Hardware Maintenance Manual

xSeries 370

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xSeries 370

Note:

Before using this information and the product it supports, be sure to read the general information under “Notices” on page 216.

Second Edition (March 2001)

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About this manual

This manual contains diagnostic information, a Symptom-to-FRU index, service information, error codes, error messages, and configuration information for the IBM® @server xSeries 370, Models 1RX, 2RX and 3RX.

Important: This manual is intended for trained servicers who are familiar with IBM PC Server products.

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.

File download address is:

http://www.us.pc.ibm.com/files.html

IBM online addresses

The HMM manuals online address is:

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

The IBM PC Company Support Page is:

http://www.us.pc.ibm.com/support/index.html

The IBM PC Company Home Page is:

http://www.pc.ibm.com

Contents

General checkout

The server diagnostic programs are stored in flash RAM on the I/O function card. These programs are the primary method of testing the major components of the server. You can also use them to test some external devices.

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

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

Note: Some error conditions will generate error messages that are displayed in the front panel video fluorescent display (VFD). Some of these messages will automatically be cleared once the problem is corrected. Others will need to be cleared manually. To ensure you have correctly identified the failing FRU during your diagnosis, manually clear any messages from the front panel display using the scroll and enter buttons on the right side of the front panel after you have replaced any FRU(s). This can be done with the system in the Standby mode before power up. Then, once you reboot the system, if a problem still exists which normally generates a message on the front panel, the new message generated will alert you to the continued or new error condition.

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

A system might be part of a cluster if:

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

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

Notes:

1. If you hear beep codes, see “Beep symptoms” on page 123.
2. If you hear beep code 1-3-1, see "1st 1MB RAM test failed" (Beep code 1-3-1) in “Beep symptoms” on page 123.
3. If you hear beep code 3-3-2, see "SM Bus error" (Beep code 3-3-2) in “Beep symptoms” on page 123.
4. If you do not hear beep codes, and have no other error indications but the system will not boot or will not power off, see “No beep symptoms” on page 127.
5. If you have SCSI errors posted on the monitor, see “SCSI errors” on page 154.
6. If you have symptoms relating to fans, CD-ROM, diskette drive, SCSI devices, or monitor, see “Other error symptoms” on page 141.
7. If you do not have two LED's lit on each power supply, see “Power supply LED errors” on page 128.
8. If you have a power fault message in the system error log, see “Power control card LED” on page 130.
9. If you have server component fault indicator LEDs lit, see “Server component fault indicators” on page 133.
10. If you have a flashing attention light and error messages posted in the front panel, see “System management codes” on page 165.
11. If you have run diagnostics which generated diagnostic error codes, see “Diagnostic error codes” on page 134.
12. If you have a SMI error posted in the front panel, see “System Management Interrupt (SMI) handler” on page 168.
13. If your system is hung, will not boot, or exhibits symptoms other than those above, see “Undetermined problems” on page 158.
14. For systems that are part of a shared DASD cluster, run one test at a time in looped mode. Do not run all tests in looped mode, as this could enable the DASD diagnostic tests. If an error is displayed on the front panel, see “System management codes” on page 165.
15. If multiple error codes are displayed, diagnose the first error code displayed.
16. If there are multiple errors logged in the system error log, diagnose the errors in the order they were posted according to the date/time stamp. If the computer hangs with a POST error, go to the xSeries 370. If the computer hangs and no error is displayed, go to “Undetermined problems” on page 158.
17. If you have intermittent problems, check the system error log; see “System error log” on page 32. Power Supply problems, see “Power supply LED errors” on page 128.
18. If you need safety information, see “Safety information” on page 181.

1. **IS THE SYSTEM PART OF A CLUSTER?**

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

NO. Go to step 2.

2. **IF THE SYSTEM IS NOT PART OF A CLUSTER:**

- Power-off the computer and all external devices.
- Check all cables and power cords.
- Set all display controls to the middle position.
- Power-on all external devices.
- Power-on the computer.

- Check the front panel system error LED; if blinking, check the error message on the front panel and see “System management codes” on page 165.
- Attempt to boot to the Configuration/Setup utility and check the system error log. If an error was recorded by the system, see “Symptom-to-FRU index” on page 123. If this is not possible, connect to the System Management Adapter and access the system error log remotely.
- Attempt to boot the system and start the Diagnostic programs. See “Running the diagnostic programs” on page 18. If the diagnostics will not load, record the symptoms you observe and go to “Symptom-to-FRU index” on page 123.
  - If you receive an error, go to “Symptom-to-FRU index” on page 123.
  - If the diagnostics completed successfully and you still suspect a problem, go to “Undetermined problems” on page 158.

General information

This information supports the xSeries 370 server.

Features and specifications

The following list summarizes the features of the xSeries 370 server.

Processors

- Intel® Pentium® III Xeon™ processor with Streaming SIMD Extensions
- Expandable to eight 900 MHz Pentium III Xeon processors
- 100 MHz Front Side Bus (FSB)
- 16 KB of level-1 cache memory
- 512 KB, 1 MB, or 2 MB of level-2 cache with error checking and correction (ECC) memory integrated into processor
- Upgradable processor speeds when available

Memory

- One memory board standard
  - — Sixteen 168-pin, dual inline memory-module (DIMM) connectors
  - — Supports up to 16 GB
- Expandable to 32 GB
- 100 MHz, PC100, registered synchronous dynamic random-access memory (SDRAM) with ECC
- Support for 128 MB, 256 MB, 512 MB, and 1 GB DIMMs
- Support for a second memory board (optional)

Diskette drive

- Supports one diskette drive
- Standard: One 3.5-inch, 1.44 MB

Hard disk drives

- Two half-high, 3.5-inch drive bays
- Supports up to two internal hard disk drives

CD-ROM drive

- Standard: Integrated drive electronics (IDE)

Expansion-slot connectors

Supports up to 14 adapters:

- 12 available PCI slot connectors
  - Eight 64-bit, 33 MHz, hot-plug PCI slot connectors
  - Four 64-bit, 66 MHz, hot-plug PCI slot connectors
- Standard: I/O integrated function card
- Standard: Advanced System Management PCI adapter

Upgradable features

- Advanced System Management PCI adapter upgrades (when available)
- Diagnostics upgrades (when available) Memory upgrades (when available)
- POST/BIOS upgrades (when available) to update electrically erasable programmable read-only memory (EEPROM) on the I/O integrated function card

Security features

- Chassis-intrusion detector (tower option only)
- Power-on and administrator passwords
- Security-error indicator (tower option only)
- Selectable drive-startup sequence
- Cover lock (tower option only)
- Unattended start mode

SCSI features

- Wide Ultra2 SCSI (LVD) controller (LVD = low-voltage differential)
  - One external connector
  - One internal connector
- Two bays available for internal SCSI hard disk drives

Power supplies

- Three - 750 watt power supplies standard
- Redundant power
- Hot-swap capable
- Auto-sensing function
- Built-in overload and surge protection
- Automatic restart after a loss of power

Predictive Failure Analysis™ (PFA) alerts

- Fans
- Power supplies
- Memory
- Hard disk drives
- Processors

Integrated functions

- Voltage regulators for processors
- Two serial ports
- Two Universal Serial Bus (USB) ports
- One parallel port

- Mouse port
- Keyboard port
- Video port
- Wake on LAN™ capability
- Alert on LAN™ capability
- Advanced System Management PCI adapter
  - Full-duplex 10/100 Mbps Ethernet controller for system management use
  - Advanced System Management Interconnect port
  - Two serial ports
- ServeRAID™ adapter supportBuilt-in programmable read-only memory (PROM) based diagnostics

Specifications for the xSeries 370 server.

Size

- Depth: 747 mm (29.4 in.)
- Height: 356 mm (14 in.)
- Width: 440 mm (17.3 in.)

Weight

- Unpacked, minimum configuration: 67 kg (147 lb.)
- Unpacked, maximum configuration: 77.5 kg (170 lb.)

Electrical input

- Sine-wave input (50± or 60± Hz) is required
- Input voltage
  - Low range
    - Minimum: 90 V AC
    - Maximum: 137 V AC
  - High range
    - Minimum: 180 V AC
    - Maximum: 265 V AC
  - Input kilovolt-amperes (KVA) approximately
    - Minimum configuration as shipped: 0.5 KVA
    - Maximum configuration: 2.1 KVA

Environment

- Air temperature
  - System on: 10º to 35º C (50º to 95º F)
    Altitude: 0 to 914 m (3000 ft.)
  - System on: 10º to 32º C (50º to 89.6º F)
    Altitude: 0 to 2133 m (7000 ft.)
  - System off: 10º to 43º C (50º to 110º F)
- Humidity
  - System on:
    8% to 80%; maximum wet-bulb 23º C (73.4º F)

— System off:

8% to 80%; maximum wet-bulb 27º C (80.6º F)

Electrostatic discharge

- Tested to 20 KV

Immunity

- Verified to comply with EN 50082-2

Acoustical noise emission values

Declared (upper limit) sound power levels

- xSeries 370 server (rack server)
  - — 6.1 bels operating
  - — 6.1 bels idle
- xSeries 370 server (tower option)
  - — 6.2 bels operating
  - — 6.2 bels idle

Mean value of the A-weighted sound pressure levels at the bystander (1 meter) position

- xSeries 370 server (rack server)
  - — 45.0 dB operating
  - — 45.0 dB idle
- xSeries 370 server (tower option)
  - — 43.5 dB operating
  - — 43.0 dB idle

Heat output

- Approximate heat output in British thermal units (Btu) per hour:
  - — Minimum configuration: 1700 Btu / hr.
  - — Maximum configuration: 7000 Btu / hr.

Safety standards

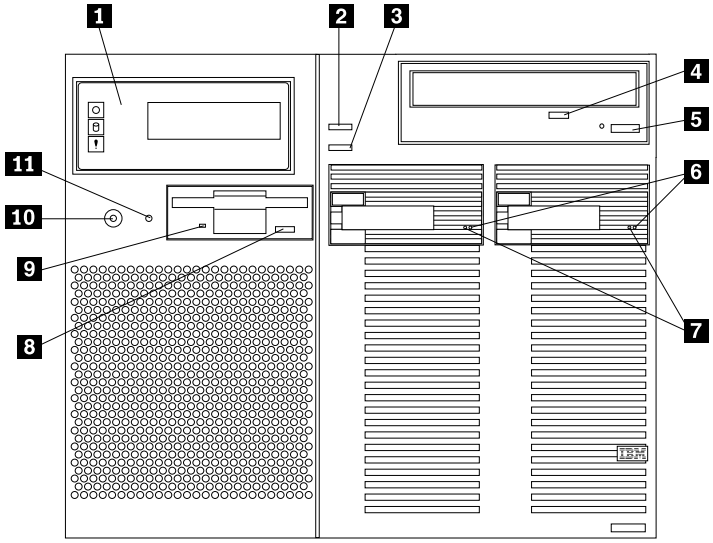
- UL 1950, Third Edition
- CSA C22.2 No. 950-95
- EN 60950 and countries deviations
- IEC 950
- NOM-019

Notes:

1. These levels are measured in controlled acoustical environments according to ISO 7779, and are reported in accordance with ISO 9296. The declared sound power levels indicate an upper limit, below which a large portion of machines operate.
2. These values apply to a random sample of machines.
3. There is no impulsive noise, and there are no prominent tones.

Controls and indicators

The most commonly used controls and status indicators are on the front of the server. See “Using the SCSISelect Utility program” on page 34 for additional information.



~1~ **Front panel:** The lights and messages on this panel give status information for the server. See “Front panel” on page 11 for more information.

~2~ **Scroll button:** Press this button to select an action to perform on a system-monitoring message; then, press the Enter button to perform the action. You can select:

- **Keep** to retain the message on the front panel and enable the system error light to continue to flash
- **Remind** to retain the message on the front panel and enable the system error light to flash slowly
- **Clear** to clear the message from the front panel and enable the system error light to stop flashing

~3~ **Enter button:** Press this button to perform an action on system-monitoring messages that appear on the front panel.

~4~ **CD-ROM drive in-use light:** When this light is on, the CD-ROM drive is being accessed.

~5~ **CD-ROM eject/load button:** Press this button to eject or retract the CD-ROM tray so that you can insert or remove a CD.

~6~ **Hard disk status light:** This light only operates in a ServeRAID environment. Each of the hot-swap drives has a Hard Disk Drive Status light. When the amber light for a hard disk drive is on continuously, the drive has failed. When the light flashes slowly (one flash per second), the drive is being rebuilt. When the light flashes rapidly (three flashes per second), the ServeRAID controller is identifying the drive.

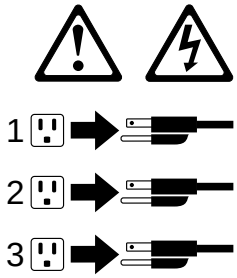
~7~ **Hard disk in-use light:** Each hot-swap hard disk drive has a Hard Disk In-Use light. When the green light for a hard disk drive is on, the drive is being accessed.

~8~ **Diskette-eject button:** Press this button to eject a diskette from the drive.

~9~ **Diskette drive in-use light:** When this light is lit, the diskette drive is being accessed.

~10~ **Power control button:** Press this button to manually turn the server on or off.

Caution: The Power Control button on the front of the server does not turn off the electrical current supplied to the server. The server also might have more than one power cord. To remove all electrical current from the server, ensure that all power cords are disconnected from the power source.



Statement 13

DANGER

Overloading a branch circuit is potentially a fire hazard and a shock hazard under certain conditions. To avoid these hazards, ensure that your system electrical requirements do not exceed branch circuit protection requirements. Refer to the information that is provided with your IBM device for electrical specifiacations.

The server can be activated in several ways:

- You can turn the server on by pressing the Power Control button on the front of the server.
- The server can also be powered on by the Advanced System Management PCI Adapter, Wake on LAN, Wake on Real-Time Clock Alarm, or Wake on Ring.

  Note: To enable the wakeup features, you must install the appropriate software and hardware in the server. For complete details, refer to the documentation that comes with the Ethernet adapter.

The server can be deactivated as follows:

- Pressing the Power Control button causes an immediate shutdown of the server, and places the server in standby mode. This feature can be used if the operating system hangs.
- After turning off the server, wait at least five seconds before pressing the Power Control button to power on the server again.
- Disconnecting all of the server power cords from the electrical outlet will shut off all power to the server.

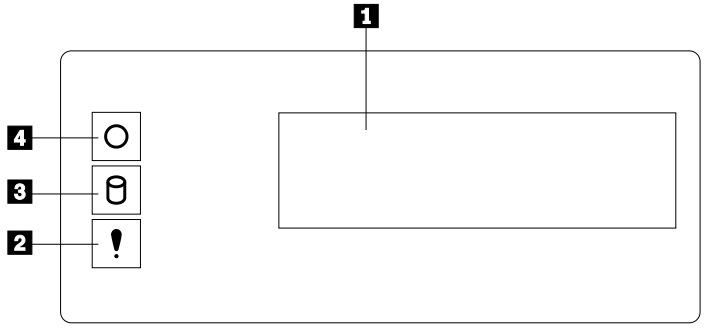
  Note: Wait for the system to stop running. Watch for the System Power light on the front panel to stop flashing or illuminating.

- The server can also be powered off by the Advanced System Management PCI Adapter.

~11~ **Reset button:** Press this button to reset the system and run the power-on self-test (POST).

Front panel

The front panel on the front of the server contains status lights and system messages.



~1~ **Information message panel:** System monitor information appears on this display. The Advanced System Management PCI Adapter monitors system functions and generates the messages.

When the server is in standby mode (the system power supply is turned off and AC current is present), the information message panel can display system monitor information.

~2~ **System error light:** This amber light is on when a system error occurs. Information about the condition displays on the information message panel.

~3~ **SCSI hard disk drive in-use light:** This green light is on when there is activity on a hard disk drive.

Attention: If the System Power Light is off, it does not mean there is no electrical current present in the server. To remove all electrical current from the server, you must unplug the server power cords.

~4~ **System Power Light:** When this green light is on, system power is present in the server. When this light flashes, the server is in standby mode (AC current is present). When this light is off, it indicates either power supply failure or an AC power failure, or the power cords have been disconnected.

System reliability considerations

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

- Each drive bay has either a drive or a filler panel installed. If a slim-high drive is installed, make sure that the slim filler bezel is installed.
- Each power supply bay has a power supply installed.
- The top cover is in place during normal operation. If the server is on, do not leave the top cover off for more than 30 minutes at a time.
- The memory-access panel is in place during normal operation.

- To leave sufficient space around the server to allow the server cooling system to work properly. Refer to the server rack documentation for additional information.
- Cables for optional adapters are routed according to the instructions that come with the adapters.
- A fan that has failed (indicated by a lit amber LED) is replaced as soon as convenient to help maintain the redundant cooling capability.
- Additional processors are installed on the processor daughterboards in the correct order. See “Processor housing assembly” on page 94 for installation instructions.
- Additional DIMMs are installed on the memory boards in the correct order. See “DIMM and memory board” on page 52 for installation instructions.

Understanding the xSeries 370 server design

The xSeries 370 server incorporates new design features and components.

In the xSeries 370 server design, the system has an I/O board, an I/O integrated function card (commonly referred to as an I/O function card), a Main backplane, a main processor board, at least one processor daughterboard, and at least one memory board. This modular design improves serviceability and provides for a compact design.

I/O board

The I/O board houses the connectors for the PCI adapters and primary server boards, and houses other I/O devices that you can install to expand the capabilities of the server.

The I/O board contains the connectors for the Main backplane, I/O function card, Advanced System Management PCI adapter, two USB ports, the PCI switch card, twelve hot-plug PCI adapters, and two voltage regulator modules (VRMs).

Note: The I/O board is also known as the I/O planar.

See “I/O board component locations” on page 83 for a layout of the I/O board.

Several features, such as the Wake on LAN feature, are built into the server I/O board. To enable the Wake on LAN feature, you must install the appropriate software and hardware in the server. For complete details, refer to the documentation that comes with the Ethernet adapter.

I/O function card

The I/O function card houses the battery, I/O ports, and other I/O devices that you can install to expand the capabilities of the server.

The I/O function card contains the connectors for the I/O board, Advanced System Management PCI adapter, CD-ROM drive, diskette drive, front panel, keyboard, mouse, SCSI and other I/O ports, jumpers, battery, and other devices.

See “I/O function card component locations” on page 84 for a layout of the I/O function card.

Main backplane

The Main backplane contains the connectors for the I/O board, the main processor board, the standard memory board (A), the optional memory board (B), three memory

I/O cooling fans, three power supplies, a media power device (through cabling), and a power control card.

The Main backplane provides all of the interconnects for all of the major server components.

See “I/O board component locations” on page 83, “Memory board component locations” on page 91, and “Main processor board component locations” on page 92 for the location of the midplane connector on the I/O board, the memory board, and the main processor board, respectively.

Profusion carrier board

The main processor board manages the server processors on the processor daughterboards.

The main processor board contains the connectors for the standard processor daughterboard, the optional processor daughterboard, the cache coherency filter card A, the cache coherency filter card B, and the LED card.

See “Main processor board component locations” on page 92 for a layout of the main processor board.

Processor daughterboard

The processor daughterboard houses the server processors and is connected to the main processor board.

The server supports two *processor daughterboards.* Each processor daughterboard contains the connectors for four processors.

See “Processor housing assembly” on page 94 for instructions on installing a processor on a processor daughterboard. See “Processor-daughterboard component locations” on page 93 for a layout of the processor daughterboard.

Memory board

The memory board houses the dual inline memory modules (DIMMs). The DIMMs contain the system memory.

The server supports two memory boards. Each memory board contains the connectors for 16 DIMMs.

See “DIMM and memory board” on page 52 for instructions on installing a DIMM on a memory board, and installing a memory board in the server. See “Memory board component locations” on page 91 for a layout of the memory board.

Diagnostics

Server problems can be caused by hardware, software, or a user error. An example of a user error is pressing the wrong key on the keyboard.

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

- Diagnostic programs
- Power-on self-test (POST)
- POST beep codes
- Error messages
- System error log
- Option diskettes

Diagnostic programs

The Diagnostics Utility program contains several server diagnostic programs. These diagnostic programs are stored on electrically erasable programmable read-only memory (EEPROM). These programs are the primary method of testing the major components of your server and some external devices.

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

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

Power-on self-test (POST)

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

POST does the following:

- Checks the operation of some basic I/O function card, processor daughterboard, and I/O board operations
- Checks the memory
- Compares the current server configuration with the stored server configuration information

- Configures PCI adapters
- Starts the video operation
- Verifies that drives (such as the diskette, CD-ROM, and hard disk drives) are connected properly

If you have a power-on password or administrator password set, you must type the password and press **Enter** before POST will continue.

While the memory is being tested, the amount of available memory appears on the screen. These numbers advance as the server progresses through POST and the final number that appears on the screen represents the total amount of memory available. If POST finishes without detecting any problems, a single beep sounds and the first screen of your operating system or application program appears.

If POST detects a problem, more than one beep sounds, or an error message appears on your screen.

Note: A single problem might cause several error messages. When this occurs, work to correct the cause of the first error message. After the cause of the first error message is corrected, the other error messages usually will not occur the next time you run the test.

POST beep codes

POST generates beep codes to indicate successful completion or the detection of a problem.

- One beep indicates the successful completion of POST.
- No beep indicates that a unrecoverable error occurred during POST.
- More than one beep indicates that POST detected a problem. For more information, see “Beep symptoms” on page 123.

Error messages

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

Hardware error messages that occur can be text, numeric, or both. Messages generated by your software generally are text messages, but they also can be numeric.

POST error messages

POST error messages occur during startup when POST finds a problem with the hardware or detects a change in the hardware configuration. For more information, see “POST error codes” on page 144.

System-monitoring messages

System-monitoring messages occur as the Advanced System Management PCI Adapter monitors critical system functions.

Diagnostic error messages

Diagnostic error messages occur when a diagnostic test finds a problem with the server hardware. These error messages are alphanumeric and they are saved in the test log. For more information, see “Diagnostic error codes” on page 134

Software-Generated error messages

These messages occur if a problem or conflict is found by an application program, the operating system, or both. Messages are generally text messages, but they also can be numeric. For information on these error messages, refer to the documentation that comes with your software.

POST error log

The POST error log contains a maximum of three error and warning messages issued during POST and all system status messages from the Advanced System Management PCI Adapter (service processor). See “POST error log” on page 31 for information on how to view the POST error log.

System error log

The system error log contains all error and warning messages issued during POST, all system status messages from the Advanced System Management PCI Adapter (service processor), and all error messages issued during diagnostic testing. See “System error log” on page 32 for information on how to view the system error log.

Option diskettes

An optional device or adapter can come with an Option Diskette. Option Diskettes usually contain option-specific diagnostic test programs or configuration files.

If your optional device or adapter comes with an Option Diskette, follow the instructions that come with the option. Different instructions apply depending on whether or not the Option Diskette is startable.

Diagnostic Programs

This section includes useful information on running the diagnostic programs. These programs are designed to test the IBM xSeries 370 server. If you want to test a non-IBM product, refer to the information that comes with that product.

Notes:

1. When you run the diagnostic programs, a single problem might cause several error messages. When this occurs, work to correct the cause of the first error message. After the cause of the first error message is corrected, the other error messages usually will not appear the next time that you run the test.
2. You can also run the diagnostic programs remotely with the Advanced System Management PCI Adapter in conjunction with the Advanced System Management service capabilities of IBM Director, a terminal program, or a Web browser.

Running the diagnostic programs

While you are running the diagnostic programs, pressing **F1** displays help information. Pressing **F1** from within a help screen provides a help index from which you can select different categories. Pressing **Esc** closes the Help window and returns to running the diagnostic programs.

Notes:

1. To run the diagnostic programs, you must start the server with the highest level password.

   That is, if you enter the power-on password and an administrator password is set, you cannot run the programs. You can only view the error messages in the Test Log.

   You must enter the administrator password to run the diagnostic programs.
2. If the server stops during testing and you cannot continue, restart the server and try running the diagnostic programs again. If the problem persists, have the system serviced.
3. If the diagnostic tests do not find a problem, but the problem persists during normal operations, see "Undetermined problems" on page 158 and look for the problem symptom.
4. You might have to install a wrap connector on your active parallel or serial port to obtain accurate test results for these ports. If you do not have a wrap connector, contact your IBM reseller or IBM marketing representative.
5. You might need a scratch diskette to obtain accurate test results when testing the diskette drive.
6. The keyboard and mouse (pointing device) tests assume that a keyboard and mouse are attached to the server.

Starting the diagnostic programs

To start the diagnostic programs:

1. Ensure that there is no diskette in the diskette drive. If the diskette drive contains a diskette, remove it.
2. Turn on the server and watch for the IBM logo screen. If the server is turned on already, shut down your operating system and restart the server.
3. After you start the server, several prompts appear on the IBM logo screen. When the prompt `Press F2 for Diagnostics` appears, press F2.

   If a power-on password or administrator password is set, the server prompts you for it. Type in the appropriate password; then, press Enter.

   The Diagnostics Utility program window appears.

   After you start the Diagnostics Utility program, the following menu headings will appear at the top of the screen:

   - **Extended**
   - **Basic**
   - **Utility**
   - **Hardware**
   - **Quit**

   a. Use the cursor control keys (arrow keys) to scroll across the menu headings.

   b. Press Enter to view the selections under the main headings.

c. Use the Up Arrow (N) and Down Arrow (N) keys to scroll down to the test that you want to run, and press Enter.

Note: If you select `Run Normal Test` or `Run Quick Test` from the **Extended** test menu, omit steps 4. and 5..

d. Select the test components that you want to run.

e. Use these keys to tailor your selection:

- Space = Select a test component
- F1 = Help
- F2 = Options (a pop-up window appears)
- F3 = Test log
- F5 = Run all tests
- F10 = Deselect all
- Esc = Exit
- Enter = Run highlighted tests
- CTRL+Enter = Run tests in view

4. Select either **Extended** or **Basic** from the top of the screen.
5. Select the test that you want to run from the list that appears; then, follow the instructions on the screen.

   When the tests have completed, you can view the Test Log by selecting **Utility** from the top of the screen.

   Also, you can view server configuration information (such as system configuration, memory contents, interrupt request (IRQ) use, direct memory access (DMA) use, device drivers, and so on) by selecting **Hardware Info** from the top of the screen.
6. When you are finished running the tests or viewing information in the Diagnostics Utility program, select **Quit** from the top of the screen.

If the hardware checks out OK, but the problem persists during normal server operations, a software error might be the cause. If you suspect a software problem, refer to the information that comes with the software package.

Using the Online Manual

To obtain detailed descriptions of the available tests, press F1 twice to gain access to the Diagnostics Utility program Online Manual. The Online Manual also describes:

- The error messages that the diagnostic tests generate
- The menu structure and options
- The function keys

In addition, the Online Manual contains a glossary of terms.

Viewing the test log

If you are already running the diagnostic programs, continue with step 1. in this procedure. If you have not run the diagnostic programs, follow the instructions in “Starting the diagnostic programs” on page 18; then, return here.

To view the Test Log:

1. Select **Utility** from the top of the screen.

2. Select **View Test Log** from the list that appears; then, follow the instructions on the screen.

Configuring the server

The following information is for the Configuration / Setup Utility program that comes with the server. In addition, this chapter provides information on the System Partition and the SCSISelect Utility program.

The Configuration / Setup Utility program is part of the IBM *Basic Input/Output System* (*BIOS*) that comes with the server. Using these programs, you can set the system date and time, define input and output device parameters, and define system security.

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

Accessing server programs

After you start the server, several prompts appear on the IBM logo screen.

- To access the Configuration / Setup Utility program, press F1 when the prompt `Press F1 for Configuration/Setup` appears. See "The Configuration / Setup Utility program" on page 22 and "Using the Configuration / Setup Utility" on page 23 for additional information.
- To access the Diagnostic Utility program, press F2 when the prompt `Press F2 for Diagnostics` appears. For information on running the diagnostics programs, see "Diagnostic programs" on page 15
- To access the utility programs in the System Partition, press Alt+F1 when the prompt `Press Alt+F1 for System Partition Boot` appears. See "Using the System Partition" on page 32 for additional information.

Configuration overview

You play a key role in how the server allocates resources to organize and interconnect hardware devices and software programs. This allocation process is referred to as *configuration*. The steps required to configure the server depend on the number and types of devices and programs that you install.

The server supports PCI adapters and SCSI devices. Because of this flexibility, you can choose from among many adapters and devices.

In general, the greater the number and variety of hardware devices and software programs that you install in the server, the more you will have to interact with the server and the devices to correctly configure the system.

The server comes with the following hardware configuration programs:

- Configuration/Setup Utility

  With the built-in Configuration/Setup Utility program, you can configure I/O functions, such as serial and parallel port assignments; change interrupt request (IRQ) settings; and change the startup sequence for drives that you install. You also can use this program to set passwords for starting up the server and accessing the Configuration/Setup Utility program.

- SCSISelect Utility

  With the built-in SCSISelect Utility program, you can configure the SCSI devices that you attach to the SCSI controller. You can use SCSISelect to change default values, resolve configuration conflicts, and perform a low-level format on a SCSI hard disk drive.

Before installing a new device or program, read the documentation that comes with it. Reading the instructions helps you to determine the steps required for installation and configuration. The following actions are typically, but not always, required to configure the server.

1. Run the Configuration/Setup Utility program and record the current configuration settings.
2. Set jumpers or switches on server components. See "Jumper settings" on page 88 and "I/O function card jumpers" on page 85.
3. Set jumpers or switches on the device. See the device installation instructions.
4. Install the device in the server. See "Preparing to install options" on page 41.
5. Install software programs. See the installation instructions that come with the software.
6. Resolve configuration conflicts. See "Resolving configuration conflicts" on page 33.

The Configuration/Setup Utility program

For most configurations, the server will operate using the default system settings. You need to change the settings only to resolve configuration conflicts or to enable or change device functions (for example, defining diskette types, and so on).

When you want or need to change the default settings, the Configuration/Setup Utility program provides a convenient way to display and change the settings.

After you run and exit from the Configuration/Setup Utility program, configuration information is stored in electrically erasable programmable read-only memory (EEPROM). While the server is off, the configuration information remains available for the next system startup.

Always run the Configuration/Setup Utility program if you add, remove, or relocate any hardware option, or if you receive an error message instructing you to do so. Review this chapter and the information that comes with the option before making changes. Also, record the current settings before making any changes.

Attention: Maintaining a record of the configuration information is especially important if you need to move the Clear CMOS register contents jumper, which erases all configuration information (see "I/O function card jumpers" on page 85 for details).

To start the Configuration/Setup Utility program:

1. Ensure that there is no diskette in the diskette drive. If the diskette drive contains a diskette, remove it.

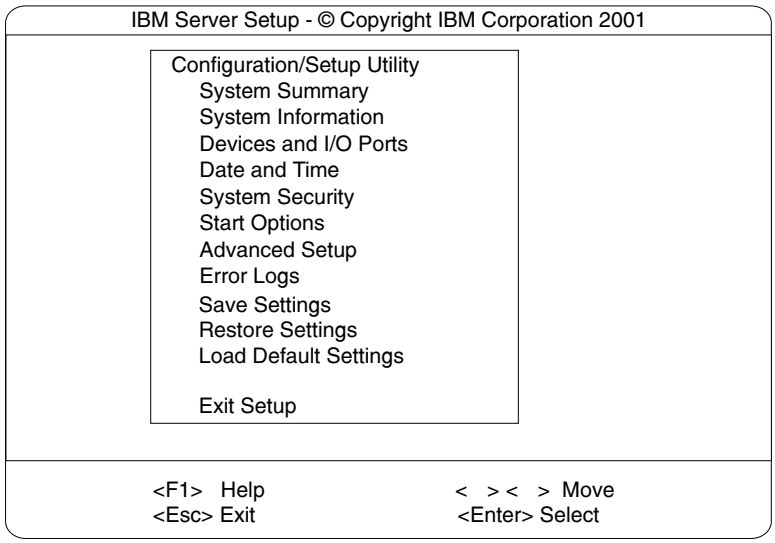
2. Turn on the server and watch for the IBM logo screen. (If the server is turned on already, shut down the operating system and restart the server.)
3. After you start the server, several prompts appear on the IBM logo screen. When the prompt `Press F1 for Configuration/Setup` appears, press F1. The Configuration / Setup Utility main menu appears. For information on the menu, see "Using the Configuration / Setup Utility".

   Note: If you enter the power-on password and an administrator (supervisor-level) password is also set, a limited version of the menu appears. To see the full menu, you must restart the server and enter the administrator password when you are prompted to enter a password. See "System security" on page 25 for additional information.

Using the Configuration/Setup Utility

From the Configuration / Setup Utility main menu, you can select settings that you want to change. The Configuration / Setup Utility main menu is similar to the following screen.

Note: The choices on some menus might differ slightly, depending on the BIOS version that comes with the server.



Pressing F1 displays Help information for a selected menu item.

To change configuration settings:

1. Use the Up Arrow (N) or Down Arrow (N) key to highlight the menu item for the configuration setting that you want to change; then, press Enter.
2. Use the Up Arrow (N) or Down Arrow (N) key to choose the appropriate setting for the selected menu item; then, press Enter.
3. Repeat steps 1. through step 2. for each setting that you want to change. Press Esc to return to the Configuration / Setup Utility main menu.
4. After making changes, you can select:
   - **Save Settings** to save the selected changes.
   - **Restore Settings** to delete the changes and restore the previous settings.
   - **Load Default Settings** to cancel the changes and restore the factory settings.

   Note: The Configuration / Setup Utility main menu selections do not save settings, restore settings, or load default settings for the PCI Slot / Device

Information choice. To save settings, or restore settings for the PCI Slot / Device Information choice, you *must* use the menu selections available from the PCI Slot / Device Information choice.

5. To exit from the Configuration / Setup Utility main menu, select **Exit Setup.** If you made any changes and did not save them with the **Save Settings** choice, the system prompts you to save or discard the changes when you attempt to exit from the Configuration / Setup Utility main menu.

System summary

Select this choice to display configuration information, including the type and speed of the processors and amount of memory.

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

The **System Summary** choice appears on the full Configuration / Setup Utility main menu and on the limited Configuration / Setup Utility main menu.

System information

Select this choice to display information on the xSeries 370 server. Changes that you make on other menus might appear on this summary screen. You cannot edit any fields. The System Information choice appears only on the full Configuration / Setup Utility main menu.

Product data

Select this choice to view system information, such as the machine type and model, the system serial number, and the revision level or issue date of the BIOS stored on the flash EEPROM.

System card data

Select this choice to view vital product data (VPD) for some xSeries 370 server components.

Devices and I/O ports

Software recognizes ports through their port assignments. Each port must have a unique port assignment. The Configuration / Setup Utility program normally handles this, but you might have special hardware or software that requires you to change these assignments.

Select the **Devices and I/O Ports** choice to view or change the assignments for devices and input / output ports.

You can add serial ports by installing a serial adapter in an expansion slot. See the documentation that comes with the serial adapter for information on port assignments.

You can configure the parallel port as *bidirectional*; that is, so that data can be both read from and written to a device. In bidirectional mode, the server supports Extended Capabilities Port (ECP) and Enhanced Parallel Port (EPP).

To display or change the assignments for devices, the serial ports, or parallel port:

1. Select **Devices and I/O Ports.**

2. Select a device or port; use the Left Arrow (N) or Right Arrow (N) key to advance through the settings.
3. The Devices and I/O Ports choice appears only on the full Configuration/Setup Utility main menu.

Notes:

1. When you configure the parallel port as bidirectional, use an Institute of Electrical and Electronics Engineers (IEEE) 1284-compliant cable. The maximum length of the cable must not exceed 3 meters (9.8 feet).
2. If you install a Universal Serial Bus (USB) keyboard that has a mouse port, the USB keyboard emulates a mouse and you will not be able to disable the mouse settings in the Configuration/Setup Utility program.
3. Check the operating system documentation to see if the operating system supports USB devices.
4. If the operating system supports USB devices, the USB is configured automatically.

Date and time

Select this choice to set the system date and time.

The system time is in a 24-hour format: hour:minute:second.

The system date is in the standard format for your country. For example, in the United States, the format is **MM/DD/YYYY** (Month/Day/Year).

Select **Date and Time**; then, use the Left Arrow (N) or Right Arrow (N) key to advance through each data field. Type the new information; the system saves the information as you type it.

The **Date and Time** choice appears only on the full Configuration/Setup Utility main menu.

System security

To control access to the information in the server databases, you can implement two levels of password protection. Implementing these security measures helps you to ensure the integrity of the data and programs that are stored in the server.

After you set a power-on password, you can enable the unattended-start mode. This locks the keyboard and mouse, but allows the system to start the operating system. The keyboard and mouse remain locked until you enter the correct password.

The **System Security** choice appears only on the full Configuration/Setup Utility main menu.

After you set a power-on or administrator password, you must enter the password when you turn on the server. (The passwords do not appear on the screen as you type them.)

Types of Password	Results
No password set	• No password is required to start the system. • You can access all choices on the Configuration / Setup Utility main menu. • No security features are enabled. • Intrusion cable (tower configuration only) will not sense any cover removal.
Power-on password only	• You must enter the password to complete the system startup. • You can access all choices on the Configuration / Setup Utility main menu.
Administrator password only	• You must enter the password to complete the system startup. • The Administrator password provides access to all choices on the Configuration / Setup Utility main menu. • If you need to run the flash update program and the administrator password has been set, you must enter the administrator password when you run the flash update program. • You must enter this password to enable system security feature. • Intrusion detection (tower configuration only) will sense cover removal.
Administrator *and* power-on password You can enter either password to complete the system startup.	• The administrator password provides access to all choices on the Configuration / Setup Utility main menu. You can set, change, or delete both the administrator and power-on passwords, and allow a power-on password to be changed by the user. • The power-on password provides access to a limited set of choices on the Configuration / Setup Utility main menu. This limited access might include changing or deleting the power-on password. • If you forget the power-on password, and the administrator password has been set, use the administrator password at the power-on password prompt; then, start the Configuration / Setup Utility program and change the power-on password. • If you need to run the flash update program and the administrator password has been set, you must enter the administrator password when you run the flash update program. • You must enter the administrator password to enable system security feature. • Intrusion detection (tower configuration only) will sense cover removal.

Using the power-on password menu

When a power-on password is set, you must enter a password each time that you start the system.

When a power-on password is set, POST does not complete until you enter the password. If you forget the power-on password, you can regain access to the server through one of the following methods:

- If an administrator password has been set, enter the administrator password at the power-on prompt. (If necessary, see "Using the administrator password menu" on page 28 for details.) Start the Configuration/Setup Utility program and change the power-on password as described in this section (see steps 1. through 4.).
- You can change the position of the Password override jumper, as described in "Jumper settings" on page 88.
- You can remove the battery and then install the battery. See "Battery replacement" on page 49.

To set a power-on password:

1. Select **Power-on Password** from the System Security menu; then, press Enter.

   The Power-on Password menu appears.

2. Type the password in the **Enter Power-on Password** data field.

   You can use any combination of up to seven characters (A-Z, a-z, and 0-9) for your power-on password. Keep a record of your password in a secure place.

3. Move the cursor to the **Enter Power-on Password Again** data field and type the password again.

   Note: A message appears if the two passwords do not match. If this happens, press Esc to cancel the request and return to the System Security menu.

4. Select **Change Power-on Password** to save the new password; then, press Enter.

To delete a power-on password:

1. Select **Power-on Password** from the System Security menu; then, press Enter.

   The Power-on Password menu appears.

2. Select **Delete Power-on Password**; then, press Enter.

   A confirmation window appears. Press Enter to delete the power-on password. Press Esc to cancel the request and return to the System Security menu.

To allow the system to start in unattended-start mode when a power-on password is set:

1. Select **Power-on Password** from the System Security menu; then, press Enter.

   The Power-on Password menu appears.

2. Select **Allow for unattended boot with password.**

   Press the Left Arrow (N) key or Right Arrow (N) key to toggle the entry to **On**.

   Note: The **Allow for unattended boot with password** data field must be set to **On** for the system to support locally or remotely scheduled system shutdowns or restarts in unattended-start mode.

Using the administrator password menu

The administrator password (sometimes called a supervisor-level password) controls access to some features of the server, including the Configuration/Setup Utility program.

Attention: If an administrator password is set and then forgotten, it cannot be overridden or removed. You must contact your IBM service technician.

To set an administrator password:

1. Select **Administrator Password** from the System Security menu: then, press Enter.

   The Administrator Password menu appears.

2. Type the password in the **Enter Administrator Password** data field.

   A password can contain any combination of up to seven alphanumeric characters (A-Z, a-z, and 0-9). Keep a record of your password in a secure place.

3. Move the cursor to the **Enter Administrator Password Again** data field and type the password again.

   Note: A message appears if the two passwords do not match. If this happens, press Esc to cancel the request and return to the System Security menu.

4. Select **Change Administrator Password** to save the new password; then, press Enter. The password becomes effective immediately.

To delete an administrator password:

1. Select **Administrator Password** from the System Security menu: then, press Enter.

   The Administrator Password menu appears.

2. Select **Delete Administrator Password**; then, press Enter.

   A confirmation window appears. Press Enter to delete the administrator password. Press Esc to return to the System Security menu.

To enable a user to change the power-on password:

1. Select **Administrator Password** from the System Security menu; then, press Enter.

   The Administrator Password screen appears.

2. Select **Power-on password changeable by user.** Press the Left Arrow (N) or Right Arrow (N) key to toggle the entry to **Yes.**

When this choice is enabled, **System Security** appears on the limited Configuration/Setup Utility main menu. The System Security menu contains the **Power-on Password** choice.

Note: If you need to run the flash update program and the administrator password has been set, you must enter the administrator password when you run the flash update program.

Start options

Start options take effect when you start the server.

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

The server uses a startup sequence to determine the device from which the operating system loads. For example, you can define a startup sequence that checks for a startable diskette in the diskette drive, then checks the hard disk drive in bay 1, and then checks a network adapter.

Attention: If the CD-ROM drive contains a startable CD, you must remove the CD if you want to use a startup sequence that begins with a startable diskette.

You can enable a virus-detection test that checks for changes in the master boot record at startup. You also can choose to run POST in the enhanced mode or the quick mode.

Select **Start Options**; then, use the Left Arrow (N) or Right Arrow (N) key to advance through each data field.

The **Start Options** choice appears only on the full Configuration/Setup Utility main menu.

Advanced setup

Select **Advanced Setup** to change values for advanced hardware features, such as cache control, PCI configuration, and processor serial number access.

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

Use the Left Arrow (N) or Right Arrow (N) key to scroll through each data field after you select one of the setup options.

The **Advanced Setup** choice appears only on the full Configuration/Setup Utility main menu.

Processor serial number access

Select this choice to enable or disable the processor serial-number security feature. This feature has a variety of uses. Review the information that comes with the processor to determine the best use for your organization. In addition, you can check the following Web site for details on the processor serial number access feature:

`http://www.intel.com`

The default value is **Disabled**. To change this value, select **Processor Serial Number Access** from the Advanced Setup menu; then, use the Up Arrow (N) or Down Arrow (N) key to highlight the **Processor Serial Number Access** choice. Use the Left Arrow (N) or Right Arrow (N) key to select **Enabled**. Enabling the processor serial number access feature changes the server configuration. Therefore, after you enable this feature, save the new configuration information in the Configuration/Setup Utility program. Start the Configuration/Setup Utility program and select **Save Settings**. See “Using the Configuration/Setup Utility” on page 23 for more information. You must shut down and restart the server to implement this change. When you restart the server, the system displays a message indicating that the configuration has changed.

Modify front panel text

Select this choice to modify the text that appears on the server front panel. For an illustration of the front panel, see “Front panel” on page 11.

To delete text, backspace to the left; then, press the Del or Delete key.

The default value is **IBM Server 8681**. To change this value, select **Modify Front Panel Text** from the Advanced Setup menu; then, use the Up Arrow (N) or Down Arrow (N) key to highlight the **Modify Front Panel Text** choice. When the **Modify Front Panel Text** menu appears, use the Up Arrow (N) or Down Arrow (N) key to highlight one of the following choices:

- First line of text

  Currently, the *First line of text* value is **IBM Server**. You may change this value to one with a maximum of 16 characters. You may use any valid combination of alphanumeric characters.

- Second line of text

  Currently, the *Second line of text value* is **8681**. You may change this value to one with a maximum of 16 characters. You may use any valid combination of alphanumeric characters.

- Save front panel text changes

  Select this choice if you want to save the changes that you made to the front-panel text.

- Set front panel text to default

  Select this choice if you want to change the front-panel text to its default value of **IBM Server 8681**.

PCI slot/device information

Select this choice to view and identify system resources used by PCI devices. PCI devices automatically communicate with the server configuration information. This usually results in automatic configuration of a PCI device. If a conflict does occur, see "Resolving configuration conflicts" on page 33.

Use the Up Arrow (N) or Down Arrow (N) key to highlight the assignment that you want to change and press Enter. Use the Left Arrow (N) or Right Arrow (N) key to select from the list of available choices. An asterisk (*) indicates that more than one device shares a slot. After making changes, you can select:

- **Save Settings** to save the selected changes.
- **Restore Settings** to delete the changes and restore the previous settings.

Note: You can use the menu selections to save settings or restore settings for the PCI Slot / Device Information choice only. The Configuration / Setup Utility main menu selections save settings, restore settings, or load default settings for all other choices, but not the PCI Slot / Device Information choice.

The server uses a rotational interrupt technique to configure PCI devices. Because of this technique, you can install a variety of PCI devices that currently do not support sharing of PCI interrupts (IRQs). Multiple-function PCI devices use more than one interrupt.

Cache control

Select this choice to enable or disable the processor cache. In addition, you can define the processor cache type as write-back (WB) or write-through (WT). Selecting write-back mode will provide the maximum system performance.

The default values are **Write back** and **Enabled**. For proper server operation, do not change the values in this field.

Note: You cannot enable or disable the cache for individual processors.

Memory settings

Select this choice to manually disable or enable a dual inline memory module (DIMM) slot.

- If you replaced a defective DIMM, you must manually enable the DIMM slot in the Configuration / Setup Utility program. In this case, the system does not

automatically access the Configuration/Setup Utility program to enable the DIMM slot.

- If a memory error is detected during POST or memory configuration, the server can automatically disable the failing DIMM slot and continue operating with reduced memory capacity. If this occurs, you must manually enable the DIMM slot after the problem is corrected.
- You can diagnose to just one DIMM.

To manually enable a DIMM slot:

1. Select **Memory Settings** from the Advanced Setup menu.
2. Use the Up Arrow (N) or Down Arrow (N) key to highlight the DIMM slot that you want to enable.
3. Use the Left Arrow (N) or Right Arrow (N) key to select **Enable**.

For additional information on DIMMs, see "DIMM and memory board" on page 52.

Processor settings

Select this choice to manually enable a processor slot.

- If you replaced a defective processor, you must manually enable the processor slot in the Configuration/Setup Utility program. In this case, the system does not automatically access the Configuration/Setup Utility program to enable the processor slot.
- If a processor error is detected during POST or runtime, the server can automatically disable the failing processors and restart the system to reconfigure without the defective processors. If this occurs, you must manually enable the processor slots after the problem is corrected.

To manually enable a processor slot:

1. Select **Processor Settings** from the Advanced Setup menu.
2. Use the Up Arrow (N) or Down Arrow (N) key to highlight the processor slot that you want to enable.
3. Use the Left Arrow (N) or Right Arrow (N) key to select **Enable**.

For additional information on processors, see "Processor housing assembly" on page 94.

MPS version control

Select this choice to view and identify the multiprocessor specification (MPS) level. The default value is 1.4. Refer to the documentation that comes with the operating system for more information.

Error logs

Select **Error Logs** to choose to view either the POST error log or the system error log.

POST error log

Select **POST Error Log** to view up to three error codes and messages that the system generated during POST. You can clear the error log by selecting **Clear error logs**.

System error log

Select **System Error Log** to view the system error log. The system error log contains all the system, error, and warning messages that the system has generated. You can use the Up Arrow (N) or Down Arrow (N) keys to move between pages in the system error log.

Save settings

After you make configuration changes, review them to be sure that they contain the correct information. If the information is correct, select **Save Settings** to save the selected changes.

Restore settings

After you make configuration changes, review them to be sure that they contain the correct information. If the information is incorrect, or if you do not want to save these changes, select **Restore Settings** to delete the changes and restore the previous settings.

Load default settings

If you make configuration changes and then decide that you want to use default values instead, select b to cancel the changes and restore the factory settings.

Exit setup

To exit from the Configuration / Setup Utility main menu, select **Exit Setup**. If you made changes and did not save them with the **Save Settings** choice, the system prompts you to either save the changes or exit without saving the changes. Follow the instructions on the menu.

Using the System Partition

The IBM ServerGuide program creates a 50 MB logical partition on the default hard disk drive. This partition is known as the System Partition. On some server models, the System Partition provides server-specific utility programs, such as the Service Processor DOS Utility Program. The System Partition Main Menu displays the programs available for the server model. The System Partition is a recent enhancement for server products.

Notes:

1. Not all server models support running utility programs from the System Partition. For a current list of the supported servers, start the *Setup and Installation* CD, and click **Learn about ServerGuide**.
2. You can only install the System Partition from the *Netfinity Setup and Installation* CD.

You may choose to use the System Partition for various utility program functions.

To access the System Partition:

1. Ensure that there is no diskette in the diskette drive. If the diskette drive contains a diskette, remove it.
2. Turn on the server and watch for the IBM logo screen.

3. If the server is turned on already, shut down the operating system and restart the server.
4. After you start the server, several prompts appear on the IBM logo screen. To access the System Partition Main Menu, press Alt+F1 when the prompt `Press Alt+F1 for System Partition Boot` appears. The System Partition Main Menu appears.

For a complete list and description of the utility programs that the server supports through the System Partition, see the System Partition Main Menu.

To exit from the System Partition Main Menu, follow the instructions on the menu.

Configuring options

Before installing a new device or program, read the documentation that comes with it. Reading the instructions helps you to determine the steps that are required for installation and configuration. The following list provides a preview of the actions that might be required to configure the server.

1. Run the Configuration/Setup Utility program and record the current configuration settings. See "The Configuration/Setup Utility program" on page 22.
2. Set jumpers or switches on the server components. See "Jumper settings" on page 88 and "I/O function card jumpers" on page 85.
3. Set jumpers or switches on the device. See the instructions that come with the adapter.
4. Install the adapter in the server. See "Adapters" on page 45.
5. Install software programs. See the installation instructions that come with the software.
6. Resolve configuration conflicts. See "Resolving configuration conflicts".

Resolving configuration conflicts

The resources used by the server consist of interrupt requests, direct memory access (DMA), I/O ports addresses, and memory. This information is useful when a resource configuration conflict occurs.

Conflicts in the configuration occur if:

- A device is installed that requires the same resource as another device. (For example, a conflict occurs when two adapters try to write to the same address space.)
- A device resource is changed (for example, changing jumper settings).
- A device function is changed (for example, assigning *COM1* to two serial ports).
- A software program is installed that requires the same resource as a hardware device.

The steps required to resolve a configuration error are determined by the number and variety of hardware devices and software programs that you install. If a hardware configuration error is detected, a *configuration error* message appears after the server completes POST and before the operating system is loaded. You can bypass the error by pressing **Esc** while the error message is displayed.

The Configuration/Setup Utility program configures the system hardware and PCI IRQs. The program does not consider the requirements of the operating system or the

application programs. See “Resolving software configuration conflicts” on page 34 for additional information.

Resolving hardware configuration conflicts

Use the following information to help resolve hardware configuration conflicts:

1. Run the Configuration/Setup Utility program to view and change resources used by the system functions and the installed options. Record the current settings before making any changes. (See “The Configuration/Setup Utility program” on page 22 for instructions.)
2. Determine which adapter or device is causing the conflict. (See “Symptom-to-FRU index” on page 123 for instructions.)
3. Change adapter jumpers or switches. Some devices use jumpers and switches to define the system resources that the devices need. If the settings are incorrect or set to use a resource that cannot be shared, a conflict occurs and the device will remain deactivated by the configuration program.
4. Change system jumpers or switches. See “Jumper settings” on page 88.
5. Remove the device or adapter. Some configurations are not supported. If you must remove an adapter, see “Adapters” on page 45.

Resolving software configuration conflicts

The memory-address space and IRQs used by some hardware options might conflict with addresses defined for use through application programs or the expanded memory specification (EMS). (EMS is used only with DOS.)

If a conflict exists, one or more of the following conditions might exist:

- The system cannot load the operating system.
- The system does not work.
- An application program does not operate, or it returns an error.
- Screen messages indicate a conflict exists.

To resolve conflicts, you can change the software or hardware configuration.

Note: Start the Configuration/Setup Utility program to view the addresses used by the server functions. (See “The Configuration/Setup Utility program” on page 22 for instructions.)

The best way to resolve memory-address conflicts is to change the addresses used by the application program or the device driver. You can use the Configuration/Setup Utility program to change addresses.

If a device driver is causing a memory-address conflict, refer to the operating-system documentation or the documentation that comes with the device drivers.

Using the SCSISelect Utility program

Note: If the server has a redundant array of independent disks (RAID) adapter installed, use the configuration method that comes with the RAID adapter to view or change SCSI settings for attached devices.

The server comes with a menu-driven configuration utility, called SCSISelect, that allows you to view and change SCSI settings.

You can use the SCSISelect Utility program to:

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

Starting the SCSISelect Utility program

You can access this program when you start the server. The SCSISelect prompt appears after the IBM logo appears. Press Ctrl+A immediately after the SCSISelect prompt appears:

```
<<< Press <CTRL><A> for SCSISelect™ Utility! >>>
```

Use the Up Arrow (N) or Down Arrow (N) key to move the highlight bar to the various menu choices. Press Esc to return to the previous menu. Also, you can press the F5 key to switch between color and monochrome modes (if the monitor permits). To change the settings of the displayed items, follow the directions on the screen. Then, press Enter.

SCSISelect Utility program choices

The following choices appear on the SCSISelect Utility program menu:

- Configure/View Host Adapter Settings
- SCSI Disk Utilities

Configure/view host adapter settings

To view or change the SCSI controller settings, select **Configure/View Host Adapter Settings** and follow the directions on the screen.

Note: On the SCSISelect Utility program menu, the SCSI controller is referred to as the *Host Adapter*.

This menu has the following choices:

- Host Adapter SCSI ID

  The default SCSI ID of the SCSI controller is 7. Do not change this value.

- SCSI Parity Checking

  The default value is *Enabled*. Do not change this value.

- Host Adapter SCSI Termination

  The default value is *Automatic*. Do not change this value.

- Boot Device Configuration

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

- SCSI Device Configuration

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

  Note: For external SCSI tape drives, set **Send Start Unit Command** to Off for that SCSI ID. This ensures proper server operation. When the **Maximum Sync Transfer Rate** is set to 40.0, this value represents the transfer rate for UltraSCSI devices. When the **Maximum Sync Transfer Rate** is set to 20.0, this value represents the transfer rate for Fast SCSI devices.

- Advanced Configuration Options

  Select this choice to view or change the settings for advanced configuration options. These options include enabling support for large hard disk drives and support for drives with UltraSCSI speed.

- BIOS Information

  The BIOS information appears on the **Configure/View Host Adapter Settings** main menu screen. The BIOS information is displayed in a pop-up window, below the selectable menu items. This window contains:

  1. Interrupt (IRQ) Channel
  2. I/O Port Address

  These values vary according to the current BIOS settings for the server; however, you cannot change the settings for the BIOS information.

To reset the SCSI controller defaults, press F6; then, follow the directions on the screen.

SCSI disk utilities

To see the IDs that are assigned to each SCSI device or to format a SCSI device, select **SCSI Disk Utilities** from the SCSISelect Utility program menu.

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

Note: If the following screen appears, you might have pressed Ctrl+A before the selected drives were ready. Restart the server and watch for the SCSISelect messages as each drive spins up. After the drive that you want to view or format spins up, press Ctrl+A.

```
Unexpected SCSI Command Failure

Target SCSI ID:      4

SCSI CDB Sent:       03 00 00 00 0E 00 07 00 02 00

Host Adapter Status: 00h - No host adapter error

Target Status:       02h - Check condition

Sense Key:           02h - Not ready

+Sense Code:    04h

+Sense Code Qualifier: 02h

Press 'Esc' to continue.
```

Performing a low-level disk format

You can use the *Format Disk* feature of the SCSISelect Utility program to perform a low-level format on a hard disk drive.

The amount of processing time that the low-level format program requires will vary according to the hard disk drive capacity.

When to use the low-level format program

Use the Low-Level Format program:

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

Note: For information on backing up all of your files, see the operating-system documentation.

Starting the low-level format program

Attention: The low-level format program erases *all* data and programs.

Note: If the server has a RAID adapter installed, refer to the RAID adapter documentation for instructions for performing a low-level format on a hard disk drive attached to the PCI RAID adapter.

1. If the hard disk is working, make a backup copy of all the files and programs on the hard disk drive
2. Select **Format Disk**; then, follow the instructions on the screen.

   Note: Hard disks normally contain more tracks than their stated capacity (to allow for defective tracks). A message appears on the screen if the defect limit is reached. If this happens, have the system serviced.
3. To install an operating system after the hard disk drive is formatted, follow the instructions in the ServerGuide and IBM Director documentation.

Installing options

The following information supports the xSeries 370 server.

Before you begin

Before you install any optional hardware in the server, thoroughly review the information in this section. Also, review the power supply requirements described in "Hot-swap power supply" on page 69.

- If you upgrade the server by installing a RAID adapter, you must configure the disk arrays after you install hard disk drives, as described in "Internal drive installation" on page 113. Follow the instructions in the RAID adapter documentation after installing the drives. Then, return here to install the remaining options, if applicable. See "Configuring the server" on page 21 for additional details about configuration and for a description of the server utility programs.
- You do not need to turn off the server to install or replace hot-swap power supplies, hot-swap fans, hot-swap drives, or hot-plug PCI adapters.
  - *Hot-swap* means that you can install or remove certain components, such as power supplies, fans, and hard disk drives, without turning off the server, provided that the server contains hardware and an operating system that support the installation or removal of these components. These components are known as *hot-swappable* components, and more commonly referred to as *hot-swap* components.

— *Hot-plug* means that you can install or remove certain components without turning off the server, after you perform an intervening action, provided that the server contains hardware and an operating system that support the installation or removal of these components. For example, before you can install or remove hot-plug PCI adapters, you must enable or disable the hot-plug PCI slots that contain or will contain these adapters. To do this, you must perform the operating-system-defined procedures for enabling or disabling the affected hot-plug PCI slots. Failure to do so might cause the system to lock up. Refer to the operating-system documentation for additional information. *Hot-plug* components are also known as *hot-pluggable* components.

- The orange color on components and labels in the server indicates hot-swap or hot-plug components. This means that you can install or remove the component while the system is running, provided that the system is configured to support this function. For complete details about installing or removing a hot-swap or hot-plug component, see the information provided in this chapter.
- The blue color on components or labels indicates touch points where a component can be gripped, a latch moved, and so on.
- For a list of supported options for the xSeries 370 server, refer to http://www.ibm.com/pc/us/compat/ on the World Wide Web.
- Several types of connectors, such as those designed for adapters, processors, DIMMs, and other components, contain keys (dividers) to ensure that these components can only be installed in the correct position.

Note: The illustrations in this chapter might differ slightly from the hardware.

Before you begin installing options, be sure to do the following:

- Become familiar with the safety and handling requirements specified under "Safety information" on page 181 and "Working inside a server with power on" on page 41. These guidelines will help you work safely while working with the server or options.
- Read the information in "System reliability considerations" on page 11.
- Make sure that you have an adequate number of properly grounded electrical outlets for the server, monitor, and any other options that you intend to install.
- Place the server in a location that is dry. Rain or spilled liquids might damage the server.
- Leave sufficient space around the server to allow the server cooling system to work properly. Refer to the server rack documentation for additional information.
- Back up all important data before you make changes to disk drives.
- Have a small, flat-blade screwdriver available.

Lifting the server

≥18 kg (37 lbs)

≥32 kg (70.5 lbs)

≥55 kg (121.2 lbs)

Caution: Use safe practices when lifting.

Working inside a server with power on

The server is designed to operate safely while powered on with the top cover removed. The server is designed to protect you and the server. Follow these guidelines when you work inside the server while the server is on:

- Avoid loose-fitting clothing on your forearms. (Button the cuffs on long-sleeved shirts before working inside the server; do not wear cuff links while you are working inside the server.)
- Do not allow any clothing (such as neckties or scarves) to hang inside the server.
- Remove all jewelry, such as necklaces, bracelets, and loose-fitting wrist watches.
- Remove items from your shirt pocket (such as pens and pencils) that could fall into the server as you lean over it.
- Avoid dropping any metallic objects, such as paper clips, hair pins, or screws, into the server.
- If the server is on, do not leave the top cover off for more than 30 minutes at a time.

Preparing to install options

Note: Before you begin—

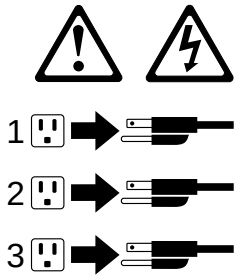
- Read “Safety information” on page 181 and “Working inside a server with power on”.

Attention: You do not need to turn off the server to install or replace hot-swap power supplies, hot-swap fans, hot-swap drives, or hot-plug PCI adapters.

If you are:

- Installing or removing a hot-plug PCI adapter, continue with “Removing the top cover” on page 43; then, go to “Adapters” on page 45.
- Installing or replacing a hot-swap hard disk drive, continue with “Internal drive installation” on page 113.
- Replacing a power supply, continue with “Hot-swap power supply” on page 69.
- Replacing a processor fan, continue with “Removing the front bezel” on page 44; then, go to “Hot-swap fan” on page 63.
- Replacing an I/O fan, continue with “Removing the top cover” on page 43; then, go to “Hot-swap fan” on page 63.
- Installing or removing an option not listed in the preceding list, continue with the following steps.

CAUTION:
The Power Control button on the front of the server does not turn off the electrical current supplied to the server. The server also might have more than one power cord. To remove all electrical current from the server, ensure that all power cords are disconnected from the power source.



1. Remove all media (diskettes or CDs) from the drives; then, turn off the server and all attached options.


DANGER

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

To avoid a shock hazard:

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

To connect:	To disconnect:
1. Turn everything OFF.	1. Turn everything OFF.
2. First, attach all cables to devices.	2. First, remove power cords from outlet.
3. Attach signal cables to connectors.	3. Remove signal cables from connectors.
4. Attach power cords to outlet.	4. Remove all cables from devices.
5. Turn device ON.	

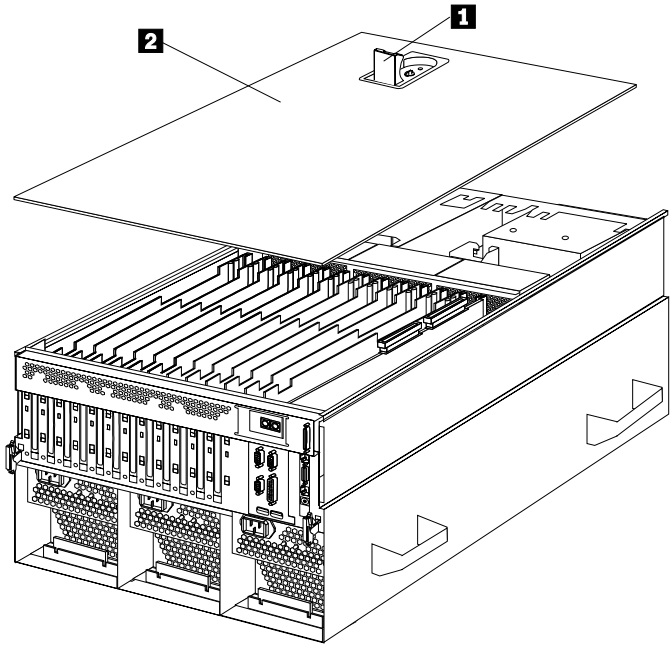
2. If you have a modem or fax machine attached to the server, disconnect the telephone line from the wall outlet.
3. Unplug all power cords (cables) from electrical outlets.
4. Note the location of the remaining cables and cords; then, disconnect them from the back of the server.

Removing the top cover

Refer to the following illustration while you perform the steps in this procedure.

Note: Before you begin—

- If the server is on, do not leave the top cover off for more than 30 minutes at a time.
- Read “Safety information” on page 181.
- Follow any special handling and installation instructions supplied with the replacement battery.



~1~ Cover-release latch

~2~ Top cover

To remove the server top cover:

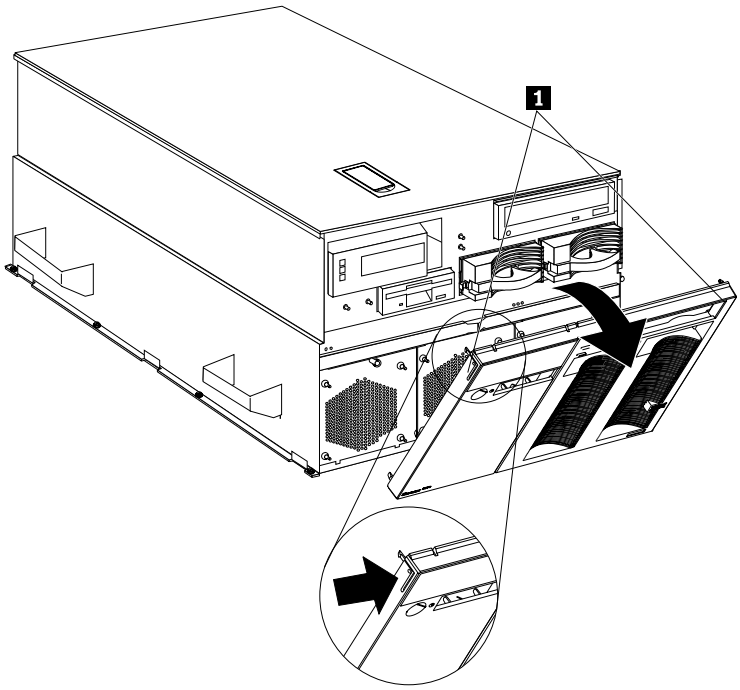
1. Unless you are installing or removing a hot-swap or hot-plug component, run the shutdown procedure for the operating system, turn off the server and all attached devices, and disconnect all external cables and power cords (see “Preparing to install options” on page 41).
2. Lift the plastic cover-release latch ~1~ near the edge of the top cover ~2~.
3. Lift the top cover off the server and set the cover aside.

Removing the front bezel

Refer to the following illustration while you perform the steps in this procedure.

Note: Before you begin—

- Read “Safety information” on page 181.



~1~ Bezel tabs

To remove the front bezel:

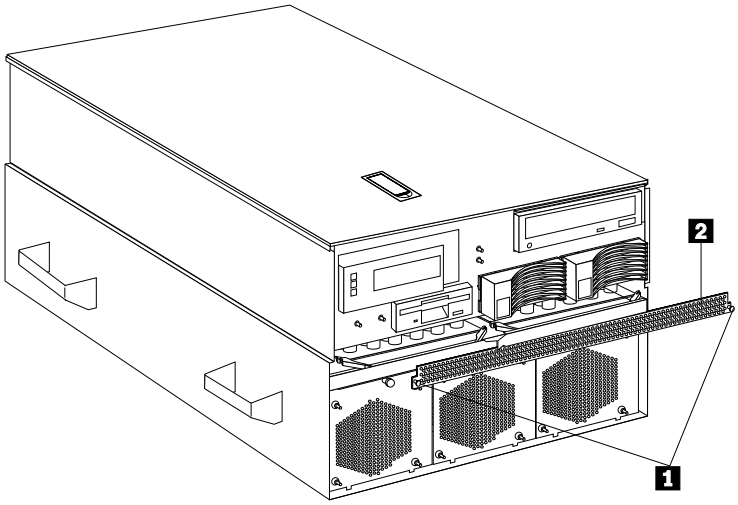
1. Press on the tabs ~1~ at the top edge of the bezel.
2. Pivot the top of the bezel slightly away from the server and remove the bezel from the server.
3. Set the bezel aside.

Removing the memory-access panel

Refer to the following illustration while you perform the steps in this procedure.

Note: Before you begin—

- Read “Safety information” on page 181.



To remove the server memory-access panel:

1. If you are installing a DIMM in an empty connector, go to step 2.. If you are replacing a failed DIMM, verify that you have selected the correct DIMM for replacement. To do this, remove the front bezel (see “Removing the front bezel” on page 44) and check the LEDs at the front of the processor housing assembly, above the processor fans, to see which one is lit.
2. Run the shutdown procedure for the operating system. Turn off the server and peripheral devices, and disconnect all external cables and power cords (see “Preparing to install options” on page 41); then, remove the front bezel (see “Removing the front bezel” on page 44).
3. Pull out the two plastic fasteners ~1~ on the memory-access panel ~2~ to the unlocked position and remove the memory-access panel.

   Note: Do not remove the plastic fasteners from the memory-access panel.
4. To install or remove DIMMs, see “DIMM and memory board” on page 52. Then, return here.

   Attention: To ensure proper EMC containment and cooling for the server, reinstall the memory-access panel before turning on the server.
5. Reinstall the memory-access panel:
   a. Ensure that the memory-access panel is fully seated in the appropriate location.
   b. Press in the two plastic fasteners on the memory-access panel to secure it into place.

Adapters

You can add adapters to extend the capabilities and power of the server.

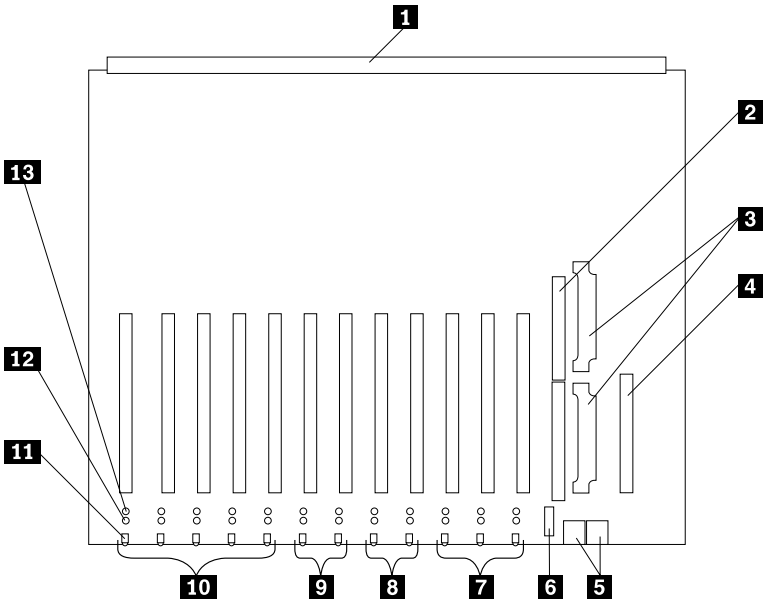
You add the adapters to the expansion connectors, called slots, on the I/O board of the server. All slots are PCI expansion slots. The server supports up to 12 adapters in the PCI slots. There are two additional dedicated slots for the I/O function card and the Advanced System Management PCI adapter.

You can install a new PCI adapter or replace an existing PCI adapter with the same type of adapter without turning the server power off and restarting the system. These slots are called *hot-pluggable* PCI slots. They are also referred to as hot-plug PCI slots.

A PCI adapter comes with built-in identification and configuration specifications (set in memory on the device) that provide installation information to the server during startup. This information is read by the input/output (I/O) bus and interpreted by the server BIOS. The BIOS routines automatically configure the adapter around the resources already in use by other devices.

The server comes with a video controller. This video controller is an integrated component on the I/O function card. The integrated video controller has super video graphics array (SVGA) technology.

The following illustration shows the location of the expansion slots and other components referred to in these steps.



~1~ Midplane connector

~2~ I/O function card slot

~3~ Voltage regulator module (VRM) connectors

~4~ Advanced System Management PCI adapter slot

~5~ USB 1 and USB 2 port connectors

~6~ PCI switch card connector

~7~ Hot-plug, 64-bit, PCI slots 10-12 (bus A, 33 MHz)

~8~ Hot-plug, 64-bit, PCI slots 8-9 (bus B, 66 MHz)

~9~ Hot-plug, 64-bit, PCI slots 6-7 (bus C, 66 MHz)

~10~ Hot-plug, 64-bit, PCI slots 1-5 (bus D, 33 MHz)

~11~ Hot-plug external attention/fail LED for PCI slot (green blink = attention, amber = defective PCI adapter)

~12~ Hot-plug internal attention/fail LED for PCI slot (green blink = attention, amber = defective PCI adapter)

~13~ Hot-plug power LED for PCI slot (green solid, on)

PCI slot LED descriptions

Each PCI slot has two lights associated with it - one Attention / Fail light and one Power On light.

- **Power On Light:** This light is on when the PCI slot is active and has power. Do not add or remove an adapter from the PCI slot when the Power On light is on. When this light is off, the PCI slot is inactive and has no power applied. You can install or remove an adapter when the Power On light is off. Refer to the operating-system documentation to determine if the operating system supports hot-plug PCI adapters.
- **Attention/Fail Lights:** These are bi-color lights. When an Attention / Fail light flashes green, it indicates the PCI Hot-Plug Attention function. The meaning of the Attention light is defined by the operating system. Refer to the operating-system documentation to determine if the operating system supports hot-plug PCI adapters and, if so, what the Attention light indicates. When this light is solid amber, it indicates a failure on the PCI adapter installed in the slot.

Adapter considerations

Before you continue with the adapter-installation procedure:

- Review and follow the instructions that come with the adapter and the operating system in addition to the instructions given in this chapter. If you need to change the switch or jumper settings on the adapter, follow the instructions that come with the adapter documentation.
- Manual assignment of interrupts is never required with operating systems that use the Advanced Programmable Interrupt Controller (APIC) interrupt structure. Although you can manually assign interrupts through the Configuration / Setup utility program, most adapters designed for PCI slots are auto-configuring. If the required resources are available, the BIOS software automatically configures an adapter around the resources already in use by other devices. The default setting is generally the most appropriate. If you choose to manually assign interrupts, be sure that these interrupts do not conflict with existing values. If a conflict does occur, see “Resolving configuration conflicts” on page 33.
- For a list of compatible RAID adapters, and installation requirements, refer to **http://www.ibm.com/pc/us/compat/** on the World Wide Web. If you install a RAID adapter, configure the adapter using the RAID adapter documentation.
- The I / O function card slot can support only the I / O function card. It is not an expansion slot.
- The Advanced System Management PCI adapter slot can support only the Advanced System Management PCI Adapter. It is not an expansion slot.

  Attention: You must have the Advanced System Management PCI Adapter installed for proper operation of the server and to use the system-management functions that the adapter provides. See “Understanding the xSeries 370 server design” on page 12 for more information about the Advanced System Management PCI Adapter.
- Your server has assigned PCI slots 10, 11, and 12 and PCI priority slots. The system BIOS scans the PCI priority slots for startable (bootable) devices before scanning the I / O function card.

The integrated video controller is not removable. If you want to disable this controller and use a video adapter instead, you can install a video adapter in an expansion slot. If you want a monitor to be the startup monitor, install a video adapter in slot 10, 11, or 12. When you install a PCI video adapter in one of these slots, the server BIOS automatically disables the integrated video controller.

Table 1 contains information on the requirements for the PCI adapter slots and PCI buses in the server.

Table 1. PCI adapter information.

Bus	Slots	Speed	PCI slot keying
A	10-12	33 MHz	5.0 V
B	8-9	66 MHz	3.3 V
C	6-7	66 MHz	3.3 V
D	1-5	33 MHz	5.0 V

Notes:

1. All expansion slots are hot-plug, 64-bit, PCI slots.
2. You can install:
   a. A full-length or half-length, 32-bit or 64-bit, 5 V or Universal, hot-plug or non-hot-plug PCI adapter in slots 1-5 or 10-12. 66 MHz PCI adapters plugged into these slots will operate at 33 MHz.
   b. A full-length or half-length, 32-bit or 64-bit, 3.3 V or Universal, hot-plug or non-hot-plug PCI adapter in slots 6-7 and 8-9. A 33 MHz PCI adapter installed in one of these slots limits a 66 MHz PCI adapter installed on the same bus to 33 MHz.
3. To optimize performance, spread the installation of high-speed adapters, such as 66 MHz Ethernet adapters, between the two 66 MHz PCI buses.

Configuring adapters

PCI devices automatically communicate with the server configuration information. This usually results in automatic configuration of a PCI device. From the Configuration/Setup utility program, you can select available resources for the adapter that you are installing. If a conflict does occur, see "Resolving configuration conflicts" on page 33.

Refer to the documentation that comes with the adapter for information about required system resources. Then, make the appropriate jumper or switch settings on the adapter.

Advanced System Management PCI adapter

With a Advanced System Management PCI adapter, in conjunction with IBM Director, you can locally and remotely configure and monitor many features of the server.

Attention: The server must have the Advanced System Management PCI Adapter installed for proper server operation and to use the system-management functions that the adapter provides.

The Advanced System Management PCI Adapter contains the connectors for the 10/100 Mbps Ethernet port, dual serial port, Advanced System Management Interconnect bus, Personal Computer Memory Card International Association (PCMCIA) token-ring, and the I/O function card.

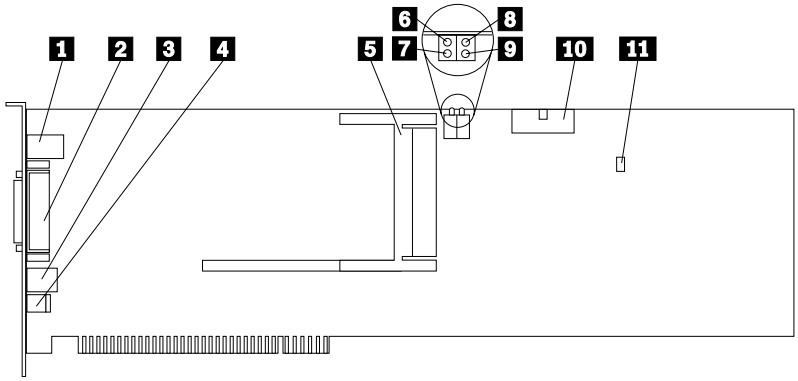
For more information:

- See "Adapters" on page 45 for an overview.

- See “External options” on page 55 for a detailed description of the connectors.
- See “Advanced System Management PCI adapter component locations” for a layout that shows the component locations.
- Refer to the Advanced System Management Information section of this software library for installation, startup, and operating instructions.

Advanced System Management PCI adapter component locations

The following simplified layout of the Advanced System Management PCI Adapter identifies the components.



~1~ 10/100 Mbps Ethernet port connector (J8)

~2~ Dual serial port connector (J11)

~3~ Advanced System Management Interconnect (RS 485) bus connector (J16)

~4~ External power supply connector (12 V DC jack J19, not used)

~5~ PCMIA token ring connector (J2)

~6~ Power on LED (CR2 bottom)

~7~ Processor error LED (CR2 top)

~8~ Ethernet activity LED (CR3 bottom)

~9~ Ethernet link LED (CR3 top)

~10~ I/O function card connector

~11~ Reserved J9

Battery replacement

When replacing the battery you must replace it with a lithium battery of the same type, from the same manufacturer. To avoid possible danger read and follow the safety statement below.

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

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

Caution: When replacing the battery, use only IBM Part Number 33F8354 or an equivalent type battery recommended by the manufacturer. If the 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 100ºC (212ºF)
- Repair or disassemble

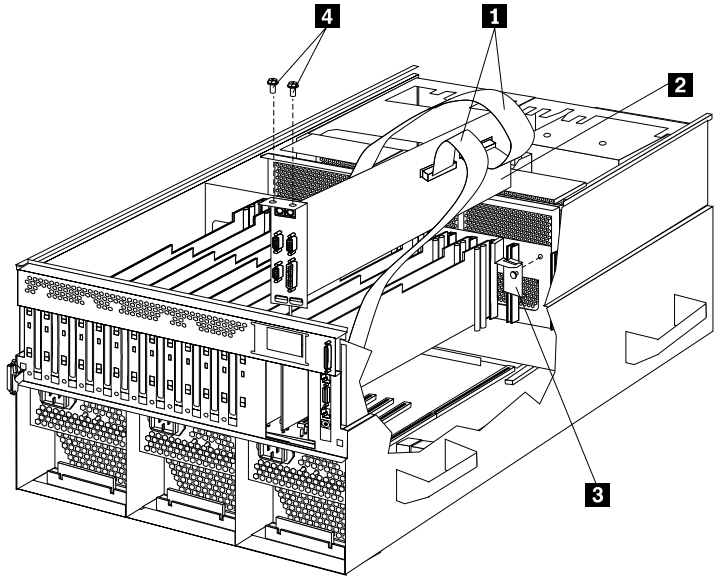
Dispose of the battery as required by local ordinances or regulations.

Note: Before you begin—

- Read "Safety information" on page 181 and "Handling electrostatic discharge-sensitive devices" on page 184.
- Follow any special handling and installation instructions supplied with the replacement battery.

To replace the battery:

1. Turn off the server and peripheral devices, and disconnect all external cables and power cords; then, remove the top cover (see "Removing the top cover" on page 43).
2. Remove the I/O function card from the server:
   a. Refer to the following illustration while you perform the steps in this procedure.



~1~ Cables

~2~ I/O function card

~3~ I/O function card retention bracket

~4~ Screws

b. Disconnect all cables ~1~ from the I/O function card ~2~. Note carefully where each cable is connected before you remove it. See "I/O function card component locations" on page 84 for the connector locations on the I/O function card.

c. Remove the two screws ~4~ located on the metal connector plate inside the server.

d. Remove the I/O function card retention bracket ~3~ on the right side of the card by pulling out the fastener on the bracket.

e. Carefully grasp the I/O function card by its top edge and pull the I/O function card out of the server.

f. Place the I/O function card connector-side up on a flat, static-protective surface.

3. Locate the battery on the I/O function card (see "I/O function card component locations" on page 84).

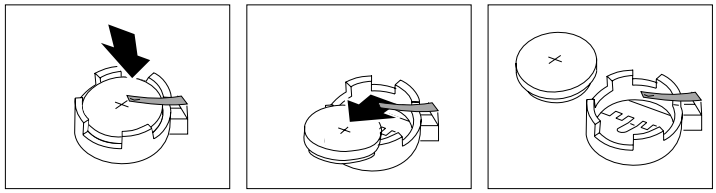
4. Remove the battery:

a. Use one finger to lift the battery clip over the battery.

b. Use one finger to slightly slide the battery toward the rear of the I/O function card. The spring mechanism behind the battery will push it out toward you as you slide it forward.

c. Use your thumb and index finger to pull the battery from under the battery clip.

d. Ensure that the battery clip is touching the base of the battery socket by pressing gently on the clip.



5. Insert the new battery:

a. Tilt the battery so that you can insert it into the front of the socket, under the battery clip.

b. As you slide it under the battery clip, press the battery down into the socket.

6. Install the I/O function card:

a. Refer to the illustration in step a on page 50 while you perform the steps in this procedure.

b. Carefully grasp the I/O function card by its top edge, and insert the tabs on the bottom edge of the metal connector plate in the matching openings on the server back panel.

c. Align the I/O function card with the guide on the opposite end of the adapter and the slot on the I/O board.

d. Press the I/O function card *firmly* into the slot.

Attention: When you install the I/O function card in the server, be sure that it is completely and correctly seated. Incomplete insertion might cause damage to server components.

e. Reinstall the I/O function card retention bracket that you removed in step d. by pressing in the fastener on the bracket.

f. Insert the two screws that you removed in step c..

g. Connect the cables that you disconnected in step b on page 51. See "I/O function card component locations" on page 84 for the connector locations on the I/O function card.

7. Reinstall the top cover and complete the installation (see "Completing the installation" on page 106).

   Note: You will have to wait approximately 20 seconds after you plug the power cord of your server into an electrical outlet for the Power Control button to become active.

8. Start the Configuration/Setup utility program and reset configuration parameters as needed.

   - To reset the system date and time, continue with "Date and time" on page 25.
   - To reset the power-on password, continue with "Using the power-on password menu" on page 27.
   - To reconfigure your server, follow the instructions given in "The Configuration/Setup Utility program" on page 22 (all models).

DIMM and memory board

You can increase the amount of memory in the server by installing additional *dual inline memory modules (DIMMs)*. The server uses 100 MHz, 168-pin, PC100 registered synchronous dynamic random-access memory (SDRAM), industry-standard DIMMs with error checking and correction (ECC). You can add extra DIMMs or replace existing DIMMs.

Notes:

1. You can install an optional memory board that contains an additional 16 DIMM connectors and supports cache-line interleaving. To obtain an optional memory board, contact an IBM reseller or IBM marketing representative.
2. The connector identifiers on both the standard and the optional memory boards are J1-J16. To distinguish the two memory boards, use the labels provided on the processor housing assembly. These labels refer to the connector identifiers as A1-A16 on the standard memory board (A), and B1-B16 on the optional memory board (B).
3. The server comes with a system label on the server cover. The numbers located to the right of the memory boards on the system label do not indicate DIMM connector identifiers. These numbers indicate the DIMMs; for example, **~1~** means the first DIMM that you install, **~9~** means the ninth DIMM that you install, and so on.
4. *Cache-line interleaving* can only occur if two memory boards are installed in the server. This process allows the two memory boards to share a common address range, with one memory board responding to even-numbered cache lines, and the other memory board responding to odd-numbered cache lines. This configuration has the highest performance because it allows the two SDRAM arrays to be used in a balanced fashion, reducing access conflicts.
5. Installing or removing DIMMs changes the server configuration. Therefore, after installing or removing a DIMM, save the new configuration information in the Configuration/Setup utility program. See "Using the Configuration/Setup Utility" on page 23 for more information.
6. If you replaced a defective DIMM, you must manually enable the DIMM slot in the Configuration/Setup utility program. In this case, the system does not automatically access the Configuration/Setup utility program to enable the DIMM slot. See "Memory settings" on page 30 for additional information.
7. See "Memory board component locations" on page 91 for a layout of the memory board.

Table 2 shows the memory installation requirements for the server.

Table 2. Memory installation requirements.

DIMM sizes	128 MB, 256 MB, 512 MB, 1 GB
DIMM population order for a single board configuration - standard memory board	(A) A1, A5, A9, A13, A3, A7, A11, A15, A2, A6, A10, A14, A4, A8, A12, A16
DIMM population order for a dual board configuration - standard memory board (A) and optional memory board (B)	A1/B1, A5/B5, A9/B9, A13/B13, A3/B3, A7/B7, A11/B11, A15/B15, A2/B2, A6/B6, A10/B10, A14/B14, A4/B4, A8/B8, A12/B12, A16/B16

Notes:

1. The 100 MHz DIMMs support the registered mode of operation.
2. Install DIMMs with a maximum height of 4.32 cm (1.7 inches).
3. The server comes with one standard (preinstalled) memory board (A), and one or more DIMMs installed on this memory board. You can install an optional memory board (B). Both the standard memory board (A) and the optional memory board (B) contain 16 DIMM connectors (J1-J16).
4. When you install DIMMs in both the standard memory board (A) and the optional memory board (B), you must install them in matching pairs with the same part number, in the same slot on each memory board; for example, J1/J1, J5/J5, J9/J9, and so on.

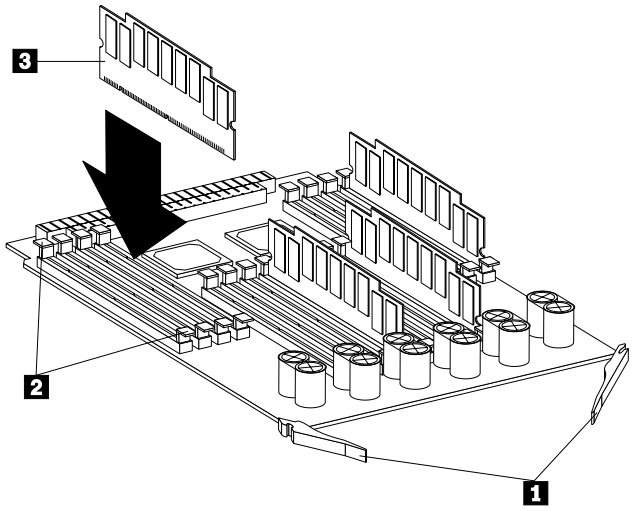
Table 3 shows the available memory configurations.

Table 3. Memory expansion.

DIMM size	16 connectors (1 board)	32 connectors (2 boards)
128 MB	2 GB	4 GB
256 MB	4 GB	8 GB
512 MB	8 GB	16 GB
1 GB	16 GB	32 GB

Refer to the following illustration while you perform the steps in this procedure.

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



~1~ Latches

~2~ Retaining clips

~3~ DIMM

Note: Before you begin—

- Read "Safety information" on page 181.
- Read the documentation that comes with the adapter for any special requirements or restrictions.

To install a DIMM:

1. Run the shutdown procedure for the operating system. Turn off the server and peripheral devices; then, remove the front bezel (see "Removing the front bezel" on page 44) and the memory-access panel (see "Removing the memory-access panel" on page 44).
2. If you are not installing an optional memory board, continue with step 3..

   If you are installing an optional memory board, touch the static-protective package containing the memory board to any unpainted metal surface on the server. Then, remove the memory board from the package. Continue with step 4..
3. Remove the memory board from the server:
   a. Pull both latches ~1~ simultaneously so that they fully extend from the memory board.
   b. Grasp the two latches and pull the memory board from the server.
   c. Place the memory board connector-side up on a flat, static-protective surface.
4. Touch the static-protective package containing the DIMM to any unpainted metal surface on the server. Then, remove the DIMM from the package.

   Attention: To avoid breaking the retaining clips or damaging the DIMM connectors, handle the clips gently.
5. Install the DIMM:
   a. Turn the ~3~ so that the keys align correctly with the connector.
   b. Align the keyed ~3~, and press on both sides of the DIMM as you insert it into the connector. Be sure to press the DIMM straight into the connector.

      Note: If a gap exists between the DIMM and the retaining clips, the DIMM has not been properly installed. Open the retaining clips and remove the DIMM; then, reinsert the DIMM.
   c. Make sure that the retaining clips ~2~ are in the closed position.
   d. Repeat these steps for each DIMM that you install.
6. Reinstall the memory board:
   a. Insert the memory board into the guides and gently press the memory board into the connector. When you install the memory board in the server, be sure that it is correctly seated in the connector before you apply force to close the latches.
   b. Push the latches ~1~ until they close and lock in place.

      Attention: To ensure proper EMC containment and cooling for the server, reinstall the memory-access panel before turning on the server.
   c. Reinstall the memory-access panel:
      1) Ensure that the memory-access panel is fully seated in the appropriate location.

2) Press in the two plastic fasteners on the memory-access panel to secure it into place.

d. Reinstall the front bezel (see “Front bezel installation” on page 108).

7. If you have other options to install or remove, do so now; otherwise, continue with “Completing the installation” on page 106.

External options

Note: Before you begin—

1. Read “Safety information” on page 181.
2. Read the documentation that comes with the options.

Connecting external SCSI devices

The server comes with one external SCSI port so that you can connect external SCSI devices.

You can also attach a SCSI storage expansion enclosure to the server.

Cabling requirements

If you plan to install external SCSI devices, you must order additional SCSI cables. These cables must have the proper connectors for the SCSI external connector and the external devices. To select and order the correct cables for use with external devices, contact the IBM reseller or IBM marketing representative.

Refer to the information that comes with the adapter to determine the number of internal and external connectors, channels, and SCSI devices that the adapter supports.

For information about the maximum length of SCSI cable between the terminated ends of the cable, see the following ANSI SCSI Standards:

- X3.131-1986 (SCSI)
- X3.131-1994 (SCSI-2)
- X3T10/1071D
- X3T10/1142D (Ultra-2 SCSI)
- X3.302:1998 (Ultra-2 SCSI)

Adhering to these standards ensures that the server operates properly.

Setting SCSI IDs for external devices

Each SCSI device that is connected to a SCSI controller must have a unique SCSI ID, so that the SCSI controller can identify the devices and ensure that different devices do not attempt to transfer data at the same time. SCSI devices that are connected to different SCSI controllers can have duplicate SCSI IDs. Refer to “SCSI IDs” on page 114 and to the instructions that come with the SCSI devices for more information about setting a SCSI ID.

Installing external devices

To attach an external device:

1. Run the shutdown procedure for the operating system. Turn off the server and all attached devices.

2. Follow the instructions that come with the option to prepare it for installation and to connect it to the server.

Input/output port connectors

The input/output (I/O) port connectors are for attaching external devices, such as printers, keyboards, and displays, to the server. The I/O port connectors on the server include:

- Two serial-port connectors
- One parallel-port connector
- One video-port connector
- One keyboard-port connector
- One auxiliary-device-port connector
- One external Wide Ultra-2 SCSI (LVD) port connector
- Two USB-port connectors
- One 10/100 Mbps Ethernet port connector on the Advanced System Management PCI Adapter
- One dual serial-port connector on the Advanced System Management PCI Adapter
- One Advanced System Management Interconnect port connector

Refer to the illustration in "Input/output connectors and expansion slots" on page 86 for the locations of the connectors.

Serial port

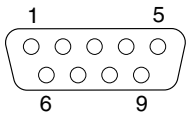
The server comes with two serial ports. (Refer to "Input/output connectors and expansion slots" on page 86 for the locations of the connectors.) These ports are used to communicate with printers, plotters, external modems, scanners, and auxiliary terminals. You can also use these ports to transfer data between computers.

Serial ports transfer data one bit at a time, using direct memory access (DMA). DMA is a method of transferring data between I/O devices and system memory without intervention by the system processor.

Serial ports can transfer data *asynchronously*, which means that they can transmit any number of characters at any time, with no restriction on the duration of the pauses between characters.

The serial ports can transmit and receive data and commands at rates of from 300 bits per second up to 345 600 bits per second. To use a serial port at 345 600 bits per second, you need a shielded serial cable. For information about this cable, contact your IBM marketing representative or your IBM authorized reseller.

Each serial port has a 9-pin, male D-shell connector on the back of the server. The pin-number assignments of this connector conform to the industry standard.



The following table shows the pin-number assignments for the serial-port connectors.

Table 4. Serial port pin-number assignments.

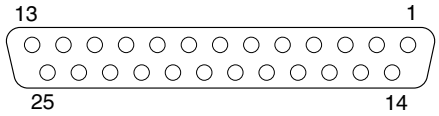
Pin	Signal	Pin	Signal
1	Data carrier detect	6	Data set ready
2	Receive data	7	Request to send
3	Transmit data	8	Clear to send
4	Data terminal ready	9	Ring indicator
5	Signal ground		

When you turn on the server, the POST routine assigns the serial ports to specific communication port addresses.

Some application programs use only certain ports, and some modems are designed for use only at certain communication port addresses. You might need to use the Configuration/Setup utility program to change communication port address assignments to resolve conflicts.

Parallel port

The parallel port usually is used to communicate with printers, and transfers data one byte at a time using DMA. The parallel port has a 25-pin, female D-shell connector on the back of the server. (Refer to "Input/output connectors and expansion slots" on page 86 for the location of the connector.)



The following table shows the pin-number assignments for the parallel-port connector.

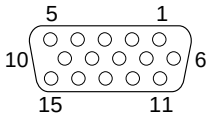
Table 5. Parallel-port pin-number assignments.

Pin	Signal	Pin	Signal
1	STROBE	14	-AUTO FEED XT
2	Data 0	15	-ERROR
3	Data 1	16	-INIT
4	Data 2	17	-SLCT IN
5	Data 3	18	Ground
6	Data 4	19	Ground
7	Data 5	20	Ground
8	Data 6	21	Ground
9	Data 7	22	Ground
10	-ACK	23	Ground
11	BUSY	24	Ground
12	PE (paper end)	25	Ground
13	SLCT (select)		

When you turn on the server, the POST routine assigns the parallel port a specific port address. You can change the parallel-port assignment by using the Configuration/Setup utility program.

Video port

The I/O function card in the server has one SVGA video port. This port is used to attach a video monitor. The video port has a 15-pin analog connector on the back of the server. (Refer to "Input/output connectors and expansion slots" on page 86 for the location of the connector.)



The following table shows the pin-number assignments for the video connector.

Table 6. Video-port pin-number assignments.

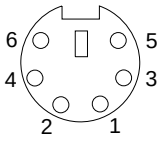
Pin	Signal	Pin	Signal	Pin	Signal
1	Red	6	Ground	11	Not connected
2	Green or monochrome	7	Ground	12	Not connected
3	Blue	8	Ground	13	Horizontal synchronization (Hsync)
4	Not connected	9	Not connected	14	Vertical synchronization (Vsync)
5	Ground	10	Ground	15	Not connected

The integrated video controller has 4 MB of video memory. The integrated video controller supports the following screen resolutions:

- 640 x 480 pels with up to 16,000,000 colors
- 800 x 600 pels with up to 16,000,000 colors
- 1024 x 768 pels with up to 16,000,000 colors
- 1152 x 864 pels with up to 16,000,000 colors
- 1280 x 1024 pels with up to 64,000 colors
- 1600 x 1200 pels with up to 64,000 colors

Keyboard and auxiliary-device ports

The I/O function card has one keyboard port and one auxiliary-device port that supports a mouse or other pointing device. (Refer to "Input/output connectors and expansion slots" on page 86 for the locations of the connectors.)



The following table shows the pin-number assignments for the connectors used by the keyboard and auxiliary-device ports.

Table 7. Keyboard and auxiliary-device port pin-number assignments.

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

Wide Ultra-2 SCSI (LVD) ports

The server has two Wide Ultra-2 SCSI (LVD) bus-master controllers on the I/O function card; one supports internal devices and the other is connected to an external connector for support of external devices. Each controller supports up to 15 SCSI devices. You can use the 68-pin SCSI connectors for these controllers to expand the capabilities of the server by attaching different types of SCSI devices, such as drives or printers.

Table 8 shows the pin-number assignments for the 68-pin SCSI connectors.

Table 8. 68-pin SCSI port pin-number assignments.

Pin	Signal	Pin	Signal
1	+DB 12	35	-DB12
2	+DB 13	36	-DB13
3	+DB 14	37	-DB14
4	+DB 15	38	-DB15
5	+DB P1	39	-DBP1
6	+DB 0	40	-DB0
7	+DB1	41	-DB1
8	+DB 2	42	-DB2
9	+DB3	43	-DB3
10	+DB4	44	-DB4
11	+DB5	45	-DB5
12	+DB6	46	-DB6
13	+DB7	47	-DB7
14	+DBP	48	-DBP
15	Ground	49	Ground
16	Ground	50	-Cable Detect
17	Termpwr	51	Termpwr
18	Termpwr	52	Termpwr
19	Ground	53	Reserved
20	Ground	54	Ground
21	+ATN	55	-ATN
22	Ground	56	Ground
23	+BSY	57	-BSY
24	+ACK	58	-ACK
25	+RST	59	-RST
26	+MSG	60	-MSG
27	+SEL	61	-SEL
28	+C/D	62	-C/D

Table 8. 68-pin SCSI port pin-number assignments.

Pin	Signal	Pin	Signal
29	+REQ	63	-REQ
30	+I/O	64	-I/O
31	+DB8	65	-DB8
32	+DB9	66	-DB9
33	+DB10	67	-DB10
34	+DB11	68	-DB11

Universal Serial Bus ports

The I/O board in the server contains two Universal Serial Bus (USB) ports. Each USB port has an external connector on the rear on the server for attaching devices that previously used serial, parallel, keyboard, mouse, and game ports.

USB is an emerging serial interface standard for telephony and multimedia devices. USB technology uses Plug and Play to determine what device is attached to the connector. Each USB device is accessed by a unique *USB address.* A device called a hub is used to convert the USB port into multiple attachment points. A hub has multiple ports where devices can be attached. USB provides 12 megabits-per-second (Mbps) data transfer rate with a maximum of 63 devices and a maximum signal distance of 5 meters (16 ft.) per data segment.

Note: If more than one USB device is to be attached, the device must be connected to a hub.

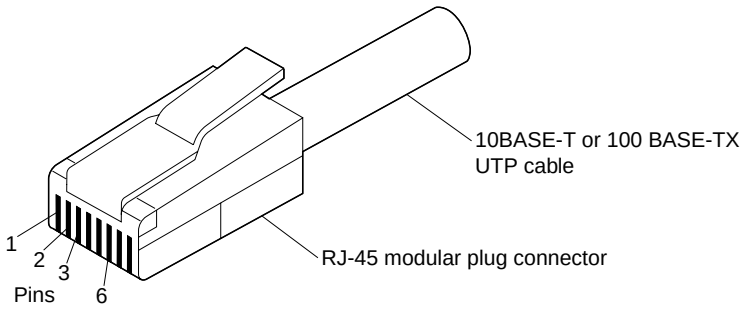
Table 9 shows the pin-number assignments for the USB connectors.

Table 9. USB-port connector pin-number assignments.

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

Advanced System Management PCI Adapter 10/100 Mbps Ethernet port

The Advanced System Management PCI Adapter contains a 10/100 Mbps Ethernet controller. The Ethernet controller has an external RJ-45 connector that is used with Category 3, 4, or 5 unshielded twisted-pair (UTP) cable. The connector enables the Advanced System Management PCI Adapter to attach to an Ethernet network for remote communication.



Notes:

1. The Advanced System Management PCI Adapter 10/100 Mbps Ethernet port cannot be accessed from the network operating system. The connector is dedicated to connecting the Advanced System Management PCI Adapter to an Ethernet network through a service-processor interface, such as IBM Director.
2. The 100BASE-TX Fast Ethernet standard requires that the cabling in the network is Category 5 or higher.

Table 10 shows the pin-number assignments for the RJ-45 connector. These assignments apply to both 10BASE-T and 100BASE-TX devices.

Table 10. 10/100 Mbps Ethernet connector pin-number assignments.

Pin	Signal	Pin	Signal
1	Transmit data+	5	Reserved
2	Transmit data-	6	Receive data -
3	Receive data+	7	Reserved
4	Reserved	8	Reserved

Advanced System Management dual serial port

The Advanced System Management PCI Adapter contains a dual serial port. The port has an external connector that can be used to attach to a Y-cable that is shipped with the server. The serial connectors on the Y-cable and the pin-number assignments are the same as for the system serial ports. This Y-cable can be used to attach to a modem that is dedicated to communication with the Advanced System Management PCI Adapter.

You can obtain a listing of compatible modems and related information by accessing the following address: http://www.ibm.com/pc/us/compat/ on the World Wide Web.

Advanced System Management Interconnect port

The Advanced System Management PCI Adapter contains an Advanced System Management Interconnect port. The port has an external connector that must be attached to an optional Y-cable that provides for chaining other compatible service processors for remote access. To obtain an optional Y-cable, contact an IBM reseller or IBM marketing representative.

The following table shows the pin-number assignments for the connectors used by the Advanced System Management Interconnect bus port.

Table 11. Advanced System Management Interconnect bus connector pin-number assignments.

Pin	Signal
1	Term power
2	+Input
3	-Input
4	+Output
5	-Output
6	Ground

Hot-swap power supplies

The server comes with three hot-swap power supplies. The power supplies can provide up to 550 watts each at 110 V AC input power, and 750 watts each at 220 V AC input power.

Danger: Overloading an electrical circuit breaker is potentially a fire hazard and a shock hazard under certain conditions. To avoid these hazards, adhere to the instructions in the following statements.

1. If you are connecting to a 100-127 V AC power source, connect each power cord to a separate branch circuit.
2. If you are connecting to a 200-240 V AC power source and the branch circuit breaker rating is:
   a. 13 amps or less, connect each power cord to a separate branch circuit.
   b. 14 amps to 19 amps, do not connect more than two power cords to the same branch circuit.
   c. 20 amps or greater, you may connect up to three power cords to the same branch circuit.

In addition to the power supplies, the server comes with three 220 V AC power cords, and three 110 V AC power cords (U.S. only). Be sure to select the appropriate power cord voltage for the server environment. All three power cords must have the same voltage.

If you connect the three power cords to the power supplies, the three power supplies support redundancy and hot-swap capability.

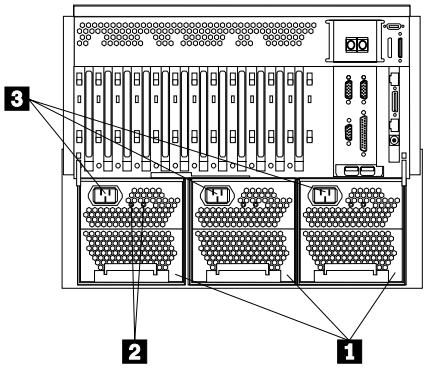
For servers with redundant power, the loss of a single power supply will not affect the server operation. Replace a power supply that has failed as soon as convenient to help maintain the redundant power and cooling capability. When a power supply has failed and the Power Good light is on, the DC power LED on the power supply is off. See “Power supply LED errors” on page 128 for more information on the DC power LEDs. See “Hot-swap power supply” on page 69 for complete details on the power supplies.

Attention: To ensure proper server operation, be sure to connect all three 220 V AC power cords or all three 110 V AC power cords to the power supplies.

Notes:

1. The server rack accessory kit also comes with three 220 V AC power cords for connection to the server rack power distribution unit (PDU). Refer to IBM Rack Power Distribution Unit (PDU) Installation Instructions (IBM Rack Power Distribution Unit) for additional information on installing a PDU. See “Installing the server in the rack enclosure” on page 73 for additional information on installing a server rack.
2. Power cords vary by country. For complete details about power cords for use in your country or region, see http://www.ibm.com/pc/support on the World Wide Web.

The following illustration shows the power supplies in the server. The server might differ slightly from this illustration.



~1~ **Power supplies:** See "Hot-swap power supply" on page 69 for information on power supply requirements and for instructions on installing additional power supplies.

~2~ **AC and DC power lights:** These lights provide status information about the power supplies. These adjacent lights are located on the power supplies; the ac power light is located closest to the power supply connector. During normal operation, both the AC and DC power lights are on. For any other combination of lights, see "Power supply LED errors" on page 128.

~3~ **Power supply connectors:** The three system power cords connect here. For additional details on power cords, refer to the information at the beginning of this section.

Hot-swap fan

The server comes with three hot-swap processor fans (labeled and numbered 1, 2, and 3) in the front of the processor housing assembly at the front of the server, and three hot-swap I/O fans (labeled and numbered 4, 5, and 6) behind the hot-swap drive bays. Each fan has an LED; the fan LEDs are amber in color. A fan LED is lit only when the fan needs replacement.

Notes:

1. The illustrations in this section might differ slightly from your hardware.
2. You do not need to turn off the power to the server to replace a fan.
3. Replace a fan that has failed as soon as convenient to maintain the redundant cooling capability.
4. The top cover is in place during normal operation. If the server is on, do not leave the top cover off for more than 30 minutes at a time.

To replace a hot-swap fan:

- To replace a processor fan, continue with "Processor fan" on page 120.
- To replace an I/O fan, continue with "I/O fan" on page 118.

Hot-plug PCI adapter

This section gives the procedure for installing a hot-plug PCI adapter. If you want to remove a hot-plug adapter, reverse the steps. If the operating system supports hot-

plug PCI adapters, you can replace a failing hot-plug PCI adapter with a new adapter of the same type without turning off power to the server.

Notes:

1. You do not need to turn off the server to install or remove a hot-plug PCI adapter.
2. When you install an adapter, be sure that the gold-edge connectors on the adapter match the connectors in the PCI slot.

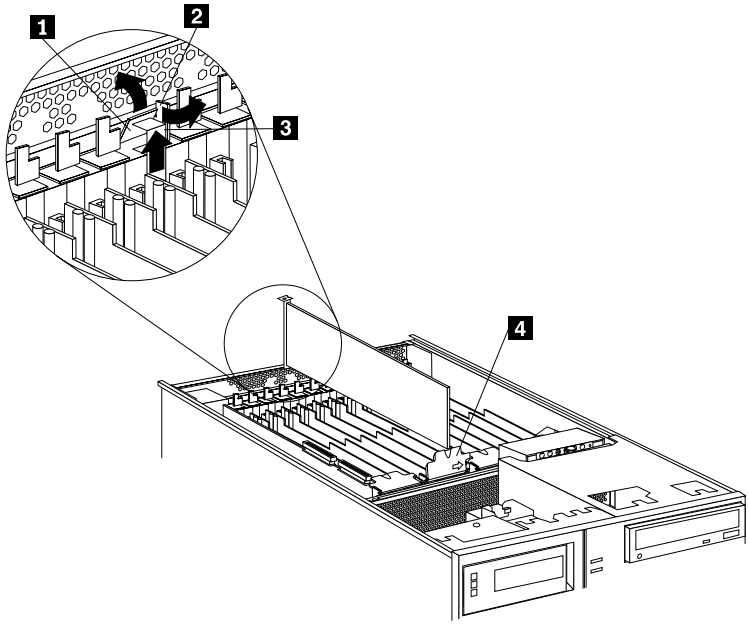
Before you begin:

- Read "Safety information" on page 181. and "Working inside a server with power on" on page 41.
- Read the documentation that comes with the adapter for any special requirements or restrictions.
- Read the documentation that comes with the operating system.
- The orange color on components and labels in the server indicates hot-swap or hot-plug components. This means that you can install or remove the component while the system is running, provided that the system is configured to support this function. For complete details about installing or removing a hot-swap or hot-plug component, see the information provided in this chapter.
- The blue color on components or labels indicates touch points where a component can be gripped, a latch moved, and so on.

Attention: Do not remove a hot-plug adapter before performing the operating-system-defined procedure for disabling the hot-plug PCI slot that contains the adapter. Failure to do so might cause the system to lock up. Refer to the operating system documentation.

Refer to the following illustrations while you perform the steps in this procedure.

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



-1- Tab

~2~ Adapter retention latch

~3~ Expansion-slot cover

~4~ Adapter retention cover

To install a hot-plug PCI adapter:

1. If you have not already done so, remove the top cover (see “Removing the top cover” on page 43).

   Attention: If the server is on, do not leave the top cover off for more than 30 minutes at a time.

2. Determine which expansion slot you will use for the adapter.

   Note: Check the instructions that come with the adapter for any requirements or restrictions.

3. Disable the PCI slot from the operating system. Make sure that the Power On light for the PCI slot is off. See step 12 on page 66 for the Power On light location. (Refer to the documentation that comes with the operating system for information about disabling a hot-plug PCI slot.)

4. Remove the expansion-slot cover:

   a. Rotate the adapter retention latch to the open (unlocked) position.

   b. Lift the tab at the top of the expansion-slot cover to the open (unlocked) position.

   c. Remove the expansion-slot cover from the server. Store it in a safe place for future use.

      Attention: Expansion-slot covers must be installed on all vacant slots. This maintains the electromagnetic-emissions characteristics of the system and ensures proper cooling of system components.

5. If you are installing a full-length adapter, open the adapter retention cover.

   a. Press outward on the adapter retention assembly where indicated by the arrow.

   b. Continue pressing on the assembly as described in step a., and lift the adapter retention cover.

6. Refer to the documentation that comes with the adapter for any cabling instructions. It might be easier for you to route any internal cables before you install the adapter.

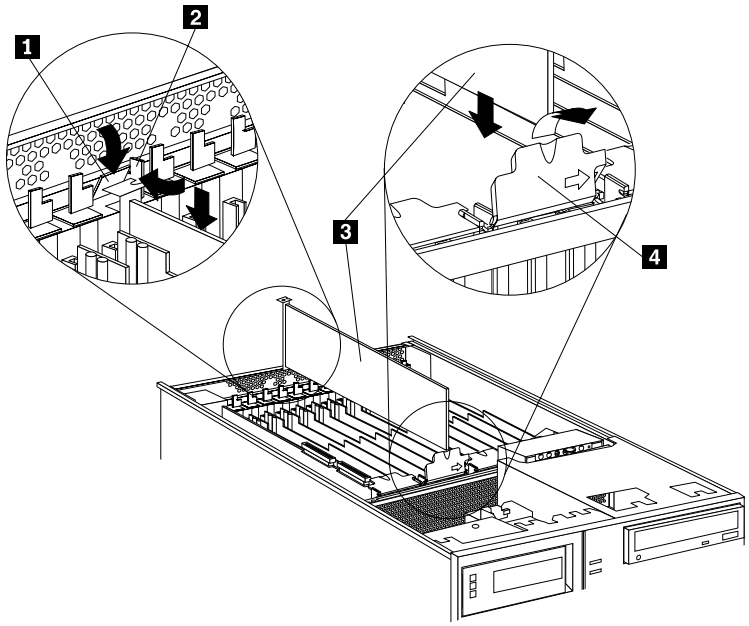
7. Touch the static-protective package containing the adapter to any unpainted metal surface on the server. Then, remove the adapter from the static-protective package.

   Note: Avoid touching the components and gold-edge connectors on the adapter.

8. Place the adapter, component-side up, on a flat, static-protective surface.

9. Set any jumpers or switches as described by the adapter manufacturer.

   Refer to the following illustrations while you perform the following steps.



~1~ Tab

~2~ Adapter retention latch

~3~ Adapter

~4~ Adapter retention cover

10. Install the adapter:
    a. Carefully grasp the adapter ~3~ by its top edge or upper corners, and align it with the expansion slot on the I/O board.

       Attention: When you install an adapter in the server, be sure that it is completely and correctly seated in the connector. Incomplete insertion might cause damage to server components or the adapter.

    b. Press the adapter *firmly* into the expansion slot.

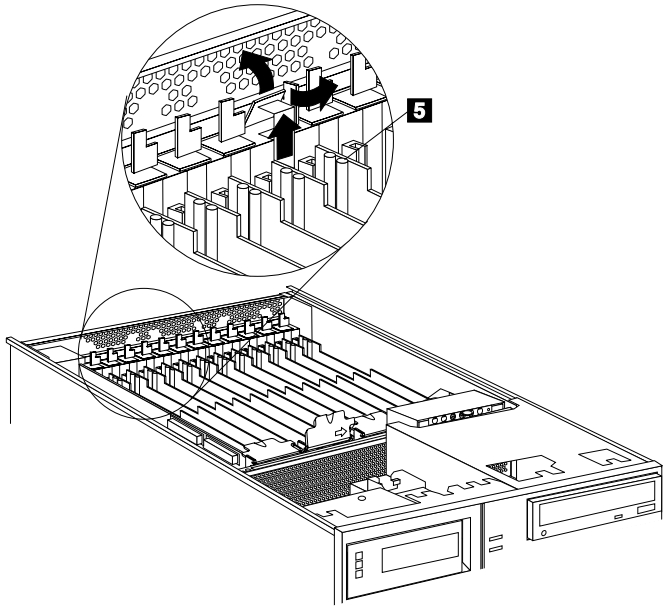
    c. If you are installing a full-length adapter, close the adapter retention cover ~4~.

    d. Lower the tab ~1~ over the adapter. Rotate the adapter retention latch ~2~ until it snaps in place (the locked position).

11. If you have not already done so, connect any cables to the adapter.

12. Enable the PCI slot from the operating system. Make sure that the Power On light ~5~ for the PCI slot is on.

    Attention: If the installed adapter is not supported by the hot-plug capability of the operating system, shut down and restart the server.



13. If you have other options to install or remove, do so now; otherwise, continue with “Completing the installation” on page 106.

Installing a non-hot plug PCI adapter

This section gives the procedures for installing a non-hot-plug adapter. If you want to remove a non-hot-plug adapter, reverse the steps.

Note: Before you begin—

- Read “Safety information” on page 181.
- Read the documentation that comes with the adapter for any special requirements or restrictions.
- The orange color on components and labels in the server indicates hot-swap or hot-plug components. This means that you can install or remove the component while the system is running, provided that the system is configured to support this function. For complete details about installing or removing a hot-swap or hot-plug component, see the information provided in this chapter.
- The blue color on components or labels indicates touch points where a component can be gripped, a latch moved, and so on.

Refer to the illustrations in “Hot-plug PCI adapter” on page 63 while you perform the steps in this procedure.

To install a non-hot-plug PCI adapter:

1. Run the shutdown procedure for the operating system. Turn off the server and peripheral devices; and disconnect all external cables and power cords (see “Preparing to install options” on page 41); then, remove the top cover (see “Removing the top cover” on page 43).
2. Determine which expansion slot you will use for the adapter.

Note: Check the instructions that come with the adapter for any requirements or restrictions.

3. Perform step 4 on page 65 through step 11 on page 66, and step 13 on page 67.

Verifying compatibility between network adapters and device drivers

The server supports several types of network adapters. If you are having trouble with the installation or operation of a network adapter or network operating system, ensure that the network-adapter device driver supports multiple processors. Refer to the network-adapter documentation for additional information about adapter compatibility requirements.

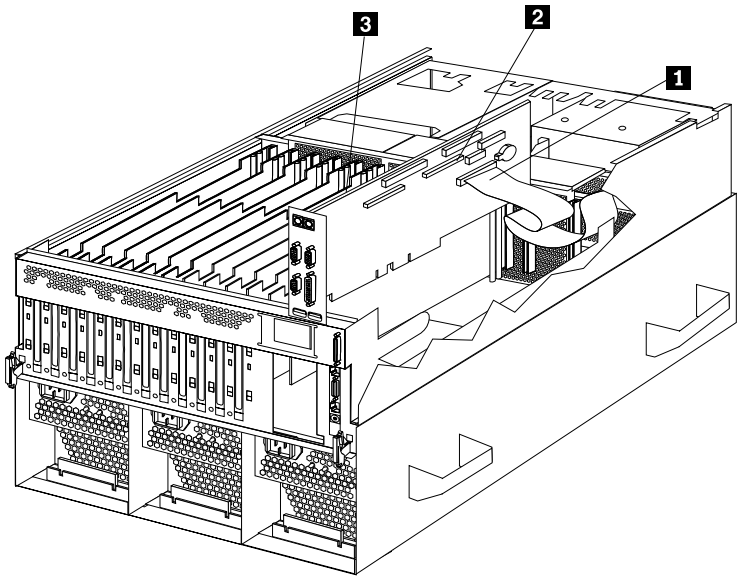
Cabling internal hard disk drives to a ServeRAID adapter (optional)

You can install an optional ServeRAID adapter in the server to enable you to configure the internal hot-swap hard disk drives into disk arrays. To do this, you must disconnect the cable from the integrated SCSI controller on the I/O function card, and connect the cable to a ServeRAID adapter. To cable a ServeRAID adapter to the internal hard disk drives in the server, or to make this adapter a startup device, you must install the ServeRAID adapter in PCI slot 10, 11, or 12. Refer to the ServeRAID adapter option documentation for complete instructions on installing a ServeRAID adapter in the server.

The following procedure describes the cable routing that is necessary when you install the ServeRAID adapter. Refer to the following illustration while you perform the steps in this procedure.

Notes:

1. It might be easier for you to route the cable before you install the adapter.
2. You do not have to remove the I/O function card or the screws on the I/O function card to connect the internal SCSI cable to a ServeRAID adapter.

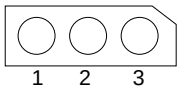


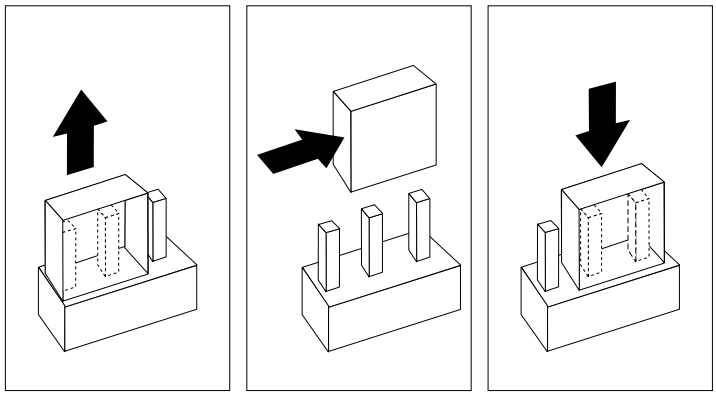
~1~ Standard internal SCSI cable location for connection to internal SCSI port B

~2~ Internal SCSI port B

~3~ New internal SCSI cable location for connection to ServeRAID adapter

1. Disconnect the internal SCSI cable ~1~ from internal SCSI port B ~2~ on the I/O function card.
2. Change the setting of the three-pin, SCSI B detect jumper (identifier J19) on the I/O function card from pins 1 and 2 to pins 2 and 3. This prevents the server from displaying a non-applicable error message, `Cable not present`, or logging this error into the system error log.





Note: For additional information on changing jumper settings, see "Jumper settings" on page 88. For the jumper location, see the illustration of the I/O function card in "I/O function card component locations" on page 84

3. The SCSI cable comes with two standard folds. Unfold the SCSI cable at the fold that is closer to the connector on the end of the cable. If necessary, refer to the illustration at the beginning of this procedure.
4. Install the ServeRAID adapter in PCI slot 10, 11, or 12.
5. Connect the internal SCSI port B end of the SCSI cable to the appropriate channel on the ServeRAID adapter ~3~. Refer to the ServeRAID adapter option documentation for instructions on installing a ServeRAID adapter in the server and connecting the SCSI cable to the ServeRAID adapter.

Hot-swap power supply

Danger: Overloading an electrical circuit breaker is potentially a fire hazard and a shock hazard under certain conditions. To avoid these hazards, adhere to the instructions in the following statements.

1. If you are connecting to a 100-127 V AC power source, connect each power cord to a separate branch circuit.
2. If you are connecting to a 200-240 V AC power source and the branch circuit breaker rating is:

a. 13 amps or less, connect each power cord to a separate branch circuit.

b. 14 amps to 19 amps, do not connect more than two power cords to the same branch circuit.

c. 20 amps or greater, you may connect up to three power cords to the same branch circuit.

The server comes with three power supplies, three 220 V AC power cords, and three 110 V AC power cords (U.S. only). Be sure to select the appropriate power cord voltage for the server environment. All three power cords must have the same voltage.

If you connect the three power cords to the power supplies, the three power supplies support redundancy and hot-swap capability.

For servers with redundant power, the loss of a single power supply will not affect the server operation. Replace a power supply that has failed as soon as convenient to help maintain the redundant power and cooling capability. When the AC power LED is on, the DC power LED is on, and the System Power light on the operator panel is on, the power supply has failed. See "Hot-swap power supplies" on page 62 for the location of the DC power LEDs. See "Power supply LED errors" on page 128 for more information on the DC power LEDs.

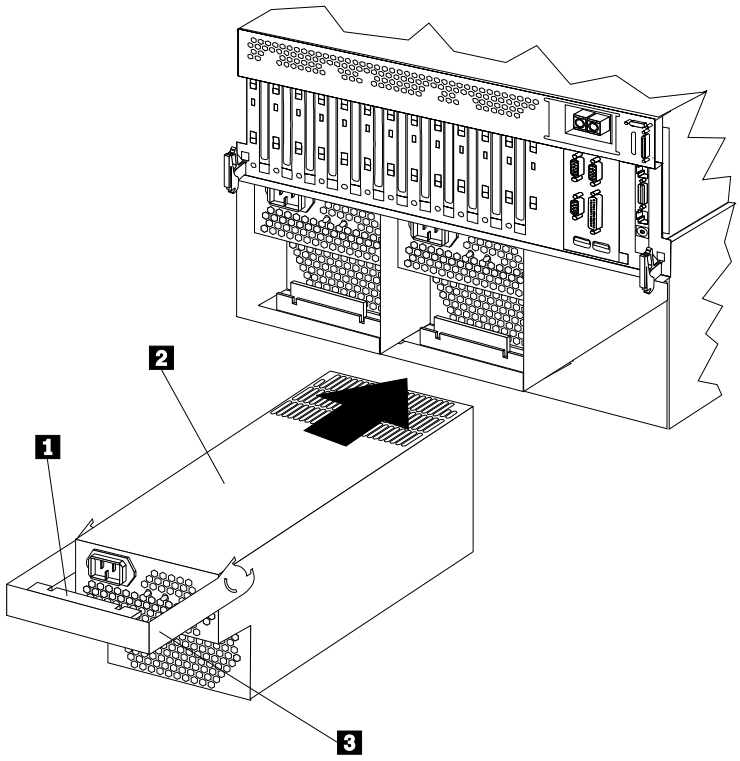
Attention: To ensure proper server operation, be sure to connect all three 220 V AC power cords or all three 110 V AC power cords to the power supplies.

Note: The server rack accessory kit also comes with three 220 V AC power cords for connection to the server rack power distribution unit (PDU). Refer to IBM Rack Power Distribution Unit (PDU) Installation Instructions (IBM Rack Power Distribution Unit) for additional information on installing a PDU. See "Installing the server in the rack enclosure" on page 73 for additional information on installing a server rack.

Refer to the following illustration while performing the steps in this procedure.

Notes:

1. The illustrations in this section might differ slightly from your hardware.
2. You do not need to turn off the power to the server to replace hot-swap power supplies.



~1~ Handle release latch

~2~ Power supply

~3~ Handle

To replace a hot-swap power supply:

1. Remove the power supply:
   a. Unplug the power cord from the power supply and the electrical outlet and, if necessary, remove the power supply cord from the strain-relief bracket.
   b. If a strain-relief bracket is attached to the power supply, remove the screw on the back of the power supply (lower right side), and remove the strain-relief bracket.
   c. Press the release latch ~1~ on the handle ~3~ on the power supply ~2~.
   d. Lift and fully extend the handle on the power supply. Then, slide the power supply out of the chassis. Refer to the power supply option documentation for complete instructions on proper handling and disposal of a defective power supply.
2. Replace the power supply:
   a. Remove the new power supply from the static-protective package.
   b. Touch the static-protective package containing the power supply to any unpainted metal surface on the server. Then, remove the power supply from the static-protective package.
   c. Place the handle ~3~ on the power supply ~2~ in the open (up) position, and slide the power supply into the chassis. If necessary, lower the handle slightly to avoid the I/O housing assembly; then, continue inserting the power supply into the bay until it stops.
   d. Press the handle down to seat the power supply in the bay. This places the power supply in the locked position.

e. Reconnect the power cord to the power supply and the electrical outlet (if removed).

f. Remove the new strain-relief bracket from its package and install it on the power supply cord.

Note: If a new strain-relief bracket did not come with the new power supply, attach the strain-relief bracket that you removed in step b on page 71 on the new power supply.

g. Verify that the AC power light and the DC power light are lit, indicating that the power supply is operating correctly. See "Power supply LED errors" on page 128 for details. See "Hot-swap power supplies" on page 62 for the location of the AC and DC power LEDs.

h. If you have other options to install or remove, do so now; otherwise, continue with "Completing the installation" on page 106.

Rack enclosure

This chapter provides instructions for installing the xSeries 370 server in the rack enclosure and removing the server from the rack enclosure.

Notes:

1. The illustrations in this chapter might differ slightly from your hardware.
2. The top cover is in place during normal operation. If the server is on, do not leave the top cover off for more than 30 minutes at a time.

The xSeries 370 server comes with all the rack installation hardware. Review the preinstallation information in "Before you begin" on page 39; then, continue with "Installing the server in the rack enclosure" on page 73.

Note: Before you begin—

Before you install the server in the rack enclosure, thoroughly review the information in this section.

- Ensure that the rack enclosure can accommodate the xSeries 370 server.
- To install the xSeries 370 in a rack enclosure, the enclosure must have a minimum clearance of 203.2 mm (8 in.) between the rear of the chassis and the surface of the rear door when the door is closed.

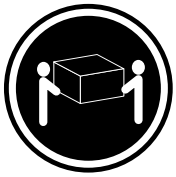
  Note: To accommodate the xSeries 370, a *Rack Extension Option* can be installed on the IBM rack enclosure.
- Review the safety and handling guidelines specified under "Safety information" on page 181. These guidelines will help you work safely while working with the server and options.
- Review the documentation that comes with the rack enclosure for safety or cabling considerations. Ensure that your planned installation is within the rack enclosure guidelines for heat generation, electrical requirements, air flow, and mechanical loading.
- Verify that the rack enclosure can meet the operating parameters, as detailed in "Features and specifications" on page 5.
- Plan the installation of servers in the rack enclosure starting from the bottom. This will ensure rack stability.
- Be aware that some of the installation procedures require four people.
- Have following items available:
  - An assortment of small screwdrivers
  - An 8-inch adjustable wrench or pliers

Installing the server in the rack enclosure

During the installation procedure, you must install parts on the rack enclosure and the server. This process can be divided into two parts:

- Preparing the rack enclosure
- Installing the server

Attention: To ensure rack stability, plan the installation of servers in the rack enclosure starting from the bottom.



≥18 kg (37 lbs)

≥32 kg (70,5 lbs)

≥55 kg (121,2 lbs)

CAUTION:
Use safe practices when lifting.

Preparing the rack enclosure

In this section, you will use the following components:

- IBM installation template
- Four lift handles
- Two slide-rail-latch assemblies (left and right)
- Two latch brackets (used with the slide-rail-latch assemblies)
- Two slide-rail assemblies
- One cable-management-arm assembly, consisting of:
  - One bracket
  - Two rigid arms (upper and lower)
  - One flexible shaft
  - Four hinge pins
  - Five cable-retainer straps
- Various screws and nuts consisting of:
  - Eight screws and eight cage nuts or clip nuts (for attaching the slide-rail-assembly to the rack)
  - Two screws and two cage nuts or clip nuts (for attaching the cable-management-arm-bracket to the rack)
  - Two screws and two cage nuts or clip nuts (for attaching the slide-rail-latch assemblies)
  - 12 screws (for attaching the server-to-slide-rail-assembly)
- Three power cords (cables)

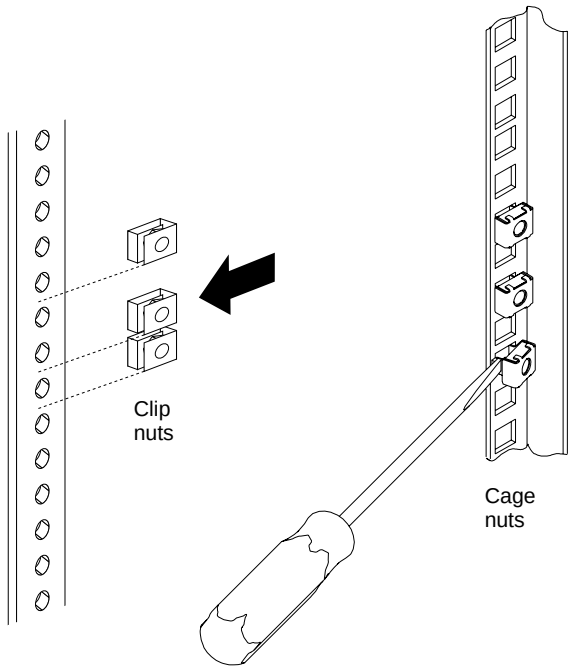
Notes:

1. The two slide-rail-latch assemblies (left and right) come preinstalled on the server.
2. The illustrations in this chapter might differ slightly from the hardware or the installation template.

To attach the mounting hardware to the rack:

1. Refer to the rack enclosure documentation to gain front and rear access.
2. Mark the positions of the slide-rail assemblies, slide-rail-latch assemblies, and the cable-management arm on the rack mounting rails:
   a. Position the installation template on the front mounting rails.
   b. Mark the location of all the holes on the front of the server (for the slide-rail assemblies and slide-rail-latch assemblies).
   c. Move the template to the same level at the rear of the server.
   d. Mark the location of all the holes on the rear of the server (for the slide-rail assemblies and the cable-management-arm attachment bracket).

      Note: Some racks come with cage nuts for the mounting rails, whereas other racks come with clip nuts for the mounting rails. To determine the type of mounting hardware that comes with the rack, refer to the rack documentation. The illustrations in this chapter show how to install cage nuts. If the rack comes with clip nuts, manually slide them onto the mounting rails, as shown in the following illustration.
3. Install eight of the cage nuts or clip nuts in the mounting rails at the locations marked for the slide-rail assemblies. See the following illustration.
4. Install two of the cage nuts or clip nuts in the mounting rails at the location marked for the cable-management-arm bracket.
5. Install two of the cage nuts or clip nuts at the bottom of the front mounting rails at the location marked for the slide-rail-latch assemblies.



6. Attach the slide-rail assemblies to the rack:

   Note: The slide-rail assemblies are interchangeable. They contain a small amount of grease to lubricate the ball bearings.

   a. At the rear of the rack, position the slide-rail assembly on the mounting rail and align it over the cage nuts or clip nuts ~1~.

      - For the left slide-rail assembly, align the holes marked **L** (for left) over the cage nuts or clip nuts.
      - For the right slide-rail assembly, align the holes marked **R** (for right) over the cage nuts or clip nuts.

   b. If required, loosen the nuts ~2~ on the rear section of the assembly and adjust the slide-rail assembly to fit over the front and rear mounting rails. After the adjustment is made, tighten the nuts.

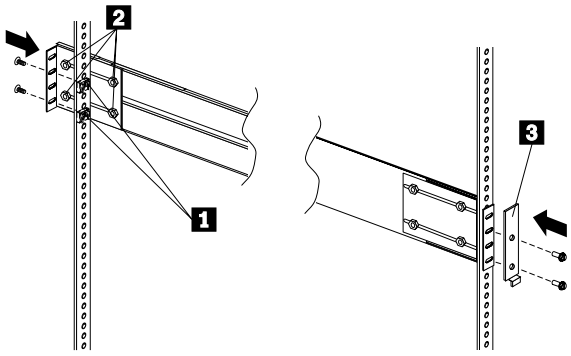
   c. Install two screws through the slide-rail assembly and into the cage nuts or clip nuts. Do not tighten these screws.

   d. Make sure the slide-rail assembly mounting holes are over the cage nuts or clip nuts in the front mounting rail.

   e. With the latch tab pointing down, position the latch bracket ~3~ in front of the slide-rail assembly.

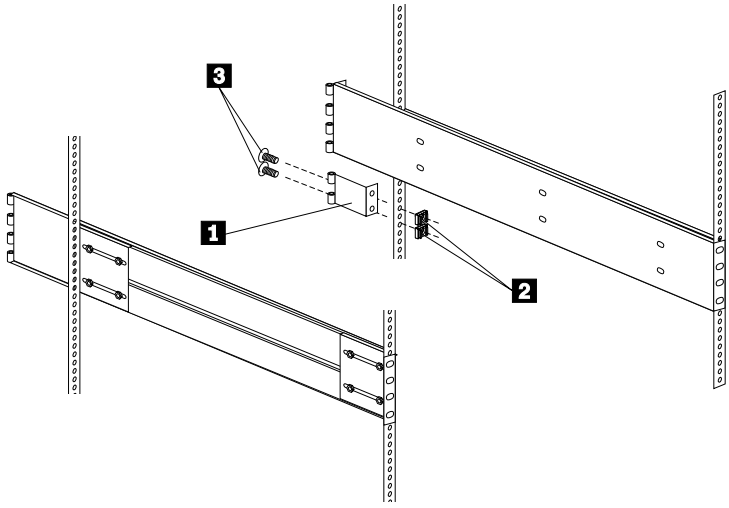
      - The latch bracket for the left slide-rail assembly is labeled **L**.
      - The latch bracket for the right slide-rail assembly is labeled **R**.

7. Install two screws through the latch bracket and the slide-rail assembly and into the cage nuts or clip nuts. Do not tighten the screws.
8. Attach the other slide-rail assembly to the rack as described in steps a. through 7.
9. Press the slide-rail assemblies toward the mounting rails and tighten all screws.

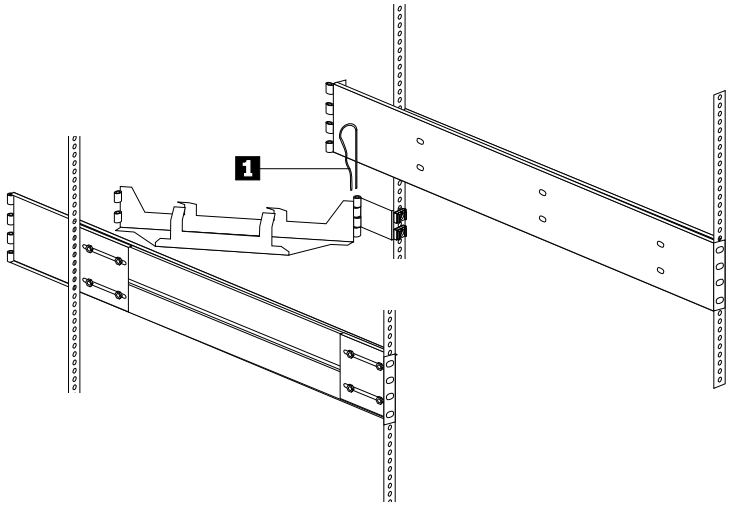


Attach the cable-management arms (upper and lower):

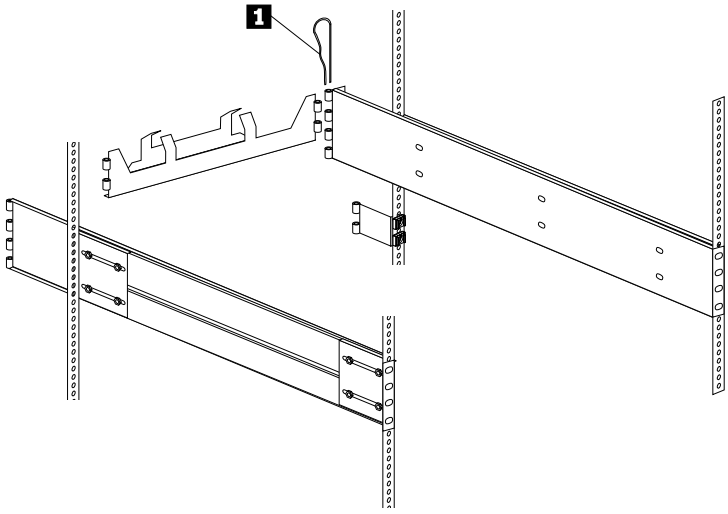
1. Position the cable-management arm bracket ~1~ on the rear mounting rail and over the cage nuts or clip nuts for the bracket.
2. Install two screws through the cable-management-arm bracket and into the cage nuts or clip nuts. Tighten the screws.



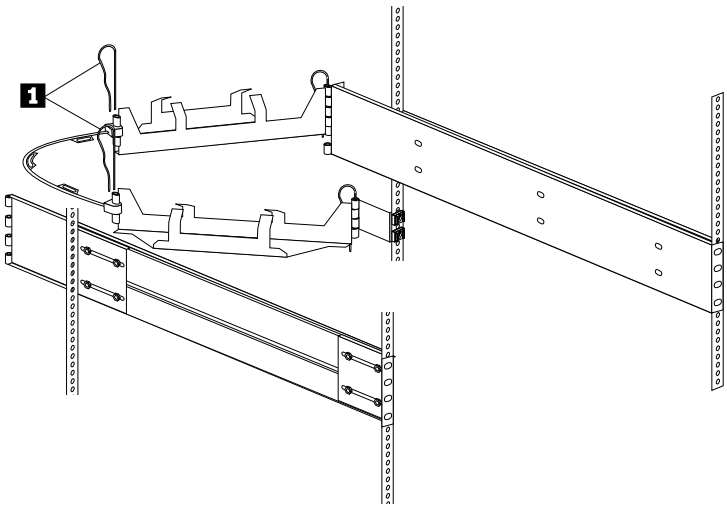
3. Attach the lower rigid cable-management arm to the bracket using one of the hinge pins ~2~.



4. Attach the upper rigid cable-management arm to the slide-rail assembly using one of the hinge pins ~3~.



5. Connect the two rigid cable-management arms with the flexible shaft using one of the hinge pins ~4~.

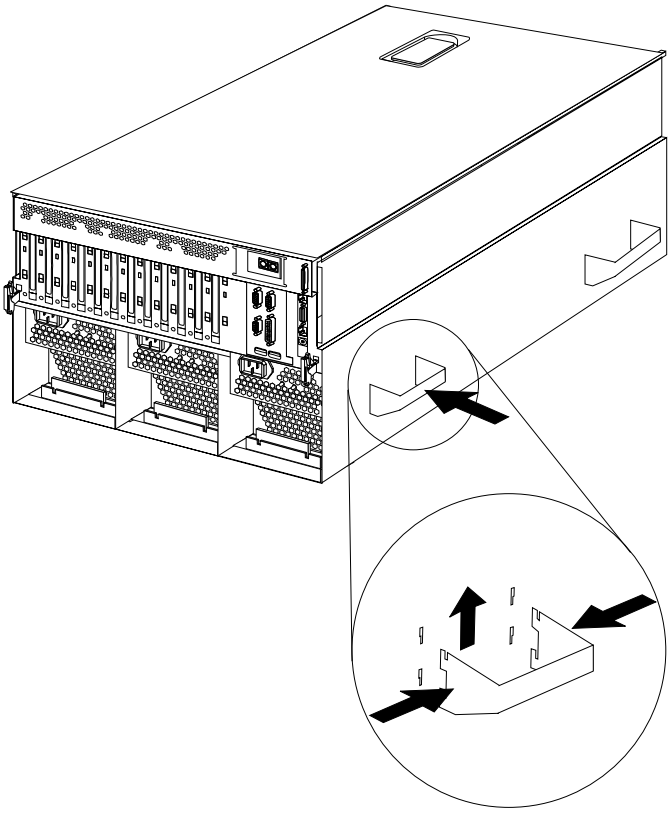


Installing the server

CAUTION:
Four persons are required to install the server in the rack.

To install the server in the rack:

1. If the four lift handles are already not installed on the server, install the handles now.
   a. Press in on the sides of the lift handle near the tabs and insert the handle tabs into the slots on the sides of the server.
   b. Move the handle up in the slots until the hooked part of each tab is inside the server.
   c. Release the pressure on the sides of the handle.



≥18 kg (37 lbs) ≥32 kg (70,5 lbs) ≥55 kg (121,2 lbs)

CAUTION:
Use safe practices when lifting.

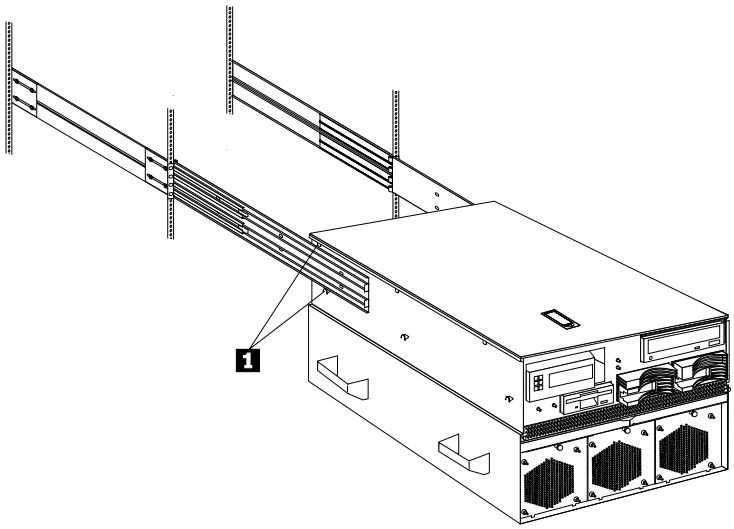
2. Move the slide-rail assemblies to the fully extended and locked position (all the way out of the rack).

   Note: When the slide-rail assemblies are moved all the way out (fully extended), safety latches ~1~ lock the rails in place. To release the safety latches, press them in toward the server.

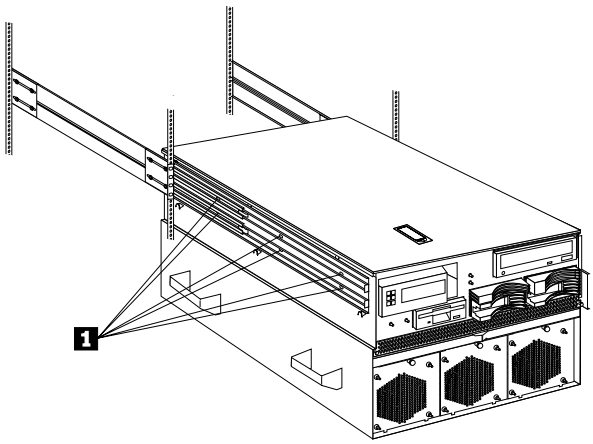
3. Lift the server and move it over the ***left*** slide-rail assembly first. Make sure that the slide-rail assembly is under the tabs ~2~.

   The tabs are farther from the edge on the right side of the server to allow you to maneuver the slide-rail assembly under the right-side tabs ***after*** you have the slide-rail assembly under the left-side tabs.

4. Next, move the server over the ***right*** slide-rail assembly. Make sure that the slide-rail assembly is under the tabs.

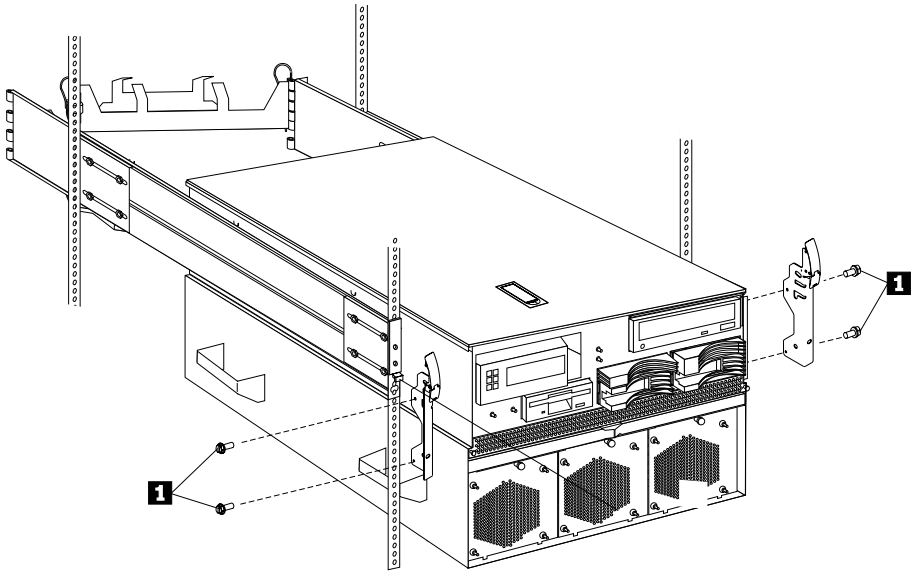


5. Once the server is on both slide-rail assemblies, move it toward the rack.
6. Align the six holes **~1~** on the left slide-rail assembly with the matching holes on the left side of the server.
7. Install six screws through the left slide-rail assembly and into the server side. Tighten the screws.
8. Repeat steps 6. and 7. for the right slide-rail assembly. This secures the server.
9. Remove the lift handles from the server and store them in a safe place.



Note: Although the left and right slide-rail-latch assemblies come preinstalled on the server, they are detachable. If you ever remove them and need to reattach them, you must perform step 10..

10. Attach the left and right slide-rail-latch assemblies **~1~** to the server using two screws for each assembly.



11. Press the safety latches and slide the server about halfway into the rack enclosure.
12. Insert and route the cables on the lower cable-management arm first; then, on the upper cable-management arm.

    Note: The server comes with three 220 V AC power cords for connection to the rack power distribution unit (PDU) in a 200-240 V AC environment. Refer to IBM Rack Power Distribution Unit (PDU) Installation Instructions (IBM Rack Power Distribution Unit) for additional information on installing the PDU.

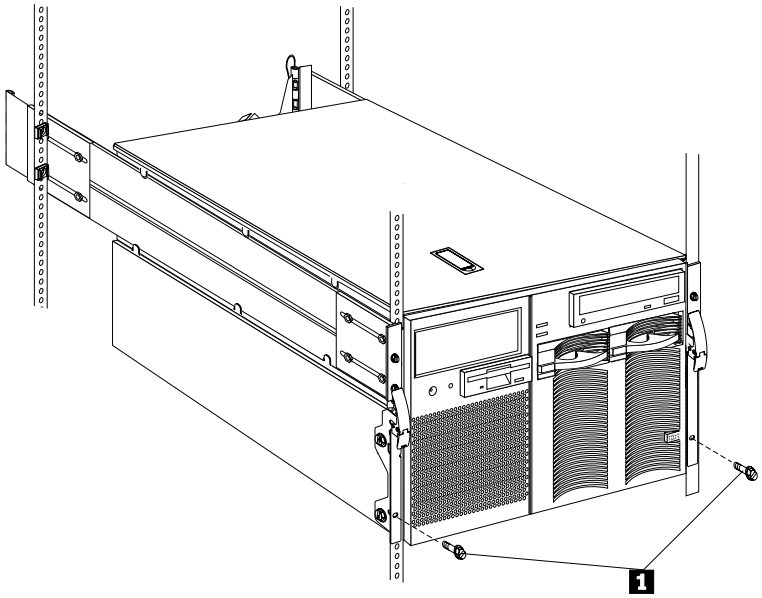
13. Attach the power cord, monitor, keyboard, and mouse cables to the corresponding connectors on the server.

    Attention: When power cords are attached to the rack power distribution unit (PDU), ensure that the cords are not pinched or chafed by any part of the rack enclosure.

14. Use the cable-retainer straps to secure the cables to the two cable-management arms.
15. Secure the server in the rack:
    a. Slide the server into the rack until each slide-rail-latch assembly locks.

       CAUTION:
       If you are located in an area where earthquakes occur, or if you plan to move the server, you *must* perform the following step.

    b. Install a retaining screw **~1~** through the hole at the bottom of each of the slide-rail-latch assemblies and tighten it.



16. To complete the installation, refer to the documentation that comes with the rack enclosure.

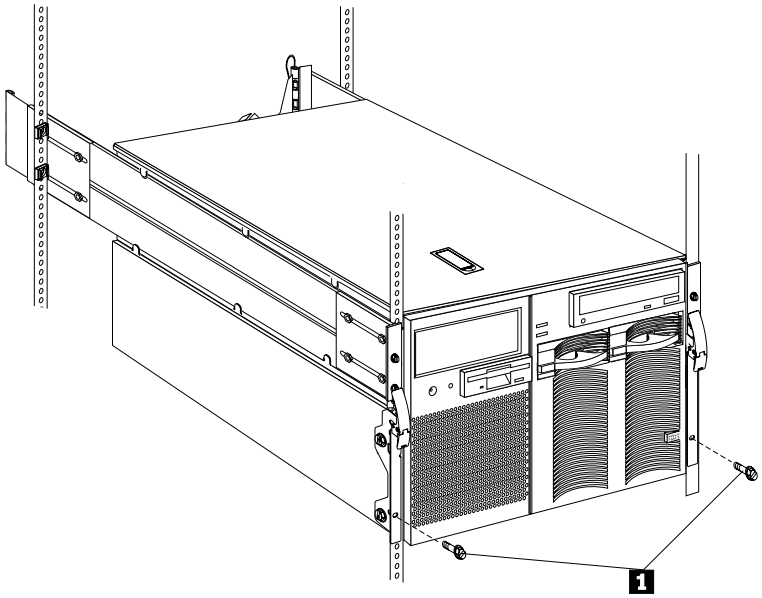
Removing the server from a rack enclosure

Note: **Before you begin—**

- Read “Safety information” on page 181.
- Follow any additional installation and safety instructions that come with the rack enclosure.

To remove the server from the rack enclosure:

1. Refer to the rack enclosure documentation to gain front and rear access.
2. Shut down the server operating system and remove all media (diskettes, CDs, optical discs, or tapes) from the drives.
3. Turn off the server and any attached devices.
4. Disconnect all power cords (cables) from the rack enclosure, the server, and electrical outlets.
5. Disconnect all communication cables from external receptacles.
6. Note the location of the remaining cables; then, disconnect all cables from the back of the server.
7. If the retaining screw ~1~ is installed on the server, remove it.



8. Release the left and right slide-latches ~1~ and move the server all the way out of the rack until both slide-rail assemblies lock.

   Note: When the server is moved all the way out so that the slide-rail assemblies are fully extended, safety latches lock the rails in place. To release the safety latches, press them in toward the server. See 2 on page 78 for the location of the safety latches.

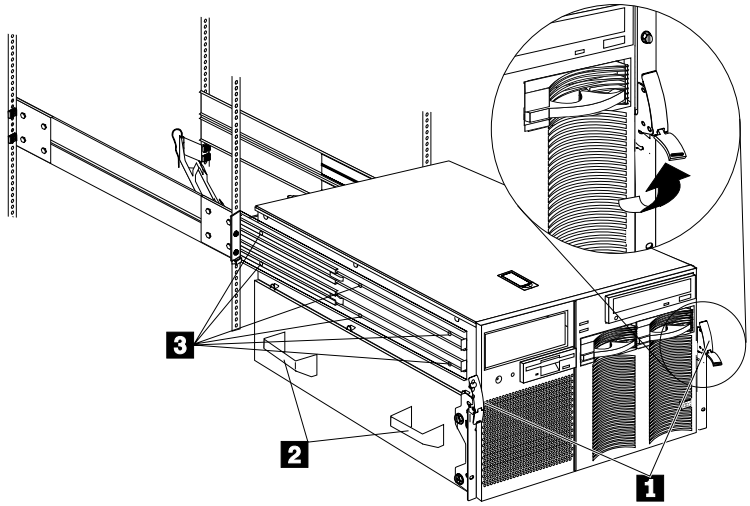
9. Locate the four server lift handles ~2~ that come with the server and attach two lift handles to each side of the server. Make sure that the handles lock into place.

   a. Press in on the sides of the lift handle near the tabs and insert the handle tabs into the slots on the side of the server.

   b. Move the handle up in the slots until the hooked part of each tab is inside the server.

   c. Release the pressure on the sides of the handle.

10. Remove the screws ~3~ that attach the server to each slide-rail assembly.



~1~ Slide-latches

~2~ Lift handles

~3~ Screws

≥18 kg (37 lbs)

≥32 kg (70,5 lbs)

≥55 kg (121,2 lbs)

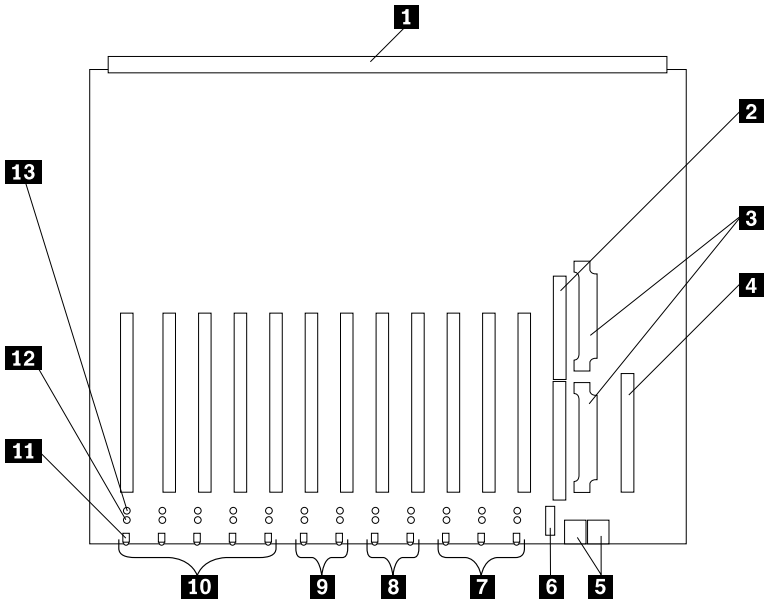
CAUTION:
Use safe practices when lifting.

11. Carefully move the server away from the rack and off the slide-rail assemblies.

Note: Refer to IBM Rack-to-Tower Conversion Kit Installation Instructions for additional information on converting a rack model server to the optional tower configuration.

I/O board component locations

A simplified layout of the I/O board is shown in the following illustration.



~1~ Midplane connector

~2~ I/O function card slot

~3~ Voltage regulator module (VRM) connectors

~4~ Advanced System Management PCI adapter slot

~5~ USB 1 and USB 2 port connectors

~6~ PCI switch card connector

~7~ Hot-plug, 64-bit, PCI slots 10-12 (bus A, 33 MHz)

~8~ Hot-plug, 64-bit, PCI slots 8-9 (bus B, 66 MHz)

~9~ Hot-plug, 64-bit, PCI slots 6-7 (bus C, 66 MHz)

~10~ Hot-plug, 64-bit, PCI slots 1-5 (bus D, 33 MHz)

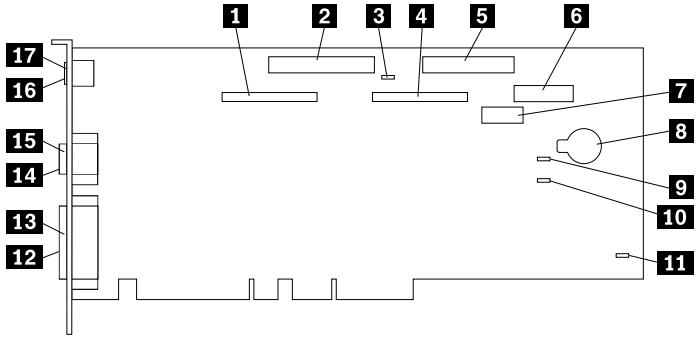
~11~ Hot-plug external attention / fail LED for PCI slot (green blink = attention, amber = defective PCI adapter)

~12~ Hot-plug internal attention / fail LED for PCI slot (green blink = attention, amber = defective PCI adapter)

~13~ Hot-plug power LED for PCI slot (green solid, on)

I/O function card component locations

The following simplified layout of the I/O function card identifies the components.



~1~ External SCSI connector (channel A)

~2~ CD-ROM drive connector

~3~ SCSI B detect jumper (J19)

~4~ Internal SCSI connector (channel B)

~5~ Diskette drive connector

~6~ Front panel connector

~7~ Advanced System Management PCI Adapter connector

~8~ Battery

~9~ Flash page swap jumper (J13)

~10~ Power-on password override jumper (J14)

~11~ Clear CMOS register contents jumper (J15)

~12~ Video port connector (note 1 on page 85)

~13~ Parallel port connector

~14~ Serial port A connector

~15~ Serial port B connector

~16~ Keyboard connector (note 2.)

~17~ Mouse connector

Notes:

1. The video port connector is a 15-pin, D-shell connector behind the parallel port connector.
2. The keyboard connector is behind the mouse connector, and is closer to the circuit side of the board.

I/O function card jumpers

Table 12 describes the jumpers on the I/O function card. The highlighted numbers in the table correspond to the highlighted numbers on the illustration in "I/O function card component locations" on page 84. See "Three-pin jumper blocks" on page 89 for instructions and an illustration on changing the I/O function card jumper settings.

Note: Turn off the server, and disconnect the power cord before moving any jumpers.

Table 12. I/O function card jumpers.

Jumper name	Description
~3~ J19 SCSI B detect jumper	The default position is a jumper installed on pins 1 and 2. Change the position of this jumper after you disconnect the SCSI cable from the internal SCSI port B and connect the cable to a ServeRAID adapter. See "Cabling internal hard disk drives to a ServeRAID adapter (optional)" on page 68 for additional information.
~9~ J13 Flash page swap	The default position is a jumper installed on pins 1 and 2. Changing the position of this jumper will change which of the two pages of flash ROM is used when the system starts.
~10~ J14 Power-on password override	Changing the position of this jumper bypasses the power-on password check. You do not need to move the jumper back to the default position after the password is overridden. Changing the position of this jumper does not affect the administrator password check if an administrator password is set.

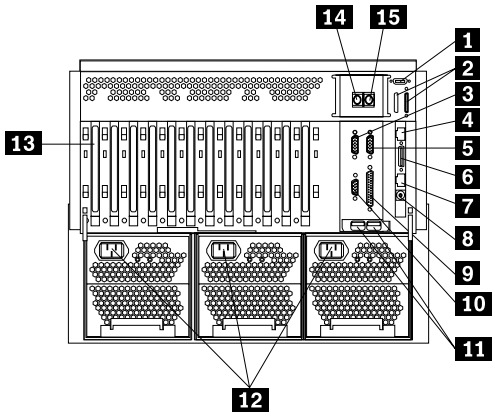
Table 12. I/O function card jumpers.

Jumper name	Description
~11~ J15 Clear CMOS register contents jumper	If you need to *erase* configuration information, you must move this jumper. The default position is a jumper installed on pins 1 and 2. When you change the position of this jumper, you must remove the battery on the I/O function card, and then move the jumper to pins 2 and 3. See "Battery replacement" on page 49. After removing the battery and moving the jumper, wait at least 5 minutes. Changing the position of this jumper erases all configuration and setup information, including the power-on password. The corrective action to reset a forgotten administrator password is to replace the Midplane card. Therefore, you must reconfigure the server after clearing CMOS memory (see "Reconfiguring the server and updating server records" on page 108). If possible, record the server configuration information *before* moving the Clear CMOS register contents jumper. After you clear the CMOS register contents, move the jumper back to its normal position (pins 1 and 2); then, reinstall the battery on the I/O function card.

Input/output connectors and expansion slots

Input/output (I/O) connectors provide ports for transferring information into and out of the server. You can connect a variety of I/O devices to the server, including a monitor, keyboard, mouse, and printer. For more information on the ports and their specific technologies, see "External options" on page 55.

At the rear of the server is an I/O function card that provides access to some I/O connectors. Adapters installed in expansion slots might also provide I/O connectors. The following illustration shows the expansion slots and the I/O connectors (ports) on the I/O function card, chassis, and the Advanced System Management PCI Adapter.



~1~ **External connector knockouts for Advanced System Management PCI Adapter token-ring option:** The chassis has an external connector knockout that can be used when you install the Advanced System Management PCI Adapter token-ring option.

~2~ **External SCSI device connector:** External SCSI devices attach here. The knockout for a second external SCSI connector is not used.

~3~ **Serial port A connector:** Serial signal cables for modems and other serial devices connect here to the 9-pin serial port A connector. See "Devices and I/O ports" on page 24 for port assignment information. If you are using a 25-pin signal cable, you need a 9-pin-to-25-pin adapter cable.

~4~ **Advanced System Management PCI Adapter 10/100 Mbps Ethernet port connector:** This connector attaches the Advanced System Management PCI Adapter to a network hub for remote communication.

Note: The Advanced System Management PCI Adapter 10/100 Mbps Ethernet connector cannot be accessed from the network operating system. The connector is dedicated to connecting the Advanced System Management PCI Adapter to an Ethernet network through a service-processor interface, such as IBM Director.

~5~ **Serial port B connector:** Serial signal cables for modems and other serial devices connect here to the 9-pin serial port B connector. See "Devices and I/O ports" on page 24 for port assignment information. If you are using a 25-pin signal cable, you need a 9-pin-to-25-pin adapter cable.

~6~ **Advanced System Management PCI Adapter dual serial port connector:** This connector can be used to attach to a *Y-cable* that is shipped with the server. This Y-cable can be used to attach to a modem that is dedicated to communication with the Advanced System Management PCI Adapter.

~7~ **Advanced System Management Interconnect port connector:** This connector is used to attach other compatible service processors for remote access.

~8~ **Advanced System Management external power connector:** This connector is not used.

~9~ **Parallel port connector:** A signal cable for a parallel device, such as a printer connects here.

~10~ **Video port connector:** The monitor signal cable connects here.

~11~ **Universal Serial Bus connectors:** You can attach I/O devices to these two Universal Serial Bus (USB) connectors. You need a 4-pin cable to connect devices to USB 1 or 2. A hot-plug keyboard-and-mouse option can be cabled or uncabled from the USB connectors without error or loss of service. Review the operating-system documentation to determine whether the operating system supports USB devices.

Note: If a standard (non-USB) keyboard is attached to the keyboard port, the USB ports are disabled while the power-on self-test (POST) is running, and no USB devices will work during POST.

~12~ **Power supply connectors:** The three system power cords connect here.

~13~ **PCI expansion slots:** The server has twelve 64-bit, PCI expansion slots. All PCI slots support hot-plug PCI adapters.

~14~ **Keyboard port connector:** The keyboard cable connects here.

~15~ **Mouse port connector:** The mouse cable connects here. This port sometimes is called an auxiliary-device or pointing-device port.

Note: For pin assignments and other details about these connectors, see "External options" on page 55.

Jumper settings

Jumpers located on the I/O function card and main processor board help you to customize the way the server operates.

The main processor board and I/O function card contain two-pin jumper blocks and three-pin jumper blocks, respectively. In some cases, groups of jumpers might combine to define a function.

Note: Before you begin—

- Read "Safety information" on page 181.

To change a jumper setting:

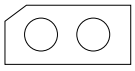
1. Remove the server top cover or front bezel, depending on the location of the jumper (see "Preparing to install options" on page 41.
2. Locate the jumper whose setting you want to change:
   - To change a two-pin jumper block, continue with "Two-pin jumper blocks".
   - To change a three-pin jumper block, continue with "Three-pin jumper blocks" on page 89.

Two-pin jumper blocks

Two-pin jumper blocks are located on the main processor board.

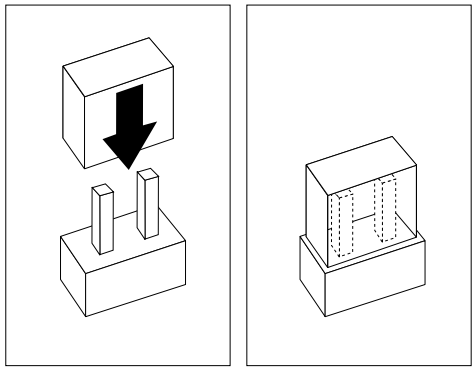
Covering both pins with a jumper defines one function of the jumper block. To change the function of the jumper block, cover one pin only or remove the jumper entirely.

The following illustration identifies pins 1 and 2 on a two-pin jumper block.

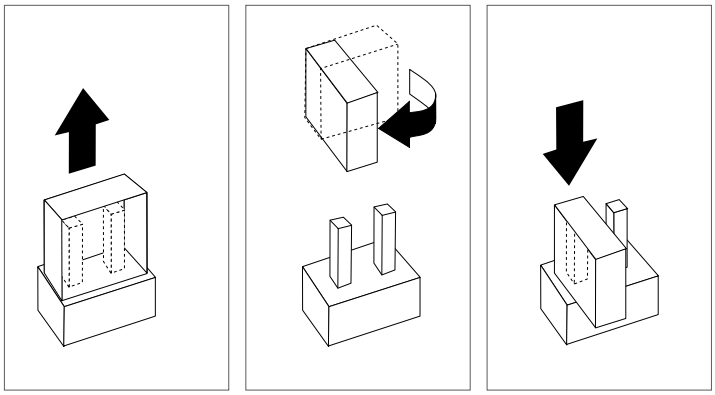


To change the jumper setting on a two-pin jumper block:

1. Lift the jumper straight off the block; then, do one of the following:
   - Align the holes in the bottom of the jumper with the two pins on the pin block, and then slide the jumper carefully onto these pins.



   - Align one of the holes in the bottom of the jumper with one of the pins on the pin block, and then slide the jumper carefully onto that pin only.



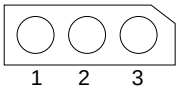
2. Reinstall the server top cover or front access cover and connect the cables (see “Completing the installation” on page 106.

Three-pin jumper blocks

Three-pin jumper blocks are located on the I/O function card.

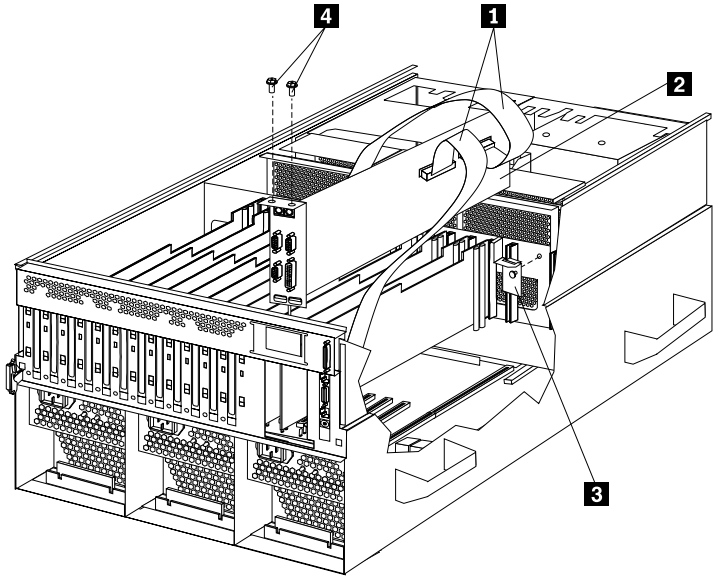
With the three-pin jumper blocks, each jumper covers two of the three pins on a pin block. You can position the jumper to fit over the center pin and either of the other two pins.

The following illustration identifies pins 1, 2, and 3 on the three-pin jumper blocks that are described in this chapter:



To change the jumper setting on a three-pin jumper block:

1. Remove the I/O function card from the server:
   a. Refer to the following illustration while you perform the steps in this procedure.



~1~ Cables

~2~ I/O function card

~3~ I/O function card retention bracket

~4~ Screws

b. Disconnect all cables ~1~ from the I/O function card ~2~. Note carefully where each cable is connected before you remove it. See "I/O function card component locations" on page 84 for the connector locations on the I/O function card.

c. Remove the two screws ~4~ located on the metal connector plate inside the server.

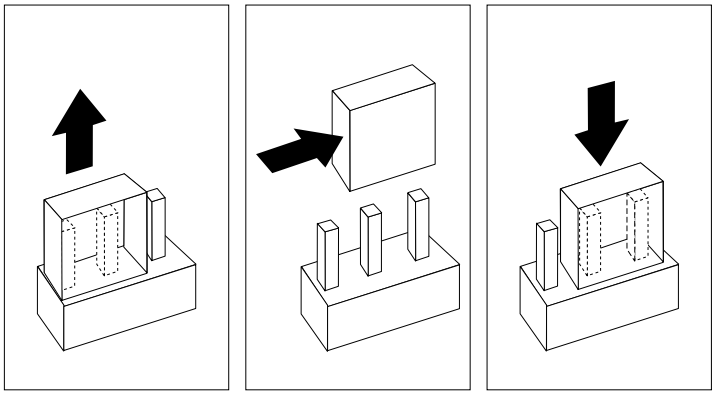
d. Remove the I/O function card retention bracket ~3~ on the right side of the card by pulling out the fastener on the bracket.

e. Carefully grasp the I/O function card by its top edge and pull the I/O function card out of the server.

f. Place the I/O function card connector-side up on a flat, static-protective surface.

2. Lift the jumper straight off the pin block.

3. Align the holes in the bottom of the jumper with the center pin and the pin that was not covered previously.



4. Slide the jumper fully onto these pins.

5. Reinstall the I/O function card:

a. Refer to the illustration in step a on page 89 while you perform the steps in this procedure.

b. Carefully grasp the I/O function card by its top edge, and insert the tabs on the bottom edge of the metal connector plate into the matching openings on the server back panel.

c. Align the I/O function card with the guide on the opposite end of the adapter and the slot on the I/O board.

d. Press the I/O function card *firmly* into the slot.

Attention: When you install the I/O function card in the server, be sure that it is completely and correctly seated. Incomplete insertion might cause damage to server components.

e. Reinstall the I/O function card retention bracket that you removed in step d. by pressing in the fastener on the bracket.

f. Insert the two screws that you removed in step c on page 90.

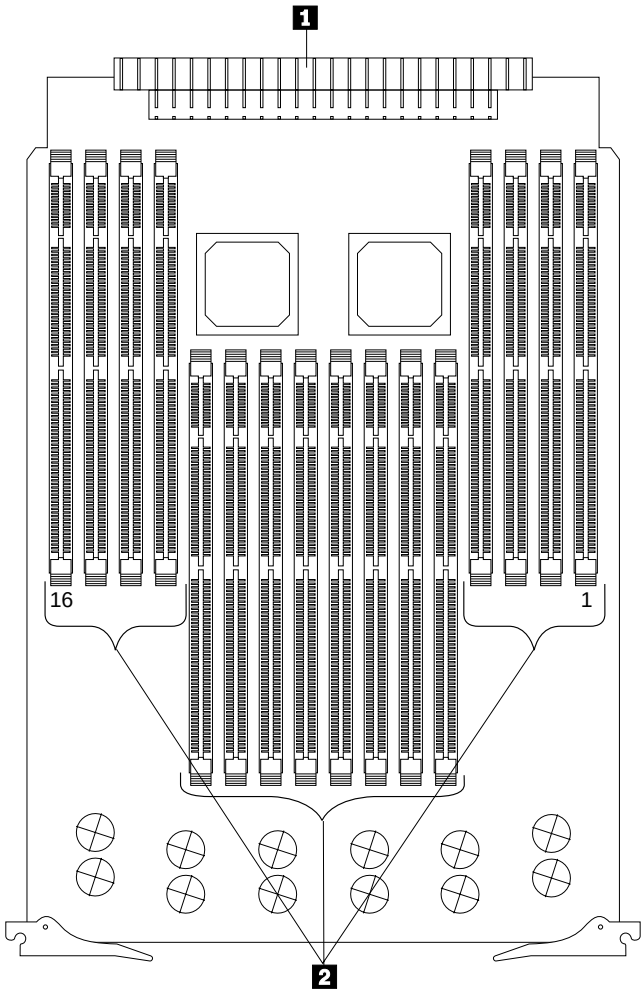
g. Connect the cables that you disconnected in step b on page 90. See “I/O function card component locations” on page 84 for the connector locations on the I/O function card.

6. Reinstall the server top cover or front access cover and connect the cables (see “Completing the installation” on page 106.

Memory board component locations

The following simplified layout of a memory board identifies the components. The server supports two memory boards.

Note: The memory board might look slightly different, depending on the hardware that comes with the server.



-1- Midplane connector

-2- DIMM connectors (J1-J16)

See “DIMM and memory board” on page 52 for instructions on installing a DIMM on a memory board, and installing a memory board in the server.

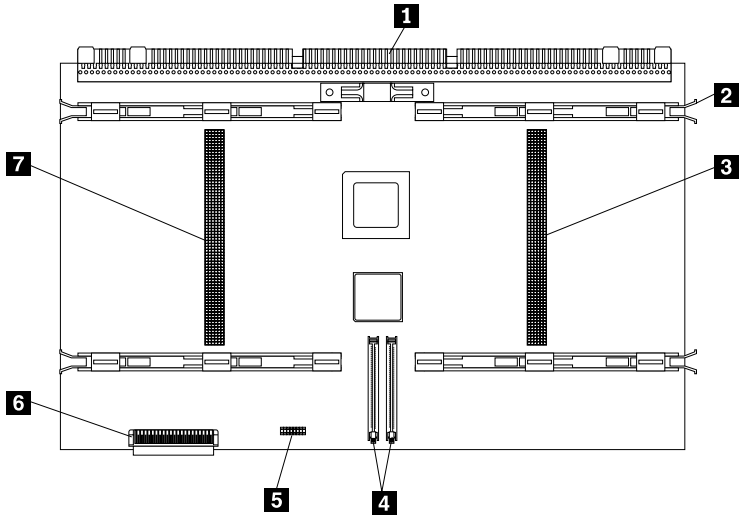
Notes:

1. The 100 MHz DIMMs support the registered mode of operation.

2. Install DIMMs with a maximum height of 4.32 cm (1.7 inches).
3. The server comes with one standard memory board (A), and one or more DIMMs installed on this memory board. You can install an optional memory board (B). Both the standard memory board (A) and the optional memory board (B) contain 16 DIMM connectors (J1-J16).
4. When you install DIMMs in both the standard memory board (A) and the optional memory board (B), you must install them in matching pairs with the same part number, in the same slot on each memory board; for example, J1 / J1, J5 / J5, J9 / J9, and so on.
5. The connector identifiers located on both the standard (A) and the optional (B) memory boards are J1-J16. To distinguish the two memory boards, use the labels provided on the processor housing assembly. These labels refer to the connector identifiers as A1-A16 on the standard memory board, and B1-B16 on the optional memory board.
6. The server comes with a system label on the server cover. The numbers located to the right of the memory boards on the system label do not indicate DIMM connector identifiers. These numbers indicate the DIMMs; for example, 1 means the first DIMM that you install, ~9~ means the ninth DIMM that you install, and so on.

Main processor board component locations

A simplified layout of the main processor board is shown in the following illustration.



~1~ Midplane connector

~2~ Processor-cage release latches (four)

~3~ Processor-daughterboard slot B connector (secondary slot)

~4~ Cache coherency filter card connectors

~5~ Processor / core-frequency selection jumper block

~6~ LED card connector

~7~ Processor-daughterboard slot A connector (primary slot)

Main processor board jumpers

Table 13 describes the jumper on the main processor board. The highlighted number in the table corresponds to the highlighted number on the illustration in"Main processor board component locations" on page 92.

Notes:

1. Turn off the server, and disconnect the power cord before moving any jumpers.
2. Be sure the processor bus-to-core ratio is set correctly. For example, if you have a 700 MHz processor installed and the system bus speed is 100 MHz (the default), be sure that the jumpers are set to a bus-to-core ratio of 7.0 (700/100). See Table 13.
3. Be sure to set the processor / core-frequency selection jumper block for the speed of the processor(s) installed in the server. Mixed speed processors are not supported.

   MHz denotes internal clock speed of the processor only; other factors also affect application performance.
4. If you plan to use the processor serial-number security feature, you must change the setting of the **Processor Serial Number** menu choice in the Advanced Setup menu of the Configuration/Setup Utility program. The default value is **Disabled**; change this value to **Enabled**, as described in "Processor serial number access" on page 29.

Attention: Be sure that the processor bus-to-core ratio jumper is properly set. If the processor bus-to-core ratio does not match the processor speed in the server, the server might operate with a degraded performance or not at all.

Processors listed in Table 13 are not necessarily available or planned for your model. If a processor becomes available for your model, use these switch settings.

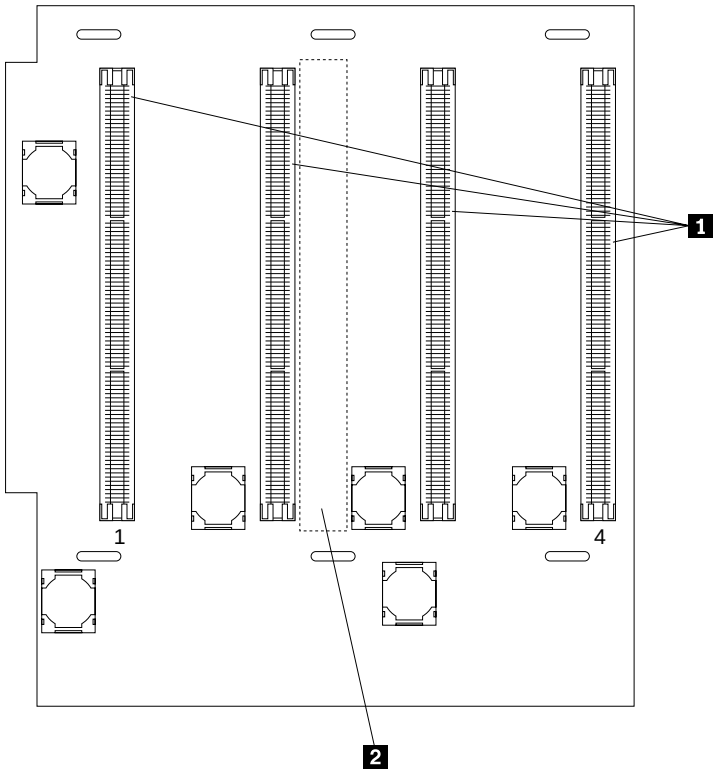
Table 13. Main processor board jumper.

Jumper name	Description
~3~ Processor- core frequency selection	For the core/bus fraction 9.0 (900/100MHz), bus ratio 9:1, the processor speed is fixed internal to the processor. Recommended jumper positions are the same as for bus ratio 7:1 (pins 9/10 and 11/12 are open, pins 13/14 and 15/16 are closed). For the core/bus fraction 7.0 (700/100 MHz), bus ratio 7:1, pins 9/10 and 11/12 are open. Pins 13/14 and 15/16 are closed.
Note: • Open = No jumper is present. • Closed = A jumper is present.	

Processor-daughterboard component locations

A simplified layout of a processor daughterboard is shown in the following illustration. The server supports two processor daughterboards.

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



~1~ Processor or processor terminator card connectors (A1-A4 or B1-B4)

~2~ Processor-controller board connector (on opposite side of processor daughterboard)

Processor housing assembly

The xSeries 370 server comes with at least one processor installed on the standard processor daughterboard. When you install one or more additional processors, the server can operate as a symmetric multiprocessing (SMP) server. With SMP, certain operating systems and application programs can distribute the processing load among the processors. This enhances performance for database and point-of-sale applications, integrated manufacturing solutions, and other applications.

Note: To ensure that the operating system supports multiprocessing operations, load the appropriate multiprocessor option software in the operating system programs.

The server supports a maximum of eight Intel Pentium III Xeon processors (upgradable when available). For a list of supported operating systems, see http://www.ibm.com/pc/us/compat/ on the World Wide Web.

Note: Before you begin—

- Read “Safety information” on page 181.
- Thoroughly review the documentation that comes with the processor, so that you can determine whether you need to update the xSeries 370 server basic input/output system (BIOS). Verify that you have the latest BIOS level for the server by accessing http://www.ibm.com/pc/us/compat/ on the World Wide Web.
- If you plan to use the processor serial-number security feature, you must change the setting of the **Processor Serial Number Access** menu choice in

the Advanced Setup menu of the Configuration/Setup Utility program. The default value is **Disabled**; change this value to **Enabled**, as described in "Processor serial number access" on page 29.

Notes:

1. The illustrations in this section might differ slightly from your hardware.
2. To ensure proper server operation, when you install an additional processor, use processors with the same cache size and core frequency as those of the currently installed processor.
3. If you replace the processors in the server with processors of a different speed, be sure to set the processor core frequency selection jumper block correctly. (See "Main processor board jumpers" on page 93 for more information. For a list of supported processor speeds, see http://www.ibm.com/pc/us/support/ on the World Wide Web.)
4. To maintain signal quality and system reliability, either a processor or a processor terminator card must be installed in each processor connector. A processor must be installed in processor connector A1 on the standard processor daughterboard (A).
5. If you are installing an optional processor daughterboard (B), you must also install the two cache coherency filter cards in the two adjacent, vertical slots between the two processor daughterboards on the main processor board. (See "Processor-daughterboard component locations" on page 93 for the location of the cache coherency filter card A and the cache coherency filter card B connectors.)
6. The server comes with a processor installed in connector A1, on the standard processor daughterboard (A). If you need to install additional processors, install them in the following order:

   - A1, A3, A2, A4

   If you need to install processors on the optional processor daughterboard (B), install them in the following order:

   - B1, B3, B2, B4
7. If you are replacing a failed processor, verify that you have selected the correct processor for replacement. To do this, remove the front bezel (see "Removing the front bezel" on page 44) and check the LEDs on the LED card at the front of the processor housing assembly, above the processor fans, to see which LED is on.
8. If you replaced a defective processor, you must manually enable the processor slot in the Configuration/Setup utility program. In this case, the system does not automatically access the Configuration/Setup utility program to enable the processor slot. See "Processor settings" on page 31 for additional information.

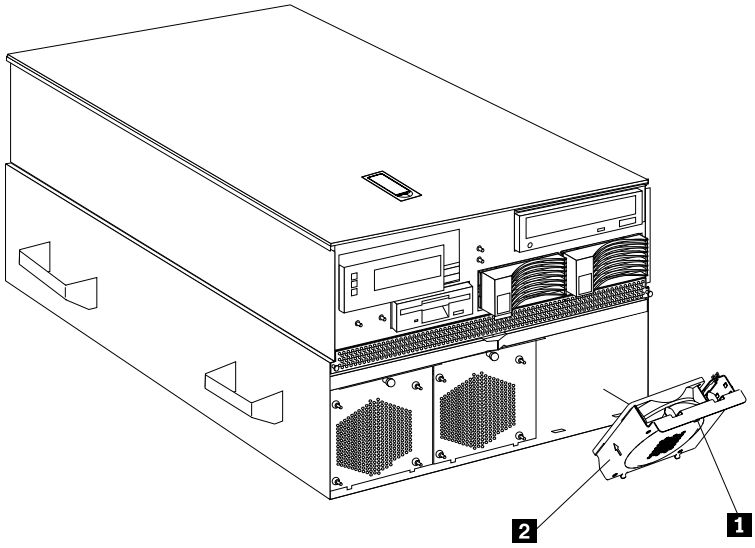
The processors in the server reside on processor daughterboards. The standard processor daughterboard (A) and the optional processor daughterboard (B) reside in separate cages on the main processor board. All of these components reside in the processor housing assembly.

This section contains the following:

Processor housing assembly removal

To remove the processor housing assembly:

1. Run the shutdown procedure for the operating system. Turn off the server and peripheral devices, and disconnect all external cables and power cords (see "Preparing to install options" on page 41); then, remove the front bezel (see "Removing the front bezel" on page 44).
2. Remove the three processor fans:



~1~ Fastener

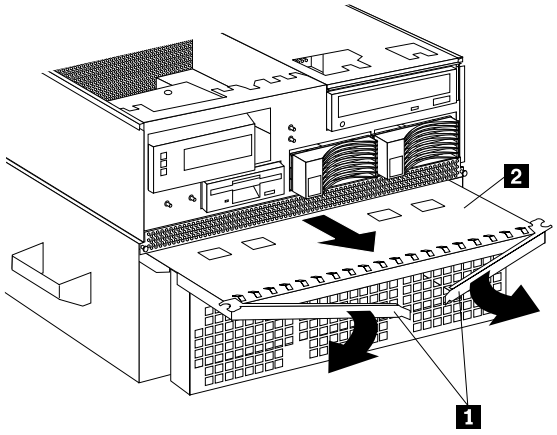
~2~ Fan housing

a. Pull the fastener ~1~ in the top center of the fan housing ~2~. This places the fastener in the unlocked position.

b. Pivot the fan downward and remove it from the server.

c. Repeat steps a. and b. for each additional fan.

Refer to the following illustration while you perform the steps in this section.



~1~ Latches

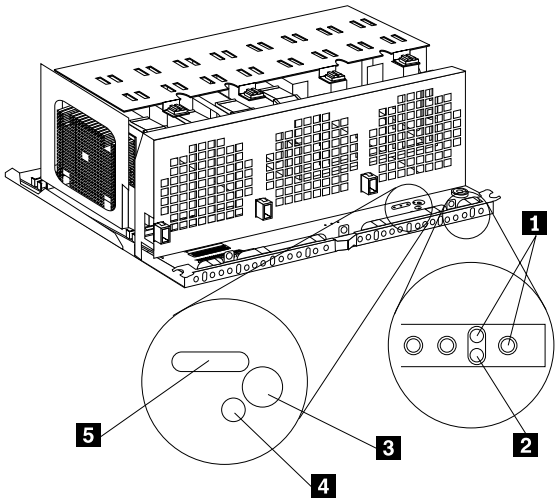
~2~ Processor housing assembly

3. Open the two latches ~1~ at the top of the processor housing assembly ~2~. Fully extend the latches.
4. Pull the processor housing assembly partially out of the server, approximately 203.2 mm (8 in.).

   Attention: To avoid injury, do not place your fingers immediately behind the latches at the top of the processor housing assembly.
5. Close the latches at the top of the processor housing assembly.

   Attention: Do not lift the processor housing assembly by the latches.
6. Grasp the bottom sides of the processor housing assembly. Lift and slide the assembly out of the server until it stops, approximately 228.6 mm (9 in.).

   Note: If the assembly stops before you can slide it out of the server, lift it slightly and continue to remove it from the server.
7. Place the processor housing assembly on a flat, static-protective surface, with processor labels A1-A4 and B1-B4 right side up.



~1~ Processor fail LEDs

~2~ Memory fail LED

~3~ Press to Show Fault button

~4~ Capacitor Testing

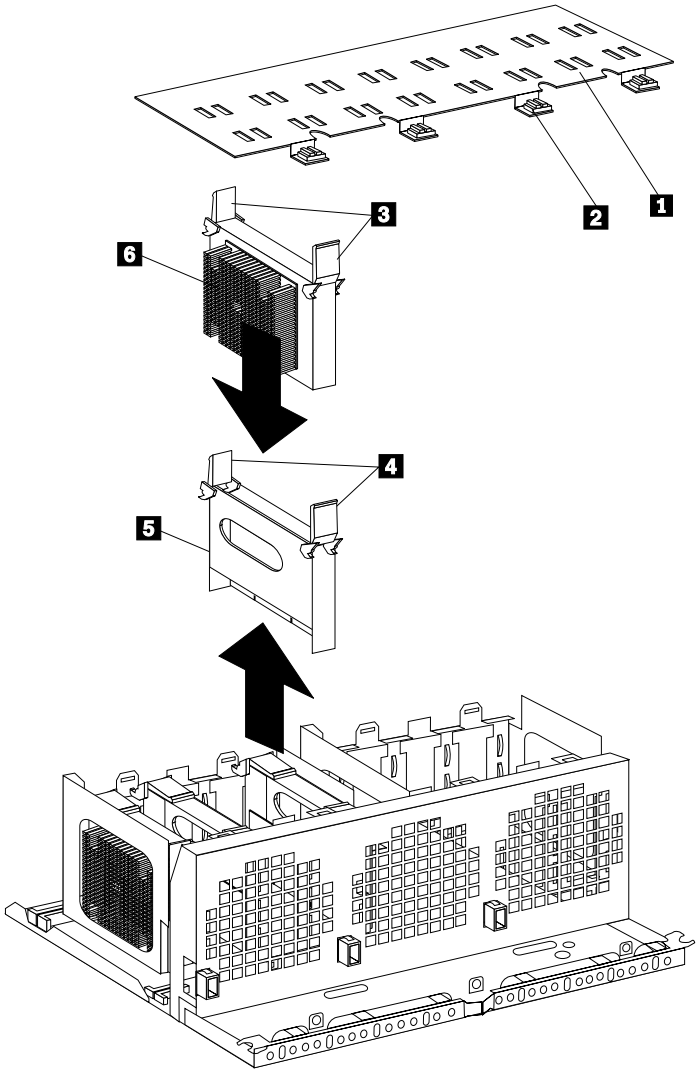
~5~ Processor Fail LED

Processors

To install or replace a processor:

Refer to the following illustrations while you perform the steps in this procedure.

Important: The 700MHz and 900MHz processors require BIOS Revision 6 or greater be resident in the Flash EEPROM **prior** to powering on the server. If BIOS Revision 6 or greater is not present in the Flash EEPROM the server will not function. Flash EEPROM level can be verified by the Configuration/Setup Utility program under System Information. BIOS Revision 6 is equivalent to Flash EEPROM Revision Level MMKT33A. BIOS Revision 6 is downward compatible and can be installed on all server models regardless of processor speed.



~1~ Processor-cage cover

~2~ Fasteners on processor-cage cover

~3~ Processor latches

~4~ Terminator card latches

~5~ Processor terminator card

~6~ Processor and heat sink

1. Turn the four plastic fasteners ~2~ on the processor-cage cover ~1~ until they are in the unlocked position (one quarter-turn). You may use a flat-blade screwdriver or a coin.
2. Remove the processor-cage cover ~1~ and set it aside.
3. Determine the processor connector in which you want to install the new processor. If the connector contains a processor terminator card ~5~:
   a. Pull the processor terminator card latches ~4~ so that they rotate to the unlocked position.
   b. Remove the processor terminator card ~5~ from the processor connector.

c. Store the processor terminator card in a safe place.

Note: After you install the new processor in the server, place the terminator card in the empty static-protective bag.

4. If you are installing processors in the optional processor-daughterboard assembly, first follow the instructions in "Installing an optional processor daughterboard and cache coherency filter cards" on page 102; then, return here to continue.

5. If you are replacing a defective processor that was indicated by a processor failure LED and you need to verify its location, perform the following test.

   a. The eight processor error LEDs are located on the LED card, behind the processor housing assembly latches. Locate the words `Press to show fault` on the processor housing assembly.

   b. Press the indicated button adjacent to the words `Press to show fault`, and note the amber LEDs that indicate the defective processors, if any.

      If no amber LEDs illuminate and the green capacitor test LED adjacent to the word `Testing` does not illuminate, have the system serviced.

   c. Remove the defective processor and install a new one as described in this section.

   Removing the processor:

   a. Pull the processor latches ~3~ so that they rotate to the unlocked position.

      Attention: Before you remove the processor, note the orientation of the original A1 processor.

   b. Remove the processor ~6~ from the processor connector.

   c. Set the processor aside. Refer to the processor option documentation for complete instructions on proper handling and disposal of a defective processor.

6. Install the processor:

   a. Touch the static-protective package containing the new processor to any *unpainted* metal surface on the server; then, remove the processor from the package.

   b. Rotate the processor latches ~3~ to the open position.

      Attention: Before you press the processor into the connector, make sure that the processor has the same orientation as the original A1 processor.

   c. Insert the processor ~6~ into the guides and gently press the processor into the connector. When the processor is correctly inserted, all the processor heat sinks in both processor cages face the same direction, toward connector A1.

   d. Rotate the processor latches ~3~ until they close and lock in place.

7. If you plan to install more than one processor, repeat step 3 on page 98 and step 6. in this section.

8. If you replaced a defective processor, you must manually enable the processor slot in the Configuration/Setup utility program. In this case, the system does not automatically access the Configuration/Setup utility program to enable the processor slot. See "Processor settings" on page 31 for additional information.

9. If you are installing a processor daughterboard, continue with "Processor daughterboard" on page 100.

   If you are not installing a processor daughterboard, continue with the following steps.

10. Reinstall the processor-cage cover by inserting the cover tabs into the slots on the top of the processor cage.

11. Turn the four plastic fasteners on the processor-cage cover until they are in the locked position (one quarter-turn). You may use a flat-blade screwdriver or a coin.

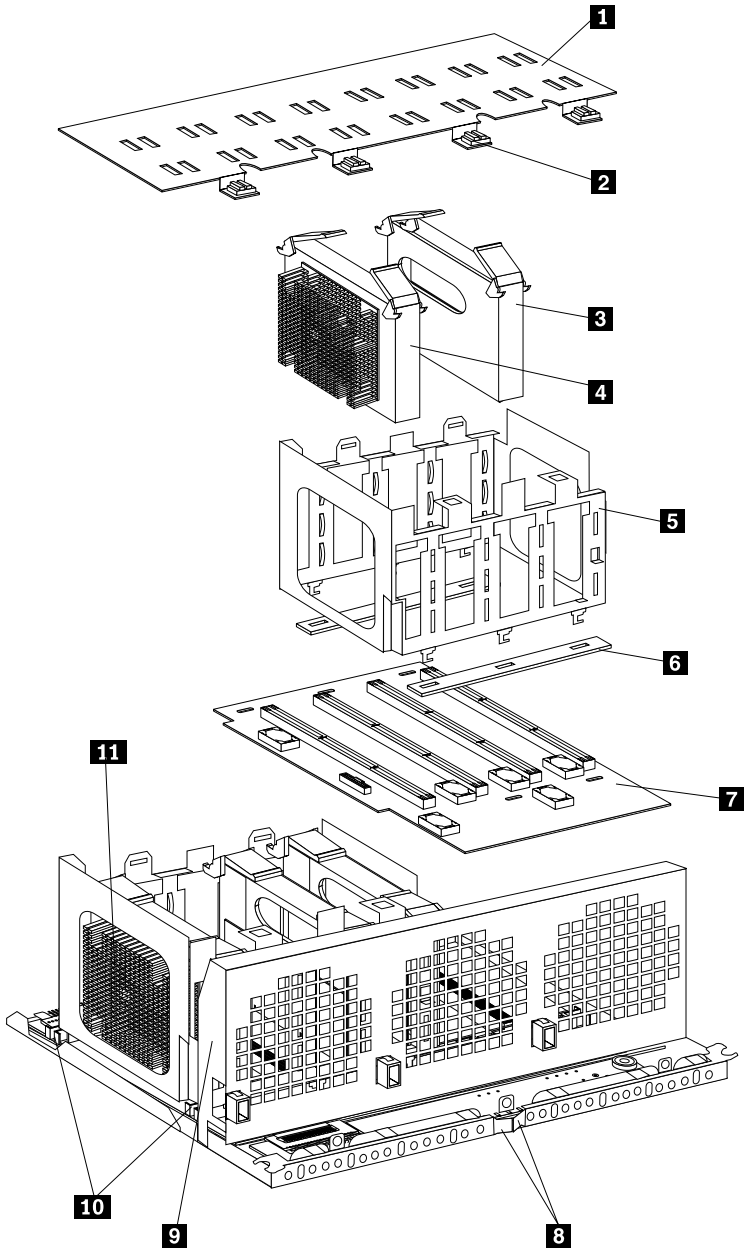
    Attention: Do not lift the processor housing assembly by the latches.

12. Reinstall the processor housing assembly as described in "Reinstalling the processor housing assembly" on page 105.

Processor daughterboard

You will need to install a second processor daughterboard if you plan to use more than four processors in the server. The additional processors must be installed on an optional processor daughterboard. Or, you might need to replace a processor daughterboard.

Refer to the following illustration while you perform the steps in this section. In this illustration, the standard processor cage is installed in the processor housing assembly, with a processor ~11~ in connector A1. The optional processor cage is item ~5~.



~1~ Processor-cage cover

~2~ Fasteners on processor-cage cover

~3~ Processor terminator card

~4~ Optional processor

~5~ Processor cage

~6~ Processor-daughterboard spacers (not present if processor daughterboard is present)

~7~ Processor daughterboard

~8~ Processor housing assembly latches

~9~ Fan guard

~10~ Processor-cage release latches

~11~ Processor A1

Installing an optional processor daughterboard and cache coherency filter cards

To install an optional processor daughterboard and the cache coherency filter cards:

Attention: Do not lift the processor housing assembly by the latches ~8~.

1. If you have not already removed the processor housing assembly, do so now. Perform step 1 on page 96 through step 7 on page 97 and steps 1 on page 98 and 2 on page 98; then, return here.
2. If you have not already removed the processor-cage cover ~1~, do so now. Rotate the four fasteners ~2~ to the unlocked position; then, lift the cover and set it aside.
3. Remove the empty processor cage ~5~:
   a. Squeeze and slide out the release latches ~10~ as far as they will go, until they reach the unlocked position; then, release.
   b. Lift the empty processor cage out of the processor housing assembly, and remove the spacers ~6~.

      Note: When you are removing the processor cage from the processor housing assembly, be sure that the processor cage release latches remain in place. Store the spacers in a safe place for future use.
4. Remove the fan guard ~9~:
   a. Remove the two screws from the sides of the fan guard.
   b. Lift the fan guard off the processor housing assembly.
   c. Rotate the fan guard away from the processors.
   d. Slide the fan guard toward the processors to remove the tabs on the bottom of the fan guard from the slots. Do not disconnect the power cables.
5. Install the two cache coherency filter cards in the two adjacent, vertical slots between the two processor daughterboards on the main processor board. For location, see “Main processor board component locations” on page 92.
6. Reinstall the fan guard:
   a. Ensure that the power cables are routed over the top of the retainer bracket that holds the two cache coherency filter cards in place.
   b. Slide the tabs on the bottom of the fan guard into the slots.
   c. Place the fan guard on the processor housing assembly.
   d. Reinstall the two screws that you removed in step a. to secure the fan guard.
7. Touch the static-protective package containing the new processor daughterboard to any *unpainted* metal surface on the server; then, remove the new processor daughterboard ~7~ from its static-protective package.
8. Align the processor-daughterboard connector with the keyed connector on the main processor board.

   Note: For the location of the processor-daughterboard connectors on the main processor board, see “Main processor board component locations” on page 92 For a layout of the processor daughterboard, see “Processor-daughterboard component locations” on page 93.

9. Firmly press the processor daughterboard ~7~ down into the keyed connector on the main processor board. Push in the center of the board, until the processor daughterboard is fully seated.
10. Ensure that the two processor cage release latches are still in the unlocked (pulled out) position.
11. Align the processor cage with its tabs over the corresponding slots on the processor daughterboard. Match the labels on the processor cage with the corresponding labels on the fan guard ~9~; for example, A1 / A1.
12. Firmly press the processor cage down into the slots in the processor housing assembly, until the processor cage is fully seated.
13. Squeeze and firmly push the release latches ~10~ back into the locked position; then, release.

    Attention: Ensure that the release latches are in the fully locked position.
14. Install processors ~4~ in the desired connectors, as described in step 3 on page 98 through step 7 on page 99; then, return here.
15. Install terminator cards ~3~ in the connectors that do not contain processors. The arrows on the terminators must face toward the large connector on the processor housing assembly and away from the fan guard.
16. Reinstall the processor-cage cover by reversing step 2 on page 102.
17. Reinstall the processor housing assembly by performing steps 1 on page 105 through 7 on page 106.

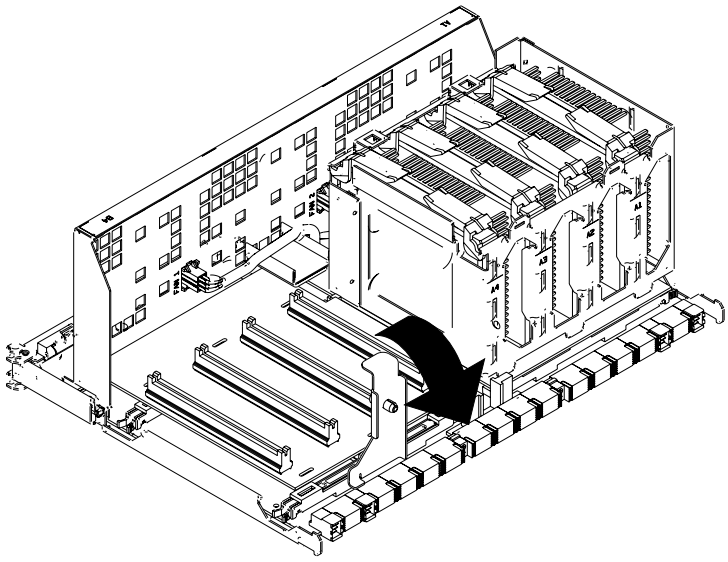
Replacing the standard processor daughterboard

To replace the processor daughterboard in the standard processor cage:

Refer to the illustration that immediately precedes“Installing an optional processor daughterboard and cache coherency filter cards” on page 102 while you perform the steps in this section.

Attention: Do not lift the processor housing assembly by the latches.

1. If you have not already removed the processor housing assembly, do so now. Perform step 1 on page 96 through step 7 on page 97 and steps 1 on page 98 and 2 on page 98; then, return here.
2. If you have not already removed the processor-cage cover ~1~, do so now. Rotate the four fasteners ~2~ to the unlocked position; then, lift the cover and set it aside.
3. Open the latches at the top of the processor in connector A1, and remove the processor. Place it on a flat, static-protective surface. Repeat these actions for the remaining processors and terminator cards in the processor cage.
4. Remove the processor cage:
   a. Squeeze and slide out the release latches ~10~ as far as they will go, until they reach the unlocked position; then, release. as they will go, until they reach the unlocked position.
   b. Lift the processor cage out of the processor housing assembly, and place it on a flat, static-protective surface.
5. If necessary, remove the processor-daughterboard extraction tool from processor cage A (behind processor A4); then, place the processor-daughterboard extraction tool under and against the processor daughterboard, as shown, in the area marked `Use extraction tool here`.



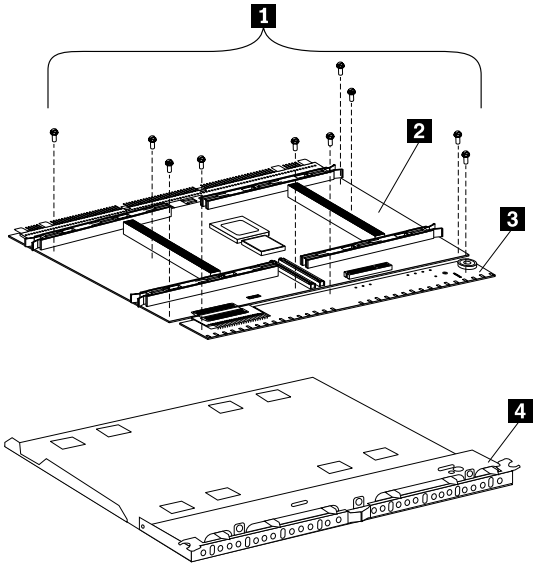
6. Press the processor-daughterboard extraction tool downward to pivot and lift the processor daughterboard; then, remove the processor daughterboard from the processor housing assembly.
7. Remove the new processor daughterboard ~7~ from its static-protective bag.
8. Align the processor-daughterboard connector with the keyed connector on the main processor board.

   Note: For the location of the processor-daughterboard connectors on the main processor board, see "Main processor board component locations" on page 92. For a layout of the processor daughterboard, see "Processor-daughterboard component locations" on page 93.
9. Firmly press the processor daughterboard ~7~ down into the keyed connector on the main processor board. Push in the center of the board, until the processor daughterboard is fully seated.
10. Align the processor cage with its tabs over the corresponding slots on the processor daughterboard. Match the labels on the processor cage with the corresponding labels on the fan guard ~9~; for example, A1 / A1.
11. Firmly press the processor cage down into the slots on the processor housing assembly, until the processor cage is fully seated.
12. Squeeze and firmly push the release latches ~10~ back into the locked position; then, release.

    Attention: Ensure that the release latches are in the fully locked position.
13. Install processors ~4~ in the desired connectors, as described in step 3 on page 98 through step 7 on page 99; then, return here.
14. Install terminator cards ~3~ in the connectors that do not contain processors. The arrows on the terminators must face toward the large connector on the processor housing assembly and away from the fan guard.
15. If you removed the processor-daughterboard extraction tool in step 5 on page 103, replace the processor-daughterboard extraction tool on processor cage A, behind processor A4. Otherwise, store the tool in a safe place for future use.
16. Reinstall the processor-cage cover by performing steps 10 on page 99 and 11 on page 100.
17. Reinstall the processor housing assembly as described in "Reinstalling the processor housing assembly" on page 105.

Removing processor controller board from metal backing

Use the following illustration as guide when separating the processor controller board from the metal backerplate ("CPU cookie sheet").



~1~ Screws

~2~ Processor controller board

~3~ LED card assembly

~4~ Metal backerplate

1. Remove the processor housing assembly (see step 1 on page 96 through step 7 on page 97 and steps1 on page 98 and 2 on page 98.
2. Remove the processor cage cover, all processor cages and fan guard (see steps 2, 3, and 4 of “Installing an optional processor daughterboard and cache coherency filter cards” on page 102).
3. Remove the screws ~1~.
4. Gently separate the board ~2~ from the backerplate ~4~.
5. Carefully separate the LED card assembly ~3~ from the processor board ~4~.

Reinstalling the processor housing assembly

To reinstall the processor housing assembly:

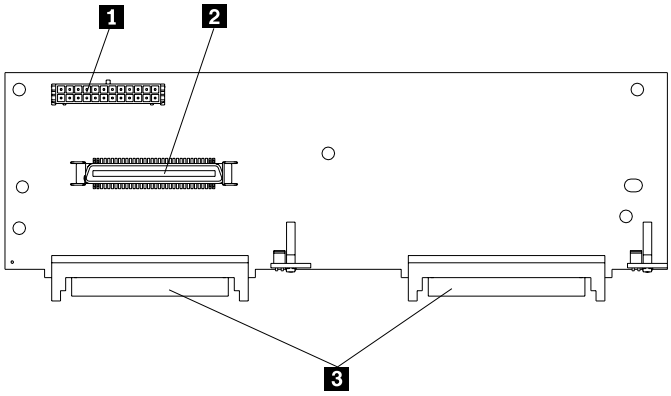
1. With the processor housing assembly positioned so that the processors are pointing downward and the latches ~8~ are closed, align the processor housing assembly with the guides on the inside walls of the server.

   Attention: To avoid injury, do not place your fingers immediately behind the latches at the top of the processor housing assembly.
2. Grasp the bottom sides of the processor housing assembly. Slide the processor housing assembly partially into the server; then, open the latches fully.
3. Lift and slide the assembly into the server until it stops.

4. Close the processor housing assembly latches.
5. Reinstall the three processor fans:
   a. Insert the fans in the server. Align the tabs on the bottom edge of the fans with the matching slots in the server chassis.
   b. When you have the fans correctly seated, press the fasteners in the top center of the fans to secure the fans in the server.
6. Reinstall the front bezel (see "Front bezel installation" on page 108).
7. If you have other options to install or remove, do so now; otherwise, continue with "Completing the installation".

SCSI backplane component locations

The following simplified layout of the SCSI backplane identifies the components. See "SCSI IDs" on page 114 for information on SCSI IDs.



~1~ Media power connector

~2~ Wide (16-bit) SCSI connector

~3~ SCSI hot-swap drive connectors (on opposite side of backplane)

Completing the installation

Depending on the options that you have installed, you must reinstall the top cover and the front bezel to complete the installation. You must also reconnect all the cables that you disconnected in "Preparing to install options" on page 41, and, after installing certain options, you must run the Configuration/Setup utility program. Follow the instructions in this section.

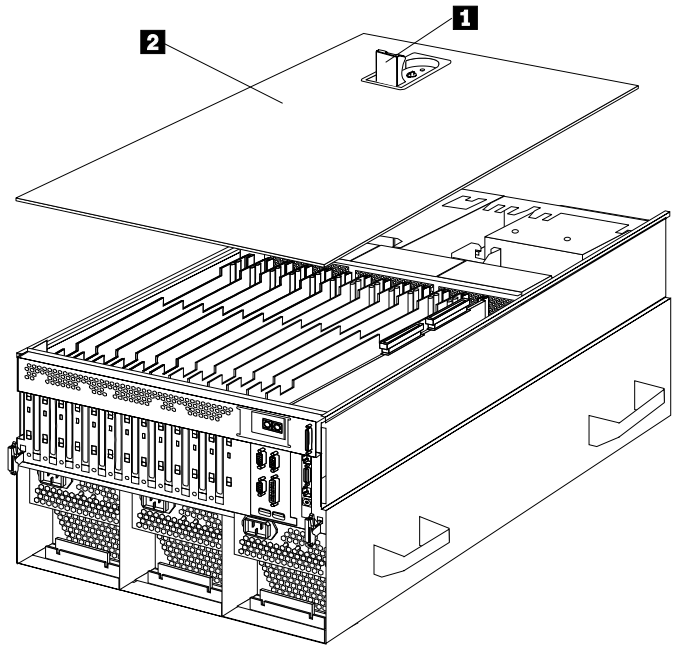
Top cover installation

Notes:

1. The top cover is in place during normal operation. If the server is on, do not leave the top cover off for more than 30 minutes at a time.
2. If necessary, see "Input/output connectors and expansion slots" on page 86 for connector locations.

To install the server top cover:

1. Before installing the top cover, check that all cables, adapters, and other components are installed and seated correctly and that you have not left tools or loose parts inside the server.
2. Place the cover-release latch ~1~ in the open (up) position.
3. Insert the bottom tabs of the cover ~2~ in the matching slots in the server chassis.



~1~ Cover-release latch

~2~ Cover

4. Close the cover-release latch to pull the cover forward and lock the cover in place.

Danger: Overloading an electrical circuit breaker is potentially a fire hazard and a shock hazard under certain conditions. To avoid these hazards, adhere to the instructions in the following statements:

a. If you are connecting to a 100-127 V AC power source, connect each power cord to a separate branch circuit.

b. If you are connecting to a 200-240 V AC power source and the branch circuit breaker rating is:

1) 13 amps or less, connect each power cord to a separate branch circuit.

2) 14 amps to 19 amps, do not connect more than two power cords to the same branch circuit.

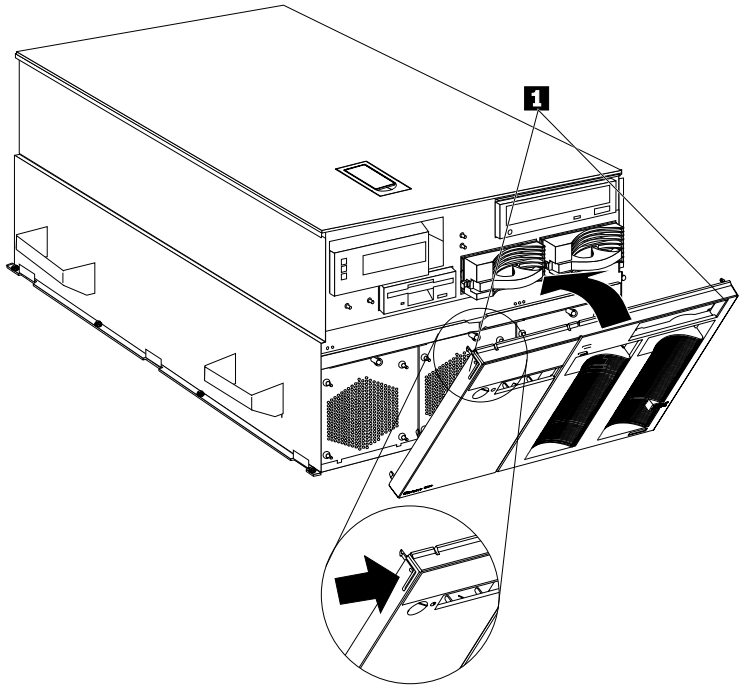
3) 20 amps or greater, you may connect up to three power cords to the same branch circuit.

5. If you disconnected any cables or cords from the back of the server, reconnect the cables; then, plug the power cords into properly grounded electrical outlets.

Front bezel installation

To install the front bezel:

1. Insert the bottom tabs of the bezel in the matching slots in the server chassis.
2. Press in the tab on the bezel; then, pivot the top of the bezel until the latches ~1~ snap into place. This places the bezel in the locked position.



~1~ Latches

Reconfiguring the server and updating server records

When you start the server for the first time after you add or remove an internal option or an external SCSI device, you might see a message telling you that the configuration has changed.

- Device drivers - Some options have device drivers that you need to install. Refer to the documentation that comes with the option for information about installing any required device drivers.
- DIMMs - If you replaced a defective DIMM, you must manually enable the DIMM slot in the Configuration/Setup utility program. In this case, the system does not automatically access the Configuration/Setup utility program to enable the DIMM slot. See "Memory settings" on page 30. for additional information.
- Processors - The xSeries 370 server comes with at least one processor installed on the standard processor daughterboard. If you have installed one or more additional processors, the server can now operate as an SMP server. Therefore, you might need to upgrade the operating system. Refer to the operating-system documentation for additional information.

  If you replaced a defective processor, you must manually enable the processor slot in the Configuration/Setup utility program. In this case, the system does not automatically access the Configuration/Setup utility program to enable the processor slot. See "Processor settings" on page 31 for additional information.

- Reconfiguring the server - Run the Configuration/Setup utility program to save the new configuration information. See “Configuring the server” on page 21.
- Updating server records - Record your updated device and configuration information.

FRU replacements

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

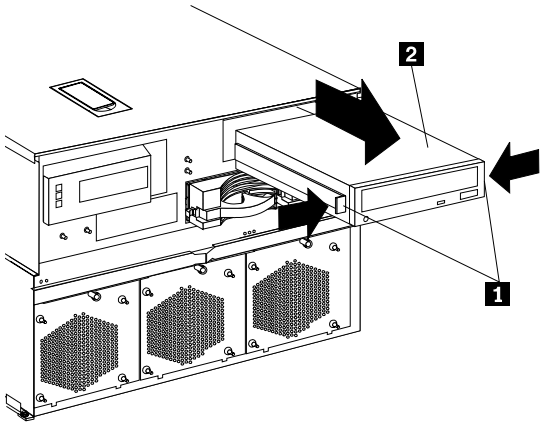
Note: Before you begin—

- Read "Safety information" on page 181.
- Read "Before you begin" on page 39.

CD-ROM drive

Notes:

1. Read "Safety information" on page 181.
2. See "Preparing to install options" on page 41 before removing or installing options.



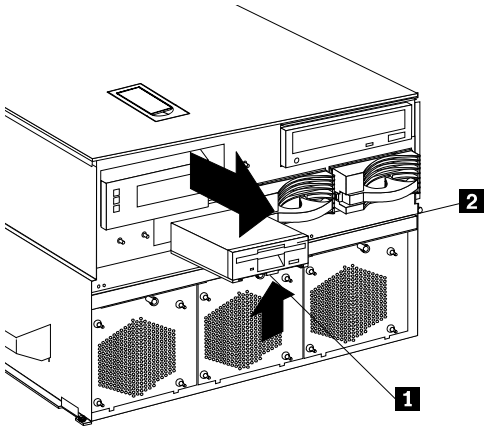
To remove the CD-ROM drive:

1. Remove the front bezel. See "Removing the front bezel" on page 44 for instructions.
2. Disconnect all cables.
3. Squeeze latches ~1~ in to remove the CD-ROM drive ~2~.
4. Reverse the procedure to install a CD-ROM drive.

Diskette drive

Note: Before you begin—

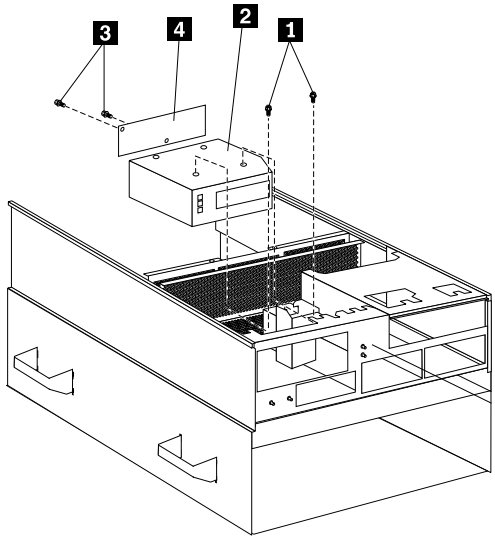
1. Read "Safety information" on page 181.
2. See "Preparing to install options" on page 41 before removing or installing options.



To remove a diskette drive:

1. Remove the front bezel. See "Removing the front bezel" on page 44 for instructions.
2. Disconnect all cables.
3. Squeeze latch ~1~ on bottom of drive inward to release the diskette drive ~2~.
4. Pull diskette drive out of the server chassis.
5. Reverse the procedure to install a diskette drive.

Front panel control card



To remove the front panel control card from the operator panel assembly:

1. Remove the two screws ~1~ that hold the operator panel assembly ~2~ to the server chassis.
2. Pull the operator panel out of the slot.
3. The front panel control card ~4~ is located on the back of the operator panel assembly.
4. Remove the two screws ~3~ which hold the front panel control card in place, and remove the front panel control card.
5. Reverse the procedure to install the front panel control card.

Internal drive installation

Different types of drives allow the system to read multiple types of media and store more data.

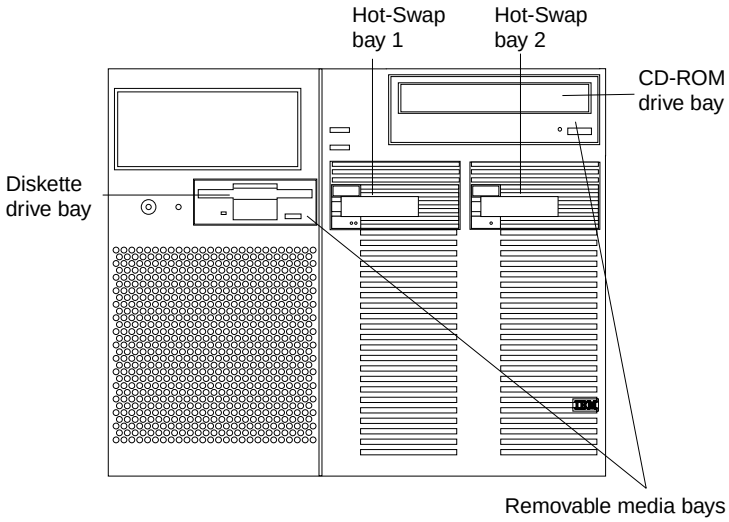
Several types of drives are available, such as:

- Diskette
- Hard disk
- CD-ROM

Some drives have a special design called *small computer system interface*, or SCSI. This design allows you to attach multiple drives to a single SCSI connector. For additional information about SCSI devices, see “SCSI IDs” on page 114.

Internal drive bays

Internal drives are installed in *bays*. The server comes with one 3.5-inch, 1.44 MB diskette drive, one CD-ROM drive, and two hard disk drive bays.



The server contains hardware and an operating system that support the replacement of a failed hard disk drive without turning off the server, when the drive is connected to a ServeRAID adapter. Therefore, you can continue to operate the system while a hard disk drive is removed or installed. These drives are known as *hot-swappable* drives. They are also referred to as hot-swap drives.

The front of each hot-swap hard disk drive has two indicator lights (see “Controls and indicators” on page 9). If the amber hard disk status light for a drive is lit continuously, that individual drive is defective and needs to be replaced. When the hard disk status light indicates a defective drive, you can replace a hot-swap drive without turning off the server.

Each hot-swap drive that you plan to install must have a hot-swap-drive tray attached. The drive must have a single connector attachment (SCA) connector. Hot-swap-drive trays come with the hot-swap drives.

- The server comes with a preinstalled 3.5-inch, 1.44 MB diskette drive and a preinstalled integrated drive electronics (IDE) CD-ROM drive.
- The server supports one diskette drive only.
- The server supports one slim-high (1-inch), 3.5-inch, hot-swap hard disk drive with a filler bezel or one half-high (1.6-inch), 3.5-inch, hot-swap hard disk drive in each hot-swap bay.
- The hot-swap bays connect to a SCSI *backplane*. This backplane is the printed circuit board behind the bay. The backplane supports up to two hard disk drives.v
- Empty hot-swap bays and trays that contain slim-high drives must contain a filler bezel.
- The diskette drive uses 2 MB diskettes. For optimum use, format 2 MB diskettes to 1.44 MB.

Hard disk drives

The server comes with a Wide Ultra2 SCSI (LVD) controller on the I/O function card.

Notes:

1. LVD = low-voltage differential
2. If you plan to install both internal and external SCSI devices, you must follow the instructions in “External options” on page 55, in addition to the instructions in this section.

A 16-bit (wide) SCSI cable connects the hot-swap backplane to one channel of the integrated SCSI controller on the I/O function card.

SCSI IDs

Each SCSI device that is connected to an individual integrated SCSI controller needs a unique identification (ID) so that the controller can identify the devices and ensure that different devices do not attempt to transfer data at the same time. (The integrated SCSI controllers operate independently.) If you need to set IDs for SCSI devices, refer to the instructions that come with those devices.

The server automatically sets SCSI IDs for hot-swap hard disk drives. The server uses the hard disk drive SCSI IDs to send status information to the indicator lights located on each hot-swap drive.

Note: Do not set the SCSI ID jumpers on hard disk drives.

The SCSI backplane in the server supports up to two hot-swap drives. Table 14 on page 115 shows the default SCSI IDs that the backplane assigns for hot-swap hard disk drives.

Table 14. Automatically assigned SCSI IDs.

Bay	1	2
ID	0	1
Note: The default SCSI ID for the SCSI backplane is 15. The default SCSI ID for each SCSI controller is 7.		

A simplified layout of the SCSI backplane is shown in "SCSI backplane component locations" on page 106.

The processing sequence for SCSI devices is set through the SCSISelect Utility program. The default sequence proceeds from the lowest SCSI ID to the highest (0 to 6, then 8 to 14). The default SCSI ID for each SCSI controller is 7. The default SCSI ID for the SCSI backplane is 15.

Termination

All the internal hot-swap drives in the server have automatic termination.

Preinstallation steps

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

1. Choose the bay in which you want to install the drive.
2. Verify that all jumpers are removed from the drive.
3. To install the drive, continue with "Installing or replacing a drive".

Installing or replacing a drive

Notes:

1. You do not have to turn off the server to install hot-swap drives in these bays. If these bays are not connected to a ServeRAID adapter, shut down and restart the server. If these bays are connected to a ServeRAID adapter, you can use the RAID management software to bring the drives online.
2. Refer to the ServeRAID adapter option documentation for instructions on installing a ServeRAID adapter.
3. You do not have to turn off the server to remove a drive from a hot-swap bay, when that bay is connected to a ServeRAID adapter.

If the amber hard disk status light for a drive is lit continuously, that individual drive is defective and needs to be replaced. For additional information, see "Internal drive installation" on page 113. For the location of the hard disk status light, see "Controls and indicators" on page 9.

Attention:

1. Before you hot-swap a drive, refer to the amber hard-disk status light for that drive to make sure that it is defective. If the server has a ServeRAID adapter installed and you assigned RAID level 1 or 5 to the logical drives in the disk array, make sure that the drive is defective. If you partially or completely remove a good drive instead of a defective one, the server might lose valuable data. However, the ServeRAID adapter can rebuild the data that you need, provided

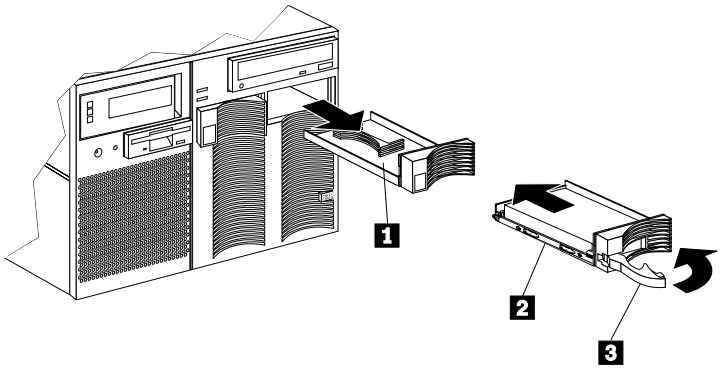
that certain conditions are met. Refer to the ServeRAID adapter documentation for further details.

2. To avoid damage to a hard disk drive, ***do not*** remove the drive from the hot-swap bay until it has had time to spin down (approximately 30 seconds after disconnecting). Handle the drive gently.

Note: Before you begin—

- Read "Safety information" on page 181 and "Handling electrostatic discharge-sensitive devices" on page 184.
- Read the documentation that comes with the drive.

Refer to the following illustration while you perform the steps in this procedure.



~1~ Filler panel (tray and slim filler bezel)

~2~ Hot-swap hard disk drive

~3~ Drive tray handle (open position)

To install or replace a hard disk drive:

1. Determine the bay in which you want to install the drive. Otherwise, continue with step 2..

   Remove the defective hard disk drive ~2~ by pressing on the lock to release the handle ~3~, placing the handle in the open position (perpendicular to the drive), and pulling the hot-swap tray from the bay. Continue with step 3..

2. Remove the filler panel ~1~ from the empty hot-swap bay by inserting your finger into the depression at the left side of the filler panel and pulling it away from the server.

   Note: If you are installing a slim-high drive, you must separate the slim filler bezel from the tray, and insert the slim filler bezel into the top of the hard disk drive cage. Otherwise, store the filler panel in a safe place.

3. Install the hard disk drive ~2~ in the hot-swap bay:

   a. Remove the new drive assembly from the static-protective package.

   b. Touch the static-protective package containing the drive assembly to any unpainted metal surface on the server. Then, remove the drive assembly from the static-protective package.

   c. If you are installing a slim-high drive, separate the slim filler bezel from the tray, and insert the slim filler bezel into the top of the hard disk drive cage.

   d. Ensure that the tray handle ~3~ is open (that is, perpendicular to the drive).

   e. Align the drive assembly so that it engages the guide rails in the bay.

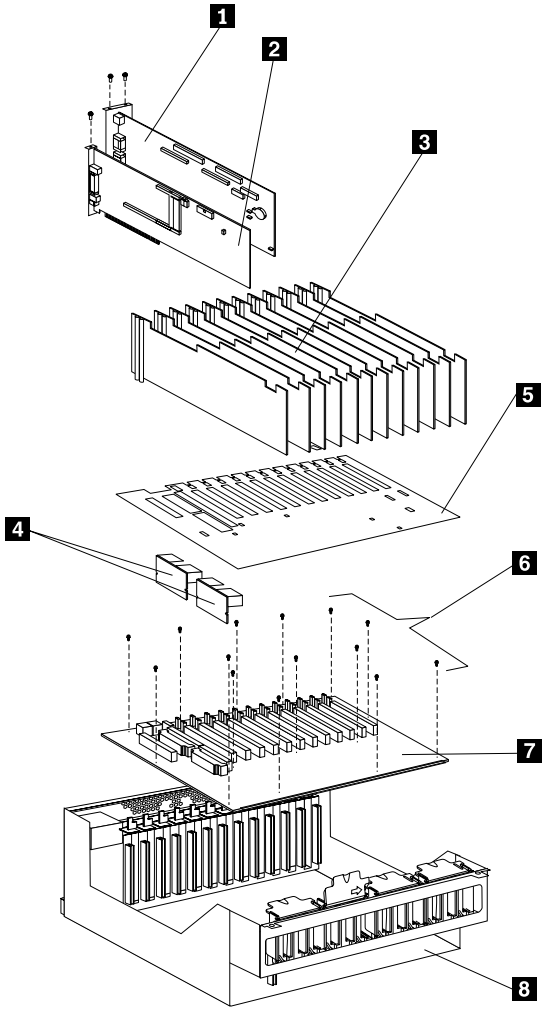
   f. Gently push the drive assembly into the bay until the drive stops.

g. Push the tray handle to the closed (locked) position.

4. Check the hard disk drive status indicators to verify that the hard disk drives are operating properly.

   Note: If the server has a ServeRAID adapter installed, refer to the ServeRAID adapter documentation for details about configuration requirements. Record the configuration information.

I/O board removal



Note: See "Preparing to install options" on page 41.

1. Remove the top cover. See "Removing the top cover" on page 43.
2. Remove the I/O function card ~1~ and the Advanced System Management PCI Adapter ~2~. Remove any other adapters in the system. Disconnect all cables. To remove the I/O function card:

   a. Disconnect all cables from the I/O function card. Note carefully where each cable is connected before you remove it. See "I/O function card component locations" on page 84 for the connector locations on the I/O function card.

   b. Remove the two screws located on the metal connector plate inside the server.

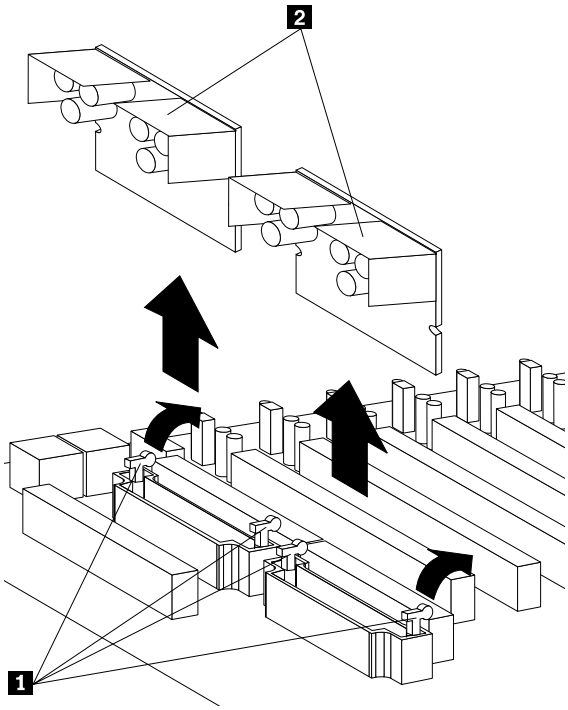
   c. Remove the I/O function card retention bracket on the right side of the card by pulling out the fastener on the bracket.

d. Carefully grasp the I/O function card by its top edge and pull the I/O function card out of the server.

e. Place the I/O function card connector side up on a flat, static-protective surface.

3. Remove all insulators ~3~. See “Hot-plug PCI adapter” on page 63 for more information.
4. Remove the I/O board protector shield ~5~ covering the I/O board ~7~.
5. Remove VRMs ~4~ from their slots on the I/O board. See “VRM latch releases”.
6. Unscrew the 14 screws ~6~ securing the I/O board to the I/O housing ~8~.
7. Reverse the procedure to install the I/O board into the server.

VRM latch releases



To remove VRMs from their slots:

1. Push latches ~1~ back.
2. Lift VRM ~2~ up out of its slot.
3. Reverse the procedure to insert the VRM into the slot.

I/O fan

1. Determine which fan you will replace.
2. Remove the top cover (see “Removing the top cover” on page 43).
3. Pull up the fastener ~1~ in the center of the fan ~2~. This places the fastener in the unlocked position.
4. Lift the fan out of the server.
5. Insert the replacement fan in the fan bay. Align the connector on the bottom of the fan with the matching connector in the server chassis.

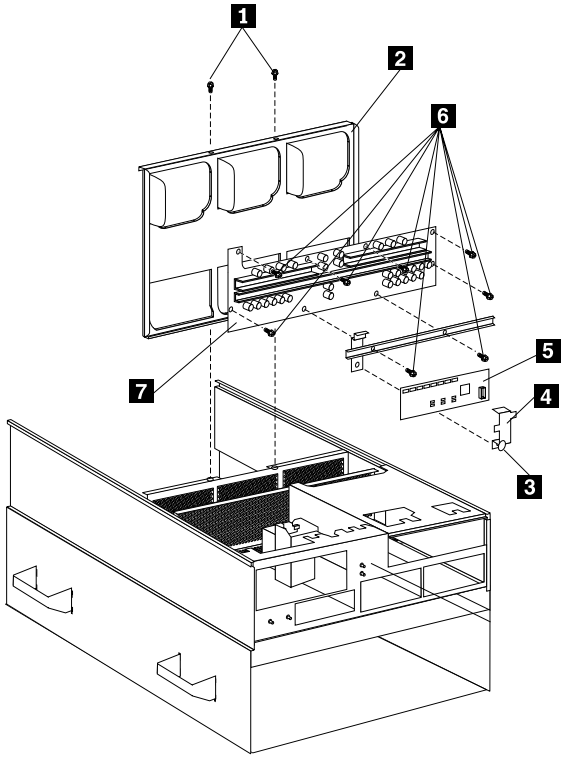
6. When you have the fan correctly seated in the fan bay, press down on the fastener in the center of the fan to secure the fan in the server.

   Note: When you correctly seat the fan in the chassis, the fan blades begin to spin. The fan LED goes out a few seconds after the new fan is installed.

7. If you have other options to install or remove, do so now; otherwise, continue with "Completing the installation" on page 106.

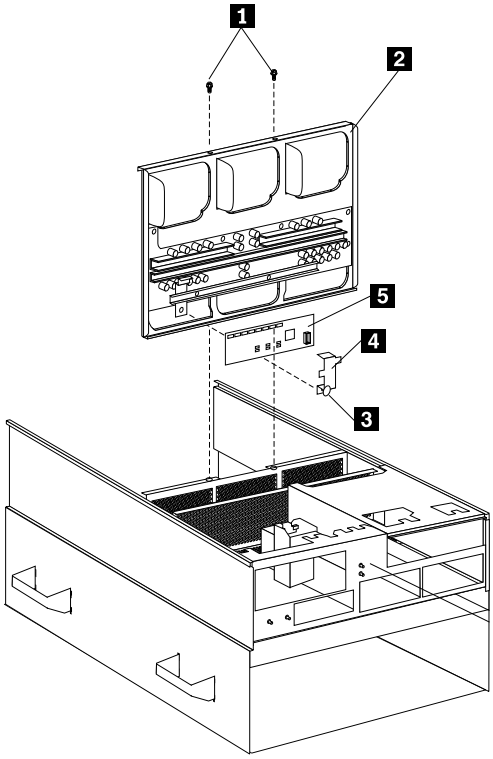
Midplane removal

Note: Before beginning, see "Safety information" on page 181.



1. See "Removing the top cover" on page 43.
2. Remove all three power supplies. See "Hot-swap power supply" on page 69 for instructions.
3. Remove the two screws ~1~ at the top of the midplane tray ~2~Y which hold the midplane to the server chassis.
4. Lift the midplane up out of the chassis.
5. Remove the eight screws ~6~ that hold the midplane card ~7~ to the midplane tray. The power control card ~5~ will still be attached to the midplane by the bracket ~4~ and ~3~ (orange pull). To remove the power control card, see "Power control card removal" on page 120.
6. Reverse this procedure to install the midplane.

Power control card removal

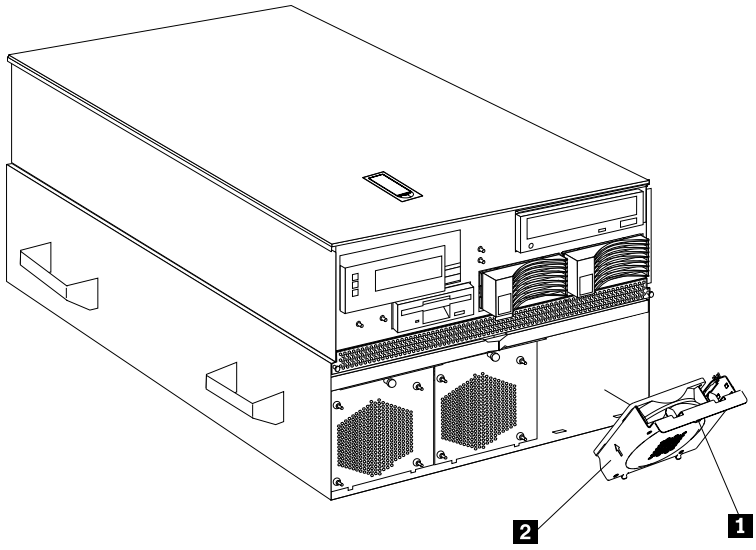


To remove the power control card:

1. The power control card ~5~ is located on the midplane ~2~. See “Midplane removal” on page 119 for instructions and the illustration on removing the midplane.
2. Lift up from the orange plastic pull ~3~ on the bracket ~4~. This will lift the bracket clear of the power control card.
3. Lift the power control card up from the midplane.
4. Reverse the procedure to install the power control card.

Processor fan

1. Determine which fan you will replace.
2. Remove the front bezel (see “Removing the front bezel” on page 44).



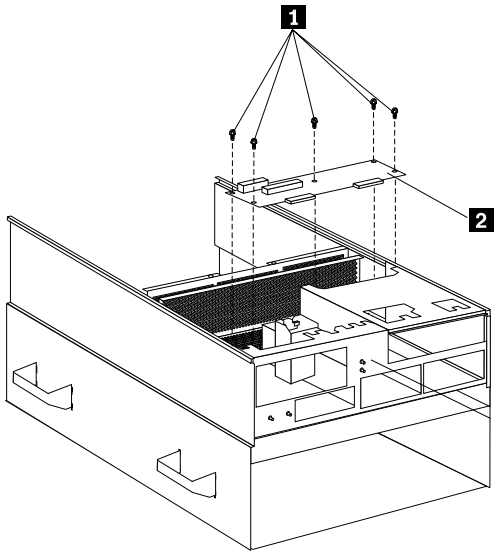
3. Pull out the fastener ~1~ in the top center of the processor fan ~2~. This places the fastener in the unlocked position.
4. Pivot the fan downward and remove it from the server.
5. Insert the replacement fan in the fan bay. Align the bottom tabs of the fan ~2~ with the matching slots in the server chassis.
6. Pivot the fan in an upward position.
7. When you have the fan correctly seated in the fan bay, press on the fastener in the center of the fan to secure the fan in the server.

   Note: When you correctly seat the fan in the chassis, the fan blades begin to spin. The fan LED goes out a few seconds after the new fan is installed.
8. If you have other options to install or remove, do so now; otherwise, continue with "Completing the installation" on page 106.

SCSI backplane

The SCSI backplane supports up to two hard disk drives.

Note: All drives must be removed and disconnected before removing the backplane.



1. See “Before you begin” on page 39 and “Internal drive installation” on page 113.
2. Remove any plugged-in drives.
3. Remove all connectors from the SCSI backplane.
4. Remove the five screws ~1~ that hold the backplane to the server chassis.
5. Lift the SCSI backplane ~2~ up and out of the server. You may need to tilt the SCSI backplane slightly to get it out of the server.
6. Reverse the procedure to install the SCSI backplane.

Symptom-to-FRU index

This index supports the xSeries 370 servers.

Notes:

1. Check the configuration before you replace a FRU. Configuration problems can cause false errors and symptoms.
2. For IBM devices not supported by index, refer to the manual for that device.
3. Always start with "General checkout" on page 1.

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

Beep symptoms

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

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

Beeps	Description
1-2-3	• One beep • A pause (or break) • Two beeps • A pause (or break) • Three Beeps
4	Four continuous beeps

Beep/Symptom	FRU/Action
1-1-2 (Processor register test failed)	1. **BSP Processor** **Note:** The BSP Processor is identified on the IBM logo screen during boot. If you cannot boot to the IBM logo screen, the BSP is the highest functional processor (highest functioning processor slot number) on the processor daughterboard A. 2. Processor controller board 3. Processor daughterboard

Beep/Symptom	FRU/Action
1-1-3 (CMOS write/read test failed)	1. **Battery** 2. I/O function card 3. System Management adapter 4. I/O board
1-1-4 (BIOS EEPROM checksum failed)	1. **I/O function card** 2. I/O board 3. Processor controller board 4. Processor daughterboard
1-2-1 (Programmable Interval Timer failed)	1. **I/O function card** 2. I/O board
1-2-2 (DMA initialization failed)	1. **I/O function card** 2. I/O board 3. Processor controller board 4. Processor daughterboard
1-2-3 (DMA page register write/read failed)	1. **I/O function card** 2. I/O board 3. Processor controller board 4. Processor daughterboard
1-2-4 (RAM refresh verification failed)	1. **Processor controller board** 2. Processor daughterboard 3. Memory Card
1-3-1 (1st 1MB RAM test failed)	1. **Remove DIMM in Memory Card A, slot J1, or, if not populated, the slot closest to J1. Attempt to boot the system. If it boots, replace the DIMM. If it does not boot, suspect the following FRUs.** 2. Memory Card A 3. Memory Card B, if installed 4. Processor controller board
1-3-2 (1st 1MB RAM ECC test failed)	1. **Remove DIMM in Memory Card A, slot J1, or, if not populated, the slot closest to J1. Attempt to boot the system. If it boots, replace the DIMM. If it does not boot, suspect the following FRUs.** 2. Memory Card A 3. Memory Card B, if installed 4. Processor controller board
2-1-1 (Secondary DMA register failed)	1. **I/O function card** 2. I/O board 3. Processor controller board 4. Processor daughterboard

Beep/Symptom	FRU/Action
2-1-2 (Primary DMA register failed)	1. **I/O function card** 2. I/O board 3. Processor controller board 4. Processor daughterboard
2-1-3 (Primary interrupt mask register failed)	1. **I/O board** 2. Processor controller board 3. Processor daughterboard
2-1-4 (Secondary interrupt mask register failed)	1. **I/O board** 2. Processor controller board 3. Processor daughterboard
2-2-1 (Interrupt vector loading failed)	1. **I/O board** 2. Processor controller board 3. Processor daughterboard
2-2-2 (Keyboard controller failed)	1. **I/O function card** 2. Keyboard
2-2-3 (CMOS power failure and checksum checks failed)	1. **Battery** 2. I/O function card 3. I/O board
2-2-4 (CMOS configuration info validation failed)	1. **Battery** 2. I/O function card
2-3-1 (Screen initialization failed)	1. **I/O function card**
2-3-2 (Screen memory failed)	1. **I/O function card**
2-3-3 (Screen retrace failed)	1. **I/O function card**
2-3-4 (Search for video ROM failed)	1. **I/O function card**
2-4-1 (Video failed, screen believed operable)	1. **I/O function card**
3-1-1 (Timer tick interrupt failed)	1. **I/O function card** 2. I/O board
3-1-2 (Interval timer channel 2 failed)	1. **I/O function card** 2. I/O board

Beep/Symptom	FRU/Action
3-1-3 (RAM test failed above address OFFFF H))	1. **If memory card LED is on, replace DIMM** 2. Memory card A 3. Memory card B, if installed 4. Processor controller board 5. Processor daughterboard
3-1-4 (Time-Of-Day clock failed)	1. **Battery** 2. I/O function card
3-2-1 (Serial port failed)	1. **I/O function card**
3-2-2 (Parallel port failed)	1. **I/O function card**
3-2-3 (Math coprocessor failed)	1. **Processor** 2. Processor controller board 3. Processor daughterboard
3-2-4 (Failure comparing CMOS memory size against actual)	1. **If memory card LED is on, replace DIMM** 2. Memory card A 3. Memory card B, if installed 4. Processor controller board 5. Processor daughterboard 6. Battery
3-3-1 (Memory size mismatch occurred, see "Memory settings" on page 30)	1. **If memory card LED is on, replace DIMM** 2. Memory card A 3. Memory card B, if installed 4. Processor controller board 5. Processor daughterboard 6. Battery
3-3-2 (Critical SMBUS error occurred)	1. **See "SM BUS error (3-3-2)" on page 155.**
Two Short Beeps (No video, no warning LED) Note: Two short beeps after a configuration change, or after AC power has been removed and is restored, is normal.	1. **I/O function card**

Beep/Symptom	FRU/Action
Three Short Beeps	1. **If memory card LED is on, replace DIMM** 2. Memory card A 3. Memory card B, if installed 4. Processor controller board 5. Processor daughterboard
One Continuous Beep	1. **Processor** 2. Processor controller board 3. Processor daughterboard
Repeating Short Beeps	1. **Keyboard** 2. I/O function card 3. I/O board
One Long and One Short Beep	1. **Video adapter (if installed)** 2. I/O function card
One Long and Two Short Beeps	1. **Video adapter (if installed)** 2. I/O function card
One Long and Three Short Beeps	1. **Monitor (display)** 2. I/O function card
Two Long and Two Short Beeps	1. **Video adapter (if installed)** 2. I/O function card

No beep symptoms

No Beep Symptom	FRU/Action
No beep and the system operates correctly.	1. **Check front panel cable** 2. Front panel 3. I/O function card
No AC power to any power supplies (Power supply AC LED is off)	1. **Check the power source.** 2. Check the power cord
No AC power to a single power supply (Power supply AC Good LED is off)	1. **Check the power source.** 2. Check the power cable 3. Power supply 4. Power control card
No beep and no video	1. **See "Undetermined problems" on page 158.**

No Beep Symptom	FRU/Action
System will not power-up (Power supply AC LED is on)	1. **See "Power supply LED errors".**
System will not power off using the power control button on the front panel	1. **See "Power supply LED errors".** 2. Four switch front panel cable 3. Front panel cable 4. Front panel assembly 5. I/O function card

Power supply LED errors

Use the power supply LED information on the following page to troubleshoot power supply problems.

Note: The minimum configuration required for the DC Good light to come on is:

- I/O board
- Midplane
- Power control card
- Processor controller card
- Memory carrier
- 128MB DIMM

Important: If you cannot power the system off with the front panel switch:

1. If ACPI is enabled (operating system dependant), you must hold the power button for 5 seconds.
2. Disconnect the AC power.
3. Remove the I/O function card.
4. Remove the battery on the I/O Function card.
5. On the I/O function card, move J15 jumper from pins 1 and 2 to pins 2 and 3.
6. Wait a minimum of five minutes.
7. On the I/O function card, move J15 jumper back from pins 2 and 3 to pins 1 and 2.
8. Reinstall the battery on the I/O function card.
9. Reinstall the I/O function card in the server.
10. Restore AC power to the server.
11. Power-on the server.
12. Reconfigure the server using the configuration/setup utility.

Table 15. Power supply LED errors.

AC Good LED	DC Good LED	Error	FRU/Action
Off	Off	No power to system or a problem with the ac power source.	1. Check ac power source. 2. Power Supply 3. Midplane 4. Power Control Card
On	Off	Standby mode or dc problem.	Go to "AC LED on/DC LED off".
On	On	Power is OK	None

AC LED on/DC LED off

If the AC LED is on and the DC LED is off, do the following:

1. **Check the Power Control Card LED, then return to this table.** See"Power control card LED" on page 130.
2. Attempt to start the system and check the DC Good LEDs.
3. If the Good AC LED on and DC Good LED off condition does not exist on all power supplies, move the power supply with the DC Good LED off to one of the other power supply positions. If the DC Good LED off condition stays with the power supply, replace FRUs in the following order:
   a. Power supply
   b. Power control card
   c. Midplane

   If the DC Good LED off condition stays with the power supply position, replace FRUs in the following order, then go to step 10 on page 130:
   a. Power control card
   b. Midplane
4. If the condition exists on all the power supplies, disconnect the AC power from all supplies for 30 seconds, then reconnect AC power and attempt to start the system. Check the LEDs again. If DC Good LEDs are lit on all power supplies, continue with system checkout. If not, continue with step 5.
5. Disconnect the ac power and reduce the system to the minimum configuration described in the note at the beginning of this section.
6. Install a jumper on J11 on the I/O Board (see "I/O board component locations" on page 83).
7. Connect the AC power cord and attempt to start the system. Check the DC Good LED.
8. If the DC Good LED is on, reinstall the components in the following order to isolate the failing FRU:
   a. Processor controller board
   b. Front Panel (once installed, jumper J11 on the I/O board is no longer needed)
   c. System management adapter
   d. All remaining components, one at a time.

9. If the DC Good LED is off, swap power supplies. If the DC Good LED is still off, replace FRUs in the following order, then go to step 10.:
   a. Power control card
   b. Midplane
   c. I/O planar
   d. Power supply

   If the DC Good LED is on after swapping power supplies, replace the power supply that was removed, then go to step 10..
10. Once the failing FRU has been replaced, re-install all remaining FRUs, and continue with the system checkout.

Power control card LED

The power control card LED is located in the center of the system, between the processors and the midplane. On the power control card is an LED that provides status of the card based on its flash rate. To view the LED, look through the hole in the left side of the chassis.

With AC power applied to the power supplies, the following conditions may be indicated by the power control card LED:

1. Slow flash rate (approximately 1 flash per second) - the power control card is functioning properly.
2. No flashing LED - Power control card is not operational. Replace the power control card.
3. Fast flash rate (approximately 2 flashes per second) - the system has a 240VA fault, which will shut down the system, indicating a possible processor failure or a short in a system component.

If a 240VA fault is indicated (LED flashing rapidly), do the following:

1. Leave the AC power applied.
2. Connect to the service processor and view the system error log, looking for a power failure message on one or more of the power planes. If a power failure message is posted, refer to the following table and proceed as indicated.

	FRU/Action
3.3V bus A (power to the memory complex)	1. **Disconnect AC power.** 2. Reduce memory to one memory carrier and one memory DIMM. 3. Reconnect AC power and wait about 30 seconds for the system management adapter to initialize. 4. Attempt to start the system. 5. If the system starts, one of the FRUs removed is the failing FRU. 6. Reinstall one FRU at a time to identify the failing FRU. If the system does not start, suspect remaining system FRUs in the following order: a. Memory DIMM b. Memory carrier c. Midplane d. Power supply

	FRU/Action
3.3V bus B (power to I/O board and CPU complex)	1. **Disconnect AC power.** 2. Reduce the system to one processor daughterboard with one processor. 3. Remove the cache coherency filter DIMMs. 4. Remove all PCI adapters except the I\O function card and the system management adapter. 5. Reconnect the AC power and wait about 30 seconds for the system management adapter to initialize. 6. Attempt to start the system. If the system starts, one of the FRUs removed is the failing FRU. Reinstall the FRUs one at a time to identify the failing FRU. 7. If the system does not start, suspect remaining system FRUs in the following order: a. I/O Planar b. Processor c. Processor daughter card d. Processor controller board e. Midplane f. Power supply
5V bus A (Power to PCI, I/O, NIO and CPU complex)	1. **Remove AC power.** 2. Reduce the system to one processor daughter board with one processor. 3. Remove the cache coherency filter DIMMs. 4. Remove all PCI adapters except the I\O function card and the system management adapter. 5. Reconnect the AC power and wait about 30 seconds for the system management adapter to initialize. 6. Attempt to start the system. If the system starts, one of the FRUs removed is the failing FRU. Reinstall the FRUs one at a time to identify the failing FRU. 7. If the system does not start, suspect remaining system FRUs in the following order: a. Hotswap sense card b. I/O function card c. System management adapter d. I/O board e. Processor f. Processor daughter board g. Processor board h. Power control card i. Midplane j. Power supply

	FRU/Action
5V bus B (power to PCI slots and SCSI devices)	1. **Disconnect AC power.** 2. Remove all internal SCSI devices (DASD or Tape drives). 3. Remove the SCSI backplane. 4. Remove all PCI adapters except the I\O function card and the system management adapter. 5. Reconnect the AC power and wait about 30 seconds for the system management adapter to initialize. 6. Attempt to start the system. If the system starts, one of the FRUs removed is the failing FRU. Reinstall the FRUs one at a time to identify the failing FRU. 7. If the system does not start, suspect remaining system FRUs in the following order: a. I/O Function card b. System management adapter c. I/O board d. Power control card e. Midplane f. Power supply
12V bus A (power to PCI slots)	1. **Disconnect AC power.** 2. Remove all PCI adapters except the I\O function card and the system management adapter. 3. Reconnect the AC power and wait about 30 seconds for the system management adapter to initialize. 4. Attempt to start the system. If the system starts, one of the FRUs removed is the failing FRU. Reinstall the FRUs one at a time to identify the failing FRU. 5. If the system does not start, suspect FRUs in the following order: a. I/O Function card b. System management adapter c. I/O board d. Midplane e. Power supply

	FRU/Action
12V bus B (power to media devices and I/O fans)	1. **Disconnect AC power.** 2. Remove all internal media devices (DASD, CD-ROM, tape, and floppy drives). 3. Remove the SCSI backplane. 4. Remove all the I/O fans (4, 5, and 6). 5. Reconnect the AC power and wait about 30 seconds for the system management adapter to initialize. 6. Attempt to start the system. If the system starts, one of the FRUs removed is the failing FRU. Reinstall the FRUs one at a time to identify the failing FRU. 7. If the system does not start, suspect FRUs in the following order: a. Midplane b. Power control card c. Power supply

Server component fault indicators

Fault Indicator	FRU/Action
Memory DIMM (see "Memory board component locations" on page 91)	1. **DIMM indicated by the lit LED** **Note:** Run the Configuration/Setup Utility to re-enable the DIMM slot following FRU replacement (see "The Configuration/Setup Utility program" on page 22). 2. Check system error log and diagnose any error messages.
Processor (see "Processor-daughterboard component locations" on page 93)	1. **Processor indicated by the lit LED** 2. Check system error log and diagnose any error messages.
Hard disk drive (see "Controls and indicators" on page 9)	1. **Hard Disk Drive indicated by the lit LED** 2. Check system error log and diagnose any error messages.
Processor fan (see "Hot-swap fan" on page 63)	1. **Processor Fan indicated by the lit LED** 2. Check system error log and diagnose any error messages.
I/O fan (see "I/O fan" on page 118)	1. **I/O Fan indicated by the lit LED** 2. Check system error log and diagnose any error messages.
System Management adapter (see "Advanced System Management PCI adapter component locations" on page 49)	1. **System Management Adapter** 2. Check system error log and diagnose any error messages.

Fault Indicator	FRU/Action
I/O function card (see "I/O function card component locations" on page 84)	1. **I/O Function Card** 2. Check system error log and diagnose any error messages.
PCI adapter (see "Adapters" on page 45)	1. **PCI Adapter indicated by the lit LED** 2. Check system error log and diagnose any error messages.

Diagnostic error codes

Error Code / Symptom	FRU/Action
001-XXX-XXX (Failed core tests)	1. **I/O Function Card** 2. I/O Board
005-XXX-XXX (Failed Video test)	1. **I/O Function Card** 2. I/O Board
011-XXX-XXX (Failed Serial Port test)	1. **I/O Function Card** 2. I/O Board
014-XXX-XXX (Failed Parallel Port test)	1. **I/O Function Card** 2. I/O Board
015-XXX-XXX (Failed USB test)	1. **I/O Board** 2. I/O Function Card
030-XXX-000 (Failed Internal SCSI interface test -channel 0)	1. **I/O Function Card** 2. I/O Board
030-XXX-001 (Failed Internal SCSI interface test -channel 1)	1. **I/O Function Card** 2. I/O Board
035-XXX-000 (Failed RAID test for adapter in slot 1)	1. **SCSI Drive Cable** 2. RAID Adapter 1 3. SCSI Backplane

Error Code / Symptom	FRU/Action
035-XXX-001 (Failed RAID test for Fixed Disk in bay 1 SCSI ID 0) **Important:** This is a duplicate error code used for adapters and disk drives. To verify the type of failure, see the system error log.	1. **Fixed Disk 1** 2. SCSI Drive Cable 3. RAID Adapter 4. SCSI Backplane
035-XXX-001 (Failed RAID test for adapter in slot 2) **Important:** This is a duplicate error code used for adapters and disk drives. To verify the type of failure, see the system error log.	1. **SCSI Drive Cable** 2. RAID Adapter 2 3. SCSI Backplane
035-XXX-002 (Failed RAID test for Fixed Disk in bay 2 SCSI ID 1) **Important:** This is a duplicate error code used for adapters and disk drives. To verify the type of failure, see the system error log.	1. **Fixed Disk 2** 2. SCSI Drive Cable 3. RAID Adapter 4. SCSI Backplane

Error Code / Symptom	FRU/Action
035-XXX-002 (Failed RAID test for adapter in slot 3) **Important:** This is a duplicate error code used for adapters and disk drives. To verify the type of failure, see the system error log.	1. **SCSI Drive Cable** 2. RAID Adapter 3 3. SCSI Backplane
035-XXX-003 (Failed RAID test for adapter in slot 4)	1. **SCSI Drive Cable** 2. RAID Adapter 4 3. SCSI Backplane
035-XXX-004 (Failed RAID test for adapter in slot 4)	1. **SCSI Drive Cable** 2. RAID Adapter 5 3. SCSI Backplane
035-XXX-005 (Failed RAID test for adapter in slot 4)	1. **SCSI Drive Cable** 2. RAID Adapter 6 3. SCSI Backplane
035-XXX-006 (Failed RAID test for adapter in slot 4)	1. **SCSI Drive Cable** 2. RAID Adapter 7 3. SCSI Backplane
035-XXX-007 (Failed RAID test for adapter in slot 4)	1. **SCSI Drive Cable** 2. RAID Adapter 8 3. SCSI Backplane
035-XXX-008 (Failed RAID test for adapter in slot 4)	1. **SCSI Drive Cable** 2. RAID Adapter 9 3. SCSI Backplane
035-XXX-009 (Failed RAID test for adapter in slot 4)	1. **SCSI Drive Cable** 2. RAID Adapter 10 3. SCSI Backplane
035-XXX-010 (Failed RAID test for adapter in slot 4)	1. **SCSI Drive Cable** 2. RAID Adapter 11 3. SCSI Backplane
035-XXX-011 (Failed RAID test for adapter in slot 4)	1. **SCSI Drive Cable** 2. RAID Adapter 12 3. SCSI Backplane

Error Code / Symptom	FRU/Action
035-XXX-099 (No adapters found)	1. **If an adapter is installed, re-check its connection** 2. 3.
035-XXX-Y99 (Failed RAID test on PCI slot Y. Check system error log before replacing a FRU.)	1. **RAID Adapter in slot Y** 2. SCSI Backplane 3. Cable
035-253-Y99 (RAID adapter initialization failure)	1. **ServeRAID adapter in slot Y is not configured properly. Obtain the basic and extended configuration status and refer to the ServeRAID HMM for more information.**
035-XXX-YNN (Fixed disk error at SCSI ID NN on slot Y. Check system error log before replacing a FRU.)	1. **Fixed disk with SCSI ID NN on RAID adapter in PCI slot Y**
089-XXX-001 (Failed Microprocessor test)	1. **Cache Coherency DIMMs, if two Processor Daughter Boards are installed. Disregard if a single Processor Daughter Board is installed.** 2. Processor B1 3. Processor Daughter Board B 4. Processor Controller Board
089-XXX-002 (Failed Microprocessor test)	1. **Cache Coherency DIMMs, if two Processor Daughter Boards are installed. Disregard if a single Processor Daughter Board is installed.** 2. Processor B2 3. Processor Daughter Board B 4. Processor Controller Card
089-XXX-003 (Failed Microprocessor test)	1. **Cache Coherency DIMMs, if two Processor Daughter Boards are installed. Disregard if a single Processor Daughter Board is installed.** 2. Processor B3 3. Processor Daughter Board B 4. Processor Controller Card
089-XXX-004 (Failed Microprocessor test)	1. **Cache Coherency DIMMs, if two Processor Daughter Boards are installed. Disregard if a single Processor Daughter Board is installed.** 2. Processor B4 3. Processor Daughter Board B 4. Processor Controller Card

Error Code / Symptom	FRU/Action
089-XXX-005 (Failed Microprocessor test)	1. **Cache Coherency DIMMs, if two Processor Daughter Boards are installed. Disregard if a single Processor Daughter Board is installed.** 2. Processor A1 3. Processor Daughter Board A 4. Processor Controller Card
089-XXX-006 (Failed Microprocessor test)	1. **Cache Coherency DIMMs, if two Processor Daughter Boards are installed. Disregard if a single Processor Daughter Board is installed.** 2. Processor A2 3. Processor Daughter Board A 4. Processor Controller Card
089-XXX-007 (Failed Microprocessor test)	1. **Cache Coherency DIMMs, if two Processor Daughter Boards are installed. Disregard if a single Processor Daughter Board is installed.** 2. Processor A3 3. Processor Daughter Board A 4. Processor Controller Card
089-XXX-008 (Failed Microprocessor test)	1. **Cache Coherency DIMMs, if two Processor Daughter Boards are installed. Disregard if a single Processor Daughter Board is installed.** 2. Processor A4 3. Processor Daughter Board A 4. Processor Controller Card
165-XXX-000 (Failed System Management Adapter test)	1. **System Management Adapter** 2. System Management Adapter Cable 3. Front Panel Cable 4. Front Panel 5. I/O Function Card
180-XXX-000 (LED test failed)	1. **System Management Adapter**
180-XXX-001 (LED test failed)	1. **Front Panel Cable** 2. Front Panel 3. System Management Adapter Cable
180-XXX-002 (Memory Card B LED test failed)	1. **Memory Card B** 2. LED Card 3. Midplane
180-XXX-003 (Memory Card A LED test failed)	1. **Memory Card A** 2. LED Card 3. Midplane
180-XXX-004 (PCI Power/Attention LED tests failed)	1. **I/O Board** 2. PCI switch card

Error Code / Symptom	FRU/Action
180-XXX-005 (Retention bracket failure)	1. **PCI switch card** 2. I/O Function card 3. I/O Board
180-XXX-006 (ASPI not loaded)	1. **SCSI Drive Cable** 2. SCSI Backplane 3. I/O Function Card
180-XXX-007 (DASD LED failed, see message for slot)	1. **Drive Cable** 2. DASD backplane
180-XXX-008 (DIMM LEDs failed)	1. **LED Card** 2. Midplane
180-XXX-009 (CPU LEDs failed)	1. **LED Card** 2. Processor Daughter Board A 3. Processor Daughter Board B
185-XXX-001 (Intrusion Security test failed)	1. **Intrusion Cable** 2. Front Panel Cable 3. Front Panel 4. I/O Function Card
185-XXX-002 (Intrusion Security test failed)	1. **Intrusion Cable** 2. Front Panel Cable 3. Front Panel 4. I/O Function Card
201-004-1DD (Single Bit Memory Error on Memory Card B) *DD* = DIMM Number (silk screened on memory card)	1. **DIMM (See message for DIMM Number)** 2. Memory Card B 3. Midplane
201-004-2DD (Single Bit Memory Error on Memory Card A) *DD* = DIMM Number (silk screened on memory card)	1. **DIMM (See message for DIMM Number)** 2. Memory Card A 3. Midplane
201-199-000 (General memory failure)	1. **DIMM** 2. Memory Card A 3. Memory Card B 4. Midplane

Error Code / Symptom	FRU/Action
201-204-1DD (Multiple Bit Memory Error on Memory Card B) *DD* = DIMM Number (silk screened on memory card)	1. **DIMM (See message for DIMM Number)** 2. Memory Card B 3. Midplane
201-204-2DD (Multiple Bit Memory Error on Memory Card A) *DD* = DIMM Number (silk screened on memory card)	1. **DIMM (See message for DIMM Number)** 2. Memory Card A 3. Midplane
201-XXX-001 (Failed ECC test)	1. **DIMM (verify failing FRU in system error log)**
202-XXX-001 (Failed Cache test)	1. **Processor B1** 2. Processor Daughter Board B 3. Processor Controller Card
202-XXX-002 (Failed Cache test)	1. **Processor B2** 2. Processor Daughter Board B 3. Processor Controller Card
202-XXX-003 (Failed Cache test)	1. **Processor B3** 2. Processor Daughter Board B 3. Processor Controller Card
202-XXX-004 (Failed Cache test)	1. **Processor B4** 2. Processor Daughter Board B 3. Processor Controller Card
202-XXX-005 (Failed Cache test)	1. **Processor A1** 2. Processor Daughter Board A 3. Processor Controller Card
202-XXX-006 (Failed Cache test)	1. **Processor A2** 2. Processor Daughter Board A 3. Processor Controller Card
202-XXX-007 (Failed Cache test)	1. **Processor A3** 2. Processor Daughter Board A 3. Processor Controller Card
202-XXX-008 (Failed Cache test)	1. **Processor A4** 2. Processor Daughter Board A 3. Processor Controller Card

Error Code / Symptom	FRU/Action
206-XXX-XXX (Failed Diskette Drive test)	1. **Diskette Drive Cable** 2. Media power cable 3. Diskette Drive 4. I/O Function Card
215-XXX-000 (Failed CD-ROM test)	1. **CD-ROM Drive Cable** 2. Media power cable 3. CD-ROM drive 4. I/O Function Card
217-XXX-001 (Failed BIOS Fixed Disk test)	1. **Fixed Disk 1**
217-XXX-002 (Failed BIOS Fixed Disk test)	1. **Fixed Disk 2**
301-XXX-XXX (Failed Keyboard test)	1. **Keyboard** 2. I/O Function Card
415-XXX-XXX (Failed modem test)	1. **Modem Card**

Other error symptoms

	FRU/Action
CD is not working properly or there is no CD activity.	1. **Clean the CD.** 2. Clean the optical-head lens. 3. Run Diagnostics. 4. Check the CD-ROM cable. 5. CD-ROM Drive 6. Media power cable 7. I/O function card
CD-ROM drive tray is not working. (The server must be powered-on.) If the server is on and the tray does not eject,	1. **Insert the end of a paper clip into the manual tray-release opening.** 2. CD-ROM Drive 3. Media Power Cable

	FRU/Action
CD-ROM drive is not recognized or is not accessible.	1. **Run Configuration/Setup, enabled primary IDE channel.** 2. Check cables and jumpers. 3. Check for correct device driver. If the CD-ROM drive is still not recognized, exchange FRUs in the following order: 1. Drive Cable 2. CD-ROM Drive 3. I/O Function Card 4. Media power cable
Diskette drive in-use light stays on; or the in-use light flashes, but the diskette is not read; or the system bypasses the diskette drive. If there is a diskette in the drive, verify that:	1. **The diskette drive is enabled in the configuration programs.** 2. The diskette is properly formatted. 3. The diskette is good and not damaged. (Try another diskette if you have one.) 4. The diskette is inserted correctly in the drive. 5. The diskette contains the necessary files to start the server. 6. The software program is OK. If the diskette drive in-use light stays on, or the system continues to configure or bypass the diskette drive, exchange FRUs in the following order: 1. Diskette drive 2. Drive cable 3. I/O function card
Diskette drive is not working or is not accessible.	1. **Check diskette drive cable.** 2. Diskette drive 3. I/O function card 4. Media power cable
Diskette drive does not configure.	1. **Check diskette drive cable.** 2. Diskette drive 3. I/O function card 4. Media power cable
Diskette drive will not read or write to the media.	1. **Try different media.** 2. Check the diskette drive cable. 3. Diskette drive 4. I/O function card 5. Media power cable
CPU Fan is running, but the CPU Fan LED is on.	1. **Fan** 2. LED card

	FRU/Action
CPU Fans (all) are not turning, but the I/O fans are turning.	1. **LED card** 2. Power control card
CPU Fans (only) continuously running fast.	1. **LED Card** 2. Power Control Card
I/O Fan is running, but the I/O Fan LED is on.	1. **Fan** 2. Power control card
I/O Fans (all) are not turning, but the CPU fans are turning.	1. **Midplane** 2. Power control card
I/O Fans (only) continuously running fast.	1. **Power Control Card**
Fan (one only) not running.	1. **Swap fans to see if the fan is defective. If the fan still does not run in the new position, replace the fan.** 2. Midplane (I/O fan) 3. LED Card (CPU fan) 4. Power Control Card
Fans (multiple) not running.	1. **Power control card (if both I/O and CPU fans are not running)** 2. Midplane (I/O fans) 3. LED card (CPU fans)
Fans (all) not running.	1. **Power control card** 2. Midplane 3. Power supply 4. AC power source
Fans (all) continuously run fast. **Note:** This may be proper operation for a system in an elevated ambient temperature environment.	1. **Check all power supplies for AC Good and DC Good LEDs.** 2. Power control card 3. Front panel cable 4. Front panel assembly 5. I/O function card 6. System Management Adapter 7. I/O board

	FRU/Action
Fans (multiple) run fast and there is no video.	1. **Check all power supplies for AC Good and DC Good LEDs.** 2. Check all fans. Swap positions to see if the problem follows the fan. Replace any fans not turning or if their fault LEDs are lit. 3. If all power supply LEDs and all fans are okay, replace FRUs in the following order: a. Operator panel b. Operator panel cable c. System management adapter d. System management adapter cable
Monitor problems (general) Some IBM monitors have their own self-tests. If you suspect a problem with the monitor, refer to the information that comes with the monitor for adjusting and testing instructions.	1. **Check video cable.** 2. Monitor 3. Display adapter (if applicable) 4. I/O function card 5. I/O board
Network no longer works.	1. **Check cables attached to the PCI adapter.** 2. Check protocol settings 3. PCI adapter 4. PCI switch card 5. I/O board
PCI adapter no longer responds.	1. **Check cables attached to the PCI adapter.** 2. PCI adapter 3. PCI switch card 4. I/O board
System continually resets itself and reboots	1. **See** "Undetermined problems" on page 158**.**

POST error codes

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

Error Code/Symptom	FRU/Action
062 (Three consecutive boot failures using the default configuration.)	1. **Run Configuration/Setup** 2. Battery 3. I/O function card

Error Code/Symptom	FRU/Action
101, 102, 106 (System and processor error)	1. **I/O board** 2. Processor controller board 3. Processor daughterboard
106 (Diskette controller error)	1. **I/O function card** 2. I/O board
111 (Channel check error)	1. **I/O board**
114 (Adapter read-only memory error)	1. **Failing adapter** 2. Run diagnostics
129 (Internal cache error)	1. **BSP Processor** **Note:** The BSP Processor is identified on the IBM logo screen during boot. If you cannot boot to the IBM logo screen, the BSP is the highest functional processor (highest functioning processor slot number) on the processor daughterboard A. 2. Processor controller board 3. Processor daughterboard
151 (Real time clock error)	1. **Run Diagnostics** 2. Battery 3. I/O function card
161 (Real time clock battery error)	1. **Run Configuration/Setup** 2. Battery 3. I/O function card
162 (Device Configuration Error) Note: Be sure to load the default settings and any additional desired settings; then, **save the configuration.**	1. **Run Configuration/Setup** 2. Battery 3. Failing device identified by displayed error message 4. I/O board 5. Media power cable
163 (Real-Time Clock error)	1. **Run Configuration/Setup** 2. Battery 3. I/O function card
164 (Memory configuration changed, see "Memory settings" on page 30.)	1. **If error 289 is displayed, follow instruction on screen. Verify failing FRU in system error log.** 2. Run Configuration/setup 3. DIMM 4. Memory Card 5. Processor daughterboard 6. Processor controller board

Error Code/Symptom	FRU/Action
173 (System CMOS checksum bad)	1. **Run Configuration/Setup** 2. Battery 3. I/O function card
175 (Hardware error)	1. **System Management adapter** 2. I/O board 3. Processor daughterboard 4. Processor controller board
176 (Computer cover or cable cover was removed without a key being used)	1. **Run Configuration/Setup** 2. Intrusion cable (if in a tower configuration) 3. Front panel cable 4. Front panel 5. I/O function card
177, 178 (Security hardware error)	1. **Run Configuration/Setup** 2. Intrusion cable (if in a tower configuration) 3. Front panel cable 4. Front panel 5. I/O function card 6. System Management adapter 7. System Management adapter cable
184 (Power-on password corrupted)	1. **Run Configuration/Setup** 2. Battery 3. System Management adapter
185 (Drive startup sequence information corrupted)	1. **Run Configuration/Setup** 2. System Management adapter
186 (Security control logic error)	1. **Run Configuration/Setup** 2. Intrusion cable (if in a tower configuration) 3. Front panel cable 4. Front panel 5. I/O function card 6. System Management adapter
187 (VPD serial number not set.)	1. **Set serial number in Setup** 2. System Management adapter
188 (Bad EEPROM CRC #2)	1. **Run Configuration/Setup** 2. I/O board

Error Code/Symptom	FRU/Action
189 (An attempt was made to access the server with invalid passwords)	1. **Run Configuration/Setup, enter the administrator password**
201 (Memory test error)	1. **DIMM** 2. Memory board 3. Processor controller board 4. Processor daughterboard
229 (Cache error)	1. **BSP Processor** **Note:** The BSP Processor is identified on the IBM logo screen during boot. If you cannot boot to the IBM logo screen, the BSP is the highest functional processor (highest functioning processor slot number) on the processor daughterboard A. 2. Processor controller board 3. Processor daughterboard
262 (DRAM parity configuration error)	1. **Run Configuration/Setup** 2. Battery 3. Processor controller board 4. Processor daughterboard
289 (DIMM has been disabled by user or system, see "Memory settings" on page 30.)	1. **Follow instructions on screen. Verify failing FRU in system error log.**
301 (Keyboard or keyboard controller error)	1. **Keyboard** 2. I/O function card 3. I/O board
303 (Keyboard controller error)	1. **Keyboard** 2. I/O function card 3. I/O board
602 (Invalid diskette boot record)	1. **Diskette media** 2. Check drive cable 3. Diskette drive 4. Media power cable 5. I/O function card
604 (Diskette drive error)	1. **Run Configuration/Setup and Diagnostics** 2. Check drive cable 3. Diskette drive 4. Media power cable 5. I/O function card

Error Code/Symptom	FRU/Action
605 (Unlock failure)	1. **Check drive cable** 2. Diskette drive 3. Media power cable 4. I/O function card
662 (Diskette drive configuration error)	1. **Run Configuration/Setup and Diagnostics** 2. Check drive cable 3. Diskette drive 4. Media power cable 5. I/O function card
962 (Parallel port error)	1. **Disconnect external cable on parallel port.** 2. Run Configuration/Setup 3. I/O function card
11XX (System board serial port 1 or 2 error)	1. **Disconnect external cable on serial port.** 2. Run Configuration/Setup 3. I/O function card
1600 (System Management adapter is not functioning) Do the following before replacing a FRU: • Remove the ac power to the system, wait 20 seconds; then, reconnect the ac power. Wait 30 seconds; then, power-on the system.	1. **I/O board cable** 2. System Management adapter cable 3. System Management adapter 4. I/O function card 5. I/O board
1762 (Fixed disk configuration error)	1. **Fixed disk cables** 2. Run Configuration/Setup 3. Fixed disk adapter 4. Fixed disk drive 5. I/O function card
178X (Fixed disk configuration error)	1. **Fixed disk cables** 2. Run Diagnostics 3. Fixed disk adapter 4. Fixed disk drive 5. I/O function card

Error Code/Symptom	FRU/Action
1800 (No more hardware interrupt available for PCI adapter)	1. **See system error log** 2. See error code 001800XX
1800 (No more hardware interrupt available for PCI adapter)	1. **See system error log** 2. See error code 001801XX
1801 (No room for PCI option ROM)	1. **See system error log** 2. See error code 001802XX
1802 (No more I/O space available for PCI adapter)	1. **See system error log** 2. See error code 001800XX
1803 (No more memory above 1MB available for PCI adapter)	1. **See system error log** 2. See error code 001803XX
1804 (No more memory below 1MB available for PCI adapter)	1. **See system error log** 2. See error code 001804XX
1805 (PCI option ROM checksum error)	1. **See system error log** 2. See error code 001805XX
1806 (PCI to PCI bridge error)	1. **See system error log** 2. See error code 001806XX
1807 (PCI device not responding)	1. **See system error log** 2. See error code 001807XX
1808 (Unsupported PCI device error)	1. **See system error log** 2. See error code 001808XX
1962 (Drive does not contain a valid boot sector)	1. **Verify a bootable operating system is installed.** 2. Run Diagnostics 3. Internal SCSI drive cable, if internal boot device; external SCSI drive cable, in external boot device 4. I/O function card 5. Hard disk drive
2400 (Video controller test failure)	1. **Video Adapter (if installed)** 2. I/O function card

Error Code/Symptom	FRU/Action
2462 (Video memory configuration error)	1. **Video Adapter (if installed)** 2. I/O function card
5962 (IDE CD-ROM configuration error)	1. **Run Configuration/Setup** 2. CD-ROM drive cable 3. CD-ROM drive 4. Media power cable 5. Battery 6. I/O function card
8603 (Pointing Device Error)	1. **Pointing device** 2. I/O function card
00012000 (Machine check architecture error)	1. **BSP processor** **Note:** The BSP Processor is identified on the IBM logo screen during boot. If you cannot boot to the IBM logo screen, the BSP is the highest functional processor (highest functioning processor slot number) on the processor daughterboard A. 2. Processor controller board 3. Processor daughterboard
000195A01 (Processor A1 is not functioning)	1. **Cache coherency filter DIMMs (if applicable)** 2. Processor A1 3. Processor daughterboard A 4. Processor controller board
000195A02 (Processor A2 is not functioning)	1. **Cache coherency filter DIMMs (if applicable)** 2. Processor A2 3. Processor daughterboard A 4. Processor controller board
000195A03 (Processor A3 is not functioning)	1. **Cache coherency filter DIMMs (if applicable)** 2. Processor A3 3. Processor daughterboard A 4. Processor controller board
000195A04 (Processor A4 is not functioning)	1. **Cache coherency filter DIMMs (if applicable)** 2. Processor A4 3. Processor daughterboard A 4. Processor controller board
000195B01 (Processor B1 is not functioning)	1. **Cache coherency filter DIMMs (if applicable)** 2. Processor B1 3. Processor daughterboard B 4. Processor controller board

Error Code/Symptom	FRU/Action
000195B02 (Processor B2 is not functioning)	1. **Cache coherency filter DIMMs (if applicable)** 2. Processor B2 3. Processor daughterboard B 4. Processor controller board
000195B03 (Processor B3 is not functioning)	1. **Cache coherency filter DIMMs (if applicable)** 2. Processor B3 3. Processor daughterboard B 4. Processor controller board
000195B04 (Processor B4 is not functioning)	1. **Cache coherency filter DIMMs (if applicable)** 2. Processor B4 3. Processor daughterboard B 4. Processor controller board
000197B01 (Processor B1 failed BIST)	1. **Processor B1** 2. Processor daughterboard B 3. Processor controller board
000197B02 (Processor B2 failed BIST)	1. **Processor B2** 2. Processor daughterboard B 3. Processor controller board
000197B03 (Processor B3 failed BIST)	1. **Processor B3** 2. Processor daughterboard B 3. Processor controller board
000197B04 (Processor B4 failed BIST)	1. **Processor B4** 2. Processor daughterboard B 3. Processor controller board
000197A01 (Processor A1 failed BIST)	1. **Processor A1** 2. Processor daughterboard A 3. Processor controller board
000197A02 (Processor A2 failed BIST)	1. **Processor A2** 2. Processor daughterboard A 3. Processor controller board
000197A03 (Processor A3 failed BIST)	1. **Processor A3** 2. Processor daughterboard A 3. Processor controller board
000197A04 (Processor A4 failed BIST)	1. **Processor A4** 2. Processor daughterboard A 3. Processor controller board
00019900A (Processor bus A disabled)	1. **Cache coherency filter DIMMs** 2. Processor daughterboard A 3. Processor controller board

Error Code/Symptom	FRU/Action
00019900B (Processor bus B disabled)	1. **Cache coherency filter DIMMs** 2. Processor daughterboard B 3. Processor controller board
001800XX (No more hardware interrupt available for PCI adapter)	1. **Run Configuration/Setup** 2. Try adapter in another PCI slot 3. Failing adapter 4. I/O function card
001801XX (No room for PCI option ROM) Note: Adapters have too many ROMs. Reduce number of PCI adapters or disable their ROMs. The last two digits identify the PCI slot of the suspect adapter.	1. **Run Configuration/Setup** 2. Failing adapter 3. I/O function card 4. I/O board
001802XX (No more I/O space available for PCI adapter) The last two digits identify the PCI slot of the suspect adapter.	1. **Run Configuration/Setup** 2. Failing adapter 3. I/O function card
001803XX (No more memory above 1MB available for PCI adapter) The last two digits identify the PCI slot of the suspect adapter.	1. **Run Configuration/Setup** 2. Failing adapter 3. I/O board
001804XX (No more memory below 1MB available for PCI adapter) The last two digits identify the PCI slot of the suspect adapter.	1. **Run Configuration/Setup** 2. Move the failing adapter to slot 11 or 12 3. Failing adapter
001805XX (PCI option ROM checksum error) The last two digits identify the PCI slot of the suspect adapter.	1. **PCI adapter** 2. I/O board

Error Code/Symptom	FRU/Action
001806XX (PCI to PCI bridge error) The last two digits identify the PCI slot of the suspect adapter.	1. **Run Configuration/Setup** 2. Move the failing adapter to slot 1 or 2 3. Failing adapter 4. I/O function card
001807XX (PCI device not responding) The last two digits identify the PCI slot of the suspect adapter.	If the adapter slot power LED is on, suspect FRUs in this order: 1. **PCI adapter** 2. I/O board 3. PCI switch card 4. I/O function card If the adapter slot power LED is off, suspect FRUs in this order: 1. **PCI switch card** 2. PCI adapter 3. I/O board 4. I/O function card
001808XX (Unsupported PCI device error) The last two digits identify the PCI slot of the suspect adapter.	1. **PCI adapter** 2. I/O board
01295085 (ECC checking hardware test error)	1. **Processor controller board** 2. Processor daughterboard 3. BSP processor 4. Run memory diagnostics
01299XXX (Hardware configuration has changed or the VPD information stored on the System Management Adapter has been corrupted) If no hardware has been changed, suspect the System Management Adapter and replace FRUs as listed. If hardware has been changed, this code is only informative and is not an error.	1. **Check the System Management adapter cable** 2. System Management adapter 3. I/O function card 4. I/O board

Error Code/Symptom	FRU/Action
I9990301 (Fixed boot sector error, no operating system installed)	1. **Run Configuration/Setup for correct startup** 2. Verify operating system installed 3. Internal SCSI drive cable, if internal boot device; external SCSI drive cable, in external boot device 4. SCSI drive 5. SCSI Backplane 6. I/O function card
I9990305 (Fixed boot sector error, no operating system installed)	1. **Install operating system to hard disk drive.**

DASD LEDs for hardfiles running in a RAID environment

Check the status LED. If on, do the following:

1. Check the internal SCSI drive cable.
2. Replace the failing hard disk drive.
3. Replace the SCSI backplane.
4. Replace the hard disk drive controller (PCI adapter).

SCSI errors

Error code	FRU/Action
Internal SCSI hard drive does not configure on boot	1. **Run Setup/Configuration Utility.** 2. Run SCSI Select Utility. 3. Suspect FRUs in the following order: a. SCSI cable b. Media Power cable c. Hard file d. I/O Function card e. SCSI backplane
External SCSI device does not configure on boot	One or more of the following might be causing the problem: 1. **External SCSI devices must be powered-on before you power-on the server.** 2. The cables for all external SCSI devices are connected correctly, and are not damaged. 3. If you have attached an external SCSI device to the server, make sure the external SCSI termination is set to automatic. 4. The last device in each SCSI chain is terminated correctly. 5. The SCSI devices are configured correctly. 6. Front Panel Cable.

Error code	FRU/Action
Internal SCSI device status LED stays lit constantly	1. **SCSI device (if in a RAID configuration)** 2. SCSI backplane 3. SCSI cable
Negotiation failed	1. **Swap the SCSI cable on the I/O function card to the other SCSI port and reboot system.** If the failure is the same as before, suspect FRUs in the following order: a. DASD drive b. SCSI cable c. SCSI backplane 2. If the system does not fail with the SCSI cable plugged into the other SCSI port, replace the I/O function card.
Wide negotiation failed	1. **Swap the SCSI cable on the I/O function card to the other SCSI port and reboot system.** If the failure is the same as before, suspect FRUs in the following order: a. DASD drive b. SCSI cable c. SCSI backplane 2. If the system does not fail with the SCSI cable plugged into the other SCSI port, replace the I/O function card.
Termination error or faulty cable	1. **Swap the SCSI cable on the I/O function card to the other SCSI port and reboot system.** If the failure is the same as before, suspect FRUs in the following order: a. DASD drive b. SCSI cable c. SCSI backplane 2. If the system does not fail with the SCSI cable plugged into the other SCSI port, replace the I/O function card.

SM BUS error (3-3-2)

Note: The minimum system configuration required to force power-on the system using I/O jumper J11 is:

1. One DIMM on one memory card
2. One processor
3. One processor daughter board
4. Processor control board without cache coherency filter cards
5. Midplane
6. Power control card
7. LED card
8. I/O board
9. I/O function card
10. One power supply

If the system produces a 3-3-2 beep error, power-off the system and disconnect all three power supplies from the ac power sources. Wait 30 seconds, then reconnect all three ac power sources and power-on the system. If this does not correct the problem, do the following:

1. Connect remotely to the system through the System Management Adapter and check the system error log.

   Investigate any errors posted.

2. Power off the system and disconnect all the power supplies from the ac power source.

3. Reduce the system to the minimum system configuration described in the note at the beginning of this section. You may leave the PCI cards in place and use the PCI switch card to remove power from the PCI slots.

   Note: Any power supplies not connected to AC power should be unlatched and unseated from the midplane to ensure proper I2C bus termination. Lift the power supply handle and pull the power supply to the rear of the system approximately 1 inch.

4. Reconnect the ac power source to the single power supply in the minimum configuration. Use jumper J11 on the I/O Board to power-on the server.

5. If the server still exhibits the 3-3-2 beep sequence, skip to step 8 on page 157.

6. If the server starts without the 3-3-2 beep code, power-off the system, remove the jumper from J11, and then attach the Front Panel Cable and front panel assembly to the I/O Function Card.

7. Attempt to boot the server using the power control button on the Front Panel. If you hear the 3-3-2 beep code, replace the Front Panel and/or cable. If the server starts, power-off the system, then attach/install the remaining components one at a time, until you hear the 3-3-2 beep. The last FRU added prior to the 3-3-2 beep code is the failing FRU. Power-on the server after the addition of each FRU, and power it off prior to adding the next FRU. FRUs should be added in the following order:

   a. Front panel (after which you no longer need to use jumper J11 on the I/O board to force power on)

   b. Power supplies (one at a time)

   c. Processors (one at a time)

      Note: Addition of the 5th processor automatically requires installation of the second processor daughter card and the cache coherency filter DIMMs as well. Any of these may be the failing FRU if the system fails at this point. If the 3-3-2 beep occurs when this combination is installed, do the following:

      1) Remove the cache coherency filter DIMMs.

      2) Remove the first processor daughter board with all its processors.

      3) Reboot the system.

      If the system boots without the 3-3-2 beep, one or more of the cache coherency filter DIMMs were the failing FRUs. Replace the pair of DIMMs.

      If the system does not boot with this combination of processor and processor daughter card, do the following:

      1) Swap the processor with one from the first processor daughter card

      2) Reboot the system.

      If the system boots without the 3-3-2 beep, the processor just removed is the failing FRU. Replace it.

If the system still gives the 3-3-2 beep, the processor daughter board is the failing FRU. Replace it.

d. Processor terminator cards (one at a time)

e. Memory card (maintaining DIMM pairs across the memory cards)

f. Memory DIMM (maintaining DIMM pairs across the memory cards)

g. System management adapter

h. SCSI backplane

i. Hardfiles (one at a time)

j. CDROM drive

k. Diskette drive

l. Fans (one at a time)

m. PCI card (one at a time)

n. External device (one at a time)

8. If the server does not start with the minimum required configuration, one of the FRUs remaining in the configuration is bad. Do the following:

   a. If the system had multiple processors, processor daughter boards, memory cards, DIMMs or power supplies in its original configuration, swap removed FRUs with those currently installed in the minimum partial-boot configuration reboot to see if there is any change in system behavior. If system boots to the IBM logo screen after swapping a FRU, last FRU removed is the failing FRU. Swap FRUs one at a time in this order

      1) Power supplies

      2) Processors

      3) Processor terminator cards

      4) Processor daughter boards

      5) Memory boards

      6) DIMMs

   b. Continue with this step until the failing FRU has been identified, or all multiple FRUs have been cycled through the minimum configuration.

   c. If the failing FRU has been identified, replace it and go to step 8..

   d. If all multiple FRUs have been cycled through the minimum configuration and the failing FRU has not been identified, go to step 9..

9. One of the FRUs remaining in the configuration is the failing FRU. Replace FRUs in the order listed below. The FRU which allows the system to boot without the 3-3-2 beep is the failing FRU:

   a. Memory board (if the original configuration had only one)

   b. DIMM (if the original configuration had only one)

   c. Processor (if the original configuration had only one)

   d. Processor terminator card (if the original configuration had only one)

   e. Processor daughter board (if the original configuration had only one)

   f. Processor controller board

   g. I/O board

   h. I/O function card

   i. Power control card

j. Midplane

10. Once the failing FRU has been identified and the minimum configuration will boot properly without the 3-3-2 beep code, reconfigure the server to its original configuration.

Undetermined problems

You are here because you have encountered a condition which could not be corrected using other parts of the service package. Before proceeding, you should have already dealt with any beep codes, POST error codes, diagnostic error codes, error messages in the system error log, error messages on the front panel or video display, or any other symptoms addressed by other sections of this publication.

This section is structured so that if a step is not applicable to the service situation at hand, go to the next step, unless otherwise directed.

Notes:

1. If you suspect a software mismatch is causing failures (solid or intermittent), be sure to see "Resolving configuration conflicts" on page 33.
2. A corrupt CMOS can cause undetermined problems.

Note: If the problem goes away when you remove an adapter from the system, and replacing that adapter does not correct the problem, suspect the I/O board and then the processor board(s).

1. Look at the front of the system and see if any amber component fault indicator LEDs are lit. The component fault indicator LEDs correspond to memory DIMMs and processors installed in the system. A lit LED indicates the failing memory DIMM or processor.
2. If no component fault indicator LEDs are lit, proceed to step 6..
3. If one or more component fault indicator LEDs are lit, replace the FRU corresponding to one of the component fault indicator LEDs.
4. Retest the system. If it boots properly and all component fault indicator LEDs are unlit, go to step 32 on page 165. If there are still remaining component fault indicator LEDs lit, continue replacing the corresponding FRUs one at a time until all component fault indicator LEDs remain unlit.
5. If the FRU(s) identified by the component fault indicator LED did not correct the problem, replace the original FRU(s) and proceed with step 6..
6. Check the LEDs on all the power supplies, see "Power supply LED errors" on page 128. If the power supply LEDs indicate the power supplies are not working correctly, follow the guidance in "Power supply LED errors" on page 128 and correct that problem before proceeding. If the LEDs indicate the power supplies are working correctly, do the following:
   a. If a component has been added, reseat the added component and components around it, and retest.
   b. If the system has been moved recently, reseat all the components and retest.
   c. If a PCI adapter or a device attached to a PCI adapter that was previously configured is now missing, suspect FRUs in the following order:
      1) PCI adapter
      2) Device attached to the PCI adapter
      3) I/O board
      4) If a non-PCI media device that was previously configured is now missing, suspect FRUs in the following order:

a)Media device

b)I/O function card

c)Media signal cable

d)Media power cable

7. Check the System Error log by booting to the System Configuration/Setup Utility (if possible), or accessing remotely through the System Management Adapter. Locate any error messages generated just prior to the system error. Investigate the errors in the order they were generated, since the root cause may generate multiple errors.

   Note: A single problem might cause several error messages. When this occurs, work to correct the cause of the first error message. After the cause of the first error message is corrected, the other error messages usually will not occur the next time you run the test.

8. Check the LEDs on the I/O board, see "I/O board component locations" on page 83.

   a. Check Power Good LEDs. If they are on, go to step b.. If not on, reseat the I/O board in the midplane. If the Power Good LEDs are still not lit, replace power control card.

   b. Check PCI slot power LEDs. If an adapter is present and its PCI power LED is on, proceed to step c.. If an adapter is present but the power LED is not on, ensure the hot plug switch is closed, then suspect the following FRUs in this order:

      1) PCI adapter

      2) PCI sense card

      3) I/O board.

   c. If no PCI adapter are installed, proceed to step d.. If any PCI adapters are installed, check their PCI slot attention lights (others may be flashing, but focus on those with adapters installed). If a PCI adapter is present and its attention light is flashing, suspect the following FRUs in this order:

      1) PCI adapter

      2) I/O board

      3) I/O function card

   d. If no PCI adapters are installed and one or more PCI attention lights flashing, suspect FRUs in this order:

      1) I/O board

      2) I/O function card

   e. Power-off the computer, wait 30 seconds and then power-on the computer.

   f. If the system boots at least as far as the IBM logo screen, go to step 16 on page 162. If the system will not boot to the IBM logo screen, consider the following note and continue with step g on page 160.

      Note: Minimum partial-boot requirements are:

      - I/O Board
      - I/O Function Card
      - Midplane
      - Power Control Card
      - Power Supply (1)
      - LED card

- Processor Daughter Board (1)
- Processor Controller Board
- Processor (1)
- Memory Card (1)
- DIMM (Minimum requirement = 1 DIMM of 128 MB or larger)
- Video Monitor (Display)

g. Reduce the server to the minimum partial-boot configuration (see note).

h. Retest the system. Use jumper J11 on the I/O board to force power on since the front panel is disconnected.

i. If the system does not boot as far as the IBM logo screen, go to step 11 on page 162.

j. If the system boots to the IBM logo screen, power-off the system, remove jumper J11 on the I/O board, and add components back into the system one at a time and reboot the system until the system fails to boot as far as the IBM logo screen. This narrows the possibilities of the failing FRU to the last FRU added, or the board it plugs into.

Note: In the case of multiple FRUs, such as power supplies, processors, processor terminators, processor daughter boards, memory cards, and DIMMS, it is prudent to verify the function of each FRU in the same position or slot prior to installing multiples of the FRU. This way, you are working with **known-good** FRUs. A failure when multiples are installed indicates failure of the card the multiple FRUs plug into, or another related FRU, rather than the FRU you just installed.

Consider these possibilities:

1) If all processors work in position A-1 but the system fails with processors in A-1 plus any other slot on processor daughterboard A, suspect the processor daughter board followed by the processor controller board.

2) If all power supplies work in position 1 but fail in slots 2 or 3, suspect the midplane or power control card.

3) If all memory DIMMs work in memory board A slot J1 but fail in any other slot, suspect the memory board, followed by the processor control board and the midplane.

4) If a populated memory card works in position A but fails in position B, suspect the processor controller board followed by the midplane.

Components should be added in the following order:

1) Front panel (after which you no longer need to use Jumper J11 on the I/O board to force power on)

2) Power supplies (one at a time)

3) Processors (one at a time)

Note: Addition of the 5th processor automatically requires installation of the second processor daughter card and the cache coherency filter DIMMs as well. Any of these may be the failing FRU if the system fails at this point. If failure occurs when this combination is installed, do the following:

1) Remove the cache coherency filter DIMMs.

2) Remove the first processor daughter board with all its processors.

3) Reboot the system.

If the system boots to the IBM logo screen, the one or more of the cache coherency filter DIMMs were the failing FRUs. Replace the pair of DIMMs.

If the system does not boot with this combination of processor and processor daughter card, do the following:

1) Swap the processor with one from the first processor daughter card
2) Reboot the system.

If the system boots to the IBM logo screen, the processor just removed is the failing FRU. Replace it.

If the system does not boot to the IBM logo screen, the processor daughter board is the failing FRU. Replace it.

k. Processor terminator cards (one at a time)
l. Memory card (maintaining DIMM pairs across the memory cards)
m. Memory DIMM (maintaining DIMM pairs across the memory cards)
n. System management adapter
o. SCSI backplane
p. Hardfiles (one at a time)
q. CD-ROM drive
r. Diskette drive
s. Fans (one at a time)
t. PCI card (one at a time)
u. External device (one at a time)

9. Once the failing FRU is identified, power off the system, replace the failing FRU and go to step 12 on page 162.
10. If the server does not boot as far as the IBM logo screen with the minimum partial-boot configuration, one of the FRUs in the current configuration is faulty. Do the following:
    a. If the system had multiple processors, processor daughter boards, memory cards, DIMMs or power supplies in its original configuration, swap removed FRUs with those currently installed in the minimum partial-boot configuration and reboot to see if there is any change in system behavior. If the system boots to the IBM logo screen after swapping a FRU, the last FRU removed is the failing FRU. Swap FRUs one at a time in this order:
        1) Power supplies
        2) Processors
        3) Processor terminator cards
        4) Processor daughter boards
        5) Memory boards
        6) DIMMs
    b. Continue with this step until the failing FRU has been identified, or all multiple FRUs have been cycled through the minimum partial-boot configuration.
    c. If the failing FRU has been identified, replace it and go to step 12 on page 162.
    d. If all multiple FRUs have been cycled through the minimum partial-boot configuration and the failing FRU has not been identified, go to step 11 on page 162.

11. One of the FRUs remaining in the configuration is the failing FRU. Replace FRUs in the order listed below. The FRU which allows the system to boot as far as the IBM logo screen is the failing FRU:
    a. Memory board (if the original configuration had only one)
    b. DIMM (if the original configuration had only one)
    c. Processor (if the original configuration had only one)
    d. Processor terminator card (if the original configuration had only one)
    e. Processor daughter board (if the original configuration had only one)
    f. Processor controller board
    g. I/O board
    h. I/O function card
    i. Power control card
    j. Midplane
12. Restore the server to its original configuration.
13. Retest the system without external devices attached.
14. Attach external devices.
15. Verify the system repair and return the system to the customer.
16. If the system will boot at least as far as the IBM Logo screen, consider the following note and continue with step 17..

    Note: Minimum full-boot requirements are:

    - I/O Board
    - I/O Function Card
    - Midplane
    - Power Control Card
    - Power Supply (1)
    - Processor Daughter Board (1)
    - Processor Controller Board
    - Processor (1)
    - LED card
    - Memory Card (1)
    - DIMM (Minimum requirement = 1 DIMM of 128 MB or larger)
    - SCSI backplane (if boot hardfile is internal)
    - Boot hardfile (internal or external)
    - PCI SCSI adapter (if external boot hardfile is driven by PCI adapter)
    - Video Monitor (Display)
    - Keyboard
    - Mouse
17. Reduce the system to the minimum full-boot configuration (see note).
18. Retest the system. Use jumper J11 on the I/O board to force power on since the front panel is disconnected.
19. If the system does not boot to the operating system, go to step 21 on page 164. If the system boots to the operating system, shutdown the server and add FRUs back into the configuration one at a time until the system will no longer boot to

the operating system. This narrows the possibilities of the failing FRU to the last FRU added, or the board it plugs into.

Note: In the case of multiple FRUs, such as power supplies, processors, processor terminators, memory cards, and DIMMS, it is prudent to verify the function of each FRU in the same position or slot prior to installing multiples of the FRU. This way, you are working with known-good FRUs. A failure when multiples are installed indicates failure of the card the multiple FRUs plug into, or another related FRU, rather than the FRU you just installed.

Consider these possibilities:

a. If all processors work in position A-1 but the system fails with processors in A-1 plus any other slot on processor daughterboard A, suspect the processor daughter board followed by the processor controller board.

b. If all power supplies work in position 1 but fail in slots 2 or 3, suspect the midplane or power control card.

c. If all memory DIMMs work in memory board A slot J1 but fail in any other slot, suspect the memory board, followed by the processor control board, and the midplane.

d. If a populated memory card works in position A but fails in position B, suspect the processor controller board followed by the midplane.

Components should be added in the following order:

a. Front panel (after which you no longer need to use Jumper J11 on the I/O board to force power on)

b. Power supplies (one at a time)

c. Processors (one at a time)

Note: Addition of the 5th processor automatically requires installation of the second processor daughter card and the cache coherency filter DIMMs as well. Any of these may be the failing FRU if the system fails at this point. If failure occurs when this combination is installed, do the following:

1) Remove the cache coherency filter DIMMs.

2) Remove the first processor daughter board with all its processors.

3) Reboot the system.

If the system boots to the IBM logo screen, the one or more of the cache coherency filter DIMMs were the failing FRUs. Replace the pair of DIMMs.

If the system does not boot with this combination of processor and processor daughter card, do the following:

1) Swap the processor with one from the first processor daughter card

2) Reboot the system.

If the system boots to the IBM logo screen, the processor just removed is the failing FRU. Replace it.

If the system does not boot to the IBM logo screen, the processor daughter board is the failing FRU. Replace it.

d. Processor terminator cards (one at a time)

e. Memory card (maintaining DIMM pairs across the memory cards)

f. Memory DIMM (maintaining DIMM pairs across the memory cards)

g. System management adapter

h. PCI card (one at a time)

i. External device (one at a time)

20. Once the failing FRU is identified, power off the system, replace the failing FRU and go to step 29 on page 165.

21. If the server boots past the IBM logo, but will not boot to the operating system, do the following:

    a. Reboot to the configuration/setup utility.

    b. Use the default configuration

    c. Exit the configuration/setup utility and reboot the system.

    d. After the IBM logo screen disappears, watch the video display to see if the boot device is listed during the SCSI polling sequence. Displayed on the screen will be a line of text that says the following:

       ```
       Press <<Ctrl-A for SCSIselect(TM) Utility>>
       ```

       Immediately after you see that line of text, the SCSI ports and devices will be posted to the screen as they are identified.

    e. Watch the video display to see if the boot hardfile is listed.

22. If the boot device is listed, but the system will not boot to the operating system, replace FRUs in the following order:

    a. Boot device

    b. I/O function card

    c. I/O Board (if your operating system is NT or SCO Unix)

23. If the boot device is not listed on the SCSI device screen and the boot device is an internal SCSI drive, move the boot drive to the other internal SCSI bay and reboot. If the drive is now listed on the SCSI screen, replace the SCSI backplane and go to step 29 on page 165.

24. Move the SCSI cable from the internal SCSI port to the external SCSI port. Reboot the system. If the drive is now listed on the SCSI screen, replace the I/O function card and go to step 29 on page 165.

25. If you still do not see the boot device listed on the SCSI screen, suspect FRUs in the following order:

    a. Boot hardfile

    b. SCSI cable

    c. I/O function card

    d. SCSI backplane

26. If the boot device is displayed on the SCSI screen but you are unable to boot to the operating system, suspect the following:

    a. Corrupt boot code

    b. Boot hardfile

    c. SCSI cable

    d. I/O function card

    e. SCSI backplane

27. If the operating system begins to load and the system hangs, suspect FRUs in the order listed. The FRU replaced which allows the system to boot to the operating system identifies the failing FRU.

    a. Memory Board

b. I/O Board
c. I/O function card
d. Processor controller board
e. Processor daughter card
f. Processor
g. Processor terminator card
h. DIMM
i. Midplane
j. Power control card
k. Power supply

28. Power off the server.
29. Restore the server to its original configuration.
30. Retest the system without external devices attached.
31. Attach external devices.
32. If memory or processor component fault indicators were lit and you replaced any of those FRUs, boot the system to the Configuration/Setup utility and enable the slots which were automatically disabled when the component fault indicators were activated.
33. Verify the system repair and return the system to the customer.

System management codes

The following page contains the system management codes. These codes are displayed on the front panel.

Notes:

1. See "System error log" on page 32 for instruction for viewing the error log. Check for additional information on all system managements codes.
2. To reset the system management adapter, shutdown the system and remove the power for 30 seconds.
3. Some of these codes will automatically be cleared once the problem is corrected. Others will need to be cleared manually. To ensure you have correctly identified the failing FRU during your diagnosis, manually clear any messages from the front panel display using the scroll and enter buttons on the right side of the front panel after you have replaced any FRU(s).

   This can be done with the system in the Standby mode before power up. Then, once you boot the system, if a problem still exists which normally generates a message on the front panel, the new message generated will alert you to the continued or new error condition.

Code/Description	FRU/Action
00 (POST failed)	1. **See the system error log and follow the instruction for the error in the log.** 2. See "Undetermined problems" on page 158.
01 (POST warning)	1. **See the system error log and follow the instruction for the error in the log.**
08 (Application failed)	1. **See the system error log and follow the instruction for the error in the log.**

Code/Description	FRU/Action
09 (Application warning)	1. **See the system error log and follow the instruction for the error in the log.**
10 (Boot failed)	1. **Try to reboot the system.** 2. See system error log for other possible errors. 3. See "Undetermined problems" on page 158.
18 (Operating system failed)	1. **Restart the server.**
20 (Log full)	1. **Clean out the error log.**
30 (CPU Fail)	1. **See the system error log for more information regarding the failure.** 2. Processor indicated by the component fault indicator LED. 3. Processor daughter board 4. Cache coherency filter DIMMs (if applicable) 5. Processor controller board
70 (VRM fail)	1. **See the system error log for more information regarding the failure.** 2. Replace the VRM (if possible) or circuit card that contains the VRM. Replaceable VRMs are located on the I/O board. Non-replaceable VRMs are located on the processor daughter board(s).
80 (Over temperature)	1. **Ensure that all six fans are working, and that all three power supplies are functional.** 2. Ensure the air intakes are clear. 3. Ensure the room temperature is not too hot. See "Features and specifications" on page 5. 4. Replace the following FRU for the temperature failure indicated in the error log: a. Ambient temperature -- replace the front panel b. Hard disk drive temperature -- replace the SCSI backplane c. Processor temperature -- replace the processor
85 (Over voltage)	1. **See system error log to determine if there are any power supply or VRM errors.** 2. Replace the power supply, if indicated by the error log. 3. Replace the VRM (if possible) or circuit card that contains the VRM. Replaceable VRMs are located on the I/O board. Non-replaceable VRMs are located on the processor daughter board(s). 4. Power control card 5. Processor daughter board 6. Processor control board

Code/Description	FRU/Action
86 (Low voltage)	1. **See system error log to determine if there are any power supply or VRM errors.** 2. Replace the power supply, if indicated by the error log. 3. Replace the VRM (if possible) or circuit card that contains the VRM. Replaceable VRMs are located on the I/O board. Non-replaceable VRMs are located on the processor daughter board(s). 4. Power control card 5. Processor daughter board 6. Processor controller board
90 (Power supply X)	1. **Power supply X** 2. Power control card 3. System management adapter cable 4. System management adapter
98 (Power system)	1. **See system error log to determine if there are any power supply or VRM errors.** 2. Replace the power supply, if indicated by the error log. 3. Replace the VRM (if possible) or circuit card that contains the VRM. Replaceable VRMs are located on the I/O board. Non-replaceable VRMs are located on the processor daughter board(s). 4. Power control card
99 (Non-Redundant) This is a warning to the operator. The load on the power subsystem is large enough that the power subsystem is no longer operating with redundancy. If one of the power supplies were to fail, the remaining power supplies may not be able to reliably power the system.	1. **Check all power supplies.** 2. Replace faulty power supply, or add additional power supply if operating with fewer than three power supplies.
A0 (Fan X, see "Other error symptoms" on page 141.)	1. **Fan X** 2. Midplane (I/O fans) 3. LED card (CPU fans) 4. Power control card
B0 (Intrusion - tower configuration only)	1. **Ensure the covers are attached correctly.** 2. Verify that there has been an intrusion into the system. 3. Intrusion Cable 4. Front Panel

Code/Description	FRU/Action
B8 (Display)	1. **Check the cable connection from the I/O function card (VFD display) to the front panel.** 2. Front Panel
C0 (SMI error)	1. **See the system error log and follow the instruction for the error in the log.** 2. Replace the FRU for the following problems listed. • PCI related error: a. PCI Adapter b. PCI switch card c. I/O Board • Processor related error: a. Processor b. Processor Daughter Board c. Processor Controller Board • Memory related error: a. DIMM b. Memory Board c. Processor Daughter Board d. Processor Controller Board • SCSI related error a. Check SCSI cable b. SCSI backplane (if internal SCSI drives) c. SCSI adapter (if external drives attached to a PCI SCSI adapter) d. I/O function card (if either internal or external SCSI drives are attached to this card) e. SCSI drive
C1 (Memory)	1. **See system error log to determine which DIMM failed.** 2. Run diagnostics on memory.
Device not installed (A card or cable needs to be installed)	1. **See the system error log for more information regarding which device is not installed.** 2. Install the specified device.

System Management Interrupt (SMI) handler

System Management Interrupt (SMI) Handler is the means of detecting system errors and logging error messages into the system error log. It is installed during the POST sequence at check point A9, and is functional thereafter. SMI Handler detects errors that are generated by system hardware such as CPU, memory and PCI devices. Any SMI-logged error message has "SMI Hdlr" in the SOURCE field as part of the system error message entry. Error messages are logged at different levels as system errors are detected. A single system failure could be the combination of errors, and it will cause multiple unique error messages to be logged in the error log. For example, a single PCI device failure will cause multiple PCI errors, and it will also cause multiple errors at the PCI Bridge level.

Each of those errors will create an entry in the system error log. It is very important to retrieve all the SMI error messages (SOURCE = SMI Hdlr), the data in the ERROR CODE and ERROR DATA fields for each message, and the sequence in which the error messages were posted to the system error log.

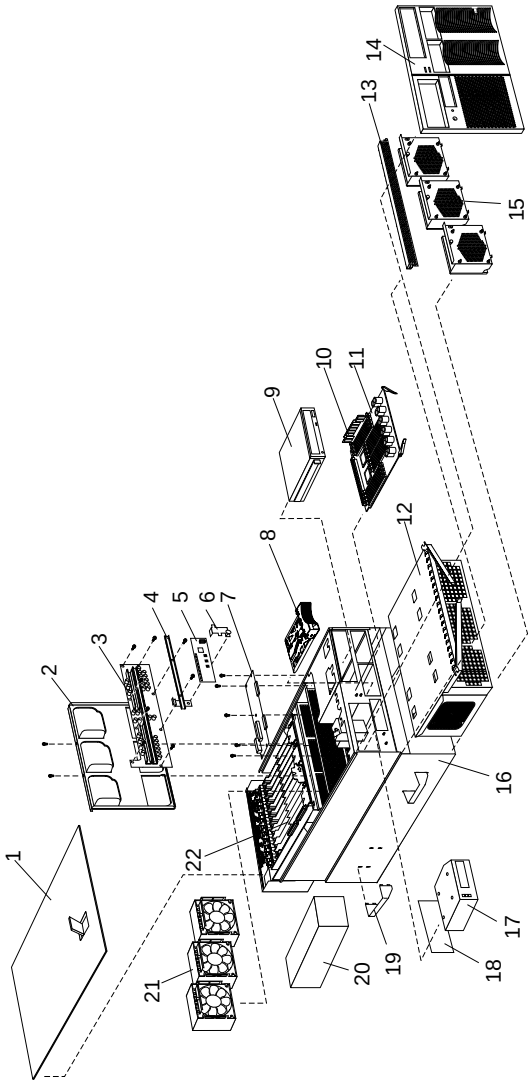
The following table describes SMI error messages, along with possible failing FRUs or appropriate action to be taken.

SMI Error Message	FRU/Action
Memory UNC ECC Error on port A, DIMM yy	1. **DIMM yy, port A**
Memory UNC ECC Error on port B, DIMM yy	1. DIMM yy, port B
Memory SBC ECC Error on port A, DIMM yy	1. **DIMM yy, port A**
Memory SBC ECC Error on port B, DIMM yy	1. **DIMM yy, port B**
UNC on P6 Processor Bus A	1. **Processors on bus A** 2. Processor daughter board A 3. Processor controller board
UNC on P6 Processor Bus B	1. **Processors on bus B** 2. Processor daughter board B 3. Processor controller board
Error on processor An	1. **Run diagnostics on the processors** 2. Processor An 3. Processor daughter board A 4. Processor controller board
Error on Processor Bn	1. **Processor Bn** 2. Run diagnostics on the processors 3. Processor daughter board B 4. Processor controller board
P6 I/O bus UNC error	If message "UNC Error on PCI bus slot x" is also displayed, follow the FRU / Action for that message first, then suspect FRUs in the following order: 1. **I/O board** 2. Processor controller board
UNC Error on PCI bus M	1. **Any PCI adapters on bus M (including I/O Function card or System Management Adapter for bus A)** 2. System management adapter cable 3. I/O board

SMI Error Message	FRU/Action
P6 I/O Bus Hard Failure Response (HFR)	Reinstall the device driver for the last PCI adapter installed, then suspect FRUs in the following order: 1. **The last installed PCI adapter** 2. Any other PCI adapter 3. System Management Adapter 4. I/O Function card 5. I/O board
UNC Error on PCI bus slot x	1. **PCI adapter in slot x** 2. I/O board 3. Another adapter on the same PCI bus
Address Parity Error (APE) on PCI bus M	1. **Any PCI adapters on bus M (including I/O function card or System Management Adapter for bus A)** 2. System management adapter cable 3. I/O board
SBC error on P6 Process Bus A	1. **Run diagnostics on the processors** 2. Any processor on bus A 3. Processor daughter board A 4. Processor controller board
SBC error on P6 Process Bus B	1. **Run diagnostics on the processors** 2. Any processor on bus B 3. Processor daughter board B 4. Processor controller board
SBC error on P6 I/O bus	1. **I/O board** 2. Processor controller board
Uncorrectable MCA error	1. **Suspect any processor on bus A and B; run diagnostics on the processors**
Correctable MCA error	1. **Suspect any processor on bus A and B; run diagnostics on the processors**
SBC Memory error has occurred	1. **Suspect any DIMM on memory bus A and B; run diagnostics on the memory**

Parts listing

This parts listing supports the following models: 1RX, 2RX, 3RX

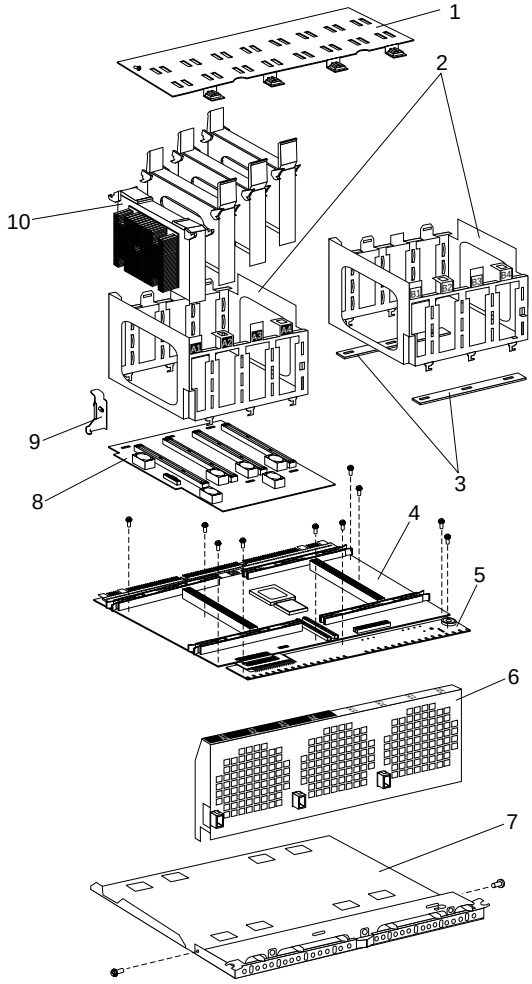


Index	System xSeries 370 Model 1RX, 2RX, 3RX	FRU No.
1	Top Cover (All models)	09N8104
2	Midplane Tray (All models)	28L4655
3	Midplane Card (w/tray) (All models)	28L4654
4	Midplane Stiffener Bracket (All models)	00N9377
5	Power/Fan Control Card (All models)	28L4667
6	Power/Fan Control Card Assembly Retention Bracket (All models)	00N9369
7	DASD Hot Plug Backplane	00N9354
8	DASD Filler Bezel Assembly (All models)	37L0198
9	48X CD-ROM Drive (primary) (All models)	06P5167
	48X CD-ROM Drive (alternate) (All models)	19K1531
10	128MB DIMM (4) (All models)	20L0246
10	256MB DIMM (All models)	20L0248
10	512MB DIMM (All models)	20L0250
10	1GB DIMM (All models)	33L3057
11	Memory DIMM Card (All models)	28L4663
12	Processor Housing Assembly -- see “Processor Housing Assembly” on page 175.	N/A
13	Memory Door (All models)	33L3703
14	Front Bezel Assembly (All models)	24P6521
15	Hot-swap Processor Fan Assembly (All models)	28L4670
16	Base Frame Assembly (Server chassis) (All models)	28L4665
17	VFD (Operator) Panel (All models)	36L9959
18	Operator Panel Bracket Kit (All models)	36L9787
19	Lifting Handles (4) (All models)	33L3705
20	750W Power Supply Assembly (All models)	36L8817
21	Hot-swap I/O Fan Assembly 120mm (All models)	28L4660
22	I/O Housing Assembly -- see “I/O Housing Assembly” on page 177.	N/A
	Cable Management Flex Arm (All models)	37L0289
	Cable Management Rigid Arm (All models)	37L0288
	CD-ROM Guide (All models)	00N6412
	Service processor to I/O CD cable (All models)	03K9193
	Chassis Flange, right (All models)	09N8118
	Chassis Flange, left (All models)	09N8119

Index		FRU No.
	Model 1RX, 2RX, 3RX	
	EMC Parts Kit (All models)	33L3706
	External SCSI Drive Cable (All models)	28L4325
	FDD Drive Cable (All models)	28L4324
	Four Switch Front Panel Cable (All models)	36L9946
	Front Panel Cable (All models)	28L4323
	Hot-Swap Parts Kit (All models). Includes: • Insulator • I/O Filler • Hot Swap Handle • System Management Card Guide • FRU Spec • Guidance Module, PCI-3 Position • Retainer, PCI-3 Position	33L3707
	IDE Drive Cable (All models)	03K9240
	Internal SCSI Drive Cable (All models)	03K9238
	I/O Function Card Retainer Bracket (All models)	33L3847
	I/O Skid (All models)	28L4657
	Miscellaneous Parts Kit (All models)	33L3739
	Pedestal Base (All models)	28L0571
	Power to SCSI Backplane and Media Cable (All models)	03K9239
	Rack Attach Bracket (All models)	36L9937
	Rack Slide Assembly (All models)	28L4690
	Line cord 220V/15A for rack kit (All models)	36L8886
	Intrusion switch cable (All models)	00N9378
	Cam lever (2) CPU mounting kit (All models)	03K9083
	Y cable (All models)	03K9318
	Bumper weldment (All models)	28L4659
	Lithium battery (All models)	33F8354
	Door assembly (All models)	36L9761
	Bracket, side cover (All models)	36L9767
	Lock assembly (All models)	36L9768
	Cap bezel (All models)	36L9782
	1.44MB diskette drive (All models)	76H4091
	CPU terminator card (All models)	94H0598
	PCI hot plug sense card (All models)	94H0859
	Advanced System Management PCI Adapter (Model 3RX)	24P6538
	System service label (All models)	24P6525

Index	System xSeries 370 Model 1RX, 2RX, 3RX	FRU No.
	Rack-to-Tower Conversion Kit	
	Left side cover assembly (All models)	00N9346
	Pedestal base (All models)	28L0571
	Miscellaneous parts kit (All models)	28L0574
	Door assembly (All models)	36L9761
	Side cover with latch (All models)	36L9766
	Side cover bracket (All models)	36L9767
	Lock with pawl (All models)	36L9768
	Cap bezel (All models)	36L9782

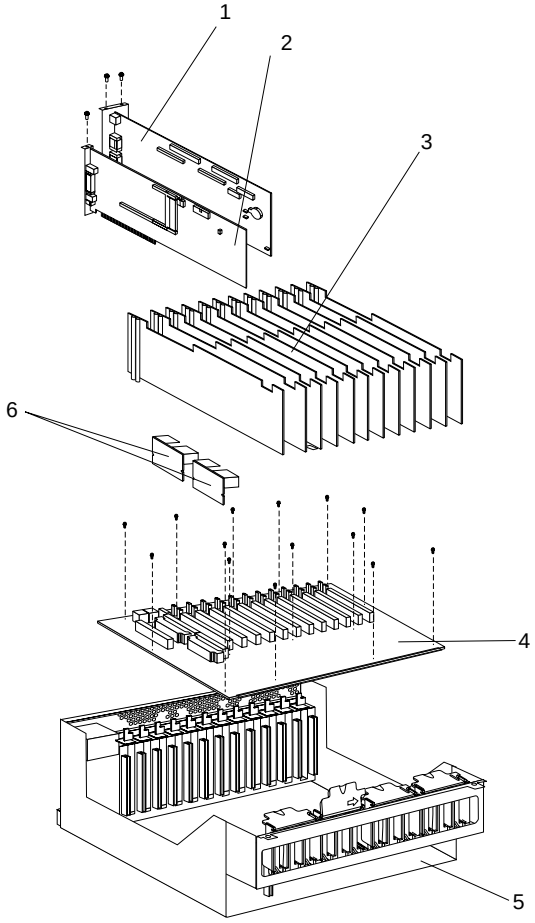
Processor Housing Assembly



Processor Housing Assembly xSeries 370

Index		FRU No.
	Model 1RX, 2RX, 3RX	
1	Retainer (2) (All models)	28L4650
2	Processor Cage (Goal Post) (right) (All models)	28L4648
2	Processor Cage (Goal Post) (left) (All models)	33L3700
3	Goal Post Mounting assembly (All models)	33L3702
4	Processor Controller Board (CPU Card Assembly) (All models)	28L4651
5	Front panel Fan / LED Card (All models)	28L4653
6	Fan Guard (All models)	28L4649
7	CPU Cookie Sheet (All models)	28L4647
8	Processor Daughter Card (All models)	09N8089
9	Cache Coherency Card Retainer (All models)	33L3842
10	Processor A1	
	700 MHz Processor with 1MB Cache (Model 1RX)	09N8086
	700 MHz Processor with 2MB Cache (Model 2RX)	09N8087
	900 MHz Processor with 2MB Cache (Model 3RX)	06P6333
	1MB Coherency Card (All models)	09N8096
	4MB Coherency Card (All models)	09N8097

I/O Housing Assembly



Index	I/O Housing Assembly xSeries 370 Model 1RX, 2RX, 3RX	FRU No.
1	Integrated I/O Function Card (All models)	24P6537
2	System Management Card (All models)	24P6538
3	Insulator (in Misc. Hot Swap Kit - FRU No. 33L3707)	N/A
4	I/O Backplane (All models)	06P5425
5	Bulkhead Weldment (All models)	28L4658
6	Voltage Regulator Module Card (All models)	36L8833

Keyboards (101/102 Key)

Keyboards (101/102 Key)	FRU No.
Arabic	37L0818 1391490
Belgian-Dutch	37L0820 1391414
Belgian-French	37L0819 1391526
Brazil / Portugal	37L0817 02K0869
Bulgarian	37L0821 1399583
Chinese / US	37L0848 02K0900
Czech	37L0822 1399570
Danish	37L0823 1391407
Dutch	37L0824 1391511
Finnish	1391411
French	37L0825 1391402
French / Canadian-ID 058	37L0815 02K0863
German	37L0826 1391403
Greek	37L0827 1399046
Hebrew	37L0828 1391408
Hungarian	37L0829 1399581
Icelandic	37L0830 1391495
Italian	37L0831 1393395
Japan	37L0847
Korean	37L0849
Latin / Spanish	37L0816

Keyboards (101/102 Key)	FRU No.
Latvian	1391406
Norwegian	37L0832 1391409
Polish	37L0833 1399580
Portuguese	37L0834 1391410
Romanian	37L0835 1399582
Russian-Cyrillic	37L0836 1399579
Serbian-Cyrillic	37L0837 1399578
Slovak	37L0838 1399571
Slovenia / Croatia / Bosnia	1393669
South Africa	1396790
Spanish	37L0839 1391405
Swedish / Finnish	37L0840 1391411
Swiss French / German	37L0841 1391412
Taiwanese	37L0848
Thailand	37L0850 02K0902
Turkish 179	37L0842 75H9538
Turkish 440	37L0843 75H9539
U.K. English	37L0844 1391406
U.K. English (ISO Compliant)	37L0846
U.S. English	37L0814 76H0896
U.S. English (E / ME / A use only)	1396790
Yugoslavia / Lithuania	37L0845

Power Cords

Power Cords	FRU No.
China (PRC)	01K9851
Japan	01K9853
Thailand	12J5120
Israel	12J5122
Bangladesh, Burma, India, Pakistan, South Africa, Sri Lanka	12J5124
Chile, Ethiopia, Italy, Libya, Somalia	12J5126
Argentina, Australia, New Zealand, Papua New Guinea, Paraguay, Uruguay, Western Samoa	12J5128
Antigua, Bahrain, Brunei, Channel Islands, China (Hong Kong S.A.R.), Cyprus, Dubai, Fiji, Ghana, Iraq, Ireland, Kenya, Kuwait, Malawi, Malaysia, Malta, Nepal, Nigeria, Polynesia, Qatar, Sierra Leone, Singapore, Tanzania, Uganda, United Kingdom, Yemen, Zambia	12J5987
Afghanistan, Algeria, Andorra, Angola, Austria, Belgium, Benin, Bulgaria, Burkina Faso, Burundi, Cameroon, Central African Rep., Chad, China (Macau S.A.R.), Czech Republic, Egypt, Finland, France, French Guiana, Germany, Greece, Guinea, Hungary, Iceland, Indonesia, Iran, Ivory Coast, Jordan, Lebanon, Luxembourg, Malagasy, Mali, Martinique, Mauritania, Mauritius, Monaco, Morocco, Mozambique, Netherlands, New Caledonia, Niger, Norway, Poland, Portugal, Romania, Senegal, Slovakia, Spain, Sudan, Sweden, Syria, Togo, Tunisia, Turkey, former USSR, Vietnam, former Yugoslavia, Zaire, Zimbabwe	55H6643
Denmark, Switzerland, Liechtenstein	55H6646
Bahamas, Barbados, Bermuda, Bolivia, Brazil, Canada, Cayman Islands, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Korea (South), Liberia, Mexico, Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Suriname, Taiwan, Trinidad (West Indies), Venezuela	76H4865
United States of America	6952300 (110 / 15A) 1838574 (220V) 36L8886 (220V / 15A)

Related service information

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

Safety information

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

General safety

Follow these rules to ensure general safety:

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

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

- Reinstall all covers correctly before returning the machine to the customer.

Electrical safety

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

Observe the following rules when working on electrical equipment.

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

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

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

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

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

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

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

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

Safety inspection guide

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

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

Consider these conditions and the safety hazards they present:

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

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

Checklist:

1. Check exterior covers for damage (loose, broken, or sharp edges).

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

Handling electrostatic discharge-sensitive devices

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

Notes:

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

When handling ESD-sensitive parts:

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

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

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

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

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

Grounding requirements

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

Safety notices (multi-lingual translations)

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

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

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

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

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

- Statement 1

DANGER

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

To avoid a shock hazard:

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

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

To Connect	To Disconnect
1. Turn everything OFF.	1. Turn everything OFF.
2. First, attach all cables to devices.	2. First, remove power cords from outlet.
3. Attach signal cables to connectors.	3. Remove signal cables from connectors.
4. Attach power cords to outlet.	4. Remove all cables from devices.
5. Turn device ON.	

- Statement 2

CAUTION:
When replacing the lithium battery, use only IBM Part Number 33F8354 or an equivalent type battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.

Do not:

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

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

- Statement 3

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

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

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

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

- Statement 4

≥18 kg (37 lbs)

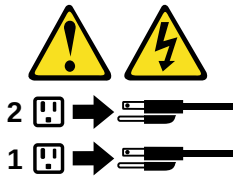
≥32 kg (70.5 lbs)

≥55 kg (121.2 lbs)

CAUTION:
Use safe practices when lifting.

- Statement 5

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



- Statement 10

CAUTION:

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

Importante:

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

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

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

Instrução 1

PERIGO

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

Para evitar risco de choque:

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

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

Instrução 2

CUIDADO:

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

Não:

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

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

Instrução 3

PRECAUCIÓN:

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

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

PERIGO

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

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

Instrução 4

≥18 kg (37 lbs)

≥32 kg (70,5 lbs)

≥55 kg (121,2 lbs)

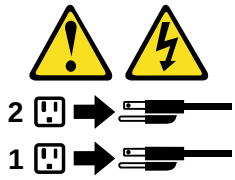
CUIDADO:

Ao levantar a máquina, faça-o com segurança.

Instrução 5

CUIDADO:

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



CUIDADO:

Instrução 10

CUIDADO:

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

重要：

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

例如，如果一个提醒条款前的数字为 1，则本部分中相应的译文也带有标号 1。

在执行任何指示的操作之前，请确保您已经阅读了全部提醒和危险条款。

声明 1

危险

电源、电话和通信电缆中带有危险电流。

为避免电击：

雷电期间不要拆接电缆或安装、维修及重新配置本产品。

将所有电源线连接至正确布线并已安全接地的电源插座上。

将应与本产品连接的所有设备连接至正确布线的插座上。

尽量只使用单手拆接信号电缆。

有水、火及结构损坏迹象时，请勿打开任何设备。

除非在安装配置过程中有明确指示，否则，打开设备机盖前应先断开与电源线、远程通信系统、网络和调制解调器的所有连接。

安装、移动或打开本产品及其附带设备的机盖时，应按下表所述连接和断开电缆。

连接时：	**断开连接时：**
1. 关闭所有设备。	**1. 关闭所有设备。**
2. 首先将所有电缆连接至设备。	**2. 首先从插座中拔出电源线。**
3. 将信号电缆连接至接口。	**3. 从接口上拔下信号电缆。**
4. 将电源线连接至插座。	

声明 2

警告：

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

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

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

声明 3

警告：

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

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

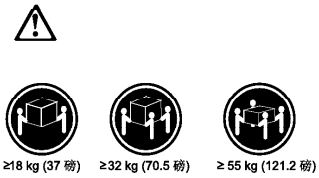
非此处指定的其它控制、调整或与性能有关的操作都有可能导致激光辐射的危险。

危险

某些激光产品中包含内嵌的 3A 级或 3B 级激光二极管。请注意以下事项。

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

声明 4

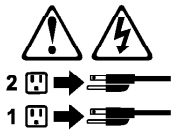


警告：
抬起时请采用安全操作方法。

声明 5

警告：

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



声明 6

警告：

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

声明 7

警告：

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

声明 8

警告：
不要拆除电源外盖或贴有下列标签的任何部件。

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

声明 9

警告：

为避免人员伤害，拆除设备上的风扇前应拔下热插拔风扇电缆。

声明 10

警告：

机柜安装的设备上面不能放置重于 82kg（180 磅）的物品。

> 82 kg (180 磅)

声明 11

警告：

下面的标签表明附近有锋利的边、角或接头。

声明 12

警告：
下面的标签表明附近有高热表面。

重要資訊：

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

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

執行任何指示之前，請詳讀所有「注意」及「危險」的聲明。

聲明 1

危險

電源、電話及通信電纜上所產生的電流均有危險性。

欲避免電擊危險：

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

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

聲明 2

注意：

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

請勿將電池：

- 丟入或浸入水中
- 加熱超過 100 ℃ (212 ℉)
- 修理或拆開

請遵照當地法令規章處理廢棄電池。

聲明 3

注意：

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

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

危險

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

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

聲明 4

≥ 18 公斤 (37 磅)

≥ 32 公斤 (70.5 磅)

≥ 55 公斤 (121.2 磅)

注意：

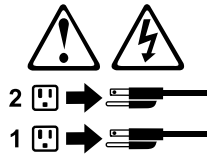
抬起裝置時，請注意安全措施。

聲明 5

注意：

裝置上的電源控制按鈕及電源供應器上的電源開關均無法關閉裝置上的電流。

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



聲明 10

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

> 82 公斤 (180 磅)

Important:

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

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

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

Notice n° 1

DANGER

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

Pour éviter tout risque de choc électrique:

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

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

Notice n° 2

ATTENTION:

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

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

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

Notice n° 3

ATTENTION:

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

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

DANGER

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

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

Notice n° 4

≥18 kg

≥32 kg

≥55 kg

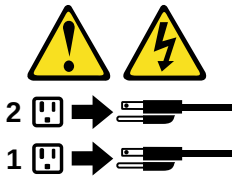
ATTENTION:

Faites-vous aider pour soulever ce produit.

Notice n° 5

ATTENTION:

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



Notice n° 10

ATTENTION:

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

Wichtig:

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

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

Lesen Sie alle Sicherheitshinweise, bevor Sie eine Anweisung ausführen.

Hinweis 1

VORSICHT

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

Aus Sicherheitsgründen:

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

Kabel anschließen:	**Kabel lösen:**
1. Alle Geräte ausschalten und Netzstecker ziehen. 2. Zuerst alle Kabel an Einheiten anschließen. 3. Signalkabel an Anschlußbuchsen anschließen. 4. Netzstecker an Steckdose anschließen. 5. Gerät einschalten.	1. Alle Geräte ausschalten. 2. Zuerst Netzstecker von Steckdose lösen. 3. Signalkabel von Anschlußbuchsen lösen. 4. Alle Kabel von Einheiten lösen.

Hinweis 2

ACHTUNG:

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

Die Batterie nicht:

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

Die örtlichen Bestimmungen für die Entsorgung von Sondermüll beachten.

Hinweis 3

ACHTUNG:

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

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

VORSICHT

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

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

Hinweis 4

≥18 kg

≥32 kg

≥55 kg

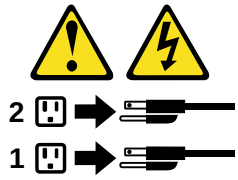
ACHTUNG:

Beim Anheben der Maschine die vorgeschriebenen Sicherheitsbestimmungen beachten.

Hinweis 5

ACHTUNG:

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



Hinweis 10

ACHTUNG:

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

Importante:

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

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

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

Avviso 1

PERICOLO

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

Per evitare il pericolo di scosse elettriche:

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

  delle unità collegate.

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

Avviso 2

ATTENZIONE:

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

Evitare di:

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

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

Avviso 3

ATTENZIONE:

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

- Non rimuovere i coperchi. L'apertura dei coperchi di prodotti laser può determinare l'esposizione a radiazioni laser pericolose. All'interno delle unità non vi sono parti su cui effettuare l'assistenza tecnica.
- L'utilizzo di controlli, regolazioni o l'esecuzione di procedure non descritti nel presente manuale possono provocare l'esposizione a radiazioni pericolose.

PERICOLO

Alcuni prodotti laser contengono all'interno un diodo laser di Classe 3A o Classe 3B. Prestare attenzione a quanto segue:

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

Avviso 4

≥18 kg

≥32 kg

≥55 kg

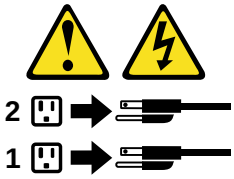
ATTENZIONE:

Durante il sollevamento della macchina seguire delle norme di sicurezza.

Avviso 5

ATTENZIONE:

Il pulsante del controllo dell'alimentazione situato sull'unità e l'interruttore di alimentazione posto sull'alimentatore non disattiva la corrente elettrica fornita all'unità. L'unità potrebbe disporre di più di un cavo di alimentazione. Per disattivare la corrente elettrica dall'unità, accertarsi che tutti i cavi di alimentazione siano scollegati dalla sorgente di alimentazione.



Avviso 10

ATTENZIONE:

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

경고문 1

위험

전원, 전화 및 통신 케이블로부터 흘러 나오는 전류는 위험합니다.

전기 충격을 피하려면:

- 뇌우를 동반할 때는 케이블의 연결이나 철수, 이 제품의 설치, 유지보수 또는 재구성을 하지 마십시오.
- 모든 전원 코드를 적절히 배선 및 접지해야 합니다.
- 이 제품에 연결될 모든 장비를 적절하게 배선된 콘센트에 연결하십시오.
- 가능한한 신호 케이블을 한 손으로 연결하거나 끊으십시오.
- 화재, 수해 또는 구조상의 손상이 있을 경우 장비를 켜지 마십시오.
- 설치 및 구성 프로시저에 다른 설명이 없는 한, 장치 덮개를 열기 전에 연결된 전원 코드, 원거리 통신 시스템, 네트워크 및 모뎀을 끊어 주십시오.
- 제품 또는 접속된 장치를 설치, 이동 및 덮개를 열 때 다음 설명에 따라 케이블을 연결하거나 끊도록 하십시오.

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

경고문 2

주의:

리튬 배터리를 교체할 때는 IBM 부품 번호 33F8354 또는 제조업체에서 권장하는 동등한 유형의 배터리를 사용하십시오. 시스템에 리튬 배터리를 갖고 있는 모듈이 있으면 동일한 제조업체에서 생산된 동일한 모듈 유형으로 교체하십시오. 배터리에 리튬이 있을 경우 제대로 사용, 처리 또는 처분하지 않으면 폭발할 수 있습니다.

다음을 주의하십시오.

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

지역 법령이나 규정의 요구에 따라 배터리를 처분하십시오.

경고문 3

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

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

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

위험

일부 레이저 제품에는 클래서 3A 또는 클래스 3B 레이저 다이오드가 들어 있습니다. 다음을 주의하십시오.

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

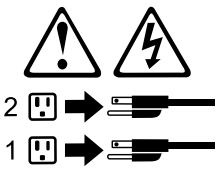
경고문 4

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

주의:
기계를 들 때는 안전하게 들어 올리십시오.

경고문 5

주의:
장치의 전원 제어 버튼 및 전원 공급기의 전원 스위치는 장치에 공급되는 전류를 차단하지 않습니다. 장치에 둘 이상의 전원 코드가 연결되어 있을 수도 있습니다. 장치에서 모든 전류를 차단하려면 모든 전원 코드가 전원으로부터 차단되어 있는 지 확인하십시오.



경고문 10

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

Importante:

Todas las declaraciones de precauciín de esta IBM documentation empiezan con un número. Dicho número se emplea para establecer una referencia cruzada de una declaraciín de precauciín o peligro en inglés con las versiones traducidas que de dichas declaraciones pueden encontrarse en esta secciín.

Por ejemplo, si una declaraciín de peligro empieza con el número 1, las traducciones de esta declaraciín de precauciín aparecen en esta secciín bajo Declaraciín 1.

Lea atentamente todas las declaraciones de precauciín y peligro antes de llevar a cabo cualquier operaciín.

Declaración 1

PELIGRO

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

Para evitar una descarga eléctrica:

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

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

Declaración 2

PRECAUCIÓN:

Cuando desee sustituir la batería de litio, utilice únicamente el número de pieza 33F8354 de IBM o cualquier tipo de batería equivalente que recomiende el fabricante. Si el sistema tiene un módulo que contiene una batería de litio, sustitúyalo únicamente por el mismo tipo de módulo, que ha de estar creado por el mismo fabricante. La batería contiene litio y puede explotar si el usuario no la utiliza ni la maneja de forma adecuada o si no se desprende de la misma como corresponde.

No realice las acciones siguientes:

- Arrojarla al agua o sumergirla
- Calentarla a una temperatura que supere los 100°C (212°F)
- Repararla o desmontarla

Despréndase de la batería siguiendo los requisitos que exija el reglamento o la legislaciín local.

Declaración 3

PRECAUCIÓN:

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

- No retire las cubiertas. Si retira las cubiertas del producto láser, puede quedar expuesto a radiaciín láser perjudicial. Dentro del dispositivo no existe ninguna pieza que requiera mantenimiento.
- El uso de controles o ajustes o la realizaciín de procedimientos que no sean los que se han especificado aquí pueden dar como resultado una exposiciín perjudicial a las radiaciones.

PELIGRO

Algunos productos láser contienen un diodo de láser incorporado de Clase 3A o de Clase 3B. Tenga en cuenta la advertencia siguiente.

Cuando se abre, hay radiaciín láser. No mire fijamente el rayo ni lleve a cabo ningún examen directamente con instrumentos ípticos; evite la exposiciín directa al rayo.

Declaración 4

≥18 kg (37 libras)

≥32 kg (70,5 libras)

≥55 kg (121,2 libras)

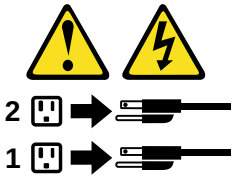
PRECAUCIÓN:

Tome medidas de seguridad al levantar el producto.

Declaración 5

PRECAUCIÓN:

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



Declaración 10

PRECAUCIÓN:

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

Send us your comments!

We want to know your opinion about this manual (part number 24P2902). Your input will help us to improve our publications.

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

Name: _____

Phone number: _____

1. Do you like this manual?

   ❑ Yes ❑ No

   _____

   _____

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

   _____

   _____

3. What is your service experience level?

   ❑ Less than five years

   ❑ More than five years

4. Which servers do you service most?

   _____

   _____

   _____

   _____

Thank you for your response!

Problem determination tips

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

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

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

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

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

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