IBM Servers

xSeries 240
Models 81Y, 8RY

Hardware Maintenance Manual

November 2000

We Want Your Comments!

IBM Servers

xSeries 240
Models 81Y, 8RY

Hardware Maintenance Manual

November 2000

We Want Your Comments!

IBM

> **Note**
>
> Before using this information and the product it
> supports, be sure to read the general information
> under "Notices" on page 258.

First Edition (October 2000)

**The following paragraph does not apply to the United
Kingdom or any country where such provisions are
inconsistent with local law:** INTERNATIONAL
BUSINESS MACHINES CORPORATION PROVIDES THIS
PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY
KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT
NOT LIMITED TO, THE IMPLIED WARRANTIES OF
MERCHANTABILITY OR FITNESS FOR A PARTICULAR
PURPOSE. Some states do not allow disclaimer of
express or implied warranties in certain transactions,
therefore, this statement may not apply to you.

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

This publication was developed for products and services
offered in the United States of America. IBM may not offer
the products, services, or features discussed in this
document in other countries, and the information is subject
to change without notice. Consult your local IBM
representative for information on the products, services,
and features available in your area.

Requests for technical information about IBM products
should be made to your IBM reseller or IBM marketing
representative.

About this supplement

This supplement contains diagnostic information, Symptom-to-FRU Indexes, service information, error codes, error messages, and configuration information for the IBM @server xSeries 240.

> **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
> 니다.
>
> 예를 들어 주의 경고문이 번호 1로 시작되면 *Safety Information*
> 책에서 이 주의 경고문은 경고문 1번 아래에 나옵니다.
>
> 지시를 따라 수행하기 전에 먼저 모든 주의 및 위험 경고문을 읽
> 도록 하십시오.

 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.ibm.com/pc/files.html

IBM online addresses:

The HMM manuals online address is:

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

The IBM Home Page is:

http://www.ibm.com/pc/

Contents

xSeries 240

    1

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 port, and parallel port. You can also use them to test some external devices. See "Diagnostic programs" on page 10.

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

> **Notes**
>
> 1. 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 "Symptom-to-FRU index" on page 189.
> 4. If the computer hangs and no error is displayed, go to "Undetermined problems" on page 210.
> 5. Power Supply problems, see "Symptom-to-FRU index" on page 189.
> 6. Safety information, see "Safety information" on page 224.
> 7. For intermittent problems, check the error log; see, "POST Error Log" on page 33.

001

IS THE SYSTEM PART OF A CLUSTER?
Yes No
|
| **002**
|
| Go to Step 004.
|
003

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

004

– 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 "Symptom-to-FRU index" on page 189.
– Check the information LED panel System Error LED; if on, see "Light path diagnostics" on page 13.
– Check the System Error Log. If an error was recorded by the system, see "Symptom-to-FRU index" on page 189.
– Start the Diagnostic Programs. See "Running diagnostic programs" on page 10.
– Check for the following responses:

   1. One beep.
   2. Readable instructions or the Main Menu.

(Step **004** continues)

(CONTINUED)

004 (continued)
**DID YOU RECEIVE BOTH OF THE CORRECT
RESPONSES?**
Yes   No

> **005**
>
> Find the failure symptom in "Symptom-to-FRU index"
> on page 189. Or, use remote video mode to
> monitor and access POST or to look at the System
> Error Log.

006

– Run the Diagnostic Programs. If necessary, refer to
  "Running diagnostic programs" on page 10.
  If you receive an error, go to "Symptom-to-FRU index"
  on page 189.
  If the diagnostics completed successfully and you still
  suspect a problem, see "Undetermined problems" on
  page 210.

Diagnostic tools

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

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

Diagnostic programs

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, such as the the system board, Ethernet controller, video controller, RAM, keyboard, mouse (pointing device), diskette drive, serial port, and parallel port. You can also use them to test some external devices.

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

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

Running diagnostic programs

While you are running the diagnostic programs, F1 displays Help information. Pressing F1 from within a help screen provides a online documentation from which you can select different categories. Pressing Esc exits Help and returns to where you left off.

> **Important**
>
> 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.
>
> You can test the USB keyboard using the regular keyboard test. The regular mouse test cannot test a USB mouse. Also, you can run the USB hub test only if there are no USB devices attached.

> **Notes**
>
> 1. 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. If the server stops during testing and you cannot continue, restart the server and try running the diagnostic programs again. If the problem persists, go to "Undetermined problems" on page 210.
> 3. If the diagnostic tests do not find a problem but the problem persists during normal operations, see "Symptom-to-FRU index" on page 189 and look for the problem symptom.
> 4. You might have to install a wrap connector on your active parallel, serial, or Ethernet port to obtain accurate test results for these ports. If you do not have a wrap connector, contact your IBM reseller or IBM marketing representative.
> 5. You might need a scratch diskette (that is, a diskette which has no contents that you want to save) to obtain accurate test results when testing the diskette drive.
> 6. The keyboard and mouse (pointing device) tests assume that a keyboard and mouse are attached to the server.

To start the diagnostic programs:

1. Turn on the server and watch the screen.

   If the server is turned on already, 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. The Diagnostics Programs screen appears.
4. Select either **Extended** or **Basic** from the top of the screen.
5. Select the test you want to run from the list that appears; then, follow the instructions on the screen.

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

   Also, you can view server configuration information (such as system configuration, memory contents, interrupt request (IRQ) use, direct memory access (DMA) use, device drivers, and so on) by selecting **Hardware Info** from the top of the screen.

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

If you are already running the diagnostic programs, continue with step 4 in this procedure.

Notes

1. The test log will not contain any information until after the diagnostic program has run.
2. The test log is maintained in memory while the server is powered on. Turning off the power clears the test log.

To view the Test Log:

1. Turn on the server and watch the screen.

    If the server is turned on already, 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. The Diagnostic Programs screen appears.
4. Select **Utility** from the top of the screen.
5. Select **View Test Log** from the list that appears; then, follow instructions on the screen.

Power-on self-test (POST)

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

POST does the following:

*   Checks the operation of some basic system-board operations
*   Checks the memory
*   Compares the current server configuration with the stored server configuration information
*   Configures PCI adapters
*   Starts the video operation
*   Verifies that drives (such as the diskette, CD-ROM, and hard disk drives) are connected properly

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

While the memory is being tested, the amount of available memory appears on the screen. These numbers advance

as the server progresses through POST and the final number that appears on the screen represents the total amount of memory available. If POST finishes without detecting any problems, a single beep sounds, 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.

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

POST beep codes

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

- One beep indicates the successful completion of POST.
- More than one beep indicates that POST detected a problem. For more information, see "Beep symptoms" on page 192.

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 Table 1 on page 14.

If the system error LED (on the information LED panel) is not lit and no diagnostics panel LEDs are lit, it means that the light path diagnostics have not detected a system error.

If the system error LED (on the information LED panel) is lit, it means that a system error was detected. Check to see which of the LEDs on the diagnostics panel inside the server are lit and refer to the following table:

width=page

Table 1 (Page 1 of 2). Light path diagnostics	
LED On	**Cause / Action**
None	The system error log is 75% or more full or a PFA alert was logged. Check the system error log and correct any problems. See "POST Error Log" on page 33 for information about clearing the error log. Disconnecting the server from all power sources for at least 20 seconds will turn off the System Error LED.
CPU	One of the microprocessors has failed or a microprocessor is installed in the wrong connector. 1. Check the Microprocessor Error LEDs on the processor board. 2. Turn off the server, reseat the microprocessor indicated by the lit Microprocessor Error LED, and restart the server. 3. If the problem persists, replace the microprocessor.
VRM	One of the voltage regulator modules on the processor board has failed. 1. Check the VRM Error LEDs on the processor board. 2. Turn off the server, reseat the VRM indicated by the lit VRM Error LED, and restart the server. 3. If the problem persists, replace the VRM.
MEMORY	A memory error occurred. 1. Check the DIMM Error LEDs on the memory board. 2. Replace the DIMM indicated by the lit DIMM Error LED.
PCI BUS A	An error occurred on PCI bus A. An adapter in PCI slot 1 or 2 or the system board caused the error. 1. Check the error log for additional information. If the error log indicates a problem with the integrated Ethernet controller, replace the system board. 2. If you cannot isolate the failing adapter from the information in the error log, try to determine the failing adapter by removing one adapter at a time from PCI bus A (PCI slot 1 and 2) and restarting the server after each adapter is removed.
PCI BUS B	An error occurred on PCI bus B. An adapter in PCI slot 3, 4, or 5 or the system board caused the error. 1. Check the error log for additional information. 2. If you cannot correct the problem from the information in the error log, try to determine the failing adapter by removing one adapter at a time from PCI bus B (PCI slots 3–5) and restarting the server after each adapter is removed.
HDD	A hot-swap hard disk drive has failed on bus 1. 1. Check the error log for additional information. If the error log indicates a temperature problem and the fans are working correctly, go to "General checkout" on page 6. 2. If the amber Hard Disk Status LED on one of the hot-swap hard disk drives is on, refer to the "ServeRAID Information" section of this *Server Library* for more information.

Table 1 (Page 2 of 2). Light path diagnostics	
LED On	**Cause / Action**
NMI	A nonmaskable interrupt occurred. 1. If the PCI BUS A or PCI BUS B LED is on, follow the instructions for those LEDs. 2. If the PCI BUS A or PCI BUS B LED is not on, restart the server.
SMI	A systems management event occurred. Restart the server.
SERVICE PROCESSOR BUS	An error has occurred on the service processor bus. Disconnect all power from the server for 30 seconds. Reconnect the power to the server; then, restart the server.
POWER SUPPLY 1	Power supply 1 has failed. Replace power supply 1.
POWER SUPPLY 2	Power supply 2 has failed. Replace power supply 2.
POWER SUPPLY 3	Power supply 3 has failed. Replace power supply 3.
POWER SUPPLY NON REDUNDANT	Power supply redundancy has been lost. 1. If one of the power supply LEDs is on, replace the indicated power supply. 2. Install an additional power supply to regain redundancy.
FAN 1	Fan 1 has failed or is operating too slowly. **Notes:** 1. An LED on the failing fan assembly will also be on. 2. A failing fan can also cause the TEMPERATURE and HDD LEDs to be on. Replace fan 1.
FAN 2	Fan 2 has failed or is operating too slowly. **Notes:** 1. An LED on the failing fan assembly will also be on. 2. A failing fan can also cause the TEMPERATURE and HDD LEDs to be on. Replace fan 2.
FAN 3	Fan 3 has failed or is operating too slowly. **Notes:** 1. An LED on the failing fan assembly will also be on. 2. A failing fan can also cause the TEMPERATURE and HDD LEDs to be on. Replace fan 3.
TEMPERATURE	The system temperature has exceeded a threshold level. 1. Check to see if a fan has failed. If it has, replace the fan. 2. Make sure the room temperature is not too hot. (See "Specifications" on page 52.) If the problem persists, go to "General checkout" on page 6.

Error messages

Error messages indicate that a problem exists.

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

POST error messages: POST error messages occur during startup when POST finds a problem with the hardware or detects a change in the hardware configuration. For more information, see "Symptom-to-FRU index" on page 189.

Diagnostic error messages: Diagnostic error messages occur when a test finds a problem with the server hardware. These error messages are alphanumeric and they are saved in the Test Log. For more information, see "Error symptoms" on page 203.

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

System error log

The system error log contains all error and warning messages issued during POST and all system status messages from the System Management Processor. See "System Event/Error Log" on page 33 for information about how to view the system error log.

Option diskettes

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

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

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:

> **Before you begin:**
>
> Read "Safety information" on page 224.

1. Turn off the server and peripheral devices and disconnect all external cables and power cords (see "Preparing to install options" on page 96); then remove the cover (see "Removing the left-side cover (tower model)" on page 99 or "Removing the cover (rack model)" on page 100).
2. Locate switch block 2 (SW2) on the system board (see "System board component locations" on page 161).
3. Set switch 1 on switch block 2 to ON 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.`
6. Remove the flash diskette from the diskette drive.
7. Turn the server off.
8. Set switch 1 on switch block 2 (SW2) to Off to return to normal startup mode.
9. Restart the server. The system should start up normally.

Features

The following table summarizes the features of the xSeries 240.

Microprocessor

- Intel® Pentium® III microprocessor with MMX™ technology and SIMD extensions
- 32 KB of level-1 cache
- 256 KB of level-2 cache (min.)
- Expandable to two microprocessors

Memory

- Standard: 128 MB, expandable to 4 GB
- 133 MHz, registered, error correcting code (ECC), synchronous dynamic random access memory (SDRAM) complying with PC 133 SDRAM Registered DIMM Specification, Revision 1.0 or later).
- Four dual inline memory-module (DIMM) sockets

Diskette Drive

- Standard: One 3.5-inch, 1.44 MB

Hard Disk Drives

- Up to six hot-swappable hard disk drives supported

CD-ROM Drive

- Standard: 40X IDE

Keyboard and Auxiliary Device
(standard only on tower models)

- Keyboard
- Mouse

Expansion Bays

- Six slim (1-inch) or three half-high (1.6-inch) hot-swap drive bays
- Three 5.25-inch non-hot-swap bays (one used by CD-ROM drive)

Expansion Slots

Up to five adapters can be installed.

- Three 64-bit hot-plug PCI slots
- Two standard (non-hot-plug) 32-bit PCI slot

Upgradable Microcode

- BIOS, diagnostics, and System Management Processor upgrades (when available) can update EEPROMs on the system board

Security Features

- Door and side cover lock (tower model only)
- Power-on and administrator passwords

- Selectable drive-startup
- Keyboard password
- Systems management security
    - User log-in password
    - Read-only or read/write access
    - Dial back

Predictive Failure Analysis™ (PFA) Alerts

- Power supplies
- Fans
- Memory
- Hard disk drives
- Microprocessors
- Voltage regulator modules (VRMs)

Integrated Functions

- Two serial ports
- Two universal serial bus (USB) ports
- One parallel port
- Mouse port
- Keyboard port
- Video port
- Advanced System Management Interconnect port
- Two SCSI ports (one internal, one external)
- 10BASE-T/100BASE-TX Ethernet port (controller on system board)
- Redundant Ethernet capability, through the use of an optional network interface card (NIC)
- System Management Processor on system board
- Dedicated Advanced System Management I/O port
- Video controller (with 4 MB video memory) compatible with:
    - Super video graphics array (SVGA)
    - Video graphics adapter (VGA)

Power Supply

- Two 250 W (115–230 V ac)
    - Standard - 500 W non-redundant, 250 W redundant
    - Optional - Additional 250 W power supply is available for 500 W redundancy
- Automatic voltage range selection
- Built-in overload and surge protection
- Automatic restart after a loss of power

Redundant Cooling

- Three hot-swap fans

Configuring the server

The following information is about he System Configuration Utility program that comes with the server.

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

The ROM-based diagnostic program that comes with the server provides diagnostic support for the system memory, disk drives, and other system components.

Configuration overview

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

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

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

The server comes with the following hardware configuration programs:

- System Configuration Utility program

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

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

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

1. Run the System Configuration Utility program and record the current configuration settings.
2. Set jumpers or switches on server components.

   See "Changing jumper positions" on page 159.
3. Set jumpers or switches on the device.

   See the device installation instructions.
4. Install the device in the server.

   See "Before you begin installing options" on page 93.
5. Install software programs.

   See the installation instructions that come with the software.
6. Resolve configuration conflicts.

   See "Resolving configuration conflicts" on page 36.

The System Configuration Utility program

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

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

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

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

To start the System Configuration Utility program:

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

> **Note**
>
> If you enter the power-on password and an administrator (supervisor-level) password is also set, a limited version of the menu appears. To see the full menu, you must restart the server and enter the administrator password when you are prompted to enter a password. See "System Security" on page 27 for additional information.

The System Configuration Utility main menu appears. For information about the menu, see "Using the System Configuration Utility main menu" on page 24.

Notes

1. When the message `Press F2 for Diagnostics` appears, press F2 to run the diagnostics programs. For information about running the diagnostics programs, see "Running diagnostic programs" on page 10.

2. When the message `Press Alt-F1 for System Partition Boot` appears, press Alt-F1 to start the system from the system partition. See the ServerGuide information provided with the server section of this *Server Library* for information about using ServerGuide to create a system partition.

Using the System Configuration Utility main menu

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

```
IBM Netfinity Setup - © Copyright IBM Corporation

        Configuration/Setup Utility
        • System Summary
        • System Information
        • Devices and I/O Ports
        • Date and Time
        • System Security
        • Start Options
        • Advanced Setup
        • Event/Error Logs
          Save Settings
          Restore Settings
          Load Default Settings

          Exit Setup


        <F1>  Help               < ↑ > < ↓ >  Move
        <Esc> Exit                <Enter> Select
```
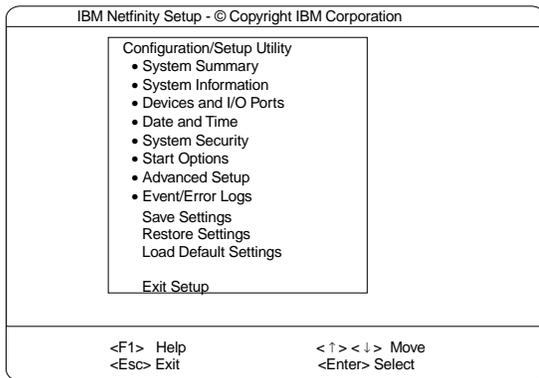
Pressing F1 displays Help information for a selected menu item.

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

To change configuration settings:

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

> **Note**
>
> The System Configuration Utility main menu
> selections do not save settings, restore settings,
> or load default settings for the PCI Slot/Device
> Information choice. To save settings, or restore
> settings for the PCI Slot/Device Information
> choice, you *must* use the menu selections
> available from the PCI Slot/Device Information
> choice.

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

System Summary: Select this choice to display
configuration information, including the type and speed of
the microprocessors and amount of memory.

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

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

System Information: Select this choice to display
information about the 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 System Configuration Utility main
menu.

Product Data: Select this choice to view system
information, such as the machine type and model, the
system serial number, and the revision level or issue date
of the BIOS stored on the flash 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: Software recognizes ports
through their port assignments. Each port must have a
unique port assignment. The System Configuration Utility
program normally handles this, but you might have special
hardware or software that requires you to change these
assignments.

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

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

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

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

1. Select **Devices and I/O Ports.**
2. Select a device or port; use the Left Arrow (←) or Right Arrow (→) key to advance through the settings.

   The Devices and I/O Ports choice appears only on the full System Configuration Utility main menu.

Notes

1. 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).
2. The universal serial bus (USB) is configured automatically.
3. 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 System Configuration Utility program.

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.

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

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

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

You can set a time delta to be added or subtracted from the system time that is sent to the service processor (Advanced System Management Processor) 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 the system clock time should be the same as the Advanced System Management Processor clock time, leave the value set at the default of 0.

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

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

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

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

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

Type of Password	Results
No password set	• No password required to start the system. • You can access all choices on the System Configuration Utility main menu.
Power-on password only	• You must enter the password to complete the system startup. • You can access all choices on the System Configuration Utility main menu.
Administrator password only	• No password is required to start the system. • You must enter the password to access the System Configuration Utility program. • The Administrator password provides access to all choices on the System Configuration Utility main menu.
Administrator *and* power-on password	You can enter either password to complete the system startup. • The administrator password provides access to all choices on the System Configuration 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 System Configuration Utility main menu. This limited access might include changing or deleting the power-on password. • If you forget the power-on password, and the administrator password has been set, use the administrator password at the power-on password prompt; then, start the System Configuration Utility program and change the power-on password.

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

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

- If an administrator password has been set, enter the administrator password at the power-on prompt. (If necessary, see "Using the administrator password menu" on page 29 for details.) Start the System Configuration Utility program and change the power-on password as previously described in this section (see steps 1 through 5).
- You can change the position of the password override switch (switch 4 of switch block 2) to the ON position as described in "Bypassing an unknown power-on password" on page 50.
- You can remove the battery as described in "Replacing the battery" on page 157 and then install the battery.

To set a power-on password:

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

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

   You can use any combination of up to seven characters (A–Z, a–z, and 0–9) for the power-on password. Keep a record of the password in a secure place.
3. Move the cursor to the **Enter Power-on Password Again** data field and type the password again.

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

4. If a message appears telling you to select another password, press Enter to return to the Power-On Password menu. Choose a different password to use for the power-on password.
5. Select **Change Power-on Password** to save the new password; then, press Enter.

To delete a power-on password:

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

   The Power-on Password menu appears.
2. Select **Delete Power-on Password**; then, press Enter.
3. A confirmation window appears. Press Enter to delete the power-on password. Press Esc to cancel the request and return to the System Security menu.

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

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

   The Power-on Password screen appears.

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

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

   Note

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

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

Attention:

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

To set an administrator password:

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

   The Administrator Password menu appears.

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

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

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

   Note

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

   ---

4. If a message appears telling you to select another password, press Enter to return to the Administrator Password menu. Choose a different password to use for the administrator password.

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

To delete an administrator password:

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

   The Administrator Password menu appears.
2. Select **Delete Administrator Password**; then, press Enter.
3. A confirmation window appears. Press Enter to delete the administrator password. Press Esc to return to the System Security menu.

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

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

   The Administrator Password screen appears.
2. Select **Power-on password changeable by user.** Press the Left Arrow (←) or Right Arrow (→) key to toggle the entry to **Yes.**

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

Defining a system owner's name: You can specify a system owner's name that displays during POST. The system owner's name can only be removed or changed from the System Security menu. If you set an administrator password, only the administrator can set, change, or delete the system owner's name.

To set the system owner's name:

1. Select **System Owner's Name** from the System Security screen, and press Enter.
2. Enter the name in the **Enter system owner's name string** data field.
3. Press the Down Arrow (↓) key to select the **Set or change system owner's name** data field.
4. Press Enter to set the name or change a previously defined name.

You can use any combination of up to 16 characters in the system owner's name.

To delete the system owner's name, select **Delete stored system owners name**; then, press Enter.

Start options take effect when you start the server.

Start Options

Start options take effect when you start the server.

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

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

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

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

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

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

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

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. 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.

MPS Version Control Select this choice to view and identify the multiprocessor specification (MPS) level. Some versions of the IBM OS/2 operating system use 1.1 as the MPS level. The default level is 1.4. Refer to the documentation that comes with the operating system for more information.

PCI Slot/Device Information: Select this choice to view and identify system resources used by PCI devices. PCI devices automatically communicate with the server configuration information. This usually results in automatic configuration of a PCI device. If a conflict does occur, see "Resolving configuration conflicts" on page 36.

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

- **Save 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.

Note

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

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

Selecting **PCI Device Control** allows you to enable or disable the system board SCSI, video, and Ethernet controllers and the PCI slots.

- The default setting is Enable for all the controllers and PCI slots. If you select Disable, the disabled device will not be configured and will be invisible to the operating system. 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; then use the Up Arrow (↑) or Down Arrow (↓) key to highlight the bank that you want to enable. Use the Left Arrow (←) or Right Arrow (→) key to select **Enable**.

System Service Processor Settings: Select this choice to view the IRQ used by the Advanced System Management Processor (system service processor). You can then use the Left Arrow (←) or Right Arrow (→) key to select the IRQ for the Advanced System Management Processor from the list of available choices.

Event/Error Logs: Select **Event/Error Logs** to choose to view either the POST error log or the system event/error log.

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

System Event/Error Log: 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 Up Arrow (↑) or Down Arrow (↓) keys to move between pages in the system event/error log. You can clear the event log by selecting **Clear error logs**.

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

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

Load Default Settings: If you make configuration changes and then decide that you want to use default values instead, select **Load Default Settings** to cancel the changes and restore the factory settings.

Exit Setup: If you have made any changes, you will be asked if you want to save the changes or exit without saving the changes.

Configuring options

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

1. Run the System Configuration Utility program and
   record the current configuration settings.

   See "The System Configuration Utility program" on
   page 22.
2. Set jumpers or switches on the server components.

   See "Changing jumper positions" on page 159.
3. Set jumpers or switches on the device.

   See the instructions that come with the adapter.
4. Install the adapter in the server.

   See "Working with adapters" on page 103.
5. Install software programs.

   See the installation instructions that come with the
   software.
6. Resolve configuration conflicts.

   See "Resolving configuration conflicts" on page 36.

Resolving configuration conflicts

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

Conflicts in the configuration occur if:

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

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

The System Configuration Utility program configures the system hardware and PCI IRQs. The program does not consider the requirements of the operating system or the application programs. See "Resolving software configuration conflicts" on page 37 for additional information.

Resolving hardware configuration

conflicts: Use the following information to help resolve hardware configuration conflicts:

1. Run the System Configuration Utility program to view and change resources used by the system functions and the installed options. Record the current settings before making any changes. (See "The System Configuration Utility program" on page 22 for instructions.)
2. Determine which adapter or device is causing the conflict. (Go to "General checkout" on page 6.)
3. Change adapter jumpers or switches. Some devices use jumpers and switches to define the system resources that the devices need. If the settings are incorrect or set to use a resource that cannot be shared, a conflict occurs and the device will remain deactivated by the configuration program.
4. Change system jumpers or switches. See "Changing jumper positions" on page 159.

5. Remove the device or adapter. Some configurations are not supported. If you must remove an adapter, see "Working with adapters" on page 103.

Resolving software configuration conflicts:

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

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

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

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

Note

Start the System Configuration Utility program to view the addresses used by the server functions. (See "The System Configuration Utility program" on page 22 for instructions.)

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

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

Using the SCSISelect utility program

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

You can use the SCSISelect Utility program to:

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

Starting the SCSISelect Utility program:

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

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

The system will locate the attached SCSI devices then prompt you to select either channel A (internal) or channel B (external).

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

SCSISelect Utility program choices: The following choices appear on the SCSISelect Utility menu:

- Configure/View Host Adapter Settings
- SCSI Disk Utilities

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

This menu has the following choices:

- Host Adapter SCSI ID

    The assigned SCSI ID of the SCSI controller is 7.
- SCSI Parity Checking

    The assigned value is *Enabled*.
- Host Adapter SCSI Termination

    The assigned value is *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**
    >
    > When the **Maximum Sync Transfer Rate** is set to 40.0, this value represents the transfer rate for UltraSCSI devices. When the **Maximum Sync Transfer Rate** is set to 80.0, this value represents the transfer rate for Ultra2 SCSI LVD devices. When the **Maximum Sync Transfer Rate** is set to 20.0, this value represents the transfer rate for Fast SCSI devices.

- Advanced Configuration Options

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

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

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

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

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

```
   Unexpected SCSI Command Failure

Target SCSI ID:           4

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

Host Adapter Status: 00h - No host adapter error

Target Status: 02h - Check condition

Sense Key: 02h - Not ready

+Sense Code: 04h

+Sense Code Qualifier: 02h

   Press 'Esc' to continue.
```

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

Depending on the hard disk drive capacity, the Low-Level
Format program could take up to two hours.

When To use the Low-Level Format

program: Use the Low-Level Format program:

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

> **Note**
>
> For information about backing up all of the files, see
> the operating-system documentation.

Starting the Low-Level Format program

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

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

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

> **Note**
>
> Hard disks normally contain more tracks than their stated capacity (to allow for defective tracks). A message appears on the screen if the defect limit is reached. If this happens, run diagnostics on the disk drive (see "General checkout" on page 6).

3. To install an operating system after the hard disk drive is formatted, follow the instructions in the ServerGuide information provided with the server section of this *Server Library*.

Configuring the Ethernet controller

The xSeries 240 server comes with an Ethernet controller on the system board. The Ethernet controller provides 10BASE-T and 100BASE-TX support through the RJ-45 connector on the back of the server. When you connect the 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). This process is also known as *auto-negotiating*. This auto-negotiation occurs without requiring software intervention. The controller supports half-duplex (HDX) and full-duplex (FDX) modes at both speeds.

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

The Ethernet controller is a PCI device, and is therefore, a Plug and Play device. You do not have to set any jumpers or configure the controller for the operating system before you use the Ethernet controller. However, you must install a device driver to enable the operating system to address the Ethernet controller (refer to the ServerGuide information provided with the server section of this *Server Library* or to the operating-system documentation).

For troubleshooting information, see "Troubleshooting the Ethernet controller" on page 54.

If you need additional Ethernet connections, you can install an Ethernet adapter, such as the IBM 10/100 PCI Ethernet adapter. Review the network-adapter documentation for any additional configuration requirements and for troubleshooting information.

Failover for redundant Ethernet

The xSeries 240 has an integrated Ethernet controller. The IBM Netfinity 10/100 Fault Tolerant Adapter is an optional redundant network interface card (NIC adapter) that you can install in the 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

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

Special considerations when combining failover and hot-plug functions: If the 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 be automatically switched to the secondary Ethernet controller. This can be very useful when a network problem is caused by faulty adapter hardware or when you want to upgrade the primary adapter hardware.

Note

If the primary adapter is hot-replaced 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 "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.

OS/2

Note

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

---

1. Add the redundant NIC adapter according to the instructions provided with the adapter and in "Working with adapters" on page 103.
2. Use the ServerGuide CDs to install the AMD PCNet Ethernet Family adapter device driver. (Refer to the

ServerGuide information provided with the server section of this *Server Library*.)

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. Refer to "System board component locations" on page 161 for the locations and slot numbers of the PCI slots. 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 created using the ServerGuide CDs to the 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 45.

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.ibm.com/pc/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 the 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. The IBM
> Netfinity Hot Plug for Windows NT Server 4.0 package
> must be installed before the IBM Netfinity 10/100 Fault
> Tolerant Adapter driver is installed. If the adapter
> device driver is installed 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 IBM 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 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 IBM 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 provided with the adapter and in "Working
   with adapters" on page 103.
2. Use the ServerGuide CDs to install the AMD PCNet
   Ethernet Family adapter device driver. (Refer to the
   ServerGuide information provided with the server
   section of this *Server Library*.)
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 (bus 0, 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 the 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 provided with the adapter and in "Working with adapters" on page 103.
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 upon 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 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:

- A message is generated to the operating system console.
- 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.

Additional service information

The following additional service information supports xSeries 240.

Checking the system for damage

This section provides instructions on what to do if the server might be damaged.

After dropping it: Look for loose cables and obvious damage. If any cables are loose, reconnect them securely.

If you see no damage, turn on the server. If it works correctly, the server probably did not suffer any damage. Observe all electrostatic precautions listed in this book to avoid damage to the server.

If the server does not work correctly, turn it off and check the adapters and memory modules to ensure that they are connected correctly; then, reseat all adapters and memory modules.

If the server still does not work correctly, run the diagnostic tests from the diagnostic utility menu. For information about running tests, see "Running diagnostic programs" on page 10.

After spilling liquid on it: If liquid gets on the keyboard:

1. Turn off the server.
2. Unplug the keyboard from the back of the server.
3. Turn the keyboard upside down to drain excess liquid.
4. Dry off the keyboard with a lint-free cloth.

After the keyboard is completely dry, plug it in and turn on the server. If it does not work correctly, replace the keyboard.

If liquid gets inside the monitor:

1. Turn off the monitor.
2. Turn off the server.
3. Unplug the monitor from the server and the electrical outlet.

If liquid gets inside the server:

1. Turn off the server and all attached devices.
2. Unplug the server from the electrical outlet and all attached devices.

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 either of the following methods:

- Enter the administrator password at the power-on prompt, if an administrator password has been set. (If necessary, see "Using the administrator password menu" on page 29 for details.) Start the Configuration/Setup Utility program and change the power-on password. See "Using the power-on password menu" on page 27.
- Change switch 4 of switch block 2 (SW2) to the ON position to bypass the power-on password check. You can then start the Configuration/Setup Utility program and change the power-on password. See "Using the power-on password menu" on page 27.

Resolving configuration conflicts

The Configuration/Setup Utility program configures only the server hardware. It does not consider the requirements of the operating system or the application programs. For these reasons, memory-address configuration conflicts might occur.

Changing the software configuration

setup: The best way to resolve memory-address conflicts is to change the software configuration by changing the addresses that the EMS device driver defined. The SVGA video memory occupies 32 KB (1 KB = approximately 1000 bytes) of space in the hex C0000 to C7FFF EMS memory area. EMS device drivers must use addresses different from those assigned to video read-only memory (ROM). You can use the Configuration/Setup Utility program to view or change the current setting for video ROM. For information about using the Configuration/Setup Utility program, see "Using the System Configuration Utility main menu" on page 24.

Changing the hardware configuration

setup: An alternative way to resolve memory-address conflicts is to change the address of the conflicting hardware option.

Specifications

The following table contains the specifications for the xSeries 240 server.

Size (Tower Model)

- – Depth: 659.3 mm (26 in.)
- – Height: 426.5 mm (16.8 in.)
- – Width: 217.3 mm (8.6 in.)

Size (Rack Model)

- – Depth: 629.3 mm (24.8 in.)
- – Height: 217.3 mm (8.6 in.) (5 U)
- – Width: 426.6 mm (16.8 in.)

Weight (Tower Model)

- Minimum configuration: 26.6 kg (58.6 lb)
- Maximum configuration: 37.5 kg (82.7 lb)

Weight (Rack Model)

- Minimum configuration: 25.3 kg (55.7 lb)
- Maximum configuration: 36.2 kg (79.8 lb)

Environment

- Air temperature:
  - – Server on: 10° to 35° C
    (50° to 95° F)
    Altitude: 0 to 914 m (3000 ft.)
  - – Server on: 10° to 32° C
    (50° to 90° F)
    Altitude: 914 m (3000 ft.) to 2133 m (7000 ft.)
  - – Server off: 10° to 43° C
    (50° to 110° F)
    Maximum Altitude: 2133 m (7000 ft.)
- Humidity:
  - – Server on: 8% to 80%
  - – Server off: 8% to 80%
- Maximum altitude: 2133 m
  (7000 ft)

Electrical Input

- Sine-wave input (50 to 60 Hz) is required
- Input voltage:
  - – Low range:
    - - Minimum: 90 V ac
    - - Maximum: 137 V ac
  - – High range:
    - - Minimum: 180 V ac
    - - Maximum: 265 V ac
  - – Input kilovolt-amperes (kVA) approximately:
    - - Minimum configuration as shipped: 0.08 kVA
    - - Maximum configuration: 0.52 kVA

Power Available for Drives

- Each hot-swap drive bay:
  - – +5 V dc line: 15 A

   –   +12 V dc line: 17.2 A

Heat Output

- Approximate heat output in British Thermal Units (Btu)
  per hour:
  - Minimum configuration:
    683 Btu (200 watts)
  - Maximum configuration:
    2048 Btu (600 watts)

Acoustical Noise Emissions Values

- Sound power, idling: 6.6 bel maximum
- Sound power, operating: 6.8 bel maximum
- Sound pressure, operating: 67 dBa maximum

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 the server.
- Check for operating system-specific causes for the problem.
- Make sure that the device drivers on the client and server are using the same protocol.

- 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.

Controller problem	Action
The server stops running when loading device drivers.	The PCI BIOS interrupt settings are incorrect.
	Check the following:
	• Determine if the interrupt (IRQ) setting assigned to the Ethernet controller 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 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.
	• Make sure that you are using the most recent device driver available from the World Wide Web. (Refer to the "Getting Help Information" section of this *Server Library* for World Wide Web addresses.)
	• Run the network diagnostic program.
	If the problem still exists, run the server diagnostic programs (see "Diagnostic programs" on page 10) and check with the LAN administrator.

Controller problem	Action
Ethernet Link Status light does not light.	Check the following: • 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 for the LEDs. If the problem still exists, run the server diagnostic programs (see "Diagnostic programs" on page 10) and check with the LAN administrator.
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. • 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: • 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.

Controller problem	Action
The Ethernet controller stopped working when another adapter was added to the server.	Check the following: • Make sure that the cable is connected to the Ethernet controller. • Make sure that the PCI system BIOS is current. • Reseat the adapter (see "Working with adapters" on page 103). • 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. If the problem still exists, run the server diagnostic programs (see "Diagnostic programs" on page 10) and check with the system administrator.
The Ethernet controller stopped working without apparent cause.	Check the following: • Run diagnostics for the Ethernet controller. • Try a different connector on the hub. • Reinstall the device drivers. Refer to the ServerGuide information included with the server. If the problem still exists run the server diagnostic programs (see "Diagnostic programs" on page 10).

Updating device records and reconfiguring the server

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

Some options have device drivers that you need to install. Refer to the documentation that comes with the option for information about installing any required device drivers.

If you have more than one microprocessor installed, you might want to upgrade the operating system. If you have installed or removed hard disk drives and the server has a RAID adapter installed, refer to the documentation provided with the RAID adapter for information about reconfiguring the disk arrays.

Run the Configuration/Setup Utility program to save the
new configuration information. See "Configuring the
server."

Record the updated device and configuration information.

Systems Management software

This section provides instructions for starting and using the Systems Management software. This software enables you to access, configure, and manage the IBM® Advanced System Management Processor. These instructions include details on how to install the configuration utilities and device drivers that the System Management processor requires. This section is intended for anyone who will install and use the System Management processor with the Systems Management software.

This section also provides instructions on using the System Management processor without the Systems Management software.

Important

- The systems management software, shipped with the server, provides the most extensive functionality available with the System Management processor. If you do not install the Systems Management software, many of the advanced features of the System Management processor will not be available to you. For information on how to install the Systems Management software, see the CD shipped with the server.
- This section of this *Server Library* explains how to use the Advanced System Management service with the System Management processor that is included with the server. This service can also be used to manage other Advanced System Management hardware, including:
  - PC Server Advanced System Management Adapter Option
  - Advanced System Management PCI Adapter (included with some servers, and available as an option for use with servers that include the System Management processor)

  The features available with the Advanced System Management service vary depending on the Advanced System Management hardware that they are managing. For detailed information on using the Advanced System Management service with Advanced System Management hardware other than the System Management processor, see the documentation that is included with the option or the *Server Library* that is included with the server.

With the Advanced System Management service, you can configure system-management events (such as POST, loader, and operating-system timeouts or critical temperature, voltage, and tamper alerts). If any of these

events occurs, the Advanced System Management service can be configured to automatically forward an alert in one of four ways:

- To another xSeries system using the modem
- To a standard numeric pager
- To an alphanumeric pager
- To another xSeries system using the network connection (available only when using Advanced System Management service with an xSeries Advanced System Management PCI Adapter)

With this service, you can use the system's modem to dial out and directly access and control a remote system's Advanced System Management PCI Adapter or Advanced System Management Processor. If the remote system has a System Management PCI Adapter installed and the adapter is connected to a Transmission Control Protocol/Internet Protocol (TCP/IP) network, you can use the Dynamic Connection Manager service (installed when you installed the Advanced System Management service) to open a TCP/IP link with the System Management PCI Adapter from the Systems Management software system. Finally, if the System Management PCI Adapter or Advanced System Management Processor is connected to an Advanced System Management (ASM) Interconnect network, or if the remote System Management PCI Adapter adapter or Advanced System Management Processor to which you have connected using the system's modem or TCP/IP connection is connected to an ASM Interconnect network, you can use this connection to access and manage the Advanced System Management PCI Adapter or Advanced System Management Processor of any other system that is connected to the ASM Interconnect network.

Figure 1. The System Management Processor

Installing Device Drivers

This chapter describes how to install device drivers for the System Management processor.

> **Notes**
>
> 1. If you plan to install the Systems Management software, you must install the required device drivers *before* you install the software.
> 2. For a list of supported operating systems, see http://www.ibm.com/pc/support on the World Wide Web.
> 3. If you plan to install Windows NT from diskette (using ServerGuide), you must also use ServerGuide to create Advanced System Management device driver diskettes for use during the operating system installation process.

Required Device Drivers: The device drivers required by the operating system can be found on the ServerGuide CD that is shipped with the server.

Device-Driver Installation Instructions: The device drivers necessary for the System Management processor to function properly can be installed in one of two ways:

- Using the ServerGuide CD .

  To install the device drivers with the ServerGuide System Updates and Applications CD, follow the online instructions during the installation.
- Using the ServerGuide Diskette to create the diskettes that you will need to install the device drivers (Windows NT, NetWare, or UNIXWare).

  You will need to create the *Netfinity Advanced System Management Device Driver Diskette.*

  > **Note**
  >
  > This diskette contains device-driver information for all operating systems that are supported on IBM servers that include System Management processor hardware.

  Follow the instructions provided on the ServerGuide Diskette Factory CD to create the diskettes.

If you are installing Windows NT you can use the ServerGuide CD to install the device drivers. You will not need to perform the specified additional steps to finish installing the device drivers.

> **Note**
>
> If you are installing NetWare or UNIXWare, you must use device driver diskettes created using the ServerGuide System Updates and Applications CD.

If you choose to use ServerGuide to create diskettes and manually install the device drivers, use the following instructions to complete the device driver installation.

1. Insert the diskette labelled *Advanced System Management Device Driver Diskette* into the primary diskette drive.

   > **Note**
   >
   > For additional information, review the README file on the diskette.

2. Open an operating-system specific window or full screen.
3. Type the following command; then, press **Enter**:
   - For Microsoft Windows NT operating system:
     `a:\nt\setup`
   - For Novell NetWare operating system: `load a:\netware\setup`
4. You will receive a prompt indicating the location (path and directory) where the device drivers (files) will be placed, and asking you if you want the files to be placed in a different location.
   - If you want the files to be placed in the indicated directory, press Enter.
   - If you want the files to be placed in a different directory, type the desired directory name and then press Enter. Be sure to use a valid directory name, and include the complete path, when the prompt appears.
5. The required device drivers (files) for the operating system will be copied onto the hard disk, in the directory that you selected in step 4.
   - For Microsoft Windows NT operating system, the registry is updated and all device drivers are loaded automatically. The device drivers will run immediately.
   - For Novell NetWare operating system, the AUTOEXEC.NCF file will be updated.
6. Remove the diskette from the diskette drive.
7. If you have the Microsoft Windows NT operating system you have completed the device-driver installation procedure.

8. If you have the the Novell NetWare operating system:
    a. Perform the shutdown procedure for the operating system. Refer to the operating system documentation for instructions.
    b. Press Ctrl+Alt+Del to restart the server. The device drivers are loaded automatically. The device drivers will run immediately. You have completed the device-driver installation procedure.

--- **Notes** ---

1. To obtain the most current device drivers for the server, go to http://www.ibm.com/support/ on the World Wide Web and download the files to the server.
2. You can also use the System Updates and Applications CD to connect to a dedicated IBM FTP server where you can check for updates.

Configuring the Advanced System Management hardware without

Systems Management software

ServerGuide includes a configuration utility that enables you to configure the Advanced System Management (ASM) PCI Adapter or Processor without using the Systems Management software. With the configuration utility, you can:

- Set Alert Settings to enable or disable alert functions
- Configure Dial In/Out settings
- Set General Settings, including the Name and Number that identifies this Advanced System Management hardware, the date and time reported by the ASM hardware, assorted time-out values, and schedule a time for the system to be turned on
- Configure Modem settings
- Configure Network settings

You can start the configuration utility in one of two ways:

- Access the server system partition and start the Advanced System Management Configuration Utility.

  If you used ServerGuide to configure the xSeries server **and** creation of a system partition is supported on the server (see the ServerGuide information that is shipped with the server for more information), the Advanced System Management Configuration Utility may be available from the the system partition menu. See the ServerGuide CD for more information.

- Start the system using an Advanced System Management Configuration Utility diskette.

  If the system does not have a system partition, you can use ServerGuide CD to create an Advanced System Management Configuration Utility diskette. After you create this diskette, place it in the server diskette drive and then restart the server. The configuration utility starts automatically.

To use the configuration utility:

1. Insert the Advanced System Management CD-ROM into the CD-ROM drive and restart the system. If the system does not start from the CD-ROM, use POST/BIOS setup to configure the CD-ROM drive as a boot device. Please refer to the Server Library that was included with the system for additional information.
2. After the system starts, the main option menu will open. The main menu contains the following selections:
   - Hardware Status and Information
   - Configuration Settings
   - Exit Utility

Use the up and down arrow keys to highlight the options. Online help is available for each option by pressing F1 while the option is highlighted. General help is available by pressing F1 from one of the help windows. To select an option, highlight it and then press Enter.

3. Highlight an option and then press Enter.

Alert Settings: Use this window to enable or disable all Critical, Non-Critical, and System alerts supported by the ASM hardware.

Use the arrow keys and the Tab key to move between the fields. Use the left and right arrow keys to enable or disable each of the alerts. For online help, press F1. When you have finished, press F6 to save and return to the main option menu. To return to the main option menu without saving, press Esc.

Dial In/Out Settings: This window is divided into two sections:

- Dial In (used to configure dial in settings)
- Dial Out (used to configure dial out settings).

To use the Dial In portion of this window, use the Tab key or the arrow keys to move the cursor to **User Profile to Configure**. Then use the left and right arrow keys to select a User Profile. Once you have selected a User Profile, you can set the following values:

- Login ID
- Password
- Dialback (enable or disable)
- Number (used for dialback only)
- Read Only Access (enable or disable)
- Dial In (enable or disable)
- Dial In Delay (minutes)

When you have finished, press F6 to save and return to the main option menu. To return to the main option menu without saving, press Esc.

To use the Dial Out portion of this window, use the Tab key or the arrow keys to move the cursor to **User Profile to Configure**. Then use the left and right arrow keys to select a User Profile. Once you have selected a User Profile, you can set the following values:

- Login ID
- Password
- Enable or disable the currently selected entry
- Number
- PIN
- Connection Type (numeric, alphanumeric, serial, TCPIP)
- Description
- Dialout Retry Limit

- Dialout Number Spacing
- Dialout Retry Delay

When you have finished, press F6 to save and return to the main option menu. To return to the main option menu without saving, press Esc.

General Settings: Use the General Settings configuration window to:

- Set the identifying Name and Number for this Advanced System Management hardware
- Set the time and date of the ASM clock
- Schedule a time and date for the system to be automatically turned on
- Specify POST, Loader, and O/S Timeout values or the Power Off Delay value.

The Name and Number are for your use, and can help you identify these systems on the network. The Name and Number values can be up to 15 characters in length.

Use the arrow keys and the Tab key to move between the fields. For online help, press F1. When you have finished entering the values, press F6 to save the values and return to the main option menu. To return to the main option menu without saving, press Esc.

Modem Settings Use the Modem Settings window to configure the modem that is used by the ASM hardware.

Network Settings: Use the Network Settings configuration window to set the network interface settings of the Advanced System Management PCI Adapter. You can set the following settings:

- Network Interface
- Enable (or Disable) the network interface
- Host Name
- IP Address
- Subnet Mask
- Gateway
- Line Type
- Routing
- Data Rate
- Duplex
- MTU Size
- MAC Address

Use the arrow keys and the Tab key to move between the fields. For online help, press F1. When you have finished entering the Network Settings values, press F6 to save the values and then press F9 to reset the Advanced System Management PCI Adapter. To return to the main option menu without saving, press Esc.

Note

The Advanced System Management PCI Adapter
must be reset before changes to the Network Settings
will take effect. Be sure to press F9 after you have
changed Network Settings.

Using the System Management Processor without Netfinity Manager

This chapter describes how to use the System Management processor without Netfinity Manager.

If you are unable to use Netfinity Manager to access and manage the System Management processor, you can use a terminal program and a modem to connect directly to the System Management processor. Connect this modem to serial port A (COM1) or management port C (COM2) to use the remote functions. (Refer to the "Hardware Information" section of this *Server Library* for information on the server serial port A (COM1) and management port C (COM2).

When connected, you will be able to access a variety of monitor, configuration, and error log data. You can also:

- Turn the remote server on or off
- Shut down and restart the server
- Initiate remote video mode on the System Management processor

  Remote video mode enables you to remotely monitor all text generated during POST. All POST data will be displayed in the terminal program window as the remote system completes POST. While you are monitoring POST on the remote system, all local keystrokes are relayed automatically to the remote system, enabling you to use POST utilities (such as system configuration, redundant array of independent disks (RAID) mini-configuration program, and diagnostic programs) that can be accessed during POST.

Establishing a Direct Connection to the System Management Processor: **To use a terminal program to establish a direct connection with the System Management processor:**

1. Use a terminal program to establish a connection with the System Management processor modem.

   Use the following modem settings:

Baud	57.6 k
Data Bits	8
Parity	None
Stop Bits	1
Flow Control	Hardware

2. Dial the System Management processor.
3. Log in to the System Management processor.

   When you have established a connection with the System Management processor, you will be prompted for a user name and password. You must provide a user name and password combination that has been previously configured for use with the System Management processor.

   You can use one of two user name and password combinations:

   - The default user name (USERID) and password (PASSW0RD)

     > **Note**
     >
     > The default user name and password are case sensitive. You must use *ALL CAPS*, and the "0" in PASSW0RD is the numeral zero.

   - A user name and password that you define using the System Management processor and Netfinity Manager

     > **Note**
     >
     > The user name and password can also be defined using the configuration utility. See "Dial In/Out Settings" on page 65.

   > **Important**
   >
   > For security purposes, change the user name and password using the System Management processor.
   >
   > If you update the System Management processor microcode, the default user name (USERID) and password (PASSW0RD) are reset. If you had previously changed them, you will need to change them again.

System Management Processor Menus:

When you log into the System Management processor, the following main menu opens:

```
2 Monitors
3 Error Logs
4 SP Configuration
5 System Services
6 System Power
7 Boot
B Remote Terminal Status
R Remote SP Access
Y Disconnect Current Logon
Z Start Remote Video
```

To access a menu item, press the number or letter that corresponds to the information that you want to access. After you select a menu item, subsequent menus will offer more specific information that pertains to the selection you made from the main menu. To return to the main menu, press the Esc key.

> **Note**
>
> - Selecting **Y Disconnect Current Logon** ends the current session and requires you to enter a new user name and password before continuing.
> - Selecting **Read** displays the entry.
> - Selecting **Read Next** steps through the entries.
> - Selecting **Write** executes the command.

Menu Selection	Data Available for Viewing
Monitors	DASD backplane temperature, ambient temperature, microprocessor temperatures, voltage readings, voltage regulator module readings, fan status
Error Logs	Contents of system error log
SP Configuration	System Management processor modem configuration, dial-out entries, dial-out alerts, dial-in logins, system status, thresholds, system statistics, vital product data (VPD) information, and system state
System Services	Status of System Management processor watchdog timers and event alerts sent to the host system.
System Power	Current system power status, power-off configuration, and power-off delay values > **Note** > You can use selections available from the System Power menu to power the system on or off. For more information, see "System Power Menu Selections" on page 71.
Boot	You can use selections available from the Boot menu to shut down and restart the system or to restart the System Management processor. For more information, see "Boot Menu Selections" on page 72.

Menu Selection	Data Available for Viewing
Remote Terminal Status	Current remote terminal status
Remote SP Access	Use Remote SP Access to connect to other Advanced System Processors using the Advanced System Management Interconnect Network.
Start Remote Video	Use **Start Remote Video** to enable the terminal program to remotely monitor and manage the server during POST. For more information, see "Using Remote Video Mode to Monitor and Access POST" on page 74.

When you are finished accessing the System Management processor using a terminal program, select **Disconnect Current Logon** from the main menu and then use the terminal program to close the connection to the System Management processor.

System Power Menu Selections: You can use the selections available from the System Power menu to:

- View data regarding the current server power status
- View data regarding the server power configuration
- Power the server off
- Power the server on

To access these functions:

1. Use a terminal program to establish a connection with the System Management processor modem.
2. Log in to the System Management processor.

   When you have established a connection with the System Management processor, you will be prompted for a user name and password. You must provide a user name and password combination that has been previously configured for use with the System Management processor. You can use one of two user name and password combinations:

   - The default user name (USERID) and password (PASSW0RD)

     > **Note**
     >
     > The default user name and password are case sensitive. You must use *ALL CAPS*, and the "0" in PASSW0RD is the numeral zero.

   - A user name and password that you define using the System Management processor and Netfinity Manager

     > **Note**
     >
     > The user name and password can also be defined using the configuration utility. See "Dial In/Out Settings" on page 65.

> **Important**
>
> For security purposes, change the user name
> and password using the System Management
> processor.
>
> If you update the System Management processor
> microcode, the default user name (USERID) and
> password (PASSW0RD) are reset. If you had
> previously changed them, you will need to
> change them again.

When you have logged into the System Management
processor, the following main menu opens:

```
2 Monitors
3 Error Logs
4 Service Processor Configuration
5 System Services
6 System Power
7 Boot
B Remote Terminal Status
Y Disconnect Current Logon
Z Start Remote Video
```

3. Select **6 System Power**.

   The following System Power menu opens:

```
1 Current Power Status
2 Power Configuration
3 Power On
4 Power Off
```

4. Select a System Power menu item.
   - Select **1 Current power Status** for information
     about the current server power status.
   - Select **2 Power Configuration** for information
     about the server power configuration.
   - Select **3 Power On** to turn the server on (if it is
     currently off).
   - Select **4 Power Off** to turn the server off (if it is
     currently on).

Boot Menu Selections: You can use the
selections available from the Boot menu to:

- Shut down the server operating system and then
  restart the server
- Restart the server immediately, without first
  performing an operating system shutdown
- Restart the System Management processor

To access these functions:

1. Use a terminal program to establish a connection with
   the System Management processor modem.
2. Log in to the System Management processor.

   When you have established a connection with the
   System Management processor, you will be prompted
   for a user name and password. You must provide a

user name and password combination that has been previously configured for use with the System Management processor. You can use one of two user name and password combinations:

- The default user name (USERID) and password (PASSW0RD)

  > **Note**
  >
  > The default user name and password are case sensitive. You must use *ALL CAPS*, and the "0" in PASSW0RD is the numeral zero.

- A user name and password that you define using the System Management processor and Netfinity Manager

  > **Note**
  >
  > The user name and password can also be defined using the configuration utility. See "Dial In/Out Settings" on page 65.

> **Important**
>
> For security purposes, change the user name and password using the System Management processor.
>
> If you update the System Management processor microcode, the default user name (USERID) and password (PASSW0RD) are reset. If you had previously changed them, you will need to change them again.

When you have logged into the System Management processor, the following main menu appears:

```
2 Monitors
3 Error Logs
4 Service Processor Configuration
5 System Services
6 System Power
7 Boot
B Remote Terminal Status
Y Disconnect Current Logon
Z Start Remote Video
```

3. Select **7 Boot**.

   The following Boot menu appears:

   ```
   1 Reboot w/OS Shutdown
   2 Reboot immediately
   4 Restart SP
   ```

4. Select a Boot menu item.
   - Select **1 Reboot w/OS Shutdown** to shut down the server operating system and then restart the server.

- Select **2 Reboot immediately** to restart the server immediately, without first shutting down the operating system.
- Select **4 Restart SP** to restart the System Management processor.

Using Remote Video Mode to Monitor and Access POST:

You can use a terminal program to remotely monitor all text generated during POST. All POST data will be displayed in the terminal program window as the remote system completes POST. While you are monitoring POST on the remote system, all local keystrokes are relayed automatically to the remote system, enabling you to use POST utilities (such as system configuration, RAID mini-configuration program, or diagnostic programs) that can be accessed during POST.

To use Remote Video Mode to monitor and access POST on the server:

1. Use a terminal program to establish a connection with the System Management processor modem.
2. Log in to the System Management processor.

   When you have established a connection with the System Management processor, you will be prompted for a user name and password. You must provide a user name and password combination that has been previously configured for use with the System Management processor. You can use one of two user name and password combinations:

   - The default user name (USERID) and password (PASSW0RD)

     > **Note**
     >
     > The default user name and password are case sensitive. You must use *ALL CAPS*, and the "0" in PASSW0RD is the numeral zero.

   - A user name and password that you define using the System Management processor and Netfinity Manager

     > **Note**
     >
     > The user name and password can also be defined using the configuration utility. See "Dial In/Out Settings" on page 65.

> **Important**
>
> For security purposes, change the user name
> and password using the System Management
> processor.
>
> If you update the System Management processor
> microcode, the default user name (USERID) and
> password (PASSW0RD) are reset. If you had
> previously changed them, you will need to
> change them again.

When you have logged into the System Management
processor, the following main menu appears:

```
2 Monitors
3 Error Logs
4 Service Processor Configuration
5 System Services
6 System Power
7 Boot
B Remote Terminal Status
Y Disconnect Current Logon
Z Start Remote Video
```

3. Start (or restart) the server.
   - If the remote server is currently off:
     a. Select **6 System Power** from the main
        menu.
     b. Select **4 Power On** from the System Power
        menu.
   - If the server is currently turned on, you must
     restart the server. You can use selections from
     the System Power menu or the Boot menu to
     restart the server in several ways.

     To restart the server using System Power menu
     selection:
     a. Select **6 System Power** from the main
        menu.
     b. Select **3 Power Off** from the System Power
        menu.
     c. Once the server has powered off, select **4
        Power On** to restore power to the server.

     To restart the server using Boot menu
     selections:
     a. Select **7 Boot** from the main menu.
     b. Select either **1 Reboot w/OS Shutdown** or
        2 Reboot immediately to restart the
        server.

     > **Note**
     >
     > For information on the System Power and
     > Boot menus, see "System Power Menu
     > Selections" on page 71 and "Boot Menu
     > Selections" on page 72.

4. After you restart the server, return to the main menu and select **Z Start Remote Video**.

Once you have started Remote Video mode on the System Management processor, all text generated during POST will be sent to the terminal window. The terminal will also act as a fully-active remote session, enabling you to enter keyboard commands that will be sent to the remote server. In this way, you can enter key commands and key-combinations that access POST operations and utilities, such as system setup or the RAID mini-configuration program.

When you have finished using Remote Video mode, press Ctrl+R; then, press Ctrl+E; and then, press Ctrl+T. This will end Remote Video mode and return you to the main menu.

Setting up and using the Advanced System Management Interconnect Network

This appendix includes information on how to configure and connect the system to function within an Advanced System Management (ASM) Interconnect network. The ASM Interconnect network can include as many as 12 individual ASM connections in a single bus. Once the systems are connected they use the ASM Interconnect network to share Advanced System Management information and resources. By connecting the Advanced System Management Processors and Advanced System Management PCI Adapters to an ASM Interconnect network, you can:

- Connect the Advanced System Management Processors and Advanced System Management PCI Adapters of up to 12 servers to a single ASM Interconnect bus.
- Share Advanced System Management resources, information, and alerts between multiple systems without having to add additional communications hardware or network interface adapters.
- Use an Advanced System Management PCI Adapter that is connected to the ASM Interconnect bus as an Ethernet or Token Ring gateway for the ASM Interconnect bus, enabling all Advanced System Management information generated by servers attached to the ASM Interconnect bus to be forwarded to other systems on the Ethernet or Token Ring network.

Note

To connect the Advanced System Management PCI Adapter to a Token Ring network you must purchase and install the IBM Netfinity Advanced System Management Token Ring Option (PN 36L9654). To purchase this option, please contact your IBM Authorized reseller.

To connect other systems to the ASM Interconnect network bus, you need an Advanced System Management Interconnect Cable Option (PN 03K9309). To purchase this option, please contact your IBM Authorized reseller.

Once you have installed the Advanced System Management Interconnect Cable option on each of the systems that will be connected to the ASM Interconnect network bus, you need to connect the systems together using standard Ethernet cable. When connecting the systems, be aware of the following setup and configuration considerations:

- The ASM Interconnect network must be set up as a bus, not as a ring. Make sure the servers are connected to the ASM Interconnect network in series, with a beginning point and an end point.
- The total length of all Ethernet cables connecting the systems in the ASM Interconnect network should not exceed 300 feet.
- Each Advanced System management PCI Adapter or Advanced System Management Processor that is connected to the ASM Interconnect network bus counts as 1 connection. For example, if you have installed an Advanced System Management PCI Adapter option in a system that has an Advanced System Management Processor, the Processor and the Adapter are connected to each other using an ASM Interconnect connection and each count as a connection on the ASM Interconnect network bus.

Advanced System Management Interconnect alert forwarding: Advanced System Management PCI Adapters and Advanced System Management Processors that are connected to an ASM Interconnect network share resources and system management information. This section provides information on how alerts are shared and forwarded in the ASM Interconnect network.

During normal operation, each Advanced System Management Processor or PCI Adapter on the ASM Interconnect network communicates with the other processors and adapters on the network. Processors or adapters that have a modem, Ethernet, or Token Ring connection "tell" the other processors and adapters that these communications resources are available for use by other systems on the ASM Interconnect network. These communications resources can now be used as ASM Interconnect network resources, enabling any Advanced System Management Processor or PCI Adapter on the ASM Interconnect network to send alerts to a modem or an IP address, even if they do not have a modem or network connection physically attached.

As they generate alerts, the alerts are forwarded to the Advanced System Management Processor or PCI Adapter on the ASM Interconnect network that has the communications resources necessary to forward the alert. If no system on the ASM Interconnect network meets the requirements, the alert is not forwarded and is discarded.

If multiple modems or multiple network connections exist in the ASM Interconnect network, you cannot specify which system will receive an alert or which will use its modem or network connection to forward the alert. If an alert is forwarded to another Advanced System Management Processor or PCI Adapter that is unable to deliver the alert

(for example, the modem it is configured to use has failed or the network cannot resolve the destination IP address), the processor or adapter will attempt to forward the alert, to another system on the ASM Interconnect network that has the resources necessary to forward the alert as requested. If another system with the necessary resources is not available or the alert still cannot be forwarded it is discarded.

Sample Advanced System Management Interconnect configurations: The following illustrations present sample ASM Interconnect network configurations that you can use. In this example, a modem has been connected to the Advanced System Management PCI Adapter that is included with a Netfinity 7000 M10 and an Advanced System Management PCI Adapter option has been installed in a Netfinity 5000. In this case, the Netfinity 5000 with the Advanced System Management PCI Adapter will act as a network gateway, forwarding system management data generated by the other systems in the ASM Interconnect network bus to system management administration system connected to the network. The Netfinity 7000 M10 has been configured to use a modem to forward the system management data to the administrator as well, providing redundancy in case of network failure.
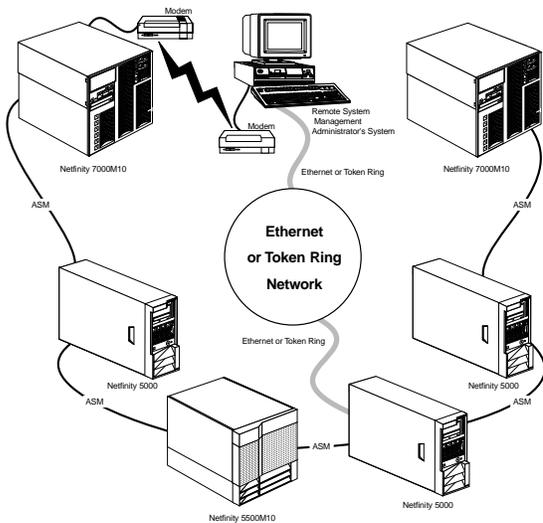
In this example, a modem has been connected to the
Advanced System Management Processor in a Netfinity
5000. In this case, the Netfinity 5000 will use the modem
to forward system management data generated by the
other systems in the ASM Interconnect network bus to the
remote system management administrator.
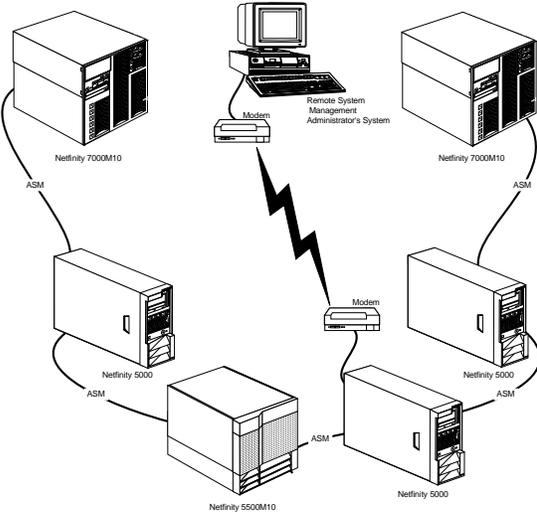
In this example, modems have been connected to the
Advanced System Management PCI Adapter that is
included with Netfinity 7000 M10 servers at each end of
the ASM Interconnect network bus. Placing modems at
opposite ends of the ASM Interconnect network bus
ensures that if an ASM Interconnect connection in the bus
fails all of the systems will still have access to a modem to
forward system management data to the remote system
administrator.
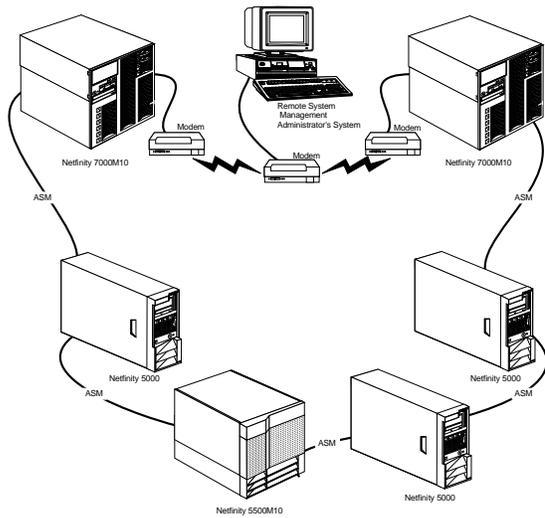
Locations/Removals

The following information supports the xSeries 240 server.

Controls and indicators

The most commonly used controls and indicators on the front of the server appear in the following illustrations.

Tower model
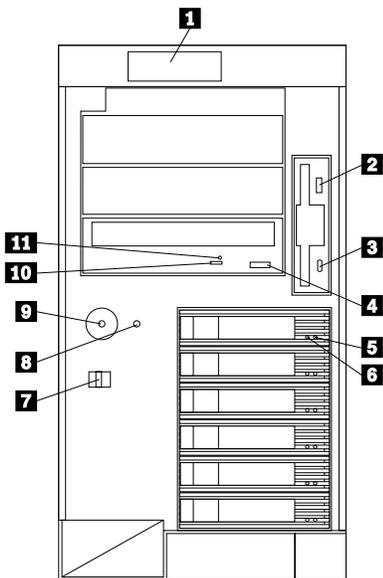
Rack model
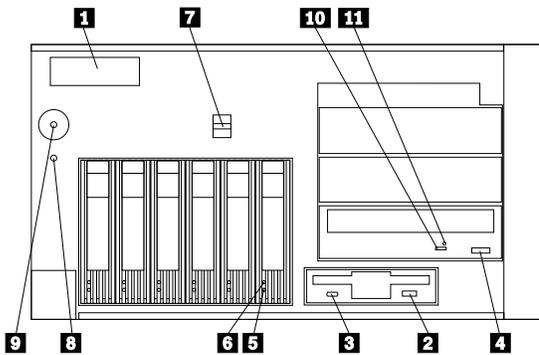
1. **Operator Information Panel:** The lights on this panel give status information for the server. See "Operator information panel" for more information.

2. **Diskette-Eject Button:** Press this button to eject a diskette from the drive.

3. **Diskette Drive In-Use Light:** When this light is on, the diskette drive is being accessed.

4   **CD-ROM Eject/Load Button:** Press this button to eject or retract the CD-ROM tray so that you can insert or remove a CD.

5   **Hard Disk Status Light:** Each of the hot-swap drive bays 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.

6   **Hard Disk Activity Light:** Each of the hot-swap drive bays has a Hard Disk Activity light. When this green light is flashing, the drive is being accessed.

7   **Cover Release Lever:** Use this lever to release the left-side cover on the tower model or the top cover on the rack model.

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

9   **Power Control Button:** Press this button to manually turn the server on or off.

Caution

The power control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.

The 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 the 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.
- The server can also be powered on by the System Management Processor.

The server can be deactivated as follows:
- 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 the 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 the system to stop running. Watch for the System Power light on the operator information panel to stop blinking.

10 **CD-ROM Drive In-Use Light:** When this light is on, the CD-ROM drive is being accessed.

11 **CD-ROM Manual Tray-Release Opening:** Insert a straightened paper clip in the opening to release the CD-ROM tray when using the CD-ROM eject button is not successful.

Operator information panel

The operator information panel on the front of the server contains status lights.
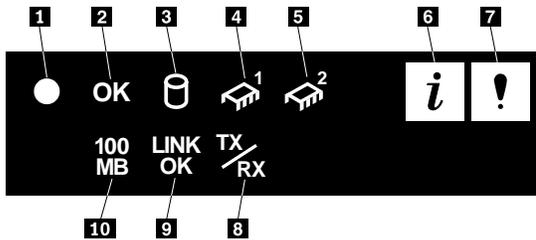
1 **System Power Light:** When this green light is on, system power is present in the server. When this light flashes, the server is in standby mode (the system power supply is turned off and AC current is present). When this light is off, either a power supply, AC power, or a light has failed.

> **Attention**
>
> If this light is off, it does not mean there is no electrical current present in the server. The light might be burned out. To remove all electrical current from the server, you must unplug the server power cords from the electrical outlets.

2 **System POST Complete Light:** This green light is on when the power-on self-test (POST) completes without any errors.

3 **SCSI Hard Disk Drive Activity Light:** This green light is on when there is activity on a hard disk drive.

4 **Processor 1 Activity Light:** This green light is on when there is microprocessor 1 activity.

5 **Processor 2 Activity Light:** This green light is on when there is microprocessor 2 activity.

6 **Information Light:** This amber light is on when the information log contains information about certain conditions in the server that might affect performance. For example, the light will be on if the server does not have redundant power. A light on the diagnostic LED panel will also be on. (For more information, see "Status LEDs" on page 190.)

7 **System Error Light:** This amber light is on when a system error occurs. A light on the diagnostic LED panel will also be on to further isolate the error. (For more information, see "Status LEDs" on page 190.)

8 **Ethernet Transmit/Receive Activity Light:** When this green light is on, there is transmit or receive activity to or from the server.

9 **Ethernet Link Status Light:** When this green light is on, there is an active connection on the Ethernet port.

10 **Ethernet Speed 100 Mbps:** When this green light is on, the Ethernet speed is 100 Mbps. When the light is off, the Ethernet speed is 10 Mbps.

Input/output connectors and expansion slots

The following illustrations show the expansion slots and the input/output connectors (ports) on the rear of the server.

Tower model
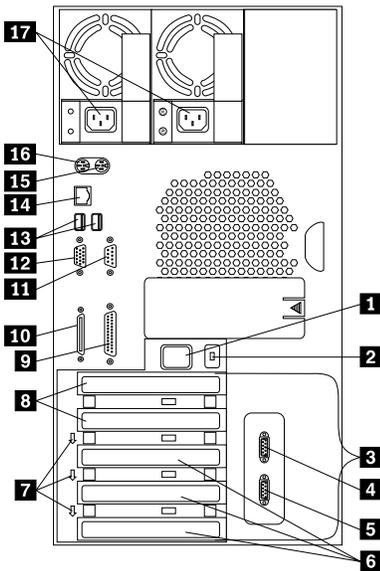
Rack model
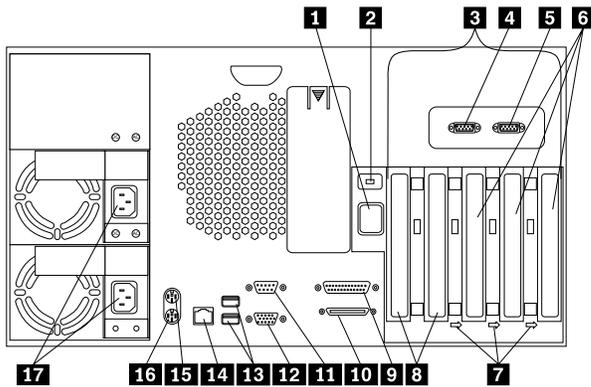
1   **Advanced System Management Interconnect Knockout:** The server has an external connector knockout for the Advanced System Management Interconnect option. This option allows you to connect rack or multirack systems through a daisy-chain cable in half-duplex mode.

2   **External Connector Knockout:** The server has an external connector knockout that can be used when you install options.

3   **PCI Expansion Slots:** The server has five available peripheral component interconnect (PCI) expansion slots. Three of the PCI slots support hot-plug PCI adapters.

Many adapters provide bus-master capabilities, which enable the adapters to perform operations without interrupting the system microprocessors.

4   **Serial A Connector:** A serial signal cable for a modem or other serial device connects to this 9-pin serial connector. Serial port A can be shared by the System Management Processor and the operating system. See "Devices and I/O Ports" on page 25 for port assignment information. If you are using a 25-pin signal cable, you need a 9-pin-to-25-pin adapter cable.

5   **Serial B Connector:** A serial signal cable for a modem or other serial device connects to this 9-pin serial connector. Serial port B is used by the operating system and cannot be shared by the System Management Processor. See "Devices and I/O Ports" on page 25 for port assignment information. If you are using a 25-pin signal cable, you need a 9-pin-to-25-pin adapter cable.

6   **Hot-Plug PCI Expansion Slots:** The server has three hot-plug PCI expansion slots.

7 **Attention Lights for Hot-Plug PCI Slots:** Each hot-plug PCI slot has an Attention light that is visible from the rear of the server. An Attention light flashes approximately once per second when it is on. The meaning of the Attention lights is defined by the operating system. Refer to the operating system documentation to determine if it supports hot-plug PCI adapters and, if so, what the Attention lights indicate.

8 **Non-Hot-Plug PCI Expansion Slots:** The server has two non-hot-plug PCI expansion slots.

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

10 **SCSI Connector:** External SCSI devices attach here. For more information, see "Connecting external options" on page 142.

11 **Management Port C Connector:** This connector is used to attach a modem that is dedicated to communication with the System Management Processor.

12 **Video Connector:** The monitor signal cable connects here.

13 **Universal Serial Bus 1 and 2 Connectors:** You can attach an I/O device to either of these universal serial bus (USB) connectors. USB 2 is the connector nearest to the edge of the server. You need a 4-pin cable to connect a device to USB 1 or 2.

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

14 **Ethernet Connector:** The server has one RJ-45 Ethernet connector. This connector is for attaching the network cable to the integrated 10BASE-T or 100BASE-TX, twisted-pair transceiver.

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

16 **Keyboard Connector:** The keyboard cable connects here.

17 **Power Connectors:** The power cords for the power supplies connect here.

Note

For pin assignments and other details about these
connectors, see "Connecting external options" on
page 142.

Power backplane/backplate assembly removal

─── **Notes** ───

1. The illustrations in this book are similar to the server; details might vary.
2. To replace the power backplane/backplate assembly, reverse this procedure.

To remove the power backplane/backplate assembly, do the following.

1. Power-off the server and all external devices; then, disconnect the server from the power source.
2. Remove the server cover. See "Removing the left-side cover (tower model)" on page 99 or "Removing the cover (rack model)" on page 100.
3. Remove the power supplies. See "Installing a hot-swap power supply" on page 131.
4. Disconnect the power backplane/backplate assembly cables.
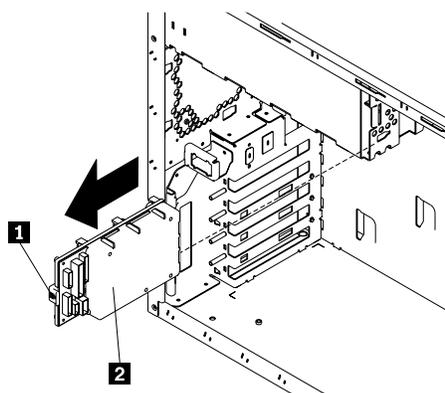
5. Release the power backplane/backplate assembly latch **1** ; then, slide the power backplane/backplate assembly **2** out of the server.

Power supplies

The following illustrations show the power supplies and
power lights on the server. The server comes with two
hot-swap power supplies installed. You can install a third
power supply. See "Installing a hot-swap power supply" on
page 131 for instructions about installing an additional
power supply and information about power redundancy.)

Note

See "Power cords" on page 222 for information about
power cords for use with the server in your country or
region.

Tower model
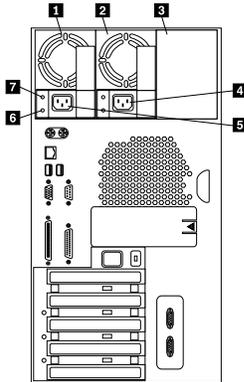
Rack model
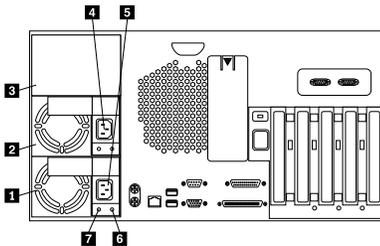
1   **Power Supply 1:** The server comes with two
    hot-swap power supplies installed. (See "Installing
    a hot-swap power supply" on page 131 for
    instructions about installing an additional power
    supply and information about power redundancy.)

2   **Power Supply 2:** The server comes with two
    hot-swap power supplies installed.

3   **Filler Panel**: You can remove this filler panel and install a third hot-swap power supply on power supply bay 3.

4   **Power Supply 2 Power Connector:** The power cord for power supply 2 connects here.

5   **Power Supply 1 Power Connector:** The power cord for power supply 1 connects here.

6   **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 190 for more information.

7   **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 190 for more information.

Air circulation

The server and monitor produce heat. The server has one or more fans that pull in fresh air and force out hot air. The monitor lets hot air escape through vents. Blocking the air vents can cause overheating, which might result in a malfunction or damage. Place the server and monitor so that nothing blocks the air vents; usually, 15 cm (6 inches) of air space is sufficient. Also, make sure the vented air is not blowing on someone else.

Before you begin installing options

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

- Become familiar with the safety and handling guidelines specified under "Safety information" on page 224. These guidelines will help you work safely while working with the server or options.
- You do not need to turn off the server to install or replace hot-swap power supplies, hot-swap drives, hot-swap fans, or hot-plug PCI adapters.
- The orange color on components and labels in the server indicates hot-swap or hot-plug components. This means that you can install or remove the component while the system is running, provided that the system is configured to support this function. For complete details about installing or removing a hot-swap or hot-plug component, see the information provided in this chapter.
- The blue color on components and labels indicates 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 the server,

monitor, and any other options that you intend to install.

- Place the server in a location that is dry. Rain or spilled liquids might damage the server.
- Be sure to leave 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.
- Leave about 50 mm (2 inches) of ventilated space on the right and left sides of the server to allow the server cooling system to work properly. Leave 100 mm (4 inches) of clearance at the rear of the server for cables.
- Have a supply of 1 MB and 2 MB, 3.5-inch diskettes available.
- 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 the xSeries 240 server, refer to http://www.ibm.com/pc/us/compat on the World Wide Web.

Working inside a xSeries 240 server with power on

The xSeries 240 server is designed with special features that make it highly available. These features include hot-plug PCI expansion slots and hot-swap fans. You can add or replace PCI adapters (if supported by the operating system) or replace a fan which no longer functions. In the past you would need to power off the server and disconnect power to perform these operations. With the hot-plug features you remove the cover of the server with the power on — something most people have not done before.

The xSeries 240 server is designed to operate safely while powered on with the cover removed. The server is designed to protect you and the server. Here are some simple guidelines to follow when you work inside a xSeries 240 server that is powered on:

- Avoid loose-fitting clothing on your forearms. Button long-sleeved shirts before working inside the server; do not wear cufflinks while you are working inside the server.
- Do not allow your necktie to hang inside the server.
- Remove jewelry, such as bracelets 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.

Preparing to install options

Note

You do not need to turn off the server to work with hot-plug or hot-swap devices, such as hot-plug PCI adapters, hot-swap hard disk drives, hot-swap power supplies, and hot-swap fans.

If you are:

- Installing or removing a hot-plug PCI adapter, go to "Working with adapters" on page 103.
- Installing or replacing a hot-swap hard disk drive, go to "Installing internal drives" on page 120.
- Installing or replacing a hot-swap power supply, go to "Installing a hot-swap power supply" on page 131.
- Removing a hot-swap power supply, go to "Removing a hot-swap power supply" on page 133.
- Replacing a hot-swap fan, go to "Replacing a hot-swap fan assembly" on page 135.
- Installing or removing an option not listed in the preceding list, continue with the following steps.

1. Unlock and open the server door.

⚠

Caution

If the device has doors, be sure to remove or secure the doors before moving or lifting the device to avoid personal injury. The doors will not support the weight of the device.

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

⚠

⚠

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.
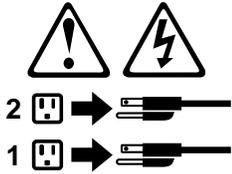
3. Unplug all power cords (cables) from electrical outlets.
4. Note the location of the remaining cables and cords; then disconnect them from the back of the server.

┌─ **Danger** ─────────────────────────┐

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

To avoid a shock hazard:

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

└──────────────────────────────────────┘

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

If you are:

- Installing or removing a non-hot-plug adapter, go to
  "Working with adapters" on page 103.
- Installing or removing a microprocessor, go to
  "Installing a microprocessor kit and VRM" on
  page 113.
- Installing or removing a memory-module kit, go to
  "Installing memory-module kits" on page 117.
- Installing or removing a drive in a non-hot-swap drive
  bay, go to "Installing internal drives" on page 120.

Removing the left-side cover (tower model)

> **Before you begin:**
>
> Read "Safety information" on page 224.

> **Note**
>
> The illustrations in this book are similar to your server; details might vary.
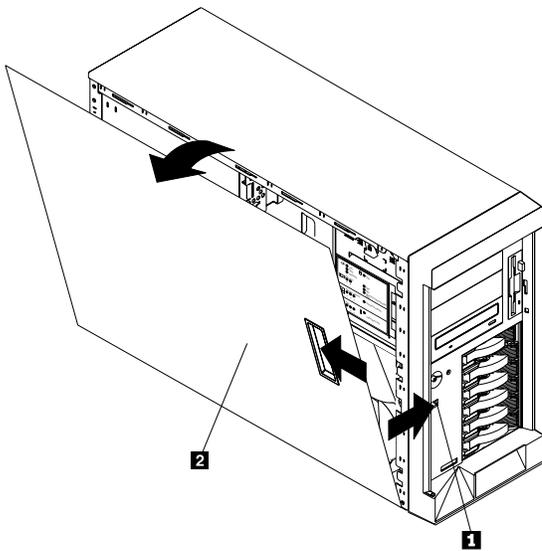
1 Cover-release latch
2 Cover

To remove the left-side cover of the tower model or the top cover of the rack model:

1. If you are planning to install or remove any part other than a hot-swap hard disk drive, hot-plug adapter, hot-swap power supply, or hot-swap fan, turn off the server and all attached devices and disconnect all external cables and power cords (see "Preparing to install options" on page 96).
2. Slide the cover-release lever 1 on the front of the server to release the cover and slide the cover 2 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.

Removing the cover (rack model)

Before you begin:

Read "Safety information" on page 224.

Note

The illustrations in this book are similar to your server;
details might vary.

---
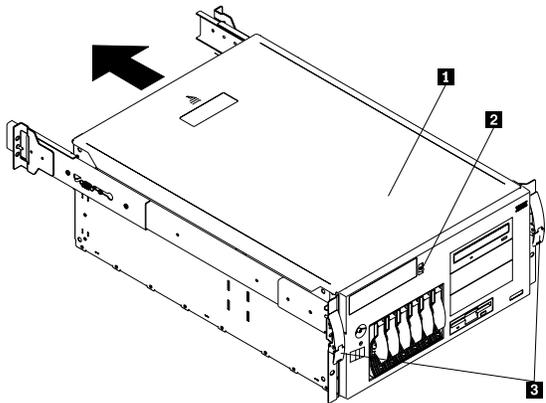
1 Top cover
2 Cover-release latch
3 Side latches

To remove the server top cover:

1. If you are planning to install or remove any part other
   than a hot-swap hard disk drive, hot-plug adapter,
   hot-swap power supply, or hot-swap fan, turn off the
   server and all attached devices and disconnect all
   external cables and power cords (see "Preparing to
   install options" on page 96).
2. Release the left and right side latches 2 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 easily reach the cables on the back of the server.

3. Move the cover-release lever **3** down while sliding the top cover **1** 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):

Refer to the following illustration while you perform the steps in this procedure.
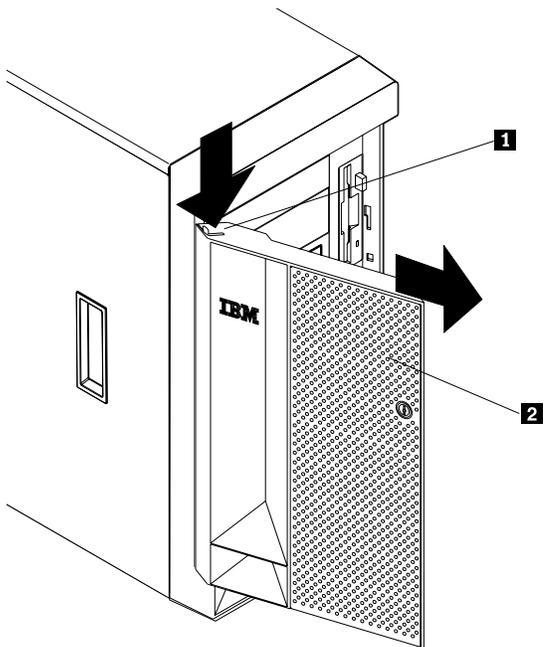
1 Flange
2 Server door

To remove the server door:

1. Unlock and open the server door **2** .

2. Locate the flange **1** 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 trim bezel: Refer to the following illustrations while you perform the steps in this procedure.

Tower model
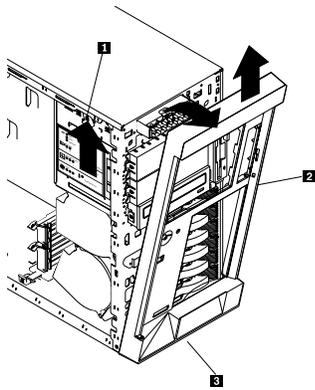
Rack model
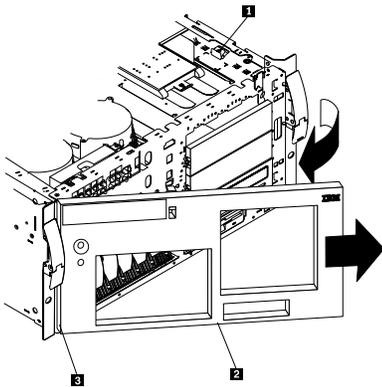
1 Bezel-release lever
2 Trim bezel
3 Side with bezel tabs and slots

To remove the trim bezel:

1. Move the blue bezel release lever **1** following the curve of the lever opening.
2. Lift the bezel tabs out of the slots **3** and pull the bezel **2** away from the server front. Store the bezel in a safe place.

Working with adapters

You can add adapters to extend the capabilities and power of the server. Many adapters provide bus-master capabilities, which enable the adapters to perform operations without interrupting the server's microprocessor.

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

In three of the PCI slots, you can install a new PCI adapter or replace an existing PCI adapter with the same type of adapter without turning off the server power and restarting the system, if these features are supported by the operating system. These slots are called *hot-pluggable* PCI slots. They are also referred to as hot-plug PCI slots.

The two remaining PCI slots support standard (non-hot-plug) PCI adapters.

The server comes with a video controller. This video controller is an integrated component on the system board. It is *not* in an expansion slot. The integrated video controller has super video graphics array (SVGA) technology.

The integrated video controller is not removable. If you want to disable this controller and use a video adapter instead, you can install a video adapter in an expansion slot. When you install a video adapter, the server BIOS automatically disables the integrated video controller.

The following illustration shows the location of the PCI expansion slots on the system board.
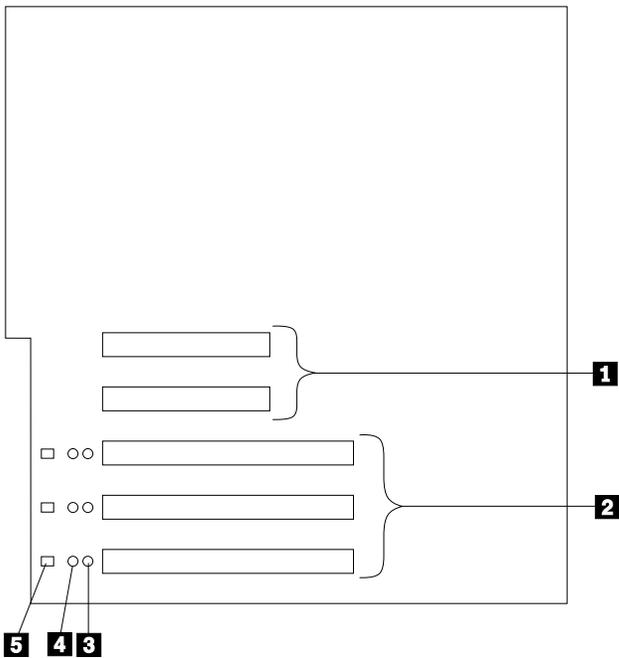
1 Non-hot-plug 32-bit PCI slots 1 and 2 (on PCI bus A)
2 Hot-plug 64-bit PCI slots 3–5 (on PCI bus B)
3 Power LEDs for hot-swap slots
4 Internal Attention LEDs for hot-swap slots
5 External Attention LEDs for hot-swap slots

LEDs for hot-plug PCI slots: Each hot-plug PCI slot has three LEDs associated with it — two Attention LEDs and one Power LED.

- **Power LED:** This LED is on when the hot-plug PCI slot is active and has power. An adapter **must not** be added to or removed from the PCI slot when the Power LED is on. When this LED is off, the PCI slot is inactive and has no power applied. An adapter can be installed when the Power LED for the PCI slot is off. Refer to the operating system documentation to determine if it supports hot-plug PCI adapters, and, if so, how to disable the hot-plug PCI slot.
- **Attention LEDs:** Each hot-plug PCI slot has an Attention LED that is visible from the rear of the server and one that can be seen from inside the server. (The LEDs have the same meaning; they are duplicated to be visible from outside or inside the server.) An Attention LED flashes approximately once per second when it is on. The meaning of the Attention LEDs is defined by the operating system. Refer to the operating system documentation to

determine if it supports hot-plug PCI adapters and, if so, what the Attention LEDs indicate.

The following table describes the LEDs:

Power LED	Attention LED	Description
On	Flashing	The adapter requires attention. **Slot still has power applied.** Do not remove or install an adapter in the slot. Refer to the operating system documentation for instructions.
On	Off	Normal operation; no intervention is required.
Off	Flashing	The adapter requires intervention. **Power is removed from the slot.** An adapter can be removed or installed in the slot.
Off	Off	**Power is removed from the slot.** An adapter can be removed or installed in the slot.

Adapter considerations: Before you continue with the adapter-installation procedure:

- Review 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 the adapter, follow the instructions that come with the adapter documentation.
- You can install full-length adapters in all expansion slots.
- You can install hot-plug PCI adapters in PCI slots 3–5, if the operating system supports this feature. Non-hot-plug PCI adapters can also be installed in these slots.
- The server supports 5.0 V and universal PCI adapters; it does not support 3.3 V adapters.

> **Note**
>
> A universal PCI adapter supports both 3.3 V and 5.0 V operation.

- The 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 3–5 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 the default boot precedence has not been changed: PCI slots 1 and 2, system board SCSI devices, and then PCI slots 3 through 5. See "Start Options" on

page 31 for information about changing the boot precedence.

> **Note**
>
> The performance of the PCI adapters depends on the configuration of adapters in the system.

Enabling hot-plug PCI support: The xSeries 240 server has hot-plug PCI capability. In order to enable this feature, you must install the operating system services for hot-plug PCI support code. To obtain the operating system hot-plug PCI support code, access the IBM Web site at:

`http://www.ibm.com/pc/support`

Click on **IBM Server Support**. From the **select family** field, click on **xSeries 240**. Click on **Downloadable files**.

> **Attention**
>
> All hot-plug operations must be done through the operating system console (or supported user interface). Failure to do this can result in a system hang or serious damage to the adapter card or system unit.

Installing a hot-plug PCI adapter: This section gives the procedure for installing a hot-plug PCI adapter. If you want to remove a hot-plug adapter, reverse the steps. If the operating system supports hot-replace PCI adapters, you can replace a failing hot-plug PCI adapter with a new adapter of the same type without turning off power to the server. If the operating system and adapter also support the hot-add feature, you can install a new adapter without turning off the power to the server.

> **Note**
>
> You do not need to turn the server off to install or remove a hot-plug PCI adapter.

> **Before you begin:**
>
> - Read "Safety information" on page 224.
> - Read the documentation that comes with the adapter for any special requirements or restrictions.
> - Read the documentation that comes with the operating system.

Attention

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

Refer to the following illustrations of the rack model while
you perform the steps in this procedure.
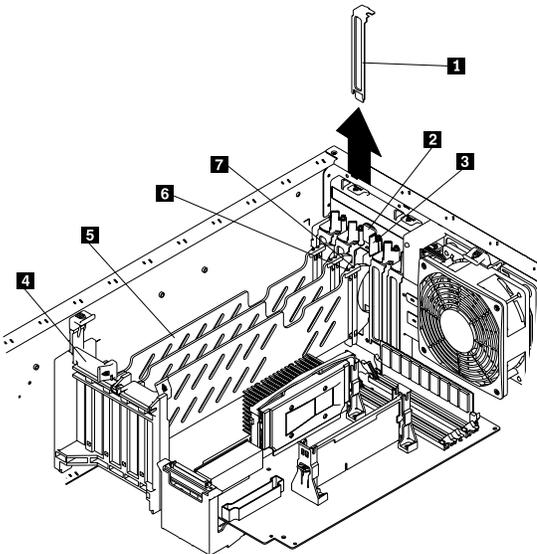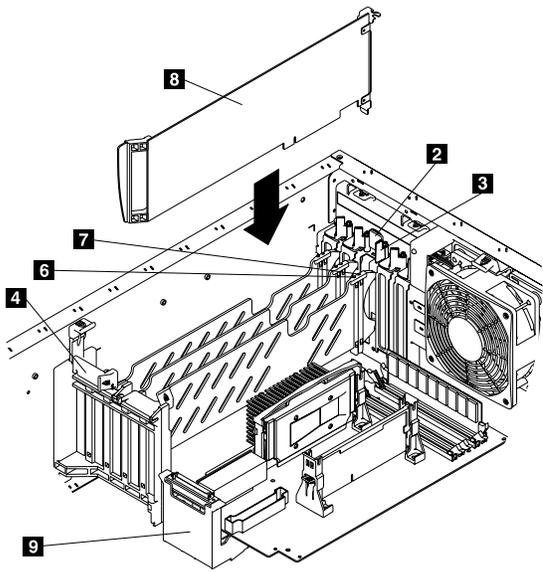
- **1** Expansion-slot cover
- **2** Tab
- **3** Adapter retention latch
- **4** Adapter retention flap
- **5** Plastic divider
- **6** Power light
- **7** Attention light
- **8** Adapter

SCSI cable extender

To install a hot-plug PCI adapter:

1. Remove the cover. See "Removing the left-side cover (tower model)" on page 99 or "Removing the cover (rack model)" on page 100.
2. Determine which PCI adapter expansion slot you will use for the adapter.

   > **Note**
   >
   > Only PCI slots 3–5 can be used for hot-plug PCI adapters.

3. Disable the selected PCI slot from the operating system. (Refer to the documentation that comes with the operating system for information about disabling a hot-plug PCI slot.) Disabling the PCI slot turns off the Power light for that PCI slot.

> **Attention**
>
> Make sure the Power light **6** for the hot-plug PCI slot is off before you continue to the next step.

4. Remove the expansion-slot cover **1**:
   a. Rotate the adapter retention latch **3** counterclockwise.
   b. Lift the tab **2** covering the top of the expansion-slot cover **1** and then remove the expansion-slot cover from the server. Store it in a safe place for future use.

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

5. Refer to the documentation that comes with the adapter for any cabling instructions. It might be easier for you to route any cables before you install the adapter.
6. Press on the touchpoint on the adapter retainer flap **4** at the end of the slot nearest the front of the server and rotate the adapter retainer flap upward.
7. Remove the adapter from the static-protective package.

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

8. Place the adapter, component-side up, on a flat, static-protective surface.
9. Install the adapter **8**:
   a. Carefully grasp the adapter **8** by its top edge or upper corners, and align it with the expansion slot on the system board.
   b. 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. Incomplete insertion might cause damage to the system board or the adapter.

   c. Lower the tab **2** on the adapter guide over the tab on the top corner of adapter. Rotate the adapter retention latch **3** clockwise until it snaps into place.

> **Attention**
>
> Power cannot be restored to the adapter slot if the tab is not lowered into place.

    d. Close the adapter retainer flap **4** .

10. Connect any needed cables to the adapter.

> **Attention**
>
> Route cables so that the flow of air from the fans is not blocked.

11. Enable the PCI slot from the operating system. (Refer to the documentation that comes with the operating system for information about enabling a hot-plug PCI slot.) Make sure that the Power light **6** for the hot-plug PCI slot is on.

12. If you have other options to install or remove, do so now; otherwise, go to "Completing the installation" on page 137.

Installing a non-hot-plug adapter

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

> **Before you begin:**
>
> - Read "Safety information" on page 224.
> - Read the documentation that comes with the option.

Refer to the illustrations in "Installing a hot-plug PCI adapter" on page 106 while you perform the steps in this procedure.

To install a non-hot-plug adapter:

1. Turn off the server and peripheral devices and disconnect all external cables and power cords (see "Preparing to install options" on page 96); then remove the cover. See "Removing the left-side cover (tower model)" on page 99 or "Removing the cover (rack model)" on page 100.

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

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

3. Remove the expansion-slot cover **1** :
   a. Rotate the adapter retention latch **3** counterclockwise.
   b. Remove the expansion-slot cover from the server. Store it in a safe place for future use.

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

4. Refer to the documentation that comes with the adapter for any cabling instructions. It might be easier for you to route any cables before you install the adapter.
5. Press on the touchpoint on the adapter retainer flap **4** at the end of the slot nearest the front of the server and rotate the adapter retainer flap upward.
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 **8** :
   a. Carefully grasp the adapter **8** by its top edge or upper corners, and align it with the expansion slot on the system board.
   b. 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.

   c. Lower the tab **2** on the adapter guide over the tab on the top corner of the adapter. Rotate the adapter retention latch **3** clockwise until it snaps into place.
   d. Close the adapter retainer flap **4** .
10. Connect any needed cables to the adapter.

> **Attention**
>
> Route cables so that the flow of air from the fans is not blocked.

11. If you have other options to install or remove, do so now; otherwise, go to "Completing the installation" on page 137.

Special considerations for installing a RAID adapter:
You can install an optional RAID adapter in the server to control the hot-swap hard-disk drives.

To install the RAID adapter:

1. Disconnect the SCSI cable from the SCSI cable extender on the system board. See the illustration in "Installing a hot-plug PCI adapter" on page 106 for the location of the SCSI cable extender. (The other end of the SCSI cable is connected to the SCSI HDD backplane.) The Service Label on the inside of the cover of the server shows cable routing for an optional RAID adapter.
2. Connect the end of the SCSI cable that you disconnected from the SCSI cable extender to the RAID adapter. The other end of the cable is connected to the SCSI HDD backplane; the drives in the hot-swap bays are now connected to the RAID adapter.
3. Connect the 2-drop SCSI cable to the SCSI cable extender on the system board, and attach the device in the non-hot-swap bay to one of the drops on the other end of the 2-drop SCSI cable. The device is attached to the integrated SCSI controller.

Refer to the documentation provided with the RAID adapter for more information about installing the adapter and configuring a disk array.

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

Installing a microprocessor kit and VRM

Note

To remove a microprocessor and VRM, reverse this procedure.

The server comes with one microprocessor installed on the processor board. If you install an additional microprocessor kit, the 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.

Before you begin:

- Read "Safety information" on page 224.
- Thoroughly 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 the server is available through the World Wide Web. Refer to the "Getting Help Information" section of this *Server Library* for the appropriate World Wide Web addresses.
- 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.

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.

Notes

1. The illustrations in this section might differ slightly from your hardware.
2. To order additional microprocessor options, contact your IBM reseller or IBM marketing representative.
3. The microprocessor that is installed in microprocessor connector U5 is CPU or processor 1. If a microprocessor is installed in microprocessor connector U6, it is CPU or processor 2. If the server has only one microprocessor installed, that microprocessor is installed in microprocessor connector U5 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 U6 is the startup processor and the microprocessor installed in U5 is the application processor.

Note

You can determine the stepping levels of the installed microprocessors using Configuration/Setup. See "System Summary" on page 25.

Refer to the following illustrations while you perform the steps in this section.
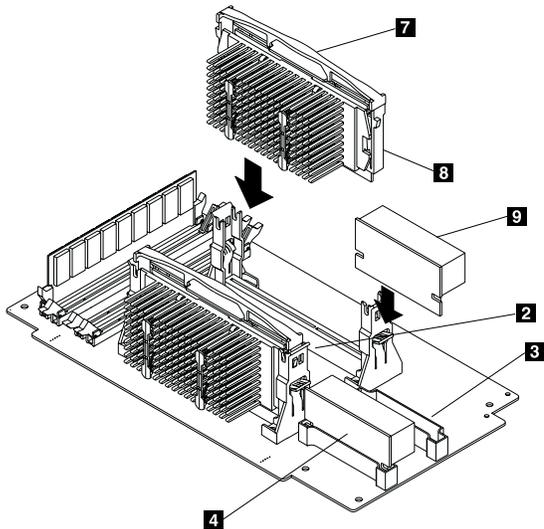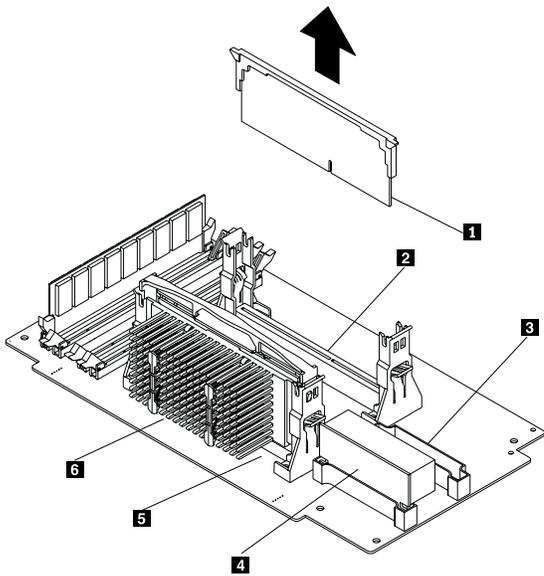
1	Terminator card
2	Microprocessor connector 2 (U6)
3	Voltage regulator module (VRM) connector for second VRM
4	VRM for first microprocessor (VRM 1)
5	Microprocessor connector 1 (U5)
6	Microprocessor 1
7	Microprocessor handle
8	Microprocessor 2
9	VRM for second microprocessor (VRM 2)

To install an additional microprocessor kit:

1. Turn off the server and peripheral devices and disconnect all external cables and power cords (see "Preparing to install options" on page 96); then remove the cover (see "Removing the left-side cover (tower model)" on page 99 or "Removing the cover (rack model)" on page 100).

2. Remove the terminator card **1** from the microprocessor connector **2**. Store the terminator card in a safe place in the static-protective package that the new microprocessor is shipped in; you will need to install it again if you ever remove the microprocessor.

3. 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 **8** over the microprocessor connector **2** and carefully press the microprocessor into the connector.

4. Install the VRM **9** included in the microprocessor kit:

   Attention

   When installing or replacing a VRM, use only VRMs specified for use with the xSeries 240 server. Use of other VRMs might cause the server to overheat.
   ---

   a. Center the VRM **9** over the VRM connector **3**. Make sure that the VRM is oriented and aligned correctly.

   b. Press the VRM into the connector.

      Notes

      1. To remove a microprocessor, pull upward on the microprocessor handle **7**.

      2. If you remove the microprocessor later, remember to install the terminator card in the appropriate microprocessor connector and to remove the VRM for that microprocessor.
      ---

5. If you have other options to install or remove, do so now; otherwise, go to "Completing the installation" on page 137.

Installing memory-module kits

> **Note**
>
> To remove a memory-module kit, reverse this procedure.

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

The server comes with a DIMM installed on the processor board in connector J1. When adding additional memory, install the DIMMs in the following order:

- Install the largest size memory DIMM in connector J1. (J1 is the memory connector farthest from the microprocessor.)

- If you are installing two memory DIMMs, the second should be installed in connector J4. (J4 is the memory connector closest to the microprocessor.)

- If you are installing three memory DIMMs, the second should be installed in connector J4 and the third in connector J3.

- If you are installing four memory DIMMs, the second should be installed in connector J4, the third in connector J3, and the fourth in connector J2.

> **Note**
>
> Except for connector J1, the size of the DIMM in each connector is unimportant.

Refer to the following table for examples of typical memory configurations:

Table 2. Typical memory configurations

J1	J2	J3	J4
512MB			
512MB			128MB
512MB		256MB	128MB
512MB	512MB	256MB	512MB
512MB	512MB	512MB	512MB

Notes

1. The xSeries 240 server supports 128 MB, 256 MB, 512 MB, and 1 GB DIMMs. The server supports a minimum of 128 MB and a maximum of 4 GB of system memory. Only 133 MHz, 3.3 V, 168-pin, 8-byte, 72-bit registered, synchronous-dynamic-random-access memory (SDRAM), error correcting code (ECC) with x4 configuration DIMM memory complying with PC 133 Registered DIMM Specification, Revision 1.0 or later is supported.
2. 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 in 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 "Using the System Configuration Utility main menu" on page 24 for more information.

---
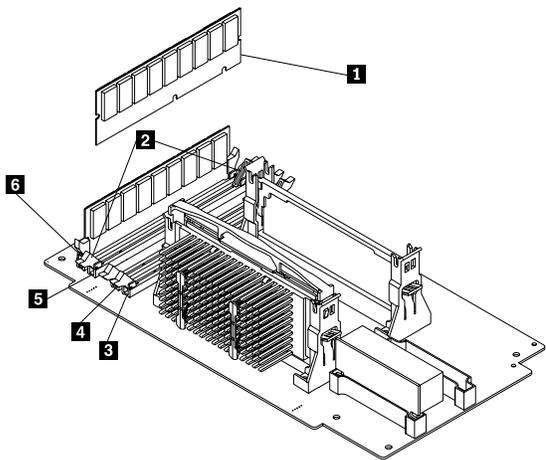
1 DIMM
2 Retaining clips
3 DIMM connector 1 (J4)
4 DIMM connector 2 (J3)
5 DIMM connector 3 (J2)
6 DIMM connector 4 (J1)

Before you begin:

- Read "Safety information" on page 224.
- Read the documentation that comes with the option.

To install a DIMM:

1. Turn off the server and peripheral devices and disconnect all external cables and power cords (see "Preparing to install options" on page 96); then remove the cover. See "Removing the left-side cover (tower model)" on page 99 or "Removing the cover (rack model)" on page 100.
2. Locate the DIMM connectors on the processor board. Determine the DIMM connector into which you will install the DIMM. (See the notes at the beginning of this procedure.)
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 **1** so that the pins align correctly with the connector **5** .
   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 **2** 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.
   d. Repeat these steps for each DIMM that you install.
5. If you have other options to install or remove, do so now; otherwise, go to "Completing the installation" on page 137.

Installing internal drives

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

- Diskette
- Hard disk
- CD-ROM
- Tape

Internal drive bays: Internal drives are installed in *bays*. The server comes with one 3.5-inch, 1.44 MB diskette drive and one CD-ROM drive.

Tower model
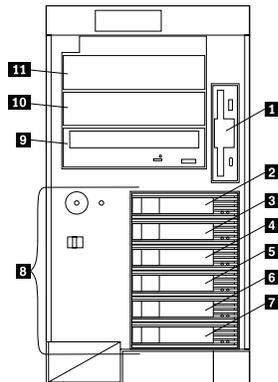
1	Diskette drive bay
2	SCSI ID 0 bay
3	SCSI ID 2 bay
4	SCSI ID 3 bay
5	SCSI ID 4 bay
6	SCSI ID 8 bay
7	SCSI ID 9 bay
8	Hot-swap bays
9	CD-ROM drive bay
10	Non-hot-swap bay B
11	Non-hot-swap bay A

Rack model
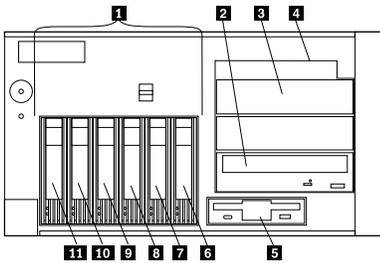
1 Hot-swap bays
2 CD-ROM drive bay
3 Non-hot-swap bay B
4 Non-hot-swap bay A
5 Diskette drive bay B
6 SCSI ID 9 bay
7 SCSI ID 5 bay
8 SCSI ID 4 bay
9 SCSI ID 3 bay
10 SCSI ID 1 bay
11 SCSI ID 0 bay

The server contains hardware that lets you replace a failed hard disk drive without turning off the server. Therefore, you have the advantage of continuing to operate the system while a hard disk drive is removed or installed. These drives are known as *hot-swappable* drives. They are also referred to as hot-swap drives.

Each hot-swap drive that you plan to install must have a hot-swap-drive tray attached. The drive must have a single connector attachment (SCA) connector. Hot-swap-drive trays come with the hot-swap drives.

- The server comes with a preinstalled 3.5-inch, 1.44 MB diskette drive and a preinstalled IDE CD-ROM drive.
- 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. Bays A and B can be combined into a single full-high bay.
- The xSeries 240 server supports only one diskette drive.

> **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.

- If you are installing a device with a 50-pin connector in one of the 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.

- The 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 supports up to six hard disk drives.
- 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.

SCSI drives: Some drives have a special design called *small computer system interface*, or SCSI. This design allows you to attach multiple drives to a single SCSI channel.

Notes

1. Any information about SCSI drives also applies to other SCSI devices, such as tape drives.
2. If you plan to install both internal and external SCSI devices, you must follow the instructions in "Connecting external options" on page 142, in addition to the instructions in this section.

A 16-bit (wide) SCSI cable connects the SCSI HDD (hard disk drive) backplane to an integrated LVD SCSI controller on the system board. An additional 16-bit 2-drop SCSI cable is shipped disconnected inside the server. It is folded and restrained with a cable clamp to the side of the power supply housing.

If you want to install a device in one of the non-hot-swap bays, you can either:

- Install an additional SCSI adapter and use the 2-drop SCSI cable to attach the device to that adapter.
- Install a RAID adapter as follows:
    1. Disconnect the SCSI cable from the SCSI cable extender on the system board. See the illustration in "Installing a hot-plug PCI adapter" on page 106 for the location of the SCSI cable extender. (The other end of the SCSI cable is connected to the SCSI HDD backplane.)
    2. Connect the end of the SCSI cable that you disconnected from the SCSI cable extender to the RAID adapter. The other end of the cable is connected to the SCSI HDD backplane; the drives in the hot-swap bays are now connected to the RAID adapter.
    3. Connect the 2-drop SCSI cable to the SCSI cable extender on the system board, and attach the device in the non-hot-swap bay to one of the drops on the other end of the 2-drop SCSI cable.

The device is attached to the integrated SCSI controller.

SCSI IDs: Each SCSI device that is connected to an individual channel of a SCSI controller needs a unique identification (ID) so that the controller can identify the devices and ensure that different devices do not attempt to transfer data at the same time. If you need to set IDs for SCSI devices, refer to the instructions that come with those devices.

The server automatically sets SCSI IDs for hot-swap hard disk drives. The SCSI ID assigned to each hot-swap bay is shown on the server beside the bay and in the illustrations in "Internal drive bays" on page 120. The server uses the hard disk drive SCSI IDs to send status information to the indicator lights above each hot-swap bay.

The SCSI backplane in the server supports up to six hot-swap bays.

The processing sequence for SCSI devices proceeds from the lowest SCSI ID to the highest (0 to 5, then 8 to 15).

Termination (internal SCSI devices): SCSI buses must be terminated at each end. The ends of the SCSI buses in the server are already terminated.

All the hot-swap drives in the server have automatic termination and the SCSI controller provides termination at the other end of the SCSI bus.

You must disable termination on any SCSI devices that you install in the non-hot-swap bays. Refer to the information that come with the SCSI device for instructions about setting device jumpers or switches that control termination.

Preinstallation steps (all bays): Before you install drives in the server, verify that you have all the cables and any other equipment specified in the documentation that comes with the internal drive. You might also need to perform certain preinstallation activities. Some of the steps are required only during the initial installation of an option.

> **Before you begin:**
> - Read "Safety information" on page 224.
> - Read the documentation that comes with the internal drive.

1. Choose the bay in which you want to install the drive.
2. Check the instructions that come with the drive to see if you need to set any switches or jumpers on the drive.

3. To install the drive, go to "Installing a non-hot-swap drive" on page 124 or "Installing a drive in a hot-swap bay" on page 125.

Installing a non-hot-swap drive

> **Before you begin:**
>
> - Read "Safety information" on page 224.
> - Read the documentation that comes with the drive.
> - Prepare the drive for installation (see "Preinstallation steps (all bays)" on page 123).

> **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.

Refer to the following illustration of the tower model while you perform the steps in this procedure.
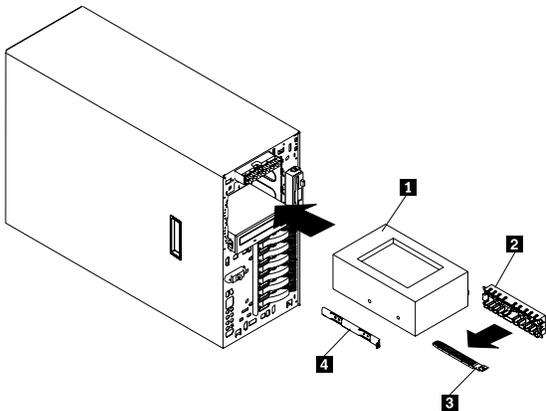
1	DLT drive
2	Filler panel
3	Blue slide rails
4	Metal slide rails

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

1. Turn off the server and peripheral devices (see "Preparing to install options" on page 96) and then remove the cover. See "Removing the left-side cover (tower model)" on page 99 or "Removing the cover (rack model)" on page 100.

2. Remove the trim bezel. (See "Removing the trim bezel" on page 102.)
3. Remove the filler panel **2** 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 **3** 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 **1**, the slide rails **4** and screws are included in the country kit.
7. Place the drive so that the slide rails engage in the bay guide rails. Push the drive into the bay until it clicks into place.
8. If you have not already done so, install an optional SCSI adapter. (See "Working with adapters" on page 103 for information about installing an adapter.) See "SCSI drives" on page 122 for information about optional SCSI adapters, installation of drives in the non-hot-swap bays, and the 16-bit 2-drop SCSI cable that is provided for use with optional SCSI adapters.
9. Connect one of the connectors on the SCSI cable for the non-hot-swap drive bays to the back of the drive **1**.
10. Connect a power cable to the back of the drive. Power cables for non-hot-swap drives come installed in the server. The connectors are keyed and can be inserted only one way.
11. If you are installing another non-hot-swap drive, do so at this time. Otherwise, continue with the next step.
12. If you have other options to install or remove, do so now; otherwise, go to "Completing the installation" on page 137.

Installing a drive in a hot-swap bay: The hot-swap drive bays support hot-swap drives only.

This section gives the procedure for installing a hot-swap hard disk drive. If you want to remove a drive, reverse the following steps.

**Before you begin:**

- Read "Safety information" on page 224.
- Read the documentation that comes with the drive.
- If the server has a RAID adapter installed, review the documentation that came with the RAID adapter for information about the RAID adapter and disk-array configuration.
- Prepare the drive for installation (see "Preinstallation steps (all bays)" on page 123).

Refer to the following illustrations of the tower model while you perform the steps in this procedure.
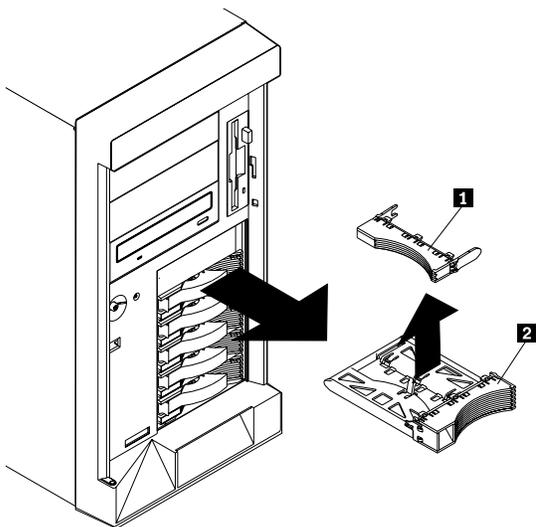
1 Filler panel for use with half-high drives
2 Filler panel (slim-high)
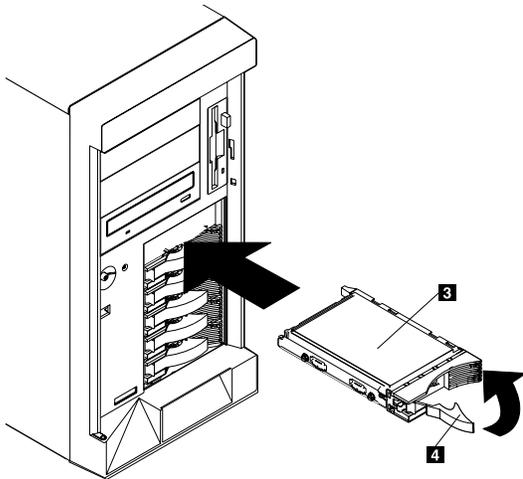
3 Drive
4 Drive tray handle (in open position)

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

1. If the 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.

2. Remove the filler panel **2** 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.

   > **— Attention ——————**
   >
   > Do not remove the drive from the tray assembly.

3. Install the hard disk drive **3** in the hot-swap bay:
   a. Ensure the tray handle **4** is open (that is, perpendicular to the drive).
   b. Align the drive/tray assembly so that it engages the guide rails in the bay.
   c. Gently push the drive/tray assembly into the bay until the drive connects to the backplane.

d. Push the tray handle to the right until it locks.
4. If you installed a half-high hard disk drive, install a filler panel **1** in the gap above the drive:
   a. Locate the smaller filler panel **1** that is designed for use with half-high drives. It is stored on the slim-high filler panel **2** that you removed earlier in this procedure.
   b. Pull the smaller filler panel off the filler panel.
   c. Gently push the filler panel **1** 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 "Status LEDs" on page 190 for details.
6. If the server is a tower model, close and lock the server door.

> **Note**
>
> If the server has a RAID controller, you must reconfigure the disk arrays after installing hard disk drives.

Replacing a drive in a hot-swap bay: You do not have to turn off the server to remove a drive from the hot-swap bays.

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 the server might lose valuable data.

   This situation is especially relevant if the server has a RAID adapter installed and you assigned RAID level 1 or 5 to the logical drives in the 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.
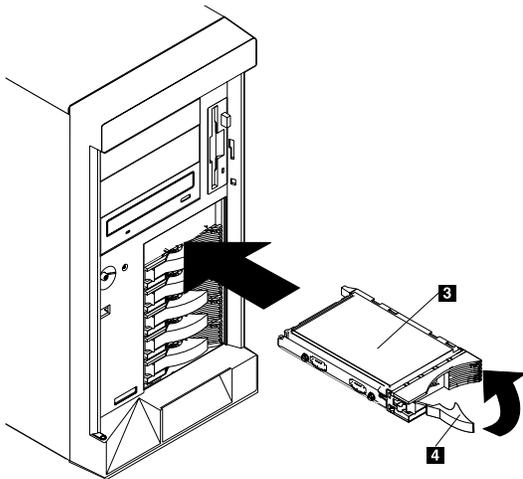
3 Drive

4 Drive tray handle (in open position)

To replace a drive in a hot-swap bay:

1. If the server is a tower model, unlock and open the server door (see "Preparing to install options" on page 96).

   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.

2. Remove the defective hard disk drive **3** by placing the handle **4** on the drive to the open position (perpendicular to the drive) and pulling the hot-swap tray from the bay.

> **Attention**
>
> Do not remove the drive from the tray assembly.

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 drive/tray assembly so that it engages the guide rails in the bay.
   c. Push the drive assembly into the bay until the drive connects to the backplane.
   d. Push the tray handle to the right until it locks.
4. Check the hard disk drive status indicators to verify that the hard disk drive is installed properly. See "Status LEDs" on page 190 for details.
5. If the server is a tower model, close and lock the server door.

Installing a hot-swap power supply

The server comes with two power supplies. You can add a third power supply. After you install a power supply, check the power-supply status indicators to verify that the power supply is operating properly. See "Power supplies" on page 92 for details.

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.

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

Note

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

---
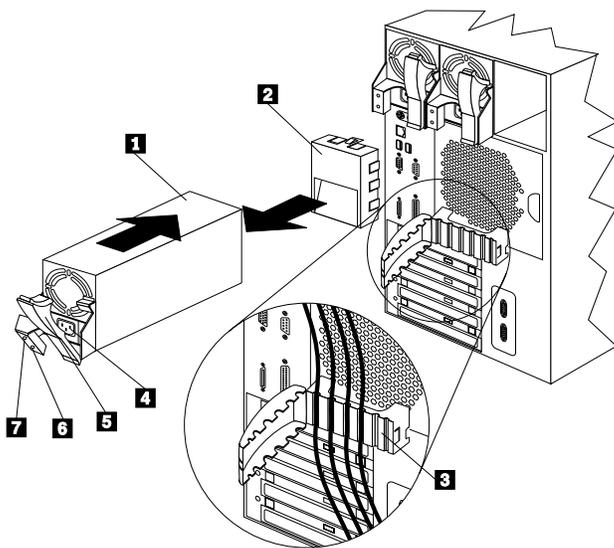
1 Power supply
2 Filler panel
3 Cable-restraint bracket
4 Power cord connector
5 Handle on power supply (in open position)
6 AC Power light

7 DC Power light

To add a power supply:

1. Remove the filler panel **2** 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 **1** in the bay:
   a. Place the handle **5** 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 **2** .
4. Route the power cord through the cable-restraint bracket **3** .
5. Plug the power cord into a properly grounded electrical outlet.
6. Verify that the DC Power light **7** and AC Power light **6** 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 "Completing the installation" on page 137.

Removing a hot-swap power supply

The server comes with two power supplies. You can add
a third power supply. Each power supply has two status
indicators; see "Power supplies" on page 92 for
information about the status indicators.

```
┌─ Attention ─────────────────────────────────┐
│                                              │
│  If the NON REDUNDANT LED on the diagnostic LED │
│  panel is lit, do not remove a hot-swap power supply │
│  without first turning the server off.       │
│                                              │
└──────────────────────────────────────────────┘
```

Refer to the illustration in "Installing a hot-swap power
supply" on page 131 while you perform the steps in this
procedure.

⚠

```
┌─ 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.  │
│                                              │
└──────────────────────────────────────────────┘
```

To remove a hot-swap power supply:

1. If the NON REDUNDANT LED on the diagnostic LED
    panel is lit, turn off the server and peripheral devices
    (see "Preparing to install options" on page 96);
    otherwise, go to the next step.
2. Remove the power supply **1** :
    a. Unplug the power cord connector from the power
        supply.

```
┌─ Note ──────────────────────────────────────┐
│                                              │
│  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 **5** 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 not replacing the power supply:

    a. Install a power-supply filler panel **2** .

> **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 **3** and remove the power cord from the cable-restraint bracket. Close the cable-restraint bracket.

    c. Unplug the power cord from the electrical outlet.

   If you are replacing the power supply:

    a. Place the handle **5** on the power supply in the open position, and 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 **4** .

    d. Verify that the AC Power light **6** and DC Power light **7** are lit, indicating that the power supply is operating correctly.

4. If you have other options to install or remove, do so now; otherwise, go to "Completing the installation" on page 137.

Replacing a hot-swap fan assembly

The server comes with three hot-swap fan assemblies.

Attention

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

Note

You do not need to turn off the power to the server to
replace a hot-swap fan assembly.

The following illustrations show the replacement of a
hot-swap fan assembly. Refer to these illustrations while
performing the steps in this procedure.
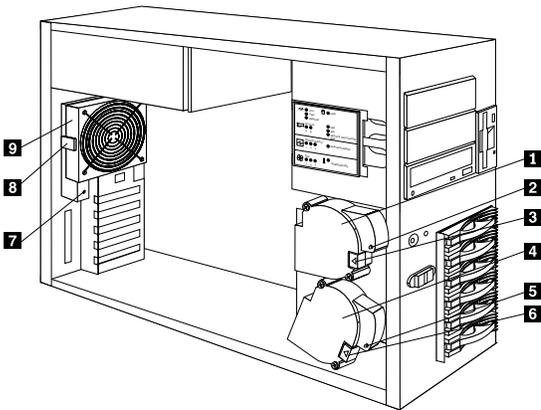
1	Hot-swap fan assembly 1
2	Fan assembly 1 LED
3	Fan 1 release latch
4	Hot-swap fan assembly 2
5	Fan assembly 2 LED
6	Fan 2 release latch
7	Fan Assembly 3 LED
8	Fan 3 release latch
9	Hot-swap fan assembly 3

To replace a hot-swap fan assembly:

1. Remove the cover. See "Removing the left-side
    cover (tower model)" on page 99 or "Removing the
    cover (rack model)" on page 100.

    Attention

    To ensure proper system cooling, do not remove
    the top cover for more than 30 minutes during
    this procedure.

    ---

2. Determine which fan assembly (fan 1 **1**, fan 2 **4**,
    or fan 3 **9**) to replace by checking the fan LEDs on

the diagnostic LED panel (see "Diagnostics panel
LEDs" on page 191) and the LEDs located on the fan
assemblies.
3. Remove the fan assembly from the server by
   pressing the orange release latch (**3** , **6** , or **8**)
   for the fan and pulling the fan away from the server.
4. Slide the replacement fan assembly into the server
   until it clicks into place.
5. Verify that the FAN LED on the diagnostic panel is
   not lit. If the FAN LED is lit, reseat the fan.
6. Replace the cover. For a tower model, see
   "Completing the tower model installation" on
   page 137. For a rack model, see "Completing the
   rack model installation" on page 140.

Completing the installation

To complete the installation, you must reinstall the cover, reconnect all the cables that you disconnected in "Preparing to install options" on page 96, and, for certain options, run the Configuration/Setup Utility program. Follow the instructions in this section.

- If you have a tower model, continue with "Completing the tower model installation."
- If you have a rack model, go to "Completing the rack model installation" on page 140.

Completing the tower model installation:

To complete the installation for the tower model:

1. Install the left-side cover, if it was removed.
2. Install the trim bezel, if it was removed.
3. Install the server door, if it was removed.
4. Restart the server.
5. Update device records and reconfigure the server (see "Updating device records and reconfiguring the server" on page 57).

To install the server left-side cover:
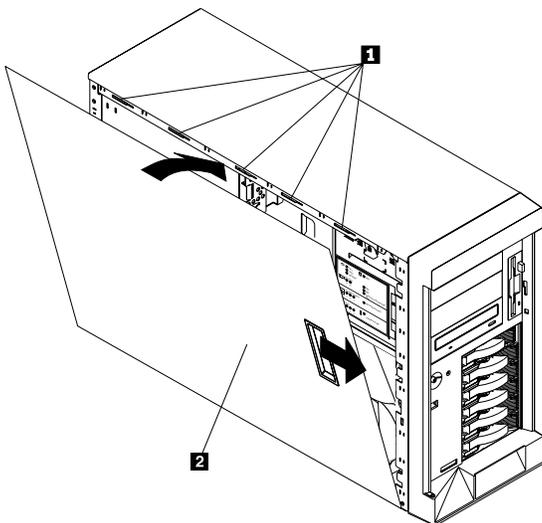
1 Slots
2 Left-side cover

a. Align the left-side cover **2** with the left side of the server, about 25 mm (1 inch) from the front of the server; place the bottom of the left-side cover on the bottom rail of the left-side side of the chassis.

b. Insert the tabs at the top of the cover into the slots **1** at the top of the server side.

c. Hold the cover against the server and slide the cover toward the front of the server until the cover clicks into place.

To install the trim bezel:
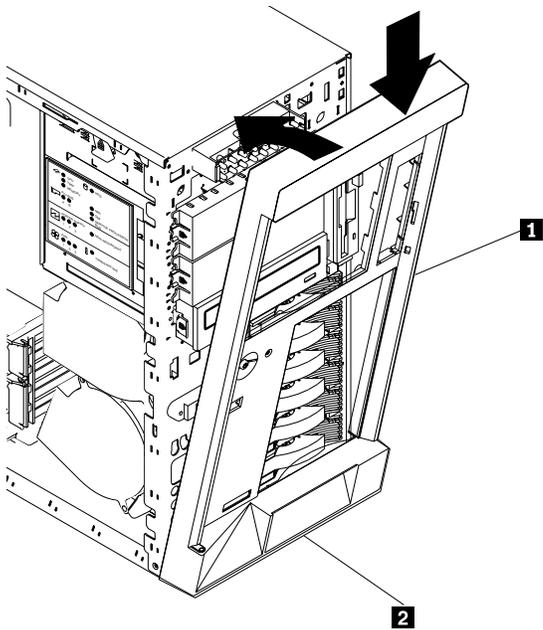
    1 Trim bezel
    2 Slots (hidden by bezel)

a. Place the tabs at the bottom edge of the trim bezel **1** in the slots **2** at the bottom front of the server.

b. Press the top of the bezel toward the server until the bezel clicks into place.

To install the server door:
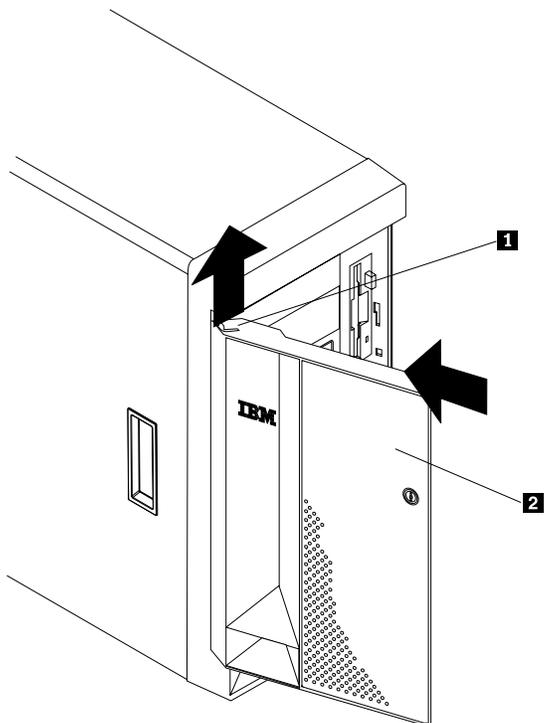
| 1 | Flange |
| 2 | Server door |

a. Set the door **2** on the bottom hinge.

b. Press the flange **1** downward while pressing the top of the door toward the server, until the flange connects with the top hinge. Release the flange.

6. 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.

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

> **Note**
>
> If necessary, see "Input/output connectors and expansion slots" on page 87 for connector locations.

Completing the rack model installation: To
complete the installation for the rack model:

1. Install the top cover, if it was removed.
2. Install the trim bezel, if it was removed.
3. Restart the server.
4. Update device records and reconfigure the server
   (see "Updating device records and reconfiguring the
   server" on page 57).

To install the server top cover:
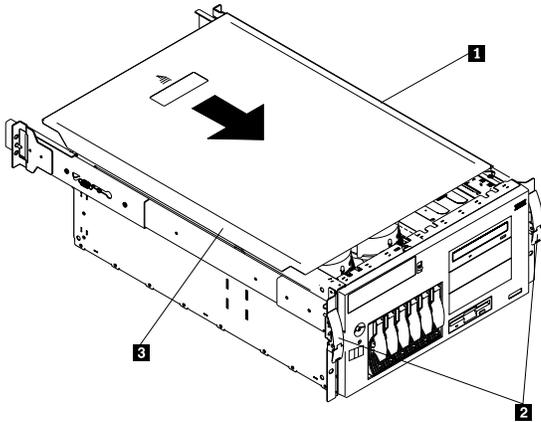
    1   Top cover
    2   Side latches
    3   Flanges

a. Align the top cover **1** 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.
b. Hold the cover against the server and slide the
   cover toward the front of the server until the
   cover clicks into place.

To install the trim bezel:
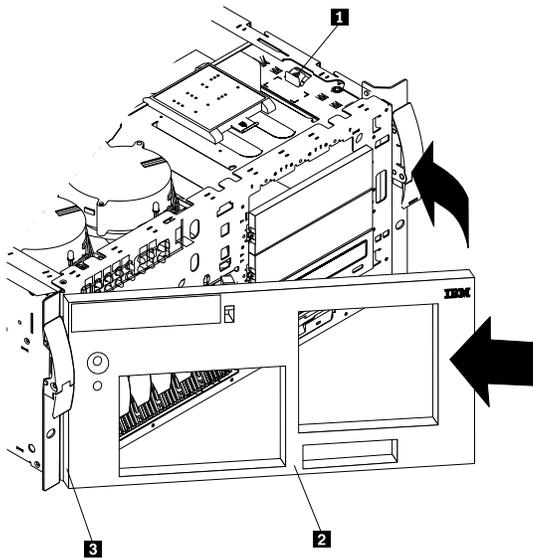
1 Bezel-release lever
2 Trim bezel
3 Slots (hidden by bezel)

   a. Place the tabs on the left side of the trim bezel in the slots 3 at the left front of the server.

   b. Press the right end of the bezel toward the server until the bezel clicks into place.

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


   Note

If necessary, see "Input/output connectors and expansion slots" on page 87 for connector locations.

Connecting external options

```
┌─ Before you begin: ────────────────────┐
│                                        │
│  •  Read "Safety information" on page 224. │
│  •  Read the documentation that comes with the │
│     options.                           │
│                                        │
└────────────────────────────────────────┘
```

Connecting external SCSI devices: You can
attach a SCSI storage expansion enclosure to the server.

Cabling requirements: The SCSI controller in the
server has one channel that can be used to attach external
devices. This channel is connected to the SCSI connector
on the back of the server and supports 14 unique SCSI
IDs. 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, see ANSI SCSI
Standards:

- X3.131-1986 (SCSI)
- X3.131-1994 (SCSI-2)
- X3T10/1071D

Adhering to these standards ensures that the server
operates properly.

Setting SCSI IDs for external devices: Each SCSI
device that is connected to a SCSI controller must have a
unique SCSI ID, so that the SCSI controller can identify
the devices and ensure that different devices do not
attempt to transfer data at the same time. SCSI devices
that are connected to different SCSI controllers can have
duplicate SCSI IDs. The SCSI controller uses one of the
SCSI IDs; the default SCSI ID for the SCSI controller is 7.
See "SCSI IDs" on page 123 and refer to the instructions
that come with the SCSI devices for more information
about setting a SCSI ID.

Installation procedure: **To attach an external
device:**

1. Turn off the server and all attached devices.
2. Follow the instructions that come with the option to
   prepare it for installation and to connect it to the
   server.

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

- Two serial-port connectors
- One management port C connector
- One parallel-port connector
- One video-port connector

- One keyboard-port connector
- One auxiliary-device-port connector
- One SCSI connector
- One Ethernet-port connector
- Two Universal serial bus ports

See the illustration in "Input/output connectors and expansion slots" on page 87 for the locations of the connectors.

Serial ports: The server comes with two serial ports. (See "Input/output connectors and expansion slots" on page 87 for the locations of the connectors.) These ports are used to communicate with printers, plotters, external modems, scanners, and auxiliary terminals. These ports also enable you to transfer data between computers.

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

The serial ports can transmit and receive data and commands at rates of from 300 bits per second up to 115 000 bits per second.

Serial port A is shared by the operating system and the integrated System Management Processor. Serial port B can be used only by the operating system.

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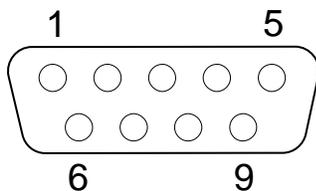
The following table shows the pin-number assignments for the serial-port connectors.

Table 3. Serial port pin-number assignments

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

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

Some application programs use only certain ports, and some modems are designed for use only at certain

communication port addresses. You might need to use the Configuration/Setup Utility program to change communication port address assignments to resolve conflicts.

Management port C: The server has a dedicated system-management I/O port. This port can be used to attach a modem that is dedicated to communication with the System Management Processor.

The connector on the back of the server and the pin-number assignments are the same as for the serial ports.

Parallel port: The parallel port usually is used to communicate with printers, and transfers data one byte at a time. The parallel port has a 25-pin, female D-shell connector on the back of the server. It support three standard IEEE 1284 modes of operation: Standard Parallel Port (SPP), Enhanced Parallel Port (EPP), and Extended Capability Port (ECP). (See "Input/output connectors and expansion slots" on page 87 for the location of the connector.)
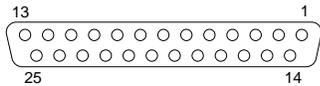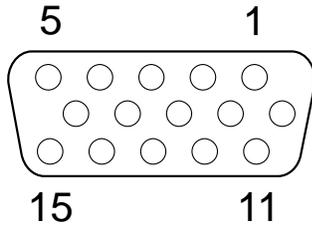

The following table shows the pin-number assignments for the parallel-port connector.

Table 4. Parallel port 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
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)	–DSTRB
15	I	–ERROR	–ERROR
16	O	–INIT	–INIT
17	O	–SLCT IN	–ASTRB
18	-	Ground	Ground
19	-	Ground	Ground
20	-	Ground	Ground
21	-	Ground	Ground
22	-	Ground	Ground
23	-	Ground	Ground
24	-	Ground	Ground
25	-	Ground	Ground

When you turn on the server, the POST routine assigns the parallel port a specific port address. You can change

the parallel-port assignment by using the Configuration/Setup Utility program. See "Devices and I/O Ports" on page 25.

Video port: The system board in the server has one SVGA video port. This port is used to attach a video monitor. The video port has a 15-pin analog connector on the back of the server. (See "Input/output connectors and expansion slots" on page 87 for the location of the connector.)

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

Table 5. Video port pin-number assignments	
Pin	**Signal**
1	Red
2	Green or monochrome
3	Blue
4	Monitor ID bit 2
5	Ground
6	Ground
7	Ground
8	Ground
9	+5 V dc
10	Ground
11	Monitor ID bit 0
12	DDC SDA
13	Horizontal synchronization (Hsync)
14	Vertical synchronization (Vsync)
15	DDC SCL

Keyboard port: The system board has one keyboard port. (See "Input/output connectors and expansion slots" on page 87 for the location of the connector.)
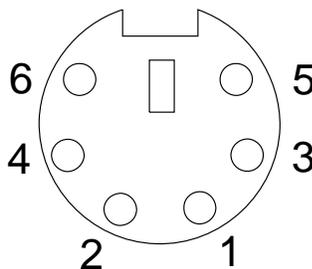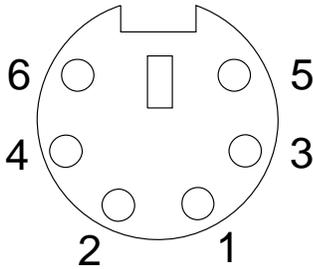

The following table shows the pin-number assignments for the connector used by the keyboard port.

Table 6. Keyboard port pin-number assignments

Pin	Signal
1	Keyboard data
2	Mouse data
3	Ground
4	+5 V dc
5	Keyboard clock
6	Mouse clock

Auxiliary-device (pointing device) port: The
system board has one auxiliary-device port that supports a
mouse or other pointing device. (See "Input/output
connectors and expansion slots" on page 87 for the
location of the connector.)

```
      6  (  O      ▯      O  )  5

      4  (  O             O  )  3

            O         O
          2            1
```

The following table shows the pin-number assignments for
the connector used by the auxiliary-device port.

*Table 7. Auxiliary-device port pin-number
assignments*

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

SCSI ports: The server comes with a LVD SCSI
controller on the system board, which provides two
independent SCSI channels. A 16-bit (wide) SCSI cable
connects the hot-swap backplane to one channel of the
integrated LVD SCSI controller. Another SCSI cable
connects the other channel of the controller to the SCSI
connector on the rear of the server.

To attach an external SCSI device to the server, connect
an external SCSI cable from the SCSI device to the SCSI
connector on the back of the server. Ensure that the last
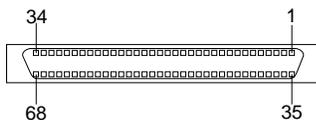device on the external SCSI cable is terminated.

```
    34                        1
   ┌─────────────────────────────┐
   │ □□□□□□□□□□□□□□□□□□□□□□□□□□□□□ │
   │ □□□□□□□□□□□□□□□□□□□□□□□□□□□□□ │
   └─────────────────────────────┘
    68                       35
```

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

| Table 8. 68-pin SCSI port 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	+Data 1	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	Terminator power	51	Terminator power
18	Terminated power	52	Terminated power
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: The system board in the xSeries 240 server contains an Ethernet *controller*. The controller has an external RJ-45 connector on the rear of the server that is used with a category 3, 4, or 5 unshielded twisted-pair (UTP) cable. The connector enables an Ethernet network to attach to the internal transceiver in the server.

Note

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

See "Configuring the Ethernet controller" on page 42 for additional information about the Ethernet controller.

Table 9 on page 148 shows the pin-number assignments for the RJ-45 connector. These assignments apply to both 10BASE-T and 100BASE-TX devices.

10BASE-T or 100 BASE-TX
UTP cable

RJ-45 modular plug connector

1
2
3
Pins   6
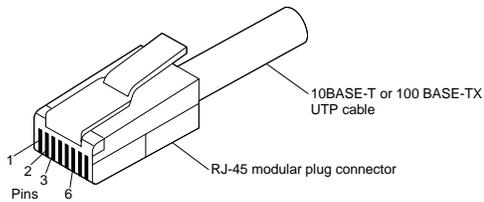
Table 9. Ethernet port pin-number assignments

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

Universal serial bus ports: The system board in the
xSeries 240 server contains two universal serial bus (USB)
ports. Each USB port has an external connector on the
rear of the server for attaching devices that previously
used serial, parallel, keyboard, mouse, and game ports.

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

 Note

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

Table 10 shows the pin-number assignments for the USB
connectors.

Table 10. USB port pin-number assignments

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

Installing a server in a rack enclosure

Use the following instructions for installing a server in a rack.

The server comes with all the rack installation hardware (rack model only). Review the preinstallation information in "Preparing to install the server in a rack enclosure"; then, continue with "Installing the rack model in a rack enclosure."

Caution

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

>**82 kg (180 lbs)**

Installing the rack model in a rack

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

- Preparing the rack enclosure
- Installing the server into the rack enclosure

Preparing to install the server in a rack

enclosure: You will need the following items:

- One rack mounting kit
    - Two slide-rail assemblies
    - One cable-management arm, including hitch pins
    - One bag of screws and nuts
    - Hook and loop fastener strips
    - One installation template
    - One packet of tie wraps
    - Two wheel-shaped knobs
- Flat-blade screwdriver
- The documentation that comes with the rack

Before you begin

- Before you begin to install the server in the rack, review the safety and handling guidelines specified under "Safety information" on page 224.
- To ensure rack stability, plan the installation of servers in the rack starting from the bottom. If you are installing different server models in the rack enclosure, install the heaviest models in the lower part of the rack enclosure. For more information, refer to the IBM Rack Configurator program provided with the ServerGuide CDs. Refer to ServerGuide information provided with the server section of this *Server Library*.
- Review the documentation that comes with the rack enclosure for safety or cabling considerations. Ensure that the planned installation is within the rack's guidelines for heat generation, electrical requirements, air flow, and mechanical loading.
- Verify that the rack can meet the operating parameters, as detailed in "Specifications" on page 52.
- Turn off the server, if it is on.

Preparing the rack enclosure: **To attach the mounting hardware to the rack enclosure:**

1. Mark the positions of the slide brackets and the cable management arm on the mounting rails of the rack enclosure.
    a. Position the template on the front mounting rail, aligning the holes.
    b. Mark the holes for the slide bracket cage nuts, using the dots supplied with the template. Also mark the holes for the chassis bracket cage nuts.
    c. Move the template to the rear mounting rails. Mark the locations for the slide bracket cage nuts and the cable-management-arm mounting bracket.

    Note

    You must align the slide brackets correctly or the installation cannot be completed.

2. Install the cage nuts or clip nuts, as required for the rack enclosure, in the marked positions.
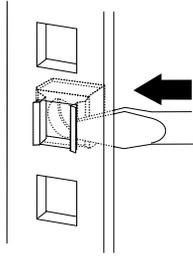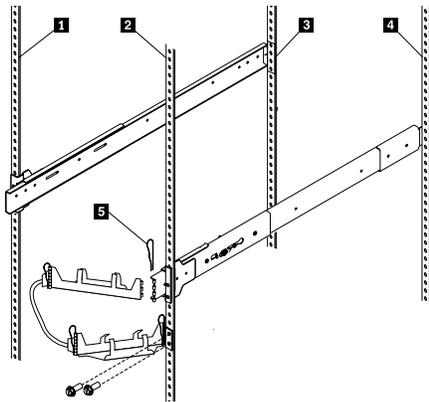
3. Attach the slide rails to the rack.
   a. Insert the left slide-rail rear bracket pin into the hole between the two cage nuts for the slide rail at the rear of the rack. The two holes in the rear bracket line up with the cage nuts.
   b. Pull the slide-rail front bracket to the front of the rack; insert the front bracket pin into the hole above the cage nuts for the slide rail. The two holes in the front bracket line up with the cage nuts.
   c. Do the same for the other slide rail.
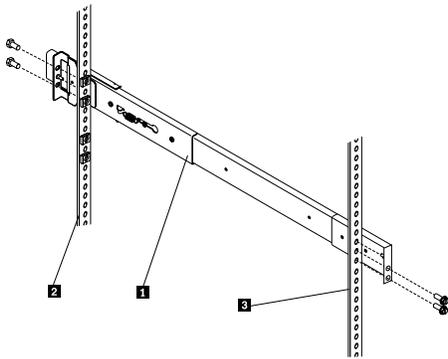
1	Left slide rail
2	Left rear
3	Left front

   d. From the outside of the rack enclosure, insert two M6 by 16-mm screws through each slide-rail bracket and cage nut; then, tighten the screws.
4. Attach the cable-management arm to the left rear of the rack enclosure.
   a. Align the cable-management-arm mounting bracket with the cage nuts on the rear mounting rail.
   b. Insert two M6 by 16-mm screws to secure the mounting bracket to the rack.

1	Right rear
2	Left rear
3	Right front
4	Left front
5	Hitch pin

  c. Attach the free end of the cable-management arm to the rear of the left slide rail, using a hitch pin **5** .

Installing the server: **To install the server in the rack enclosure:**

1. Mount the server on the slide rails.
   - a. Extend the slide rails fully from the rack until the slide rails lock.
   - b. Rest the wheel-shaped knobs **1** on the slide rails at a point close to the rack.
   - c. Lower the front of the server until the bottom notch in each chassis bracket fits into the top notch in the slide rail end.
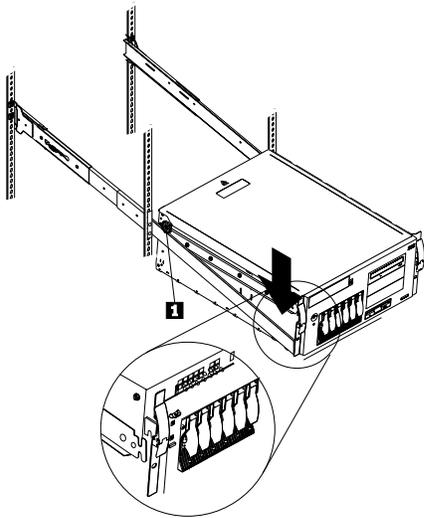
Slide the server backward or forward as necessary until the notches meet.

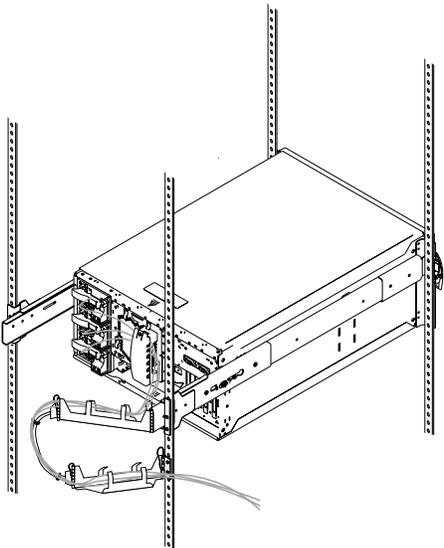   d. Attach the rails to the sides of the server with M4 by 5-mm screws.
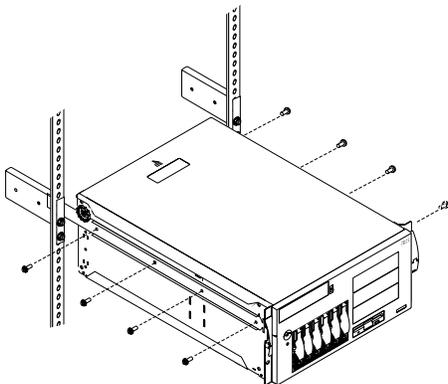
2. Remove the wheel-shaped knobs from the server. Store the knobs in a safe place to use if you need to remove the server from the rack at a later time.

3. Press the safety latches on the slide rails **1** and slide the server about halfway into the rack enclosure.

> **Note**
>
> When the server is fully extended, safety latches on the slide rails lock into place. This prevents the server from being accidentally pulled out too far and dropped. To release the safety latch, press in.
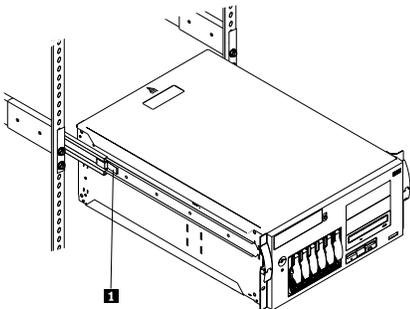
4. Attach the cables to the server.
    a. Attach all cables to the corresponding connectors on the server. Refer to the "Express Setup and Installation" section of this *Server Library* for instructions.
    b. Route the power cords, mouse cable, and keyboard cable through the cable-restraint bracket.
    c. Route all cables through the cable-management arm, attaching the cables to the arm with the hook and loop fastener strips provided. The wraps are provided for additional cable management.
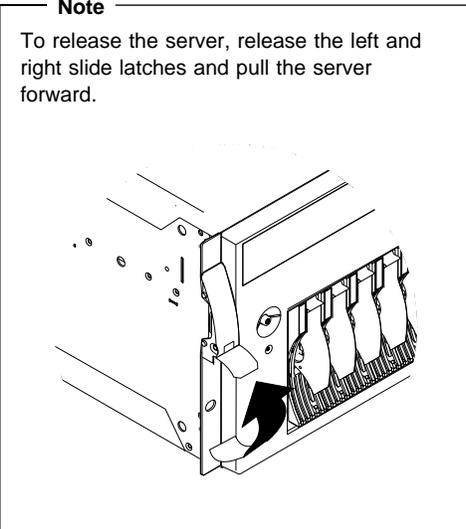
5. Secure the server in the rack enclosure.
    a. Slide the server into the rack enclosure until the slide latches on the front chassis brackets click into place.
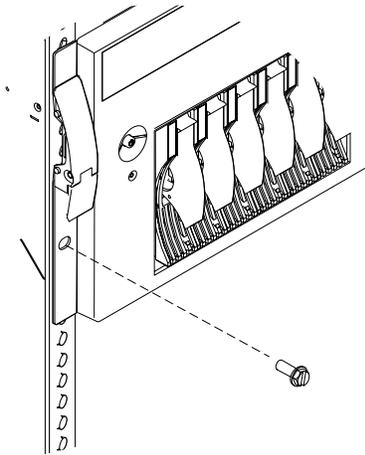
b. Using a screwdriver, tighten the screws that hold the rear of the slide rails to the rear of the rack.

c. Release the server and pull the server forward about half-way.

> **Note**
>
> To release the server, release the left and right slide latches and pull the server forward.
>
>

d. Using a screwdriver, tighten the screws that hold the front of the slide rails to the front of the rack.

e. Slide the server into the rack enclosure again until the slide latches on the front chassis brackets click into place.

6. (Optional) For additional security, such as when transporting the rack, fasten the server to the rack enclosure by inserting a M6 by 16-mm screw through the chassis bracket, mounting rail, and cage nut on each side.

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

Replacing the battery

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

To order replacement batteries call 1-800-772-2227 within the United States, and 1-800-465-7999 or 1-800-465-6666 within Canada. Outside the U.S. and Canada, call your IBM reseller or IBM marketing representative.

Note

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

Caution

When replacing the lithium battery, use only IBM Part Number 33F8354 or an equivalent type battery recommended by the manufacturer. If the system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.

Do not:

- Throw or immerse into water
- Heat to more than 100°C (212°F)
- Repair or disassemble

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


To replace the battery:

1. Turn off the server and peripheral devices and disconnect all external cables and power cords (see "Preparing to install options" on page 96); then remove the cover (see "Removing the left-side cover (tower model)" on page 99 or "Removing the cover (rack model)" on page 100).
2. Locate the battery on the system board (see "System board component locations" on page 161).
3. Remove adapters to allow access to the battery. (See "Installing a hot-plug PCI adapter" on page 106 for information about installing and removing adapters from the hot-plug PCI slots.)
4. Remove the plastic dividers between the hot-swap PCI slots to allow access to the battery.
5. Remove the battery:
   a. Use one finger to lift the battery clip over the battery.
   b. Use one finger to slightly slide the battery toward the rear of the server. The spring mechanism

behind the battery will push it out toward you as
you slide it forward.

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

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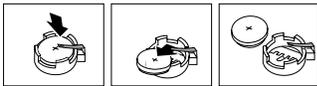
6. Insert the new battery:

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

b. As you slide it under the battery clip, press the
battery down into the socket.
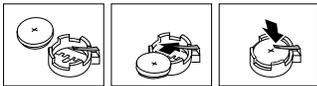
7. Reinstall any adapters you removed. (See "Installing
a hot-plug PCI adapter" on page 106 for information
about installing and removing adapters from the
hot-plug PCI slots.)

8. Reinstall any plastic dividers that you removed.

9. Reinstall the top cover and complete the installation
(see "Completing the installation" on page 137).

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

10. Start the Configuration/Setup Utility program and set
configuration parameters as needed.

- To set the system date and time, go to "Date
and Time" on page 26.
- To set the power-on password, go to "Using the
power-on password menu" on page 27.
- To reconfigure the server, follow the instructions
given in "The System Configuration Utility
program" on page 22 (all models).
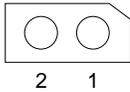
Changing jumper positions

Jumpers located on the system board and the processor board help you to customize the way the server operates.

The system board and processor board contain two-pin and three-pin jumper blocks.

In some cases, groups of jumpers might combine to define a function.

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

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

To change a jumper's position for a two-pin jumper block:

1. Turn off the server; then, disconnect the server power cords.
2. Remove the server cover (see "Preparing to install options" on page 96).
3. Do one of the following:
    *   Lift the jumper straight off the pin block.
    *   Align the holes in the bottom of the jumper with the two pins on the pin block, and then slide the jumper onto these pins.
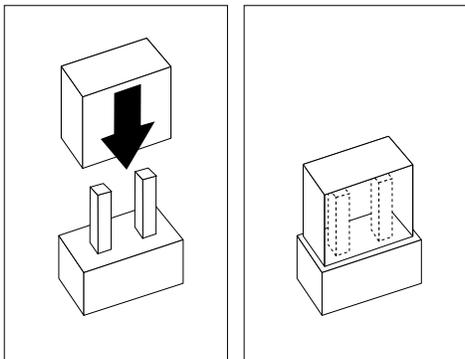
    *   Align one of the holes in the bottom of the jumper with one of the pins on the pin block, and then slide the jumper onto that pin only.

4. Reinstall the server cover and connect the cables (see "Completing the installation" on page 137).

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

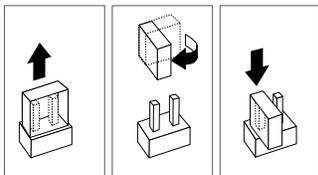The following illustration identifies pins 1, 2, and 3 on a three-pin jumper block.
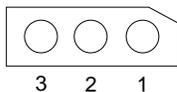
To change a jumper's position for a three-pin jumper block:

1. Turn off the server; then, disconnect the server power cords.
2. Remove the server cover (see "Preparing to install options" on page 96).
3. Lift the jumper straight off the pin block.
4. Align the holes in the bottom of the jumper with the center pin and the pin that was not covered previously.

5. Slide the jumper fully onto these pins.
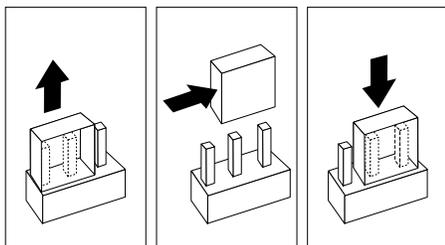6. Reinstall the server cover and connect the cables (see "Completing the installation" on page 137).

System board component locations

The following illustration shows a layout of the system board and identifies system-board components. You might need to refer to this figure before you install hardware in the server, or when you record information in the tables in this chapter.
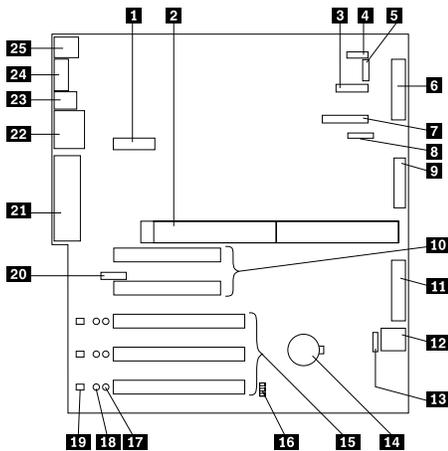
1 Dual serial and PCI hot-plug control switch connector (J1)

2 Microprocessor board connector (J4, J8)

3 Operator information panel connector (J29)

4 Reserved (J32)

5 Reserved (J10)

6 Diskette drive connector (J23)

7 Diagnostic LED panel connector (J6)

8 Reserved (J17)

9 Internal LVD (low voltage differential) SCSI connector (J25) (with extender cable on bracket)

10 PCI slots 1 and 2 (on primary PCI bus A)

11 IDE connector (J27)

12 Power control and reset panel cable connector (J18)

13 Advanced System Management Interconnect connector (J35)

14 Battery

15 PCI (hot-plug) slots 3–5 (on primary PCI bus B)

16 Jumper block (J20)

17 PCI slot Power Good LEDs

18 Internal PCI slot Attention LEDs

19 External PCI slot Attention LEDs

20 Advanced System Management adapter connector (J21)

21 External LVD SCSI/Parallel port connectors (J19)

22 Serial/video port connectors (J11)

23 USB 1 and USB 2 port connectors (J9) (USB 2 is below USB 1.)
24 Ethernet port connector (J7)
25 Mouse and keyboard connectors (J5) (The mouse connector is above the keyboard connector.)

System board jumpers

Table 11 describes the jumpers on the system board. The numbers in the table correspond to the highlighted numbers on the illustration in "System board component locations" on page 161.

Note

Turn off the server, and disconnect the power cords before moving any jumpers.

The following illustration shows pin positions for the system board jumper J20. Pin 1 is the pin at the upper-left corner of J20 in the illustration of the system board in "System board component locations" on page 161.
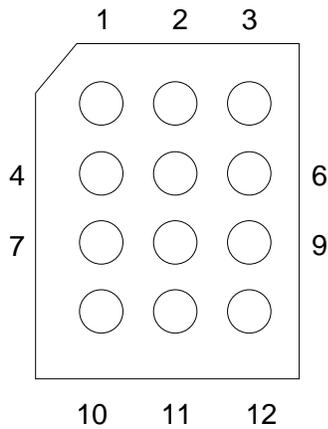
Table 11. System board jumper (J20)	
Jumper Pin Positions	**Description**
Pins 1–3 (N/A)	The default is no jumper on pins 1 , 2, and 3.
Pins 4–6 (N/A)	The default is a jumper on pins 5 and 6.
Pins 7–9	The default is a jumper on pins 8 and 9 ASM enabled (pins 7-8 ASM disabled).
Pins 10–12 (N/A)	The default is a jumper on pins 10 and 11.

System board/backplane assembly removal

Note

1. The illustrations in this book are similar to your server; details might vary.
2. To replace the system board/backplate assembly, reverse this procedure.

To remove the system board/backplate assembly, do the following.

1. Power-off the server and all external devices; then, disconnect the server from the power source.
2. Remove the server cover. See "Removing the left-side cover (tower model)" on page 99 or "Removing the cover (rack model)" on page 100.
3. Remove the processor board. See "Processor board/backplate removal" on page 167.
4. Disconnect the system board/backplate assembly cables.
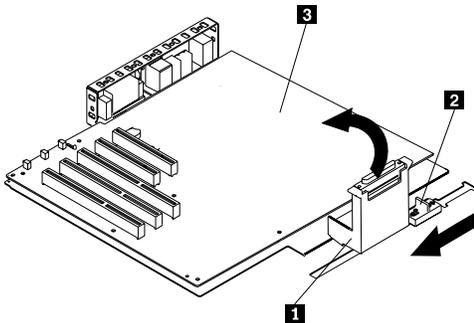
5. While tilting the cable bracket **1** forward, slide the system board/backplate assembly latch **2** in the direction shown. Then, remove the system board/backplate assembly **3** out of the server.

Processor board component locations

A layout of the processor board is shown in the following illustration.
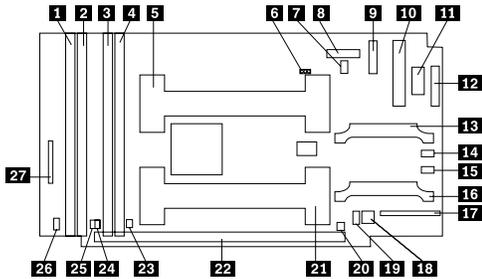
1 DIMM connector 4 (J1)
2 DIMM connector 3 (J2)
3 DIMM connector 2 (J3)
4 DIMM connector 1 (J4)
5 Microprocessor 2 connector (U6)
6 SP reset jumper (J15) if fitted
7 Microprocessor 2 Error LED (CR13)
8 Reserved (J19)
9 Power supply connector (J6)
10 Power supply connector (J11)
11 Power supply connector (J12)
12 Power supply connector (J14)
13 VRM 2 connector (J13)
14 VRM 2 Error LED (CR19)
15 VRM 1 Error LED (CR17)
16 VRM 1 connector (J5)
17 Fans 1 and 2 connector (J8)
18 Switch block 2 (SW2)
19 Switch block 1 (SW1) (might not be present on your server)
20 Microprocessor 1 Error LED (CR12)
21 Microprocessor 1 connector (U5)
22 System board connectors (J9 and J25) (on reverse side of processor board)
23 DIMM 1 Error LED (CR8)
24 DIMM 2 Error LED (CR9)
25 DIMM 3 Error LED (CR10)
26 DIMM 4 Error LED (CR11)
27 Fan 3 connector (J10)

Processor board jumper and switches

Table 12 contains the description of the jumper block located on the processor board. Table 13 shows the switch settings for switch block 1. These settings are set automatically by the processor. Table 14 shows the switch settings for switch block 2. The highlighted numbers in the tables refer to the highlighted numbers in the illustration in "Processor board component locations" on page 165.

> **Note**
>
> Turn off the server, and disconnect the power cords before moving any jumpers or changing any switch settings.

Table 12. Processor board jumpers

Jumper name	Description
6 J15 SP reset jumper	The default position is a jumper on pins 2 and 3.

Table 13. Processor board switch block 1 (SW1) Settings

1	2	3	4	Multiplier	Processor speed
Off	Off	Off	On	7.5X	1000

Table 14. Processor board switch block 2 (SW2) Settings

Switch	Name	Description
1	BIOS Recovery	The default position is OFF.
2	Processor Speed	The default position is OFF. (This sets the system bus speed to 133 MHz.)
3	Bypass power switch button	The default position is OFF.
4	Bypass Power On Password	The default position is OFF. Changing the switch position to ON bypasses the power-on password check.

Processor board/backplate removal

─── **Note** ───

1. The illustrations in this book are similar to your server; details might vary.
2. To replace the processor board/backplate assembly, reverse this procedure. Care should be taken in routing the system baord cables when replacing the procesor baord.

To remove the processor board/backplate assembly, do the following.

1. Power-off the server and all external devices; then, disconnect the server from the power source.
2. Remove the server cover. See "Removing the left-side cover (tower model)" on page 99 or "Removing the cover (rack model)" on page 100.

3. Disconnect the processor board cables.
4. Release the processor board latch **1** ; then. remove the processor board for the server.

SCSI backplane combo/backplate assembly removal
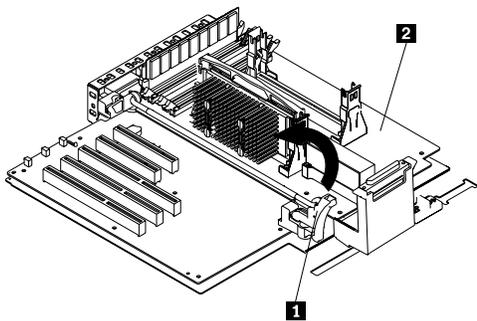

Before you begin:

Read "Safety information" on page 224.

Note

1. The illustrations in this book are similar to your server; details might vary.
2. To replace the SCSI backplane combo/backplate assembly, reverse this procedure.

To remove the SCSI backplane combo/backplate assembly, do the following.

1. Power-off the server and all external devices; then, disconnect the server from the power source.
2. Remove the server cover. See "Removing the left-side cover (tower model)" on page 99 or "Removing the cover (rack model)" on page 100.
3. Remove the SCSI drives. See "Installing a drive in a hot-swap bay" on page 125.
4. Remove hot-swap fan assemblies 1 and 2 from the server. See "Replacing a hot-swap fan assembly" on page 135.
5. Disconnect SCSI backplane cables.
6. Remove the two thumbscrews located on each side of the SCSI backplane assembly latch.
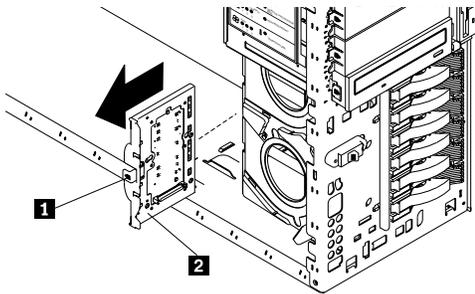
7. Release the SCSI backplane assembly latch **1** ; then, slide the SCSI backplane assembly **2** out of the server.

Tower-to-Rack Conversion Kit

With the IBM xSeries 240 Tower-to-Rack Conversion Kit, you can convert your server from a tower model to a rack model. This book provides instructions for installing a conversion kit on your server and installing your server in a rack enclosure. For additional information about the xSeries 240 server, consult the "Hardware Information" section of the xSeries 240 *Server Library*.

Note

Installing the server in a rack will require three people.

Inventory list: The conversion kit contains the following items:

- Two chassis brackets
- Two server covers
- One service label
- One rack-model trim bezel, with power-on switch protector attached in a bag
- Two wheel-shaped knobs
- One or more packages of screws, some of which are optional replacement screws
- One installation template
- One rack mounting kit
    - Two slide-rail assemblies
    - One cable-management arm assembly including hitch pins
    - One bag of screws and nuts
    - Hook and loop fastener strips
    - One packet of tiewraps
- *IBM xSeries 240 Tower-To-Rack Conversion Kit Installation Instructions* (this book)
- *IBM xSeries 240 Hot-Plug SCSI Setup Utility* diskette

What you will need: You will need the following items to install the conversion kit and to install the server in a rack:

- Flat-blade screwdriver
- The documentation that comes with the rack

Installing the conversion kit on the server

```
Before You Begin
```
- Read through these instructions to familiarize yourself with the installation procedure.
- Read "Safety information" on page 224.

```
Note
```
The illustrations in this publication might be slightly different from your hardware.

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

```
Caution
```
Use safe lifting practices when lifting your machine.

Complete the following procedure to install the conversion kit on the server.

1. Prepare the server for conversion.
   a. Shut down the server operating system.
   b. Unlock the server door and open it by pulling on the door edge next to the lock.
   c. If desired, remove the server door.
      1) Locate the flange on the top edge of the front door, near the hinge.
      2) Press the flange downward while pulling the door forward or pressing out on the door; then, lift the door off the hinge. Set the door aside.
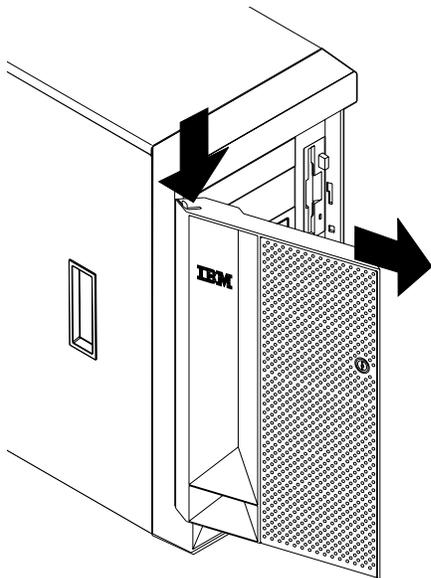
d. Remove all removable media (diskettes, CDs, optical discs, or tapes) from the drives.

e. Turn off the server and any attached devices, such as printers, monitors, and external drives.

f. If you have a fax or modem attached to the server, disconnect the telephone line from the wall outlet and the server.

⚠

Caution

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

g. Disconnect all the power cords (cables) from electrical outlets.

h. Disconnect all communication cables from external receptacles.

i. Disconnect all remaining cables and power cords from the back of the server.

2. Remove the left-side cover.

a. Locate the cover-release lever **1** on the front of the server and slide it to the right.
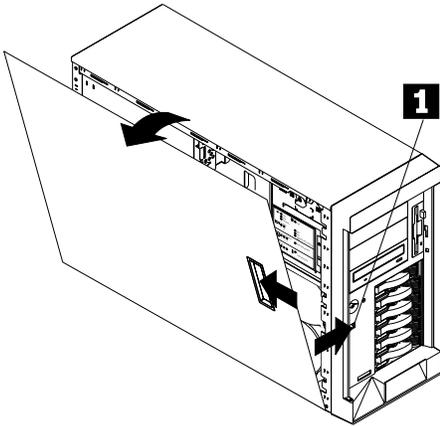
b. Slide the left-side cover back about 25 mm (1 inch); then, lift the cover and remove it.

3. Obtain the new service label from the conversion kit; you might need to refer to the service label during this procedure.

4. Remove the trim bezel.

   a. Locate the blue bezel-release lever **1** on the left side of the server in the top front corner.
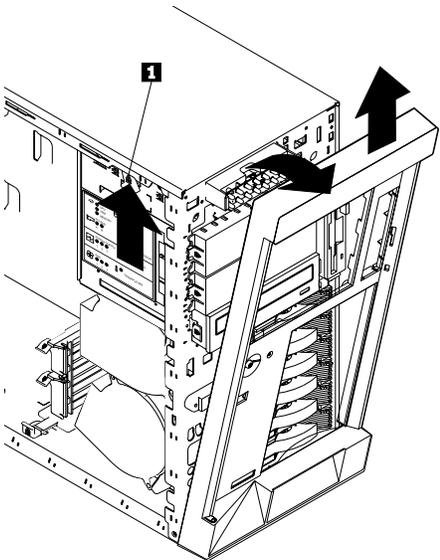
   b. Move the lever upward following the curve of the lever opening.
   c. Lift the bezel tabs out of the tab openings at the bottom front of the server and pull the bezel away from the server front.
   d. Store the bezel in a safe place.

5. Remove the right-side cover.
   a. From the rear of the server, remove the screws holding the cover.
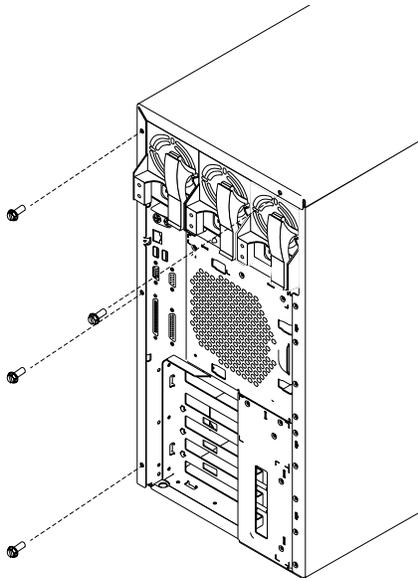
   b. Slide the cover toward the rear of the server about 25 mm (1 inch); then, lift the cover off the server.
6. Install the new bottom cover.
   a. Position the server open-side-down, as illustrated below.
   b. Select either server cover from the conversion kit to use as the bottom cover. The remaining cover will be the top cover.
   c. Align the bottom cover with the frame of the server.
   d. Press the cover onto the server; then, slide the cover toward the front of the server, making sure the tabs on the rear of the cover fit into the slots on the rear of the server.
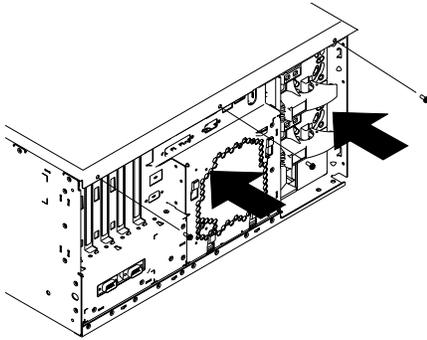
    e. Install two screws in the back of the cover.

7. Position the server open-side-up on a flat, nonconductive surface.

8. Remove the feet **1** from the server by unscrewing them.
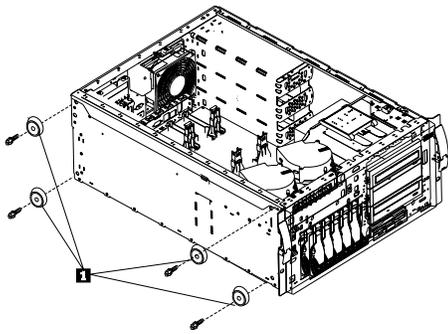
9. Remove the fan assemblies at the front of the server. To remove a fan assembly, press the orange touchpoint[1] to release the fan assembly; then, lift the fan assembly out.

10. Move the power switch panel **1** to its new location **2** .

    a. Remove the hard disk drives and note the SCSI ID assigned to each drive.

    b. Remove the power switch panel by pressing down and in on the arrow on the top blue tab.

---

[1] An orange touchpoint is a point on a hot-swap component where the component can be gripped, a latch moved, and so on.
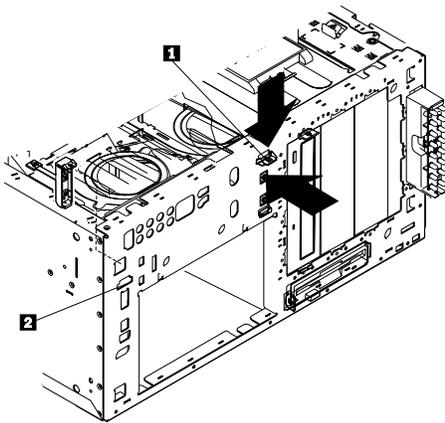
c. Align the panel with its new location **2**, making sure that:
- The power control button is positioned above the reset button.
- The tab on the server inside front goes between the two posts on the power switch panel.

d. Place the squared end of the power switch panel bracket into the bottom opening, and press the other end of the bracket toward the server front until the bracket clicks into place.

11. Move the operator LED panel **2** to its new location **1**.
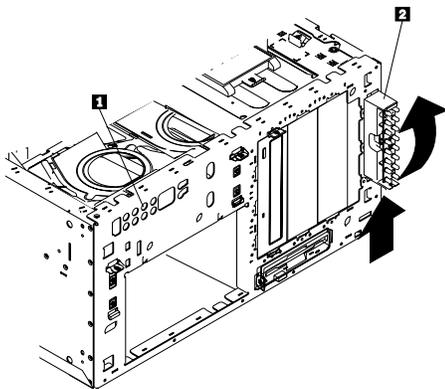
a. Remove the operator LED panel bracket by pressing firmly on the bottom of the bracket (on the arrow closer to the server) and pulling the bracket away from the server.

b. Unplug the cable from the back of the operator LED panel.

c. From inside the server, gently pull the cable toward the rear of the server until the cable is free of the non-hot-swap bay area.

d. Release the cable from the cable clip on the right side of the server, behind the non-hot-swap bays.

e. Reroute the cable to the top left side of the server.

1) Run the cable along the top of the hard disk drive (HDD) backplane assembly toward the left side of the server **1**, tucking the cable under the two protrusions at the rear of the HDD backplane assembly as you do so.

> **Note**
>
> The HDD backplane assembly is at the immediate rear of the fan platform.

2) Make sure to tuck the cable between the server left side and the HDD backplane support **2**; then, continue along the server left side to the server left front corner.
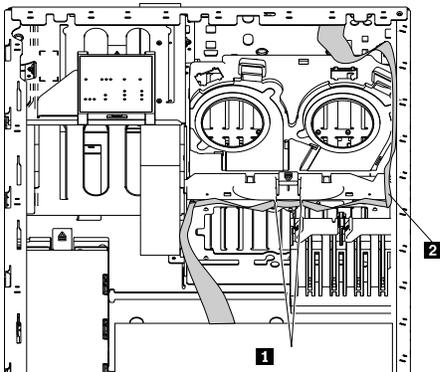
f. Reattach the cable to the operator LED panel.

> **Note**
>
> If you have difficulty connecting the cable, turn the cable connector over and try again; the cable connector is keyed to connect only one way.

g. Move the operator LED panel and bracket to the inside of the server, in its new location.

h. Place the notched end of the operator LED panel bracket into the opening **1**, aligning the LEDs so that they show through the holes in the server front.
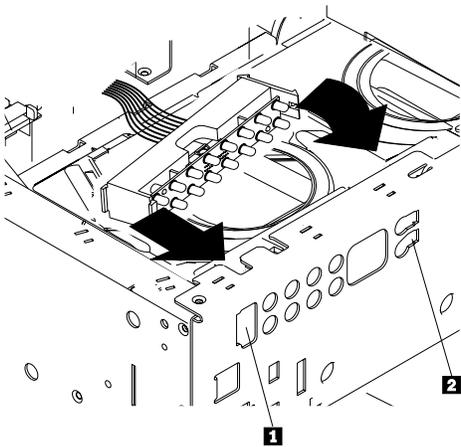
i. Press the other end of the bracket through the other opening **2** until the bracket clicks into place.

12. Replace the front fan assemblies, ensuring that the cables clear the fans and do not block the flow of air.

13. Replace the hard disk drives. Place the hard disk drive assigned to SCSI ID 0 in the left-most position. The remaining SCSI IDs are assigned in order from left to right.

14. Reposition the CD-ROM drive and any other drives or filler panels in the non-hot-swap bays for rack operation.

   a. Remove the power and signal cables from the back of the drives in the non-hot-swap bays.

   b. Pull the drives and filler panels out of the server.

   c. Orient the drives so that they are top-side-up and horizontal.

   d. Insert the drives in the server.

   e. Insert filler panels into any unused non-hot-swap bays.
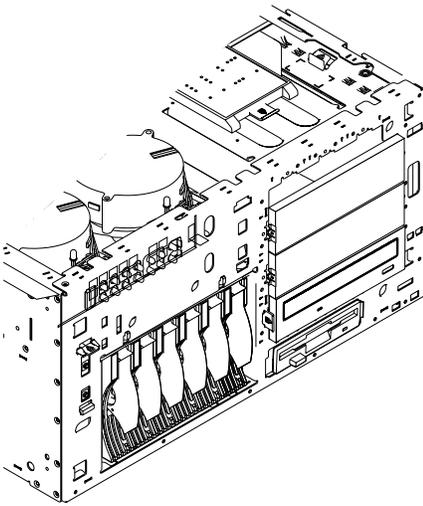
f. Reconnect the power and signal cables to the back of the CD-ROM drive and other drives.

15. Install the new top cover.

a. Install the service label on the inside surface of the top cover.

b. Align the top cover with the top of the server, about 25 mm (1 inch) from the front of the server.

c. Hold the top cover against the server and slide the cover toward the front of the server until the cover clicks into place.

> **Note**
>
> Ensure that the tabs on the back of the cover fit into the slots on the back of the server. Be sure the front edge of the cover is flat against the server.
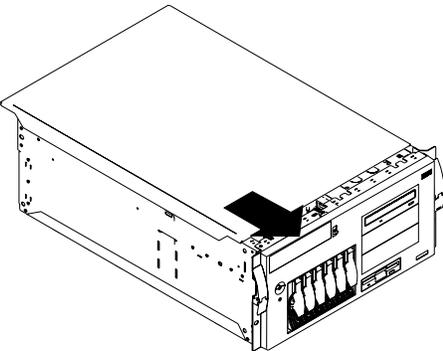
16. Attach the chassis brackets.

a. Insert the left bracket tab into the slot **2** in the left side of the server until the upper notch **1** aligns with the side of the server.

> **Note**
>
> The left bracket is marked with an **L**.

b. Push the bracket up until the holes in the bracket align with the holes in the side of the server.

c. Insert two M3.5 by 7-mm screws through the left bracket into the holes on the left side of the server; then, tighten the screws.
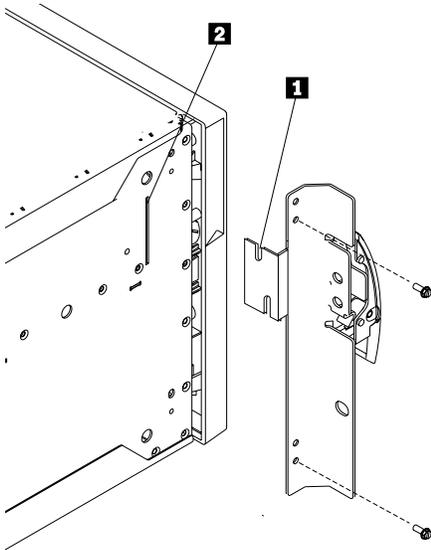
d. Perform steps 16a through 16c using the right bracket and the right side of the server.

17. Install the new trim bezel from the conversion kit.

a. Align the tabs on the back of the bezel with the tab openings on the front of the server.
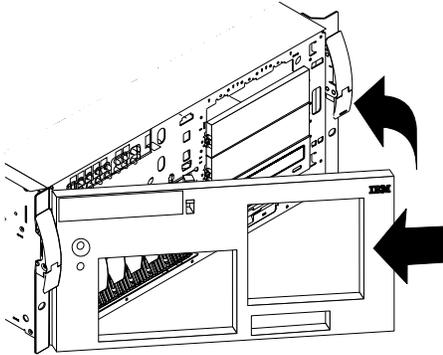
    b. Press the bezel into place until it clicks.

18. Continue the installation with "Installing the server in the rack enclosure" on page 181.

Installing the server in the rack enclosure:

This process is divided into two parts: preparing the rack and installing the server.

```
┌─ Important ─────────────────────────────────┐
│                                             │
│  1. Installing the server in a rack requires│
│     three people.                           │
│  2. To ensure cabinet stability, install the│
│     servers starting from the bottom of the │
│     rack enclosure.                         │
│  3. If you are installing different server  │
│     models in the rack enclosure, install   │
│     the heaviest models in the lower part of│
│     the rack enclosure.                     │
│                                             │
└─────────────────────────────────────────────┘
```

You will need a flat-blade screwdriver.

```
┌─ Note ──────────────────────────────────────┐
│                                             │
│  In preparing the rack you will use either  │
│  cage nuts or clip nuts, as appropriate for │
│  your style rack. For brevity, this document│
│  uses the term cage nuts only.              │
│                                             │
└─────────────────────────────────────────────┘
```

Preparing the rack enclosure: Complete the following procedure to attach the mounting hardware to the rack enclosure.

1. Mark the positions of the slide brackets and the cable management arm on the mounting rails of the rack enclosure.
   a. Position the template on the front mounting rail, aligning the holes.
   b. Mark the holes for the slide bracket cage nuts, using the dots supplied with the template. If you require additional security for the server, also mark the holes for the chassis bracket cage nuts.
   c. Move the template to the rear mounting rails. Mark the locations for the slide bracket cage nuts and the cable-management-arm mounting bracket.

   ```
   ┌─ Note ───────────────────────────────────┐
   │                                          │
   │  You must align the slide brackets       │
   │  correctly or the installation cannot be │
   │  completed.                              │
   │                                          │
   └──────────────────────────────────────────┘
   ```

2. Install the cage nuts in the marked positions as shown.
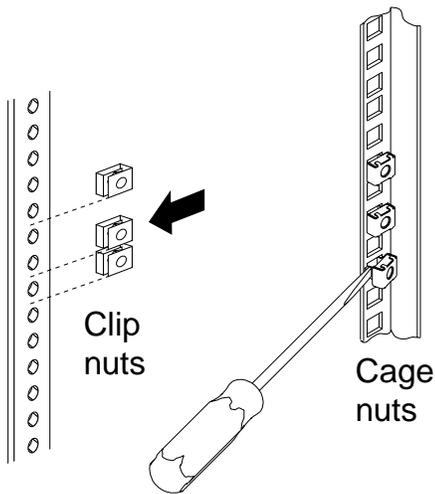
3. Attach the slide rails to the rack.
   a. Insert the left slide rail **1** rear bracket pin into the hole between the two cage nuts for the slide rail at the rear of the rack. The two holes in the rear bracket line up with the cage nuts.
   b. Pull the slide rail front bracket to the front of the rack; insert the front bracket pin into the hole above the cage nuts for the slide rail. The two holes in the front bracket line up with the cage nuts.
   c. Do the same for the other slide rail.
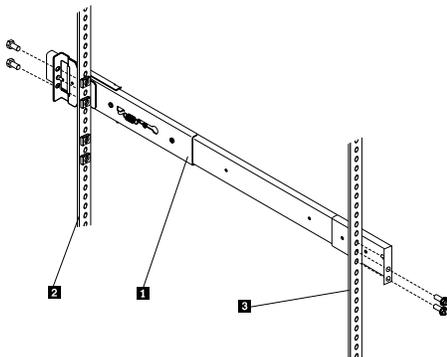
2   Left rear
3   Left front
1   Left slide rail

   d. From the outside of the rack enclosure, insert two M6 by 16-mm screws through each slide rail

bracket and cage nuts; then, finger-tighten the screws.
4. Attach the cable-management arm to the left rear of the rack enclosure.
    a. Align the cable-management-arm mounting bracket with the cage nuts on the rear mounting rail.
    b. Insert two M6 by 16-mm screws to secure the mounting bracket to the rack.
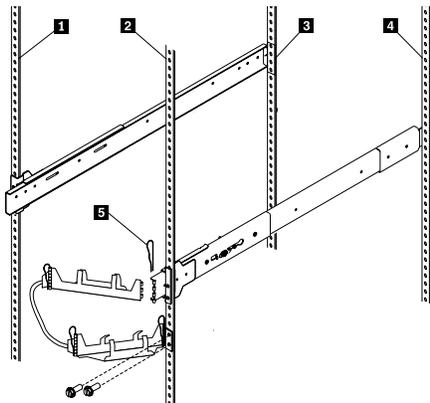
1   Right rear
2   Left rear
3   Right front
4   Left front
5   Hitch pin

    c. Attach the free end of the cable-management arm to the rear of the left slide rail, using a hitch pin 5 .

Installing the server: Complete the following procedure to install the server into the rack enclosure.

1. Mount the server on the slide rails.
    a. Attach the large wheel-shaped knobs 1 to the sides of the server, near the rear of the server.
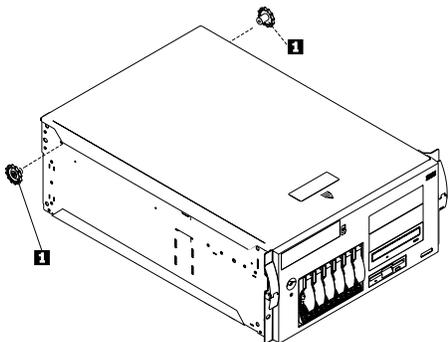
b. Extend the slide rails fully from the rack until the slide rails lock.

c. Rest the wheel-shaped knobs **1** on the slide rails at a point close to the rack.

d. Lower the front of the server until the bottom notch in each chassis bracket fits into the top notch in the slide rail end.
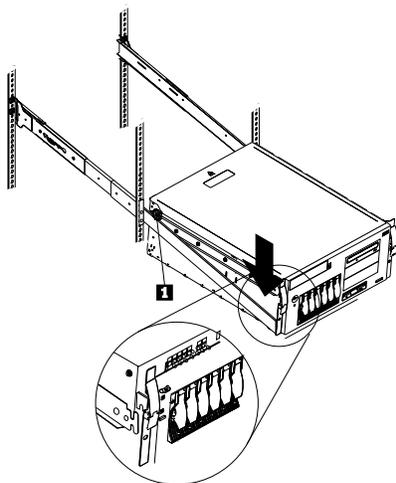
Slide the server backward or forward as necessary until the notches meet.

e. Attach the rails to the sides of the server with M4 by 5-mm screws.
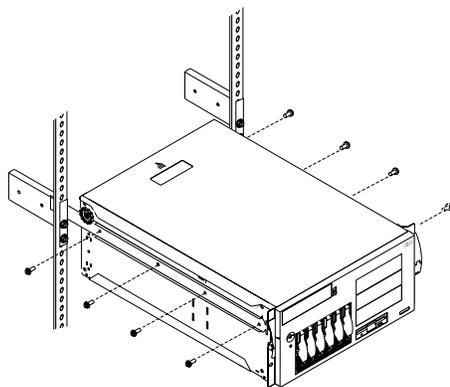
2. Remove the wheel-shaped knobs from the server.

3. Press the safety latches **1** on the slide rails and slide the server about halfway into the rack enclosure.

> **Note**
>
> When the server is fully extended, safety latches on the slide rails lock into place. This prevents the server from being accidentally pulled out too far and dropped. To release the safety latch, press in.
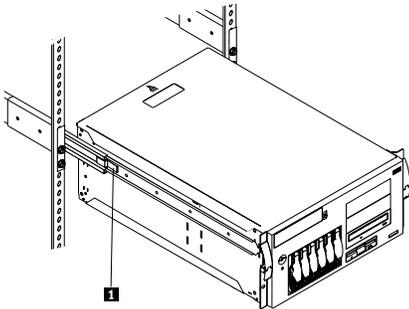
4. Attach the cables to the server.
    a. Attach the monitor, keyboard, and power cables to the corresponding connectors on the server. Refer to the rack enclosure documentation for instructions.
    b. Attach any other cables you removed before you converted the server to a rack model.
    c. Route all the cables through the cable-management arm, attaching the cables to the arm with the hook and loop fastener strips provided. Tie wraps are provided for additional cable management beyond the cable-management arm.

5. Secure the server in the rack enclosure.
   a. Slide the server into the rack enclosure until the slide latches on the front chassis brackets click into place.
   b. Using a screwdriver, tighten the screws that hold the rear of the slide rails to the rear of the rack.
   c. Release the server and pull the server forward about half-way.

   > **Note**
   >
   > To release the server, release the left and right slide latches and pull the server forward.

d. Using a screwdriver, tighten the screws that hold the front of the slide rails to the front of the rack.

e. Slide the server into the rack enclosure again until the slide latches on the front chassis brackets click into place.

6. (Optional) For additional security, such as when transporting the rack, fasten the server to the rack enclosure by inserting a M6 by 16-mm screw through the chassis bracket, mounting rail, and cage nut on each side.

7. Connect all server and device cables and connectors.

8. Use the server configuration program to reconfigure the server.

   Because of the new orientation of the server, you must change the server configuration so that the Netfinity Manager program will show a graphic of a rack model for this server instead of showing a tower model.

   a. Press the power control button to turn on the server, and watch the display.

   b. When the messages `Press F1 for Configuration/Setup` and `Press F2 for Diagnostics` appear, Press F1.

   c. Select **System Information**; then select **Product Data**.

   d. Change the machine type and model from a tower model to a rack model.

      1) Find the machine type and model in the Tower column in the following table.

      2) Change it to the machine type and model shown in the Rack column.

Tower	Rack
8664-11Y	8664-1RY
8664-21Y	8664-2RY
8664-31Y	8664-3RY

e. Press **Esc** to return to the main configuration utility menu.

f. Select **Save Settings**; then select **Exit Setup**.

9. Insert the *IBM xSeries 240 Hot-Plug SCSI Setup Utility* diskette in diskette drive a: and restart the system.

Important

1. Only run this utility if you are installing this kit on a xSeries 240 server.

2. Failure to run this utility on a xSeries 240 server will result in the SCSI drive order being reported incorrectly. Failure to run this utility can also cause a loss of data.

3. Complete all other steps in this installation procedure before running the utility.

The utility on the diskette starts automatically and updates the drive order of the SCSI IDs for reporting purposes. A progress indicator displays during both stages of the utility (up to three minutes), followed by a message that indicates successful or unsuccessful completion of the utility.

a. If the utility did not complete successfully, restart the server to retry the utility.

b. If the utility completed successfully, remove the diskette, turn off the server, disconnnect all power cords, wait 60 seconds, reconnect all power cords, and restart the server.

The tower-to-rack conversion is complete.

Symptom-to-FRU index

This index supports xSeries 240 servers.

Notes

1. Check the configuration before you replace a FRU. Configuration problems can cause false errors and symptoms.
2. For IBM devices not supported by index, refer to the manual for that device.
3. Always start with "General checkout" on page 6.

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.

Status LEDs

Your server has LEDs to help you identify problems with some server components. These LEDs are part of the light path diagnostics built into the server. By following the *path of lights*, you can quickly identify the type of system error that occurred. See "Light path diagnostics" on page 13 for more information.

Status LEDs are located on the following components:

- Information panel

  For more information, see "Operator information panel" on page 85.
- Hard disk drive trays

  For more information, see "Controls and indicators" on page 83.
- Power supply

  For more information, see "Power supply LEDs."
- Diagnostics panel

  For more information, see "Diagnostics panel LEDs" on page 191.
- System board

  See "System board component locations" on page 161 for locations of the LEDs on the system board.
- Processor board

  See "Processor board component locations" on page 165 for locations of the LEDs on the processor board.

Power supply LEDs: The AC and DC Power LEDs on the power supply provide status information about the power supply. See "Power supplies" on page 92 for the location of these LEDs.

The following table describes the AC and DC Power LEDs.

AC Power LED	DC Power LED	Description and action
On	On	The power supply is on and operating correctly.
On	Off	There is a DC power problem. Possible causes: 1. The Power Control button on the front of the server is in the Off position. **Action:** Press the Power Control button to start the server. 2. The power supply has failed. **Action:** Replace the power supply.
Off	Off	There is an AC power problem. Possible causes: 1. There is no AC power to the power supply. **Actions:** Verify that: • The power cord is properly connected to the server. • The power outlet functions properly. 2. The power supply has failed. **Action:** Replace the power supply. If the problem persists, go to "Undetermined problems" on page 210

Diagnostics panel LEDs: The following illustration shows the LEDs on the diagnostics panel inside the server. See "Light path diagnostics" on page 13 for information on identifying problems using these LEDs.
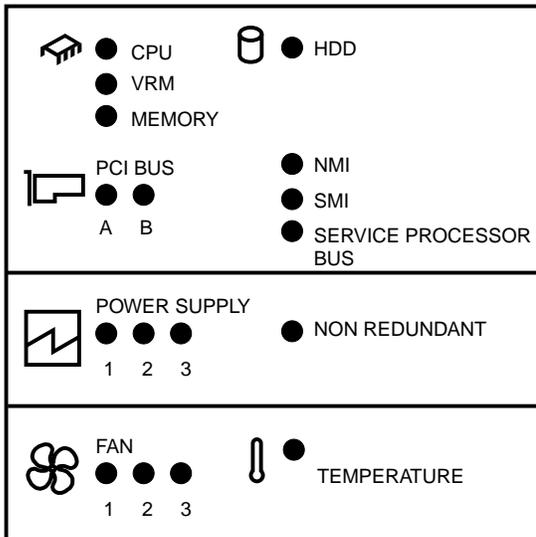
Beep symptoms

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 indicated the system is functioning properly.

Beeps	Description
1-2-3	• One beep • A pause (or break) • Two beeps • A pause (or break) • Three beeps
4	Four continuous beeps

Beep/Symptom	FRU/Action
1-1-2 (Processor register test failed)	1. **Optional Processor** (if installed) 2. Processor
1-1-3 (CMOS write/read test failed)	1. **Battery** 2. Processor Board 3. System Board
1-1-4 (BIOS EEPROM checksum failed)	1. **System Board** 2. Processor Board
1-2-1 (Programmable Interval Timer failed)	1. **System Board** 2. Processor Board

Beep/Symptom	FRU/Action
1-2-2 (DMA initialization failed)	1. **System Board** 2. Processor Board
1-2-3 (DMA page register write/read failed)	1. **System Board** 2. Processor Board
1-2-4 RAM refresh verification failed	1. **System Board**
1-3-1 (1st 64K RAM test failed)	1. **DIMM** 2. Processor Board
1-3-2 (1st 64K RAM parity test failed)	1. **DIMM** 2. Processor Board 3. System Board
2-1-1 (Secondary DMA register failed)	1. **System Board**
2-1-2 (Primary DMA register failed)	1. **System Board**
2-1-3 (Primary interrupt mask register failed)	1. **System Board**
2-1-4 (Secondary interrupt mask register failed)	1. **System Board**
2-2-1 (Interrupt vector loading failed)	1. **System Board** 2. Processor 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 info validation failed)	1. **Battery** 2. System Board
2-3-1 (Screen initialization failed)	1. **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 (Video failed, screen believed operable)	1. **System Board**
3-1-1 (Timer tick interrupt failed)	1. **System Board**

Beep/Symptom	FRU/Action
3-1-2 (Interval timer channel 2 failed)	1. **System Board**
3-1-3 (RAM test failed above address 0FFFFH)	1. **DIMM** 2. Processor Board 3. 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**
3-2-3 (Math coprocessor failed)	1. **Optional Processor** (if installed) 2. Processor 3. Processor Board
3-2-4 (Failure comparing CMOS memory size against actual)	1. **DIMM** 2. Battery
3-3-1 (Memory size mismatch occurred)	1. **DIMM** 2. Battery
3-3-2 (Critical SMBUS error occurred)	1. **Disconnect the server power cord from outlet, wait 30 seconds and retry.** 2. Memory DIMMs 3. Processor Board
3-3-3 (No memory in system)	1. **Install or reseat the memory modules** 2. DIMMs 3. Processor Board 4. System Board
Two Short Beeps (Information only, the configuration has changed)	1. **Run Diagnostics** 2. Run Configuration/Setup 3. Processor Board
Three Short Beeps	1. **DIMM** 2. Processor Board 3. System Board
One Continuous Beep	1. **Processor** 2. Optional Processor (if installed) 3. Processor Board 4. System Board
Repeating Short Beeps	1. **Keyboard** 2. System Board
One Long and One Short Beep	1. **Video adapter** (if present) 2. System Board 3.

Beep/Symptom	FRU/Action
One Long and Two Short Beeps	1. **Video adapter** (if present) 2. System Board
Two Long and Two Short Beeps	1. **Video adapter**

No beep symptoms

No Beep Symptom	FRU/Action
No beep and the system operates correctly.	1. **System Board**
No Beeps occur after successfully completing POST (The Power-On Status is disabled.)	1. **Run Configuration/Setup, set the Start Options Power-On Status to enable.** 2. System Board
No ac power (Power supply ac LED is off)	1. **Check the power cord** 2. Power Supply (If two are installed, swap them to determine if one is defective.)
No beep and no video	1. **See "Undetermined problems" on page 210.**

Diagnostic error codes

Error Code/Symptom	FRU/Action
001-XXX-000 (Failed core tests)	1. **System Board**
001-250-001 (Failed ECC test)	1. **Processor Board** 2. System Board
005-XXX-000 (Failed Video test)	1. **System Board** 2. Processor 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** 2. Processor 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 on PCI slot N**
035-XXX-099 (No adapters were found)	1. **If adapter is installed, recheck connections**
035-XXX-199 (Failed RAID test on PCI slot 1. Check system error log before replacing a FRU.)	1. **Adapter** 2. SCSI Backplane 3. Cable

Error Code/Symptom	FRU/Action
035-253-199 (RAID adapter initialization failure)	1. **ServeRAID Adapter in PCI slot 1** is not configured properly. Obtain the basic and extended configuration status and refer to the ServeRAID HMM for more information.
035-XXX-1NN (Check system error log before replacing a FRU. NN = SCSI ID or fixed disk.)	1. **Fixed disk with SCSI ID NN on RAID adapter in PCI slot 1**
035-XXX-299 (Failed RAID test on PCI slot 2. Check system error log before replacing a FRU.)	1. **Adapter** 2. SCSI Backplane 3. Cable
035-253-299 (RAID adapter initialization failure)	1. **ServeRAID Adapter in PCI slot 2** is not configured properly. Obtain the basic and extended configuration status and refer to the ServeRAID HMM for more information.
035-XXX-2NN (Check system error log before replacing a FRU. NN = SCSI ID or fixed disk.)	1. **Fixed disk with SCSI ID NN on RAID adapter in PCI slot 2**
035-XXX-399 (Failed RAID test on PCI slot 3. Check system error log before replacing a FRU.)	1. **Adapter** 2. SCSI Backplane 3. Cable
035-253-399 (RAID adapter initialization failure)	1. **ServeRAID Adapter in PCI slot 3** is not configured properly. Obtain the basic and extended configuration status and refer to the ServeRAID HMM for more information.
035-XXX-3NN (Check system error log before replacing a FRU. NN = SCSI ID or fixed disk.)	1. **Fixed disk with SCSI ID NN on RAID adapter in PCI slot 3**
035-XXX-499 (Failed RAID test on PCI slot 4. Check system error log before replacing a FRU.)	1. **Adapter** 2. **SCSI Backplane** 3. **Cable**

Error Code/Symptom	FRU/Action
035-253-499 (RAID adapter initialization failure)	1. **ServeRAID Adapter in PCI slot 4** is not configured properly. Obtain the basic and extended configuration status and refer to the ServeRAID HMM for more information.
035-XXX-4NN (Check system error log before replacing a FRU. NN = SCSI ID of failing FRU.)	1. **Fixed disk with SCSI ID NN on RAID adapter 4 in PCI slot 4.**
035-XXX-599 (Failed RAID test on PCI slot 5. Check system error log before replacing a FRU.)	1. **Adapter** 2. SCSI Backplane 3. Cable
035-253-599 (RAID adapter initialization failure)	1. **ServeRAID Adapter in PCI slot 5** is not configured properly. Obtain the basic and extended configuration status and refer to the ServeRAID HMM for more information.
035-XXX-5NN (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 5.**
075-XXX-000 (Failed Power Supply test)	1. **Power Supply** 2. Power Backplane/cable
089-XXX-001 (Failed Microprocessor test)	1. **Microprocessor** 2. VRM for Microprocessor 3. Processor Board 4. System Board
089-XXX-002 (Failed Optional Microprocessor test)	1. **Optional Microprocessor** 2. VRM for Optional Microprocessor 3. Processor Board 4. System Board
165-XXX-000 (Failed System Board test; detected by service processor)	1. **System Board** 2. Processor Board 3. Power Backplane 4. Hot-Swap Drive Backplane
180-XXX-001 (Failed Information Panel LED test)	1. **Information LED Panel** 2. Power-on Panel
180-XXX-002 (Failed Diagnostics LED Panel test)	1. **Diagnostics LED Panel** 2. Power-on Panel

Error Code/Symptom	FRU/Action
180-XXX-003 (Failed System Board LED test)	1. **System Board**
180-XXX-004 (Failed Processor Board LED test)	1. **Processor Board** 2. System Board
180-XXX-005 (Failed SCSI Backplane LED test)	1. **SCSI Backplane** 2. SCSI Backplane Cable 3. System Board
201-XXX-001 (Failed Memory test)	1. **DIMM Location J4**
201-XXX-002 (Failed Memory test)	1. **DIMM Location J3**
201-XXX-003 (Failed Memory test)	1. **DIMM Location J2**
201-XXX-004 (Failed Memory test)	1. **DIMM Location J1**
201-XXX-999 (Multiple DIMM failure, see error text.)	1. **See error text for failing DIMMs**
202-XXX-001 (Failed System Cache test)	1. **Microprocessor**
202-XXX-002 (Failed System Cache test on Optional Microprocessor)	1. **Optional Microprocessor**
206-XXX-000 (Failed Diskette Drive test)	1. **Diskette Drive cable** 2. Diskette Drive
215-XXX-000 (Failed IDE CD-ROM test)	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 drive.	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 drive.	1. **Fixed Disk 2**

Error Code/Symptom	FRU/Action
217-XXX-002 (Failed BIOS Fixed Disk test) **Note** If RAID is configured, the fixed disk number refers to the RAID logical drive.	1. **Fixed Disk 3**
217-XXX-003 (Failed BIOS Fixed Disk test) **Note** If RAID is configured, the fixed disk number refers to the RAID logical drive.	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 drive.	1. **Fixed Disk 5**
217-XXX-005 (Failed BIOS Fixed Disk test) **Note** If RAID is configured, the fixed disk number refers to the RAID logical drive.	1. **Fixed Disk 6**
264-XXX-0YY **(Failed Tape Drive Test)**	1. **Tape Cartridge**, if user executed the Read/Write Tape Drive test (failure code of XXX=256). 2. SCSI or power cable connected to the tape drive with SCSI ID YY. 3. Tape Drive with SCSI ID YY. Refer to the Help and Service Information appendix of the tape drive's User Guide. 4. System board or SCSI controller. Run SCSI Controller Diagnostics to determine if the SCSI bus is functioning properly.

Error Code/Symptom	FRU/Action
264-XXX-999 (Error on multiple tape drives, see error text for more information)	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)	1. **System Board**
405-XXX-00X (Failed Fault Tolerant Ethernet test)	1. **Fault Tolerant Ethernet Card**

Error symptoms

Error Symptom	FRU/Action
CD is not working properly.	1. **Clean the CD** 2. Try alternate CD 3. Clean the optical-head lens. 4. CD-ROM Drive
CD-ROM drive tray is not working. (The server must be powered-on.) If the server is on and the tray does not eject,	1. **Insert the end of a paper clip into the manual tray-release opening.** 2. CD-ROM Drive
CD-ROM drive is not recognized.	1. **Run Configuration/Setup, enabled primary IDE channel.** 2. Check cables and jumpers. 3. Check for correct device driver.
Diskette drive in-use light stays on, or the system bypasses the diskette drive.	If there is a diskette in the drive, verify that: 1. The diskette drive is enabled in the Configuration/Setup Utility. 2. The diskette is good and not damaged. (Try another diskette if you have one.) 3. The diskette is inserted correctly in the drive. 4. The diskette contains the necessary files to start the server. 5. The software program is OK. If the diskette drive in-use light stays on, or the system continues to bypass the diskette drive, replace the diskette drive.
Monitor problems (general) Some IBM monitors have their own self-tests. If you suspect a problem with the monitor, refer to the information that comes with the monitor for adjusting and testing instructions.	1. **Monitor** 2. Display Adapter/System Board

POST error codes

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

Error Code/Symptom	FRU/Action
062 (Three consecutive boot failures using the default configuration.)	1. **Run Configuration/Setup** 2. Battery 3. Processor Board 4. System Board
101, 102 (System and processor error)	1. **Processor Board** 2. System Board
106 (System and processor error)	1. **Processor Board** 2. System Board
111 (Channel check error)	1. **Memory DIMM** 2. Processor Board 3. System Board
114 (Adapter read-only memory error)	1. **Failing Adapter** 2. Run Diagnostics
129 (Internal Cache error)	1. **Processor** 2. Optional Processor (if installed) 3. Processor Board
151 (Real time clock error)	1. **Run Diagnostics** 2. Battery 3. System Board
161 (Real time clock battery error)	1. **Run Configuration/Setup** 2. Battery 3. System Board
162 (Device Configuration Error) **Important** Be sure to load the default settings and any additional desired settings; then, **save the configuration**.	1. **Run Configuration/Setup** 2. Battery 3. Failing Device 4. System Board
163 (Real-Time Clock error)	1. **Run Configuration/Setup** 2. Battery 3. System Board
164 (Memory configuration changed)	1. **Run Configuration/Setup** 2. DIMM 3. Processor Board
173 (System CMOS checksum bad)	1. **Run Configuration/Setup** 2. Battery 3. System Board

Error Code/Symptom	FRU/Action
175 (Hardware error)	1. **Processor Board** 2. System Board
176 (Computer cover or cable cover was removed without a key being used)	1. **Run Configuration/Setup** 2. System Board
177, 178 (Security hardware error)	1. **Run Configuration/Setup** 2. Remove AC power and reboot. 3. System Board
184 (Security hardware error)	1. **Run Configuration/Setup** 2. Remove AC power and reboot. 3. System Board
185 (Security hardware error)	1. **Run Configuration/Setup** 2. Remove AC power and reboot. 3. System Board
186	1. **Run Configuration/Setup** 2. System Board
187 (Security hardware error)	1. **Run Configuration/Setup** 2. Remove AC power and reboot. 3. System Board
188 (Security hardware error)	1. **Run Configuration/Setup** 2. Remove AC power and reboot. 3. System Board
189 (An attempt was made to access the server with invalid passwords)	1. **Run Configuration/Setup, enter the administrator password**
201 (Memory test error)	1. **DIMM** 2. Processor Board 3. System Board
229 (Cache error)	1. **Processor** 2. Optional Processor (if installed) 3. Processor Board
262 (DRAM configuration error)	1. **Run Configuration/Setup** 2. Battery 3. System Board

Error Code/Symptom	FRU/Action
289 (DIMM has been disabled the user or system)	1. **Run Configuration/Setup, if disabled by user** 2. Ensure if a DIMM was added/changed that the power was disconnected. 3. Disabled DIMM, if not disabled by user. 4. Processor Board
301 (Keyboard or keyboard controller error)	1. **Keyboard** 2. System Board
303 (Keyboard controller error)	1. **Keyboard** 2. System Board
602 (Invalid diskette boot record)	1. **Diskette** 2. Cable 3. Diskette Drive
604 (Diskette drive error)	1. **Run Configuration/Setup and Diagnostics** 2. Diskette Drive 3. Drive Cable 4. System Board
605 (Unlock failure)	1. **Diskette Drive** 2. Drive Cable 3. System Board
662 (Diskette drive configuration error)	1. **Run Configuration/Setup and Diagnostics** 2. Diskette Drive 3. Drive Cable 4. System Board
962 (Parallel port error)	1. **Disconnect external cable on parallel port.** 2. Run Configuration/Setup 3. System Board
11XX (System board serial port 1 or 2 error)	1. **Disconnect external cable on serial port.** 2. Run Configuration/Setup 3. System Board
1301 (Cable to Information LED panel not detected.	1. **Cable**
1302 (Cable to Power and Reset pushbuttons not detected.	1. **Cable**
1303 (I2C cable to Power Backplane not detected)	1. **Cable**

Error Code/Symptom	FRU/Action
1304 (Cable to Diagnostic LED panel not detected.	1. **Cable**
1600, 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: 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. 3. Check the SP reset jumper, if fitted.	1. **System Board**
1762 (Fixed Disk Configuration error)	1. **Fixed Disk Cables** 2. Run Configuration/Setup 3. Fixed Disk Adapter, if fitted 4. Fixed Disk Drive 5. System Board
178X (Fixed Disk error)	1. **Fixed Disk Cables** 2. Run Diagnostics 3. Fixed Disk Adapter, if fitted 4. Fixed Disk Drive 5. System Board
1800 (No more hardware interrupt available for PCI adapter)	1. **Run Configuration/Setup** 2. Failing Adapter 3. System Board
1801 (No room for PCI option ROM)	1. **Run Configuration/Setup** 2. Failing Adapter 3. System Board
1802 (No more I/O space available for PCI adapter)	1. **Run Configuration/Setup** 2. Failing Adapter 3. System Board
1803 (No more memory (above 1MB for PCI adapter)	1. **Run Configuration/Setup** 2. Failing Adapter 3. System Board

Error Code/Symptom	FRU/Action
1804 (No more memory (below 1MB for PCI adapter))	1. **Run Configuration/Setup** 2. Move the failing adapter to slot 1 or 2 3. Failing Adapter 4. System Board
1805 (PCI option ROM checksum error)	1. **Remove Failing PCI Card** 2. System Board
1806 (PCI to PCI Bridge error)	1. **Run Configuration/Setup** 2. Move the failing adapter to slot 1 or 2 3. Failing Adapter 4. System Board 5. Processor Board
1807, 1808, 1810 (General PCI error)	1. **Remove Failing PCI Card** 2. System Board 3. Processor Board
1962 (Drive does not contain a valid boot sector)	1. **Verify a bootable operating system is installed** 2. Run Diagnostics 3. Hard Disk Drive Cable 4. System Board 5. Hard Disk Drive
2400 (Video controller test failure)	1. **Video Adapter** (if installed) 2. System Board
2462 (Video memory configuration error)	1. **Video Adapter** (if installed) 2. System Board
5962 (IDE CD-ROM configuration error)	1. **Run Configuration/Setup** 2. CD-ROM Drive 3. Battery
8603 (Pointing Device Error)	1. **Pointing Device** 2. System Board
19501 (Processor 1 not functioning)	1. **VRM 1** 2. Processor 1 3. Processor Board 4. System Board
19502 (Processor 2 not functioning)	1. **VRM 2** 2. Processor 2 3. Processor Board 4. System Board
19701 (Processor 1 failed BIST)	1. **Processor 1** 2. Processor Board 3. System Board
19702 (Processor 2 failed BIST)	1. **Processor 2** 2. Processor Board 3. System Board

Error Code/Symptom	FRU/Action
0001200 (Machine check architecture error)	1. **Processor** 2. Optional Processor
000120P0, **000120P1,000120P2,000120PF** (Processor cache error)	1. **Failing Processor** 2. Processor Board
01295085 (ECC checking hardware test error)	1. **Processor** 2. Processor Board
I9990301 (Fixed boot sector error, no operating system installed)	1. **Run** **Configuration/Setup** **for correct startup** 2. Verify operating system installed
I9990305 (Fixed boot sector error, no operating system installed)	1. **Install operating** **system to hard disk** **drive.**
I9990650 (AC power has been restored)	1. **Check cable** 2. Check for interruption of power supply 3. Power Cable

SCSI error codes

Error Code	FRU/Action
All SCSI Errors One or more of the following might be causing the problem: • 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	1. **All SCSI devices must be powered-on before you power-on the server.** 2. The cables for all SCSI devices are connected correctly. 3. The last device in each SCSI chain is terminated correctly. 4. The SCSI devices are configured correctly.

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 "Resolving configuration conflicts" on page 36.
> 2. A corrupt CMOS can cause undetermined problems.

Check the LEDs on all the power supplies. 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
   - External surge suppressor/UPS devices
   - Modem, printer, mouse, or non-IBM devices
   - Each adapter
   - Drives
   - Memory-Module Kits (Minimum requirement = 1 bank of 128 MB DIMM
   - Secondary microprocessor VRM, if installed

> **Note**
>
> Minimum operating requirements are:
>
> Power supply,
> Processor board, use switch 3 on switch
> block.2 on the processor board to bypass
> the power switch button.
> Verify that the power connectors J11 and
> J14 are installed correctly at both ends.
> System Board
> Memory Module kit Minimum requirement =
> 1 bank of 128 MB DIMM

4. Power-on the computer. If the problem remains,
   suspect the following FRUs in the order listed:
   - Power Supply
   - Power Backplane
   - Processor
   - System Board
   - Processor Board

> **Note**
>
> If the problem goes away when you remove an
> adapter from the system, and replacing that adapter
> does not correct the problem, suspect the system
> board then the processor.

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 contains the error messages for the Novell NetWare or IntraNetWare server ODI driver. The explanation and recommended action are included with each message.

PCNTNW-NW-026 The MSM is unable to parse a required custom keyword.

Explanation: The user entered an incorrect parameter keyword.

Action: Reload the driver using the correct keyword.

PCNTNW-NW-054 The adapter did not respond to the initialization command.

Explanation: The adapter did not respond when the driver tried to initialize it.

Action: Verify that the Ethernet controller is enabled. (See "PCI Slot/Device Information" on page 32.) If the Ethernet controller is enabled, go to "General checkout" on page 6 to run the diagnostic programs.

PCNTNW-NW-058 The adapter did not respond to the initialization command.

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. See "PCI Slot/Device Information" on page 32 for information on setting the interrupt requests. If the IRQ settings are correct, replace the ethernet controller.

PCNTNW-NW-066 The cable might be disconnected from the adapter.

Explanation: The cable might be disconnected from the server Ethernet port.

Action: Verify that a cable is connected to the Ethernet port.

PCNTNW-NW-071 The matching virtual adapter could not be found.

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. If the adapter is seated correctly, replace the adapter.

PCNTNW-NW-072 A resource tag is unavailable.

Explanation: The driver tried to allocate some resources that were not available.

Action: Add or free some memory in the server. Then, restart the server.

PCNTNW-NW-073 Unable to allocate memory.

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.

PCNTNW-NW-074 The hardware interrupt cannot be set.

Explanation: An attempt was made to initialize a given hardware interrupt. The attempt was not successful.

Action: If you have an Ethernet adapter installed, make sure the adapter does not share an IRQ with any other device (see "PCI Slot/Device Information" on page 32.)

PCNTNW-NW-075 The Multiple Link Interface Driver (MLID) cannot be registered with the Link Support Layer (LSL).

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.

PCNTNW-NW-079 The Multiple Link Interface Driver (MLID) did not initialize MSMTx Free Count.

Explanation: The MSMTx Free Count is not initialized correctly.

Action: Restart the server. If the problem persists, replace the adapter.

PCNTNW-NW-086 The driver parameter block is too small.

Explanation: The driver parameter block is too small.

Action: Restart the server. If the problem persists, replace the adapter.

PCNTNW-NW-087 The media parameter block is too small.

Explanation: The driver media parameter block is too small.

Action: Restart the server. If the problem persists, replace the adapter.

PCNTNW-NW-091 The hardware configuration conflicts.

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. See "PCI Slot/Device Information" on page 32 for information on viewing and changing interrupt requests.

PCNTNW-NW-126 The group bit in the node address override was cleared.

Explanation: The IEEE address has a group bit indicating 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.

PCNTNW-NW-127 The local bit in the node address override was set.

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.

PCNTNW-NW-164 The device was not found.

Explanation: The driver cannot find an Ethernet controller in the server.

Action: Verify that the Ethernet controller is enabled. (See "PCI Slot/Device Information" on page 32.) If the Ethernet controller is enabled, go to "General checkout" on page 6 to run the diagnostic programs.

PCNTNW-NW-165 The device was not found at IOADDRESS.

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.

PCNTNW-NW-167 PCI scan specified, device not found.

Explanation: The driver cannot locate the Ethernet controller on the PCI bus.

Action: Verify that the Ethernet controller is enabled. (See "PCI Slot/Device Information" on page 32.)

If the problem persists, go to "General checkout" on page 6 to run the diagnostic programs.

PCNTNW-NW-180 The DMA parameter is not necessary for PCI device.

Explanation: The Ethernet controller does not require a DMA setting.

Action: None necessary, message is for information only.

NDIS 2.01 (OS/2) driver messages: This

section contains the error messages for the NDIS 2.01 (OS/2) drivers. The explanation and recommended action are included with each message.

PCNTND-1   Unable to open the Protocol Manager.

Explanation: The NDIS stack is not configured correctly.

Action: Check and correct your configuration.

PCNTND-6   Out of memory while allocating buffers.

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.

PCNTND-7   A Protocol Manager device error occurred.

Explanation: The NDIS stack is not configured correctly.

Action: Check and correct your configuration.

PCNTND-8   Bad status for the Protocol Manager.

Explanation: The NDIS stack is not configured correctly in the PROTOCOL.INI file.

Action: Check and correct your configuration.

PCNTND-9   Cannot find the PROTOCOL.INI entry.

Explanation: The NDIS stack is not configured correctly in the PROTOCOL.INI file.

Action: Check and correct your configuration.

PCNTND-10   The Protocol Manager Input Output Control (IOCTL) failed.

Explanation: The NDIS stack is not configured correctly in the PROTOCOL.INI file.

Action: Check and correct your configuration.

PCNTND-11   Protocol Manager registration failed.

Explanation: The NDIS stack is not configured correctly.

Action: Check and correct your configuration.

PCNTND-15   Device not found.

Explanation: The driver cannot find an Ethernet controller in the server.

Action: Verify that the Ethernet controller is enabled. (See "PCI Slot/Device Information" on page 32.) If the Ethernet controller is enabled, go to "General checkout" on page 6 to run the diagnostic programs.

PCNTND-16   PCI scan specified, device not found.

Explanation: The driver cannot locate the Ethernet controller on the PCI bus.

Action: Verify that the Ethernet controller is enabled. (See "PCI Slot/Device Information" on page 32.) If the Ethernet controller is enabled, go to "General checkout" on page 6 to run the diagnostic programs.

PCNTND-21   **The adapter failed the checksum test.**

Explanation: The driver cannot find an Ethernet controller.

Action: Verify that the Ethernet controller is enabled. (See "PCI Slot/Device Information" on page 32.) If the Ethernet controller is enabled, go to "General checkout" on page 6 to run the diagnostic programs.

PCNTND-23   **WARNING: PCNET IRQ found =** *xx*

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. (See "PCI Slot/Device Information" on page 32.)

PCNTND-24   **WARNING: PCNET IRQ does not match PROTOCOL.INI.**

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. (See "PCI Slot/Device Information" on page 32.)

PCNTND-25   **PCI scan specified, PCI bus not found!**

Explanation: The driver cannot locate the PCI bus.

Action: Run the diagnostic programs (go to "General checkout" on page 6).

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.

PermaNet(tm) 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(tm) 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(tm) 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 contains the error messages for the SCO UNIX LLI driver.

---

pnt0-2   **PCI search specified, PCI device not found!**

Explanation: The driver cannot locate the Ethernet controller on the PCI bus.

Action: Run the NETCONFIG program to search for another Ethernet controller.

Action: Verify that the Ethernet controller is enabled. (See "PCI Slot/Device Information" on page 32.) If the Ethernet controller is enabled, go to "General checkout" on page 6 to run the diagnostic programs.

---

pnt0-6   **Cannot allocate memory for the adapter during an interrupt. Please check your Streams parameters.**

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.

---

pnt0-7   **Cannot allocate memory for the adapter during reset. Please check your Streams parameters.**

Explanation: The system is out of Streams memory blocks.

Action: Use the CRASH utility to increase the number of Streams memory blocks.

---

pnt0-11   **Device not found!**

Explanation: The driver cannot find an Ethernet controller.

Action: Verify that the Ethernet controller is enabled. (See "PCI Slot/Device Information" on page 32.) If the Ethernet controller is enabled, go to "General checkout" on page 6 to run the diagnostic programs.

---

pnt0-12   **Device failed checksum test!**

Explanation: The driver cannot find an Ethernet controller.

Action: Verify that the Ethernet controller is enabled. (See "PCI Slot/Device Information" on page 32.) If the Ethernet controller is enabled, go to "General checkout" on page 6 to run the diagnostic programs.

---

pnt0-13   **add_intr_handler failed! Interrupts already enabled.**

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 match the hardware settings.

---

pnt0-14   **Cannot locate hardware.**

Explanation: The SunSoft Solaris driver cannot find any Ethernet controller.

Action: Verify that the Ethernet controller is enabled. (See "PCI Slot/Device Information" on page 32.) If the Ethernet controller is enabled, go to "General checkout" on page 6 to run the diagnostic programs.

---

pnt0-15   **No more devices to open.**

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, go to "General checkout" on page 6 to run the diagnostic programs.

pnt0-17   **Device fault...Reset initiated!**

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, go to "General checkout" on page 6 to run the diagnostic programs.

---

pnt0-19   **IRQ found for PCnet hardware does not match space.c (or pnt.conf)!**

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.

---

pnt0-20   **add_intr_handler failed! Unknown interrupt type.**

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.

---

pnt0-21   **add_intr_handler failed! Out of range interrupt number.**

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.

---

pnt0-22   **add_intr_handler failed! Out of range IPL.**

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.

---

pnt0-23   **add_intr_handler failed! Vector already occupied.**

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.

---

pnt0-24   **add_intr_handler failed! Vector already shared at different IPL.**

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.

---

pnt0-26   **The DMA number is not necessary for PCI device.**

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.

---

pnt0-29   **The IRQ number is already in use.**

Explanation: The specified I/O address is already in use.

Action: Run the NETCONFIG program to modify your hardware settings.

---

pnt0-31   **I/O address is not necessary for the PCI device.**

Explanation: The I/O address specified is not required.

Action: Remove the assigned I/O address specified for the Ethernet controller.

Parts listing xSeries 240
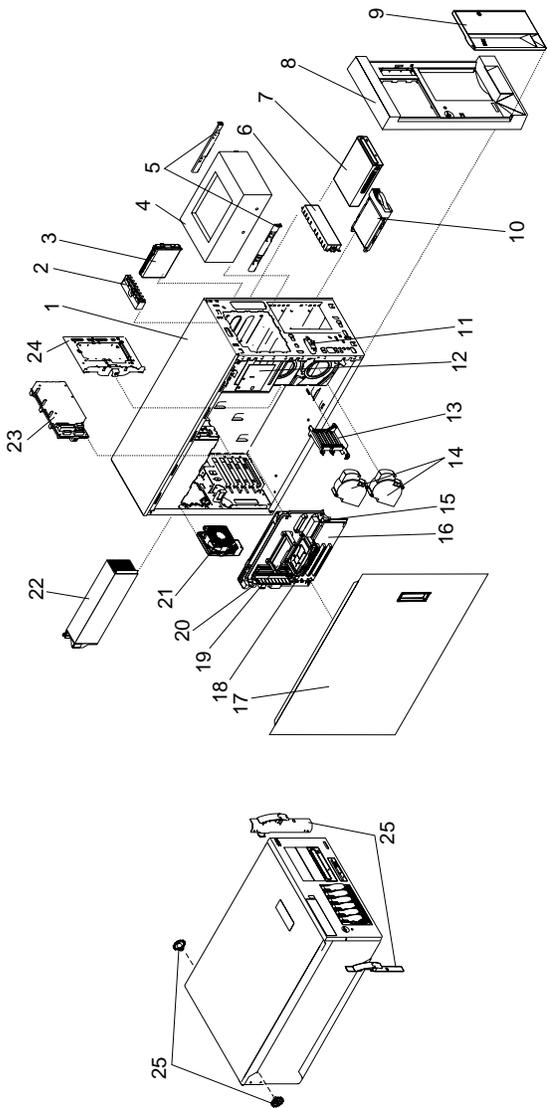
System

This parts listing supports the following models: 81Y, 8RY

Index	System (xSeries 240) Models 81Y, 8RY	FRU No.
1	Tower coverset (Model 81Y)	21P9653
2	Front LED Panel Assembly (All models)	00N6373
3	1.44 MB Diskette Drive (All models)	76H4091
4	DLT Drive (optional)	N/A
5	Metal DLT Slide (4) (All models)	12J5681
6	5.25 Blank Bezel (All models)	00N6407
7	40X CD-ROM Drive (All models)	09N0881
8	Front Bezel Assembly (Model 8RY)	24P0603
8	Front Bezel Assembly (Model 81Y)	24P0601
9	Door Bezel Assembly (Models 81Y)	24P0615
10	Fixed Disk Drive (Optional)	N/A
11	Power/Reset Card (All models)	00N6377
12	Diagnostics Card (All models)	00N6381
13	Option Card Support (All models)	00N6415
14	Blower Assembly (All models)	09N7499
15	Voltage Regulator Module (All models)	36L8901
16	System Board/Backplane Assembly (All models)	61H2739
17	Cover Assembly (Model 81Y)	00N6401
17	Cover Assembly (Model 8RY)	00N6403
18	1000 MHz/133 Processor with 256KB Cache (Models 81Y, 8RY)	21P9566
18	1000 MHz/133 Processor with 256KB Cache (Models 81Y, 8RY)	21P8621
19	Processor Terminator Card (All models)	37L5949
20	256 MB SD R-DIMM (Model 81Y, 8RY)	33L3061
21	Rear Fan Assembly (All models)	00N6387
22	250W Power Supply (All models)	36L8819
23	Power Backplane/Backplate Assembly (All models)	00N6391
24	SCSI Backplane Combo/Backplate Assembly (Models 81Y, 8RY)	00N9557
25	Rack Brackets (2 each) complete with wheels (Model 8RY)	00N6429

Non-illustrated FRUs

Blower Housing (All models)	00N6409
LVD Extender (All models)	00N6406
Miscellaneous Parts Kit, System (screws, springs, clamps, clips, grommets, spacers, brackets, handles, bezels) (All models)	00N6421
3V Lithium Battery (All models)	33F8354
Service Label (Model 81Y)	09N7518
Keylock Assembly (Model 81Y)	00N6393
Power Supply Filler Plate (All models)	00N6405
Snap-In Foot (4) (Model 81Y)	00N6411
DASD Backplane Assembly (All models)	00N9557
Moulded CD/DASD Slide (2) (All models)	00N6412
DASD Blank Filler (All models)	00N7259
Floppy Disk Drive Slide (2) (All models)	00N6413
Processor Handle (All models)	33L4320

Index	System (xSeries 240) Models 81Y, 8RY	FRU No.
	Processor Goalpost (4) (All models)	36L9543
	Rack Slide Kit (Model 8RY)	00N6417
	Mouse (Model 81Y)	76H0889
	Processor Card (All models)	61H2918
	PCI Card Assembly (All models)	06P5894
	Miscellaneous Parts Kit, Rack Slide (tie wraps, screws, nuts, pins) (Model 8RY)	00N6419
	Media tray (All models)	09N7521
	Washer (6) (All models)	21P9658
	Rack coverset (Model 8RY)	21P9652
	Fan assembly (Models 81Y, 8RY)	21P9601

Cables

Cable	FRU No.
Blower Housing Cable (All models)	37L6063
CD-ROM Cable (All models)	37L6055
Fixed Disk Drive Cable (All models)	37L6057
LVD SCSI 1-Drop Cable (All models)	37L6051
LVD SCSI 1-Drop Cable (All models)	09N7528
SCSI Extender Cable(All models)	09N7531
Rear Fan Cable (All models)	37L6061
LED Cable (Model 81Y)	00N6371
LED Cable (Model 8RY)	00N6575
Power Backplane to DASD Backplane Cable (All models)	00N6579
Power Backplane to Media Cable (All models)	00N6583
Power Backplane to Processor Board (Aux) Cable (All models)	00N6580
Power Backplane to Processor Board (I2C) Cable (All models)	00N6581
Power Backplane to Processor Board (Power) Cable (All models)	00N6584
Power Backplane to Processor Board (Signal) Cable (All models)	00N6582
Ultra SCSI 2-Drop Cable (All models)	37L6053

Keyboards

Keyboards	FRU No.
Arabic	37L2555
Belgian-French	37L2556
Belgian-UK/Dutch	37L2557
Brazil/Portugal	37L2571
Bulgarian	37L2558
Chinese/US	37L2585
Czech	37L2559
Danish	37L2560
Dutch	37L2561
French	37L2562
French/Canadian - 58	37L0913
French/Canadian - 445	37L2552
German	37L2563
Greek	37L2564
Hebrew	37L2565
Hungarian	37L2566
Icelandic	37L2567
Italian	37L2568
Korean	02K0901
Norwegian	37L2569
Polish	37L2570
Portuguese	37L2571
Romanian	37L2572
Russian	37L2573
Serbian/Cyrillic	37L2574
Slovak	37L2575
Spanish	37L2576
Spanish - Latin America	37L2553
Swedish/Finnish	37L2577
Swiss French/German	37L2578
Thailand	37L2587
Turkish - 179	37L2579
Turkish - 440	37L2580
UK English	37L2581
US English	37L2551
UK English (ISO Compliant)	37L2583
Yugoslavia/Lithuania	37L2582

Power cords

Power Cords	FRU No.
Arabic	14F0033
Belgium	1339520
Bulgaria	1339520
Czech Republic	1339520
Denmark	13F9997
Finland	1339520
France	1339520
Germany	1339520
Hungary	1339520
Israel	14F0087
Italy	14F0069
Latvia	1339520
Netherlands	1339520
Norway	1339520
Poland	1339520
Portugal	1339520
Serbia	1339520
Slovakia	1339520
South Africa	14F0015
Spain	1339520
Switzerland	1339520
Switzerland (French/German)	14F0051
U.S. English	6952301
U.K./Ireland	14F0033
Yugoslavia	1339520

Related service information

```
┌─ Important ─────────────────────────────────────┐
│                                                 │
│  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.           │
│                                                 │
└─────────────────────────────────────────────────┘
```

223

Safety information

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

DANGER

> **To avoid a shock hazard, do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.**
>
> **To avoid shock hazard:**
> - **The power cord must be connected to a properly wired and earthed receptacle.**
> - **Any equipment to which this product will be attached must also be connected to properly wired receptacles.**
>
> **When possible, use one hand to connect or disconnect signal cables to prevent a possible shock from touching two surfaces with different electrical potentials.**
>
> **Electrical current from power, telephone, and communications cables is hazardous. To avoid shock hazard, connect and disconnect cables as described following when installing, moving, or opening covers of this product or attached devices.**

To Connect	To Disconnect
1. Turn Everything OFF.	1. Turn Everything OFF.
2. First, attach all cables to devices.	2. First, remove power cord(s) from outlet.
3. Attach signal cables to receptacles.	3. Remove signal cables from receptacles.
4. Attach power cord(s) to outlet.	4. Remove all cables from devices.
5. Turn device ON.	

NOTE: In the UK, by law, the telephone cable must be connected after the power cord.	NOTE: In the UK, the power cord must be disconnected after the telephone cable.

CAUTION:
When replacing the battery, use only IBM Part Number 33F8354 or an equivalent type battery recommended by the manufacturer. If the system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.

Do not:
*   **Throw or immerse into water**
*   **Heat to more than 100°C (212°F)**
*   **Repair or disassemble**

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

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

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

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

DANGER

> **Some CD-ROM drives contain an embedded Class 3A or Class 3B laser diode. Note the following.**
>
> **Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam.**

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

CAUTION:
Use safe lifting practices when lifting the machine.

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

CAUTION:
When the power cord bracket option is installed on the power cord, the server must be plugged to a power source that is easily accessible.

50 kg (110 lbs)

CAUTION:
Do not place any object weighing more than 50 kg (110 lbs) on top of the rack model of the server.

DANGER

> **Para evitar choques elétricos, não conecte ou desconecte nenhum cabo, nem efetue instalação, manutenção ou reconfiguração deste produto durante uma tempestade com raios.**
>
> **Para evitar choques elétricos:**
>
> - **O cabo de alimentação deve ser conectado a um receptáculo corretamente instalado e aterrado.**
> - **Todos os equipamentos aos quais este produto será conectado devem também ser conectados a receptáculos corretamente instalados.**
>
> **Quando possível, utilize uma das mãos para conectar ou desconectar cabos de sinal, para evitar um possível choque ao tocar duas superfícies com potenciais elétricos diferentes.**
>
> **A corrente elétrica proveniente de cabos de alimentação, de telefone e de comunicação é perigosa. Para evitar choques elétricos, conecte e desconecte os cabos conforme descrito a seguir, ao instalar, movimentar ou abrir tampas deste produto ou de dispositivos conectados.**

Para Conectar	**Para Desconectar**
1. DESLIGUE tudo.	1. DESLIGUE tudo.
2. Conecte primeiro todos os cabos nos dispositivos.	2. Remova primeiro o(s) cabo(s) de alimentação das tomadas.
3. Conecte os cabos de sinal nos receptáculos.	3. Remova os cabos de sinal dos receptáculos.
4. Conecte o(s) cabo(s) de alimentação nas tomadas.	4. Remova todos os cabos dos dispositivos.
5. LIGUE o dispositivo.	

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

Não:

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

Descarte a bateria conforme requerido pelas disposições e regulamentações locais.

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

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

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

DANGER

> **Algumas unidades de CD-ROM contém um diodo de laser da Classe 3A ou da Classe 3B. Observe o seguinte.**
>
> **Radiação de laser quando aberto. Não olhe diretamente para o feixe de laser, não olhe diretamente com instrumentos óticos, e evite exposição direta ao raio.**

≥32 kg (70,5 lbs)   ≥55 kg (121,2 lbs)
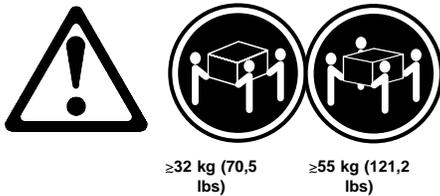
CAUTION:
Utilize práticas seguras para levantamento de peso ao levantar sua máquina.

CAUTION:
O botão de Controle de Energia na parte frontal do servidor não desliga a corrente elétrica fornecida ao servidor. O servidor pode também possuir mais que um cabo de alimentação. Para remover toda a corrente elétrica do servidor, assegure que todos os cabos de alimentação estejam desconectados da fonte de energia.

CAUTION:
Quando o suporte do cabo de alimentação estiver instalado no cabo de alimentação, o servidor deve estar conectado a uma fonte de energia de fácil acesso.
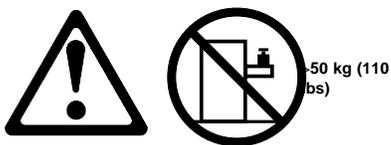
50 kg (110 lbs)

CAUTION:
Não coloque qualquer objeto com peso superior a 50 kg (110 lbs) sobre o modelo de gaveta do servidor.

声明 1

危险！

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

为避免电击危险：

– 电源线必须连接到适当的电线及接地插座。

– 此产品将要连接的所有设备也必须连接到正确接线的插座上。

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

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

要连接电缆	要断开电缆
1. 关闭所有设备。	1. 关闭所有设备。
2. 首先将所有电缆与设备连接。	2. 首先从电源插座拔下电源线。
3. 将信号线连接到插座。	3. 从插座拔下信号电缆。
4. 将电源线连接到电源插座。	4. 从设备上拔下所有电缆。
5. 打开设备。	

声明 2

注意！

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

不要：

– 将其投入或浸于水中

– 加热超过100℃ （212℉）

– 修理或拆卸

应按照当地法规和条例对此电池进行处理。

声明 3

注意 ！

在已安装 CD-ROM 驱动器的情况下，请注意下面的内容。

不遵循此处指定的控制、调整、或操作过程的操作将可能导致危险
的辐射泄漏。

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

声明 4

危险 !

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

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

声明 5

32 kg (70.5 磅)   **55 kg (121.2 磅)**

注意！

搬运机器时，请进行安全搬运操作。

声明 6

注意！

关闭服务器前端的电源控制按钮并不能完全切断供给服务器的电流。
服务器可能有多条电源线。为从服务器断开所有电流，应确保断开
所有电源线与电源的连接。

声明 7

注意！

当电源线上安装有电源线固定夹选件时，服务器必须插在容易接近
的电源上。

声明 12

>50 kg (110 磅)

注意！

请不要将任何重量超过 50 kg(1101 磅)的物体放在抽屉型服务器的
顶部。

• 聲明 1

危險

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

為了避免雷擊:

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

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

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

連接	拔掉
1. 關掉所有開關。	1. 關掉所有開關。
2. 首先,將所有電纜線連接到裝置。	2. 首先,自電源插座拔掉電源線。
3. 將信號電纜連接到信號插座。	3. 拔掉信號插座上的所有信號電纜。
4. 將電源線連接到電源插座。	4. 拔掉裝置上的所有電纜線。
5. 開啟裝置電源。	

• 聲明 2

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

嚴禁:.

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

處理廢棄電池時,請遵照當地法令規章處理。

• 聲明 3

注意:
安裝光碟機時,請注意下列事項:

不依此處所指示的控制、調整或處理步驟,恐有遭致輻射之虞。

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

• 聲明 4

危險

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

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

· 聲明 5

>= 32 公斤(70.5 磅)　　>= 55 公斤(121.2 磅)

注意：
提昇機器時，請使用安全提昇措施。

· 聲明 6

注意：
伺服器前面的電源控制按鈕無法關閉供應伺服器的電流。本伺服器
可能有一條以上的電源線。如要移除伺服器上的所有電流，請確認
所有電源線已與電源分離。

· 聲明 7

注意：
如電源線上安裝了電源線托架裝置，則所使用的電源必須是伺服器
容易使用為原則。

· 聲明 12

>50 公斤(110 磅)

注意：
請勿將任何重量超過 50 公斤(110 磅) 的東西置於伺服器的抽屜上
方。

DANGER

> **Pour éviter tout risque de choc électrique, ne manipulez aucun câble et n'effectuez aucune opération d'installation, d'entretien ou de reconfiguration de ce produit au cours d'un orage.**
>
> **Pour éviter tout risque de choc électrique :**
>
> - **Les cordons d'alimentation du présent produit et de tous les appareils qui lui sont connectés doivent être branchés sur des socles de prise de courant correctement câblés et mis à la terre.**
>
> **Afin d'éviter tout risque de choc électrique provenant d'une différence de potentiel de terre, n'utilisez qu'une main, lorsque cela est possible, pour connecter ou déconnecter les cordons d'interface.**
>
> **Le courant électrique passant dans les câbles de communication, ou les cordons téléphoniques et d'alimentation peut être dangereux. Pour éviter tout risque de choc électrique, lorsque vous installez ou que vous déplacez le présent produit ou des périphériques qui lui sont raccordés, reportez-vous aux instructions ci-dessous pour connecter et déconnecter les différents cordons.**

Connexion	Déconnexion
1. Mettez les unités hors tension.	1. Mettez les unités hors tension.
2. Commencez par brancher tous les cordons sur les unités.	2. Commencez pas débrancher les cordons alimentation des socles de prise de courant.
3. Branchez les câbles d'interface sur les prises.	3. Débranchez les câbles d'interface des prises.
4. Branchez les cordons d'alimentation sur un socle de prise de courant.	4. Débranchez tous les câbles des unités.
5. Mettez les unités sous tension.	

CAUTION:
**Remplacez la pile usagée par une pile de référence
identique exclusivement - voir la référence IBM - ou
par une pile équivalente recommandée par le fabricant.
Si votre système est doté d'un module contenant une
pile au lithium, vous devez le remplacer uniquement
par un module identique, produit par le même
fabricant. La pile contient du lithium et présente donc
un risque d'explosion en cas de mauvaise
manipulation ou utilisation.**

- **Ne la jetez pas à l'eau.**
- **Ne l'exposez pas à une température supérieure à
100 °C.**
- **Ne cherchez pas à la réparer ou à la démonter.**

**Pour la mise au rebut, reportez-vous à la
réglementation en vigueur.**

CAUTION:
**Si une unité de CD-ROM est installée, prenez
connaissance des informations suivantes :**

**Pour éviter tout risque d'exposition au rayon laser,
respectez les consignes de réglage et d'utilisation des
commandes, ainsi que les procédures décrites dans le
présent document.**

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

DANGER

> **Certaines unités de CD-ROM contiennent une diode laser de classe 3A ou 3B. Prenez connaissance des informations suivantes :**
>
> **Rayonnement laser lorsque le carter est ouvert. Évitez de regarder fixement le faisceau ou de l'observer à l'aide d'instruments optiques. Évitez une exposition directe au rayon.**

≥32 kg　　**≥55 kg**

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

CAUTION:
Le bouton de mise sous tension/hors tension situé sur la face avant du serveur ne coupe pas l'arrivée de courant électrique à l'intérieur de la machine. Il se peut que votre serveur dispose de plusieurs cordons d'alimentation. Pour isoler totalement le serveur du réseau électrique, débranchez tous les cordons d'alimentation des socles de prise de courant.

CAUTION:
Lorsqu'une patte de fixation du cordon d'alimentation est installée, branchez le serveur sur une prise de courant électrique facile d'accès.
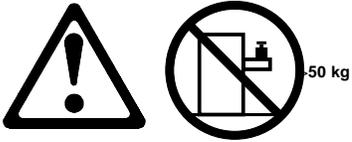
CAUTION:
Ne posez pas d'objet dont le poids dépasse 50 kg sur
les modèles tiroir de serveur.

DANGER

> **Aus Sicherheitsgründen bei Gewitter an diesem Gerät keine Kabel anschließen oder lösen. Ferner keine Installations-, Wartungs- oder Rekonfigurationsarbeiten durchführen.**
>
> **Aus Sicherheitsgründen:**
>
> - **Gerät nur an eine Schutzkontaktsteckdose mit ordnungsgemäß geerdetem Schutzkontakt anschließen.**
> - **Alle angeschlossenen Geräte ebenfalls an Schutzkontaktsteckdosen mit ordnungsgemäß geerdetem Schutzkontakt anschließen.**
>
> **Signalkabel möglichst einhändig anschließen oder lösen, um einen Stromschlag durch Berühren von Oberflächen mit unterschiedlichem elektrischem Potential zu vermeiden.**
>
> **Elektrische Spannungen von Netz-, Telefon- und Datenübertragungsleitungen sind gefährlich. Um einen Stromschlag zu vermeiden, nur nach den Anweisungen arbeiten, die für Installation, Transport oder Öffnen von Gehäusen dieses Produkts oder angeschlossenen Einheiten gelten.**

Kabel anschließen	Kabel lösen
1. Alle Geräte ausschalten und Netzstecker ziehen.	1. Alle Geräte ausschalten.
2. Zuerst alle Kabel an Einheiten anschließen.	2. Zuerst Netzstecker von Steckdose lösen.
3. Signalkabel an Anschlußbuchsen anschließen.	3. Signalkabel von Anschlußbuchsen lösen.
4. Netzstecker an Steckdose anschließen.	4. Alle Kabel von Einheiten lösen.
5. Gerät einschalten.	

CAUTION:
**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.**

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

**Das Entfernen der Abdeckungen des
CD-ROM-Laufwerks kann zu gefährlicher
Laserstrahlung führen. Es befinden sich keine Teile
innerhalb des CD-ROM-Laufwerks, die vom Benutzer
gewartet werden müssen. Die Verkleidung des
CD-ROM-Laufwerks nicht öffnen.**

DANGER

> **Manche CD-ROM-Laufwerke enthalten eine
> eingebaute Laserdiode der Klasse 3A oder
> 3B. Die nachfolgend aufgeführten Punkte
> beachten.**
>
> **Laserstrahlung bei geöffneter Tür. Niemals
> direkt in den Laserstrahl sehen, nicht direkt
> mit optischen Instrumenten betrachten und
> den Strahlungsbereich meiden.**

≥32 kg **≥55 kg**

CAUTION:
Beim Anheben der Maschine die vorgeschriebenen
Sicherheitsbestimmungen beachten.

CAUTION:
Mit dem Betriebsspannungsschalter an der Vorderseite
des Servers 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.

CAUTION:
Wenn am Netzkabel eine Kabelhalterung angebracht
ist, muß der Server an eine leicht zugängliche
Netzsteckdose angeschlossen werden.

-50 kg

CAUTION:
Legen Sie keine Gegenstände, die mehr als 50 kg
wiegen, auf das Einschubmodell des Servers.

PERICOLO

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

Per evitare il pericolo di scosse elettriche:

- **collegare il cavo di alimentazione ad una presa elettrica correttamente cablata e munita di terra di sicurezza;**
- **collegare qualsiasi apparecchiatura collegata a questo prodotto ad una presa elettrica correttamente cablata e munita di terra di sicurezza.**

Quando possibile, collegare o scollegare i cavi di segnale con una sola mano per evitare il rischio di scosse derivanti dal contatto con due superfici a diverso potenziale elettrico.

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

Per collegare	Per scollegare
1. SPEGNERE tutti i dispositivi.	1. SPEGNERE tutti i dispositivi.
2. Collegare prima tutti i cavi alle unità.	2. Rimuovere prima il(i) cavo(i) di alimentazione dalla presa elettrica.
3. Collegare i cavi di segnale alle prese.	3. Rimuovere i cavi di segnale dalle prese.
4. Collegare il(i) cavo(i) di alimentazione alla presa elettrica.	4. Rimuovere tutti i cavi dalle unità.
5. ACCENDERE le unità.	

ATTENZIONE:
Quando si sostituisce la batteria, utilizzare solo una batteria IBM o batterie dello stesso tipo o di tipo equivalente consigliate dal produttore. Se il sistema di cui si dispone è provvisto di un modulo contenente una batteria al litio, sostituire tale batteria solo con un tipo di modulo uguale a quello fornito dal produttore. La batteria contiene litio e può esplodere se utilizzata, maneggiata o smaltita impropriamente.

Evitare di:

- **Gettarla o immergerla in acqua**
- **Riscaldarla ad una temperatura superiore ai 100° C**
- **Cercare di ripararla o smaltirla**

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

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

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

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

PERICOLO

> Alcune unità CD-ROM contengono all'interno un diodo laser di Classe 3A o Classe 3B. Prestare attenzione a quanto segue:
>
> Aprendo l'unità vengono emesse radiazioni laser. Non fissare il fascio, non guardarlo direttamente con strumenti ottici ed evitare l'esposizione diretta al fascio.

≥32 kg   **≥55 kg**
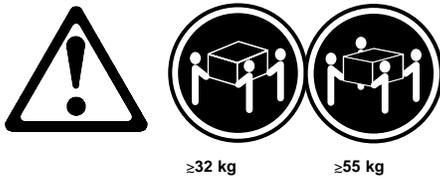
ATTENZIONE:
Durante il sollevamento della macchina seguire delle norme di di sicurezza.

ATTENZIONE:
Il pulsante del controllo dell'alimentazione situato nella parte anteriore del servente non disattiva la corrente elettrica fornita al servente. Il servente potrebbe anche avere più di un cavo di alimentazione. Per disattivare la corrente elettrica del servente, assicurarsi che tutti i cavi di alimentazione siano scollegati dalla sorgente di alimentazione.

ATTENZIONE:
Quando sul cavo di alimentazione è installata l'opzione di sostegno del cavo, il servente deve essere collocato in prossimità di una presa elettrica facilmente accessibile.
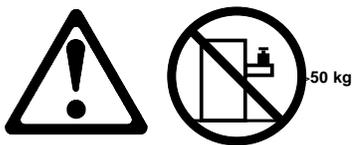
ATTENZIONE:
Non poggiare oggetti che pesano più di 50 kg sulla parte superiore del servente.

경고문 1

⚠️
위험

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

전기 충격을 피하려면 다음과 같아야 합니다.

– 고압선은 적절한 배선 및 접지 상태의 콘센트로 연결되어야 합니다.

– 이 제품이 접속될 모든 장비도 적절한 배서 상태의 콘센트로 연결되어야 합니다.

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

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

연결하려면	연결해제하려면
1. 모든 스위치를 켠다.	1. 모든 스위치를 끈다.
2. 먼저 모든 케이블을 장치에 연결한다.	2. 먼저 모든 케이블을 장치에 제거한다.
3. 신호선을 콘센트에 연결한다.	3. 신호선을 콘센트에서 제거한다.
4. 전원을 콘센트에 연결한다.	4. 장치에서 모든 케이블을 제거한다.
5. 장치 스위치를 켠다.	

경고문 2

⚠️

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

다음을 주의하십시오.

– 던지거나 물에 담그지 않도록 하십시오.
– 100℃(212℉) 이상으로 가열하지 않도록 하십시오.
– 수리하거나 분해하지 않도록 하십시오.

지역 법령이나 규정의 요구에 따라 배터리를 처분하십시오.

경고문 3

⚠️

주의:
CD-ROM 드라이브가 설치되어 있으면 다음 사항을 명심하십시오.

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

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

경고문 4

위험

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

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

경고문 5

32kg(70.5 파운드)   55kg(121.2 파운드)

주의:
기계를 들 때는 안전하게 들어 올리십시오.

경고문 6

주의:
서버 앞쪽의 전원 제어 버튼을 꺼도 서버로 공급되는 전류가 차단되지 않습니다.
또한 서버에 둘 이상의 전선이 연결되어 있는 경우가 있습니다. 서버에서 모든
전류를 차단하려면 모든 전선이 전원으로부터 차단되어 있는지 확인하십시오.

경고문 7

주의:
전선 브래킷 옵션이 전선에 설치되어 있으면 서버는 쉽게 액세스할 수 있는 전원으로
연결되어야 합니다.

경고문 12

50kg(110 파운드) 이상

주의:
서랍형 모델의 서버 상단에는 50kg(110 파운드)이 넘는 물체를 올려 놓지 않도록
하십시오.

DANGER

> **Para evitar una posible descarga eléctrica, no conecte ni desconecte los cables ni lleve a cabo ninguna operación de instalación, de mantenimiento o de reconfiguración de este producto durante una tormenta eléctrica.**
>
> **Para evitar una posible descarga:**
>
> - **El cable de alimentación debe conectarse a un receptáculo con una instalación eléctrica correcta y con toma de tierra.**
> - **Los aparatos a los que se conecte este producto también deben estar conectados a receptáculos con la debida instalación eléctrica.**
>
> **Cuando sea posible, utilice una sola mano para conectar o desconectar los cables de señal a fin de evitar una posible descarga al tocar dos superficies con distinto potencial eléctrico.**
>
> **La corriente eléctrica de los cables de comunicaciones, teléfono y alimentación puede resultar peligrosa. Para evitar una posible descarga, siga las indicaciones de conexión y desconexión de los cables siempre que tenga que instalar, mover o abrir las cubiertas de este producto o de los dispositivos acoplados.**

Instrucciones de conexión	**Instrucciones de desconexión**
1. Apague todos los componentes (OFF).	1. Encienda todos los componentes (ON).
2. En primer lugar, conecte todos los cables a los dispositivos.	2. En primer lugar, retire los cables de alimentación de las tomas.
3. Conecte los cables de señal a los receptáculos.	3. Retire los cables de señal de los receptáculos.
4. Conecte los cables de alimentación a las tomas.	4. Retire todos los cables de los dispositivos.
5. Encienda el dispositivo (ON).	

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

Lo que no debe hacer

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

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

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

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

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

Related service information   **247**

DANGER

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

≥32 kg   **≥55 kg**

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

CAUTION:
El botón de control de alimentación del panel frontal del servidor no apaga la corriente eléctrica suministrada al servidor. Puede suceder que el servidor tenga más de un cable de alimentación. Para eliminar por completo la corriente eléctrica del servidor, asegúrese de desconectar todos los cables de alimentación del suministro de alimentación.

CAUTION:
Cuando la opción de soporte del cable de alimentación está instalada en el cable de alimentación, el servidor debe estar conectado a un suministro de alimentación de fácil acceso.

-50 kg
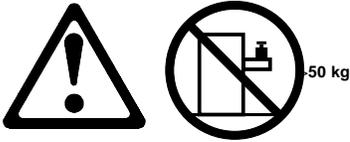
CAUTION:
No coloque ningún objeto cuyo peso sea superior a los 50 kilos sobre la bandeja modelo del servidor.

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.

> **Note**
>
> 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.

Laser compliance statement

Some IBM Personal Computer models are equipped from the factory with a CD-ROM drive. CD-ROM drives are also sold separately as options. The CD-ROM drive is a laser product. The CD-ROM drive is certified in the U.S. to conform to the requirements of the Department of Health and Human Services 21 Code of Federal Regulations (DHHS 21 CFR) Subchapter J for Class 1 laser products. Elsewhere, the drive is certified to conform to the requirements of the International Electrotechnical

Commission (IEC) 825 and CENELEC EN 60 825 for
Class 1 laser products.

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

⚠️

CAUTION:

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

**O uso de controles, ajustes ou desempenho de
procedimentos diferentes daqueles aqui especificados
pode resultar em perigosa exposição à radiação.**

凡未在这里指明的任何控制用法、调整、行为，

都会导致严重后果。

**Pour éviter tout risque d'exposition au rayon laser,
respectez les consignes de réglage et d'utilisation des
commandes, ainsi que les procédures décrites.**

**Werden Steuer- und Einstellelemente anders als hier
festgesetzt verwendet, kann gefährliche
Laserstrahlung auftreten.**

Az itt előírt eljárásoktól, beállításoktól és vezérlésektől
eltérni a lézersugárzás veszélye miatt kockázatos !

**L'utilizzo di controlli, regolazioni o l'esecuzione di
procedure diverse da quelle specificate possono
provocare l'esposizione a**

Использование элементов настройки и
выполнение процедур иных, чем указано
здесь, может привести к опасному
радиационному облучению.

Použitie kontrôl, úprav alebo iných vykonaní od iných
výrobcov, ako je v tomto špecifikované, mohlo by mať
za následok nebezpečenstvo vystavenia sa vyžiarovaniu.

**El uso de controles o ajustes o la ejecución de
procedimientos distintos de los aquí especificados
puede provocar la exposición a radiaciones
peligrosas.**

Opening the CD-ROM drive could result in exposure to
hazardous laser radiation. There are no serviceable parts
inside the CD-ROM drive. **Do not open.**

Some CD-ROM drives contain an embedded Class 3A or
Class 3B laser diode. Note the following.

DANGER:

Laser radiation when open. Do not stare into the
beam, do not view directly with optical instruments,
and avoid direct exposure to the beam.

Radiação por raio laser ao abrir. Não olhe fixo no feixe
de luz, não olhe diretamente por meio de instrumentos
óticos e evite exposição direta com o feixe de luz.

开启时会有激光发射时，请勿盯视激光光束，请勿直接查看
视觉仪器，并且避免直接接触在激光光束之中。

Rayonnement laser si carter ouvert. Évitez de fixer le
faisceau, de le regarder directement avec des
instruments optiques, ou de vous exposer au rayon.

Laserstrahlung bei geöffnetem Gerät. Nicht direkt oder
über optische Instrumente in den Laserstrahl sehen
und den Strahlungsbereich meiden.

Kinyitáskor lézersugár ! Ne nézzen bele se szabad
szemmel, se optikai eszközökkel. Kerülje a
sugárnyalábbal való érintkezést !

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

Открывая, берегитесь лазерного излучения.
Не смотрите на луч, не разглядывайте его
с помощью оптических инструментов, а также
избегайте прямого воздействия лазерного луча.

Keď je laserová jednotka otvorená. Vyhnite sa priamemu
pohľadu a nehľadte priamo s optickými nástrojmi do lúča
a vyhnite sa priamemu vystaveniu lúčov.

Radiación láser al abrir. No mire fijamente ni examine
con instrumental óptico el haz de luz. Evite la
exposición directa al haz.

Send us your comments!

We want to know your opinion about this manual (part number 19K6111). Your input will help us to improve our publications.

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

Name _____

Phone Number _____

1. Do you like this manual?

    ☐ Yes   ☐ No

    _____

    _____

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

    _____

    _____

3. What is your service experience level?

    ☐ Less than five years

    ☐ More than five years

    _____

    _____

4. Which Servers do you service most?

    _____

    _____

    _____

    _____

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

Important

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.

Notices

References in this publication to IBM products, programs, or services do not imply that IBM intends to make these available in all countries in which IBM operates. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Subject to IBM's valid intellectual property or other legally protectable rights, any functionally equivalent product, program, or service may be used instead of the IBM product, program, or service. The evaluation and verification of operation in conjunction with other products, except those expressly designated by IBM, are the responsibility of the user.

Trademarks

The following terms are trademarks of the IBM Corporation in the United States or other countries or both:

HelpCenter	HelpFax
IBM	OS/2
NetBAY3	Netfinity
Netfinity Manager	ThinkPad
SystemXtra	xSeries

@server

The following terms are trademarks of other companies:

The following terms are trademarks of other companies:

Notes	Lotus Development Corporation

MMX and Pentium are trademarks or registered trademarks of Intel Corporation.

UNIX is a trademark or registered trademark of The Open Group in the United States and other countries.

Windows NT is a trademark or registered trademark of Microsoft Corporation.

IBM®

Part Number: 19K6111

Printed in U.S.A.