

IBM Personal Computer Types 2179 and 6643



Hardware Maintenance Manual

IBM Personal Computer Types 2179 and 6643



Hardware Maintenance Manual

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Note: Before using this information and the product it supports, be sure to read the general information under “Notices” on page 116.

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About this manual

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This manual contains service and reference information for the IBM Personal Computer, Types 2179 and 6643.

This manual is divided into product service sections, by type, 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.

Attention:

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 notices (multi-lingual translations)" on page 77 and "Safety information" on page 102.

Important safety information

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

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

注意和危险声明 (简体中文)

重要事项:

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

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

在按说明执行任何操作前，请务必阅读所有注意和危险声明。

注意及危險聲明 (中文)

重要資訊：

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

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

執行任何指示之前，請詳讀所有「注意」及「危險」的聲明。

Prenez connaissance de toutes les consignes de type Attention et

Danger avant de procéder aux opérations décrites par les instructions.

Lesen Sie alle Sicherheitshinweise, bevor Sie eine Anweisung ausführen.

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

주의 및 위험 경고문(한글)

중요:

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

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 읽도록 하십시오.

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

Online support

Use the World Wide Web (WWW) to download Diagnostic, BIOS Flash, and Device Driver files, and Documents.

The Web address is:

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

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Chapter 1. General checkout

General Checkout

This general checkout procedure is for types 2179 and 6643 computers.

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 "IBM PC Enhanced Diagnostics" on page 6.

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:

Use Beep codes and the IBM Enhanced Diagnostics to diagnose and fix problems.

1. Types 2179 and 6643 computers default to come up quiet (no beep and no memory count and checkpoint code display) when no errors are detected.
2. 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 71.
3. If there is a Beep code, go to "Beep symptoms" on page 35.
4. If multiple error codes are displayed, diagnose the first error code displayed.
5. If the computer hangs with a POST error, go to "POST error codes" on page 54.
6. If the computer hangs and no error is displayed, go to "Undetermined problems" on page 56.
7. 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. Set all display controls to the middle position.
4. Insert the IBM Enhanced Diagnostics diskette into drive A or the CD into the CD drive.
5. Power-on all external devices.
6. Power-on the computer.
7. Check for the following response:
 - a. One or two beeps (depending on the diagnostics version level).
 - b. 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 Configuration/Setup Utility program (see “Setup Utility program” on page 5.)
 2. Select **Power Management** from the Configuration/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**.
- OR
7. Go to “IBM PC Enhanced Diagnostics” on page 6.

003

Run the IBM PC Enhanced Diagnostics test. If necessary, refer to “Diagnostics and test information” on page 5.

- If you receive an error, replace the part that the diagnostic program calls out or go to “IBM PC Enhanced Diagnostics” on page 6.
- If the test stops and you cannot continue, replace the last device tested.
- If the LCD display has problems such as black screen, blinking on-off, or the screen pallet color is wrong, go to “Display” on page 17.

Module test menu and hardware configuration report

Depending on the diagnostics version level you are using, the installed devices in the computer are verified in one of two ways:

1. At the start of the diagnostic tests, the Module Test Menu is displayed. Normally, all installed devices in the computer are highlighted on the menu.
2. At the start of the diagnostic tests, the main menu appears. From this menu, select **System Info** then select **Hardware Configuration** from the next menu. Normally, all installed devices in the computer are highlighted on this report.

If an installed device is not recognized by the diagnostics program:

- The diagnostic code for the device is not on the diagnostics provided with that device
- The missing device is defective or it requires an additional diskette or service manual.
- An unrecognizable device is installed.
- A defective device is causing another device not to be recognized.
- The SCSI controller failed (on the system board or SCSI adapter).
- Use the procedure in “Undetermined problems” on page 56 to find the problem.

If a device is missing from the list, replace it. If this does not correct the problem, use the procedure in “Undetermined problems” on page 56.

Chapter 2. General information

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Features

The IBM Personal Computer Types 2179 and 6643 come with:

- One EIDE hard disk drive
- One 3.5-inch diskette drive
- One CD-ROM drive or DVD-ROM drive
- Two low-profile PCI adapter slots
- Five USB connectors

Security

- Power-on and administrator passwords
- Rear bucket cover lock
- Startup sequence control
- Unattended start mode
- Diskette and hard disk I/O control
- Alert on LAN

Specifications

Specifications Information (ISO/ANSI)

The following machine type specifications information was determined in controlled acoustical environments according to 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 your location might differ from 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 proportion of machines will operate.

Size	Depth: 261 mm (10.28 inches) Height: 414 mm (16.3 inches) Width: 413 mm (16.26 inches)
Weight	Minimum configuration as shipped: 10.1 kg (22.27 lb.)

Environment	<p>Air temperature:</p> <ul style="list-style-type: none"> • System on: 5 to 35 C (41 to 95 F) • System off: -10 to 60 C (14 to 140 F) <p>Humidity:</p> <ul style="list-style-type: none"> • System on: 8% to 80% • System off: 8% to 80% <p>Maximum altitude: 3048 m (10,000 ft.)</p>
Heat Output	<p>Approximate heat output in BTUs per hour:</p> <ul style="list-style-type: none"> • Minimum: 340 BTU/hr. (100 watts) • Maximum: 2385 BTU/hr. (700 watts)
Electrical Input	<p>Sine-wave input (50 to 60 Hz) required</p> <p>Low range input voltage:</p> <ul style="list-style-type: none"> • Minimum: 100 V AC • Maximum: 127 V AC <p>High range input voltage:</p> <ul style="list-style-type: none"> • Minimum: 200 V AC • Maximum: 240 V AC <p>Input kVA (approximately):</p> <ul style="list-style-type: none"> • Maximum (as shipped): 0.07 kVA
Airflow	<p>Approximately 0.56 cubic meters/minute (20 cubic feet/minute)</p>
Acoustical Noise Emission Values	<p>Average sound pressure levels:</p> <p>At operator position:</p> <ul style="list-style-type: none"> • - 41 dB operating • - 34 dB idle <p>At bystander position (1 meter):</p> <ul style="list-style-type: none"> • - 34 dB operating • - 29 dB idle <p>Declared (upper limit) sound power levels:</p> <ul style="list-style-type: none"> • - 5.3 bels operating • - 4.7 bels idle

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Setup Utility program

Attention:

A customized setup configuration (other than default settings) might exist on the computer you are servicing. Running the 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 Setup Utility (configuration) program is stored in the permanent memory of the computer. This program includes settings for the following:

- System Summary
- Product Data
- Devices and I/O Ports
- Start Options
- Date and Time
- Advanced Setup
- System Security
- Power Management

To run the Setup Utility program, use the following procedure.

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 Setup Utility prompt appears on the screen during start-up, press **F1**. The 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.

Diagnostics and test information

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

- Beep Codes
- IBM PC Enhanced Diagnostics

Notes:

1. Types 2179 and 6643 computers default to come up quiet (No Beep and no memory count and checkpoint code display) when no errors are detected.
2. Use Beep codes and the IBM Enhanced Diagnostics to diagnose and fix problems.
3. Check all power supply voltages before you replace the system board. (See "Power Supply" on page 16).
4. Check the hard disk drive jumper settings before you replace a hard disk drive. (See "Hard disk drive jumper settings" on page 70).
5. If you can not run the IBM Enhanced Diagnostics program, go to "Undetermined problems" on page 56.

IBM PC Enhanced Diagnostics

The IBM PC Enhanced Diagnostics program uses a full range of diagnostic utilities to determine the operating condition of the computer's hardware components. The user interface is PC-Doctor which serves as the control program for running the IBM PC Enhanced Memory Diagnostics and the suite of diagnostic tests provided by PC-Doctor.

For a complete list of error codes and messages, see Chapter 5, "Symptom-to-FRU Index," on page 35.

Diagnostics program download

To download the Diagnostics program, do the following:

- Go to <http://www.ibm.com/pc/us/>
- Select **Support**.
- Select **IntelliStation** or Type from the "Product Family" list.
- Select **Brand/Product home page**.
- Select **Downloadable files**.
- Select **Diagnostics**.

This diagnostic diskette includes:

- A user interface (WaterGate Software's PC-Doctor)
 - This interface serves as the control program for running both the IBM PC Enhanced Memory Diagnostics and the suite of diagnostic tests provided by PC-Doctor.
- IBM PC Enhanced Memory Diagnostics
 - The memory diagnostic tests determine which DIMM is defective and report the socket where the failing DIMM is located. The Memory diagnostics can run a quick and full test of the system.

Note:

See "IBM Enhanced Diagnostic error codes" on page 37 for the IBM PC Enhanced Diagnostics error codes.

Starting the IBM PC Enhanced Diagnostics Program

To start the program:

1. Shut down and power-off the system.

2. Wait 10 seconds.
3. Insert the IBM PC Enhanced Diagnostics Diskette into diskette drive A.
4. Power-on the system.

The initial diagnostics menu will be displayed.

Navigating through the diagnostics programs

Use either the mouse or the keyboard to navigate through the Enhanced Diagnostics program.

- 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".
3. From within a test category, press **Ctrl-Enter** to automatically run only the selected tests in that category. See "Test Selection".
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 10.

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 with a chevron >>. 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.

IBM PC Enhanced Memory Diagnostics

The IBM PC Enhanced Memory Diagnostics provide the capability to identify a particular memory module (SIMM, DIMM, or RIMM) which fails during testing. Use the System Board Layout section to reference the memory sockets, or select **F1** twice to load the Diagnostics online manual and select "DIMM Locator".

Follow the steps below to locate the Memory Diagnostic tests options.

1. Select the DIAGNOSTICS option on the toolbar and press **Enter**.

2. Highlight either the *Memory Test-Full* or *Memory Test-Quick* option and press **Enter**.
3.
 - **Memory Test-Full**
The full memory test will take about 80 seconds per MB of memory and will detect marginal, intermittent, and solid (stuck) memory failures.
 - **Memory Test-Quick**
The quick memory test will take about 20 seconds per MB of memory and will detect solid (stuck) memory failures only.

Notes:

Either level of memory testing can be performed on all memory or a selected DIMM socket.

Only DIMM sockets containing a DIMM can be selected for testing. Unpopulated sockets are noted by beside the test description.

Alert-On LAN™ test

The Alert On LAN test does the following:

- Determines if Alert On LAN is supported on the system.
- Checks the revision ID register.
- Verifies the EEPROM checksum.
- Validates that a software alert can be sent.

Asset ID™ test

The Asset ID test does the following:

- Determines if Asset ID is supported on the system.
- Verifies the EEPROM areas.
- Performs an antenna detection test.

Test results

IBM PC Enhanced Diagnostic 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.

<p>Note:</p> <p>See "IBM Enhanced Diagnostic error codes" on page 37 for error code listings.</p>
--

Hard file Smart test

Use the Hard File Smart Test when the system management tool has detected a hard file SMART alert.

The Smart test does the following:

- Interrogates IDE devices for support of the SMART instruction set.
- Issues a ENABLE SMART command to make sure SMART functionality is active.
- Checks the SMART RETURN STATUS command to determine if any thresholds have been exceeded.

If thresholds have been exceeded, an error message is shown, and the test fails. If no SMART is supported by the drive, the test returns with "N/A".

Fixed Disk Optimized Test

You can use the Fixed Disk Optimized Test to identify a particular area of a hard disk that fails during testing. You can also use this test to correct types of errors.

To run the Fixed Disk Optimized Test, do the following:

1. From the toolbar, select **Diagnostics**.
2. Select **Fixed Disk Optimized Test**.
3. Select Hard Drives - **Normal Test** to run a complete hard file test.
4. Select Hard Drives - **Presence Test** to run a test to check the drive controller and report any SMART information that the drive has detected.

Quick and Full erase - hard drive

The IBM PC Enhanced 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.

Iomega Zip drive test

Use the Iomega Zip Drive Test to test the Zip drive and the drive interface. The test takes about 20 seconds to run.

The default tests the following:

- Controller
- Max Seek (50 times)
- Random Seek (300 sectors)

Asset EEPROM backup

When replacing a system board, this utility allows the backup of all Asset information from the EEPROM to diskette. This utility also restores data to the EEPROM from diskette after replacement of the system board.

To run this utility, use the following procedure.

- Select **Utility**
- Select **Asset EEPROM Backup**
- Follow instructions on screen.

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.

Memory Errors: SIMM/DIMM/RIMM error messages issued by the IBM PC Enhanced Diagnostics:

Message	Failure Found	Recommended Actions
2xx-1y (For SIMMs)	A memory error was detected in SIMM socket Y	Replace the SIMM in the socket identified by the last digit of the error code. Re-run the Test If the same error code occurs again, replace the system board.
2xx-2y (for DIMMs/RIMMs)	A memory error was detected in DIMM/RIMM pair socket Y	Replace the DIMM/RIMM in the socket identified by the last digit of the error code. Re-run the Test If the same error code occurs again, replace the memory board or where memory is on the processor card, replace the processor card.
Corrupt BIOS	Information in BIOS is not as expected. Not able to find expected DMI information from BIOS. Memory control chipset vendor ID does not match expected value.	Reflash the BIOS. Perform boot block recovery. Replace the system board.
Test aborted by user.	User stopped test.	Restart test.
Note: "Y" is the SIMM/DIMM/RIMM socket number. Use the System Board memory section to reference the memory sockets.		

Hard disk drive boot error

A hard disk drive boot error (error code 1962 can be caused by the following:

Cause	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: <ol style="list-style-type: none"> 1. Attempt to access and recover (back-up) the failing hard disk drive. 2. Using the operating systems programs, format the hard disk drive. 3. Go to "Preparing the hard disk drive for use" on page 12.
The drive is defective.	Replace the hard disk drive.

When to use the Low-Level Format program

Notes
<ol style="list-style-type: none">1. The low-level format is not available on all diagnostic diskettes.2. Before formatting the hard disk drive, make a backup copy of the files on the drive to be formatted.

Use the Low-Level Format program in the following situations:

- When you are installing software that requires a low-level format.
- When you get recurring messages from the test programs directing you to run the Low-Level Format program on the hard disk.
- As a last resort before replacing a hard disk drive.

Preparing the hard disk drive for use

When the Low-Level Format program is finished, restore to the hard disk all the files that you previously backed up.

1. Partition the remainder of the hard disk for the operating system. (The commands vary with the operating system. Refer to the operating system manual for instructions.)
2. Format the hard disk using the operating system. (The commands vary with the operating system. Refer to the operating system manual for instructions.)
3. Install the operating system.

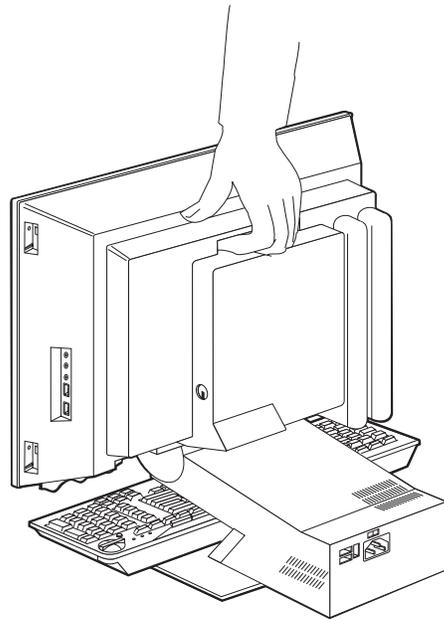
You are now ready to restore the files.

Chapter 4. FRU replacements

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Moving The Computer

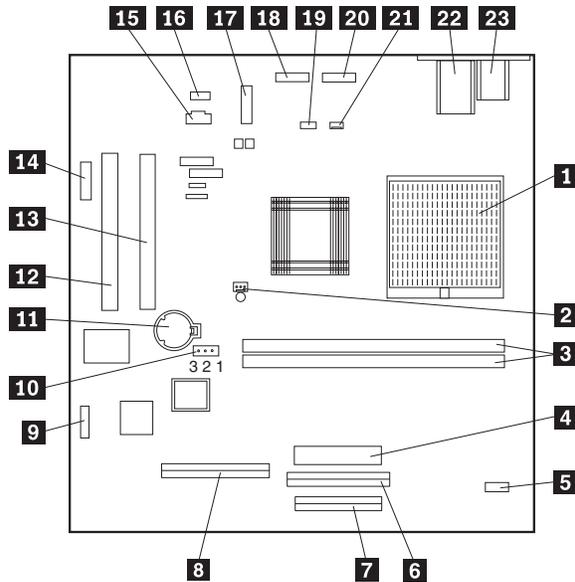
Take the following precautions before moving the Type 2179 or Type 6643 computer.



1. Remove all media from the drives.
2. Power-off the computer and all attached devices. The hard disk drive automatically parks the read/write heads to prevent damage to the hard disk.
3. Unplug the power cords from the electrical outlets.
4. Disconnect the communication, modem, and/or network cables from their outlets first, then from the computer.
5. Disconnect all attached device cables from the computer.
6. If you are moving the computer a short distance, you can carry the keyboard on the computer base.

- Lift the computer as shown and take care not to let the keyboard slide off the base.

System board layout



- Microprocessor connector
- System fan connector (not used)
- DIMM connectors
- Power connector
- Inverter connector
- CD-ROM drive or DVD drive connector
- Diskette drive connector
- Hard disk drive connector
- LCD connector
- CMOS clear jumper
- Battery
- PCI expansion slot
- PCI expansion slot
- Reserved (not used)
- CD-ROM or DVD-ROM audio connector
- Speaker connector
- USB connector
- BTN (button) connector
- IR (Infra Red) connector
- Audio I/O and USB connector
- CPU fan connector (fan located on EMC shield)

- 22** Ethernet connector
- 23** PS/2 keyboard and mouse connector.

CMOS Clear jumper settings

CMOS Clear Jumper	Description
1.2	Normal
2.3	Clear CMOS

To clear CMOS, see “CMOS Clear Procedure” on page 72.

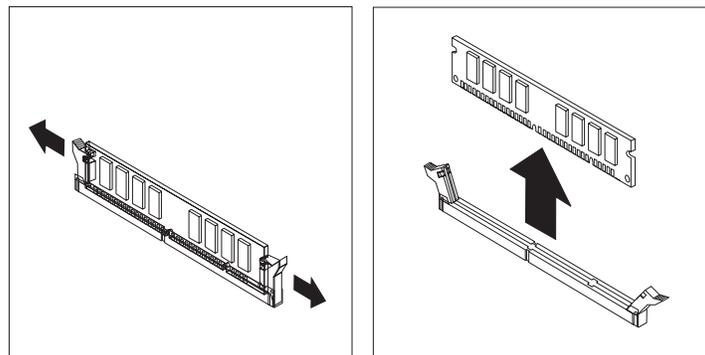
Processor Speed Settings

Processor **FSB** speed for the IBM Personal Computer Types 2179 and 6643 are set in the Setup Utility (configuration) program. There are no jumper settings for processor speed.

System Board Memory

Types 2179 and 6643 use PC133 Non-Parity DIMM memory modules.

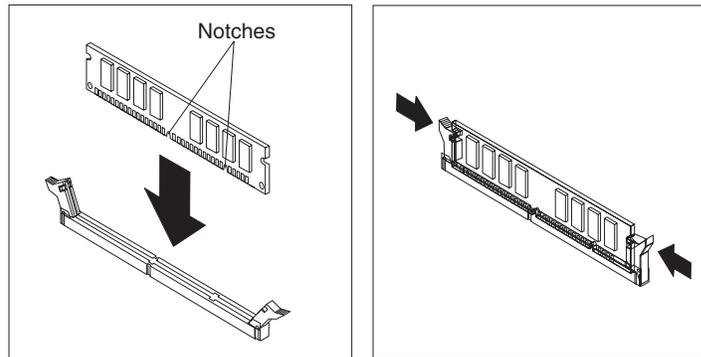
Removing a DIMM



Note:

Be careful not to push too hard on the retaining clips, because the DIMM might eject too quickly.

Installing a DIMM



1. Position the DIMM above the connector so that the two notches on the bottom edge of the module align properly with the empty connector.
2. Firmly push the module straight down into the connector until the retaining clips pop up and fit snugly around both ends of the module.

Power Supply

If the power-on indicator is not on, the power-supply fan is not running, or the computer will not power-off, do the following:

Check/Verify	FRU/Action
Check the following for proper installation. <ul style="list-style-type: none">• Power Cord• On/Off Switch connector• System Board Power Supply connectors• microprocessor(s) connection	Reset
Check the power cord for proper continuity.	Power Cord
Check the power-on switch for continuity when pressed.	Power-on Switch

If the above are correct, check the following voltages.

20-pin main power supply connection

See “System board layout” on page 14.

Attention:

These voltages must be checked with the power supply cables connected to the system board.

Pin	Signal	Function
1	3.3 V	+3.3 V dc
2	3.3 V	+3.3 V dc
3	COM	Ground
4	5 V	+5 V dc

Pin	Signal	Function
5	COM	Ground
6	5 V	+5 V dc
7	COM	Ground
8	POK	Power Good
9	5VSB	Standby Voltage
10	12 V	+12 V dc
11	3.3 V	+3.3 V dc
12	-12 V	-12 V dc
13	COM	Ground
14	PS-ON	DC Remote Enable
15	COM	Ground
16	COM	Ground
17	COM	Ground
18	-5 V	-5 V dc
19	5 V	+5 V dc
20	5 V	+5 V dc

If the voltages are not correct, and the power cord is good, replace the power supply.

Display

Note:

The number of defective pixels to qualify a TFT LCD panel to be replaced under warranty is **8 or more** for all types 2179 and 6643 computers.

If the screen has no display (black screen), do the following:

1. Replace power supply.
2. Replace inverter card.
3. Reseat/replace receiver board (receiver board is behind the LCD display).

If the screen comes on, then, quickly goes black, do the following:

1. Check power supply fan. If fan is running:
 - a. Replace inverter board.
 - b. Replace receiver board.
2. If Power supply fan is not running, replace the power supply.

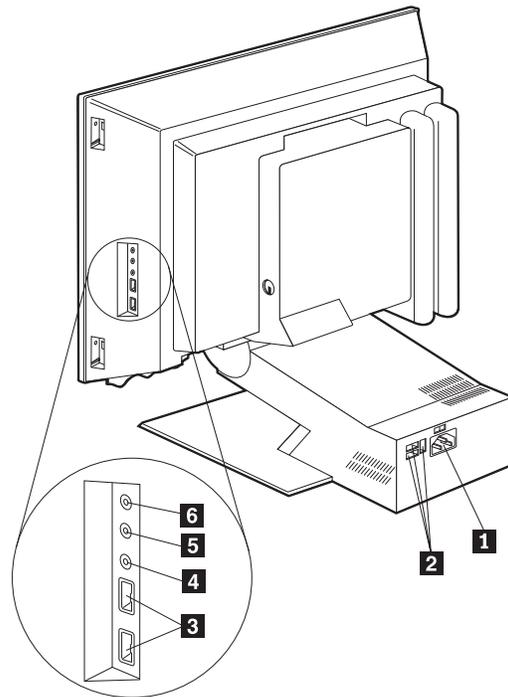
If the screen pallet color is wrong, do the following:

1. Replace LCD signal cable.
2. Replace receiver board.
3. Replace system board.

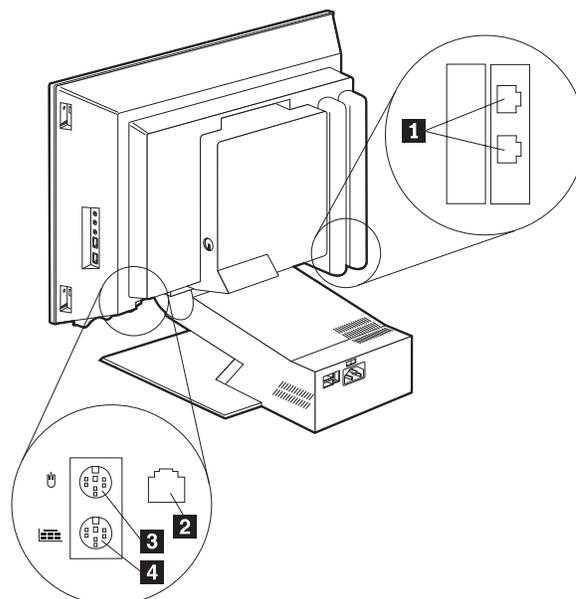
If there are scaling problems, do the following:

1. Assure latest level video drivers are installed.

Input/Output connectors

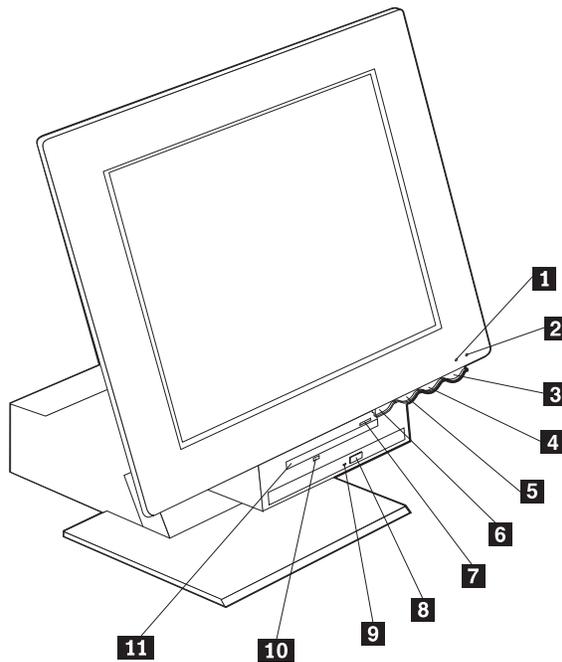


- 1** Power connector
- 2** USB connector
- 3** USB keyboard and mouse connector
- 4** Audio line in connector
- 5** Audio line out connector
- 6** Microphone connector

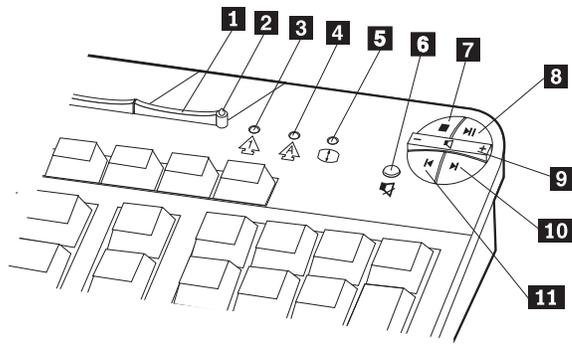


- 1** Modem connector
- 2** Ethernet connector
- 3** PS/2 mouse connector
- 4** PS/2 keyboard connector

Controls and status indicators

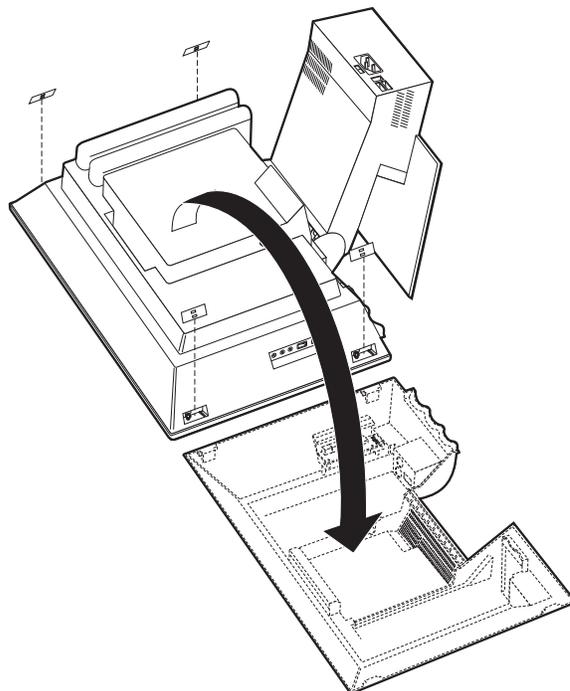


- 1** Hard disk drive "in use" indicator
- 2** Power/Standby indicator
- 3** Power button
- 4** LCD brightness decrease switch
- 5** LCD brightness increase switch
- 6** Device bay release button
- 7** Diskette eject button
- 8** CD-ROM drive or DVD-ROM drive eject button
- 9** CD-ROM drive or DVD-ROM drive
- 10** Diskette drive "in use" indicator
- 11** Diskette drive



- 1** Standby button
- 2** Standby LED
- 3** Num Lock LED
- 4** Caps Lock LED
- 5** Scroll Lock LED
- 6** Mute button
- 7** Stop button
- 8** Play/Pause button
- 9** Volume control
- 10** Next track button
- 11** Previous track button

Rear bucket housing (rear cover) removal



Note:

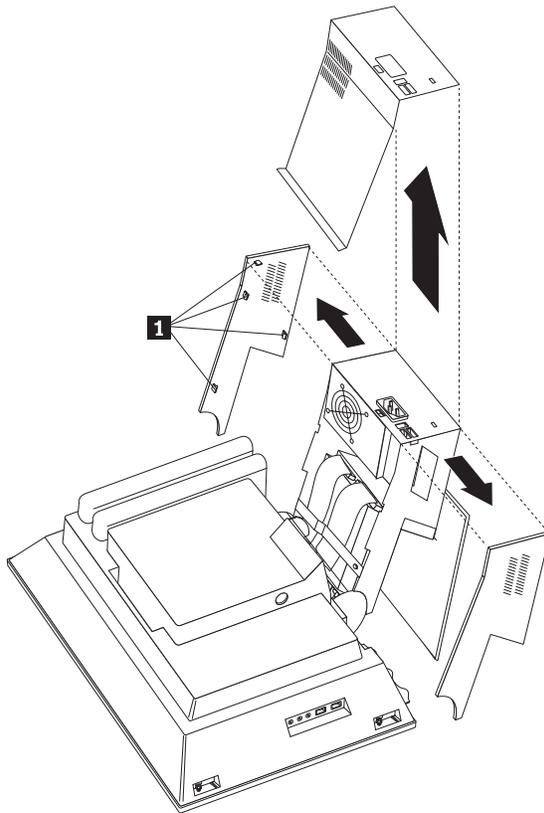
1. Before servicing, disconnect all cables attached to the computer.
2. For proper cooling, do not operate the computer without all covers in place.
3. When placing the monitor on a flat surface, place it on a padded surface such as cloth or paper towels to protect the monitor and monitor bezel from scratches.

1. Turn off the computer and all attached devices.
2. Unplug the power cord.
3. Pry off the four snap-on screw covers.
4. Unscrew the four captured screws.
5. Carefully lift rear bucket housing up to clear the rear EMC cover and rotate it to the position as shown.

Note:

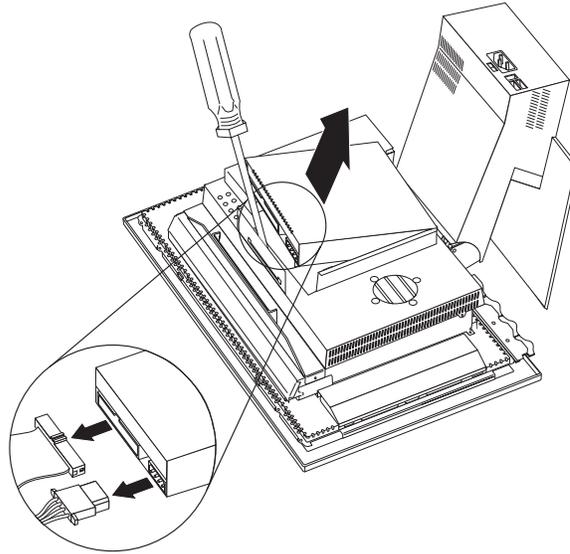
When replacing the rear bucket housing assembly, make sure the small coil spring attached to the device bay release button is properly positioned against the inside of the rear cover. The device bay release button will not work correctly if the spring is not in the proper position.

Upper base cover and base cover wing removal



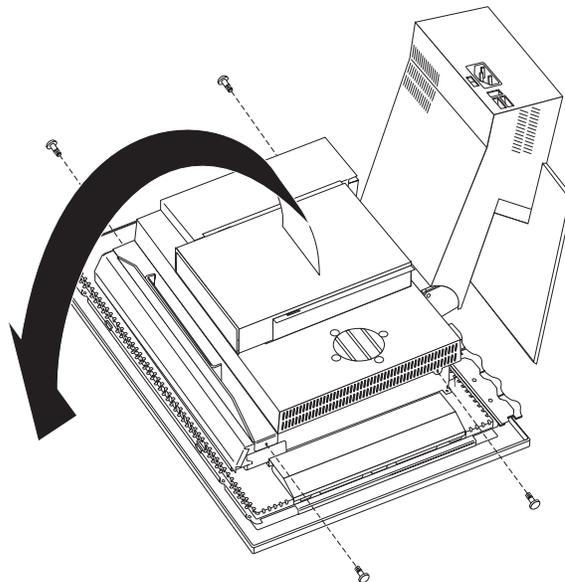
1. Remove the upper base cover by pulling out on the rear bottom part of the cover.
2. Gently pry the two base cover wings from the hinge stand assembly. Note the positions of the plastic tabs 1.

Hard disk drive removal



1. Remove the rear bucket housing, see “Rear bucket housing (rear cover) removal” on page 21.
2. To release the hard disk drive, use a flat-blade screw driver to pry the latch as shown.
3. Rotate the hard disk drive outward, and disconnect the power and signal cables from the drive.
4. Lift the hard disk drive up and back to release the hook from the rear EMC cover.

Rear EMC cover assembly removal

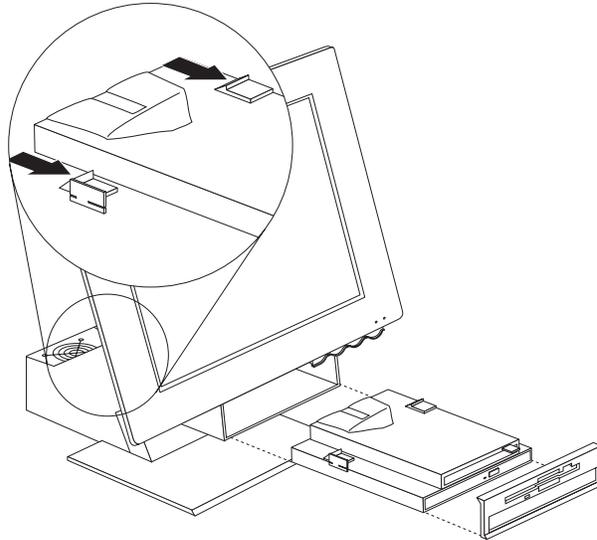


The rear EMC cover must be removed in order to remove the system board.

1. Remove the rear bucket housing, see “Rear bucket housing (rear cover) removal” on page 21.

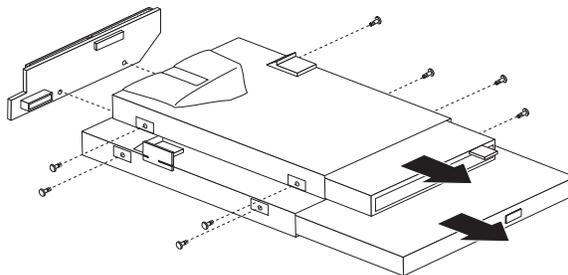
2. Remove the four thumb screws holding the system board cover.
3. Lift the rear EMC cover up and rotate it as shown by the arrow. It is not necessary to remove the hard disk drive assembly.

Diskette drive/CD-ROM drive/DVD drive removal



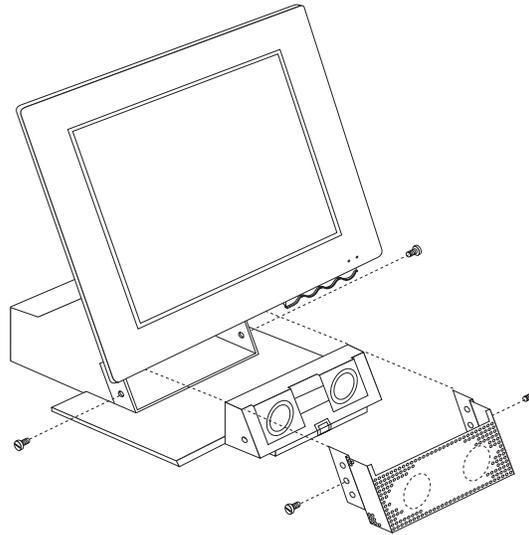
1. Remove the upper base cover, see "Upper base cover and base cover wing removal" on page 22.
2. Release the drive unit device bay to the down position.
3. Remove the device bay bezel by gently pulling it out from both sides.
4. Unplug the two signal cables from the interface card.
5. Push the two white plastic release clips on the top and side of the drive assembly forward to release the drive assembly from the device bay.
6. Unplug the other two cables (power and speaker) from the interface card.
7. Remove the drive bracket assembly from the front of the device bay.

Removing the drives from the drive bracket assembly



1. Unplug the back interface card from the drives.
2. Remove the eight screws from both drives.
3. Pull drives out from the drive bracket assembly.

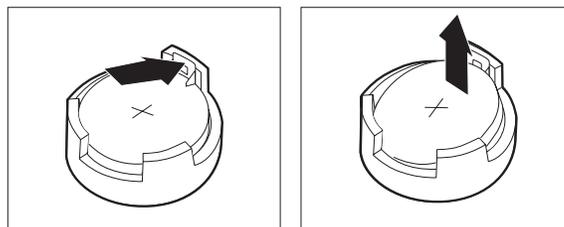
Speaker assembly removal



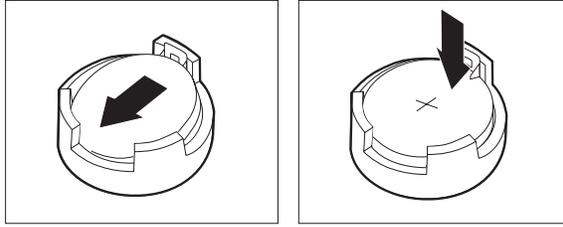
1. Remove the upper base cover, see “Upper base cover and base cover wing removal” on page 22.
2. Remove both left and right base cover wings.
3. Remove two side screws that secure the metal speaker grill.
4. Place the LCD down on a soft covered flat surface.
5. Remove the bottom plate stand (6 screws).
6. Remove the rear bucket housing, see “Rear bucket housing (rear cover) removal” on page 21.
7. Remove the rear EMC cover, see “Rear EMC cover assembly removal” on page 23.
8. Remove the two speaker cables from the system board.
9. Remove two side screws holding the speaker assembly.
10. Pull speaker assembly out through the front opening.

Battery removal and installation

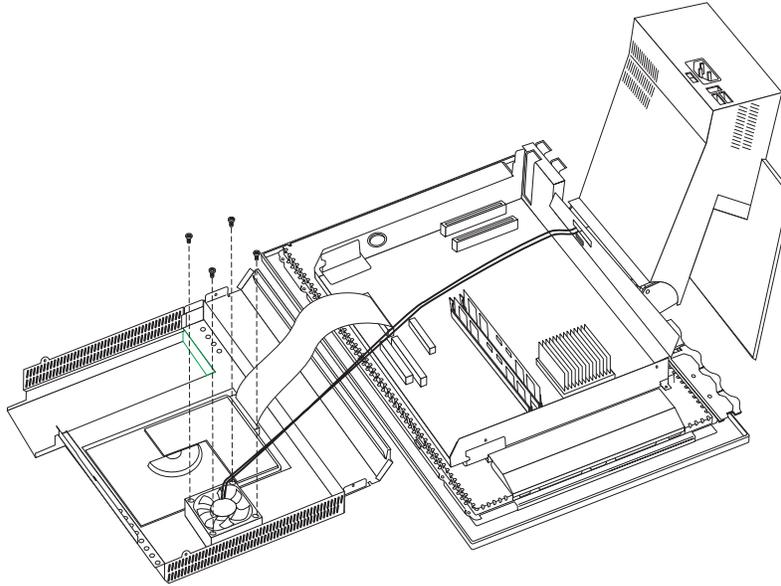
1. Turn off the computer and all attached devices.
2. Unplug the power cord.
3. Remove the rear bucket housing, see “Rear bucket housing (rear cover) removal” on page 21.
4. Locate the battery.
5. Remove the old battery.



6. Insert the new battery.



Fan removal



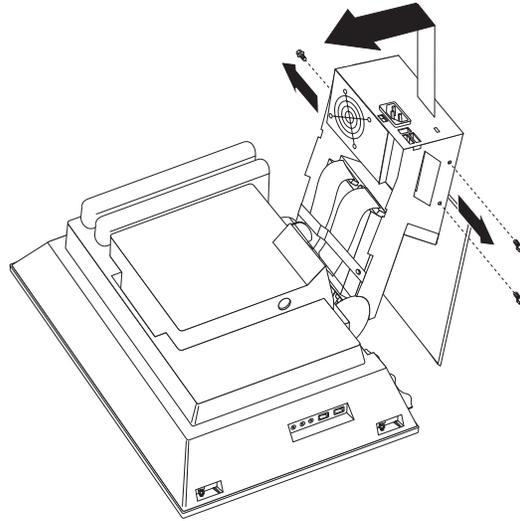
To remove the rear bucket housing-fan do the following:

1. Remove the rear bucket housing, see “Rear bucket housing (rear cover) removal” on page 21.
2. Remove the rear EMC cover assembly, see “Rear EMC cover assembly removal” on page 23.
3. Remove the fan assembly (four screws) from the EMC cover assembly.

Power supply removal

Note:

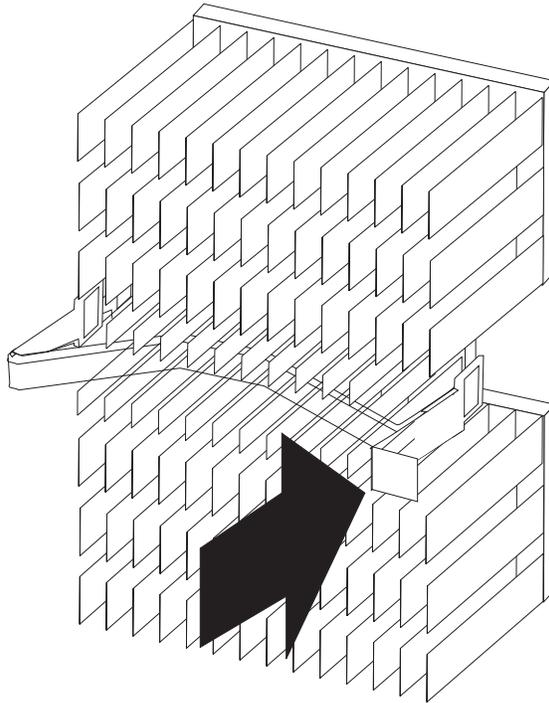
Make sure the power supply voltage switch is set to the proper operating voltage; 115V or 230V.



To remove the power supply, do the following:

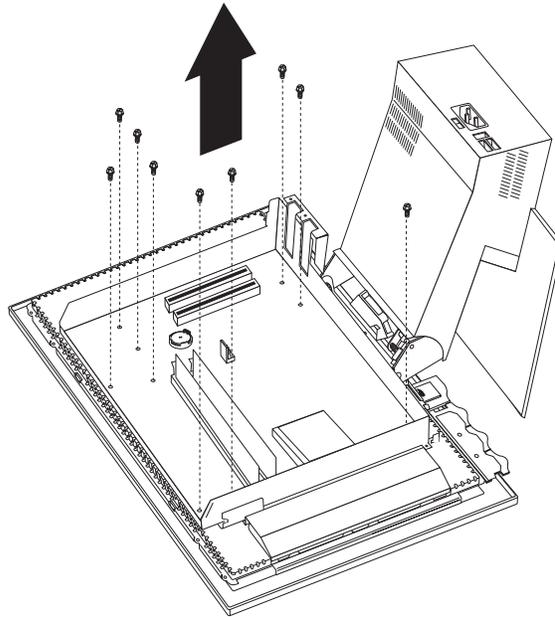
1. Disconnect the power cable.
2. Remove the two base cover wings and the upper base cover from the hinge stand assembly, see “Upper base cover and base cover wing removal” on page 22.
3. Remove the rear EMC cover assembly, see “Rear EMC cover assembly removal” on page 23.
4. Disconnect the hard disk drive power cable.
5. Disconnect the diskette drive power cable.
6. Disconnect the power supply cable from the system board.
7. Remove the USB card from the top of the power supply (two screws).
8. Remove the cable retainer on top of the hinge stand assembly.
9. Remove the power supply screws.
10. Lift the power supply up and out of the chassis.

Processor removal



1. Remove the rear bucket housing, see “Rear bucket housing (rear cover) removal” on page 21.
2. Remove the rear EMC cover assembly, see “Rear EMC cover assembly removal” on page 23.
3. Release the processor heatsink clip as shown above.
4. If installed, disconnect the processor fan cable.
5. Lift the processor socket lever to the up position.
Attention: Be careful not to damage the processor pins.
6. Lift the processor straight up from its socket.

System board removal

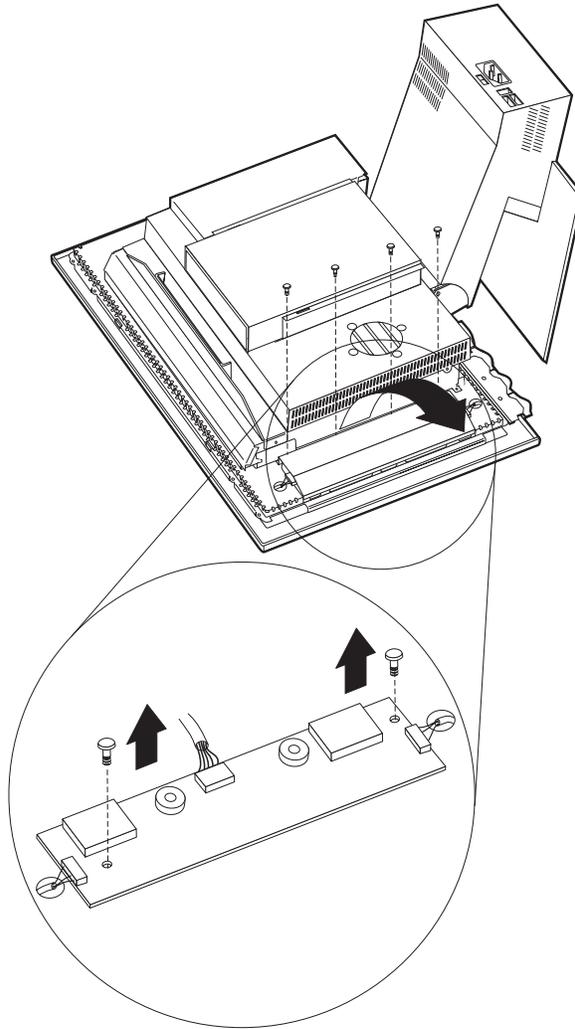


1. Remove the rear bucket housing, see “Rear bucket housing (rear cover) removal” on page 21.
2. Remove the rear EMC cover assembly, see “Rear EMC cover assembly removal” on page 23.
3. Disconnect all cables attached to the system board.
4. Unplug any installed PCI cards.
5. Remove the nine system board screws.
6. Lift the system board from the chassis assembly.

Power inverter board removal

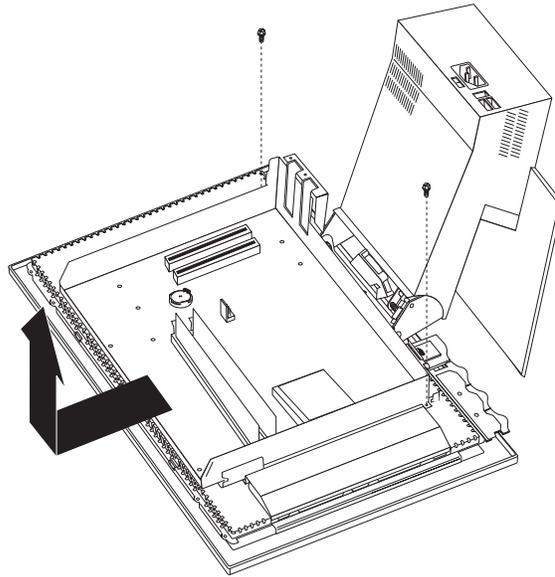
Attention:

1. Unplug the power cord from the computer before servicing the Power inverter board.
2. Do not power on the computer unless the power inverter board **cover with insulator** is properly installed.



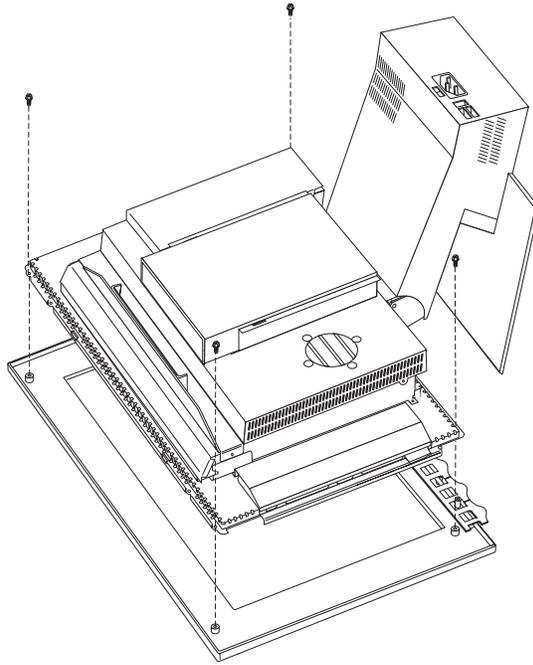
1. Remove the rear bucket housing, see “Rear bucket housing (rear cover) removal” on page 21.
2. Remove the four power inverter board cover screws. Use the tamper resistant screw driver, IBM part number 19K3624, to remove these screws.
3. Disconnect the two end cables and the LCD cable from the power inverter board.
4. Remove the two screws from the power inverter board.

Chassis assembly removal



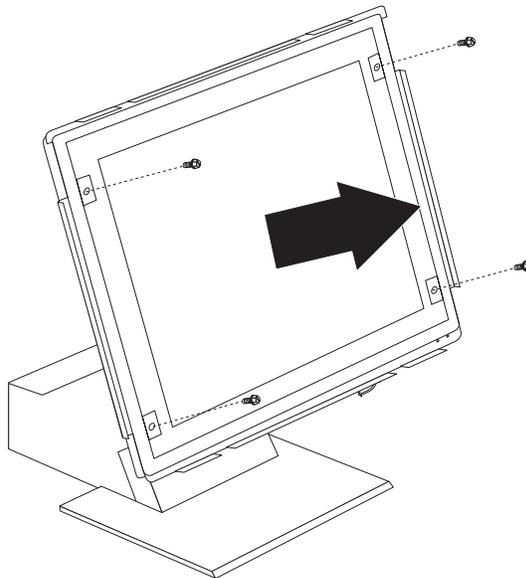
1. Remove the rear bucket housing, see “Rear bucket housing (rear cover) removal” on page 21.
2. Remove the rear EMC cover assembly, see “Rear EMC cover assembly removal” on page 23.
3. Disconnect all cables attached to the system board.
4. Unplug any installed PCI cards.
5. Remove the nine system board screws.
6. Lift the system board from the chassis assembly.
7. Remove the two screws as shown.
8. Pull the chassis assembly forward, then up to remove it from the LCD housing assembly.

Front bezel removal



1. Remove the rear bucket housing, see “Rear bucket housing (rear cover) removal” on page 21.
2. Remove the four corner screws securing the bezel to the LCD housing assembly.
3. Gently pull the bezel from the LCD housing. Note the plastic tabs on the bezel.

LCD removal



Notes:

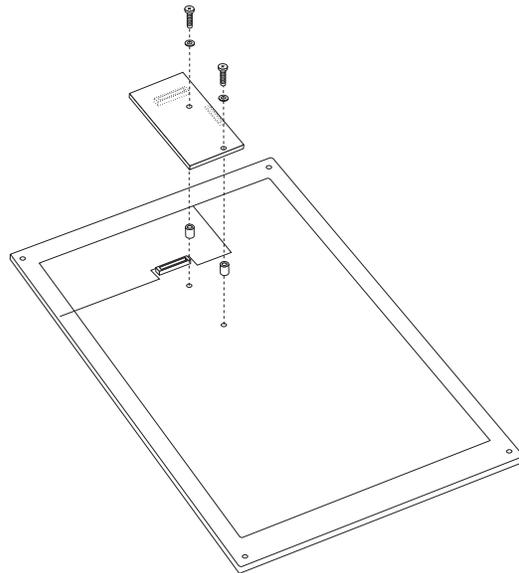
- Protect the LCD panel from being scratched.
- Lay the LCD panel down on a flat clean surface over a cloth or other soft material that will protect it from being scratched.
- Be careful not to allow other items to come close to the LCD panel as those items might touch the panel and scratch it.

Note:

The number of defective pixels to qualify a TFT LCD panel to be replaced under warrant is **8 or more** for all types 2179 and 6643 computers.

1. Remove the rear bucket housing, see “Rear bucket housing (rear cover) removal” on page 21.
2. Remove the four corner screws securing the bezel to the LCD housing assembly.
3. Gently pull the bezel from the LCD housing. Note the plastic tabs on the bezel.
4. Unplug the top and bottom LCD connectors from the power inverter card.
5. Remove the four corner screws from the front of the LCD panel to remove the LCD panel to remove the LCD panel.
6. As you remove the LCD panel, feed the cables through the holes on the LCD housing assembly.
7. Unplug the cable to the Receiver card.
8. The LCD panel can now be removed.

LCD Receiver card removal

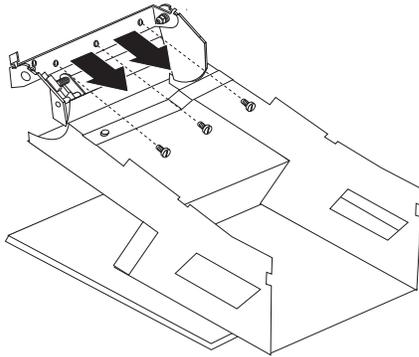


1. Perform the previous LCD removal procedure, see “LCD removal” on page 32.
2. Remove the two screws from the receiver card being careful to keep the plastic screw washers and the plastic stand-offs.
3. Lift up on the receiver card to unplug it from the LCD panel.

Installing the Receiver card

1. Lay the LCD panel on a flat protected surface.
2. Put each stand-off on the threaded holes of the LCD panel.
3. Place the receiver card over the stand-offs and by visual site line up the receiver card holes with the stand-offs.
4. Lower the receiver card down on the stand-offs and put mild pressure on the left side of the card in order to seat the card into its connectors.
5. Install the two screws with the plastic washers into the two mounting holes of the receiver card to secure the card to the LCD panel.

Hinge assembly removal



1. Remove the rear bucket housing, see “Rear bucket housing (rear cover) removal” on page 21.
2. Remove the rear EMC cover assembly, see “Rear EMC cover assembly removal” on page 23.
3. Remove the upper base cover, see “Upper base cover and base cover wing removal” on page 22.
4. Remove left and right base cover wings.
5. Disconnect the two signal cables from the system board that connects to the diskette drive and CD-ROM drive.
6. Disconnect the power supply cables from the system board.
7. Disconnect the USB card cable from the system board.
8. Remove the three screws from the hinge assembly being careful to hold and support either assembly so it will not drop.

Chapter 5. Symptom-to-FRU Index

Beep symptoms	35	POST error codes	54
Hard disk drive boot error	36	Undetermined problems	56
IBM Enhanced Diagnostic error codes	37		

The Symptom-to-FRU index lists error symptoms and possible causes. The most likely cause is listed first. Always begin with Chapter 2, "General information," on page 3. 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 56.

Important:

- Types 2179 and 6643 computers come up quiet (no beep and no memory count and checkpoint code display) when no errors are detected.
- Use Beep codes and the IBM Enhanced Diagnostics to diagnose and fix problems.
- The processor is a separate FRU from the system board; the processor is not included with the system board FRU.

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	<ul style="list-style-type: none"> • 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 Refresh failure	<ol style="list-style-type: none"> Run IBM Enhanced Diagnostics Memory module System board
3 Base 64KB memory failure	<ol style="list-style-type: none"> Memory module System board
4 Timer not operational	<ol style="list-style-type: none"> Memory module System board
5 Processor error	<ol style="list-style-type: none"> Processor System Board
6 8042-Gate A20 failure	<ol style="list-style-type: none"> System Board Keyboard

Beep Symptom	FRU/Action
7 Processor exception interrupt error	1. Processor 2. System Board
8 Display memory read/write error	1. Memory module 2. System Board
9 ROM Checksum error	1. System Board
10 CMOS shutdown register read/write error	1. System Board
11 Cache error/External Cache bad	1. System Board

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: <ol style="list-style-type: none"> 1. Attempt to access and recover (back-up) the failing hard disk drive. 2. Using the operating systems programs, format the hard disk drive. 3. Go to "Preparing the hard disk drive for use" on page 12.
The drive is defective.	Replace the hard disk drive.

IBM Enhanced Diagnostic error codes

Refer to the following diagnostic error codes when using the diagnostic tests. See "Diagnostics and test information" on page 5 for the specific type 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
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

Diagnostic Error Code	FRU/Action
000-197-XXX BIOS test warning	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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 the "Undetermined problems" section
000-199-XXX BIOS test failed, cause unknown	<ol style="list-style-type: none"> 1. Go to the "Undetermined problems" section 2. Flash the system and re-test 3. Replace component under function test
000-250-XXX BIOS APM failure	<ol style="list-style-type: none"> 1. Flash the system 2. System board
000-270-XXX BIOS ACPI failure	<ol style="list-style-type: none"> 1. Flash the system 2. System board
001-000-XXX System Test Passed	<ol style="list-style-type: none"> 1. No action
001-00X-XXX System Error	<ol style="list-style-type: none"> 1. System board
001-01X-XXX System Error	<ol style="list-style-type: none"> 1. System board
001-024-XXX System Addressing test failure	<ol style="list-style-type: none"> 1. System board
001-025-XXX System Checksum Value error	<ol style="list-style-type: none"> 1. Flash the system 2. System board
001-026-XXX System FLASH data error	<ol style="list-style-type: none"> 1. Flash the system 2. System board
001-027-XXX System Configuration/Setup error	<ol style="list-style-type: none"> 1. Run Setup 2. Flash the system 3. System board
001-032-XXX System Device Controller failure	<ol style="list-style-type: none"> 1. System board
001-034-XXX System Device Buffer Allocation failure	<ol style="list-style-type: none"> 1. Reboot the system 2. Flash the system 3. Run memory test 4. System board
001-035-XXX System Device Reset condition detected	<ol style="list-style-type: none"> 1. System board
001-036-XXX System Register error	<ol style="list-style-type: none"> 1. System board

Diagnostic Error Code	FRU/Action
001-038-XXX System Extension failure	<ol style="list-style-type: none"> Adapter card System board
001-039-XXX System DMI data structure error	<ol style="list-style-type: none"> Flash the system System board
001-040-XXX System IRQ failure	<ol style="list-style-type: none"> Power-off/on system and re-test System board
001-041-XXX System DMA failure	<ol style="list-style-type: none"> Power-off/on system and re-test System board
001-195-XXX System Test aborted by user	<ol style="list-style-type: none"> Information Re-start the test, if necessary
001-196-XXX System test halt, error threshold exceeded	<ol style="list-style-type: none"> Press F3 to review the log file Re-start the test to reset the log file
001-197-XXX System test warning	<ol style="list-style-type: none"> Make sure the component that is called out is connected and/or enabled Re-run test Component that is called out in warning statement Component under test
001-198-XXX System test aborted	<ol style="list-style-type: none"> If a component is called out, make sure it is connected and/or enabled Flash the system and re-test Go to the "Undetermined problems" section
001-199-XXX System test failed, cause unknown	<ol style="list-style-type: none"> Go to the "Undetermined problems" section Flash the system and re-test Replace component under function test
001-250-XXX System ECC error	<ol style="list-style-type: none"> System board
001-254-XXX 001-255-XXX 001-256-XXX 001-257-XXX System DMA error	<ol style="list-style-type: none"> System board
001-260-XXX 001-264-XXX System IRQ error	<ol style="list-style-type: none"> System board
001-268-XXX System IRQ1 failure	<ol style="list-style-type: none"> Device on IRQ1 System board
001-269-XXX System IRQ2 failure	<ol style="list-style-type: none"> Device on IRQ2 System board
001-270-XXX System IRQ3 failure	<ol style="list-style-type: none"> Device on IRQ3 System board

Diagnostic Error Code	FRU/Action
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
001-300-XXX System RTC Alarm failure	1. System board

Diagnostic Error Code	FRU/Action
001-301-XXX System RTC Century byte error	<ol style="list-style-type: none"> 1. Flash the system 2. System board
005-000-XXX Video Test Passed	<ol style="list-style-type: none"> 1. No action
005-00X-XXX Video error	<ol style="list-style-type: none"> 1. Video card, if installed 2. System board
005-010-XXX 005-011-XXX 005-012-XXX 005-013-XXX Video Signal failure	<ol style="list-style-type: none"> 1. Video card, if installed 2. System board
005-016-XXX Video Simple Pattern test failure	<ol style="list-style-type: none"> 1. Video Ram 2. Video card, if installed 3. System board
005-024-XXX Video Addressing test failure	<ol style="list-style-type: none"> 1. Video card, if installed 2. System board
005-025-XXX Video Checksum Value error	<ol style="list-style-type: none"> 1. Video card, if installed 2. System board
005-027-XXX Video Configuration/Setup error	<ol style="list-style-type: none"> 1. Run Setup 2. Video drivers update 3. Video card, if installed 4. System board
005-031-XXX Video Device Cable failure	<ol style="list-style-type: none"> 1. Video cable 2. Monitor 3. Video card, if installed 4. System board
005-032-XXX Video Device Controller failure	<ol style="list-style-type: none"> 1. Video card, if installed 2. System board
005-036-XXX Video Register error	<ol style="list-style-type: none"> 1. Video card, if installed 2. System board
005-038-XXX System BIOS extension failure	<ol style="list-style-type: none"> 1. Video card, if installed 2. System board
005-040-XXX Video IRQ failure	<ol style="list-style-type: none"> 1. Video card, if installed 2. System board
005-195-XXX Video Test aborted by user	<ol style="list-style-type: none"> 1. Information 2. Re-start the test, if necessary
005-196-XXX Video test halt, error threshold exceeded	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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 the "Undetermined problems" section
005-199-XXX Video test failed, cause unknown	<ol style="list-style-type: none"> 1. Go to the "Undetermined problems" section 2. Flash the system and re-test 3. Replace component under function test
005-2XX-XXX 005-3XX-XXX Video subsystem error	<ol style="list-style-type: none"> 1. Video card, if installed 2. System board
006-000-XXX Diskette interface Test Passed	<ol style="list-style-type: none"> 1. No action
006-0XX-XXX Diskette interface error	<ol style="list-style-type: none"> 1. Diskette drive Cable 2. Diskette drive 3. System board
006-195-XXX Diskette interface Test aborted by user	<ol style="list-style-type: none"> 1. Information 2. Re-start the test, if necessary
006-196-XXX Diskette interface test halt, error threshold exceeded	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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 the "Undetermined problems" section
006-199-XXX Diskette interface test failed, cause unknown	<ol style="list-style-type: none"> 1. Go to the "Undetermined problems" section 2. Flash the system and re-test 3. Replace component under function test
006-25X-XXX Diskette interface Error	<ol style="list-style-type: none"> 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 the "Undetermined problems" section
011-199-XXX Serial port test failed, cause unknown	1. Go to the "Undetermined problems" section 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	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 1. System board
014-013-XXX 014-014-XXX Parallel port Control Signal/Loopback test failure	<ol style="list-style-type: none"> 1. System board
014-015-XXX Parallel port External Loopback failure	<ol style="list-style-type: none"> 1. Wrap plug 2. System board
014-027-XXX Parallel port Configuration/Setup error	<ol style="list-style-type: none"> 1. Run Setup, enable port 2. Flash the system 3. System board
014-03X-XXX 014-04X-XXX Parallel port failure	<ol style="list-style-type: none"> 1. System board
014-195-XXX Parallel port Test aborted by user	<ol style="list-style-type: none"> 1. Information 2. Re-start the test, if necessary
014-196-XXX Parallel port test halt, error threshold exceeded	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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 the "Undetermined problems" section
014-199-XXX Parallel port test failed, cause unknown	<ol style="list-style-type: none"> 1. Go to the "Undetermined problems" section 2. Flash the system and re-test 3. Replace component under function test
014-2XX-XXX 014-3XX-XXX Parallel port failure	<ol style="list-style-type: none"> 1. External parallel device 2. System board
015-000-XXX USB port Interface Test Passed	<ol style="list-style-type: none"> 1. No action
015-001-XXX USB port Presence	<ol style="list-style-type: none"> 1. Remove USB device(s) and re-test 2. System board

Diagnostic Error Code	FRU/Action
015-002-XXX USB port Timeout	<ol style="list-style-type: none"> 1. Remove USB device(s) and re-test 2. System board
015-015-XXX USB port External Loopback failure	<ol style="list-style-type: none"> 1. Remove USB device(s) and re-test 2. System board
015-027-XXX USB port Configuration/Setup error	<ol style="list-style-type: none"> 1. Flash the system 2. System board
015-032-XXX USB port Device Controller failure	<ol style="list-style-type: none"> 1. System board
015-034-XXX USB port buffer allocation failure	<ol style="list-style-type: none"> 1. Reboot the system 2. Flash the system 3. Run memory test 4. System board
015-035-XXX USB port Reset condition detected	<ol style="list-style-type: none"> 1. Remove USB device(s) and re-test 2. System board
015-036-XXX USB port Register error	<ol style="list-style-type: none"> 1. System board
015-040-XXX USB port IRQ failure	<ol style="list-style-type: none"> 1. Run setup and check for conflicts 2. Flash the system 3. System board
015-195-XXX USB port Test aborted by user	<ol style="list-style-type: none"> 1. Information 2. Re-start the test, if necessary
015-196-XXX USB port test halt, error threshold exceeded	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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 the "Undetermined problems" section
015-199-XXX USB port test failed, cause unknown	<ol style="list-style-type: none"> 1. Go to the "Undetermined problems" section 2. Flash the system and re-test 3. Replace component under function test
018-000-XXX PCI Card Test Passed	<ol style="list-style-type: none"> 1. No action
018-0XX-XXX PCI Card Failure	<ol style="list-style-type: none"> 1. Riser card if installed 2. System board

Diagnostic Error Code	FRU/Action
018-195-XXX PCI Card Test aborted by user	<ol style="list-style-type: none"> 1. PCI card 2. Information 3. Re-start the test, if necessary
018-196-XXX PCI Card test halt, error threshold exceeded	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 1. Make sure the component that is called out is connected and/or enabled 2. Flash the system and re-test 3. Go to the "Undetermined problems" section
018-199-XXX PCI Card test failed, cause unknown	<ol style="list-style-type: none"> 1. Go to the "Undetermined problems" section 2. Flash the system and re-test 3. Replace component under function test
018-250-XXX PCI Card Services error	<ol style="list-style-type: none"> 1. PCI card 2. Riser card, if installed 3. System board
020-000-XXX PCI Interface Test Passed	<ol style="list-style-type: none"> 1. No action
020-0XX-XXX PCI Interface error	<ol style="list-style-type: none"> 1. PCI card 2. Riser card, if installed 3. System board
020-195-XXX PCI Test aborted by user	<ol style="list-style-type: none"> 1. Information 2. Re-start the test, if necessary
020-196-XXX PCI test halt, error threshold exceeded	<ol style="list-style-type: none"> 1. Press F3 to review the log file 2. Re-start the test to reset the log file
020-197-XXX PCI test warning	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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 the "Undetermined problems" section

Diagnostic Error Code	FRU/Action
020-199-XXX PCI test failed, cause unknown	<ol style="list-style-type: none"> 1. Go to the "Undetermined problems" section 2. Flash the system and re-test 3. Replace component under function test
020-262-XXX PCI system error	<ol style="list-style-type: none"> 1. PCI card 2. Riser card, if installed 3. System board
025-000-XXX IDE interface Test Passed	<ol style="list-style-type: none"> 1. No action
025-00X-XXX 025-01X-XXX IDE interface failure	<ol style="list-style-type: none"> 1. IDE signal cable 2. Check power supply 3. IDE device 4. System board
025-027-XXX IDE interface Configuration/Setup error	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 1. IDE signal cable 2. Check power supply 3. IDE device 4. System board
025-195-XXX IDE interface Test aborted by user	<ol style="list-style-type: none"> 1. Information 2. Re-start the test, if necessary
025-196-XXX IDE interface test halt, error threshold exceeded	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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 the "Undetermined problems" section
025-199-XXX IDE interface test failed, cause unknown	<ol style="list-style-type: none"> 1. Go to the "Undetermined problems" section 2. Flash the system and re-test 3. Replace component under function test
030-000-XXX SCSI interface Test Passed	<ol style="list-style-type: none"> 1. No action

Diagnostic Error Code	FRU/Action
030-00X-XXX 030-01X-XXX SCSI interface failure	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 1. Information 2. Re-start the test, if necessary
030-196-XXX SCSI interface test halt, error threshold exceeded	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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 the "Undetermined problems" section
030-199-XXX SCSI interface test failed, cause unknown	<ol style="list-style-type: none"> 1. Go to the "Undetermined problems" section 2. Flash the system and re-test 3. Replace component under function test
035-000-XXX RAID interface Test Passed	<ol style="list-style-type: none"> 1. No action
035-0XX-XXX RAID interface Failure	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 1. Information 2. Re-start the test, if necessary

Diagnostic Error Code	FRU/Action
035-196-XXX RAID interface test halt, error threshold exceeded	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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 the "Undetermined problems" section
035-199-XXX RAID interface test failed, cause unknown	<ol style="list-style-type: none"> 1. Go to the "Undetermined problems" section 2. Flash the system and re-test 3. Replace component under function test
071-000-XXX Audio port Interface Test Passed	<ol style="list-style-type: none"> 1. No action
071-00X-XXX 071-01X-XXX 071-02X-XXX Audio port error	<ol style="list-style-type: none"> 1. Run Setup 2. Flash the system 3. System board
071-03X-XXX Audio port failure	<ol style="list-style-type: none"> 1. Speakers 2. Microphone 3. Audio card, if installed 4. System board
071-04X-XXX Audio port failure	<ol style="list-style-type: none"> 1. Run Setup 2. Audio card, if installed 3. System board
071-195-XXX Audio port Test aborted by user	<ol style="list-style-type: none"> 1. Information 2. Re-start the test, if necessary
071-196-XXX Audio port test halt, error threshold exceeded	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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 the "Undetermined problems" section

Diagnostic Error Code	FRU/Action
071-199-XXX Audio port test failed, cause unknown	<ol style="list-style-type: none"> 1. Go to the "Undetermined problems" section 2. Flash the system and re-test 3. Replace component under function test
071-25X-XXX Audio port failure	<ol style="list-style-type: none"> 1. Speakers 2. Audio card, if installed 3. System board
080-000-XXX Game Port interface Test Passed	<ol style="list-style-type: none"> 1. No action
080-XXX-XXX Game Port interface Error	<ol style="list-style-type: none"> 1. Remove the game port device and re-test the system
080-195-XXX Game Port interface Test aborted by user	<ol style="list-style-type: none"> 1. Information 2. Re-start the test, if necessary
080-196-XXX Game Port interface test halt, error threshold exceeded	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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 the "Undetermined problems" section
080-199-XXX Game Port interface test failed, cause unknown	<ol style="list-style-type: none"> 1. Go to the "Undetermined problems" section 2. Flash the system and re-test 3. Replace component under function test
086-000-XXX Mouse Port interface Test Passed	<ol style="list-style-type: none"> 1. No action
086-001-XXX Mouse Port interface Presence	<ol style="list-style-type: none"> 1. Mouse 2. System board
086-032-XXX Mouse Port interface Device controller failure	<ol style="list-style-type: none"> 1. Mouse 2. System board
086-035-XXX Mouse Port interface Reset	<ol style="list-style-type: none"> 1. Mouse 2. System board
086-040-XXX Mouse Port interface IRQ failure	<ol style="list-style-type: none"> 1. Run Setup 2. Mouse 3. System board
086-195-XXX Mouse Port interface Test aborted by user	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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 the "Undetermined problems" section
086-199-XXX Mouse Port interface test failed, cause unknown	<ol style="list-style-type: none"> 1. Go to the "Undetermined problems" section 2. Flash the system and re-test 3. Replace component under function test
089-000-XXX Microprocessor Test Passed	<ol style="list-style-type: none"> 1. No action
089-XXX-XXX Microprocessor failure	<ol style="list-style-type: none"> 1. Microprocessor(s) 2. System board
089-195-XXX Microprocessor Test aborted by user	<ol style="list-style-type: none"> 1. Information 2. Re-start the test, if necessary
089-196-XXX Microprocessor test halt, error threshold exceeded	<ol style="list-style-type: none"> 1. Press F3 to review the log file 2. Re-start the test to reset the log file
089-197-XXX Microprocessor test warning	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 1. Flash the system and re-test 2. Go to the "Undetermined problems" section
089-199-XXX Microprocessor test failed, cause unknown	<ol style="list-style-type: none"> 1. If a component is called out, make sure it is connected and/or enabled 2. Go to the "Undetermined problems" section 3. Flash the system and re-test 4. Replace component under function test
170-000-XXX Voltage Sensor(s) Test Passed	<ol style="list-style-type: none"> 1. No action
170-0XX-XXX Voltage Sensor(s) failure	<ol style="list-style-type: none"> 1. Flash system 2. System board

Diagnostic Error Code	FRU/Action
170-195-XXX Voltage Sensor(s) Test aborted by user	<ol style="list-style-type: none"> Information Re-start the test, if necessary
170-196-XXX Voltage Sensor(s) test halt, error threshold exceeded	<ol style="list-style-type: none"> Press F3 to review the log file Re-start the test to reset the log file
170-197-XXX Voltage Sensor(s) test warning	<ol style="list-style-type: none"> Make sure the component that is called out is connected and/or enabled Re-run test Component that is called out in warning statement Component under test
170-198-XXX Voltage Sensor(s) test aborted	<ol style="list-style-type: none"> If a component is called out, make sure it is connected and/or enabled Flash the system and re-test Go to the "Undetermined problems" section
170-199-XXX Voltage Sensor(s) test failed, cause unknown	<ol style="list-style-type: none"> Go to the "Undetermined problems" section Flash the system and re-test Replace component under function test
170-250-XXX 170-251-XXX Voltage Sensor(s) Voltage limit error	<ol style="list-style-type: none"> Power supply System board
170-254-XXX Voltage Sensor(s) Voltage Regulator Module error	<ol style="list-style-type: none"> Voltage Regulator Module (VRM) Microprocessor System board
175-000-XXX Thermal Sensor(s) Test Passed	<ol style="list-style-type: none"> No action
175-0XX-XXX Thermal Sensor(s) failure	<ol style="list-style-type: none"> Flash system System board
175-195-XXX Thermal Sensor(s) Test aborted by user	<ol style="list-style-type: none"> Information Re-start the test, if necessary
175-196-XXX Thermal Sensor(s) test halt, error threshold exceeded	<ol style="list-style-type: none"> Press F3 to review the log file Re-start the test to reset the log file
175-197-XXX Thermal Sensor(s) test warning	<ol style="list-style-type: none"> Make sure the component that is called out is connected and/or enabled Re-run test Component that is called out in warning statement Component under test
175-198-XXX Thermal Sensor(s) test aborted	<ol style="list-style-type: none"> If a component is called out, make sure it is connected and/or enabled Flash the system and re-test Go to "Undetermined problems" section

Diagnostic Error Code	FRU/Action
175-199-XXX Thermal Sensor(s) test failed, cause unknown	<ol style="list-style-type: none"> 1. Go to the "Undetermined problems" section 2. Flash the system and re-test 3. Replace component under function test
175-250-XXX 175-251-XXX Thermal Sensor(s) limit error	<ol style="list-style-type: none"> 1. Check fans 2. Check Power supply 3. Microprocessor 4. System board
185-000-XXX Asset Security Test Passed	<ol style="list-style-type: none"> 1. No action
185-XXX-XXX Asset Security failure	<ol style="list-style-type: none"> 1. Flash system 2. System board
185-278-XXX Asset Security Chassis Intrusion	<ol style="list-style-type: none"> 1. Assure Asset Security Enabled 2. C2 Cover Switch 3. System board
201-000-XXX System Memory Test Passed	<ol style="list-style-type: none"> 1. No action
201-XXX-XXX System Memory error	<ol style="list-style-type: none"> 1. Replace the memory module called out by the test 2. System board
202-000-XXX System Cache Test Passed	<ol style="list-style-type: none"> 1. No action
202-XXX-XXX System Cache error	<ol style="list-style-type: none"> 1. Cache, if removable 2. System board 3. Microprocessor
206-000-XXX Diskette Drive Test Passed	<ol style="list-style-type: none"> 1. No action
206-XXX-XXX Diskette Drive error	<ol style="list-style-type: none"> 1. Diskette Drive Cable 2. Check power supply voltages 3. Diskette drive 4. System board
215-000-XXX CD-ROM Drive Test Passed	<ol style="list-style-type: none"> 1. No action
215-XXX-XXX CD-ROM Drive error	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 1. No action
217-25X-XXX 217-26X-XXX Hard Disk Drive (IDE) error	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 1. No action
220-XXX-XXX Hi-Capacity Cartridge Drive error	<ol style="list-style-type: none"> 1. Remove the Hi-Capacity Cartridge Drive and re-test the system
301-XXX-XXX Keyboard error	<ol style="list-style-type: none"> 1. Keyboard 2. Check and test mouse 3. System board
301-000-XXX Keyboard Test Passed	<ol style="list-style-type: none"> 1. No action
302-000-XXX Mouse Test Passed	<ol style="list-style-type: none"> 1. No action
302-XXX-XXX Mouse error	<ol style="list-style-type: none"> 1. Mouse 2. Check and test Keyboard 3. System board
303-000-XXX Joystick Test Passed	<ol style="list-style-type: none"> 1. No action
303-XXX-XXX Joystick error	<ol style="list-style-type: none"> 1. Remove the Joystick and re-test the system
305-000-XXX Monitor DDC Test Passed	<ol style="list-style-type: none"> 1. No action
305-250-XXX Monitor DDC self test failure	<ol style="list-style-type: none"> 1. Run Setup to enable DDC 2. Cable 3. Monitor 4. Video card 5. System board
415-000-XXX Modem Test Passed	<ol style="list-style-type: none"> 1. No action
415-XXX-XXX Modem error	<ol style="list-style-type: none"> 1. Remove the Modem and re-test the system

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:

Types 2179 and 6643 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 Configuration/Setup Utility program (see "Setup Utility program" on page 5).
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.

POST Error Code	FRU/Action
161 Bad CMOS battery	<ol style="list-style-type: none"> 1. Run Setup, reload defaults, set Date/Time 2. CMOS Backup Battery (see "Safety information" on page 102) 3. System Board
162 CMOS checksum error	<ol style="list-style-type: none"> 1. Run Setup, reload defaults, set Date/Time 2. CMOS Backup Battery (see "Safety information" on page 102) 3. System Board
163 Clock not updating or invalid time set	<ol style="list-style-type: none"> 1. Time and Date Set? 2. CMOS Backup Battery (see "Safety information" on page 102) 3. System Board
164 POST detected a memory size decrease	<ol style="list-style-type: none"> 1. Run Setup. Check System Summary menu for memory size change. (See "Setup Utility program" on page 5.) 2. Run the Extended Memory Diagnostic tests
301 Keyboard error	<ol style="list-style-type: none"> 1. Keyboard 2. Keyboard Cable 3. System Board
662 Diskette drive configuration error	<ol style="list-style-type: none"> 1. Diskette drive configuration error or wrong diskette drive type. Run Setup Configuration
1762 Hard disk drive configuration error	<ol style="list-style-type: none"> 1. Run Configuration. (See "Setup Utility program" on page 5.) This occurs when a drive is added or removed.

POST Error Code	FRU/Action
5962 An IDE device (other than hard drive) configuration error	<ol style="list-style-type: none"> 1. Run Configuration 2. CD-ROM/DVD/CD-RW Drive. This occurs when a drive is added or removed. 3. System Board 4. Riser card if installed

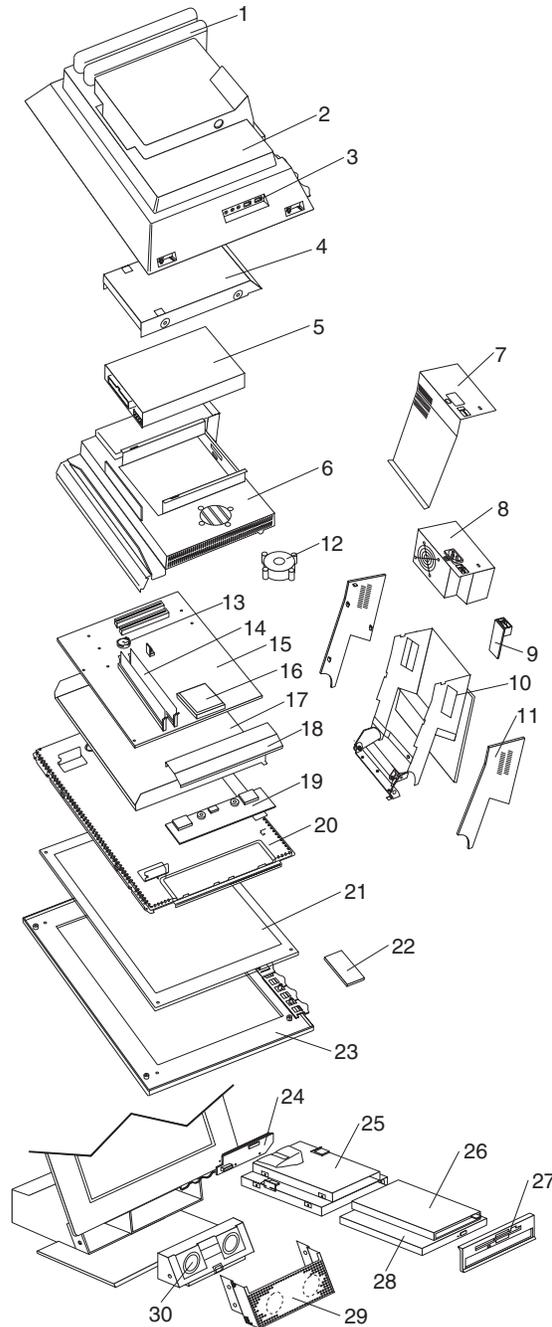
Undetermined problems

Check the power supply voltages (see “Power Supply” on page 16). 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. Diskette drive
 - e. Memory modules
 Before removing or replacing memory modules, see “System Board Memory” on page 15.
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 “System board removal” on page 29).

Chapter 6. Parts listing



System Type 2179

Type 2179 parts listing supports the following models: 700, 750, 50A, 52A, 90S, 90T, 90K, 968, 50J, 70F, 71U, 71F, 51J, 77U, 53A, 91G, 97G, 51Q, 53U, 52C, 52M, 52H, 77F, 81U, 81F, 81G, 84Q, 84J, 86U, 86S, 86H, 86Y, 86G, 86A, 88U, GG1, 85C, 85D, 85M, 85V

Index	System (Type 2179)	FRU No.
1	PCI housing (Scuba Housing) (all models)	09N3282
2	Rear bucket housing (all models) (Includes rear housing, USB audio card bracket, keylock cover, keylock assembly, PCI housing, screws, and USB audio label)	09N3281
3	Audio/USB board (Line-in, Mic-in, head Phone-out) (all models)	09N3274
4	Hard disk drive bracket assembly (Includes hard disk drive bracket, 4 ground clips (shielding) and 4 grommets (dampers) (all models)	19K3408
5	10GB HDD, 3.5", 5400 RPM (models 700, 50A, 90S, 90T, 90K, 70F, GG1)	09N2629
5	15GB HDD, 3.5", 5400 RPM (models 750, 52A, 968, 50J)	09N2630
5	20GB HDD, 3.5", 5400 RPM (models 77U, 53A, 97G, 71U, 71F, 91G, 53U, 52C, 52M, 52H, 77F, 81U, 81F, 81G, 86U, 86S, 86H, 86Y, 86G, 86A, 88U)	09N2631
5	30GB HDD, 3.5", 7200 RPM (model 51J, 51Q)	09N0925
5	40GB HDD, 3.5", 7200 RPM (model 84Q, 84J, 85C, 85D, 85M, 85V)	24P6070
6	Rear EMC cover assembly (Includes rear EMC cover, rear handle, 2 pan head screws, handle bar, rear cover, PCI cover and Hard drive clip) (models 700, 750, 50A, 52A, 90S, 90T, 90K, 968, 50J, 70F, 71U, 71F, 51J, 77U, 53A, 91G, 97G, 51Q, 53U, 52C, 52M, 52H, 77F, GG1)	19K2627
6	Rear EMC cover assembly (Includes rear EMC cover, rear handle, 2 pan head screws, handle bar, rear cover, PCI cover and Hard drive clip), Air duct (models 81U, 81F, 81G,84Q, 84J, 86U, 86S, 86H, 86Y, 86G, 86A, 88U, 85C, 85D, 85M, 85V)	19K2627
7	Upper base cover assembly (Includes upper cover, cable shield, USB label, voltage switch label, and mesh upper cover) (all models)	09N2645
8	Power supply - 110W (models 700, 750, 50A, 52A, 90S, 90T, 90K, 968, 70F, 71U, 71F, 77U, 53A, 51Q, 53U, 52C, 52M, 52H, 77F, GG1)	09N3267
8	Power supply - 110W (Japan) (models 50J, 51J)	19K3405
8	Power supply - 110W (EMEA) (models 968, 91G, 97G)	24P6082
8	Power supply - 115W (non-PFC) (models 81U, 81F, 84Q, 86U, 86S, 86H, 86Y, 86A, 88U, 85C, 85D, 85M, 85V)	24P6068
8	Power supply - 115W (Japan) (model 84J)	24P6069
8	Power supply - 115W (EMEA) (models 81G, 86G)	24P6083
9	Rear USB (3 Port) Board (all models)	09N3273
10	Hinge stand assembly (Base assembly) for CD-ROM drives - including plate stand (Includes hinge assembly, device bay, device bay sector gear, device bay idle gear, spring coil bushing, device bay coil holder, ITM damper, device bay spring coil, spring coil bolt, drop downslide plate, drop down spring, washer, cable stand holder, pin good spacer support, M3L5 flange screw, M3L3 K-head screw and M3L5 flat screw) (models 700, 50A, 90S, 90T, 90K, 50J, 70F, 71U, 71F, 77U, 91G, 77F, GG1)	19K2630
10	Hinge stand assembly (Base assembly) for DVD drives - including plate stand (Includes hinge assembly, device bay, device bay sector gear, device bay idle gear, spring coil bushing, device bay coil holder, ITM damper, device bay spring coil, spring coil bolt, drop down slide plate, drop down spring, washer, cable stand holder, pin good spacer support, M3L5 flange screw, M3L3 K-head screw and M3L5 flat screw) (models 750, 52A, 968, 51J, 53A, 97G, 51Q, 53U, 52C, 52M, 52H, 84Q, 84J, 86U, 86S, 86H, 86Y, 86G, 86A, 85C, 85D, 85M, 85V)	19K3515
11	Base cover wings (Left and Right) (all models)	19K2632

Index	System (Type 2179)	FRU No.
12	System fan (models 700, 750, 50A, 52A, 90S, 90T, 90K, 968, 50J, 70F, 71U, 71F, 51J, 77U, 53A, 91G, 97G, 51Q, 53U, 52C, 52M, 52H, 77F, GG1)	09N2628
12	System fan, Dual bearing (models 81U, 81F, 81G, 84Q, 84J, 86U, 86S, 86H, 86Y, 86G, 86A, 88U, 85C, 85D, 85M, 85V)	24P6065
13	Battery, Lithium (all models)	33F8354
14	64MB DIMM module (PC133) (models 700, 90S, 90T, 90K,968, 50J, 70F, 71U, 71F, 51J, 91G, 51Q, 81U, 81F, 81G, 84Q, 84J)	09N2626
14	128 MB DIMM module (PC133) (models 52A, 750, 77U, 53A, 97G, 53U, 52C, 52M, 52H, 77F, 86U, 86S, 86H, 86Y, 86G, 86A, 88U, GG1, 85C, 85D, 85M, 85V)	09N2627
15	System board, (no processor, no memory) supports 66 MHz. FSB (models 700, 90S, 90T, 90K, 50J, 70F, 71U, 71F, 91G, GG1)	09N2625
15	System board, (w/PIO) supports Celeron (models 81U, 81F, 81G)	09N2625
15	System board, (no processor, no memory) supports 133 MHz. FSB and PIII up to 667MHz (models 750, 52A, 968)	19K3597
15	System board, (no processor, no memory) supports 133 MHz. FSB and PIII above 667MHz (models 51Q, 51J, 53U, 53A, 77U, 97G, 52C, 52M, 52H, 77F)	22P2434
15	System board, (w/PIO) supports 933 MHz and above (models 84Q, 84J, 86U, 86S, 86H, 86Y, 86G, 86A, 88U, 85C, 85D, 85M, 85V)	24P6067
16	Processor, Intel 370, PPGA, Celeron 533-66 MHz. (models 700, 50A, 90S, 90T, 90K, 70F)	09N3275
16	Processor, Intel 370, PPGA, Celeron 600-66 MHz. (model 50J)	19K3601
16	Processor, Intel 370, FCPGA, Celeron 633-66 MHz. (models 71U, 71F, 91G, GG1)	22P2317
16	Processor, Intel 370, FCPGA, Celeron 733-66 MHz. (models 81U, 81F, 81G)	22P6073
16	Processor, Intel 370, FCPGA, PIII 600-133 MHz. (models 750, 52A, 968)	09N3277
16	Processor, Intel 370, FCPGA, PIII 800-133 MHz. (models 77U, 53A, 51J, 97G, 51Q, 53U, 77F)	22P2319
16	Processor, Intel 370, FCPGA, PIII 866-133 MHz (models 52C, 52M, 52H)	22P2320
16	Processor, Intel 370, FCPGA, PIII 1.0 GHz-133 (models 84Q, 84J, 86U, 86S, 86H, 86Y, 86G, 86A, 88U, 85C, 85D, 85M, 85V)	24P6072
17	Chassis assembly (houses the system board) (Includes chassis, edge saddle cable clip, I/O port shield/label, LP port brackets, one port bracket screw and expansion PCI bracket) (all models)	19K2628
18	Power inverter board cover with insulator (all models)	19K3623
19	LCD Power inverter board (high voltage) (all models)	09N3268
20	LCD Housing assembly (Includes LCD housing assembly and insulator plate assembly) (all models)	19K2629
21	TFT (LCD) Panel (all models)	09N2671
22	Button Board (Power-on/suspend, Brightness up/down) (models 700, 750, 50A, 52A, 90S, 90T, 90K, 968, 50J, 70F, 71U, 71F, 51J, 77U, 53A, 91G, 97G, 51Q, 53U, 52C, 52M, 52H, 77F, GG1)	09N3271
22	Button Board (Power-on/suspend, Brightness up/down) (models 81U, 81F, 81G, 84Q, 84J, 86U, 86S, 86H, 86Y, 86G, 86A, 88U, 85C, 85D, 85M, 85V)	24P6078

Index	System (Type 2179)	FRU No.
23	Front bezel, Black, (Includes black bezel, button release, button power, hard drive/LED lens and screw) (models 700, 750, 50A, 52A, 90S, 90T, 90K, 968, 70F, 71U, 71F, 77U, 53A, 91G, 97G, 51Q, 53U, 52C, 52M, 52H, 77F, 81U, 81F, 81G, 84Q, 86U, 86S, 86H, 86Y, 86G, 86A, 88U, 85C, 85D, 85M, 85V)	19K3410
23	Front bezel, Silver, (Includes silver bezel, button release, button power, hard drive/LED lens and screw) (models 50J, 51J, 84J)	09N3284
23	Custom front bezel for model GG1	31P4100
24	DASD Interface (FDD/CD-ROM board) (all models)	09N3270
25	FDD/CD-ROM Drive Bracket Asm (Includes FDD bracket, CD bracket, 2 device bay clips, device release button, device release button (left) and 2 device release springs) (all models)	19K2633
26	3.5", diskette drive, Slim 3-Models (700, 750, 50A, 52A, 90S, 90T, 90K, 968, 50J, 70F, 71U, 71F, 51J, 77U, 53A, 91G, 97G, 51Q, 53U, 52C, 52M, 52H, 77F, 81U, 81F, 81G, 84Q, 84J, 86U, 86S, 86H, 86Y, 86G, 86A, 88U, GG1, 85C, 85D, 85M, 85V)	09N2674
27	Device Bay Bezel Asm (Includes LED lens and bezel) (all models)	19K3406
28	10-24X, CD-ROM drive, Slim (models 700, 50A, 90S, 90T, 90K, 50J, 70F, 71U, 71F, 91G, 81U, 81F, 81G)	09N2675
28	4x4x32, CD-R/W, Slim (model 77U, 77F)	09N2676
28	8x4x32, CD-R/W, Slim (model 88U)	24P6074
28	6X, DVD drive, Slim (models 750, 52A, 968)	09N2677
28	8x DVD drive, Slim (models 51J, 53A, 97G, 51Q, 53U, 52C, 52M, 52H, 84Q, 84J, 86U, 86S, 86H, 86Y, 86G, 86A, 85C, 85D, 85M, 85V)	22P2321
29	Speaker Grill (all models)	09N2672
30	Speaker assembly, Internal (Pair), LG05 (all models)	09N2658
	Cable - Audio USB (System board to Side Audio USB) (all models)	09N2668
	Cable - Button (System board to Button board) (all models)	09N2666
	Cable - CD/DVD-ROM Audio (all models)	09N2670
	Cable - CD/DVD-ROM drive ribbon (all models)	09N2661
	Cable - FDD Ribbon (all models)	09N2659
	Cable - HDD Ribbon (all models)	09N2660
	Cable - Inverter (System board to Inverter board) (all models)	09N2664
	Cable - IR (System board to IR Board) (all models)	09N2665
	Cable - LCD Signal (System board to Receiver board) (all models)	09N2669
	Cable - Rear USB (System board to Rear USB board) (all models)	09N2667
	Cable - Slim line diskette drive Ribbon (all models)	09N2662
	Heatsink for Celeron processors (models 700, 50A, 90S, 90T, 90K, 50J, 70F)	09N2656
	Heatsink for Pentium III processors (models 750, 52A, 968, 71U, 71F, 51J, 77U, 53A, 91G, 97G, 51Q, 53U, 52C, 52M, 52H, 77F, GG1)	09N2657
	Heatsink for Pentium III & Celeron processors (models 81U, 81F, 81G, 84Q, 84J, 86U, 86S, 86H, 86Y, 86G, 86A, 88U, 85C, 85D, 85M, 85V)	24P6063
	IR Board (Communicates with External Peripherals, shared data) (all models)	09N3272
	Lever assembly (Drop Down) white plastic push button (Includes cone/button spring, lever shaft, top lever holder and device drop lever) (all models)	19K3407

Index	System (Type 2179)	FRU No.
	Microphone, Andrea Headset NC8 (models 50A, 52A, 50J, 968, 90S, 90T, 90K, 700, 750, 70F)	19K3403
	Modem, Askey-Monopack-1456VQH87, LP NA/LA/SA/AP-N (models 700, 750, 90S, 90T, 90K, 50J, 70F, 71U, 71F, 51J, 77U, 53U, 52C, 52M, 52H, 77F, 81U, 81F, 84J, 86U, 86S, 86H, 86Y, 88U, 85C, 85D, 85M, 85V)	19K3353
	Modem, Askey-Monopack-1456VQH87 (INT), LP EMEA/ANZ/India/Singapore (models 50A, 52A, 53A, 51Q, 84Q, 86A, 85C, 85D, 85M, 85V)	19K3354
	Modem, GVC-Monopack-F-1156IV/R9C, LP NA/LA/SA/AP-N (models 700, 750, 90S, 90T, 90K, 50J, 70F, 71U, 71F, 51J, 77U, 53U, 52C, 52M, 52H, 77F, 81U, 81F, 84J, 86U, 86S, 86H, 86Y, 88U, 85C, 85D, 85M, 85V)	19K3351
	Modem, GVC-Monopack-F-1156IV+/R9C (WT2), LP EMEA/ANZ/INDIA/Singapore (models 50A, 52A, 968, 53A, 91G, 97G, 51Q, 81G, 84Q, 86G, 86A)	19K3352
	Mouse, Scrollpoint III (SP 3), USB, Black (models 700, 750, 50A, 52A, 90S, 90T, 90K, 968, 70F, 71U, 71F, 53A, 91G, 97G, 51Q, 53U, 77U, 52C, 52M, 52H, 77F, 81U, 81F, 81G, 84Q, 86U, 86S, 86H, 86Y, 86G, 86A, 88U, 85C, 85D, 85M, 85V)	09N5527
	Mouse, Scrollpoint III (SP 3), USB, Metallic Silver (Japan) (models 50J, 51J, 84J)	09N5529
	Mouse, Scrollpoint III Wireless (RF), USB, Black (models: none)	19K1991
	Mouse, Standard Sleek, Black (model GG1)	10L6149
	Screw Pack (Includes 4 rubber feet and screws) (all models)	19K2634
	Screw Driver, Tamper Resistant for removing Power Inverter board (all models)	19K3624
	Flash ROM Module, w/Basic level BIOS (all models)	22P2310

System Type 6643

Type 6643 parts listing supports the following models: 11U, 11F, 11S, 12U, 12F, 12S, 13U, 13F, 13G, 13S, 14U, 14F, 14G, 14S, 13J, 13A, 13D, 13Q, 21U, 21F, 22U, 22F, 23U, 23F, 23A, 24D, 23Q, 24U, 24F, 24G, 22G, 41J

Index	System (Type 6643)	FRU No.
1	PCI Housing (Scuba Housing) (all models)	09N3282
2	Rear bucket housing (Includes rear housing, USB audio card bracket, keylock cover, keylock assembly, PCI housing, screws, and USB audio label) (all models)	09N3281
3	Audio/USB board (Line-in, Mic-in, head Phone-out) (all models)	09N3274
4	Hard disk drive bracket assembly (Includes hard disk drive bracket, 4 ground clips (shielding) and 4 grommets (dampers) (all models)	19K3408
5	10GB HDD, 3.5", 5400 RPM (models 11U, 11F, 11S, 12U, 12F, 12S)	09N2629
5	20 GB HDD, 3.5", 5400 RPM (models 21U, 21F, 22U, 22F, 22G)	09N2631
5	20GB HDD, 3.5", 7200 RPM (models 13U, 13F, 13G, 13S, 14U, 14F, 14G, 14S, 13J, 13A, 13D, 13Q)	09N2632
5	30GB HDD, 3.5", 7200 RPM (models 23U, 23F, 23A, 24D, 23Q, 24U, 24F, 24G, 41J)	09N0925

Index	System (Type 6643)	FRU No.
6	Rear EMC cover assembly (Includes rear EMC cover, rear handle, 2 pan head screws, handle bar, rear cover, PCI cover and Hard drive clip) (all models)	19k2627
7	Upper Base cover assembly (Includes upper cover, cable shield, USB label, voltage switch label, and mesh upper cover) (all models)	09N2645
8	Power supply - 110W (models 11U, 11F, 11S, 12U, 2F, 13U, 13F, 13G, 13S, 14U, 14F, 14G, 14S, 13A, 13D, 13Q, 21U, 21F, 22U, 22F, 23U, 23F, 23A, 24D, 23Q, 24U, 24F, 24G, 22G)	09N3267
8	Power supply - 110W (Japan) (models 13J, 41J)	19K3405
9	Rear USB (3 Port) Board (all models)	09N3273
10	Hinge Stand assembly (Base assembly) for CD-ROM drives - including plate stand (Includes hinge assembly, device bay, device bay sector gear, device bay idle gear, spring coil bushing, device bay coil holder, ITM damper, device bay spring coil, spring coil bolt, drop down slide plate, drop down spring, washer, cable stand holder, pin good spacer support, M3L5 flange screw, M3L3 K-head screw and M3L5 flat screw) (all models)	19K2630
11	Base cover wings (Left and Right) (all models)	19K2632
12	System fan (all models)	09N2628
13	Battery, Lithium (all models)	33F8354
14	64 MB DIMM module (PC133) (models 11U, 11F, 1S, 13U, 13F, 13S, 13J, 13A, 13D, 13Q, 21U, 21F, 23U, 23F, 23A, 23Q, 41J)	09N2626
14	128 MB DIMM module (PC133) (models 12U, 12F, 12S, 14U, 14F, 14S, 14G, 13G, 22U, 22F, 24U, 24F, 24G, 22G, 24D)	09N2627
15	System board, (no processor, no memory) supports 66 MHz. FSB (models 11U, 11F, 11S, 12U, 12F, 12S)	09N2625
15	System board, (no processor, no memory) supports 133 MHz. FSB (models 13U, 13F, 13G, 13S, 14U, 14F, 14G, 14S, 13J, 13A, 13D, 13Q, 21U, 21F, 22U, 22F, 23U, 23F, 23A, 24D, 23Q, 24U, 24F, 24G, 22G, 41J)	19K3597
16	Processor, Intel 370, FCPGA, Celeron 566-66 MHz. (models 11U, 11F, 12U, 12F, 11S, 12S)	09N3276
16	Processor, Intel 370, FCPGA, PIII 667-133 MHz. (models 13U, 13F, 13G, 13S, 14U, 14F, 14G, 14S, 13J, 13A, 13D, 13Q)	09N3278
16	Processor, Intel 370, FCPGA, PIII 800-133 MHz. (models 21U, 21F, 22U, 22F, 22G, 41J)	22P2319
16	Processor, Intel 370, FCPGA, PIII 866-133 MHz. (models 23U, 23F, 23A, 24D, 23Q, 24U, 24F, 24G)	22P2320
16	Processor, Intel 370, FCPGA, PIII 1.0 GHz-133 (model 32U)	24P6072
17	Chassis assembly (houses the system board) (Includes chassis, edge saddle cable clip, I/O port shield/label, LP port brackets, one port bracket screw and expansion PCI bracket) (all models)	19K2628
18	Power Inverter board cover with Insulator (all models)	19K3623
19	LCD Power inverter board (high voltage) (all models)	09N3268
20	LCD Housing assembly (Includes LCD housing assembly and insulator plate assembly) (all models)	19K2629
21	TFT (LCD) Panel (all models)	09N2671
22	Button board (Power-on/suspend, Brightness up/down) (all models)	09N3271
23	Front bezel, Black, (Includes black bezel, button release, button power, hard drive/LED lens and screw) (all models)	19K3410

Index	System (Type 6643)	FRU No.
24	DASD Interface (FDD/CD-ROM board) (all models)	09N3270
25	FDD/CD-ROM drive bracket assembly (Includes FDD bracket, CD bracket, 2 device bay clips, device release button, device release button (left) and 2 device release springs) (all models)	19K2633
26	3.5", diskette drive, Slim 3-Mode (all models)	09N2674
27	Device Bay bezel assembly (Includes LED lens and bezel) (all models)	19K3406
28	10-24X, CD-ROM drive, Slim (all models)	09N2675
29	Speaker grill (all models)	09N2672
30	Speaker assembly, Internal (Pair), LG05 (all models)	09N2658
	Cable - Audio USB (System Board to Side Audio USB) (all models)	09N2668
	Cable - Button (System board to Button board) (all models)	09N2666
	Cable - CD/DVD-ROM audio (all models)	09N2670
	Cable - CD/DVD-ROM drive ribbon (all models)	09N2661
	Cable - FDD Ribbon (all models)	09N2659
	Cable - HDD Ribbon (all models)	09N2660
	Cable - Inverter (System board to Inverter board) (all models)	09N2664
	Cable - IR (System board to IR board) (all models)	09N2665
	Cable - LCD Signal (System board to Receiver board) (all models)	09N2669
	Cable - Rear USB (System board to Rear USB board) (all models)	09N2667
	Cable - Slim Line Diskette drive Ribbon (all models)	09N2662
	Etherjet 10/100 adapter with Alert On LAN, Lake Clark (all models)	09N3266
	Heatsink for Celeron Processors (models 11U, 11F, 12U, 12F, 11S, 12S)	09N2656
	Heatsink for Pentium III processors (models 13U, 13F, 13G, 13S, 14U, 14F, 14G, 14S, 13J, 13A, 13D, 13Q, 21U, 21F, 22U, 22F, 23U, 23F, 23A, 24D, 23Q, 24U, 24F, 24G, 22G, 41J)	09N2657
	IR Board (Communicates with External Peripherals, shared data) (all models)	09N3272
	Lever assembly (Drop down) white plastic push button (Includes cone/button spring, lever shaft, top lever holder and device drop lever) (all models)	19K3407
	Mouse, Scrollpoint III (SP 3), USB, Black (all models)	09N5527
	Screw Pack (Includes 4 rubber feet and screws) (all models)	19K2634
	Screw Driver, Tamper resistant for removing Power Inverter board (all models)	19K3624
	Flash ROM module, w/Basic level BIOS (all models)	22P2310

Keyboards

Type 2179 - USB RAK3 Stealth Black
Note: <ul style="list-style-type: none"> • Japanese keyboard is Platinum Mist Silver Color. • Keyboards are USB interface, no adapter, with 2 USB ports.

Keyboards - Type 2179	FRU
US English, US/CAN/China/ANZ (models 700, 750, 50A, 52A, 71U, 53A, 51Q, 53U, 77U, 52C, 81U, 86U, 86A, 86Q, 85C, 85D, 85M, 85V)	09N5670
French/Canadian 445 (models 70F, 71F, 77F, 81F)	09N5680
Latin America/Spanish (models 90S, 90T, 90K, 86S, 86H, 86Y)	09N5690
Arabic (models 968, 91G, 97G, 81G, 86G)	09N5671
Belgian-French (models 968, 81G, 86G)	09N5672
Belgian-UK (models 968, 81G, 86G)	09N5673
Bulgarian (models TBD)	09N5674
Chinese/US, Hong Kong/Taiwan (TC) (models 52M, 52H)	09N5675
Czech (models TBD)	09N5676
Danish (models 968, 91G, 97G, 81G, 86G)	09N5677
Dutch (models 968, 91G, 97G, 81G, 86G)	09N5678
French (models 968, 91G, 97G, 81G, 86G)	09N5679
German (models 968, 91G, 97G, 81G, 86G)	09N5682
Greek (models TBD)	09N5683
Hebrew (models TBD)	09N5684
Hungarian (models TBD)	09N5685
Icelandic (models TBD)	09N5686
Italian (models 968, 91G, 97G, 81G, 86G)	09N5687
Japanese (Platinum Mist Silver Color) (models 50J, 51J, 84J)	09N5688
Korean (models TBD)	09N5689
Norwegian (models 968, 91G, 97G, 81G, 86G)	09N5691
Polish (models TBD)	09N5692
Portuguese (models TBD)	09N5693
Romania (models TBD)	09N5694
Russian (models TBD)	09N5695
Russian/Cyrillic (models TBD)	09N5696
Serbian/Cyrillic (models TBD)	09N5697
Slovakian (models TBD)	09N5698
Spanish (models 968, 81G, 86G)	09N5699
Swedish/Finland (models 968, 91G, 97G, 81G, 86G)	09N5700
Swiss French/German (models 968, 81G, 86G)	09N5701
Thailand (models TBD)	09N5702
Turkish (ID 179) (models TBD)	09N5704
Turkish (ID 440) (models TBD)	09N5703

Keyboards - Type 2179	FRU
UK English (models 968, 91G, 97G, 81G, 86G)	09N5705
US International (models TBD)	09N5706
Yugoslavian/Latin (models TBD)	09N5707
Brazil/Portuguese (models TBD)	09N5708

Rapid Access Wireless (RF)	
Keyboards - Type 2179	FRU
RF Kit (contains keyboard, mouse, receiver and pubs) (model 88U)	22P5183

PC Next, Black	
Keyboards - Type 2179	FRU
US English (model GG1)	37L2551

Keyboards

Type 6643 - USB Standard Stealth Black
Note: Keyboards are USB interface, no adapter, no USB ports.

Keyboards - Type 6643	FRU
Arabic	09N5591
Belgian-French	09N5592
Belgian-UK	09N5593
Brazil/Portugal	09N5628
Bulgarian	09N5594
Chinese/US Hong Kong/Taiwan (TC)	09N5595
Czech	09N5596
Danish	09N5597
Dutch	09N5598
French	09N5599
French/Canadian	09N5601
German	09N5602
Greek	09N5603
Hebrew	09N5604
Hungarian	09N5605
Icelandic	09N5606
Italian	09N5607
Japanese	09N5608
Korean	09N5609
Latin/Spanish	09N5610
Norwegian	09N5611
Polish	09N5612

Keyboards - Type 6643	FRU
Portuguese	09N5613
Romania	09N5614
Russian	09N5615
Russian/Cyrillic	09N5616
Serbian/Cyrillic	09N5617
Slovakian	09N5618
Spanish	09N5619
Swed/Fin	09N5620
Swiss French/German	09N5621
Thailand	09N5622
Turkish (ID 179)	09N5624
Turkish (ID 440)	09N5623
UK English	09N5625
US English, US/CAN/China	09N5590
US International	09N5626
Yugoslavian/Latin	09N5627

Computer power cords

Straight, inline, 6 foot, black	
Power Cords - Type 2179	FRU
US, Latin America (Lo Volt), Canada, Mexico, Peru, Columbia, Ecuador, Venezuela, Bolivia, Panama, El Salvador, Honduras, Nicaragua, Dominican Republic, Guatamala, Taiwan, Saudi Arabia, Thailand (models 700, 750, 90S, 70F, 71U, 71F, 77U, 53U, 52H, 77F, 81U, 81F, 84Q, 86U, 86S, 88U, 91G, 97G, 81G, 86G, GG1, 85V)	6952301
APU Countries (??) (model 90K)	36L8879
France, Germany, Sweden, Norway, Netherlands, Finland, Belgium, Bosnia, Croatia, Egypt, Greece, Hungary, Poland, Portugal, Romania, Slovenia, Spain, Turkey, Latin America (Hi Volt) (models 91G, 97G, 81G, 86G, 86H)	13F9978
United Kingdom, Hong Kong, Singapore, United Arab Emirate (Dubai) (models 91G, 97G, 51Q, 52M, 81G, 84Q, 86G, 85D, 85M)	14F0032
Denmark (models 91G, 97G, 81G, 86G)	13F9996
Italy, Chile (models 91G, 97G, 81G, 86G)	14F0068
Japan (models 50J, 51J, 84J)	36L9015
China (models 52C, 85C)	02K0545
Australia, New Zealand (models 50A, 52A, 53A, 32A)	13F9939

Six foot, right angle, black	
Power Cords - Type 2179	FRU
Argentina (models TBD)	36L8875
France, Germany, Sweden, Norway, Netherlands, Finland (model 968)	13F9975
Latin-America Hi Voltage (model 90T)	6952403

Six foot, right angle, black	
Power Cords - Type 2179	FRU
United Kingdom, Hong Kong, Singapore (model 968)	14F0029
Denmark (model 968)	13F9993
Italy, Chile (model 968)	14F0065

Power Cords - Type 6643	FRU
Argentina	36L8875
Australia	13F9936
Bolivia	13F9956
Brazil	13F9956
Canada	13F9956
Chile	14F0065
China	02K0542
Columbia	13F9956
Costa Rica	13F9956
Denmark	13F9993
Dominican Republic	13F9956
Ecuador	13F9956
El Salvador	13F9956
Finland	13F9975
France	13F9975
Germany	13F9975
Guatemala	13F9956
Haiti	13F9956
Honduras	13F9956
Italy	14F0065
Japan	34G0228
Latin-America Hi Voltage (2179 only)	6952403
Mexico	13F9956
Netherlands	13F9975
New Zealand	13F9936
Nicaragua	13F9956
Norway	13F9975
Panama	13F9956
Peru	13F9956
Sweden	13F9975
Taiwan	13F9956
U.S.	13F9956
U.K.	14F0029
Venezuela	13F9956

The following tools are required to service these computers:

- A volt-ohm meter, IBM P/N 73G5404
- Tamper resistant screw driver IBM P/N 19K3624

Chapter 7. Additional service information

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Security

Security features in this section include the following:

- Power-on and Administrator Passwords
- 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 “Setup Utility program” on page 5 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:

1. Unplug the power cord.
2. Remove the rear bucket housing and rear EMC cover assembly.
3. Refer to “System board layout” on page 14 to find the CMOS jumper.
4. Change the CMOS jumper from pins 1,2 to pins 2,3.
5. Power-on the computer. The system senses the change in the switch setting and erases the password.
6. Power-off the computer.
7. Change the CMOS jumper back to pins 1,2.
8. Install the rear EMC cover assembly and rear bucket housing.
9. Remind the user to enter a new password when service is complete.

Administrator password

The administrator password is used to restrict access to the Configuration/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:

Types 2179 and 6643 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 Configuration/Setup Utility program.

Administrator password control

The Administrator password is set in the Setup Configuration. Refer to “Setup Utility program” on page 5.

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 (BIOS/VPD) update procedure” on page 72.

Alert on LAN

Alert on LAN provides notification of changes in the computer, even when the computer power is turned off. Working with DMI and Wake on LAN[®] technologies, Alert on LAN helps to manage and monitor the hardware and software features of the computer. Alert on LAN generates notifications to the server of these occurrences:

- Computer disconnected from the network
- Computer unplugged from the power outlet
- All POST errors
- Operating system or POST hang condition

Alert on LAN events are configured to be Enabled or Disabled from the LAN server only, and not from the computer. See the LAN administrator for configuration status information.

Hard disk drive jumper settings

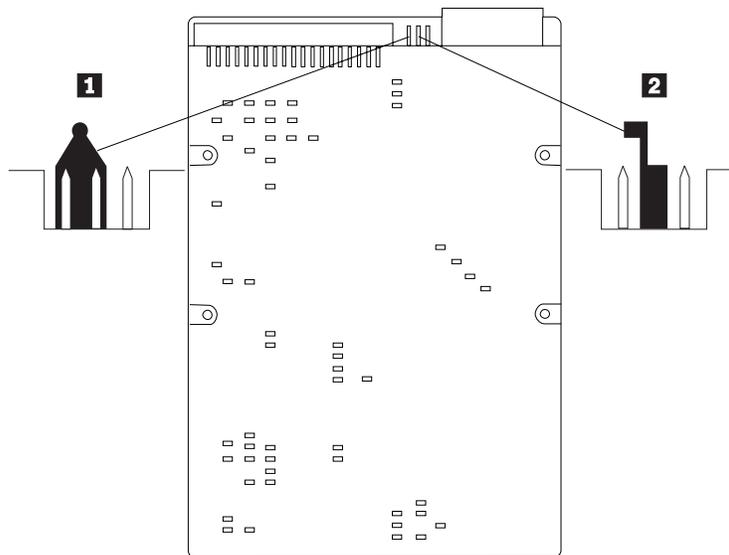
The IDE hard disk drive uses a jumper to set the drive as primary (master) or secondary (slave).

Attention:

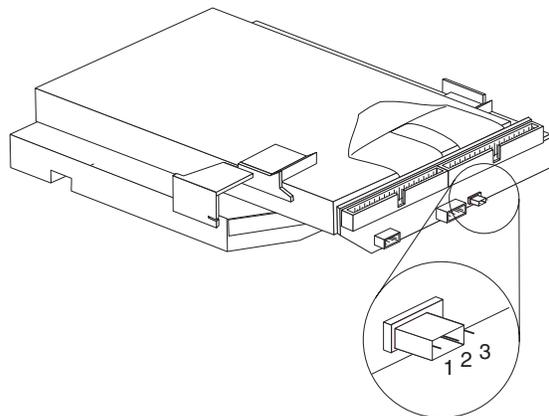
Types 2179 and 6643 use a single drop cable with a hard disk drive jumper setting as Primary.

IDE hard disk drive settings

- 1 Primary (Master) Hard Disk Drive
- 2 Secondary (Slave) Hard Disk Drive



CD-ROM drive/DVD drive jumper settings



The slim CD-ROM drive and DVD drive are connected to the DASD interface board. The DASD interface board includes connectors for the two signal cables, power and speaker cables and jumper pins:

- Primary (master) pins 1,2
- Secondary (slave) pins 2,3

BIOS levels

An incorrect level of BIOS can cause false error 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 Configuration Utility to determine the level of BIOS installed.

- Sources for determining the latest level BIOS available
 1. IBM Home Page, Support
<http://www.ibm.com/pc/us/>
 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 Home Page, Support
<http://www.ibm.com/pc/us/>
 2. PC PartnerInfo-Technical Database (CTSTIPS.NSF)
 3. Support Center
 4. Levels 1 and 2 Support

To update (flash) the BIOS, see “Flash (BIOS/VPD) update procedure.”

CMOS Clear Procedure

1. Power-off the computer
2. Unplug the power cord.
3. Remove the rear bucket housing.
4. Remove the rear EMC shield.
5. Move the CMOS Clear jumper from pins 1,2 to pins 2,3 (See “System board layout” on page 14).
6. Power-on the computer. This will erase the CMOS information.
7. Power-off the computer.
8. Unplug the power cord.
9. Move the CMOS Clear jumper from pins 2,3 back to pins 1,2.
10. Install the rear EMC shield.
11. Install the rear bucket housing.
12. Power-on the computer.

Flash (BIOS/VPD) update procedure

1. Power-off the computer.
2. Insert the flash update diskette into drive A.
3. Power-on the computer.
4. When the Update Utility appears; select the country/keyboard, then press **Enter**.
5. If the computer serial number was previously recorded, the number is displayed with an option to update it. Press **Y** to update the serial number.
6. Type the 7-digit serial number of the computer you are servicing, then press **Enter**.
7. Follow the instructions on the screen to complete the flash (BIOS/VPD) update procedure.

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.

Advanced 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 Configuration/Setup Utility program.

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.

There are three levels of specified time that the computer must be inactive before the power management options that are selected take effect. Select the amount of time that is offered within each level.

Level 1	Set time from 5 minutes to 4 hours.
Level 2	Set time from 10 minutes to 5 hours.
Level 3	Set time from 15 minutes to 6 hours.

At each level, 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 Configuration/Setup Utility program (see “Setup Utility program” on page 5).
2. Select **Advanced Power Management** from the Configuration/Setup Utility program menu.

3. Select the **APM BIOS Mode** and be sure it is set to **Enabled**. If it is not, press Left Arrow (←) or Right Arrow (→) to change the setting.
4. Press **Esc** to go back one screen.
5. Select **Automatic Hardware On**.
6. Set **Automatic Hardware Power On** to **Enabled**.
7. Enable or disable the following:
 - Wake On Lan
 - Wake Up On Alarm
 - PCI Modem Ring Detect
 - PCI Wake Up
8. Press **Esc** twice to return to the Configuration/Setup Utility program menu.
9. Before you exit from the program, select **Save Settings** from the Configuration/Setup Utility program menu.
10. To exit from the Configuration/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.

- **PCI Modem Ring Detect:** With this feature set to **Enabled** the computer will turn on automatically when a ring is detected on the modem.
- **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.
- **PCI Wake Up:** PCI Wake Up uses PCI Power Management Enabled (PME) to wake up the computer when using token-ring, Ethernet LAN adapters, modems, or other PCI cards capable of waking up the computer. When you set PCI Wake Up to **Enabled**, the computer will turn on when it receives a specific signal from another computer on the Local Area Network (LAN) or from a modem signal.

Wake on LAN features can be used on the types 2179 and 6643 computers. For further information, see “Wake on LAN” on page 75.

Network settings

This section applies only to computers that are linked to a network.

The Configuration/Setup Utility program includes settings that can be enabled and disabled to configure the network interface in the computer. These settings are the following:

- Flash over LAN (Update POST/BIOS over Network)
- Wake on LAN

Flash over LAN (update POST/BIOS over network)

Note:

For local Flash (BIOS/VPD) update, see “Flash (BIOS/VPD) update procedure” on page 72.

This setting is used to enable or disable the Flash over LAN feature. When the feature is enabled, the system programs in the computer can be updated remotely from a network server. If the administrator password is set in the computer, it does not have to be entered by the server.

To access the Flash over LAN setting, use the following procedure.

1. Start the Configuration/Setup Utility program. See “Setup Utility program” on page 5.
2. Select **System Security**.
3. Select **POST/BIOS Update** from the Configuration/Setup Utility program menu.
4. To enable Flash over LAN, select **Enabled**. To disable Flash over LAN, select **Disabled**.
5. Press **Esc** twice to return to the Configuration/Setup Utility program menu.
6. Before you exit from the program, select **Save Settings** from the Configuration/Setup Utility program menu.
7. To exit from the Configuration/Setup Utility program, press **Esc** and follow the instructions on the screen.

Wake on LAN

This setting is used to enable or disable the IBM-developed Wake on LAN feature. This feature makes it possible for the computer to be turned on remotely by a network server. Remote network management software must be used in conjunction with this feature.

To access the Wake on LAN setting, use the following procedure.

1. Start the Configuration/Setup Utility program. See “Setup Utility program” on page 5.
2. Select **Advanced Power Management**.
3. Select **Automatic Power On** from the program menu.
4. Select **Wake on LAN** from the *Automatic Power On* menu.
5. To enable Wake on LAN, select **Enabled**. To disable Wake on LAN, select **Disabled**.
6. Press **Esc** until you return to the Configuration/Setup Utility program menu.
7. Before you exit from the program, select **Save Settings** from the Configuration/Setup Utility program menu.
8. To exit from the Configuration/Setup Utility program, press **Esc** and follow the instructions on the screen.

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Safety notices (multi-lingual translations)

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

- English
- Portuguese (Brazil)
- Chinese
- French
- German
- Italian
- Korean
- Spanish



DANGER

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.

To avoid shock hazard:

- | |
|---|
| <ul style="list-style-type: none">• The power cord must be connected to a properly wired and earthed receptacle.• Any equipment to which this product will be attached must also be connected to properly wired receptacles. |
|---|

When possible, use one hand to connect or disconnect signal cables to prevent a possible shock from touching two surfaces with different electrical potentials.

Electrical current from power, telephone, and communications cables is hazardous. To avoid shock hazard, connect and disconnect cables as described following when installing, moving, or opening covers of this product or attached devices.

To Connect	To Disconnect
<ol style="list-style-type: none"> 1. Turn Everything OFF. 2. First, attach all cables to devices. 3. Attach signal cables to receptacles 4. Attach power cord(s) to outlet. 5. Turn device ON. 	<ol style="list-style-type: none"> 1. Turn Everything OFF. 2. First, remove power cord(s) from outlet. 3. Remove signal cables from receptacles. 4. Remove all cables from devices.
Note: In the UK, by law, the telephone cable must be connected after the power cord.	Note: In the UK, the power cord must be disconnected after the telephone cable.



CAUTION:

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

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

Removing the covers of the CD-ROM drive could result in exposure to hazardous laser radiation. There are no serviceable parts inside the CD-ROM drive. Do not remove the CD-ROM drive covers.

DANGER
Some CD-ROM drives 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.

		
	<p>≥ 32 kg (70.5 lbs)</p>	<p>≥ 55 kg (121.2 lbs)</p>

CAUTION:

Use safe lifting practices when lifting your machine.



CAUTION:

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

**PERIGO**

Para evitar choques elétricos, não conecte ou desconecte nenhum cabo, nem efetue instalação, manutenção ou reconfiguração deste produto durante uma tempestade com raios.

Para evitar choques elétricos:

- O cabo de alimentação deve ser conectado a um receptáculo corretamente instalado e aterrado.
- Todos os equipamentos aos quais este produto será conectado devem também ser conectados a receptáculos corretamente instalados.

Quando possível, utilize uma das mãos para conectar ou desconectar cabos de sinal, para evitar um possível choque ao tocar duas superfícies com potenciais elétricos diferentes.

A corrente elétrica proveniente de cabos de alimentação, de telefone e de comunicação é perigosa. Para evitar choques elétricos, conecte e desconecte os cabos conforme descrito a seguir, ao instalar, movimentar ou abrir tampas deste produto ou de dispositivos conectados.

Para Conectar	Para Desconectar
<ol style="list-style-type: none">1. DESLIGUE tudo.2. Conecte primeiro todos os cabos nos dispositivos.3. Conecte os cabos de sinal nos receptáculos.4. Conecte o(s) cabo(s) de alimentação nas tomadas.5. LIGUE o dispositivo.	<ol style="list-style-type: none">1. DESLIGUE tudo.2. Remova primeiro o(s) cabo(s) de alimentação das tomadas.3. Remova os cabos de sinal dos receptáculos.4. Remova todos os cabos dos dispositivos.

**Cuidado:**

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

Não:

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

Descarte a bateria conforme requerido pelas disposições e regulamentações locais.

**Cuidado:**

Quando uma unidade de CD-ROM estiver instalada, observe o seguinte.

A utilização de controles ou ajustes ou a execução de procedimentos diferentes daqueles especificados nesta publicação pode resultar em exposição perigosa à radiação.

A remoção das tampas da unidade de CD-ROM pode resultar em exposição a radiação perigosa de laser. Não existem peças que possam ser consertadas no interior da unidade de CD-ROM. Não remova as tampas da unidade de CD-ROM.

PERIGO

Algumas unidades de CD-ROM contém um diodo de laser da Classe 3A ou da Classe 3B. Observe o seguinte.

Radiação de laser quando aberto. Não olhe diretamente para o feixe de laser, não olhe diretamente com instrumentos óticos, e evite exposição direta ao raio.

		
	<p>≥ 32 kg (70.5 lbs)</p>	<p>≥ 55 kg (121.2 lbs)</p>

Cuidado:

Utilize práticas seguras para levantamento de peso ao levantar sua máquina.



Cuidado:

A corrente elétrica proveniente de cabos de alimentação, de telefone e de comunicação é perigosa. Para evitar ferimentos pessoais ou danos aos equipamentos, desconecte os cabos de alimentação, sistemas de telecomunicação, redes e modems antes de abrir as tampas do servidor, a menos que receba outras instruções nos procedimentos de instalação e configuração.

声明 1



危险!

为避免电击危险，请不要在暴风雨期间连接或断开任何电缆，或是进行此产品的安装、维护或重新配置操作。

为避免电击危险：

- 电源线必须连接到适当的电线及接地插座。
- 此产品将要连接的所有设备也必须连接到正确接线的插座上。

如果可能，请使用一只手连接或断开连接信号电缆，以避免在接触两个具有不同电势的表面时遭到电击。

电源线、电话线以及通信电缆中的电流非常危险。为避免电击，请在安装、移动或打开本产品或连接设备的外盖时，按照下述步骤连接或断开电缆。

要连接电缆

1. 关闭所有设备。
2. 首先将所有电缆与设备连接。
3. 将信号线连接到插座。
4. 将电源线连接到电源插座。
5. 打开设备。

要断开电缆

1. 关闭所有设备。
2. 首先从电源插座拔下电源线。
3. 从插座拔下信号电缆。
4. 从设备上拔下所有电缆。

声明 2



注意！

当更换电池时，仅可使用 IBM 部件号为 33F8354 的产品或由制造商推荐的同等电池。如果系统中有包含锂电池的模块，则只能使用由相同制造商制造的相同类型模块更换。该电池含有锂，如果使用、操作或处理不当会发生爆炸。

不要：

- 将其投入或浸于水中
- 加热超过100°C (212°F)
- 修理或拆卸

应按照当地法规和条例对此电池进行处理。

声明 3



注意！

在已安装 CD-ROM 驱动器的情况下，请注意下面的内容。

不遵循此处指定的控制、调整、或操作过程的操作将可能导致危险的辐射泄漏。

取下 CD-ROM 驱动器的外盖会导致危险的激光辐射泄漏。CD-ROM 驱动器内没有可以使用的部件。请不要取下 CD-ROM 驱动器的外盖。

声明 4

危险！

一些 CD-ROM 驱动器中包含内置的 3A 类或 3B 类激光二极管。
请注意下述内容。

打开驱动器会产生激光辐射。请不要凝视激光束，请不要使用光学仪器直接观看激光束，同时也要避免人体直接暴露在激光束下。

声明 5



32 kg (70.5 磅)

55 kg (121.2 磅)

注意！

搬运机器时，请进行安全搬运操作。

声明 10



注意！

电源线、电话线以及通信电缆中的电流非常危险。为避免人身伤害或设备损坏，除非在安装和配置过程中特别指明，请在打开服务器外盖前断开已连接的全部电源线、电信系统、网络及调制解调器。

· 声明 1



危险

為了避免雷擊，在閃電期間，請勿連接或拔掉本裝置上的任何電纜線，或請勿安裝、維修或重新架構本產品。

為了避免雷擊：

- 電源線必須連接到接線及接地正確的插座。
- 本產品所連接的設備也必須連接到接線正確的插座。

儘可能使用單手來連接或拔掉信號電纜，以避免因接觸兩不同電位的平面，而受到電擊。

電源、電話及通信電纜上均有電流通過。為了避免電擊，在安裝、移動本產品，或開啓本產品的蓋子或與本產品連接之裝置的蓋子時，請依照下列「連接」及「拔掉」電纜線的步驟操作。

連接

1. 關掉所有開關。
2. 首先，將所有電纜線連接到裝置。
3. 將信號電纜連接到信號插座。
4. 將電源線連接到電源插座。
5. 開啓裝置電源。

拔掉

1. 關掉所有開關。
2. 首先，自電源插座拔掉電源線。
3. 拔掉信號插座上的所有信號電纜。
4. 拔掉裝置上的所有電纜線。

• 聲明 2



注意：

更換電池時，只可使用 IBM 零件編號 33F8354 的電池，或廠商建議的相當類型的電池。如您系統中的模組含有鋰電池，更換時，請使用相同廠商製造的相同模組類型。如未正常使用、處理或捨棄含有鋰的電池時，可能會造成爆炸。

嚴禁：

- 丟入或浸入水中
- 加熱超過攝氏100度（華氏 212 度）
- 修補或拆解

處理廢棄電池時，請遵照當地法令規章處理。

• 聲明 3



注意：

安裝光碟機時，請注意下列事項：

不依此處所指示的控制、調整或處理步驟，恐有遭致輻射之虞。

移開光碟機蓋子，恐有遭致雷射輻射之虞。光碟機中沒有需要維修的部分。請勿移開光碟機的蓋子。

• 聲明 4



危險

光碟機含有內嵌式 Class 3A 或 Class 3B 雷射二極體時，請注意下列事項：

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

• 聲明 5



≥ 32 公斤 (70.5 磅)



≥ 55 公斤 (121.2 磅)

注意：

提昇機器時，請使用安全提昇措施。

• 聲明 10



注意：
電源、電話及通信電纜上均有電流通過。在安裝及架構之時，若非專家指導，為了避免人員受傷、設備受損，在開啓伺服器蓋子之前，請切斷電源線、電信系統、網路及數據機。

**DANGER**

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.

Pour éviter tout risque de choc électrique:

- Les cordons d'alimentation du présent produit et de tous les appareils qui lui sont connectés doivent être branchés sur des socles de prise de courant correctement câblés et mis à la terre.

Afin d'éviter tout risque de choc électrique provenant d'une différence de potentiel de terre, n'utilisez qu'une main, lorsque cela est possible, pour connecter ou déconnecter les cordons d'interface.

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, 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
<ol style="list-style-type: none">1. Mettez les unités hors tension.2. Commencez par brancher tous les cordons sur les unités.3. Branchez les câbles d'interface sur les prises.4. Branchez les cordons d'alimentation sur un socle de prise de courant.5. Mettez les unités sous tension.	<ol style="list-style-type: none">1. Mettez les unités hors tension2. Commencez pas débrancher les cordons alimentation des socles de prise de courant.3. Débranchez les câbles d'interface des prises.4. Débranchez tous les câbles des unités.



Attention:

Remplacez la pile 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 une unité de CD-ROM est installée, prenez connaissance des informations suivantes:

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.

Pour éviter une exposition directe au rayon laser, n'ouvrez pas l'unité de CD-ROM. Vous ne pouvez effectuer aucune opération de maintenance à l'intérieur.

DANGER
Certaines unités de CD-ROM 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.

		
	<p>≥ 32 kg (70.5 lbs)</p>	<p>≥ 55 kg (121.2 lbs)</p>

Attention:

Ce produit pèse un poids considérable. Faites-vous aider pour le soulever.



Attention:

Le courant électrique circulant dans les câbles de communication et les cordons téléphoniques et d'alimentation peut être dangereux. Pour votre sécurité et celle de l'équipement, avant de retirer les carters du serveur, mettez celui-ci hors tension et déconnectez ses cordons d'alimentation, ainsi que les câbles qui le relient aux réseaux, aux systèmes de télécommunication et aux modems (sauf instruction contraire mentionnée dans les procédures d'installation et de configuration).



VORSICHT

Aus Sicherheitsgründen bei Gewitter an diesem Gerät keine Kabel anschließen oder lösen. Ferner keine Installations-, Wartungs- oder Rekonfigurationsarbeiten durchführen.

Aus Sicherheitsgründen:

- 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, um einen Stromschlag durch Berühren von Oberflächen mit unterschiedlichem elektrischem Potential zu vermeiden.

Elektrische Spannungen von Netz-, Telefon- und Datenübertragungsleitungen sind gefährlich. Um einen Stromschlag zu vermeiden, nur nach den Anweisungen arbeiten, die für Installation, Transport oder Öffnen von Gehäusen dieses Produkts oder angeschlossenen Einheiten gelten.

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



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 CD-ROM-Laufwerk installiert ist, beachten Sie folgendes. Steuer- und Einstellelemente sowie Verfahren nur entsprechend den Anweisungen im vorliegenden Handbuch einsetzen. Andernfalls kann gefährliche Laserstrahlung auftreten.

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.

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.

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

Achtung:

Beim Anheben der Maschine die vorgeschriebenen Sicherheitsbestimmungen beachten.



Achtung:

An Netz-, Telefon- und Datenleitungen können gefährliche elektrische Spannungen anliegen. Um eine Gefährdung des Benutzers oder Beschädigung des Geräts zu vermeiden, ist der Server auszuschalten. Die Verbindung zu den angeschlossenen Netzkabeln, Telekommunikationssystemen, Netzwerken und Modems ist vor dem öffnen des Servergehäuses zu unterbrechen (sofern in Installations- und Konfigurationsanweisungen nicht anders angegeben).

**PERICOLO**

Per evitare il pericolo di scosse elettriche durante i temporali, non collegare o scollegare cavi, non effettuare l'installazione, la manutenzione o la riconfigurazione di questo prodotto.

Per evitare il pericolo di scosse elettriche:

- collegare il cavo 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 per evitare il rischio di scosse derivanti dal contatto con due superfici a diverso potenziale elettrico.

La corrente elettrica circolante nei cavi di alimentazione, del telefono e di segnale è pericolosa. Per evitare scosse elettriche, collegare e scollegare i cavi come descritto quando si effettuano l'installazione, la rimozione o l'apertura dei coperchi di questo prodotto o durante il collegamento delle unità.

Per collegare	Per scollegare
<ol style="list-style-type: none">1. SPEGNERE tutti i dispositivi.2. Collegare prima tutti i cavi alle unità.3. Collegare i cavi di segnale alle prese.4. Collegare il(i) cavo(i) di alimentazione alla presa elettrica.5. ACCENDERE le unità.	<ol style="list-style-type: none">1. SPEGNERE tutti i dispositivi.2. Rimuovere prima il(i) cavo(i) di alimentazione dalla presa elettrica.3. Rimuovere i cavi di segnale dalle prese.4. Rimuovere tutti i cavi dalle unità.



Attenzione:

Quando si sostituisce la batteria, utilizzare solo una batteria IBM 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 smaltirla

Smaltire secondo la normativa in vigore (D.Lgs 22 del 5/2/97) e successive disposizioni nazionali e locali.



Attenzione:

Quando è installata un'unità CD-ROM, notare quanto segue:

L'utilizzo di controlli, regolazioni o l'esecuzione di procedure non descritti nel presente manuale possono provocare l'esposizione a radiazioni pericolose.

L'apertura di un'unità CD-ROM può determinare l'esposizione a radiazioni laser pericolose. All'interno dell'unità CD-ROM non vi sono parti su cui effettuare l'assistenza tecnica. Non rimuovere i coperchi dell'unità CD-ROM.

PERICOLO

Alcune unità CD-ROM contengono all'interno un diodo laser di Classe 3A o Classe 3B. Prestare attenzione a quanto segue:

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

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

Attenzione:

Durante il sollevamento della macchina seguire delle norme di sicurezza.



Attenzione:

La corrente circolante nei cavi di alimentazione, del telefono e di segnale è pericolosa. Per evitare situazioni pericolose per le persone o danneggiamenti all'apparecchiatura, scollegare i cavi di alimentazione, i sistemi di telecomunicazioni, le reti e ed i modem prima di aprire i coperchi del server se non diversamente indicato nelle procedure di installazione e configurazione.

경고문 1



위험

전기 충격을 피하려면 날씨가 나쁠 때(예: 눈 또는 비가 오거나 천둥 번개가 칠 때는) 케이블을 연결하거나 끊지 않도록 하고 이 제품의 설치, 유지보수 또는 재구성 등의 작업을 수행하지 않도록 하십시오.

전기 충격을 피하려면 다음과 같아야 합니다.

- 고압선은 적절한 배선 및 접지 상태의 콘센트로 연결되어야 합니다.
- 이 제품이 접속될 모든 장비도 적절한 배서 상태의 콘센트로 연결되어야 합니다.

다른 전위를 가진 두 표면을 만졌을 때 발생할 수 있는 전기 충격을 피하려면 한 손으로 신호선을 연결하거나 끊으십시오.

전원, 전화 및 통신 케이블로부터 흘러 나오는 전류는 위험합니다. 전기 충격을 피하려면 이 제품이나 접속 장치를 설치, 이동 및 덮개를 열 때 다음 설명에 따라 케이블을 연결하고 끊도록 하십시오.

연결하려면

1. 모든 스위치를 켜다.
2. 먼저 모든 케이블을 장치에 연결한다.
3. 신호선을 콘센트에 연결한다.
4. 전원을 콘센트에 연결한다.
5. 장치 스위치를 켜다.

연결해제하려면

1. 모든 스위치를 끈다.
2. 먼저 모든 케이블을 장치에 제거한다.
3. 신호선을 콘센트에서 제거한다.
4. 장치에서 모든 케이블을 제거한다.

경고문 2



주의:

배터리를 교체할 때는 IBM 부품 번호 &PN. 또는 제조업체에서 추천하는 동등한 유형의 배터리를 사용하십시오. 시스템에 리튬 배터리를 포함하는 모듈이 있으면 이것은 동일한 제조업체에서 생산된 동일한 모듈 유형으로만 교체하십시오. 배터리에는 리튬이 포함되어 있으므로 제대로 사용, 처리 또는 처분하지 않으면 폭발할 수 있습니다.

다음은 주의하십시오.

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

지역 법령이나 규정의 요구에 따라 배터리를 처분하십시오.

경고문 3



주의:

CD-ROM 드라이브가 설치되어 있으면 다음 사항을 명심하십시오.

여기에서 지정하지 않은 방식으로 CD-ROM 드라이브를 제어 또는 조절하거나 다른 절차로 사용하면 위험한 방사능 노출이 발생할 수 있습니다.

CD-ROM 드라이브의 덮개를 제거하면 위험한 레이저 방사능이 노출될 수 있습니다. CD-ROM 드라이브 내에는 정비할 수 있는 부품이 없습니다. CD-ROM 드라이브 덮개를 제거하지 않도록 하십시오.

경고문 4

위험

일부 CD-ROM 드라이브에는 클래스 3A 또는 3B 레이저 2극 진공관(다이오드)이 들어 있습니다. 다음 사항을 명심하십시오.

열면 레이저 방사능이 노출됩니다. 광선을 주시하거나 광학 기계를 직접 쳐다보지 않도록 하고 광선에 노출되지 않도록 하십시오.

경고문 5



32kg(70.5 파운드)



55kg(121.2 파운드)

주의:

기계를 들 때는 안전하게 들어 올리십시오.

경고문 10



주의:

전원, 전화 및 통신 케이블로부터 흘러 나오는 전류는 위험합니다. 설치 및 구성 절차에 다른 지시가 없으면, 다치거나 장비 손상이 생기지 않게 하기 위해 서버 덮개를 열기 전에 접속된 전선, 원격 통신 시스템, 네트워크 및 모뎀의 연결을 끊으십시오.

**PELIGRO**

Para evitar una posible descarga eléctrica, no conecte ni desconecte los cables ni lleve a cabo ninguna operación de instalación, de mantenimiento o de reconfiguración de este producto durante una tormenta eléctrica.

Para evitar una posible descarga:

- El cable de alimentación debe conectarse a un receptáculo con una instalación eléctrica correcta y con toma de tierra.
- Los aparatos a los que se conecte este producto también deben estar conectados a receptáculos con la debida instalación eléctrica.

Cuando sea posible, utilice una sola mano para conectar o desconectar los cables de señal a fin de evitar una posible descarga al tocar dos superficies con distinto potencial eléctrico.

La corriente eléctrica de los cables de comunicaciones, teléfono y alimentación puede resultar peligrosa. Para evitar una posible descarga, siga las indicaciones de conexión y desconexión de los cables siempre que tenga que instalar, mover o abrir las cubiertas de este producto o de los dispositivos acoplados.

Instrucciones de conexión	Instrucciones de desconexión
<ol style="list-style-type: none">1. Apague todos los componentes (OFF).2. En primer lugar, conecte todos los cables a los dispositivos.3. Conecte los cables de señal a los receptáculos.4. Conecte los cables de alimentación a las tomas.5. Encienda el dispositivo (ON).	<ol style="list-style-type: none">1. Encienda todos los componentes (ON).2. En primer lugar, retire los cables de alimentación de las tomas.3. Retire los cables de señal de los receptáculos.4. Retire todos los cables de los dispositivos.



Precaución:

Al cambiar la batería, utilice únicamente la batería IBM Número de pieza 33F8354 o un tipo de batería equivalente recomendado por el fabricante. Si el sistema tiene un módulo que contiene una batería de litio, sustitúyalo únicamente por el mismo tipo de módulo del mismo fabricante. La batería contiene litio y puede explotar si no se utiliza, manipula o desecha correctamente.

Lo que no debe hacer

- Tirar o sumergir el producto en agua.
- Exponer el producto a una temperatura superior a 100°C.
- Reparar o desmontar el producto.

Cuando quiera desechar la batería, siga las disposiciones y reglamentaciones locales.



Precaución:

Cuando instale una unidad de CD-ROM, tenga en cuenta la siguiente información.

Si se llevan a cabo controles o ajustes o se utilizan métodos que no se atengan a lo aquí especificado, se puede producir una exposición peligrosa a las radiaciones.

Si se retiran las cubiertas de la unidad de CD-ROM, se puede producir una peligrosa exposición a radiaciones de láser. Dentro de la unidad de CD-ROM no existen piezas reparables. No retire las cubiertas de la unidad de CD-ROM.

PELIGRO
Algunas unidades de CD-ROM tienen incorporado un diodo de láser de Clase 3A o de Clase 3B Tenga en cuenta la siguiente información.
Cuando la unidad está abierta se generan emisiones de rayos láser. No dirija la mirada al haz, no lo observe directamente con instrumentos ópticos y evite la exposición directa.

		
	<p>≥ 32 kg (70.5 lbs)</p>	<p>≥ 55 kg (121.2 lbs)</p>

Precaución:

Alce la máquina con cuidado; el sobrepeso podría causar alguna lesión.



Precaución:

La corriente eléctrica de los cables de comunicaciones, de teléfono y de alimentación puede resultar peligrosa. Para evitar posibles lesiones o daños del aparato, desconecte los cables de alimentación, los sistemas de telecomunicaciones, las redes y los módems antes de abrir las cubiertas del servidor, salvo que se indique lo contrario en las instrucciones de las operaciones de instalación y configuración.

Safety information

This section contains the safety information with which you need to be familiar, before you service an IBM mobile 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 doing any of the following: 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.

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.

Electrical safety

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.

Observe the following rules when working on electrical equipment.

- 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 (or similar units) *with the power on* when they are removed from their normal operating places in a machine. This practice ensures correct grounding of the units.)
 - Power supply units
 - Pumps
 - Blowers and fans
 - Motor generators
 - If an electrical accident occurs:
 - **Use caution; do not become a victim yourself.**
 - **Switch off power.**
 - **Send another person to get medical aid.**

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.

Use the following precautions 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.
- 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.
- 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.

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 following checks with the power off, and the power cord disconnected.

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 the following:
 - 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.

Problem determination tips

Because there is a large variety of hardware and software combinations that can be encountered, use the following information to assist you in problem determination.

- Verify any recent hardware changes. See “Hardware considerations” on page 108.
- Verify any recent software changes. See “Software considerations” on page 107.
- Verify that the BIOS is at the latest level. See “BIOS” on page 107.
- Verify that the drivers are at the latest levels. See “Drivers” on page 107.
- Verify that the Configuration matches the hardware. See “System resource conflicts” on page 109.
- Verify that the Diagnostics diskette is at the latest level. See “File updates.”

As you go through problem determination, consider these questions.

- 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?

Important

To eliminate confusion, systems are considered identical only if the following are *exactly* identical for *each* system:

1. Machine type and model
2. BIOS level
3. Adapters/attachments (in same locations)
4. Address jumpers/terminators/cabling
5. Software versions and levels
6. Reference/Diagnostics Diskette
7. Configuration options set in the system
8. Setup for operation system control files

Comparing the configuration and software setup between “working” and “non-working” systems will often resolve problems.

File updates

Use the IBM support area on the World Wide Web (WWW) to download Diagnostic, BIOS Flash, and Device Driver files.

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

Adding adapters to the system

When adapters are added to the system, an area in memory has to be allocated to run its programs. This can be done with either **hardware switches** or **software mapping**.

If there is a conflict in software mapping, then the following may be true.

- The first device to attach to an IRQ, DMA, I/O Address, or RAM location will probably function. The second device will not be found.

- Standalone diagnostics might function properly because the device that was found is the only device running.

Software configuration conflicts occur when the following are true.

- Hardware has a different configuration than the software that is using it expects.
- Hardware memory address space is in conflict with memory used by the application software.

Software considerations

Suspect a software failure if one of the following is true.

- Hardware diagnostics run error-free.
- Swapping hardware components fails to isolate the problem.

A software problem might be the result of a mismatch between the hardware and the operating system device drivers or direct drivers.

BIOS

The BIOS acts as an interface between the system hardware, application software, and the operating system.

The BIOS contains the instructions to operate the basic system components:

- Keyboard
- Serial and parallel ports
- Diskette drive
- Hard disk drive
- VGA display
- Clock
- Memory controller.

The BIOS then starts the IPL or Boot functions.

Drivers

Device drivers are the BIOS for additional hardware. They are the communicators of the hardware assignments to the operating system, including the following:

- IRQ level
- DMA channel
- I/O address
- ROM or RAM.

Some device drivers like HIMEM.SYS are position sensitive and must be placed before other device drivers in the CONFIG.SYS file.

Not all device drivers are found in the CONFIG.SYS file. Advanced operating systems use .INI files to set up and start devices.

Device drivers can access the hardware in five ways.

- **Operating system direct to hardware using a direct driver**

Direct drivers, which bypass BIOS, have the advantage of faster throughput, but the disadvantage of limited error-handling capability and reduced software and hardware compatibility and flexibility. This method is not used in the IBM PC Series systems.

- **Operating system to BIOS to hardware**
This is the recommended way. It's the most flexible because it is independent of the hardware.
- **Applications to operating system to BIOS to hardware**
This method is inflexible and is dependent on the operating system.
- **Applications to BIOS to hardware**
This method has some flexibility but it is dependent on the BIOS.
- **Applications to hardware**
This method is dependent on the hardware and is very inflexible. However, it is very fast, very efficient, and it has no overhead.

Hardware considerations

Use the following tools to help identify and resolve hardware-related problems.

- Power-on self-test (POST)
- POST Beep codes
- Test programs
- Error messages

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

Use the test programs that come with this HMM or with the system you are servicing to test the IBM components of the system and some external devices. Also, from the DOS prompt or from OS/2 Utilities, use the **CHKDSK** command to check and repair hard disk data allocation errors.

Error messages generated by the software (the operating system or application programs), generally are text messages. However, error messages can be text, numeric, or both text and numeric.

Any time there is an error message indicating a problem with the system, follow the General Checkout procedures in this HMM to resolve the problem.

Basically, there are five types of error messages.

- **POST error messages** are displayed when the POST finds problems with the hardware or detects a change in the hardware configuration.
- **POST Beep codes** are sounds emitted from the speaker if the POST finds a problem. One beep indicates that the POST completed successfully. Multiple beeps indicate a problem was found.
- **Diagnostic error messages** are displayed when a test program finds a problem with a hardware component.
- **Software-generated error messages** are displayed 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 the installed software package. Also, refer to "Software considerations" on page 107.

- **Multiple messages** occur when the first error causes additional errors. Follow the suggested action of the first error displayed.

System resource conflicts

System failures occur when there are system resource conflicts with the following:

- Interrupt Request Queue (IRQ)
- Direct Memory Access (DMA)
- I/O Address
- ROM and RAM Addresses.

IRQ

- Assigns a unique interrupt request line to every I/O device (line numbers range from 0 to 15).
- Interrupts the processor to force it to service the request.
- Handles interrupts on a priority basis (low numbers have the highest priority).
- Queues interrupt request.

IRQ conflicts occur when there are multiple assignments to the same interrupt level. If there is an IRQ conflict, the system will hang. Use the systems diagnostics to check for multiple assignments to the same interrupt level before replacing any hardware component.

DMA

- **Accesses the memory by bypassing the processor.** This allows the processor more time for applications and programs.
- Accesses memory directly from the serial and parallel ports on some systems.
- **Accesses memory directly from some adapters using a DMA channel.** This allows the adapter to operate faster.
- **Provides from 4 to 15 DMA channels.** The number varies depending on the system.

If multiple assignments of the same DMA channel occur, the system will hang. Use the system diagnostics to check for multiple assignments to the same DMA channel before replacing any hardware components.

I/O address

A unique I/O address is assigned to each system component.

If multiple assignments of the same I/O address occur, the system will hang. Use the **DOS MEM** command to check for multiple assignments to the same I/O address before replacing any hardware component.

ROM and RAM Addresses

Adapter cards with processors can contain RAM and ROM. If the adapter cards have onboard memory, then the following are true.

- ROM contains operating instructions for the adapter I/O.
- RAM is used for buffering.

Two adapters using the same memory area will cause a failure. This failure might appear as a hardware failure.

The IRQ levels, DMA channels, I/O address, and ROM and RAM addresses all become potential conflicts and system problems. When conflicts arise, they might show up as system hangs, lost or missing devices, incorrect or bad data, or failing diagnostics. **Always eliminate conflicts in these areas before replacing any hardware components.**

Miscellaneous information

Acronyms, Abbreviations, and Terms

Term	Information
ACPA/A	Audio Capture and Playback Adapter
ADP	Automatic Data Processing
AGP	Advanced Graphics Port
Alt	Alternate
ANSI	American National Standards Institute
ARTIC	A Real Time Interface Coprocessor
ASCII	American National Standard Code for Interface Interchange
AT	Advanced Technology (refer to AT Bus)
AVC	Audio Video Connection
BIOS	Basic Input/Output System
bps	Bits Per Second
BPS	Bytes Per Second
CCITT	The International Telephone and Telegraph Consultative Committee
CCS	Common Command Set
CCSB	Common Complete Status Block
CCSB	Configuration Control Sub Board
CD	Compact Disc
CDPD	Cellular Digital Packet Data
CD-ROM	CD Read-Only Memory
CGA	Color Graphics Adapter (See EGA)
CRC	Cyclic Redundancy Check
CRT	Cathode Ray Tube
CSA	Canadian Standards Association
CSD	Corrective Service Diskette
DASD	Direct Access Storage Device (hard disk)
DMA	Direct Memory Access
DRAM	Dynamic Random Access Memory
ECA	Engineering Change Announcement
ECC	Error Correction Code
EGA	Enhanced Graphics Adapter
ESD	Electrostatic Discharge
ESDI	Enhanced Small Device Interface
EEPROM	Electrically Erasable Programmable Read-Only Memory
EWS	Energy Work Station
FRU	Field Replaceable Unit (replaceable part)
GPIB	General Purpose Interface Bus (IEEE 348)
GSA	General Services Administration

Term	Information
Ht	Height
IDE	Integrated Drive Electronics
IC	Integrated Circuit
IEEE	Institute of Electrical and Electronics Engineers
IEC	International Electrotechnical Commission
IML	Initial Machine Load
IPL	Initial Program Load
ISA	Industry Standard Architecture
ISO	International Organization for Standardization
ISDN	Integrated-Services Digital Network
LAN	Local Area Network
LBA	Local Block Address
LTB	Local Transfer Bus
LUN	Logical Unit Number (refer to SCSI)
MAP	Maintenance Analysis Procedure
MCGA	Modified Color Graphics Adapter
MCA	Micro Channel Architecture (bus structure)
MHz	Mega Hertz (million cycles per second)
MIDI	Musical Instrument Digital Interface
MM	Multimedia
N/A	Not Available or Not Applicable
NDD	National Distribution Division
NDIS	Network Driver Interface Specification
NMI	Non-Maskable Interrupt
NSC	National Support Center
NVRAM	Non-Volatile Random Access Memory
OEM	Original Equipment Manufacturer
PCI	Peripheral Component Interconnect
PCMCIA	Personal Computer Memory Card International Association
POS	Programmable Option Select
PUN	Physical Unit Number (refer to SCSI)
RAID	Redundant Array of Inexpensive Disks
RAM	Random Access Memory (read/write)
RGB	Red Green Blue (refer to monitors)
RIPL	Remote Initial Program Load
ROM	Read-Only Memory
SASD	Sequential Access Storage Device (Tape)
SCB	Subsystem Control Block
SCSI	Small Computer Systems Interface
SCSI ID	SCSI Identification Number
SPD	Software Product Description

Term	Information
SR	Service Representative
SRAM	Static Random Access Memory
SVGA	Super Video Graphics Array (800x600x16)
STN	Super Twisted Nematic
T/A	NDD Technical Advisor (see your Marketing Representative)
TDD	Telecommunications Device for the Deaf
TFT	Thin-Film Transistor
TPF	ThinkPad File
TSR	Terminate and Stay Resident
UL	Underwriters Laboratory
VCA	Video Capture Adapter
VESA	Video Electronics Standards Association
VGA	Video Graphics Array (640x480x16)
VPD	Vital Product Data
VRAM	Video Random Access Memory
WORM	Write Once Read Many (storage medium)
XGA	Extended Graphics Array
Y/C	Luminance/Chrominance Signal (Video)

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

Name: _____

Phone number: _____

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Yes No

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

3. What is your service level experience level?

Less than five years More than five years

4. Which computers do you service most?

Thank you for your response!

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HelpFax	HelpWare	IBM
Intellistation	Micro Channel	Netfinity
NetVista	Netfinity Manager	NetView
OS/2	Personal System/2	PC 300
PC 700	PS/ValuePoint	Rapid Resume
Predictive Failure Analysis	RETAIN	SelectaSystem
ScrollPoint	Skill Dynamics	SystemView
SystemXtra	ThinkPad	TrackPoint
TrackPoint II	Wake on LAN	XGA

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