

IBM Netfinity Servers

S10L-9800-03

**IBM Netfinity 5500 - Type 8660**

**Hardware Maintenance Manual**

**June 1999**

**We Want Your Comments!**  
**(Please see page 389)**

**This Manual Supports  
The Following Models:**

11U, 11X, 1RU, 1RX,  
41U, 41X, 42U, 42X,  
4RU, 4RX, 4SU, 4SX,  
51U, 51X, 52U, 52X,  
5RU, 5RX, 5SU, 5SX,  
61U, 61X, 62U, 62X,  
6RU, 6RX, 6SU, 6SX,  
71U, 72U, 7RU, 7SU



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**Note**

Before using this information and the product it supports, be sure to read the general information under "Notices" in the manual.

**Fourth Edition (June 1999)**

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## About this supplement

This supplement contains diagnostic information, Symptom-to-FRU Indexes, service information, error codes, error messages, and configuration information for the Netfinity 5500 - Type 8660.

### Important

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

## Important safety information

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

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### 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。

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### 注意及危险声明 (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。

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

Prenez connaissance de toutes les consignes de type Attention et Danger avant de procéder aux opérations décrites par les instructions.

Lesen Sie alle Sicherheitshinweise, bevor Sie eine Anweisung ausführen.

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

### **주의 및 위험 경고문(한글)**

#### **중요:**

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

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

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

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

### **Online support**

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

File download address is:

<http://www.ibm.com/pc/files.html>

The IBM BBS can be reached at (919) 517-0001.

### **IBM Online addresses:**

The HMM manuals online address is:

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

The IBM Support Page is:

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

The IBM Home Page is:

<http://www.ibm.com>

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## General Checkout

The server diagnostic programs are stored in nonvolatile random-access memory (NVRAM) 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.

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.

(CONTINUED)

**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 264.
4. If the computer hangs and no error is displayed, go to "Undetermined problems" on page 291.
5. Power Supply problems, see "Symptom-to-FRU index" on page 264.
6. Safety information, see "Safety information" on page 308.
7. For intermittent problems, check the error log; see, "Error logs" on page 99.

**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.
- Check the control panel system error LED; if on, see "Control panel system error LED" on page 267.
- Check the error log. If an error was recorded by the system, see "Symptom-to-FRU index" on page 264.
- Start the Diagnostic Programs. See "Running Diagnostic programs" on page 13.
- Check for the following responses:
  1. No beep.
  2. Readable instructions or the Main Menu.

(Step **004** continues)



004 (continued)

**DID YOU RECEIVE THE CORRECT RESPONSES?**

Yes No

005

Find the failure symptom in "Symptom-to-FRU index" on page 264.

006

- Run the Diagnostic Programs. If necessary, refer to "Running Diagnostic programs" on page 13. If you receive an error, go to "Symptom-to-FRU index" on page 264. If the diagnostics completed successfully and you still suspect a problem, see "Undetermined problems" on page 291.
-

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## Diagnostic tools

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

### 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 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.

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.

## 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 the operating system or application program appears, and the System POST Complete (OK) light is illuminated on the information LED panel.

If POST detects a problem, more than one beep sounds and an error message appears on the 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.

For a complete list of error codes, see "Symptom-to-FRU index" on page 264.

## 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.
- For a complete list of error codes, see "Symptom-to-FRU index" on page 264.

## **Error messages**

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

Troubleshooting and servicing of complex problems indicated by error messages should be performed by trained service personnel.

Hardware error messages that occur can be text, numeric, or both. Messages generated by the 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 264..

**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 277.

**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 the software.

**System error log:** The system error log contains all error and warning messages issued during POST and all system status messages from the the system management processor. See “System error log” on page 99 for information about how to view the system error log.

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

If the 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.

## Diagnostic programs

Use the following information to run the diagnostic programs. These programs are designed to test the IBM Netfinity 5500. If you want to test a non-IBM product, refer to the information that comes with that product.

### 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 usually will 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 help index from which you can select different categories. Pressing **Esc** exits Help and returns to where you left off.

### Notes

1. To run the diagnostic programs, you must start the server with the highest level password.  
That is, if you enter the power-on password and an administrator password is set, you cannot run the programs. You can only view the error messages in the Test Log.  
You must enter the administrator password to run the diagnostic programs.
2. If the server stops during testing and you cannot continue, restart the server and try running the diagnostic programs again. If the problem persists, have the system serviced.
3. If the diagnostic tests do not find a problem but the problem persists during normal operations, see "Symptom-to-FRU index" on page 264 and look for the problem symptom.
4. You might have to install a wrap connector on the active parallel or serial port to obtain accurate test results for these ports.
5. You might need a scratch diskette to obtain accurate test results when testing the diskette drive.
6. The keyboard and mouse (pointing device) tests assume that a keyboard and mouse are attached to the server.

### To start the diagnostic programs:

1. Turn on the server and watch the screen.

If the server is turned on already, shut down the 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 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.

### To view the Test Log:

1. Turn on the server and watch the screen.

If the server is turned on already, shut down the 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.

---

## Features

The following table summarizes the features of the Netfinity 5500.

### Microprocessor

- Intel® Pentium® II microprocessor with MMX™ technology
- 16 KB of level-1 cache
- 512 KB of level-2 cache
- Expandable to two microprocessors

### Memory

- Standard: 128 MB (min.), expandable to 1 GB
- 100 MHz synchronous dynamic random access memory (SDRAM), error correcting code (ECC)
- 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: 32X IDE

### Keyboard and Auxiliary Device

(some models)

- Keyboard
- Mouse

### Expansion Bays

- Six slim (1-inch) or three half-high (1.6-inch) hot-swap drive bays
- Three 5.25-inch removable-media bays (one used by CD-ROM drive)
- The IBM Netfinity NetBAY3 (tower model only) allows installation of options to provide extra expansion bays

### Expansion Slots

Up to seven adapters can be installed.

- Four 32-bit hot-plug PCI slots
- Two standard (non-hot-plug) 32-bit PCI slots
- One 16-bit ISA slot

### Upgradable Firmware

- BIOS, diagnostics, system management processor, and ServeRAID II upgrades (when available) can update EEPROMs on the system board

### Security Features

- Door and top cover lock (tower model only)
- NetBAY3 bezel lock
- 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

### Integrated Functions

- Two serial ports
- Two universal serial bus (USB) ports
- One parallel port
- Mouse port
- Keyboard port
- Video port

- IBM ServeRAID II controller (two channels) on system board
- 10BASE-T/100BASE-TX Ethernet port (controller on system board)
- For redundant Ethernet capability, an optional network interface card (NIC) is available
- System management processor on system board
- Dedicated systems management I/O port
- Video controller (with 1 MB video memory) compatible with:
  - Super video graphics array (SVGA)
  - Video graphics adapter (VGA)

**Power Supply**

- 400 W (115–230 V ac)
- Automatic voltage range selection
- Built-in overload and surge protection
- Automatic restart after a loss of power
- For redundant power, an optional 400 W power supply is available

**Redundant Cooling**

- Three hot-swap fans



---

## Additional service information

The following additional service information supports  
Netfinity 5500 - Type 8660

- “Administration and Monitoring Utility Program” on page 18.
- “Configuring the Ethernet controller” on page 55.
- “Configuring options” on page 57.
- “Configuration overview” on page 58.
- “Configuration/Setup Utility program” on page 60.
- “Configuring ISA and PCI adapters” on page 61.
- “Failover for redundant Ethernet” on page 62.
- “Netfinity System Management Processor” on page 65.
- “Resolving configuration conflicts” on page 73.
- “ServeRAID Configuration program” on page 74.
- “Software installation” on page 74.
- “Specifications” on page 75.
- “Starting the ServeRAID Configuration program” on page 77.
- “Status LEDs” on page 79.
- “Understanding disk array technology” on page 81.
- “Using the Advanced Configuration functions” on page 89.
- “Using the Configuration/Setup Utility Main menu” on page 91.
- “Using the ServeRAID Configuration program” on page 101.
- “Using the ServeRAID Mini-Configuration program” on page 137.

## Administration and Monitoring Utility Program

The IBM ServeRAID Administration and Monitoring utility program monitors the ServeRAID controller while the network operating system is up and running.

The Administration and Monitoring utility program comes in three versions:

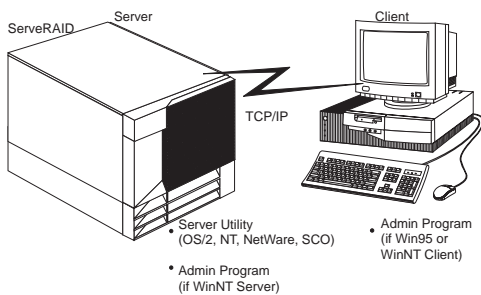
- IBM OS/2
- Novell NetWare/IntraNetware
- Microsoft Windows NT and Windows 95

The OS/2 and NetWare/IntraNetware utility programs run on the server in the stand-alone mode only.

The Windows NT/Windows 95 Administration and Monitoring utility program runs on the server in the stand-alone mode, or in a client/server environment in the client/server mode. You can use the stand-alone mode to administer and configure the ServeRAID controller while at the server. You can use the client/server mode to administer and configure ServeRAID controllers and adapters that are in servers anywhere on the network. The TCP/IP networking protocol supports the client/server mode and allows connections to IBM OS/2, Microsoft Windows NT, Novell NetWare/IntraNetware and SCO OpenServer operating systems.

### Note

The Windows NT and Windows 95 utility programs are required to use the logical-drive migration feature. See "Logical drive migration administration" on page 38.



This section provides installation instructions for the following ServeRAID utility programs.

- The Administration and Monitoring utility program runs on a Windows-based system (Windows 95, Windows NT Workstation, or Windows NT Server).
- Server Utilities
  - OS/2 Server Utility

- Microsoft Windows NT Server Utility
- Novell NetWare/Intranetware Server Utility
- SCO OpenServer Utility

You can obtain updates to the installation instructions for the ServeRAID utility programs from the World Wide Web. See "Online support" on page iv.

### **Before you begin**

- Be sure that the ServeRAID controller is configured properly.
- Be sure that the network operating system is installed and functional.
- If you are using Microsoft Windows NT, you can use the Administration and Monitoring utility program in the client/server mode (across the network) or in the stand-alone mode (at the server).
  - See "Installing the Server Utility Programs" on page 20 for client/server mode instructions.
  - See "Installing the Administration and Monitoring Utility Programs using diskettes" on page 25 for stand-alone mode instructions.
- If you are using OS/2, NetWare/IntraNetware, or SCO OpenServer, you must use the Administration and Monitoring utility program in the client/server mode. Requirements for this environment include:
  - A Windows NT or Windows 95 client running the IBM ServeRAID Administration and Monitoring utility program
  - A network adapter or controller with proper cabling for access to the client system
  - The TCP/IP networking protocol installed on both the server and client systems
  - The IBM ServeRAID Administration and Monitoring Server utility program installed on the client system
    - See "Installing the Server Utility Programs using Diskettes" on page 20 to install the server utility program.
    - See "Installing the Administration and Monitoring Utility Programs using diskettes" on page 25 to install the Administration and Monitoring utility program on a Windows 95 or Windows NT system.

## Installing the Server Utility Programs

### Note

If you are installing the OS/2, Novell NetWare/Intranetware, or SCO OpenServer versions of the server utility programs, you must use diskettes. Go to

You can install the server utility programs in one of two ways:

- Using ServerGuide (see "Installing the Server Utility Programs using ServerGuide")
- Using diskettes (see "Installing the Server Utility Programs using Diskettes")

### **Installing the Server Utility Programs using**

**ServerGuide:** You can install the server utility programs using the CoPilot feature of ServerGuide. Refer to the ServerGuide package for more information.

Once you have installed the server utility programs, go to "Using the Server Utility Programs" on page 23 for information on how to use them.

### **Installing the Server Utility Programs using**

**Diskettes:** This section contains installation instructions and information about using the IBM OS/2 server utility, Microsoft Windows NT server utility, Novell NetWare/IntraNetware server utility, and SCO OpenServer utility.

### Note

You must first make the ServeRAID diskettes using the Diskette Factory feature of ServerGuide. Refer to the ServerGuide package for instructions.

### **IBM OS/2 Server Utility Programs: To install the IBM OS/2 server utility program using diskettes:**

1. Insert the *IBM ServeRAID Device Driver Diskette* into the diskette drive.
2. Create an IPSRAID directory on the hard disk. Type:  
md d:\ipsraid  
(where *d*: is the hard disk drive letter)
3. Copy the following file to the target directory. Type:  
copy a:\remote\servers\os2\ipsadm.exe d:\ipsraid  
(where *a*: is the diskette drive letter and *d*: is the hard disk drive letter)
4. Copy the icon file to the target directory. Type:  
copy a:\remote\servers\os2\ipsadm.ico  
d:\ipsraid\ipsadm.ico

(where *a*: is the diskette drive letter and *d*: is the hard disk drive letter)

5. Create an icon for the application:
  - a. Open the template folder from the OS/2 Systems folder on the Desktop.
  - b. Drag a program template onto the Desktop.
  - c. At the Program Tab, type the following path and file name:  
d:\ipsraid\ipsadm.exe  
(where *d*: is the hard disk drive letter)
  - d. At the General Tab, type the following as the title:  
IPSRAID Admin/Monitor
  - e. Find the current icon,  
d:\ipsraid\ipsadm.ico  
(where *d*: is the hard disk drive letter)
6. Double-click on the new icon to access the server utilities.
7. Continue with "Using the Server Utility Programs" on page 23.

### **Microsoft Windows NT Server 4.x Utility**

**Program:** To install the Microsoft Windows NT 4.x server utility program :

1. Insert the *IBM ServeRAID Device Driver Diskette* into the diskette drive.
2. Create an IPSRAID directory on the hard disk. Type:  
md d:\ipsraid  
(where *d*: is the hard disk drive letter)
3. Copy the following file to the target directory. Type:  
copy a:\remote\servers\nt\ipsadm.exe  
d:\ipsraid\ipsadm.exe  
(where *a*: is the diskette drive letter and *d*: is the hard disk drive letter)
4. Copy the icon file to the target directory. Type:  
copy a:\remote\servers\nt\ipsadm.ico  
d:\ipsraid\ipsadm.ico  
(where *a*: is the diskette drive letter and *d*: is the hard disk drive letter)
5. To create a new shortcut for the utility:
  - a. Using the right mouse button, click on the Desktop and select **New**; then, select **Shortcut**.
  - b. In the **Create Shortcut** window, type:  
d:\ipsraid\ipsadm.exe  
(where *d*: is the hard disk drive letter)  
  
or  
  
If you are not sure of the path and file name, click on the **Browse** button; then, find and select the file:

- d:\ipsraid\ipsadm.ext  
(where *d*: is the drive letter)
- c. Click on **Next**.
  - d. In the Select a Title for the Program window, type:  
ipsraid admin/monitor server
  - e. Click on **Finish** and an icon appears on the desktop.
6. To create a customized icon for the shortcut you just created:
- a. Using the right mouse button, click on the icon that you created for the shortcut; then, select **Properties**.
  - b. Click on the **Shortcut** note tab.
  - c. Click on **Change Icon**.
  - d. Click on **OK** in the information window.
  - e. In the **Change Icon window**, type:  
d:\ipsadm\ipsadm.ico  
(where *d*: is the hard disk drive letter)  
*or*  
If you are not sure of the path and file name, click on the **Browse** button; then, find and select the file:  
d:\ipsadm\ipsadm.ico  
(where *d*: is the hard disk drive letter)
  - f. Click on **OK** for the icon.
  - g. Click on **OK** for the program properties.
  - h. Double-click on the new icon to access the server utilities.
7. Continue with "Using the Server Utility Programs" on page 23.

### **Novell NetWare/Intranetware Server Utility**

**Program:** To install the Novell Netware 3.x/IntraNetware 1.0 server utility program, do *one* of the following:

- From a DOS prompt:
  1. Insert the *IBM ServeRAID Device Driver Diskette* into the diskette drive.
  2. Type:  
copy a:\remote\servers\netware\ipsadm.nlm  
d:\nwserver\ipsadm.nlm  
(where *a*: is the diskette drive letter and *d:\nwserver* is the hard disk drive and directory where NetWare/IntraNetware is installed)
  3. Load the NLM from the system console, type:  
load d:\nwserver\ipsadm.nlm  
(where *d:\nwserver* is the hard disk drive and directory where NetWare/IntraNetware is installed)

4. Continue with "Using the Server Utility Programs" on page 23.
- From a client workstation on the network:
  1. Insert the *IBM ServeRAID Device Driver Diskette* into a diskette drive, such as drive a:.
  2. Type:
 

```
copy a:\remote\servers\netware\ipsadm.nlm
f:\system\ipsadm.nlm
```

 (where *a*: is the diskette drive letter and *f* is the SYS volume)
  3. Load the NLM from the system console. Type:
 

```
load ipsadm.nlm
```
  4. Continue with "Using the Server Utility Programs."

**SCO OpenServer Server Utility Program:** The SCO OpenServer Server utility program is installed from the *SCO Open Server Boot-Time Loadable (BTL) Diskette* during the installation of the IBM ServeRAID device driver. The file is installed in the **/usr/bin** directory.

To run the program, type **ipsadm &** at the command prompt.

**If the program does not run, use the following instructions to manually install the SCO OpenServer 5.X utility program.**

1. Insert the *IBM ServeRAID SCO Open Server Boot-Time Loadable (BTL) Diskette* into a diskette drive.
2. Create a directory for the server utility. Type:
 

```
mkdir /ipsraid
```
3. Mount the diskette drive. Type:
 

```
mount /dev/fd0 /mnt
```
4. Copy the following file. Type:
 

```
cp /mnt/ipsraid/new/usr/bin/ipsadm /ipsraid/ipsadm
```
5. Unmount the diskette drive. Type:
 

```
umount /mnt
```
6. To start the server utility to run in the background, type:
 

```
./ipsadm &
```
7. Continue with "Using the Server Utility Programs."

**Using the Server Utility Programs:** You can use command-line parameters to customize the ServeRAID programs.

To use command-line parameters, issue the IPSADM command in the following format:

```
IPSADM <parameter 1> <parameter 2> ... <parameter n>
```

Descriptions of the optional command-line parameters are as follows:

<b>Command</b>	<b>Description</b>
<b>-?</b>	The <b>-?</b> command displays the help for the valid parameters.
<b>-p:number</b>	<p>The <b>-p:number</b> command specifies the port number on which the server will check for client connections.</p> <p>The <i>port number</i> is a parameter used in TCP/IP to distinguish between different services on a single server. The default for the ServeRAID utilities is port number 1087. You can change the port number on the command line if another service on the system is using 1087.</p>
<b>-d</b>	The <b>-d</b> command disables logging of messages to the display.
<b>-f</b>	The <b>-f</b> command specifies to log messages to the default file, IPSADM.LOG
<b>-f:filename</b>	<p>The <b>-f:filename</b> command specifies the name of a file in which to log messages.</p> <p>Messages can be logged to the screen or to a text file on the system. The default setting logs messages to the standard output (usually the display), but you can disable this by using the <b>-d</b> parameter. The <b>-f</b> parameter enables logging messages to a file. Messages consist of startup information, connecting and disconnecting clients, and error messages.</p>
<b>-s:filename</b>	The <b>-s:filename</b> command specifies the name of the file that contains security information. For more information about server security, see "Server security file."

**Server security file:** Security information is maintained in an optional text file on the server system. The file stores unencrypted user names and unencrypted passwords; therefore, the file must be kept in a secure directory.

When user names and passwords are entered on the Administration and Monitoring utility program (the client), they are encrypted for delivery to the server. The server decrypts the user names and passwords to verify authorized access to the ServeRAID controller. If the verification is successful, the ServeRAID controller accepts commands from the client. If no security file is present in the default directory or the directory specified by the **-s**



parameter, the ServeRAID controller disables security and accepts commands from any client connection.

The security file contains one user name and password combination per line. The user name and password strings are separated by a colon (:), and each string can have a maximum of eight characters.

**Server Utility name resolution:** The server utility program relies on name resolution to determine the host name from the client that is trying to connect. When a client is trying to access a remote server, the server tries to look up the name of the connecting client. The method used to look up the name is determined by the configuration of the server. Some possible methods for this are Domain Name Servers (DNS) or *HOSTS* files. With certain configurations, some timing delays might occur due to misconfiguration or inability to access the DNS. If problems occur, check the network configuration.

## Installing the Administration and Monitoring

**Utility Program:** You can install the Administration and Monitoring utility program in one of two ways:

- Using ServerGuide (see "Installing the Administration and Monitoring Utility Program using ServerGuide")
- Using diskettes (see "Installing the Administration and Monitoring Utility Programs using diskettes")

### Note

If you are installing the OS/2, Novell NetWare/IntraNetwork, or SCO OpenServer versions of the Administration and Monitoring program, you must use diskettes. Go to "Installing the Administration and Monitoring Utility Programs using diskettes" for instructions.

### Installing the Administration and Monitoring

**Utility Program using ServerGuide:** You can install the Administration and Monitoring utility program using the CoPilot feature of ServerGuide. Refer to the ServerGuide package for more information.

Once you have installed the Administration and Monitoring utility program, go to "Using the Administration and Monitoring Utility Program" on page 26 for information on how to use it.

### Installing the Administration and Monitoring Utility Programs using diskettes

**Note**

You must first make the ServeRAID diskettes using the Diskette Factory feature of ServerGuide. Refer to the ServerGuide package for instructions. Also, if you are using OS/2, Novell NetWare/IntraNetware, or SCO OpenServer, you must use the Administration and Monitoring utility program in the client/server mode.

**To install the Administration and Monitoring utility program using diskettes:**

1. Ensure that the system is turned on and Windows NT or Windows 95 is installed. Refer to the documentation that comes with the operating system for installation instructions.
2. Insert the *Administration and Monitoring Utility Program Diskette* that you created into the diskette drive.
3. At the **Run** prompt, type:  
a:setup
4. Press **Enter**; then, follow the instructions that appear on the screen.

For instructions on how to use the Administration and Monitoring utility program, see "Using the Administration and Monitoring Utility Program."

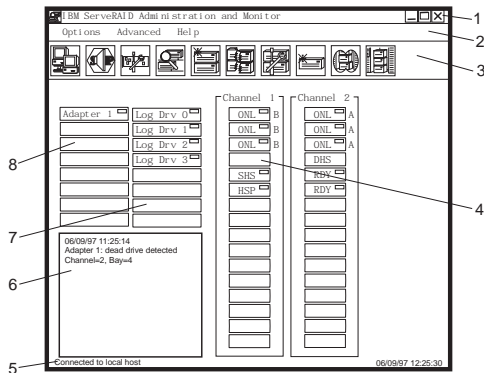
**Using the Administration and Monitoring Utility Program:** You can use the Administration and Monitoring utility program to monitor the serverAID controllers, view the ServeRAID configuration and associated devices, rebuild an array, reassign a drive to replace a defunct drive, rebuild a logical drive, create a logical drive, create an array, delete an array, dynamically increase the logical drive size, change RAID levels, and much more.

**To start the Administration and Monitoring utility program:**

- Double-click on the IBM ServeRAID Administration icon.
- or*
- Select **IBM ServeRAID Administration** from the start menu.

The Administration and Monitoring utility program starts in stand-alone mode.

The following illustration is an example of the screen that appears.



Descriptions of the labeled areas are as follows:

- 1. Title Bar** Displays the title of the application, along with the minimize icon, the maximize icon, and the close icon.
- 2. Menu Bar** Displays the pull-down menus for all supported functions.
- 3. Tool Bar** Displays the icons for the commonly used functions.
- 4. Device Area** Displays information for each device connected to the physical channel of the ServeRAID controller. This includes the device states and the array identifiers, if applicable.
- 5. Status Bar** Displays help for the area where the cursor is currently pointing. The date and time are also displayed.
- 6. Status Window** Displays messages regarding the operational status of each ServeRAID controller.
- 7. Logical Drive Area** Displays the number of logical drives that you created and the status of each logical drive.
- 8. Adapter Area** Displays the number of ServeRAID controllers installed in the server and the status of each ServeRAID controller.

**Options pull-down menu:** This section provides information about the following three choices available from the Options pull-down menu on the main screen of the Administration and Monitoring utility:

- Network Settings
- General Options


- Alert Options

**Network settings:** If you want to monitor ServeRAID controllers across a network, you must switch to the client/server mode.



You can use the Network Settings dialog box to select and connect to servers in the network that have an IBM ServeRAID controller installed.

**To select and connect to a server:**

1. Click on the  icon on the tool bar or select **Network Settings** from the **Options** pull-down menu. A screen similar to the following appears.

2. Select the **Client/Server** radio button.
3. If security is enabled on the server to which you are connecting, type in the **User Name** and **Password** as defined by the security file on the server to which you are connecting. (See "Server security file" on page 24 for information about the security file).
4. Type in either the **Hostname** or the **TCP/IP Address** of the system, or select them from the pull-down list.

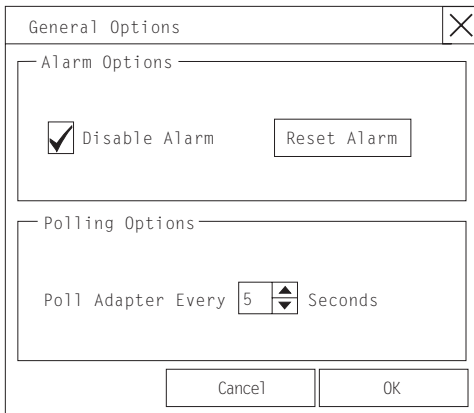
**Note**

If the server was started on any port other than the default (1087), type in a colon and the correct port number for the configuration (for example: ServeRAID:1088) after the Hostname or TCP/IP Address that you just entered.

5. Click on **Connect** to initiate a connection with the remote system.

**General options:** You can use the General Options screen to enable, disable, or reset the alarm; or to set the polling options.


When you select General Options from the Options pull-down menu, a screen similar to the following appears.



**Enabling, Disabling, or Resetting the Alarm:** The alarm alerts you if any of the following conditions occur:

- A DDD hard disk drive has been detected
- A Predictive Failure Analysis (PFA) event has occurred
- A ServeRAID controller is not responding

To enable or disable the alarm, click on the box for **Disable Alarm** on the General Options screen. Placing a check in the box disables the alarm; removing the check enables the alarm.

To reset the alarm, click on the  icon or click on **Reset Alarm** on the General Options menu. Resetting the alarm turns off the alarm for the current failure. It does not disable the feature.

**Polling Options:** You can use the General Options screen to define how often the ServeRAID controller will *poll*, or check the server for any changes that might have occurred in the server (such as a rebuild or a drive entering the defunct (DDD) state). You can set a time interval of from five to 60 seconds. The default time interval setting is five seconds.

The following events are polled for:

- Rebuild started
- Rebuild completed

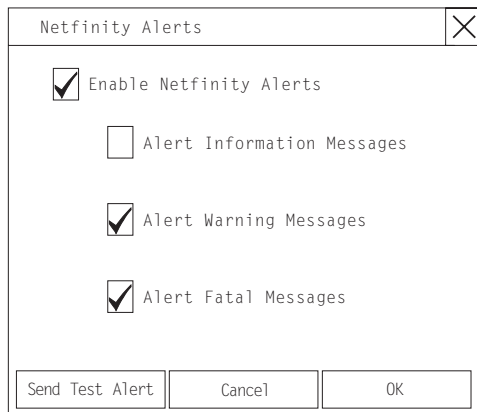
- Synchronization started
- Synchronization completed
- Migration started
- Migration completed
- PFA event detected
- Dead drive detected
- ServeRAID controller not responding to commands

**Netfinity alert options:** Netfinity alerts allow system administrators who are using the Netfinity Manager to configure the ServeRAID Administration and Monitoring utility program, to notify the Netfinity Alert Manager of various activities occurring on the server.

**To configure the settings for the Netfinity alerts:**

1. Open the Options pull-down menu.
2. Click on **Alert Options**.
3. Click on **Netfinity Alerts**.

A screen similar to the following appears.



4. To enable all of the Netfinity alerts, click on the check box next to Enable Netfinity Alerts.
5. To disable any of the Netfinity alerts:
  - a. Verify that there is a check in the check box next to Enable Netfinity Alerts.
  - b. Click on the check box next to the specific alert or alerts that you want to disable.
6. To test the Netfinity alerts, click on the **Send Test Alert** button. This will send a Netfinity alert and test message to the Netfinity Alert Manager.

If Netfinity alerts are enabled, the ServeRAID controller relays three types of messages to the Netfinity Alert Manager:

- Information messages
  - Rebuild started
  - Rebuild completed
  - Synchronization started

- Synchronization completed
- Migration started
- Migration completed
- Warning messages
  - PFA event detected
- Critical messages
  - Dead drive detected
  - ServeRAID controller not responding to commands

By knowing what these types of messages are, the system administrator can then configure Netfinity Manager with instructions for monitoring the server configuration and specifying the appropriate action to take if an alert is issued. For example, the system administrator can program Netfinity Manager to dial out through a modem to a specified phone number if a defunct drive is detected on any server across the network.

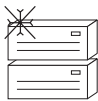
### Using the ServeRAID administration

**functions:** This section describes how to administer the ServeRAID controller using the following functions:

- "Array administration"
- "Logical drive administration" on page 34
- "Logical drive migration administration" on page 38
- "Physical device administration" on page 42
- "ServeRAID controller administration" on page 45

**Array administration:** This section contains instructions for creating a disk array and deleting a disk array using the ServeRAID Administration and Monitoring utility program.

#### Creating Disk Arrays

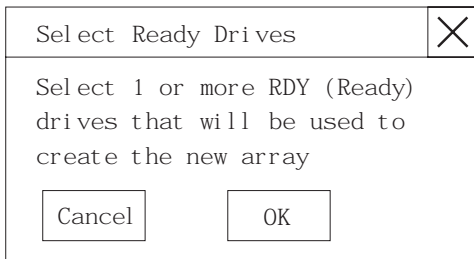


Disk arrays provide access to hard disk drives in a logical manner. Hard disk drives are grouped in a disk array, and divided into logical drives for access by the operating system.

#### To create a disk array:

1. Click on the  icon on the tool bar or select **Manage Disk Arrays** from the **Advanced** pull-down menu; then, select **Create Disk Array**.

A screen similar to the following appears.



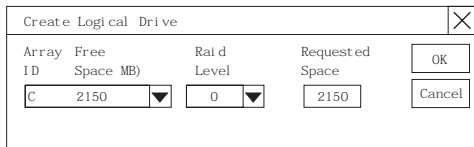
2. Select one or more Ready (RDY) drives for the new disk array.

To select a RDY drive, click on the desired RDY button from the device area. A disk array identifier appears beside each RDY drive added to the disk array.

If you change your mind about a selected drive, select the button again to remove the selected drive from the disk array.

3. Click on **OK** to define a logical drive for the new array.

A screen similar to the following appears.



4. Select the RAID level that you want to assign to the logical drive from the pull-down list.

The RAID levels available depend on the number of hard disk drives that you select for the disk array.

- If you have one hard disk drive, the logical drive can be only RAID level 0.
- If you have two or more hard disk drives, the logical drive can be RAID level 0 or 1.
- If you have three or more hard disk drives, the logical drive can be RAID level 0, 1, or 5.

5. Type the size, in megabytes, that you want to assign to the logical drive in the **Requested Space** entry field.



## Notes

### Notes:

1. The Requested Space default value is calculated as the maximum logical drive size available for the RAID level assigned.
2. The Requested Space must be between 2MB and the maximum available.
3. The actual logical drive size that appears might be slightly different from what you type in the **Space Requested** field.

The size of a logical drive is determined by the RAID level and the number of hard disk drives. For example, a disk array consisting of three, 1 GB hard disk drives with a requested RAID level 0 logical drive of 1000 MB will actually contain only 999 MB because the data is striped across all three drives, with 333 MB on each drive.

6. Click on **OK** to create the disk array.
7. You *must* initialize all new logical drives before storing data in them. See "Initializing logical drives" on page 36.

### Note

All new RAID level 5 logical drives are automatically synchronized when you initialize them.

## Deleting Disk Arrays



Deleting a disk array deletes all logical drives that are defined in that array. All data and programs in the disk array are lost during this procedure.


### Note

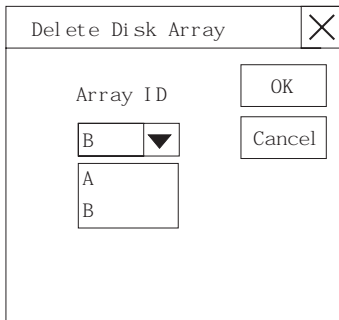
For some operating systems, deleting a disk array and its associated logical drives will change the drive letters that are assigned to the remaining drives when you restart the system.

### Attention

Before proceeding, ensure that you have backed up any data and programs that you want to save.

**To delete a disk array:**

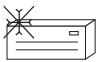
1. Click on the  icon on the tool bar or select **Manage Disk Arrays** from the **Advanced** pull-down menu; then, select **Delete Disk Array**.  
A screen similar to the following appears.



2. Select the disk array ID that you want to delete from the pull-down list.
3. Click on **OK** to delete the disk array.

**Logical drive administration:** This section contains instructions for creating a logical drive, initializing and synchronizing a logical drive, and accessing blocked logical drives using the ServeRAID Administration and Monitoring utility program.

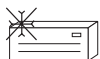
### Creating Logical Drives



You *must* create at least one logical drive for each disk array. You can create up to eight logical drives.

If you plan to use the logical-drive migration (LDM) feature, do not create more than seven logical drives. The LDM procedure requires one free logical drive to perform the migration. See "Logical drive migration administration" on page 38 for more information.

#### To create a logical drive:

1. Click on the  icon on the tool bar or select **Manage Logical Drive** from the **Advanced** pull-down menu; then, select **Create Logical Drive**.  
A screen similar to the following appears.

Array ID	Free Space (MB)	Raid Level	Requested Space
A	1762	0	881
B	1906		

2. Select the disk array ID for which you want to create a logical drive.
3. Select the RAID level that you want to assign to the logical drive from the pull-down list.

The RAID levels available depend on the number of hard disk drives that you select for the disk array.

**Notes:**

- a. If you have one hard disk drive, the logical drive can be only RAID level 0.
  - b. If you have two or more hard disk drives, the logical drive can be RAID level 0 or 1.
  - c. If you have three or more hard disk drives, the logical drive can be RAID level 0, 1, or 5.
  - d. If you plan to use the Change RAID Level feature of logical drive migration, you must assign the same RAID level to all of the logical drives in the array. See “Changing RAID levels” on page 39 for more information.
4. Type the size, in megabytes, that you want to assign to the logical drive in the **Requested Space** entry field.

**Notes:**

- a. The Requested Space default value is calculated as the maximum logical drive size available for the RAID level assigned.
- b. The Requested Space must be between 2 MB and the maximum available.
- c. The actual logical drive size that appears might be slightly different from what you type in the Requested Space field.

The size of a logical drive is determined by the RAID level and the number of hard disk drives. For example, a disk array consisting of three, 1 GB hard disk drives with a requested RAID level 0 drive of 1000 MB will actually contain only 999 MB because the data is striped across all three drives, with 333 MB on each drive.

5. Click on **OK** to create the logical drive.
6. You *must* initialize all new logical drives before storing data in them. Continue with “Initializing logical drives” on page 36.

**Note**

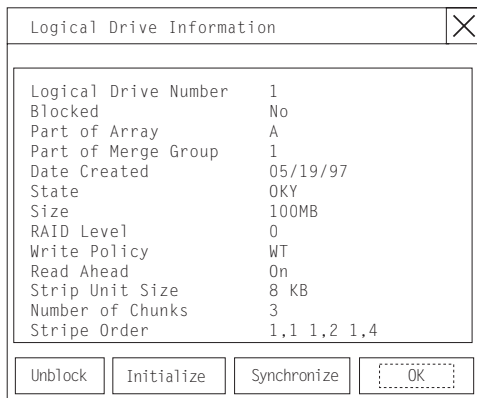
All new RAID level 5 logical drives are automatically synchronized when you initialize them.

**Initializing logical drives:** Initializing a logical drive erases the first 1024 sectors on the drive and prevents access to any data previously stored on that drive. You must initialize all new logical drives before storing data in them.

**To initialize a logical drive:**

1. Select the logical drive that you want to initialize from the Main Screen of the Administration and Monitoring utility program.

A screen similar to the following appears.



2. Click on **Initialize** to initialize the drive.

**Note**

RAID level 5 logical drives are automatically synchronized when you initialize them. You do not need to synchronize RAID level 0 or 1 logical drives before storing data.

**Synchronizing logical drives:** The purpose of synchronizing logical drives is to compute and write the parity data on the selected RAID level 5 logical drives. Synchronizing a RAID level 1 logical drive copies the data from the primary disk to the mirrored disk.

RAID level 5 logical drives are automatically synchronized when you initialize them. You do not need to synchronize RAID level 0 or 1 logical drives before storing data. Also, the *data scrubbing* feature of the ServeRAID controller continuously reads all sections of RAID level 1 and RAID level 5 logical drives “in the background” while the system

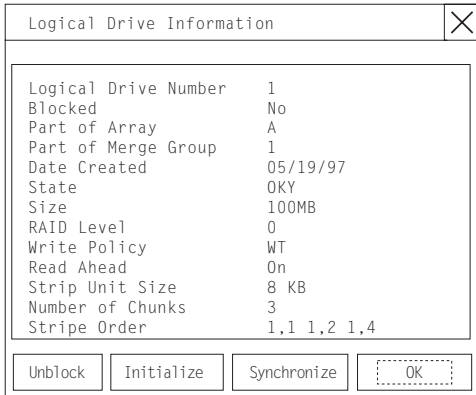
is running. If a defective sector is found, it is automatically repaired. As a result, you no longer have to synchronize RAID level 1 and RAID level 5 logical drives on a weekly basis.

Synchronizing a logical drive verifies that the data redundancy for the logical drive is correct. For RAID level 5, the parity bit is computed and then written to the parity drive.

**To synchronize a logical drive:**

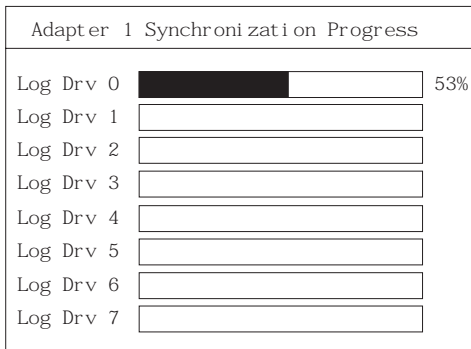
1. Select the logical drive that you want to synchronize from the Main Screen of the Administration and Monitoring utility program.

A screen similar to the following appears.



2. Click on **Synchronize** to synchronize the drive.

The synchronization process begins and reports progress information on the screen.



**Note**

Only one synchronization command can be active at a time.

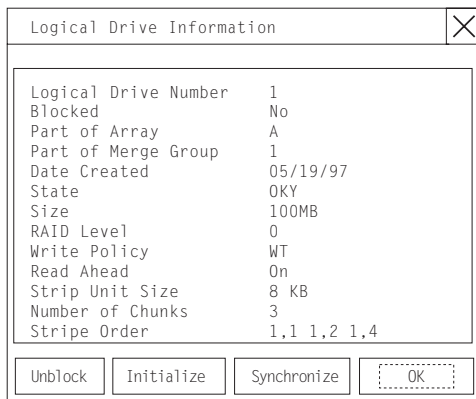
**Unblocking logical drives:** Whenever the ServeRAID controller performs a rebuild operation on an array, the data stored in any RAID level 1 and RAID level 5 logical drives in the array is reconstructed. However, the data stored in RAID level 0 logical drives in that array cannot be reconstructed. The data in the RAID level 0 logical drives is blocked when the ServeRAID controller detects that the array is valid, but the data might be damaged.

After the rebuild process completes, you can unblock the RAID level 0 logical drives; this redefines their state as OKY and allows access to them once again. But remember, the RAID level 0 logical drive might contain damaged data. You must re-create, install, or restore the data for the RAID level 0 logical drive from the most recent backup disk or tape.

**To unblock a blocked drive:**

1. Select the logical drive that is blocked from the Main Menu of the Administration and Monitoring utility program.

A screen similar to the following appears.



2. Click on **Unblock** to unblock the drive.
3. You *must* initialize all new logical drives before storing data in them. See with "Initializing logical drives" on page 36.
4. Restore the data to the drive from the most recent backup disk or tape.

**Logical drive migration administration:** The logical drive migration (LDM) feature dynamically changes the current logical drive structure. You can use this feature to change the RAID level, increase the free space in a disk array, or change the size of a logical drive.

To use the LDM feature, you must have two logical drives available: one free (FRE) logical drive and one source

logical drive that is in the okay (OKY) state. During the LDM procedure, the ServeRAID controller changes the state of the FRE logical drive to SYS; then, temporarily uses the SYS drive to perform the migration. When the migration procedure completes, the ServeRAID controller changes the state of the SYS drive back to FRE.

### Changing RAID levels:



You can change (migrate) the RAID levels of currently defined logical drives. Depending upon the current RAID level, you might need to add or remove a hard disk drive before you can change the RAID level.

To use the Change RAID Level feature, all of the logical drives within the array must be the same RAID level.

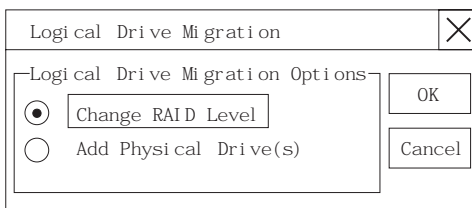
The ServeRAID controller supports changing RAID levels as follows:

- Change two RAID level 0 logical drives to RAID level 5 by adding one hard disk drive
- Change two RAID level 1 logical drives to RAID level 5 by adding one hard disk drive
- Change from RAID level 5 to RAID level 0 by removing one hard disk drive

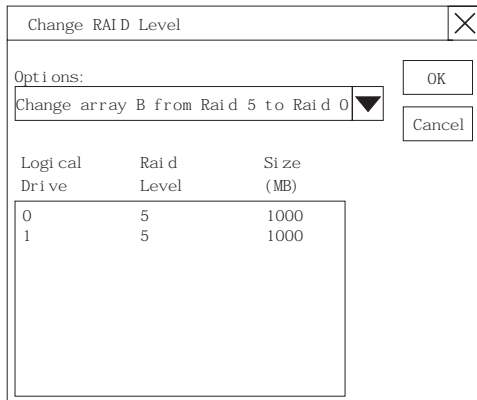
### To change the RAID level:

1. Click on the  icon on the tool bar or select **Manage Disk Arrays** from the **Advanced** pull-down menu; then, select **Logical Drive Migration**.

A screen similar to the following appears.



2. Select **Change RAID Level**; then, click on **OK**.



3. Select a migrating option from the pull-down list.

**Note**

The affected logical drives appear based on the migrating option selected.

4. Click on **OK** to proceed; then, click on **OK** to verify the operation.
5. Select a Ready (RDY) drive to add to the array if you are migrating to RAID level 5.

**Note**

If you are migrating to RAID level 0, the last drive defined in the array becomes RDY.

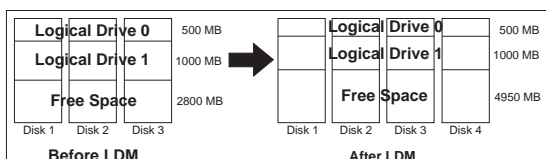
**Adding a physical drive:**



You can expand currently defined arrays to new sizes by adding one to three new hard disk drives.

The ServeRAID controller supports adding new space to a disk array as follows:

- You can increase the free space in a disk array without adjusting the size of the logical drives. This is useful when you need to add logical drives to the existing disk arrays. Refer to the following illustration.

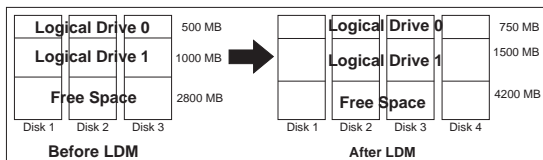


For example, an existing disk array uses three, 2150 MB hard disk drives that are configured as two



RAID level 5 logical drives (one 500 MB and one 1000 MB) and 2800 MB of free space. If you use the logical-drive migration procedure and add a 2150 MB hard disk drive to increase the amount of free space, the end result will be two RAID level 5 logical drives (one 500 MB and one 1000 MB) and 4950 MB of free space.

- You can increase the size of all the logical drives proportionally in a disk array. This is useful when you want to increase the size of the currently defined logical drives. Refer to the following illustration.

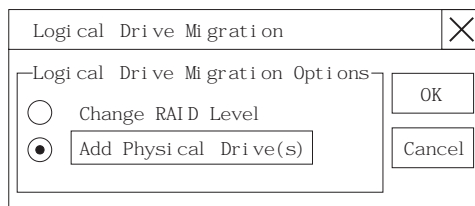


For example, an existing array uses three 2150 MB hard disk drives that are configured as two RAID level 5 logical drives (one 500 MB and one 1000 MB) and 2800 MB of free space. If you use the logical-drive migration procedure and add a 2150 MB hard disk drive to proportionally increase the size of the disk array, the end result will be two RAID level 5 logical drives (one 750 MB and one 1500 MB) and 4200 MB of free space.

#### To add a physical drive:

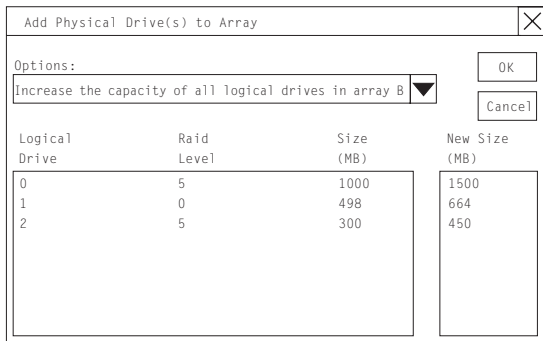
- Click on the  icon on the tool bar or select **Manage Disk Arrays** from the **Advanced** pull-down menu; then, select **Logical Drive Migration**.

A screen similar to the following appears.



- Select **Add Physical Drive(s)**; then, click on **OK**.  
A prompt appears requesting that you select from 1 to 3 Ready (RDY) drives to add to the existing array.
- Click on the appropriate RDY drives. An **X** appears beside the selected drive.
- Click on **OK**.

A screen similar to the following appears.



5. Select one of the available options for expansion from the pull-down list.

The screen shows a list of the affected logical drives with their new sizes.

6. Click on **OK**.

**Physical device administration:** This section contains instructions for setting physical device states and rebuilding drives using the ServeRAID Administration and Monitoring utility program.

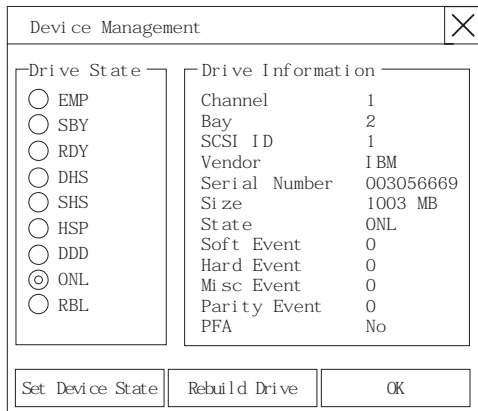
**Setting Physical device states:** Physical devices always appear in one of the following defined states, but you can easily redefine them into another state.

The following table shows the valid device states and valid alternative states.

Device States	Alternate States
EMP	RDY SBY
SBY	RDY EMP HSP SHS
DHS	EMP HSP SHS
SHS	HSP DHS
DDD	ONL RBL
RDY	EMP HSP SHS SBY
HSP	RDY SHS DHS
ONL	DDD
RBL	DDD ONL

**To change the physical device state:**

1. Select the device from the Main Screen of the Administration and Monitoring utility program. A screen similar to the following appears.



2. Click on the radio button that indicates the desired state.

**Note**

If you set a DDD drive to ONL without performing a Rebuild (RBL) operation and that drive is part of a critical (CRT) logical drive, the server might lose data.

3. Click on **Set Device State**.

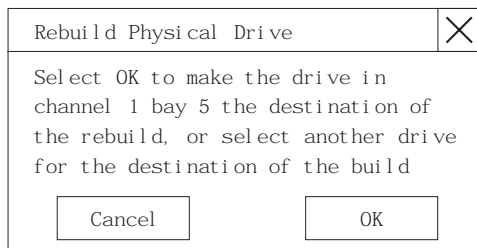
**Rebuilding drives:** When a hard disk drives goes defunct (DDD), a Rebuild operation is required to reconstruct the data for the device in its respective disk array. You can rebuild only RAID level 1 and RAID level 5 logical drives. The data stored in stored in RAID level 0 logical drives cannot be reconstructed; therefore, RAID level 0 logical drives are blocked.

After the rebuild process completes, you can unblock the RAID level 0 logical drives, which redefines their state as OKY and allows access to them once again. But remember, the RAID level 0 logical drive might contain damaged data. You must re-create, install, or restore the data for the RAID level 0 logical drive from the most recent backup disk or tape. (See “Unblocking logical drives” on page 38 for more information.)

**To rebuild a drive:**

1. Click on the DDD device on the Main Screen of the Administration and Monitoring utility program.
2. Click on **Rebuild Device**.

A screen similar to the following appears.

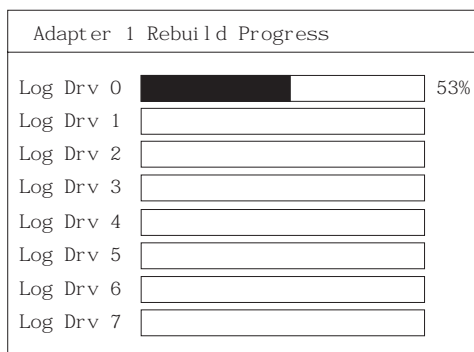


3. Select a RDY drive on which to store the reconstructed data, or click on **OK** to use the same bay if you have physically replaced the drive.

**Note**

The replacement hard disk drive must be the same size or larger than the failed drive.

4. The rebuild process begins and reports progress information on the screen.

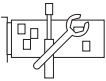


**Notes:**

1. Only one Rebuild operation can take place at a time.
2. The Rebuild operation changes the hard disk drive state from DDD to RBL if the array contains a CRT logical drive. After the Rebuild operation completes, the hard disk drive state changes from RBL to ONL. (When you rebuild to a RDY drive, the DDD drive is removed from the array and the state of the DDD drive is changed to defunct hot-spare (DHS).)
3. If multiple hot-spare (HSP) drives are available, the ServeRAID controller searches all the bays on each channel for a hot-spare drive of the appropriate size and the first appropriate hot-spare drive found enters the Rebuild (RBL) state.
4. If a hot-spare (HSP) drive is available, a Rebuild operation starts automatically.

**ServeRAID controller administration:** This section provides instructions for copying the drive configuration to the ServeRAID controller, copying the ServeRAID controller configuration to the drives, initializing the ServeRAID controller configuration, and scanning for new drives.

***Copying the drive configuration to the ServeRAID controller:***




You can copy the configuration information stored on the hard disk drives to the ServeRAID controller. This procedure is useful when you install drives from other systems.

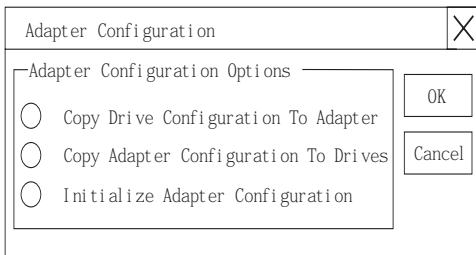
During the copy procedure, the ServeRAID controller automatically performs any necessary rearrangement of the configuration; then, the controller writes the new configuration information back to the reserved area on the configured hard disk drives.

**To copy the drive configuration information to the ServeRAID controller:**



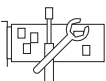
1. Click on the  icon on the tool bar or select **Adapter Configuration** from the **Advanced** pull-down menu.

A screen similar to the following appears.




2. Select **Copy Drive Configuration to Adapter**; then, click on **OK**.

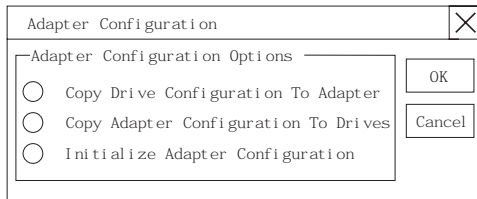
***Copying the ServeRAID controller configuration to the drives:***



You can copy the configuration information stored in the ServeRAID controller to all configured hard disk drives.

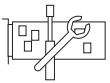
**To copy the ServeRAID controller configuration information to the drives:**

1. Click on the  icon on the tool bar or select **Adapter Configuration** from the **Advanced** pull-down menu.  
A screen similar to the following appears.



2. Select **Copy Adapter Configuration to Drives**; then, click on **OK**.

#### **Initializing the ServeRAID II controller:**




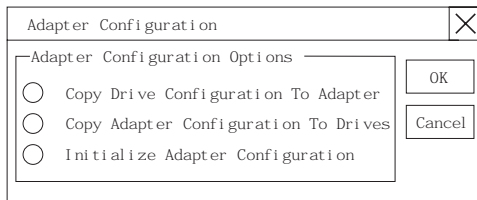
This procedure initializes the ServeRAID controller configuration by clearing all the logical drives and resetting all functional hard disk drives to RDY. This procedure is useful when you want to start over and create a new configuration.

#### **Attention**

All the data and programs in the array are lost during this procedure.

#### **To initialize the ServeRAID controller:**


1. Click on the  icon on the tool bar or select **Adapter Configuration** from the **Advanced** pull-down menu.  
A screen similar to the following appears.



2. Select **Initialize Adapter Configuration**; then, click on **OK**.

**Scanning for new drives:** This option enables you to locate new drives attached to the ServeRAID controller.

#### **To scan for new drives:**

Click on the  icon on the tool bar or select **Scan For New Drives** from the **Advanced** pull-down menu.

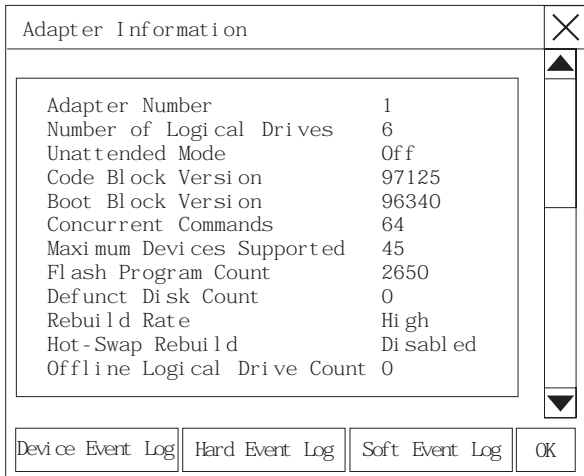
## Using the ServeRAID monitoring

**functions:** This section contains instructions for using the ServeRAID Administration and Monitoring utility program to monitor the ServeRAID controller status information, event logs, logical drive information, and physical device information.

**Monitoring status information:** You can monitor the ServeRAID controller status by clicking on the active ServeRAID controller button on the Main Screen of the Administration and Monitoring utility program. The currently active ServeRAID controller button is indicated by a green or red light. (Green indicates an active controller; red indicates that the controller is not responding.)

If there is more than one ServeRAID controller in the system, click on the appropriate button to make it active.

A screen similar to the following appears.



Descriptions of the information that appears on the screen are as follows.

### Note

You might have to scroll down, using the scroll bar, to see all of the items that appear on this screen.

**Adapter Number** The active ServeRAID controller (1 to 8).

**Number of Logical Drives** The number of defined logical drives (0 to 8).



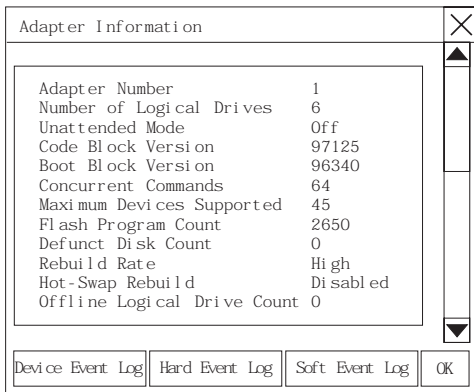
<b>Unattended Mode</b>	<p><b>Off</b> - The user chooses the recovery method when there is a ServeRAID controller startup error.</p> <p><b>On</b> - The ServeRAID controller chooses the recovery method when there is a startup error.</p>
<b>Code Block Version</b>	The current version level of the firmware microcode for the ServeRAID controller.
<b>Boot Block Version</b>	The current version level of the microcode loaded in the boot block for the ServeRAID controller.
<b>Concurrent Commands</b>	The maximum numbers of concurrent commands supported.
<b>Maximum Devices Supported</b>	The maximum number of devices supported.
<b>Flash Program Count</b>	The number of times that the ServeRAID controller microcode (Flash EEPROM) has been <i>flashed</i> or updated.
<b>Defunct Disk Count</b>	The current number of defunct hard disk drives.
<b>Rebuild Rate</b>	The setting for the rebuild rate can be low, medium, or high priority. (The default setting is high.)
<b>Hot-Swap Rebuild</b>	<p>If hot-swap rebuild is set to enable, the ServeRAID controller will rebuild a defunct drive automatically when all of the following conditions exist:</p> <ul style="list-style-type: none"> <li>• The hot-swap rebuild parameter is set to Enable</li> <li>• The defunct drive is part of a RAID level 1 or RAID level 5 logical drive</li> <li>• The capacity of the replacement drive is equal to or greater than the capacity of the defunct drive</li> <li>• No rebuild, synchronization, or RAID level change operation is in progress</li> </ul> <p>When you replace the drive and these requirements are met, the ServeRAID controller automatically initiates a rebuild of the drive without user intervention.</p>
<b>Offline Logical Drive Count</b>	The current number of offline logical drives.
<b>Configuration Update Count</b>	The number of times that the ServeRAID controller configuration information has been updated.

**Monitoring event logs:** The ServeRAID controller stores, in the event logs, information concerning various unexpected events. There are three types of event logs: a device event log, a hard event log, and a soft event log.

**To view the event logs:**

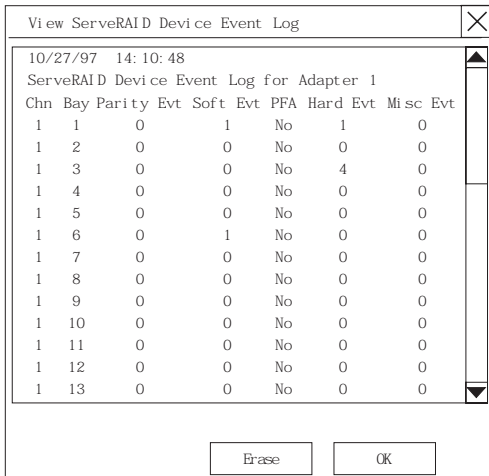
1. Click on the **adapter** (or controller) on the Main Screen of the Administration and Monitoring utility program.

A screen similar to the following appears.



2. Select the appropriate button at the bottom of the screen for the event log you want to view.

**Device event log:** The Device Event Log contains event counters for each attached physical device.



Descriptions of the events logged in the Device Event Log are as follows:

- Parity Event

The ServeRAID controller detects parity events while transferring data on the SCSI bus. A large number of parity events might indicate a problem with the SCSI cable, connectors, or terminators attached to the devices.

- Soft Event

SCSI devices detect these events and reports them to the ServeRAID controller through Check Condition status.

- Predictive Failure Analysis (PFA)

A device has signaled the ServeRAID controller that it might fail in the near future.

- Hard Event

The ServeRAID controller detects these events. Most likely, these events are caused by the ServeRAID controller.

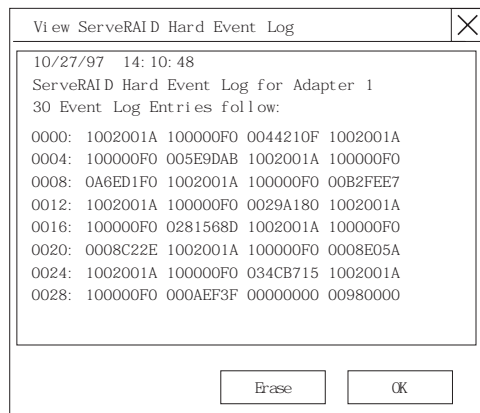
- Misc Event

The ServeRAID controller detects these events. Most likely, these events are caused by the SCSI device, such as selection timeout, unexpected bus free, or SCSI phase event.

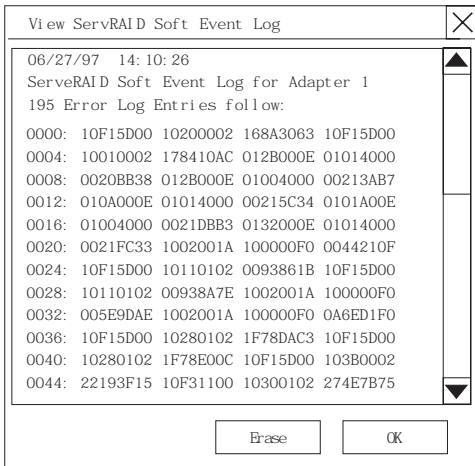
**Note**

Under normal operating conditions, the event logs will contain entries that are not errors.

**Hard event log:** You can view the Hard Event Log.



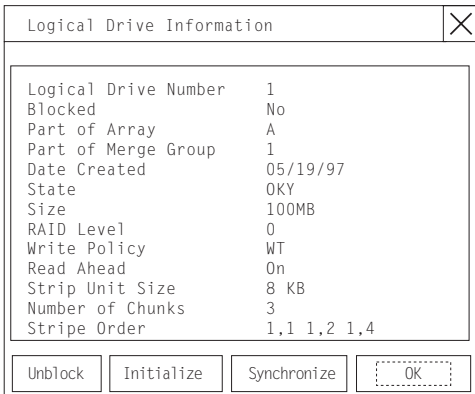
**Soft event log:** You can view the Soft Event Log.



**Monitoring the logical drive information:**

You can monitor the logical drive information by clicking on the desired logical drive button on the Main Screen of the Administration and Monitoring utility program.

When you click on the logical drive button, a screen similar to the following appears.



are as follows:

- Logical Drive Number**            The number of the logical drive.
- Blocked**                        **No** - The logical drive is accessible.  
                                       **Yes** - The logical drive is not accessible.
- Part of Array**                 The identifier of the logical drive's disk array (A, B, C, D, E, F, G, H).

<b>Part of Merge Group</b>	The identifier of the logical drive's merge group (1 through 254).
<b>Date Created</b>	The date that the logical drive was created.
<b>State</b>	The current drive state (see "Logical drive states" on page 88 for more information).
<b>Size</b>	The size in megabytes.
<b>RAID Level</b>	RAID level (0, 1, or 5).
<b>Write Policy</b>	<b>WT</b> - Write-through. <b>WB</b> - Write-back.
<b>Read Ahead</b>	<b>Off</b> - Disk Read-Ahead is inactive. <b>On</b> - Disk Read-Ahead is active.
<b>Stripe Unit Size</b>	The size of each stripe unit per hard disk (8, 16, 32, 64).
<b>Number of Chunks</b>	The number of hard disk drives that make up the logical drive.
<b>Stripe Order</b>	The channel and bay number of the physical drives that make up the logical drive.

## Monitoring the physical device

**information:** You can monitor the physical device information by clicking on the desired device button on the Main Screen of the Administration and Monitoring utility program.

When you click on the device button, a screen similar to the following appears.

Device Management
✕

<div style="border-bottom: 1px solid black; margin-bottom: 5px;">Drive State</div> <ul style="list-style-type: none"> <li><input type="radio"/> EMP</li> <li><input type="radio"/> SBY</li> <li><input type="radio"/> RDY</li> <li><input type="radio"/> DHS</li> <li><input type="radio"/> SHS</li> <li><input type="radio"/> HSP</li> <li><input type="radio"/> DDD</li> <li><input checked="" type="radio"/> ONL</li> <li><input type="radio"/> RBL</li> </ul>	<div style="border-bottom: 1px solid black; margin-bottom: 5px;">Drive Information</div> <table style="width: 100%; border-collapse: collapse;"> <tr><td>Channel</td><td style="text-align: right;">1</td></tr> <tr><td>Bay</td><td style="text-align: right;">2</td></tr> <tr><td>SCSI ID</td><td style="text-align: right;">1</td></tr> <tr><td>Vendor</td><td style="text-align: right;">IBM</td></tr> <tr><td>Serial Number</td><td style="text-align: right;">003056669</td></tr> <tr><td>Size</td><td style="text-align: right;">1003 MB</td></tr> <tr><td>State</td><td style="text-align: right;">ONL</td></tr> <tr><td>Soft Event</td><td style="text-align: right;">0</td></tr> <tr><td>Hard Event</td><td style="text-align: right;">0</td></tr> <tr><td>Misc Event</td><td style="text-align: right;">0</td></tr> <tr><td>Parity Event</td><td style="text-align: right;">0</td></tr> <tr><td>PFA</td><td style="text-align: right;">No</td></tr> </table>	Channel	1	Bay	2	SCSI ID	1	Vendor	IBM	Serial Number	003056669	Size	1003 MB	State	ONL	Soft Event	0	Hard Event	0	Misc Event	0	Parity Event	0	PFA	No
Channel	1																								
Bay	2																								
SCSI ID	1																								
Vendor	IBM																								
Serial Number	003056669																								
Size	1003 MB																								
State	ONL																								
Soft Event	0																								
Hard Event	0																								
Misc Event	0																								
Parity Event	0																								
PFA	No																								

Set Device State
Rebuild Drive
OK

Descriptions of the information that appears on this screen are as follows:

<b>Channel</b>	The channel to which the device is connected.
<b>Bay</b>	The bay number of the device on a channel (1 to 16).
<b>SCSI ID</b>	The SCSI ID (0 to 15).
<b>Vendor</b>	The drive manufacturer.
<b>Serial Number</b>	The drive manufacturer's identifier.
<b>Size</b>	The size of the drive in megabytes.
<b>State</b>	The current drive state (see "Physical device states" on page 86 and "Logical drive states" on page 88 for more information.)
<b>Soft Event</b>	The number of soft events reported from the device event log.
<b>Hard Event</b>	The number of hard events reported from the device event log.
<b>Misc Event</b>	The number of miscellaneous events reported from the device event log.
<b>Parity Event</b>	The number of parity events reported from the device event log.
<b>PFA</b>	<b>Yes</b> - Device indicates predictive failure analysis event. <b>No</b> - Device does not indicate predictive failure analysis event.

## Configuring the Ethernet controller

The Netfinity 5500 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.

Fast Ethernet operates at a data rate of 100 Mbps; that is, ten times faster than standard Ethernet. However, except for the different operating speeds, Fast Ethernet and standard Ethernet are structurally identical. Applications and protocols that are currently hosted on a standard Ethernet system can be seamlessly migrated to a Fast Ethernet system. (In a very small number of cases, minor tuning might be required to adjust the application to the higher performance of a Fast Ethernet system). Because of the equivalence of the two types of Ethernet, mixed Ethernet and Fast Ethernet systems also can be designed and implemented.

The bandwidth required at each workstation connected to a server is generally far less than the bandwidth required at the server. This is because the server might have to handle the bandwidth of multiple workstations at the same time. A cost-effective solution to the bandwidth requirements of this type of system is a mixed Ethernet and Fast Ethernet network. This mixed network consists of standard Ethernet connections at the workstations and Fast Ethernet connections at the servers.

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 documentation or operating-system documentation).

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.



## Configuring options

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

1. Run the Configuration/Setup Utility program and record the current configuration settings.  
See "Configuration/Setup Utility program" on page 60.
2. Set jumpers or switches on the server system board.  
See "Changing jumper positions" on page 151 and "System board jumpers" on page 257.
3. Set jumpers or switches on the device.  
See the instructions that came with the adapter.
4. Install the adapter in the server.  
See "Adapters" on page 142.
5. Install software programs.  
See the installation instructions that came with the software.
6. Resolve configuration conflicts.  
See "Resolving configuration conflicts" on page 73.

## 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 several types of adapters and SCSI devices. Because of this flexibility, you can choose from among many adapters and devices that comply with any of the following standards:

- Peripheral Component Interconnect (PCI)
- Industry Standard Architecture (ISA)
- Small Computer System Interface (SCSI)

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 utility programs:

- Configuration/Setup Utility

With the built-in Configuration/Setup Utility program, you can configure system board 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 utility program to set passwords for starting up the server and accessing the Configuration/Setup Utility program.

- ServeRAID

You can use ServeRAID programs to define and maintain the disk arrays. You can also use these programs to configure SCSI devices (such as hot-swap drives) that are attached to the ServeRAID controller on the system board. See “Understanding disk array technology” on page 81 for complete instructions.

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

1. Run the Configuration/Setup Utility program and record the current configuration settings.
2. Set jumpers or switches on the server system board.  
See “Changing jumper positions” on page 151 and “System board jumpers” on page 257.
3. Set jumpers or switches on the device.  
See the device installation instructions.

4. Install the device in the server.

If you install an ISA adapter that is not a Plug and Play device, select the **Plug and Play** choice on the main menu of the Configuration/Setup Utility program to assign the ISA legacy resources. See “Plug and Play” on page 99 for more information.

5. Install software programs.

See the installation instructions that come with the software.

6. Resolve configuration conflicts.

See “Resolving configuration conflicts” on page 73.

## Configuration/Setup Utility program

### Note

To print a copy of the hardware configuration, view server configuration information (such as system configuration, memory contents, interrupt request (IRQ) use, direct memory access (DMA) use, device drivers, and so on), do the following:

1. Start the diagnostic programs (see "Running Diagnostic programs" on page 13).
2. When the Diagnostic Programs screen appears, select **Hardware Info**.

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

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

After you run and exit from the Configuration/Setup Utility program, configuration information is stored in nonvolatile random-access memory (NVRAM). While the server is off, the configuration information remains available for the next system startup.

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

### To start the Configuration/Setup 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 94 for additional information.

The Configuration/Setup Utility main menu appears. For information about the menu, see "Using the Configuration/Setup Utility Main menu" on page 91.

## Configuring ISA and PCI adapters

You cannot assign an ISA adapter to the same interrupt that you have assigned to a PCI adapter. This is because the Netfinity 5500 does not support interrupt sharing among PCI and ISA adapters.

If a situation occurs where you need an additional interrupt, you can use an interrupt from another function that you might not need, such as COM2 (Interrupt 3).

To configure ISA adapters, select **Plug and Play** and follow the instructions on the screen. See "Plug and Play" on page 99 and "Plug and Play technology" on page 144 for additional information.

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 73.

Multiple-function PCI adapters use more than one interrupt. When you install one of these adapters, review the IRQ assignments in the Configuration/Setup Utility programs (see "PCI routing" on page 92). Verify that the IRQ assignments are correct.

The Netfinity 5500 uses a rotational interrupt technique to configure PCI adapters. This technique enables you to install a variety of PCI adapters that currently do not support sharing of PCI interrupts.

## Failover for redundant Ethernet

The Netfinity 5500 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. Applications with active sessions do not experience any data loss. When the primary link is restored to an operational state, the Ethernet traffic automatically switches back to the primary Ethernet controller.

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.

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

1. Add the redundant NIC adapter according to the instructions provided with the adapter and in “Adapters” on page 142.
2. Use ServerGuide to install the AMD PCNet Ethernet Family adapter device driver.

- 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.

- 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 255 for the locations and slot numbers of the PCI slots. The integrated controller is located in slot E.
- To enable the writing of messages to the IBMCOM\LANTRAN.LOG file when a failover occurs:
  - Copy the file PCNETOS2.EXE from the root directory of the diskette created by ServerGuide to the hard disk drive.
  - 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.
- Restart the server.

The failover function is now enabled.

### **Windows NT**

- Add the redundant NIC adapter according to the instructions provided with the adapter and in "Adapters" on page 142.
- Use ServerGuide to install the AMD PCNet Ethernet Family adapter device driver.
- From the Windows NT desktop, select **Control Panel**, then select the **Network** icon, then the **Adapters** tab.
- Highlight one of the adapters that will be in the redundant pair and then select the **Properties...** button.
- Check the **Grouping** box. This will show the possible combinations for redundant pairs.
- Select the adapter pair you want and then select **OK**. Note that the integrated Ethernet controller is located at PCI bus 0, slot 14.
- 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 Windows NT Event Viewer log. If the DMI instrumentation code for the integrated Ethernet controller is active (PCNET.EXE was run), a popup message is generated also.

## **IntraNetware**

1. Add the redundant NIC adapter according to the instructions provided with the adapter and in “Adapters” on page 142.
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 contains 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.



## Netfinity System Management Processor

The following information is about the system management processor that is integrated in the server. It also describes how to access the system management processor without Netfinity Manager. The following information is for the Netfinity System Management Processor.

One of the features of the Netfinity 5500 is the integrated system management processor.

### Note

To use all of the functions of the system management processor, you must install the Advanced System Management service for Netfinity Manager. You also will need a user-provided modem attached to serial port A to use the remote functions. Refer to "Serial ports" on page 166 for information about serial port A.

The Advanced System Management service gives you the ability to configure and monitor many features of the server's system management processor. You can connect to, and directly access and control, the system management processor of a remote system. With the Advanced System Management service you can configure Advanced System Management service events (such as, POST, loader, and operating-system timeouts; and critical temperature and voltage failures). If any of these events occur, the Advanced System Management service can be configured to automatically forward a Netfinity alert in one of three ways:

- Alert forwarded to another Netfinity system
- Alert forwarded to a standard numeric pager
- Alert forwarded to an alphanumeric pager

In addition, with the Advanced System Management service you can remotely monitor, record, and replay all textual data generated by a remote system during POST. While monitoring a remote system during POST, you can enter key commands on the keyboard that will then be relayed to the remote system.

The Netfinity Manager software is included in the serverGuide package. Refer to the documentation that comes with ServerGuide for information on how to install the Netfinity Manager software. Then, refer to the online Netfinity documentation or the online *Advanced System Management Service for Netfinity Manager User's Guide* for information on using the system management processor.

## System requirements for the Advanced System Management Service with Netfinity Manager

**Manager:** The minimum system requirements for using the Advanced System Management service are:

- System management processor (built into the Netfinity 5500)
- Netfinity Manager or Client Services for Netfinity Manager, version 5.10.4 or later
- 2 MB of available hard disk drive space

## Accessing the System Management Processor without Netfinity Manager

If for some reason 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. This modem should be connected to management port C. (Refer to "Management port C" on page 167 for information on management port C.) When connected, you will be able to access a variety of monitor, configuration, and error log data. You can also power the remote (Netfinity 5500) system on or off, shutdown and restart the server, and initiate remote video mode on the system management processor. Remote video mode enables you to remotely monitor all textual output 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 (terminal program) keystrokes are relayed automatically to the remote system, enabling you to use POST utilities (such as system configuration, RAID mini-configuration program, and diagnostic programs) that can be accessed during POST.

To use a terminal program to establish a connection with the system management processor:

1. Use a terminal program to establish a connection with the system management processor modem. The modem settings you should use are:  
**Baud** 57.6 k  
**Data Bits** 8  
**Parity** None  
**Stop Bits** 1  
**Flow Control** Hardware
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 username and password. You must provide a username and password combination that has been previously configured for use with the system

management processor. You can use one of two username and password combinations:

- The default username (USERID) and password (PASSWORD)

**Note**

The default username and password is case sensitive. You must use all caps, and the "0" in PASSWORD is the numeral zero.

- A username and password that you define using the Advanced System Management service and Netfinity Manager

**Important**

If you update the system management processor microcode, the default username (USERID) and password (PASSWORD) are reset. If applicable, notify the system administrator.

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

To access a menu item, press the number or letter that corresponds to the information 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.

**Note**

- Selecting **Y Disconnect Current Logon** ends the current session and requires you to enter a new username and password before continuing.
- Selecting **Read** displays the last entry.
- Selecting **Read Last** steps backwards through the entries.
- Selecting **Write** executes the command.

Menu Selection	Data Available for Viewing
<b>Monitors</b>	System board temperature, CPU temperatures, power supply temperatures, voltage readings, voltage regulator module readings, fan status, redundant power supply status
<b>Error Logs</b>	Contents of system error log

Menu Selection	Data Available for Viewing
<b>Service Processor Configuration</b>	System management processor modem configuration, dial-out entries, dial-out alerts, dial-in logins, system status, thresholds, system statistics, VPD information and system state
<b>System Services</b>	Status of system management processor watchdog timers and event alerts sent to the server
<b>System Power</b>	Current system power status, power-off configuration and power-off delay values.  <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p style="text-align: center;"><b>Note</b></p> <p>You can use selections available from the <b>System Power</b> menu to power the system on or off. For more information, see "System Power menu selections" on page 68.</p> </div>
<b>Boot</b>	You can use selections available from the <b>Boot</b> menu to shutdown and restart the system or to restart the system management processor. For more information, see "Boot menu selections" on page 69.
<b>Remote Terminal Status</b>	Current remote terminal status
<b>Start Remote Video</b>	Use <b>Start Remote Video</b> 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 71.

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 username and password. You must provide a username and password combination that has been previously configured for use with the system management processor. You can use one of two username and password combinations:

- The default username (USERID) and password (PASSWORD)

**Note**

The default username and password is case sensitive. You must use all caps, and the "0" in PASSWORD, is the numeral zero.

- A username and password that you define using the Advanced System Management service and Netfinity Manager

**Important**

If you update the system management processor microcode, the default username (USERID) and password (PASSWORD) are reset. If applicable, notify the system administrator.

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 **6 System Power**.

The following System Power menu appears:

- 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 power the server on (if it is currently powered off).
- Select **4 Power Off** to power the server off (if it is currently powered on).

**Boot menu selections:** You can use the selections available from the Boot menu to:

- Shutdown 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 username and password. You must provide a username and password combination that has been previously configured for use with the system management processor. You can use one of two username and password combinations:

- The default username (USERID) and password (PASSWORD)

**Note**

The default username and password is case sensitive. You must use all caps, and the "0" in PASSWORD, is the numeral zero.

- A username and password that you define using the Advanced System Management service and Netfinity Manager

**Important**

If you update the system management processor microcode, the default username (USERID) and password (PASSWORD) are reset. If applicable, notify the system administrator.

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
3 Restart SP
```

4. Select a Boot menu item.
  - Select **1 Reboot w/OS Shutdown** to shutdown 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 **3 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 textual output 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 username and password. You must provide a username and password combination that has been previously configured for use with the system management processor. You can use one of two username and password combinations:

- The default username (USERID) and password (PASSWORD)

**Note**  
The default username and password is case sensitive. You must use all caps, and the "0" in PASSWORD, is the numeral zero.

- A username and password that you define using the Advanced System Management service and Netfinity Manager

**Important**  
If you update the system management processor microcode, the default username (USERID) and password (PASSWORD) are reset. If applicable, notify the system administrator.

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 powered 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 powered 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 68 and "Boot menu selections" on page 69.

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 textual output 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.



## 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 bits) 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 programs, see "Using the Configuration/Setup Utility Main menu" on page 91.

## Changing the hardware configuration

**setup:** An alternative way to resolve memory-address conflicts is to change the address of the conflicting hardware option. See "Plug and Play" on page 99 for information about reserving resources for ISA legacy adapters.

## **ServeRAID Configuration program**

You can use the IBM ServeRAID Configuration program to view the current disk-array configuration, change or delete existing arrays, create and initialize new disk arrays, and perform many other configuration and maintenance tasks.

You must use the ServeRAID Configuration program or the EZ-RAID configuration feature to configure the disk arrays *before* you partition the hard disk drives and install the operating system. After you configure the disk arrays, use the information provided in the ServerGuide package to install the operating system. Then, return to this manual for information about installing and using the ServeRAID Administration and Monitoring utility program.

## **Software installation**

Use ServerGuide to verify that you have the proper working environment for the specific operating system you are installing.

1. Follow the instructions provided in the ServerGuide package to install the operating system.

### **What to do next?**

- To install application programs, refer to the application program documentation.

## Specifications

The following list contains the specifications for the Netfinity 5500.

### Size (Tower Model)

- Depth: 700 mm (27.6 in.)
- Height with NetBAY3: 530 mm (20.9 in.)
- Height without NetBAY3: 356 mm (14 in.)
- Width: 483 mm (19 in.)
- Front clearance: 305 mm (12 in.)
- Rear clearance: 100 mm (4 in.)
- Side clearance: 50 mm (2 in.)

### Size (Rack Model)

- Depth: 650 mm (25.6 in.)
- Height: 356 mm (14 in.) (8 U)
- Width: 440 mm (17.3 in.)

### Weight

- Unpacked, minimum configuration (with empty NetBAY3): 39 kg (85 lb.)
- Unpacked, maximum configuration: 55 kg (120 lb.)

### Heat Output

- Approximate heat output in British thermal units (Btu) per hour:
  - Minimum configuration: 1023.9 Btu
  - Maximum configuration: 2764.6 Btu

### Environment

- Air temperature
  - System on: 10° to 35° C (50° to 95° F)  
Altitude: 0 to 914 m (3000 ft.)
  - System on: 10° to 32° C (50° to 89.6° F)  
Altitude: 914 m (3000 ft.) to 2133 m (7000 ft.)
  - System off: 10° to 43° C (50° to 110° F)  
Maximum altitude: 2133 m (7000 ft.)
- Humidity
  - System on: 8% to 80%; maximum wetbulb, 23° C (73.4° F)
  - System off: 8% to 80%; maximum wetbulb, 27° C (80.6° F)
- Altitude: 0 to 2133 m (0 to 7000 ft.)

### Acoustical Noise Emissions Values

- Sound power, idling
  - 6.2 bel for open bay system (no hard disk drives installed)
  - 6.2 bel for typical system configuration (3 hard disk drives installed)
- Sound power, operating
  - 6.2 bel for open bay system (no hard disk drives installed)

- 6.4 bel for typical system configuration (3 hard disk drives installed)
- Sound pressure, idling
  - 45 dBA for open bay system (no hard disk drives installed)
  - 45 dBA for typical system configuration (3 hard disk drives installed)
- Sound pressure, operating
  - 45 dBA for open bay system (no hard disk drives installed)
  - 46 dBA for typical system configuration (3 hard disk drives installed)

These levels are measured in controlled acoustical environments according to ISO 7779, and are reported in accordance with ISO 9296. The declared sound power levels indicate an upper limit, below which a large portion of machines operate. Sound pressure levels in your location might exceed the average values stated because of room reflections and other nearby noise.

#### **Electrical Input**

- Sine-wave input (50± or 60± Hz) is required
- Input voltage
  - Low range
    - Minimum: 90 V ac
    - Maximum: 137 V ac
  - High range
    - Minimum: 180 V ac
    - Maximum: 265 V ac
  - Input kilovolt-amperes (KVA) approximately
    - Minimum configuration as shipped: 0.2 KVA
    - Maximum configuration: 0.78 KVA

#### **Electrostatic Discharge**

- Tested to 14 KV

#### **Immunity**

- Verified to comply with EN 50082-2

#### **Safety Standards**

- UL 1950
- CSA C22.2 No. 950-M93
- EN 60950 and countries deviations
- IEC 950
- NOM-019

## Starting the ServeRAID Configuration program

You can start the ServeRAID Configuration program in one of three ways. Choose one of these startup methods, and follow the appropriate instructions.

- During the initial startup of the server using ServerGuide (see “During the initial startup of the server”).
- After an operating system is installed using ServerGuide (see “After an operating system is installed”).
- Using diskettes (see “Using diskettes to start the ServeRAID Configuration program”).

### During the initial startup of the server:

Using ServerGuide, insert the *HardwareGuide* CD in the CD-ROM drive and start the server. Follow the instructions in the serverGuide package to start the ServeRAID Configuration program.

When the ServeRAID Configuration program starts, go to “Using the ServeRAID Configuration program” on page 101 for more information.

### After an operating system is installed

#### Notes

1. Ensure that the CD-ROM is enabled as the startup drive. (See “Start options” on page 97 for additional information.)
2. If a screen appears asking you to select an operating system, select the operating system that you have installed. This does not reinstall the operating system. This is for information only.

Insert the *HardwareGuide* CD in the CD-ROM drive and start the server. Follow the instructions in the serverGuide package to start the ServeRAID Configuration Program.

When the ServeRAID Configuration Program starts, go to “Using the ServeRAID Configuration program” on page 101 for more information.

### Using diskettes to start the ServeRAID

**Configuration program:** If you choose to use diskettes to configure the ServeRAID controller, you must first make the ServeRAID diskettes. You can make the diskettes using the Diskette Factory feature of ServerGuide. Refer to the serverGuide documentation for instructions. You can also download the diskette images from the World Wide Web. See “Online support” on

page iv for information about pages IBM maintains on the World Wide Web.

Once you have made the ServeRAID diskettes, do the following to start the ServeRAID Configuration program.

Insert the ServeRAID Configuration Diskette into the primary diskette drive; then, turn on the system. If the system is already turned on, press **Ctrl+Alt+Del**.

Each time the system starts, the ServeRAID controller performs a power-on self-test (POST). The POST checks the configuration information for the ServeRAID controller and for the configured hard disk drives. When POST detects a problem, an error message appears on the screen. If this occurs, see "Symptom-to-FRU index" on page 264.

When the ServeRAID Configuration program starts, go to "Using the ServeRAID Configuration program" on page 101 for more information.

## Status LEDs

The server has LEDs to help you identify problems with some server components (see, “Symptom-to-FRU index” on page 264).

Status LEDs are located on the following components:

- Information panel  
For more information, see “Information LED panel” on page 189.
- Hard disk drive trays  
For more information, see “Controls and indicators” on page 158.
- Power supply  
For more information, see “Power supply LEDs.”
- Diagnostic panel  
For more information, see “Diagnostics panel LEDs” on page 164.
- Processor board  
See “Processor board component locations” on page 227 for locations of the LEDs on the processor board.
- System board  
See “System board component locations” on page 255 for locations of the LEDs on the system 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 224 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	<p>There is a dc power problem.</p> <p>Possible causes:</p> <ol style="list-style-type: none"> <li>1. The Power Control button on the front of the server is in the Off position. <b>Action:</b> Press the Power Control button to start the server.</li> <li>2. The Power switch on the power supply is in the Off position. <b>Action:</b> Turn the Power switch to the On position.</li> <li>3. The power supply has failed. <b>Action:</b> Replace the power supply.</li> </ol>
Off	Off	<p>There is an ac power problem.</p> <p>Possible causes:</p> <ol style="list-style-type: none"> <li>1. There is no ac power to the power supply. <b>Actions:</b> Verify that: <ul style="list-style-type: none"> <li>• The power cord is properly connected to the server.</li> <li>• The power outlet functions properly.</li> </ul> </li> <li>2. The power supply has failed. <b>Action:</b> Replace the power supply.</li> </ol>



## Understanding disk array technology

When you connect several hard disks together and configure the RAID controller to access them in a predetermined pattern, you create a *disk array*. The ServeRAID controller on the system board supports up to eight independent arrays.

Disk arrays are used to improve security, performance, and reliability. The amount of improvement depends on the application programs that you run on the server and the RAID levels that you assign to the logical drives in the arrays. The ServeRAID controller supports RAID levels 0, 1, and 5.

The server has space for up to six hot-swap hard disk drives.

**Hard disk drive capacities:** Hard disk drive capacities influence the way you create arrays. Drives in the array can be of different capacities (1 GB<sup>1</sup> or 2 GB, for example), but the ServeRAID controller treats them as if they all have the capacity of the *smallest* disk drive.

For example, if you group three 1 GB drives and one 2 GB drive into an array, the total capacity of the array is 1 GB times 4, or 4 GB, not the 5 GB physically available. Conversely, if you add a smaller drive to an array of larger drives, such as a 1 GB drive to a group containing three 2 GB drives, the total capacity of that array is 4 GB, not the 7 GB physically available. Therefore, the optimal way to create arrays is to use hard disk drives that have the same capacity.

**Logical drives:** When you create an array, you group hard disk drives into one storage area. You can define this storage area as a single *logical* drive, or you can subdivide it into several logical drives. Each logical drive appears to the operating system as a single physical hard disk drive.

The ServeRAID controller on the system board supports up to eight logical drives. If you have only one array, you can define it as a single logical drive, or you can divide it into several logical drives. The first logical drive that you define will be the startup (boot) drive. If you have two or more arrays, each array can be one logical drive, or you can divide each array into multiple logical drives, as long as the total number of logical drives for all of the arrays does not exceed eight.

---

<sup>1</sup> When referring to hard-disk-drive capacity, GB means 1 000 000 000 bytes; total user-accessible capacity may vary depending on operating environment.

**RAID classifications:** With RAID technology, data is *striped* across an array of hard disk drives. This data-distribution technique complements the way the operating system requests data.

The six basic RAID classifications are RAID level 0 through RAID level 5. The ServeRAID controller on the system board supports three, industry-recognized RAID levels: 0, 1, and 5.

**RAID level 0:** RAID level 0 stripes the data across all the drives in the array. This offers substantial speed enhancement, but provides for no data redundancy. The ServeRAID controller automatically assigns RAID level 0 to all logical drives in an array containing only one hard disk drive.

A hard disk failure within the array results in loss of data in the logical drive assigned level 0, but *only in that logical drive*. If you have logical drives assigned RAID level 1 or 5 in the same array, they will not lose data.

When you replace the failed drive, the ServeRAID controller automatically rebuilds all the logical drives assigned RAID levels 5 and 1 onto the replacement hard disk drive and defines the level 0 logical drive. However, the data that was in the failed level 0 logical drive is lost.

Though the risk of data loss is present, you might want to assign RAID level 0 to one of the logical drives, to take advantage of the speed offered with this RAID level. You could use this logical drive to enter data that you back up each day and for which safety is not of primary importance; that is, data that you can re-create easily. You also might want to use a level 0 logical drive when the work you are doing requires maximum capacity. RAID level 0 provides the largest capacity of the three RAID levels offered, because no room is taken up for redundant data or data parity storage.

**RAID level 1:** RAID level 1 provides 100% data redundancy and requires two hard disk drives. With RAID level 1, the first stripe is the data stripe; the second stripe is the *mirror* (copy) of the first stripe, but written to another drive. If one of the hard disk drives fails, the ServeRAID controller switches read and write requests to the remaining functional drive in the array.

Because the data is mirrored, the capacity of the logical drive when assigned level 1 is 50% of the physical capacity of the grouping of hard disk drives in the array.

RAID level 1 requires two drives. When you group more than two drives into a RAID level 1 array, the ServeRAID controller automatically assigns the Enhanced RAID level 1.

The Enhanced RAID level 1 stripes data and copies of the data across all the drives in the array. As with the standard RAID level 1, the data is mirrored, and the capacity of the logical drive is 50% of the physical capacity of the grouping of hard disk drives in the array.

The following illustration shows data arranged in an array with three hard disk drives. The logical drive is assigned the Enhanced level 1. Notice that the mirror of the first data stripe (XXX YYY ZZZ) is shifted one drive. The other data stripes in level 1 follow the same pattern.




			
Stripe	XXX	YYY	ZZZ
Mirrored stripe	ZZZ	XXX	YYY
Stripe	AAA	BBB	CCC
Mirrored stripe	CCC	AAA	BBB

Table 1. Enhanced RAID Level 1

If you have only two drives available, the second drive is a mirror copy of the first drive.

**RAID level 5:** RAID level 5 stripes data and parity across all drives in the array. When an array is assigned level 5, the capacity of the logical drive is reduced by one drive (for data parity storage).

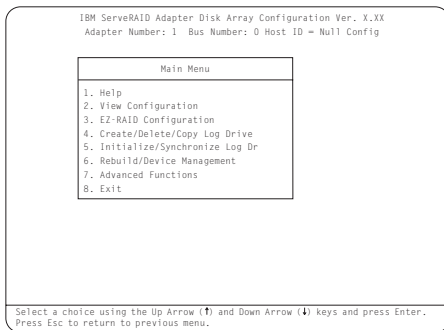
RAID level 5 is generally the most desirable choice, because it offers both data protection and increased throughput. RAID level 5 gives you higher capacity than level 1, but level 1 offers better performance.

If you want to have a hot-spare drive (that is, a drive that can be automatically used to replace a similar drive that fails) and also assign RAID level 5, you must have at least four hard disk drives in the server.

### ServeRAID menus, screens, and drive

**states:** The following information describes the Main Menu, the ServeRAID screens and pop-up windows, the physical device states, and the logical drive states.

**Main menu:** The following illustration shows the Main Menu of the IBM ServeRAID Configuration program.



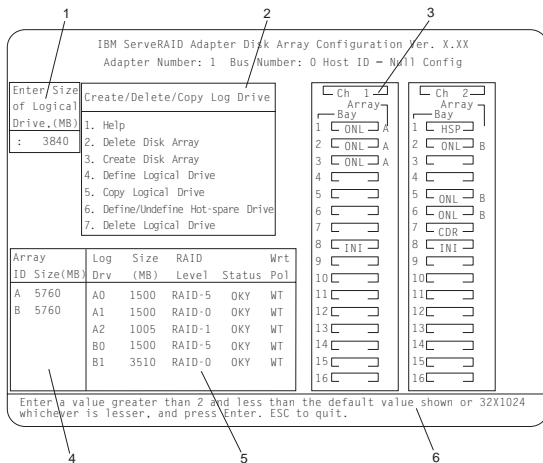
Descriptions of the choices available from the Main Menu are as follows:

- 1. Help** provides information about the choices available on the menu. You also can press F1 from any screen to obtain online Help.
- 2. View Configuration** displays the existing disk-array configuration information. See “Viewing or changing the configuration” on page 113 for more information.
- 3. EZ-RAID Configuration** automatically creates a configuration based on the number of physical drives installed in the system. See “Using the EZ-RAID configuration feature” on page 102 for more information.
- 4. Create/Delete/Copy Log Drive** lets you manually create the disk arrays. You can select the drives that you want to include in an array. (See “Creating disk arrays manually” on page 104 for more information.) You also can select this choice to define, delete, or copy logical drives and to define hot-spare drives.
- 5. Initialize/Synchronize Log Dr** prepares the drives for data storage. RAID level 5 logical drives are automatically synchronized when you initialize them. See “Initializing/Synchronizing logical drives at the same time” on page 108 for more information.
- 6. Rebuild/Device Management** rebuilds RAID level 1 and RAID level 5 logical drives. You also can select this choice to define or change the state of a physical drive, view drive information, and clear the Device Event Log. (See “Maintaining the disk-array configuration” on page 125 for more information.)
- 7. Advanced Functions** lets you change the write policy (the way data is written to the drive), save the configuration information to a diskette, restore the configuration from a diskette, or change the ServeRAID

controller parameters. You also can select this choice to run the RAID subsystems diagnostics, initialize the controller configuration, reset the configuration values to the factory defaults, and select a source (hard disk, NVRAM, Flash) from which to synchronize the ServeRAID controller configuration.

**8. Exit** lets you exit from the Main Menu of the ServeRAID Configuration program.

**Screens and pop-up windows:** The following illustration is a compilation of several configuration screens that appear when you use the IBM ServeRAID Configuration program.



Descriptions of the labeled areas in this illustration are as follows:

- 1** Pop-up windows that apply to the current menu appear in this area of the screen. For example, when you need to confirm an action, the Confirm pop-up window appears in this area.
- 2** You can select any of the choices that appear on the menu. To make a selection from a menu, type the highlighted number of the menu item, or use the Up Arrow (↑) or Down Arrow (↓) key to highlight your choice; then, press **Enter**. You can press the **Esc** key to return to a previous menu, to a previous work area of a screen, or to the Main Menu.
- 3** The Array/Bay selection list shows the bays for the ServeRAID controller. For each bay that contains a drive, the list indicates the array in which the drive is grouped and the physical device state. (See "Physical device states" on page 86 for more information.) For example, in the illustration, the

drive in Channel 1, Bay 1 has a drive state of online (ONL) and is part of Array A.

**Notes**

1. The Array/Bay selection list does not reflect the physical configuration of the server. (See "Internal drive bays" on page 197 for the physical location of the hard disk drives.)
2. The SCSI IDs for the hot-swap hard disk drives is set by the backplane. The backplane allows you to define the IDs as low (0 to 5) or high (8 to 13). See "SCSI backplane option jumpers" on page 250 for more information about setting jumpers on the backplane.
3. The bay number corresponds to the SCSI ID of the device plus 1. For example, the ServeRAID controller (INI) uses SCSI ID 7 and its bay number is 8 (7 + 1).
4. Bay Number 8 (SCSI ID 7) is reserved for the ServeRAID controller (also known as the initiator, INI); therefore do not set the SCSI ID of non-hot-swap device, such as a tape drive, to 7.

- 4 The Array list indicates the array IDs and the sizes (in megabytes) of the arrays. When a drive is being rebuilt, this list and the Logical Drive list show the progression of the rebuild process.
- 5 The Logical Drive list shows the size, RAID level, status, and write policy for each logical drive. (See "Logical drive states" on page 88 for more information.)
- 6 This area provides information and instructions about the actions you can perform on the current screen or pop-up window.

**Physical device states:** Descriptions of the physical device states, which appear in the Array/Bay selection list, are as follows:

State	Meaning
CDR	A CD-ROM drive is installed.
DDD	The physical hard disk drive is defunct (DDD). A drive in the Online (ONL) or Rebuild (RBL) state has become defunct (DDD). It does not respond to commands, which means that the ServeRAID controller cannot communicate properly with the drive.  A hard disk drive in the DDD state does not necessarily mean that you need to replace the

drive. Before you replace the drive, ensure that:

1. All cables are connected correctly to the backplane and to the hard disk drive. Also, check to ensure that all cables inside the server are connected correctly.
2. The hot-swap drive tray is seated properly in the drive bay.
3. See "Symptom-to-FRU index" on page 264.

**DHS** A drive enters the Defunct Hot-spare (DHS) state if:

1. A defunct (DDD) drive has been rebuilt to another drive, such as a hot-spare drive.
2. A hot-spare (HSP) or standby hot-spare (SHS) drive fails to respond to commands from the ServeRAID controller.

**EMP** No device is present in the bay. This state appears as dashes (---) on the ServeRAID configuration screen, or as a blank space on the Administration and Monitor utility screen.

**HSP** A hot-spare (HSP) drive is a hard disk drive that is defined for automatic use when a similar drive fails. (See "Defining hot-spare drives" on page 111 for more information.)

**INI** The INI represents the initiator for the ServeRAID controller.

**ONL** The drive is online (ONL). It is functioning properly and is part of an array.

**PRC** The device is a generic SCSI controller (for example, a hot-swap backplane that has onboard systems-management support).

**RBL** The drive is being rebuilt. (See "Understanding the drive rebuild process" on page 131 for more information.)

**RDY** The ServeRAID controller recognizes a ready (RDY) drive as being available for definition. The ready drive state changes to empty (EMP) when the drive is physically removed from the bay.

**SBY** A standby (SBY) drive is a hard disk drive that the ServeRAID controller has spun down.

**SHS** A standby hot-spare (SHS) is a hot-spare drive that the ServeRAID controller has spun down. If an online (ONL) drive becomes defunct and no suitable hot-spare drive is available, a standby hot-spare of the appropriate size automatically spins up, and enters the rebuild (RBL) state.

**TAP** A tape drive is installed.

**Logical drive states:** Descriptions of the logical drive states, which appear in the Logical Drive list, are as follows:

<b>State</b>	<b>Meaning</b>
<b>CRM</b>	A logical drive undergoing a logical-drive migration (LDM) is in the critical state.
<b>CRS</b>	The ServeRAID controller uses this reserved state during a logical-drive migration (LDM).
<b>CRT</b>	A RAID level 1 or 5 logical drive that contains a defunct physical drive is in the critical state. A critical (CRT) logical drive is accessible, despite a physical drive failure.
<b>FRE</b>	The drive is in a free (FRE) state. It is not defined.
<b>LDM</b>	The logical drive is undergoing a logical-drive migration (LDM); that is, a change in RAID levels, a change in logical drive size, or an increase in free space.
<b>OFL</b>	The logical drive is offline (OFL) and not accessible. This state occurs if one or more physical drives in a RAID level 0 logical drive are defunct. This state also occurs when two or more physical drives in a RAID level 1 or RAID level 5 logical drive are defunct.
<b>OKY</b>	The drive is okay (OKY). It is in a good, functional state.
<b>SYS</b>	The ServeRAID controller uses this reserved state during logical-drive migration (LDM).

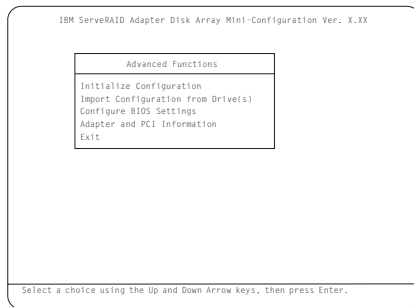
If the state of the logical drive is critical (CRT), you must replace and rebuild the defunct drive. See “Understanding the drive rebuild process” on page 131 for more information.



## Using the Advanced Configuration functions

The Advanced Functions choice allows you to initialize the configuration (reset the ServeRAID controller settings), import the configuration information from the drives, enable and disable the Boot CD-ROM and INT13 extensions, and view the controller and PCI information.

When you select Advanced Functions from the Main Menu, a screen similar to the following appears.



Descriptions of the choices available from the Advanced Functions menu are as follows:

### Attention

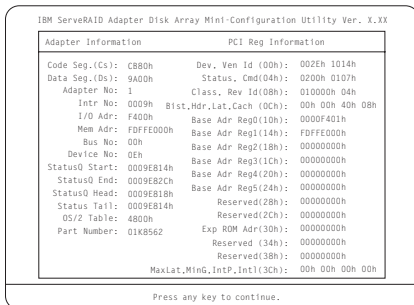
The following choices might result in loss of data due to changes in the configuration.

- **Initialize Configuration** resets the ServeRAID controller settings to their factory defaults and sets all functional hard disk drives to the RDY state.
- **Import Configuration from Drive(s)** reads the most common configuration information from the drives in the server and copies it to the controller's NVRAM and to the controller's EEPROM module.
- **Boot CD-ROM and INT13 Extensions** is used to configure the **BootCd** feature. When **BootCd** is enabled, the ServeRAID controller attempts to start (boot) from a CD, if the CD-ROM drive contains a startable (boot-enabled) CD, and no other controller is currently using INT13 extensions.

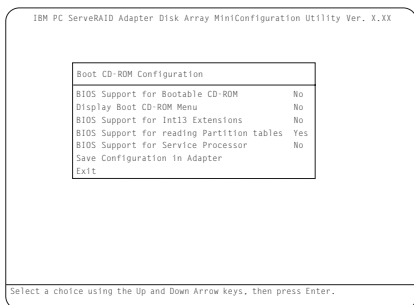
### Attention:

Only one controller can support INT13 extensions.

- **Adapter and PCI Information** displays the ServeRAID controller hardware and PCI register information, as shown in the following example screen.



**Setting the BootCd feature:** When you select **Boot CD-ROM and INT13 Extensions**, a screen similar to the following appears.



**To enable the BootCd feature:**

1. Use the Up Arrow (↑) or Down Arrow (↓) key to highlight **BIOS Support for Bootable CD-ROM**. Press **Enter** to change No to Yes. This also changes No to Yes next to **Display Boot CD-ROM Menu** and **BIOS Support for INT13 Extensions**.
2. Ensure that the screen displays Yes next to **BIOS Support for reading Partition tables**. If not, use the Up Arrow (↑) or Down Arrow (↓) key to highlight **BIOS Support for reading Partition tables**; then, press **Enter** to change No to Yes.
3. Highlight **Save Configuration for Adapter**; then, press **Enter**. A Configuration Saved message appears. The Main Menu of the Mini-Configuration program returns.

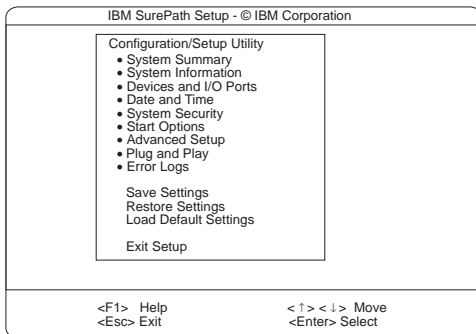
**Note**

Highlighting **Exit**, instead of **Save Configuration for Adapter**, and pressing **Enter** causes any changes you made **not** to be saved.

4. Press **Ctrl+Alt+Del** to restart the server.

## Using the Configuration/Setup Utility Main menu

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



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 Up Arrow (↑) or Down 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 Configuration/Setup Utility main menu.
4. After making changes, you can select:
  - **Save Settings** to save the selected changes.
  - **Restore Settings** to delete the changes and restore the previous settings.
  - **Load Default Settings** to cancel the changes and restore the factory settings.
5. To exit from the Configuration/Setup Utility main menu, select **Exit Setup**. If you made any changes and did not save them with the **Save Settings** choice, the system prompts you to save or discard the changes when you attempt to exit from the Configuration/Setup Utility main menu.

**System summary:** Select this choice to display configuration information, including the type and speed of the microprocessor and amount of memory.

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

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

**System information:** Select this choice to display information about the Netfinity 5500, and to view the IRQ settings for the RAID and Ethernet controllers on the system board, and other PCI adapters that you purchase and install.

Changes that you make on other menus might appear on this summary screen. You cannot edit any fields.

The System Information choice appears only on the full Configuration/Setup Utility menu.

**Product data:** Select this choice to view system information, such as the machine type and model, the system serial number, the system board identifier, and the revision level or issue date of the flash electronically erasable programmable ROM (EEPROM) for the system management processor, diagnostics, and BIOS.

**System card data:** Select this choice to view information for the system board and processor board.

**PCI routing:** Select this choice to view the IRQ settings for PCI adapters and for the Ethernet, SCSI, and other controllers on the system board. See "PCI bus control" on page 98 for information about changing the PCI IRQ settings.

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

**Note**

Serial port A can be shared by the system management processor and operating system. Serial port B is used by the operating system only. Management port C is controlled exclusively by the system management processor, cannot be used by the operating system, and cannot be configured using the Configuration/Setup utility program.

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, serial ports, or the 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 available.

The Devices and I/O Ports choice appears only on the full Configuration/Setup Utility 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. For further details about Plug and Play devices, see "Plug and Play" on page 99.
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 setting in the Configuration/Setup Utility.

**Date and time:** Select this choice to set the system date and time.

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

The system date is in 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.

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

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

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

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

**To set, change, or delete a password:**

1. Select **System Security**.
2. Select the password that you want to change.
3. Follow the instructions on the screen.

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	<ul style="list-style-type: none"> <li>• No password required to start system.</li> <li>• You can access all choices on the Configuration/Setup Utility main menu.</li> </ul>
Power-on password only	<ul style="list-style-type: none"> <li>• You must enter the password to complete the system startup.</li> <li>• You can access all the choices on the Configuration/Setup Utility main menu.</li> </ul>
Administrator password only	<ul style="list-style-type: none"> <li>• You must enter the password to complete the system startup.</li> <li>• Administrator password provides access to all choices on the Configuration/Setup Utility main menu.</li> </ul>
Administrator <i>and</i> power-on password	<ul style="list-style-type: none"> <li>• You can enter either password to complete the system startup.               <ul style="list-style-type: none"> <li>– Administrator password provides access to all choices on the Configuration/Setup Utility main menu. You can set, change, or delete both the administrator and power-on passwords, and allow a power-on password to be changed by the user.</li> <li>– Power-on password provides access to a limited set of choices on the Configuration/Setup Utility main menu. This might include changing or deleting the power-on password.</li> <li>– If you forget the power-on password, and the administrator password has been set, use the administrator password at the power-on password prompt; then, start the Configuration/Setup Utility program and change the power-on password.</li> </ul> </li> </ul>

**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.

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

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. (See “Using the administrator password menu” on page 96 for details.) Start the Configuration/Setup Utility program and change the power-on password as previously described in this section (see steps 1 through 4).
- You can change the position of the Power-On Password Override jumper, as described in “Bypassing an unknown power-on password” on page 258.
- You can remove the battery as described in “Battery replacement” on page 147 and then reinstall the battery.

**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 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**.

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

**Attention**

If an administrator password is set and then forgotten, it cannot be overridden or removed. You must 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. 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 Configuration/Setup Utility menu. The System Security menu contains the **Power-on Password** choice.

**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 in disketteless and monitorless operation.

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 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 Configuration/Setup Utility menu.

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

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 Configuration/Setup Utility menu.

**ACPI control:** Select this choice to enable or disable the advanced configuration and power management interface (ACPI) in the BIOS. You can choose to change the ACPI hardware signature or select an IRQ for ACPI.

**Cache control:** Select this choice to enable or disable the microprocessor cache. In addition, you can define the microprocessor cache mode as write-back (WB) or write-through (WT).

Selecting write-back mode will provide the maximum system performance.

**Note**

If the system does not start (boot) successfully after three attempts, the default configuration is loaded, disabling the cache.

**PCI bus control:** Select **PCI Bus Control** to get the following choices:

- **PCI-PCI Bridge Pre-fetching:** Set **PCI-PCI bridge pre-fetching** to **Enabled** for maximum performance. If you experience problems running peer-to-peer adapters, disable this function.
- **PCI Primary Bus MLT:** This setting is for the primary master latency timer (MLT). It can be used to help tune performance of the server.
- **PCI Secondary BUS MLT:** This setting is for the secondary master latency timer (MLT). It can be used to help tune performance of the server.
- **PCI Interrupt Routing:** This choice can be used to manually override the interrupts for PCI devices. Any changes that you make in PCI Interrupt Routing will not be reflected in the IRQ settings displayed in the PCI Routing selection of the System Information menu until you restart the server.

**Memory settings:** Select this choice to manually disable or enable a row of memory.

If a memory error is detected during POST or memory configuration, the server can automatically disable the failing row of memory and continue operating with reduced memory capacity. If this occurs, you must manually enable the row of memory after the problem is corrected. Choose **Memory Settings** from the Advanced Setup menu; then use the the Up Arrow (↑) or Down Arrow (↓) key to highlight the row that you want to enable. Use the Left Arrow (←) or Right Arrow (→) key to select **Enable**.

**Advanced ISA settings:** Select this choice to select the I/O recovery timer settings.

**System Service Processor settings:** Select this choice to change the system management processor IRQ.

**Plug and Play:** Before you can install Plug and Play adapters, you must configure ISA legacy adapters (if applicable) and assign the resources that are used by these adapters. When you install an ISA legacy adapter, you must allocate the system resources that the adapter will use. Select **Plug and Play** to view and identify these resources, which include:

- Memory
- I/O ports
- Direct memory access (DMA)
- Interrupt

**Note**

These menus do not display the resources that are required for the system or by Plug and Play devices.

Select **Plug and Play**; then, use the Up Arrow (↑) or Down Arrow (↓) key to highlight the assignment that you want to change. Use the Left Arrow (←) or Right Arrow (→) key to select from the list of available choices.

Enter the appropriate values in the **Interrupt Resources** data fields. These values range from 0 through 15.

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

**Note**

For further details about Plug and Play devices, see "Plug and Play technology" on page 144.

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

**POST error log:** Select **POST Error Log** to view the three most recent error errors detected and logged during POST. You can clear the Post error log from this screen by selecting **Clear error logs**.

**System error log:** Select **System Error Log** to view the system error log. The system error log contains all of the error and warning messages generated during POST and all system status messages from the system management processor. The most recent error is displayed first. Use the Up Arrow (↑) and Down Arrow (↓) keys to move through the system error log. You can clear the system error 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:** Select to exit from the Configuration/Setup utility program. If you have made any changes, you will be asked if you want to make the changes or exit without making the changes.

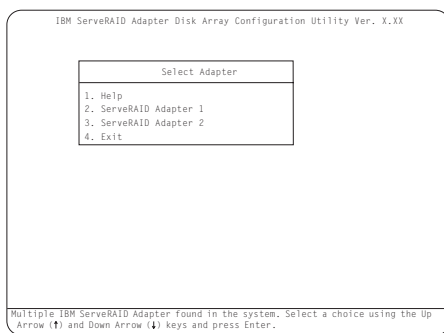
## Using the ServeRAID Configuration program

After the ServeRAID Configuration program starts, one of the following screens will appear:

- If you have more than one ServeRAID controller in the system, a screen similar to the following appears.

### Note

You can install multiple ServeRAID adapters in the server, but you must configure each adapter separately.

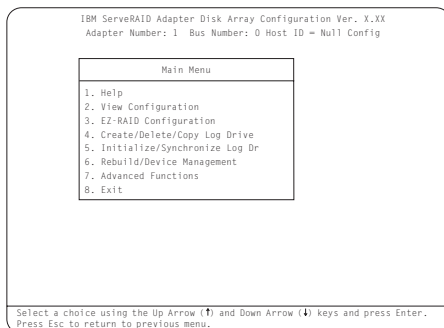


### Note

In the upper-right corner of the screen, you will see Ver. x.xx. On the screen, the x.xx is replaced by the version number of the configuration program.

Use the Up Arrow (↑) or Down Arrow (↓) key to highlight your choice; then, press **Enter**. The Main Menu appears.

- If you have only one ServeRAID controller installed in the server, the Main Menu appears.



Type the highlighted number of the menu item, or use the Up Arrow (↑) or Down Arrow (↓) key to highlight your choice; then, press **Enter**. You can also press **Esc** to return to the previous menu, the previous work area of a screen, or to the beginning of the Main Menu.

If you are not familiar with the ServeRAID Configuration program, review the information in “ServeRAID menus, screens, and drive states” on page 83.

**Creating disk arrays:** The ServeRAID controller on the system board supports up to eight independent arrays. You must use the EZ-RAID configuration feature or the Create/Delete/Copy Log Drive menu to configure the disk arrays *before* you partition the hard disk drives and install the operating system.

The EZ-RAID configuration feature provides an easy way for you to quickly configure the disk arrays. This feature automatically creates a disk array, based on the number of RDY physical drives in the system. The EZ-RAID feature defines, initializes, and synchronizes the logical drive for you. If four or more RDY physical drives are available, this feature also will define a hot-spare drive. (See “Using the EZ-RAID configuration feature” for more information.)

The Create/Delete/Copy Log Drive menu enables you to configure the arrays manually. You can use this menu to select the physical drives that you want to include in the disk arrays. You also can use this menu to define the logical and hot-spare drives for the arrays. (See “Creating disk arrays manually” on page 104 for more information.)

#### **For Advanced Users**

If you want to change the stripe-unit size to maximize performance, see to “Changing the RAID parameters” on page 118.

**Using the EZ-RAID configuration feature:** The EZ-RAID configuration feature groups up to eight ready (RDY) drives into one disk array and defines one logical drive. The size of the logical drive depends on the amount of free space available, and the RAID level assigned to the logical drive depends on the number of physical drives available.

The following table provides information about how EZ-RAID configuration defines a logical drive, based on the number of ready (RDY) drives available.

Physical RDY Drives Available	Logical Drive RAID Level	Hot-Spare Available
1	0	No
2	1	No
3	5	No
4-9	5	Yes

For example, if the server contains six drives that are in the RDY state, the EZ-RAID configuration feature will use five drives to create one disk array and define it as one RAID level 5 logical drive. The remaining drive is defined as a hot-spare drive.

If you want to use the EZ-RAID configuration feature to create multiple disk arrays, you might need to change the device states of some of the drives to prevent them from being included in the first array.

**To create a disk array using the EZ-RAID configuration feature:**

1. Start the ServeRAID Configuration program (see “Starting the ServeRAID Configuration program” on page 77).
2. If you want to include all RDY drives in the array, continue with step 3. Otherwise, change the device states of the RDY drives that you do not want to include in the array to SBY. To do this:
  - a. Select **Rebuild/Device Management** from the Main Menu; then, press **Enter**.
  - b. Select **Set Device State** from the next menu; then, press **Enter**.
  - c. Use the Up Arrow (↑) or Down Arrow (↓) key to highlight the drive that you do not want to include in the array; then, press **Enter**.
  - d. When the drive states pop-up window appears, select **SBY**; then, press **Enter**.
  - e. Repeat steps 2b through 2d for each RDY drive that you do not want to include in the array; then, press **Esc** to return to the Main Menu.

**Note**

After you run EZ-RAID configuration, you can change the device states back to RDY.

3. Select **EZ-RAID Configuration** from the Main Menu; then, press **Enter**. Information about the disk-array configuration appears on the screen.
4. When the Confirm pop-up window appears, select **Yes**; then, press **Enter**. The drives are automatically initialized. RAID level 5 drives are synchronized in the background.
5. If you are creating multiple arrays and you set some of the devices to another state using the procedure in step 2, use that procedure to set the devices for the

next array to RDY. Then, return to step 3 to create the next array. If you have finished creating the arrays, continue with step 6 on page 104.

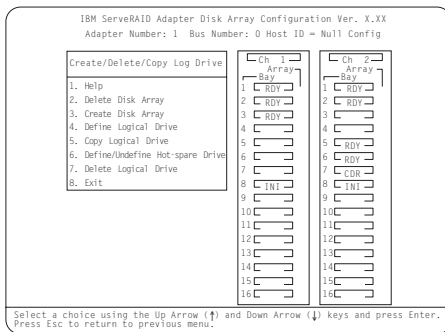
- When the initialization process completes, you have completed the required steps for creating a ServeRAID disk-array configuration.
- Back up the disk-array configuration information to diskette. See "Backing up the disk-array configuration" on page 126 for instructions.
- You are now ready to install the operating system. Refer to the information provided in the ServerGuide package.

**Creating disk arrays manually:** You can use the Create/Delete/Copy Log Drive menu to create the disk arrays manually. You also can use this menu to define the logical and hot-spare drives for the arrays. You must define at least one logical drive for each array.

**To create a disk array manually:**

- Start the ServeRAID Configuration program (see "Starting the ServeRAID Configuration program" on page 77).
- Select **Create/Delete/Copy Log Drive** from the Main Menu; then, press **Enter**.

A screen similar to the following appears.



- Select **Create Disk Array**; then, press **Enter**.
- Use the Up Arrow (↑) or Down Arrow (↓) key to highlight each drive that you want to include in the array; then, press **Enter**. The cursor is active in the Array/Bay selection list. (You must press **Enter** to select each drive. As you select each drive, the state of that drive changes from ready (RDY) to online (ONL).)



#### Notes

1. Hard disk drive capacities influence the way you create arrays. Drives in the array can be of different capacities, but the ServeRAID controller treats them as if they all have the capacity of the *smallest* disk drive. (See “Hard disk drive capacities” on page 81 for more information.)
2. If you change your mind after selecting the drives for an array, you can delete the array (by selecting **Delete Disk Array** from the Create/Delete Copy Log Drive menu); then, begin again.

5. After you select all of the drives that you want to include in the array, press **Esc** to return to the Create/Delete Copy Log Drive menu.

#### Note

When the stripe-unit size is 8 K (the default setting) or 16 K (a manual setting), the maximum number of physical drives in an array is 16. When the stripe-unit size is 32 K or 64 K (both are manual settings), the maximum number of physical drives in an array is eight.

6. If you want to create another array, return to step 3 on page 104. Otherwise, continue with step 7.
7. You must define at least one logical drive for each new array. Continue with “Defining logical drives.”

**Defining logical drives:** You must define at least one logical drive for each array. The ServeRAID controller supports up to eight logical drives. If you have only one array, you can define it as a single logical drive, or you can divide it into several logical drives. If you have two or more arrays, each array can be one logical drive, or you can divide each array into multiple logical drives, as long as the total number of logical drives for all of the arrays does not exceed eight.

#### Note

Refer to the documentation provided with the operating system for information about the recommended logical drive size.

#### To define a logical drive:

1. Select **Define Logical Drive** from the Create/Delete/Copy Log Drive menu; then, press **Enter**.
2. Use the Up Arrow (↑) or Down Arrow (↓) key to highlight the array for which you want to define a logical drive; then, press **Enter**.

The Select RAID Level pop-up window appears.

**Notes**

1. Typically, the first logical drive that you define will be the startup (boot) drive.
2. The ServeRAID Configuration program automatically assigns RAID level 0 to any logical drives defined in an array containing only one hard disk drive. When this is the case, the Select RAID Level pop-up window will not appear.
3. If you have two hard disk drives in the array, the Select RAID Level pop-up window appears, but RAID level 5 is not available. You need at least three hard disk drives in an array to assign RAID level 5 to the logical drives.
4. The RAID level that you assign to a logical drive can influence the amount of space that the drive requires; therefore, you must assign a RAID level before you enter the size of the logical drive.
5. For a description of RAID levels 0, 1, and 5, see "RAID classifications" on page 82.
6. You can define up to eight logical drives for the array. If you plan to use the logical-drive migration (LDM) procedure, do not define more than seven logical drives. The LDM procedure requires one free logical drive. (See "Logical drive migration administration" on page 38 for more information.)
7. If you plan to use the Change RAID Level feature of the LDM, you must assign the same RAID level to all of the logical drives in the array. (See "Changing RAID levels" on page 39 for more information.)

3. Use the Up Arrow (↑) or Down Arrow (↓) key to highlight the RAID level that you want to assign to the logical drive; then, press **Enter**. The Logical Drive Size pop-up window appears.

If this is the first logical drive you are defining, the Logical Drive Size pop-up window will show the amount of free space available in the array.

**Note**

Typically, the first logical drive that you define will be the startup (boot) drive.

If you already defined other logical drives for this array, the Allocation Table appears showing the existing logical drive sizes and the amount of free space available.

The size of a logical drive is determined by several factors, but the size must be divisible by the number of data drives in the array. A logical drive in an array can be any size you choose within the size limitations of the array. Consider the following examples:

**Example 1.** The array consists of three 1 GB drives.<sup>2</sup> You assign RAID level 0, which uses all the drives in the array with no redundant or parity storage; then, you type 1000. The number 999 will appear in the Size (MB) field because it is the number closest to and lower than 1000 that is divisible by 3.

**Example 2.** The array consists of three 1 GB drives. You assign RAID level 1, which provides disk mirroring and stripes data across all drives in the array. Because the data is mirrored, the capacity of the logical drive is 50% of the physical capacity of the hard disk drives grouped in the array. If you type 1000, the number 999 will appear in the Size (MB) field. The physical capacity used is 2000 MB, twice that of the logical drive size. The number that is closest to and lower than 2000 that is divisible by 3 is 1998. The logical drive size is 999 MB, which is 50% of the physical capacity.

**Example 3.** The array consists of three 1 GB drives and you assign RAID level 5. Data is striped across all three drives in the array, but the space equivalent to that of one drive is used for redundant storage. Therefore, if you type 1000, the number 1000 remains in the Size (MB) field because it is divisible by 2 (drives), which is the space available for data. The physical capacity used is 1500 MB.

4. Type the size, in megabytes, that you want for the logical drive; then, press **Enter**.
5. When the Confirm pop-up window appears, select **Yes**; then, press **Enter**.  
Information about the new logical drive appears in the Logical Drive list. If you did not use all of the available free space, you can create another logical drive. You can assign the same or a different RAID level to additional logical drives.
6. When a message appears, stating that all logical drives must be initialized, press any key to continue.

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<sup>2</sup> When referring to hard disk drive capacity, MB stands for 1 000 000 bytes and GB stands for 1 000 000 000 bytes. Total user-accessible capacity may vary depending on operating environments.

#### Note

To ensure that the server operates correctly, you *must* initialize the new logical drive. A quick initialization of a logical drive erases the first 1024 sectors on the drive.

7. When the Confirm pop-up window appears, you have two choices:
  - Select **Yes** to perform a quick initialization; then, press **Enter**. When the quick initialization is complete, go to step 8.
  - Select **No** and if the drive is a RAID level 5 drive, it will be automatically synchronized in the background. Go to “Initializing logical drives” on page 109 to perform a complete initialization.
8. If you just performed a quick initialization of a RAID level 5 logical drive, a message appears, stating that the logical drive that you just created is being synchronized in the background and is ready for data storage. You have now completed the required steps for creating a ServeRAID configuration. Continue with the next step in this procedure.
9. Back up the disk-array configuration information to diskette. See “Backing up the disk-array configuration” on page 126 for instructions.

If you have not already done so, use the information provided in the ServerGuide package to install the operating system.

**Initializing/Synchronizing logical drives at the same time:** Initializing a logical drive sets the drive to a predetermined state. The initialization process overwrites any data on the drive with zeros, and all existing data is lost. The purpose of synchronizing logical drives is to compute and, if necessary, write the parity data on the selected RAID level 5 logical drive. If you did not initialize the logical drives when you defined them, you can now initialize multiple logical drives at the same time. However you can still initialize and synchronize multiple logical drives in separate steps (see “Initializing logical drives” on page 109 and “Synchronizing logical drives” on page 110 for instructions).

#### To initialize/synchronize logical drives:

1. Select **Initialize/Synchronize Log Drive** from the Main Menu; then, press **Enter**.
2. Select **Initialize/Synchronize Log Drive** from the next menu; then, press **Enter**.
3. Use the Up Arrow (↑) or Down Arrow (↓) key to highlight the logical drive that you want to initialize/synchronize; then, press the **Spacebar** to select the drive. Continue doing this until you have

selected all of the drives that you want to initialize/synchronize; then, press **Enter**.

4. When the Confirm pop-up window appears, select **Yes** to initialize/synchronize the logical drive or drives; then, press **Enter**.

The initialization/synchronization process begins. You can see the progress in the **Pct. I/S.** (percent initialized/synchronized) column of the Logical Drive list.

**Note**

Once the synchronization process begins, it cannot be interrupted.

5. Once you have completed initializing/synchronizing the logical drives, then you have completed the required steps for creating a ServeRAID configuration.
6. Back up the disk-array configuration information to diskette. See "Backing up the disk-array configuration" on page 126 for instructions.

If you have not already done so, use the information provided in the ServerGuide package to install the operating system. then you have completed the required steps for creating a ServeRAID configuration.

**Initializing logical drives:** Initializing a logical drive sets the drive to a predetermined state. You can initialize multiple logical drives at the same time.

**Note**

The initialization process overwrites any data on the drive with zeros, and all existing data is lost.

If you did not initialize the logical drives when you defined them, you must use the following instructions to initialize the drives *before* storing data.

**To initialize logical drives:**

1. Select **Initialize/Synchronize Log Drive** from the Main Menu; then, press **Enter**.
2. Select **Initialize Logical Drive** from the next menu; then, press **Enter**.
3. Use the Up Arrow (↑) or Down Arrow (↓) key to highlight the logical drive that you want to initialize; then, press the **Spacebar** to select the drive. Continue doing this until you have selected all of the drives that you want to initialize; then, press **Enter**.

The Confirm pop-up window appears.

**Attention**

When you select **Yes** in the Confirm pop-up window, information in the logical drive will be overwritten with zeros. All existing data is lost.

4. Select **Yes** to initialize the logical drive or drives; then, press **Enter**.

The initialization process begins. You can see the progress in the **Pct. Int.** (percent initialized) column of the Logical Drive list.

You can pause the initialization at any time by pressing **Esc**. Press **Esc** to stop the initialization and return to the previous menu. Press **Enter** to continue initializing the drive.

**Note**

You do not need to synchronize RAID level 0 or 1 logical drives before storing data.

5. You *must* synchronize all RAID level 5 logical drives before storing data. If you just initialized RAID level 5 logical drives, continue with "Synchronizing logical drives." Otherwise, continue with step 6.
6. If you have completed initializing the logical drives and do not have to synchronize any RAID level 5 logical drives, then you have completed the required steps for creating a ServeRAID configuration.
7. When the initialization process completes, back up the disk-array configuration information to diskette. See "Backing up the disk-array configuration" on page 126 for instructions.

If you have not already done so, use the information provided in the ServerGuide package to install the operating system.

**Synchronizing logical drives:** The purpose of synchronizing logical drives is to compute and, if necessary, write the parity data on the selected RAID level 5 logical drive. Synchronizing a RAID level 1 logical drive copies the data from the primary disk to the mirrored disk.

RAID level 5 logical drives are automatically synchronized when you define them. You do not need to synchronize RAID level 0 or 1 logical drives before storing data. Also, the *data scrubbing* feature of the ServeRAID controller continuously reads all sections of RAID level 1 and RAID level 5 logical drives "in the background" while the system is running. If a defective sector is found, it is automatically repaired. As a result, you no longer have to synchronize RAID level 1 and RAID level 5 logical drives on a weekly basis.

**To synchronize logical drives:**

1. Select **Initialize/Synchronize Log Drive** from the Main Menu of the ServeRAID Configuration program; then, press **Enter**.
2. Select **Synchronize Logical Drive** from the next menu; then, press **Enter**.
3. Use the Up Arrow (↑) or Down Arrow (↓) key to highlight the logical drive that you want to synchronize; then, press the **Spacebar** to select the drive. Continue doing this until you have selected all of the drives that you want to synchronize; then, press **Enter**.
4. When the Confirm pop-up window appears, select **Yes** to synchronize the logical drive or drives; then, press **Enter**.

The synchronization progress appears in the **Pct. Syn.** (percent synchronized) column of the Logical Drive list.

**Note**

Once the synchronization process begins, it cannot be interrupted.

5. Once you have completed synchronizing the logical drives, then you have completed the required steps for creating a ServeRAID configuration.
6. When the synchronization process completes, back up the disk-array configuration information to diskette. See "Backing up the disk-array configuration" on page 126 for instructions.

If you have not already done so, use the information provided in the ServerGuide package to install the operating system.

**Defining hot-spare drives:** A hot-spare (HSP) drive is a hard disk drive that is defined for automatic use when a similar drive fails. The drive capacity of the HSP drive must be equal to or greater than the capacity of the drive being replaced.

**Notes:**

1. If you want to have a hot-spare drive (HSP) or a standby hot-spare drive (SHS) and also assign RAID level5 to one of the logical drives, you must have at least four hard disk drives.
2. In the event of a drive failure in an array that contains a logical drive assigned RAID level0, the ServeRAID controller will not activate a hot-spare drive.

You can use the Create/Delete/Copy/Log menu to define a RDY drive as a hot-spare drive. Or, you can change the state of a SBY, DHS, SHS, or RDY drive to HSP (see "Changing device states" on page 116).

#### To define a RDY drive as a hot-spare drive:

1. Start the ServeRAID Configuration program (see "Starting the ServeRAID Configuration program" on page 77).
2. Select **Create/Delete/Copy Log Drive** from the Main Menu; then, press **Enter**.
3. Select **Define/Undefine Hot Spare Drive** from the next menu; then, press **Enter**.
4. Use the Up Arrow (↑) or Down Arrow (↓) key to highlight the RDY drive that you want to define as the hot spare (HSP); then, press **Enter**.

The drive state changes from RDY to HSP. You can press **Enter** to toggle between the HSP and RDY states.

5. Press **Esc** to make the change; then, press **Esc** again to return to the Main Menu.
6. To enable or disable the hot-swap rebuild parameter, continue with "Enabling or disabling hot-swap rebuild."
7. Back up the disk-array configuration information to diskette. See "Backing up the disk-array configuration" on page 126 for instructions.

**Enabling or disabling hot-swap rebuild:** The default setting for the hot-swap rebuild parameter is Disable. When you set the hot-swap rebuild parameter to Enable, the ServeRAID controller can automatically rebuild a defunct (DDD) drive when you replace it.

The ServeRAID controller will rebuild a defunct drive automatically when all of the following conditions exist:

- The hot-swap rebuild parameter is set to Enable.
- The defunct drive is part of a RAID level 1 or RAID level 5 logical drive.
- The capacity of the replacement drive is equal to or greater than the capacity of the defunct drive.
- No rebuild, synchronization, or RAID level change operation is in progress.

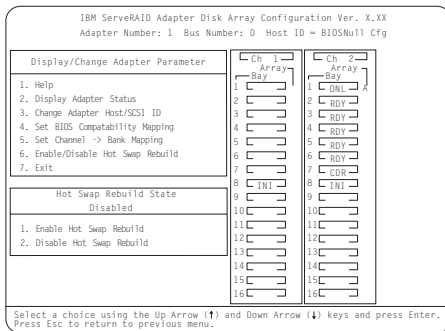
When these requirements are met, the ServeRAID controller automatically initiates a rebuild of the drive without user intervention.

#### To enable or disable hot-swap rebuild:

1. Start the ServeRAID configuration program (see "Starting the ServeRAID Configuration program" on page 77).
2. Select **Advanced Functions** from the Main Menu; then, press **Enter**.
3. Select **Display/Change Adapter Parameters** from the next menu; then, press **Enter**.
4. Select **Enable/Disable Hot-Swap Rebuild**; then, press **Enter**.



A screen similar to the following appears:



5. Use the Up Arrow (↑) or Down Arrow (↓) key to highlight your selection - enable or disable; then, press **Enter**.
6. Press **Esc** to return to the Advanced Functions menu.
7. Back up the disk-array configuration information to diskette. See to "Backing up the disk-array configuration" on page 126 for more information.

**Viewing or changing the configuration:** This section contains the following information and instructions for using the ServeRAID Configuration program to view or change the existing configuration.

- "Viewing the disk-array configuration"
- "Viewing the drive information" on page 114
- "Viewing or changing the ServeRAID controller parameters" on page 115
- "Changing device states" on page 116
- "Changing the RAID parameters" on page 118
- "Changing the write policy" on page 120

You also can use the Administration and Monitoring Utility program to view or change the existing configuration. (See "Using the Administration and Monitoring Utility Program" on page 26 for more information.)

**Viewing the disk-array configuration:** To view the current configuration:

1. Start the ServeRAID Configuration program (see "Starting the ServeRAID Configuration program" on page 77).
2. Select **View Configuration** from the Main Menu; then, press **Enter**. The current disk-array configuration information appears on the screen.
3. To see the stripe order (the channel and bay numbers of the physical drives that make up the logical drives):
  - a. Press **Enter**. The stripe order will appear in a separate window.
  - b. Press any key to return to the View Configuration screen.

4. Press **Esc** to return to the Main Menu.

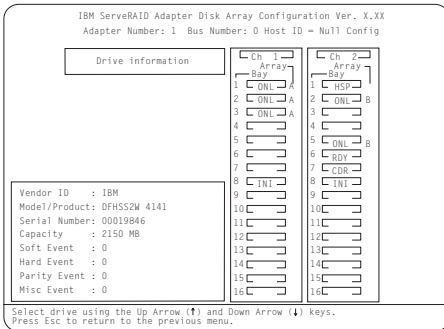
**Viewing the drive information:** You can use the ServeRAID Configuration program to view the vendor ID, model number, serial number, and capacity of each hard disk drive attached to the ServeRAID controller.

You also can use this program to view information about the number and types of events that occurred. The Device Event Log, in nonvolatile random-access memory (NVRAM), collects event information for each hard disk drive attached to the ServeRAID controller.

**To view the drive information:**

1. Start the ServeRAID Configuration program (see “Starting the ServeRAID Configuration program” on page 77).
2. Select **Rebuild/Device Management** from the Main Menu; then, press **Enter**.
3. Select **Display Drive Information** from the next menu; then, press **Enter**.

A screen similar to the following appears.



4. Use the Up Arrow (↑) or Down Arrow (↓) key to highlight the drives in the Array/Bay selection list. When you highlight the drive, the drive information appears as follows:
  - **Vendor ID** displays the name of the manufacturer or vendor.
  - **Model/Product** displays the 4-digit model number, the 4-digit product number, the 2-digit ROM code revision level, and the 2-digit RAM code revision level.
  - **Serial Number** displays the unit serial number of the device.
  - **Capacity** displays the size of the device.
  - **Soft Event** displays the number of SCSI Check Condition status messages returned from the drive (except Unit Attention and SCSI parity events) since the Device Event Log was last cleared.

- **Hard Event** displays the number of SCSI I/O processor events that occurred on the drive since the Device Event Log was last cleared. It also indicates if the drive exceeded the Predictive Failure Analysis (PFA) threshold.

**Notes**

1. If a PFA event is detected, it appears beside the hard event information.
2. If the drive exceeded the PFA threshold, back up the RAID level0 logical drives. Then, replace the drive.

- **Parity Event** displays the number of parity events that occurred on the SCSI bus since the Device Event Log was last cleared.
- **Misc Event** displays the number of other events (such as selection timeout, unexpected bus free, or SCSI phase event) that occurred on the drive since the Device Event Log was last cleared.

5. Press **Esc** to return to the Main Menu.

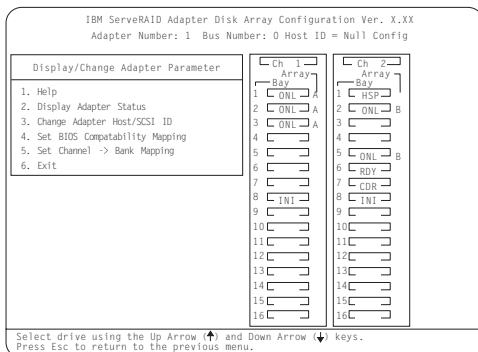
**Viewing or changing the ServeRAID controller parameters:**

You can use the ServeRAID Configuration program to view or change the ServeRAID controller parameters.

**To view or change the ServeRAID controller parameters:**

1. Start the ServeRAID Configuration program (see "Starting the ServeRAID Configuration program" on page 77).
2. Select **Advanced Functions** from the Main Menu; then, press **Enter**.
3. Select **Display/Change Adapter Params** from the next menu; then, press **Enter**.

A screen similar to the following appears.



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

**1. Help** provides information about the choices available on the menu. You also can press F1 from any screen to obtain online Help.

**2. Display Adapter Status** lets you view the current settings (On or Off) for Unattended Mode, CD-ROM Boot, and Read Ahead. You also can select this choice to view information about BIOS Compatibility Mapping, logical drive sizes, and logical drives that are blocked or have a bad stripe. (See “Changing the RAID parameters” on page 118 for more information.)

**3. Change Adapter Host/SCSI ID** lets you change the SCSI configuration ID or the SCSI transfer rate for the ServeRAID controller. You can change the ServeRAID controller host configuration ID to any 12 characters. If you are using Ultra Fast/Wide SCSI-3 drives, you can change the default SCSI transfer rate from 10 MHz to a maximum of 20 MHz. When the transfer rate is set to 20 MHz, the SCSI bus for the ServeRAID controller provides a data-transfer rate of up to 40 MB per second. In addition, this choice lets you change the number of hard disk drives in a group that will start up simultaneously, and set the start-up delay (in seconds) between groups of drives.

**4. Set BIOS Compatibility Mapping** lets you change the basic input/output system (BIOS) mapping from 8 GB (default setting) to 2 GB. (For the server, use the default setting.)

**5. Set Channel → Bank Mapping** lets you specify which direct access storage device (DASD) bank is connected to the ServeRAID controller. This mapping is critical for the correct operation of the Administration and Monitoring Utility program, which uses the settings to identify drives, to control power to specific drives, and to operate the SCSI LEDs.

4. Use the Up Arrow (↑) or Down Arrow (↓) key to highlight your choice; then, press **Enter**.
5. Press **Esc** to return to the Advanced Functions menu.
6. Back up the disk-array configuration information to diskette. See “Backing up the disk-array configuration” on page 126 for instructions.

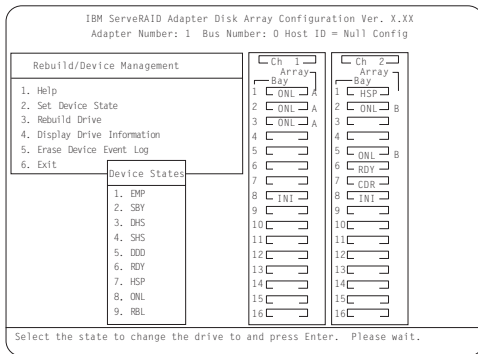
**Changing device states:** You can use the ServeRAID Configuration program to change the state of a physical hard disk drive attached to the ServeRAID controller.

**To change the state of a physical hard disk drive:**

1. Start the ServeRAID Configuration program (see “Starting the ServeRAID Configuration program” on page 77).

2. Select **Rebuild/Device Management** from the Main Menu; then, press **Enter**.
3. Select **Set Device State** from the next menu; then, press **Enter**.
4. Use the Up Arrow (↑) or Down Arrow (↓) key to highlight the appropriate drive; then, press **Enter**.

A screen similar to the following appears.



The Drive States pop-up window lists all hard disk drive states. (See “Physical device states” on page 86 for more information.) The following table shows the current device states and the valid alternate device states that you can assign. For example, you can change the state of a standby hot-spare drive from SHS to HSP or DHS.

**Note**

Setting a DDD drive that is part of a CRT logical drive to ONL without performing the rebuild process might result in loss of data. (See “Understanding the drive rebuild process” on page 131 for more information.)

Device States	Alternate States
EMP	RDY SBY
SBY	RDY EMP HSP SHS
DHS	EMP HSP SHS
SHS	HSP DHS
DDD	ONL RBL
RDY	EMP HSP SHS SBY
HSP	RDY SHS DHS
ONL	DDD
RBL	DDD ONL

5. Use the Up Arrow (↑) or Down Arrow (↓) key to highlight a valid alternate drive state; then, press **Enter**. The new state appears in the Array/Bay selection list.
6. If you want to change the state of another drive, return to step 4. Otherwise, continue with step 7.
7. Press **Esc** to return to the Main Menu.

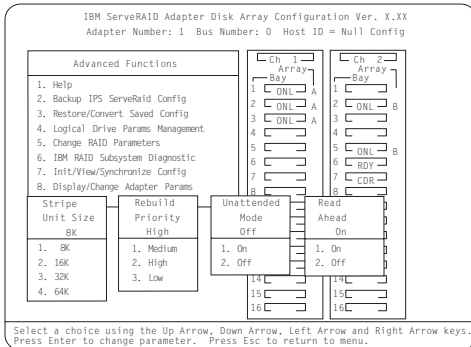
- Back up the disk-array configuration information to diskette. See "Backing up the disk-array configuration" on page 126 for instructions.

**Changing the RAID parameters:** You can use the ServeRAID Configuration program to set the stripe-unit size, to set the rebuild priority, to turn Unattended Mode On or Off, or to turn Read Ahead On or Off.

**To change the RAID parameters:**

- Start the ServeRAID Configuration program (see "Starting the ServeRAID Configuration program" on page 77).
- Select **Advanced Functions** from the Main Menu; then, press **Enter**.
- Select **Change RAID parameters** from the next menu; then, press **Enter**.

A screen similar to the following appears.



Descriptions of the RAID parameters that you can change are as follows:

- Stripe Unit Size:** The default setting is 8 K data bytes.

The stripe-unit size is the amount of data written on a given disk before writing on the next disk. To maximize the overall performance, choose a size that is close to the size of the system I/O request.

**Note**

The size of the system I/O request depends on the operating system. If you are not sure of the size, use the default setting.

**Attention**

After you set a stripe-unit size and store data in the logical drives, you cannot change the size without destroying data in the logical drives.

You can set the stripe-unit size to 8 K, 16 K, 32 K, or 64 K.

- When the stripe-unit size is 8 K or 16 K, the maximum number of physical drives in an array is 16.
- When the stripe-unit size is 32 K or 64 K, the maximum number of physical drives in an array is eight.

- **Rebuild Priority:** The default setting is High.

The rebuild priority can be set to High, Medium, or Low.

- When the rebuild priority is set to High, the rebuild I/O request gets highest priority in the execution order.
- When the rebuild request is set from High to Medium in a heavily loaded system, it can increase the disk rebuild time, but provide better system performance.
- When the rebuild request is set from High or Medium to Low in a moderate to heavily loaded system, it can increase the disk rebuild time, but provide better system performance.

- **Unattended Mode:** The default setting is Off.

You can enable the ServeRAID controller to accept changes in the configuration without user input.

When unattended mode is set to Off, the program waits for user input when an event is detected.

When unattended mode is set to On, the ServeRAID controller pauses briefly to permit a user to override the default action; then, the controller makes the necessary changes. Unattended mode also clears any blocked drives. This mode is useful when the server operates remotely.

When unattended mode is set to On, the ServeRAID controller “chooses” an action that is equivalent to pressing one of the function keys.

**Note**

When F5 is selected, non-responding ONL and RBL drives become DDD, RDY and SBY drives become EMP, and HSP drives become DHS.

**F5:** The server continues the startup operation after identifying a defunct drive. For example, an HSP drive failed to respond during POST. Startup continues, but the ServeRAID controller changes the state of the HSP drive to DHS.

**F6:** When a drive is removed from the server (for example, for maintenance or security), but is returned to a different bay, the ServeRAID controller adjusts the configuration to the drive's new location.

**F7:** A ServeRAID controller, with stored configuration information that does not match that of the configured drives present, imports the configuration information from the drives.

- **Read Ahead:** The default setting is On.

Normally, the ServeRAID controller transfers data from disk to its local cache in increments equal to the stripe-unit size. This provides excellent overall performance when workloads are steady and sequential. However, if the workload is random or the system I/O requests are smaller than the stripe-unit size, reading ahead to the end of the stripe might degrade performance.

When read ahead is set to Off, the ServeRAID controller transfers data from disk to its local cache in increments equal to the system I/O request size, without reading ahead to the end of the stripe.

You can change the read-ahead setting without destroying data in a logical drive.

4. Use the Up Arrow (↑), Down Arrow (↓), Right Arrow (→), or Left Arrow (←) key to highlight the parameter that you want to change; then, press **Enter**.
5. Press **Esc** to return to the Advanced Functions menu.
6. Back up the disk-array configuration information to diskette. See "Backing up the disk-array configuration" on page 126 for instructions. (The backup procedure also saves the RAID parameters to diskette.)

**Changing the write policy:** When you configure a logical drive, the ServeRAID controller sets the write policy to *write-through* (WT) mode, where the completion status of a write command is sent *after* the data is written to the hard disk drive. Under certain workloads, you can improve performance by changing the write policy to *write-back* (WB) mode, where the completion status is sent *after* the data is copied to cache memory, but *before* the data is actually written to the storage device.

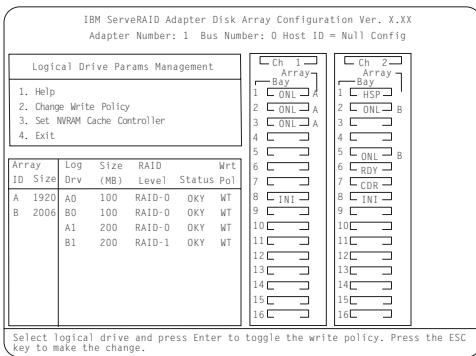
Although you might gain performance with write-back mode, it creates a greater risk of losing data due to a power failure. If a ServeRAID controller failure occurs while data is in the cache the data is lost. This is because the system gets a completion status message when the data reaches cache memory, but *before* data is actually written to the hard disk drive.



**To change the write policy:**

1. Start the ServeRAID Configuration program (see “Starting the ServeRAID Configuration program” on page 77).
2. Select **Advanced Functions** from the Main Menu; then, press **Enter**.
3. Select **Logical Drive Params Management** from the Advanced Functions menu; then, press **Enter**.
4. Select **Change Write Policy** from the next menu; then, press **Enter**.

A screen similar to the following appears.



5. Locate the **Wrt Pol** field in the Logical Drive list. The write policy is shown as either write through (WT), which is the default setting, or write back (WB).
6. Select the logical drive whose write policy you want to change.

**Attention**

If you change the write policy to WB, wait at least 10 seconds after the last operation before you turn off the system. It takes that long for the system to move the data from the cache memory to the storage device. Failure to follow this practice can result in lost data.

7. Press **Enter** to change the write policy. (You can press **Enter** to toggle between WT and WB.)
8. Press **Esc**. The Confirm pop-up window appears.
9. Select **Yes** to save the changes, or select **No** to return the setting to its original state; then, press **Enter**.
10. Back up the disk-array configuration information to diskette. See “Backing up the disk-array configuration” on page 126 for more information.

**Copying logical drives and disk arrays:** You can use the ServeRAID Configuration program to make backup copies of the logical drives and disk arrays in the server. You also might want to use this program to create a duplicate copy of a logical drive or array for use in another system.

**Copying logical drives:** You can use this feature to create a backup copy of the data on an existing logical drive, or to duplicate data for use in another system.

The copy logical drive feature does not copy the RAID configuration information. If you want to copy an existing array for use in another system, use the instructions provided in “Copying an existing disk array” on page 123.

**Note**

If you have a RAID level 5 logical drive, make sure that the target drive is synchronized *before* starting this procedure.

**To copy a logical drive:**

1. Start the ServeRAID Configuration program (see “Starting the ServeRAID Configuration program” on page 77).
2. Select **Create/Delete/Copy Log Drive** from the Main Menu; then, press **Enter**.
3. Select **Copy Logical Drive** from the next menu; then, press **Enter**.
4. Select the source and target drives:

**Notes**

- The size of the target logical drive must be equal to or greater than the size of the source logical drive.
- You can select up to four source/target pairs at a time.

- a. From the Logical Drive list, use the Up Arrow (↑) or Down Arrow (↓) key to highlight the source logical drive that you want to copy from; then, press the **Spacebar** to select the drive.
  - b. From the Logical Drive list, use the Up Arrow (↑) or Down Arrow (↓) key to highlight the target logical drive that you want to copy to; then, press the **Spacebar** to select the drive.
  - c. Select another source and target drive, if desired.
5. To start the copy process, press **Enter**.  
The Confirm pop-up window appears.

### Attention

When you select **Yes** in the Confirm pop-up window, information in the target logical drive will be overwritten with information from the source logical drive. All existing data on the target logical drive is lost.

6. Select **Yes** to copy the logical drive; then, press **Enter**.

The copy progress appears in the percent Read/Write (Pct. R/W) column as a percentage of the total number of sectors read and written.

7. When the copy process completes, back up the disk-array configuration information to diskette. See “Backing up the disk-array configuration” on page 126 for instructions.

**Copying an existing disk array:** You can use the following instructions to create a complete copy (including the RAID configuration information) of an existing array. You can use this procedure to duplicate the current disk-array configuration for use on another system.

#### To copy an existing disk array:

1. Back up the configuration of the source system to a diskette. (See “Backing up the disk-array configuration” on page 126.)
2. On the source system, create a copy of the disk array that you want to use on another system.

For example, if you want a copy of Array A to use on another system, create an Array B that is identical to Array A. (See “Creating disk arrays manually” on page 104.)

3. Copy all logical drives from the source array to the target array.

For example, if you made an identical copy of Array A and that copy is Array B, you would copy all logical

drives in Array A to Array B. (See “Copying logical drives” on page 122.)

4. Physically remove the hard disk drives that contain the copy from the source system; then, install them in the same bays on the target system.

**Note**

Ensure that you install the drives in the same bays on the target system that the drives of the source array occupy in the source system. (Remember, the bay number is equal to the SCSI ID of the device + 1.)

5. Using ServerGuide, insert the *HardwareGuide* CD in the CD-ROM drive and start the server.
6. Using the diskette that contains the backup copy of the source configuration (you created this diskette in step 1 on page 123), *restore* the configuration to the target system. (See “Restoring the disk-array configuration” on page 127.)

**Deleting Logical drives and disk arrays:** This section contains instructions for deleting logical drives and disk arrays. In all cases, when you delete an array or its associated logical drives, all the data and programs in the array are lost. Before proceeding, back up any data and programs that you want to save. You might want to use a high-speed back up device, such as a tape drive, to back up large amounts of data.

**Deleting logical drives:** In some operating systems, deleting a logical drive might change the drive letters assigned to the existing logical drives.

**To delete a logical drive:**

1. Start the ServeRAID Configuration program (see “Starting the ServeRAID Configuration program” on page 77).
2. Select **Create/Delete/Copy Log Drive** from the Main Menu; then, press **Enter**.
3. Select **Delete Logical Drive** from the next menu; then, press **Enter**.
4. Use the Up Arrow (↑) or Down Arrow (↓) key to highlight the logical drive that you want to delete; then, press the **Del** key. The Confirm pop-up window appears.

**Attention**

All data and programs in the logical drive are lost during this procedure. Before proceeding, back up any data and programs that you want to save.

5. Select **Yes** to delete the logical drive, or select **No** if you do not want to delete the drive; then, press **Enter**.

6. Select **Exit** or press **Esc** to return to the Main Menu.
7. Back up the disk-array configuration information to diskette. See "Backing up the disk-array configuration" on page 126 for instructions.

**Deleting disk arrays:** Deleting a disk array deletes all logical drives that are defined in that disk array. All data and programs are lost once you perform the procedure.

**To delete a disk array:**

1. Start the ServeRAID Configuration program (see "Starting the ServeRAID Configuration program" on page 77).
2. Select **Create/Delete/Copy Log Drive** from the Main Menu; then, press **Enter**.
3. Select **Delete Disk Array** from the next menu; then, press **Enter**.
4. Use the Up Arrow (↑) or Down Arrow (↓) key to highlight the array that you want to delete; then, press the **Del** key. The Confirm pop-up window appears.

**Attention:**

All data and programs in the array are lost during this procedure. Before proceeding, back up any data and programs that you want to save.

5. Select **Yes** to delete the array, or select **No** if you do not want to delete the array; then, press **Enter**.

If you delete an array of Online (ONL) drives, the state of the ONL drives changes to Ready (RDY). If the array contains a defunct drive (DDD), the state of the DDD drive changes to defunct hot spare (DHS).

You can reset the drive state as follows:

- If the drive is good, change the device state from DHS to HSP; then, select the drive again and change the device state from HSP to RDY. (See "Changing device states" on page 116 for instructions.)
  - If the drive is defective, physically replace it with a good drive; then, set the state for the new drive to RDY. (See "Internal drive installation" on page 197 and "Changing device states" on page 116 for instructions.)
6. Select **Exit** or press **Esc** to return to the Main Menu.
  7. Back up the disk-array configuration information to diskette. See "Backing up the disk-array configuration" on page 126 for instructions.

**Maintaining the disk-array configuration:**

This section contains the following information and instructions for using the ServeRAID Configuration program to maintain the existing disk-array configuration.

- "Backing up the disk-array configuration" on page 126
- "Restoring the disk-array configuration" on page 127
- "Testing the RAID subsystem" on page 127

- “Formatting drives” on page 128
- “Clearing the device event log” on page 128
- “Replacing a faulty drive” on page 129
- “Understanding the drive rebuild process” on page 131
- “Initializing, viewing, or synchronizing the ServeRAID II controller configuration” on page 133

**Backing up the disk-array configuration:** The disk-array configuration is *vital information*. To protect this information, back up the information to diskette as soon as you complete your tasks.

The ServeRAID controller maintains a record of the disk-array configuration information in its NVRAM, in an electrically erasable programmable read-only memory (EEPROM) module, and on each ONL and RBL drive.

**Attention:**

Dynamic changes in the configuration of the disk arrays can occur due to hot-spare drive replacement or other drive maintenance activity. It is important that you back up the disk-array configuration information frequently, to keep the backup information on the diskette current.

You need a blank, 3.5-inch, 2 MB, formatted diskette to create a backup copy.

**To back up the disk-array configuration information:**

1. Label a blank diskette “Disk-Array Configuration Backup” and date it.
2. Start the ServeRAID Configuration program (see “Starting the ServeRAID Configuration program” on page 77).
3. Select **Advanced Functions** from the Main Menu; then, press **Enter**.
4. Select **Backup IPS ServeRAID Config** from the next menu; then, press **Enter**. (The disk-array configuration is also known as the *IBM ServeRAID (IPS) configuration*.)
5. Insert the blank *Disk-Array Configuration Backup* diskette into the diskette drive.
6. A pop-up window appears with a default file name of CONFIG; change the file name by typing over the default; then, press **Enter**. The Backup program assigns a file-name extension of *.ips*.
7. The Confirm pop-up window appears.  
Select **Yes** to confirm that you want to copy the file to the backup diskette, or select **No** to return to the previous menu; then press **Enter**.
8. Remove the backup diskette from the drive and store it in a safe place.
9. Press **Esc** to return to the Main Menu.

**Restoring the disk-array configuration:** To restore the disk-array configuration information for the ServeRAID controller, use the *RAIDport Adapter Configuration CD* and an up-to-date disk-array configuration backup diskette.

**Attention:**

Dynamic changes in the configuration of the disk arrays occur due to hot-spare drive replacement or other drive maintenance activity. Because of this, the configuration backup information on the diskette might be different from the information stored in NVRAM for the ServeRAID controller. Therefore, it is important that you back up the disk-array configuration information frequently, to keep the backup information on the diskette current.

**To restore the ServeRAID configuration information:**

1. Start the ServeRAID Configuration program (see “Starting the ServeRAID Configuration program” on page 77).
2. Select **Advanced Functions** from the Main Menu; then, press **Enter**.
3. Select **Restore/Convert Saved Configuration** from the next menu; then, press **Enter**.
4. Insert the Disk-Array Configuration Backup diskette into the diskette drive; then, press **Enter**.
5. A list of backup file names appears. Use the Up Arrow (↑) or Down Arrow (↓) key to select the file name that you want to restore; then, press **Enter**.
6. The Confirm pop-up window appears.  
Select **Yes** to restore the configuration information, or select **No** to return to the previous menu; then, press **Enter**.
7. Press **Esc** to return to the Main Menu.

**Testing the RAID subsystem:** You can use the RAID Subsystem Diagnostic program to test the ServeRAID controller and the devices connected to the controller.

**To test the RAID subsystem:**

1. Start the ServeRAID Configuration program (see “Starting the ServeRAID Configuration program” on page 77).
2. Select **Advanced Functions** from the Main Menu; then, press **Enter**.
3. Select **IBM RAID Subsystem Diagnostic** from the next menu; then, press **Enter**.
4. Select the diagnostic test that you want to run; then, press **Enter**.

Descriptions of the diagnostic tests available are as follows:

- **Run Adapter Self-tests** tests the ServeRAID controller. Restart the server after the self-test completes.

- **SCSI Device Self-test** runs diagnostic tests on the SCSI devices attached to the ServeRAID controller.
  - **Drive Media Test** verifies that all sectors on the hard disk drive are accessible. The drive must be in the RDY or HSP state.
  - **Format Drive** performs a low-level format on a hard disk drive. For more information, see “Formatting drives.”
5. Follow the instructions that appear on the screen.

**Formatting drives:** The Format Drive feature provides a low-level format on a hard disk drive. If you install a new hard disk drive that requires a standard format, use the operating system Format command to format the drive. You can use the Format Drive feature to low-level format hard disk drives that are in the Ready (RDY), Empty (EMP), Standby (SBY), Standby Hot-Spare (SHS), or Hot-Spare (HSP) states. This feature can low-level format multiple drives simultaneously.

**To perform a low-level format:**

1. Start the ServeRAID Configuration program (see “Starting the ServeRAID Configuration program” on page 77).
2. Select **Advanced Functions** from the Main Menu; then, press **Enter**.
3. Select **IBM RAID Subsystem Diagnostic** from the next menu; then, press **Enter**.

You can perform a low-level format on more than one drive at a time.

**Attention**

A low-level format erases all data and programs from the hard disk drive. Before proceeding, back up any data and programs that you want to save.

4. Select **Format Drive**; then, press **Enter**.

**Note**

If formatting is interrupted, the state of the drive being formatted might appear as Empty (EMP) in the Array/Bay selection list. If this occurs, select the drive and format it again.

5. Follow the instructions that appear on the screen. When a message similar to *Formatting Complete* appears, press **Esc** to return to the Main Menu.

**Clearing the device event log:** The Device Event Log, located in the ServeRAID controller, collects statistics on the number and type of events that occur on all of the hard disk drives attached to the ServeRAID controller.



After you correct a disk-array problem, you might want to clear the Device Event Log so that you can quickly identify any subsequent errors.

**To clear the Device Event Log:**

1. Start the ServeRAID Configuration program (see “Starting the ServeRAID Configuration program” on page 77).
2. Select **Rebuild/Device Management** from the Main Menu; then, press **Enter**.
3. Select **Erase Device Event Log** from the next menu; then, press **Enter** to clear the log.

**Replacing a faulty drive:** To avoid the loss of critical data, it is important that you replace and rebuild a defunct (DDD) drive promptly.

The results of hard disk drive failures depend on the configuration of the disk arrays and the number of drives that fail. Before you remove or replace a DDD drive, review the following examples.

- Example 1.** One hard disk drive becomes defunct, but a hot-spare (HSP) drive of the same size exists.
- If the failing drive is part of a redundant (RAID level 1 or RAID level 5) logical drive, the hot-spare drive takes over immediately.
  - RAID level 1 and RAID level 5 logical drives within the array change to the critical (CRT) state and remain in the CRT state until the rebuild process completes.
  - The RAID level 0 logical drives within the array change to the offline (OFL) state.
  - All data in the RAID level 0 logical drives within the array is lost.

- Example 2.** One hard disk drive becomes defunct, and an appropriate hot-spare (HSP) drive is not available.
- The RAID level 1 and RAID level 5 logical drives change to the CRT state and remain in the CRT state until the rebuild process completes. Data is not lost from logical drives in the CRT state, but you must replace the DDD hard disk drive promptly to avoid the loss of data. (If two drives within the same array become DDD, all data within the array is lost.)
  - The RAID level 0 logical drives change to the OFL state.
  - All data in the RAID level 0 logical drives within the array is lost.

- Example 3.** Multiple drives within an array become defunct.
- All logical drives in the array change to the offline (OFL) state.

- All data from the array is lost, regardless of the RAID levels assigned to the logical drives.

#### To replace a faulty drive:

1. Before you remove or replace a drive that you suspect to be defective, verify that the drive is defective. To do this:
  - a. Check the drive for damage.
  - b. Verify that the drive is positioned correctly. If the drive is not installed correctly, reposition the drive.
  - c. Check the lights on the drive tray. (See the following information for a description of the lights.) Verify that you can remove the drive safely.

The lights on the hot-swap drive tray provide drive status information, as follows:

- **Hard Disk Activity Light:** When this green light is flashing, it indicates that the server is accessing the drive.
  - **Hard Disk Status Light:** When this amber light is lit continuously, it indicates that the drive has failed. When the light flashes slowly (one flash per second), it indicates that the hard disk drive is part of a disk array and is being rebuilt. When the light flashes rapidly (three flashes per second), it indicates that the controller is identifying the drive. The drive *should not* be replaced if this light is blinking; the drive has just been replaced and the disk array is being rebuilt.
2. Physically replace the defective drive or use an existing RDY drive that has a capacity equal to or greater than the drive that you are replacing as a hot-spare replacement drive.

#### Attention

Removing the wrong hard disk drive might cause loss of all data in the array.

- a. To physically replace the defective hard disk drive, follow the instructions in “Internal drive installation” on page 197 and “Installing a drive in a hot-swap bay” on page 203; then, follow the instructions in “Understanding the drive rebuild process” on page 131.
- b. To rebuild the defunct drive to an existing RDY drive, follow the instructions in “Understanding the drive rebuild process” on page 131.

**Note**

You can use the Administration and Monitoring utility program to identify a defunct drive and designate a replacement drive without restarting the server. Review the information in “Understanding the drive rebuild process” on page 131; then, see “Using the Administration and Monitoring Utility Program” on page 26 for more information.

**Understanding the drive rebuild process:** This section contains guidelines and instructions for rebuilding a defunct (DDD) drive using the ServeRAID Configuration program.

If you are using the Administration and Monitoring utility program, review the guidelines and information in this section; then, see “Physical device administration” on page 42 for instructions.

**Automatic rebuild process:** The ServeRAID controller will rebuild a defunct drive automatically when all of the following conditions exist:

- The physical drive that failed is part of a RAID level 1 or 5 logical drive.
- A HSP or SHS drive with a capacity equal to or greater than the original drive is available the moment that the drive fails.
- No rebuild, synchronization, or RAID level change operation is in progress.

If multiple hot-spare drives are available, the ServeRAID controller searches all bays for a hot-spare drive of the appropriate size. The first drive that meets this requirement enters the rebuild state.

A physical hard disk drive can enter the rebuild (RBL) state if:

- You physically replace a defunct drive that is part of the critical (CRT) logical drive.  
When you physically replace a defunct drive in a critical (CRT) logical drive, the ServeRAID controller rebuilds the data on the new physical drive *before* it changes the logical drive state back to Okay (OKY).
- The ServeRAID controller adds a hot-spare or a standby hot-spare drive to the array and changes its state from HSP or SHS to RBL.
- A ready or standby drive replaces a defunct drive that is part of the critical (CRT) logical drive.

**Guidelines for Rebuilding a Drive**

Before you rebuild a drive, review the following guidelines:

- If the state of the logical drive is critical (CRT), you must rebuild the defunct hard disk drive promptly.
- The replacement hard disk drive must be the same size or larger than the failed drive.
- If the hard disk drive being rebuilt is part of a RAID level 0 logical drive, the RAID level 0 drive is blocked to external access during the rebuild process.
  - If you use the ServeRAID Configuration program to initiate the rebuild process, the program unblocks the RAID level 0 logical drive when the rebuild process completes. If the rebuild process is interrupted, you must restart the server to unblock the blocked RAID level 0 logical drive.
  - If you use the Administration and Monitoring Utility program to initiate the rebuild process, you must unblock the RAID level 0 logical drive when the rebuild process completes. (See “Unblocking logical drives” on page 38 for more information.)
- Data that was stored in a RAID level 0 logical drive is lost during the rebuild process. If you backed up the data before the drive failed, you can restore the data to the new drive.

## Rebuilding a Drive

### To rebuild a physical drive:

1. Start the ServeRAID Configuration program (see “Starting the ServeRAID Configuration program” on page 77).
2. Select **Rebuild/Device Management** from the Main Menu; then, press **Enter**.
3. Select **Rebuild Drive** from the next menu; then, press **Enter**. The cursor is active in the Array/Bay list.
4. A pop-up window appears. Select one of the following:
  - Select **Same Location** if you physically replaced a hard disk drive in the same bay; then, press **Enter**. A Confirm pop-up window appears. Select **Yes** and continue with step 5.
  - Select **New Location** to assign a hard disk drive in a new location. Use the Up Arrow (↑) or Down Arrow (↓) key to select the replacement drive that you want to use for the rebuild operation; then, press **Enter**.

Information and status messages about each stage of the rebuild process appear on the screen.

5. When the rebuild process completes, press **Esc** to return to the Main Menu. The new configuration is saved.
6. Back up the new configuration to diskette (see “Backing up the disk-array configuration” on page 126).
7. Select **Exit** to leave the ServeRAID Configuration program.

- Remove the *HardwareGuide CD* and press **Ctrl+Alt+Del** to restart the server.

**Initializing, viewing, or synchronizing the ServeRAID II controller configuration:** The ServeRAID configuration information stored in nonvolatile random-access memory (NVRAM) is critical to the reliable operation of the disk array. To protect the integrity of the configuration information, the configuration information is also stored in an EEPROM and on each RBL and ONL hard disk drive. Each time you change the configuration information, all corresponding copies are updated automatically.

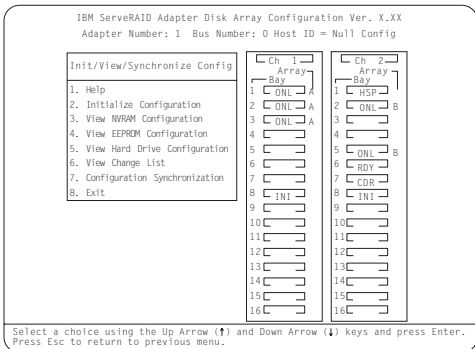
During POST, if the NVRAM configuration information does not match the configuration information stored in the EEPROM or on the hard disk drives, an error message appears.

You can use the Init/View/Synchronize Config menu to initialize, view, or synchronize the ServeRAID controller configuration information.

**To initialize, view, or synchronize the configuration information:**

- Start the ServeRAID Configuration program (see “Starting the ServeRAID Configuration program” on page 77).
- Select **Advanced Functions** from the Main Menu; then, press **Enter**.
- Select **Init/View/Synchronize Config** from the next menu; then, press **Enter**.

A screen similar to the following appears.



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

- Help** provides information about the choices available on the menu. You also can press F1 from any screen to obtain online Help.
- Initialize Configuration** lets you set the configuration of the ServeRAID controller to its

default settings. This choice sets the states for all powered-on hard disk drives to RDY, all CD-ROM drives to CDR, and all tape drives to TAP. This choice also deletes all previously defined arrays and logical drives. This choice writes a "Null Configuration" for the ServeRAID controller.

You must select this choice if a message appears stating that you have an unrecoverable configuration error, because valid configuration information does not exist.

- **View NVRAM Configuration** displays the current configuration settings stored in the controller's NVRAM.
- **View EEPROM Configuration** displays the current configuration settings stored in the controller's EEPROM.
- **View Hard Drive Configuration** displays the configuration settings for the selected ONL or RBL hard disk drive. To view the stripe order, press **Enter**.
- **View Change List** displays the device state configuration changes that the ServeRAID controller reported since you restarted or turned on the server.
  - **View Power-on Change List** displays the hard disk drive device state changes since the last time that you restarted or turned on the server.
  - **View Wrong SCSI ID List** provides a list of hard disk drives that were found at a different SCSI ID location (bay) when you restarted or turned on the server.
  - **View Unidentified Drive List** provides a list of hard disk drives that have identifiers that do not match the stored configuration information.

The identifier consists of both the configuration host ID and a time stamp. You can define the host ID (for example, a host ID can be the serial number of the server) as any string up to 12 characters. (See "Viewing or changing the ServeRAID controller parameters" on page 115 for more information.)
- **Configuration Synchronization**. See "Configuration synchronization" on page 135 for a description of this choice.

4. Use the Up Arrow (↑) or Down Arrow (↓) key to highlight your choice from the menu; then, press **Enter**.
5. Follow the instructions that appear on the screen.

**Configuration synchronization:** When the configuration information stored in NVRAM, in the EEPROM, and on the hard disk drives does not match, you can select one source; then, copy the selected configuration information to the other locations.

You can view the individual configurations to determine if they are valid, and then select the configuration that you want to use.

If a message appears stating that you have a recoverable configuration error, one of the following conditions exists:

- The configuration information in NVRAM is valid, but the configuration information in the EEPROM is invalid.
- The configuration information in the EEPROM is valid, but the configuration information in NVRAM is invalid.
- The configuration information in NVRAM is valid and the configuration information in the EEPROM is valid, but they do not match.

If a message appears stating that you have an unrecoverable configuration error, valid configuration information does not exist. If this occurs, you must initialize the configuration immediately. See "Initializing, viewing, or synchronizing the ServeRAID II controller configuration" on page 133 for instructions.

Descriptions of the choices available from the Configuration Synchronization menu are as follows:

- **EEPROM as Source** copies configuration information from the the controller's EEPROM to NVRAM and to all configured RBL and ONL hard disk drives defined in the the controller's EEPROM configuration.
- **NVRAM as Source** copies configuration information from NVRAM to the EEPROM and to all configured RBL and ONL hard disk drives defined in the NVRAM configuration.
- **NVRAM and POCL as Source** updates information from the power-on change list (drive state changes at power-on time) with the information in NVRAM, then copies this updated configuration information to the EEPROM and to all configured RBL and ONL hard disk drives defined in the NVRAM configuration.
- **Hard Disk Drive as Source** retrieves configuration information from the most common hard disk drive configuration, then copies the configuration information to NVRAM and to the EEPROM.
- **Identified HDD as Source** updates the configuration information with configuration information from hard disk drive that matches the identifiers stored in NVRAM. The updated configuration information is then copied to NVRAM, to the EEPROM, and to the configured hard disk drives in the array.

- **Specific HDD as Source** retrieves the configuration information from the hard disk drive that you select. The updated configuration information is then copied to NVRAM, to the EEPROM, and to the configured hard disk drives.



## Using the ServeRAID Mini-Configuration program

The ServeRAID Mini-Configuration program is a quick way to view the ServeRAID controller settings and to perform a limited set of the configuration functions. The ServeRAID Mini Configuration program is stored in read-only memory (ROM).

### To access the ServeRAID Mini-Configuration program:

1. Start the server. If the system is already turned on, press **Ctrl+Alt+Del** to restart the server.

Each time the system starts, the ServeRAID controller performs a power-on self-test (POST). The POST checks the configuration information for the ServeRAID controller and for the configured hard disk drives, to see if any changes have occurred.

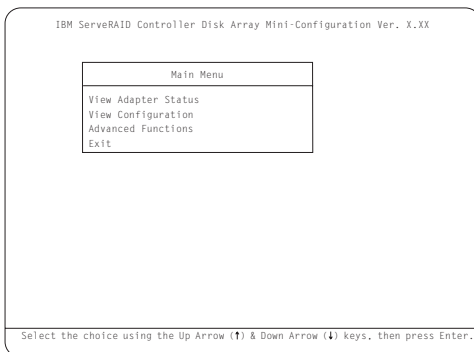
- If POST does not detect changes in the configuration or encounter any hardware problems, continue with step 2.
  - If POST detects changes in the configuration or encounters a hardware problem, messages appear on the screen. If this occurs, see “Symptom-to-FRU index” on page 264 and correct the problem; then, return here and continue with step 2.
2. Press **Ctrl+I** immediately when a screen similar to the following Mini-Configuration screen appears.



### Note

In the preceding figure, the version number will be replaced by the version number of the Mini-Configuration program, the MM/DD/YY will be replaced by the date of the version of the Mini-Configuration program, and NNNNN will be replaced by the version number of the firmware.

3. If you have more than one ServeRAID controller installed, a selection screen appears. Use the Up Arrow (↑) or Down Arrow (↓) key to select your choice; then, press **Enter**. Otherwise, the Main Menu of the Mini-Configuration program appears, similar to the following screen.



Descriptions of the choices available from the Main Menu are as follows:

- **View Adapter Status** displays the current status of the ServeRAID controller. (See "Viewing the ServeRAID II controller status" on page 139.)
  - **View Configuration** displays the current configuration information for the ServeRAID controller. (See "Viewing the configuration" on page 140.)
  - **Advanced Functions** lets you initialize the configuration (that is, reset the ServeRAID controller settings to their factory defaults), import the configuration from drives, enable and disable the Boot CD-ROM and INT13 extensions, and view the controller and PCI information. (See "Using the Advanced Configuration functions" on page 89.)
4. Use the Up Arrow (↑) or Down Arrow (↓) key to highlight your choice; then, press **Enter**.
  5. Follow the instructions that appear on the screen.
  6. Select **Exit** to leave the Main Menu.

## Viewing the ServeRAID II controller status:

When you select View Adapter Status from the Main Menu, a screen similar to the following appears.

IBM ServeRAID Adapter Disk Array Mini-Configuration Utility Ver. X.XX

Status for Adapter: 1

Hdr: ISPR-EF10h BCS-OFh ESC-00h
Unattended: Off ReadAhead: On BootCd:On
CompMode: On Clustered: Off
Boot Bk : 97115 Code Bk 97115
Rebuild Rate : High
No. Of DDD Drv. : 0
No. Of OFL Drv. : 0
No. Of CRT Drv. : 0
Cfg. Updates: 1 Flash Pgms.: 10
Locked, Bad Stripe, or Blocked Drive
Bad Stripe : None
Locked Drive : None
Blocked Drive : None

Ch. 1 Array Bay	Ch. 2 Array Bay
1 ONL A	1 ONL A
2 ONL A	2 ONL A
3 ONL A	3 ONL A
4 ONL A	4 ONL A
5 ONL A	5 ONL A
6 ONL A	6 ONL A
7 CDR	7 CDR
8 TNL	8 TNL
9 TNL	9 TNL
10	10
11	11
12	12
13	13
14	14
15	15
16	16

Press any key to continue.

The screen contains the following fields:

- **Unattended** shows the current state of the Unattended Mode, On or Off. (See “Changing the RAID parameters” on page 118.)
- **Read Ahead** shows the current state of the Read Ahead Cache Mode, On or Off. (See “Changing the RAID parameters” on page 118.)
- **BootCd** shows the current state of the BootCd function, On or Off. (See “Setting the BootCd feature” on page 90.)
- **CompMode** shows the BIOS compatibility mode. **On** indicates 8 GB Extended; **Off** indicates 2 GB Limited.
- **Boot Bk** shows the current version number of the startable code stored in the Boot Block.
- **Code Bk** shows the current version number of the firmware (microcode) for the ServeRAID controller.
- **Rebuild Rate** shows the current speed of the rebuild process: High (default), Medium, or Low. (See “Changing the RAID parameters” on page 118.)
- **No. of DDD Drv.** shows the current number of defunct drives.
- **No. of OFL Drv.** shows the current number of offline logical drives.
- **No. of CRT Drv.** shows the current number of critical logical drives.
- **Cfg. Updates** shows the current number of times that the configuration has been updated. When you initialize the configuration, the Cfg. Update is reset to zero.
- **Flash Pgms** shows the current number of times that the firmware EEPROM has been updated.
- **Locked, Bad Stripe, or Blocked Drive** identifies the logical drives that are affected, and contains the following fields:

- **Bad Stripe** indicates the logical drives that contain bad stripes.
- **Locked Stripe** is a reserved field.
- **Blocked Drive** indicates the logical drives that are blocked. The drives that are blocked cannot be used until they are unblocked. (See “Unlocking logical drives” on page 38.)

**Viewing the configuration:** The View Configuration choice provides configuration and status information about the logical drives.

When you select View Configuration from the Main Menu, a screen similar to the following appears. You can view the number and size of logical drives installed, RAID level, current state, stripe unit size, write policy, read-ahead status, and the date that the logical drive was created.

IBM ServeRAID Adapter Disk Array Mini-Configuration Ver. X.XX

Adapter 1 Logical Drive Configuration

Logical Drive	Size (MB)	RAID Level	Current State	Stripe Size	Wrt Pol	Read Ahead	Date Created mm/dd/xx
0	100	5	OKY	8K	WT	NO	10/31/97
1	100	5	OKY	8K	WT	NO	10/31/97
2	100	5	OKY	8K	WT	NO	10/31/97
3	100	5	OKY	8K	WB	NO	10/31/97
4	100	5	OKY	8K	WB	NO	10/31/97
5	99	1	OKY	8K	WT	NO	10/31/97
6	200	5	OKY	8K	WT	NO	10/31/97
7	300	1	OKY	8K	WT	NO	10/31/97

Press any key to continue

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## Locations

The following information supports the Netfinity 5500 - Type 8660 server.

- “Adapters” on page 142.
- “Battery replacement” on page 147.
- “Before you begin” on page 150.
- “Changing jumper positions” on page 151.
- “Completing the installation” on page 154
- “Controls and indicators” on page 158.
- “CD-ROM drive” on page 161.
- “DASD backplane removal” on page 163.
- “Diagnostics panel LEDs” on page 164.
- “External options” on page 165.
- “Front bezel removal” on page 172.
- “Hot-plug PCI adapter installation” on page 173.
- “Hot-swap power supply installation” on page 181.
- “Hot-swap power supply removal” on page 185.
- “Hot-swap fan assembly” on page 187.
- “Information LED panel” on page 189.
- “Information panel cover removal” on page 191.
- “Information panel LED assembly removal” on page 192.
- “Input/Output connectors and expansion slots” on page 194.
- “Interior LED and speaker assembly” on page 196.
- “Internal drive installation” on page 197.
- “Installing devices in the NetBAY3” on page 209.
- “Memory-module kits” on page 214.
- “Microprocessor kit” on page 217.
- “Preparing to install options” on page 220.
- “Power backplane removal” on page 222.
- “Power supplies” on page 224.
- “Power supply filler plate” on page 225.
- “NetBAY3 bezel installation” on page 226.
- “Processor board component locations” on page 227.
- “Processor board jumpers” on page 229.
- “Processor board removal” on page 232.
- “Rack installation” on page 233.
- “SCSI backplane component locations” on page 249.
- “SCSI backplane option jumpers” on page 250.
- “Server cabling” on page 251.
- “Server door and trim bezels removal” on page 252
- “Shuttle removal” on page 253
- “Side cover(s) removal” on page 254.
- “System board component locations” on page 255.
- “System board jumpers” on page 257.
- “System board removal” on page 259.
- “Top cover removal” on page 262
- “Voltage regulator card removal” on page 263

## 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 seven adapters in the expansion connectors, called slots, on the system board of the server. Six of the slots are peripheral component interconnect (PCI) expansion slots and one is an industry standard architecture (ISA) expansion slot.

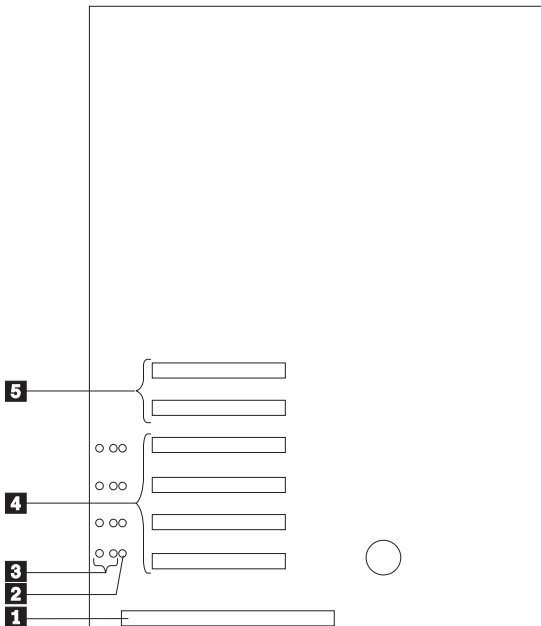
Four of the PCI slots allow you to install a new PCI adapter or replace an existing PCI adapter with the same type of adapter without turning the server power off and restarting the system, if these features are supported by the operating system. These slots are called *hot-pluggable* PCI slots. They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

The expansion slots have Plug and Play capabilities. See "Plug and Play technology" on page 144 for additional information.

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 PCI video adapter, the server BIOS automatically disables the integrated video controller. When you install an ISA video adapter, you must move a jumper to disable the integrated video controller. See "System board jumpers" on page 257 for more information.

The following illustration shows the location of the PCI and ISA expansion slots on the system board.



- 1** 16-bit ISA slot
- 2** Power LEDs for hot-swap slots
- 3** Attention LEDs for hot-swap slots
- 4** Hot-plug 32-bit PCI slots 1–4
- 5** Non-hot-plug 32-bit PCI slots 5 and 6

**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 required attention. <b>Slot still has power applied.</b> 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. <b>Power is removed from the slot.</b> An adapter can be removed or installed in the slot.
Off	Off	<b>Power is removed from the slot.</b> 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 a full-length ISA adapter in the ISA expansion slot.
- You can install full-length adapters in all PCI expansion slots.
- You can install hot-plug PCI adapters in PCI slots 1–4, if the operating system supports this feature. Non-hot-plug PCI adapters can also be installed in these slots.
- The server supports 5.0V and universal PCI adapters; it does not support 3.3V adapters.

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

- The server uses a rotational interrupt technique to configure PCI adapters. This technique enables you to install a variety of PCI adapters that currently do not support sharing of PCI interrupts.
- PCI slots 5 and 6 are on the primary PCI bus and PCI slots 1–4 are on the secondary PCI bus. The performance of the PCI adapters depends on the configuration of adapters in the system.

**Plug and Play technology:** *Plug and Play* is an ISA technology designed to make expanding the server easier. Plug and Play adapter support is built into the system board in the server. If the operating system supports Plug and Play technology, the server will



automatically configure itself when you install an ISA Plug and Play device.

**Note**

PCI adapters are also often referred to as plug and play because they configure automatically.

**Plug and Play adapters:** Plug and Play adapters are easier to install and set up because they are auto-configuring. This means that there are no jumpers or switches to set.

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

**Legacy adapters:** If an adapter that you install is not Plug and Play compatible, the Configuration/Setup utility program can help you to manually configure the adapter. Adapters that are not Plug and Play compatible are known as *legacy devices*.

**Configuration/Setup Utility program:** Within the Configuration/Setup utility program, the Plug and Play screen displays server resources that are typically required by adapters:

- I/O port address
- Memory address
- IRQ line
- DMA channel

From the Configuration/Setup utility program screens, you can select available resources for the adapter that you are installing. Resources that are not currently being used by adapters that are already installed in the server are listed as **[ISA Legacy]**. The system resources that are in use by other devices are listed as **[Not Applicable]**.

#### Notes

1. Refer to the documentation that comes with the adapter for information about required system resources. Then, make the appropriate jumper or switch settings on the adapter.
2. If you have a resource conflict, set the resources that are used by the ISA legacy adapter to **[ISA Legacy]**. This will manually configure the ISA legacy adapter to that specific server resource. Once Plug and Play detects that a resource is not available, it will skip that resource, and reconfigure to other available system resources. (See "Plug and Play" on page 99.)

## Battery replacement

### Note

If the battery is removed, the standby light will not blink until after the first completion of the POST.

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



### Caution

When replacing the battery, use only IBM Part Number 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.

### Note

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

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

To order replacement batteries, call 1-800-772-2227 within the United States, 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.

**Before you begin, be sure you have:**

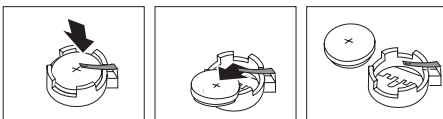
- Read “Safety information” on page 308
- Followed any special handling and installation instructions supplied with the replacement battery.

**Note**

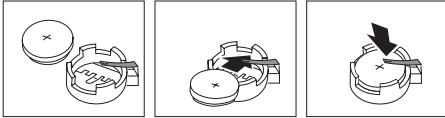
After you replace the battery, you must reconfigure the server and reset the system date and time.

**To replace the battery:**

1. Turn off the server and peripheral devices and disconnect all external cables and power cords (see “Preparing to install options” on page 220); then remove the top cover (see “Top cover removal” on page 262).
2. Locate the battery on the system board (see “System board component locations” on page 255).
3. Remove any adapters that are installed in PCI slots 1 and 2, so you can access the battery. (See “Hot-plug PCI adapter installation” on page 173 for information about installing and removing adapters from the hot-plug PCI slots.)
4. Lift and remove the plastic dividers between PCI slot 1 and the ISA slot and between PCI slot 1 and PCI slot 2 by pressing the latches on the top ends of the dividers toward the dividers and lifting the dividers from the server.
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 “Hot-plug PCI adapter installation” on page 173 for information about installing and removing adapters from the hot-plug PCI slots.)
8. Insert the plastic dividers into the divider guides beside PCI slots 1 and 2.
9. Reinstall the top cover and complete the installation (see “Completing the installation” on page 154).

**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 reset configuration parameters as needed.
  - To reset the system date and time, go to “Date and time” on page 93.
  - To reset the power-on password, go to “Using the power-on password menu” on page 95.
  - To reconfigure the server, follow the instructions given in “Configuration/Setup Utility program” on page 60 (all models).

## Before you begin

### Notes:

1. You do not need to turn the server off to install or replace hot-swap power supplies, hot-swap drives, hot-swap fans, or hot-plug PCI adapters.
2. The color orange on components or labels in the Netfinity 5500 indicates hot-plug components.
  - Become familiar with the safety procedures, see "Safety information" on page 308.
  - Make sure that you have an adequate number of properly grounded electrical outlets for the server, monitor, and any other options that you intend to install.
  - Place the server in a location that is dry. Rain or spilled liquids might damage the server.
  - Leave 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 Netfinity 5500, refer to <http://www.ibm.com/pc/us/compat/> on the World Wide Web.

## Changing jumper positions

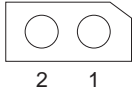
Jumpers located on the system board and the processor board help you to customize the way the server operates.

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

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

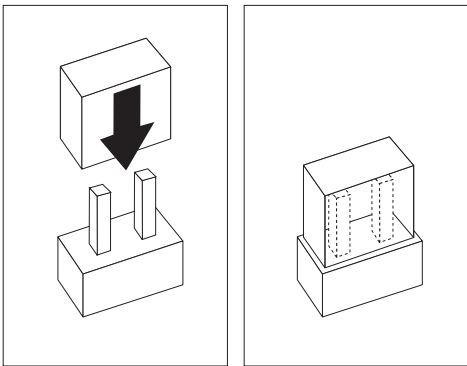
**Two-pin jumper blocks:** Covering both pins with a jumper defines one function of the jumper block. To change the function of the jumper block, cover one pin only or remove the jumper entirely.

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

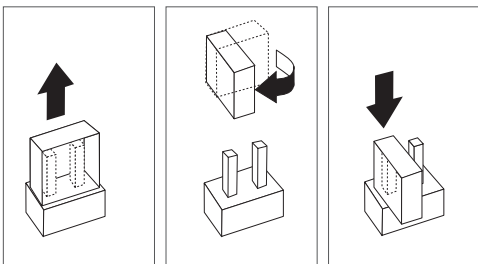


**To change a jumper's position for a two-pin jumper block:**

1. Turn off the server; then, disconnect the server power cords.
2. Remove the server cover (see "Preparing to install options" on page 220).
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.

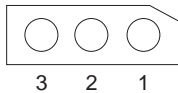


4. Reinstall the server cover and connect the cables (see "Completing the installation" on page 154).



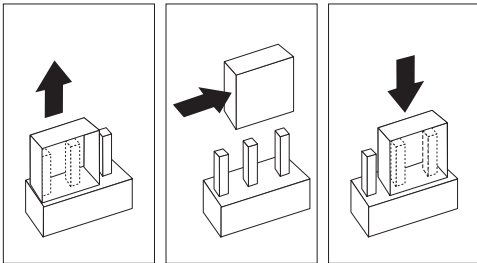
**Three-pin jumper blocks:** With the three-pin jumper blocks, each jumper covers two of the three pins on a pin block. You can position the jumper to fit over the center pin and either of the other two pins.

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 220).
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 154).

## Completing the installation

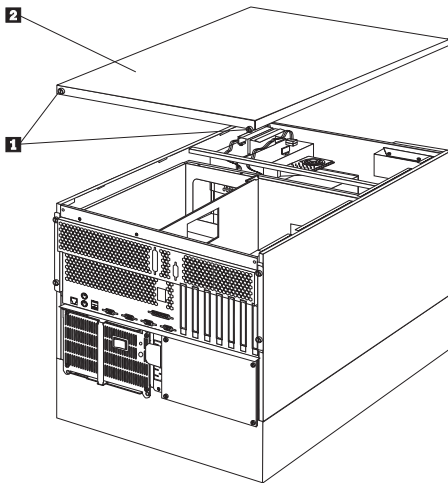
To complete the installation, you must reinstall the side and top covers, reconnect all the cables that you disconnected in “Preparing to install options” on page 220, and, for certain options, run the Configuration utility program. Follow the instructions in this section.

### Attention

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

**Installing the top cover:** To install the server top cover:

1. Before installing a cover, check that all cables, adapters, and other components are installed and seated correctly and that you have not left loose tools or parts inside the server.
2. Lower the cover **2** with the rear edge of the cover about 25 mm (1 inch) back from the rear edge of the server.
3. Slide the cover forward.



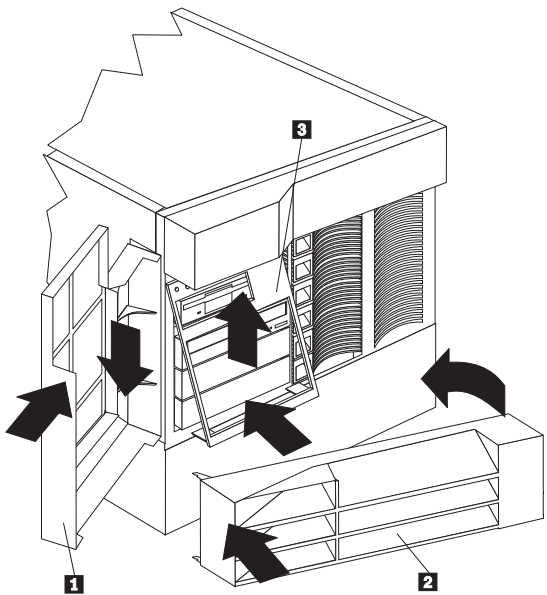
4. Tighten the two thumbscrews **1** on the back edge of the cover.
5. If you disconnected any cables from the back of the server, reconnect the cables; then, plug the power cords into properly grounded electrical outlets.

**Notes**

1. If you are in the United Kingdom and have a modem or fax machine attached to the server, reconnect the telephone line *after* you plug in the power cords.
2. If necessary, see "Input/Output connectors and expansion slots" on page 194 for connector locations.

## Installing the trim bezels and server door:

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



### To install the media-bay trim bezel:

1. Insert the two tabs on the top of the media-bay trim bezel **3** in the matching holes on the server chassis.
2. Push the bottom of the bezel toward the server until the two tabs at the bottom of the bezel snap into place.

### To install the NetBAY3 bezel:

1. Hook the tabs on the left side of the NetBAY3 bezel **2** around the posts on the NetBAY3.
2. Gently push the right side of the bezel toward the server until the bezel snaps into place.
3. Lock the NetBAY3 bezel.

### To install the server front door:

1. Align the pins on the server door **1** with the hinges on the server and slide the door down.
2. Close and lock the door.

## 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.

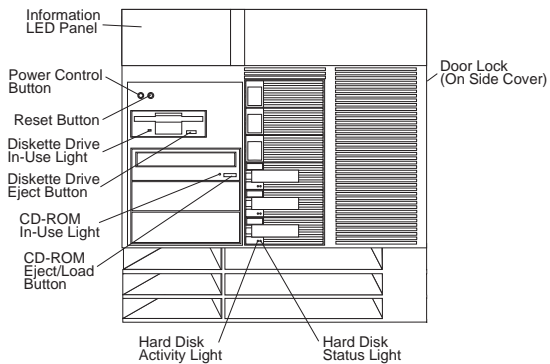
Some options have device drivers that you need to install. Refer to the documentation that comes with the option for information about installing any required device drivers.

If you have installed a new microprocessor, you might want to upgrade the operating system. Refer to the serverGuide package. If you have installed or removed hard disk drives, see “ServeRAID Configuration program” on page 74 for information about reconfiguring the disk arrays.

Run the Configuration/Setup utility program to save the new configuration information. See “Configuration overview” on page 58.

## Controls and indicators

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



**Door Lock (Tower Model Only):** You can lock the door on the server to deter tampering with the internal components. This same lock also locks the top cover in place.

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



### Caution

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

The server can be activated in several ways:

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

### 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.

- The server can also be powered on by the system management processor.

The server can be deactivated as follows:

- You can turn the server off by pressing the Power Control button on the front of the server. Pressing the Power Control button starts a graceful 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.

- Pressing and holding the Power Control button for more than 4 seconds causes an immediate shutdown of the server and places the server in standby mode. This feature can be used if the operating system hangs.
- Disconnecting the server power cords from the electrical outlets will shut off all power to the server.

**Note**

Wait about 15 seconds after disconnecting the power cord for the system to stop running. Watch for the System Power light on the information LED panel to stop blinking.

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

**Information LED Panel:** The lights on this panel give status information for the server. See "Information LED panel" on page 189 for more information.

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

**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.

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

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

**Hard Disk Lights:** Each of the six hot-swap drive bays has a set of two lights, which indicate the following:

- **Hard Disk Status Light:** When the amber light for a hard disk drive is lit continuously, the drive has failed. When the light flashes slowly (one flash per second), the drive is being rebuilt.

When the light flashes rapidly (three flashes per second), the controller is identifying the drive.

- **Hard Disk Activity Light:** When the green light for a hard disk drive is flashing, the drive is being accessed.



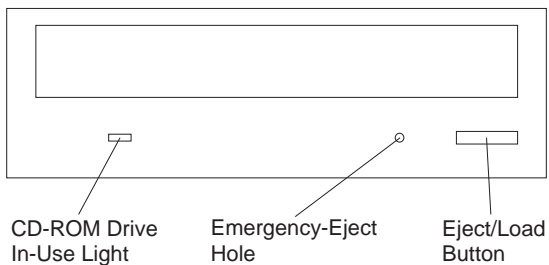
## CD-ROM drive

An IDE CD-ROM drive is a standard feature on the server. CD-ROM drives can play back or read from a CD, but cannot write information to it. CD-ROM drives use industry standard, 12 cm (4.75-inch) CDs.

Follow these guidelines when using a CD-ROM drive:

- Do not place the server where the following conditions exist:
  - High temperature
  - High humidity
  - Excessive dust
  - Excessive vibration or sudden shock
  - An inclined surface
  - Direct sunlight
- Do not insert any object other than a CD into the drive.
- Before moving the server, remove the CD from the drive.

The following illustration shows the front of the CD-ROM drive.



**Handling a CD:** When handling a CD, follow these guidelines:

- Hold the CD by its edges. Do not touch the surface.
- To remove dust or fingerprints, wipe the CD from the center to the outside with a soft, nonabrasive cloth. Wiping the CD in a circular direction might cause loss of data.
- Do not write or stick paper on the CD.
- Do not scratch or mark the CD.
- Do not place or store the CD in direct sunlight.
- Do not use benzene, thinners, or other cleaners to clean the CD.
- Do not drop or bend the CD.

**Loading a CD:** To load a CD into a CD-ROM drive:

1. Press the Eject/Load button. The tray slides out of the drive. (Do not manually force the tray open.)
2. Place the CD in the tray with the label facing up.
3. Close the tray by pressing the Eject/Load button, or

by gently pushing the tray forward. When the tray is closed, the CD-ROM drive In-Use light on the front of the drive will activate to indicate that the drive is in use.

4. To eject the CD, press the Eject/Load button. When the tray slides out, carefully remove the CD.
5. Close the tray by pressing the Eject/Load button, or by gently pushing the tray forward.

**Note**

1. If the tray does not slide out of the drive when you press the Eject/Load button, insert the pointed end of a large paper clip into the emergency-eject hole located on the front of the CD-ROM drive.
2. In some models, you might have to remove the front bezel that houses the CD-ROM drive so that you can access the emergency-eject hole.

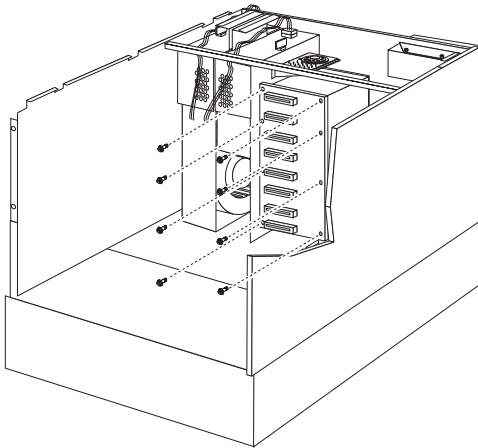
## DASD backplane removal

### Before you begin:

Read "Safety information" on page 308.

To remove the DASD backplane, do the following:

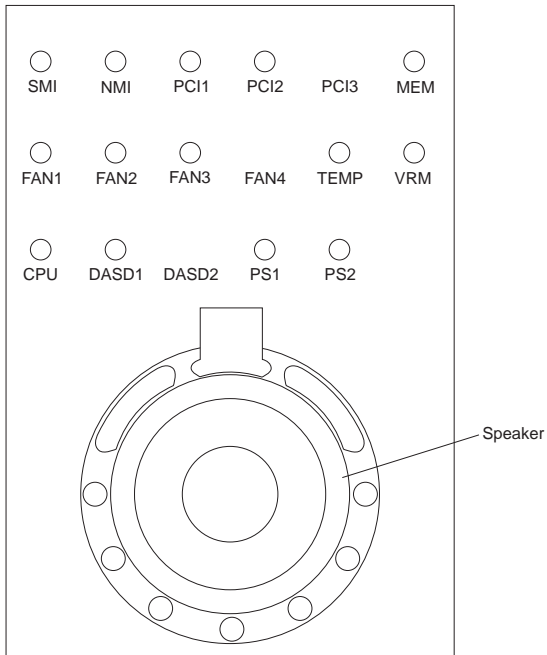
1. Remove the top cover (see "Top cover removal" on page 262).
2. To access the cable(s) attached to the DASD backplane, slide the shuttle to the rear of the system, see "Shuttle removal" on page 253.
3. Disconnect the DASD backplane cables.
4. Remove the DASD backplane.



- a. Remove the DASD backplane screws **1**, then; remove the DASD backplane.

## Diagnostics panel LEDs

The following illustration shows the LEDs on the diagnostics panel inside the server. See “Symptom-to-FRU index” on page 264 for information on identifying problems using these LEDs.



To replace the diagnostics panel LEDs, you must replace the interior LED and speaker assembly, see “Interior LED and speaker assembly” on page 196.

## External options

### Before you begin:

- Read “Safety information” on page 308.
- 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 ServeRAID controller in the server has one channel that can be used to attach external devices.

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

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

For information about the maximum length of SCSI cable between the terminated ends of the cable, see 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. See “SCSI IDs” on page 199 and 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 systems management connector
- One parallel-port connector
- One video-port connector
- One keyboard-port connector
- One auxiliary-device-port connector
- One Ethernet-port connector
- Two USB-port connectors

See the illustration in “Input/Output connectors and expansion slots” on page 194 for the locations of the connectors.

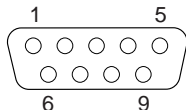
**Serial ports:** The server comes with two serial ports. (See “Input/Output connectors and expansion slots” on page 194 for the locations of the connectors.) These ports are used to communicate with printers, plotters, external modems, scanners, and auxiliary terminals. These ports also enable you to 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 by 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.

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		

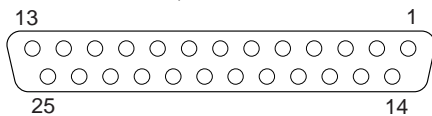
When you turn on the server, the POST routine assigns the serial ports to specific communication port addresses.

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 systems 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 Capacity Port (ECP). (See "Input/Output connectors and expansion slots" on page 194 for the location of the connector.)



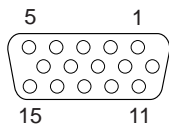
The following table shows the pin-number assignments for the parallel-port connector.

Table 3. 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.

**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 194 for the location of the connector.)

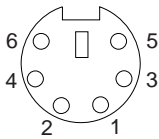


The following table shows the pin-number assignments for the video connector.



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
10	Ground
11	Monitor ID bit 0
12	DDC SDA
13	Horizontal synchronization (Hsync)
14	Vertical synchronization (Vsync)
15	DDC SDL

**Keyboard and auxiliary-device ports:** The system board has one keyboard port and one auxiliary-device port that supports a mouse or other pointing device. (See “Input/Output connectors and expansion slots” on page 194 for the locations of the connectors.)



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

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

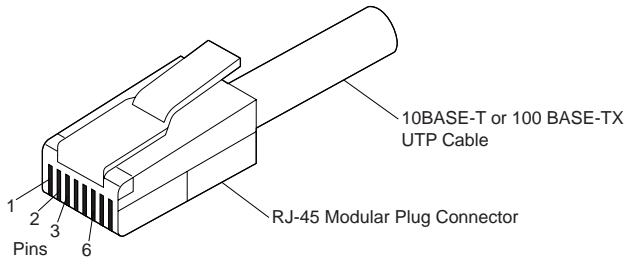
**Ethernet port:** The system board in the Netfinity 5500 contains an Ethernet *controller*. The controller has an external RJ-45 connector on the rear of the server that is used with a category 3, 4, or 5 unshielded twisted-pair (UTP) cable. The connector enables an Ethernet network to attach to the internal transceiver in the server.

**Note**

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

See “Configuring the Ethernet controller” on page 55 for additional information about the Ethernet controller.

Table 6 shows the pin-number assignments for the RJ-45 connector. These assignments apply to both 10BASE-T and 100BASE-TX devices.



*Table 6. Ethernet Connector Pin-Number Assignments*

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

**Note**

The wrap plug must have pin 1 connected to pin 3 and pin 2 connected to pin 6.

**Universal serial bus ports:** The system board in the Netfinity 5500 contains two universal serial bus (USB) ports. Each USB port has an external connector on the rear on the server for attaching devices that previously used serial, parallel, keyboard, mouse, and game ports.

USB is an emerging serial interface standard for telephony and multimedia devices. USB technology uses Plug and Play to determine what device is attached to the connector. Each USB device is accessed by a unique *USB address*. A device called a hub is used to convert the USB port into multiple attachment points. A hub has multiple ports where 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 7 shows the pin-number assignments for the USB connectors.

<b>Pin</b>	<b>Signal</b>
1	VCC
2	-Data
3	+Data
4	Ground

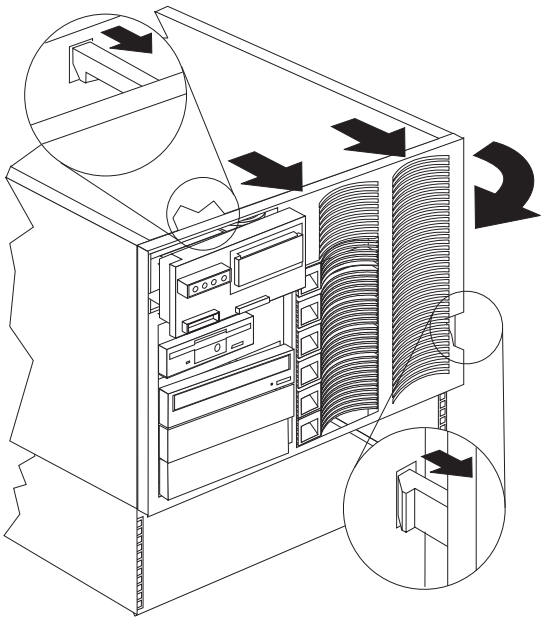
## Front bezel removal

### Before you begin:

Read "Safety information" on page 308.

To remove the front bezel, do the following:

1. Remove the top cover, see "Top cover removal" on page 262.
2. Remove the information panel cover, see "Information panel cover removal" on page 191.
3. Remove the door and trim bezel, see "Server door and trim bezels removal" on page 252.
4. Remove the side covers, see "Side cover(s) removal" on page 254.
5. Remove the front bezel.



- a. While releasing the top and side bezel tabs, rotate the left side of the bezel away from the system.

## Hot-plug PCI adapter installation

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:

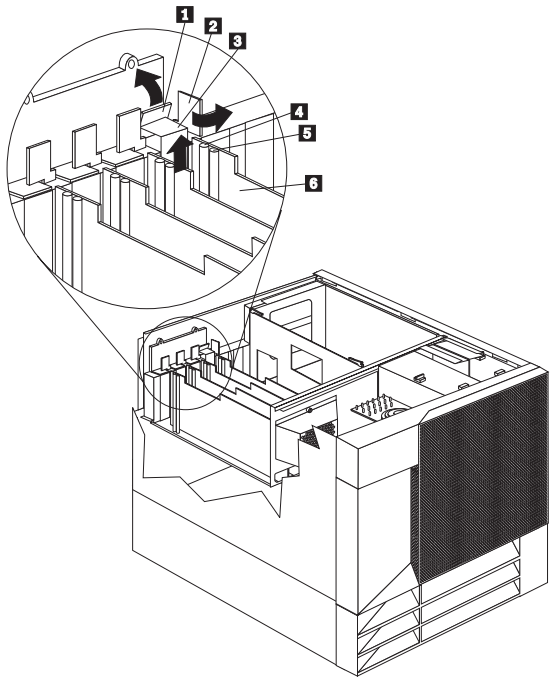
- Read “Safety information” on page 308.
- Read the documentation that comes with the adapter for any special requirements or restrictions.
- Read the documentation that comes with the operating system.

### Attention

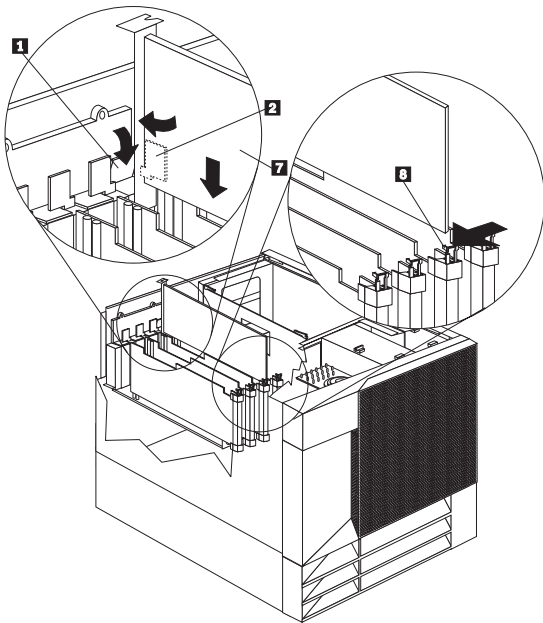
Do not remove a hot-plug adapter before performing the operating-system-defined procedure for disabling the hot-plug PCI slot that contains the adapter. Failure to do so might cause the system to lock up.

Refer to the operating system documentation.

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



- 1** Tab
- 2** Adapter retention latch
- 3** Expansion-slot cover
- 4** Attention light
- 5** Power light
- 6** Plastic divider



- 1** Tab
- 2** Adapter retention latch
- 7** Adapter
- 8** Adapter retention latch

**To install a hot-plug PCI adapter:**

1. Remove the top cover (see “Top cover removal” on page 262).
2. Determine which expansion slot you will use for the adapter.

**Note**

Only PCI slots 1–4 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 **5** for the hot-plug PCI slot is off before you continue to the next step.

4. Remove the expansion-slot cover **3**:
  - a. Rotate the adapter retention latch **2** counterclockwise.

- b. Lift the tab **1** covering the top of the expansion-slot cover **3** and remove 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. Remove the adapter from the static-protective package.

**Note**

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. Install the adapter **7** :
  - a. Carefully grasp the adapter **7** 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 **1** over the tab on the top corner of adapter. Rotate the adapter retention latch **2** clockwise until it snaps into place.

**Note**

The expansion slot also has an adapter retention latch **8** at the end of the slot toward the middle of the server. To remove the adapter, you need to push this adapter retention latch **8** away from the adapter until the top edge of the adapter is past the latch.

9. Connect any needed cables to the adapter.
10. 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 **5** for the hot-plug PCI slot is on.

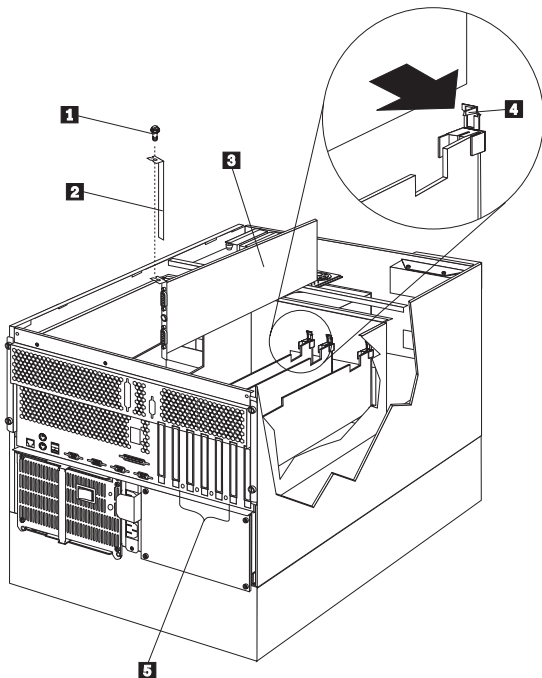
11. If you have other options to install or remove, do so now; otherwise, go to “Completing the installation” on page 154.

**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 308.
- Read the documentation that comes with the option.

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



- 1** Expansion-slot cover screw
- 2** Expansion-slot cover
- 3** Adapter
- 4** Adapter retention latch

**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 220); then remove the top cover (see “Top cover removal” on page 262).

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

**Note**

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

3. Remove the expansion-slot cover **2**:
  - If you are installing an adapter in PCI slot 1, 2, 3, or 4:
    - a. See the illustration in “Hot-plug PCI adapter installation” on page 173 for operation of the adapter retention latch on the end of the slot near the rear of the server.
    - b. Rotate the adapter retention latch counterclockwise.
    - c. Lift the tab covering the top of the expansion-slot cover and remove expansion-slot cover from the server. Store it in a safe place for future use.
  - If you are installing an adapter in PCI slot 5 or 6 or in the ISA slot:
    - a. Remove the screw **1** on the top of the expansion-slot cover **2**.
    - b. Slide the expansion-slot cover out of the server.
    - c. Store these items 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. Remove the adapter from the static-protective package.

**Note**

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

6. Place the adapter, component-side up, on a flat, static-protective surface.
7. Set any jumpers or switches as described by the adapter manufacturer.
8. Install the adapter:

- a. Carefully grasp the adapter **3** by its top edge or upper corners, and align it with the expansion slot on the 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.

9. If you are installing an adapter in PCI slots 1, 2, 3, or 4:
  - a. Refer to the illustration in "Hot-plug PCI adapter installation" on page 173 for operation of the adapter retention latch on the end of the slot near the rear of the server.
  - b. Lower the tab on the adapter guide over the tab on the top corner of the adapter. Rotate the adapter retention latch clockwise until it snaps into place.

If you are installing an adapter in PCI slots 5 or 6 or in the ISA slot:

- a. Align the rounded notch in the retaining bracket with the threaded hole in the expansion-slot frame. The retaining bracket on the adapter fits into the space that was occupied by the expansion-slot cover.
- b. Insert the expansion-slot screw **3** that you removed earlier into the threaded hole, and push the rounded notch up against the screw.
- c. Tighten the expansion-slot screw firmly.

**Note**

The expansion slot also has an adapter retention latch **4** at the end of the slot toward the middle of the server. To remove the adapter, you need to push this adapter retention latch **4** away from the adapter until the top edge of the adapter is past the latch.

10. Connect any needed cables to the adapter.
11. If you have other options to install or remove, do so now; otherwise, go to "Completing the installation" on page 154.

**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 dual processors. Refer to the network-adapter documentation for additional information about adapter compatibility requirements.

## Hot-swap power supply installation

The server comes with one power supply. You can add a second power supply to provide redundant power. 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 224 for details.



### Caution

Never remove the cover on a power supply or any part (power backplane and ac box) that has the following label attached.

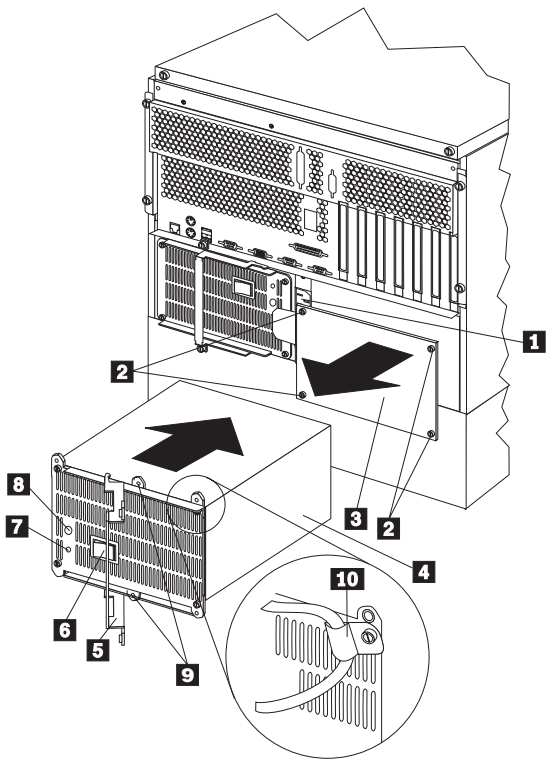


Hazardous voltage, current, and energy levels are present inside the power supplies, power backplane, and ac box. There are no serviceable parts inside the power supplies, power backplane, or ac box.

Refer to the following illustration 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 cord connector for power supply 2
- 2** Screws
- 3** Filler panel
- 4** Power supply
- 5** Handle
- 6** Power switch on power supply
- 7** AC Power light
- 8** DC Power light
- 9** Holes for shipping screws
- 10** Power-cord strain-relief bracket

**To add a power supply:**



**Caution**

Never remove the cover on a power supply or any part (power backplane and ac box) that has the following label attached.



Hazardous voltage, current, and energy levels are present inside the power supplies, power backplane, and ac box. There are no serviceable parts inside the power supplies, power backplane, or ac box.

**Note**

It is not necessary to turn the Power switch on the power supply off when you are installing a power supply.

1. Remove the filler panel **3** :
  - a. Remove the four screws **2** from the filler panel.
  - b. Remove the filler panel **3** from the power-supply bay and save it and the four screws you removed for future use.

**Note**

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

2. Place the handle **5** on the power supply in the open position, and slide the power supply into the chassis.
3. Gently close the handle **5** on the power supply to seat the power supply in the bay.
4. Plug the power cord for the added power supply into power cord connector **1** .



**Caution**

When the power-cord strain-relief bracket option is installed on the power cord, the server must be plugged to a power source that is easily accessible.

5. Install a power-cord strain-relief bracket **10** , if desired.
6. Plug the power cord into a properly grounded electrical outlet.

7. Make sure the Power switch **6** on the power supply is in the On position.
8. Verify that the dc Power light **8** and ac Power light **7** on the power supply are lit, indicating that the power supply is operating correctly.



## Hot-swap power supply removal

The server comes with one power supply. You can add a second power supply to provide redundant power. Each power supply has two status indicators; see “Power supplies” on page 224 for information about the status indicators.

### Attention

You cannot hot-swap a power supply if the server has only one power supply installed.

Refer to the illustration in “Hot-swap power supply installation” on page 181 while you perform the steps in this procedure.

### To remove a hot-swap power supply:



### Caution

Never remove the cover on a power supply or any part (power backplane and ac box) that has the following label attached.



Hazardous voltage, current, and energy levels are present inside the power supplies, power backplane, and ac box. There are no serviceable parts inside the power supplies, power backplane, or ac box.

1. If the server has only one power supply installed, turn off the server and peripheral devices (see “Preparing to install options” on page 220); otherwise, go to the next step.

### Attention

Before removing a functional power supply, set the Power switch on the power supply to the Off position.

2. Set the Power switch on the power supply that you are removing to the Off position.
3. Remove the power supply **4**:
  - a. Remove the shipping screws **9** from the power supply, if they have not already been removed.

### Note

You do not need to replace the shipping screws.

- b. Remove the power-cord strain-relief bracket **10**, if one is installed.

- c. Grasp the handle **5** on the power supply and pull the handle toward the center of the server; then, slide the power supply out of the chassis.

**Note**

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

4. If you are not installing a replacement power supply:
  - a. Disconnect the power cord for the power supply that you replaced.
  - b. Install a power-supply filler panel; then go to step 5.

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 **5** on the power supply to seat the power supply in the bay.
- c. Make sure the Power switch **6** on the power supply is in the On position.
- d. Verify that the ac Power light **7** and dc Power light **8** are lit, indicating that the power supply is operating correctly.



**Caution**

When the power-cord strain-relief bracket option is installed on the power cord, the server must be plugged to a power source that is easily accessible.

- e. Install a power-cord strain-relief bracket **10**, if desired.
5. If you have other options to install or remove, do so now; otherwise, go to "Completing the installation" on page 154.

## Hot-swap fan assembly

The server comes with three hot-swap fan assemblies.

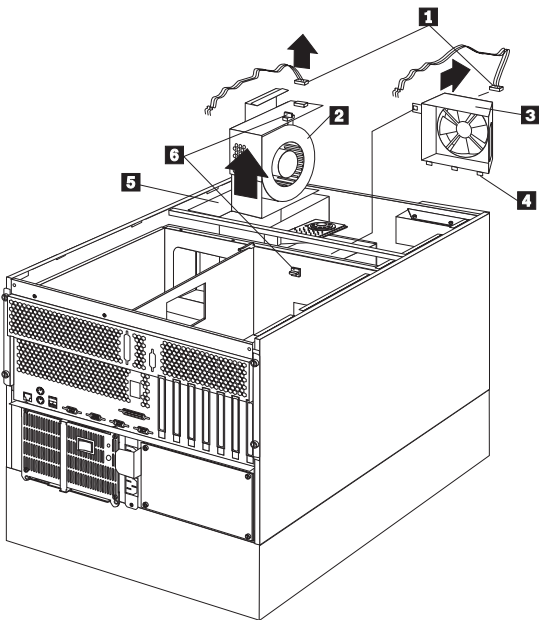
### Attention:

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 illustration shows the replacement of a hot-swap fan assembly. Refer to this illustration while performing the steps in this procedure.



- 1** Fan power cables
- 2** Hot-swap fan assembly 2
- 3** Hot-swap fan assembly 1
- 4** Tabs
- 5** Hot-swap fan assembly 3
- 6** Quarter-turn fasteners

To replace a hot-swap fan assembly:



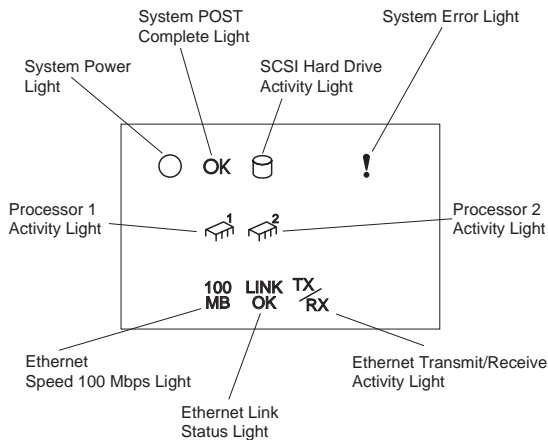
### Caution

The power cable to the fan should be disconnected whenever the fan assembly is not installed in the server; otherwise, the fan might start turning while you are holding it and the fan blades could injure your fingers.

1. Remove the top cover (see "Top cover removal" on page 262).  
**Attention:**  
To ensure proper system cooling, the top cover should be removed for no more than 30 minutes during this procedure.
2. Determine which fan assembly **2**, **3**, or **5** needs to be replaced by checking the fan LEDs on the diagnostic panel (see "Diagnostics panel LEDs" on page 164).
3. Disconnect the fan power cable **1** from the fan assembly that you are replacing.
4. Turn the quarter-turn fastener **6** for the fan assembly one quarter turn and remove the fan assembly from the server.
5. Slide the replacement fan assembly into the server. (If you are replacing fan assembly 1 **3**, make sure the tabs **4** fit into the slots at the bottom of the fan opening in the server.)
6. When you have the fan assembly correctly seated, turn the quarter-turn fastener **6** one quarter turn to secure the fan in the server.
7. Connect the fan power cable **1** to the power connector.
8. Replace the top cover (see "Installing the top cover" on page 155).

## Information LED panel

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



**System Power Light:** When this green light is lit, 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, it indicates either power supply failure, an ac power failure, or a light failure.

### Note

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.

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

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

**System Error Light:** This amber light is lit when a system error occurs. A light on the diagnostics LED panel will also be lit to further isolate the error. (For more information, see "Symptom-to-FRU index" on page 264)

**Processor 1 Activity Light:** This green light is lit when there is activity on microprocessor 1 (the primary microprocessor).

**Processor 2 Activity Light:** This green light is lit when there is activity on microprocessor 2 (the secondary microprocessor).

**Ethernet Speed 100 Mbps:** When this green light is lit, the Ethernet speed is 100 Mbps.

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

**Ethernet Transmit/Receive Activity Light:** When this green light is lit, it indicates transmit or receive activity to or from the server.

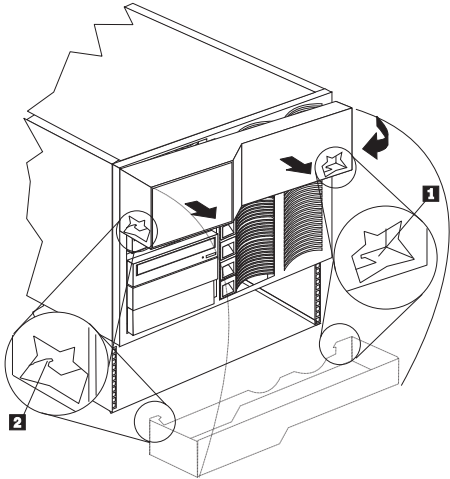
## Information panel cover removal

### Before you begin:

Read "Safety information" on page 308.

To remove the information-panel cover, do the following:

1. Remove the door, see "Server door and trim bezels removal" on page 252.
2. Remove the information-panel cover.



- a. Place your fingers inside the right side of the cover
- b. Move the end of the cover away from the right side of server until the latch tab **1** on the cover is released from the slot on the side of the server.
- c. Lift up on the cover and pivot the right side of the cover away from the front of the server.
- d. Move the cover to the left to release the left latch tab **2** and remove the cover from the server.

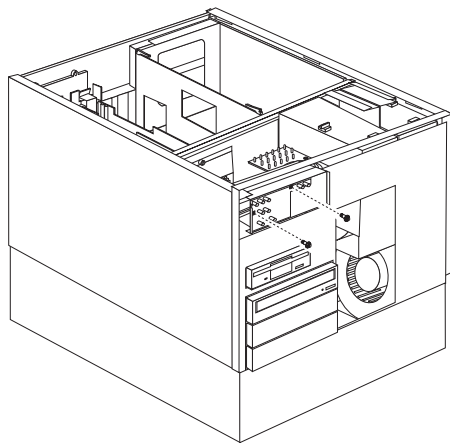
## Information panel LED assembly removal

### Before you begin:

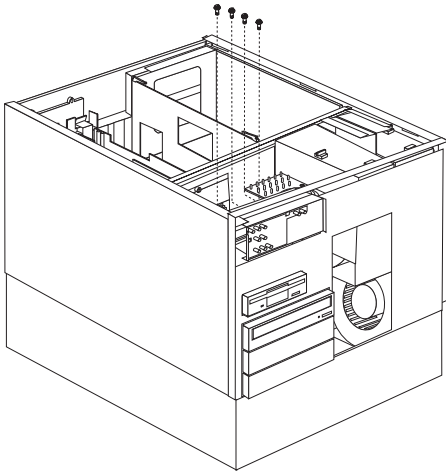
Read "Safety information" on page 308.

To remove the information panel LED assembly, do the following:

1. Remove the server door and trim bezels, see "Server door and trim bezels removal" on page 252.
2. Remove the top cover, see "Top cover removal" on page 262.
3. Remove the side covers, see "Side cover(s) removal" on page 254.
4. Remove the door assembly, see "Server door and trim bezels removal" on page 252.
5. Remove the information panel cover, see "Information panel cover removal" on page 191.
6. Disconnect the information panel LED assembly cables.
7. Remove the information panel LED assembly.



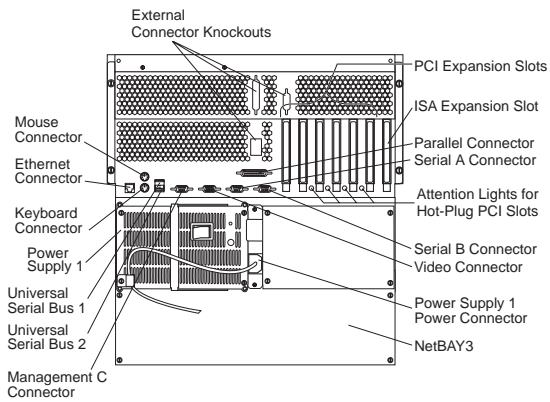




- a. Remove the information panel LED assembly screws, then; remove the assembly.

## Input/Output connectors and expansion slots

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



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

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

**Serial Connectors:** Serial signal cables for modems and other serial devices connect here to the two 9-pin serial connectors, ports A and B. See "Devices and I/O ports" on page 92 for port assignment information. If you are using a 25-pin signal cable, you need a 9-pin-to-25-pin adapter cable.

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

**NetBAY3:** The tower model of the Netfinity 5500 comes with a NetBAY3 attached. You can install devices, such as the IBM EXP10 or a power distribution unit, in the NetBAY3. Refer to "Installing devices in the NetBAY3" for more information.

**Management C Connector:** This connector is used to attach a modem that is dedicated to communication with the system management processor.

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

**Universal Serial Bus Connectors:** You can attach I/O devices to these two universal serial bus (USB) connectors. You need a 4-pin cable to connect devices to USB 1 or 2.

**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.

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

**Expansion Slots:** The server has one industry standard architecture (ISA) expansion slot and six peripheral component interconnect (PCI) expansion slots. Four of the PCI slots support hot-plug PCI adapters.

You can install PCI or ISA adapters. Many adapters provide bus-master capabilities, which enable the adapters to perform operations without interrupting the system microprocessors.

**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.

**Power Connector:** The power cord for power supply 1 connects here. (The power connector for the additional optional power supply is covered by the filler panel.)

**External Connector Knockout:** The server has three external connector knockouts that can be used when you install options, such as the external SCSI cable option.

**Note**

For pin assignments and other details about these connectors, see "External options" on page 165.

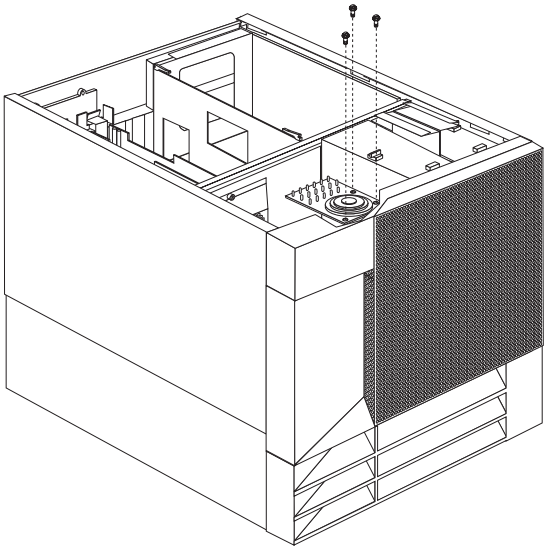
## Interior LED and speaker assembly

### Before you begin:

Read "Safety information" on page 308.

To remove the interior LED and speaker assembly (diagnostic LEDs), do the following:

1. Remove the top cover, see "Top cover removal" on page 262
2. Disconnect the cables attached to interior LED and speaker assembly.
3. Remove the interior LED and speaker assembly.



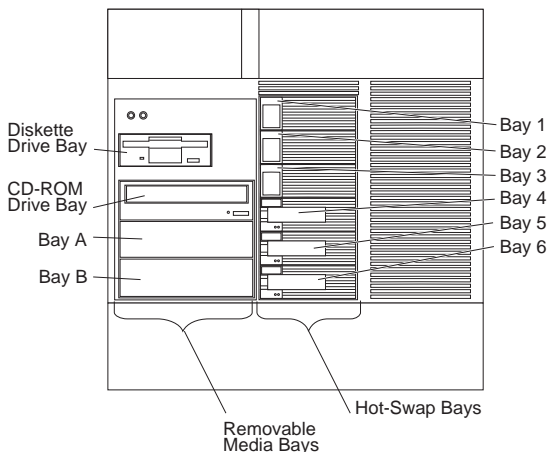
- a. Remove the interior LED and speaker assembly mounting screws. then; remove the interior LED and speaker assembly.

## Internal drive installation

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

- Diskette
- Hard disk
- CD-ROM
- 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.



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 bay has two indicator lights on the front of the server (see "Information LED panel" on page 189). If the amber Hard Disk Status light for a drive is lit continuously, that individual drive is faulty and needs to be replaced. When the Hard Disk Status light indicates a drive fault, you can replace a hot-swap drive without turning off the server.

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

- The server comes with a preinstalled 3.5-inch, 1.44 MB diskette drive and a preinstalled 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 Netfinity 5500 supports only one diskette drive.
- The server does not support hard disk drives in bays A and B because of cooling considerations.

**Note**

The server's EMI integrity and cooling are both protected by having the left front bays (removable-media 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.

- If you are installing a device with a 50-pin connector in one of the removable-media bays (bays A–B), you need a 68-pin to 50-pin converter.
- 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 "External options" on page 165, in addition to the instructions in this section.

A 16-bit (wide) SCSI cable connects the hot-swap backplane to one channel of the integrated RAID SCSI controller on the system board. An additional 16-bit SCSI cable with connectors for optional devices in bays A and B connects to the second channel of the RAID controller. This cable has a terminator at the other end and is folded and restrained with a cable clamp to the bottom of the server between the open bays and the power supply area.

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

The server automatically sets SCSI IDs for hot-swap hard disk drives, according to the jumper settings on the SCSI backplanes. 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. Table 8 shows the default SCSI IDs that the backplane assigns for hot-swap hard disk drives.

<i>Table 8. Automatically Assigned SCSI IDs</i>						
Bay	1	2	3	4	5	6
ID	0	1	2	3	4	5
<b>Note:</b> The default SCSI ID for the SCSI backplane is 15. The default SCSI ID for each channel of the RAID controller is 7.						

You can change the default ID addresses of the drives by changing the jumper settings on the SCSI backplane. See “SCSI backplane option jumpers” on page 250. A simplified layout of the SCSI backplane is shown in “SCSI backplane component locations” on page 249.

The processing sequence for SCSI devices is set through the ServeRAID Configuration Utility program. The sequence proceeds from the lowest SCSI ID to the highest (0 to 6, then 8 to 15 determined by the jumper settings).

**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 RAID controller provides termination at the other end of the SCSI bus.

If you install SCSI devices in the removable-media bays (bays A and B), you must disable the termination on the devices; the RAID controller is already terminated and the SCSI cable for devices in the removable-media drive bays has a terminator at the other end. For example, when you install a SCSI device in a removable-media drive bay (bay A or B), set its termination to Disable, because the SCSI cable is already terminated at the end.

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 308.
- 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 5.25-inch removable-media drive” or “Installing a drive in a hot-swap bay” on page 203.

## Installing a 5.25-inch removable-media drive

**Before you begin:**

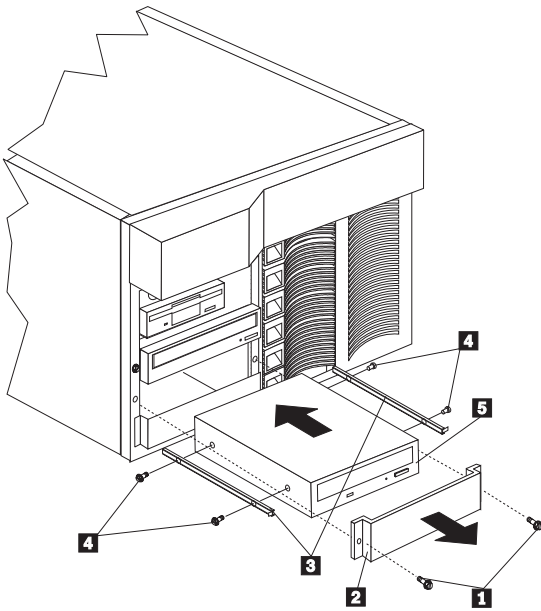
- Read “Safety information” on page 308.
- Read the documentation that comes with the drive.
- Prepare the drive for installation (see “Preinstallation steps (all bays)”).

**Note**

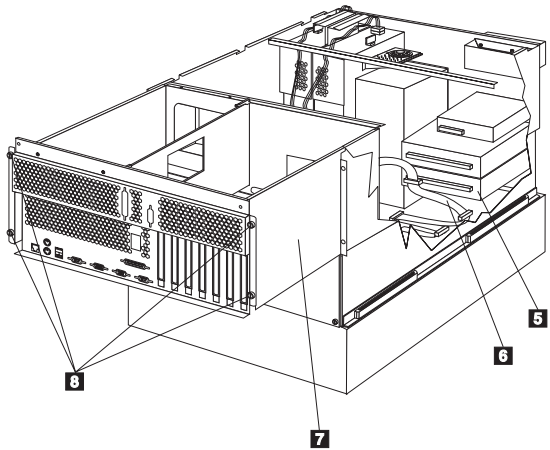
The server’s EMI integrity and cooling are both protected by having the left front bays covered or occupied. When you install a drive, save the filler panel from the bay, in case you later remove the drive and do not replace it with another.

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





- 1** Screws for filler panel
- 2** Filler panel with EMI shield
- 3** Slide rails
- 4** Screws for slide rails
- 5** Drive



- 5** Drive
- 6** SCSI cable for the removable-media drive bays
- 7** Shuttle
- 8** Thumbscrews

**To install a removable-media drive in one of the left front bays:**

1. Turn off the server and peripheral devices (see "Preparing to install options" on page 220) and remove the top cover (see "Top cover removal" on page 262).
2. Remove the NetBAY3 bezel and the media-bay trim bezel. (See "Server door and trim bezels removal" on page 252.)
3. Remove the screws **1** and filler panel **2** from the bay opening. Save screws for later use in this procedure. 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. Use screws **4** of the appropriate size and length to attach a slide rail **3** to each side of the drive **5**.

**Note**

The slide rails and screws are included in the drive accessory kit that comes with the server.

7. Place the drive so that the slide rails engage in the bay guide rails. Push the drive into the bay and attach it with the two screws **1** from the filler panel.
8. Loosen the four thumbscrews **8** on the shuttle at the back of the server.

9. Pull the shuttle **7** toward the back of the server.
10. Connect one of the connectors on the SCSI cable for the removable-media drive bays **6** to the back of the drive **5**.
11. Connect a power cable to the back of the drive. Power cables for removable-media drives come installed in the server. The connectors are keyed and can be inserted only one way.
12. If you are installing another 5.25-inch drive, do so at this time. Otherwise, continue with the next step.
13. Push the shuttle **7** toward the front of the server and tighten the four thumbscrews **8** at the back of the shuttle.
14. Install the media-bay trim bezel and the NetBAY3 bezel that you removed earlier. (See "Installing the trim bezels and server door" on page 156)
15. If you have other options to install or remove, do so now; otherwise, go to "Completing the installation" on page 154.

**Installing a drive in a hot-swap bay:** The bays on the right front of the server support hot-swap drives only.

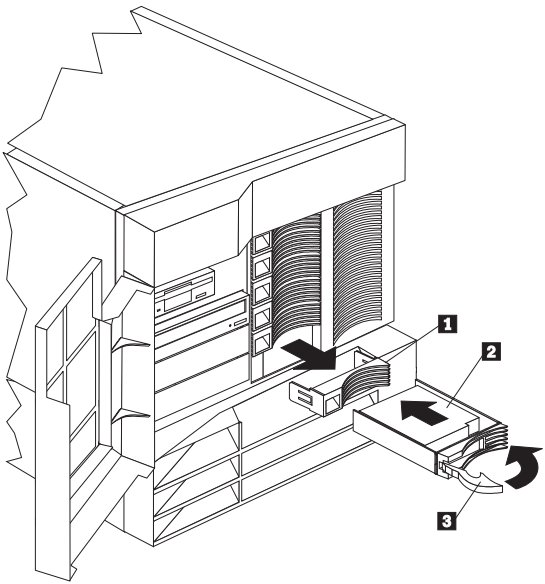
**Note**

You do not have to turn off the server to install hot-swap drives in these bays. However, you must turn off the server when performing any steps that involve installing or removing cables.

**Before you begin:**

- Read "Safety information" on page 308.
- Read the documentation that comes with the drive.
- Reviewed "ServeRAID Configuration program" on page 74. for information about the RAID controller and disk-array configuration.
- Prepare the drive for installation (see "Preinstallation steps (all bays)" on page 200).

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



- 1** Filler panel
- 2** Hot-swap hard disk drive
- 3** Drive tray handle (open position)

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

1. Unlock and open the server door (see “Preparing to install options” on page 220).

**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(s) **1** 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.
3. Install the hard disk drive **2** in the hot-swap bay:
  - a. Ensure the tray handle **3** 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 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 drives are operating properly.
5. Close and lock the server door.

**Note**

Because the server has a RAID controller, you must reconfigure the disk arrays after installing hard disk drives. Record the configuration information.

## Replacing a drive in a hot-swap bay

**Note**

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

**Attention**

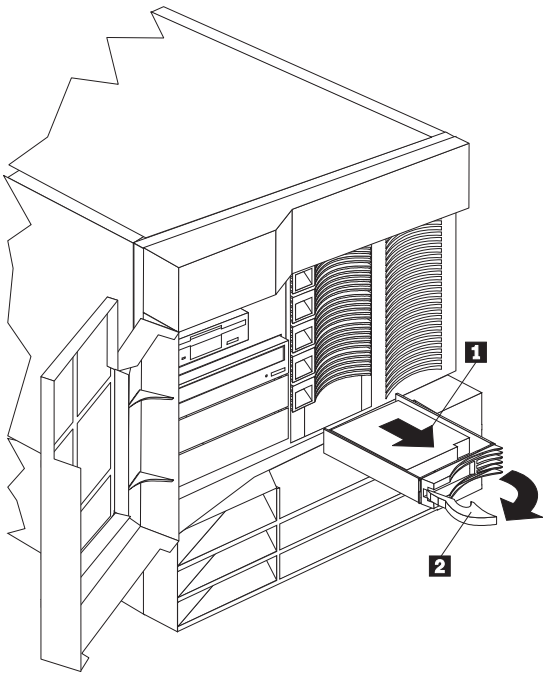
Before you remove from a hot-swap bay a hard disk drive that is not defective, back up all important data.

Before you attempt to remove a defective drive, thoroughly review the information that appears on the server screen to determine the location of the failed drive. "ServeRAID menus, screens, and drive states" on page 83 explains the status codes that the server uses to indicate a defective drive. Also, if the amber Hard Disk Status light for a drive is lit continuously, that individual drive is faulty and needs to be replaced. If you remove a hard disk drive that is not defective from an array that already has a defective hard disk drive, all data in the array will be lost. This situation is especially relevant if you assigned RAID level 1 or 5 to the logical drives in the disk array. However, the RAID controller can rebuild the data that you need, provided that certain conditions are met. See "Replacing a faulty drive" on page 129 for further details.

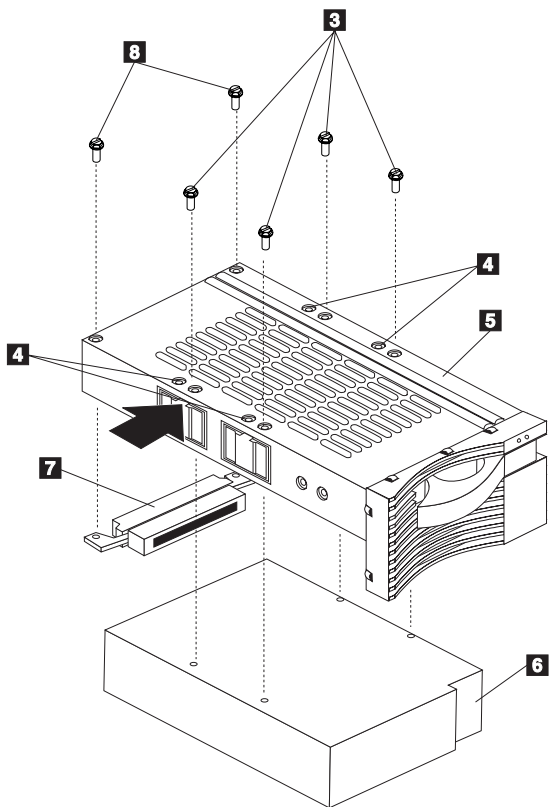
**Before you begin:**

- Read "Safety information" on page 308.
- Read the documentation that comes with the drive.
- Reviewed "ServeRAID Configuration program" on page 74. for information about the ServeRAID controller and disk-array configuration.
- Prepare the drive for installation (see "Preinstallation steps (all bays)" on page 200).

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



- 1** Hard disk drive
- 2** Drive tray handle (open position)



- 3** Screws for half-high drive
- 4** Screw holes for slim-high drive
- 5** Drive tray
- 6** Drive
- 7** Connector for half-high drive
- 8** Screws for half-high drive connector

**To replace a drive in a hot-swap bay:**

1. Unlock and open the server door (see “Preparing to install options” on page 220).

**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 **1** by placing the handle **2** on the drive to the open position (perpendicular to the drive) and pulling the hot-swap tray from the bay.
3. Remove the hard disk drive from the tray:
  - a. If the drive is a half-high drive, remove the two screws **8** that hold the connector **7** to the

- hot-swap tray **5**; then, remove the connector from the back of the drive.
- b. Remove the four screws **3** (for a half-high drive) or **4** (for a slim-high drive) that attach the drive **6** to the hot-swap tray, and remove the drive from the tray.
4. Place the new hard disk drive on the hot-swap tray and attach the drive to the tray using four screws, as follows:
    - a. If the drive is a half-high drive, use screws **3** to attach the drive to the tray. If the drive is a slim-high drive, use screws in holes **4** to attach the drive to the tray.
    - b. As you tighten each screw, press on the metal spring nearest the screw at the point indicated by the arrow on the illustration.
    - c. If the drive is a half-high drive, plug the connector **7** to the back of the drive and secure the connector to the drive with screws **8**. (Slim-high drives do not need the connector.)
  5. 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.
  6. Check the hard disk drive status indicators to verify that the hard disk drive is installed properly.
  7. Close and lock the server door.



## Installing devices in the NetBAY3

This appendix contains information about installing devices in the NetBAY3.

### Note

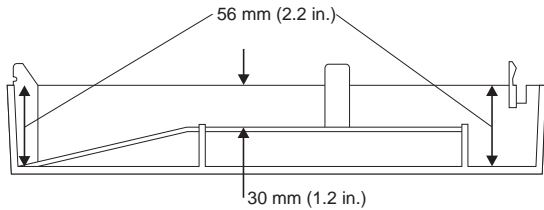
The illustrations in this appendix do not show the server on top of the NetBAY3, however, you do not need to remove the NetBAY3 to install devices.

**General considerations:** You can install three types of devices in the NetBAY3:

- Devices, such as the IBM EXP10, that sit on side rails
- Cantilevered devices, such as a power distribution unit (PDU), that are screwed to the front or rear of the NetBAY3
- Devices that sit on the NetBAY3 base plate

### Notes

1. To allow the NetBAY3 front bezel to close, devices with handles must not protrude out more than 56 mm (2.2 in.). The following illustration of the front bezel top-view cross section shows the clearances.
2. All device cables must exit from the rear of the NetBAY3.

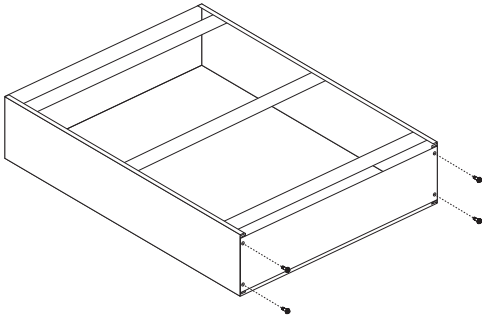


## Removing the rear panel

### Note

Do not remove the rear panel if you are not installing a device in the NetBAY3.

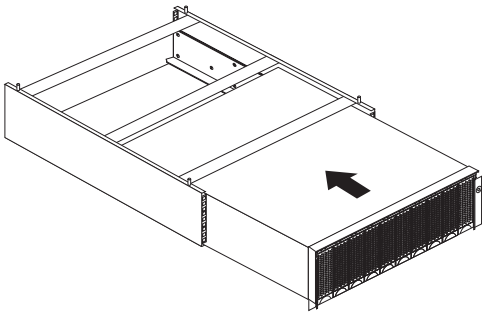
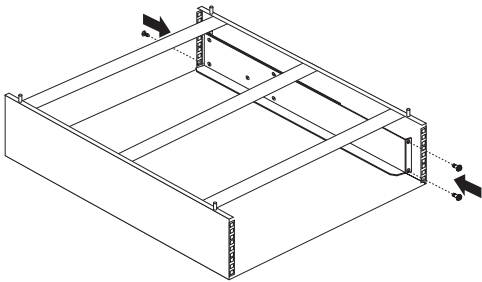
1. Remove the NetBAY3 rear panel.
  - a. Remove the four screws.
  - b. Lift the rear panel off.



2. After you remove the rear panel, do one of the following:
  - Install a device on rails in the NetBAY3. (Go to "Installing devices on side rails.")
  - Install a cantilevered device in the NetBAY3. (Go to "Installing cantilevered devices" on page 212.)
  - Install a device on the NetBAY3 base plate. (Go to "Installing devices on the NetBAY3 base plate" on page 213.)

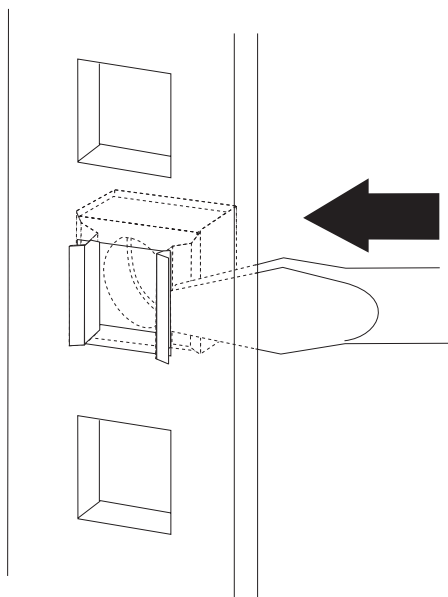
**Installing devices on side rails:** Installing devices that sit on side rails in a NetBAY3 is similar to installing these devices in a rack enclosure. The device side rails must be screwed to the NetBAY3 vertical mounting rails. Follow the instructions in the documentation that comes with the device and use the following illustrations as a guide.

If you need to remove or move the cage nuts at the rear of the NetBAY3 to hold the rails, go to "Removing cage nuts" on page 211.



**Removing cage nuts:** Device installation might require the removal or moving of the rear-pane cage nuts. If you need to move the cage nuts, follow this procedure to move them and then go to "Installing cage nuts" on page 212 to install them in the correct position.

1. Hold the cage nut in place and compress the cage-nut clip with a flat screwdriver blade.



2. With the cage nut-clip compressed, push the cage nut-clip out of the square hole.
3. Release the screwdriver pressure on the clip. The cage nut is now loose and can be removed from the square hole.

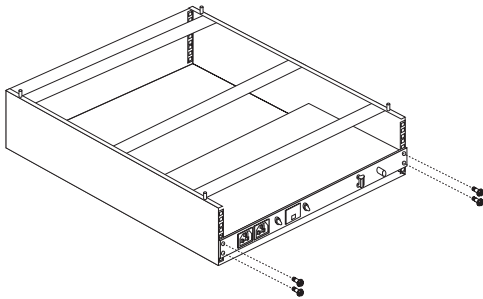
**Installing cage nuts:** The nuts go toward the inside of the NetBAY3. Make sure you install all the cage nuts at the same level on the mounting rails.

1. Hook one side of the cage-nut clip into the rack-mounting-rail square hole.
2. Hold the cage nut in place and compress the cage-nut clip with a flat screwdriver blade.
3. With the cage-nut clip compressed, push the cage-nut clip into the square hole.
4. Release the screwdriver pressure on the clip. The cage nut is now locked in the square hole.

⚠

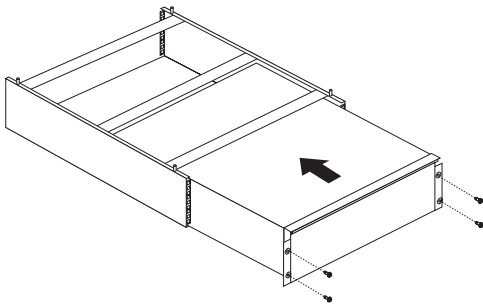
5i topmar=1p.

**Installing cantilevered devices:** Installing cantilevered devices in a NetBAY3 is similar to installing these devices in a rack enclosure. Cantilevered devices can be installed in the front or rear of the NetBAY3. The devices must be screwed to the NetBAY3 vertical mounting rails. Follow the instructions in the documentation that comes with the device and use the following figure as a guide.



### Installing devices on the NetBAY3 base

**plate:** Some devices rest on the NetBAY3 base plate. These devices must be screwed to the NetBAY3 vertical mounting rails.



## Memory-module kits

### Note

If installing a 256MB Registered memory module in the server, ensure the jumper is installed on pins 2 and 3 of Jumper Block J12 on the processor board.

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 memory-module installed in connector J1, the connector nearest the rear of the server. Install additional memory modules in connectors J2, J3, and J4, in that order. If you mix DIMM sizes, install the largest sized DIMM in connector J1, the next largest sized DIMM in connector J2, and so forth.

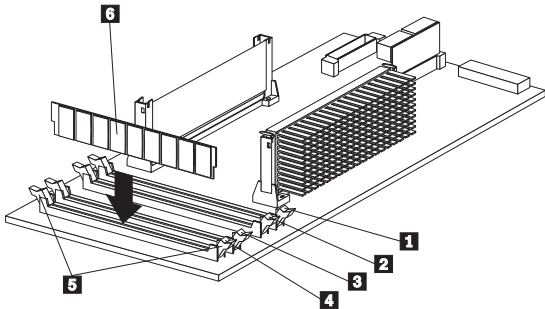
### Notes

1. The memory-module kit sizes available for the server are 64 MB, 128 MB, and 256 MB. The server supports a minimum of 128 MB and a maximum of 1 GB of system memory.
2. Install only 3.3 V, 168-pin, 8-byte DIMMs. Only 100 MHz, 72-bit, unbuffered, synchronous, error correcting code (ECC), x8 configuration DIMM memory is supported for the 64 MB and 128 MB DIMMs. Only 100 MHz, 72-bit, registered, synchronous, ECC, x4 configuration DIMM memory is supported for the 256 MB DIMMs.
3. Mixing of DIMM types (registered and unbuffered) is not supported. You can install 64 MB unbuffered and 128 MB unbuffered DIMMs in the same system, but neither 64 MB unbuffered nor 128 MB unbuffered DIMMs can be installed in a system with 256 MB registered DIMMs.
4. Installing or removing memory modules changes the configuration information in the server. Therefore, after installing or removing a DIMM, save the new configuration information in the Configuration/Setup program. When you restart the server, the system displays a message indicating that the memory configuration has changed. Start the Configuration/Setup program and select **Save Settings**. See "Using the Configuration/Setup Utility Main menu" on page 91 for more information.

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

**Note**

The illustration shows only the processor board for simplicity; you do not need to remove the processor board to install a memory module.



- 1** Memory socket (Bank 1 (J4))
- 2** Memory socket (Bank 2 (J3))
- 3** Memory socket (Bank 3 (J2))
- 4** Memory socket (Bank 4 (J1))
- 5** Retaining clips
- 6** DIMM

**Before you begin:**

- Read "Safety information" on page 308.
- Read the documentation that comes with the option.

**To install a memory module:**

1. Turn off the server and peripheral devices and disconnect all external cables and power cords (see "Preparing to install options" on page 220); then remove the top cover (see "Top cover removal" on page 262).
2. Locate the memory-module connectors on the memory board.
3. Touch the static-protective package containing the memory-module kit to any unpainted metal surface on the server. Then, remove the memory module from the package.
4. Install the memory module:

**Note**

To avoid breaking the retaining clips or damaging the memory-module connectors, handle the clips gently.

- a. Locate the lowest-numbered, empty memory-module connector on the processor board.
  - b. Turn the memory module (DIMM) **6** so that the pins align correctly with the connector **4**.
  - c. 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.
  - d. Repeat the preceding step to make sure the DIMM is seated correctly.
  - e. Make sure the retaining clips **5** are in the closed position.
  - f. 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.
  - g. Repeat these steps for each memory module that you install.
5. If you have other options to install or remove, do so now; otherwise, go to "Completing the installation" on page 154.



## Microprocessor kit

The server comes with one microprocessor installed on the processor board. When 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 308.
- 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 and the IBM Bulletin Board System (BBS). See "Online support" on page iv for the appropriate World Wide Web addresses and bulletin-board telephone numbers.
- 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.

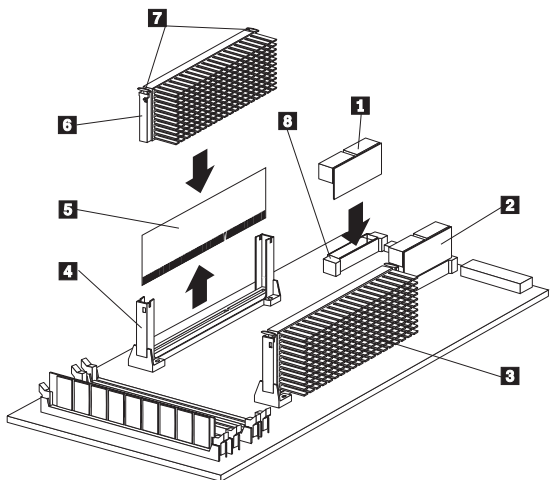
### Notes:

1. The illustrations in this section might differ slightly from the hardware.
2. To avoid damage and ensure proper server operation when you install a new or additional microprocessor, use the same speed and voltage as those of the currently installed microprocessor. Microprocessor internal and external clock frequencies must be identical.
3. The microprocessor that is installed in the primary microprocessor connector is CPU or processor 1. If a microprocessor is installed in the secondary microprocessor connector, it is CPU or processor 2. If the server has only one microprocessor installed, that microprocessor is installed in the primary microprocessor connector and is the boot processor. If the server has two microprocessors installed, the microprocessor in the secondary microprocessor connector is the boot processor and the microprocessor in the primary microprocessor connector is the application processor.

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

#### Note

The illustration shows only the processor board for simplicity; you do not need to remove the processor board to install a microprocessor kit.



- 1** Voltage regulator module (VRM) for secondary microprocessor
- 2** VRM for primary microprocessor
- 3** Primary microprocessor (CPU or processor 1)
- 4** Secondary microprocessor connector
- 5** Terminator card
- 6** Secondary microprocessor (CPU or processor 2)
- 7** Latches
- 8** Connector for VRM for secondary microprocessor

#### 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 220); then remove the top cover (see "Top cover removal" on page 262).
2. Remove the terminator card **5** from the secondary microprocessor connector **4**. You do not need the terminator card when you have a second microprocessor installed. You can store it in a safe place in the static-protective package that the new microprocessor is shipped in.
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 **6** over the secondary connector **4**.

**Attention**

Make sure the microprocessor is oriented and aligned correctly before you try to press it into the connector.

- c. Press in on the latches **7** and carefully insert the microprocessor into the connector.
- d. Press outward on the latches **7** to lock the microprocessor in place.

**Note**

To remove the microprocessor, press in on the latches **7** and lift the microprocessor out of the connector.

- 4. Install the voltage regulator module (VRM) **1** included in the microprocessor kit in the secondary VRM connector **3**.

**Note**

If you remove the secondary microprocessor at some time in the future, remember to install the terminator card in the secondary microprocessor connector and to remove the VRM for the secondary microprocessor.

- 5. If you have other options to install or remove, do so now; otherwise, go to "Completing the installation" on page 154.

## Preparing to install options

### Before you begin:

Read "Safety information" on page 308.

### Note

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

If you are:

- Installing or removing a hot-plug PCI adapter, go to "Adapters" on page 142.
  - Installing or replacing a hot-swap hard disk drive, go to "Internal drive installation" on page 197.
  - Installing or replacing a hot-swap power supply, go to "Hot-swap power supply installation" on page 181.
  - Removing a hot-swap power supply, go to "Hot-swap power supply removal" on page 185.
  - Replacing a hot-swap fan, go to "Hot-swap fan assembly" on page 187.
  - Installing or removing an option not listed in the preceding list, continue with the following steps.
1. Unlock and open the server door.



### Caution

When unlocked, the server door will not support the weight of the server. To avoid personal injury, be sure to remove or lock the server door before moving or lifting the server.

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 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.

3. If you have a modem or fax machine attached to the server, disconnect the telephone line from the electrical outlet.

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



**Caution**

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

Go to "Top cover removal" on page 262.

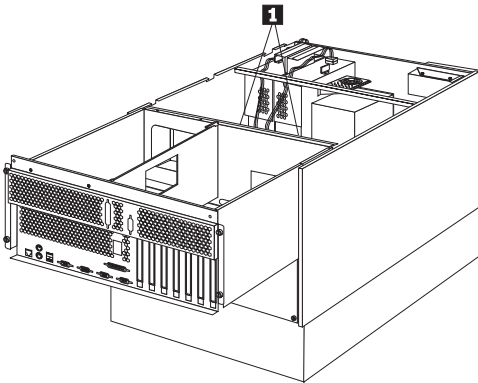
## Power backplane removal

### Before you begin:

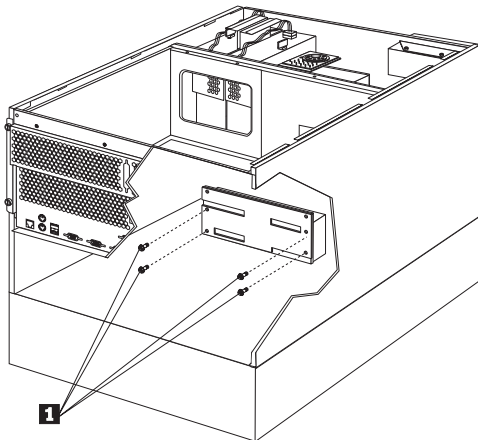
Read "Safety information" on page 308.

To remove the power backplane, to the following

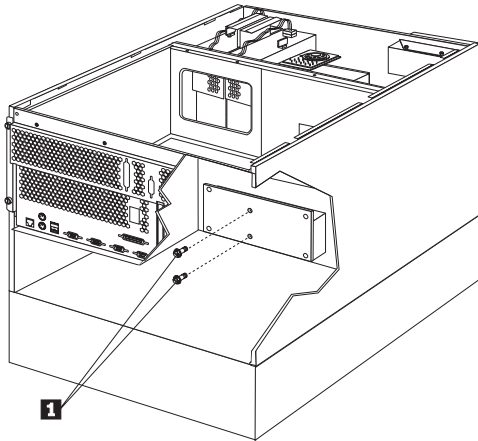
1. Remove the top cover (see "Top cover removal" on page 262).
2. To access the power backplane cables, slide the shuttle to the rear of the system, see "Shuttle removal" on page 253.
3. Disconnect the power backplane cables.
4. Remove the power backplane cover.



- a. Remove the power backplane cover screws **1**.



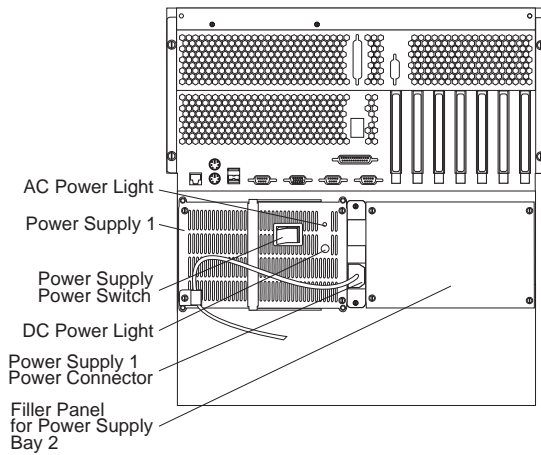
- b. Remove the power backplane cover screws **1**, then; remove the power backplane cover.
  - c.
5. Remove the power backplane.



- a. Remove the power backplane screws **1**, then; remove the power backplane.

## Power supplies

The following illustration shows the power supplies on the server.



**Hot-Swap Power Supplies:** The server comes with one hot-swap power supply installed. You can install a second hot-swap power supply to provide redundant power. You cannot hot-swap a power supply if the server has only one power supply installed. (See “Hot-swap power supply installation” on page 181 for instructions.)

**Power Switch:** This switch turns the power supply on and off.

**AC and DC Power Lights:** These lights provide status information about the power supply. For normal operation, both lights should be on. For any other combination of lights, see “Symptom-to-FRU index” on page 264 for more information.

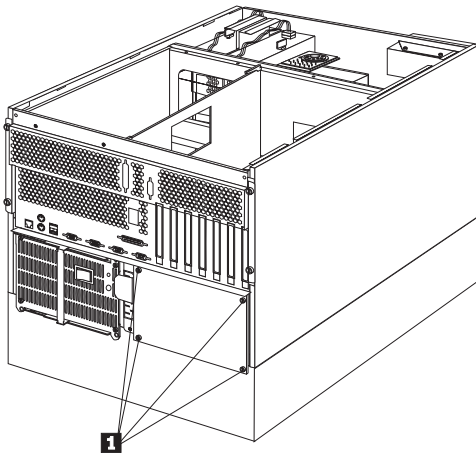


## Power supply filler plate

### Before you begin:

Read "Safety information" on page 308.

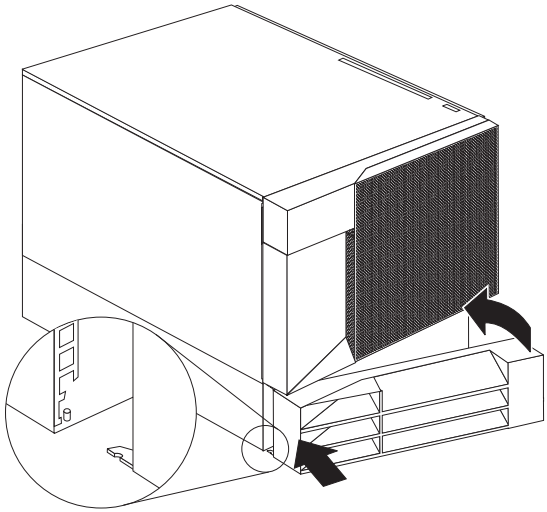
To remove the power supply filler plate, do the following:



1. Remove the power supply filler plate screws **1**, then; remove the power supply filler plate.

## NetBAY3 bezel installation

The NetBAY3 bezel is shipped, unattached, inside the NetBAY3.

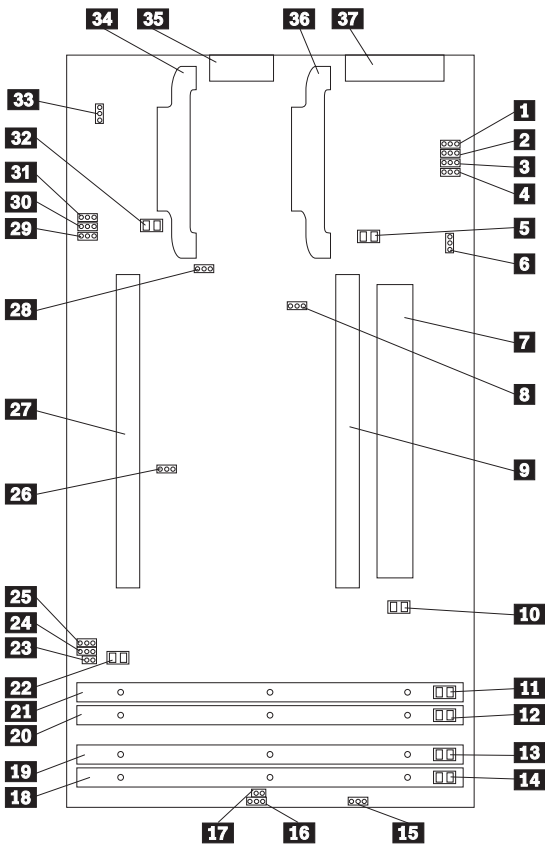


### To install the NetBAY3 bezel:

1. Remove the package containing the NetBAY3 bezel and unpack the bezel.
2. Hook the tabs on the left side of the NetBAY3 bezel around the posts on the NetBAY3.
3. Gently push the right side of the bezel toward the server until the bezel snaps into place.
4. Lock the NetBAY3 bezel.

## Processor board component locations

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



- 1 – 4** Microprocessor core-frequency-selection jumper block (J27–J30)
- 5** Primary microprocessor VRM error LED (CR17)
- 6** Reserved (J20)
- 7** System board interface connector (J9) (on reverse side of processor board)
- 8** Reserved (J5)
- 9** Primary microprocessor card connector (U5)
- 10** Primary microprocessor error LED (CR12)
- 11** DIMM 1 error LED (CR8)
- 12** DIMM 2 error LED (CR9)
- 13** DIMM 3 error LED (CR10)
- 14** DIMM 4 error LED (CR11)
- 15** Reserved (J12)
- 16** Reserved (J13)
- 17** Reserved (J8)
- 18** DIMM socket 4 (J1)

- 19** DIMM socket 3 (J2)
- 20** DIMM socket 2 (J3)
- 21** DIMM socket 1 (J4)
- 22** Secondary microprocessor error LED (CR13)
- 23** Reserved (J7)
- 24** Reserved (J24)
- 25** Reserved (J6)
- 26** Reserved (J16)
- 27** Secondary microprocessor card connector (U6)
- 28** Reset-system jumper block (J23)
- 29** Reserved (J15)
- 30** Reserved (J14)
- 31** Reserved (J11)
- 32** Secondary microprocessor VRM error LED (CR19)
- 33** Reserved (J18)
- 34** Secondary microprocessor VRM connector (U22)
- 35** Power control connector (J17)
- 36** Primary microprocessor VRM connector (U15)
- 37** Power supply connector (J10)

## Processor board jumpers

Table 9 on page 230 contains the names and descriptions of the jumper blocks located on the processor board. The highlighted numbers in the table refer to the highlighted numbers in the illustration in "Processor board component locations" on page 227.

### Notes

1. Turn off the server, and disconnect the power cords before moving any jumpers.
2. Be sure the microprocessor bus-to-core fraction is set correctly. For example, if you have a 350 MHz microprocessor installed and the system bus speed is 100 MHz (the default), be sure that the jumpers are set to a bus-to-core fraction of 3.5 (350/100). Refer to jumpers J27–J30 in Table 9 on page 230 and Table 10 on page 231.

MHz denotes internal clock speed of the microprocessor only; other factors also affect application performance.

### Attention

If installing or changing to a different speed processor than the original processor, be sure to change the processor core-frequency selection jumpers on the processor board. If the microprocessor bus-to-core fraction is incorrect, system board components will overheat and component damage might occur.

**Table 9. Processor Board Jumpers**

Jumper Name	Description
<b>1-4</b> Microprocessor core frequency selection (J27–J30)	<p>The default core/bus fraction is 3.5 (350/100 MHz). Jumpers are installed on pins 1 and 2 of J27 and J30; and jumpers are installed on pins 2 and 3 of J28 and J29.</p> <p>For the core/bus fraction 4 (400/100 MHz), the jumpers are installed on pins 1 and 2 of J28, J29, and J30; and a jumper is installed on pins 2 and 3 of J27.</p> <p>For the core/bus fraction 4.5 (450/100 MHz), jumpers are installed on pins 1 and 2 of J28 and J30; and jumpers are installed on pins 2 and 3 of J27 and J29.</p> <p>For the core/bus fraction 5.0 (500/100 MHz), jumpers are installed on pins 1 and 2 of J28 and J30; and jumpers are installed on pins 2 and 3 of J27 and J29.</p> <p>For the core/bus fraction 5.5 (550/100 MHz), jumpers are installed on pins 1 and 2 of J30; and jumpers are installed on pins 2 and 3 of J27, J28, and J29.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p style="text-align: center;"><b>Note</b></p> <p>For core/bus fractions of 4.5 and up (450/100 MHz and up), the system will automatically detect the microprocessor speed and will set itself up accordingly. Therefore, the jumper settings are not applicable.</p> </div>
<b>8</b> J5 Reserved	The default position is a jumper on pins 1 and 2.
<b>15</b> J12 SDRAM selection	If the server has unbuffered SDRAM, a jumper should be on pins 1 and 2. If the server has registered SDRAM, a jumper should be on pins 2 and 3.
<b>16</b> J13 Reserved	The default position is a jumper on pins 1 and 2.
<b>17</b> J8 Reserved	The default position is no jumper on J8.
<b>23</b> J7 Reserved	The default position is a jumper on pins 1 and 2.
<b>24</b> J24 Reserved	The default position is a jumper on pins 2 and 3.
<b>25</b> J6 Reserved	The default position is a jumper on pins 1 and 2.
<b>26</b> J16 Reserved	The default position is a jumper on pins 1 and 2.
<b>28</b> J23 System reset	In normal operation, there is either a jumper on pins 2 and 3 of J23 or no jumper on J23. Installing a jumper on pins 1 and 2 of J23 forces the system into the reset state.
<b>29</b> J15 Reserved	The default position is a jumper on pins 1 and 2.
<b>30</b> J14 Reserved	The default position is a jumper on pins 2 and 3.
<b>31</b> J11 Reserved	The default position is a jumper on pins 1 and 2.

*Table 10. Microprocessor Core Frequency Selection*

<b>Core/Bus Fraction</b>	<b>J27 Jumper</b>	<b>J28 Jumper</b>	<b>J29 Jumper</b>	<b>J30 Jumper</b>
350/100	Pins 1 and 2	Pins 2 and 3	Pins 2 and 3	Pins 1 and 2
400/100	Pins 2 and 3	Pins 1 and 2	Pins 1 and 2	Pins 1 and 2
450/100	Pins 2 and 3	Pins 1 and 2	Pins 2 and 3	Pins 1 and 2
500/100	Pins 2 and 3	Pins 1 and 2	Pins 2 and 3	Pins 1 and 2
550/100	Pins 2 and 3	Pins 2 and 3	Pins 2 and 3	Pins 1 and 2

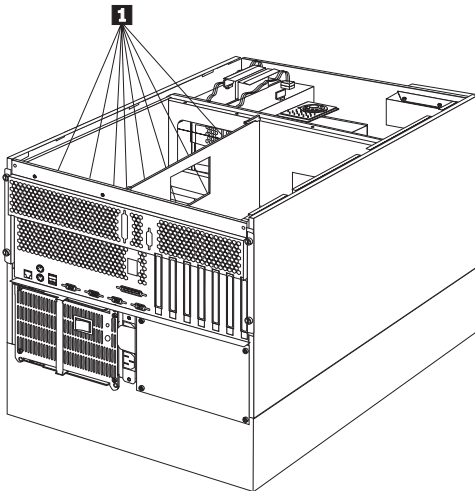
## Processor board removal

### Before you begin:

Read "Safety information" on page 308.

To remove the processor board, do the following.

1. Remove the top cover (see "Top cover removal" on page 262).
2. Disconnect all processor board cables.
3. Remove the processor board.



4. Remove the processor board screws **1**, then; lift the processor board out of the tray.

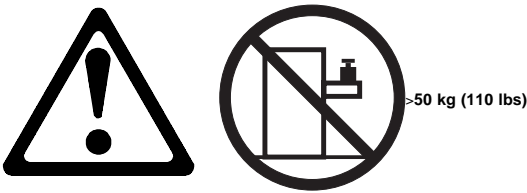


## Rack installation

This chapter provides instructions for installing a server in a rack and for removing a server from a rack.

The server comes with all the rack installation hardware (rack model only). Review the preinstallation information in “Before you begin”; then, continue with “Installing and removing the server.”

## 12



### Caution

Do not place any object weighing more than 50 kg (110 lbs) on top of the rack model of the server.

## Before you begin

- You will need the following items:
  - An assortment of small screwdrivers
  - 8-inch adjustable wrench or pliers

Some of the installation procedures require three people.

- To ensure rack stability, plan the installation of servers in the rack starting from the bottom. For more information, refer to the IBM Netfinity Rack Configurator program provided with ServerGuide.
- 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 75.

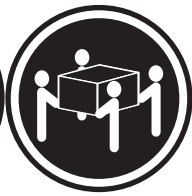
**Installing and removing the server:** During the installation procedure, you must install parts on the rack and the server. This process can be divided into two parts:

- Preparing the rack
- Installing the server in the rack

## Preparing the rack



≥32 kg (70.5 lbs)



≥55 kg (121.2 lbs)

### Caution

Use safe lifting practices when lifting the machine.

In this section, you will use the following parts:

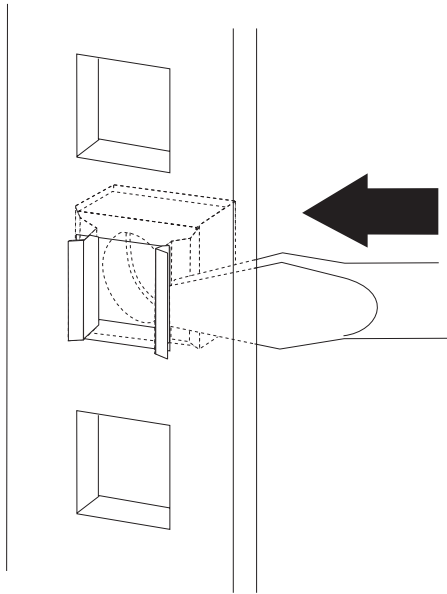
- IBM Installation Template
- Two slide-bracket assemblies
- One cable-management arm
- Two bezel brackets
- Six screws (for attaching the bezel brackets)
- Sixteen long screws (M6 by 16 mm)
- Eight short screws (M4 by 8 mm)
- Six cage nuts
- Two hex nuts (M6)
- Four lift handles (shipped with some servers)
- Cable ties
- One server bracket (for attaching the cable management arm to the server)

### Attention

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

To attach the mounting hardware to the rack:

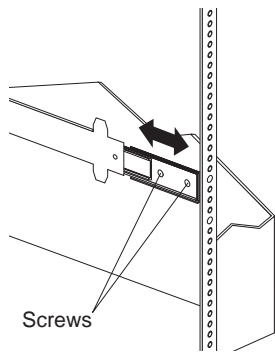
1. Remove the rack front door. Refer to the rack documentation for instructions.
2. Mark the positions of the slide-bracket assemblies, bezel brackets, and the cable-management arm on the rack:
  - a. Position the installation template on the front mounting rails on the rack, aligning the holes.
  - b. Mark the holes for the slide-bracket assemblies and bezel brackets.
  - c. Move the template to the same U level at the rear of the server and mark the locations for the slide-bracket assemblies and cable-management arm.
  - d. Install the six cage nuts at the locations marked on the mounting rails.



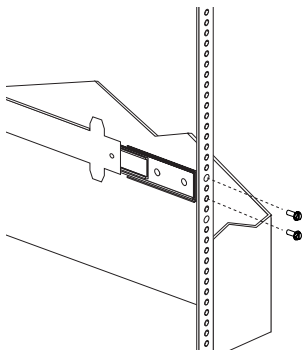
3. Attach a slide-bracket assembly to the front of the rack:

*Notes:*

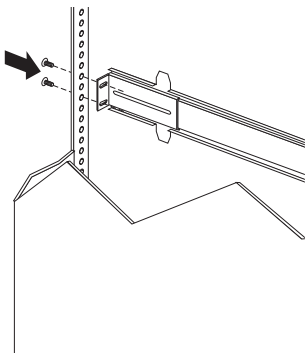
- Get another person to help you attach the slide-bracket assemblies to the rack.
  - The slide-bracket assemblies can be installed on either the left or right side of the rack.
  - Refer to the illustrations for examples of the proper alignment of the slide-bracket assemblies.
- a. Position the slide-bracket assembly behind the mounting rail so that the slides will extend out from the front of the rack.
  - b. If necessary, loosen the screws at the rear of the slide bracket assembly and adjust the length of the slide-bracket to fit the mounting rail. Tighten the screws.



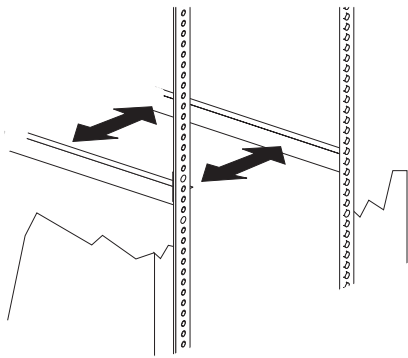
- c. Insert screws (6M by 16 mm) through the mounting rail to the slide-bracket assembly. Do not tighten the screws.



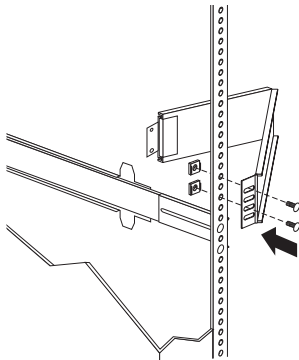
4. Attach the slide bracket assembly to the rear of the rack:
  - a. Position the slide-bracket assembly inside the mounting rail.
  - b. Insert screws (6M by 16mm) through the mounting rail to the slide-bracket assembly. Do not tighten the screws.



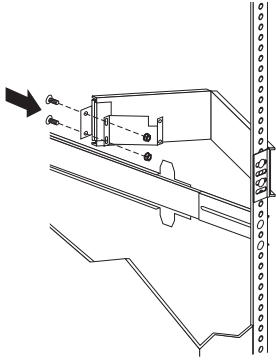
5. Attach the other slide-bracket assembly to the front and rear of the rack.
6. Push the slide-bracket assemblies to the outermost positions on the rack.



7. Tighten all screws to secure both slide-bracket assemblies. If you are using a torque screwdriver, use the following torque setting: 8–11 Nm (70.8–97.0 in/lbs).
8. Attach the cable-management arm to the rear of the rack:
  - a. Position the cable-management arm bracket on the outside of the mounting rail.
  - b. Insert screws (M6 by 16 mm) through the cable-management arm bracket, mounting rail, and cage nuts. Tighten the screws.



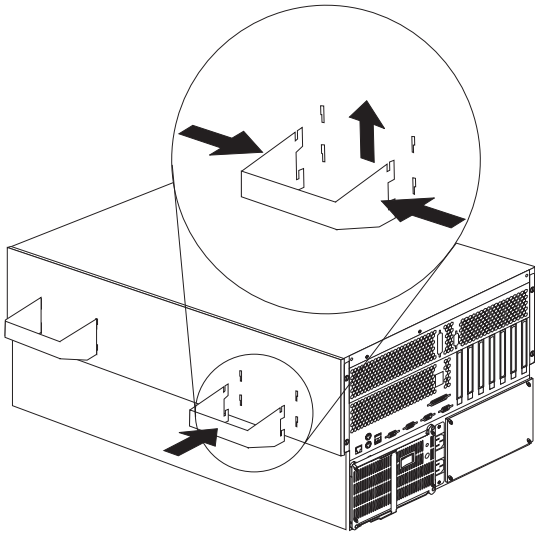
- c. Position the server bracket on the cable-management arm.
- d. Insert screws through the cable-management arm and the server bracket. Attach M6 hex nuts to the screws and tighten the hex nuts.



**Installing the server in the rack:** In this section, you will use eight screws (M4 by 8).

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

1. Fully extend the slide-bracket assemblies until they lock.
2. Install the four lift handles on the sides of the server:
  - a. Press in on the sides of the lift handle near the tabs and insert the handle tabs into the slots on the side of the server.
  - b. Move the handle up in the slots so that the hooked part of each tab is inside the server. Release the pressure on the sides of the handle.
  - c. Install the remaining three lift handles.







≥32 kg (70.5 lbs)

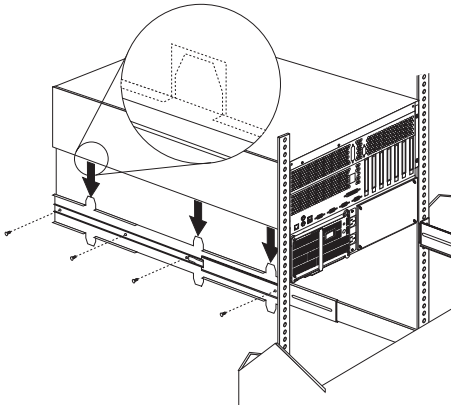


≥55 kg (121.2 lbs)

**Caution**

Use safe lifting practices when lifting the machine.

3. Lift and position the server so that the bayonet slots on the server are above the bayonets on the slide-bracket assemblies.
4. Lower the server and slip the bayonets into the bayonet slots.
5. Insert screws through one slide-bracket assembly and server side. Tighten the screws. Repeat this step for the other slide-bracket assembly on the opposite side of the server. This secures the server.

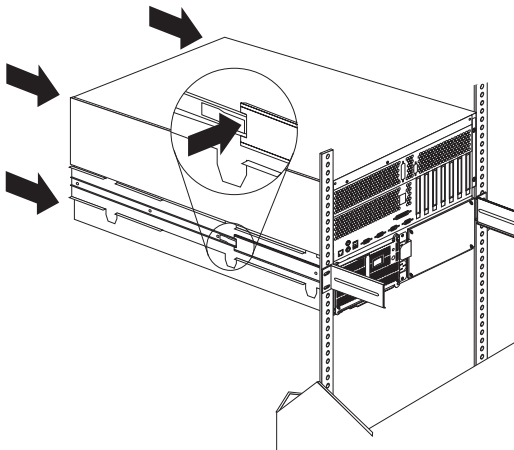


6. Remove the four lift handles from the sides of the server:
  - a. Grasp the lift handle and press in on the sides of the lift handle near the tabs until the tabs touch the inside edges of the slots.
  - b. Move the handle down in the slots so that the hooked parts of the tabs clear the top edges of the slots; then, pull the handle away from the server.
  - c. Remove the remaining three handles. Store the handles in a safe place.

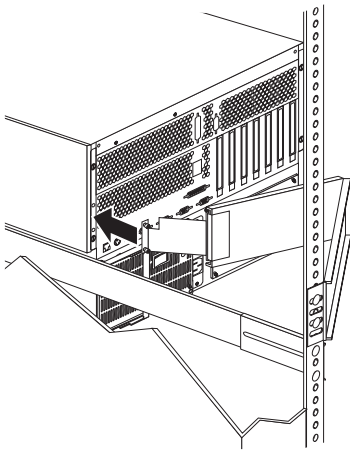
**Note**

When the drawer is fully extended, safety latches on the slide-brackets lock into place. To release the safety latch, press the latch on each side of the rack.

7. Press the safety latches and slide the drawer about halfway into the rack.

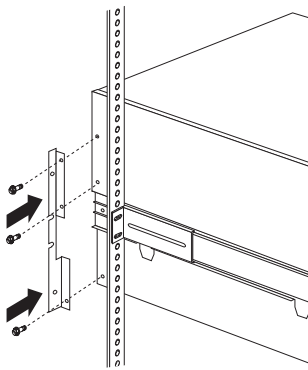


8. Attach the cable-management arm to the server using the captive screws.

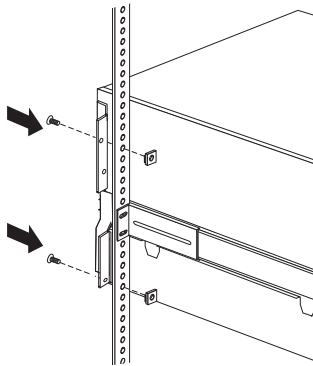


9. Attach the monitor, keyboard, and power cables to the corresponding connectors on the server. Refer to the rack documentation for instructions.
10. Attach the cables to the cable-management arm using cable ties.

11. Attach the two bezel brackets (one for each side) to the front sides of the server with the six screws provided.



12. Secure the server in the rack:
  - a. Slide the server into the rack.
  - b. Secure the server to both sides of the rack by inserting screws (M6 by 16 mm) through the bezel brackets, mounting rails, and cage nuts.



13. Install the rack front door.
14. To complete the installation, refer to the documentation that came with the rack.

## **Removing the server from a rack**

### **Before you begin**

- Read “Safety information” on page 308.
- Turn off the server.
- Follow any additional installation and safety instructions that come with the rack.

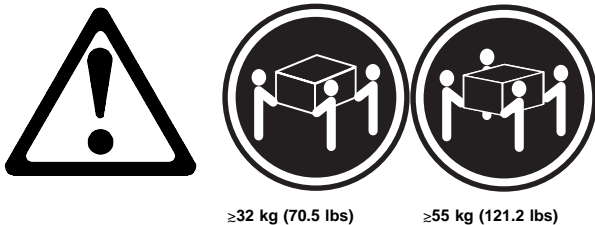
### **To remove the server from a rack:**

1. If you have a modem or fax machine attached to the server, disconnect the telephone line from the electrical outlet and the server.

#### **Note**

If you are in the United Kingdom, you must perform this step before disconnecting the power cords.

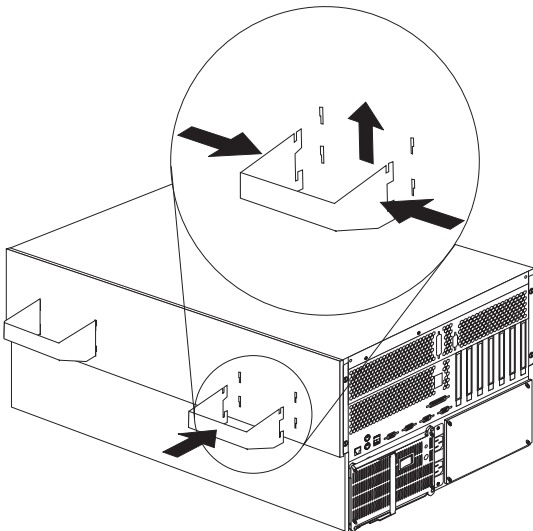
2. Disconnect all cables and power cords from the rear of the server.
3. Disconnect all power cords from the rack.
4. Remove the screws from the bezel brackets on each side of the front bezel. Set them aside for later use.
5. Slide the server about halfway out of the rack.
6. Loosen the captive screws that secure the cable-management arm.
7. Fully extend the slide-bracket assemblies until they lock.
8. Remove the screws that attach the server to each slide-bracket assembly.



**Caution**

Use safe lifting practices when lifting the machine.

9. Install the four lift handles on the sides of the server:
  - a. Press in on the sides of the lift handle near the tabs and insert the handle tabs into the slots on the side of the server.
  - b. Move the handle up in the slots so that the hooked part of each tab is inside the server.  
Release the pressure on the sides of the handle.
  - c. Install the remaining three lift handles.

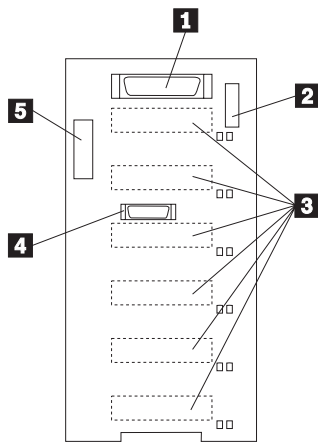


10. Lift the server from the slide bracket assemblies and place the server on a flat, nonconductive surface.



## SCSI backplane component locations

The following simplified layout of the SCSI backplane identifies the components. Refer to this figure when you set the jumpers on the backplane.



- 1** Wide (16-bit) SCSI connector
- 2** Option jumper block (J10)
- 3** SCSI hot-swap drive connectors (on reverse side of backplane)
- 4** Repeater card connector
- 5** Power connector

## SCSI backplane option jumpers

The option jumper block on the SCSI backplane defines the SCSI IDs for hot-swap drives. See the illustration in “SCSI backplane component locations” on page 249 for the location of the option jumper block.

Table 11 summarizes the settings for the SCSI backplane option jumper block (J10).

Pins	Description
1-2	Reserved.
3-4	Reserved
5-6	Placing a jumper on these two pins enables SCSI IDs 8-13
7-8	Reserved.
9-10	Reserved.
11-12	Placing a jumper on these two pins reverses the SCSI IDs on the backplane.
<b>Note:</b> The default is no jumpers installed on the J10 jumper block.	

Table 12 shows the SCSI IDs that you can use for hot-swap drives.

J10 Pins 5-6	J10 Pins 11-12	Bay 1	Bay 2	Bay 3	Bay 4	Bay 5	Bay 6
No jumper	No jumper	0	1	2	3	4	5
No jumper	Jumper	5	4	3	2	1	0
Jumper	No jumper	13	12	11	10	9	8
<b>Notes:</b>							
1. No jumper on pins 5-6 and 11-12 is the default.							
2. Jumpers on pins 5-6 and 11-12 is not supported.							

## Server cabling

Make sure you have an adequate number of properly grounded electrical outlets for the server, monitor, and any other options that you installed. Place the server in a location that is dry. Rain or spilled liquids might damage the server. Leave about 50 mm (2 inches) of space at the right and left sides of the server to allow the server's cooling system to work properly. Leave about 100 mm (4 inches) clearance at the rear for cables.

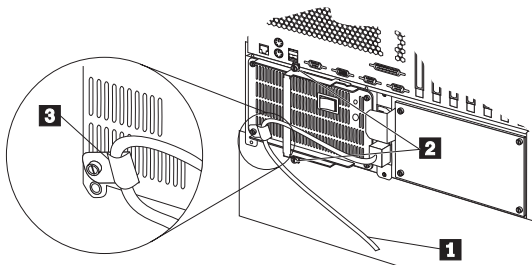
1. Use the illustration in "Input/Output connectors and expansion slots" on page 194 to cable the server.
2. Remove any shipping screws **2** from the power supply.
3. Connect the power cord **1** to the server.



### Caution.

When the power-cord strain-relief bracket option is installed on the power cord, the server must be plugged to a power source that is easily accessible.

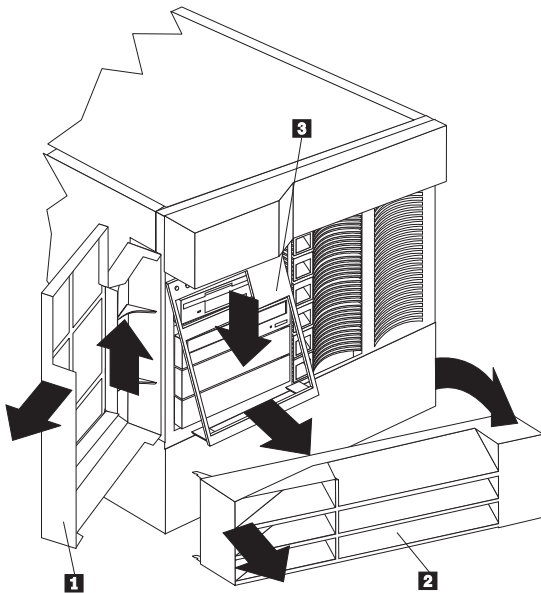
4. Install the power-cord strain-relief bracket **3** (if desired).



5. Plug the power cord into a properly grounded electrical outlet.

## Server door and trim bezels removal

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



### To remove the server door:

1. Unlock and open the server door **1**.
2. Lift the server door up and off its hinges. Store the door in a safe place.

### To remove the NetBAY3 bezel (tower model only):

1. Unlock the NetBAY3 bezel **2**.
2. With your fingers on the ribbed area on the right side of the NetBAY3 bezel **2**, grasp the right side of the NetBAY3 bezel and pull it away from the pedestal.
3. Unhook the left side of the bezel from the server. Store the bezel in a safe place.

### To remove the media-bay trim bezel:

1. Release the two tabs at the bottom edge of the bezel **3** and pull the bottom of the bezel slightly away from the server.
2. Pull the bezel down to release the two tabs at the top edge of the bezel. Store the bezel in a safe place.

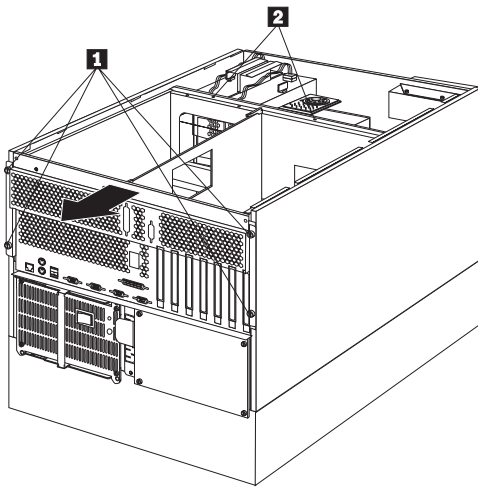
## Shuttle removal

### Before you begin:

Read "Safety information" on page 308.

To remove the shuttle, do the following:

1. Remove the top cover (see "Top cover removal" on page 262).
2. Remove the shuttle.

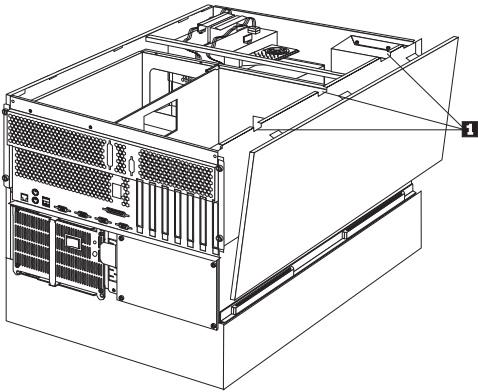


- a. Remove the screws **2**.
- b. Loosen the screws **1**, then: slide the shuttle to the rear of the system.

## Side cover(s) removal

To remove the side cover(s), do the following:

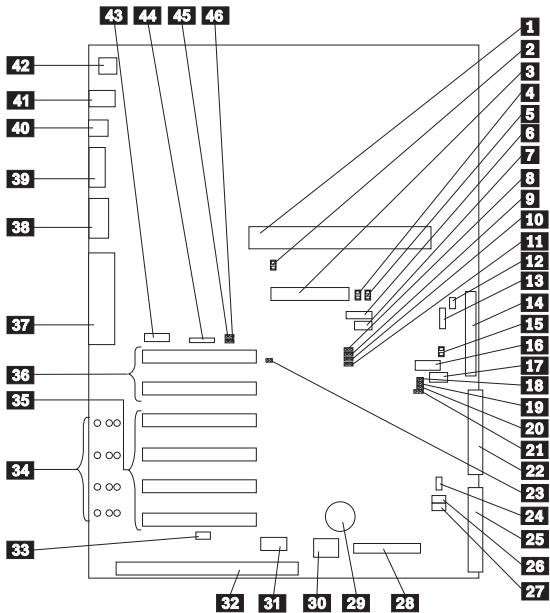
1. Remove the top cover (see "Top cover removal" on page 262).
2. Remove the side cover.



- a. Release the three tabs **1** on the top edge of one side cover and tilt the cover away from the server.
- b. Lift the cover off the server and set it aside.
- c. Repeat the previous steps to remove the other side cover.

## System board component locations

The following illustration shows 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. You might also need to refer to this figure when you set configuration jumpers on the system board.



- 1** Processor board connector (J19)
- 2** System management processor error LED (CR24)
- 3** RAID channel 1 connector (J7)
- 4** RAID channel 1 error LED (CR30)
- 5** RAID channel 2 error LED (CR31)
- 6** Reserved (J54)
- 7** Reserved (J64)
- 8** Disable RAID controller jumper block (J11)
- 9** Reserved (J45)
- 10** Power on control jumper block (J32)
- 11** Reserved (J25)
- 12** Reserved (J9)
- 13** Power backplane cable connector (J8)
- 14** RAID channel 2 connector (to backplane) (J3)
- 15** RAID system error LED (CR32)
- 16** Reserved (J27)
- 17** Reserved (J35)
- 18** SCSI activity LED connector (J52)
- 19** Reserved (J34)
- 20** Reserved (J29)
- 21** Reserved (J26)

- 22** IDE connector (J33)
- 23** System reset jumper block (J51)
- 24** Fan connector (J36)
- 25** Diskette drive connector (J22)
- 26** Power on password override jumper block (J24)
- 27** Flash ROM page swap jumper block (J30)
- 28** Control panel connector (J20)
- 29** Battery
- 30** Reserved (J46)
- 31** Hot-plug PCI controller programmer interface connector (J53)
- 32** ISA expansion slot
- 33** Hot-plug switch connector (J16)
- 34** PCI slot LEDs (four are on the side of the board)
- 35** PCI slots 1–4 (hot-plug)
- 36** PCI slots 5 and 6
- 37** Parallel port connector (J56) (Serial port A and B connectors are below the parallel port connector.)
- 38** Video port connector (J2)
- 39** Management port C connector (J42)
- 40** USB 1 and USB 2 port connectors (USB 2 is below USB 1.) (J31)
- 41** Mouse and keyboard connectors (J1) (The mouse connector is above the keyboard connector.)
- 42** Ethernet port connector (J4)
- 43** Reserved (J17)
- 44** Reserved (J18)
- 45** Disable Ethernet controller jumper block (J5)
- 46** Disable video controller jumper block (J14)



## System board jumpers

Table 13 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 255.

### Note

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

*Table 13. System Board Jumpers*

Jumper Name	Description
<b>8</b> J11 Disable RAID controller	The default position is Enabled (jumper on pins 1 and 2). Move the the jumper to pins 2 and 3 to disable the RAID controller.
<b>9</b> J45 Reserved	The default position is a jumper on pins 2 and 3.
<b>10</b> J32 Power on control	The default position is normal operation (jumper on pins 1 and 2). Moving the jumper to pins 2 and 3 allows the power supply to be turned on without a control panel or system management processor.
<b>11</b> J25 Reserved	The default position is a jumper on pins 1 and 2.
<b>12</b> J9 Reserved	The default position is a jumper on pins 1 and 2.
<b>19</b> J34 Reserved	The default is no jumper installed on J34.
<b>20</b> J29 Reserved	The default is no jumper installed on J29.
<b>21</b> J26 Reserved	The default is a jumper on pins 2 and 3.
<b>23</b> J51 System reset	In normal operation, there is no jumper on J51. Installing a jumper on J51 resets the system logic.
<b>26</b> J24 Power on password override	Changing the position of this jumper bypasses the power-on password check if the jumper has been moved since the server was last powered on. You do not need to move the jumper back to the default position after the password is overridden.  Changing the position of this jumper does not affect the administrator password check if an administrator password is set.
<b>27</b> J30 Flash ROM page swap	The default position is a jumper installed on pins 2 and 3. Changing the position of this jumper will change which of the two pages of Flash ROM is used when the system is started.
<b>45</b> J5 Disable Ethernet controller	The default position is Enabled (jumper on pins 1 and 2). Move the the jumper to pins 2 and 3 to disable the Ethernet controller.
<b>46</b> J14 Disable video controller	The default position is Enabled (jumper on pins 1 and 2). Move the the jumper to pins 2 and 3 to disable the video controller.

## **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 96 for details.) Start the Configuration/Setup utility programs and change the power-on password. See “Using the power-on password menu” on page 95.
- Change the position of the jumper on J24 as described in Table 13 on page 257 to bypass the power-on password check. You can then start the Configuration/Setup utility programs and change the power-on password. See “Using the power-on password menu” on page 95.

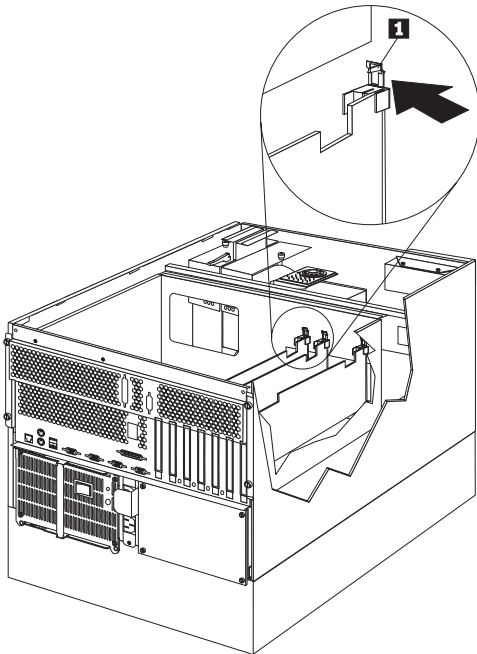
## System board removal

### Notes

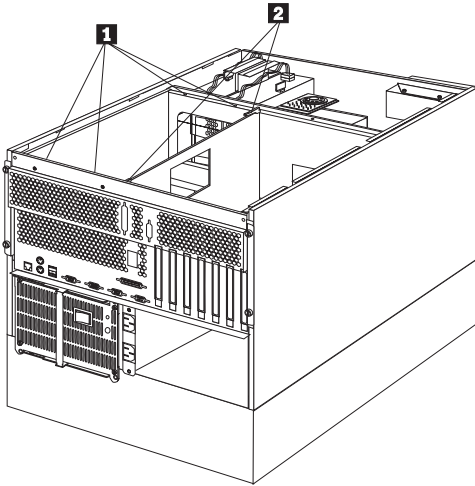
1. Read "Safety information" on page 308.
2. If possible, record the configuration settings before removing the system board. (see "Configuration/Setup Utility program" on page 60.)

To remove the system board, do the following:

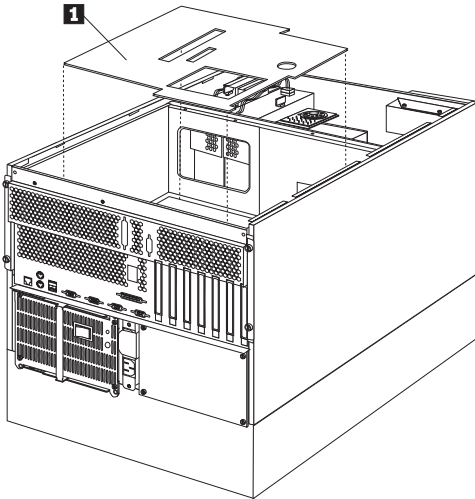
1. Remove the top cover (see "Top cover removal" on page 262).
2. Disconnect all adapter cables and remove the adapters (see "Adapters" on page 142).
3. Remove the adapter dividers.



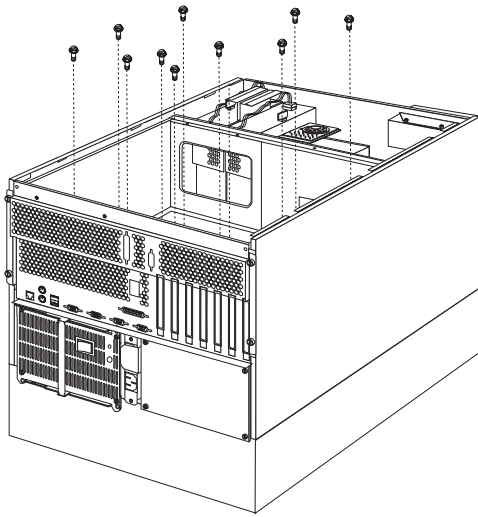
- a. Press on the adapter divider release tab **1** and lift the divider out of the system.
  - b. Repeat the procedure for each adapter divider.
4. Remove the processor board (see "Processor board removal" on page 232).
  5. Disconnect all system board cables.
  6. Remove the processor card support tray housing.



- a. Remove the processor card support tray housing screws **1**.
  - b. Lift the support tray housing latches **2** to release the housing from the shuttle, then; lift the housing out of the system.
7. Remove the system board dust cover **1** ..



8. Remove the system board.



- a. Remove the system board mounting screws, then; remove the system board.

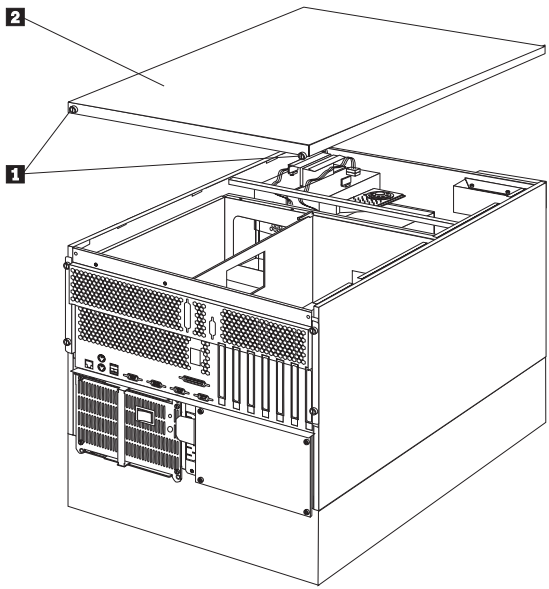
## Top cover removal

### Before you begin:

Read “Safety information” on page 308.

### Note

You do not have to power-off the system to replace a hot-swap fan.



### To remove the server top cover:

1. Turn off the server and all attached devices and disconnect all external cables and power cords (see “Preparing to install options” on page 220).
2. Loosen the two thumbscrews **1** on the back edge of the top cover.
3. Slide the top cover **2** slightly toward the rear of the server; the cover will stop after about 25 mm (1 inch). Lift the cover off the server and set the cover aside.

### Attention

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

Go to “Server door and trim bezels removal” on page 252.

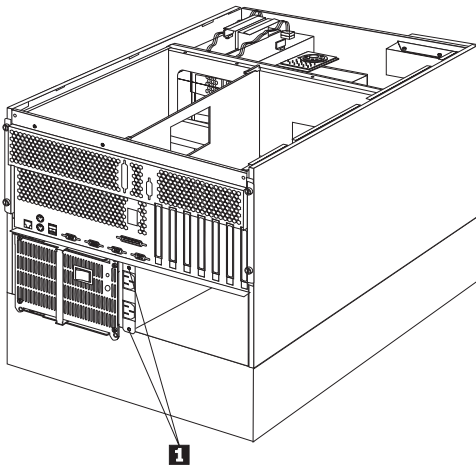
## Voltage regulator card removal

### Note

Read "Safety information" on page 308.

To remove the voltage regulator card, do the following:

1. Turn off the server and all external devices.
2. Disconnect the server and all external devices from the power source.



3. Remove the voltage regulator card mounting screws **1**, then; slid the voltage regulator card out of the server.

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## Symptom-to-FRU index

This index supports Netfinity 5500 - Type 8660 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 7.

The Symptom-to-FRU lists symptoms, errors, and the possible causes. The most likely cause is listed first. Use this Symptom-to-FRU Index to help you decide which FRUs to have available when servicing the computer. The POST BIOS displaying POST error codes and messages on the screen.

## Beep symptoms

Beep symptoms are short tones or a series of short tones separated by pauses (intervals without sound). See the following examples.

### Note

One beeps after successfully completing POST indicated the system is functioning properly.

Beeps	Description
1-2-3	<ul style="list-style-type: none"><li>• One beep</li><li>• A pause (or break)</li><li>• Two beeps</li><li>• A pause (or break)</li><li>• Three beeps</li></ul>
4	Four continuous beeps

Beep/Symptom	FRU/Action
1-1-2 (Processor register test failed)	<ol style="list-style-type: none"><li>1. <b>Optional Processor</b> (if installed)</li><li>2. Processor</li></ol>
1-1-3 (CMOS write/read test failed)	<ol style="list-style-type: none"><li>1. <b>Battery/CMOS chip</b></li><li>2. System Board</li></ol>
1-1-4 (BIOS EEPROM checksum failed)	<ol style="list-style-type: none"><li>1. <b>System Board</b></li></ol>
1-2-1 (Programmable Interval Timer failed)	<ol style="list-style-type: none"><li>1. <b>System Board</b></li><li>2. Processor Board</li></ol>
1-2-2 (DMA initialization failed)	<ol style="list-style-type: none"><li>1. <b>System Board</b></li><li>2. Processor Board</li></ol>



<b>Beep/Symptom</b>	<b>FRU/Action</b>
<b>1-2-3</b> (DMA page register write/read failed)	1. <b>System Board</b> 2. Processor Board
<b>1-2-4</b> RAM refresh verification failed	1. <b>System Board</b> 2. Processor Board
<b>1-3-1</b> (1st 64K RAM test failed)	1. <b>DIMM</b> 2. Processor Board
<b>1-3-2</b> (1st 64K RAM parity test failed)	1. <b>DIMM</b> 2. Processor Board 3. System Board
<b>2-1-1</b> (Secondary DMA register failed)	1. <b>System Board</b> 2. Processor Board
<b>2-1-2</b> (Primary DMA register failed)	1. <b>System Board</b> 2. Processor Board
<b>2-1-3</b> (Primary interrupt mask register failed)	1. <b>System Board</b> 2. Processor Board
<b>2-1-4</b> (Secondary interrupt mask register failed)	1. <b>System Board</b> 2. Processor Board
<b>2-2-1</b> (Interrupt vector loading failed)	1. <b>System Board</b> 2. Processor Board
<b>2-2-2</b> (Keyboard controller failed)	1. <b>System Board</b>
<b>2-2-3</b> (CMOS power failure and checksum checks failed)	1. <b>Battery/CMOS chip</b> 2. System Board
<b>2-2-4</b> (CMOS configuration info validation failed)	1. <b>Battery/CMOS chip</b> 2. System Board
<b>2-3-1</b> (Screen initialization failed)	1. <b>Jumper on J14</b> 2. System Board
<b>2-3-2</b> (Screen memory failed)	1. <b>System Board</b>
<b>2-3-3</b> (Screen retrace failed)	1. <b>System Board</b>
<b>2-3-4</b> (Search for video ROM failed)	1. <b>System Board</b>
<b>2-4-1</b> (Video failed, screen believed operable)	1. <b>System Board</b>
<b>3-1-1</b> (Timer tick interrupt failed)	1. <b>System Board</b>
<b>3-1-2</b> (Interval timer channel 2 failed)	1. <b>System Board</b>

<b>Beep/Symptom</b>	<b>FRU/Action</b>
<b>3-1-3</b> (RAM test failed above address 0FFFFH)	<ol style="list-style-type: none"> <li>1. <b>DIMM</b></li> <li>2. Processor Board</li> <li>3. System Board</li> </ol>
<b>3-1-4</b> (Time-Of-Day clock failed)	<ol style="list-style-type: none"> <li>1. <b>Battery/CMOS chip</b></li> <li>2. System Board</li> </ol>
<b>3-2-1</b> (Serial port failed)	<ol style="list-style-type: none"> <li>1. <b>System Board</b></li> </ol>
<b>3-2-2</b> (Parallel port failed)	<ol style="list-style-type: none"> <li>1. <b>System Board</b></li> </ol>
<b>3-2-3</b> (Math coprocessor failed)	<ol style="list-style-type: none"> <li>1. <b>Optional Processor</b> (if installed)</li> <li>2. Processor</li> <li>3. Processor Board</li> </ol>
<b>3-2-4</b> (Failure comparing CMOS memory size against actual)	<ol style="list-style-type: none"> <li>1. <b>DIMM</b></li> <li>2. Processor Board</li> <li>3. Battery/CMOS chip</li> </ol>
<b>3-3-1</b> (Memory size mismatch occurred, see "Memory settings" on page 98 )	<ol style="list-style-type: none"> <li>1. <b>DIMM</b></li> <li>2. Processor Board</li> <li>3. Battery/CMOS chip</li> </ol>
<b>3-3-2</b> (Critical SMBUS error occurred)	<ol style="list-style-type: none"> <li>1. <b>Disconnect the server power cord from outlet, wait 30 seconds and retry.</b></li> <li>2. Processor Board</li> <li>3. Memory DIMMs</li> </ol>
Three Short Beeps	<ol style="list-style-type: none"> <li>1. <b>DIMM</b></li> <li>2. Processor Board</li> <li>3. System Board</li> </ol>
One Continuous Beep	<ol style="list-style-type: none"> <li>1. <b>Processor</b></li> <li>2. Optional Processor (if installed)</li> <li>3. Processor Board</li> <li>4. System Board</li> </ol>
Repeating Short Beeps	<ol style="list-style-type: none"> <li>1. <b>Keyboard</b></li> <li>2. System Board</li> </ol>
One Long and One Short Beep	<ol style="list-style-type: none"> <li>1. <b>Video adapter</b> (if present)</li> <li>2. System Board</li> <li>3.</li> </ol>
One Long and Two Short Beeps	<ol style="list-style-type: none"> <li>1. <b>Video adapter</b> (if present)</li> <li>2. System Board</li> </ol>
Two Long and Two Short Beeps	<ol style="list-style-type: none"> <li>1. <b>Video adapter</b></li> </ol>

## No beep symptoms

No Beep Symptom	FRU/Action
No beep and the system operates correctly. 1. <b>Check speaker cables</b> 2. Speaker 3. System Board	
No Beeps occur after successfully completing POST (The Power-On Status is disabled.)	1. <b>Run Configuration/Setup, set the Start Options Power-On Status to enable.</b> 2. Check speaker connection. 3. Speaker 4. System Board
<b>No ac power</b> (Power supply ac LED is off)	1. <b>Check the power cord</b> 2. Power Supply (If two are installed, swap them to determine if one is defective.) 3. Power Backplane 4. Hot-Swap Power AC Inlet Box
<b>No beep and no video</b>	1. <b>See “Undetermined problems” on page 291.</b>
<b>System will not power-up</b> (Power supply ac LED is on)	1. <b>See “Power supply LED errors” on page 278.</b>

## Control panel system error LED

The system error LED is turned on when an error is detected. If the system error LED is on, remove the cover and check the diagnostic panel LEDs. The following is a complete list of diagnostic panel LEDs followed by the FRU/Action for replacing the problem.

### Notes

- To locate the LEDs on the processor board see “Processor board component locations” on page 227.
- To locate the LEDs on the system board see “System board component locations” on page 255.
- Check the system error log for additional information before replacing a FRU.

Diagnostic Panel LED	FRU/Action
<b>CPU LED on</b> (The LED next to the failing CPU is on.)	1. <b>Processor 1 or 2</b> on (Processor 1 or 2). 2. Processor Board

Diagnostic Panel LED	FRU/Action
<b>DASD 1 LED on</b> (The LED located next to the drive bay that the failing drive is installed in will be turned on.)	<ol style="list-style-type: none"> <li>1. <b>Failing drive.</b></li> <li>2. Be sure the fans are operating correctly and the air flow is good.</li> <li>3. SCSI Backplane</li> </ol>
<b>FAN 1 LED on</b>	<ol style="list-style-type: none"> <li>1. <b>Fan 1</b></li> <li>2. Fan Cable</li> <li>3. System Board</li> </ol>
<b>FAN 2 LED on</b>	<ol style="list-style-type: none"> <li>1. <b>Fan 2</b></li> <li>2. Fan Cable</li> <li>3. System Board</li> </ol>
<b>FAN 3 LED on</b>	<ol style="list-style-type: none"> <li>1. <b>Fan 3</b></li> <li>2. Fan Cable</li> <li>3. System Board</li> </ol>
<b>MEM LED on</b> (The LED next to the failing DIMM is on.)	<ol style="list-style-type: none"> <li>1. <b>Failing DIMM in slot J1, J2, J3, or J4).</b></li> <li>2. Processor Board</li> <li>3. System Board</li> </ol>
<b>NMI LED on</b> (Machine check error)	<ol style="list-style-type: none"> <li>1. <b>Reboot the system.</b></li> <li>2. Check the system Board LED(s); if on, see "System board LEDs" on page 290.</li> <li>3. Check the system error log.</li> </ol>
<b>PCI 1 LED on</b>	<ol style="list-style-type: none"> <li>1. <b>PCI Card for the PCI slot LED that is turned on</b></li> <li>2. System Board</li> <li>3. Processor Board</li> </ol>
<b>PCI 2 LED on</b>	<ol style="list-style-type: none"> <li>1. <b>Card in slot 1 or 4</b></li> <li>2. System Board</li> <li>3. Processor Board</li> </ol>
<b>PS1 LED on</b>	<ol style="list-style-type: none"> <li>1. <b>Check the DC Good LED on power supply 1. If off, replace power supply 1.</b></li> <li>2. Power Backplane</li> </ol>
<b>PS2 LED on</b>	<ol style="list-style-type: none"> <li>1. <b>Check the DC Good LED on power supply 2. If off, replace power supply 2.</b></li> <li>2. Power Backplane</li> </ol>
<b>SMI LED on</b>	<ol style="list-style-type: none"> <li>1. <b>Reboot the system.</b></li> <li>2. Check the system Board LED(s); if on, see "System board LEDs" on page 290.</li> </ol>

Diagnostic Panel LED	FRU/Action
<b>TEMP LED on</b>	<ol style="list-style-type: none"> <li>1. <b>Be sure the fans are operating correctly and the air flow is good.</b></li> <li>2. Check processor 1 and 2 LEDs</li> <li>3. Be sure the power supply fans are operating correctly and the air flow is good.</li> <li>4. Processor Board</li> <li>5. System Board</li> </ol>
<b>VRM LED on</b> (Check the VRM (voltage regulator module) LEDs on the processor board.)	<ol style="list-style-type: none"> <li>1. <b>Voltage regulator module for the VRM LED on the processor board that is turned on</b></li> <li>2. Processor 1, if the VRM 1 LED on the processor board is on. Processor 2, if the VRM 2 LED on the processor board is on.</li> <li>3. Processor Board</li> </ol>

## Diagnostic error codes

### Attention

In the following error codes, if *XXX* is *000*, *195*, or *197* **do not** replace a FRU. The description for these error codes are:

- 000** The test passed.  
**195** The **Esc** key was pressed to abort the test.  
**197** This is a warning error and may not indicate a hardware failure.

For all error codes, replace/follow the FRU/Action indicated.

Error Code/Symptom	FRU/Action
<b>001-XXX-000</b> (Failed core tests)	1. <b>System Board</b>
<b>001-XXX-001</b> (Failed core tests)	1. <b>Processor Board</b>
<b>001-250-000</b> (Failed System Board ECC)	1. <b>System Board</b>
<b>001-250-001</b> (Failed Processor Board ECC)	1. <b>Processor Board</b> 2. System Board
<b>005-XXX-000</b> (Failed Video test)	1. <b>System Board</b> 2. Processor Board
<b>011-XXX-000</b> (Failed COM1 Serial Port test) Note: The external loopback test of Serial Port A will fail if run remotely.	1. <b>System Board</b>
<b>011-XXX-001</b> (Failed COM2 Serial Port test)	1. <b>System Board</b>
<b>014-XXX-000</b> (Failed Parallel Port test)	1. <b>System Board</b>
<b>015-XXX-001</b> (Failed USB test)	1. <b>System Board</b>
<b>020-XXX-000</b> (Failed PCI Interface test)	1. <b>Processor Board</b> 2. System Board
<b>020-XXX-001</b> (Failed Hot-Swap Slot 1 PCI Latch test)	1. <b>PCI Hot-Swap Latch Assembly</b> 2. System Board
<b>020-XXX-002</b> (Failed Hot-Swap Slot 2 PCI Latch test)	1. <b>PCI Hot-Swap Latch Assembly</b> 2. System Board
<b>020-XXX-003</b> (Failed Hot-Swap Slot 3 PCI Latch test)	1. <b>PCI Hot-Swap Latch Assembly</b> 2. System Board

<b>Error Code/Symptom</b>	<b>FRU/Action</b>
<b>020-XXX-004</b> (Failed Hot-Swap Slot 4 PCI Latch test)	<ol style="list-style-type: none"> <li>1. <b>PCI Hot-Swap Latch Assembly</b></li> <li>2. System Board</li> </ol>
<b>030-XXX-000</b> (Failed Internal SCSI interface test)	<ol style="list-style-type: none"> <li>1. <b>System Board</b></li> </ol>
<b>035-XXX-000</b> <i>DUPLICATE ERROR CODE</i> (Failed System Board RAID test. Check System Error Log before replacing a FRU.)	<ol style="list-style-type: none"> <li>1. <b>Verify RAID adapter disable jumper block is not installed (see “System board jumpers” on page 257).</b></li> <li>2. System Board</li> <li>3. SCSI Backplane</li> <li>4. Cable</li> </ol>
<b>035-XXX-000</b> <i>DUPLICATE ERROR CODE</i> (Check System Error Log before replacing a FRU.)	<ol style="list-style-type: none"> <li>1. <b>Fixed Disk with SCSI ID 00 on System Board RAID controller</b></li> </ol>
<b>035-XXX-0NN</b> (Check System Error Log before replacing a FRU. NN = SCSI ID of failing fixed disk.)	<ol style="list-style-type: none"> <li>1. <b>Fixed Disk with SCSI ID NN on System Board RAID controller</b></li> </ol>
<b>035-XXX-100</b> <i>DUPLICATE ERROR CODE</i> (Failed RAID test on PCI slot 1. Check System Error Log before replacing a FRU.)	<ol style="list-style-type: none"> <li>1. <b>Adapter</b></li> <li>2. SCSI Backplane</li> <li>3. Cable</li> </ol>
<b>035-XXX-100</b> <i>DUPLICATE ERROR CODE</i> (Check System Error Log before replacing a FRU.)	<ol style="list-style-type: none"> <li>1. <b>Fixed Disk with SCSI ID 00 on RAID adapter in PCI slot 1</b></li> </ol>
<b>035-XXX-1NN</b> (Check System Error Log before replacing a FRU. NN = SCSI ID of failing fixed disk.)	<ol style="list-style-type: none"> <li>1. <b>Fixed Disk with SCSI ID NN on RAID adapter in PCI slot 1</b></li> </ol>
<b>035-XXX-200</b> <i>DUPLICATE ERROR CODE</i> (Failed RAID test on PCI slot 2. Check System Error Log before replacing a FRU.)	<ol style="list-style-type: none"> <li>1. <b>Adapter</b></li> <li>2. SCSI Backplane</li> <li>3. Cable</li> </ol>
<b>035-XXX-200</b> <i>DUPLICATE ERROR CODE</i> (Check System Error Log before replacing a FRU.)	<ol style="list-style-type: none"> <li>1. <b>Fixed Disk with SCSI ID 00 on RAID adapter in PCI slot 2</b></li> </ol>
<b>035-XXX-2NN</b> (Check System Error Log before replacing a FRU. NN = SCSI ID of failing fixed disk.)	<ol style="list-style-type: none"> <li>1. <b>Fixed Disk with SCSI ID NN on RAID adapter in PCI slot 2</b></li> </ol>

<b>Error Code/Symptom</b>	<b>FRU/Action</b>
<b>035-XXX-300</b> <i>DUPLICATE ERROR CODE</i> (Failed RAID test on PCI slot 3. Check System Error Log before replacing a FRU.)	<ol style="list-style-type: none"> <li>1. <b>Adapter</b></li> <li>2. SCSI Backplane</li> <li>3. Cable</li> </ol>
<b>035-XXX-300</b> <i>DUPLICATE ERROR CODE</i> (Check System Error Log before replacing a FRU.)	<ol style="list-style-type: none"> <li>1. <b>Fixed Disk with SCSI ID 00 on RAID adapter in PCI slot 3</b></li> </ol>
<b>035-XXX-3NN</b> (Check System Error Log before replacing a FRU. NN = SCSI ID of failing fixed disk.)	<ol style="list-style-type: none"> <li>1. <b>Fixed Disk with SCSI ID NN on RAID adapter in PCI slot 3</b></li> </ol>
<b>035-XXX-400</b> <i>DUPLICATE ERROR CODE</i> (Failed RAID test on PCI slot 4. Check System Error Log before replacing a FRU.)	<ol style="list-style-type: none"> <li>1. <b>Adapter</b></li> <li>2. SCSI Backplane</li> <li>3. Cable</li> </ol>
<b>035-XXX-400</b> <i>DUPLICATE ERROR CODE</i> (Check System Error Log before replacing a FRU.)	<ol style="list-style-type: none"> <li>1. <b>Fixed Disk with SCSI ID 00 on RAID adapter in PCI slot 4</b></li> </ol>
<b>035-XXX-4NN</b> (Check System Error Log before replacing a FRU. NN = SCSI ID of failing fixed disk.)	<ol style="list-style-type: none"> <li>1. <b>Fixed Disk with SCSI ID NN on RAID adapter in PCI slot 4</b></li> </ol>
<b>035-XXX-500</b> <i>DUPLICATE ERROR CODE</i> (Failed RAID test on PCI slot 5. Check System Error Log before replacing a FRU.)	<ol style="list-style-type: none"> <li>1. <b>Adapter</b></li> <li>2. SCSI Backplane</li> <li>3. Cable</li> </ol>
<b>035-XXX-500</b> <i>DUPLICATE ERROR CODE</i> (Check System Error Log before replacing a FRU.)	<ol style="list-style-type: none"> <li>1. <b>Fixed Disk with SCSI ID 00 on RAID adapter in PCI slot 5</b></li> </ol>
<b>035-XXX-5NN</b> (Check System Error Log before replacing a FRU. NN = SCSI ID of failing fixed disk.)	<ol style="list-style-type: none"> <li>1. <b>Fixed Disk with SCSI ID NN on RAID adapter in PCI slot 5</b></li> </ol>
<b>035-253-N00</b> (RAID initialization error for adapter in PCI slot number N.)	<ol style="list-style-type: none"> <li>1. <b>ServeRAID Adapter is not configured correctly.</b> Refer to the ServeRAID Hardware Maintenance Manual for more information.</li> </ol>
<b>075-XXX-000</b> (Failed Power Supply test)	<ol style="list-style-type: none"> <li>1. <b>Power Supply</b></li> </ol>



<b>Error Code/Symptom</b>	<b>FRU/Action</b>
<b>089-XXX-001</b> (Failed Microprocessor test)	<ol style="list-style-type: none"> <li>1. <b>VRM for Microprocessor</b></li> <li>2. Microprocessor</li> </ol>
<b>089-XXX-002</b> (Failed Optional Microprocessor test)	<ol style="list-style-type: none"> <li>1. <b>VRM for Optional Microprocessor</b></li> <li>2. Optional Microprocessor</li> </ol>
<b>165-XXX-000</b> (Failed System Board test)	<ol style="list-style-type: none"> <li>1. <b>System Board</b> Before replacing the system board, ensure that system board jumper J51 is not installed (the default) when the error occurs.</li> <li>2. Processor Board</li> <li>3. Power Backplane</li> <li>4. Hot-Swap Drive Backplane</li> </ol>
<b>175-XXX-001</b> (Failed Fan 1 test)	<ol style="list-style-type: none"> <li>1. <b>Fan 1</b></li> </ol>
<b>175-XXX-002</b> (Failed Fan 2 test)	<ol style="list-style-type: none"> <li>1. <b>Fan 2</b></li> </ol>
<b>175-XXX-003</b> (Failed Fan 2 test)	<ol style="list-style-type: none"> <li>1. <b>Fan 3</b></li> </ol>
<b>175-XXX-004</b> (Processor Board Temperature sensor out of range)	<ol style="list-style-type: none"> <li>1. <b>Check system cooling</b></li> </ol>
<b>180-XXX-000</b> (Diagnostics LED failure)	<ol style="list-style-type: none"> <li>1. <b>Run Diagnostic LED test for the failing LED</b></li> </ol>
<b>180-XXX-001</b> (Failed Information Panel LED test)	<ol style="list-style-type: none"> <li>1. <b>Information LED Panel</b></li> <li>2. Power-on Panel</li> </ol>
<b>180-XXX-002</b> (Failed Diagnostics LED Panel test)	<ol style="list-style-type: none"> <li>1. <b>Diagnostics LED Panel</b></li> <li>2. Power-on Panel</li> </ol>
<b>180-XXX-003</b> (Failed System Board LED test)	<ol style="list-style-type: none"> <li>1. <b>Run hot-swap PCI latch test in Other Devices under Extended Tests</b></li> <li>2. <b>System Board</b></li> </ol>
<b>180-XXX-004</b> (Failed Processor Board LED test)	<ol style="list-style-type: none"> <li>1. <b>Processor Board</b></li> <li>2. System Board</li> </ol>
<b>180-XXX-005</b> (Failed SCSI Backplane LED test)	<ol style="list-style-type: none"> <li>1. <b>SCSI Backplane</b></li> <li>2. SCSI Backplane Cable</li> <li>3. System Board</li> </ol>
<b>201-XXX-001</b> (Failed Memory test, see "Memory settings" on page 98 )	<ol style="list-style-type: none"> <li>1. <b>DIMM Location J1</b></li> </ol>

<b>Error Code/Symptom</b>	<b>FRU/Action</b>
<b>201-XXX-002</b> (Failed Memory test, see"Memory settings" on page 98 )	1. <b>DIMM Location J2</b>
<b>201-XXX-003</b> (Failed Memory test, see"Memory settings" on page 98 )	1. <b>DIMM Location J3</b>
<b>201-XXX-004</b> (Failed Memory test, see"Memory settings" on page 98 )	1. <b>DIMM Location J4</b>
<b>201-XXX-999</b> (Multiple DIMM failure, see error text.)	1. <b>See error text for failing DIMMs</b>
<b>202-XXX-001</b> (Failed System Cache test)	1. <b>Microprocessor</b>
<b>202-XXX-002</b> (Failed System Cache test on Optional Microprocessor)	1. <b>Optional Microprocessor</b>
<b>206-XXX-000</b> (Failed Diskette Drive test)	1. <b>Diskette Drive cable</b> 2. Diskette Drive 3. System Board
<b>215-XXX-000</b> (Failed IDE CD-ROM test)	1. <b>CD-ROM Drive Cables</b> 2. CD-ROM Drive 3. System Board
<b>215-XXX-001</b> (Failed IDE test)	1. <b>System Board</b>
<b>217-XXX-000</b> (Failed BIOS Fixed Disk test)  <div style="border: 1px solid black; padding: 5px; width: fit-content;"> <p><b>Note</b></p> <p>If RAID is configured, the fixed disk number refers to the RAID logical array.</p> </div>	1. <b>Fixed Disk 1</b>
<b>217-XXX-001</b> (Failed BIOS Fixed Disk test)  <div style="border: 1px solid black; padding: 5px; width: fit-content;"> <p><b>Note</b></p> <p>If RAID is configured, the fixed disk number refers to the RAID logical array.</p> </div>	1. <b>Fixed Disk 2</b>

Error Code/Symptom	FRU/Action
<p><b>217-XXX-002</b> (Failed BIOS Fixed Disk test)</p> <p><b>Note</b></p> <p>If RAID is configured, the fixed disk number refers to the RAID logical array.</p>	<p>1. <b>Fixed Disk 3</b></p>
<p><b>217-XXX-003</b> (Failed BIOS Fixed Disk test)</p> <p><b>Note</b></p> <p>If RAID is configured, the fixed disk number refers to the RAID logical array.</p>	<p>1. <b>Fixed Disk 4</b></p>
<p><b>217-XXX-004</b> (Failed BIOS Fixed Disk test)</p> <p><b>Note</b></p> <p>If RAID is configured, the fixed disk number refers to the RAID logical array.</p>	<p>1. <b>Fixed Disk 5</b></p>
<p><b>217-XXX-005</b> (Failed BIOS Fixed Disk test)</p> <p><b>Note</b></p> <p>If RAID is configured, the fixed disk number refers to the RAID logical array.</p>	<p>1. <b>Fixed Disk 6</b></p>
<p><b>264-XXX-0NN</b> (<b>NN = SCSI ID of failing Tape Drive</b>)</p>	<ol style="list-style-type: none"> <li>1. <b>Tape Cartridge</b>, if user executed the Read/Write Tape Drive test (XXX = 256)</li> <li>2. SCSI or Power Cable connected to tape drive with SCSI ID NN.</li> <li>3. Tape Drive with SCSI ID NN.</li> <li>4. System board or SCSI Controller. (Run SCSI Controller Diagnostic to determine if the SCSI bus is functioning properly.)</li> </ol>

Error Code/Symptom	FRU/Action
<b>264-XXX-999</b> (Errors on multiple tape drives, see error text for more info)	1. <b>See error messages/text</b> in the error log for detailed information on each individual tape drive error.
<b>301-XXX-000</b> (Failed Keyboard test)	1. <b>Keyboard</b>
<b>405-XXX-000</b> (Failed Ethernet test)	1. <b>Verify that the ethernet disable jumper is not installed (see “System board jumpers” on page 257).</b> 2. System Board
<b>405-XXX-00N</b> (Failed Ethernet test on adapter in PCI slot N)	1. <b>Adapter in PCI slot N</b> 2. System Board
<b>415-XXX-000</b> (Failed Modem test)	1. <b>Cable</b> 2. Modem 3. System Board

## Error symptoms

Error Symptom	FRU/Action
CD is not working properly.	<ol style="list-style-type: none"> <li>1. <b>Clean the CD</b></li> <li>2. Clean the optical-head lens.</li> <li>3. CD-ROM Drive</li> </ol>
CD-ROM drive tray is not working. (The server must be powered-on.) If the server is on and the tray does not eject,	<ol style="list-style-type: none"> <li>1. <b>Insert the end of a paper clip into the manual tray-release opening.</b></li> <li>2. CD-ROM Drive</li> </ol>
CD-ROM drive is not recognized.	<ol style="list-style-type: none"> <li>1. <b>Run Configuration/Setup, enabled primary IDE channel.</b></li> <li>2. Check cables and jumpers.</li> <li>3. Check for correct device driver.</li> </ol>
Diskette drive in-use light stays on, or the system bypasses the diskette drive.	<p>If there is a diskette in the drive, verify that:</p> <ol style="list-style-type: none"> <li>1. The diskette drive is enabled in the configuration programs.</li> <li>2. The diskette is good and not damaged. (Try another diskette if you have one.)</li> <li>3. The diskette is inserted correctly in the drive.</li> <li>4. The diskette contains the necessary files to start the server.</li> <li>5. The software program is OK.</li> </ol> <p>If the diskette drive in-use light stays on, or the system continues to bypass the diskette drive, replace the diskette drive.</p>
Monitor problems (general) Some IBM monitors have their own self-tests. If you suspect a problem with the monitor, refer to the information that comes with the monitor for adjusting and testing instructions.	<ol style="list-style-type: none"> <li>1. <b>Monitor</b></li> <li>2. Display Adapter/System Board</li> </ol>

## Power supply LED errors

Use the power supply LED information on the following page to trouble shoot power supply problems.

### Note

The minimum configuration required for the DC Good light to come on is.

Power Supply

Power Backplane

Power AC Inlet Box

System Board (With pins 2 and 3 of J32 connected together to bypass the power switch (button). The default is pins 1 and 2.)

Processor Board (Verify that the J10 and J17 connectors are installed correctly.)

Memory-Module Kits (Minimum requirement = 1 bank of 64 MB DIMMs)

Table 14. Power Supply LED Errors

AC Good LED	DC Good LED	Description	FRU/Action
Off	Off	No power to system or ac problem.	<p><b>Check ac power to system</b></p> <ol style="list-style-type: none"> <li>Power Supply</li> <li>Power Backplane</li> <li>Power AC Inlet Box</li> </ol>
On	Off	Standby mode or dc problem.	<p><b>Verify power supply switch is on.</b></p> <ol style="list-style-type: none"> <li>Check processor connectors J10 and J17.</li> <li>Move jumper J32 to pins 2-3 to bypass power control. If the DC Good LED comes on, reseal the system power switch (button) assembly cable connector to the system board.</li> <li>Remove the adapters and disconnect the cables and power connectors to all internal and external devices. Power-on the system. If the DC Good LED comes on, replace the adapters and devices one at a time until you isolate the problem.</li> <li>Power Supply</li> <li>Power Backplane</li> <li>System Board</li> <li>Processor Board</li> </ol>
On	On	Power is OK	N/A

## POST error codes

In the following error codes, X can be any number or letter.

Error Code/Symptom	FRU/Action
<b>062</b> (Three consecutive boot failures using the default configuration.)	<ol style="list-style-type: none"> <li>1. <b>Run Configuration/Setup</b></li> <li>2. Battery/CMOS Chip</li> <li>3. System Board</li> </ol>
<b>101, 102</b> (System and processor error)	<ol style="list-style-type: none"> <li>1. <b>System Board</b></li> <li>2. Processor Board</li> </ol>
<b>106</b> (System and processor error)	<ol style="list-style-type: none"> <li>1. <b>System Board</b></li> <li>2. Processor Board</li> </ol>
<b>111</b> (Channel check error)	<ol style="list-style-type: none"> <li>1. Failing ISA Adapter</li> <li>2. Memory DIMM</li> <li>3. System Board</li> </ol>
<b>114</b> (Adapter read-only memory error)	<ol style="list-style-type: none"> <li>1. <b>Failing Adapter</b></li> <li>2. Run Diagnostics</li> </ol>
<b>129</b> (Internal Cache error)	<ol style="list-style-type: none"> <li>1. <b>Processor</b></li> <li>2. Optional Processor (if installed)</li> <li>3. Processor Board</li> </ol>
<b>151</b> (Real time clock error)	<ol style="list-style-type: none"> <li>1. <b>Run Diagnostics</b></li> <li>2. Battery/CMOS chip</li> <li>3. System Board</li> </ol>
<b>161</b> (Real time clock battery error)	<ol style="list-style-type: none"> <li>1. <b>Run Configuration/Setup</b></li> <li>2. Battery/CMOS chip</li> <li>3. System Board</li> </ol>
<b>162</b> (Device Configuration Error) <div style="border: 1px solid black; padding: 5px; margin-top: 5px;"> <p style="text-align: center;"><b>Important</b></p> <p>Be sure to load the default settings and any additional desired settings; then, <b>save the configuration.</b></p> </div>	<ol style="list-style-type: none"> <li>1. <b>Run Configuration/Setup</b></li> <li>2. Battery/CMOS Chip</li> <li>3. Failing Device</li> <li>4. System Board</li> </ol>
<b>163</b> (Real-Time Clock error)	<ol style="list-style-type: none"> <li>1. <b>Run Configuration/Setup</b></li> <li>2. Battery/CMOS Chip</li> <li>3. System Board</li> </ol>
<b>164</b> (Memory configuration changed, see "Memory settings" on page 98)	<ol style="list-style-type: none"> <li>1. <b>Run Configuration/Setup</b></li> <li>2. DIMM</li> <li>3. Processor Board</li> </ol>
<b>173</b> (System CMOS checksum bad)	<ol style="list-style-type: none"> <li>1. <b>Run Configuration/Setup</b></li> <li>2. Battery/CMOS Chip</li> <li>3. System Board</li> </ol>
<b>175</b> (Hardware error)	<ol style="list-style-type: none"> <li>1. <b>System Board</b></li> <li>2. Processor Board</li> </ol>



<b>Error Code/Symptom</b>	<b>FRU/Action</b>
<b>176</b> (Computer cover or cable cover was removed without a key being used)	<ol style="list-style-type: none"> <li>1. <b>Run Configuration/Setup</b></li> <li>2. System Board</li> </ol>
<b>177, 178</b> (Security hardware error)	<ol style="list-style-type: none"> <li>1. <b>Run Configuration/Setup</b></li> <li>2. Service Processor Adapter</li> <li>3. System Board</li> </ol>
<b>184</b> (Power-on password corrupted)	<ol style="list-style-type: none"> <li>1. <b>Run Configuration/Setup</b></li> <li>2. System Board</li> </ol>
<b>185</b> (Drive startup sequence information corrupted)	<ol style="list-style-type: none"> <li>1. <b>Run Configuration/Setup</b></li> <li>2. System Board</li> </ol>
<b>186</b>	<ol style="list-style-type: none"> <li>1. <b>Run Configuration/Setup</b></li> <li>2. System Board</li> </ol>
<b>187</b> (VPD serial number not set.)	<ol style="list-style-type: none"> <li>1. <b>Set serial number in Setup</b></li> <li>2. System Board</li> </ol>
<b>188</b> (Bad EEPROM CRC #2)	<ol style="list-style-type: none"> <li>1. <b>Run Configuration/Setup</b></li> <li>2. System Board</li> </ol>
<b>189</b> (An attempt was made to access the server with invalid passwords)	<ol style="list-style-type: none"> <li>1. <b>Run Configuration/Setup, enter the administrator password</b></li> </ol>
<b>195</b> (Processor 1 is not functioning)	<ol style="list-style-type: none"> <li>1. <b>VRM 1</b></li> <li>2. Processor 1</li> <li>3. Processor Board</li> <li>4. System Board</li> </ol>
<b>196</b> (Processor 2 is not functioning)	<ol style="list-style-type: none"> <li>1. <b>VRM 2</b></li> <li>2. Processor 2</li> <li>3. Processor Board</li> <li>4. System Board</li> </ol>
<b>197</b> (Processor 1 failed BIST)	<ol style="list-style-type: none"> <li>1. <b>Processor 1</b></li> <li>2. Processor Board</li> <li>3. System Board</li> </ol>
<b>198</b> (Processor 2 failed BIST)	<ol style="list-style-type: none"> <li>1. <b>Processor 2</b></li> <li>2. Processor Board</li> <li>3. System Board</li> </ol>
<b>201</b> (Memory test error, see "Memory settings" on page 98)	<ol style="list-style-type: none"> <li>1. <b>DIMM</b></li> <li>2. Processor Board</li> <li>3. System Board</li> </ol>
<b>229</b> (Cache error)	<ol style="list-style-type: none"> <li>1. <b>Processor</b></li> <li>2. Optional Processor (if installed)</li> <li>3. Processor Board</li> </ol>

<b>Error Code/Symptom</b>	<b>FRU/Action</b>
<b>262</b> (DRAM parity configuration error)	<ol style="list-style-type: none"> <li>1. <b>Run Configuration/Setup</b></li> <li>2. Battery/CMOS Chip</li> <li>3. System Board</li> </ol>
<b>289</b> (DIMM has been disabled the user or system, see "Memory settings" on page 98)	<ol style="list-style-type: none"> <li>1. <b>Run Configuration/Setup, if disabled by user</b></li> <li>2. Disabled DIMM, if not disabled by user.</li> <li>3. Processor Board</li> </ol>
<b>301</b> (Keyboard or keyboard controller error)	<ol style="list-style-type: none"> <li>1. <b>Keyboard</b></li> <li>2. System Board</li> </ol>
<b>303</b> (Keyboard controller error)	<ol style="list-style-type: none"> <li>1. <b>Keyboard</b></li> <li>2. System Board</li> </ol>
<b>602</b> (Invalid diskette boot record)	<ol style="list-style-type: none"> <li>1. <b>Diskette</b></li> <li>2. Cable</li> <li>3. Diskette Drive</li> </ol>
<b>604</b> (Diskette drive error)	<ol style="list-style-type: none"> <li>1. <b>Run Configuration/Setup and Diagnostics</b></li> <li>2. Diskette Drive</li> <li>3. Drive Cable</li> <li>4. System Board</li> </ol>
<b>605</b> (Unlock failure)	<ol style="list-style-type: none"> <li>1. <b>Diskette Drive</b></li> <li>2. Drive Cable</li> <li>3. System Board</li> </ol>
<b>662</b> (Diskette drive configuration error)	<ol style="list-style-type: none"> <li>1. <b>Run Configuration/Setup and Diagnostics</b></li> <li>2. Diskette Drive</li> <li>3. Drive Cable</li> <li>4. System Board</li> </ol>
<b>762</b> (Coprocessor configuration error)	<ol style="list-style-type: none"> <li>1. <b>Run Configuration/Setup</b></li> <li>2. Battery/CMOS Chip</li> <li>3. Processor</li> </ol>
<b>962</b> (Parallel port error)	<ol style="list-style-type: none"> <li>1. <b>Disconnect external cable on parallel port.</b></li> <li>2. Run Configuration/Setup</li> <li>3. System Board</li> </ol>
<b>11XX</b> (System board serial port 1 or 2 error)	<ol style="list-style-type: none"> <li>1. <b>Disconnect external cable on serial port.</b></li> <li>2. Run Configuration/Setup</li> <li>3. System Board</li> </ol>
<b>1762</b> (Fixed Disk Configuration error)	<ol style="list-style-type: none"> <li>1. <b>Fixed Disk Cables</b></li> <li>2. Run Configuration/Setup</li> <li>3. Fixed Disk Adapter</li> <li>4. Fixed Disk Drive</li> <li>5. System Board</li> </ol>

<b>Error Code/Symptom</b>	<b>FRU/Action</b>
<b>178X</b> (Fixed Disk error)	<ol style="list-style-type: none"> <li>1. <b>Fixed Disk Cables</b></li> <li>2. Run Diagnostics</li> <li>3. Fixed Disk Adapter</li> <li>4. Fixed Disk Drive</li> <li>5. System Board</li> </ol>
<b>1800</b> (No more hardware interrupt available for PCI adapter)	<ol style="list-style-type: none"> <li>1. <b>Run Configuration/Setup</b></li> <li>2. Failing Adapter</li> <li>3. System Board</li> </ol>
<b>1801</b> (No room for PCI option ROM)	<ol style="list-style-type: none"> <li>1. <b>Run Configuration/Setup</b></li> <li>2. Failing Adapter</li> <li>3. System Board</li> </ol>
<b>1802</b> (No more I/O space available for PCI adapter)	<ol style="list-style-type: none"> <li>1. <b>Run Configuration/Setup</b></li> <li>2. Failing Adapter</li> <li>3. System Board</li> </ol>
<b>1803</b> (No more memory (above 1MB for PCI adapter)	<ol style="list-style-type: none"> <li>1. <b>Run Configuration/Setup</b></li> <li>2. Failing Adapter</li> <li>3. System Board</li> </ol>
<b>1804</b> (No more memory (below 1MB for PCI adapter)	<ol style="list-style-type: none"> <li>1. <b>Run Configuration/Setup</b></li> <li>2. Move the failing adapter to slot 1 or 2</li> <li>3. Failing Adapter</li> <li>4. System Board</li> </ol>
<b>1805</b> (PCI option ROM checksum error)	<ol style="list-style-type: none"> <li>1. <b>Remove Failing PCI Card</b></li> <li>2. System Board</li> </ol>
<b>1806</b> (PCI to PCI Bridge error)	<ol style="list-style-type: none"> <li>1. <b>Run Configuration/Setup</b></li> <li>2. Move the failing adapter to slot 1 or 2</li> <li>3. Failing Adapter</li> <li>4. System Board</li> </ol>
<b>1807, 1808, 1810</b> (General PCI error)	<ol style="list-style-type: none"> <li>1. <b>Remove Failing PCI Card</b></li> <li>2. System Board</li> </ol>
<b>1962</b> (Drive does not contain a valid boot sector)	<ol style="list-style-type: none"> <li>1. <b>Verify a bootable operating system is installed</b></li> <li>2. Run Diagnostics</li> <li>3. Hard Disk Drive Cable</li> <li>4. System Board</li> <li>5. Hard Disk Drive</li> </ol>
<b>2400</b> (Video controller test failure)	<ol style="list-style-type: none"> <li>1. <b>Video Adapter</b> (if installed)</li> <li>2. System Board</li> </ol>
<b>2462</b> (Video memory configuration error)	<ol style="list-style-type: none"> <li>1. <b>Video Adapter</b> (if installed)</li> <li>2. System Board</li> </ol>

<b>Error Code/Symptom</b>	<b>FRU/Action</b>
<b>5962</b> (IDE CD-ROM configuration error)	<ol style="list-style-type: none"> <li>1. <b>Run Configuration/Setup</b></li> <li>2. CD-ROM Drive</li> <li>3. Battery/CMOS Chip</li> </ol>
<b>8603</b> (Pointing Device Error)	<ol style="list-style-type: none"> <li>1. <b>Pointing Device</b></li> <li>2. System Board</li> </ol>
<b>8603</b> (Pointing Device Error)	<ol style="list-style-type: none"> <li>1. <b>Pointing Device</b></li> <li>2. System Board</li> </ol>
<b>0001200</b> (Machine check architecture error)	<ol style="list-style-type: none"> <li>1. <b>Processor</b></li> <li>2. Optional Processor</li> <li>3. Processor Board</li> </ol>
<b>000120P0, 000120P1, 000120P2, 000120PF</b> (Processor cache error)	<ol style="list-style-type: none"> <li>1. <b>Failing Processor</b></li> <li>2. Processor Board</li> </ol>
<b>01295085</b> (ECC checking hardware test error)	<ol style="list-style-type: none"> <li>1. <b>Processor Board</b></li> <li>2. Processor</li> </ol>
<b>I9990301</b> (Fixed boot sector error, no operating system installed)	<ol style="list-style-type: none"> <li>1. <b>Run Configuration/Setup for correct startup</b></li> <li>2. Verify operating system installed</li> </ol>
<b>I9990305</b> (Fixed boot sector error, no operating system installed)	<ol style="list-style-type: none"> <li>1. <b>Install operating system to hard disk drive.</b></li> </ol>

## SCSI error codes

Error Code	FRU/Action
<p><b>All SCSI Errors</b> One or more of the following might be causing the problem:</p> <ul style="list-style-type: none"><li>• A failing SCSI device (adapter, drive, controller)</li><li>• An improper SCSI configuration or SCSI termination jumper setting</li><li>• Duplicate SCSI IDs in the same SCSI chain</li><li>• A missing or improperly installed SCSI terminator</li><li>• A defective SCSI terminator</li><li>• An improperly installed cable</li><li>• A defective cable</li></ul>	<ol style="list-style-type: none"><li>1. <b>External SCSI devices must be powered-on before you power-on the server.</b></li><li>2. The cables for all external SCSI devices are connected correctly.</li><li>3. If you have attached an external SCSI device to the server, make sure the external SCSI termination is set to automatic.</li><li>4. The last device in each SCSI chain is terminated correctly.</li><li>5. The SCSI devices are configured correctly.</li></ol>

## ServeRAID II controller error codes/messages

Use the following ServeRAID II controller error code/message information when diagnosing ServeRAID problems. The error codes/messages are displayed on the screen in a line of text immediately after the the adapter BIOS version screen similar to the following appears.

```
IBM PC ServeRAID Adapter BIOS
Copyright IBM Corp. 1995,1997
BIOS Ver. x.xx.x xx/xx/xx
```

Press **Ctrl+I** to start the MiniConfig Utility. The following message is displayed on the screen.

```
Initializing Adapter Number 1.
Please Wait. Starting Drives.
Firmware Version: x.xx.xx
```

\* Adapter POST & configuration Error Codes:  
**IPSR=xxxx BCS=xx ECS=xx**

The interrupt status port register (IPSR) codes, basic configuration status (BCS) messages, and extended configurations status (ECS) messages identify the Controller State. The BCS and ECS codes indicate a configuration change. Configuration change information is displayed on the screen in text following the IPSR code.

### Note

**Do Not** replace a planar (system board) for RAID problems that has an integrated on-board ServeRAID Controller if the system board is not listed as the FRU/Action in the following index. Refer to RAID adapter HMM S10L-9147-00 for recovery procedures for DDD drives.

IPSR Error	FRU/Action
<b>EF10</b> (Default ISPR)	1. <b>Controller is functioning properly. DO NOT replace Controller.</b>
<b>1xxx</b> (Microcode Checksum Error)	1. <b>RAID Controller. System Board, if integrated controller.</b>
<b>2xxx thru 8xxx</b> (Code DRAM Error)	1. <b>Install the download jumpers (two jumpers on J15, installed parallel to PCI slots) and Flash the Controller with the latest IBM ServeRAID BIOS/Firmware from the IBM Web site, then; remove the jumpers.</b> 2. <b>RAID Controller System Board, if integrated controller.</b>

IPSR Error	FRU/Action
<p><b>9xxx thru Bxxx(hex)</b> (SCSI bus error caused by either defective drives, termination, etc.)</p>	<p>1. <b>Note</b> — The Controller will detect a configuration change. Do not select Save Changes. Press <b>F10</b> to bypass any save options.</p> <p><b>Isolate between the SCSI subsystem and the controller by disconnecting all SCSI cables and reboot. If the IPSR code still occurs, replace the planar.</b></p> <p>2. If the IPSR code does not occur after disconnecting the cables, follow the steps below until the error is eliminated:</p> <ol style="list-style-type: none"> <li>a. Identify which channel is causing the error by the second digit of the original IPSR code: <ul style="list-style-type: none"> <li>= Channel 1</li> <li>ISPR = B2xx = Channel 2</li> <li>ISPR = B3xx = Channel 1 and 2</li> </ul> </li> <li>b. Confirm that the channel(s) identified by the error code(s) is/are the cause of the error by verifying that the error presents itself when the offending channel is reconnected.</li> <li>c. Ensure that channel is properly terminated.</li> <li>d. Ensure that the backplane configuration jumpers settings are correct.</li> <li>e. Replace the failing cable.</li> <li>f. Replace the failing backplane.</li> <li>g. Disconnect one drive at a time that is attached to the failing channel, then; reboot to the system to determine which drive is causing the error.</li> </ol>



IPSR Error	FRU/Action
<b>EF10</b> (Default ISPR)	1. <b>N/A, controller is functioning properly.</b>
<b>EFFE</b> (Firmware code corrupt or download jumpers are in place)	1. <b>Verify that the download jumpers (J15) are not in place.</b> 2. Flash the controller firmware with the download jumpers in place (two jumpers on J15, installed parallel to PCI slots), then remove the download jumpers. 3. RAID Controller. System Board, if integrated controller.
<b>FFFF</b>	1. <b>Isolate between SCSI Subsystem and Controller by disconnecting all attached SCSI cables and reboot. IF IPSR code is NOT PRESENT after disconnecting cables, follow the steps below until the error is eliminated:</b> <ol style="list-style-type: none"> <li>a. Identify which channel is causing the error by reconnecting cables one at a time and rebooting until the error returns.</li> <li>b. Verify correct termination of the failing channel.</li> <li>c. SCSI cable attached to the failing channel.</li> <li>d. Backplane attached to the failing channel.</li> <li>e. Disconnect one drive at a time attached to failing channel and reboot to determine which drive is causing the problem.</li> </ol> 2. <b>If the IPSR code remains after disconnecting all SCSI cables then rebooting, replace system planar.</b>

## System board LEDs

The system board contains three SCSI LEDs and a processor LED that are turned on when the system detects an error.

### Notes

1. To locate the LEDs on the system board see "System board component locations" on page 255.
2. Check the system error log for additional information before replacing a FRU.

System Board LED	FRU/Action
Service Processor LED	1. System Board
SCSI LED(s) on (Blinking or solid)	1. See "System board SCSI LEDs."

## System board SCSI LEDs

A solid on or blinking system board SCSI LED indicated an error was detected. (The blinks are followed by a pause.)

### Notes

1. To locate the LEDs on the system board see "System board component locations" on page 255.
2. If you are instructed to flash the ServeRAID controller on the system board, refer to the ServerGuide that was shipped with the system for instructions on creating a bootable ServeRAID Flash diskette. Or refer to the WEB, see "Online support" on page iv.
3. Check the system error log for additional information before replacing a FRU.

System Board SCSI LEDs	FRU/Action
<b>1 blink followed by a pause</b> (Boot block checksum error)	<ol style="list-style-type: none"> <li>1. Check cables</li> <li>2. System Board</li> <li>3. DASD Backplane</li> </ol>
<b>2 blinks followed by a pause</b> (DRAM parity error)	<ol style="list-style-type: none"> <li>1. Check cables</li> <li>2. System Board</li> <li>3. DASD Backplane</li> </ol>
<b>3 blinks followed by a pause</b> (Code block checksum error, flash the ServeRAID controller.)	<ol style="list-style-type: none"> <li>1. Run the ServeRAID Flash program.</li> <li>2. Check cables</li> <li>3. System Board</li> <li>4. DASD Backplane</li> </ol>
<b>4 blinks followed by a pause</b> (DRAM DATA)	<ol style="list-style-type: none"> <li>1. Check cables</li> <li>2. System Board</li> <li>3. DASD Backplane</li> </ol>

System Board SCSI LEDs	FRU/Action
<b>5 blinks followed by a pause</b> (DRAM address error)	<ol style="list-style-type: none"> <li>a. <b>Check cables</b></li> <li>b. System Board</li> <li>c. DASD Backplane</li> </ol>
<b>6 blinks followed by a pause</b> (Code block checksum error, flash the ServeRAID controller.)	<ol style="list-style-type: none"> <li>1. <b>Run the ServeRAID Flash program.</b></li> <li>2. <b>Check cables</b></li> <li>3. System Board</li> <li>4. DASD Backplane</li> </ol>
<b>On (solid)</b>	<ol style="list-style-type: none"> <li>1. <b>Check jumper J11, see "System board jumpers" on page 257.</b></li> <li>2. Check cables</li> <li>3. System Board</li> <li>4. DASD Backplane</li> </ol>

## 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 73.
2. A corrupt CMOS can cause undetermined problems.

Check the LEDs on all the power supplies, see "Power supply LED errors" on page 278. If the LEDs indicate the power supplies are working correctly, return here and do the following:

1. Power-off the computer.
2. Be sure the system is cabled correctly.
3. Remove or disconnect the following (one at a time) until you find the failure (power-on the computer and reconfigure each time).
  - Any external devices
  - Surge suppressor device (on the computer)
  - Modem, printer, mouse, or non-IBM devices
  - Each adapter
  - Drives
  - Memory-Module Kits (Minimum requirement = 1 bank of 64 MB DIMMs)

**Note**

Minimum operating requirements are:

Power Supply

Power Backplane

Power AC Inlet Box

System Board (With pins 2 and 3 of J32 connected together to bypass the power switch (button). The default is pins 1 and 2.)

Processor Board (Verify that the J10 and J17 connectors are installed correctly.)

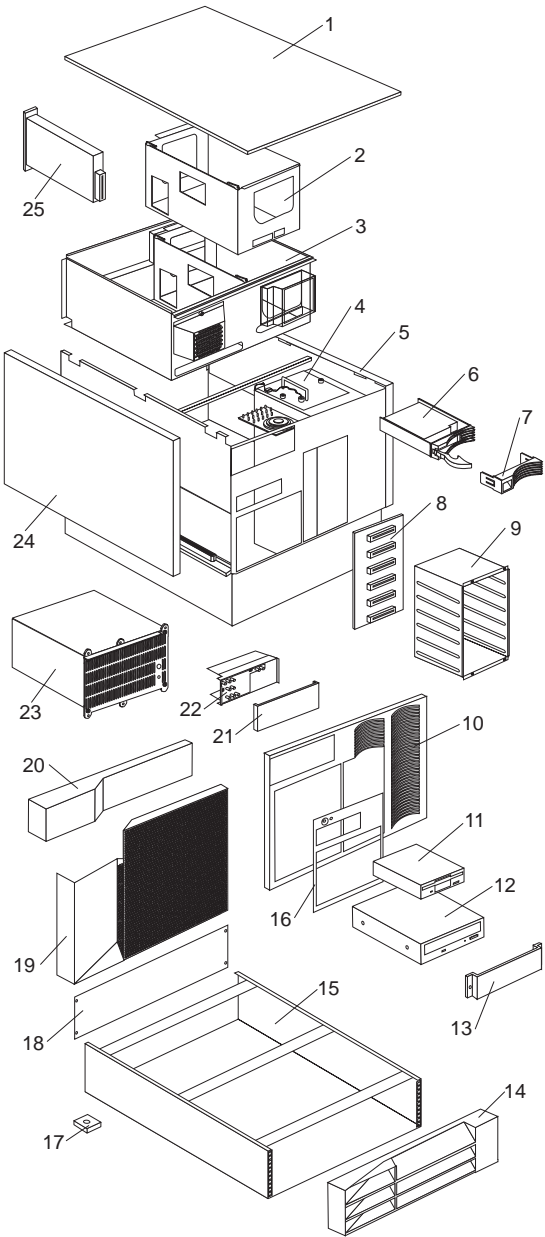
Memory-Module Kits (Minimum requirement = 1 bank of 64 MB DIMMs)

4. Power-on the computer. If the problem remains, suspect the following FRUs in the order listed:
- Power Supply
  - Power Backplane
  - System Board
  - 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 board(s)

Parts listing (Type 8660)



## System

Index	System (Netfinity 5500 - Type 8660) Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX, 51U, 51X, 52U, 52X, 5RU, 5RX, 5SU, 5SX, 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX, 71U, 72U, 7RU, 7SU	FRU No.
1	Top Cover (Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX, 51U, 51X, 52U, 52X, 5RU, 5RX, 5SU, 5SX, 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX, 71U, 72U, 7RU, 7SU)	12J3063
2	Processor Card Support Tray (Housing) (Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX, 51U, 51X, 52U, 52X, 5RU, 5RX, 5SU, 5SX, 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX, 71U, 72U, 7RU, 7SU)	01K6983
3	Shuttle with Bracket (Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX, 51U, 51X, 52U, 52X, 5RU, 5RX, 5SU, 5SX, 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX, 71U, 72U, 7RU, 7SU)	01K6998
4	Fan Assembly 92 mm with Connector and Bracket (Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX, 51U, 51X, 52U, 52X, 5RU, 5RX, 5SU, 5SX, 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX, 71U, 72U, 7RU, 7SU)	01K6999
4	Short Blower Fan Assembly with Bracket (Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX, 51U, 51X, 52U, 52X, 5RU, 5RX, 5SU, 5SX, 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX, 71U, 72U, 7RU, 7SU)	01K6988
4	Long Blower Fan Assembly with Bracket and Vane (Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX, 51U, 51X, 52U, 52X, 5RU, 5RX, 5SU, 5SX, 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX, 71U, 72U, 7RU, 7SU)	01K6990
	Fan/Blower 3x Power Cable (Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX, 51U, 51X, 52U, 52X, 5RU, 5RX, 5SU, 5SX, 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX, 71U, 72U, 7RU, 7SU)	03K9168
5	Base Frame Assembly (Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX, 51U, 51X, 52U, 52X, 5RU, 5RX, 5SU, 5SX, 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX, 71U, 72U, 7RU, 7SU)	01K6991

<b>Index</b>	<b>System (Netfinity 5500 - Type 8660) Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX, 51U, 51X, 52U, 52X, 5RU, 5RX, 5SU, 5SX, 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX, 71U, 72U, 7RU, 7SU</b>	<b>FRU No.</b>
6	Hard Disk Drive See "Hard disk drives and cables" on page 302 .	N/A
7	Hard Disk Drive Bezel (Black) (Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX, 51U, 51X, 52U, 52X, 5RU, 5RX, 5SU, 5SX, 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX, 71U, 72U, 7RU, 7SU)	12J3072
8	DASD Backplane Board (Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX, 51U, 51X, 52U, 52X, 5RU, 5RX, 5SU, 5SX, 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX, 71U, 72U, 7RU, 7SU)	76H6880
9	DASD 6-Drive Cage Assembly (Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX, 51U, 51X, 52U, 52X, 5RU, 5RX, 5SU, 5SX, 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX, 71U, 72U, 7RU, 7SU)	01K6987
10	Front Bezel without Door Assembly (Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX, 51U, 51X, 52U, 52X, 5RU, 5RX, 5SU, 5SX, 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX, 71U, 72U, 7RU, 7SU)	01K6997
11	1.44MB Diskette Drive, Black (Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX, 51U, 51X, 52U, 52X, 5RU, 5RX, 5SU, 5SX, 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX, 71U, 72U, 7RU, 7SU)	76H4091
	Diskette Holder Bracket (Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX, 51U, 51X, 52U, 52X, 5RU, 5RX, 5SU, 5SX, 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX, 71U, 72U, 7RU, 7SU)	12J3065
	Diskette Drive Signal Cable (Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX, 51U, 51X, 52U, 52X, 5RU, 5RX, 5SU, 5SX, 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX, 71U, 72U, 7RU, 7SU)	03K9340
12	MKE CR-504 32x CD-ROM Drive, Black (Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX, 51U, 51X, 52U, 52X, 5RU, 5RX, 5SU, 5SX, 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX, 71U, 72U, 7RU, 7SU)	02K1119

Index	System (Netfinity 5500 - Type 8660) Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX, 51U, 51X, 52U, 52X, 5RU, 5RX, 5SU, 5SX, 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX, 71U, 72U, 7RU, 7SU	FRU No.
	CD-ROM Signal Cable (IDE) (Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX, 51U, 51X, 52U, 52X, 5RU, 5RX, 5SU, 5SX, 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX, 71U, 72U, 7RU, 7SU)	03K9338
13	5.25-Inch Blank Bezel (Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX, 51U, 51X, 52U, 52X, 5RU, 5RX, 5SU, 5SX, 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX, 71U, 72U, 7RU, 7SU)	12J3073
14	3-U Front Bezel Assembly with Lock and Keys (Models 11U, 11X, 41U, 41X, 42U, 42X, 4SU, 4SX, 51U, 51X, 52U, 52X, 5SU, 5SX, 61U, 61X, 62U, 62X, 71U, 72U)	03K8798
15	3-U Enclosure Frame (Models 11U, 11X, 41U, 41X, 42U, 42X, 4SU, 4SX, 51U, 51X, 52U, 52X, 5SU, 5SX, 61U, 61X, 62U, 62X, 71U, 72U)	03K8797
16	Media and Switch Trim Panel (Models 11U, 11X, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX, 51U, 51X, 52U, 52X, 5RU, 5RX, 5SU, 5SX, 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX, 71U, 72U, 7RU, 7SU)	03K8773
17	Foot Pads, 4 each (Models 11U, 11X, 41U, 41X, 42U, 42X, 4SU, 4SX, 51U, 51X, 52U, 52X, 5SU, 5SX, 61U, 61X, 62U, 62X, 71U, 72U)	03K8800
18	3-U Blank Panel (Models 11U, 11X, 41U, 41X, 42U, 42X, 4SU, 4SX, 51U, 51X, 52U, 52X, 5SU, 5SX, 61U, 61X, 62U, 62X, 71U, 72U)	03K8799
19	DASD Door (Models 11U, 11X, 41U, 41X, 42U, 42X, 4SU, 4SX, 51U, 51X, 52U, 52X, 5SU, 5SX, 61U, 61X, 62U, 62X, 71U, 72U)	03K8778
20	Front Bezel Cap (Models 11U, 11X, 41U, 41X, 42U, 42X, 4SU, 4SX, 51U, 51X, 52U, 52X, 5SU, 5SX, 61U, 61X, 62U, 62X, 71U, 72U)	12J7041
	Door Hinge (Models 11U, 11X, 41U, 41X, 42U, 42X, 4SU, 4SX, 51U, 51X, 52U, 52X, 5SU, 5SX, 61U, 61X, 62U, 62X, 71U, 72U)	01K6637
21	Status Cover Lens (Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX, 51U, 51X, 52U, 52X, 5RU, 5RX, 5SU, 5SX, 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX, 71U, 72U, 7RU, 7SU)	12J7031



Index	System (Netfinity 5500 - Type 8660) Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX, 51U, 51X, 52U, 52X, 5RU, 5RX, 5SU, 5SX, 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX, 71U, 72U, 7RU, 7SU	FRU No.
22	Front LED (Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX, 51U, 51X, 52U, 52X, 5RU, 5RX, 5SU, 5SX, 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX, 71U, 72U, 7RU, 7SU)	01K7001
23	400 Watt Hot-Swap PFC Power Supply Assembly with Bracket (Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX, 51U, 51X, 52U, 52X, 5RU, 5RX, 5SU, 5SX, 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX, 71U, 72U, 7RU, 7SU)	03K8774
	Power Supply Filler Plate (Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX, 51U, 51X, 52U, 52X, 5RU, 5RX, 5SU, 5SX, 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX, 71U, 72U, 7RU, 7SU)	01K6996
	Hot-Swap Power Backplane Card with 5 Power Cables (Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX, 51U, 51X, 52U, 52X, 5RU, 5RX, 5SU, 5SX, 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX, 71U, 72U, 7RU, 7SU)	01K6992
24	Side Access Cover (Models 11U, 11X, 41U, 41X, 42U, 42X, 4SU, 4SX, 51U, 51X, 52U, 52X, 5SU, 5SX, 61U, 61X, 62U, 62X, 71U, 72U)	03K8776
	Side Cover Retention Bracket (Models 11U, 11X, 41U, 41X, 42U, 42X, 4SU, 4SX, 51U, 51X, 52U, 52X, 5SU, 5SX, 61U, 61X, 62U, 62X, 71U, 72U)	12J7040
25	Power AC Inlet Box (Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX, 51U, 51X, 52U, 52X, 5RU, 5RX, 5SU, 5SX, 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX, 71U, 72U, 7RU, 7SU)	01K6995
	64MB ECC 3.3v REG DIMM (Option)	01K7392
	128 MB ECC 3.3v REG DIMM (Models 11U, 11X, 41U, 41X, 51U, 51X, 5RU, 5RX)	01K7393
	128 MB ECC 3.3v REG SDRAM DIMM (Models 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX, 71U, 72U, 7RU, 7SU)	28L1015
	256MB ECC 3.3v REG DIMM (Models 52U, 52X, 5SU, 5SX; options for other models)	01K7391

Index	System (Netfinity 5500 - Type 8660) Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX, 51U, 51X, 52U, 52X, 5RU, 5RX, 5SU, 5SX, 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX, 71U, 72U, 7RU, 7SU	FRU No.
	512 KB Processor Card without Processor (Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX, 51U, 51X, 52U, 52X, 5RU, 5RX, 5SU, 5SX, 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX, 71U, 72U, 7RU, 7SU)	01K7077
	350 MHz Processor with 512 KB Cache and Heat Sink (Models 11U, 11X, 1RU, 1RX)	10L5881
	400 MHz Processor with 512 KB Cache and Heat Sink (Models 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX)	10L5882
	450 MHz Processor with 512 KB Cache and Heat Sink (Models 51U, 51X, 52U, 52X, 5RU, 5RX, 5SU, 5SX)	01K1578
	500 MHz Processor with 512 KB Cache and Heat Sink (Models 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX)	33L1615
	550 MHz Processor with 512 KB Cache and Heat Sink (Models 71U, 72U, 7RU, 7SU)	37L5603
	Air Diffuser (Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX, 51U, 51X, 52U, 52X, 5RU, 5RX, 5SU, 5SX, 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX, 71U, 72U, 7RU, 7SU)	01K7000
	Cable Management Arm (Models 1RU, 1RX, 4RU, 4RX, 4SU, 4SX, 5RU, 5RX, 5SU, 5SX, 6RU, 6RX, 6SU, 6SX, 7RU, 7SU)	12J3088
	Cable Management Arm Bracket (Models 1RU, 1RX, 4RU, 4RX, 4SU, 4SX, 5RU, 5RX, 5SU, 5SX, 6RU, 6RX, 6SU, 6SX, 7RU, 7SU)	12J3089
	EIA Mounting Flange (Left and Right) (Models 1RU, 1RX, 4RU, 4RX, 4SU, 4SX, 5RU, 5RX, 5SU, 5SX, 6RU, 6RX, 6SU, 6SX, 7RU, 7SU)	01K6981
	Interior LED and Speaker (Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX, 51U, 51X, 52U, 52X, 5RU, 5RX, 5SU, 5SX, 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX, 71U, 72U, 7RU, 7SU)	01K7002
	Keyboard with Cable (Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX, 51U, 51X, 52U, 52X, 5RU, 5RX, 5SU, 5SX, 61U, 61X, 62U, 62X) See "Keyboards" on page 303 .	N/A

Index	System (Netfinity 5500 - Type 8660) Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX, 51U, 51X, 52U, 52X, 5RU, 5RX, 5SU, 5SX, 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX, 71U, 72U, 7RU, 7SU	FRU No.
	Keylock with Keys and Pawl (Models 11U, 11X, 41U, 41X, 42U, 42X, 4SU, 4SX, 51U, 51X, 52U, 52X, 5SU, 5SX, 61U, 61X, 62U, 62X, 71U, 72U)	01K6641
	Lift Handle (Models 1RU, 1RX, 4RU, 4RX, 4SU, 4SX, 5RU, 5RX, 5SU, 5SX, 6RU, 6RX, 6SU, 6SX, 7RU, 7SU)	03K9069
	Lock Linkage (Models 11U, 11X, 41U, 41X, 42U, 42X, 4SU, 4SX, 51U, 51X, 52U, 52X, 5SU, 5SX, 61U, 61X, 62U, 62X, 71U, 72U)	03K8777
	Media Bracket (Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX, 51U, 51X, 52U, 52X, 5RU, 5RX, 5SU, 5SX, 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX, 71U, 72U, 7RU, 7SU)	12J5681
	Miscellaneous Parts Kit 1 (Models 11U, 11X, 41U, 41X, 42U, 42X, 4SU, 4SX, 51U, 51X, 52U, 52X, 5SU, 5SX, 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX, 71U, 72U, 7RU, 7SU) <ul style="list-style-type: none"> <li>• 32X5/16 Screws (4 each)</li> <li>• M3.5X8 Plastite Screws (2 each)</li> <li>• (8 each)-M3X5 (CD/BRKT SCREWS),15- M3.5X7 (PROC CD SCREWS),</li> <li>• 6-32X3/16 Screws (8 each)</li> <li>• 3.9ID Nylon Washers (2 each)</li> <li>• EMC Springs (24 each)</li> <li>• Lock Hole Plug (1 each)</li> <li>• (1 each)CABLE TIE,</li> <li>• (4 each)FAN GROMMETS,</li> </ul>	12J3079
	Miscellaneous Parts Kit 2 (Models 11U, 11X, 41U, 41X, 42U, 42X, 4SU, 4SX, 51U, 51X, 52U, 52X, 5SU, 5SX, 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX, 71U, 72U, 7RU, 7SU) <ul style="list-style-type: none"> <li>• EMI I/O Gasket</li> <li>• EMI PCI/ISA I/O Gasket (1 each)</li> </ul>	03K8782

Index	System (Netfinity 5500 - Type 8660) Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX, 51U, 51X, 52U, 52X, 5RU, 5RX, 5SU, 5SX, 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX, 71U, 72U, 7RU, 7SU	FRU No.
	Miscellaneous Parts Kit 3 (Models 11U, 11X, 41U, 41X, 42U, 42X, 4SU, 4SX, 51U, 51X, 52U, 52X, 5SU, 5SX, 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX, 71U, 72U, 7RU, 7SU) <ul style="list-style-type: none"> <li>• M3X5 Handle Screws (5 each)</li> <li>• PCI Card/Housing to Shuttle Screws (2 each)</li> <li>• Insulator with Light Pipes (5 each)</li> <li>• Hot-Swap PCI Card Clamps (4 each)</li> <li>• Hot-Swap PCI Card Guides (5 each)</li> <li>• Hot-Swap PCI I/O Card Guides (6 each)</li> <li>• ISA I/O Card Guide (1 each)</li> <li>• PCI Filler Plate Bracket (4 each)</li> <li>• Hot-Swap Retention Handles (4 each)</li> <li>• Switch Card Mounting to Chassis (1 each)</li> </ul>	28L4526
	Miscellaneous Rack Parts Kit 4 (Models 1RU, 1RX, 4RU, 4RX, 5RU, 5RX, 6RU, 6RX, 6SU, 6SX, 7RU, 7SU) <ul style="list-style-type: none"> <li>• M6X16 Slide/Bracket to Rack Screws (16 each)</li> <li>• M3.5X7 EIA Flanges to Chassis Screws (6 each)</li> <li>• M4X8 Slides to Chassis Screws (8 each)</li> <li>• M6 Slide/Bracket to Rack Nut Clips (6 each)</li> <li>• M6 Flange Arm to Bracket Nuts (2 each)</li> </ul>	12J3090
	Mouse (Models 11U, 11X, 41U, 41X, 42U, 42X, 4SU, 4SX, 51U, 51X, 52U, 52X, 5SU, 5SX, 61U, 61X, 62U, 62X, 71U, 72U)	76H0889
	Power Supply Bracket (Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX, 51U, 51X, 52U, 52X, 5RU, 5RX, 5SU, 5SX, 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX, 71U, 72U, 7RU, 7SU)	36L9535
	Power Switch (Button) Assembly with Bracket (Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX, 51U, 51X, 52U, 52X, 5RU, 5RX, 5SU, 5SX, 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX, 71U, 72U, 7RU, 7SU)	01K7003
	Processor Terminator Card (Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX, 51U, 51X, 52U, 52X, 5RU, 5RX, 5SU, 5SX)	12J2701
	Processor Terminator Card (Models 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX, 71U, 72U, 7RU, 7SU)	36L9420

Index	System (Netfinity 5500 - Type 8660) Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX, 51U, 51X, 52U, 52X, 5RU, 5RX, 5SU, 5SX, 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX, 71U, 72U, 7RU, 7SU	FRU No.
	Rack Slide Bracket Assembly (Models 1RU, 1RX, 4RU, 4RX, 4SU, 4SX, 5RU, 5RX, 5SU, 5SX, 6RU, 6RX, 6SU, 6SX, 7RU, 7SU)	03K8775
	Slot 1 Adapter (Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX, 51U, 51X, 52U, 52X, 5RU, 5RX, 5SU, 5SX)	36L9543
	Slot 1 Adapter (Models 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX, 71U, 72U, 7RU, 7SU)	33L4320
	System Battery (Note: Test new battery before installing)	33F8354
	(Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX, 51U, 51X, 52U, 52X, 5RU, 5RX, 5SU, 5SX, 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX, 71U, 72U, 7RU, 7SU)	
	System Board without Memory and Processor Card (Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX, 51U, 51X, 52U, 52X, 5RU, 5RX, 5SU, 5SX)	01K7213
	System Board without Memory and Processor Card (Models 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX, 71U, 72U, 7RU, 7SU)	36L9446
	System Board without Memory and Processor Card (Models 71U, 72U, 7RU, 7SU)	37L5994
	System Board Shield (Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX, 51U, 51X, 52U, 52X, 5RU, 5RX, 5SU, 5SX, 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX, 71U, 72U, 7RU, 7SU)	03K9054
	System Service Label (Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX, 51U, 51X, 52U, 52X, 5RU, 5RX, 5SU, 5SX, 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX, 71U, 72U, 7RU, 7SU)	02K3571
	Voltage Regulator Card (Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX, 51U, 51X, 52U, 52X, 5RU, 5RX, 5SU, 5SX, 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX, 71U, 72U, 7RU, 7SU)	01K7113

## Hard disk drives and cables

Index	Hard Disk Drive Option	FRU No.
6	4 GB Hard Disk Drive (Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX)	76H5817
6	4 GB Hard Disk Drive (2nd Source) (Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX)	76H7243
6	9 GB Hard Disk Drive (Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX)	76H5818
6	9 GB Hard Disk Drive (2nd Source) (Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX)	76H7244
	Hard Disk Drive Tray (Slim) (Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX)	12J3276
	Hard Disk Drive Tray (Half High) (Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX)	12J3758
	Half High Drive Extender (Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX)	12J3286
	PCI Switch Card (Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX, 51U, 51X, 52U, 52X, 5RU, 5RX, 5SU, 5SX, 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX, 71U, 72U, 7RU, 7SU)	03K8982
	SCSI Hard Disk Drive Cable (3X) (Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX, 51U, 51X, 52U, 52X, 5RU, 5RX, 5SU, 5SX, 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX, 71U, 72U, 7RU, 7SU)	12J3711
	External SCSI Cable (Models 11U, 11X, 1RU, 1RX, 41U, 41X, 42U, 42X, 4RU, 4RX, 4SU, 4SX, 51U, 51X, 52U, 52X, 5RU, 5RX, 5SU, 5SX, 61U, 61X, 62U, 62X, 6RU, 6RX, 6SU, 6SX, 71U, 72U, 7RU, 7SU)	03K9342

## Keyboards

Keyboards	FRU No.
Arabic	37L2555
	37L0818
	02K0870
Belgian-French	37L2556
	37L0819
	02K0871
Belgian-UK/Dutch	37L2557
	37L0820
	02K0872
Brazil/Portugal	37L2571
	37L0817
	02K0869
Bulgarian	37L2558
	37L0821
	02K0873
Chinese/US	37L2585
	37L0848
	02K0900
Czech	37L2559
	37L0822
	02K0874
Danish	37L2560
	37L0823
	02K0875
Dutch	37L2561
	37L0824
	02K0876
French	37L2562
	37L0825
	02K0877
French/Canadian - 58	37L0913
	02K0863
French/Canadian - 445	37L2552
	37L0815
	02K0865
German	37L2563
	37L0826
	02K0878
Greek	37L2564
	37L0827
	02K0879
Hebrew	37L2565
	37L0828
	02K0880
Hungarian	37L2566
	37L0829
	02K0881
Icelandic	37L2567
	37L0830
	02K0882
Italian	37L2568
	37L0831
	02K0883
Japanese	37L0847
	02K0899
	02K0901
Korean	37L0849
	76H0935

<b>Keyboards</b>	<b>FRU No.</b>
Norwegian	37L252569
	37L0832
	02K0884
Polish	37L2570
	37L0833
	02K0885
Portuguese	37L2571
	37L0834
	02K0886
Romanian	37L2572
	37L0835
	02K0887
Russian	37L2573
	37L0836
	02K0888
Serbian/Cyrillic	37L2574
	37L0837
	02K0889
Slovak	37L2575
	37L0838
	02K0890
Spanish	37L2576
	37L0839
	02K0891
Spanish - Latin America	37L2553
	37L0816
	02K0867
Swedish/Finnish	37L2577
	37L0840
	02K0892
Swiss French/German	37L2578
	37L0841
	02K0893
Thailand	37L2587
	37L0850
	02K0902
Turkish - 179	37L2579
	37L0842
	02K0894
Turkish - 440	37L2580
	37L0843
	02K0895
UK English	37L2581
	37L0844
	02K0896
US English	37L2551
	37L0814
	02K0861
UK English (ISO Compliant)	37L2583
	37L0846
	02K0898
Yugoslavia/Lithuania	37L2582
	37L0845
	02K0897



## 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	62X1045
U.K./Ireland	14F0033
Yugoslavia	1339520



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## 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.

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## Safety information

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

### General safety

Follow these rules to ensure general safety:

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

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

## Electrical safety



### Caution

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

Observe the following rules when working on electrical equipment.

### Important

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

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

- Find the room emergency power-off (EPO) switch, disconnecting switch, or electrical outlet. If an electrical accident occurs, you can then operate the switch or unplug the power cord quickly.
- Do not work alone under hazardous conditions or near equipment that has hazardous voltages.
- Disconnect all power before:
  - Performing a mechanical inspection
  - Working near power supplies
  - Removing or installing main units
- Before you start to work on the machine, unplug the power cord. If you cannot unplug it, ask the customer to power-off the wall box that supplies power to the machine and to lock the wall box in the off position.
- If you need to work on a machine that has *exposed* electrical circuits, observe the following precautions:
  - Ensure that another person, familiar with the power-off controls, is near you.  
**Remember:** Another person must be there to switch off the power, if necessary.
  - Use only one hand when working with powered-on electrical equipment; keep the other hand in your pocket or behind your back.

**Remember:** There must be a complete circuit to cause electrical shock. By observing the above rule, you may prevent a current from passing through your body.

- When using testers, set the controls correctly and use the approved probe leads and accessories for that tester.
- Stand on suitable rubber mats (obtained locally, if necessary) to insulate you from grounds such as metal floor strips and machine frames.

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

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

and similar units. (This practice ensures correct grounding of the units.)

- If an electrical accident occurs:
  - **Use caution; do not become a victim yourself.**
  - **Switch off power.**
  - **Send another person to get medical aid.**

## Safety inspection guide

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

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

Consider these conditions and the safety hazards they present:

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

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

Checklist:

1. Check exterior covers for damage (loose, broken, or sharp edges).
2. Power-off the computer. Disconnect the power cord.
3. Check the power cord for:
  - a. A third-wire ground connector in good condition. Use a meter to measure third-wire ground continuity for 0.1 ohm or less between the external ground pin and frame ground.
  - b. The power cord should be the appropriate type as specified in the parts listings.
  - c. Insulation must not be frayed or worn.
4. Remove the cover.
5. Check for any obvious non-IBM alterations. Use good judgment as to the safety of any non-IBM alterations.
6. Check inside the unit for any obvious unsafe conditions, such as metal filings, contamination, water or other liquids, or signs of fire or smoke damage.
7. Check for worn, frayed, or pinched cables.
8. Check that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.

## Handling electrostatic discharge-sensitive devices

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

### Notes:

1. Use product-specific ESD procedures when they exceed the requirements noted here.
2. Make sure that the ESD protective devices you use have been certified (ISO 9000) as fully effective.

When handling ESD-sensitive parts:

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

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

- Attach the ESD ground clip to any frame ground, ground braid, or green-wire ground.
- Use an ESD common ground or reference point when working on a double-insulated or battery-operated system. You can use coax or connector-outside shells on these systems.
- Use the round ground-prong of the ac plug on ac-operated computers.

## Grounding requirements

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





## 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

1. DESLIGUE tudo.
2. Conecte primeiro todos os cabos nos dispositivos.
3. Conecte os cabos de sinal nos receptáculos.
4. Conecte o(s) cabo(s) de alimentação nas tomadas.
5. LIGUE o dispositivo.

### Para Desconectar

1. DESLIGUE tudo.
2. Remova primeiro o(s) cabo(s) de alimentação das tomadas.
3. Remova os cabos de sinal dos receptáculos.
4. Remova todos os cabos dos dispositivos.



**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.

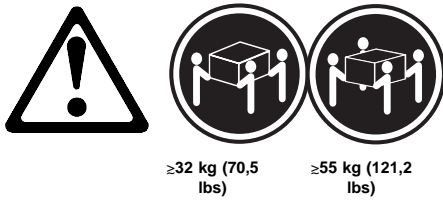
A utilização de controles ou ajustes ou a execução de procedimentos diferentes daqueles especificados nesta publicação pode resultar em exposição perigosa à radiação.

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.



**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.



**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

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

#### 要断开电缆

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

## 声明 2



### 注意!

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

#### 不要：

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

应按照当地法规和条例对此电池进行处理。

## 声明 3



### 注意!

在已安装 CD-ROM 驱动器的情况下，请注意下面的内容。

不遵循此处指定的控制、调整、或操作过程的操作将可能导致危险的辐射泄漏。

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

声明 4

危险！

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

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

声明 5



32 kg (70.5 磅)



55 kg (121.2 磅)

注意！

搬运机器时，请进行安全搬运操作。

声明 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 (110 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通過。為了避免電擊，在安裝、移動本產品，或開啓本產品的蓋子或與本產品連接之裝置的蓋子時，請依照下列「連接」及「拔掉」電纜線的步驟操作。

連接

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. 開啓裝置電源。         |                    |

• 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：

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

• 聲明 5



>= 32 公斤 (70.5 磅)



>= 55 公斤 (121.2 磅)

注意：  
提昇機器時，請使用安全提昇措施。

• 聲明 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**

**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**

1. Turn Everything OFF.
2. First, attach all cables to devices.
3. Attach signal cables to receptacles.
4. Attach power cord(s) to outlet.
5. Turn device ON.

**To Disconnect**

1. Turn Everything OFF.
2. First, remove power cord(s) from outlet.
3. Remove signal cables from receptacles.
4. Remove all cables from devices.

NOTE: In the UK, by law, the telephone cable must be connected after the power cord.

NOTE: In the UK, the power cord must be disconnected after the telephone cable.





**CAUTION:**

When replacing the battery, use only IBM Part Number 33F8354 or an equivalent type battery recommended by the manufacturer. If 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**

**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**

1. Mettez les unités hors tension.
2. Commencez par brancher tous les cordons sur les unités.
3. Branchez les câbles d'interface sur les prises.
4. Branchez les cordons d'alimentation sur un socle de prise de courant.
5. Mettez les unités sous tension.

**Déconnexion**

1. Mettez les unités hors tension.
2. Commencez par débrancher les cordons alimentation des socles de prise de courant.
3. Débranchez les câbles d'interface des prises.
4. Débranchez tous les câbles des unités.



**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.



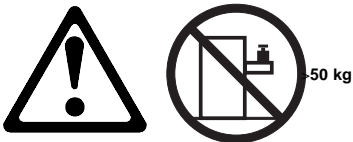
**CAUTION:**  
Ce produit pèse un poids considérable. Faites-vous aider pour le soulever.



**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**

1. Alle Geräte ausschalten und Netzstecker ziehen.
2. Zuerst alle Kabel an Einheiten anschließen.
3. Signalkabel an Anschlußbuchsen anschließen.
4. Netzstecker an Steckdose anschließen.
5. Gerät einschalten.

**Kabel lösen**

1. Alle Geräte ausschalten.
2. Zuerst Netzstecker von Steckdose lösen.
3. Signalkabel von Anschlußbuchsen lösen.
4. Alle Kabel von Einheiten lösen.



**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

1. SPEGNERE tutti i dispositivi.
2. Collegare prima tutti i cavi alle unità.
3. Collegare i cavi di segnale alle prese.
4. Collegare il(i) cavo(i) di alimentazione alla presa elettrica.
5. ACCENDERE le unità.

### Per scollegare

1. SPEGNERE tutti i dispositivi.
2. Rimuovere prima il(i) cavo(i) di alimentazione dalla presa elettrica.
3. Rimuovere i cavi di segnale dalle prese.
4. Rimuovere tutti i cavi dalle unità.

**ATTENZIONE:**

Quando si sostituisce la batteria, utilizzare solo una batteria IBM o batterie dello stesso tipo o di tipo equivalente consigliate dal produttore. Se il sistema di cui si dispone è provvisto di un modulo contenente una batteria al litio, sostituire tale batteria solo con un tipo di modulo uguale a quello fornito dal produttore. La batteria contiene litio e può esplodere se utilizzata, maneggiata o smaltita impropriamente.

**Evitare di:**

- Gettarla o immergerla in acqua
- Riscaldarla ad una temperatura superiore ai 100° C
- Cercare di ripararla o smaltirla

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

**ATTENZIONE:**

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

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

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

**PERICOLO**

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

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



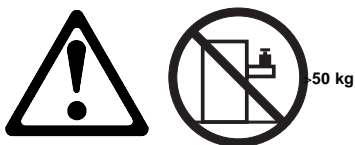
**ATTENZIONE:**  
Durante il sollevamento della macchina seguire delle norme di sicurezza.



**ATTENZIONE:**  
Il pulsante del controllo dell'alimentazione situato nella parte anteriore del server non disattiva la corrente elettrica fornita al server. Il server potrebbe anche avere più di un cavo di alimentazione. Per disattivare la corrente elettrica del server, 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 server 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 server.

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 재구성 등의 작업을 수행하지 않도록 하십시오.

전기 충격을 피하려면 다음과 같아야 합니다.

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

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

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

연결하려면	연결해제하려면
1. 모든 스위치를 켜다.	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 켜다.	

경고문 2



주의:

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

다음은 주의하십시오.

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

지역 법령이나 규정의 요구에 따라 배터리를 처분하십시오.

경고문 3



주의:

CD-ROM 드라이브가 설치되어 있으면 다음 사항을 명심하십시오.

여기서 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 2급 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 껐도 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**

1. Apague todos los componentes (OFF).
2. En primer lugar, conecte todos los cables a los dispositivos.
3. Conecte los cables de señal a los receptáculos.
4. Conecte los cables de alimentación a las tomas.
5. Encienda el dispositivo (ON).

**Instrucciones de desconexión**

1. Encienda todos los componentes (ON).
2. En primer lugar, retire los cables de alimentación de las tomas.
3. Retire los cables de señal de los receptáculos.
4. Retire todos los cables de los dispositivos.



**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.

## 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:

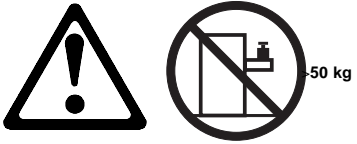
El botón de control de alimentación del panel frontal del servidor no apaga la corriente eléctrica suministrada al servidor. Puede suceder que el servidor tenga más de un cable de alimentación. Para eliminar por completo la corriente eléctrica del servidor, asegúrese de desconectar todos los cables de 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.





**CAUTION:**  
No coloque ningún objeto cuyo peso sea superior a los 50 kilos sobre la bandeja modelo del servidor.



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## 2-way Xeon upgrade installation

### Note

For additional information about systems with the 2-Way Xeon Upgrade Kit installed, refer to the Netfinity 5500 M10 - Type 8661 Hardware Maintenance Manual (Part Number 37L5210).

You can upgrade the IBM® Netfinity™ server with Intel® Pentium® II Xeon™ microprocessors. This Processor Upgrade Kit contains a new processor assembly that includes the processor board and a terminator card. It does not include the microprocessors, voltage regulator modules (VRM), or memory modules.

This section provides instructions for installing the Processor Upgrade Kit. It also includes the installation instructions for the microprocessors, VRMs, and the memory modules.

---

### Before you begin

Read through these instructions to familiarize yourself with the installation procedure.

The option contains the following items:

- Processor assembly, consisting of:
  - Processor housing
  - Processor board
  - Terminator card
- *IBM Netfinity 5500/5500 M10 BIOS Update Diskette*
- *IBM Netfinity 5500 Advanced System Management Processor Update Diskette*
- *IBM Netfinity 5500/5500 M10 Diagnostic Update Diskette 1 of 2*
- *IBM Netfinity 5500/5500 M10 Diagnostic Update Diskette 2 of 2*
- *IBM Netfinity Upgrade Kit for Pentium II Xeon Processors Installation Instructions* (this book)
- *IBM Safety Information* book

You must install the following companion options with the Processor Upgrade Kit:

1. You can install one or two microprocessor kits in the server. 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.
2. You can add memory modules to the server in any of the following configurations:
  - 128 MB synchronous dynamic random access memory (SDRAM) error checking and correction

(ECC) registered dual inline memory module (DIMM)

- 256 MB registered SDRAM ECC DIMM
- 512 MB registered SDRAM ECC DIMM
- A combination of 128 MB, 256 MB, and 512 MB registered SDRAM ECC DIMMs

**Note**

The server might come with memory modules that are not compatible with the Processor Upgrade Kit.

For more information about the memory configurations supported, see “Installing memory-modules” on page 353.

You need the following items to install the Processor Upgrade Kit:

- A medium flat-blade screwdriver
- A medium phillips screwdriver
- The documentation that comes with the server

**Note**

The illustrations in this book might be slightly different from the hardware.

---

## Installing the software

The information on the following pages will guide you in installing the necessary software needed for this processor upgrade.

### Updating the system BIOS and microcode levels

You must have the correct versions of the following software before you install this option:

- System BIOS
- Advanced System Management Microcode
- Diagnostic Programs

### Checking the system BIOS version:

The server must be at system BIOS revision level 2.0 or later to support the Processor Upgrade Kit.

Complete this procedure to check the BIOS revision level.

1. Close all server applications and shut down the server operating system.
2. Turn off the server.
3. Turn on the server.
4. Watch the monitor screen. When the server startup begins POST (power-on self-test) and the IBM logo appears, note the BIOS revision level in the left-hand corner of the monitor screen.

If the BIOS revision level is 2 or higher, go to “Updating the Advanced System Management Processor code” on page 342.

If the BIOS revision level is lower than 2, go to “Updating the system BIOS”

### Updating the system BIOS:

### Important

Updating the System BIOS might overwrite the existing configuration and reset it to the system default values.

Before you begin this procedure, make sure that you have recorded the settings of the configuration. To do that, go into the Configuration/Setup Utility program and record the information. You can record the information on a piece of paper or in the Server Records and Specifications tables found in the Hardware Information section of the Server Library. If you need information about the Configuration/Setup Utility program, refer to the documentation that comes with the server.

After you have recorded the information, continue with this procedure.

Complete this procedure to update the system BIOS.

1. Insert the *IBM Netfinity 5500 BIOS Update Diskette* in the diskette drive.
2. Press **Ctrl+Alt+Del** to restart the server. The system begins the power-on self-test (POST).
3. Select **1 - Update POST/BIOS** from the menu that contains various flash (update) options.
4. Select **Y** when you are asked if you would like to move the current POST/BIOS image to the backup ROM location.
5. Select **N** when you are asked if you would like to save the current code to a diskette.
6. You will be asked to choose which language you wish to use.  
Select your language (0-7) and press **Enter** to accept your choice. When complete, you will be prompted to remove the diskette and press **Enter** to restart the system.
7. Remove the diskette and go to "Updating the Advanced System Management Processor code."

### Updating the Advanced System Management Processor code:

Complete this procedure to update the advanced system management processor code.

1. Insert the *IBM Netfinity 5500 Advanced System Management Processor Update Diskette* into the diskette drive.
2. Press **Ctrl+Alt+Del** to restart the server. The system begins the power-on self-test (POST).  
Information similar to the following will appear on the screen.

```
Flash Utility

Select one:

1. Update Advanced System Management Processor
2. Configure OS WatchDog Timer
3. Exit

Enter      F1=Help      F3=Exit
```

3. Select **1. Update Advanced System Management Processor** and press **Enter**.

A warning message appears on the screen with information similar to the following.

```
Warning

This procedure will update the Advanced
System Management Processor code. The
system must not lose power during this
operation.

Press Enter to continue with the update
or press Esc to cancel it.

Enter      Esc=Cancel
```

4. Press **Enter** when you are ready to continue. Several screens are displayed as the system upgrades the microcode.

After a successful upgrade, a message similar to the following appears.

```
Information

The Advanced System Management Processor
update was successful.

Press Enter to return to the main menu.

Enter
```

5. Press **Enter** when this screen appears. The main menu appears.
6. Press **Enter** or **F3** to exit from the utility program. A message similar to the following appears.

Information

Remove the diskette from the default drive and reboot the system.

7. Remove the diskette and go to “Updating the System Diagnostic programs.”

**Note**

If an error occurs, a message similar to the following appears on a screen with a red background.

Error

An error occurred during the Advanced System Management Processor Update.

Retry updating the Advanced System Management processor.

Enter

If this message appears, remove the diskette and return to “Updating the Advanced System Management Processor code” on page 342 to retry this procedure. If this error message appears again, remove the diskette, turn off the system, and contact your service representative for assistance.

## Updating the System Diagnostic programs:

Complete this procedure to update the system diagnostic programs.

1. Insert the *IBM Netfinity 5500/5500 M10 Diagnostic Update Diskette 1 of 2* into the diskette drive.
2. Press **Ctrl+Alt+Del** to restart the server. The system begins the power-on self-test (POST).
3. A menu appears containing a number of selections. Select: **Option 2 (Update Diagnostic)** and press **Enter**.
4. Select a language (0—7) from the list shown on the next screen and press **Enter** to accept your choice. A message in your selected language similar to the following appears.



```
Reading the flash image $0021000.us1
```

After this message appears, you will be prompted to insert the *IBM Netfinity Diagnostic Update Diskette 2 of 2* into the diskette drive.

5. Insert the diskette into the diskette drive and press **Enter**.

A message similar to the following appears.

```
Reading the flash image $0021000.us2
```

After this message, another message similar to the following appears.

```
The system diagnostic is being updated and it might  
take up to 5 minutes to complete. Do not power off  
or restart the system during this procedure.
```

6. When the update is complete, a message similar to the following appears, however, do not press enter to restart the system at this time.

```
Diagnostic Update Completed.  
  
Remove the diskette from the drive and press  
Enter to restart the system.
```

Remove the diskette from the diskette drive and turn off the server. This completes the update of the software needed to install the Processor Upgrade Kit. You will now install the hardware.

## **Staying up to date with the latest software:**

Periodically check the World Wide Web at <http://www.ibm.com/pc/us/netfinity> for future releases of:

- Netfinity 5500 system BIOS
- Netfinity 5500 advanced system management processor code
- Netfinity 5500 system diagnostics programs

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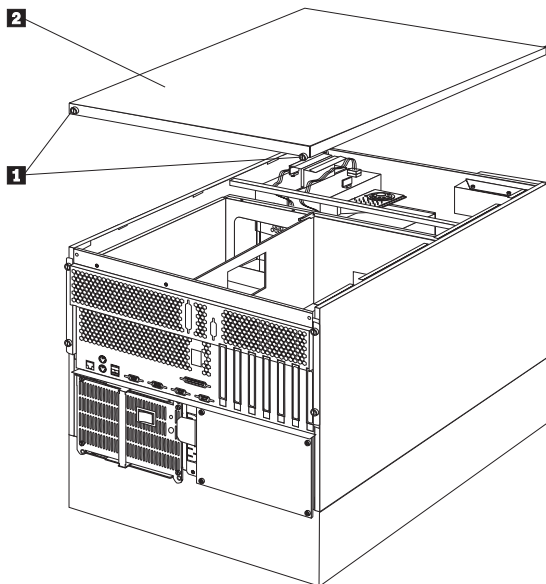
## Installing the hardware

The information on the following pages will guide you in installing the hardware included in this processor upgrade.

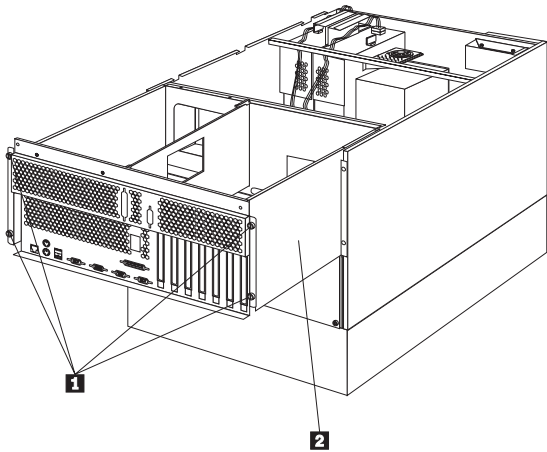
### Removing the processor assembly

Complete this procedure to remove the processor assembly.

1. Remove all media (diskettes, CDs, optical discs, or tapes) from the drives.
2. Turn off the server and any attached devices.
3. If you are in the United Kingdom and have a modem or fax machine attached to the server, you must disconnect the telephone line from the server *before* unplugging any power cords (also known as power cables). When reassembling the server, you must reconnect the telephone line *after* you plug in the power cords.
4. Disconnect all power cords (cables) from electrical outlets.
5. Disconnect all power cords from the server.
6. Disconnect all communication cables from external receptacles.
7. Note the location of the remaining cables and cords; then, disconnect them from the server.
8. Unscrew the top cover thumbscrews **1** and remove the top cover **2**.



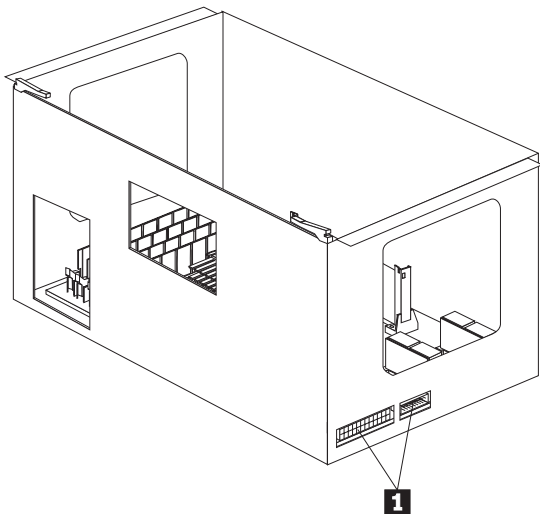
9. Loosen the four thumbscrews **1** at the rear of the shuttle.



10. Slide the shuttle **2** to the rear of the server.
11. Disconnect the two cables from the connectors **1** on the processor assembly.

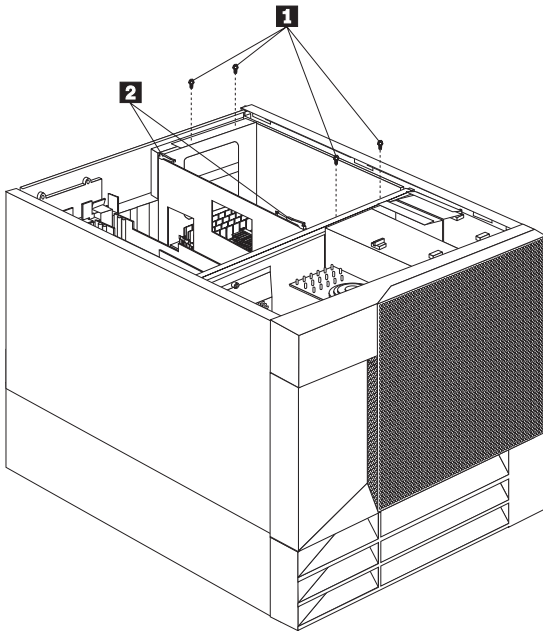
**Note**

For easier access to the connectors, you might have to remove the air diffuser near the fan. To do this, slide the air diffuser up and off of the clips. Then, lift it out of the server. You will be instructed when to replace the funnel later in this procedure.

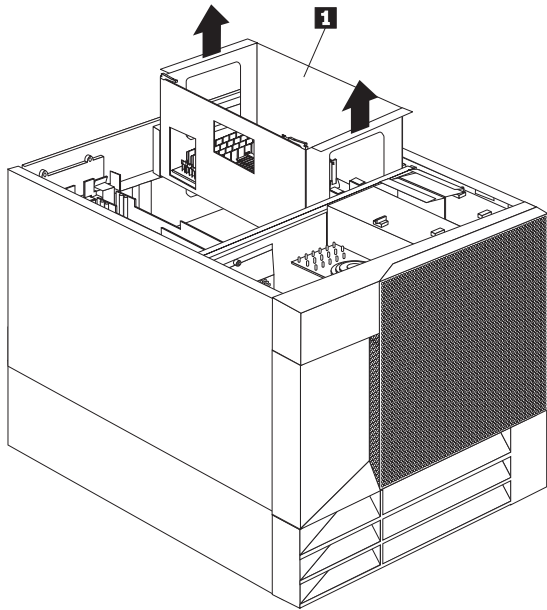


12. Remove the four screws **1** securing the processor assembly.

13. If the processor assembly has two levers **2** at the top corners, pull the levers up.

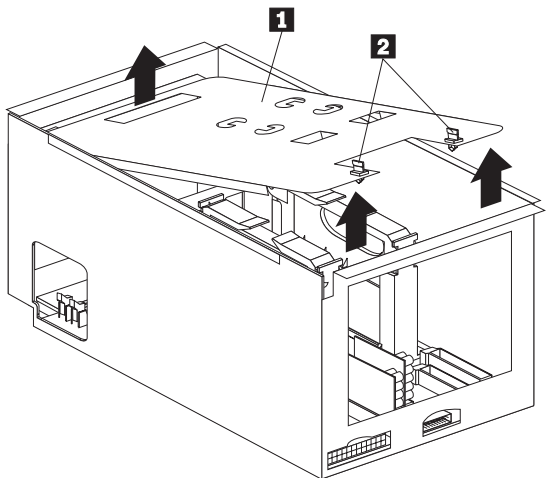


14. Lift the processor assembly **1** out of the server and put it aside. This processor assembly is not used for the upgrade.

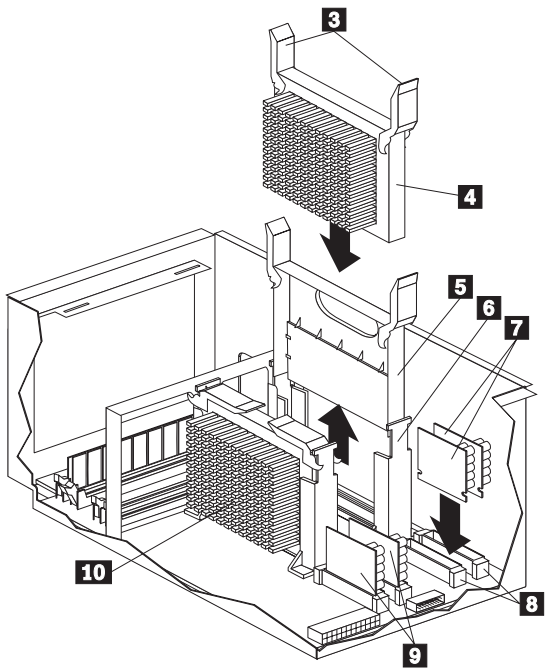


### Installing a microprocessor kit

Refer to the following illustrations of the processor assembly and processor board while you perform the steps in this procedure.



- 1** Processor assembly top cover
- 2** Quarter-turn fasteners

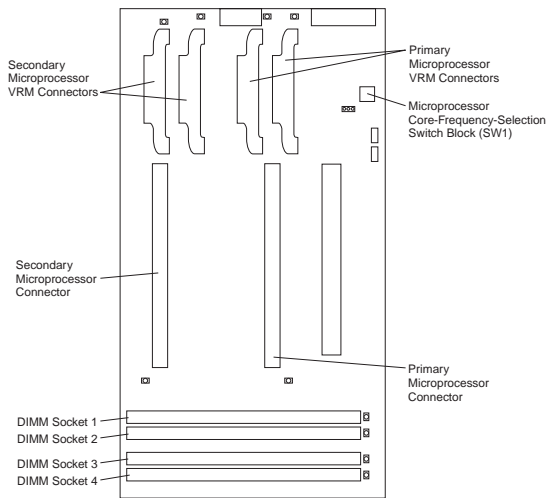


- 3** Latches
- 4** Secondary microprocessor
- 5** Terminator card
- 6** Secondary microprocessor connector
- 7** Voltage regulator modules (VRMs) for secondary microprocessor
- 8** VRM connectors for secondary microprocessor
- 9** VRMs for primary microprocessor
- 10** Primary microprocessor

Complete this procedure to install a microprocessor kit in the processor assembly.

1. Turn the quarter-turn fasteners **2** and remove the processor assembly top cover **1**.

Refer to the processor board layout for component locations.



2. Install the microprocessor in the primary microprocessor connector.
  - 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. Hold the microprocessor **10** by the open latches **3** and center the microprocessor over the microprocessor connector.
  - c. Make sure the microprocessor is oriented and aligned correctly.
  - d. Insert the microprocessor into the guides until it seats in the connector. Close the latches.
3. Install the two VRMs (voltage regulator modules) **9** in the primary microprocessor VRM connectors.
  - a. Center one VRM over the connector.
  - b. Make sure the VRM is oriented and aligned correctly.
  - c. Press the VRM into the connector until the VRM latches snap into the locked position.
  - d. Repeat this procedure to install the other VRM.
4. If you are installing a second microprocessor kit, complete this procedure.
  - a. Remove the terminator card **5** from the secondary microprocessor connector **6**.
  - b. Refer to the procedure in step 2 and install the secondary microprocessor **4**.
  - c. Refer to the procedure in step 3 and install the two VRMs **7** in the secondary microprocessor VRM connectors **8**.
5. Set the microprocessor core-ratio-selection switch (SW1) for the correct microprocessor core ratio. For example, if you have a 450 MHz microprocessor installed, be sure that the microprocessor core-ratio-selection switch is set to a microprocessor



core ratio of 4.5 (450/100). Refer to the following table.

**Note**

To turn a switch Off, press the switch on the side where the word off is printed. To turn a switch On, press the switch on the side opposite of where the word off is printed.

CPU Core Ratio	SW1 Position 1	SW1 Position 2	SW1 Position 3	SW1 Position 4
4.0	On	On	On	Off
4.5	On	Off	On	Off
5.0	On	On	Off	Off

## Installing memory-modules

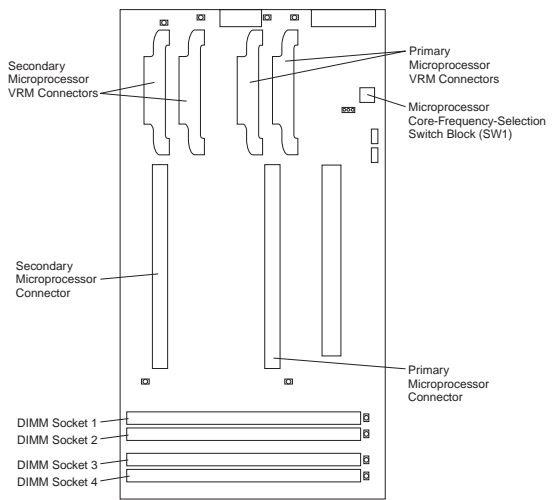
You install the memory modules on the processor assembly included in the Processor Upgrade Kit. You must install memory modules that are compatible with the Processor Upgrade Kit.

**Important**

When installing memory, keep the following in mind:

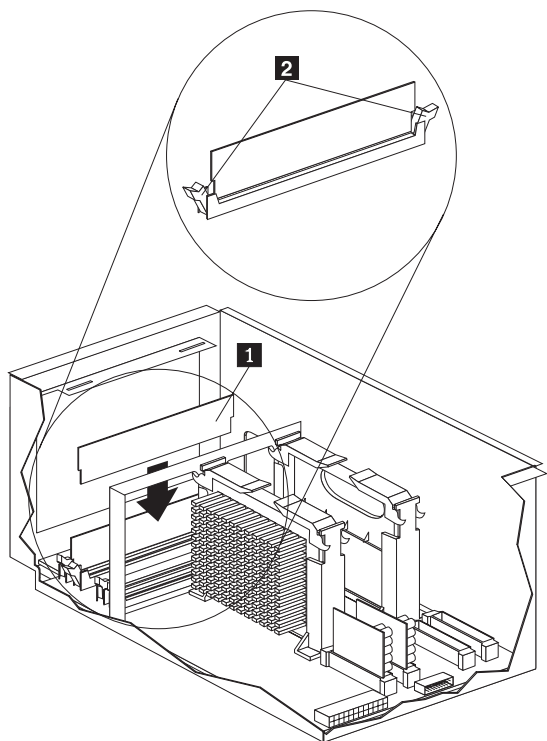
- Install only 3.3 V, 168-pin, 8-byte, registered DIMMs.
- The memory-module kit sizes available for the server are 128 MB, 256 MB, and 512 MB. The server supports a minimum of 128 MB and a maximum of 2 GB of system memory.
- Only 100 MHz, 72-bit, registered, synchronous, ECC, x4 configuration DIMMs are supported for the 128, 256 MB and 512 MB DIMMs.
- Installing or removing memory modules changes the configuration information in the server. After adding or removing a DIMM, save the new configuration information in the Configuration/Setup program. When you restart the server, the system displays a message indicating that the memory configuration has changed. Start the Configuration/Setup program and select **Save Settings**. Refer to the documentation that comes with the server for more information.

Install the first memory module in DIMM socket 4. Install additional memory modules in DIMM sockets 3, 2, and 1 in that order. If you mix DIMM sizes, install the largest sized DIMM in DIMM socket 4, the next largest sized DIMM in DIMM socket 3, and so forth.

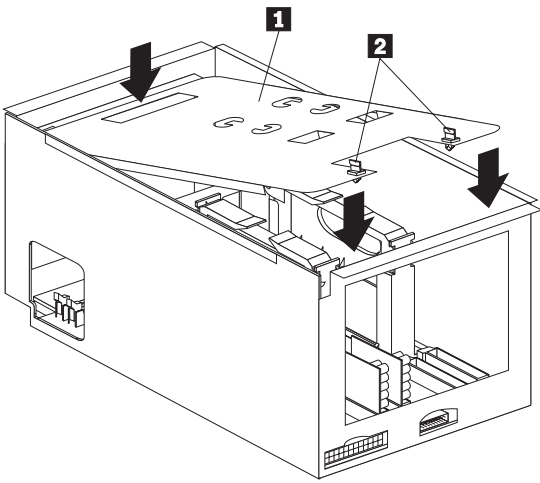


Complete this procedure to install memory-modules.

1. Center the DIMM **1** over the connector. Make sure the DIMM is oriented and aligned correctly.



2. Press the DIMM into the connector until the latches **2** snap into the locked position.
3. Repeat this procedure for additional DIMMs.
4. Replace the processor assembly top cover **1**.

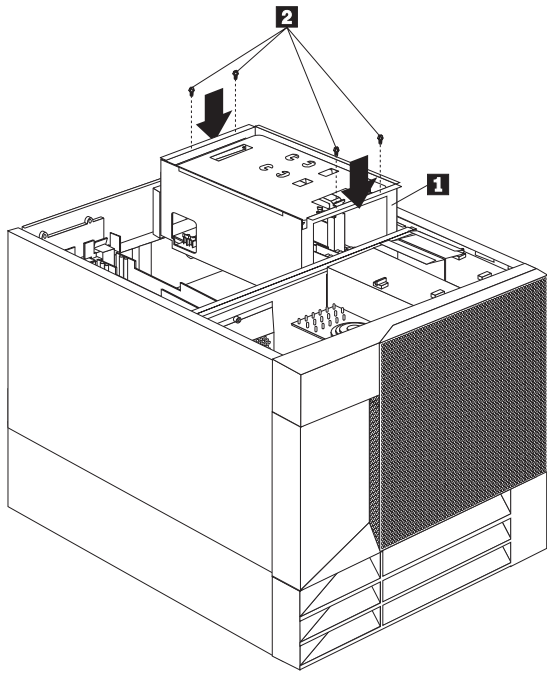


5. Turn the quarter-turn fasteners **2** to the locked position.

### Installing the processor assembly

Complete this procedure to install the processor assembly.

1. Lift the processor assembly by the openings in the top cover and orient the processor assembly **1** with the DIMMs toward the rear of the server.

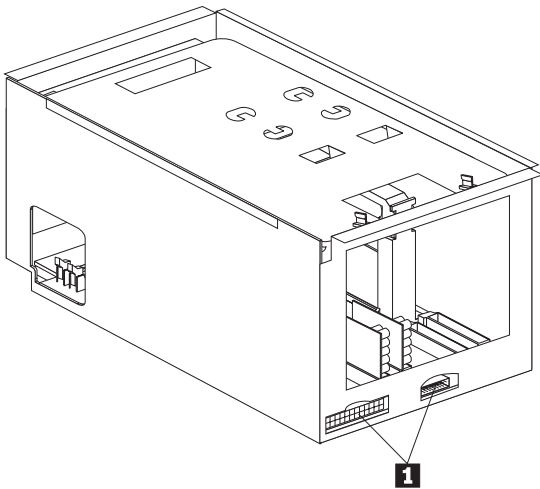


2. Carefully lower the processor assembly into the server shuttle until it is fully seated.
3. Install and tighten the four screws **2** that you removed in step 12 on page 348.

**Note**

If you removed the air diffuser, reinstall it now.

4. Reconnect the two cables that you disconnected in step 11 on page 348.



5. Slide the shuttle into place and tighten the four shuttle thumbscrews.
6. Reinstall the top cover.
  - a. Check that all cables, adapters, and other components are installed and seated correctly and that you have not left loose tools or parts inside the server.
  - b. Lower the cover with the rear edge of the cover approximately 2.5 cm (1 in.) back from the rear edge of the server.
  - c. Slide the cover forward.
  - d. Tighten the two thumbscrews on the back edge of the cover.

## Completing the installation

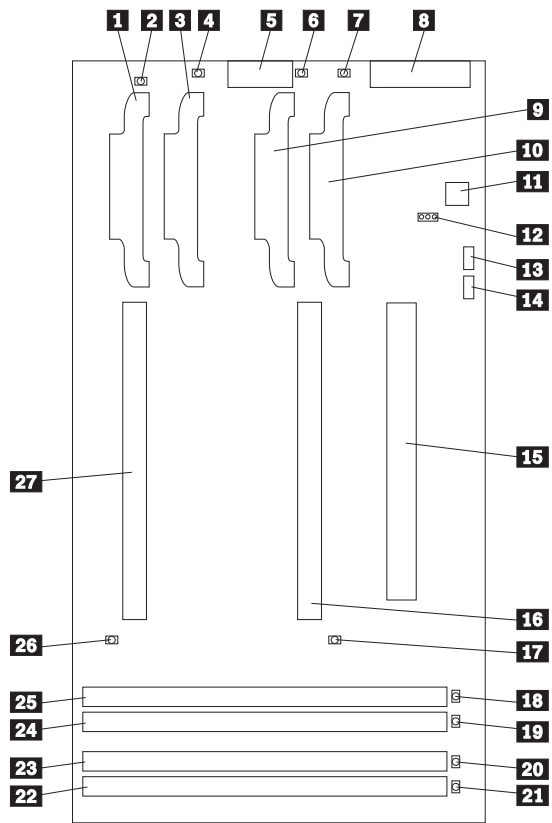
Complete this procedure.

1. Connect all server and device cables and connectors.
2. Turn on the server.
3. Watch the screen. When prompted, press **F1** to enter the Configuration/Setup Utility program.
4. Select **Save Settings** and exit the Configuration/Setup Utility program. The server restarts automatically.

The upgrade installation is complete.

## Processor board component locations

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



- 1** Secondary microprocessor cache VRM connector (U15)
- 2** Secondary microprocessor cache VRM error LED (CR36)
- 3** Secondary microprocessor core VRM connector (U7)
- 4** Secondary microprocessor core VRM error LED (CR37)
- 5** Power control connector (J17)
- 6** Primary microprocessor cache VRM error LED (CR19)
- 7** Primary microprocessor core VRM error LED (CR17)
- 8** Power supply connector (J10)

- 9** Primary microprocessor cache VRM connector (U17)
- 10** Primary microprocessor core VRM connector (U22)
- 11** Microprocessor core-ratio-selection switch block (SW1)
- 12** Reserved (J22)
- 13** Reserved (J20)
- 14** Reserved (J18)
- 15** System board connector (J9) (on reverse side of processor board)
- 16** Primary microprocessor connector (U5)
- 17** Primary microprocessor error LED (CR12)
- 18** DIMM 1 error LED (CR8)
- 19** DIMM 2 error LED (CR9)
- 20** DIMM 3 error LED (CR10)
- 21** DIMM 4 error LED (CR11)
- 22** DIMM socket 4 (J1)
- 23** DIMM socket 3 (J2)
- 24** DIMM socket 2 (J3)
- 25** DIMM socket 1 (J4)
- 26** Secondary microprocessor error LED (CR13)
- 27** Secondary microprocessor connector (U6)

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## Parts listing (2-way upgrade kit)

2-Way Upgrade Kit	FRU No.
Processor Board Support Tray	10L6971
Slot 2 Goalpost	36L9544
D2SP Processor Board without CPU	61H0523
CPU Terminator Card	94H0598
400/100MHz DS2P 512KB/L2	11L1569
400/100MHz DS2P 1MB/L2	11L1571
450MHZ Pentium II Xeon W/1MB	28L4558
450MHZ Pentium II Xeon W/512	28L4557
Voltage Regulator Card	20L1010
128MB ECC 3.3v REG DIMM	28L1015
256MB ECC 3.3v REG DIMM	01K7391
512MB ECC 3.3v REG DIMM	28L1016

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## 4-way Xeon upgrade installation

### Note

For additional information about systems with the 4-Way Xeon Upgrade Kit installed, refer to the Netfinity 5500 M20 - Type 8662 Hardware Maintenance Manual (Part Number 37L2020).

You can upgrade the Netfinity 5500 or Netfinity 5500 M10 server with up to four Intel® Pentium® II Xeon™ microprocessors or up to four Pentium III Xeon microprocessors. This Processor Upgrade Kit provides a new microprocessor assembly that includes the processor board and three terminator cards. It does not include the microprocessors, voltage regulator modules (VRMs), or memory modules.

You must install at least one microprocessor kit. Optionally, you can install up to four microprocessor kits. (The microprocessor kits include the required VRMs.) You must also install the memory-modules.

This book provides instructions for installing the Processor Upgrade Kit. It also includes instructions for installing the microprocessors, VRMs, and the memory-modules.

### Important

This Processor Upgrade Kit must be installed by trained service personnel. Contact IBM or a trained service provider for assistance.

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## Before you begin

Read through these instructions to familiarize yourself with the installation procedure. Be sure you have the additional microprocessors and memory options required to complete the upgrade (see "Required companion options" on page 362).

The option contains the following items:

- Processor housing assembly, consisting of:
  - Processor housing
  - Processor board
  - Memory board
  - Three terminator cards
  - Fan Assembly
- Power supply
- Power supply handle
- Power backplane
- Power supply separator
- RS-485 interface cable
- Processor housing guide

- SCSI controller-to-bulkhead cable
- Front panel assembly
- Diagnostic panel assembly
- Air diffuser
- Half-card slot insulator
- Power supply filler panel
- Four blue thumbscrews
- Jumper extension cable
- *IBM Netfinity 5500 M20 Advanced System Management Processor Firmware Update Diskette*
- *IBM Netfinity 5500 M20 BIOS Update Diskette*
- *IBM Netfinity 5500 M20 Diagnostic Update Diskette 1 of 2*
- *IBM Netfinity 5500 M20 Diagnostic Update Diskette 2 of 2*
- *IBM Netfinity Four-Way Processor Upgrade Kit Installation Instructions* (this book)
- *IBM Netfinity 5500 M20 Server Library*, which includes the *ServerGuide CDs*
- IBM Netfinity 5500 M20 system service label
- Intel microprocessor label
- Two upgrade stickers

**Note**

The illustrations in this book might be slightly different from the hardware.

## Required companion options

You must install the following companion options with the Processor Upgrade Kit:

1. You can install one to four microprocessor kits in the server. 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.

**Note**

If you are upgrading a Netfinity 5500 M10, the server might come with one or more microprocessors that are compatible with this Processor Upgrade Kit.

2. You can add memory modules to the server in any of the following configurations.
  - 128 MB synchronous dynamic random access memory (SDRAM) error checking and correction (ECC) registered dual inline memory module (DIMM)
  - 256 MB registered SDRAM ECC DIMM
  - 512 MB registered SDRAM ECC DIMM
  - A combination of the 128 MB, 256 MB, and 512 MB registered SDRAM ECC DIMMs

For more information about the memory configurations supported, see “Installing memory-modules” on page 376.

3. Optionally, you can install a second 500-watt power supply for redundant power. With a redundant power supply installed, you can replace a failing power supply without turning off the server.

## Additional considerations

Additionally, review the following considerations:

1. You must remove any adapter you have installed in slot 6. You can populate slot 5 only with a half-size adapter. Before you install the option, consider how to maximize the performance of the adapters using slots 1 through 5. Review the documentation that comes with the adapters and the documentation that comes with the server for more information.
2. You need the following items to install the Processor Upgrade Kit.
  - A medium flat blade screwdriver
  - A medium Phillips screwdriver
  - The documentation that comes with the server
3. If you need to move the server to install the option, arrange for additional help.



### Caution



≥18 kg (37 lbs)



≥32 kg (70.5 lbs)



≥55 kg (121.2 lbs)

Use safe practices when lifting.

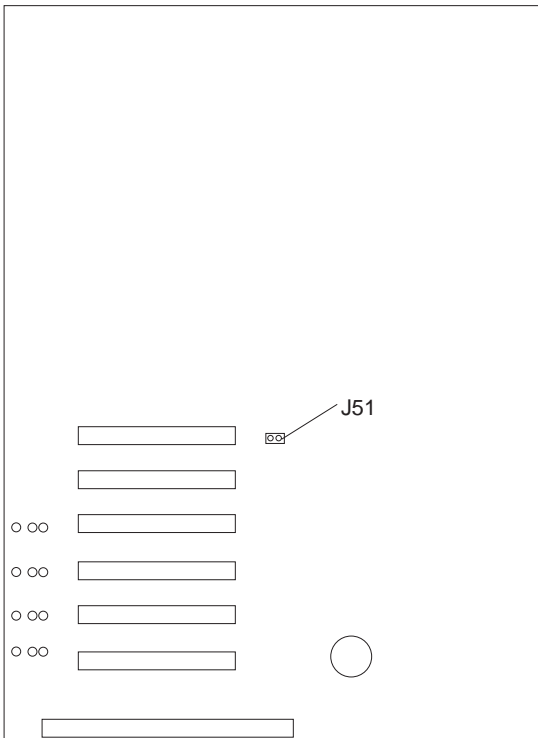
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## Important

If the Disable Advanced System Management Processor jumper (J51) on the system board has a jumper installed, remove the jumper. Refer to the “Hardware Information” section of the *IBM Netfinity 5500 M20 Server Library* for instructions on working with jumpers.

### Note

In normal operation, there is no jumper on J51. A jumper installed on J51 disables the Netfinity Advanced System Management Processor.



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## Updating the system BIOS

Complete this procedure to update the system BIOS.

1. Insert the *IBM Netfinity 5500 M20 BIOS Update Diskette* in the diskette drive.
2. Press Ctrl+Alt+Del to restart the server. The system begins the power-on self-test (POST).
3. Select **1 - Update POST/BIOS** from the menu that contains various flash (update) options.
4. Select **Y** when you are asked if you would like to move the current POST/BIOS image to the backup ROM location.

**Important:** The backup image of the current POST/BIOS is helpful with troubleshooting the upgrade, if troubleshooting becomes necessary.

5. Select **N** when you are asked if you would like to save the current code to a diskette.
6. You will be asked to choose which language you wish to use. Select your language (0–7) and press Enter to accept your choice.
7. Press Enter to start the update process.
8. Press Enter to confirm that you want to update the system BIOS. When the update process completes, you will be prompted to remove the diskette and press Enter to restart the system.
9. Remove the diskette and go to “Removing the shuttle and processor housing” on page 366.

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## Removing the shuttle and processor housing

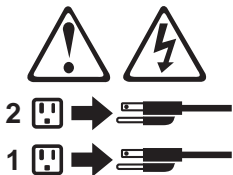
Complete this procedure to remove the shuttle and processor housing.

1. Remove all media (diskettes, CDs, optical discs, or tapes) from the drives.
2. Turn off the server and any attached devices.



### 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.



### Attention

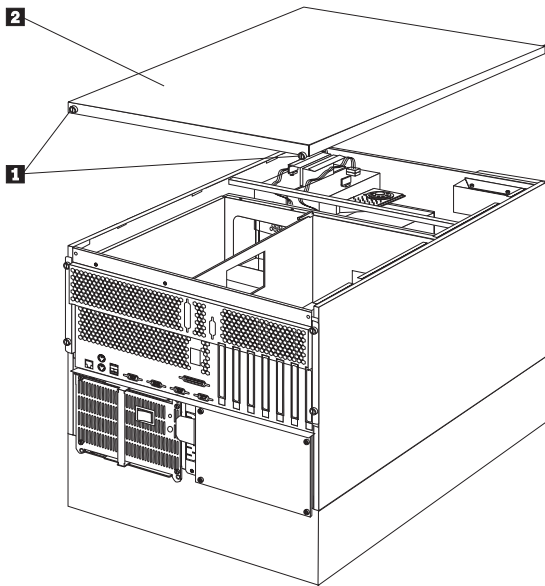
If you are in the United Kingdom and have a modem or fax machine attached to the server, you must disconnect the telephone line from the server *before* unplugging any power cords (also known as power cables). When reassembling the server, you must reconnect the telephone line *after* you plug in the power cords.

3. Disconnect all power cords (cables) from electrical outlets.
4. Disconnect all power cords from the server.

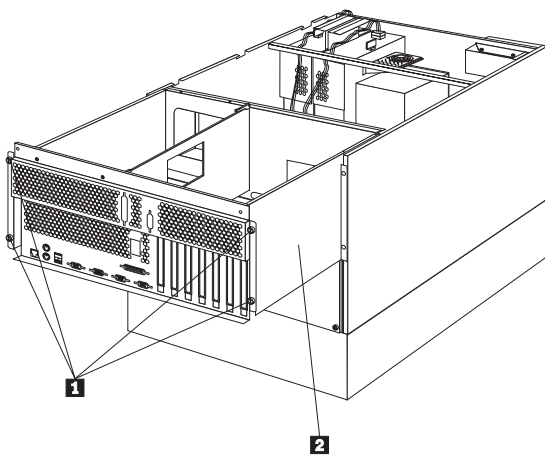
### Note

The power cords used with the server are compatible with this option. Keep a power cord nearby for use after the upgrade is installed.

5. Disconnect all communication cables from external receptacles.
6. Note the location of the remaining cables and cords; then, disconnect them from the server.
7. Unscrew the top cover thumbscrews **1** and remove the top cover **2**.



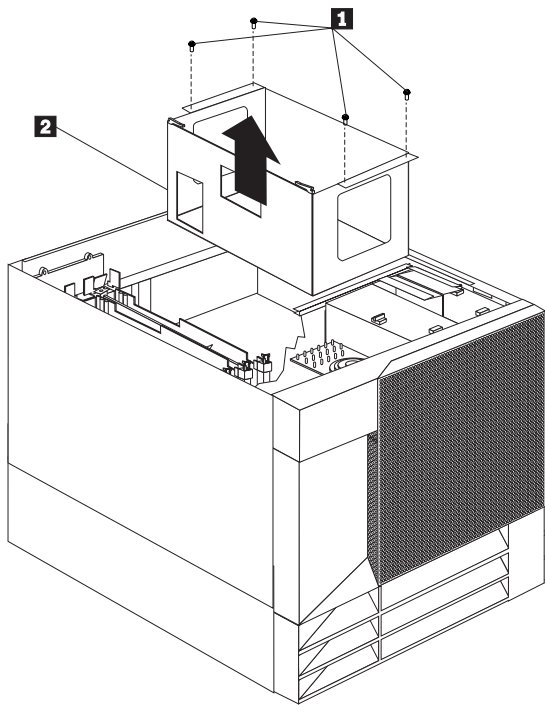
8. Loosen the four thumbscrews **1** at the rear of the shuttle.



9. Slide the shuttle **2** to the rear of the server.
10. Remove the power supply cables from the rear of the processor housing.
11. Remove the four screws **1** securing the processor housing.
12. If the processor housing has two levers at the top corners, pull the levers up.
13. Lift the processor housing **2** out of the server and put it aside. This processor housing is not used with the upgrade.

**Note**

Keep the processor housing nearby and in a safe place for use in troubleshooting the upgrade, if troubleshooting becomes necessary.



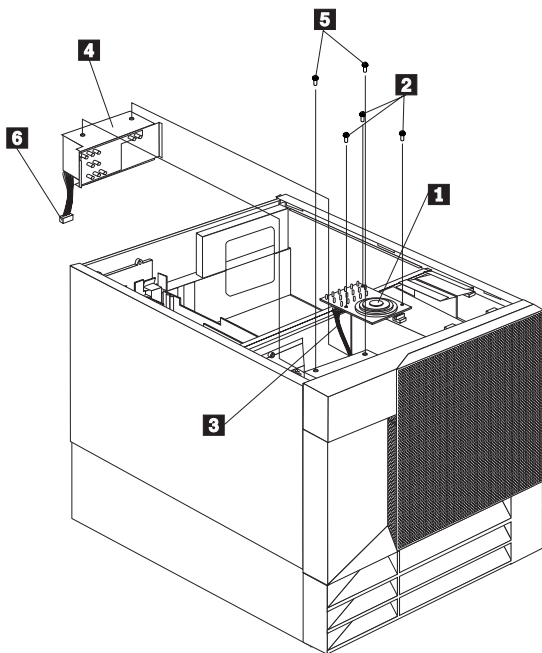
14. Note the location of all cables connected to the shuttle and disconnect the cables.
15. Remove the shuttle from the server and place it on a flat, static-free surface.
16. Go to “Replacing the diagnostic panel and front panel assemblies” on page 369.



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## Replacing the diagnostic panel and front panel assemblies

Complete this procedure to replace the diagnostic panel assembly and the front panel assembly.



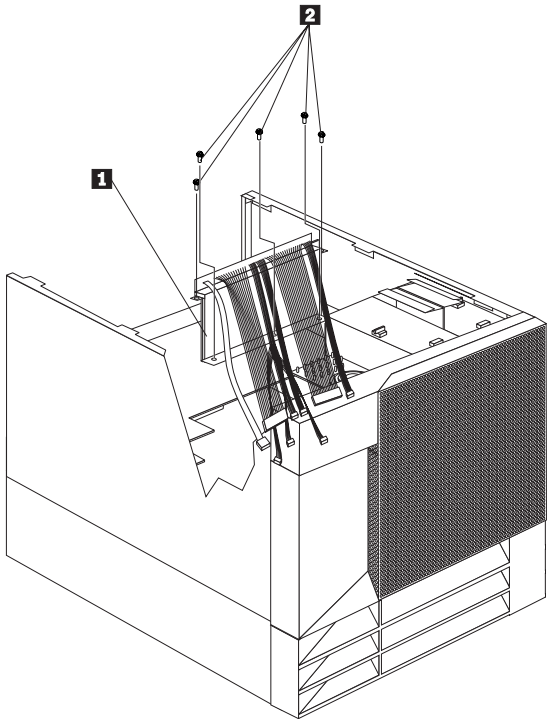
1. Replace the diagnostic panel assembly **1** :
  - a. Disconnect the cable **3** and remove the screws **2** that secure the diagnostic panel assembly.
  - b. Remove the diagnostic panel assembly from the server.
  - c. Install the diagnostic panel assembly that comes with this option. Connect the cable and secure the diagnostic panel assembly with screws.
2. Replace the front panel assembly **4** :
  - a. Disconnect the cable **6** and remove the screws **5** that secure the front panel assembly.
  - b. Remove the front panel assembly from the server.
  - c. Carefully position the front panel assembly that comes with this option.
  - d. Connect the cable and secure the panel with screws.
3. Go to “Replacing the power backplane, ac box, and power supplies” on page 370.

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## Replacing the power backplane, ac box, and power supplies

Complete this procedure to replace the power backplane, ac box, and power supplies.

1. Loosen the two screws and remove the ac box.
2. Remove the power supply:
  - a. Remove any shipping screws from the power supply.
  - b. Pull the handle on the power supply; then, slide the power supply out of the chassis.
  - c. Repeat this procedure if a second power supply is installed.
3. Loosen the five screws **2**, disconnect all power cables, and remove the power backplane **1**.



4. Install the power backplane contained in this option:
  - a. Lower the power backplane with the power supply connectors toward the rear of the server.
  - b. Seat the power backplane on the guide pins and secure with screws.
5. Install the power supply separator **2** contained in this option and secure with screws **1**.

**Note**

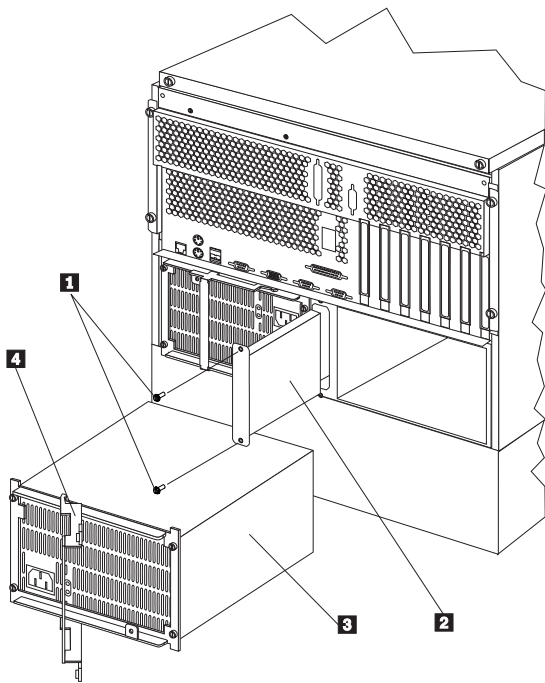
The power supply separator replaces the ac box in this option.

6. Install the power supply contained in this option **3** :

**Note**

The power supplies you might have in the server are not compatible with this option.

- a. Secure the handle to the power supply with screws.
- b. Place the handle **4** on the power supply in the open position, and slide the power supply into the chassis.
- c. Close the handle on the power supply to seat the power supply in the bay.
- d. Repeat this procedure if a second power supply is installed.



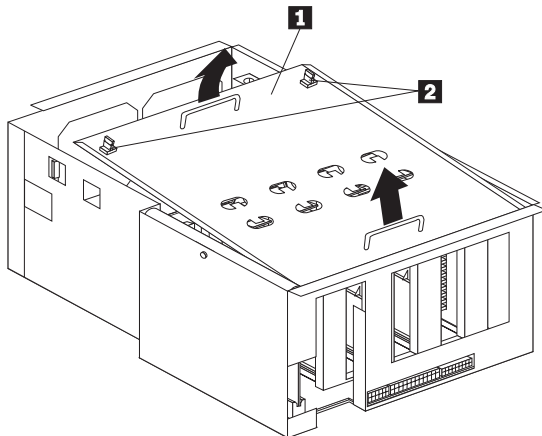
7. If you are not installing a second power supply, attach the filler panel over the open bay.
8. Go to "Installing a microprocessor kit" on page 372.

## Installing a microprocessor kit

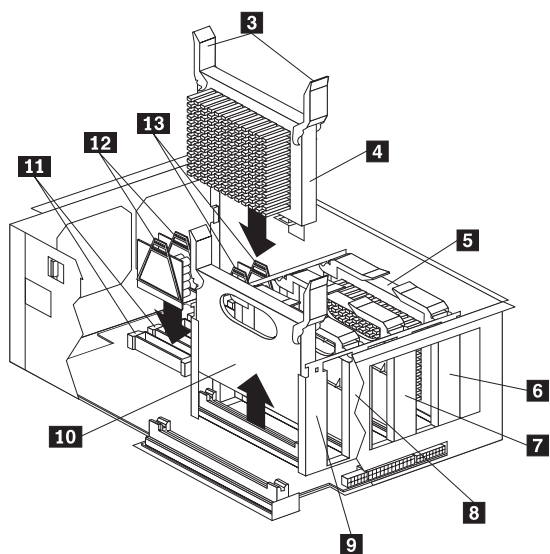
The following table shows the order in which microprocessors and VRMs must be installed.

<i>Table 15. Microprocessor and VRM Installation Order</i>					
<b>Note:</b> A terminator card must be installed in each microprocessor connector that does not contain a microprocessor.					
One Microprocessor Installed in J1					
J12 (VRM 1)	J13 (VRM 2)	J14 (VRM 3)	J16 (VRM 4)	J17 (VRM 5)	J18 (VRM 6)
Installed	Installed				
Two Microprocessors Installed in J1 and J4					
J12 (VRM 1)	J13 (VRM 2)	J14 (VRM 3)	J16 (VRM 4)	J17 (VRM 5)	J18 (VRM 6)
Installed	Installed			Installed	Installed
Three Microprocessors Installed in J1, J2, and J4					
J12 (VRM 1)	J13 (VRM 2)	J14 (VRM 3)	J16 (VRM 4)	J17 (VRM 5)	J18 (VRM 6)
Installed	Installed	Installed		Installed	Installed
Four Microprocessors Installed in J1, J2, J3, and J4					
J12 (VRM 1)	J13 (VRM 2)	J14 (VRM 3)	J16 (VRM 4)	J17 (VRM 5)	J18 (VRM 6)
Installed	Installed	Installed	Installed	Installed	Installed

Refer to the following illustrations of the processor housing and processor board that come with this option while you perform the steps in this procedure.



- 1** Processor housing cover
- 2** Quarter-turn fasteners



- 3** Latches
- 4** Second installed microprocessor (CPU or processor 4)
- 5** First installed microprocessor (CPU or processor 1)
- 6** Microprocessor connector 1 (J1)
- 7** Microprocessor connector 2 (J2)
- 8** Microprocessor connector 3 (J3)
- 9** Microprocessor connector 4 (J4)
- 10** Terminator card
- 11** VRM connectors 5 (J17) and 6 (J18)
- 12** VRMs for second microprocessor (VRMs 5 and 6)
- 13** VRMs for first microprocessor (VRMs 1 and 2)

Complete this procedure to install a microprocessor in the processor housing that comes with this option.

1. Determine the connectors where the microprocessor and VRMs are to be installed. See Table 15 on page 372.
2. Turn the quarter-turn fasteners **2** and remove the processor housing cover **1**.
3. Pull on the fasteners and remove the fan assembly.
4. If the microprocessor connector **9** contains a microprocessor terminator card **10**, remove the terminator card from the microprocessor connector.
5. Install the microprocessor:
  - a. Touch the static-protective package containing the new microprocessor to any *unpainted* metal surface on the processor housing; then, remove the microprocessor from the package.

- b. Hold the microprocessor **4** by the open latches **3**, and center the microprocessor over the microprocessor connector **9**.

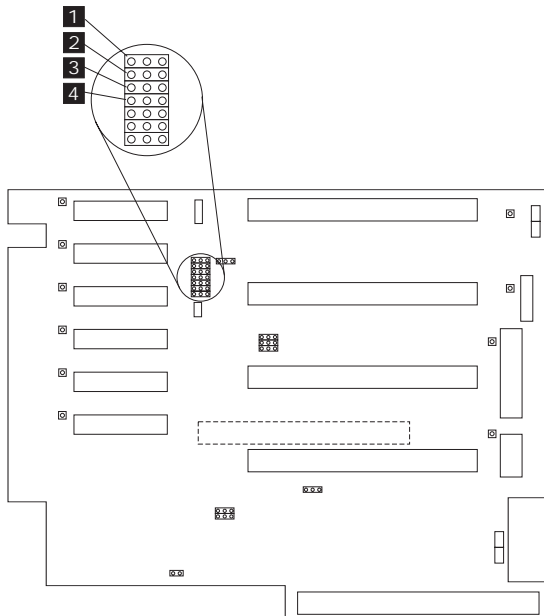
**Attention**

Make sure the microprocessor is oriented and aligned correctly before you try to close the latches.

- c. Press the microprocessor into the connector and carefully close the latches **3** to seat the microprocessor in the connector.
6. Set the microprocessor core-ratio selection jumper block for the correct core ratio.

**Attention**

If the microprocessor bus-to-core ratio is incorrect, system board components will overheat and component damage might occur. Be sure that the microprocessor core-ratio selection is properly set.



**1** (J31)–**4** (J28) Microprocessor core-ratio-selection.

For the core/bus ratio 4.0 (400/100 MHz), jumpers are installed on pins 1 and 2 of J28, J30, and J31 and on pins 2 and 3 of J29.

For the core/bus ratio 4.5 (450/100 MHz), jumpers are installed on pins 1 and 2 of J28 and J31 and on pins 2 and 3 of J29 and J30.

For the core/bus ratio 5.0 (500/100 MHz), jumpers are installed on pins 1 and 2 of J30 and J31 and on pins 2 and 3 of J28 and J29.

7. Install the voltage regulator modules (VRMs) **12** included in the microprocessor kit:
  - a. Determine the connectors where the VRMs are to be installed. See Table 15 on page 372. The microprocessor upgrade kit comes with two VRMs. You might need to install only one, depending on the number of microprocessors in the server.
  - b. Center the VRM **12** over the connector **11**. Make sure that the VRM is oriented and aligned correctly; then, press the VRM into the connector.
  - c. Repeat the preceding step for the second VRM, if needed.

**Note**

If you need to install only one VRM, store the remaining VRM in a safe place to use as a replacement.

8. Go to "Installing memory-modules" on page 376.

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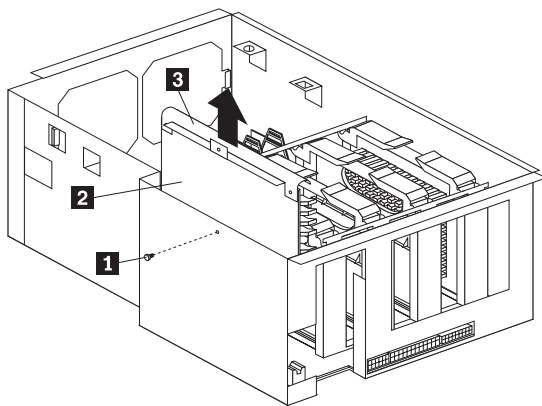
## Installing memory-modules

You install memory-modules on the memory board included in the Processor Upgrade Kit.

### Notes:

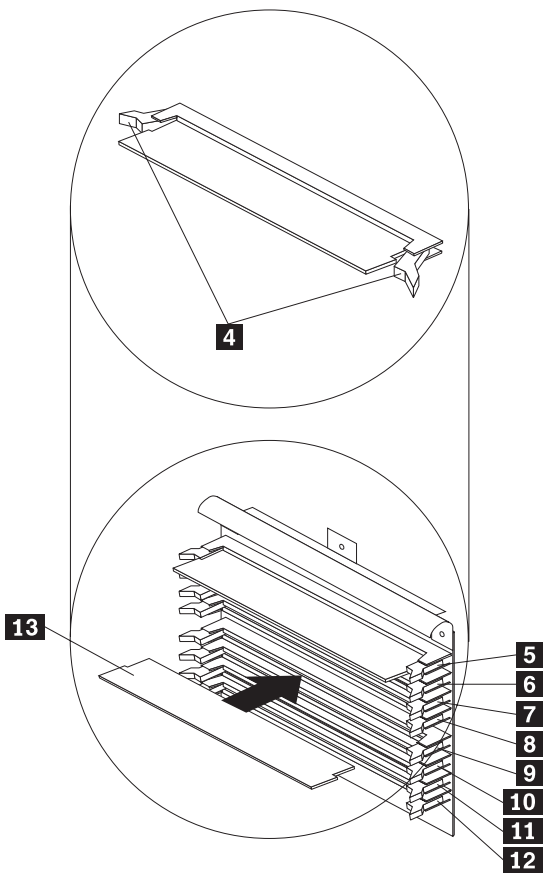
1. Install memory modules in connectors J1, J5, J2, J6, J3, J7, J4, and J8, in that order. (See the illustration on the next page for memory connector locations.)
2. If you mix DIMM sizes, install the largest sized DIMM in connector J1, the next largest sized DIMM in connector J2, and so forth, to enhance memory-module performance.
3. Installing or removing memory modules 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 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**.

Refer to the following illustrations of the processor housing and the processor board while you perform the steps in this procedure.



- 1** Thumbscrew
- 2** Memory board
- 3** Memory board handle





- 4** Retaining clips
- 5** Memory connector 1 (J1)
- 6** Memory connector 2 (J2)
- 7** Memory connector 3 (J3)
- 8** Memory connector 4 (J4)
- 9** Memory connector 5 (J5)
- 10** Memory connector 6 (J6)
- 11** Memory connector 7 (J7)
- 12** Memory connector 8 (J8)
- 13** DIMM

Complete this procedure to install memory-modules.

1. Remove the memory board:
  - a. Remove the thumbscrew **1** from the side of the processor housing.
  - b. Lift up on the memory board handle **3** and remove the memory board **2** from the server.

- c. Place the memory board on a static-protective surface, such as the static-protective package in which the option came.
2. Locate the memory-module connectors on the memory board. Determine the memory-module connector into which you will install the memory module.
3. Touch the static-protective package containing the memory-module kit to any unpainted metal surface on the server. Then, remove the memory module from the package.

**Note**

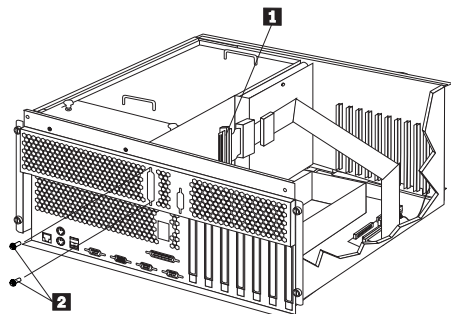
To avoid breaking the retaining clips or damaging the memory-module connectors, handle the clips gently.

4. Install the memory module:
  - a. Turn the memory module (DIMM) **13** 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. The retaining clips **4** will snap into the closed positions.
  - c. Make sure the retaining clips **4** 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 memory module that you install.
5. Install the memory board:
  - a. Hold the memory board by the top edge and align the memory board over the memory board connector.
  - b. Press on the top edge of the memory board, insert the memory board into the connector, and tighten the thumbscrew to secure.
6. Go to "Installing the processor housing" on page 379.

## Installing the processor housing

Complete this procedure to install the processor housing.

1. If slot 6 contains an adapter, move the adapter to an empty slot. If slot 5 contains a full-size adapter, move the adapter to an empty slot. (Only half-size adapters will fit in slot 5.)
2. Remove the slot 5 and 6 plastic guides opposite the bulkhead.
3. If you have installed the SCSI Controller-to-Bulkhead Cable option, remove the option and replace it with the SCSI controller-to-bulkhead cable contained in this option:
  - a. Detach the SCSI cable from the SCSI connector on the system board.

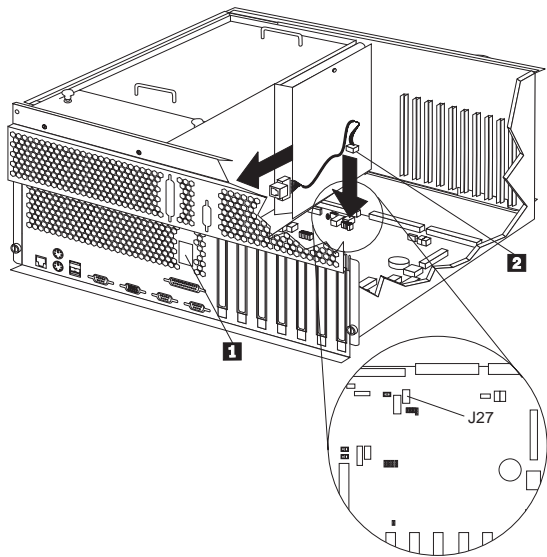


- b. Remove the screws from the external connector on the bulkhead opening.
  - c. Connect one end of the SCSI cable contained in this option to the SCSI connector on the system board.
  - d. Insert the SCSI cable external connector **1** into the knockout opening.
  - e. Insert the two screws **2** that come with the replacement SCSI cable into the external connector; tighten the screws.
4. Optionally, install the RS-485 cable:

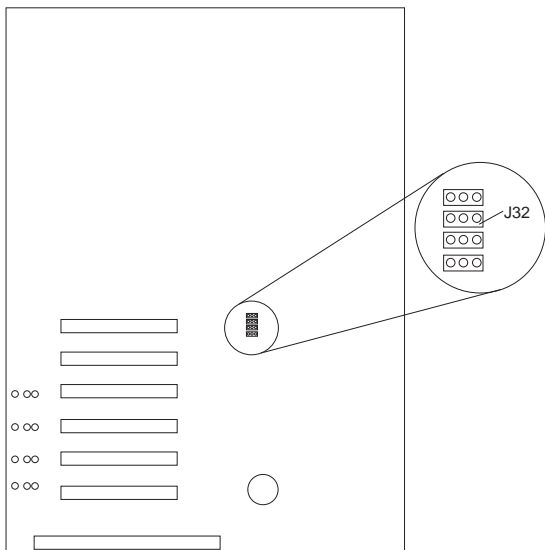
### Note

Only models with either 01K7234 or 28L1019 as the system board assembly part number support the RS-485 cable option. The system board assembly part number is located near the battery on the system board.

- a. Connect the RS-485 cable to the RS-485 connector (J27) **2** on the system board.
- b. Insert the external connector into the knockout opening **1**.



5. Install the jumper extension cable on the Power on control jumper (J32):
  - a. Note the position of the jumper on the pin block and remove the jumper.

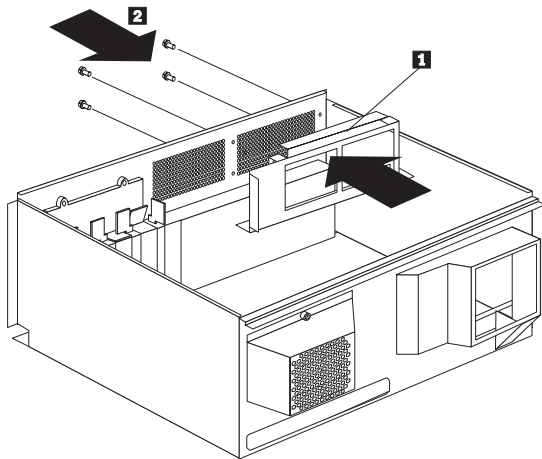


- b. Align the white cable with pin 1 and insert the connector over the pin block.
  - c. If necessary, change the position of the jumper on the jumper extension cable.

**Note**

The default jumper position of J32 and the jumper extension cable is a jumper on pins 1 and 2. Refer to the "Hardware Information" section of the *IBM Netfinity 5500 M20 Server Library* for a description of the jumper.

- d. Route the jumper extension cable along the system board and the shuttle side wall.
6. Replace the processor housing guide:
  - a. Remove the screws that secure the processor housing guide and remove the guide.
  - b. Install the processor housing guide **1** that comes with this option and secure with screws **2**.

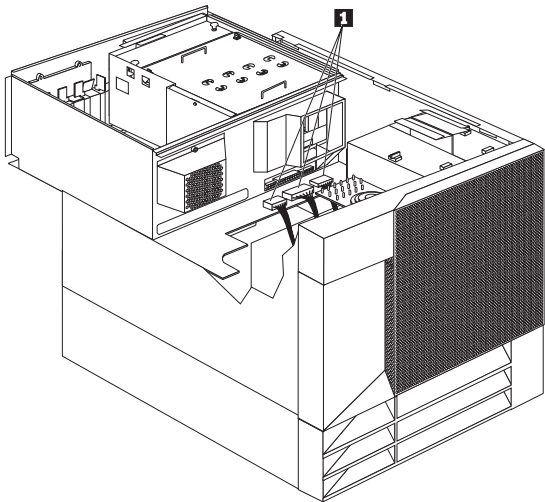


7. Replace the fan assembly and press on the fasteners to lock in place.
8. Replace the processor housing top cover and press on the fasteners to lock in place.
9. Align the shuttle with the guides and slide the shuttle partially into the server.
10. Reconnect the cables to the shuttle that you disconnected in step 14 on page 368.
11. Reconnect the power cables that you disconnected in step 3 on page 370.
12. Grasp the handles on the processor housing top cover and lift the housing.
13. Orient the processor housing with the cable connectors toward the front of the server.

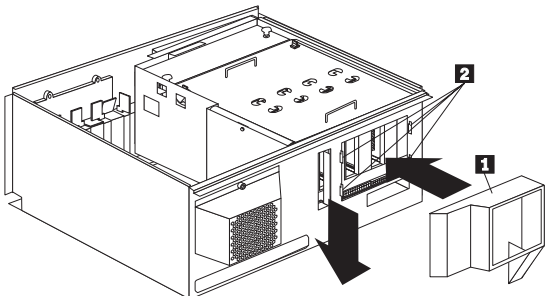
**Attention**

When you install the processor housing in the server, be sure that it is aligned correctly before seating in the shuttle. Incorrect seating might cause damage to server components.

14. Align the processor housing with the guides. Carefully lower the processor housing into the shuttle until it is fully seated.
15. Install and tighten the four blue thumbscrews.
16. Install the half-card slot insulator between slot 5 and the processor housing.
17. Connect the power supply cables **1** to the processor housing.



18. Secure the air diffuser **1** in the server by positioning the air diffuser on the matching metal tabs **2** on the shuttle.



19. Seat the shuttle in the server and tighten the four shuttle thumbscrews.

20. Place the IBM Netfinity 5500 M20 system service label on the inside of the top cover.
21. Place one upgrade sticker near the machine type serial number on the information label. The upgrade sticker identifies the server as having this option installed.

**Note**

The information label is located at the front of the server behind the media-bay trim bezel.

22. Place the other upgrade sticker on the front bezel, above the machine type serial number.
23. Place the Intel microprocessor label on the front bezel.
24. Reinstall the top cover.
  - a. Check that all cables, adapters, and other components are installed and seated correctly and that you have not left loose tools or parts inside the server.
  - b. Lower the cover with the rear edge of the cover approximately 2.5 cm (1 in.) back from the rear edge of the server.
  - c. Slide the cover forward.
  - d. Tighten the two thumbscrews on the back edge of the cover.
25. Go to "Completing the upgrade installation" on page 384.

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## Completing the upgrade installation

Information on the following pages will guide you in completing the hardware installation and installing the necessary software for this processor upgrade.

## Updating the system configuration

Complete this procedure.

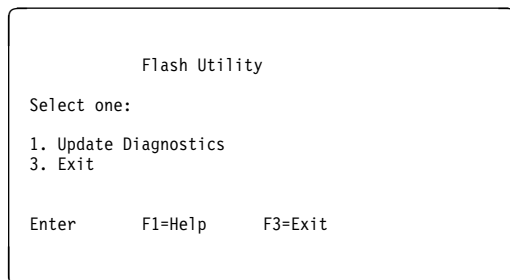
1. Connect the power cord to the power supply.
2. Connect all other server and device cables and connectors.
3. Turn the server power on.
4. Watch the monitor screen. The system automatically accesses the Configuration/Setup program.
5. Select **Save Settings** and exit the Configuration/Setup program.
6. Insert the *HardwareGuide CD* that comes with the *IBM Netfinity 5500 M20 Server Library* contained in this option package, into the CD-ROM drive. If necessary, refer to the Server Library for information on using the *HardwareGuide CD*.
7. Restart the server.
8. Go to "Updating the System Diagnostic programs."

## Updating the System Diagnostic programs

Complete this procedure to update the system diagnostic programs.

1. Insert the *IBM Netfinity 5500 M20 Diagnostic Update Diskette 1 of 2* into the diskette drive.
2. Press Ctrl+Alt+Del to restart the server. The system begins the power-on self-test (POST).

Information similar to the following will appear on the screen.



3. Select: **1. Update Diagnostics** and press Enter.
4. Select a language (0–7) from the list shown on the next screen and press Enter to accept your choice.  
A message in your selected language similar to the following appears.



Reading the flash image \$0021000.us1

After this message appears, you will be prompted to insert the *IBM Netfinity 5500 M20 Diagnostic Update Diskette 2 of 2* into the diskette drive.

5. Insert the diskette into the diskette drive and press Enter.
6. Press Enter to confirm that you want to update the system diagnostic programs.

A message similar to the following appears.

Reading the flash image \$0021000.us2

After this message, another message similar to the following appears.

The system diagnostic is being updated and it might take up to 5 minutes to complete. Do not power off or restart the system during this procedure.

7. When the update is complete, a message similar to the following appears.

Diagnostic Update Completed.

Remove the diskette from the drive and press Enter to restart the system.

8. Go to "Updating the Advanced System Management Processor code" on page 386.

## Updating the Advanced System Management Processor code

Complete this procedure to update the advanced system management processor code.

1. Insert the *IBM Netfinity 5500 M20 Advanced System Management Processor Firmware Update Diskette* into the diskette drive.
2. Press Ctrl+Alt+Del to restart the server. The system begins the power-on self-test (POST).

Information similar to the following will appear on the screen.

```
Flash Utility

Select one:

1. Update Advanced System Management Processor
2. Update Watchdog Timer
3. Exit

Enter      F1=Help    F3=Exit
```

3. Select **1. Update Advanced System Management Processor** and press Enter.

A warning message appears on the screen with information similar to the following.

```
Warning

This procedure will update the Advanced
System Management Processor code. The
system must not lose power during this
operation.

Press Enter to continue with the update
or press Esc to cancel it.

Enter      Esc=Cancel
```

4. Press Enter when you are ready to continue. Several screens are displayed as the system upgrades the microcode.

After a successful upgrade, a message similar to the following appears.

Information

The Advanced System Management Processor update was successful.

Press Enter to return to the main menu.

Enter

5. Press Enter when this screen appears. The main menu appears.
6. Press Enter or F3 to exit from the utility program. A message similar to the following appears.

Information

Remove the diskette from the default drive and reboot the system.

7. Remove the diskette from the diskette drive.
8. Verify that the advanced system management processor code matches the level on the update diskette.
  - a. Turn off the server; then, restart the server.
  - b. When the IBM logo appears, press F1 to use the Configuration/Setup program.
  - c. Select **System Information** and **Product Data** to check the code level.
  - d. Press Esc and select **Exit Setup** to exit from the Configuration/Setup program.
  - e. Turn off the server.

This upgrade installation is complete.

---

## Parts listing (4-way upgrade kit)

4-Way Upgrade Kit	FRU No.
Diffuser	28L0630
Front LED Card Assembly	28L0691
Internal LED Card and Outline Assembly	28L0692
System Service Label	28L0694
Status Panel Lens	28L0643
AC Blank Filler Panel	28L0633
Power Backplane Assembly	36L9540
RS-485 Internal Cable	03K9321
SCSI to Bulkhead Cable with Bracket and Screw	36L9537
Memory Board Assembly	01K7231
CPU Terminator Assembly	94H0598
Processor Board Assembly	01K7230
500W Power Supply	01K9879
Power Supply Assembly Bracket	36L9520
450/100MHZ DS2P 512KB/L2	28L4557
450/100MHZ DS2P 1MB/L2	28L4558
256MB ECC 3.3V REG SDRAM DIMM	01K7391
512MB ECC 3.3V REG SDRAM DIMM	28L1016
Fan #4 Assembly	28L0635
Processor Board Support Tray	36L9541
Short Insulator	36L9548
Air Baffle	36L9549
Fan #4 Cable	36L9552
System Board without Memory or CPU Board	28L0714

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## Send us your comments!

We want to know your opinion about this manual (part number 00N5902). 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!**

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## Problem determination tips

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

- Machine type and model
- Processor or hard disk upgrades
- Failure symptom
  - Do diagnostics fail?
  - What, when, where, single, or multiple systems?
  - Is the failure repeatable?
  - Has this configuration ever worked?
  - If it has been working, what changes were made prior to it failing?
  - Is this the original reported failure?
- Reference/Diagnostics 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.

## Phone numbers, U.S. and Canada

### Note

EMEA customers should contact their Dealer or IBM Service organization.

Before you place a call to the Support Center, refer to "Problem determination tips" on page 390.

### Authorized Dealers or Servicers

Number	Information
919-517-0001	Bulletin Board Service - PC Company
800-528-7705	Bulletin Board Service - TSS Only
800-937-3737	IBM Business Partner Education
800-426-2472	IBM Customer Engineer Technical Support
800-IBM-DEAL	IBM Dealer Support Center
800-342-6672	IBM Direct Desktop Software Sales
303-924-4015	IBM Part Number ID and Look Up
800-426-7763	IBM PC HelpCenter
800-237-5511	IBM Software Defect Support (CSDs)
800-327-5711	IBM Software Ordering (Publications)
800-426-1484	IBM Supplies Technical Hotline
800-388-7080	IBM Warranty Parts Claims Center

### U.S. Customers and Helpware Subscribers

Number	Information
919-517-0001	Bulletin Board Service - PC Company
800-426-8322	Customer Education Business Unit
800-999-0052	Customized Operational Services
800-237-4824	EduQuest (Educational Computers)
800-964-8523	End User HelpDesk Support
800-742-2493	IBM Anti-Virus Services
800-447-4700	IBM Authorized Dealer Referrals
800-426-2468	IBM Dealer Referral
800-426-3333	IBM Information Referral Service
800-IBM-SERV	IBM Service
800-772-2227	IBM PC HelpCenter and HelpDesk
800-426-7282	IBM Technical Manuals
800-426-9402 (Ext. 150)	Multimedia Information Center
800-241-1620	Multimedia HelpCenter
800-342-6672	OS/2 Information Line
800-237-5511	OS/2 Support Services
800-284-5933	Prodigy
914-962-0310	Prodigy User Questions
800-547-1283	Technical Coordinator Program
	SystemXtra for Personal Systems
	LAN Automated Distribution/2
	OS/2 Bulletin Board
	OS/2 Application Assistance Center
800-551-2832	Technical Solutions Magazine

## IBM Canada Customer and Servicer Support

Number	Information
800-661-PSMT	Business Partner Marketing Support
905-316-5556	Business Partner Marketing Support - Toronto
514-938-6048	Business Partner Marketing Support - French
800-465-4YOU	Customer Relations
800-IBM-SERV	Customer Service Dispatch
800-263-2769	Customer Service Parts
800-465-2222	Customer Support Center (ISC)
416-443-5701	Customer Service Repair Centre
800-505-1855	Dealer Support Group (DSG)
800-465-7999	HelpClub Registration / IBM Direct
800-465-3299	HelpFax
905-316-3299	HelpFax - Toronto
800-565-3344	HelpPC
905-513-3355	IBM Certification Administrator Mail to: 50 Acadia Drive Markham, Ontario L3R 0B3
800-661-2131	IBM Education (A+ Course)
800-268-3100	IBM Information Network Support
800-387-8343	IBM PC Service Partners
800-487-7426	International Warranty Registration
800-663-7662	Lexmark Product Information
800-IBM-9990	PartnerLine
800-263-2769	Parts Orders, Exchange or Emergency
416-443-5808	Parts Regular Orders, Exchange (Fax)
416-443-5755	Parts Orders, Inquiries
514-938-3022	PC Co Bulletin Board - Montreal
905-316-4255	PC Co Bulletin Board - Markham
604-664-6464	PC Co Bulletin Board - Vancouver
204-934-2735	PC Co Bulletin Board - Winnipeg
800-661-7768	PS Marketing Support (PSMT)
800-565-3344	PS/1 Warranty Customer Helpline
800-387-8483	PS/1 Warranty Service (DOAs)
800-465-1234	Publications Ordering
905-316-4148	Service Management Support
905-316-4100	Service Management Support (Fax)
905-316-4150	Service (Warranty) Manager
905-316-4100	Service (Warranty) Manager (Fax)
905-316-4872	Service Quality Programs
905-316-4100	Service Quality Programs (Fax)
800-661-2131	Skill Dynamics (Education)
800-565-3344	ThinkPad EasyServe
416-443-5835	Warranty Claim Fulfillment (Fax)
905-316-2445	Warranty Claim Reimbursement
905-316-3515	Warranty Claim Reimbursement (Fax)
416-443-5778	Warranty Claim Parts Inquiry
800-505-1855	Warranty Provider Support Hotline
800-267-7472	Warranty Service, ThinkPad



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