK (models 35G B3G 13G 51G 72G 74G 53G 64G 83G 91G 75G 77G 78G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG)	13R9700	*
NL (models 35G B3G 13G 51G 72G 74G 53G 64G 83G 91G 75G 77G 78G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG)	13R9704	*
AE (models 35G B3G 13G 51G 72G 74G 53G 64G 83G 91G 75G 77G 78G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG)	13R9708	*
SV (models 35G B3G 13G 51G 72G 74G 53G 64G 83G 91G 75G 77G 78G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG)	13R9699	*

8191 Windows XP Pro Recovery CDs	FRU#	CRU
HE (models 35G B3G 13G 51G 72G 74G 53G 64G 83G 91G 75G 77G 78G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG)	13R9705	*
FI (models 35G B3G 13G 51G 72G 74G 53G 64G 83G 91G 75G 77G 78G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG)	13R9702	*
NO (models 35G B3G 13G 51G 72G 74G 53G 64G 83G 91G 75G 77G 78G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG)	13R9703	*
PL (models 35G B3G 13G 51G 72G 74G 53G 64G 83G 91G 75G 77G 78G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG)	13R9706	*
PO (models 35G B3G 13G 51G 72G 74G 53G 64G 83G 91G 75G 77G 78G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG)	13R9712	*
RU (models 35G B3G 13G 51G 72G 74G 53G 64G 83G 91G 75G 77G 78G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG)	13R9709	*
HU (models 35G B3G 13G 51G 72G 74G 53G 64G 83G 91G 75G 77G 78G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG)	13R9711	*
CZ (models 35G B3G 13G 51G 72G 74G 53G 64G 83G 91G 75G 77G 78G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG)	13R9707	*
TR (models 35G B3G 13G 51G 72G 74G 53G 64G 83G 91G 75G 77G 78G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG)	13R9710	*
GK (models 35G B3G 13G 51G 72G 74G 53G 64G 83G 91G 75G 77G 78G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG)	13R9713	*
Multilingual RCD 1	19R1269	*
Multilingual RCD 2	19R1271	*

8191 Windows XP Home Recovery CDs	FRU#	CRU
US (models 11U 21U 31U)	13R9714	*
SP (models 11D 11S 11Y 21D 21S 21Y 31D 31S 31Y)	13R9717	*
BR (models 11P 21P 31P)	13R9719	*

8191 Keyboards (Standard PS/2 Black)	FRU#	CRU
US English (models 11U 12U 13G 15M 21U 22U 23M 31U 32U 51G 62M 71G 72G 73G 74G CAU CBU CCU CDU 16G 42M 34M B1M B2U 53G 54U 63M 64G 81M 82M 83G 91G 75G 76G 77G 78G D1U 35G B3G 66G 79G 7BG D2M D3G 86M 87M 7CG 7DG 7EG 7FG 7GG)	89P8300	*
Arabic (models 13G 51G 71G 72G 73G 74G 16G 53G 64G 83G 91G 75G 76G 77G 78G 35G B3G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG)	89P8301	*
Belgian/French (models 13G 51G 71G 72G 73G 74G 16G 53G 64G 83G 91G 75G 76G 77G 78G 35G B3G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG)	89P8302	*
Bulgarian (models 13G 51G 71G 72G 73G 74G 16G 53G 64G 83G 91G 75G 76G 77G 78G 35G B3G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG)	89P8305	*
Czech (models 13G 51G 71G 72G 73G 74G 16G 53G 64G 83G 91G 75G 76G 77G 78G 35G B3G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG)	89P8307	*
Danish (models 13G 51G 71G 72G 73G 74G 16G 53G 64G 83G 91G 75G 76G 77G 78G 35G B3G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG	89P8308	*
Dutch (models 13G 51G 71G 72G 73G 74G 16G 53G 64G 83G 91G 75G 76G 77G 78G 35G B3G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG)	89P8309	*
French (models 13G 51G 71G 72G 73G 74G 16G 53G 64G 83G 91G 75G 76G 77G 78G 35G B3G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG)	89P8310	*

8191 Keyboards (Standard PS/2 Black)	FRU#	CRU
German (models 13G 51G 71G 72G 73G 74G 16G 53G 64G 83G 91G 75G 76G 77G 78G 35G B3G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG)	89P8313	*
Greek (models 13G 51G 71G 72G 73G 74G 16G 53G 64G 83G 91G 75G 76G 77G 78G 35G B3G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG)	89P8314	*
Belgian/UK (models 13G 51G 71G 72G 73G 74G 16G 53G 64G 83G 91G 75G 76G 77G 78G 35G B3G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG)	89P8303	*
Hebrew (models 13G 51G 71G 72G 73G 74G 16G 53G 64G 83G 91G 75G 76G 77G 78G 35G B3G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG)	89P8315	*
Hungarian (models 13G 51G 71G 72G 73G 74G 16G 53G 64G 83G 91G 75G 76G 77G 78G 35G B3G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG)	89P8316	*
Iceland (models 13G 51G 71G 72G 73G 74G 16G 53G 64G 83G 91G 75G 76G 77G 78G 35G B3G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG)	89P8317	*
Italian 141 (models 13G 51G 71G 72G 73G 74G 16G 53G 64G 83G 91G 75G 76G 77G 78G 35G B3G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG)	89P8318	*
Italian 142 (models 13G 51G 71G 72G 73G 74G 16G 53G 64G 83G 91G 75G 76G 77G 78G 35G B3G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG)	89P8319	*
LA Spanish (models 11S 11D 11Y 14S 14Y 21S 21D 21Y 22S 22Y 31S 31D 31Y 33S 33Y 41S 41Y 61S 61Y D1S D1Y 54S 54Y 65S 65Y 85S 85Y 92S 92Y B2S B2Y 83S 83Y 91S 91Y)	89P8322	*
Norwegian (models 13G 51G 71G 72G 73G 74G 16G 53G 64G 83G 91G 75G 76G 77G 78G 35G B3G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG)	89P8323	*
Polish (models 13G 51G 71G 72G 73G 74G 16G 53G 64G 83G 91G 75G 76G 77G 78G 35G B3G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG	89P8324	*
Portuguese (models 13G 51G 71G 72G 73G 74G 16G 53G 64G 83G 91G 75G 76G 77G 78G 35G B3G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG)	89P8325	*
Romanian (models 13G 51G 71G 72G 73G 74G 16G 53G 64G 83G 91G 75G 76G 77G 78G 35G B3G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG)	89P8326	*
Russian (models 13G 51G 71G 72G 73G 74G 16G 53G 64G 83G 91G 75G 76G 77G 78G 35G B3G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG)	89P8327	*
Russian/Cyrillic (models 13G 51G 71G 72G 73G 74G 16G 53G 64G 83G 91G 75G 76G 77G 78G 35G B3G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG)	89P8328	*
Serbian/Cyrillic (models 13G 51G 71G 72G 73G 74G 16G 53G 64G 83G 91G 75G 76G 77G 78G 35G B3G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG)	89P8329	*
Slovak (models 13G 51G 71G 72G 73G 74G 16G 53G 64G 83G 91G 75G 76G 77G 78G 35G B3G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG)	89P8330	*
Spanish (models 13G 51G 71G 72G 73G 74G 16G 53G 64G 83G 91G 75G 76G 77G 78G 35G B3G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG)	89P8331	*
Swedish/Finn (models 13G 51G 71G 72G 73G 74G 16G 53G 64G 83G 91G 75G 76G 77G 78G 35G B3G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG)	89P8332	*
Swiss F/G (models 13G 51G 71G 72G 73G 74G 16G 53G 64G 83G 91G 75G 76G 77G 78G 35G B3G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG)	89P8333	*
Turkish 440 (models 13G 51G 71G 72G 73G 74G 16G 53G 64G 83G 91G 75G 76G 77G 78G 35G B3G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG)	89P8335	*
Turkish 179 (models 13G 51G 71G 72G 73G 74G 16G 53G 64G 83G 91G 75G 76G 77G 78G 35G B3G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG)	89P8336	*
UK English (models 13G 51G 71G 72G 73G 74G 16G 53G 64G 83G 91G 75G 76G 77G 78G 35G B3G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG)	89P8337	*
US Euro (models 13G 51G 71G 72G 73G 74G 16G 53G 64G 83G 91G 75G 76G 77G 78G 35G B3G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG)	89P8338	*

8191 Keyboards (Standard PS/2 Black)	FRU#	CRU
Yugoslav/Latin (models 13G 51G 71G 72G 73G 74G 16G 53G 64G 83G 91G 75G 76G 77G 78G 35G B3G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG)	89P8339	*
Brazil/Portuguese (models 11P 14P 21P 22P 31P 33P 41P 61P D1P 54P 65P 85P)	89P8304	*

8191 Power Cords	FRU#	CRU
Power Cord (models 11U 11S 11P 11D 12U 13G 14S 14P 21U 21S 21P 21D 22U 22S 22P 41S 41P 51G 61S 61P 71G 72G 73G 74G CTO CAU CBU CCU CDU 16G 42M 34M B1M B2U 53G 54U 63M 64G 81M 82M 83G 91G 75G 76G 77G 78G D1U D1S D1P D1U D1S D1P 84U 84S 84P 54S 54P 35G B3G 65S 65P 85S 85P 66G 79G 7BG D2M D3G 86M 87M 92S 7CG 7DG 7EG 7FG 7GG B2S 83S 91S)	6952301	*
Power Cord (models 15M 23M 62M)	13F9939	*
Power Cord (models 13G 51G 71G 72G 73G 74G 16G 53G 64G 83G 91G 75G 76G 77G 78G 35G B3G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG)	13F9978	*
Power Cord (models 13G 51G 71G 72G 73G 74G 16G 53G 64G 83G 91G 75G 76G 77G 78G 35G B3G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG)	14F0032	*
Power Cord (models 13G 51G 71G 72G 73G 74G 16G 53G 64G 83G 91G 75G 76G 77G 78G 35G B3G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG)	13F9996	*
Power Cord (models 11S 11P 11D 11Y 13G 14S 14P 14Y 21S 21P 21D 21Y 22S 22P 22Y 41S 41P 41Y 51G 61S 61P 61Y 71G 72G 73G 74G 16G 53G 64G 83G 91G 75G 76G 77G 78G D1S D1P D1Y D1S D1P D1Y 84S 84P 84Y 54S 54P 54Y 35G B3G 65S 65P 65Y 85S 85P 85Y 66G 79G 7BG D3G 92S 92Y 7CG 7DG 7EG 7FG 7GG B2S B2Y 83S 83Y 91S 91Y)	14F0068	*
Power Cord (models 11Y 14Y 21Y 22Y 41Y 61Y D1Y D1Y 84Y 54Y 65Y 85Y 92Y B2Y 83Y 91Y)	36L8879	*
Power Cord (models 13G 51G 71G 72G 73G 74G 16G 53G 64G 83G 91G 75G 76G 77G 78G 35G B3G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG)	14F0086	*
Power Cord (models 13G 51G 71G 72G 73G 74G 16G 53G 64G 83G 91G 75G 76G 77G 78G 35G B3G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG)	14F0014	*
Power Cord (models 13G 51G 71G 72G 73G 74G 16G 53G 64G 83G 91G 75G 76G 77G 78G 35G B3G 66G 79G 7BG D3G 7CG 7DG 7EG 7FG 7GG)	14F0050	*

Machine Type 8198

Item #	8198 FRUs	FRU#	CRU
1	Side cover assembly (all models)	59P8547	*
2	″L″ Cover assembly (all models)	59P8546	*
3	Front bezel assembly (all models)	59P8544	
4	Trim bezel/Label kit (all models)	49P1900	
5	CD-ROM Drive 48X - Black (models 11S 11Y 31S 31Y 41S 41Y 61S 61Y 12U 22U 32U 42U 91U 63U 93U)	33P3203	*
5	CD-ROM Drive 48X - Black w/o jack & vol (models 81U 51U 76G 52G 53G 64G 83G A1U 71G 72G 73G 74G 75G 65G 77G)	71P7367	*
5	CD-ROM Drive 48X - Black w/o jack & vol (models 81U 51U 76G 52G 53G 64G 83G A1U 71G 72G 73G 74G 75G 65G 77G)	71P7369	*
5	CD-ROM Drive 48X - Black w/o jack & vol (models 81U 51U 76G 52G 53G 64G 83G A1U 71G 72G 73G 74G 75G 65G 77G)	71P7375	*
5	CD-ROM Drive 48X - Black w/o jack & vol (models 81U 51U 76G 52G 53G 64G 83G A1U 71G 72G 73G 74G 75G 65G 77G)	71P7385	*

Item #	8198 FRUs	FRU#	CRU
5	CD-ROM Drive 48X - Black w/o jack & vol (models 81U 51U 76G 52G 53G 64G 83G A1U 71G 72G 73G 74G 75G 65G 77G)	71P7371	*
5	48X CDROM (Black) (models 11S 11Y 31S 31Y 41S 41Y 61S 61Y 12U 22U 32U 42U 91U 63U 93U)	71P7353	*
5	48X24X48X CD-RW (Black) (models 92U 94U)	33P3289	*
5	CD-RW Drive (48X/32X/48X) (models 82U A2U)	71P7347	*
5	CD-RW Drive (48X/32X/48X) (models 82U A2U)	71P7349	*
6	FDD, 3.5 1.44MB (models 11S 11Y 31S 31Y 41S 41Y 61S 61Y 12U 22U 32U 42U 91U 92U 63U 93U 94U 81U 82U 51U 76G 52G 53G 64G 83G A1U A2U 71G 72G 73G 74G 75G 65G 77G)	76H4091	* *
7	HDD, 40GB EIDE	19K1562	*
7	HDD, 40GB EIDE (models 11S 11Y 31S 31Y 41S 41Y 61S 61Y 12U 22U 32U 42U 91U 92U 63U 93U 94U 81U 82U 51U 76G 52G 53G 64G 83G A1U A2U 71G 72G 73G 74G 75G 65G 77G)	19K1568	*
8	System board, 10/100 E-net, no POV (models 41S 41Y 61S 61Y 11S 11Y 31S 31Y 12U 22U 32U 42U 91U 92U 63U 93U 94U 81U 82U 51U 76G 52G 53G 64G 83G A1U A2U 71G 72G 73G 74G 75G 65G 77G)	02R4637	N
8	System board, 10/100 @400/533FSB, w/AGP plug, wo-POV **Only use if 533FSB and AGP plug req'd** -- optional to 02R4637 (models 41S 41Y 61S 61Y 11S 11Y 31S 31Y 12U 22U 32U 42U 91U 92U 63U 93U 94U 81U 82U 51U 76G 64G 83G A1U A2U 74G 75G)	88P8477	N
9	128 MB SDRAM (models 12U 22U 32U 42U 63U 51U 76G 71G)	33L3303	*
9	256 MB SDRAM (models 11S 11Y 31S 31Y 41S 41Y 61S 61Y 91U 92U 93U 94U 81U 82U 64G 83G A1U A2U 74G 75G 65G 77G 52G 53G 72G 73G)	33L3305	*
10	Intel Celeron 2.0 GHz (models 11S 11Y 12U)	74P1617	* *
10	Intel Celeron 2.1 GHz (model 22U)	74P1619	* *
10	Intel Celeron 2.2 GHz (models 31S 31Y 32U)	74P1621	* *
10	Intel Celeron 2.4 GHz (models 51U 52G 72G)	88P7699	* *
10	Intel Celeron 2.6 GHz (models 53G 71G 73G)	13R8907	* *
10	Intel P4 2.4 GHz (models 41S 41Y 42U 91U 92U)	74P1625	* *
10	Intel P4 2.66 GHz (models 61S 61Y 63U 93U 94U 64G 74G)	74P1629	* *
10	Intel P4 2.6 GHz (400MHz FSB, 512KB cache) (models 65G 77G)	73P0574	* *
10	Intel P4 2.8 GHz (models 81U 82U 83G 75G)	74P1631	* *
10	Intel P4 3.06 GHz (models A1U A2U)	74P1633	* *
11	Fan sink (models 11S 11Y 31S 31Y 41S 41Y 61S 61Y 12U 22U 32U 42U 91U 92U 63U 93U 94U 81U 82U 51U 76G 52G 53G 64G 83G A1U A2U 71G 72G 73G 74G 75G 52G 72G 53G 71G 73G 64G 74G 83G 75G 65G 77G)	32P4004	* *
11	Fan sink (models A1U A2U)	01R3330	* *
11	P4 mounting assembly (all models)	48P6726	*
12	Power supply, 230W (models 11S 11Y 31S 31Y 41S 41Y 61S 61Y 12U 22U 32U 42U 91U 92U 63U 93U 94U 81U 82U 51U 76G 52G 53G 64G 83G A1U A2U 71G 72G 73G 74G 75G 65G 77G)	74P4300	N
13	Chassis assembly (all models)	59P8542	*

The FRUs listed in the following table are not illustrated.

8198 FRUs	FRU#	CRU
Bezel blanks kit (all models)	25P0068	*
Front bezel release kit (all models)	25P0069	*
Cable, audio (all models)	75H9219	*
5.25 EMC shield (all models)	19K5548	*
Rubber foot (all models)	03K9655	*
Misc. hardware kit (all models)	09N5764	*
Universal adapter bracket (all models)	32P4743	*
80 mm fan assembly (models with 3.06Ghz microprocessor or greater)	22P4447	*
Cable, audio assembly (all models)	49P1933	*
Cable, dual USB 2.0 (all models)	49P4365	*
HDD bracket assembly (all models)	59P8543	*
HDD tray (all models)	59P8549	*
Control panel assembly (all models)	59P8545	*
Bezel, FDD (all models)	59P8548	*
Cable, IDE (all models)	59P8571	*
Cable, IDE (all models)	59P8572	*
Battery, 3.0 V (all models)	33F8354	*
Mouse, 2 button, black (models 11S 11Y 31S 31Y 41S 41Y 61S 61Y 12U 22U 32U 42U 63U 76G 52G 53G 64G 83G 71G 72G 73G 74G 75G 65G 77G)	24P0383	*
Mouse, optical wheel (models 91U 92U 93U 94U 81U 82U 51U A1U A2U)	89P5089	*
Soft modem V.92/V.44 (models 91U 92U 93U 94U 81U 82U)	22P7943	*
Speakers, Infinity Active T1 (Black) (models 91U 92U 93U 94U 81U 82U)	25P4726	*
Speaker Power brick - US, CE, CF, LA, Taiwan (models 91U 92U 93U 94U 81U 82U)	10K2587	*
Cable clip (all models)	59P8584	*
RJ11 connector adapter (Spain, Ireland) (All ″G″ models)	60H6043	*
RJ11 connector adapter (Austria) (All ″G″ models)	60H6045	*
RJ11 connector adapter (Belgium) (All ″G″ models)	60H6046	*
RJ11 connector adapter (Denmark) (All ″G″ models)	60H6047	*
RJ11 connector adapter (Norway, Finland) (All ″G″ models)	60H6048	*
RJ11 connector adapter (France) (All ″G″ models)	60H6049	*
RJ11 connector adapter (Germany) (All ″G″ models)	60H6050	*
RJ11 connector adapter (UK, NZ, HK) (All ″G″, ″M″, ″B″, ″H″ models)	60H6051	*
RJ11 connector adapter (Italy) (All ″G″ models)	60H6052	*
RJ11 connector adapter (Netherlands) (All ″G″ models)	60H6053	*
RJ11 connector adapter (Sweden) (All ″G″ models)	60H6054	*
RJ11 connector adapter (Switzerland) (All ″G″ models)	60H6055	*

8198 Windows XP Home Recovery CDs	FRU#	CRU
US/UK/AP/TH (models 76G 71G)	13R9714	*
FR/CF (models 76G 71G)	13R9715	*

8198 Windows XP Home Recovery CDs	FRU#	CRU
GR (models 76G 71G)	13R9716	*
SP/LA (models 76G 71G)	13R9717	*
IT (models 76G 71G)	13R9718	*
SV (models 76G 71G)	13R9720	*
DK (models 76G 71G)	13R9721	*
FI (models 76G 71G)	13R9722	*
NO (models 76G 71G)	13R9723	*
NL (models 76G 71G)	13R9724	*
HE (models 76G 71G)	13R9725	*
PL (models 76G 71G)	13R9726	*
CZ (models 76G 71G)	13R9727	*
AE (models 76G 71G)	13R9728	*
RU (models 76G 71G)	13R9729	*
TR (models 76G 71G)	13R9730	*
HU (models 76G 71G)	13R9731	*
PO (models 76G 71G)	13R9732	*
GK (models 76G 71G)	13R9733	*

8198 Windows XP Pro Recovery CDs	FRU#	CRU
US/UK/AP/TH (models 51U 12U 22U 32U 42U 63U 91U 92U 93U 94U 81U 82U 52G 53G 64G 83G A1U A2U 72G 73G 74G 75G 65G 77G)	13R9693	*
FR/CF (models 52G 53G 64G 83G 72G 73G 74G 75G 65G 77G)	13R9694	*
GR (models 52G 53G 64G 83G 72G 73G 74G 75G 65G 77G)	13R9695	*
SP (models 52G 53G 64G 83G 72G 73G 74G 75G 65G 77G)	13R9696	*
IT (models 52G 53G 64G 83G 72G 73G 74G 75G 65G 77G)	13R9697	*
SV (models 52G 53G 64G 83G 72G 73G 74G 75G 65G 77G)	13R9699	*
DK (models 52G 53G 64G 83G 72G 73G 74G 75G 65G 77G)	13R9700	*
FI (models 52G 53G 64G 83G 72G 73G 74G 75G 65G 77G)	13R9702	*
NO (models 52G 53G 64G 83G 72G 73G 74G 75G 65G 77G)	13R9703	*
NL (models 52G 53G 64G 83G 72G 73G 74G 75G 65G 77G)	13R9704	*
HE (models 52G 53G 64G 83G 72G 73G 74G 75G 65G 77G)	13R9705	*
PL (models 52G 53G 64G 83G 72G 73G 74G 75G 65G 77G)	13R9706	*
CZ (models 52G 53G 64G 83G 72G 73G 74G 75G 65G 77G)	13R9707	*
AE (models 52G 53G 64G 83G 72G 73G 74G 75G 65G 77G)	13R9708	*
RU (models 52G 53G 64G 83G 72G 73G 74G 75G 65G 77G)	13R9709	*
TR (models 52G 53G 64G 83G 72G 73G 74G 75G 65G 77G)	13R9710	*
HU (models 52G 53G 64G 83G 72G 73G 74G 75G 65G 77G)	13R9711	*
PO (models 52G 53G 64G 83G 72G 73G 74G 75G 65G 77G)	13R9712	*
GK (models 52G 53G 64G 83G 72G 73G 74G 75G 65G 77G)	13R9713	*
Multilingual RCD 1	19R1269	*
Multilingual RCD 2	19R1271	*

8198 Keyboards (Standard PS/2 Black)	FRU#	CRU
US English (models 12U 22U 32U 42U 91U 92U 63U 93U 94U 81U 82U 51U 76G 52G 53G 64G 83G A1U A2U 71G 72G 73G 74G 75G 65G 77G)	89P8300	*
Arabic (models 76G 52G 53G 64G 83G 71G 72G 73G 74G 75G 65G 77G)	89P8301	*
Belgian/French (models 76G 52G 53G 64G 83G 71G 72G 73G 74G 75G 65G 77G)	89P8302	*
Belgian/UK (models 76G 52G 53G 64G 83G 71G 72G 73G 74G 75G 65G 77G)	89P8303	*
Bulgarian (models 76G 52G 53G 64G 83G 71G 72G 73G 74G 75G 65G 77G)	89P8305	*
Czech (models 76G 52G 53G 64G 83G 71G 72G 73G 74G 75G 65G 77G)	89P8307	*
Danish (models 76G 52G 53G 64G 83G 71G 72G 73G 74G 75G 65G 77G)	89P8308	*
Dutch (models 76G 52G 53G 64G 83G 71G 72G 73G 74G 75G 65G 77G)	89P8309	*
French (models 76G 52G 53G 64G 83G 71G 72G 73G 74G 75G 65G 77G)	89P8310	*
German (models 76G 52G 53G 64G 83G 71G 72G 73G 74G 75G 65G 77G)	89P8313	*
Greek (models 76G 52G 53G 64G 83G 71G 72G 73G 74G 75G 65G 77G)	89P8314	*
Hebrew (models 76G 52G 53G 64G 83G 71G 72G 73G 74G 75G 65G 77G)	89P8315	*
Hungarian (models 76G 52G 53G 64G 83G 71G 72G 73G 74G 75G 65G 77G)	89P8316	*
Iceland (models 76G 52G 53G 64G 83G 71G 72G 73G 74G 75G 65G 77G)	89P8317	*
Italian 141 (models 76G 52G 53G 64G 83G 71G 72G 73G 74G 75G 65G 77G)	89P8318	*
Italian 142 (models 76G 52G 53G 64G 83G 71G 72G 73G 74G 75G 65G 77G)	89P8319	*
LA Spanish (models 11S 11Y 31S 31Y 41S 41Y 61S 61Y)	89P8322	*
Norwegian (models 76G 52G 53G 64G 83G 71G 72G 73G 74G 75G 65G 77G)	89P8323	*
Polish (models 76G 52G 53G 64G 83G 71G 72G 73G 74G 75G 65G 77G)	89P8324	*
Portugese (models 76G 52G 53G 64G 83G 71G 72G 73G 74G 75G 65G 77G)	89P8325	*
Romanian (models 76G 52G 53G 64G 83G 71G 72G 73G 74G 75G 65G 77G)	89P8326	*
Russian (models 76G 52G 53G 64G 83G 71G 72G 73G 74G 75G 65G 77G)	89P8327	*
Russian/Cyrilic (models 76G 52G 53G 64G 83G 71G 72G 73G 74G 75G 65G 77G)	89P8328	*
Serbian/Cyrilic (models 76G 52G 53G 64G 83G 71G 72G 73G 74G 75G 65G 77G)	89P8329	*
Slovak (models 76G 52G 53G 64G 83G 71G 72G 73G 74G 75G 65G 77G)	89P8330	*
Spanish (models 76G 52G 53G 64G 83G 71G 72G 73G 74G 75G 65G 77G)	89P8331	*
Swedish/Finn (models 76G 52G 53G 64G 83G 71G 72G 73G 74G 75G 65G 77G)	89P8332	*
Swiss, F/G (models 76G 52G 53G 64G 83G 71G 72G 73G 74G 75G 65G 77G)	89P8333	*
Turkish 440 (models 76G 52G 53G 64G 83G 71G 72G 73G 74G 75G 65G 77G)	89P8335	*
Turkish 179 (models 76G 52G 53G 64G 83G 71G 72G 73G 74G 75G 65G 77G)	89P8336	*
UK English (models 76G 52G 53G 64G 83G 71G 72G 73G 74G 75G 65G 77G)	89P8337	*
US Euro (models 76G 52G 53G 64G 83G 71G 72G 73G 74G 75G 65G 77G)	89P8338	*
Yugoslav/Latin (models 76G 52G 53G 64G 83G 71G 72G 73G 74G 75G 65G 77G)	89P8339	*

8198 Power Cords	FRU#	CRU
Power Cord (US,Japan, Mexico) (models 11S 31S 41S 61S 12U 22U 32U 63U 93U 94U 81U 82U 51U 76G 52G 53G 64G 83G A1U A2U 71G 72G 73G 74G 75G 65G 77G)	6952301	*
Power Cord (Afghan Belgium Congo) (models 76G 52G 53G 64G 83G 71G 72G 73G 74G 75G 65G 77G)	13F9978	*
Power Cord (Baharain Iraq UK) (models 76G 52G 53G 64G 83G 71G 72G 73G 74G 75G 65G 77G)	14F0032	*

8198 Power Cords	FRU#	CRU
Power Cord (Denmark) (models 76G 52G 53G 64G 83G 71G 72G 73G 74G 75G 65G 77G)	13F9996	*
Power Cord (Chile, Libya, Italy) (models 11S 11Y 31S 31Y 41S 41Y 61S 61Y 76G 52G 53G 64G 83G 71G 72G 73G 74G 75G 65G 77G)	14F0068	*
Power Cord (Israel) (models 76G 52G 53G 64G 83G 71G 72G 73G 74G 75G 65G 77G)	14F0086	*
Power Cord (LA) (models 76G 52G 53G 64G 83G 71G 72G 73G 74G 75G 65G 77G)	14F0014	*
Power Cord (Lichtenstine, Switzerland) (models 76G 52G 53G 64G 83G 71G 72G 73G 74G 75G 65G 77G)	14F0050	*
Power Cord (Arg Parguay Urguay)(models 11Y 31Y 41Y 61Y)	36L8879	*

Machine Type 8199
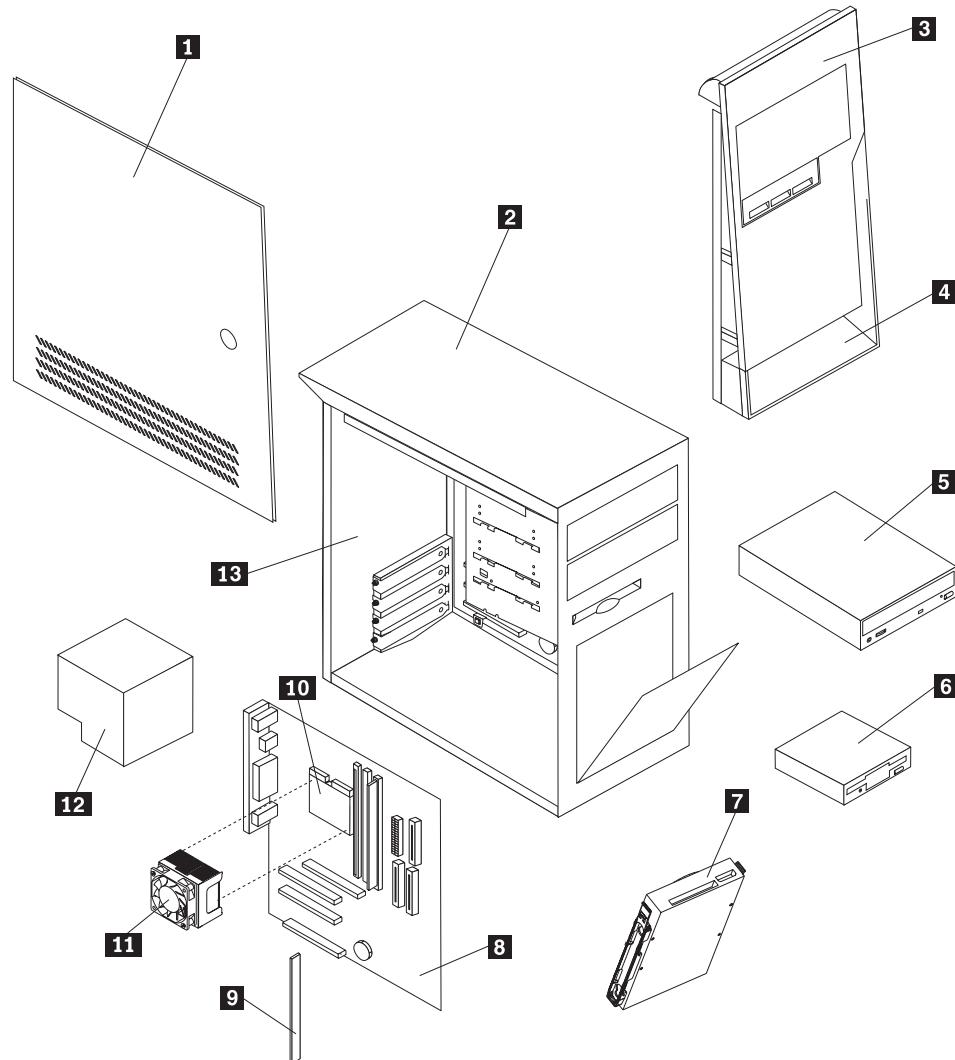
Item #	8199 FRUs	FRU#	CRU
1	Side cover assembly (all models)	59P8547	*
2	″L″ Cover assembly (all models)	59P8546	*
3	Front bezel assembly (all models)	59P8544	*

Item #	8199 FRUs	FRU#	CRU
4	Trim bezel/Label kit (all models)	49P1900	*
5	CD-ROM Drive 48X - Black (models 11U 14M 21U 22S 22Y 24M 31U 32Y 41U 42Y 32S 42S 44U 44F 62U 65U 65F 91U 93U 15U 15F 34U 34F 91F 93F)	33P3203	*
5	CD-ROM Drive 48X - Black w/o jack & vol (models 16U 36U 36S 36D 36Y 51U B1U 46U 67U D1U 54U E1U 83U 68S 68D 68Y 88U 88S 88D 88Y F5U)	71P7367	*
5	CD-ROM Drive 48X - Black w/o jack & vol (models 16U 36U 36S 36D 36Y 51U B1U 46U 67U D1U 54U E1U 83U 68S 68D 68Y 88U 88S 88D 88Y F5U)	71P7369	*
5	CD-ROM Drive 48X - Black w/o jack & vol (models 16U 36U 36S 36D 36Y 51U B1U 46U 67U D1U 54U E1U 83U 68S 68D 68Y 88U 88S 88D 88Y F5U)	71P7375	*
5	CD-ROM Drive 48X - Black w/o jack & vol (models 54U E1U 83U 68S 68D 68Y 88U 88S 88D 88Y F5U)	71P7385	*
5	CD-ROM Drive 48X - Black w/o jack & vol (models 54U E1U 83U 68S 68D 68Y 88U 88S 88D 88Y F5U)	71P7371	*
5	48X CDROM (Black) (models 11U 14M 21U 22S 22Y 24M 31U 32Y 41U 42Y 32S 42S 44U 44F 62U 65U 65F 91U 93U 15U 15F 34U 34F 91F 93F)	71P7353	*
5	48X24X48X CD-RW (Black) (models 13U 13S 13D 13Y 23U 23S 23D 23Y 33U 33S 33D 33Y 43U 43S 43D 43Y 64U 92U 94U 92F 94F)	33P3289	*
5	CD-RW Drive (48X/32X/48X) (models 52U 52S 52D 52Y 53M B2U B2S B2P B2D B2Y B3M E2U 84U 55U E2S E2D E2Y 87S 87D 87Y F6U F6S F6D F6Y F7S F7D F7Y)	71P7347	*
5	CD-RW Drive (48X/32X/48X) (models 52U 52S 52D 52Y 53M B2U B2S B2P B2D B2Y B3M E2U 84U 55U E2S E2D E2Y 87S 87D 87Y F6U F6S F6D F6Y F7S F7D F7Y)	71P7349	*
6	FDD, 3.5 1.44MB (models 11U 13U 13S 13D 13Y 14M 21U 22S 22Y 23U 23S 23D 23Y 24M 31U 32Y 33U 33S 33D 33Y 41U 42Y 43U 43S 43D 43Y CAU CBU CCU CDU CGU CHU CJU 32S 42S 44U 44F 62U 64U 65U 65F 91U 92U 93U 94U 15U 15F 34U 34F 35U 35F 45U 45F 66U 66F 91F 92F 93F 94F 16U 36U 36S 36D 36Y 51U 52U 52S 52D 52Y 53M B1U B2U 46U CKU CLU CMU CNU CPU 67U D1U D2U D2F B2S B2P B2D B2Y 54U B3M E1U E2U E3U E4U 83U 84U 85U 85F 86U 86F CQU 55U E2S E2D E2Y 87S 87D 87Y E3F E4F 68S 68D 68Y 88U 88S 88D 88Y F5U F6U F6S F6D F6Y F7S F7D F7Y)	76H4091	* *
7	HDD, 40GB EIDE (models 11U 14M 21U 22S 22Y 24M 31U 32Y 41U 42Y 32S 42S 44U 44F 62U 65U 65F 91U 92U 93U 94U 15U 15F 34U 34F 35U 35F 45U 45F 66U 66F 91F 92F 93F 94F 16U 36U 36S 36D 36Y 51U B1U 46U 67U D1U D2U D2F 54U E1U E3U 83U 85U 85F 86U 86F 55U E3F E4F E4U 88U 88S 88D 88Y F5U F6U F6S F6D F6Y)	19K1568	*
7	HDD, 80GB EIDE (models 13U 13S 13D 13Y 23U 23S 23D 23Y 33U 33S 33D 33Y 43U 43S 43D 43Y 64U 52U 52S 52D 52Y 53M B2U B2S B2P B2D B2Y B3M E2U 84U E2S E2D E2Y 87S 87D 87Y 68S 68D 68Y F7S F7D F7Y)	24P3665	*
8	System board, 10/100 E-net, with AGP plug, no POV (models 41U 42Y 43U 43S 43D 43Y CGU CHU CJU 11U 13U 13S 13D 13Y 21U 22S 22Y 23U 23S 23D 23Y 31U 32Y 33U 33S 33D 33Y 41U 42U 42Y 43U 43S 43D 43Y CAU CBU CCU CDU CEU 32S 42S 44U 44F 62U 64U 65U 65F 91U 92U 93U 94U 15U 15F 34U 34F 35U 35F 45U 45F 66U 66F 91F 92F 93F 94F 16U 36U 36S 36D 36Y 51U 52U 52S 52D 52Y B1U B2U 46U CKU CLU CMU CNU CPU 67U D1U D2U D2F B2S B2P B2D B2Y 54U E1U E2U E3U E4U 83U 84U 85U 85F 86U 86F CQU 55U E2S E2D E2Y 87S 87D 87Y E3F E4F 68S 68D 68Y 88U 88S 88D 88Y F5U F6U F6S F6D F6Y F7S F7D F7Y)	02R4637	N

Item #	8199 FRUs	FRU#	CRU
8	System board, 10/100 E-net, with AGP plug, no POV (models 41U 42Y 43U 43S 43D 43Y CGU CHU CJU 11U 13U 13S 13D 13Y 21U 22S 22Y 23U 23S 23D 23Y 31U 32Y 33U 33S 33D 33Y 41U 42U 42Y 43U 43S 43D 43Y CAU CBU CCU CDU CEU 32S 42S 44U 44F 62U 64U 65U 65F 91U 92U 93U 94U 15U 15F 34U 34F 35U 35F 45U 45F 66U 66F 91F 92F 93F 94F 16U 36U 36S 36D 36Y 51U 52U 52S 52D 52Y B1U B2U 46U CKU CLU CMU CNU CPU 67U D1U D2U D2F B2S B2P B2D B2Y 54U E1U E2U E3U E4U 83U 84U 85U 85F 86U 86F CQU 55U E2S E2D E2Y 87S 87D 87Y E3F E4F 68S 68D 68Y 88U 88S 88D 88Y F5U F6U F6S F6D F6Y F7S F7D F7Y) (optional to 02R4637)	88P8477	N
8	system board, 10/100 E-net, no POV (models 14M 24M CTO 53M B3M)	02R4084	N
8	system board, 10/100 E-net, no POV (models 14M 24M CTO 53M B3M) (optional to 02R4084)	88P8474	N
9	128 MB SDRAM (models 11U 13U 13S 13D 13Y 21U 22S 22Y 23U 23S 23D 23Y 31U 32Y 33U 33S 33D 33Y 41U 42Y 43U 43S 43D 43Y CAU CBU CCU CDU CGU CHU CJU 32S 42S 62U 64U 16U 36U 36S 36D 36Y 51U 52U 52S 52D 52Y B1U B2U 46U CKU CLU CMU CNU CPU 67U D1U B2S B2P B2D B2Y 54U E1U E2U 83U 84U CQU E2S E2D E2Y 68S 68D 68Y F5U)	33L3303	*
9	256 MB SDRAM (models 14M 24M 44U 44F 65U 65F 91U 92U 93U 94U 15U 15F 34U 34F 35U 35F 45U 45F 66U 66F 91F 92F 93F 94F 53M D2U D2F 55U 87S 87D 87Y B3M E3F E4F E3U E4U 88U 88S 88D 88Y F6U F6S F6D F6Y F7S F7D F7Y)	33L3305	*
10	Intel Celeron 2.0 GHz (models 11U 12U 13U 13S 13D 13Y 14M CAU 15U 15F 16U)	74P1617	* *
10	Intel Celeron 2.1 GHz (models 21U 22S 22Y 23U 23S 23D 23Y 24M CBU)	74P1619	* *
10	Intel Celeron 2.2 GHz (models 31U 32Y 33U 33S 33D 33Y CCU 32S 34U 34F 35U 35F 36U 36S 36D 36Y)	74P1621	* *
10	Intel Celeron 2.3 GHz (model CDU)	88P5866	* *
10	Intel Celeron 2.4 GHz (models 51U 52U 52S 52D 52Y 53M CKU 54U 55U)	88P7699	* *
10	Intel Celeron 2.5 GHz (model CLU)	13R8905	* *
10	Intel Celeron 2.6 GHz (models B1U B2U CMU B2S B2P B2D B2Y B3M E1U E2U)	13R8907	* *
10	Intel Celeron 2.7 GHz (model CQU)	13R8947	* *
10	Intel Celeron 2.8 GHz (models E2S E2D E2Y CQU E3U E4U E3F E4F)	13R8963	* *
10	Intel P4 2.26 GHZ (models D1U D2U D2F)	73P0575	* *
10	Intel P4 2.4 GHz (models 41U 42Y 43U 43S 43D 43Y CGU 42S 44U 44F 91U 92U 45U 45F 91F 92F 46U)	74P1625	* *
10	Intel P4 2.53 GHz (model CHU)	74P1627	* *
10	Intel P4 2.66 GHz (models CJU 62U 64U 65U 65F 93U 94U 66U 66F 93F 94F 67U 68S 68D 68Y)	74P1629	* *
10	Intel P4 2.8 GHz (models CNU 83U 84U 85U 85F 86U 86F 87S 87D 87Y 88U 88S 88D 88Y)	74P1631	* *
10	Intel P4 3.06 GHz (models CPU F5U F6U F6S F6D F6Y F7S F7D F7Y)	74P1633	* *
11	Fan sink (models 11U 13U 13S 13D 13Y 21U 22S 22Y 23U 23S 23D 23Y 31U 32Y 33U 33S 33D 33Y 41U 42Y 43U 43S 43D 43Y CAU CBU CCU CDU CGU CHU CJU 32S 42S 62U 64U 16U 36U 36S 36D 36Y 51U 52U 52S 52D 52Y B1U B2U 46U CKU CLU CMU CNU CPU 67U D1U B2S B2P B2D B2Y 54U E1U E2U 83U 84U CQU E2S E2D E2Y 68S 68D 68Y F5U)	01R3330	* *

Item #	8199 FRUs	FRU#	CRU
11	Fan sink (models 11U 13U 13S 13D 13Y 14M 21U 22S 22Y 23U 23S 23D 23Y 24M 31U 32Y 33U 33S 33D 33Y 41U 42Y 43U 43S 43D 43Y CAU CBU CCU CDU CGU CHU CJU 32S 42S 44U 44F 62U 64U 65U 65F 91U 92U 93U 94U 15U 15F 34U 34F 35U 35F 45U 45F 66U 66F 91F 92F 93F 94F 16U 36U 36S 36D 36Y 51U 52U 52S 52D 52Y 53M CKU 46U CNU 67U D1U D2U D2F B2S B2P B2D B2Y 54U E1U E2U E3U E4U CQU 83U 84U 85U 85F 86U 86F 55U E2S E2D E2Y E2S E2D E2Y 87S 87D 87Y E3F E4F 68S 68D 68Y 88U 88S 88D 88Y)	32P4004	* *
11	P4 mounting assembly (all models)	48P6726	*
12	Power supply, 230W (models 11U 13U 13S 13D 13Y 14M 21U 22S 22Y 23U 23S 23D 23Y 24M 31U 32Y 33U 33S 33D 33Y 41U 42Y 43U 43S 43D 43Y CAU CBU CCU CDU CGU CHU CJU 32S 42S 44U 44F 62U 64U 65U 65F 91U 92U 93U 94U 15U 15F 34U 34F 35U 35F 45U 45F 66U 66F 91F 92F 93F 94F 16U 36U 36S 36D 36Y 51U 52U 52S 52D 52Y 53M B1U B2U 46U CKU CLU CMU CNU CPU 67U D1U D2U D2F B2S B2P B2D B2Y 54U B3M E1U E2U E3U E4U 83U 84U 85U 85F 86U 86F CQU 55U E2S E2D E2Y 87S 87D 87Y E3F E4F 68S 68D 68Y 88U 88S 88D 88Y F5U F6U F6S F6D F6Y F7S F7D F7Y)	74P4300	N
13	Chassis assembly (all models)	59P8542	N

The FRUs listed in the following table are not illustrated.

8199 FRUs	FRU#	CRU
Bezel blanks kit (all models)	25P0068	*
2 Audio Front Panel (models D2U D2F B3M E1U E2U E2S E2D E2Y 84U CQU)	49P1750	*
Front bezel release kit (all models)	25P0069	*
Cable, audio (all models)	75H9219	*
FRU, Cable clip	59P8584	
5.25 EMC shield (all models)	19K5548	*
Rubber foot (all models)	03K9655	*
Misc. hardware kit (all models)	09N5764	*
Universal adapter bracket (all models)	32P4743	*
80 mm fan assembly (models with 3.06Ghz microprocessor or greater)	22P4447	*
Cable, audio assembly (all models)	49P1933	*
Cable, dual USB 2.0 (all models)	49P4365	*
HDD bracket assembly (all models)	59P8543	*
HDD tray (all models)	59P8549	*
Control panel assembly (all models)	59P8545	*
Bezel, FDD (all models)	59P8548	*
Cable, IDE (all models)	59P8571	*
Cable, IDE (all models)	59P8572	*
Battery, 3.0 V (all models)	33F8354	*
Mouse, 2 button, black (models 11U 21U 22S 22Y 31U 32Y 41U 42Y 32S 42S 44U 44F 62U 65U 65F 15U 15F 34U 34F 35U 35F 45U 45F 66U 66F 16U 36U 36S 36D 36Y 46U 67U D1U D2U D2F 54U E3U E4U 83U 85U 85F 86U 86F E3F E4F F5U)	24P0383	*

8199 FRUs	FRU#	CRU
Mouse, optical wheel (models 13U 13S 13D 13Y 14M 23U 23S 23D 23Y 24M 33U 33S 33D 33Y 43S 43D 43Y CAU CBU CCU CDU CGU CHU CJU 64U 91U 92U 93U 94U 91F 92F 93F 94F 51U 52U 52S 52D 52Y 53M B1U B2U CKU CLU CMU CNU CPU B2S B2P B2D B2Y B3M E1U E2U 84U CQU 55U E2S E2D E2Y 87S 87D 87Y 68S 68D 68Y 88U 88S 88D 88Y F6U F6S F6D F6Y F7S F7D F7Y)	89P5089	*
Soft modem V.92/V.44 (models 11U 13U 13S 13D 13Y 14M 21U 23U 23S 23D 23Y 24M 31U 33U 33S 33D 33Y 41U 43U 43S 43D 43Y 62U 64U 91U 92U 93U 94U 91F 92F 93F 94F 51U 52U 52S 52D 52Y 53M B1U B2U B2S B2P B2D B2Y B3M E1U E2U E3U E4U 83U 84U 55U E2S E2D E2Y 87S 87D 87Y E3F E4F 68S 68D 68Y 88U 88S 88D 88Y F6U F6S F6D F6Y F7S F7D F7Y)	22P7943	*
Speakers, Infinity Active T1 (Black) (models 11U 13U 13D 21U 23U 23D 31U 33U 33D 14M 24M 13S 13Y 23S 23Y 33S 33Y 41U 43U 43D 43S 43Y 62U 64U 91U 92U 93U 94U 91F 92F 93F 94F 51U 52U 52D B1U B2U 53M 52S 52Y B2P B2D B2S B2Y E1U E2U 84U B3M 55U E2D 87D E2S E2Y 87S 87Y 68D 88U 88D F6U F6D F7D 68S 68Y 88S 88Y F6S F6Y F7S F7Y)	25P4726	*
Speaker Power brick - US, CE, CF, LA, Taiwan (models 11U 13U 13D 21U 23U 23D 31U 33U 33D 13S 13Y 23S 23Y 33S 33Y 41U 43U 43D 43S 43Y 62U 64U 91U 92U 93U 94U 91F 92F 93F 94F 51U 52U 52D B1U B2U 52S 52Y B2P B2D B2S B2Y E1U E2U 84U 55U E2D 87D E2S E2Y 87S 87Y 68D 88U 88D F6U F6D F7D 68S 68Y 88S 88Y F6S F6Y F7S F7Y)	10K2587	*
Speaker Power brick - ANZ (models 14M 24M 53M B3M)	25P5705	*
Speaker Power brick - Argentina (models 13S 13Y 23S 23Y 33S 33Y 43S 43Y 52S 52Y B2S B2Y E2S E2Y 87S 87Y 68S 68Y 88S 88Y F6S F6Y F7S F7Y)	01R2253	*
RJ11 connector adapter (Spain, Ireland) (All "G" models)	60H6043	*
RJ11 connector adapter (Austria) (All "G" models)	60H6045	*
RJ11 connector adapter (Belgium) (All "G" models)	60H6046	*
RJ11 connector adapter (Denmark) (All "G" models)	60H6047	*
RJ11 connector adapter (Norway, Finland) (All "G" models)	60H6048	*
RJ11 connector adapter (France) (All "G" models)	60H6049	*
RJ11 connector adapter (Germany) (All "G" models)	60H6050	*
RJ11 connector adapter (UK, NZ, HK) (All "G", "M", "B", "H" models)	60H6051	*
RJ11 connector adapter (Italy) (All "G" models)	60H6052	*
RJ11 connector adapter (Netherlands) (All "G" models)	60H6053	*
RJ11 connector adapter (Sweden) (All "G" models)	60H6054	*
RJ11 connector adapter (Switzerland) (All "G" models)	60H6055	*

8199 Windows XP Pro Recovery CDs	FRU#	CRU
US (models E4U 86U 15U 34U 35U 44U 45U 65U 66U 91U 92U 93U 94U D2U)	13R9693	*
FR (models86F 15F 34F 35F 44F 45F 65F 66F 91F 92F 93F 94F D2F E4F)	13R9694	*
SP (models 22S 22Y 32S 32Y 42S 42Y)	13R9696	*

8199 Windows XP Home Recovery CDs	FRU#	CRU
US (models54U B3M E1U E2U E3U 83U 84U 85U 55U 11U 13U 14M 21U 23U 24M 31U 33U 41U 43U 62U 64U 16U 36U 51U 52U 53M B1U B2U 46U 67U D1U 88U F5U F6U)	13R9714	*
US (models 54U B3M E1U E2U E3U 83U 84U 85U 55U)	13R9714	*
FR/CF (models 85F KUF E3F)	13R9715	*

8199 Windows XP Home Recovery CDs	FRU#	CRU
SP (models E2S E2D E2Y 87S 87D 87Y 13S 13D 13Y 23S 23D 23Y 33S 33D 33Y 43S 43D 43Y 36S 36D 36Y 52S 52D 52Y B2S B2D B2Y 68S 68D 68Y 88S 88D 88Y F6S F6D F6Y F7S F7D F7Y)	13R9717	*
BR (LA) (model B2P)	13R9719	*

8199 Keyboards (Standard PS/2 Black)	FRU#	CRU
US English (models 11U 13U 21U 23U 31U 33U 41U 43U CAU CBU CCU CDU CGU CHU CJU 44U 62U 64U 65U 91U 92U 93U 94U 15U 34U 35U 45U 66U 16U 36U 51U 52U B1U B2U 46U CKU CLU CMU CNU CPU 67U D1U D2U 54U E1U E2U E3U E4U 83U 84U 85U 86U CQU 55U 88U F5U F6U)	89P8300	*
Brazil/Portuguese (models B2P B2P)	89P8304	*
French Canadian 445 (models 44F 65F 15F 34F 35F 45F 66F 91F 92F 93F 94F D2F 85F 86F E3F E4F)	89P8311	*
French Canadian 58 (models 44F 65F 15F 34F 35F 45F 66F 91F 92F 93F 94F D2F 85F 86F E3F E4F)	89P8312	*
LA Spanish (models 13S 13D 13Y 22S 22Y 23S 23D 23Y 32Y 33S 33D 33Y 42Y 43S 43D 43Y 32S 42S 36S 36D 36Y 52S 52D 52Y B2S B2D B2Y E2S E2D E2Y 87S 87D 87Y 68S 68D 68Y 88S 88D 88Y F6S F6D F6Y F7S F7D F7Y)	89P8322	*

8199 Keyboards RAK III Lite	FRU#	CRU
US English (models 14M 24M 53M B3M)	19K1910	*

8199 Power Cords	FRU#	CRU
Power Cord (models 11U 13U 13S 13D 21U 22S 23U 23S 23D 31U 33U 33S 33D 41U 43U 43S 43D CAU CBU CCU CDU CGU CHU CJU CTO 32S 42S 44U 44F 62U 64U 65U 65F 91U 92U 93U 94U 15U 15F 34U 34F 35U 35F 45U 45F 66U 66F 91F 92F 93F 94F 16U 36U 36S 36D 51U 52U 52S 52D B1U B2U 46U CKU CLU CMU CNU CPU 67U D1U D2U D2F 55U E2S E2D 87S 87D E3F E4F 68S 68D 88U 88S 88D F5U F6U F6S F6D F7S F7D)	6952301	*
Power Cord (models 14M 24M 53M)	13F9939	*
Power Cord (models 13S 13D 13Y 22S 22Y 23S 23D 23Y 32Y 33S 33D 33Y 42Y 43S 43D 43Y 32S 42S 36S 36D 36Y 52S 52D 52Y E2S E2D E2Y 87S 87D 87Y 68S 68D 68Y 88S 88D 88Y F6S F6D F6Y F7S F7D F7Y)	14F0068	*
Power Cord (models 13Y 22Y 23Y 32Y 33Y 42Y 43Y 36Y 52Y E2Y 87Y 68Y 88Y F6Y F7Y)	36L8879	*

Machine Type 8316
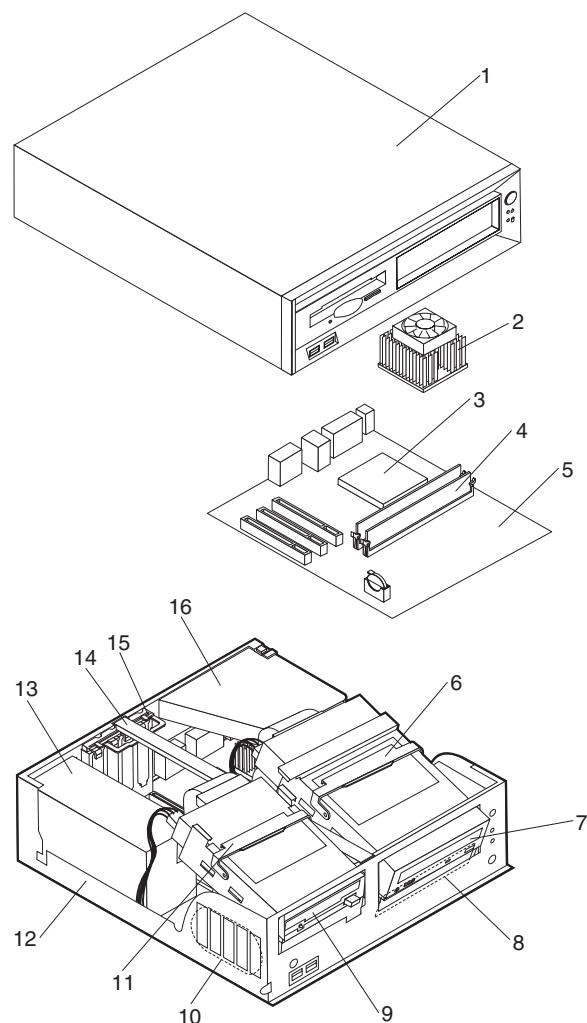
Item #	8316 FRUs	FRU#	CRU
1	Top cover assembly (all models)	88P5925	*
2	Fan sink (models 63B 11J)	32P4004	* *
3	Intel Celeron 2.0 GHz (model 11J)	74P1617	* *
3	Intel P4 2.66 GHz (model 63B)	74P1629	* *
4	256 MB SDRAM (model 63B)	33L3305	*
4	512 MB SDRAM (model 11J)	33L3307	*
5	System board, 10/100 E-net, w/o POV (model 63B)	02R4084	**
5	System board, 10/100 E-net, w/o POV (model 63B) (optional to 02R4084)	88P8474	**
5	System board, 10/100 E-net, w/AGP plug - w/o POV (model 11J)	02R4637	**
5	System board, 10/100 E-net, w/AGP plug - w/o POV (model 11J) (optional to 02R4637)	88P8477	**
6	Pivot lock, 5.25 DASD (all models)	24P9877	*
7	48X CDROM (Black) (model 11J)	33P3203	* *
7	48X CDROM (Black) (model 11J)	33P3207	* *

Item #	8316 FRUs	FRU#	CRU
7	48X CDROM (Black) (model 11J)	33P3211	* *
7	48X CDROM (Black) (model 11J)	33P3215	* *
7	48X CDROM (Black) (model 11J)	71P7353	* *
7	48X24X48X16X DVD-ROM/CD-RW combo drive (Black) (model 63B)	33P3301	* *
8	HDD, 40GB EIDE (model 11J)	19K1568	*
8	HDD, 80GB EIDE (model 63B)	24P3665	*
9	FDD, 3.5 1.44MB (model 63B)	76H4091	* *
9	FDD, 3.5 1.44MB (model 11J)	06P5291	* *
10	Speaker Assembly (all models)	00N5151	*
11	Pivot lock, 3.5 FDD (all models)	24P9876	*
12	Chassis assembly (all models)	88P5924	*
13	Power supply, 200W (models 63B 11J)	74P4305	N
14	Link bracket (all models)	88P5918	*
15	I/O cam bracket (all models)	24P9869	*
16	Air duct w/o fan (all models)	88P5922	*

The FRUs listed in the following table are not illustrated.

8316 FRUs	FRU#	CRU
5.25 EMC shield (all models)	19K5548	*
Retention kit (all models)	24P4811	*
Cable, FDD (all models)	88P5930	*
Optical cable, ATA66 (all models)	88P5929	*
Cable, primary IDE (ATA66 1 drop) (all models)	88P5928	*
Bezel kit (all models)	88P5923	*
Fan bracket assembly (all models)	88P5921	*
Misc. hardware kit (all models)	24P9878	*
Cable, CDROM audio (all models)	75H9219	*
2 audio front panel (model 63B)	49P1750	*
Stand - black (all models)	88P5917	*
Bottom foot (all models)	03K9655	*
HDD mounting bracket assembly (all models)	88P5916	*
Cable assembly, pwr/LED (all models)	37L5092	*
Cable, serial (all models)	49P4530	*
Cable, USB 2.0 (all models)	49P4365	*
Battery, 3.0 V (all models)	33F8354	*
Mouse, optical wheel (models 63B 11J)	89P5089	*
Soft modem V.92/V.44 (LP) (model 63B)	22P7945	*
Speakers, Infinity Active T1 (Black) (model 63B)	25P4726	*
Speaker Power brick - UK, Hong Kong (3 prong) (model 63B)	25P5703	*
RJ11 connector adapter (Spain, Ireland) (All ″G″ models)	60H6043	*
RJ11 connector adapter (Austria) (All ″G″ models)	60H6045	*
RJ11 connector adapter (Belgium) (All ″G″ models)	60H6046	*
RJ11 connector adapter (Denmark) (All ″G″ models)	60H6047	*
RJ11 connector adapter (Norway, Finland) (All ″G″ models)	60H6048	*
RJ11 connector adapter (France) (All ″G″ models)	60H6049	*
RJ11 connector adapter (Germany) (All ″G″ models)	60H6050	*
RJ11 connector adapter (UK, NZ, HK) (All ″G″, ″M″, ″B″, ″H″ models)	60H6051	*
RJ11 connector adapter (Italy) (All ″G″ models)	60H6052	*
RJ11 connector adapter (Netherlands) (All ″G″ models)	60H6053	*
RJ11 connector adapter (Sweden) (All ″G″ models)	60H6054	*
RJ11 connector adapter (Switzerland) (All ″G″ models)	60H6055	*

8316 Windows XP Pro Recovery CDs	FRU#	CRU
JP (model 11J)	TBD	*

8316 Windows XP Home Recovery CDs	FRU#	CRU
HK (model 63B)	13M6477	*

8316 Windows XP Pro Recovery CDs	FRU#	CRU
JP (model 11J)	13M6449	*

8316 Keyboards (Standard PS/2 Black)	FRU#	CRU
Japanese (model 11J)	89P8320	*

8316 Keyboards RAK III Lite	FRU#	CRU
Chinese/US (model 63B)	19K1915	*

8316 Power Cords	FRU#	CRU
Power Cord (model 11J)	1838576	*
Power Cord (model 63B)	02K0545	*

Machine Type 8434
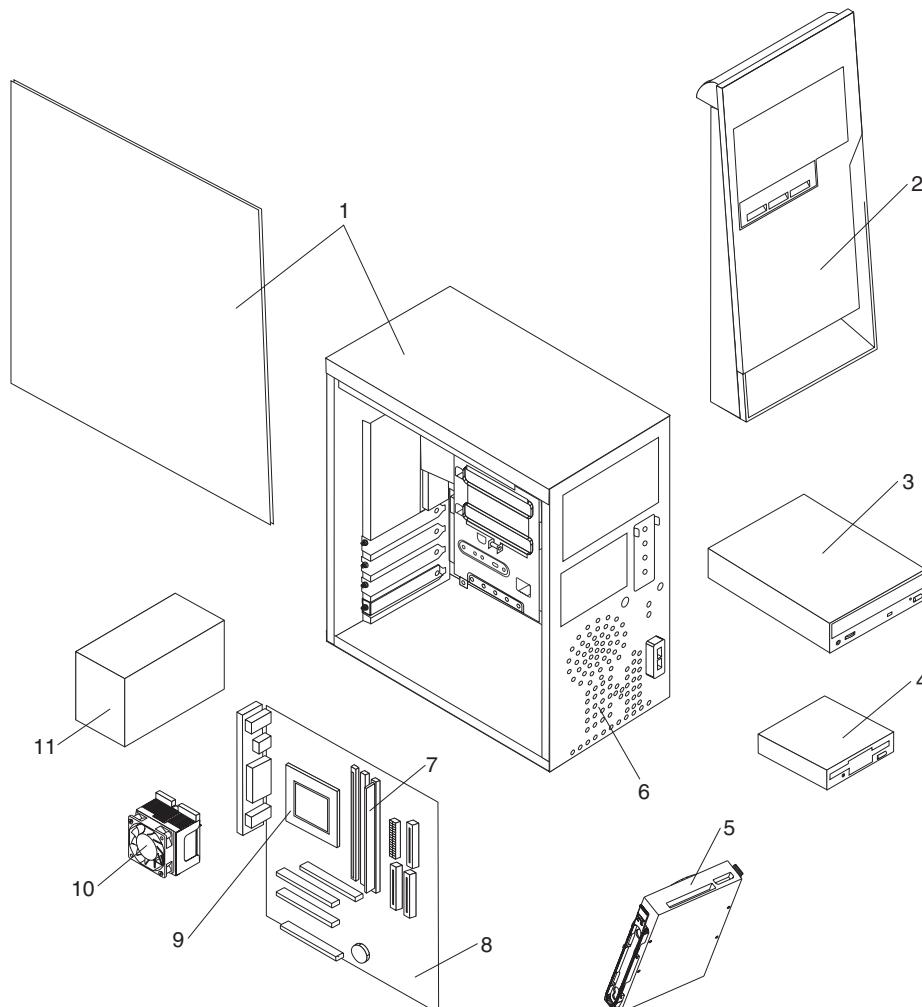
Item #	8434 FRUs	FRU#	CRU
1	Chassis assembly (all models)	74P2256	*

Item #	8434 FRUs	FRU#	CRU
2	Bezel and shield kit (all models)	74P2257	*
3	48X CD-ROM Drive (Black) (models 13B 13H 41C 42K 43K 52A 53A 53T 53B 53H 54A 54T 54C 54B 54H 54V 56A 56T 56B 56H 56V 62A 62T 63A 63T 63B 63H 63V 64K 65K 13A 13T 13V 52C 56C 61C 14C 44C 45C 67C)	33P3203	* *
3	48X CD-ROM Drive (Black) (models 13B 13H 41C 42K 43K 52A 53A 53T 53B 53H 54A 54T 54C 54B 54H 54V 56A 56T 56B 56H 56V 62A 62T 63A 63T 63B 63H 63V 64K 65K 13A 13T 13V 52C 56C 61C 14C 44C 45C 67C)	33P3207	* *
3	48X CD-ROM Drive (Black) (models 13B 13H 41C 42K 43K 52A 53A 53T 53B 53H 54A 54T 54C 54B 54H 54V 56A 56T 56B 56H 56V 62A 62T 63A 63T 63B 63H 63V 64K 65K 13A 13T 13V 52C 56C 61C 14C 44C 45C 67C)	33P3211	* *
3	48X CD-ROM Drive (Black) (models 13B 13H 41C 42K 43K 52A 53A 53T 53B 53H 54A 54T 54C 54B 54H 54V 56A 56T 56B 56H 56V 62A 62T 63A 63T 63B 63H 63V 64K 65K 13A 13T 13V 52C 56C 61C 14C 44C 45C 67C)	33P3215	* *
3	CD-ROM Drive 48X - Black w/o jack & vol (models 33B 33H 81A 81T 82C 83C 84A 84T 84B 84H 85V 86K 33J D1C 21J 87K D2A 68C 69A 69T 69B 69H 69V 88B 88H 93B 93H 21B 21H)	71P7367	* *
3	CD-ROM Drive 48X - Black w/o jack & vol (models 33B 33H 81A 81T 82C 83C 84A 84T 84B 84H 85V 86K 33J D1C 21J 87K D2A 68C 69A 69T 69B 69H 69V 88B 88H 93B 93H 21B 21H)	71P7369	* *
3	CD-ROM Drive 48X - Black w/o jack & vol (models 33B 33H 81A 81T 82C 83C 84A 84T 84B 84H 85V 86K 33J D1C 21J 87K D2A 68C 69A 69T 69B 69H 69V 88B 88H 93B 93H 21B 21H)	71P7375	* *
3	CD-ROM Drive 48X - Black w/o jack & vol (models 21J 87K 88B 88H 93B 93H 21B 21H)	71P7371	* *
3	CD-ROM Drive 48X - Black w/o jack & vol (models 21J 87K 88B 88H 93B 93H 21B 21H)	71P7385	* *
3	DVD-ROM 16X48X - Black (model 66V)	33P3297	* *
3	DVD-ROM 16X48X - Black (model 66V)	33P3281	* *
3	48X24X48X16X DVD-ROM/CD-RW combo drive (models 91K 92K 89K)	33P3301	* *
4	FDD, 3.5 1.44MB (models 11B 11H 13B 13H 41C 42K 43K 51A 52A 53A 53T 53B 53H 54A 54T 54C 54B 54H 54V 56A 56T 56B 56H 56V 62A 62T 63A 63T 63B 63H 63V 64K 65K 11A 11V 13A 13T 13V 52C 56C 61C 66V 14C 44C 45C 67C 31T 32T 32C 32H 33B 33H 81A 81T 82C 83C 84A 84T 84B 84H 85V 86K 91K D1C 87K 92K D2A 68C 69A 69T 69B 69H 69V 23C 24C 88B 88H 89K 93B 93H 21B 21H)	76H4091	* *
4	FDD, 3.5 1.44MB (models 33J 21J 87K 92K)	06P5291	* *
5	HDD, 40GB EIDE (models 11B 11H 13B 13H 41C 43K 51A 52A 53A 53T 53B 53H 54A 54T 54C 54B 54H 54V 56A 56T 56B 56H 56V 62A 62T 63A 63T 63B 63H 63V 11A 11V 13A 13T 13V 52C 56C 61C 14C 44C 45C 67C 31T 32T 32C 32H 33B 33H 81A 81T 82C 83C 84A 84T 84B 84H 85V 33J D1C 21J D2A 68C 69A 69T 69B 69H 69V 23C 24C 88B 88H 93B 93H 21B 21H)	19K1568	* *
5	HDD, 80GB EIDE (models 42K 64K 65K 66V 86K 91K 87K 92K 89K)	24P3665	* *
6	Speaker Asm. Soldered Terminals (all models)	00N5151	* *
7	128 MB SDRAM (models 11B 11H 13B 13H 51A 52A 53A 53T 53B 53H 54A 54T 54C 54B 54H 54V 62A 62T 11A 11V 13A 13T 13V 52C 14C 44C 31T 32T 32C 32H 33B 33H 81A 81T 33J D1C 21J D2A 68C 69A 69T 69B 69H 69V 23C 24C 21B 21H)	33L3303	* *
7	256 MB SDRAM (models 41C 42K 43K 56A 56T 56B 56H 56V 63A 63T 63B 63H 63V 64K 65K 56C 61C 66V 45C 67C 82C 83C 84A 84T 84B 84H 85V 86K 91K 87K 92K 88B 88H 89K 93B 93H)	33L3305	* *
8	System board, 10/100 E-net, w/o POV (models 85V 87K 92K 89K)	02R4084	N

Item #	8434 FRUs	FRU#	CRU
8	System board, 10/100 E-net, w/o POV (models 85V 87K 92K 89K) (optional to 02R4084)	88P8474	N
8	System board, 10/100 E-net, w/AGP plug - w/o POV (models 41C 42K 43K 51A 52A 53A 53T 53B 53H 54A 54T 54C 54B 54H 54V 56A 56T 56B 56H 56V 62A 62T 63A 63T 63B 63H 63V 64K 65K 11B 11H 13B 13H 11A 11V 13A 13T 13V 52C 56C 61C 66V 14C 44C 45C 67C 31T 32T 32C 32H 33B 33H 81A 81T 82C 83C 84A 84T 84B 84H 86K 91K 33J D1C 21J D2A 68C 69A 69T 69B 69H 69V 23C 24C 88B 88H 93B 93H 21B 21H)	02R4637	N
8	System board, 10/100 E-net, w/AGP plug - w/o POV (models 41C 42K 43K 51A 52A 53A 53T 53B 53H 54A 54T 54C 54B 54H 54V 56A 56T 56B 56H 56V 62A 62T 63A 63T 63B 63H 63V 64K 65K 11B 11H 13B 13H 11A 11V 13A 13T 13V 52C 56C 61C 66V 14C 44C 45C 67C 31T 32T 32C 32H 33B 33H 81A 81T 82C 83C 84A 84T 84B 84H 86K 91K 33J D1C 21J D2A 68C 69A 69T 69B 69H 69V 23C 24C 88B 88H 93B 93H 21B 21H) (optional to 02R4637)	88P8477	N
9	Intel Celeron 2.0 GHz (models 11B 11H 13B 13H 11A 11V 13A 13T 13V 14C)	74P1617	* *
9	Intel Celeron 2.2 GHz (models 31T 32T 32C 32H 33B 33H 33J)	74P1621	* *
9	Intel Celeron 2.4 GHz (models 21J 21B 21H)	88P7699	* *
9	Intel P4 2.6 GHz (models 23C 24C)	13R8907	* *
9	Intel P4 2.26 GHz (model D1C)	73P0575	* *
9	Intel P4 2.2 GHz (model D2A)	73P0571	* *
9	Intel P4 2.4 GHz (models 41C 42K 43K 51A 52A 53A 53T 53B 53H 54A 54T 54C 54B 54H 54V 56A 56T 56B 56H 56V 52C 56C 44C 45C)	74P1625	* *
9	Intel P4 2.6 GHz (models 68C 69A 69T 69B 69H 69V)	58P9961	* *
9	Intel P4 2.6 GHz (models 68C 69A 69T 69B 69H 69V)	73P0574	* *
9	Intel P4 2.66 GHz (models 62A 62T 63A 63T 63B 63H 63V 64K 65K 61C 66V 67C)	74P1629	* *
9	Intel P4 2.8 GHz (models 81A 81T 82C 83C 84A 84T 84B 84H 85V 86K 87K 88B 88H 89K)	74P1631	* *
9	Intel P4 3.06 GHz (models 91K 92K 93B 93H)	74P1633	* *
10	Fan sink (models 91K 92K 93B 93H)	01R3330	* *
10	Fan sink (models 11B 11H 13B 13H 41C 42K 43K 51A 52A 53A 53T 53B 53H 54A 54T 54C 54B 54H 54V 56A 56T 56B 56H 56V 62A 62T 63A 63T 63B 63H 63V 64K 65K 11A 11V 13A 13T 13V 52C 56C 61C 66V 14C 44C 45C 67C 31T 32T 32C 32H 33B 33H 81A 81T 82C 83C 84A 84T 84B 84H 85V 86K 33J D1C 21J 87K D2A 68C 69A 69T 69B 69H 69V 23C 24C 21B 21H 88B 88H 89K)	32P4004	* *
11	Power supply, 230W (models 11B 11H 13B 13H 42K 43K 51A 52A 53A 53T 53B 53H 54A 54T 54B 54H 54V 56A 56T 56B 56H 56V 62A 62T 63A 63T 63B 63H 63V 64K 65K 11A 11V 13A 13T 13V 66V 31T 32T 32H 33B 33H 81A 81T 84A 84T 84B 84H 85V 86K 91K 33J 21J 87K 92K D2A 69A 69T 69B 69H 69V 88B 88H 89K 93B 93H 21B 21H)	74P4300	N
11	Power supply, 230W (China) (models 41C 54C 52C 56C 61C 14C 44C 45C 67C 32C 82C 83C D1C 68C 23C 24C)	74P4301	N

The FRUs listed in the following table are not illustrated.

8434 FRUs	FRU#	CRU
Cable, FDD (all models)	01K1513	*
Cable, audio (all models)	75H9219	*
Cable, IDE (ATA66 1 drop) (all models)	37L4525	*
Cable, IDE (ATA66 2 drop) (all models)	37L5098	*
Planar shield (all models)	49P4646	*
Dual USB 1.1cable) (top channel) (all models)	22P2400	*
Audio cable assembly (ATA) (all models)	49P1933	*
Front panel label kit (all models)	09N6708	*
Access panel (all models)	49P3386	*
Cable, power/LED (all models)	09N6709	*
Screw kit (all models)	49P3387	*
Cable, serial port (all models)	49P4530	*
Bracket second hardfile mount & 6-32 screw (all models)	74P2254	*
Cable, serial ATA (all models)	88P5927	*
Battery, 3.0 V (all models)	33F8354	*
Mouse, 2 button, black	24P0383	*
Mouse, optical wheel (models 11B 11H 13B 13H 41C 42K 43K 51A 52A 53A 53T 53B 53H 54A 54T 54C 54B 54H 54V 56A 56T 56B 56H 56V 62A 62T 63A 63T 63B 63H 63V 64K 65K 11A 11V 13A 13T 13V 52C 56C 61C 66V 14C 44C 45C 67C 31T 32T 32C 32H 33B 33H 81A 81T 82C 83C 84A 84T 84B 84H 85V 86K 91K 33J D1C 21J 87K 92K D2A 68C 69A 69T 69B 69H 69V 23C 24C 88B 88H 89K 93B 93H 21B 21H)	89P5089	*
Korean label (models 42K 43K 64K 65K 86K 91K)	13R9162	*
RJ11 connector adapter (Spain, Ireland) (All ″G″ models)	60H6043	*
RJ11 connector adapter (Austria) (All ″G″ models)	60H6045	*
RJ11 connector adapter (Belgium) (All ″G″ models)	60H6046	*
RJ11 connector adapter (Denmark) (All ″G″ models)	60H6047	*
RJ11 connector adapter (Norway, Finland) (All ″G″ models)	60H6048	*
RJ11 connector adapter (France) (All ″G″ models)	60H6049	*
RJ11 connector adapter (Germany) (All ″G″ models)	60H6050	*
RJ11 connector adapter (UK, NZ, HK) (All ″G″, ″M″, ″B″, ″H″ models)	60H6051	*
RJ11 connector adapter (Italy) (All ″G″ models)	60H6052	*
RJ11 connector adapter (Netherlands) (All ″G″ models)	60H6053	*
RJ11 connector adapter (Sweden) (All ″G″ models)	60H6054	*
RJ11 connector adapter (Switzerland) (All ″G″ models)	60H6055	*

8434 Windows 2000 Recovery CDs	FRU#	CRU
US (models 54A 54H 54T)	13R9673	*
SC (model 54C)	13M6485	*
TW (model 54V)	13M6488	*
HK (model 54B)	13M6491	*

8434 Windows XP Pro Recovery CDs	FRU#	CRU
US (models 13A 13H 13T 51A 53A 53H 53T 56A 56H 56T 62A 62T 63A 63H 63T 33H 81A 81T 84A 84T 84H D2A 69A 69T 69H 88H 93H 21H)	13R9693	*
HK (models 13B 53B 56B 63B 33B 84B 69B 88B 93B 21B)	13M6461	*
JP (model 33J)	13M6449	*
KR (models 43K 65K)	13M6465	*
SC (model 56C)	13M6453	*
TW (models 13V 56V 63V 85V)	13M6457	*

8434 Windows XP Home Recovery CDs	FRU#	CRU
US (models 11A 11H 52A 32T 32H)	13R9714	*
KR (models 87K 92K 42K 64K 86K 91K 89K)	13M6481	*
SC (models 41C 52C 61C 32C 83C 24C)	13M6469	*
TW (models 11V 66V)	13M6473	*
HK (model 11B)	13M6477	*

8434 Keyboards (Standard PS/2 Black)	FRU#	CRU
US English (models 11H 13H 41C 51A 52A 53A 53H 54A 54C 54H 56A 56H 62A 63A 63H 11A 13A 52C 56C 61C 14C 44C 45C 67C 32C 32H 33H 81A 82C 83C 84A 84H D1C D2A 68C 69A 69H 23C 24C 88H 93H 21H)	89P8300	*
Chinese/US (models 11B 13B 53B 54B 54V 56B 56V 63B 63V 11V 13V 66V 33B 84B 85V 69B 69V 88B 93B 21B)	89P8306	*
Japanese (models 33J 21J)	89P8320	*
Korean (models 42K 43K 64K 65K 86K 91K 87K 92K 89K)	89P8321	*
Thailand (models 53T 54T 56T 62T 63T 13T 31T 32T 81T 84T 69T)	89P8334	*

8434 Power Cords	FRU#	CRU
Power Cord (models 51A 52A 53A 53T 54A 54T 54V 56A 56T 56V 62A 62T 63A 63T 63V 11A 11V 13A 13T 13V 66V 31T 32T 81A 81T 84A 84T 85V D2A 69A 69T 69V)	6952301	*
Power Cord (models 42K 43K 64K 65K 86K 91K 87K 92K 89K)	13F9978	*
Power Cord (models 11H 13H 53H 54H 56H 63H 32H 33H 84H 69H 88H 93H 21H)	14F0032	*
Power Cord (models 33J 21J)	1838576	*
Power Cord (models 11B 11H 13B 13H 41C 53B 53H 54C 54B 54H 56B 56H 63B 63H 52C 56C 61C 14C 44C 45C 67C 32C 32H 33B 33H 82C 83C 84B 84H D1C 68C 69B 69H 23C 24C 88B 88H 93B 93H 21B 21H)	02K0545	*

Chapter 10. Related service information

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

Safety information

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

General safety

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

  Remember: Metal objects are good electrical conductors.
- Wear safety glasses when you are: hammering, drilling soldering, cutting wire, attaching springs, using solvents, or working in any other conditions that might be hazardous to your eyes.
- After service, reinstall all safety shields, guards, labels, and ground wires. Replace any safety device that is worn or defective.
- Reinstall all covers correctly before returning the machine to the customer.

Electrical safety

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

Observe the following rules when working on electrical equipment.

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

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

- Find the room emergency power-off (EPO) switch, disconnecting switch, or electrical outlet. If an electrical accident occurs, you can then operate the switch or unplug the power cord quickly.
- Do not work alone under hazardous conditions or near equipment that has hazardous voltages.
- Disconnect all power before:
  – Performing a mechanical inspection
  – Working near power supplies
  – Removing or installing main units
- Before you start to work on the machine, unplug the power cord. If you cannot unplug it, ask the customer to power-off the wall box that supplies power to the machine and to lock the wall box in the off position.
- If you need to work on a machine that has exposed electrical circuits, observe the following precautions:
  – Ensure that another person, familiar with the power-off controls, is near you.
    Remember: Another person must be there to switch off the power, if necessary.
  – Use only one hand when working with powered-on electrical equipment; keep the other hand in your pocket or behind your back.
    Remember: There must be a complete circuit to cause electrical shock. By observing the above rule, you may prevent a current from passing through your body.
  – When using testers, set the controls correctly and use the approved probe leads and accessories for that tester.
  – Stand on suitable rubber mats (obtained locally, if necessary) to insulate you from grounds such as metal floor strips and machine frames.

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

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

  and similar units. (This practice ensures correct grounding of the units.)
- If an electrical accident occurs:
  - Use caution; do not become a victim yourself.
  - Switch off power.
  - Send another person to get medical aid.

Safety inspection guide

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

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

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

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

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

   a. A third-wire ground connector in good condition. Use a meter to measure third-wire ground continuity for 0.1 ohm or less between the external ground pin and frame ground.

   b. The power cord should be the appropriate type as specified in the parts listings.

   c. Insulation must not be frayed or worn.

4. Remove the cover.

5. Check for any obvious non-IBM alterations. Use good judgment as to the safety of any non-IBM alterations.

6. Check inside the unit for any obvious unsafe conditions, such as metal filings, contamination, water or other liquids, or signs of fire or smoke damage.

7. Check for worn, frayed, or pinched cables.

8. Check that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.

Handling electrostatic discharge-sensitive devices

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

Notes:

1. Use product-specific ESD procedures when they exceed the requirements noted here.

2. Make sure that the ESD protective devices you use have been certified (ISO 9000) as fully effective.

When handling ESD-sensitive parts:

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

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

   – Attach the ESD ground clip to any frame ground, ground braid, or green-wire ground.

   – Use an ESD common ground or reference point when working on a double-insulated or battery-operated system. You can use coax or connector-outside shells on these systems.

   – Use the round ground-prong of the ac plug on ac-operated computers.

Grounding requirements

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

Safety notices (multi-lingual translations)

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

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

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 procedure**s.
- **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.	1. Turn everything OFF.
2. First, attach all cables to devices.	2. First, remove power cords from outlet.
3. Attach signal cables to connectors.	3. Remove signal cables from connectors.
4. Attach power cords to outlet.	4. Remove all cables from devices.
5. Turn device ON.	

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.

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.

≥18 kg (37 lbs) ≥32 kg (70.5 lbs) ≥55 kg (121.2 lbs)

CAUTION:
Use safe practices when lifting.

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.
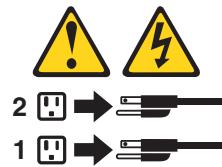
CAUTION:

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

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:
1. DESLIGUE Tudo.	1. DESLIGUE Tudo.
2. Primeiramente, conecte todos os cabos aos dispositivos.	2. Primeiramente, remova os cabos de alimentação das tomadas.
3. Conecte os cabos de sinal aos conectores.	3. Remova os cabos de sinal dos conectores.
4. Conecte os cabos de alimentação às tomadas.	4. Remova todos os cabos dos dispositivos.
5. LIGUE os dispositivos.	

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 móídulo com uma bateria de lítio, substitua-o apenas pelo mesmo tipo de mídulo, 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.

PRECAUCIÓN:

Quando produtos a laser (unidades de CD-ROM, unidades de DVD, dispositivos de fibra ítica, 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 íticos, e evite exposição direta ao raio.

| ≥18 kg (37 lbs) | ≥32 kg (70.5 lbs) | ≥55 kg (121.2 lbs) |

CUIDADO:

Ao levantar a máquina, faça-o com segurança.

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.
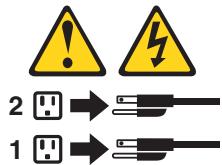
CUIDADO:

CUIDADO:

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

重要：

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

例如，如果一个提醒条款前的数字为 1，则本部分中相应的译文也带有标号 1。

在执行任何指示的操作之前，请确保您已经阅读了全部提醒和危险条款。

声明 1

⚠️ ⚡

危险

电源、电话和通信电缆中带有危险电流。

为避免电击：

雷电期间不要拆接电缆或安装、维修及重新配置本产品。

将所有电源线连接至正确布线并已安全接地的电源插座上。

将应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：
扔入或浸入水电　　　。
加热超过 100　（212 F）
进行修理或分解
请按本地法规要求处理电池。

声明 3

警告:

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

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

非此处指定的其它控制、调整或与性能有关的操作都有可能导致激光辐射的
危险。

危险

某些激光产品中包含内嵌的 3A 级或 3B 级激光二极管。请注意以下事项。
打开时会产生激光辐射。不要直视光束，不要使用光学仪器直接观看光束， 避免直接暴露于光束之下。

声明 4

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

警告：
抬起时请采用安全操作方法。

声明 5

警告：

使用设备上的电源控制按钮和电源上的开关都不能断开本设备上的电流。
另外，本设备可能带有多条电源线。如要断开设备上的所有电流，请确
保所有电源线均已与电源断开连接。
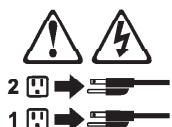
声明 6

警告：

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

声明 7

警告：

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

声明 8

警告：
不要拆除电源外盖或贴有下列标签的任何部件。

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

声明 9

警告：

为避免人员伤害，拆除设备上的风扇前应拨下热插拔风扇电缆。

声明 10

警告：

机柜安装的设备上面不能放置重于 82kg（180 磅）的物品。

> 82 kg (180 磅)

声明 11

警告:

下面的标签表明附近有锋利的边、角或接头。

声明 12

警告:
下面的标签表明附近有高热表面。

重要資訊：

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

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

> 執行任何指示之前，請詳讀所有「注意」及「危險」的聲明。

聲明 1

危險

> 電源、電話及通信電纜上所產生的電流均有危險性。
>
> 欲避免電擊危險：
>
> —在雷雨期間，請勿連接或切斷本產品上的任何電纜線，或安裝、維修及重新架構本產品。
> —請將電源線接至接線及接地正確的電源插座。
> —請將本產品隨附的設備連接至接線正確的插座。
> —儘可能使用單手來連接或切斷信號電纜線。
> —當設備有火燒或泡水的痕跡，或有結構性損害時，請勿開啟該設備的電源。
> —在安裝及架構之時，若非非常熟悉，在開啟裝置蓋子之前，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，或開啟其蓋子時，請依照下表中「連接」及「切斷」電纜線的步驟執行。

連接：	切斷：
1. 關閉所有開關。	1. 關閉所有開關。
2. 先將所有電纜線接上裝置。	2. 先自電源插座拔掉電源線。
3. 將信號電纜接上接頭。	3. 拔掉接頭上的所有信號電纜。
4. 再將電源線接上電源插座。	4. 再拔掉裝置上的所有電纜線。
5. 開啟裝置的電源。	

聲明 2

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

請勿將電池：
— 丟入或浸入水中
— 加熱超過 100 ℃ (212 ℉)
— 修理或拆開

請遵照當地法令規章處理廢棄電池。

⚠

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:

開啟時會產生雷射輻射。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。

⚠ ⚡

2
1
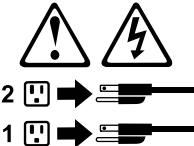
聲明 10

⚠️

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

> 82 公斤 (180 磅)

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.	

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.

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.

| ≥18 kg (37 lbs) | ≥32 kg (70.5 lbs) | ≥55 kg (121.2 lbs) |

ATTENTION:

Faites-vous aider pour soulever ce produit.

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.
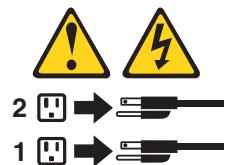
ATTENTION:

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

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 anschlie*β*en:	Kabel lösen:
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.	1. Alle Geräte ausschalten. 2. Zuerst Netzstecker von Steckdose lösen. 3. Signalkabel von Anschlußbuchsen lösen. 4. Alle Kabel von Einheiten lösen.

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.

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.

≥18 kg   ≥32 kg   ≥55 kg

ACHTUNG:

Beim Anheben der Maschine die vorgeschriebenen Sicherheitsbestimmungen beachten.

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.
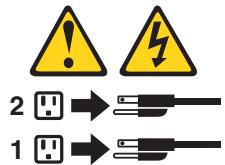
ACHTUNG:

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

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.	

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.

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:

Aprendo l'unità vengono emesse radiazioni laser. Non fissare il fascio, non guardarlo direttamente con strumenti ottici ed evitare l'esposizione diretta al fascio.

| ≥18 kg | ≥32 kg | ≥55 kg |

ATTENZIONE:

Durante il sollevamento della macchina seguire delle norme di sicurezza.

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.
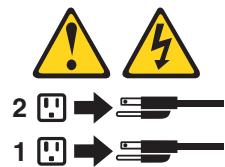
ATTENZIONE:

Non poggiare oggetti che pesano più di 82 kg sulla parte superiore delle unità montate in rack.

중요:

본 *Server Library*에 있는 모든 주의 및 위험 경고문은 번호로
시작합니다. 이 번호는 영문 주의 혹은 위험 경고문과 이 절에 나오는
번역된 버전의 주의 혹은 위험 경고문을 상호 참조하는 데 사용됩니다.

예를 들어, 주의 경고문이 번호 1로 시작하면, 번역된 해당 주의
경고문을 본 절의 경고문 1에서 찾아볼 수 있습니다.

모든 지시사항을 수행하기 전에 반드시 모든 주의 및 위험 경고문을
읽으십시오.

경고문 1

위험

전원, 전화 및 통신 케이블로부터 흘러 나오는 전류는
위험합니다.

전기 충격을 피하려면:

- 뇌우를 동반할 때는 케이블의 연결이나 철수, 이 제품의
  설치, 유지보수 또는 재구성을 하지 마십시오.

- 모든 전원 코드를 적절히 배선 및 접지해야 합니다.

- 이 제품에 연결될 모든 장비를 적절하게 배선된 콘센트에
  연결하십시오.

- 가능한한 신호 케이블을 한 손으로 연결하거나
  끊으십시오.

- 화재, 수해 또는 구조상의 손상이 있을 경우 장비를 켜지
  마십시오.

- 설치 및 구성 프로시저에 다른 설명이 없는 한, 장치 덮개를
  열기 전에 연결된 전원 코드, 원거리 통신 시스템, 네트워크
  및 모뎀을 끊어 주십시오.

- 제품 또는 접속된 장치를 설치, 이동 및 덮개를 열 때
  다음 설명에 따라 케이블을 연결하거나 끊도록 하십시오.

연결하려면:	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.

다음을 주의하십시오.

- 던지거나 물에 담그지 않도록 하십시오.
- 100℃(212°F) 이상으로 가열하지 마십시오.
- 수리하거나 분해하지 마십시오.

지역 법령이나 규정의 요구에 따라 배터리를 처분하십시오.

경고문 3

주의:

레이저 제품(**CD-ROMs, DVD** 드라이브, 광 장치 또는 트랜스미터 등과 같은)이 설치되어 있을 경우 다음을 유의하십시오.

- 덮개를 제거하지 마십시오. 레이저 제품의 덮개를 제거했을 경우 위험한 레이저 광선에 노출될 수 있습니다. 이 장치 안에는 서비스를 받을 수 있는 부품이 없습니다.

- 여기에서 지정하지 않은 방식의 제어, 조절 또는 실행으로 인해 위험한 레이저 광선에 노출될 수 있습니다.

위험

일부 레이저 제품에는 클래서 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 있는 지 확인하십시오.
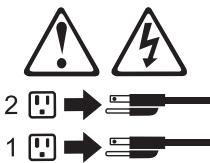
경고문 10

⚠️

주의:
서랍형 모델의 장치 상단에 82 kg(180 lbs.)이 넘는 물체를 올려
놓지 마십시오.

> 82 kg (180 lbs)

PELIGRO

La corriente eléctrica de los cables telefínicos, de alimentaciín y de comunicaciones es perjudicial.

Para evitar una descarga eléctrica:
- No conecte ni desconecte ningún cable ni realice las operaciones de instalaciín, mantenimiento o reconfiguraciín de este producto durante una tormenta.
- Conecte cada cable de alimentaciín a una toma de alimentaciín eléctrica con conexiín a tierra y cableado correctos.
- Conecte a tomas de alimentaciín 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 sent.al.
- No encienda nunca un equipo cuando haya riesgos de incendio, de inundaciín o de daños estructurales.
- Desconecte los cables de alimentaciín, sistemas de telecomunicaciones, redes y mídems conectados antes de abrir las cubiertas del dispositivo a menos que se indique lo contrario en los procedimientos de instalaciín y configuraciín.
- Conecte y desconecte los cables tal como se describe en la tabla siguiente cuando desee realizar una operaciín de instalaciín, de traslado o de apertura de las cubiertas para este producto o para los dispositivos conectados.

Para la conexin	Para la desconexiín
1. APÁGUELO todo.	1. APÁGUELO todo.
2. En primer lugar, conecte los cables a los dispositivos.	2. En primer lugar, retire cada cable de alimentaciín de la toma de alimentaciín.
3. Conecte los cables de señal a los conectores.	3. Retire los cables de señal de los conectores.
4. Conecte cada cable de alimentaciín a la toma de alimentaciín.	4. Retire los cables de los dispositivos.
5. ENCIENDA el dispositivo.	

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 mídulo que contiene una batería de litio, sustitúyalo únicamente por el mismo tipo de mídulo, 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 legislaciín local.

PRECAUCIÓN:

Cuando instale productos láser (como, por ejemplo, CD-ROM, unidades DVD, dispositivos de fibra íptica o transmisores), tenga en cuenta las advertencias siguientes:

- No retire las cubiertas. Si retira las cubiertas del producto láser, puede quedar expuesto a radiaciín láser perjudicial. Dentro del dispositivo no existe ninguna pieza que requiera mantenimiento.
- El uso de controles o ajustes o la realizaciín de procedimientos que no sean los que se han especificado aquí pueden dar como resultado una exposiciín 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 radiaciín láser. No mire fijamente el rayo ni lleve a cabo ningún examen directamente con instrumentos ípticos; evite la exposiciín directa al rayo.


| ≥18 kg | ≥32 kg | ≥55 kg |

PRECAUCIÓN:

Tome medidas de seguridad al levantar el producto.

PRECAUCIÓN:

El botín de control de alimentaciín del dispositivo y el interruptor de alimentaciín de la fuente de alimentaciín no apagan la corriente eléctrica suministrada al dispositivo. Es posible también que el dispositivo tenga más de un cable de alimentaciín. Para eliminar la corriente eléctrica del dispositivo, asegúrese de desconectar todos los cables de alimentaciín de la fuente de alimentaciín.
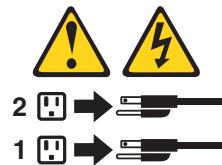
PRECAUCIÓN:

No coloque ningún objeto que pese más de 82 kg (180 libras) encima de los dispositivos montados en bastidor.

Send us your comments!

We want to know your opinion about this manual (part number 74P2661). Your input will help us to improve our publications.

Please photocopy this survey, complete it, and then fax it to **IBM HMM Survey** at **919-543-8167 (USA)**.

Name: _____

Phone number: _____

1. Do you like this manual?

    ☐ Yes ☐ No

    _____
    _____

2. What would you like to see added, changed, or deleted in this manual?

    _____
    _____

3. What is your service experience level?

    ☐ Less than five years

    ☐ More than five years
4. Which computers do you service most?

    _____
    _____
    _____
    _____

Thank you for your response!

Problem determination tips

Due to the variety of hardware and software combinations that can be encountered, use the following information to assist you in problem determination. If possible, have this information available when requesting assistance from Service Support and Engineering functions.

- Machine type and model
- Processor or hard disk upgrades
- Failure symptom
  - Do diagnostics fail?
  - What, when, where, single, or multiple systems?
  - Is the failure repeatable?
  - Has this configuration ever worked?
  - If it has been working, what changes were made prior to it failing?
  - Is this the original reported failure?
- Reference/Diagnostics version
  - Type and version level
- Hardware configuration
  - Print (print screen) configuration currently in use
  - BIOS level
- Operating system software
  - Type and version level

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

1. Are the exact machine type and models
2. Have the same BIOS level
3. Have the same adapters/attachments in the same locations
4. Have the same address jumpers/terminators/cabling
5. Have the same software versions and levels
6. Have the same Reference/Diagnostics Diskette (version)
7. Have the same configuration options set in the system
8. Have the same setup for the operation system control files

Comparing the configuration and software set-up between "working and non-working" systems will often lead to problem resolution.

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