

Hardware Maintenance Manual



xSeries 230 Models 6RY, 61Y

Hardware Maintenance Manual



xSeries 230 Models 6RY, 61Y

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

Third Edition (March 2004)

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About this manual

This manual contains diagnostic information, a Symptom-to-FRU index, service information, error codes, error messages, and configuration information for the IBM® eServer xSeries 230.

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

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

Online Support

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

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>

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General checkout

The server diagnostic programs are stored in upgradable read-only memory (ROM) on the system board. These programs are the primary method of testing the major components of the server: the system board, Ethernet controller, video controller, RAM, keyboard, mouse (pointing device), diskette drive, serial ports, hard drives, and parallel port. You can also use them to test some external devices. See “Diagnostic tools overview” on page 13.

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

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

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

A system might be part of a cluster if:

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

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

Notes:

1. For systems that are part of a shared DASD cluster, run one test at a time in looped mode. Do not run all tests in looped mode, as this could enable the DASD diagnostic tests.
2. If multiple error codes are displayed, diagnose the first error code displayed.
3. If the computer hangs with a POST error, go to the “POST error codes” on page 134.
4. If the computer hangs and no error is displayed, go to “Undetermined Problems” on page 143.
5. Power supply problems, see “Power supply LED errors” on page 133.
6. Safety information, see “Safety information” on page 149.
7. For intermittent problems, check the error log; see “POST error codes” on page 134.

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. IS THE SYSTEM IS NOT PART OF A CLUSTER?

- Power-off the computer and all external devices.
- Check all cables and power cords.
- Set all display controls to the middle position.
- Power-on all external devices.
- Power-on the computer.
- Record any POST error messages displayed on the screen. If an error is displayed, look up the first error in the "POST error codes" on page 134.
- Check the information LED panel System Error LED; if on, see "Information panel system error LED" on page 128.
- Check the System Error Log. If an error was recorded by the system, see "Symptom-to-FRU index" on page 125.
- Start the Diagnostic Programs. See "Starting the diagnostic programs" on page 16.
- Check for the following responses:
 - a. One beep.
 - b. Readable instructions or the Main Menu.

3. DID YOU RECEIVE BOTH OF THE CORRECT RESPONSES?

NO. Find the failure symptom in "Symptom-to-FRU index" on page 125.

YES. Run the Diagnostic Programs. If necessary, refer to "Starting the diagnostic programs" on page 16.

If you receive an error, go to "Symptom-to-FRU index" on page 125.

If the diagnostics completed successfully and you still suspect a problem, see "Undetermined Problems" on page 143.

General information

Your IBM® @server xSeries 230 is a high-performance, symmetric multiprocessing (SMP) server. It is ideally suited for networking environments that require superior microprocessor performance, efficient memory management, flexibility, and large amounts of reliable data storage.

Your xSeries 230 comes with a three-year limited warranty and IBM PC Server 90-Day Start Up Support. If you have access to the World Wide Web, you can obtain up-to-date information about your xSeries 230 model and other IBM server products at the following World Wide Web address:

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

Your server serial number and model number are located on labels on the rear of the server and on the front under the trim bezel. You will need these numbers when you register your server with IBM. To register your server, go to the following World Wide Web address:

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

To find the meanings of various computer-related terms, you can access the IBM xSeries 230 at the following World Wide Web address:

<http://www.networking.ibm.com/nsg/nsgmain.htm>

Features and specifications

The following table provides a summary of the features and specifications for your xSeries 230 server.

Microprocessor:

- Intel® Pentium III microprocessor with MMX technology and SIMD extensions
- 256 KB Level-2 cache (min.)
- Supports up to two microprocessors

Memory:

- Standard: 128 MB
- Maximum: 4GB
- Type: 133 MHz, ECC, SDRAM, Registered DIMMs
- Sockets: 4 dual inline sockets

Drives standard:

- Diskette: 1.44 MB
- CD-ROM: 40X IDE

Expansion bays:

- Hot-swap: 6 slim high or 3 half high
- Non-hot-swap: Three 5.25-inch (one used by CD-ROM drive)

PCI expansion slots:

- Three 33 MHz/ 64-bit slots
- Two 33 MHz/ 32-bit slots

Power supplies: 250 W (115-230 Vac)

- Standard: One, non-hot-swappable
- Maximum: Three, only with optional power backplane that enables multiple power supplies and hot-swappability

Video:

- S3 Savage 4 video controller (integrated on system board)
- Compatible with SVGA and VGA
- 4 MB video memory

Size (Rack Model)

- Height: 220 mm (8.7 in.)
- Depth: 630 mm (24.8 in.)
- Width: 440 mm (17.3 in.)
- Weight: approximately 27.22 Kg (60 lb.) when fully configured

Size (Tower Model)

- Height: 440 mm (17.3 in.)
- Depth: 660 mm (26.0 in.)
- Width: 220 mm (8.7 in.)
- Weight: approximately 27.22 Kg (60 lb.) when fully configured

Integrated functions:

- Netfinity Advanced System Management processor
- Dual channel Ultra2 SCSI controller (both channels internal)
- One 10BASE-T/100BASE-TX AMD Ethernet controller
- One S3 Savage 4 video controller
- Two serial ports
- One parallel port
- Two Universal Serial Bus (USB) ports
- Keyboard port
- Mouse port
- Video port

Acoustical noise emissions:

- Sound power, idling: 6.0 bel maximum
- Sound power, operating: 6.0 bel maximum
- Sound pressure, operating: 45 dBa maximum

Environment:

- Air temperature:
 - Server on: 10|| to 35|| C (50.0|| to 95.0|| F). Altitude: 0 to 914 m (2998.7 ft.)
 - Server on: 10|| to 32|| C (50.0|| to 89.6|| F). Altitude: 914 m (2998.7 ft.) to 2133 m (6998.0 ft.)
 - Server off: 10|| to 43|| C (50.0|| to 109.4|| F). Maximum altitude: 2133 m (6998.0 ft.)
- Humidity:
 - Server on: 8% to 80%
 - Server off: 8% to 80%

Heat output: Approximate heat output in British Thermal Units (BTU) per hour:

- Minimum configuration: 683 BTU (200 watts)
- Maximum configuration: 2048 BTU (600 watts)

Electrical input:

- Sine-wave input (50-60 Hz) required

- Input voltage low range:
 - Minimum: 90 V ac
 - Maximum: 137 V ac
- Input voltage high range:
 - Minimum: 180 V ac
 - Maximum: 265 V ac
- Input kilovolt-amperes (kVA) approximately: Minimum: 0.08 kVA
 - Maximum: 0.42 kVA

What your IBM xSeries 230 offers

The unique design of your server takes advantage of advancements in symmetric multiprocessing (SMP), data storage, Your server combines:

- Impressive performance using an innovative approach to SMP

Your server supports up to two Pentium III microprocessors. Your server comes with one microprocessor installed; you can install an additional microprocessor to enhance performance and provide SMP capability.

- Large data-storage and hot-swap capabilities

All models of the server support up to six hot-swap hard disk drives. This *hot-swap* feature enables you to remove and replace hard disk drives without turning off the server.

- Redundant power capabilities

The standard 250-watt power supply in your server can handle a load of up to 250 watts. By replacing the power backplane with the optional backplane that provides hot-swap capability to the power supplies, you can install a second, optional power supply. This provides a full 500 watts of power. If the average load on your server is less than 250 watts and a problem occurs with one of the power supplies, the other power supply can handle the load (redundant power). If the average load on your server is greater than 250 watts, and you have installed a second power supply, you can install a third, optional power supply to provide redundancy.

The OVERCURRENT light emitting diode (LED) on the system board is lit when the power load is 250 watts or greater with two power supplies, or when the power load is 500 watts or greater with three power supplies.

- Large system memory

The memory bus in your server supports up to 4 GB of system memory. The memory controller provides error correcting code (ECC) support for up to four industry standard PC133, 3.3 V, 168-pin, 8-byte, registered, synchronous-dynamic-random access memory (SDRAM) DIMMs (Intel PC-Registered SDIMM Specifications, Revision 1.0 or later), synchronous, dual inline memory modules.

- System-management capabilities

Your server comes with a Netfinity Advanced System Management Processor on the system board. This processor, in conjunction with the Netfinity Manager™ provided on your ServerGuide CDs, allows you to manage the functions of the server locally and remotely. The Netfinity Advanced System Management Processor also provides system monitoring, event recording, and dial-out alert capability.

Note: The Netfinity Advanced System Management Processor is sometimes referred to as the service processor.

Refer to the Advanced System Management section for more information.

- Integrated network environment support

Your server comes with an Ethernet controller on the system board. This Ethernet controller has an interface for connecting to 10-Mbps or 100-Mbps networks. The server automatically selects between 10BASE-T and 100BASE-TX. The controller provides full-duplex (FDX) capability, which allows simultaneous transmission and reception of data on the Ethernet local area network (LAN).

- Redundant network-interface card

The addition of an optional, redundant network interface card (NIC) provides a failover capability to a redundant Ethernet connection. If a problem occurs with the primary Ethernet connection, all Ethernet traffic associated with this primary connection is automatically switched to the redundant NIC. This switching occurs without data loss and without user intervention.

- IBM ServerGuide CDs

The ServerGuide CDs included with IBM xSeries servers provide programs to help you set up your server and install the network operating system (NOS). The ServerGuide program detects the hardware options installed, and provides the correct configuration program and device drivers. In addition, the ServerGuide CDs include a variety of application programs such as IBM Update Connector to help keep your server BIOS and microcode updated, and IBM Netfinity Manager for systems management.

For more information about the ServerGuide CDs, see the ServerGuide and Netfinity Manager Information section.

Your server is designed to be cost-effective, powerful, and flexible. It uses peripheral component interconnect (PCI) bus architecture to provide compatibility with a wide range of existing hardware devices and software applications.

As always, your IBM server meets stringent worldwide certifications for power, electromagnetic compatibility (EMC), and safety. Refer to the 'Safety Information' section. for additional information.

Reliability, availability, and serviceability features

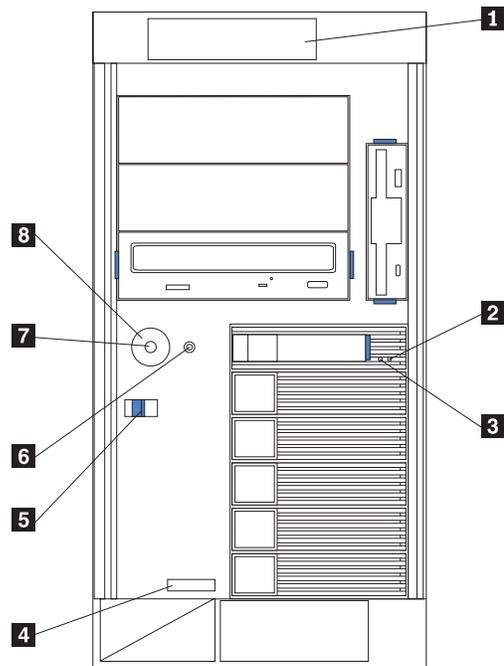
Three of the most important features in server design are reliability, availability, and serviceability (RAS). These factors help to ensure the integrity of the data stored on your server; that your server is available when you want to use it; and that should a failure occur, you can easily diagnose and repair the failure with minimal inconvenience.

The following is an abbreviated list of the RAS features that your server supports. Many of these features are explained in later chapters or sections.

- Menu-driven setup, system configuration, RAID configuration, and diagnostic programs
- Power-on self-test (POST)
- Integrated Netfinity Advanced System Management Processor
- Predictive failure alerts
- System auto-configuring from configuration menu
- Remote system problem-determination support
- Power and temperature monitoring
- Fault-resilient startup
- Hot-swap hard drive bays
- Error codes and messages
- System error logging
- Upgradable BIOS, diagnostics, and Netfinity Advanced System Management Processor code
- Automatic restart after a power failure

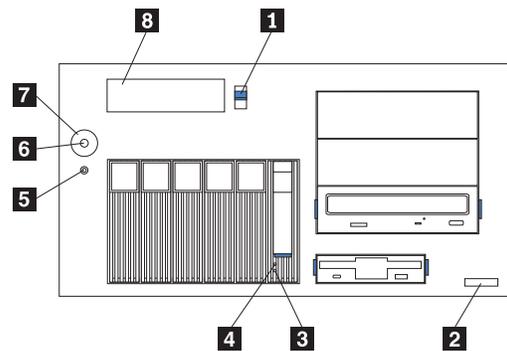
- Parity checking on the SCSI and PCI buses
- Error checking and correcting (ECC) memory
- Redundant hot-swap power supply option
- Redundant hot-swap cooling
- Redundant Ethernet capabilities (with optional adapter)
- Vital Product Data (VPD) on processor complex, system board, power backplane, SCSI backplane, and each power supply.
- Operator information panel
- Diagnostic LEDs on the system board
- Remote Connect

Server controls and indicators



- 1** Operator information panel
- 2** Hard disk drive activity light
- 3** Hard disk drive status light
- 4** Serial number
- 5** Cover release latch
- 6** Reset button
- 7** Power control button
- 8** Power control button shield (if installed)

Rack model



- 1** Cover release latch
- 2** Serial number
- 3** Hard disk drive activity light
- 4** Hard disk drive status light
- 5** Reset button
- 6** Power control button
- 7** Power control button shield (if installed)
- 8** Operator information panel

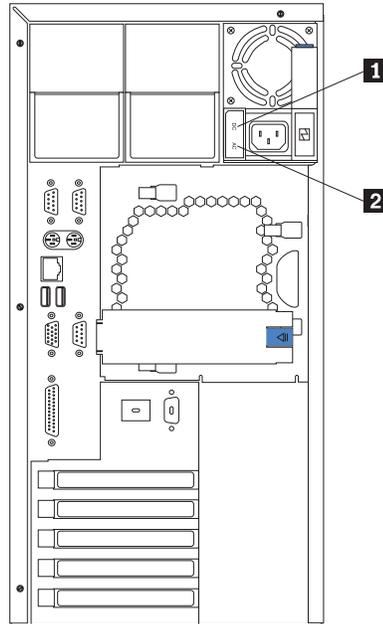
Reset Button: Press this button to reset the server and run the power-on self-test (POST).

Operator Information Panel: The lights on this panel give status information for your server. See “Operator Information panel” on page 10 for more information.

Hard Disk Status Light: Each of the hot-swap drives has a Hard Disk Status light. When this amber light 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 controller is identifying the drive.

Hard Disk Activity Light: Each of the hot-swap drives has a Hard Disk Activity light. When this green light is flashing, the controller is accessing the drive.

Rear view
(tower shown)



1 AC power LED

2 DC power LED

AC Power Light: This light provides status information about the power supply. During normal operation, both the AC and DC Power lights are on. For any other combination of lights, see “Power supply LEDs” on page 14.

DC Power Light: This light provides status information about the power supply. During normal operation, both the AC and DC Power lights are on. For any other combination of lights, see “Power supply LEDs” on page 14.

Starting the server

After you have plugged the power cord of your server into an electrical outlet and the power supply has been turned on, the server can be activated in several ways:

- You can turn on the server by pressing the Power control button on the front of the server.

Note: If you have just plugged the power cord of your server into an electrical outlet, you will have to wait approximately 20 seconds before pressing the Power control button.

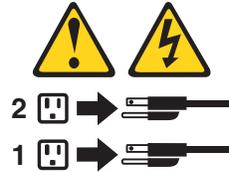
- If the server is activated and a power failure occurs, the server will start automatically when power is restored.
- Pressing the Reset button resets the server and runs the power-on self-test.
- The server can also be powered on by the Netfinity Advanced System Management Processor.

Deactivating the server

The server can be deactivated as follows:

CAUTION:

The power control button on the device and/or 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.



- You can turn off the server by pressing the Power control button on the front of the server. Pressing the Power control button starts an orderly shutdown of the operating system, if this feature is supported by your operating system, and places the server in standby mode.

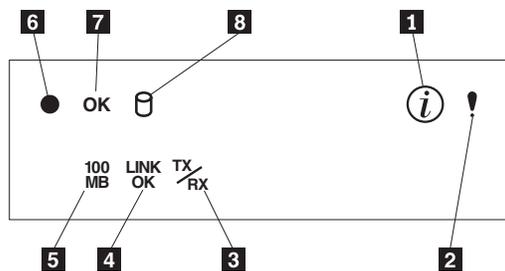
Note: After turning off the server, wait at least 5 seconds before pressing the Power control button to power the server on again.

- You can press and hold the Power control button for more than 4 seconds to cause an immediate shutdown of the server and place the server in standby mode. This feature can be used if the operating system hangs.
- You can disconnect the server power cords from the electrical outlets to shut off all power to the server.

Note: Wait about 15 seconds after disconnecting the power cords for your system to stop running. Watch for the System Power light on the operator information panel to stop blinking.

Operator Information panel

The operator information panel on the front of the server contains status lights.



- 1** Information light
- 2** System error light
- 3** Ethernet transmit/receive activity light
- 4** Ethernet link status light
- 5** Ethernet speed light
- 6** Power-on light
- 7** POST complete light
- 8** SCSI hard disk drive in-use light

Power-on light

This green LED lights when system power is present in the server. When this light flashes, the server is in standby mode (the system power supply is turned off and AC current is present). If this light is not on, the power cord is not connected, the power supply has failed, or this LED has failed.

POST complete light

This green LED lights when the server completes the power-on self-test (POST) without any errors.

SCSI Hard Disk Drive In-use Light:

This green LED lights when there is activity on a hard disk drive.

Information Light:

This amber LED lights when the information log contains information about certain conditions in your server that might affect performance. For example, the light will be on if your server does not have redundant power. An LED on the diagnostic panel on the system board will also be on.

System Error Light:

This amber LED lights when a system error occurs. An LED on the diagnostic panel on the system board will also be on to further isolate the error.

Ethernet speed Light:

This green LED lights when the Ethernet LAN speed is 100 Mbps.

Ethernet Link Status Light:

This green LED lights when there is an active connection on the Ethernet port.

Ethernet Transmit/Receive Activity Light:

This green LED lights when there is transmit or receive activity to or from the server.

Diagnostics

This section provides basic troubleshooting information to help you resolve some common problems that might occur with your server.

Diagnostic tools overview

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

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

The power-on self-test (POST) generates beep codes and messages to indicate successful test completion or the detection of a problem. See “POST error codes” on page 134 for more information.

- **Light path diagnostics**

Your server has light-emitting diodes (LEDs) to help you identify problems with server components. These LEDs are part of the light-path diagnostics that are built into your server. By following the path of lights, you can quickly identify the type of system error that occurred. See “Light path diagnostics” on page 14 and the table in “Information panel system error LED” on page 128 for more information.

- **Diagnostic programs and error messages**

The server diagnostic programs are stored in upgradable read-only memory (ROM) on the system board. These programs are the primary method of testing the major components of your server. See “Diagnostic programs and error messages” on page 15 for more information.

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.

If POST finishes without detecting any problems, a single beep sounds, the first screen of your operating system or application program appears, and the System POST Complete (OK) light is illuminated on the operator information panel.

If POST detects a problem, more than one beep sounds and an error message appears on your screen. See “Beep Symptoms” on page 125 and “POST error codes” on page 134 for more information.

Notes:

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

Event/error logs

The POST error log contains the three most recent error codes and messages that the system generated during POST. The System Event/Error Log contains all error

messages issued during POST and all system status messages from the Netfinity Advanced System Management Processor.

To view the contents of the error logs, start the Configuration/Setup Utility program; then, select **Event/Error Logs** from the main menu.

Small computer system interface messages

The table in “SCSI error codes” on page 140 lists actions to take if you receive a SCSI error message.

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

You will get these messages only when running the SCSISelect Utility.

Identifying problems using status LEDs

If the System Error light in the operator information panel on the front of the server is on, one or more LEDs inside the server or on the power supplies will be on. Use the light path diagnostics to identify the type of error that occurred.

Light path diagnostics

You can use the light path diagnostics built into your server to quickly identify the type of system error that occurred. Your server is designed so that any LEDs that are illuminated remain illuminated when the server shuts down as long as the AC power source is good and the power supplies can supply +5V dc current to the server. This feature helps you isolate the problem if an error causes the server to shut down. See “Light path diagnostics table” on page 15.

Power supply LEDs

The AC and DC Power LEDs on the power supply provide status information about the power supply. See “Power supply LED errors” on page 133.

Diagnostics panel

The following illustration shows the LEDs on the diagnostics panel on the system board. See “Light path diagnostics table” on page 15 below for information on

identifying problems using these LEDs.

PS1
PS2
PS3
NON
OVER
NMI
TEMP
FAN
MEM
CPU
PCI A
PCI B
VRM
DASD1
DASD2

Light path diagnostics table

The System Error LED on the operator information panel is lit when certain system errors occur. If the System Error LED on your server is lit, use the table in “Information panel system error LED” on page 128 to help determine the cause of the error and the action you should take.

Diagnostic programs and error messages

The server diagnostic programs are stored in upgradable read-only memory (ROM) on the system board. These programs are the primary method of testing the major components of your server.

Diagnostic error messages indicate that a problem exists; they are not intended to be used to identify a failing part.

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

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

The error code format is as follows:

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

where:

fff is the three-digit function code that indicates the function being tested when the error occurred. For example, function code 089 is for the microprocessor.

ttt is the three-digit failure code that indicates the exact test failure that was encountered.

- iii** is the three-digit device ID. .
- date** is the date that the diagnostic test was run and the error recorded.
- cc** is the check digit that is used to verify the validity of the information.
- text message**
is the diagnostic message that indicates the reason for the problem.

Text messages

The diagnostic text message format is as follows:

Function Name: Result (test specific string)

where:

Function Name

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

Result can be one of the following:

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

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

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

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

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

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

Test Specific String

This is additional information that you can use to analyze the problem.

Starting the diagnostic programs

You can press F1 while running the diagnostic programs to obtain Help information. You also can press F1 from within a help screen to obtain online documentation from which you can select different categories. To exit Help and return to where you left off, press Esc.

To start the diagnostic programs:

1. Turn on the server and watch the screen.

Note: To run the diagnostic programs, you must start the server with the highest level password that is set. That is, if an administrator password is set, you must enter the administrator password, not the power-on password, to run the diagnostic programs.

2. When the message F2 for Diagnostics appears, press F2.
3. Type in the appropriate password; then, press Enter.
4. Select either **Extended** or **Basic** from the top of the screen.
5. When the Diagnostic Programs screen appears, select the test you want to run from the list that appears; then, follow the instructions on the screen.

Notes:

- a. If the server stops during testing and you cannot continue, restart the server and try running the diagnostic programs again.
- b. The keyboard and mouse (pointing device) tests assume that a keyboard and mouse are attached to the server.
- c. If you run the diagnostic programs with either no mouse or a USB mouse attached to your server, you will not be able to navigate between test categories using the **Next Cat** and **Prev Cat** buttons. All other functions provided by mouse-selectable buttons are also available using the function keys.
- d. You can test the USB keyboard by using the regular keyboard test. The regular mouse test can test a USB mouse. Also, you can run the USB hub test only if there are no USB devices attached.
- e. 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.

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

Viewing the test log

The test log will not contain any information until after the diagnostic program has run.

Note: If you already are running the diagnostic programs, begin with step 3

To view the test log:

1. Turn on the server and watch the screen.
If the server is on, shut down your operating system and restart the server.
2. When the message 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.
3. When the Diagnostic Programs screen appears, select **Utility** from the top of the screen.
4. Select **View Test Log** from the list that appears; then, follow the instructions on the screen.

The system maintains the test-log data while the server is powered on. When you turn off the power to the server, the test log is cleared.

Diagnostic error message tables

The tables in “Diagnostic error codes” on page 129 provide descriptions of the error messages that might appear when you run the diagnostic programs.

Attention: If diagnostic error messages appear that are not listed in the tables, make sure that your server has the latest levels of BIOS, Advanced System Management Processor, and diagnostics microcode installed.

Recovering BIOS

If your BIOS has become corrupted, such as from a power failure during a flash update, you can recover your BIOS using the recovery boot block and a BIOS flash diskette.

Note: You can obtain a BIOS flash diskette from one of the following sources:

- Use the ServerGuide program to make a BIOS flash diskette.
- Download a BIOS flash diskette from the World Wide Web. Go to <http://www.pc.ibm.com/support/>, select IBM Server Support, and make the selections for your server.

The flash memory of your server contains a protected area that cannot be overwritten. The recovery boot block is a section of code in this protected area that enables the server to start up and to read a flash diskette. The flash utility recovers the system BIOS from the BIOS recovery files on the diskette.

To recover the BIOS:

1. Turn off the server and peripheral devices and disconnect all external cables and power cords; then, remove the cover.
2. Locate the boot block jumper (J37) on the system board.
3. Place a jumper on pins 1 and 2 to enable BIOS recovery mode.
4. Insert the BIOS flash diskette into the diskette drive.
5. Restart the server.

The Recovery Boot screen will appear. A progress report, Loading data from diskette *xx%*, is displayed. When programming is underway, a further progress report, Programming block *n of 7 yy%*, is displayed. When recovery is complete, Recovery complete, remove the diskette and return boot block switch to the off position before rebooting is displayed.

6. Remove the flash diskette from the diskette drive.
7. Turn the server off.
8. Remove the jumper on the boot-block jumper block or move pins 2 and 3 to return to normal startup mode.
9. Restart the server. The system should start up normally.

Troubleshooting the Ethernet controller

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

Network connection problems

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

- Make sure that the cable is installed correctly.

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

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

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

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

- Determine if the hub supports auto-negotiation. If not, try configuring the integrated Ethernet controller manually to match the speed and duplex mode of the hub.
- Check the Ethernet controller lights on the operator information panel.

These lights indicate whether a problem exists with the connector, cable, or hub.

 - The Ethernet Link Status light illuminates when the Ethernet controller receives a LINK pulse from the hub. If the light is off, there might be a bad connector or cable, or a problem with the hub.
 - The Ethernet Transmit/Receive Activity light illuminates when the Ethernet controller sends or receives data over the Ethernet Network. If the Ethernet Transmit/Receive Activity light is off, make sure that the hub and network are operating and that the correct device drivers are loaded.
 - The Ethernet Speed 100 Mbps light illuminates when the Ethernet controller LAN speed is 100 Mbps.
- Make sure that you are using the correct device drivers, supplied with your server.
- Check for operating system-specific causes for the problem.
- Make sure that the device drivers on the client and server are using the same protocol.
- Test the Ethernet controller.

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

Ethernet controller troubleshooting chart

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

Table 1. Ethernet troubleshooting chart

Ethernet controller problem	Suggested Action
The server stops running when loading device drivers.	<p>The PCI BIOS interrupt settings are incorrect.</p> <p>Check the following:</p> <ul style="list-style-type: none"> • Determine if the interrupt (IRQ) setting assigned to the Ethernet controller is also assigned to another device in the Configuration/Setup Utility program. <p>Although interrupt sharing is allowed for PCI devices, some devices do not function well when they share an interrupt with a dissimilar PCI device. Try changing the IRQ assigned to the Ethernet controller or the other device. For example, for NetWare Versions 3 and 4 it is recommended that disk controllers not share interrupts with LAN controllers.</p> <ul style="list-style-type: none"> • Make sure that you are using the most recent device driver available from the World Wide Web. • Run the network diagnostic program.
Ethernet Link Status light does not light.	<p>Check the following:</p> <ul style="list-style-type: none"> • Make sure that the hub is turned on. • Check all connections at the Ethernet controller and the hub. • Check the cable. A crossover cable is required unless the hub has an X designation. • Use another port on the hub. • If the hub does not support auto-negotiation, manually configure the Ethernet controller to match the hub. • If you manually configured the duplex mode, make sure that you also manually configure the speed. • Run diagnostics on the LEDs.

Table 1. Ethernet troubleshooting chart (continued)

Ethernet controller problem	Suggested Action
The Ethernet Transmit/Receive Activity light does not light.	Check the following: Note: The Ethernet Transmit/Receive Activity LED illuminates only when data is sent to or by this Ethernet controller. <ul style="list-style-type: none"> • Make sure that you have loaded the network device drivers. • The network might be idle. Try sending data from this workstation. • Run diagnostics on the LEDs. • The function of this LED can be changed by device driver load parameters. If necessary, remove any LED parameter settings when you load the device drivers.
Data is incorrect or sporadic.	Check the following: <ul style="list-style-type: none"> • Make sure that you are using Category 5 cabling when operating the server at 100 Mbps. • Make sure that the cables do not run close to noise-inducing sources like fluorescent lights.
The Ethernet controller stopped working when another adapter was added to the server.	Check the following: <ul style="list-style-type: none"> • Make sure that the cable is connected to the Ethernet controller. • Make sure that your PCI system BIOS is current. • Reseat the adapter. • Determine if the interrupt (IRQ) setting assigned to the Ethernet adapter is also assigned to another device in the Configuration/Setup Utility program. Although interrupt sharing is allowed for PCI devices, some devices do not function well when they share an interrupt with a dissimilar PCI device. Try changing the IRQ assigned to the Ethernet adapter or the other device.
The Ethernet controller stopped working without apparent cause.	Check the following: <ul style="list-style-type: none"> • Run diagnostics for the Ethernet controller. • Try a different connector on the hub. • Reinstall the device drivers. Refer to your operating-system documentation and to the ServerGuide information.

Ethernet controller messages

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

- Novell™ NetWare™ or IntraNetWare Server ODI
- NDIS Adapter for level 2.01 (OS/2)
- NDIS Adapter for level 4.0 (Windows NT)
- SCO™ UNIX LLI

Novell NetWare or IntraNetWare server ODI driver messages

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

Table 2. Novell NetWare or IntraNetWare ODI driver messages for the Ethernet controller

PCNTNW-NW-026	<p>The MSM is unable to parse a required custom keyword.</p> <p>Explanation: The user entered an incorrect parameter keyword. Action: Reload the driver using the correct keyword.</p>
PCNTNW-NW-054	<p>The adapter did not respond to the initialization command.</p> <p>Explanation: The adapter did not respond when the driver tried to initialize it. Action: Verify that the Ethernet controller is enabled. If the Ethernet controller is enabled, go to “Starting the diagnostic programs” on page 16 to run the diagnostic programs.</p>

Table 2. Novell NetWare or IntraNetWare ODI driver messages for the Ethernet controller (continued)

PCNTNW-NW-058	<p>The adapter did not respond to the initialization command.</p> <p>Explanation: The interrupt request (IRQ) setting might not be valid or the EEPROM information might be incorrect. Action: Make sure the IRQ settings are correct in the Configuration/Setup Utility program. for information on setting the interrupt requests.</p>
PCNTNW-NW-066	<p>The cable might be disconnected from the adapter.</p> <p>Explanation: The cable might be disconnected from the server Ethernet port. Action: Verify that a cable is connected to the Ethernet port.</p>
PCNTNW-NW-071	<p>The matching virtual adapter could not be found.</p> <p>Explanation: You tried to load another instance of the driver with a different I/O address. This new adapter could not be found. Action: Verify that you installed an IBM Netfinity 10/100 Fault Tolerant Adapter and make sure that the adapter is seated correctly.</p>
PCNTNW-NW-072	<p>A resource tag is unavailable.</p> <p>Explanation: The driver tried to allocate some resources that were not available. Action: Add more memory, or free some memory resources in the server. Then, restart the server.</p>
PCNTNW-NW-073	<p>Unable to allocate memory</p> <p>Explanation: The driver failed to allocate the memory needed for normal operation. Action: Add more memory, or free some memory resources in the server. Then, restart the server.</p>
PCNTNW-NW-074	<p>The hardware interrupt cannot be set.</p> <p>Explanation: An attempt was made to initialize a given hardware interrupt. The attempt was not successful. Action: Verify that the Ethernet controller is enabled. If the Ethernet controller is enabled, go to "Starting the diagnostic programs" on page 16 to run the diagnostic programs.</p> <p>If you have an Ethernet adapter installed, make sure that the adapter does not share an IRQ with any other device.</p>
PCNTNW-NW-075	<p>The Multiple Link Interface Driver (MLID) cannot be registered with the Link Support Layer (LSL).</p> <p>Explanation: An error occurred while the driver was trying to register with the LSL. Action: Check the version of the NetWare or IntraNetWare Operating System. Make sure that this driver is correct for the version of NetWare or IntraNetWare that you are using. Restart the server.</p>
PCNTNW-NW-079	<p>The Multiple Link Interface Driver (MLID) did not initialize MSMTx Free Count.</p> <p>Explanation: The MSMTx Free Count is not initialized correctly. Action: Restart the server.</p>
PCNTNW-NW-086	<p>The driver parameter block is too small.</p> <p>Explanation: The driver parameter block is too small. Action: Restart the server.</p>
PCNTNW-NW-087	<p>The media parameter block is too small.</p> <p>Explanation: The driver media parameter block is too small. Action: Restart the server.</p>

Table 2. Novell NetWare or IntraNetWare ODI driver messages for the Ethernet controller (continued)

PCNTNW-NW-091	<p>The hardware configuration conflicts.</p> <p>Explanation: You tried to load a new frame type for the existing controller. The hardware assumptions made in doing so are incorrect. This error can also occur if you try to specify a mode (such as, redundancy) that conflicts with another specified mode. Action: Make sure that your hardware configuration matches the software settings.</p>
PCNTNW-NW-126	<p>The group bit in the node address override was cleared.</p> <p>Explanation: The IEEE address has a group bit that indicates that an address belongs to a group of stations. This bit is used only as a destination address; it cannot be used as a source address. You tried to enter a source address with this bit set. The driver cleared the group bit of the source address. Action: None necessary, message is for information only.</p>
PCNTNW-NW-127	<p>The local bit in the node address override was set.</p> <p>Explanation: The local bit in the IEEE address format indicates that the addresses are being managed locally. If you use the node address override capabilities of this driver to enter a new address, the local bit must be set. You entered an address without the local bit set. The driver has set the local bit. Action: None necessary, message is for information only.</p>
PCNTNW-NW-164	<p>The device was not found.</p> <p>Explanation: The driver cannot find an Ethernet controller in the server. Action: Verify that the Ethernet controller is enabled. If the Ethernet controller is enabled, go to “Starting the diagnostic programs” on page 16 to run the diagnostic programs.</p>
PCNTNW-NW-165	<p>The device was not found at IOADDRESS.</p> <p>Explanation: The Ethernet controller cannot be found at the I/O address specified. Action: The Ethernet controller does not require a parameter for the I/O address. Remove the I/O address parameter.</p>
PCNTNW-NW-167	<p>PCI scan specified, device not found.</p> <p>Explanation: The driver cannot locate the Ethernet controller on the PCI bus. Action: Verify that the Ethernet controller is enabled. If the problem persists, go to “Starting the diagnostic programs” on page 16 to run the diagnostic programs.</p>
PCNTNW-NW-180	<p>The DMA parameter is not necessary for PCI device.</p> <p>Explanation: The Ethernet controller does not require a DMA setting. Action: None necessary, message is for information only.</p>

Network driver interface specification 2.01 (OS/2) driver messages

This section provides explanations of the error messages for the NDIS 2.01 (OS/2) drivers, and suggested actions to resolve each problem.

Table 3. NDIS 2.01 (OS/2) driver messages for the Ethernet controller

PCNTND-1	<p>Unable to open the Protocol Manager.</p> <p>Explanation: The NDIS stack is not configured correctly. Action: Check and correct your configuration.</p>
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Table 3. NDIS 2.01 (OS/2) driver messages for the Ethernet controller (continued)

PCNTND-6	<p>Out of memory while allocating buffers.</p> <p>Explanation: The driver could not allocate the requested buffers. Action: Check your system configuration. Edit the PROTOCOL.INI file to reduce the number of Txbuffers and Rxbuffers specified for the driver.</p>
PCNTND-7	<p>A Protocol Manager device error occurred.</p> <p>Explanation: The NDIS stack is not configured correctly. Action: Check and correct your configuration.</p>
PCNTND-8	<p>Bad status for the Protocol Manager.</p> <p>Explanation: The NDIS stack is not configured correctly in the PROTOCOL.INI file. Action: Check and correct your configuration.</p>
PCNTND-9	<p>Cannot find the PROTOCOL.INI entry.</p> <p>Explanation: The NDIS stack is not configured correctly in the PROTOCOL.INI file. Action: Check and correct your configuration.</p>
PCNTND-10	<p>The Protocol Manager Input Output Control (IOCTL) failed.</p> <p>Explanation: The NDIS stack is not configured correctly in the PROTOCOL.INI file. Action: Check and correct your configuration.</p>
PCNTND-11	<p>Protocol Manager registration failed.</p> <p>Explanation: The NDIS stack is not configured correctly. Action: Check and correct your configuration.</p>
PCNTND-15	<p>Device not found.</p> <p>Explanation: The driver cannot find an Ethernet controller in the server. Action: Verify that the Ethernet controller is enabled. If the Ethernet controller is enabled, go to "Starting the diagnostic programs" on page 16 to run the diagnostic programs.</p>
PCNTND-16	<p>PCI scan specified, device not found.</p> <p>Explanation: The driver cannot locate the Ethernet controller on the PCI bus. Action: Verify that the Ethernet controller is enabled. If the Ethernet controller is enabled, go to "Starting the diagnostic programs" on page 16 to run the diagnostic programs.</p>
PCNTND-21	<p>The adapter failed the checksum test.</p> <p>Explanation: The driver cannot find an Ethernet controller. Action: Verify that the Ethernet controller is enabled. If the Ethernet controller is enabled, go to "Starting the diagnostic programs" on page 16 to run the diagnostic programs.</p>
PCNTND-23	<p>WARNING: PCNET IRQ found = xx</p> <p>Explanation: The interrupt request (IRQ) setting (xx) in the PROTOCOL.INI file does not match the hardware IRQ setting. Action: Remove the IRQ setting from the PROTOCOL.INI file or change the IRQ setting in the PROTOCOL.INI file to match the IRQ setting shown in the PCI Slot/Device Information selection of the Advanced Setup menu in the Configuration/Setup Utility program.</p>
PCNTND-24	<p>WARNING: PCNET IRQ does not match PROTOCOL.INI.</p> <p>Explanation: The interrupt request (IRQ) setting in the PROTOCOL.INI file does not match the hardware IRQ setting. Action: Remove the IRQ setting from the PROTOCOL.INI file or change the IRQ setting in the PROTOCOL.INI file to match the IRQ setting shown in the PCI Slot/Device Information selection of the Advanced Setup menu in the Configuration/Setup Utility program.</p>

Table 3. NDIS 2.01 (OS/2) driver messages for the Ethernet controller (continued)

PCNTND-25	PCI scan specified, PCI bus not found! Explanation: The driver cannot locate the PCI bus. Action: Run the diagnostic programs.
PCNTND-29	WARNING: DMA number is not necessary for PCI device. Explanation: The Ethernet controller does not require a DMA setting. Action: Remove the DMA setting in the PROTOCOL.INI file.
PCNTND-33	PCNET device with specified IOBASE is already in use. Explanation: The specified I/O address number is already in use by another Ethernet controller or device. Action: Remove the I/O address setting in the PROTOCOL.INI file.

NDIS 4.0 (Windows NT) driver messages

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

Table 4. NDIS (Windows NT) driver messages for the Ethernet controller

PermaNet™ Server:	No Secondary Adapter Found. Grouping Mode is disabled. Explanation: The failover option requires an adapter that is compatible with the device driver of the Ethernet controller on the system board. No such adapter was found. Action: Make sure the correct adapter is installed.
PermaNet Server:	Problem Occurs on the Primary Adapter. Switching over to the Secondary Adapter. Explanation: The system detected a problem with the primary Ethernet connection and has transferred all network traffic to the secondary Ethernet controller. Action: identify the cause of the failure on the primary Ethernet connection. Restoring the operational state of the primary connection will cause the network traffic to automatically transfer to the primary Ethernet controller.
PermaNet Server:	Switching back to Primary Adapter. Explanation: The primary Ethernet connection is now operating correctly. Network traffic will automatically transfer to the primary Ethernet controller. Action: None needed, message is for information only.

UNIX messages

This section provides descriptions of the Ethernet error messages for the SCO UNIX LLI driver, and suggested actions to resolve each problem.

Table 5. UNIX LLI driver messages for the Ethernet controller

pnt0-2	PCI search specified, PCI device not found! Explanation: The driver cannot locate the Ethernet controller on the PCI bus. Action: <ul style="list-style-type: none"> • Run the NETCONFIG program to search for another Ethernet controller • Verify that the Ethernet controller is enabled. If the Ethernet controller is enabled, run the diagnostic programs.
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Table 5. UNIX LLI driver messages for the Ethernet controller (continued)

pnt0-6	<p>Cannot allocate memory for the adapter during an interrupt. Please check your Streams parameters.</p> <p>Explanation: On a SunSoft Solaris system, this message indicates that the system is out of Streams memory blocks. Action: Use the CRASH utility to increase the number of Streams memory blocks. Modify the interrupt request (IRQ) settings in the Configuration/Setup Utility program, or run the NETCONFIG program to match the hardware settings.</p>
pnt0-7	<p>Cannot allocate memory for the adapter during reset. Please check your Streams parameters.</p> <p>Explanation: The system is out of Streams memory blocks. Action: Use the CRASH utility to increase the number of Streams memory blocks.</p>
pnt0-11	<p>Device not found!</p> <p>Explanation: The driver cannot find an Ethernet controller. Action: Verify that the Ethernet controller is enabled. If the Ethernet controller is enabled, run the diagnostic programs.</p>
pnt0-12	<p>Device failed checksum test!</p> <p>Explanation: The driver cannot find an Ethernet controller. Action: Verify that the Ethernet controller is enabled. If the Ethernet controller is enabled, run the diagnostic programs.</p>
pnt0-13	<p>add_intr_handler failed! Interrupts already enabled.</p> <p>Explanation: The interrupt request (IRQ) that was specified, or the IRQ that was found, conflicts with other devices in the server. Action: Modify your hardware settings.</p>
pnt0-14	<p>Cannot locate hardware.</p> <p>Explanation: The SunSoft Solaris driver cannot find any Ethernet controller. Action: Verify that the Ethernet controller is enabled. If the Ethernet controller is enabled, run the diagnostic programs.</p>
pnt0-15	<p>No more devices to open.</p> <p>Explanation: The SunSoft Solaris driver cannot find any more Ethernet controllers. Action: Verify that additional IBM Netfinity 10/100 Fault Tolerant Adapters are present or replace the Ethernet adapter that fails to respond. If the problem persists, run the diagnostic programs.</p>
pnt0-17	<p>Device fault...Reset initiated!</p> <p>Explanation: The SunSoft Solaris driver has been reset due to a device fault. Action: Verify that additional IBM Netfinity 10/100 Fault Tolerant Adapters are present or replace the Ethernet adapter that fails to respond. If the problem persists, run the diagnostic programs.</p>
pnt0-19	<p>IRQ found for PCnet hardware does not match space.c (or pnt.conf)!</p> <p>Explanation: This is a warning message referring to the interrupt request (IRQ) that the SunSoft Solaris driver found in the system. Action: Ignore this message if you are sure that this is what you want to do. Otherwise, run the NETCONFIG program to match the hardware settings</p>
pnt0-20	<p>add_intr_handler failed! Unknown interrupt type.</p> <p>Explanation: The interrupt request (IRQ) that was specified, or the IRQ that was found, conflicts with other devices in the server. Action:</p> <ul style="list-style-type: none"> • Modify your hardware settings. • Run the NETCONFIG program to search for another Ethernet controller.

Table 5. UNIX LLI driver messages for the Ethernet controller (continued)

pnt0-21	<p>add_intr_handler failed! Out of range interrupt number.</p> <p>Explanation: The interrupt request (IRQ) that was specified, or the IRQ that was found, conflicts with other devices in the server. Action:</p> <ul style="list-style-type: none"> • Modify your hardware settings. • Run the NETCONFIG program to search for another Ethernet controller.
pnt0-22	<p>add_intr_handler failed! Out of range IPL.</p> <p>Explanation: The interrupt request (IRQ) that was specified, or the IRQ that was found, conflicts with other devices in the server. Action: Modify your hardware settings. Run the NETCONFIG program to search for another Ethernet controller.</p>
pnt0-23	<p>add_intr_handler failed! Vector already occupied.</p> <p>Explanation: The interrupt request (IRQ) that was specified, or the IRQ that was found, conflicts with other devices in the server. Action: Modify your hardware settings.</p>
pnt0-24	<p>add_intr_handler failed! Vector already shared at different IPL.</p> <p>Explanation: The interrupt request (IRQ) that was specified, or the IRQ that was found, conflicts with other devices in the server. Action:</p> <ul style="list-style-type: none"> • Modify your hardware settings. • Run the NETCONFIG program to search for another Ethernet controller.
pnt0-26	<p>The DMA number is not necessary for PCI device.</p> <p>Explanation: The IBM Netfinity 10/100 Fault Tolerant Adapter does not require a DMA setting. Action: Edit the SPACE.C file to delete the DMA parameter.</p>
pnt0-29	<p>The IRQ number is already in use.</p> <p>Explanation: The specified I/O address is already in use. Action: Run the NETCONFIG program to modify your hardware settings.</p>
pnt0-31	<p>I/O address is not necessary for the PCI device.</p> <p>Explanation: The I/O address specified is not required. Action: Remove the assigned I/O address specified for the Ethernet controller</p>

Power checkout

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

A general procedure for troubleshooting power problems is as follows:

1. Power off the system and disconnect the AC cord(s).
2. Check for loose cables in the power subsystem. Also check for short circuits, for instance if there is a loose screw causing a short circuit on a circuit board.
3. Remove adapters and disconnect the cables and power connectors to all internal and external devices until system is at minimum configuration required for power on (see "Minimum operating requirements" on page 144).
4. Reconnect the AC cord and power on the system. If the system powers up successfully, replace adapters and devices one at a time until the problem is isolated. If system does not power up from minimal configuration, replace FRUs of minimal configuration one at a time until the problem is isolated.

To use this method it is important to know the minimum configuration required for a system to power up (see page 144). For specific problems, see “Power error messages” on page 141.

Replacing the battery

IBM has designed this product with your safety in mind. The lithium battery must be handled correctly to avoid possible danger. If you replace the battery, you must adhere to the following instructions.

CAUTION:

When replacing the battery, use only IBM Part Number 10L6432 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.

Note: In the U.S., call 1-800-IBM-4333 for information about battery disposal.

If you replace the original lithium battery with a heavy-metal battery or a battery with heavy-metal components, be aware of the following environmental consideration. Batteries and accumulators that contain heavy metals must not be disposed of with normal domestic waste. They will be taken back free of charge by the manufacturer, distributor, or representative, to be recycled or disposed of in a proper manner. To order replacement batteries, call 1-800-772-2227 within the United States.

Before you begin:

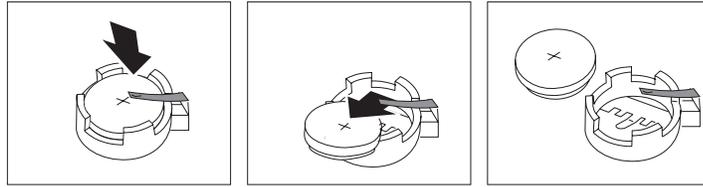
- Read “Before you begin” on page 47.
- Follow any special handling and installation instructions supplied with the replacement battery.

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

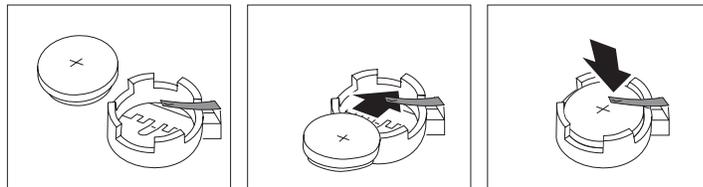
To replace the battery:

1. Turn off the server and peripheral devices and disconnect all external cables and power cords; then, remove the server cover.
2. Remove the battery:
 - a. Use one finger to lift the battery clip over the battery.
 - b. Use one finger to slightly slide the battery out from its socket. The spring mechanism will push the battery out toward you as you slide it from the socket.
 - 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.



3. Insert the new battery:
 - a. Tilt the battery so that you can insert it into the socket, under the battery clip.
 - b. As you slide it under the battery clip, press the battery down into the socket.



4. Reinstall the server cover and connect the cables.

Note: 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.

5. Turn on the server.
6. Start the Configuration/Setup Utility program and set configuration parameters.
 - Set the system date and time.
 - Set the power-on password.
 - Reconfigure your server.

Temperature checkout

Proper cooling of the system is important for proper operation and system reliability. For a typical Netfinity server, you should make sure:

- Each of the drive bays has either a drive or a filler panel installed
- Each of the power supply bays has either a power supply or a filler panel installed
- The top cover is in place during normal operation
- There is at least 50 mm (2 inches) of ventilated space at the sides of the server and 100 mm (4 inches) at the rear of the server
- The top cover is removed for no longer than 30 minutes while the server is operating
- The processor housing cover covering the processor and memory area is removed for no longer than ten minutes while the server is operating
- A removed hot-swap drive is replaced within two minutes of removal
- Cables for optional adapters are routed according to the instructions provided with the adapters (ensure that cables are not restricting air flow)

- The fans are operating correctly and the air flow is good
- A failed fan is replaced within 48 hours

In addition, ensure that the environmental specifications for the system are met. See “Features and specifications” on page 3.

For more information on specific temperature error messages, see “Temperature error messages” on page 140.

Configuring the server

The following configuration programs are provided with your server:

- **Configuration/Setup Utility**

This program Configuration/Setup Utility is part of the *basic input/output system (BIOS)* that comes with your server. You can use this program to configure serial and parallel port assignments, change interrupt request (IRQ) settings, change the drive startup sequence, set the date and time, and set passwords. See “Using the Configuration/Setup Utility program” for more information.

- **SCSISelect Utility**

With the built-in SCSISelect Utility program, you can configure the devices attached to the integrated SCSI controller. See “Using the SCSISelect utility program” on page 37 for more information.

- **ServerGuide CDs**

The ServerGuide CDs include software setup and installation tools specifically designed for IBM xSeries servers. You can use these CDs during the initial installation of your server to configure the server hardware and simplify your network operating system installation. The ServerGuide CDs also contain a collection of application programs, which you can install after your server is up and running. See “Working with adapters” on page 51 for more detailed information.

- **ServeRAID programs**

The ServeRAID programs come with the optional ServeRAID adapters and with server models that have a ServeRAID adapter preinstalled. If your server has a ServeRAID adapter installed, you must use the ServeRAID Configuration program to define and configure your disk-array subsystem *before* you install your operating system. See “Working with adapters” on page 51 for more detailed information.

Using the Configuration/Setup Utility program

This section provides the instructions needed to start the Configuration/Setup Utility program and descriptions of the menu choices available.

Starting the Configuration/Setup Utility program

To start the Configuration/Setup Utility program:

1. Turn on the server and watch the monitor screen.
2. When the message Press F1 for Configuration/Setup appears, press F1.

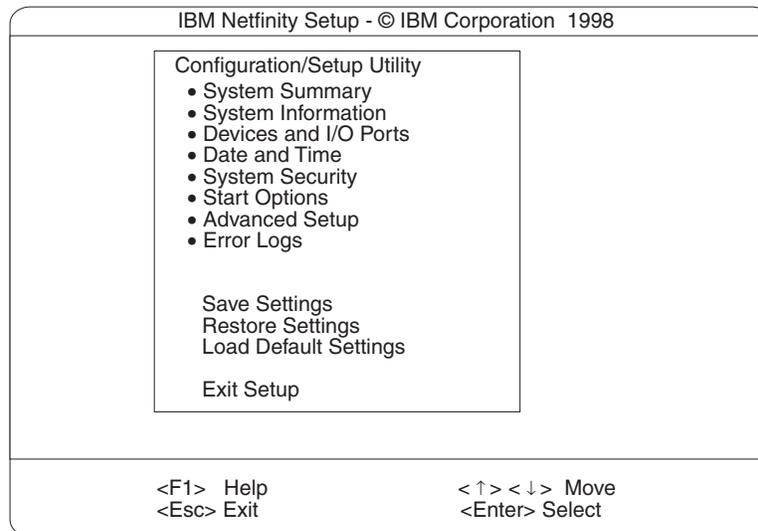
Note: If you have set both levels of passwords (user and administrator), you must enter the administrator password to access the full Configuration/Setup menu.

3. Follow the instructions that appear on the screen.

Choices available from the Configuration/Setup main menu

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:



Notes:

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

Descriptions of the choices available from the main menu are as follows:

- **System Summary**

Select this choice to display configuration information. This includes the type and speed of the microprocessors and the amount of memory installed.

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

This choice appears on both the full and limited Configuration/Setup Utility menus.

- **System Information**

Select this choice to display information about your 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 server serial number, and the revision level or issue date of the BIOS stored in the flash electronically erasable programmable ROM (EEPROM).

- **System Card Data**

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

- **Devices and I/O Ports**

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

- **Date and Time**

Select this choice to set the system date and time and to change the system time sent to the Advanced System Management Processor (service processor) when the server is started. This choice appears only on the full Configuration/Setup Utility main menu.

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

You can set a time delta to be added or subtracted from the system time that is sent to the service processor (Configuration/Setup Utility) each time the server is started. Use the number keys to enter the hours and minutes and + or – to add or subtract from the system time. If you want the system clock time to be the same as the Configuration/Setup Utility clock time, leave the value set at its default of 0.

- **System Security**

Select this choice to set passwords or a system owner's name. This choice appears only on the full Configuration/Setup Utility main menu.

You can implement two levels of password protection:

- **Power-on Password**

Select this choice to set or change a power-on password. See "Using passwords" on page 35 for more information.

- **Administrator Password**

Select this choice to set or change an administrator password.

Attention: If an administrator password is set and then forgotten, it cannot be overridden or removed. You must replace the system board.

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.

See "Using passwords" on page 35 for more information.

- **System Owner's Name**

Select this choice to specify a system owner's name, which will display during POST. You can remove or change the name only from the System Security menu. You can use any combination of up to 16 characters for the system owner's name.

- **Start Options**

Select this choice to view or change the start options. This choice appears only on the full Configuration/Setup Utility main menu. Start options take effect when you start your 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, monitor, or keyboard.

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.

You also can select which PCI SCSI adapter is given boot precedence. The first drive that is attached to the selected adapter will be assigned drive number 80L and the operating system will start from that drive. The default for boot precedence is Disabled. The range of choices depends upon the number of PCI SCSI adapters installed in the server.

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.

- **Advanced Setup**

Select this choice to change values for advanced hardware features, such as cache control, and PCI configuration. This choice appears only on the full Configuration/Setup Utility main menu.

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

- **Processor Serial Number Access**

Select this choice to identify if the microprocessor serial number in the microprocessor is readable.

- **Core Chipset Control**

Select this choice to modify settings that control features of the core chip set on the system board.

Attention: Do not make changes here unless directed to do so by an IBM authorized service representative.

- **Cache Control**

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

- **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.

Attention: You must use the menu selections to save custom settings for the PCI Slot/Device Information choice. The save, restore and load default settings choices on the main menu of the Configuration/Setup Utility do not save the PCI Slot/Device Information settings.

After making changes, select:

- **Save and exit the PCI Utility** to save the changes and return to the Advanced Setup choice.
- **Exit the PCI Utility without saving changes** to ignore the changes, restore the previous settings, and return to the Advanced Setup choice.

PCI Device Control allows you to enable or disable the integrated SCSI, video, and Ethernet controllers. You can also enable or disable PCI slots from this menu.

- The default setting is Enable for all the controllers and PCI slots. If you select Disable, the system will not configure the disabled device and the operating system will not see the device. (This is equivalent to unplugging the device.)
- If the on-board SCSI controller is disabled and no other controller and mass storage device are installed, operating system startup cannot occur.
- If the video controller is disabled and no video adapter is installed, the server will have no video capability. However, turning the server off and on three times results in a default startup that enables video again.

- **Memory Settings**

Select this choice to manually disable or enable a bank of memory.

If a memory error is detected during POST or memory configuration, the server can automatically disable the failing memory bank and continue operating with reduced memory capacity. If this occurs, you must manually

enable the memory bank after the problem is corrected. Select **Memory Settings** from the Advanced Setup menu, use the arrow keys to highlight the bank that you want to enable; then, use the arrow keys to select **Enable**.

- **System Service Processor Settings**

Select this choice to view the interrupt-request setting (IRQ) used by the Configuration/Setup Utility (system service processor). You can then use the arrow keys to select a new IRQ setting for the Configuration/Setup Utility from the list of available choices.

- **Event/Error Logs**

Select this choice to view or clear error logs.

- Select **Clear error logs** to clear the error or event log.
- Select **POST Error Log** to view the three most recent error codes and messages that the system generated during POST.
- Select **System Event/Error Log** to view the system event/error log. The system event/error log contains all the system error and warning messages that the system has generated. You can use the arrow keys to move between pages in the system event/error log.

- **Save Settings**

Select this choice to save your customized settings.

- **Restore Settings**

Select this choice to delete your changes and restore the previous settings.

- **Load Default Settings**

Select this choice to cancel your changes and restore the factory settings.

- **Exit Setup**

If you have made any changes, the program will prompt you to save the changes or exit without saving the changes.

Using passwords

The **System Security** choice appears only on the full Configuration/Setup Utility menu. After you select this choice, you can implement two levels of protection: power-on password and administrator password.

Power-on password

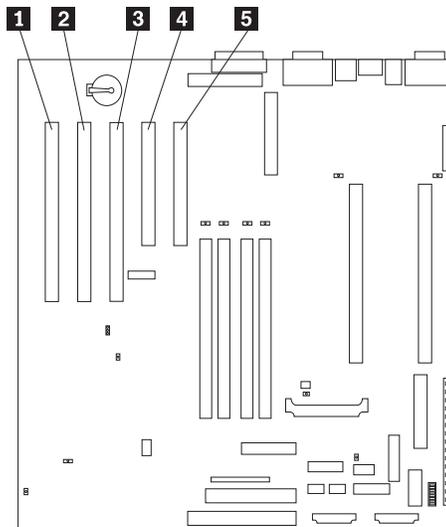
After you set a power-on password, you can enable the unattended-start mode. This locks the keyboard and mouse, but allows the system to start the operating system. The keyboard and mouse remain locked until you enter the correct password.

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. If you forget the power-on password, you can regain access to the server through one of the following methods:

- If an administrator password is set, enter the administrator password at the power-on prompt. Start the Configuration/Setup Utility program and change the power-on password.
- Change the position of the password override switch as described in “Setting the password override switch” on page 36..
- Remove the battery and then install the battery.

Setting the password override switch: The following illustration shows the location of the password override switch (switch 8 on switch block 1) on the system board.

Note: As shown in the illustration, switch 8 is the one at the top of the switch block.



- 1** PCI slot 5 64-bit (J44)
- 2** PCI slot 4 64-bit (J39)
- 3** PCI slot 3 64-bit (J34)
- 4** PCI slot 2 32-bit (J32)
- 5** PCI slot 1 32-bit (J27)

To set the password override switch:

1. Review the information in “Before you begin” on page 47.
2. Turn off the server and peripheral devices and disconnect all external cables and power cords; then, remove the cover. See “Removing the cover, door, and bezel” on page 48.
3. Change the setting of the password override switch (switch 8 on switch block 1 on the system board) to ON.
4. Install the server cover (see “Installing the cover” on page 70) and connect all external cables and power cords.

Note: You can now start the Configuration/Setup utility program and change the power-on password. If you want the server to ask for a password when you turn on the server, set the password override switch back to the OFF position.

Administrator password

Select this choice to set an administrator password. 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.

Attention: If an administrator password is set and then forgotten, it cannot be overridden or removed. You must replace the system board.

The following table provides a summary of the password features.

Table 6. Power-on and administrator password features

Type of password	Results
Power-on password	<ul style="list-style-type: none">• Enter the password to complete the system startup.• All choices are available on the Configuration/Setup Utility main menu.
Administrator password	<ul style="list-style-type: none">• No password is required to start the system.• Enter the password to access the Configuration/Setup Utility program.• All choices are available on the Configuration/Setup Utility main menu.
Administrator <i>and</i> power-on password	<ul style="list-style-type: none">• 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.

Bypassing an unknown power-on password

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 any of the following methods:

- Enter the administrator password at the power-on prompt, if an administrator password has been set.
- Start the Configuration/Setup Utility program and change the power-on password. See GENC3CYS.
- Change switch 8 of switch block 1 (SW1) on the system board to the opposite position to bypass the power-on password check. See D3MV1BMS. You can then start the Configuration/Setup Utility program and change the power-on password. See GENC3CYS.

Using the SCSISelect utility program

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

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

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

Note: If your server has a RAID adapter installed, use the configuration method supplied with the RAID adapter to view or change SCSI settings for attached devices.

Starting the SCSISelect utility program

To start the SCSISelect utility program:

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

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

3. When prompted, select either channel A (internal) or channel B (external).
4. Use the arrow keys to select a choice from the menu.
 - Press Esc to return to the previous menu.
 - Press the F5 key to switch between color and monochrome modes (if your monitor permits).
5. Follow the instructions on the screen to change the settings of the selected items; then, press Enter.

Choices available from the SCSISelect menu

The following choices appear on the SCSISelect Utility menu:

- **Configure/View Host Adapter Settings**

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

You can view or change the following controller settings:

- **Host Adapter SCSI ID**

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

- **SCSI Parity Checking**

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

- **Host Adapter SCSI Termination**

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

- **Boot Device Options**

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

- The transfer rate for Ultra3 SCSI LVD devices is 160.0
- The transfer rate for Ultra2 SCSI LVD devices is 80.0
- The transfer rate for Fast SCSI devices is 20.0

- **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 speeds.

- **SCSI Disk Utilities**

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

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

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

- **Format Disk**

Attention: The Low-Level Format program erases *all* data and programs.

Select this choice to perform a low-level format on a hard disk drive. Depending on the hard disk drive capacity, the Low-Level Format program could take up to two hours.

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

To start the Low-Level Format program:

1. If the hard disk is working, make a backup copy of all the files and programs on the hard disk drive. (See your operating system information for instructions.)
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.

Installing options

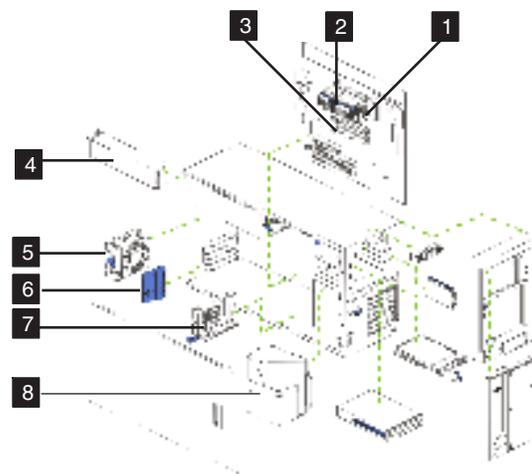
This chapter provides instructions to help you add options to your server. Some option-removal instructions are provided, in case you need to remove one option to install another.

Exploded view of the xSeries 230 server

The orange color on components and labels in your server identifies hot-swap or hot-plug components. This means that you can install or remove the component while the system is running, provided that your system is configured to support this function. For complete information about installing or removing a hot-swap component, see the detailed procedures in this chapter.

The blue color on components and labels indicates touch points where a component can be gripped, a latch moved, and so on.

The following illustration shows the locations of major components in your server.



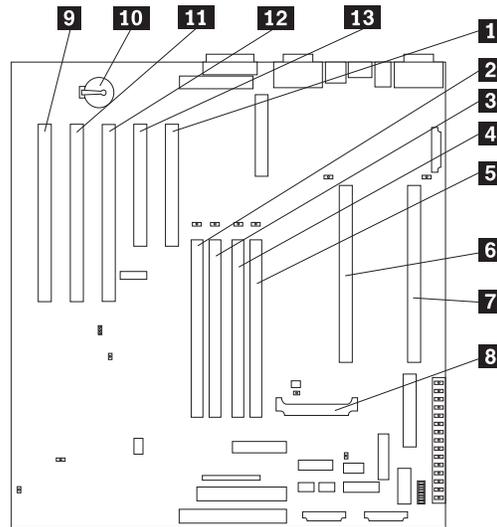
- 1** Terminator card
- 2** Microprocessor
- 3** DIMM
- 4** Power supply
- 5** Fan
- 6** Adapter-retention bracket
- 7** Adapter-support bracket
- 8** Fan (blower)

System board layout

The illustrations in the following sections show the components on the system board.

System board options connectors

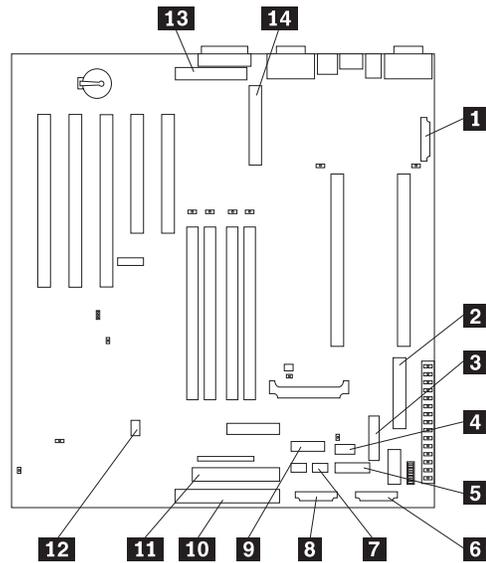
The following illustration identifies system-board connectors for user-installable options.



- 1** PCI slot 1 32-bit (J27)
- 2** DIMM 1 (J23)
- 3** DIMM 2 (J21)
- 4** DIMM 3 (J19)
- 5** DIMM 4 (J18)
- 6** Primary microprocessor (U3)
- 7** Secondary microprocessor (U17)
- 8** Voltage regulator module 2 (VRM2) (U26)
- 9** PCI slot 5 64-bit (J44)
- 10** Battery
- 11** PCI slot 4 64-bit (J39)
- 12** PCI slot 3 64-bit (J34)
- 13** PCI slot 2 32-bit (J32)

System board internal cable connectors

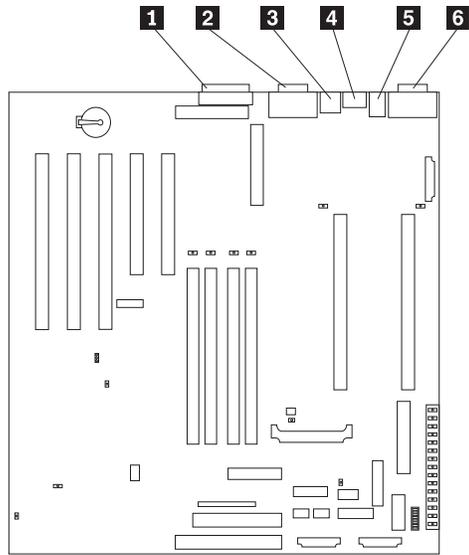
The following illustration identifies system-board connectors for internal cables.



- 1** Fan 3 (J35)
- 2** Main Power (J4)
- 3** Power (J51)
- 4** DASD (SCSI) system management (J5)
- 5** Power system management (J12)
- 6** Fan 1 (J59)
- 7** Operator information panel (J50)
- 8** Fan 2 (J60)
- 9** On-off / Reset panel (J38)
- 10** IDE (J31)
- 11** Diskette (J26)
- 12** Advance System Management processor (J40)
- 13** Internal SCSI channel B (J29)
- 14** Internal SCSI channel A (J17)

System board external port connectors

The following illustration identifies system-board connectors for external devices.



- 1** Parallel port (J22)
- 2** Video / Advanced System Management Process or port (J13)
- 3** USB ports (J11)
- 4** Ethernet ports (J9)
- 5** Keyboard / mouse port (J6)
- 6** Serial ports (J3)

System board switches and jumpers

The following illustration identifies the switches and jumpers on the system board.



- 1** Boot block jumper (J37)
- 2** System board switch block (SW1)

System board switch block

The switch block contains microswitches 1-8. As pictured in this illustration, switch 8 is at the top of the switch block and switch 1 is at the bottom.

The following table describes the function for each switch.

Table 7. Switches 1-8

Switch number	Switch description
1	Microprocessor speed setting (requires switches 1-4). See Table 8 for specific settings.
2	Microprocessor speed setting (requires switches 1-4). See Table 8 for specific settings.
3	Microprocessor speed setting (requires switches 1-4). See Table 8 for specific settings.
4	Microprocessor speed setting (requires switches 1-4). See Table 8 for specific settings.
5	Power-on override. The default setting is Off (disabled). When On, overrides the power-on switch and forces power-on mode. The system will always boot without the use of the power-on switch.
6	Clock frequency selection. The default setting is Off. When On, sets the host bus speed to 100 MHz. When Off, the host bus speed is 133 MHz.
7	Reserved. The default setting is Off.
8	Bypass power-on password. The default setting is Off. When On, bypass the power-on password. When Off, require the user to enter the power-on password at startup, if one is set.

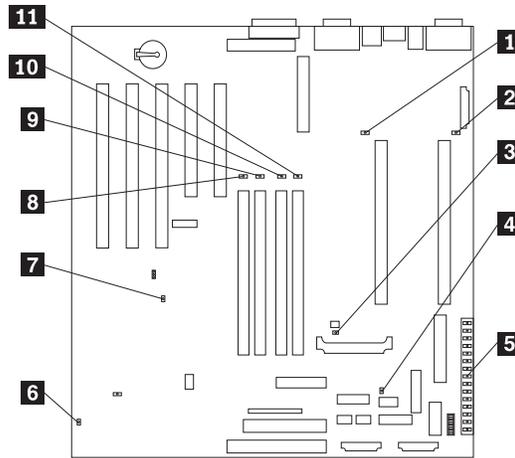
Table 8. Microprocessor speed settings

Microprocessor speed	Switch 1	Switch 2	Switch 3	Switch 4
133/1000MHz	off	off	off	on

Note: The speed settings shown above apply only to unlocked processors. If the processors are production level they are locked and there is no need to change the speed settings.

System board LED locations

The following illustration identifies system-board LEDs. You may need to refer to this figure when troubleshooting a problem.



- 1** Secondary microprocessor failure (CR7)
- 2** Primary microprocessor failure (CR1)
- 3** Voltage regulator module (VRM2) failure (CR16)
- 4** Integrated voltage regulator (VRM1) failure (CR4)
- 5** Diagnostics panel
- 6** Advanced System Management Processor error (CR70)
- 7** Power-on (CR56)
- 8** DIMM1 failure (CR23)
- 9** DIMM2 failure (CR28)
- 10** DIMM3 failure (CR18)
- 11** DIMM4 failure (CR20)

Table 9. Diagnostics panel LEDs

LED	Description
PS1	Power supply 1 failure.
PS2	Power supply 2 failure.
PS3	Power supply 3 failure.
NON	Non-redundant power.
OVER	Overspecification. The system has exceeded the power capabilities of the installed power supply units.
NMI	Non-maskable-interrupt occurred.
TEMP	System temperature exceeded maximum rating.
FAN	A fan failed or is operating slowly.
MEM	Memory failure. One or more memory DIMMS have failed.
CPU	Microprocessor failure. One or both microprocessors have failed.
PCI 1	Error on primary PCI channel (A) or system board.
PCI 2	Error on secondary PCI channel (B) or system board.
VRM	Error on voltage regulator module or on integrated voltage regulator.
DASD1	The hot-swap disk drive backplane on SCSI channel A has failed.
DASD2	Not used.

Before you begin

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

- Become familiar with the safety and handling guidelines specified under “Working inside a server with power on,” “Handling static sensitive devices” on page 48, and read “Safety information” on page 149. These guidelines will help you work safely while working with your server or options.
- You do not need to turn off the server to install or replace hot-swap power supplies, or hot-swap drives.
- The orange color on components and labels in your server indicates hot-swap components. This means that you can install or remove the component while the system is running, provided that your system is configured to support this function. For complete details about installing or removing a hot-swap component, see the information provided in this chapter.
- The blue color on components and labels identifies touch points where a component can be gripped, a latch moved, and so on.
- Make sure that you have an adequate number of properly grounded electrical outlets for your server, monitor, and any other options that you intend to install.
- Back up all important data before you make changes to disk drives.
- Have a small, flat-blade screwdriver available.
- For a list of supported options for your server, refer to <http://www.ibm.com/pc/us/compat> on the World Wide Web.

System reliability considerations

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

- Each of the drive bays has either a drive or a filler panel installed.
- Each of the power supply bays has either a power supply or a filler panel installed.
- The cover is in place during normal operations, or is removed for no longer than 30 minutes while the server is operating.

Note: The front door (tower model) can be removed permanently without affecting system reliability.

- There is space around the server to allow the server cooling system to work properly.
 - On a tower model, leave about 127 mm (5 in.) of space around the front and rear of the server.
 - On a rack model, refer to the documentation that comes with the rack.
- A removed hot-swap drive is replaced within two minutes of removal.
- Cables for optional adapters are routed according to the instructions provided with the adapters.
- A failed fan is replaced within 48 hours.

Working inside a server with power on

Your server is designed to operate safely while turned on with the cover removed, such as when you are following the light path diagnostics (see “Light path diagnostics” on page 14). Follow these guidelines when you work inside a server that is turned on:

- Avoid loose-fitting clothing on your forearms. Button long-sleeved shirts before working inside the server; do not wear cuff links while you are working inside the server.
- Do not allow your necktie or scarf to hang inside the server.
- Remove jewelry, such as bracelets, rings, necklaces, and loose-fitting wrist watches.
- Remove items from your shirt pocket (such as pens or pencils) that could fall into the server as you lean over it.
- Take care to avoid dropping any metallic objects, such as paper clips, hair pins, or screws, into the server.

Handling static sensitive devices

Static electricity, though harmless to you, can seriously damage server components or options.

Note: When you are adding an internal option, do not open the static-protective package containing the option until you are instructed to do so.

When you handle options and other server components, take these precautions to avoid damage from static electricity:

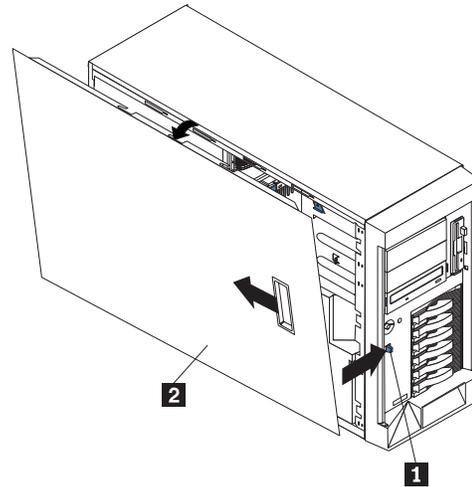
- Limit your movement. Movement can cause static electricity to build up around you.
- Always handle components carefully. Handle adapters, the memory board, and memory modules (DIMMs) by the edges. Never touch any exposed circuitry.
- Prevent others from touching components.
- When you are installing a new option, touch the static-protective package containing the option to a metal expansion-slot screw or other unpainted metal surface on the server for at least two seconds. (This reduces static electricity from the package and from your body.)
- When possible, remove the option and install it directly into the server without setting the option down. When this is not possible, place the static-protective package that the option comes in on a smooth, level surface and place the option on it.
- Do not place the option on the server's covers or any metal surface.

Removing the cover, door, and bezel

The following sections describe how to remove the cover, the door (for tower models), and the bezel.

Removing the left-side cover (tower model)

Note: To remove or install a hot-swap hard disk drive or hot-swap power supply, it is not necessary to remove the cover.



- 1** Cover release lever
- 2** Left-side cover

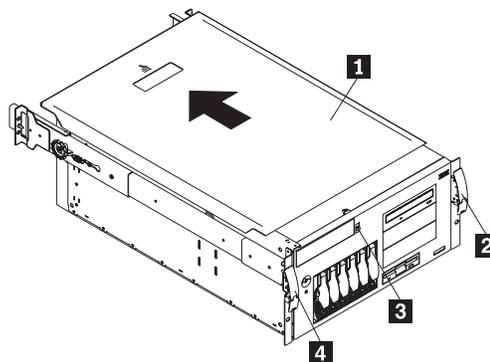
To remove the left-side cover of the tower model:

1. Review the information in “Before you begin” on page 47.
2. If you are planning to install or remove any part other than a hot-swap hard disk drive or hot-swap power supply, turn off the server and all attached devices and disconnect all external cables and power cords.
3. Slide the cover-release lever on the front of the server to release the cover; then, slide the cover toward the rear of the server about 25 mm (1 inch). Move the top edge of the cover out from the server; then, lift the cover off the server. Set the cover aside.

Attention: For proper cooling and airflow, replace the cover before turning on the server. Operating the server for extended periods of time (over 30 minutes) with the cover removed might damage server components.

Removing the cover (rack model)

Note: To remove or install a hot-swap hard disk drive or hot-swap power supply, it is not necessary to remove the cover.



- 1** Top cover
- 2** Right side latch
- 3** Cover release lever
- 4** Left side latch

To remove the server top cover:

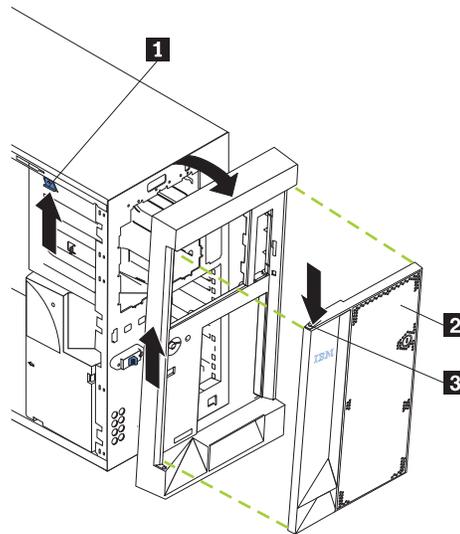
1. Review the information in “Before you begin” on page 47.
2. If you are planning to install or remove any part other than a hot-swap hard disk drive or hot-swap power supply, turn off the server and all attached devices and disconnect all external cables and power cords.
3. Release the left and right side latches and pull the server out of the rack enclosure until both slide rails lock.

Note: When the server is in the locked position, you can reach the cables on the back of the server.

4. Move the cover-release lever down while sliding the top cover toward the rear of the server about 25 mm (1 inch). Lift the cover off the server and set the cover aside.

Attention: For proper cooling and airflow, replace the cover before turning on the server. Operating the server for extended periods of time (over 30 minutes) with the cover removed might damage server components.

Removing the server door (tower model)



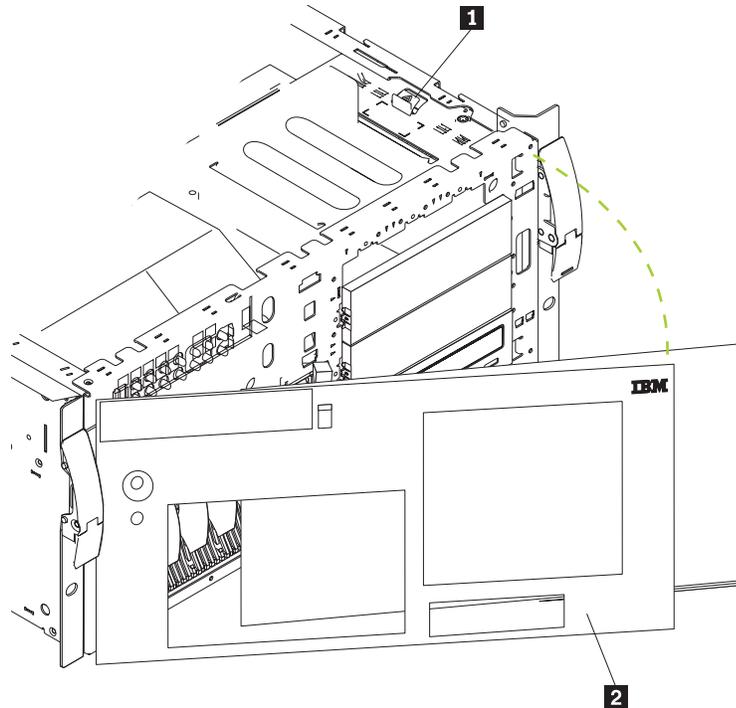
- 1** Release tab
- 2** Door
- 3** Flange

To remove the server door:

1. Unlock and open the server door.
2. Locate the flange on the top edge of the door.

3. Press down on the flange while pressing out on the door; then, lift the server door up and off the hinge. Set the door aside in a safe place.

Removing the bezel (rack or tower)



- 1** Bezel-release lever
- 2** Bezel

To remove the bezel:

1. Move the blue bezel-release lever, following the curve of the lever opening.

Note: The illustration shows a rack model.

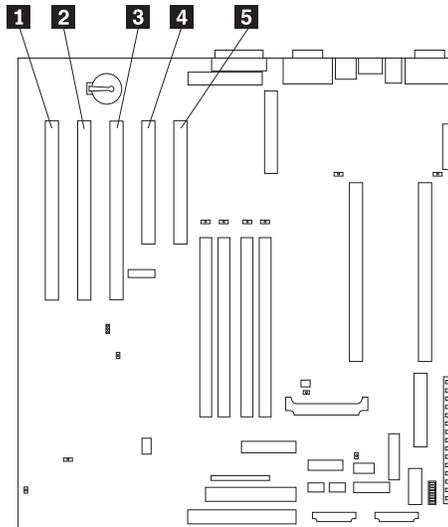
2. Lift the bezel tabs out of the slots and pull the bezel away from the server front. Store the bezel in a safe place.

Working with adapters

You can install up to five peripheral component interconnect (PCI) adapters in the expansion connectors, called slots, on the system board of your server.

Your server comes with an integrated video controller, which is a component on the system board. When you install a video adapter, the server BIOS automatically disables the integrated video controller.

The following illustration shows the location of the 33 MHz PCI expansion slots on the system board.



- 1** PCI slot 5 64-bit (J44)
- 2** PCI slot 4 64-bit (J39)
- 3** PCI slot 3 64-bit (J34)
- 4** PCI slot 2 32-bit (J32)
- 5** PCI slot 1 32-bit (J27)

Adapter considerations

Before you install adapters, review the following:

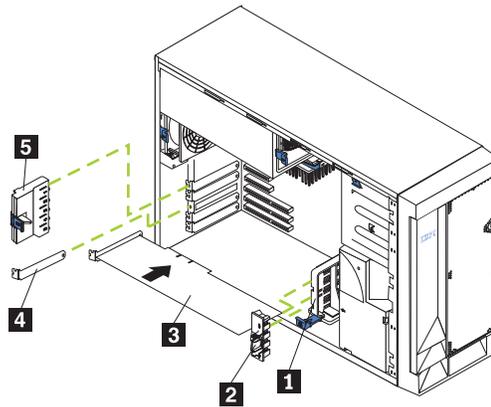
- Locate the documentation that comes with the adapter and follow those instructions in addition to the instructions given in this chapter. If you need to change the switch or jumper settings on your adapter, follow the instructions that come with the adapter.
- You can install full-length adapters in all expansion slots.
- You can install a 32-bit adapter in any of the PCI slots, but you might want to install it in a 32-bit slot and use the 64-bit slots for 64-bit adapters.
- Your server supports 5.0 V and universal PCI adapters; it does not support 3.3 V adapters.

Note: Universal PCI adapters support both 3.3 V and 5.0 V operation.

- Your server uses a rotational interrupt technique to configure PCI adapters. Because of this technique, you can install a variety of PCI adapters that currently do not support sharing of PCI interrupts.
- PCI slots 1 and 2 are on PCI bus A and PCI slots 3, 4, and 5 are on PCI bus B. Both PCI buses are primary buses. The system scans PCI slots 1 through 5 to assign system resources; then the system starts (boots) the PCI devices in the following order, if you have not changed the default boot precedence: PCI slots 1 and 2, system board SCSI devices, and then PCI slots 3 through 5.

Note: To change the boot precedence for PCI devices, start the Configuration/Setup Utility program, select Start Options from the main menu, then select the PCI SCSI adapter boot option. See “Configuring the server” on page 31 for details on using the Configuration/Setup Utility program.

Installing an adapter



- 1** Adapter support bracket
- 2** Support bracket bezel
- 3** Adapter
- 4** Expansion slot cover
- 5** Adapter retention bracket

To install an adapter:

1. Review the information in “Before you begin” on page 47.
2. Turn off the server and peripheral devices and disconnect all external cables and power cords; then, remove the cover. See “Removing the cover, door, and bezel” on page 48 for details.
3. Determine which expansion slot you will use for the adapter.

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

4. Remove the expansion-slot cover:
 - a. Press the arrow on the adapter-retention bracket release tab and remove the bracket.
 - b. Slide the expansion-slot cover out of 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. Refer to the documentation that comes with your adapter for any cabling instructions. It might be easier for you to route any cables before you install the adapter.

6. Remove the adapter from the static-protective package.

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

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

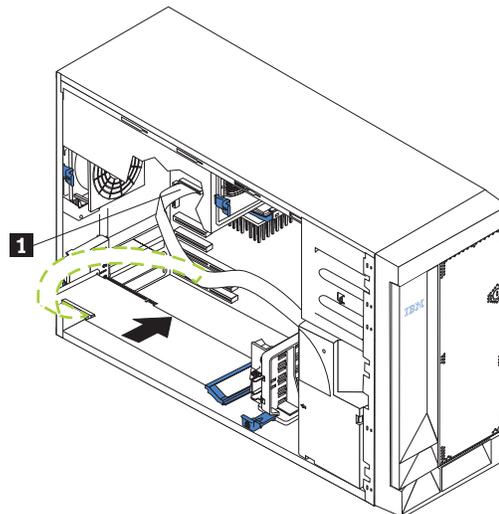
8. Set any jumpers or switches as described by the adapter manufacturer.

9. Install the adapter:

- a. If necessary, open the adapter support bracket retaining flap.

- b. Carefully grasp the adapter by its top edge or upper corners, and align it with the expansion slot on the system board.
 - c. Press the adapter *firmly* into the expansion slot.
Attention: When you install an adapter in the server, be sure that it is completely and correctly seated in the system-board connector before you apply power. Incomplete insertion might cause damage to the system board or the adapter.
 - d. Close the retaining flap on the adapter support bracket, if you opened it.
 - e. Align the bottom tabs of the adapter retention bracket with the holes at the top of the expansion slots, and press the adapter retention bracket toward the back of the server until it clicks into the locked position.
10. Connect any needed cables to the adapter.
- Attention:** Route cables so that they do not block the flow of air from the fans.

The following illustration shows the rerouting of the SCSI cable if you install a ServeRAID adapter (remove the cable from SCSI connector A (J17) on the system board and connect it to the RAID adapter).



11. If you have other options to install or remove, do so now; otherwise, go to “Installing the cover” on page 70.

Installing internal drives

Different types of drives allow your system to read multiple types of media and store more data. Several types of drives are available, such as:

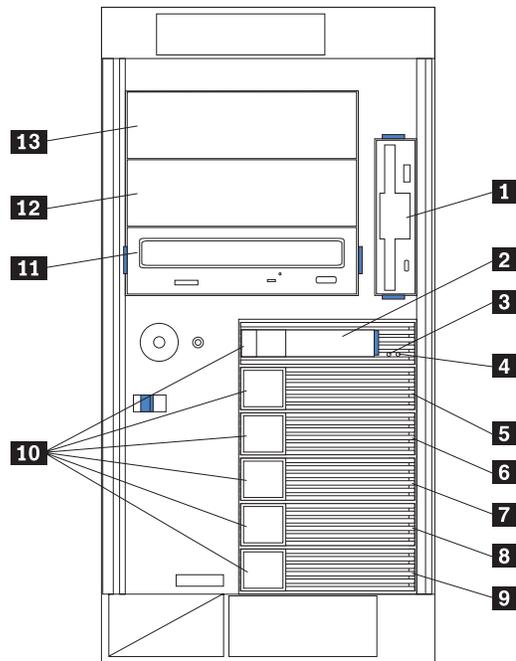
- Diskette (already installed)
- Hard disk
- CD-ROM (already installed)
- Tape, including DLT

Internal drive bays

Internal drives are installed in *bays*. The bays of the xSeries 230 are in the front of the server, as shown in the following illustrations.

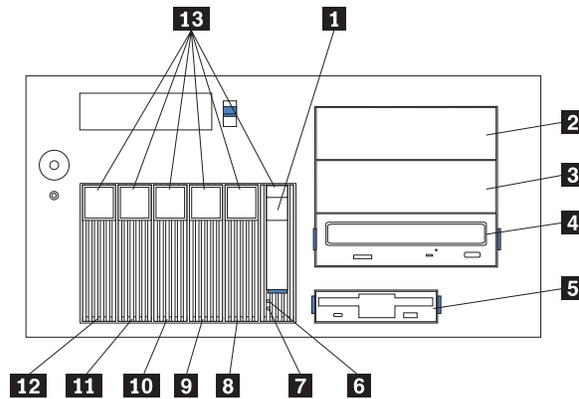
Attention: If you are going to install additional drives in the non-hot-swap bays, you must install the power supply backplane option and additional power supplies.

Tower model



- 1** Non-hot-swap bay D
- 2** SCSI ID 0
- 3** Hard disk activity light
- 4** Hard disk status light
- 5** SCSI ID 2
- 6** SCSI ID 3
- 7** SCSI ID 4
- 8** SCSI ID 8
- 9** SCSI ID 9
- 10** Hot swap bays
- 11** Non-hot-swap bay C
- 12** Non-hot-swap bay B
- 13** Non-hot-swap bay A

Rack model



- 1** SCSI ID 9
- 2** Non-hot-swap bay B
- 3** Non-hot-swap bay C
- 4** Non-hot-swap bay A
- 5** Non-hot-swap bay D
- 6** Hard disk activity light
- 7** Hard disk status light
- 8** SCSI ID 5
- 9** SCSI ID 4
- 10** SCSI ID 3
- 11** SCSI ID 1
- 12** SCSI ID 0
- 13** Hot swap bays

Hot-swap drives

Your server contains hardware that lets you continue to operate your 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.

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.

- Your server supports six slim (1-inch) or three half-high (1.6-inch), 3.5-inch hot-swap hard disk drives in the hot-swap bays.
- The hot-swap bays connect to a SCSI *backplane*. This backplane is the printed circuit board behind the bay.
- The backplane controls the SCSI IDs for the hot swap drives.

Non-hot-swap drives

Diskette drives, tape drives, and CD-ROM drives are non-hot-swap drives. To remove or install a non-hot swap drive, you must turn off the server first. Non-hot-swap drives are installed in bays A, B, C, and D only.

- Your server comes with a preinstalled 3.5-inch, 1.44 MB diskette drive in bay D and a preinstalled IDE CD-ROM drive in bay C.
- The xSeries 230 server supports only one diskette drive.
- The diskette drive uses 1 MB and 2 MB diskettes. For optimum use, format 1 MB diskettes to 720 KB and format 2 MB diskettes to 1.44 MB.
- Bays A and B come without a device installed. These bays are for 5.25-inch, half-high, removable-media drives, such as tape backup drives. You can combine bays A and B into a single full-high bay.
- If you are installing a device with a 50-pin connector in one of the empty non-hot-swap bays (bays A–B), you need a 68-pin to 50-pin converter. To order the converter, contact your IBM reseller or IBM marketing representative.

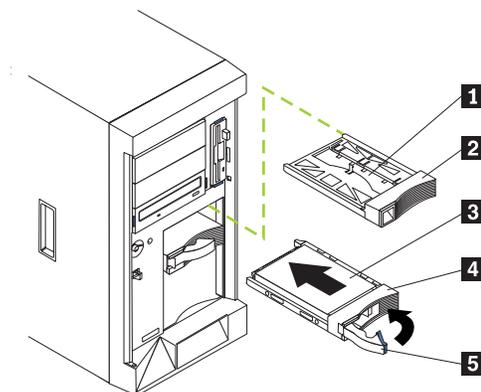
Note: The server's EMI integrity and cooling are both protected by having bays A and B covered or occupied. When you install a drive, save the filler panel from the bay, in case you later remove the drive and do not replace it with another.

Preinstallation steps (all bays)

Before you install drives in your 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. Read "Safety information" on page 149, "Handling static sensitive devices" on page 48, and the documentation that comes with your drive.
2. Choose the bay in which you want to install the drive.
3. Check the instructions that come with the drive to see if you need to set any switches or jumpers on the drive.
4. To install the drive, go to "Installing a hot-swap drive" or to "Installing a non-hot-swap drive" on page 60, as appropriate.

Installing a hot-swap drive



- 1 Filler panel tray for use with half-high drives
- 2 Slim filler bezel
- 3 Hard disk drive
- 4 Drive tray
- 5 Drive tray handle (in open position)

Attention: To maintain proper system cooling, do not operate the server for more than two minutes without either a drive or a filler panel installed for each bay.

To install a drive in a hot-swap drive bay:

1. If your hard disk drive is not installed on the drive tray, place the drive in the drive tray and, **being careful not to over-tighten the screws**, attach the drive to the tray using the four screws provided with the option kit.
2. Remove the filler panel from one of the empty hot-swap bays 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 half-high hard disk drive, you will need to remove two adjacent filler panels. The two filler panels should be from either the top pair of bays, the middle pair of bays, or the bottom pair of bays.

3. Install the hard disk drive in the hot-swap bay:
 - a. Ensure the tray handle is open (that is, perpendicular to the drive).
 - b. Align the rails on the drive/tray assembly with the guide rails in the drive bay.
 - c. Gently push the drive/tray assembly into the bay until the drive connects to the backplane.
 - d. Push the tray handle toward the closed position until it locks the drive in place.
4. If you installed a half-high hard disk drive, install a filler panel in the gap above the drive:
 - a. Locate the slim filler bezel that is designed for use with half-high drives. It is stored on the empty tray of the filler panel that you removed earlier in this procedure.
 - b. Pull the slim filler bezel off the filler panel.
 - c. Gently push the slim filler bezel into place in the gap above the drive.
5. Check the hard disk drive status indicators to verify that the hard disk drives are operating properly (see “Server controls and indicators” on page 7 for the location of the status indicators).
 - When the amber light is on continuously, the drive has failed.
 - When the amber light flashes slowly (one flash per second), the drive is being rebuilt.
 - When the amber light flashes rapidly (three flashes per second), the controller is identifying the drive.
 - If you have a RAID adapter installed, when the green Activity light is on continuously the drive is ready.

Note: If your server has a RAID adapter installed, refer to the information provided with the RAID adapter for information about adding a drive.

Replacing a drive in a hot-swap bay

You do not have to turn off the server to remove or install the hot-swap drives.

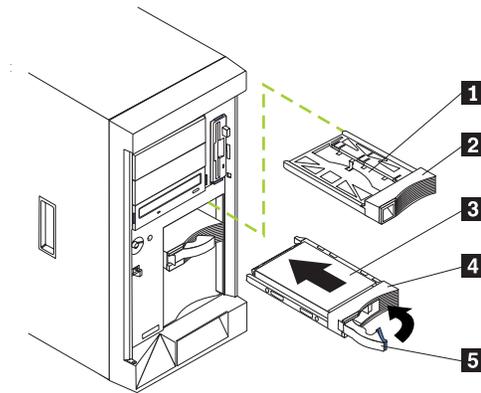
Attention:

1. Before you remove a hot-swap hard disk drive that is not defective, back up all important data.

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). Handle the drive carefully.
3. Before you hot-swap a drive, make sure it is defective. If you partially or completely remove a good drive instead of a defective one, your server might lose valuable data.

This situation is especially relevant if your server has a RAID adapter installed and you assigned RAID level 1 or 5 to the logical drives in your disk array. The RAID adapter can rebuild the data that you need, provided that certain conditions are met. Refer to the information provided with the RAID adapter for further details.

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



- 1 Filler panel for use with half-high drives (tray and slim filler bezel)
- 2 Slim filler bezel
- 3 Hard disk drive
- 4 Drive tray
- 5 Drive tray handle (in open position)

To replace a drive in a hot-swap bay:

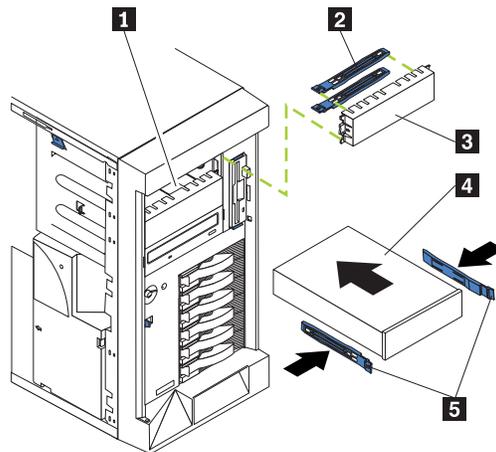
1. Before you begin, do the following:
 - Read the documentation that comes with your drive.
 - If your server has a RAID adapter installed, review the information provided with the RAID adapter for information about replacing a drive.
2. If your server is a tower model, unlock and open the server door.

Attention: To maintain proper system cooling, do not operate the server for more than two minutes without either a drive or a filler panel installed for each bay.
3. Locate the defective drive (look for an amber Hard Disk Status light on the front of the drive).
4. Remove the defective hard disk drive: move the handle on the drive to the open position (perpendicular to the drive) and pull the hot-swap tray from the bay.
5. Remove the four screws that attach the drive to the hot-swap tray, and remove the drive from the tray.

6. Place the new hard disk drive on the hot-swap tray and, **being careful not to over-tighten the screws**, attach the drive to the tray using four screws.
7. Install the hard disk drive in the hot-swap bay:
 - a. Ensure the tray handle is open (that is, perpendicular to the drive).
 - b. Align the rails on the drive/tray assembly with the guide rails in the drive bay.
 - c. Gently push the drive/tray assembly into the bay until the drive connects to the backplane.
 - d. Push the tray handle toward the closed position until it locks the drive in place.
8. Check the hard disk drive status indicators to verify that the hard disk drive is installed properly (see "Server controls and indicators" on page 7 for the location of the status indicators).
 - When the amber light is on continuously, the drive has failed.
 - When the amber light flashes slowly (one flash per second), the drive is being rebuilt.
 - When the amber light flashes rapidly (three flashes per second), the controller is identifying the drive.
 - If you have a RAID adapter installed, when the green Activity light is on continuously the drive is ready
9. If your server is a tower model, close and lock the server door.

Installing a non-hot-swap drive

Note: The server's EMI integrity and cooling are both protected by having the non-hot-swap bays covered or occupied. When you install a drive, save the filler panel from the bay, in case you later remove the drive and do not replace it with another.



- 1** Non-hot-swap bay
- 2** Blue slide rails
- 3** Filler panel
- 4** Non-hot-swap drive
- 5** Slide rails

To install a non-hot-swap drive in one of the non-hot-swap bays:

1. Read the information in “Preinstallation steps (all bays)” on page 57.
2. Turn off the server and peripheral devices and then remove the cover and the bezel (see “Removing the cover, door, and bezel” on page 48 for details).
3. Remove the filler panel from the bay opening by pulling the filler panel away from the server. You do not need the filler panel when you have a drive installed in the bay.
4. Touch the static-protective bag containing the drive to any unpainted metal surface on the server; then, remove the drive from the bag and place it on a static-protective surface.
5. Set any jumpers or switches on the drive according to the documentation that comes with the drive.
6. Install rails on the drive.
 - If you are installing a standard-size drive:
 - a. Pull the blue slide rails off the back of the filler panel.
 - b. Clip the rails onto the sides of the drive.
 - If you are installing a digital linear tape (DLT) backup drive, the slide rails and screws are included in the optional power supply backplane kit.
7. Align the rails on the drive with the guide rails in the drive bay.
8. Push the drive into the bay until it clicks into place.
9. If the drive is an IDE device:
 - Make sure the drive is not a hard disk drive.
 - Plug a connector on the IDE cable into the back of the drive.
 - Make sure the other end of the IDE cable is plugged into the IDE connector on the system board.
 - Go to step 11.
10. If the drive is a SCSI device:
 - a. Make sure the drive is not a hard disk drive.
 - b. Obtain a 16-bit SCSI cable to connect the device to the connector for SCSI channel B on the system board, or to an optional SCSI adapter. A suitable cable usually comes with your SCSI device.
 - c. Connect one of the connectors on the SCSI cable to the back of the drive.
 - d. Connect the other end of the SCSI cable to the SCSI channel B connector on the system board, or to an optional SCSI adapter, as appropriate. See “System board internal cable connectors” on page 43 for the location of the SCSI connectors. See also “SCSI ports” on page 78 for information about SCSI connections and devices.
11. Connect a power cable to the back of the drive. Power cables for non-hot-swap drives come installed in your server. The connectors are keyed and can be inserted only one way.
12. If you are installing another non-hot-swap drive, do so at this time. Otherwise, continue with the next step.
13. If you have other options to install or remove, do so now; otherwise, replace the cover (see “Installing the cover” on page 70 for details).

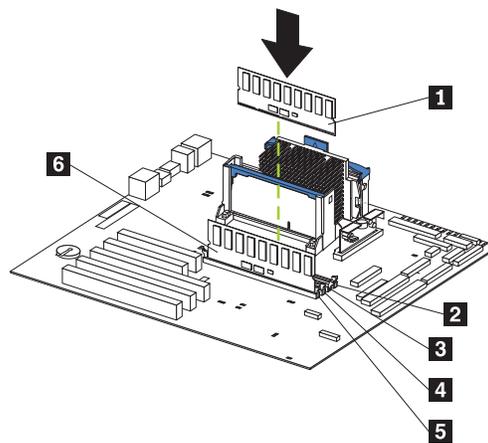
Installing memory modules

Adding memory to your server is an easy way to make programs run faster. You can increase the amount of memory in your server by installing options called *memory-module kits*. Each kit contains one industry-standard, dual-inline memory module (DIMM). Your server uses a noninterleaved memory configuration.

Your server comes with a DIMM installed on the system board in connector J23.

Notes:

1. Install additional DIMMs in connectors J21, J19, and J18, in that order. (See the following illustration for memory connector locations.)
2. Your xSeries 230 server supports 128 MB, 256 MB, 512 MB, and 1 GB DIMMs. Your server supports a minimum of 128 MB and a maximum of 4 GB of system memory.
3. Installing or removing DIMMs changes the configuration information in the server. Therefore, after installing or removing a DIMM, you must save the new configuration information by using the Configuration/Setup Utility program. When you restart the server, the system displays a message indicating that the memory configuration has changed. Start the Configuration/Setup Utility program and select **Save Settings**. See “Configuring the server” on page 31 for more information.



- 1** DIMM 2
- 2** DIMM connector 4 (J18)
- 3** DIMM connector 3 (J19)
- 4** DIMM connector 2 (J21)
- 5** DIMM connector 1 (J23)
- 6** DIMM 1

To install a DIMM:

1. Review the information in “Before you begin” on page 47 and the documentation that comes with your option.
2. Turn off the server and peripheral devices and disconnect all external cables and power cords; then, remove the cover (see “Removing the cover, door, and bezel” on page 48 for details).
3. Touch the static-protective package containing the DIMM to any unpainted metal surface on the server. Then, remove the DIMM from the package.

Note: To avoid breaking the retaining clips or damaging the DIMM connectors, handle the clips gently.

4. Install the DIMM:
 - a. Turn the DIMM so that the pins align correctly with the connector.

- b. Insert the DIMM into the connector by pressing on one edge of the DIMM and then on the other edge of the DIMM. Be sure to press straight into the connector. Be sure that the retaining clips snap into the closed positions.
 - c. Make sure the retaining clips are in the closed position. If a gap exists between the DIMM and the retaining clips, the DIMM has not been properly installed. In this case, open the retaining clips and remove the DIMM; then, reinsert the DIMM.
5. If you have other options to install or remove, do so now; otherwise, go to “Installing the cover” on page 70.

Installing a microprocessor

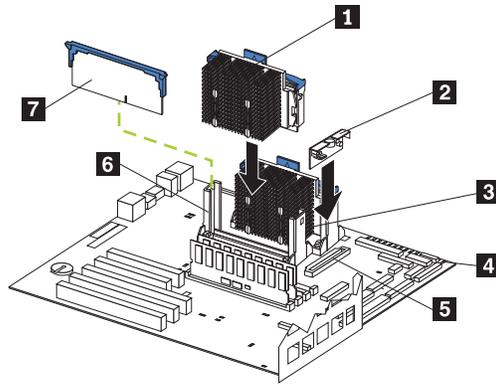
Your server comes with one microprocessor installed on the system board. If you install an additional microprocessor kit, your server can operate as a symmetric multiprocessing (SMP) server. With SMP, certain operating systems and application programs can distribute the processing load between the microprocessors. This enhances performance for database and point-of-sale applications, integrated manufacturing solutions, and other applications.

Notes:

1. Before you install a new microprocessor, review the documentation that comes with the microprocessor, so that you can determine whether you need to update the server basic input/output system (BIOS). The latest level of BIOS for your server is available through the World Wide Web.
2. Obtain an SMP-capable operating system (optional). For a list of supported operating systems, see <http://www.ibm.com/pc/us/compat/> on the World Wide Web.
3. The microprocessor that is installed in microprocessor connector U3 is CPU 1 or processor 1. If a microprocessor is installed in microprocessor connector U17, it is CPU 2 or processor 2. If the server has only one microprocessor installed, that microprocessor is installed in microprocessor connector U3 and is the startup (boot) processor. If more than one microprocessor is installed, the microprocessor with the lower stepping level is the startup processor and the microprocessor with the higher stepping level is the application processor. If both microprocessors have the same stepping level, the microprocessor installed in microprocessor connector U3 is the startup processor and the microprocessor installed in U17 is the application processor.

Note: You can determine the stepping levels of the installed microprocessors using the Configuration/Setup utility program.

Attention: To avoid damage and ensure proper server operation when you install a new or an additional microprocessor, use microprocessors that have the same cache size and type, and the same clock speed. Microprocessor internal and external clock frequencies must be identical.



- 1** Microprocessor 1
- 2** VRM
- 3** Microprocessor 2
- 4** Switch block
- 5** VRM connector
- 6** Microprocessor 2 connector
- 7** Terminator card

To install an additional microprocessor:

1. Review the information in “Before you begin” on page 47.
2. Turn off the server and peripheral devices and disconnect all external cables and power cords; then remove the cover (see “Removing the cover, door, and bezel” on page 48 for details).
3. Remove the terminator card from the microprocessor connector. Store the terminator card in a safe place in the static-protective package that your new microprocessor is shipped in; you will need to install it again if you ever remove the microprocessor.
4. Install the microprocessor:
 - a. Touch the static-protective package containing the new microprocessor to any *unpainted* metal surface on the server; then, remove the microprocessor from the package.
 - b. Center the microprocessor over the microprocessor connector and carefully press the microprocessor into the connector.

Note: To remove a microprocessor, pull upward on the microprocessor handle.

5. Install the voltage regulator module (VRM) included in the microprocessor kit.

Attention: When installing or replacing a VRM, use only a VRM specified for use with the xSeries 230 server. Use of other VRMs might cause your server to overheat.

- a. Center the VRM over the VRM connector. Make sure that the VRM is oriented and aligned correctly.
- b. Press the VRM into the connector.

Note: If you remove the microprocessor later, remember to install the terminator card in the appropriate microprocessor connector and to remove the VRM.

- If you replaced the microprocessor with a different speed microprocessor, change switches 1-4 on the switch block to the appropriate settings, as shown in the following table.

Table 10. Microprocessor speed settings

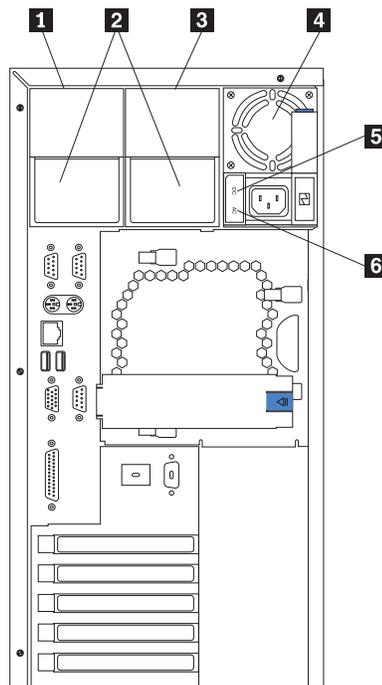
Microprocessor speed	Switch 1	Switch 2	Switch 3	Switch 4
667/133	On	On	Off	Off
733/133	On	Off	Off	Off
800/133	Off	On	On	On

Note: The speed settings shown above apply only to unlocked processors. If the processors are production level they are locked and there is no need to change the speed settings.

- If you have other options to install or remove, do so now; otherwise, go to "Installing the cover" on page 70.

Installing or removing a power supply

Your server comes with one power supply. You can replace the power supply backplane with an optional backplane that will enable you to add a second and third power supply, and will make the power supplies hot-swappable. Each power supply has two status indicators; see the following illustration for information about the status indicators and power supply bay locations.



- Power supply bay 1
- Filler panels
- Power supply bay 2
- Power supply 3
- AC power LED

6 DC power LED

Filler panels

To maintain proper airflow, keep filler panels in place on empty power supply bays.

Power supply bay 1

If you install an optional power supply in this bay, it becomes power supply 1.

Power supply bay 2

If you install an optional power supply in this bay, it becomes power supply 2.

Power supply bay 3

Your server comes with power supply 3 installed.

AC power LED

This light provides status information about the power supply. During normal operation, both the AC and DC power LEDs are on. See “Power supply LEDs” on page 14 for more information.

DC power LED

This light provides status information about the power supply. During normal operation, both the AC and DC power LEDs are on. See “Power supply LEDs” on page 14 for more information.



CAUTION:

Never remove the cover on a power supply or any part that has the following label attached.

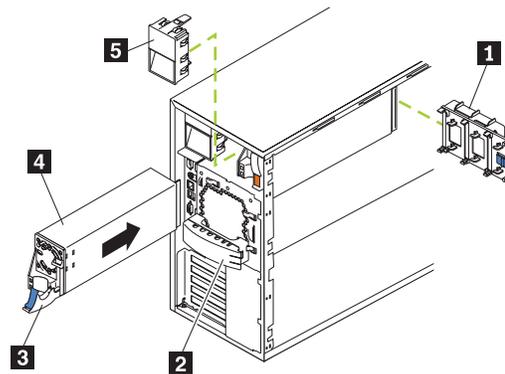


Hazardous voltage, current, and energy levels are present inside any component that has this label attached. There are no serviceable parts inside these components. If you suspect a problem with one of these parts, contact a service technician.

Adding a power supply

If you replace the power supply backplane with the power supply backplane option, you can add a second and third power supply, and the power supplies will be hot-swappable. After you install a power supply, verify that the power-supply status indicators (AC Power light and DC Power light) are lit, indicating that the power supply is operating properly.

Note: You do not need to turn off the power to the server to install hot-swap power supplies.



- 1** Power supply backplane option
- 2** Cable-restraint bracket
- 3** Power supply handle (in open position)
- 4** Power supply
- 5** Filler panel

To install a hot-swap power supply:

1. Remove the filler panel from the empty power supply bay by inserting your finger into the depression on the filler panel and pulling it away from the server. Save the filler panel in case you remove the power supply at a later time.

Note: During normal operation, each power-supply bay must have either a power supply or filler panel installed for proper cooling.

2. Install the power supply in the bay:
 - a. Place the handle on the power supply in the open position (that is, perpendicular to the power supply) and slide the power supply into the chassis.
 - b. Gently close the handle to seat the power supply in the bay.
3. Plug the power cord for the added power supply into the power cord connector.
4. Route the power cord through the cable-restraint bracket.
5. Plug the power cord into a properly grounded electrical outlet.
6. Verify that the DC Power light and AC Power light on the power supply are lit, indicating that the power supply is operating correctly.
7. If you have other options to install or remove, do so now; otherwise, go to "Installing the cover" on page 70.

Removing a hot-swap power supply

Attention: If you have not installed the power supply backplane option, you have only one power supply, which is not hot-swappable. To remove the single power supply, or the only remaining hot-swap power supply, go to "Removing the only power supply" on page 68. Otherwise, continue with the following procedure.

To remove a hot-swap power supply:

1. If the NON LED on the diagnostic LED panel is lit, turn off the server and peripheral devices; otherwise, go to the next step.
2. Remove the power supply:
 - a. Unplug the power cord connector from the power supply.
Attention: Be careful when you remove the hot-swap power supply; the power supply might be too hot to handle comfortably.



CAUTION:

The following label indicates a hot surface nearby.



- b. Remove the defective power supply by placing the handle on the power supply in the open position (perpendicular to the power supply) and pulling the power supply from the bay.
3. If you are replacing the power supply with another one, go to step 4. Otherwise, continue with step 3a.
 - a. Install a power-supply filler panel.

Note: During normal operation, each power-supply bay must have either a power supply or filler panel installed for proper cooling.
 - b. Open the cable-restraint bracket and remove the power cord from the cable-restraint bracket. Close the cable-restraint bracket.
 - c. Unplug the power cord from the electrical outlet.
 - d. Continue with step 5.
4. If you are replacing the power supply:
 - a. Place the handle on the replacement power supply in the open position; then, slide the power supply into the chassis.
 - b. Gently close the handle on the power supply to seat the power supply in the bay.
 - c. Plug the power cord for the power supply into the power cord connector.
 - d. Verify that the AC Power light and DC Power light are lit, indicating that the power supply is operating correctly.
5. If you have other options to install or remove, do so now; otherwise, go to "Installing the cover" on page 70.

Removing the only power supply

To remove the only power supply:

1. Turn off the server and peripheral devices.
2. Remove the power supply:
 - a. Unplug the power cord from the power supply.
Attention: Be careful when you remove the power supply; the power supply might be too hot to handle comfortably.



CAUTION:
The following label indicates a hot surface nearby.



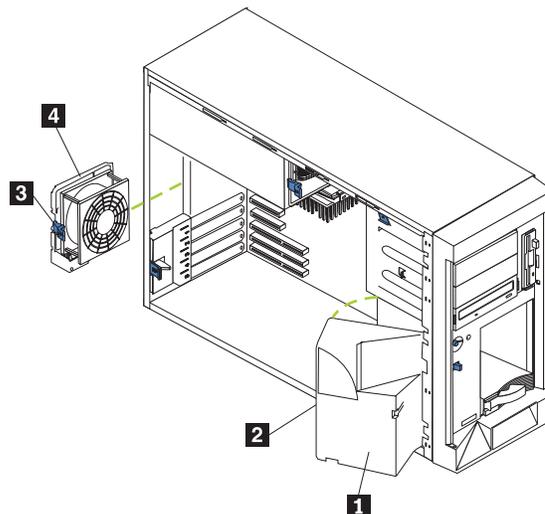
- b. Remove the defective power supply by placing the handle of the power supply in the open position (perpendicular to the power supply) and pulling the power supply from the bay.
3. Install a replacement power supply:
 - a. Place the handle on the replacement power supply in the open position; then, slide the power supply into the chassis.
 - b. Gently close the handle on the power supply to seat the power supply in the bay.
 - c. Plug the power cord for the power supply into the power cord connector.
 - d. Verify that the AC Power light and DC Power light are lit, indicating that the power supply is operating correctly.
4. Turn on the server and peripheral devices.
5. If you have other options to install or remove, do so now; otherwise, go to “Installing the cover” on page 70.

Replacing a fan assembly

Your server comes with two fan assemblies.

Attention: Replace a fan that has failed within 48 hours to help ensure proper cooling.

The following illustration shows the replacement of a fan assembly.



- 1** Fan assembly
- 2** Fan assembly latch

- 3** Fan assembly latch
- 4** Fan assembly

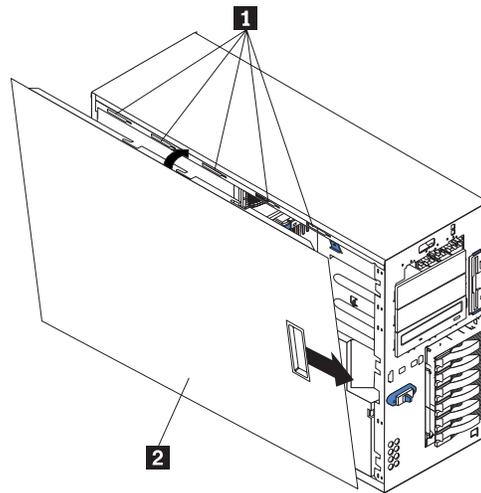
To replace the fan assembly:

1. Turn off the server and peripherals.
2. Remove the cover. See “Removing the cover, door, and bezel” on page 48 for details.
3. Determine which fan assembly to replace by checking the LED on each fan; a lit LED indicates the fan to replace.
4. Remove the fan assembly from the server by pressing the blue release latch for the fan and pulling the fan away from the server.
5. Slide the replacement fan assembly into the server until it clicks into place.
6. Verify that the FAN LED on the diagnostic panel is not lit. If the FAN LED is lit, reseal the fan.
7. Replace the cover.
8. Turn on the server and peripherals.

Installing the cover

If you have a tower model, continue with “Installing the cover (tower).” If you have a rack model, go to “Installing the cover (rack)” on page 71.

Installing the cover (tower)

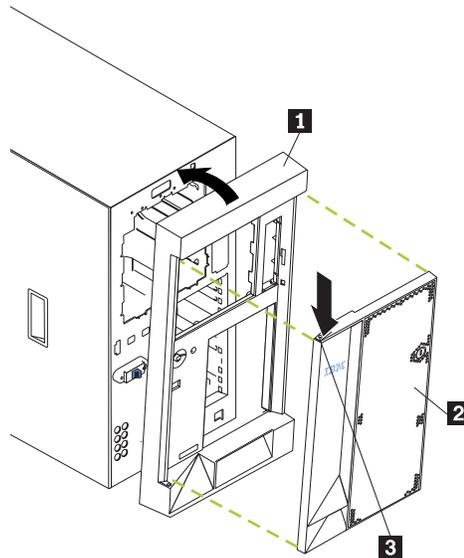


- 1** Slots
- 2** Left-side cover

To install the server left-side cover:

1. Align the cover with the left side of the server, about 25 mm (1 inch) from the front of the server; place the bottom of the cover on the bottom rail of the chassis.
2. Insert the tabs at the top of the cover into the slots at the top of the server.
3. Hold the cover against the server and slide the cover toward the front of the server until the cover clicks into place.

Installing the bezel and front door



- 1** Bezel
- 2** Server door
- 3** Flange

To install the bezel:

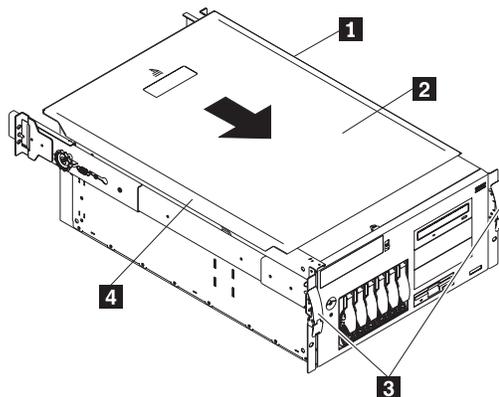
1. Place the tabs at the bottom edge of the bezel in the slots at the bottom front of the server.
2. Press the top of the bezel toward the server until the bezel clicks into place.

To install the server door:

1. Set the door on the bottom hinge.
2. Press the flange downward while pressing the top of the door toward the server, until the flange connects with the top hinge. Then, release the flange.
3. Close and lock the server door.

Attention: Be sure to maintain a clearance of at least 127 mm (5 inches) on the front and rear of the server to allow for air circulation.

Installing the cover (rack)

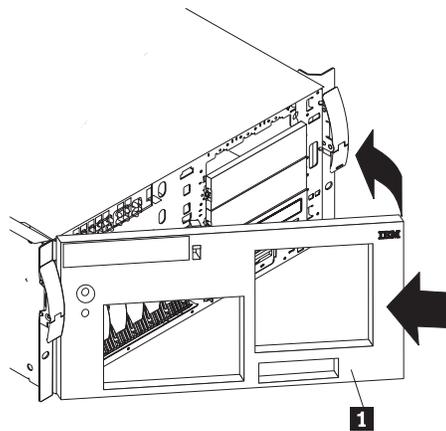


- 1** Flange
- 2** Top cover
- 3** Side latches
- 4** Flange

To install the server top cover:

1. Align the top cover with the top of the server, about 25 mm (1 inch) from the front of the server; the flanges on the left and right sides of the cover should be on the outside of the server chassis.
2. Hold the cover against the server and slide the cover toward the front of the server until the cover clicks into place.

Installing the bezel



- 1** Trim bezel

To install the bezel:

1. Place the tabs on the left side of the bezel in the slots at the left front of the server.
2. Press the right end of the bezel toward the server until the bezel clicks into place.

Connecting external options

If you install a SCSI adapter, you can attach a SCSI storage expansion enclosure to your server.

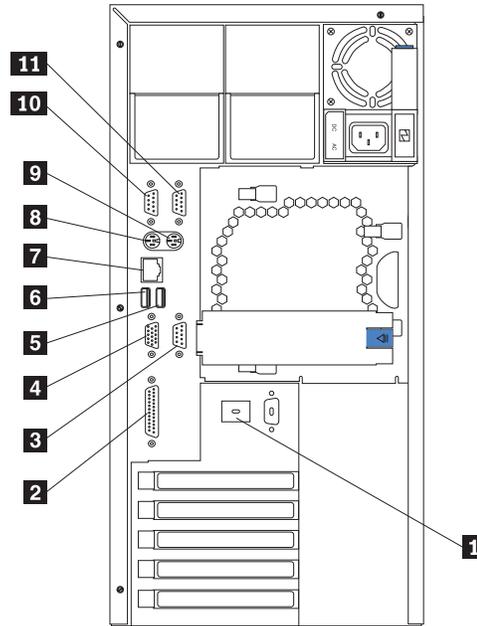
Installation procedure

To attach an external device:

1. Read "Before you begin" on page 47' and the documentation that comes with your options.
2. Turn off the server and all attached devices.
3. Follow the instructions that come with the option to prepare it for installation and to connect it to the server.

I/O connector locations

The following illustration shows the input/output connectors (ports) and the expansion slots on the rear of the server. For pin assignments and other details about these connectors, see “Input/Output ports.”



- 1** Advanced System Management Interconnect knockout
- 2** Parallel
- 3** Management C
- 4** Video
- 5** USB 1
- 6** USB 2
- 7** Ethernet
- 8** Keyboard
- 9** Mouse
- 10** Serial B
- 11** Serial ARS-485 peer-to-peer management knockout

Input/Output ports

This section provides information about the input/output (I/O) ports on your server. These ports include the following:

- One parallel port
- One video port
- Two Ultra3 SCSI ports
- One keyboard port
- One auxiliary pointing device (mouse) port
- Two serial ports
- Two Universal Serial Bus (USB) ports

- One Ethernet port
- One Advanced System Management Interconnect port

Parallel port

Your server has one parallel port. This port supports three standard Institute of Electrical and Electronics Engineers (IEEE) 1284 modes of operation: Standard Parallel Port (SPP), Enhanced Parallel Port (EPP), and Extended Capability Port (ECP).

Viewing or changing the parallel-port assignments

You can use the built-in Configuration/Setup Utility program to 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 the ECP and EPP modes.

To view or change the parallel-port assignment:

1. Restart the server and watch the monitor screen.
2. When the message Press F1 for Configuration/Setup appears, press F1.

Note: The Devices and I/O Ports choice appears only on the full configuration menu. If you set two levels of passwords, you must enter the administrator password to access the full configuration menu.

3. From the main menu, select **Devices and I/O Ports**; then, press Enter.
4. Select the parallel port; then, use the arrow keys to advance through the settings available.

Note: When you configure the parallel port as bidirectional, use an IEEE 1284-compliant cable. The maximum length of the cable must not exceed 3 meters (9.8 feet).

5. Select **Save Settings**; then, select **Exit Setup** to exit from the Configuration/Setup Utility main menu.

Parallel port connector

The following table shows the pin-number assignments for the 25-pin, female D-shell parallel-port connector on the rear of your server.

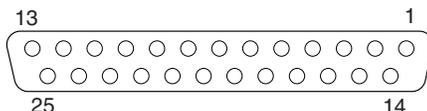


Table 11. Parallel-port connector pin-number assignments

Pin	I/O	SPP/ECP Signal	EPP Signal
1	O	-STROBE	-WRITE
2	I/O	Data 0	Data 0
3	I/O	Data 1	Data 1
4	I/O	Data 2	Data 2
5	I/O	Data 3	Data 3
6	I/O	Data 4	Data 4
7	I/O	Data 5	Data 5
8	I/O	Data 6	Data 6

Table 11. Parallel-port connector pin-number assignments (continued)

9	I/O	Data 7	Data 7
10	I	-ACK	-ACK
11	I	BUSY	-WAIT
12	I	PE (paper end)	PE (paper end)
13	I	SLCT (select)	SLCT (select)
14	O	-AUTO FD (feed)	-AUTO FD
15	I	-ERROR	-ERROR
16	O	-INIT	-INIT
17	O	-SLCT IN	-SLCT IN
18	-	Ground	Ground
19	-	Ground	Ground
20	-	Ground	Ground
21	-	Ground	Ground
22	-	Ground	Ground
23	-	Ground	Ground
24	-	Ground	Ground
25	-	Ground	Ground

Serial ports

Your server has two standard serial ports: Serial port A and Serial port B. The operating system can use and share both serial ports; however, the integrated Netfinity Advanced System Management Processor can use and share only Serial port A.

Some application programs require specific ports, and some modems function properly only at certain communication port addresses. You might need to use the Configuration/Setup Utility program to change communication port address assignments to prevent or resolve address conflicts.

Viewing or changing the serial-port assignments

To view or change the serial-port assignments:

1. Restart the server and watch the monitor screen.
2. When the message Press F1 for Configuration/Setup appears, press F1.
3. From the main menu, select **Devices and I/O Ports**; then, press Enter.

Note: The Devices and I/O Ports choice appears only on the full configuration menu. If you set two levels of passwords, you must enter the administrator password to access the full configuration menu.

4. Select the serial port; then, use the arrow keys to advance through the settings available.
5. Select **Save Settings**; then, select **Exit Setup** to exit from the Configuration/Setup Utility main menu.

Serial-port connectors

The following table shows the pin-number assignments for the 9-pin, male D-shell serial-port connectors on the rear of your server. These pin-number assignments

conform to the industry standard.

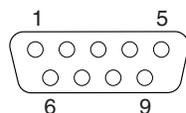


Table 12. Serial-port connectors pin-number assignments

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

Universal Serial Bus ports

Your server has two Universal Serial Bus (USB) ports, which configure automatically. USB is an emerging serial interface standard for telephony and multimedia devices. It uses Plug and Play technology to determine the type of device attached to the connector.

Notes:

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

USB cables and hubs

You need a 4-pin cable to connect devices to USB 1 or USB 2. If you plan to attach more than two USB devices, you must use a hub to connect the devices. The hub provides multiple connectors for attaching additional external USB devices.

USB technology provides 12 megabits-per-second (Mbps) speed with a maximum of 127 external devices and a maximum signal distance of five meters (16 ft.) per segment.

USB-port connectors

Each USB port has an external connector on the rear of the server for attaching USB compatible devices.

The following table shows the pin-number assignments for the USB-port connectors on the rear of your server.

Table 13. USB-port connector pin-number assignments

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

Keyboard port

There is one keyboard on the rear of your server.

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

The following table shows the pin-number assignments for the keyboard connector on the rear of your server.

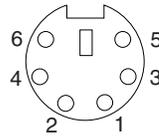


Table 14. Keyboard connector pin-number assignments

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

Auxiliary-device (pointing device) port

The system board has one auxiliary-device port that supports a mouse or other pointing device.

The following table shows the pin-number assignments for the auxiliary-device connector on the rear of your server.

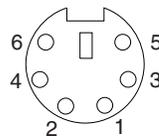


Table 15. Auxiliary-device connector pin-number assignments

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

Video port

Your server comes with an integrated super video graphics array (SVGA) video controller. This controller is not removable, but you can disable it by installing a PCI video adapter.

Note: If you install a PCI video adapter, the server BIOS will automatically disable the integrated video controller.

The following table shows the pin-number assignments for the 15-pin analog video connector on the rear of your server.

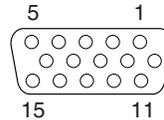


Table 16. Video-port connector pin-number assignments

Pin	Signal	Pin	Signal	Pin	Signal
1	Red	6	Ground	11	Monitor ID bit 0
2	Green or monochrome	7	Ground	12	DDC SDA
3	Blue	8	Ground	13	Horizontal synchronization (Hsynch)
4	Monitor ID bit 2	9	+5 V dc	14	Vertical synchronization (Vsynch)
5	Ground	10	Ground	15	DDC SDL

SCSI ports

Your server has an integrated dual-channel Ultra3 small computer system interface (SCSI) controller. This controller supports two independent Ultra 160/m SCSI channels, both internal. Each of these channels supports up to 15 SCSI devices. In addition, this controller uses:

- Double-transition clocking to achieve high transfer rates
- Domain name validation to negotiate compatible data transfer speeds with each device
- Cyclic-redundancy checking (CRC), instead of the usual parity checking, to significantly improve data reliability
- An active terminator on the system board for SCSI bus termination

A SCSI cable connects the SCSI channel A connector to the hot-swap drive backplane. If you obtain an additional SCSI cable, the SCSI channel B connector is available for connecting non-hot-swap SCSI drives in the 5.25-in. bays.

If you install a SCSI adapter in your server, you can use its SCSI connector to connect different types of small computer system interface (SCSI) devices.

Note: If you install a PCI RAID adapter to configure and manage the internal hot-swap drives, you must move the SCSI cable from the system-board SCSI connector to an internal channel connector on the RAID adapter.

SCSI cabling requirements

If you plan to attach external SCSI devices, you must order additional SCSI cables. To select and order the correct cables for use with external devices, contact your IBM reseller or IBM marketing representative.

For information about the maximum length of SCSI cable between the terminated ends of the cable, refer to the ANSI SCSI standards. Adhering to these standards will help ensure that your server operates properly.

Setting SCSI IDs

Each SCSI device connected to a SCSI controller must have a unique SCSI ID. This ID enables the SCSI controller to identify the device and ensure that different devices on the same SCSI channel do not attempt to transfer data simultaneously. SCSI devices that are connected to different SCSI channels can have duplicate SCSI IDs.

The hot-swap-drive backplane controls the SCSI IDs for the internal hot-swap drive bays. However, when you attach SCSI devices to the external SCSI connector, you must set a unique ID for the device. Refer to the information that is provided with the device for instructions to set its SCSI ID.

SCSI connector pin-number assignments

The following table shows the pin-number assignments for the 68-pin SCSI connectors.

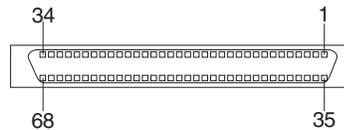


Table 17. 68-pin SCSI connector pin-number assignments

Pin	Signal	Pin	Signal
1	+Data 12	35	-Data 12
2	+Data 13	36	-Data 13
3	+Data 14	37	-Data 14
4	+Data 15	38	-Data 15
5	+Data P1	39	-Data P1
6	+Data 0	40	-Data 0
7	+Data1	41	-Data 1
8	+Data 2	42	-Data 2
9	+Data 3	43	-Data 3
10	+Data 4	44	-Data 4
11	+Data 5	45	-Data 5
12	+Data 6	46	-Data 6
13	+Data 7	47	-Data 7
14	+Data P	48	-Data P
15	Ground	49	Ground
16	DIFFSENS	50	Ground
17	Term power	51	Term power
18	Term power	52	Term power

Table 17. 68-pin SCSI connector pin-number assignments (continued)

Pin	Signal	Pin	Signal
19	Reserved	53	Reserved
20	Ground	54	Ground
21	+Attention	55	-Attention
22	Ground	56	Ground
23	+Busy	57	-Busy
24	+Acknowledge	58	-Acknowledge
25	+Reset	59	-Reset
26	+Message	60	-Message
27	+Select	61	-Select
28	+Control/Data	62	-Control/Data
29	+Request	63	-Request
30	+Input/Output	64	-Input/Output
31	+Data 8	65	-Data 8
32	+Data 9	66	-Data 9
33	+Data 10	67	-Data 10
34	+Data 11	68	-Data 11

Ethernet port

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

To access the Ethernet port, connect a Category 3, 4 or 5 unshielded twisted-pair (UTP) cable to the RJ-45 connector on the rear of your server.

Note: The 100BASE-TX Fast Ethernet standard requires that the cabling in the network be Category 5 or higher.

Configuring the Ethernet controller

When you connect your server to the network, the Ethernet controller automatically detects the data-transfer rate (10 Mbps or 100 Mbps) on the network and then sets the controller to operate at the appropriate rate. That is, the Ethernet controller will adjust to the network data rate, whether the data rate is standard Ethernet (10BASE-T), Fast Ethernet (100BASE-TX), half duplex (HDX), or full duplex (FDX). The controller supports half-duplex (HDX) and full-duplex (FDX) modes at both speeds.

The Ethernet controller is a PCI Plug and Play device. You do not need to set any jumpers or configure the controller for your operating system before you use the Ethernet controller. However, you must install a device driver to enable your operating system to address the Ethernet controller. The device drivers are provided on the ServerGuide CDs.

Failover for redundant Ethernet

The IBM Netfinity 10/100 Fault Tolerant Adapter is an optional redundant network interface card (NIC adapter) that you can install in your server. If you install this

NIC adapter and connect it to the same logical segment as the primary Ethernet controller, you can configure the server to support a *failover* function. You can configure either the integrated Ethernet controller or the NIC adapter as the primary Ethernet controller. In failover mode, if the primary Ethernet controller detects a link failure, all Ethernet traffic associated with it is switched to the redundant (secondary) controller. This switching occurs without any user intervention. When the primary link is restored to an operational state, the Ethernet traffic switches back to the primary Ethernet controller. The switch back to the primary Ethernet controller can be automatic or manually controlled, depending on the setup and operating system.

Note that only one controller in the redundant pair is active at any given time. For example, if the primary Ethernet controller is active, then the secondary Ethernet controller cannot be used for any other network operation.

Note: Your operating system determines the maximum number of IBM Netfinity 10/100 Fault Tolerant Adapters that you can install in your server. See the documentation that comes with the adapter for more information.

Considerations when combining failover and hot-plug functions: If your operating system supports hot-plug PCI adapters and the optional redundant NIC adapter is installed in a hot-plug PCI slot, you can replace the NIC adapter without powering off the server — even if it is the primary Ethernet controller. Disconnecting the Ethernet cable from the primary Ethernet controller will cause the Ethernet traffic to switch automatically to the secondary Ethernet controller. This can be very useful if a faulty adapter causes a network problem, or if you want to upgrade the primary adapter hardware.

Note: If you hot replace the primary adapter while the Ethernet traffic is being handled by the secondary Ethernet controller, the traffic does not automatically switch back to the primary adapter when the primary adapter comes back online. See below “Configuring for failover.”.

Configuring for failover: The failover feature currently is supported by OS/2™, Windows NT Server, and IntraNetWare. The setup required for each operating system follows.

IBM Operating System/2 (OS/2):

1. Add the redundant NIC adapter according to the instructions that are provided with the adapter.

Note: The OS/2 operating system does not support hot-plug operations.

2. Use the ServerGuide CDs to install the AMD PCNet Ethernet Family adapter device driver.
3. Using the MPTS Utility program, select the driver from the list and select the **Edit** button.

Note: Only one driver instance needs to be loaded for each redundant pair of Ethernet controllers.

4. Change the PermaNet Server Feature keyword to **TRUE** and specify the Primary and Standby slots that contain the redundant pair. The integrated controller is located in slot 2 (PCI bus A slot 2).
5. To enable the writing of messages to the IBMCOM\LANTRAN.LOG file when a failover occurs:

- a. Copy the file PCNETOS2.EXE from the root directory of the diskette that is created using the ServerGuide CDs to your hard disk drive.
- b. Add the following statement to the CONFIG.SYS file:
`Run=d:\path\PCNETOS2.EXE`

where *d* and *path* are the drive and path to which you copied PCNETOS2.EXE.

6. Restart the server. The failover function is now enabled.

Windows NT Server: IBM offers hot-plug support for Windows NT Server Version 4.0. Failover can work in conjunction with hot-plug support or independently. If you are not using hot-plug support, go to “Windows NT Server failover setup” on page 83.

Windows NT Server hot-plug setup: IBM Netfinity Hot Plug PCI for Windows NT Server 4.0 package is available for download from the IBM Web site at:
<http://www.pc.ibm.com/support>

Enter the brand type of **Server**, click on **Downloadable files** and look for **Hot Plug**. The IBM Netfinity Hot Plug PCI for Windows NT Server 4.0 package uses the Intel Desktop Management Interface (DMI) to control hot-plug support for the Ethernet controllers. The Ethernet controller in your computer is DMI compliant. Download and install the following software in the order listed:

1. IBM Failover DMI Agent
2. IBM PCI Hot Plug Solution
3. IBM Netfinity 10/100 Fault Tolerant Adapter device drivers

Note: The order of installation is important. You must install the IBM Netfinity Hot Plug for Windows NT Server 4.0 package before you install the IBM Netfinity 10/100 Fault Tolerant Adapter driver. If you install the adapter device driver before the PCI Hot Plug Solution package, the adapter device driver will not recognize the hot-plug code. This happens because the adapter device driver only checks the NT registry for the Hot Plug package during installation. If the PCI Hot Plug Solution package is added after the adapter device driver is installed, the adapter must be removed and added again in order for it to detect the PCI Hot-Plug Solution code.

To install the IBM Failover DMI Agent:

1. Download the DMI EXE file from the Netfinity Support web page and extract the files onto a diskette.
2. Insert the diskette into the diskette drive.
3. From the Start menu, select the **Run** option.
4. Type A:\SETUP.EXE in the Open box.
5. Click **Ok**. The setup wizard opens.
6. Follow the instructions that are given by the setup wizard until the program is installed.
7. Restart the server.

To install the IBM PCI Hot Plug Solution package:

1. Download the IBM PCI Hot Plug Services EXE file from the PC Support web page and extract the files onto a diskette.
2. Log on to Windows NT Server as a user in the Administrator group.
3. Insert the diskette into the diskette drive.

4. From the Start menu, select the **Run** option.
5. Type A:\SETUP.EXE in the Open box.
6. Click **OK**. The Setup wizard opens.
7. Follow the instructions given by the setup wizard until the program is installed.

Windows NT Server failover setup: To install the IBM Netfinity 10/100 Fault Tolerant Adapter device drivers:

1. Add the redundant NIC adapter according to the instructions that are provided with the adapter.
2. Use the ServerGuide CDs to install the AMD PCNet Ethernet Family adapter device driver.
3. Do not select the Grouping box at this point; you must first restart the machine.
4. From the Windows NT Server desktop, select **Control Panel**, then select the **Network** icon, then select the **Adapters** tab.
5. Highlight one of the adapters that will be in the redundant pair and then click the **Properties...** button.
6. Check the Grouping box. This will show the possible combinations for redundant pairs.
7. Select the adapter pair you want and then select **OK**. Note that the integrated Ethernet controller is located at PCI bus A, slot 2.

Two options are available for recovering from a failover condition. The options are determined by the Enable for DMI / Hot Swap Support checkbox. If the IBM Netfinity Hot Plug PCI for Windows NT Server 4.0 package is installed, this checkbox will appear at the bottom of the Adapter Properties panel. If you do not have the IBM Netfinity Hot Plug PCI for Windows NT Server 4.0 package installed on your server, you will not see the Enable for DMI / Hot Swap Support checkbox.

If the Enable for DMI / Hot Swap Support checkbox is not checked or is not present, traffic will automatically switch back to the primary adapter when the primary link status is restored. In this mode, the adapter cannot be hot-swapped. Users with the IBM Netfinity Hot Plug PCI for Windows NT Server 4.0 package installed should check the Enable for DMI / Hot Swap Support checkbox.

If the Enable for DMI / Hot Swap Support checkbox is checked, traffic will remain on the secondary adapter until the user directs it to return to the primary adapter. This can be done after the hot-swap replacement of the primary adapter or by using the DMI interface.

8. Select **Close** to exit from the Network setup.

When you restart the server, the failover function will be in effect.

If a failover occurs, a message is written to the NT Event Viewer log. In addition, if the Enable for DMI / Hot Swap Support checkbox is checked, a DMI alert will also be generated.

IntraNetWare:

1. Add the redundant NIC adapter according to the instructions that are provided with the adapter.
2. Load the device driver by using the following command:
LOAD *d:\path\PCNTNW.LAN* PRIMARY=*x* SECONDARY=*y*

where *d* and *path* are the drive and path where the driver is located, and *x* and *y* are the PCI slot numbers where the redundant pair is located.

The slot number associated with the integrated Ethernet controller can vary depending on the configuration of the server. To determine the slot number, load the driver with no parameters. The driver will display the available slot numbers. The slot number that is greater than 10000 will be the slot number of the integrated Ethernet controller. When the slot number of the integrated Ethernet controller is determined, reload the driver with the appropriate parameters.

3. When the driver is loaded, bind it to a protocol stack.

The failover function is now enabled. If a failover occurs:

- The operating system console generates a message.
- The custom counters for the device driver contain variables that define the state of the failover function and the location of the redundant pair. You can use the NetWare Monitor to view the custom counters.

Note: If the primary adapter was hot-replaced while the Ethernet traffic was being handled by the secondary Ethernet controller, the traffic does not automatically switch back to the primary adapter when the primary adapter comes back online. In this case, issue the command:

```
LOAD d:\path\PCNTNW SCAN
```

where *d* and *path* are the drive and path where the driver is located. This command causes the device driver to locate the primary adapter and switch the Ethernet traffic to it.

Ethernet port connector

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

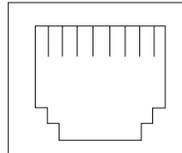


Table 18. Ethernet RJ-45 connector pin-number assignments.

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

Advanced System Management ports

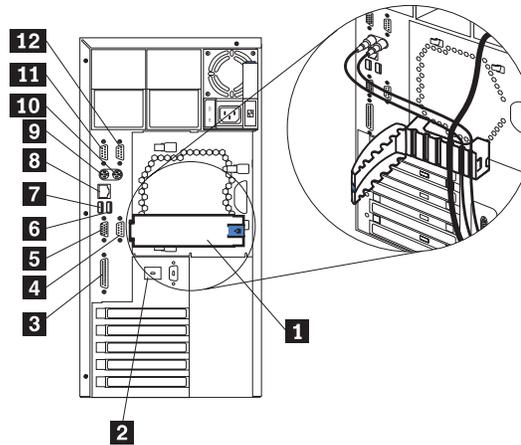
Your server has three communication ports dedicated to the Netfinity Advanced System Management Processor. One port uses a standard D-shell serial-port connector, connector C. The other two ports, which are used for the RS-485 function, use a dual RJ-45 connector.

You can attach a dedicated modem to the D-shell system-management connector on the rear of your server to communicate with the integrated Netfinity Advanced System Management Processor.

The RS-485 function uses the RJ-45 system-management connectors. This function enables you to connect the Advanced System Management Processors of several rack-mounted servers so that they can communicate with each other in half-duplex mode.

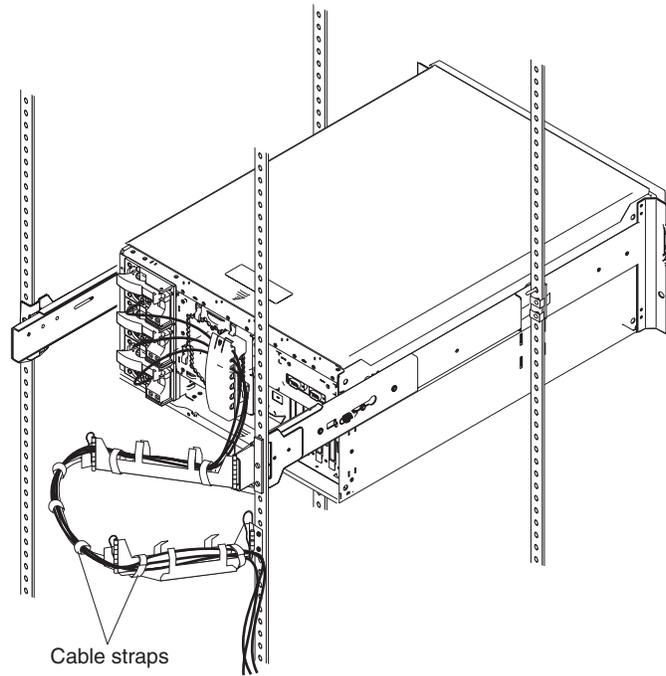
Cabling the server

When you cable the server, be sure to route the cables through the cable-restraint bracket on the rear of the server.



- 1** Cable-restraint bracket
- 2** Advanced system management Interconnect knockout
- 3** Parallel
- 4** Management
- 5** Video
- 6** USB 1
- 7** USB 2
- 8** Ethernet
- 9** Keyboard
- 10** Mouse
- 11** Serial B
- 12** Serial A

Additionally, for rack models, be sure to route the cables through the cable-management arm on the rack.



Netfinity Manager

Netfinity Manager provides powerful hardware systems-management capabilities, including access to all systems on the network that are running Netfinity Manager or Client Services for Netfinity Manager. In addition to all standard Client Services for Netfinity Manager functions, Netfinity Manager also features directory transfers and file, remote screen captures, and remote command-line sessions. Netfinity Manager also enables you to export data collected by System Information Tool, System Profile, Software Inventory, and System Monitor to a DB2, Lotus Notes, or SQL or DB2 via an open database connectivity (ODBC) database (ODBC export is available on Windows NT systems only). Finally, Netfinity Manager enables you to start services at scheduled times and dates for simplified, automated systems management.

Netfinity Manager also provides two powerful features that enable you to access the Netfinity Manager system and all Netfinity Manager systems from a system that is not attached to the managing system network:

- Serial Connection Control

Use the Serial Connection Control service to use a Netfinity Manager system modem to establish a connection with any Netfinity Manager system that has a modem. Once this connection is established, the Netfinity Manager has full access to Netfinity Manager services, just as though the remote system were part of the managing system network.

- Netfinity Manager for Web

Netfinity Manager for Web enables access and remote control of the Netfinity Manager system over the Internet, using any system that has an Internet connection and a World Wide Web (WWW) browser. With the Netfinity Manager for Web, you can access your Netfinity Manager systems from anywhere in the world.

Managing your IBM Netfinity server with Netfinity Manager

The copy of Netfinity Manager that is included with ServerGuide entitles you to one Netfinity Manager installation. You are also entitled to additional installations of Client Services for Netfinity Manager. To use Netfinity Manager to monitor and manage this Netfinity server, install Netfinity Manager on a system in your network that you will use as a system-management console, and then install Client Services for Netfinity Manager on your Netfinity server. You can also install additional copies of Client Services for Netfinity Manager on other systems in your network. Furthermore, additional Netfinity Manager and Client Services for Netfinity Manager licenses are available for purchase from your IBM representative.

Note: This section provides installation instructions for all operating systems supported by Netfinity Manager. However, not all operating systems described in this section are certified for use with all Netfinity server models. For a list of supported operating system for you Netfinity server model, see the Server Proven list at

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

Netfinity Manager documentation

The Netfinity directory on the *ServerGuide Netfinity Applications* CD contains online versions (*.PDF format) of all Netfinity Manager documentation. For more information on included documentation, see “Getting more information about Netfinity Manager” on page 113.

Netfinity Manager system requirements

The minimum system requirements for Netfinity Manager vary based on which supported operating system is running on your system.

- If you are installing Netfinity Manager for OS/2, see “Netfinity Manager for OS/2 system requirements.”
- If you are installing Netfinity Manager for Windows 95 (or Windows 98), see “Netfinity Manager for Windows 95 and Windows 98 system requirements” on page 89.
- If you are installing Netfinity Manager for Windows NT, see “Netfinity Manager for Windows NT system requirements” on page 89.

Netfinity Manager for OS/2 system requirements

The minimum system requirements for Netfinity Manager for OS/2 are:

- OS/2 version 3.0 or later
- Approximately 19 MB–22 MB of hard disk space (space required depends on system configuration)
- A LAN adapter card and one or more of the following communications protocols:
 - IBM TCP/IP for OS/2 version 1.2 or later (required for Netfinity Manager with Web Enhancement)
 - NetBIOS

Note: The Netfinity Manager NetBIOS requirements are three names, two sessions, and nine network control blocks (NCBs).

- IPX
- SNA (IBM Communications Manager/2 version 1.1 only)

Note: Systems using Netfinity Manager with Microsoft SNA Server cannot communicate with systems that run the Microsoft SNA Server client. Netfinity Manager supports only server-to-server communications between systems that run Microsoft SNA Server software. However, Netfinity Manager systems running Microsoft SNA Server can communicate with other Netfinity Manager systems using any of the other supported SNA stacks.

- A 9600 baud or greater modem (optional).

The hard disk requirement for Client Services for Netfinity Manager is 6.5 MB–9 MB of hard disk space. All other system requirements are the same as for Netfinity Manager for OS/2.

Note: Serial Connection Control will not function on systems that do not have a properly installed and configured modem.

Netfinity Manager for Windows 95 and Windows 98 system requirements

The minimum system requirements for Netfinity Manager for Windows 95 are:

- Microsoft Windows 95 or later
- Approximately 17 MB–20 MB of hard disk space (space required depends on system configuration)
- A LAN adapter card and one or more of the following communications protocols:
 - TCP/IP (must be WinSock Version 1.1-compatible; required for Netfinity Manager with Web Enhancement)
 - NetBIOS

Note: The Netfinity Manager NetBIOS requirements are three names, two sessions, and nine network control blocks (NCBs).

- IPX
- SNA (PCOMM 4.1 or later SNA stack)

Note: Systems using Netfinity Manager with Microsoft SNA Server cannot communicate with systems that run the Microsoft SNA Server client. Netfinity Manager supports only server-to-server communications between systems that run Microsoft SNA Server software. However, Netfinity Manager systems running Microsoft SNA Server can communicate with other Netfinity Manager systems using any of the other supported SNA stacks.

- A 9600 baud or greater modem (optional).

The hard disk requirement for Client Services for Netfinity Manager is 6.5 MB–9 MB of hard disk space. All other system requirements are the same as for Netfinity Manager for Windows NT.

Note: Serial Connection Control will not function on systems that do not have a properly installed and configured modem.

Netfinity Manager for Windows NT system requirements

The minimum system requirements for Netfinity Manager for Windows NT are:

- Microsoft Windows NT version 4.0 or later
- Approximately 17 MB–20 MB of hard disk space (space required depends on system configuration)
- A LAN adapter card and one or more of the following communications protocols:
 - TCP/IP (must be WinSock Version 1.1-compatible; required for Netfinity Manager with Web Enhancement)
 - NetBIOS

Note: The Netfinity Manager NetBIOS requirements are three names, two sessions, and nine network control blocks (NCBs).

- IPX
- SNA (Microsoft SNA Server version 2.11 with Service Pack 1 and WCPIC32.DLL dated 01/22/97 or later. This DLL is available from Microsoft)

Note: Systems using Netfinity Manager with Microsoft SNA Server cannot communicate with systems that run the Microsoft SNA Server client. Netfinity Manager supports only server-to-server communications between systems that run Microsoft SNA Server software. However, Netfinity Manager systems running Microsoft SNA Server can communicate with other Netfinity Manager systems using any of the other supported SNA stacks.

- A 9600 baud or greater modem (optional).

The hard disk requirement for Client Services for Netfinity Manager is 6.5 MB–9 MB of hard disk space. All other system requirements are the same as for Netfinity Manager for Windows NT.

Notes:

1. Serial Connection Control will not function on systems that do not have a properly installed and configured modem.
2. To most effectively manage Windows NT systems, any user that will be using Netfinity Manager on a Windows NT system (locally or remotely) must have administrator-level access to the system.

Starting the Netfinity Manager installation program

For instructions on installing Client Services for Netfinity Manager, see the documentation listed in “Getting more information about Netfinity Manager” on page 113.

To start the Netfinity Manager installation program on a system that is running Windows NT 4.0:

1. Start the computer with your operating system.
2. Place the *ServerGuide Netfinity Applications* CD into the CD-ROM drive.
3. Follow the instructions for your operating system below:
 - OS/2 Warp Server
 - a. From a command prompt, type
`x:`
where *x* is the CD-ROM drive letter, and then press **Enter**.
 - b. Type
`SC0S2`
and then press **Enter**. The ServerGuide Netfinity Applications windows opens.
 - c. Select **IBM Netfinity Manager** from the Available Applications selection list.

Note: To install Client Services for Netfinity Manager, select **Client Services for Netfinity Manager** from the Available Applications list and then refer to the *Client Services for Netfinity Manager User’s Guide* for additional installation instructions.
 - d. Click **Install Product** to start the installation process.
 - Windows 95, 98, or NT
 - a. Click the **Start** button.
 - b. Click **Run...** from the Start button menu.
 - c. Type
`x:\SCW95`

where *x* is the drive letter of the CD-ROM drive in the **Command Line** field and then click **OK**. The ServerGuide Netfinity Applications windows opens.

- d. Select **IBM Netfinity Manager** from the Available Applications selection list.

Note: To install Client Services for Netfinity Manager, select **Client Services for Netfinity Manager** from the Available Applications list and then refer to the *Client Services for Netfinity Manager User's Guide* for additional installation instructions.

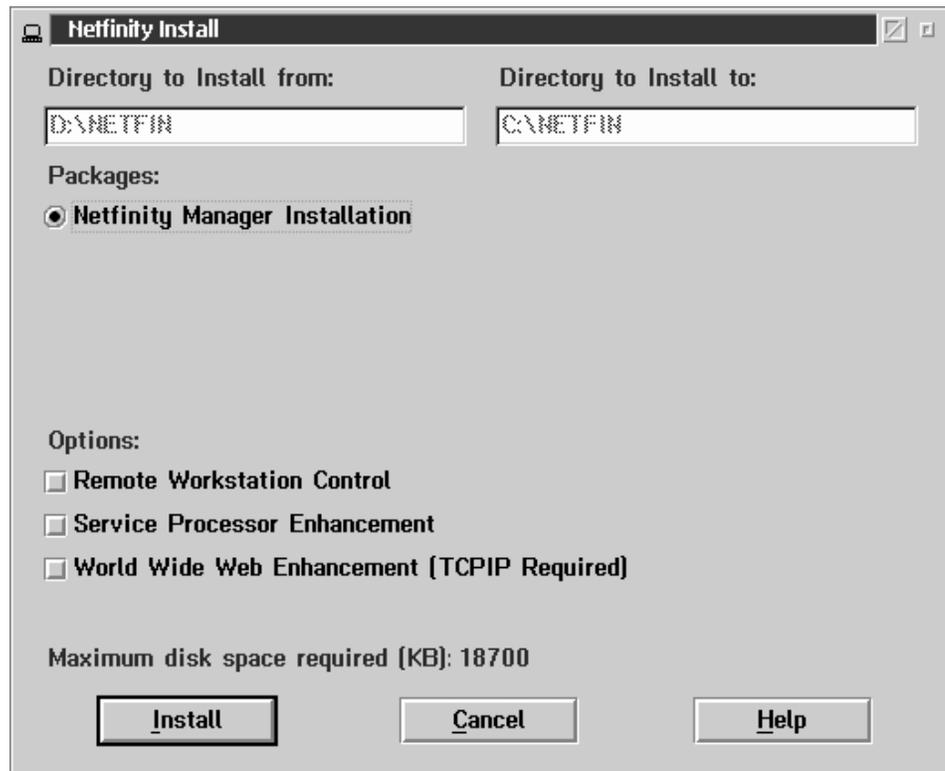
- e. Click **Install Product** to start the installation process.
4. Choose a drive and directory from which the Netfinity Manager program files will be copied.

Type in the **Directory to Install from** field the drive and directory name where the Netfinity Manager program files are located. The default is the drive and directory from which the Netfinity Manager installation program was started.

5. Type in the **Directory to Install to** field the drive and directory in which to install the Netfinity Manager files.

Enter the drive and directory name to which the Netfinity Manager program files will be copied. The default is **C:\NETFIN** (on systems running OS/2) or **C:\WNETFIN** (on systems running Windows 95 or Windows NT).

6. Click **OK** to save these settings and open the Netfinity Manager Installation Program window.



7. Select installation options.

There is only one installation configuration for Netfinity Manager. However, the Netfinity Manager program offers several installation options. Each option enables additional specialized feature of this product.

The available installation options are:

- **Advanced System Management Support**
Click **Advanced System Management Support** to install the Advanced System Management service on this system. Use this service to monitor and manage IBM Advanced System Management processors and adapters.
Important: If you install Advanced System Management support an enhanced version of the Serial Connection Control service, named Dynamic Connection Manager, will be installed instead of Serial Connection Control. For more information on Advanced System Management and the Dynamic Connection Manager service see the *Advanced System Management Information* section of this server library.
- **Capacity Manager**
Click **Capacity Management** to install the Capacity Management service on this system. Capacity Management is a resource management and planning tool that is designed to enable network managers and administrators to remotely monitor server performance.
- **Remote Workstation Control**
Click **Remote Workstation Control** to enable the Remote Workstation Control service on this system. Use Remote Workstation Control to monitor or control the screen display of remote systems that are running Netfinity Manager or Client Services for Netfinity Manager.
- **Update Connector Manager (NT 4.0, TCP/IP, and Web Browser Required)**
Click **Update Connector Manager (NT 4.0, TCP/IP, and Web Browser Required)** if Netfinity Manager is being installed on a system that will be used to manage system updates on client systems using updates that are available from the IBM selection server.
- **World Wide Web Enhancement (TCP/IP Required)**
Click **World Wide Web Enhancement (TCP/IP Required)** if the Netfinity Manager is being installed on a system that will be used to manage other Netfinity Manager systems, and can be accessed and controlled remotely over the Internet using a World Wide Web browser.

8. Install Netfinity Manager.

Click **Install** to continue. The installation program copies all program files that are required by the installation configuration. A window appears, displaying the name of the file that is currently being copied.

Note: Click **Cancel** to stop the installation process.

Network communication drivers and the following Netfinity Manager services are installed:

- Alert Manager
- Alert on LAN[®] Configuration (available only on systems running Windows 95 or later or Windows NT 4.0 or later)
- Capacity Management (available only on systems running Windows NT 4.0 or later)
- Cluster Manager (available only on systems running Windows NT 4.0 or later)
- Critical File Monitor
- DMI Browser (requires DMI Service Layer)
- ECC Memory Setup (requires ECC memory)
- Event Scheduler
- File Transfer
- Power On Error Detect

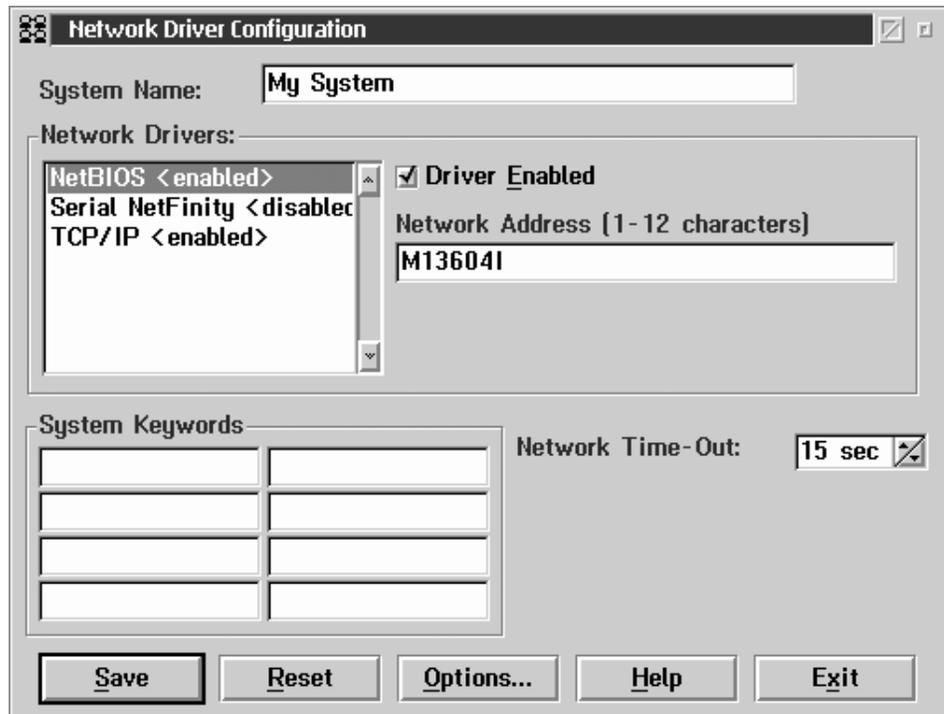
- Predictive Failure Analysis[®] (requires PFA-enabled hard disk drive)
- Process Manager
- RAID Manager (requires RAID adapter)
- Remote Session
- Remote System Manager
- Remote Workstation Control
- Screen View
- Security Manager
- Serial Connection Control
- Service Configuration Manager
- Service Processor Manager
- Service Manager
- Software Inventory
- System Diagnostics Manager
- System Information Tool
- System Monitor
- System Partition Access (requires System Partition)
- Update Connector Manager (available only on systems running Windows NT 4.0 or later)
- System Profile
- Web Manager Configuration (installed only if the Netfinity Manager Installation with Web Enhancement installation configuration is selected)

Note: The graphical user interface (GUI) program files for DMI Browser, ECC Memory Setup, System Partition Access, RAID Manager, and Predictive Failure Analysis will be installed regardless of whether the system has a DMI Service Layer, ECC Memory, a System Partition, a RAID adapter, or a PFA-enabled disk drive. This enables a network administrator to remotely access these services on other systems within a network. However, the installation program installs the base program that enables local use of the service only if the required hardware or system configuration is present.

9. Configure the Network Drivers.

If the installation configuration allows for network access, enter information regarding the communication protocols that are supported by the system. The

Network Driver Configuration window will appear.



Follow these steps to continue configuring the system:

- a. Enter a System Name.

Enter a name for the system in the **System Name** field. This name will help other Netfinity Manager users identify the system on the network.

- b. Select a Network Driver.

Select one of the available Network Drivers that are displayed in the **Network Drivers** field. Once selected, the Network Driver will assign a network address to the system.

Notes:

- 1) The fields that appear beneath the **Driver Enabled** check box will change depending on which Network Driver you select.
- 2) When enabling the IPX or TCP/IP Network Driver, the network address cannot be altered, and it will not appear on the screen. No field will appear beneath the **Driver Enabled** check box if you select the IPX or TCP/IP Network Driver.
- 3) When enabling the NetBIOS Network Driver, a network address will be selected and displayed in the **Network Address** field. To change this default name, enter any 1–8 character address. However, this address *must* be unique to the system. If this NetBIOS address is identical to the NetBIOS address of another system on the network, it will prevent Netfinity Manager from starting properly.
- 4) When enabling the Serial Netfinity Manager driver, type a name that will be used to identify the system in the **Unique Machine Dialup Name** field. This name can be up to 32 characters long, and must be unique to the system. If this name is not unique, it can prevent remote Netfinity Manager users from using the Serial Connection Control service to access the system.

- c. Enable the Network Driver.

When you have entered all required information, click the **Driver Enabled** check box to activate the driver on startup.

If the system supports multiple network interfaces, add additional network drivers by repeating steps b and c.

d. Identify the system with System Keywords (optional).

To make full use of the Remote System Manager's discovery process, identify the system (and each of the Netfinity Manager systems that are on the network) with descriptive system keywords. Enter these keywords in the appropriate **System Keywords** fields.

e. Select Netfinity Manager Options (optional)

Click on the **Options** button to open the Netfinity Manager Options window. The Netfinity Manager Options window contains special options that affect Netfinity Manager network operations. Available options include:

- Force Remote Logons

If the **Force Remote Logons** option is enabled, the system will not be able to save the User ID/Password combinations that were used when accessing remote systems. This will force you to manually log on each time a remote system is accessed.

- Service Execution Alerts

If the **Service Execution Alerts** option is enabled, the Netfinity Manager Service Manager will generate a Netfinity Manager alert whenever one of *the user's* Netfinity Manager services is started by a remote user. The alert includes the name of the service that was run and information about the user that started the service.

- Show Network Support

If the **Show Network Support** option is enabled, the Netfinity Manager Support Program (or Network Interface) will be visible as a minimized process in the Windows NT 4.0 task bar. This enables the user to shut down the Netfinity Manager Support Program. If the Netfinity Manager Support Program is to remain invisible to the user, do not enable this option.

- Remote User Authorization for Screen Access

If the **Remote User Authorization for Screen Access** option is enabled, a remote user cannot use either Remote Workstation Control or Screen View on your system without your permission. When this option is enabled and a remote user attempts to use one of these services on your system, a window will pop up on your desktop alerting you that a remote user is attempting to use the Remote Workstation Control or Screen View service and asking whether you want to permit this user to use this service on your system. You can click **Yes** or **No**. If you do not make a selection within 15 seconds (for example, if you are not sitting at your system when the access attempt is made), Netfinity Manager will automatically prevent the remote user from using the service on your system.

- Disable DNS Name Resolution

If the **Disable DNS Name Resolution** option is enabled, Netfinity Manager will use only a numeric TCP/IP address (for example, 8.24.67.32) to communicate with remote systems and will not attempt to resolve the numeric address into an alphanumeric, Domain Name Server (DNS) address (for example, your.system.ibm.com). Select this option if

you are using Netfinity Manager is a WINS networking environment or if you are using TCP/IP in an environment that does not have a Domain Name Server.

To enable one or more of the available Netfinity Manager Options:

- 1) Click **Options...**
 - 2) Select one or more Netfinity Manager options.
 - 3) Click **Save**.
- f. Set the Network Time-out Value (optional).
The **Network Time-out** field shows the number of seconds that Netfinity Manager will attempt to communicate with a remote system that is not responding. If Netfinity Manager does not establish contact with the remote system within this time, it cancels the communication attempt. The Network Time-out default setting is 15 seconds. This default setting might not need to be altered.
- g. Save the configuration and continue.
Click **Save** to save the configuration. Then, click **Exit** to continue.

Note: The configuration can be changed later by double-clicking the **Network Driver Configuration** object in the Netfinity Manager folder.

10. After finishing configuring the system for network access, the installation program displays a list of changes that must be made to the system configuration files, and asks whether the installation program should make the changes. For example, if you are installing Netfinity Manager for Windows 95, the installation program will display a list of changes that must be made to the CONFIG.SYS file.

Click either **Yes** or **No**.

Note: These changes must be made to the system configuration for Netfinity Manager to run correctly.

- If you click **Yes** the installation program automatically makes the necessary changes to the system configuration.
- If you click **No** the commands are saved to a file named CONFIG.NEW in the destination directory (and to AUTOEXEC.NEW, if appropriate) so that they can be added later.

11. The installation is now complete. Shut down and restart the system for the system configuration changes to take effect.

Netfinity Manager database support

Netfinity Manager supports the collection and export of a vast amount of system-specific data to a Netfinity Manager database.

Netfinity Manager databases can be created on database management systems using DB2[®], Lotus Notes[®], or Microsoft SQL. Microsoft SQL is supported through open database connectivity (ODBC), and is available on systems running Netfinity Manager for OS/2, Windows 95, or Windows NT. If the system supports ODBC, the user can access and export DB2 data through ODBC as well. Once support for one or more of these databases has been installed along with Netfinity Manager, data can be exported from these Netfinity Manager services:

- Alert Manager
- Software Inventory
- System Information Tool

- System Profile
- System Monitor

Information on how to install and configure support for database export follows.

- If support for DB2 database export is being installed, see “DB2 database support.”
- If support for Lotus Notes database export is being installed, see “Lotus Notes database support” on page 101.
- If support for ODBC database export is being installed, see “ODBC database support” on page 102.

DB2 database support

Support for DB2 database export is automatically configured during installation of the Netfinity Manager. However, the database system itself must be configured. Instructions for configuring the database follow.

A raw data dump to a file is also available and will run without a database.

System requirements

Netfinity Manager DB2 database export is supported on systems running Netfinity Manager for OS/2, Netfinity Manager for Windows 95, Netfinity Manager for Windows 98, and Netfinity Manager for Windows NT. For more information about supported version numbers refer to Table 19 on page 105.

Attention: Using Netfinity Manager database support with systems running unsupported versions of DB2 or the DB2 Client might cause unpredictable results and might halt the system.

See the *DB2 Installation Guide* for general requirements and supported protocols.

Installing and configuring the database

The following information describes the steps to install and configure the DB2 database.

Note: If your primary system is OS/2, refer to “Installing the database on OS/2.”

1. Start a DB2 command window.

Note: If it is not already running, start the DB2 database manager.

2. Type the following command:

```
DB2 CREATE databasename ON d
```

where

- *databasename* is the name of the database
- *d* is the drive where the database is created

3. Press Enter.
4. Next, you must configure the tables for ODBC database support. For information on configuring the database for ODBC, refer to “ODBC database configuration” on page 103. For information on creating the tables, refer to “Creating the Netfinity Manager tables” on page 104.
5. Finally, you must bind the database. For information on binding the database, refer to “Activating the database” on page 98.

Installing the database on OS/2:

1. Insert the Netfinity Manager CD into the CD-ROM drive (in this example, drive D; individual drive letters might be different).
2. Start an OS/2 window or full-screen session.
3. Make the CD-ROM drive the active drive.
Type D: and then press Enter.
4. Type the following command at the OS/2 prompt:
NETFINDB CREATE /DBNAME=*databasename* /DRIVE=*d*
where *databasename* is the name of the database and *d* is the drive where the database will be located.

Note: If any part of the database already exists, the utility program will create only the portions of the database that are missing.

5. Press Enter.

Activating the database

The following information describes how to connect, bind, and grant privileges to the database.

1. Connecting to the Database
 - a. Start a DB2 command window.
 - b. Type the following command:
DB2 CONNECT TO *databasename*
where *databasename* is the name of the database as specified in the database installation step.
 - c. Press Enter.
2. Bind the package and the database
To prepare SQL statements stored in the bind file and store the package in the database, perform the following steps from a system on which Netfinity Manager for OS/2, Netfinity Manager for Windows 95, or Netfinity Manager for Windows NT has been installed:
 - a. Open a DB2 command window.
 - b. In the DB2 command window, type the following command:
DB2 BIND *x:\directory\DB2SQLC0.bnd*
where *x:\directory* is the name of the drive and directory where Netfinity Manager is installed.
 - c. Press Enter.

Granting and revoking database privileges

The following information describes how to grant and revoke database privileges.

Note: If your primary system is OS/2, refer to "Database privileges on OS/2 systems" on page 99.

1. Start a DB2 command window.

Notes:

- a. If it is not already running, start the DB2 database manager.
 - b. If you are not connected to the DB2 Netfinity database, connect to the database now.
2. Type the following command:
DB2 GRANT *privilegecode* ON TABLE *tablename* TO *userid*
where

- *privilegecode* is one of the following privilege codes:
 - ALL
 - ALL PRIVILEGES

Note: Grants all the appropriate privileges, except CONTROL, on the database.

- ALTER
- CONTROL
- DELETE
- INDEX
- INSERT
- REFERENCES
- SELECT
- UPDATE
- *tablename* is the name of the table as specified during database installation. A listing of the Netfinity database table names can be found in the *Netfinity User's Guide* (Appendix H: Netfinity Relational Database Tables).

Note: The Netfinity Database Administration Tool can also be used to GRANT or REVOKE privileges.

- *userid* is the user ID to be granted access
3. Press Enter to execute the command.

To revoke privileges, substitute REVOKE for GRANT in the command line.

Database privileges on OS/2 systems:

1. Use the GRANT EXECUTE command to enable Netfinity Manager to access the database.

Type the following command at the OS/2 prompt:

```
DB2 GRANT EXECUTE ON PACKAGE NETFIN.DB2SQLC0 TO PUBLIC
```

and then press Enter.

Note: Specify PUBLIC or authorize only specific manager systems. To limit access to the database, substitute the authorization name of the managing system for PUBLIC.

2. Use the CONNECT RESET command to disconnect current users from the database.

Type the following command at the OS/2 prompt:

```
DB2 CONNECT RESET
```

and then press Enter.

3. Use the NETFINDB GRANT command to grant (or revoke) database privileges.

To grant or revoke table privileges on OS/2:

- a. Insert the Netfinity Manager CD into the CD-ROM drive (in this example, drive D; individual drive letters might be different).
- b. Make the CD-ROM drive the active drive.
Type D: and then press Enter.
- c. Type the following command:

```
NETFINDB GRANT /ID=id PUBLIC /DBNAME=databasename /PRIV=privilegecode
```

where

- *id* is the user ID to be granted access
- *databasename* is the name of the database as specified during NETFINDB execution

- *privilegecode* is one of the following privilege codes:
 - ALL
 - ALTER
 - CONTROL
 - DELETE
 - INDEX
 - INSERT
 - REFERENCES
 - SELECT
 - UPDATE
- d. Press Enter to execute the command.

Note: Use PUBLIC or authorize only a specific ID or group name. Netfinity Manager update programs use the DB2SQLC0 package and do not require specific table privileges.

To revoke privileges, substitute REVOKE for GRANT in the command line.

To configure Netfinity Manager to discontinue export data through ODBC for use on DB2, refer to “ODBC database support” on page 102.

Cataloging the database in the managing system: If the manager is using a remote database, catalog the node the database resides on and then catalog the database to that node.

Once this step has been completed, the name of the Netfinity Manager database will appear in the System Information Tools Database Selection window.

Deleting the database

The following information describes how to delete the database for all supported operating systems.

Note: If your operating system is OS/2, refer to “Deleting the database on OS/2.”

1. Start a DB2 command window.
2. Type

```
DB2 DROP DATABASE databasename
```

where

databasename is the name of the database as specified during the database installation.

3. Press Enter.

Deleting the database on OS/2:

1. Insert the *Netfinity Manager* CD-ROM into the database server CD-ROM drive (in this example, the CD-ROM drive is E).
2. Start an OS/2 window or full-screen session.
3. Make the CD-ROM drive the active drive.

Type E: and press Enter.

4. Type the following command at the OS/2 prompt:

```
NETFINDB DELETE /DBNAME=databasename
```

where *databasename* is the name of the database as specified during NETFINDB execution.

5. Press Enter.

To configure Netfinity Manager to discontinue export data through ODBC for use on DB2, refer to “ODBC database support” on page 102.

Lotus Notes database support

To enable the Netfinity Manager to export system data to a Lotus Notes database, the following must be done:

1. Install the Netfinity Manager database template on the Lotus Notes server.
2. Enable Netfinity Manager to export to the Lotus Notes server.

Instructions on installing the Lotus Notes database template and enabling the Netfinity Manager to export to the Lotus Notes database follow.

System requirements

The minimum requirements for Netfinity Manager to export data to a Lotus Notes database are:

- Lotus Notes
- Lotus Notes client

For information on what versions of Lotus Notes and the Lotus Notes client are supported, see Table 19 on page 105. See the *Notes Administrator's Guide* for general system requirements and supported communications protocols.

Installing the database

To enable Netfinity Manager to export system data to a Lotus Notes database, install the Netfinity Manager database template on the Lotus Notes server. During Netfinity Manager installation, a Lotus Notes database template file (named NETFINDB.NTF) was copied to the Netfinity Manager program directory. To install the database template on the Lotus Notes server:

1. Copy NETFINDB.NTF from the Netfinity program directory to the Notes data directory on the Lotus Notes server.
2. Start Lotus Notes on the server.
3. Click **New Database...** from the Notes File pull-down menu.
This opens the New Database window.
4. Click **Netfinity Database** from the Template selection list.
5. Check the **Inherit Future Design Changes** check box.
This enables future releases of Netfinity Manager to automatically apply changes to this Netfinity Manager database.
6. Click **Local** from the Servers selection list.

Note: When installing the database on a remote server, select the name of the remote server from the Servers list.

7. Type in the **Filename** field:
NETFINDB.NSF
8. Type in the **Title** field:
Netfinity Database
9. Click **New** to create the database and close the New Database window.
10. Double-click the Netfinity Database icon in the Lotus Notes workspace.
11. Click **Database** in the File pull-down menu.
12. Click **Access Control...** in the Database pull-down menu.

13. Set the Access Level for all Netfinity Manager systems that will be exporting data to this database to **Editor**.
14. Check the **Can Delete Documents** check box.
15. Click **OK**.

Once the Lotus Notes database is installed, enable Netfinity Manager systems to export to the Lotus Notes server.

- If the Netfinity Manager system is running Netfinity Manager for OS/2, ensure that the Lotus Notes directories are included in the CONFIG.SYS file LIBPATH, PATH, and DPATH statements. If the directories are not included in these statements, it is not possible to export to the Lotus Notes database.
- If the system is running Netfinity Manager for Windows NT, ensure that the Lotus Notes directory path is included in the Global Windows NT environment settings.
- If the system is running Netfinity Manager for Windows 95, ensure that the Lotus Notes directories are included in the AUTOEXEC.BAT file PATH statement. If the directories are not included in this statement, it is not possible to export to the Lotus Notes database.

Once these steps have been completed, export system information from Netfinity Manager to an easy-to-browse Lotus Notes database.

Browsing the Netfinity Manager Lotus Notes database

To browse the data contained in the Netfinity Manager Lotus Notes database:

1. Open the Netfinity Database object in the Lotus Notes Workspace.
2. Select from the View pull-down menu the section of the Netfinity Manager database to be browsed.

The Netfinity Manager database is divided into sections that contain data gathered by specific Netfinity Manager services. Click the name of the service that gathers the data to be viewed (for example, **Alert Logs**).

Note: Some menu selections will contain submenus.

3. Information contained in the part of the Netfinity Manager database that has been selected is now listed in the window. For more detailed information about any displayed data item, double-click the data item.
4. Some data items can be expanded to reveal additional information. These items are identified by a plus sign (+) in the left side border of the Notes window, beside the name of the data item. To expand the data item, select the item and then click **Expand** in the View pull-down menu.

ODBC database support

Netfinity Manager supports exporting data via ODBC for use on SQL or DB2 database systems.

Note: ODBC database export is available only on systems that are running Netfinity Manager.

System requirements

The minimum requirements for Netfinity Manager ODBC database export are:

- Windows NT
 - ODBC

- ODBC support for one or more of the following database management systems (DBMS):
 - IBM DB2
 - Microsoft SQL Server
- Windows 95, with:
 - ODBC
 - ODBC support for one or more of the following database management systems:
 - IBM DB2
 - Microsoft SQL Server
- OS/2
 - Microsoft SQL Server (using the Visigenic driver provided with Microsoft SQL Server)
 - or*
 - IBM DB2

For detailed information about supported ODBC platforms, see Table 19 on page 105.

Note: The ODBC database name must not be longer than 8 characters.

ODBC database configuration

This section describes the procedures you must complete before Netfinity Manager can create the Netfinity Database Tables using ODBC.

1. Define the NETFIN ID so the Netfinity Database Administration can create the Netfinity Database tables with a table qualifier of NETFIN.

Attention: NETFIN is a restricted user ID. The password is not retained by Netfinity Database Administration after use. Do not use this ID for exports.

Notes:

- a. In OS/2 and Windows 95, NETFIN must either be the owner of the database or must be given administrator authority.
 - b. In Windows NT, when exporting to DB2, NETFIN must either be the owner of the database or be defined as a system administrator through the NT User Manager for Domains or the NT User Manager.
 - In Windows NT, when exporting to MS SQL, NETFIN must be the owner of the database or be given table create rights.
2. Create the database with the appropriate relationship with the NETFIN ID.
 3. Make a database ODBC source either using the ODBC tools shipped with the operating system or the database.
 4. On Windows NT, configure the Netfinity Support Program to export data using the ODBC database.
 - a. Open **Services** from the Control Panel.
 - b. Click **Netfinity Support Program** from the **Services** field, then click **Startup**.
 - c. Click **Automatic** in the Startup Type button group.
 - d. Click **This Account** in the **Log On As field** group. Enter in the **This Account** field the user name of the account that made this database an ODBC source.
 - e. Click **OK**.

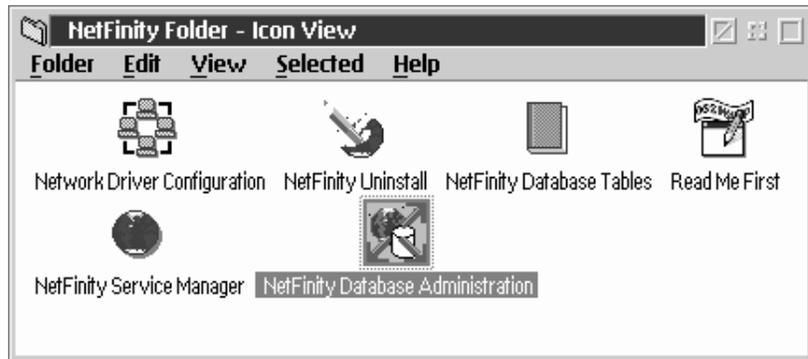
Note: If the Event Scheduler or Alert Manager will be used to export data using ODBC, continue to have the ID which made the database an ODBC source logged on during the time Event Scheduler will be exporting data.

Creating the Netfinity Manager tables

To create the tables needed to enable Netfinity Manager to export data:

1. Open the Netfinity Manager Database Administration service.

The Netfinity Manager Database Administration service is found in the Netfinity Manager folder or Netfinity Manager program group. Double-click this icon to open the Netfinity Manager Database Administration window.



2. Select a DBMS.

Click in the **Select DBMS** listing the name of the DBMS which Netfinity Manager will be using to export data.



3. To create the Netfinity Manager table groups within the database, click **Create** and then click **OK** to open the Database Server window.

The following table actions are also available:

- Delete

To remove the Netfinity Manager table groups from the database, click **Delete** and then click **OK** to open the Database Server window.

- **Grant**

Permits access to a database for a specified user ID. To grant access:

- Click **Grant**.
- In the **User ID** field type the user ID that will be permitted to access the database.
- Select privileges for this ID.
All privileges (Insert, Delete, Select, and Update) are selected by default. A user ID must have all of these privileges to export data to the database.
- Click **OK** to open the Database Server window.

- **Revoke**

Disables access to a database for a specified user ID. To revoke access:

- Click **Revoke**.
- In the **User ID** field type the user ID that will have access to the database revoked.
- Deselect privileges to be revoked for this ID.
All privileges (Insert, Delete, Select, and Update) are selected by default. A user ID must have all of these privileges to export data to the database. Some or all of these privileges can be revoked.
- Click **OK** to open the Database Server window.

4. Select the database within which the table groups will be created.

5. Click **OK**.

The Netfinity Manager Database Access window opens.

6. Type in the **User ID** field

`netfin`

netfin is the qualifier name of the Netfinity Manager database.

7. In the **Password** field type the password that enables access to the Netfinity Manager database.

8. Click **OK**.

As the information is processed, a Creating tables status message should be displayed. When the operation completes, a Requested Action Completed message should be displayed.

Supported and certified databases

The following table shows databases and operating systems that are certified for use with this release of Netfinity Manager.

Table 19. Supported Netfinity Databases.. Reference by operating system and database client version.

Product	Win 95	Win NT 3.51	Win NT 4.0	OS/2 Warp Connect	OS/2 Warp 4.0
IBM DB2 Version 2.1.2	Yes	Yes	Yes	Yes	Yes
IBM DB2 Universal Database 5.0	Yes	Yes	Yes	Yes	Yes
ODBC - IBM DB2 Version 2.1.2	Yes, DB2 Driver	Yes, DB2 Driver	Yes, DB2 Driver	Yes, DB2 Driver	Yes, DB2 Driver

Table 19. Supported Netfinity Databases. (continued). Reference by operating system and database client version.

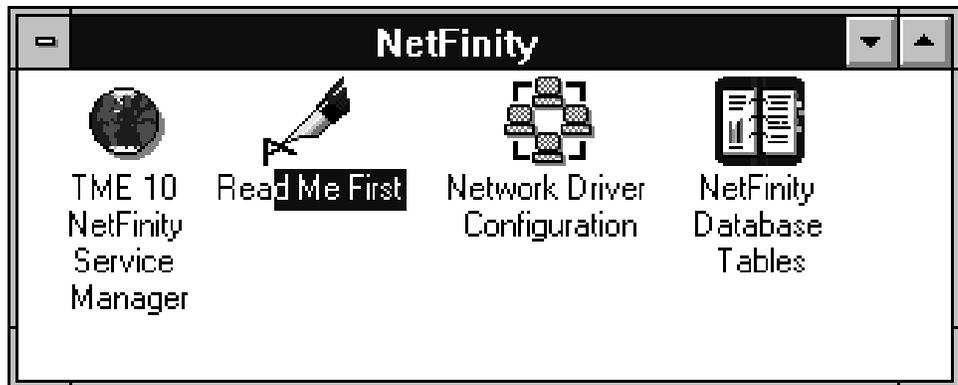
Product	Win 95	Win NT 3.51	Win NT 4.0	OS/2 Warp Connect	OS/2 Warp 4.0
ODBC - IBM DB2 Universal Database 5.0	Yes, DB2 Driver	Yes, DB2 Driver	Yes, DB2 Driver	Yes, DB2 Driver	Yes, DB2 Driver
ODBC - Microsoft SQL Version 7.0	Yes, Microsoft SQL Driver	Yes, Microsoft SQL Driver	Yes, Microsoft SQL Driver	Yes, Visigenic Driver Version 1.10	No
ODBC - Microsoft SQL Version 6.5	Yes, Microsoft SQL Driver	Yes, Microsoft SQL Driver	Yes, Microsoft SQL Driver	No	No
Lotus Notes Version 4.5.2	Yes	Yes	Yes	Yes	Yes
Lotus Notes Version 4.5.3a	Yes	Yes	Yes	Yes	Yes
Lotus Notes Version 4.6	Yes	No	Yes	No	No
Lotus Notes Version 4.6a	Yes	No	Yes	No	No
Lotus Notes Version 4.63	Yes	No	Yes	No	No
Oracle Version 7.3	Yes, Oracle Driver Version 2.0.3.1.1	Yes, Oracle Driver Version 2.0.3.1.1	Yes, Oracle Driver Version 2.0.3.1.1	No	No
Oracle Version 8.0	Yes, Oracle Driver Version 8.0.3.0.0	No	Yes, Oracle Driver Version 8.0.3.0.0	No	No
Sybase SQL Version 11.0	Yes, Sybase Driver Version 10.0.3T4	Yes, Sybase Driver Version 10.0.3T4	Yes, Sybase Driver Version 10.0.3T4	No	No
Note: The above applies to Netfinity Manager Release 5.2.0 and later.					

Starting Netfinity Manager

To start Netfinity Manager:

1. Open the Netfinity Manager folder or program group.

During installation of Netfinity Manager, a Netfinity Manager folder (OS/2, Windows 95, or Windows NT 4.0 only) or a Netfinity Manager program group (Windows NT 3.51 only) was added to the Desktop. The Netfinity Manager folder or program group contains the Netfinity Manager Service Manager object.



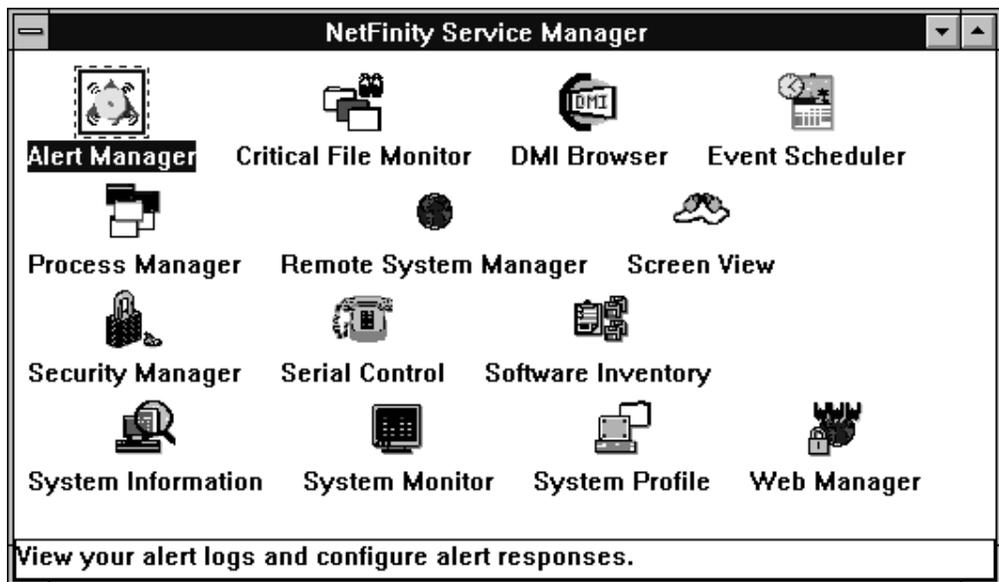
Notes:

- a. In your Netfinity Manager folder or program group is a document titled *Read Me First*, which contains information about Netfinity Manager that might not be covered in your documentation.
 - b. The Netfinity Manager folder also contains the Network Driver Configuration object, which you can use to reconfigure your network protocols and system keywords, and the Netfinity Manager Database Tables object, which contains a handy online reference for all of the data tables in the Netfinity Manager database. For more information on Netfinity Manager database support see "Netfinity Manager database support" on page 96.
 - c. The Netfinity Manager folder also contains a Netfinity Database Administration object. You can use Netfinity Database Administration to configure Netfinity Manager database support. For more information on Database Administration, see "ODBC Database Support" in *Netfinity Manager Quick Beginnings*.
2. Start the Netfinity Service Manager.
To start the Netfinity Service Manager, double-click the Netfinity Service Manager object.

Netfinity Manager Service Manager

All Netfinity Manager services that are supported by the operating system can be started from the Netfinity Manager Service Manager window. The services that are available for use depend on the installation configuration that was selected during

installation.



To start any Netfinity Manager service that appears in the Service Manager window, double-click the icon for that service. To start a Netfinity Manager service on a remote system, use the Remote System Manager service.

Netfinity Manager service descriptions

Each Netfinity Manager service consists of a base program and a graphical user interface (GUI). The service base programs enable Netfinity Manager to remotely access the individual services, but do not allow for local access. The service GUIs, when functioning along with their respective base program, enable access to the service.

Some services are available only on systems with certain system configurations. These services are:

- Alert on LAN Configuration (available only on systems running Windows 95 or later or Windows NT 4.0 or later)
- Capacity Management (available only on systems running Windows NT 4.0 or later)
- Cluster Manager (available only on systems running Windows NT 4.0 or later)
- DMI Browser (requires DMI Service Layer)
- ECC Memory Setup (requires ECC memory)
- Predictive Failure Analysis (requires a PFA-enabled hard disk drive)
- RAID Manager (requires a RAID hard disk drive subsystem)
- System Partition Access (requires a built-in System Partition)
- Update Connector Manager (available only on systems running Windows NT 4.0 or later)

Brief descriptions of each of the Netfinity Manager services follow. Complete instructions on how to use each of these services can be found in the service-specific chapters of the *Netfinity Manager User's Guide*.

Advanced System Management

The Advanced System Management service provides extensive functionality available for your IBM PC Server Advanced System Management Adapter,

Netfinity Advanced System Management PCI Adapter, or Netfinity Advanced System Management Processor. With the Advanced System Management service, you can configure system management events (such as POST, loader, and operating system time-outs or critical temperature, voltage, and tamper alerts). If any of these events occurs, the Advanced System Management service can be configured to use a modem or your Netfinity Manager system to automatically forward a Netfinity alert to other Netfinity Manager systems or to a numeric or alphanumeric pager.

Alert Manager

The Alert Manager is an extendable facility that allows receiving and processing of application-generated alerts. A variety of actions can be taken in response to alerts, including logging alerts, notifying the user, forwarding the alert to another system, executing a program, playing a WAV file (available only on multimedia systems), generating an SNMP alert message, dialing out to a digital pager service (available only on systems that have a modem), or taking an application-defined action. Actions are user-definable, using a flexible action management interface.

Also, an extensive, detailed log is kept of all alerts received by the Alert Manager. Logged information includes date and time the alert was received, type and severity of the alert, the ID of the application that generated the alert, as well as any text that was generated and any action taken by the Alert Manager. Individual or multiple alerts can be selected from the log and printed for later reference, or deleted once problems are corrected. This service is available for stand-alone use and network use.

Alert on LAN configuration

Use the Alert on LAN configuration service to configure monitoring options of Alert on LAN-capable systems locally and remotely. Systems with Alert on LAN capability provide critical status information about system states. The data is reported by hardware or software (depending on whether the systems are currently powered on or not) using TCP/IP.

Capacity Management

Capacity Management is an easy-to-use resource management and planning tool for network managers and administrators, allowing you to remotely monitor the performance of servers on the network.

Cluster Manager

Cluster Manager is an application designed to enhance the cluster management capabilities of the Microsoft Cluster Server (MSCS) administration console, included with Microsoft Windows NT Version 4.0 Enterprise Edition. Cluster Manager builds on the power of MSCS, providing an integrated graphical interface that enables you to quickly and easily monitor and manage the clustered systems on your network. This service is available only on systems running Windows NT Workstation 4.0.

Critical File Monitor

Critical File Monitor can warn you whenever critical system files on the system are deleted or altered. Critical File Monitor makes it simple to generate Netfinity alerts when an important System File (such as the CONFIG.SYS file) changes date, time, size, or when it is deleted or created. Critical File Monitor can also be used to monitor any other files that reside on a Netfinity Manager system.

DMI Browser

DMI Browser enables you to examine information about the DMI-compliant hardware and software products installed in or attached to the system.

ECC Memory Setup

The ECC Memory Setup allows for monitoring of ECC memory single-bit errors, and can automatically “scrub,” or correct, the ECC memory when errors are detected. Also, a running count of single-bit errors can be kept, and can set a single-bit error threshold that will cause a nonmaskable interrupt (NMI) if the ECC single-bit error threshold is exceeded. This service is available for both stand-alone and network use by any system that has ECC memory.

Event Scheduler

Use Event Scheduler to automate many Netfinity Manager services. With Event Scheduler, you can automatically gather and export System Information Tool, System Profile, and Software Inventory data, distribute or delete files, restart systems, execute commands, and access and manage System Partitions on all of the Netfinity Manager systems on the network. Scheduled events can be performed one time only, or can be performed according to a user-defined schedule.

File Transfer

Use the File Transfer service to easily send, receive, or delete files or entire directories to and from remote Netfinity Manager systems on the network.

Power-On Error Detect

The Power-On Error Detect service can warn you immediately when a remote Netfinity Manager system has start-up problems, enabling you to react quickly to problems and minimize downtime.

Predictive Failure Analysis

The Predictive Failure Analysis (PFA) service enables continual monitoring and managing of PFA-enabled hard disk drives. A PFA-enabled hard disk drive features hardware designed to help detect drive problems and predict drive failures before they occur, thus enabling you to avoid data loss and system downtime.

Process Manager

Use Process Manager to view detailed information about all processes that are currently active on any system. It is also possible to stop or start processes and generate Netfinity Manager alerts if a process starts, stops, or fails to start within a specified amount of time after system startup.

RAID Manager

The RAID Manager service can monitor, manage, and configure an assortment of Redundant Arrays of Independent Disk (RAID) adapters and arrays without requiring the RAID system to be taken offline to perform maintenance. Use the RAID Manager to gather data about the system RAID array and RAID adapter, rebuild failing drives, add (or remove) logical drives, perform data integrity tests, and many other RAID system tasks. This service is available for stand-alone use and network use by any system that has a supported RAID adapter.

Remote Session

Use Remote Session to establish a fully active command session with any remote Netfinity Manager system.

Remote System Manager

Use Remote System Manager to access and manage any Netfinity Manager service on any Netfinity Manager system in the network. The Netfinity Manager system on the network is organized into easy-to-manage logical groups that can be updated automatically using the auto-discovery feature.

Remote Workstation Control

Remote Workstation Control can monitor or control the screen display of a remote system that is running Netfinity Manager (or Client Services for Netfinity Manager). Once you initiate a Remote Workstation Control session with another Netfinity Manager system, you can passively monitor events that are occurring on the display of the remote system or actively control the remote system desktop. When you initiate an active Remote Workstation Control session, clicks and keystrokes that are entered on your system are automatically passed to the remote system. With Remote Workstation Control, you can remotely start programs, open and close windows, enter commands, and much more.

Screen View

The Screen View service takes a “snapshot” of the system graphic display or any remote system running Netfinity Manager or Client Services for Netfinity Manager and displays it on the screen. These snapshots can be saved as bitmaps and viewed later.

Security Manager

The Security Manager service can prevent unauthorized access to some or all of the Netfinity Manager services. It uses incoming user ID and password combinations, and is available for network use only.

Serial Connection Control

The Serial Connection Control service enables remote systems running Netfinity Manager to access the system through a phone line and modem. With the Serial Connection Control service, you do not have to be attached to a network to benefit from the outstanding remote system access, monitoring, and management capabilities of Netfinity Manager.

Note: The system *must* have a properly installed and configured modem that supports at least 9600 baud for the Serial Connection Control service to function.

Service Configuration Manager

Service Configuration Manager can save the configuration of a Netfinity Manager service from a selected system to a service configuration file (SCF). Once created, SCF files can be used by Event Scheduler to restore the configuration to the same system, or it can be used (in conjunction with Event Scheduler) to duplicate that configuration on other similar systems you choose.

Software Inventory

Software Inventory enables the user to create and manage software product dictionaries that can be used to easily maintain an inventory of all application programs installed on the system.

System Diagnostics Manager

System Diagnostics Manager enables you to initiate a variety of diagnostic tasks on systems that support ROM-based diagnostics. The results of all previously run diagnostic sessions are stored and can be examined using System Diagnostics Manager to help diagnose and resolve system problems.

System Information Tool

The System Information Tool enables quick and convenient access to detailed information on the hardware and software configurations of the system. System Information Tool gathers information about almost any computer; however, the

most detail is provided when this service is used with IBM computers. This service is available for both stand-alone and network use.

System Monitor

The System Monitor provides a convenient method of charting and monitoring the activity of a number of components in a system, including processor usage, disk space used, and ECC memory errors. These convenient monitors are detachable and scalable, enabling only the monitors needed to remain available at all times. Use the System Monitor Threshold Manager to set threshold levels for any of the monitored components. When exceeded, these thresholds will generate user-configured alerts.

Data is continually collected from the time the system starts. A sophisticated data-handling technique is used to weigh the individual values, average concurrent samples, and post single values that accurately reflect long-term system activity. This technique allows system activity records to be maintained without creating enormous data files. This service is available for both stand-alone and network use.

System Partition Access

The System Partition Access allows for greatly simplified system partition file handling, both locally and remotely. Individual files and entire directories can be renamed or deleted from the system partition. Individual files can be renamed, deleted, or copied into the system partition. Also, the entire partition can be backed-up, restored, or deleted. This service is available for stand-alone use and network use by any system that has a System Partition.

System Profile

The System Profile provides a convenient notebook of pertinent data about a particular user or system. It features many predefined fields for extensive user-specific data, including name, address, office number and location, and phone number. System Profile also includes many predefined fields for system-specific data that might not be available to the System Information Tool, including model and serial numbers and date of purchase. Finally, there are many user-definable miscellaneous fields that can be used to hold any data the user or administrator requires.

Update Connector Manager

Use Update Connector Manager to quickly and easily gather information about various updates that are available for your client systems. Once available updates are discovered, use Update Connector Manager to apply updates to your systems remotely. Updates can be applied to individual systems, or you can apply multiple updates to multiple systems, all from Netfinity Manager. You can also use Update Connector Manager to remove previously applied updates. Update Connector Manager also includes a scheduler that you can use to discover, apply, or remove updates automatically and periodically.

Web Manager Configuration

Use the Web Manager Configuration service to limit access to the Netfinity Manager for Web to user-specified TCP/IP host or ranges of TCP/IP host addresses. Enable or disable the Netfinity Manager for Web and specify the TCP/IP port number to which the Netfinity Manager Web server functions.

Delaying Netfinity Manager startup on OS/2 systems

In some cases, it might be necessary for you to delay the automatic startup of the Netfinity Manager Network Interface (NETFBASE.EXE) in order to allow other time-sensitive applications to start up correctly or to allow your system to fully

configure itself prior to beginning network operations. NETFBASE.EXE includes a parameter (WAIT) that you can use to specify the number of seconds that NETFBASE.EXE will wait before starting.

During Netfinity Manager installation, the Netfinity Manager Network Interface object is placed in the Startup folder. To configure Netfinity Manager to wait a specified number of seconds before starting:

1. Shut down the Netfinity Manager Network Interface if it is running.
2. Open the Startup folder.
3. Using the right mouse button, click the **Netfinity Manager Network Interface** object. This will open the Netfinity Manager Network Interface context menu.
4. Click **Settings** to open the Netfinity Manager Network Interface **Settings** notebook.
5. In the **Parameters** field type
`WAIT:x`
 where *x* is the number of seconds that you want the Netfinity Manager Network Interface to wait before starting.
6. Close the Netfinity Manager Network Interface **Settings** notebook.

With the WAIT parameter set to *x*, whenever you start your system, the Netfinity Manager Network Interface will wait *x* seconds before starting.

Note: This feature is available only on systems that are running OS/2.

Getting more information about Netfinity Manager

Complete information on how to use Netfinity Manager (as well as Client Services for Netfinity Manager) is included in Adobe Acrobat format on the Netfinity Manager CD.

The \DOCS subdirectory contains the following files:

Filename	Document Title	Description
DOCSREAD.ME	DOCSREAD.ME	Text file that contains brief descriptions of each of the Adobe Acrobat-readable PDF file contained in this directory.
README.SCO	Client Services for Netfinity Manager for SCO UnixWare Read Me	Text file that contains installation and setup information for Client Services for Netfinity Manager for SCO UnixWare.
NFMGRQB.PDF	Netfinity Manager Quick Beginnings	Installation and setup information for Netfinity Manager.
NFMGRUG.PDF	Netfinity Manager User's Guide	Detailed information on how to use Netfinity Manager.
NFMGRCR.PDF	Netfinity Manager Command Reference	Detailed information on Netfinity Manager command line functions.
NFCSVCQB.PDF	Client Services for Netfinity Manager Quick Beginnings	Installation and setup information for Client Services for Netfinity Manager.
NFSVCUG.PDF	Client Services for Netfinity Manager User's Guide	Detailed information on how to use Client Services for Netfinity Manager.

Filename	Document Title	Description
NFSVCNW.PDF	Client Services for Netfinity Manager for NetWare User's Guide	Installation, setup, and usage information for Client Services for Netfinity Manager for NetWare.
ASMUPDT.PDF	Advanced System Management Information	Updated information on the Advanced System Management and Dynamic Connection Manager services. These services are included with this version of Netfinity Manager.
NFSCOBAS.PDF	Client Services for Netfinity Manager for SCO UnixWare User's Guide	Installation, setup, and usage information for Client Services for Netfinity Manager for SCO UnixWare.

Installation options

This appendix describes methods for performing automated installations of Netfinity Manager and creating customized Netfinity Manager installations.

Automated installation

If the system has a CID-enabled (CID stands for customization, installation, and distribution) software distribution manager utility (such as LAN CID, included with IBM Network Transport Services/2), Netfinity Manager can be installed on systems within the network by using the Netfinity Manager installation program command line parameters and response file. First, a source directory must be created for the installation.

To create a source directory for a Client Services for Netfinity Manager installation:

1. Create a new directory on your system. This new directory will serve as a source directory for the program files.
2. Copy the files from the appropriate Client Services for Netfinity Manager directory location on the CD-ROM to source directory you created.

For example, when creating a source directory to distribute Netfinity Manager Services for OS/2, copy all of the files from the OS2/SERVICES directory into the created directory.

To create a source directory for a Netfinity Manager installation:

1. Create a new directory on your system. This new directory will serve as a source directory for the program files.

Important: Be sure to copy the Client Services for Netfinity Manager source files before the copying the Netfinity Manager source files because the Netfinity Manager directory contains some files that will overwrite files from the Client Services for Netfinity Manager directory. Only Netfinity Manager installations can be done from this directory.

2. Copy the files from the appropriate Client Services for Netfinity Manager directories.

For example, when creating a source directory to distribute Netfinity Manager for OS/2, copy all of the files from the OS2/SERVICES directory into the source directory.

3. Copy the files from the appropriate Netfinity Manager directory.

For example, when creating a source directory to distribute Netfinity Manager for OS/2, copy all of the files from the OS2/MANAGER directory into the source directory.

After an installation source directory has been created, use a response file and the Netfinity Manager installation program command-line parameters. The Netfinity Manager installation program supports the following command-line parameters:

/R: *drive+path+filename*

Specifies the drive, path, and file name of the response file. See the NETFBASE.RSP file (located in the directory in which Netfinity Manager was installed) for an example of a response file with comments on the included parameters.

/S: *drive+path*

Specifies the drive and path to install *from*. This is the directory to which the files were copied.

/T: *drive*

Specifies the drive to install *to*. Default is the current startup drive.

/TU: *drive+path*

Specifies the drive and path of the CONFIG.SYS file to update. The default is to change the CONFIG.SYS in the root directory of the drive specified in the /T parameter (or the startup drive). This parameter is ignored if the *ChangeConfig* parameter in the response file is FALSE.

For example, the line:

```
NETFINST /R:NETFBASE.RSP /S:Y:\NETFIN  
/T:C /TU:D:\
```

will install Netfinity Manager, using the options in the response file NETFBASE.RSP, from the directory Y:\NETFIN, to drive C: (the directory to which the files are installed is taken from the response file), and will modify the CONFIG.SYS file in the D:\ directory.

Note: For information on how to use a CID-enabled software distribution manager, refer to the publications provided with the individual CID-enabled product.

Customized installation

For security reasons, not all users might need to have access to all services. User access can be restricted by creating a customized installation that will prevent some services from being installed.

To create a customized installation, the INSTALL.INI file must be edited. For example, when creating a customized Netfinity Manager for Windows 95 or NT installation, edit the INSTALL.INI file that is found on Netfinity Manager directory.

The INSTALL.INI file has three sections, separated by the line

```
[==]
```

The first section contains the installation configuration that can be selected during installation. There can be no more than eight choices. Each choice takes up two lines. The first line is the text that is displayed next to the installation configuration radio button. The second line is a list of the options in the third section that will be installed when this choice is selected for installation.

For example:

```
;IBM SysMgt Install Script, Version 2 (Do not remove this comment line)  
Netfinity Manager Installation [Manager 16900]  
Advanced System Management Support [ServProc 450]
```

```

Capacity Manager Enhancement [CapMgt 5600]
Remote Workstation Control [RWC 2000]
World Wide Web Enhancement (TCPIP Required) [WebManager 3000] IsTcpip
[==]
Netfinity Manager CD for Windows 95/NT
[==]
Netfinity Admin
NULL Manager
  CL 0 1 NETFBASE.EXE
  CCL 0 1 NETDOM.INI
  CCL 0 1 NETNODES.INI
  CCL 0 1 INSTALL.BAT
  CCL 0 1 NETFINST.EXE
  CCL 0 1 INSTALL.INI
  CCL 0 1 WININST.HLP
  CL 0 1 APCKINST.DLL
;Screen Capture GUI
;NULL Manager
; CL 0 1 SAVEG.EXE
; CL 0 1 SAVEG.HLP

```

This INSTALL.INI will create a Netfinity Manager installation configuration that also installs Advanced System Management, Capacity Manager, Remote Workstation Control, and Netfinity Manager World Wide Web enhancement.

The second section contains the names of the CD that this installation script will use.

The third section contains the list of options that can be installed. These are the options that are selected by the choices in the first section. The options are consecutively numbered starting at 1, so any inserted options will change the number of all following options. Each option uses the following format:

```

Option Name
Dll-entripoint
  option file
  option file
  ...
install command
install command
  ...

```

Option Name
An identifying comment by the installation program. All options must have a different Option Name. This is used only for identification.

Dll-entripoint
Used to determine whether an option is valid for a given target machine. In most cases, it should be the reserved string "NULL."

The easiest way to customize an installation is to simply put a semicolon in front of any service that you want to remove from the installation.

To add a line item in a specific section, add all the necessary item information in the format shown in the following example.

Before:

```
Screen Capture GUI
NULL Manager
  CL 0 1 SAVEG.EXE
  CL 0 1 SAVEG.HLP
```

After:

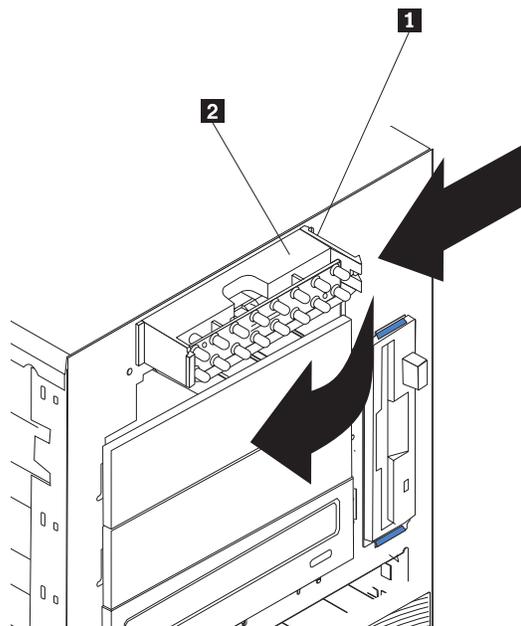
```
Screen Capture GUI
NULL Manager
  CL 0 1 SAVEG.EXE
  CL 0 1 SAVEG.HLP
  CL 0 1 CUSTOM.INI
```

FRU information (service only)

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

Note: Before performing any removals, read “Safety information” on page 149 and “Before you begin” on page 47.

Removing the external LED card

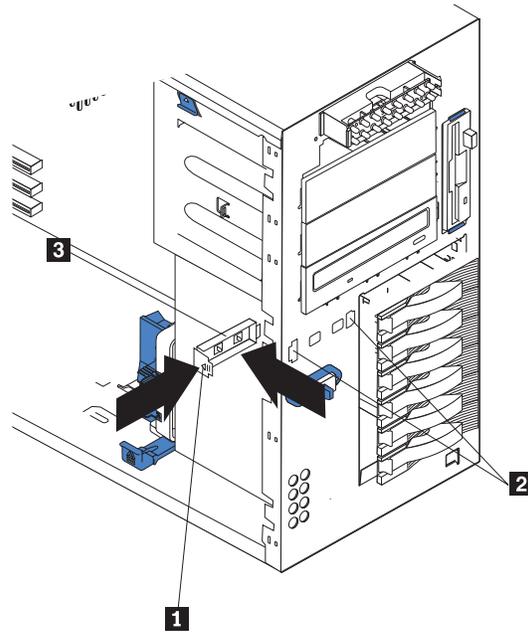


- 1** Tab
- 2** External LED card

To remove the external LED card, do the following:

1. Power off the server.
2. Disconnect all external cables.
3. Remove the cover. See “Removing the cover, door, and bezel” on page 48.
4. Remove the blower fan assembly. See “Replacing a fan assembly” on page 69.
5. Disconnect cables.
6. Press the arrow on the tab **1** to release the bracket.
7. Rotate the LED card **2** away from the front bezel to slide the card out of the slot.

Removing the power reset card

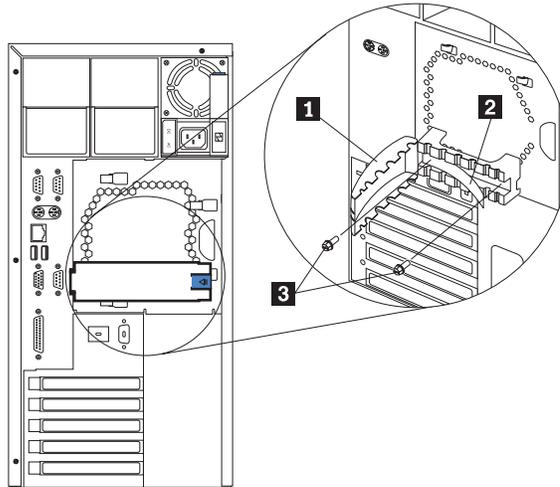


- 1** Tab
- 2** Slots (2)
- 3** Power reset card

To remove the on/off reset board:

1. Power off the server
2. Disconnect cables.
3. Press the arrow on the tab **1** to release.
4. Gently pull the power reset card **3** out of slots **2** to remove from the front panel.

Removing the rear cable bracket

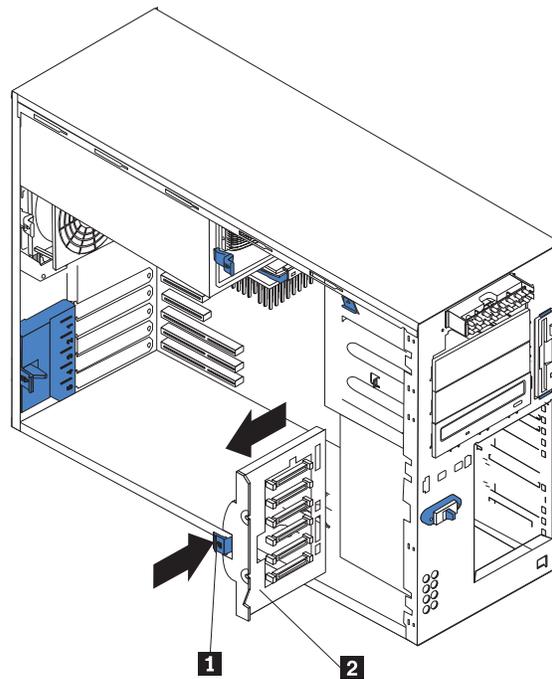


- 1** Rear cable bracket
- 2** Adhesive strip
- 3** Screws (2)

To remove the on/off reset board:

1. Power off the server
2. Disconnect cables.
3. Press the arrow on the tab of the rear cable bracket **1** to release the bracket arm.
4. Carefully peel away the adhesive strip **2**.
5. Remove the screws **3**.
6. Gently pull the rear cable bracket **1** to remove.

Removing the DASD backplane assembly

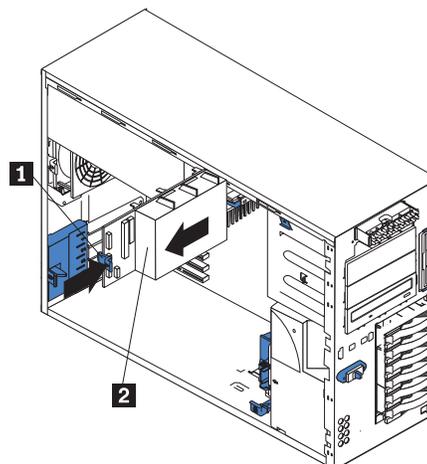


- 1** Tab
- 2** DASD backplane

To remove the DASD backplane assembly:

1. Power off the server.
2. Disconnect all external cables from the server.
3. Remove the cover. See “Removing the cover, door, and bezel” on page 48.
4. Disconnect cable.
5. Press the arrow on the tab **1** to release the backplane.
6. Carefully slide out the DASD backplane **2** to remove.

Removing the power supply backplane

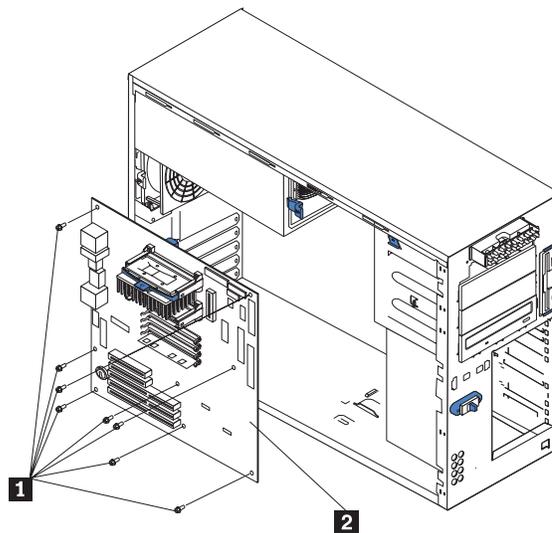


- 1** Tab
- 2** Power supply backplane

To remove the power supply backplane:

1. Power off the server.
2. Disconnect all external cables from the server.
3. Remove the cover. See “Removing the cover, door, and bezel” on page 48.
4. Disconnect cables from the backplane.
5. Press the arrow on the tab **1** to release the backplane.
6. Slide out the power supply backplane **2** to remove.

Removing the system board



- 1** Screws (9)
- 2** System Board

To remove the system board:

1. Power off the server.
2. Disconnect all external cables from the server.
3. Remove the cover. See “Removing the cover, door, and bezel” on page 48.
4. Remove the rear air flow fan. See “Replacing a fan assembly” on page 69.
5. Remove the DASD backplane assembly. See “Removing the DASD backplane assembly” on page 122.”
6. Remove the power supply backplane. See “Removing the power supply backplane” on page 122.”
7. Disconnect the system board cables.
8. Remove the screws (9) **1**.
9. Gently pull out the system board **2** to remove.

Symptom-to-FRU index

This index supports xSeries 230 servers. The Symptom-to-FRU lists symptoms, errors, and the possible causes. The most likely cause is listed first. Use this Symptom-to-FRU index to help you decide which FRUs to have available when servicing the computer.

The POST BIOS displays POST error codes and messages on the screen.

Beep Symptoms

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

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

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

Beep/Symptom	FRU/Action
1-1-2 (Processor register test failed)	<ol style="list-style-type: none">1. Optional Processor (if installed)2. Processor
1-1-3 (CMOS write/read test failed)	<ol style="list-style-type: none">1. Battery2. System Board
1-1-4 (BIOS ROM checksum failed)	<ol style="list-style-type: none">1. System Board
1-2-1 (Programmable Interval Timer failed)	<ol style="list-style-type: none">1. System Board
1-2-2 (DMA initialization failed)	<ol style="list-style-type: none">1. System Board
1-2-3 (DMA page register write/read failed)	<ol style="list-style-type: none">1. System Board
1-2-4 (RAM refresh verification failed)	<ol style="list-style-type: none">1. DIMM2. System Board
1-3-1 (1st 64K RAM test failed)	<ol style="list-style-type: none">1. DIMM2. System Board
1-3-2 (1st 64K RAM parity test failed)	<ol style="list-style-type: none">1. DIMM2. Processor3. System Board
2-1-1 (Secondary DMA register failed)	<ol style="list-style-type: none">1. System Board

Beep/Symptom	FRU/Action
2-1-2 (Primary DMA register failed)	1. System Board
2-1-3 (Primary interrupt mask register failed)	1. System Board
2-1-4 (Secondary interrupt mask register failed)	1. System Board
2-2-2 (Keyboard controller failed)	1. System Board
2-2-3 (CMOS power failure and checksum checks failed)	1. Battery 2. System Board
2-2-4 (CMOS configuration into validation failed)	1. Battery 2. System Board
2-3-1 (Screen initialization failed)	1. Jumper on J14 2. System Board
2-3-2 (Screen memory failed)	1. System Board
2-3-3 (Screen retrace failed)	1. System Board
2-3-4 (Search for video ROM failed)	1. System Board
2-4-1 (Search for video ROM failed)	1. System Board
3-1-1 (Timer tick interrupt failed)	1. System Board
3-1-2 (Interval timer channel 2 failed)	1. System Board
3-1-3 (RAM test failed above address OFFFFH)	1. DIMM 2. System Board
3-1-4 (Time-Of-Day clock failed)	1. Battery 2. System Board
3-2-1 (Serial port failed)	1. System Board
3-2-2 (Parallel port failed)	1. System Board
3-2-4 (Failure comparing CMOS memory size against actual)	1. DIMM 2. System Board 3. Battery
3-3-1 (Memory size mis-match occurred; see "Memory Settings" on page 34)	1. DIMM 2. System Board 3. Battery
3-3-2 (Critical SMBUS error occurred)	1. Disconnect the server power cord from outlet, wait 30 seconds and retry. 2. System Board 3. DIMMs 4. DASD Backplane 5. Power Supply 6. Power Supply Backplane 7. 12C Cable

Beep/Symptom	FRU/Action
3-3-3 (No operational memory in system)	<ol style="list-style-type: none"> 1. Install or reseal the memory modules, then do a 3 boot reset. See “Configuring the server” on page 31 2. DIMMs 3. System Board
Two Short Beeps (Information only, the configuration has changed)	<ol style="list-style-type: none"> 1. Run Diagnostics 2. Run Configuration/Setup
Three Short Beeps	<ol style="list-style-type: none"> 1. DIMM 2. System Board
One Continuous Beep	<ol style="list-style-type: none"> 1. Processor 2. Optional Processor (if installed) 3. System Board
Repeating Short Beeps	<ol style="list-style-type: none"> 1. Keyboard 2. Repeating Board
One Long and One Short Beep	<ol style="list-style-type: none"> 1. Video adapter (if present) 2. System Board
One Long and Two Short Beeps	<ol style="list-style-type: none"> 1. Video adapter (if present) 2. System Board
Two Long and Two Short Beeps	<ol style="list-style-type: none"> 1. Video adapter

No Beep symptoms

No Beep Symptom	FRU/Action
No beep and the system operates correctly.	<ol style="list-style-type: none"> 1. Check speaker cables 2. Speaker 3. System Board
No Beeps occur after successfully completing POST (The Power-On Status is disabled.)	<ol style="list-style-type: none"> 1. Run Configuration/Setup, set the Start Options Power-On Status to enable. 2. Check speaker connection 3. Speaker 4. System Board
No ac power (Power supply ac LED is off)	<ol style="list-style-type: none"> 1. Check the power cord. 2. Power Supply (If two are installed, swap them to determine if one is defective.) 3. Power Backplane 4. Hot-Swap Power AC Inlet Box
No beep and no video	<ol style="list-style-type: none"> 1. See “Undetermined Problems” on page 143
System will not power-up (Power supply ac LED is on)	<ol style="list-style-type: none"> 1. See “Power supply LED errors” on page 133

Information panel system error LED

The system error LED is turned on when an error is detected. If the system error LED is on, remove the cover and check the diagnostic panel LEDs (found in the upper right corner of the processor). The following is a complete list of diagnostic panel LEDs followed by the FRU/Action for correcting the problem.

Note: If a diagnostic panel LED is on and the information LED panel system error LED is off, there is probably an LED problem. Run LED diagnostics.

Notes:

1. To locate the LEDs on the system board see “System board layout” on page 41.
2. Check the System Error Log for additional information before replacing a FRU.
3. The DIMM error LEDs, processor error LEDs, and VRM error LEDs turn off when the system is powered down.

Diagnostic Panel LED	FRU/Action
All LEDs off (Check System Error Log for error condition, then clear System Error Log when the problem is found.)	<ol style="list-style-type: none"> 1. System Error Log is 75% full; clear the log. 2. PFA alert; check Netfinity log for failure; clear PFA alert; remove AC power for at least 20 seconds, reconnect, then power up system. 3. Run Information Panel diagnostics.
CPU LED on (The LED next to the failing CPU should be on.)	<ol style="list-style-type: none"> 1. Processor 1 or 2. 2. System Board.
VRM LED on (The LED next to the failing VRM should be on.)	<ol style="list-style-type: none"> 1. Voltage regulator module indicated by the VRM LED on the system board that is turned on. 2. Processor indicated by the Processor LED. 3. System Board.
DASD1 LED on (The LED located next to the drive bay that the failing drive is installed in will be turned on. Check amber drive LED for failing hard drive.)	<ol style="list-style-type: none"> 1. Be sure the fans are operating correctly and the air flow is good. 2. Failing drive. SCSI channel A has failed (This is the SCSI channel for the hot-swap hard disk drives). 3. SCSI Backplane.
DASD2 LED on (The LED located next to the drive bay that the failing drive is installed in will be turned on. Check amber drive LED for failing hard drive.)	<ol style="list-style-type: none"> 1. Be sure the fans are operating correctly and the air flow is good. 2. Failing drive. SCSI channel B has failed (This is the channel for optional CSI devices installed in the non-hot-swap bays). 3. SCSI Backplane.
FAN LED on	<ol style="list-style-type: none"> 1. Check individual fan LEDs. 2. Replace respective fan. 3. Fan Cable. 4. System Board. 5. Power Backplane Board.
MEM LED on (The LED next to the failing DIMM is on.)	<ol style="list-style-type: none"> 1. System Board. 2. Failing DIMM in slot J1-J4.
NMI LED on	<ol style="list-style-type: none"> 1. Reboot the system. 2. Check the System Error Log.
PCI A LED on	<ol style="list-style-type: none"> 1. PCI Card in slot 5. 2. Remove all PCI adapters from slots 1-5. 3. System Board.

Diagnostic Panel LED	FRU/Action
PCI B LED on	<ol style="list-style-type: none"> 1. Card in slots 3-5. 2. Remove all PCI adapters from slots 1-5. 3. System Board.
PCI C LED on	<ol style="list-style-type: none"> 1. Remove all PCI adapters from slots 1-5. 2. System Board.
PS1 LED on	<ol style="list-style-type: none"> 1. Check the DC Good LED on power supply 1. If off, replace power supply 1. 2. Power Backplane.
PS2 LED on	<ol style="list-style-type: none"> 1. Check the DC Good LED on power supply 2. If off, replace power supply 2. 2. Power Backplane.
OVER LED on	<ol style="list-style-type: none"> 1. Install an optional additional power supply, or remove optional devices from the server.
SMI LED on	<ol style="list-style-type: none"> 1. Reboot the system.
TEMP LED on (Look at test cases.)	<ol style="list-style-type: none"> 1. Ambient temperature must be within normal operating specifications. See "Features and specifications" on page 3. 2. Ensure fans are operating correctly. 3. Examine System Error Log. <ol style="list-style-type: none"> a. System over recommended temperature <ol style="list-style-type: none"> 1) Information LED Panel b. DASD over recommended temperature (DASD LED also on) <ol style="list-style-type: none"> 1) Overheating hard drive 2) DASD Backplane c. System over recommended temperature for CPU X (where X is CPU 1, 2, 3, or 4) (CPU LED also on) <ol style="list-style-type: none"> 1) CPU X 2) System Board 4. If the CPU LED on the diagnostics panel is also on, one of the microprocessors has caused the error. 5. System Board

Diagnostic error codes

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

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

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

Error Code/Symptom	FRU/Action
001-XXX-000 (Failed core tests)	1. System Board
001-XXX-001 (Failed core tests)	1. System Board

Error Code/Symptom	FRU/Action
001-250-000 (Failed System Board ECC)	1. System Board
001-250-001 (Failed Processor Board ECC)	1. System Board
005-XXX-000 (Failed Video test)	1. System Board
011-XXX-000 (Failed COM1 Serial Port test)	1. System Board
011-XXX-001 (Failed COM2 Serial Port test)	1. System Board
014-XXX-000 (Failed Parallel Port test)	1. System Board
015-XXX-001 (Failed USB test)	1. System Board
020-XXX-000 (Failed PCI Interface test)	1. System Board
020-XXX-001 (Failed Hot-Swap Slot 1 PCI Latch test)	1. PCI Hot-Swap Latch Assembly 2. System Board
020-XXX-002 (Failed Hot-Swap Slot 2 PCI Latch test)	1. PCI Hot-Swap Latch Assembly 2. System Board
020-XXX-003 (Failed Hot-Swap Slot 3 PCI Latch test)	1. PCI Hot-Swap Latch Assembly 2. System Board
020-XXX-004 (Failed Hot-Swap Slot 4 PCI Latch test)	1. PCI Hot-Swap Latch Assembly 2. System Board
030-XXX-000 (Failed Internal SCSI interface test)	1. System Board
030-XXX-00N (Failed SCSI test on PCI slot N. Check system error log before replacing a FRU.)	1. Adapter
035-XXX-099	1. No adapters were found. 2. If adapter is installed re-check connection.
035-XXX-S99 (Failed RAID test on PCI slot S. Check System Error Log before replacing a FRU.)	1. Cable 2. SCSI Backplane 3. Adapter
035-XXX-SNN (Check System Error Log before replacing a FRU. NN = SCSI ID of failing fixed disk.)	1. Fixed Disk with SCSI ID NN on RAID adapter in PCI slot S.
035-253-S99 (RAID adapter initialization failure)	1. ServeRAID Adapter in slot S is not configured properly. Obtain the basic and extended configuration status and refer to the ServeRAID Hardware Maintenance Manual for more information. 2. Cable 3. SCSI Backplane 4. Adapter
075-XXX-000 (Failed Power Supply test)	1. Power Supply
089-XXX-001 (Failed Microprocessor test)	1. VRM 1 2. Microprocessor 1
089-XXX-002 (Failed Optional Microprocessor test)	1. VRM 2 2. Microprocessor 2

Error Code/Symptom	FRU/Action
165-XXX-000 (Failed Service Processor test)	<ol style="list-style-type: none"> 1. System Board. Before replacing the System Board, ensure that System Board jumper J45 is not installed (the default) when the error occurs. 2. Power Backplane 3. Hot-Swap Drive Backplane
180-XXX-000 (Diagnostics LED failure)	<ol style="list-style-type: none"> 1. Run Diagnostic LED test for the failing LED. 2. Power Switch Assembly
180-XXX-001 (Failed information LED panel test)	<ol style="list-style-type: none"> 1. Information LED Panel 2. Diagnostic LED Panel
180-XXX-002 (Failed Diagnostics LED Panel test)	<ol style="list-style-type: none"> 1. Diagnostics LED Panel 2. Power Switch Assembly
180-XXX-003 (Failed System Board LED test)	<ol style="list-style-type: none"> 1. System Board
180-XXX-004 (Failed Processor Board LED test)	<ol style="list-style-type: none"> 1. System Board
180-XXX-005 (Failed SCSI Backplane LED test)	<ol style="list-style-type: none"> 1. SCSI Backplane 2. SCSI Backplane Cable 3. System Board
180-XXX-006 (Memory Board LED test)	<ol style="list-style-type: none"> 1. Memory 2. System Board
201-XXX-0NN (Failed Memory test, see "Memory Settings" on page 34.)	<ol style="list-style-type: none"> 1. DIMM Location DIMM1 - DIMM4 where NN = 1 = DIMM2, 2 = DIMM1, 3 = DIMM4, 4 = DIMM3. 2. System Board
201-XXX-999 (Multiple DIMM failure, see error text.)	<ol style="list-style-type: none"> 1. See error text for failing DIMMs 2. System Board
202-XXX-001 (Failed System Cache test)	<ol style="list-style-type: none"> 1. VRM 1 2. Microprocessor 1
202-XXX-002 (Failed System Cache test)	<ol style="list-style-type: none"> 1. VRM 2 2. Microprocessor 2
206-XXX-000 (Failed Diskette Drive test)	<ol style="list-style-type: none"> 1. Cable 2. Diskette Drive 3. System Board
215-XXX-000 (Failed IDE CD-ROM test)	<ol style="list-style-type: none"> 1. CD-ROM Drive Cables 2. CD-ROM Drive 3. System Board
217-XXX-000 (Failed BIOS Fixed Disk test) Note: If RAID is configured, the fixed disk number refers to the RAID logical array.	<ol style="list-style-type: none"> 1. Fixed Disk 1
217-XXX-001 (Failed BIOS Fixed Disk test) Note: If RAID is configured, the fixed disk number refers to the RAID logical array.	<ol style="list-style-type: none"> 1. Fixed Disk 2
217-XXX-002 (Failed BIOS Fixed Disk test) Note: If RAID is configured, the fixed disk number refers to the RAID logical array.	<ol style="list-style-type: none"> 1. Fixed Disk 3

Error Code/Symptom	FRU/Action
217-XXX-003 (Failed BIOS Fixed Disk test) Note: If RAID is configured, the fixed disk number refers to the RAID logical array.	1. Fixed Disk 4
217-XXX-004 (Failed BIOS Fixed Disk test) Note: If RAID is configured, the fixed disk number refers to the RAID logical array.	1. Fixed Disk 5
264-XXX-0NN (Failed Tape Drive test)	<ol style="list-style-type: none"> 1. Tape Cartridge, if user executed the Read/Write Tape Drive test (XXX = 256) 2. SCSI or Power Cable connected to tape drive with SCSI ID NN. 3. Tape Drive with SCSI ID NN (Refer to the Help and Service Information appendix of the tape drive's User Guide). 4. System Board or SCSI Controller. (Run SCSI Controller Diagnostic to determine if the SCSI bus is functioning properly.)
264-XXX-999 (Errors on multiple tape drives, see error text for more info)	1. See error messages/text in the PC Doctor error log for detailed information on each individual tape drive error.
301-XXX-000 (Failed Keyboard test)	1. Keyboard
405-XXX-000 (Failed Ethernet test on controller on the System Board)	<ol style="list-style-type: none"> 1. Verify that Ethernet is not disabled in BIOS. 2. System Board
405-XXX-00N (Failed Ethernet test on adapter in PCI slot N)	<ol style="list-style-type: none"> 1. Adapter in PCI slot N. 2. System Board
415-XXX-000 (Failed Modem test)	<ol style="list-style-type: none"> 1. Cable 2. Modem Note: Ensure modem is present and attached to server. 3. System Board

Error symptoms

Error Symptom	FRU/Action
CD is not working properly.	<ol style="list-style-type: none"> 1. Clean the CD. 2. Run CD-ROM Diagnostic 3. CD-ROM Drive
CD-ROM drive tray is not working. (The server must be powered-on.)	<ol style="list-style-type: none"> 1. Insert the end of a paper clip into the manual tray-release opening. 2. Run CD-ROM Diagnostic 3. CD-ROM Drive
CD-ROM drive is not recognized.	<ol style="list-style-type: none"> 1. Run Configuration/Setup, enable primary IDE channel. 2. Check cables and jumpers. 3. Check for correct device driver. 4. System Board 5. Run CD-ROM diagnostics 6. CD-ROM Drive

Error Symptom	FRU/Action
Power switch does not work and reset button does work.	<ol style="list-style-type: none"> 1. Verify that the power-on override switch 5 of SW1 is set to Off (see "System board switches and jumpers" on page 44). 2. Power Switch Assembly 3. System Board
Diskette drive in-use light stays on, or the system bypasses the diskette drive, or the diskette drive does not work.	<ol style="list-style-type: none"> 1. If there is a diskette in the drive, verify that: <ol style="list-style-type: none"> a. The diskette drive is enabled in the Configuration/Setup utility program. b. The diskette is good and not damaged. (Try another diskette if you have one.) c. The diskette is inserted correctly in the drive. d. The diskette contains the necessary files to start the server. e. The software program is OK. f. Cable is installed correctly (proper orientation) 2. Run Diskette Drive Diagnostics. 3. Cable 4. Diskette Drive 5. System Board
Monitor problems (general). Some IBM monitors have their own self-tests. If you suspect a problem with the monitor, refer to the information that comes with the monitor for adjusting and testing instructions.	<ol style="list-style-type: none"> 1. Monitor 2. Run Video Diagnostics. If diagnostics pass, the problem may be a video driver. 3. Display Adapter / System Board

Power supply LED errors

Use the power supply LED information on the following page to troubleshoot power supply problems.

The minimum configuration required for the DC Good light to come on is:

- Power Supply
- Power Backplane
- System Board (with power-on override switch (switch 5 of SW1) set to On; see "System board switches and jumpers" on page 44)

Note: The power-on override switch (switch 5 of SW1) is intended for problem determination purposes only. Use of this switch will cause POST errors.

AC Good LED	DC Good LED	Description	FRU/Action
Off	Off	No power to system or ac problem.	<ol style="list-style-type: none"> 1. Check ac power to system. 2. Power Supply 3. Power Backplane 4. Power AC Inlet Box

AC Good LED	DC Good LED	Description	FRU/Action
On	Off	Standby mode or dc problem.	<ol style="list-style-type: none"> 1. Check system board cable connectors J4 and J15 (system board to power backplane). Set power-on override switch (switch 5 of SW1) to On position (see "System board switches and jumpers" on page 44). If the DC Good LED comes on, check the following components: <ol style="list-style-type: none"> a. Power Switch Assembly b. System Board <p>Note: The power-on override switch (switch 5 of SW1) is intended for problem determination purposes only. Use of this switch will cause POST errors.</p> 2. Remove the adapters and disconnect the cables and power connectors to all internal and external devices. Power-on the system. If the DC Good LED comes on, replace the adapters and devices one at a time until you isolate the problem. 3. Power Supply 4. Power Backplane 5. System Board
On	On	Power is OK.	N/A

POST error codes

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

Error Code/Symptom	FRU/Action
062 (Three consecutive boot failures using the default configuration.)	<ol style="list-style-type: none"> 1. Run Configuration/Setup 2. Battery 3. System Board 4. Processor
101, 102 (System and processor error)	<ol style="list-style-type: none"> 1. System Board
106 (System and processor error)	<ol style="list-style-type: none"> 1. System Board
111 (Channel check error)	<ol style="list-style-type: none"> 1. Failing ISA Adapter 2. Memory DIMM 3. System Board
114 (Adapter read-only memory error)	<ol style="list-style-type: none"> 1. Failing Adapter 2. Run Diagnostics
129 (Internal cache error)	<ol style="list-style-type: none"> 1. Processor 2. Optional Processor (if installed) 3. System Board
151 (Real time clock error)	<ol style="list-style-type: none"> 1. Run Diagnostics 2. Battery 3. System Board

Error Code/Symptom	FRU/Action
161 (Real time clock battery error)	<ol style="list-style-type: none"> 1. Run Configuration/Setup 2. Battery 3. System Board
162 (Device Configuration Error) Note: Be sure to load the default settings and any additional desired settings; then, save the configuration	<ol style="list-style-type: none"> 1. Run Configuration/Setup 2. Battery 3. Failing Device 4. System Board
163 (Real-Time Clock error)	<ol style="list-style-type: none"> 1. Run Configuration/Setup 2. Battery 3. System Board
164 (Memory configuration changed, see "Memory settings" on page 34.)	<ol style="list-style-type: none"> 1. Run Configuration/Setup 2. DIMM 3. System Board
175 (Hardware error)	<ol style="list-style-type: none"> 1. System Board
176 (Computer cover or cable cover was removed without a key being used)	<ol style="list-style-type: none"> 1. Run Configuration/Setup 2. System Board 3. C2 Security Switch
177, 178 (Security hardware error)	<ol style="list-style-type: none"> 1. Run Configuration/Setup 2. System Board
184 (Power-on password corrupted)	<ol style="list-style-type: none"> 1. Run Configuration/Setup 2. System Board
185 (Drive startup sequence information corrupted)	<ol style="list-style-type: none"> 1. Run Configuration/Setup 2. System Board
186 (Security hardware control logic failed)	<ol style="list-style-type: none"> 1. Run Configuration/Setup 2. System Board
187 (VPD serial number not set.)	<ol style="list-style-type: none"> 1. Set serial number in Setup 2. System Board
188 (Bad EEPROM CRC #2)	<ol style="list-style-type: none"> 1. Run Configuration/Setup 2. System Board
189 (An attempt was made to access the server with invalid passwords)	<ol style="list-style-type: none"> 1. Run Configuration/Setup, enter the administrator password
201 (Memory test error, see "Memory Settings" on page 34.) If the server does not have the latest level of BIOS installed, update the BIOS to the latest level and run the diagnostic program again.	<ol style="list-style-type: none"> 1. DIMM 2. System Board
229 (Cache error)	<ol style="list-style-type: none"> 1. Processor 2. Optional Processor (if installed) 3. System Board
262 (DRAM parity configuration error)	<ol style="list-style-type: none"> 1. Run Configuration/Setup 2. Battery 3. System Board

Error Code/Symptom	FRU/Action
289 (DIMM has been disabled by the user or system, see "Memory Settings" on page 34.)	<ol style="list-style-type: none"> 1. Run Configuration/Setup, if disabled by user 2. Disabled DIMM, if not disabled by user. 3. System Board
301 (Keyboard or keyboard controller error)	<ol style="list-style-type: none"> 1. Keyboard 2. System Board
303 (Keyboard controller error)	<ol style="list-style-type: none"> 1. System Board 2. Keyboard
602 (Invalid diskette boot record)	<ol style="list-style-type: none"> 1. Diskette 2. Diskette Drive 3. Cable 4. System Board
604 (Diskette drive error)	<ol style="list-style-type: none"> 1. Run Configuration/Setup and Diagnostics 2. Diskette Drive 3. Drive Cable 4. System Board
605 (Unlock failure)	<ol style="list-style-type: none"> 1. Diskette Drive 2. Drive Cable 3. System Board
662 (Diskette drive configuration error)	<ol style="list-style-type: none"> 1. Run Configuration/Setup and Diagnostics 2. Diskette Drive 3. Drive Cable 4. System Board
762 (Coprocessor configuration error)	<ol style="list-style-type: none"> 1. Run Configuration/Setup 2. Battery 3. Processor
962 (Parallel port error)	<ol style="list-style-type: none"> 1. Disconnect external cable on parallel port. 2. Run Configuration/Setup 3. System Board
11XX (System board serial port 1 or 2 error)	<ol style="list-style-type: none"> 1. Disconnect external cable on serial port. 2. Run Configuration/Setup 3. System Board
0001200 (Machine check architecture error)	<ol style="list-style-type: none"> 1. Processor 2. Optional Processor 3. System Board
0001295 (ECC circuit check)	<ol style="list-style-type: none"> 1. System Board
1301 (I ² C cable to front panel not found)	<ol style="list-style-type: none"> 1. Cable 2. Front Panel 3. Power Switch Assembly 4. System Board

Error Code/Symptom	FRU/Action
1302 (I ² C cable from system board to power on and reset switches not found)	<ol style="list-style-type: none"> 1. Cable 2. Power Switch Assembly 3. System Board
1303 (I ² C cable from system board to power backplane not found)	<ol style="list-style-type: none"> 1. Cable 2. Power Backplane 3. System Board
1304 (I ² C cable to diagnostic LED board not found)	<ol style="list-style-type: none"> 1. Cable 2. Diagnostic LED Board 3. Power Switch Assembly 4. System Board
1600 (The Service Processor is not functioning) Do the following before replacing a FRU: <ol style="list-style-type: none"> 1. Ensure that a jumper is not installed on J51. 2. Remove the ac power to the system, wait 20 seconds; then, re-connect the ac power. Wait 30 seconds; then, power-on the system. 	<ol style="list-style-type: none"> 1. System Board
1601 (The system is able to communicate to the Service Processor, but the Service Processor failed to respond at the start of POST.) Do the following before replacing a FRU: <ol style="list-style-type: none"> 1. Remove the ac power to the system, wait 20 seconds; then, re-connect the ac power. Wait 30 seconds; then, power-on the system. 2. Flash update the Service Processor. 	<ol style="list-style-type: none"> 1. System Board
1762 (Fixed Disk Configuration error)	<ol style="list-style-type: none"> 1. Fixed Disk Cables 2. Run Configuration/Setup 2 3. Fixed Disk Adapter 4. Fixed Disk Drive 5. SCSI Backplane 6. System Board
178X (Fixed Disk error)	<ol style="list-style-type: none"> 1. Fixed Disk Cables 2. Run Diagnostics 3. Fixed Disk Adapter 4. Fixed Disk Drive 5. System Board
1800 (No more hardware interrupt available for PCI adapter)	<ol style="list-style-type: none"> 1. Run Configuration/Setup 2. Failing Adapter 3. System Board

Error Code/Symptom	FRU/Action
1962 (Drive does not contain a valid boot sector)	<ol style="list-style-type: none"> 1. Verify a bootable operating system is installed. 2. Run Diagnostics 3. Hard Disk Drive 4. SCSI Backplane 5. Cable 6. System Board
2400 (Video controller test failure)	<ol style="list-style-type: none"> 1. Video Adapter (if installed) 2. System Board
2462 (Video memory configuration error)	<ol style="list-style-type: none"> 1. Video Adapter (if installed) 2. System Board
5962 (IDE CD-ROM configuration error)	<ol style="list-style-type: none"> 1. Run Configuration/Setup 2. CD-ROM Drive 3. CD-ROM Power Cable 4. IDE Cable 5. System Board 6. Battery
8603 (Pointing Device Error)	<ol style="list-style-type: none"> 1. Pointing Device 2. System Board
00019501 (Processor 1 is not functioning - check VRM and processor LEDs)	<ol style="list-style-type: none"> 1. VRM 1, VRM 2 2. Processor 1 3. System Board
00019502 (Processor 2 is not functioning - check VRM and processor LEDs)	<ol style="list-style-type: none"> 1. VRM 2 2. Processor 2 3. System Board
00019701 (Processor 1 failed BIST)	<ol style="list-style-type: none"> 1. Processor 1 2. System Board
00019702 (Processor 2 failed BIST)	<ol style="list-style-type: none"> 1. Processor 2 2. System Board
00180100 (No room for PCI option ROM)	<ol style="list-style-type: none"> 1. Run Configuration/Setup 2. Failing Adapter 3. System Board
00180200 (No more I/O space available for PCI adapter)	<ol style="list-style-type: none"> 1. Run Configuration/Setup 2. Failing Adapter 3. System Board
00180300 (No more memory (above 1MB for PCI adapter)	<ol style="list-style-type: none"> 1. Run Configuration/Setup 2. Failing Adapter 3. System Board
00180400 (No more memory (below 1MB for PCI adapter)	<ol style="list-style-type: none"> 1. Run Configuration/Setup 2. Move the failing adapter to slot 1 or 2 3. Failing Adapter 4. System Board

Error Code/Symptom	FRU/Action
00180500 (PCI option ROM checksum error)	<ol style="list-style-type: none"> 1. Remove Failing PCI Card 2. System Board
00180600 (PCI built-in self test failure) PCI to PCI Bridge error	<ol style="list-style-type: none"> 1. Run Configuration/Setup 2. Move the failing adapter to slot 1 or 2 3. Failing Adapter 4. System Board
00180700, 00180800 (General PCI error)	<ol style="list-style-type: none"> 1. System Board 2. PCI Card
01295085 (ECC checking hardware test error)	<ol style="list-style-type: none"> 1. System Board 2. Processor
01298001 (No update data for processor 1)	<ol style="list-style-type: none"> 1. Ensure all processors are the same cache size. 2. Processor 1
01298002 (No update data for processor 2)	<ol style="list-style-type: none"> 1. Ensure all processors are the same cache size. 2. Processor 2
01298101 (Bad update data for processor 1)	<ol style="list-style-type: none"> 1. Ensure all processors are the same cache size. 2. Processor 1
01298102 (Bad update data for processor 2)	<ol style="list-style-type: none"> 1. Ensure all processors are the same cache size. 2. Processor 2
I9990301 (Fixed boot sector error)	<ol style="list-style-type: none"> 1. Hard Disk Drive 2. SCSI Backplane 3. Cable 4. System Board
I9990305 (Fixed boot sector error, no operating system installed)	<ol style="list-style-type: none"> 1. Install operating system to hard disk drive.
I9990650 (AC power has been restored)	<ol style="list-style-type: none"> 1. Check cable 2. Check for interruption of power supply 3. Power Cable

SCSI error codes

Error Code	FRU/Action
<p>All SCSI Errors One or more of the following might be causing the problem:</p> <ul style="list-style-type: none"> • A failing SCSI device (adapter, drive, controller) • An improper SCSI configuration or SCSI termination jumper setting • Duplicate SCSI IDs in the same SCSI chain • A missing or improperly installed SCSI terminator • A defective SCSI terminator • An improperly installed cable • A defective cable 	<ol style="list-style-type: none"> 1. External SCSI devices must be powered-on before you power-on the server. 2. The cables for all external SCSI devices are connected correctly. 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.

Temperature error messages

Message	Action
<p>DASD "X" Over Temperature (level-critical; Direct Access Storage Device bay "X" was over temperature)</p>	<ol style="list-style-type: none"> 1. Ensure system is being properly cooled; see "Temperature checkout" on page 28.
<p>DASD "X" Over recommended Temperature (level-warning; DASD bay "X" had over temperature condition)</p>	<ol style="list-style-type: none"> 1. Ensure system is being properly cooled; see "Temperature checkout" on page 28.
<p>DASD "X" under recommended temperature (level-warning; direct access storage device bay "X" had under temperature condition)</p>	<ol style="list-style-type: none"> 1. Ambient temperature must be within normal operating specifications; (see "Features and specifications" on page 3.)
<p>DASD 1 Over Temperature (level-critical; sensor for DASD1 reported temperature over recommended range)</p>	<ol style="list-style-type: none"> 1. Ensure system is being properly cooled; see "Temperature checkout" on page 28.
<p>Power Supply "X" Temperature Fault (level-critical; power supply "x" had over temperature condition)</p>	<ol style="list-style-type: none"> 1. Ensure system is being properly cooled; see "Temperature checkout" on page 28. 2. Replace Power Supply "X"
<p>System board is over recommended temperature (level-warning; system board is over recommended temperature)</p>	<ol style="list-style-type: none"> 1. Ensure system is being properly cooled; see "Temperature checkout" on page 28. 2. Replace system board
<p>System board is under recommended temperature (level-warning; system board is under recommended temperature)</p>	<ol style="list-style-type: none"> 1. Ambient temperature must be within normal operating specifications; (see "Features and specifications" on page 3.)
<p>System over temperature for CPU "X" (level-warning; CPU "X" reporting over temperature condition)</p>	<ol style="list-style-type: none"> 1. Ensure system is being properly cooled; see "Temperature checkout" on page 28.
<p>System under recommended CPU "X" temperature (level-warning; system reporting under temperature condition for CPU "X")</p>	<ol style="list-style-type: none"> 1. Ambient temperature must be within normal operating specifications; (see "Features and specifications" on page 3.)

Fan error messages

Message	Action
Fan "X" failure (level-critical; fan "X" had a failure)	<ol style="list-style-type: none"> 1. Check connections to fan "X" 2. Replace fan "X"
Fan "X" fault (level-critical; fan "X" beyond recommended RPM range)	<ol style="list-style-type: none"> 1. Check connections to fan "X" 2. Replace fan "X"

Power error messages

Message	Action
Power supply "X" current fault (level-critical; excessive current demand on power supply "X")	<ol style="list-style-type: none"> 1. See "Power checkout" on page 26.
Power supply "X" DC good fault (level-critical; power good signal not detected for power supply "X")	<ol style="list-style-type: none"> 1. Replace power supply "X"
Power supply "X" fan fault (level-critical; fan fault in power supply "X")	<ol style="list-style-type: none"> 1. Replace power supply "X"
Power supply "X" fault (level-critical; overcurrent condition exists)	<ol style="list-style-type: none"> 1. See "Power checkout" on page 26.
Power supply "X" 12V fault (level-critical; overcurrent condition detected)	<ol style="list-style-type: none"> 1. See "Power checkout" on page 26.
Power supply "X" 3.3V fault (level-critical; 3.3V power supply "X" had an error)	<ol style="list-style-type: none"> 1. See "Power checkout" on page 26.
Power supply "X" 5V fault (level-critical; 5V power supply "X" had an error)	<ol style="list-style-type: none"> 1. See "Power checkout" on page 26.
System over recommended "X" current (level-non-critical; system running too much current on that voltage)	<ol style="list-style-type: none"> 1. See "Power checkout" on page 26.
System running non-redundant power (level-non-critical; system does not have redundant power)	<ol style="list-style-type: none"> 1. Add another power supply 2. Remove options from system 3. System can continue to operate without redundancy protection if 1 and 2 above are not followed.
System under recommended voltage for "X" v (level-warning; indicated voltage supply under nominal value; value for "X" can be +12, -12, or +5)	<ol style="list-style-type: none"> 1. Check connections to power subsystem 2. Replace power supply 3. Replace power backplane
System under recommended voltage on 3.3 v (level-warning; 3.3 volt supply under nominal value)	<ol style="list-style-type: none"> 1. Check connections to power subsystem 2. Replace power supply 3. Replace power backplane
System under recommended X current (level-non-critical; system drawing less current than recommended on voltage "X")	<ol style="list-style-type: none"> 1. See "Power checkout" on page 26.
"X" V bus fault (level-critical; overcurrent condition on "X" voltage bus)	<ol style="list-style-type: none"> 1. Check for short circuit on "X" voltage bus 2. See "Power checkout" on page 26.

Message	Action
12V "X" bus fault (level-critical; overcurrent condition on 12 volt "X" voltage bus)	<ol style="list-style-type: none"> 1. Check for short circuit on 12 volt "X" voltage bus 2. See "Power checkout" on page 26.
5V fault (level-critical; overcurrent condition on 5 V subsystem)	<ol style="list-style-type: none"> 1. Check for short circuit on 5 v bus 2. See "Power checkout" on page 26.
240 VA bus fault (level-critical; overcurrent or overvoltage condition in power subsystem)	<ol style="list-style-type: none"> 1. See "Power checkout" on page 26.

System shutdown

Refer to the following tables when experiencing system shutdown related to voltage or temperature problems.

Voltage related system shutdown

Message	Action
System shutoff due to "X" current over max value (level-critical; system drawing too much current on voltage "X" bus)	<ol style="list-style-type: none"> 1. See "Power checkout" on page 26
System shutoff due to "X" current over min value (level-critical; current on voltage bus "X" under minimum value)	<ol style="list-style-type: none"> 1. See "Power checkout" on page 26.
System shutoff due to "X" V over voltage (level-critical; system shutoff due to "X" supply over voltage)	<ol style="list-style-type: none"> 1. Check power supply connectors 2. Replace power supply 3. Replace power backplane
System shutoff due to "X" V under voltage (level-critical system shutoff due to "X" supply under voltage)	<ol style="list-style-type: none"> 1. Check power supply connectors 2. Replace power supply 3. Replace power backplane
System shutoff due to VRM "X" over voltage	<ol style="list-style-type: none"> 1. Replace power supply 2. Replace power supply backplane

Temperature related system shutdown

Message	Action
System shutoff due to board over temperature (level-critical; board is over temperature)	<ol style="list-style-type: none"> 1. Ensure system is being properly cooled, see "Temperature checkout" on page 28. 2. Replace board
System shutoff due to CPU "X" over temperature (level-critical; CPU "X" is over temperature)	<ol style="list-style-type: none"> 1. Ensure system is being properly cooled, see "Temperature checkout" on page 28. 2. Replace CPU "X"
System shutoff due to CPU "X" under temperature (level-critical; CPU "X" is under temperature)	<ol style="list-style-type: none"> 1. Ambient temperature must be within normal operating specifications (see "Features and specifications" on page 3.)

Message	Action
System shutoff due to DASD temperature (sensor X) (level-critical; DASD area reported temperature outside recommended operating range)	1. Ensure system is being properly cooled , see “Temperature checkout” on page 28.
System shutoff due to high ambient temperature (level-critical; high ambient temperature)	1. Ambient temperature must be within normal operating specifications (see “Features and specifications” on page 3.).
System shutoff due to system board under temperature (level-critical; system board is under temperature)	1. Ambient temperature must be within normal operating specifications (see “Features and specifications” on page 3.).

DASD checkout

Message	Action
Hard drive "X" removal detected (level-critical; hard drive "X" has been removed)	1. Information only, take action as appropriate.

Host Built-In Self Test (BIST)

Message	Action
Host BIST fail (level-informational; host's built-in self test failed)	<ol style="list-style-type: none"> 1. Reseat CPU 2. Reseat VRM 3. Replace CPU

Bus fault messages

Message	Action
Failure reading 12C device. Check devices on bus 0.	1. Replace system board
Failure reading 12C device. Check devices on bus 1.	<ol style="list-style-type: none"> 1. Reseat Power Supply 2. Replace Power supply 3. Replace power supply backplane 4. Replace system board
Failure reading 12C device. Check devices on bus 2.	<ol style="list-style-type: none"> 1. Replace DASD backplane 2. Replace system board
Failure reading 12C device. Check devices on bus 3.	1. Replace system board
Failure reading 12C device. Check devices on bus 4.	<ol style="list-style-type: none"> 1. Replace DIMM 2. Replace system board

Undetermined Problems

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

Notes:

1. If you suspect a software mismatch is causing failures (solid or intermittent), be sure to see "Using the SCSISelect utility program" on page 37.
2. A corrupt CMOS can cause undetermined problems.

Check the LEDs on all the power supplies, see "Power supply LED errors" on page 133. If the LEDs indicate the power supplies are working correctly, return here and do the following:

1. Power-off the computer.
2. Be sure the system is cabled correctly.
3. Remove or disconnect the following (one at a time) until you find the failure (power-on the computer and reconfigure each time).

Any external devices

Surge suppressor device (on the computer)

Modem, printer, mouse, or non-IBM devices

Each adapter

Drives

Memory-Modules (Minimum requirement = 512 MB (4x128 MB DIMMs))

Note: Minimum operating requirements are:

- a. 1 Power Supply
 - b. Power Backplane
 - c. System Board
 - d. 1 Microprocessor and VRM
 - e. 3 Terminator Cards
 - f. Memory Module (with a minimum of 1 bank of 128 MB DIMMs)
4. Power-on the computer. If the problem remains, suspect the following FRUs in the order listed:
 - Power Supply
 - Power Backplane
 - System Board

Notes:

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

Parts listing (xSeries 230)

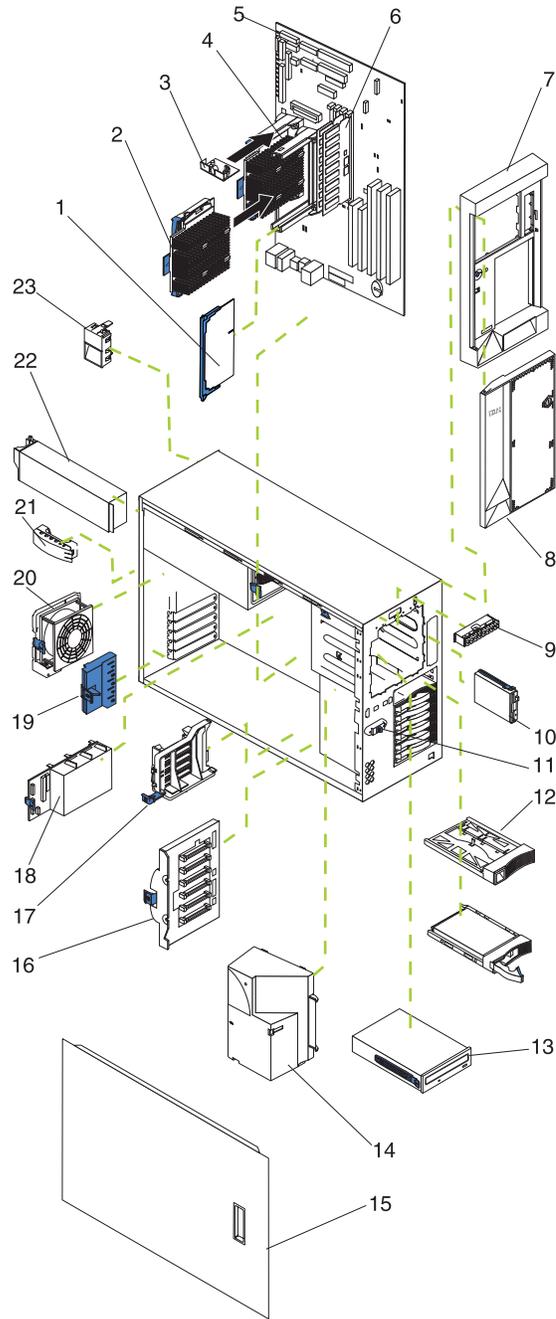


Table 20. System Parts Listing for the xSeries 230 Models 6RY, 61Y

Index	System Part (Model No.)	FRU No.
1	Terminator Card Assembly (All Models)	37L5949
2	1000/133 Processor Assembly (Models 6RY, 61Y)	21P8621
3	Voltage Regulator Module (All Models)	36L8901
4	1000/133 Processor Assembly (Models 6RY, 61Y)	21P8621
5	System Board Assembly (All Models)	09N7844

Table 20. System Parts Listing for the xSeries 230 Models 6RY, 61Y (continued)

Index	System Part (Model No.)	FRU No.
6	128MB Memory DIMM (All Models)	33L3124
7	Bezel, Tower (Model 61Y)	24P0601
7	Bezel, Rack (Model 6RY)	24P0603
8	Door Bezel Assembly (Models 6RY)	24P0615
8	Door Bezel Assembly (Model 61Y)	00N6399
9	External LED Card Assembly (All Models)	37L6773
10	Floppy Drive, 1.44 MB (All Models)	76H4091
11	Power Reset Card Assembly (All Models)	00N6377
12	Hard Disk Drive Filler Blank (All Models)	00N7259
13	CD ROM, 40X (All Models)	09N0881
14	Blower Assembly (All Models)	36L9998
15	Cover Assembly (Model 61Y)	00N6401
15	Cover Assembly (Model 6RY)	00N6403
16	DASD Backplane Assembly (All Models)	00N9557
17	PCI Adapter Card Support Assembly (All Models)	00N7056
18	Power Backplane Card Assembly (All Models)	00N6391
19	PCI Adapter Card Retainer (All Models)	36L9994
20	Rear Fan Assembly (All Models)	36L9995
21	Bracket Rear, Rack Cable (Model 6RY)	00N6419
22	Power Supply, 250 Watt (All Models)	36L8819
23	Power supply Filler (All Models)	00N6405
	Chassis, Tower (Model 61Y)	09N9595
	Chassis, Rack (Model 6RY)	09N9597
	9.1 GB Hard Disk Drive, 7200 RPM	37L6212
	18.2 GB Hard Disk Drive, 7200 RPM	37L6213
	9.1 GB Hard Disk Drive, 10000 RPM	37L6216
	18.2 GB Hard Disk Drive, 10000 RPM	37L6217
	9.1 Hard Disk Drive, Ultra 160 MB	19K0610
	18.2 Hard Disk Drive, Ultra 160 MB	19K0611
	Key Lock Assembly (Model 61Y)	00N6393
	Battery (3V) (All Models)	10L6432
	Power Backplane, Single Supply (All Models)	09N9411
	CD/DASD Slide, Metal (All Models)	12J5681
	5.25" Media Blank Bezel (All Models)	00N6407
	Plastic CD/DASD Slide (2) (All Models)	00N6412
	Floppy Disk Drive Slide (2) (All Models)	00N6413
	Chassis Weldment (All Models)	00N7046
	Keyboard (US) (Model 61Y)	37L2551
	Mouse (Model 61Y)	10L6149
	Miscellaneous Parts Kit (All Models)	00N6421
	Rack Slide Kit (Model 6RY)	00N6417
	Miscellaneous Rack Parts Kit (Models 6RY)	00N6419
	Rack Bracket Assemblies (2) (Model 6RY)	00N6429
	Foot Screw-in (4) (Model 61Y)	00N6411
	Front Bezel Assembly (Model 61Y)	00N7052
	Front Bezel Assembly (Model 6RY)	00N7054
	Cable, Power Backplane to DASD Backplane (All Models)	00N6579
	Cable, Power Backplane to System Board-I2C (All Models)	00N6581
	Cable, Power Backplane to System Board-Signal (All Models)	00N6582
	Cable, Power Backplane to Media (All Models)	00N6583
	Cable, Power Backplane to Processor (All Models)	00N6584
	Cable, LVD SCSI (All Models)	37L0350
	Cable, IDE (All Models)	37L6055
	Cable, Floppy Disk Drive (All Models)	37L6057

Table 20. System Parts Listing for the xSeries 230 Models 6RY, 61Y (continued)

Index	System Part (Model No.)	FRU No.
	Cable, Power Backplane to System Board-Power (All Models)	37L6777
	Power Cord (All Models)	6952301
	Misc Parts Kit (Model 6RY)	20L1450
	5.25" Mounting Bracket (All Models)	12J5681
	LVD SCSI Cable 2-Drop (All Models)	37L0149
	Baffle (All Models)	09N9577

Keyboards

Keyboard	FRU No.
US English	37L2551
French Canadian	37L2552
LA Spanish	37L2553
Arabic	37L2555
Belgium/French	37L2556
Belgium/UK	37L2557
Bulgarian	37L2558
Czech	37L2559
Danish	37L2560
Dutch	37L2561
French	37L2562
German	37L2563
Greek	37L2564
Hebrew	37L2565
Hungarian	37L2566
Korean	02K0901
Iceland	37L2567
Italy	37L2568
Norwegian	37L2569
Polish	37L2570
Portuguese	37L2571
Romanian	37L2572
Russian	37L2573
Serbian/Cyrillic	37L2574
Slavic	37L2575
Spanish	37L2576
Swedish/Finn	37L2577
Swiss, F/G	37L2578
Turkish	37L2579
Turkish	37L2580
UK English	37L2581
Yugosl/Lat.	37L2582
US English-EMEA	37L2583
Chinese/US	37L2585
Thailand	37L2587
French Canadian	37L0913

Power cords

Power cord	FRU No.
China (PRC)	01K9851

Power cord	FRU No.
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, Cyprus, Dubai, Fiji, Ghana, Hong Kong, 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, Czech Republic, Egypt, Finland, France, French Guiana, Germany, Greece, Guinea, Hungary, Iceland, Indonesia, Iran, Ivory Coast, Jordan, Lebanon, Luxembourg, Macau, 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	6952301 (110) 1838574 (220) 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 mobile computer.

General safety

Follow these rules to ensure general safety:

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

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

Electrical safety



CAUTION:

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

Observe the following rules when working on electrical equipment.

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

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

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

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

- Regularly inspect and maintain your electrical hand tools for safe operational condition.
- Do not use worn or broken tools and testers.
- *Never assume* that power has been disconnected from a circuit. First, *check* that it has been powered-off.
- Always look carefully for possible hazards in your work area. Examples of these hazards are moist floors, nongrounded power extension cables, power surges, and missing safety grounds.
- Do not touch live electrical circuits with the reflective surface of a plastic dental mirror. The surface is conductive; such touching can cause personal injury and machine damage.
- Do not service the following parts with the power on when they are removed from their normal operating places in a machine:
 - Power supply units
 - Pumps
 - Blowers and fans
 - Motor generators
 and similar units. (This practice ensures correct grounding of the units.)
- If an electrical accident occurs:
 - Use caution; do not become a victim yourself.
 - Switch off power.
 - Send another person to get medical aid.

Safety inspection guide

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

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

Consider these conditions and the safety hazards they present:

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

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

Checklist:

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

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

Handling electrostatic discharge-sensitive devices

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

Notes:

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

When handling ESD-sensitive parts:

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

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

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

Grounding requirements

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

Safety notices (multi-lingual translations)

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

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

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

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

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

- Statement 1



DANGER

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

To avoid a shock hazard:

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

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

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

- Statement 2



CAUTION:

When replacing the lithium battery, use only IBM Part Number 33F8354 or an equivalent type battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.

Do not:

- Throw or immerse into water
- Heat to more than 100°C (212°F)
- Repair or disassemble

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

- Statement 3



CAUTION:

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

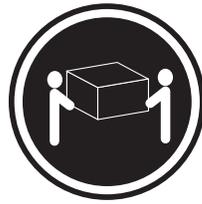
- Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.
- Use of controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation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



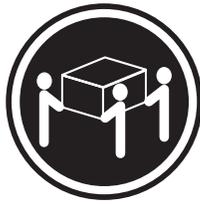
DANGER: Some laser products contain an embedded Class 3A or Class 3B laser diode. Note the following:

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

- Statement 4



≥18 kg (37 lbs)



≥32 kg (70.5 lbs)



≥55 kg (121.2 lbs)

CAUTION:

Use safe practices when lifting.

- Statement 5



CAUTION:

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



- Statement 10

CAUTION:

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



Importante:

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

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

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

Instrução 1



PERIGO

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

Para evitar risco de choque:

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

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

Instrução 2



CUIDADO:

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

Não:

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

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

Instrução 3



PRECAUCIÓN:

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

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

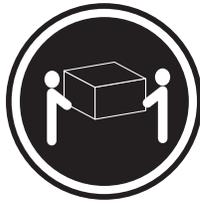
PERIGO

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

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

Instrução 4





≥18 kg (37 lbs)



≥32 kg (70.5 lbs)



≥55 kg (121.2 lbs)

CUIDADO:

Ao levantar a máquina, faça-o com segurança.

Instrução 5



CUIDADO:

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



CUIDADO:

Instrução 10



CUIDADO:



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

重要:

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

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

在执行任何指示的操作之前, 请确保您已经阅读了全部提醒和危险条款。

声明 1



危险

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

连接时:	断开连接时:
1. 关闭所有设备。	1. 关闭所有设备。
2. 首先将所有电缆连接至设备。	2. 首先从插座中拔出电源线。
3. 将信号电缆连接至接口。	3. 从接口上拔下信号电缆。
4. 将电源线连接至插座。	

声明 2



警告:

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

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

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

声明 3



警告:

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

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

非此处指定的其它控制、调整或与性能有关的操作都有可能导致激光辐射的危险。



危险

某些激光产品中包含内嵌的 3A 级或 3B 级激光二极管。请注意以下事项。

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

声明 4



≥18 kg (37 磅)



≥32 kg (70.5 磅)



≥55 kg (121.2 磅)

警告：
抬起时请采用安全操作方法。

声明 5



警告：

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



2



1

声明 6



警告：

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

声明 7



警告:

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

声明 8



警告:

不要拆除电源外盖或贴有下列标签的任何部件。



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

声明 9



警告:

为避免人员伤害，拆除设备上的风扇前应拨下热插拔风扇电缆。

声明 10



警告:

机柜安装的设备上面不能放置重于 82kg (180 磅) 的物品。



> 82 kg (180 磅)

声明 11



警告:

下面的标签表明附近有锋利的边、角或接头。



声明 12



警告:

下面的标签表明附近有高热表面。



重要資訊：

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

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

執行任何指示之前，請詳讀所有「注意」及「危險」的聲明。

聲明 1



危險

電源、電話及通信電纜上所產生的電流均有危險性。

欲避免電擊危險：

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

連接：

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

切斷：

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

聲明 2



注意：

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

請勿將電池：

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

請遵照當地法令規章處理廢棄電池。

聲明 3



注意：

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

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



危險

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

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

聲明 4



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

注意：

抬起裝置時，請注意安全措施。

聲明 5



注意：

裝置上的電源控制按鈕及電源供應器上的電源開關均無法關閉裝置上的電流。

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



聲明 10



注意：

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



>82 公斤 (180 磅)

Important:

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

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

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

Notice n° 1



DANGER

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

Pour éviter tout risque de choc électrique:

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

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



Notice n° 2

ATTENTION:

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

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

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



Notice n° 3

ATTENTION:

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

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



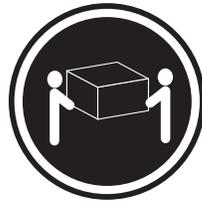
DANGER

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

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

Notice n° 4





≥18 kg (37 lbs)



≥32 kg (70.5 lbs)



≥55 kg (121.2 lbs)

ATTENTION:

Faites-vous aider pour soulever ce produit.

Notice n° 5



ATTENTION:

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



Notice n° 10



ATTENTION:

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

Wichtig:

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

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

Lesen Sie alle Sicherheitshinweise, bevor Sie eine Anweisung ausführen.

Hinweis 1



VORSICHT

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

Aus Sicherheitsgründen:

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

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

Hinweis 2



ACHTUNG:

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

Die Batterie nicht:

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

Die örtlichen Bestimmungen für die Entsorgung von Sondermüll beachten.

Hinweis 3



ACHTUNG:

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

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



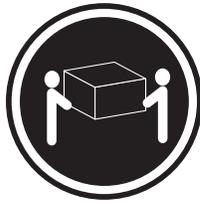
VORSICHT

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

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

Hinweis 4





≥18 kg



≥32 kg



≥55 kg

ACHTUNG:

Beim Anheben der Maschine die vorgeschriebenen Sicherheitsbestimmungen beachten.

Hinweis 5



ACHTUNG:

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



Hinweis 10



ACHTUNG:



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

Importante:

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

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

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

Avviso 1



PERICOLO

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

Per evitare il pericolo di scosse elettriche:

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

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

Avviso 2



ATTENZIONE:

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

Evitare di:

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

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

Avviso 3



ATTENZIONE:

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

- Non rimuovere i coperchi. L'apertura dei coperchi di prodotti laser può determinare l'esposizione a radiazioni laser pericolose. All'interno delle unità non vi sono parti su cui effettuare l'assistenza tecnica.
- L'utilizzo di controlli, regolazioni o l'esecuzione di procedure non descritti nel presente manuale possono provocare l'esposizione a radiazioni pericolose.



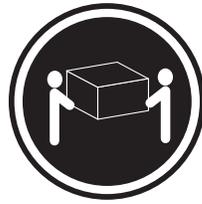
PERICOLO

Alcuni prodotti laser contengono all'interno un diodo laser di Classe 3A o Classe 3B. Prestare attenzione a quanto segue:

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

Avviso 4





≥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.

중요:

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

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

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

경고문 1



위험

전원, 전하 및 통신 케이블로부터 흘러 나오는 전류는 위험합니다.

전기 충격을 피하려면:

- 뇌우를 동반할 때는 케이블의 연결이나 철수, 이 제품의 설치, 유지보수 또는 재구성을 하지 마십시오.
- 모든 전원 코드를 적절히 배선 및 접지해야 합니다.
- 이 제품에 연결될 모든 장비를 적절하게 배선된 콘센트에 연결하십시오.
- 가능한 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, 원격리 통신 시스템, 네트워크 및 모뎀을 끊어 주십시오.
- 제품 또는 접속된 장치를 설치, 이동 및 덮개를 열 때 다음 설명에 따라 케이블을 연결하거나 끊도록 하십시오.

연결하려면:

1. 모든 스위치를 끕니다.
2. 먼저 모든 케이블을 장치에 연결합니다.
3. 신호 케이블을 커넥터에 연결합니다.
4. 콘센트에 전원 코드를 연결합니다.
5. 장치 스위치를 켭니다.

연결을 끊으려면:

1. 모든 스위치를 끕니다.
2. 먼저 콘센트에서 전원 코드를 뽑습니다.
3. 신호 케이블을 커넥터에서 제거합니다.
4. 장치에서 모든 케이블을 제거합니다.

경고문 2



주의:

리튬 배터리를 교체할 때는 IBM 부품 번호 33F8354 또는 제조업체에서 권장하는 동등한 유형의 배터리를 사용하십시오. 시스템에 리튬 배터리를 갖고 있는 모듈이 있으면 동일한 제조업체에서 생산된 동일한 모듈 유형으로 교체하십시오. 배터리에 리튬이 있을 경우 제대로 사용, 처리 또는 처분하지 않으면 폭발할 수 있습니다.

다음은 주의하십시오.

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

지역 법령이나 규정의 요구에 따라 배터리를 처분하십시오.

경고문 3



주의:

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

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

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



위험

일부 레이저 제품에는 클래스 3A 또는 클래스 3B 레이저 다이오드가 들어 있습니다. 다음을 주의하십시오.

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

경고문 4



≥18 kg (37 lbs)



≥ 32 kg (70.5 lbs)



≥ 55 kg (121.2 lbs)

주의:

기계를 들 때는 안전하게 들어 올리십시오.

경고문 5



주의:

장치의 전원 제어 버튼 및 전원 공급기의 전원 스위치는 장치에 공급되는 전류를 차단하지 않습니다. 장치에 둘 이상의 전원 코드가 연결되어 있을 수도 있습니다. 장치에서 모든 전류를 차단하려면 모든 전원 코드가 전원으로부터 차단되어 있는지 확인하십시오.



경고문 10



주의:

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



>82 kg (180 lbs)

Importante:

Todas las declaraciones de precaución de esta IBM documentation empiezan con un número. Dicho número se emplea para establecer una referencia cruzada de una declaración de precaución o peligro en inglés con las versiones traducidas que de dichas declaraciones pueden encontrarse en esta sección.

Por ejemplo, si una declaración de peligro empieza con el número 1, las traducciones de esta declaración de precaución aparecen en esta sección bajo Declaración 1.

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

Declaración 1



PELIGRO

La corriente eléctrica de los cables telefónicos, de alimentación y de comunicaciones es perjudicial.

Para evitar una descarga eléctrica:

- No conecte ni desconecte ningún cable ni realice las operaciones de instalación, mantenimiento o reconfiguración de este producto durante una tormenta.
- Conecte cada cable de alimentación a una toma de alimentación eléctrica con conexión a tierra y cableado correctos.
- Conecte a tomas de alimentación con un cableado correcto cualquier equipo que vaya a estar conectado a este producto.
- Si es posible, utilice una sola mano cuando conecte o desconecte los cables de señal.
- No encienda nunca un equipo cuando haya riesgos de incendio, de inundación o de daños estructurales.
- Desconecte los cables de alimentación, sistemas de telecomunicaciones, redes y módems conectados antes de abrir las cubiertas del dispositivo a menos que se indique lo contrario en los procedimientos de instalación y configuración.
- Conecte y desconecte los cables tal como se describe en la tabla siguiente cuando desee realizar una operación de instalación, de traslado o de apertura de las cubiertas para este producto o para los dispositivos conectados.

Para la conexión	Para la desconexión
<ol style="list-style-type: none">1. APÁGUELO todo.2. En primer lugar, conecte los cables a los dispositivos.3. Conecte los cables de señal a los conectores.4. Conecte cada cable de alimentación a la toma de alimentación.5. ENCIENDA el dispositivo.	<ol style="list-style-type: none">1. APÁGUELO todo.2. En primer lugar, retire cada cable de alimentación de la toma de alimentación.3. Retire los cables de señal de los conectores.4. Retire los cables de los dispositivos.

Declaración 2



PRECAUCIÓN:

Cuando desee sustituir la batería de litio, utilice únicamente el número de pieza 33F8354 de IBM o cualquier tipo de batería equivalente que recomiende el fabricante. Si el sistema tiene un módulo que contiene una batería de litio, sustitúyalo únicamente por el mismo tipo de módulo, que ha de estar creado por el mismo fabricante. La batería contiene litio y puede explotar si el usuario no la utiliza ni la maneja de forma adecuada o si no se desprende de la misma como corresponde.

No realice las acciones siguientes:

- Arrojarla al agua o sumergirla
- Calentarla a una temperatura que supere los 100°C (212°F)
- Repararla o desmontarla

Despréndase de la batería siguiendo los requisitos que exija el reglamento o la legislación local.

Declaración 3



PRECAUCIÓN:

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

- No retire las cubiertas. Si retira las cubiertas del producto láser, puede quedar expuesto a radiación láser perjudicial. Dentro del dispositivo no existe ninguna pieza que requiera mantenimiento.
- El uso de controles o ajustes o la realización de procedimientos que no sean los que se han especificado aquí pueden dar como resultado una exposición perjudicial a las radiaciones.

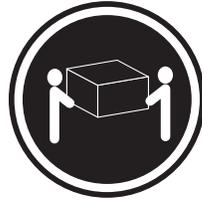


PELIGRO

Algunos productos láser contienen un diodo de láser incorporado de Clase 3A o de Clase 3B. Tenga en cuenta la advertencia siguiente.

Cuando se abre, hay radiación láser. No mire fijamente el rayo ni lleve a cabo ningún examen directamente con instrumentos ópticos; evite la exposición directa al rayo.

Declaración 4



≥18 kg



≥32 kg



≥55 kg

PRECAUCIÓN:

Tome medidas de seguridad al levantar el producto.

Declaración 5



PRECAUCIÓN:

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



Declaración 10



PRECAUCIÓN:



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

Send us your comments!

We want to know your opinion about this manual (part number 19K6112). 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 to 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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