

**IBM Netfinity 5000 - Type 8659  
Models 12Y, 1SY, 22Y, 2SY, 31Y, 3RY**

**Hardware Maintenance Manual**

**October 1998**

**We Want Your Comments!  
(Please see page 204)**



**IBM Netfinity 5000 - Type 8659**  
**Models 12Y, 1SY, 22Y, 2SY, 31Y, 3RY**

**Hardware Maintenance Manual**

**October 1998**

**We Want Your Comments!**  
**(Please see page 204)**



## Note

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

### First Edition (September 1998)

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

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

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

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

© **Copyright International Business Machines Corporation 1997, 1998. All rights reserved.**

Note to U.S. Government users—Documentation related to Restricted rights—Use, duplication, or disclosure is subject to restrictions set forth in GSA ADP Schedule Contract with IBM Corp.

---

## About This Manual

This manual contains diagnostic information, Symptom-to-FRU Indexes, service information, error codes, error messages, and configuration information for the Netfinity 5000 - Type 8659.

### Important

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

## Important Safety Information

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

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

---

### 注意和危险声明 (简体中文)

重要事项:

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

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

在按说明执行任何操作前，请务必阅读所有注意和危险声明。

---

### 注意及危险声明 (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。

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 PC Company BBS to download Diagnostic, BIOS Flash, and Device Driver files.

File download address is:

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

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

## IBM Online Addresses:

The HMM manuals online address is:

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

The IBM PC Company Support Page is:

**<http://www.us.ibm.com/support/index.html>**

The IBM PC Company Home Page is:

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

---

# Contents

About This Manual . . . . .	iii
Important Safety Information . . . . .	iii
Online Support . . . . .	iv
<b>Netfinity 5000 - Type 8659 . . . . .</b>	<b>1</b>
General Checkout . . . . .	5
Diagnostic Tools . . . . .	8
Features . . . . .	14
Additional Service Information . . . . .	16
Locations . . . . .	55
Symptom-to-FRU Index . . . . .	152
Undetermined Problems . . . . .	165
Parts Listing (Type 8659) . . . . .	167
<b>Related Service Information . . . . .</b>	<b>173</b>
Safety Information . . . . .	174
Send Us Your Comments! . . . . .	204
Problem Determination Tips . . . . .	205
Phone Numbers, U.S. and Canada . . . . .	206
Trademarks . . . . .	208



---

# Netfinity 5000 - Type 8659

General Checkout . . . . .	5
Diagnostic Tools . . . . .	8
Diagnostic Tools Overview . . . . .	8
Diagnostic LEDs . . . . .	8
Diagnostic Test Programs . . . . .	8
Power-On Self-Test (POST) . . . . .	9
POST Beep Codes . . . . .	10
Error Messages . . . . .	10
POST Error Messages and Beep Codes . . . . .	10
Diagnostic Error Messages . . . . .	10
Software-Generated Error Messages . . . . .	10
Option Diskettes . . . . .	10
Diagnostic Test Programs . . . . .	11
Navigating Through the Diagnostic Tests . . . . .	11
Running Diagnostic Test Programs . . . . .	12
Viewing the Test Log . . . . .	13
Features . . . . .	14
Additional Service Information . . . . .	16
Checking the System for Damage . . . . .	17
After Dropping It . . . . .	17
After Spilling Liquid on It . . . . .	17
Configuration Overview . . . . .	18
Configuration/Setup Utility . . . . .	20
Configuration/Setup Utility Usage . . . . .	22
System Summary . . . . .	22
System Information . . . . .	23
Product Data . . . . .	23
System Card Data . . . . .	23
PCI Routing . . . . .	23
Devices and I/O Ports . . . . .	23
Date and Time . . . . .	24
System Security . . . . .	24
Using the Power-on Password Menu . . . . .	26
Using the Administrator Password Menu . . . . .	27
Defining a System Owner's Name . . . . .	28
Start Options . . . . .	29
Advanced Setup . . . . .	29
Core Chipset Control . . . . .	29
PCI Bus Control . . . . .	30
Cache Control . . . . .	30
Memory Settings . . . . .	30
Advanced ISA Settings . . . . .	30
Service Processor IRQ Settings . . . . .	30
Plug and Play . . . . .	31
Error Log . . . . .	31
Configuring PCI Features and Options . . . . .	31
Configuring the Ethernet Controller . . . . .	32
Ethernet Controller Messages . . . . .	34
Novell NetWare or IntraNetWare Server ODI . . . . .	
Driver Messages . . . . .	34
NDIS 2.01 (OS/2) Driver Messages . . . . .	36

NDIS 4.0 (Windows NT) Driver Messages . . .	38
UNIX Messages . . . . .	38
Failover for Redundant Ethernet . . . . .	41
Configuring Failover on OS/2 . . . . .	41
Configuring Failover on Windows NT . . . . .	42
Configuring Failover on IntraNetWare . . . . .	42
Identifying Problems Using Status LEDs . . . . .	44
Power Supply LEDs . . . . .	44
LED Diagnostics . . . . .	45
Recovering BIOS . . . . .	48
Resolving Configuration Conflicts . . . . .	49
Resolving Memory-Address Conflicts . . . . .	49
Changing the Software Configuration Setup . . . . .	49
Changing the Hardware Configuration Setup . . . . .	49
Resolving Resource Conflicts . . . . .	50
Resolving Hardware Configuration Conflicts . . . . .	50
Resolving Software Configuration Conflicts . . . . .	51
Using the SCSISelect Utility Program . . . . .	52
Starting the SCSISelect Utility Program . . . . .	52
SCSISelect Utility Program Choices . . . . .	52
Configure/View Host Adapter Settings . . . . .	52
SCSI Disk Utilities . . . . .	53
Performing a Low-Level Disk Format . . . . .	54
When To Use the Format Disk Program . . . . .	54
Starting the Low-Level Format . . . . .	54
Verifying the Disk Media . . . . .	54
Locations . . . . .	55
Adapters . . . . .	56
Adapter Considerations . . . . .	56
Installing or Removing Adapters . . . . .	57
Battery . . . . .	61
Bays . . . . .	64
Types of Cables . . . . .	65
SCSI Devices . . . . .	66
SCSI IDs . . . . .	66
Termination Requirements . . . . .	67
Preinstallation Steps (All Bays) . . . . .	67
Installing or Removing Drives in Bays A and B (Removable Media) . . . . .	69
Installing or Removing a Drive in Bay C (Diskette Drive) . . . . .	70
Installing or Removing Drives in Bays 1 through 5 (Hard Disk Drives) . . . . .	72
Changing Jumper Positions . . . . .	75
Two-Pin Jumper Blocks . . . . .	75
Completing the Installation . . . . .	77
Completing the Tower Model Installation . . . . .	77
Completing the Rack Model Installation . . . . .	80
Controls . . . . .	82
Front Panel Indicators . . . . .	85
DASD Fan Assembly Removal . . . . .	90
Ethernet Connector . . . . .	91
Expansion Bays . . . . .	92
External Options . . . . .	94

Adding External SCSI Devices . . . . .	94
Attaching External Options . . . . .	95
Hot Swap Backplane Assembly Removal . . . . .	96
Input/Output Connectors . . . . .	97
Installing a Server in a Rack Enclosure . . . . .	99
Before You Begin . . . . .	100
Installing the Rack Model in a Rack Enclosure	102
Preparing the Server . . . . .	102
Preparing the Rack Enclosure . . . . .	104
Installing the Server in the Rack Enclosure	108
Removing the Rack Model from a Rack	
Enclosure . . . . .	111
Internal Drives Installation or Removing . . . . .	113
Keyboard and Mouse Connectors . . . . .	114
Management Port C . . . . .	115
Memory Modules . . . . .	116
Installing or Removing Memory Modules . . . . .	116
Microprocessors . . . . .	118
Installing Microprocessor Upgrades . . . . .	118
Installing or Replacing a Microprocessor . . . . .	119
Option Installation . . . . .	125
Preparing a Tower Model . . . . .	126
Preparing a Rack Model . . . . .	128
Parallel Port Connector . . . . .	131
Power Supplies . . . . .	132
Power Supply Removal . . . . .	133
Rear Fan Assembly Removal . . . . .	134
SCSI Connectors . . . . .	135
Internal SCSI Connector . . . . .	135
External SCSI Connector . . . . .	135
SCSI Jumpers . . . . .	137
DASD Backplane Jumper Block Location	138
Security . . . . .	139
Installing a U-Bolt and Security Cable . . . . .	139
Serial Port Connectors . . . . .	141
System Board Illustration . . . . .	142
System Board LEDs . . . . .	142
System Board Connectors . . . . .	143
System Board Removal/Replacement . . . . .	145
System Board Switches . . . . .	147
Bypassing an Unknown Power-on Password	148
Universal Serial Bus Ports . . . . .	149
Updating the Server Configuration . . . . .	150
Video Port Connector . . . . .	151
Symptom-to-FRU Index . . . . .	152
Beep Symptoms . . . . .	152
No Beep Symptoms . . . . .	155
Diagnostic Error Codes . . . . .	156
Error Symptoms . . . . .	159
POST Error Codes . . . . .	160
SCSI Error Codes . . . . .	165
Undetermined Problems . . . . .	165
Parts Listing (Type 8659) . . . . .	167
System . . . . .	168

Keyboards . . . . .	171
---------------------	-----

---

## 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 your 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.

### 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 152.
4. If the computer hangs and no error is displayed, go to "Undetermined Problems" on page 165.
5. Power Supply problems, see "No Beep Symptoms" on page 155.
6. Safety information, see "Safety Information" on page 174.
7. For intermittent problems, check the error log; see, "Error Log" on page 31.

**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 error log, see "Error Log" on page 31. If an error was recorded by the system, see "Symptom-to-FRU Index" on page 152.
- Start the Diagnostic Programs. See "Running Diagnostic Test Programs" on page 12.
- 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 152.

**006**

- Run the Diagnostic Programs. If necessary, refer to “Running Diagnostic Test Programs” on page 12. If you receive an error, go to “Symptom-to-FRU Index” on page 152. If the diagnostics completed successfully and you still suspect a problem, see “Undetermined Problems” on page 165.
-

---

## Diagnostic Tools

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

You can check the hardware by using the diagnostic test programs and the information in this section.

### Note

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

If the hardware is OK and you have not made an error, you might have a software problem. If you suspect that you have a software problem, refer to the information that comes with that software package.

## Diagnostic Tools Overview

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

- LEDs on the system board and power supplies.
- Diagnostic test programs
- Power-on self-test (POST)
- POST beep codes
- Error messages
- Troubleshooting charts
- Option diskettes

**Diagnostic LEDs:** When a system error occurs, the relevant LEDs on the system board are lighted to identify where the errors are (see “System Board LEDs” on page 142). When you see the System Error LED illuminated on the operator LED (status) panel on the front of the server, check the LEDs on the power supplies and at any Ethernet adapters, then open the cover and see which LEDs are illuminated on the system board.

**Diagnostic Test Programs:** The server diagnostics test programs are stored in nonvolatile random-access memory (NVRAM) on the system board. These programs are the primary method of testing the system board, memory, and other standard features of your Netfinity 5000. 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 test programs to confirm that the hardware is working properly.

The server diagnostic test programs can identify most problems associated with major components of your server: the system board, Ethernet controller, video controller, RAM, diskette drive, serial port, parallel port, keyboard, and mouse.

You can start the diagnostic test programs from the Startup panel, when the message Press F2 for Diagnostics appears. Test options let you batch groups of tests, specify test parameters (for example, which memory DIMM you want to test), and specify the number of passes that you want to run (1 through 9999).

You can also view the server configuration information from the Diagnostic Utility menu. For example, you can view the interrupt request (IRQ) and direct memory access (DMA) assignments, memory usage, device drivers, and so on.

**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 options. 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** before POST will continue.

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

If POST detects a problem, an error message appears on your screen. A single problem can cause several error messages to appear. When this occurs, work to correct the cause of the first error message. After the cause is corrected, the other error messages probably will not appear the next time you turn on the system.

**POST Beep Codes:** POST generates beep codes to indicate successful completion or the detection of an error.

- One beep indicates successful completion of POST.
- More than one beep indicates that POST detected an error, see “Beep Symptoms” on page 152

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

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

**POST Error Messages and Beep Codes:** POST error messages and beep codes occur during startup when POST finds a problem with the hardware or detects a change in the hardware configuration, see “Symptom-to-FRU Index” on page 152.

**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.

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

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

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

## Diagnostic Test Programs

This section includes useful information about navigating through the diagnostic test programs, as well as procedures for starting and stopping them. These programs are designed to test the IBM Netfinity 5000. If you want to test a non-IBM product, refer to the information that comes with that product.

You can start the diagnostic test programs from the Startup panel, when the message Press F2 for Diagnostics appears.

### Note

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

## Navigating Through the Diagnostic Tests:

Error messages in the Test Log are stored by diagnostic test session. A diagnostic test session is defined as running one, all, or a selection of tests, one or more times. You can use the following keys to maneuver within the test program:

<b>Enter</b>	Selects an item.
<b>Down Arrow (↓)</b>	Moves the cursor down.
<b>Up Arrow (↑)</b>	Moves the cursor up.
<b>Left Arrow (←)</b>	Toggles test selection between Yes and No.
<b>Right Arrow (→)</b>	Toggles test selection between Yes and No.
<b>Page Down (PgDn)</b>	Moves to the next diagnostic test session in the log (if any).
<b>Page Up (PgUp)</b>	Moves to the previous diagnostic test session in the log (if any).
<b>F1</b>	Displays the appropriate Help information. Use the Up Arrow (↑) or Down Arrow (↓) key to scroll through the 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.
<b>Esc</b>	Returns to the previous menu.

**Running Diagnostic Test Programs:** When you start the diagnostic test programs from the Diagnostic Utility menu, you can select the tests, the way the tests run, and the number of times the tests run.

**Notes**

1. To run the diagnostic test 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 test programs. You can only view the error messages in the test log.  
If an administrator password is set, you must enter the administrator password to run the diagnostic test programs.
2. If the server stops during testing and you cannot continue, restart the server and try running the tests again. If the problem persists, see “Error Symptoms” on page 159 and look for the problem symptom.
3. If the diagnostic tests do not find a problem, see “Error Symptoms” on page 159 and look for the problem symptom.
4. You might need a scratch diskette to obtain accurate test results when testing the diskette drive.
5. The keyboard and mouse tests assume that a keyboard and mouse are attached to the server.

**To start the diagnostic tests:**

1. Turn on the server and watch the screen.  
If the system is turned on already, shut down your operating system and restart the server.
2. When the message Press F2 for Diagnostics appears, press **F2**.  
If a power-on password or administrator password is set, the system prompts you for it. Type in the appropriate password; then, press **Enter**.
3. The Diagnostic Programs screen appears.
4. Select **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 that appear on the screen. The actions available include specifying the options for the tests to be run, such as the number of times to run the test, whether to stop on error, or whether to use a predefined overlay that describes the tests to be run.  
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 system is turned on already, shut down your operating system and restart the server.
2. When the message Press F2 for Diagnostics appears, press **F2**.  
If a power-on password or administrator password is set, the system prompts you for it. Type in the appropriate password; then, press **Enter**.
3. The Diagnostic Programs screen appears. After you run diagnostic tests or abort the diagnostic tests, the utility option appears at the top of the screen.
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.
6. Press **Esc** to return to the Diagnostic Programs screen.
7. Select **Quit** from the top of the screen; then, select **Exit Diags** to exit from the diagnostic programs. The server restarts.

---

## Features

The following table summarizes the features of the Netfinity 5000 - Type 8659.

### hp2.Microprocessor

- Intel® Pentium® II microprocessor with MMX™ technology
- 512 KB of level-2 cache (min)

### Memory

- Standard: 64 MB (min), expandable to 1 GB
- 100 MHz, error correcting code (ECC) registered synchronous dynamic random access memory (SDRAM)
- Four dual-inline memory-module (DIMM) sockets

### Diskette Drive

- One 3.5-inch, 1.44 MB

### Hard Disk Drives

- Up to five hot-swappable internal hard disk drives are supported

### CD-ROM Drive

- Standard: IDE

### Keyboard and Auxiliary Device (tower models)

- Keyboard
- Mouse

### Expansion Slots

Supports up to five adapters

- One ISA slot
- Two shared PCI/ISA slot
- Three dedicated PCI slots

#### Expansion Bays

- One 3.5-inch diskette drive bay
- Two 5.25-inch drive bays, open bay supports half-high SCSI tape drive
- Five 3.5-inch drive bays, hot-swappable

### Upgradable Microcode

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

### Power Supply

- 350 W with voltage auto-selection (110, 120, 220, 240 V ac) and power redundancy
  - Standard—350 W non-redundant, 175 W redundant

- Optional—Additional 175 W power supply available for 350 W redundancy
- Built-in overload and surge protection
- Automatic restart after a momentary loss of power

### **Integrated Functions**

- Two serial ports
- Two universal serial bus (USB) ports
- System management port (C)
- Advanced system management processor on system board
- One IDE internal connector, supports the system IDE CD-ROM drive
- One parallel port
- Mouse port
- Keyboard port
- 16-bit UltraSCSI controller
  - One external connector (16-bit)
  - One internal connector (16-bit)
- Full-duplex 10/100 Mbps Ethernet controller
  - 10BASE-T/100BASE-TX port
  - Redundant Ethernet capability, through the use of an optional network interface card (NIC)
- Video controller port, super video graphics array (SVGA)
- 1 MB video memory

### **Security Features**

- Bolt-down capability
- Door lock (tower model only)
- Power-on and administrator passwords
- Selectable startup sequence

---

## Additional Service Information

The following additional service information supports Netfinity 5000 - Type 8659.

- “Checking the System for Damage” on page 17.
- “Configuration Overview” on page 18.
- “Configuration/Setup Utility” on page 20.
- “Configuration/Setup Utility Usage” on page 22.
- “Configuring the Ethernet Controller” on page 32.
- “Ethernet Controller Messages” on page 34.
- “Failover for Redundant Ethernet” on page 41.
- “Identifying Problems Using Status LEDs” on page 44.
- “Recovering BIOS” on page 48.
- “Resolving Configuration Conflicts” on page 49.
- “Resolving Resource Conflicts” on page 50.

## Checking the System for Damage

This section provides instructions on what to do if your system might be damaged.

**After Dropping It:** Look for loose cables and obvious damage. If any cables are loose, reconnect them securely.

If you see no damage, turn on the system. If it works correctly, the system probably did not suffer any damage.

If the system does not work correctly, turn it off and check the adapters and memory modules to ensure that they are connected correctly. Reseat all adapters and memory modules.

If the system still does not work correctly, run the diagnostic tests from diagnostic utility menu. For information about running tests, see “Running Diagnostic Test Programs” on page 12.

**After Spilling Liquid on It:** If liquid gets on the keyboard:

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

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

If liquid gets inside the monitor:

1. Turn off the monitor.
2. Turn off the server.
3. Unplug the monitor from the server and the electrical outlet.
4. Let the monitor dry out.

If liquid gets inside the server:

1. Turn off the server and all attached devices.
2. Unplug the server from the electrical outlet and all attached devices.
3. Let the server dry out.

## Configuration Overview

You play a key role in how your 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 your server depend on the number and types of devices and programs that you install.

Your server supports several types of adapters. Because of this flexibility, you can choose from among thousands of 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 your server, the more you will have to interact with your server and your devices to correctly configure your system.

Your 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 settings; and change the startup sequence for drives that you install. You can also use this utility program to set passwords for starting up the server and accessing the Configuration/Setup Utility program.

- SCSISelect Utility

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

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

1. Run the Configuration/Setup Utility program and record the current configuration settings.
2. Set switches on the server system board.  
See “System Board Switches” on page 147 for the meanings of the system board switches.
3. Set jumpers or switches on the device.  
See the device installation instructions.
4. Install the device in the server, see “Locations” on page 55.
5. Install software programs.  
Refer to the information provided with the “ServerGuide and Netfinity Manager Information” section of this *Server Library* and with your operating system for more information.
6. Resolve configuration conflicts.  
See “Resolving Resource Conflicts” on page 50.

## Configuration/Setup Utility

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.

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

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

### To start the Configuration/Setup Utility program:

1. Turn on the server and watch the screen.
2. When the messages Press F1 for Configuration/Setup and Press F2 for Diagnostics appear, select the action you need.
  - To configure your server, press F1 to select **Configuration/Setup Utility**.

The Configuration/Setup Utility main menu appears. For information about the menus, see “Configuration/Setup Utility Usage” on page 22.

#### Note

If you enter a power-on password and an administrator password has been set, a limited menu appears on the screen. To access the full Configuration/Setup Utility menu, you must enter the administrator password.

- To run the system diagnostics, press F2 to select **Diagnostic Utility**.

The Diagnostic Utility main menu appears. For information about running the system diagnostics, see “Diagnostic Test Programs” on page 11.

### Important

If a defective PCI adapter is causing the system to stop responding during startup, you can press **Alt+F1** here. This will cause the server to bypass PCI device initialization (except video) and go directly to the **Configuration/Setup Utility**, where you can disable the defective PCI adapter. Disabling the defective PCI adapter should enable you to complete a normal startup when you restart the server.

## Configuration/Setup Utility Usage

From the Configuration/Setup Utility program main menu you can select settings you want to change.

Pressing **F1** displays Help information for a selected menu item.

### Notes

1. If you enter only the power-on password and an administrator (supervisor-level) password is also set, a limited version of the menu appears. To view the full Configuration/Setup Utility menu you must enter the administrator password.
2. The choices on some menus might differ slightly, depending on the BIOS version that comes with your server.

### To change configuration settings:

1. Use the Up Arrow (↑) key to select the item you want to change; then, press **Enter**.
2. Select the configuration setting you want to change. Use the Right Arrow (→) or Left Arrow (←) key to highlight the menu, if needed.
3. Use the Right Arrow (→) or Left Arrow (←) key to select the appropriate setting for the selected item.
4. Repeat Steps 1 through 3 for each setting that you want to change. Press **Esc** to return to the Configuration/Setup Utility main menu.
5. After making changes, you can select:
  - **Save Settings** to save the selected changes.
  - **Restore Settings** to delete the selected changes.
  - **Load Default Settings** to cancel the changes and restore the factory settings.
6. To exit from the Configuration/Setup Utility main menu, select **Exit Setup**.
7. The system prompts you to confirm your choice. You can return to the Configuration/Setup Utility main menu, or exit.

**System Summary:** Select this choice to display configuration information, such as 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.

**System Information:** Select this choice to display information about your Netfinity 5000,

Changes that you make on other menus might appear on this summary screen.

**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) and BIOS.

**System Card Data:** Select this choice to view the system board model, submodel, system serial number, system board identifier, DASD backplane identifier, and identifiers for power supply 1 and power supply 2.

### **PCI Routing:**

Select this choice to view the interrupt request (IRQ) settings for PCI adapters and for the Ethernet, SCSI, and other controllers on the system board. See “PCI Bus Control” on page 30 for information about changing the PCI IRQ settings.

**Devices and I/O Ports:** Software recognizes ports from 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. See the “Advanced System Management Information” section of this *Server Library* for information about configuring serial ports A and C.

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 standard, as bidirectional, as an Extended Capabilities Port (ECP), or as an Enhanced Parallel Port (EPP). Bidirectional, ECP, and EPP are all bidirectional modes; in all three modes, data can be both read from and written to a device. ECP and EPP are industry-standard, high-performance bidirectional modes. Which one of these modes you choose depends on what mode your device supports.

**Note**

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

You can configure the mouse and diskette controller as enabled or disabled, and configure the type of diskette drive.

You can view the type of video controller and the amount of video memory installed.

You can configure the IDE channel (enabled or disabled) and view the IDE Primary Master Device (type, size, transfer selection and mode, and logical block addressing (LBA) mode).

**To display or change the port assignments:**

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

**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.

**System Security:** To control access to the information in your server, you can implement security features, such as adding passwords and defining a system owner's name that displays during startup. Implementing these security measures helps you to ensure the integrity of the data and programs that are stored in your server.

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

**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 have set a power-on or administrator password, you must enter the password whenever 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 program 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 choices on the Configuration/Setup Utility program main menu.</li> <li>• If you forget the power-on password, you can regain access to the server by using switch 8 on the system board. See "Using the Power-on Password Menu" on page 26 for details.</li> </ul>
Administrator password only	<ul style="list-style-type: none"> <li>• You must enter the password to enter the Configuration/Setup Utility program.</li> <li>• You can access all choices on the Configuration/Setup Utility program main menu.</li> <li>• If the administrator password is forgotten, it cannot be overridden or removed. You must replace the system board.</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 program 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 program main menu. This might include changing or deleting the power-on password.</li> </ul> </li> <li>• If you forget the power-on password, and the administrator password has been set, use the administrator password at the password prompt. Then, start the Configuration/Setup Utility program and change the power-on password.</li> </ul>

**Using the Power-on Password Menu:** When a power-on password is set, you must enter a password each time 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 your power-on password. Keep a record of your password in a secure place.

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

**Note**

A message appears if the two passwords do not match. If this happens, press **Enter** to return to the Power-On Password menu.

4. Select **Change Power-on Password** to save the new password; then, press **Enter**.
5. A confirmation window appears. Press **Enter** to change the power-on password. Press **Esc** to return to the System Security menu.

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 27 for details). Start the Configuration/Setup Utility program and change the power-on password as described in steps 1 through 5 above.
- Use the Bypass-Power-On-Password switch on the system board to temporarily bypass the power-on password.
  1. See “Option Installation” on page 125 through “Preparing a Tower Model” on page 126 or through “Preparing a Rack Model” on page 128 for instructions on powering off the server and removing the cover. Then, refer to the system-board diagram inside your server for the location of the switch block.
  2. Locate switch 8 (see “System Board Switches” on page 147).
  3. Set switch 8 on the switch block to On, to bypass the power-on password.
  4. Restart the server, then start the Configuration/Setup Utility program and change

the power-on password as described in steps 1 through 5 above.

5. Turn the server off again.
6. Set switch 8 back to Off.
7. Restart the server.

#### 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 server to start in unattended mode when a power-on password is set:

##### Note

If the password data field is set to **On**, the **Unattended Start and Stop** modes are not supported.

1. Select **Power-on Password** from the System Security menu; then, press **Enter**.  
The Power-on Password menu appears.
2. Select **Allow for unattended boot with password**. Press the Left Arrow (←) or Right Arrow (→) key to toggle the entry to **On**.

If no power-on password is set on the server, this option has no effect.

**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.

##### Important

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

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

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

**Note**

A message appears if the two passwords do not match. If this happens, press **Enter** to return to the Administrator Password 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**.
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**.
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 menu. The System Security menu contains the **Power-on Password** choice.

**Defining a System Owner's Name:** You can specify a system owner's name that displays during POST each time that your server is started. If you set an administrator password, only the administrator can set, change, or delete the system owner's name.

**To set the system owner's name:**

1. Select **System Owners Name** from the System Security menu; then, press **Enter**.  
The System Owners Name screen appears.
2. Type the name in the **Enter System Owners Name String** data field. You can use any combination of up to 15 characters and spaces in your system owner's name.
3. Press the Down Arrow (↓) key to select the **Set or Change System Owners Name** data field.
4. Press **Enter** to set the name or change a previously defined name.

To delete the system owner's name, select **Delete Stored System Owners Name**; then, press **Enter**.

**Start Options:** Start options take effect when you start your server.

You can select keyboard operating characteristics, such as the keyboard speed. You also can specify whether the keyboard number lock (NumLock) starts on or off. You also can enable the server to run in disketteless and monitorless operation.

You can specify the startup sequence the server is to use to determine the device from which the operating system loads. For example, you can define a startup sequence that checks for a CD-ROM, then checks an installed hard disk drive, and then checks a network adapter.

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

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

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

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

**Note**

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

Use the Left Arrow (←) or Right Arrow (→) key to highlight the options for the selected menu item.

**Core Chipset Control:** Select this choice to modify settings that control features of the core chip set on the system board. The chipset control choices are:

**IOQ Depth** Use this setting to control the in order queue (IOQ) depth in the system. The value can be varied from 1 to 8. This value should normally be set at 8 (default)

**Grant Timers** Use this setting to enable or disable the grant timer mechanism for each the 5 PCI slots. Enabling this will cause grant to be asserted to a PCI bus agent for a minimum of two clocks. This setting should normally be set to disable (default)

## PCI Bus Control

### Note

This page shows the interrupts and the correct interrupted assigned to the devices.

Select **PCI Bus Control** to:

- Change the master latency timer values for PCI bus 0 and PCI bus 1.
- Specify the system board interrupt routing (IRQs) for SCSI, Ethernet, video, and USB.
- Specify the slot interrupt routing (IRQs) for PCI slots.
- Enable and disable PCI device types (SCSI, video, Ethernet) and slots. When a PCI adapter is defective, you can use **Alt+F1** at startup and then disable the PCI adapter in order to enable the system to start up successfully.

### Note

Any changes you make to IRQs will not be reflected in the PCI Interrupt Routing selection of this menu until you restart the server.

**Cache Control:** Select this choice to define the microprocessor cache state as enabled or disabled, and to define the microprocessor cache type as Write-back or Write-through.

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

**Memory Settings:** Select this choice to view the server banks of memory and to enable or disable selected rows of memory within those banks.

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:** Use this selection to set the timer delay for ISA I/O recovery.

**Service Processor IRQ Settings:** Use this selection to specify the IRQ the system-management processor is to use and to synchronize the service processor clock to the system clock.

**Plug and Play:** Most adapters designed for PCI slots are Plug and Play devices that are auto-configuring. However, many ISA adapters are not Plug and Play devices and you must allocate the system resources that the adapter will use. Select **Plug and Play** to identify the available system resources:

- Memory
- I/O ports
- DMA
- Interrupt

**Note**

The menus do not contain resources that are used by the system or by previously installed Plug and Play adapters.

Select **Plug and Play**; then, use the Up Arrow (↑) and Down Arrow (↓) key to highlight the system resource that you want to change. Use the Left Arrow (←) or Right Arrow (→) key to toggle from **Plug and Play** to **ISA Legacy** for the selected menu choice.

**Error Log:** Select **Error Log** to view the three most recent power-on self-test (POST) errors the system has generated, or to view the system error log. You can clear both error logs from this screen by selecting **Clear Error Logs**.

**Configuring PCI Features and Options:** 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 Resource Conflicts” on page 50.

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 Bus Control” on page 30). Verify that the IRQ assignments are correct.

Your Netfinity 5000 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. For information on manually overriding the interrupt setting, see “PCI Bus Control” on page 30.

## Configuring the Ethernet Controller

Your Netfinity 5000 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 your server.

When you connect your server to the network, the Ethernet controller automatically detects the data-transfer rate (10 Mbps or 100 Mbps) on the network and then sets the controller to operate at the appropriate rate. That is, the Ethernet controller will adjust to the network data rate, whether the data rate is standard Ethernet (10BASE-T), Fast Ethernet (100BASE-TX), half duplex (HDX), or full duplex (FDX). This process is also known as *auto-negotiation*. This auto-negotiation occurs without software intervention. The controller supports half-duplex (HDX) and full-duplex (FDX) modes at both speeds.

Auto-negotiation works only if the hub or switch to which your server is connected also supports auto-negotiation. If the hub or switch does not support auto-negotiation, the speed (10 Mbps or 100 Mbps) will still be detected correctly, but half-duplex mode will always be selected. A full-duplex switch that does not support auto-negotiation will not attach to the Netfinity 5000 in full-duplex mode.

In this case, if you want the network to operate in full-duplex mode, you must manually override the settings to obtain a full-duplex connection. To do this, your server must have a device driver that supports manual overrides. Use the ServerGuide CDs to install this device driver. Refer to the “ServerGuide and Netfinity Manager Information” section of this *Server Library* for instructions on installing device drivers. The ServerGuide CDs contain IBM Update Connector, a dial-up<sup>1</sup> program that keeps your BIOS and device drivers current. Verify that you have installed the appropriate device driver. Also, refer to your Ethernet documentation for additional information on operating modes, manual overrides, and device drivers.

### Attention:

- The 10BASE-T Ethernet and the 100BASE-TX Fast Ethernet cabling in the network must be Category 5 or higher to meet various standards, including electromagnetic compatibility.
- You must install a device driver to enable your operating system to address the Ethernet controller. Use the ServerGuide CDs to install this device driver. Refer to the information in the “ServerGuide and Netfinity Manager Information” section of this *Server*

---

<sup>1</sup> Response time will vary, depending on the number and nature of calls received.

*Library* for instructions on installing device drivers, or for more information about the ServerGuide CDs.

Fast Ethernet operates at a data rate of up to 100 Mbps. However, except for the different operating speeds, Fast Ethernet and standard Ethernet are structurally identical. Most applications and protocols that are currently installed on a standard Ethernet system can be seamlessly migrated to 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 your operating system before you use the Ethernet controller.

#### **Notes**

1. The Ethernet controller supports the operating systems that your server supports. To find out which operating systems your server supports, go to the following World Wide Web address:  
<http://www.pc.ibm.com/us/compat/>

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

#### **Note**

If you are installing an IBM 10/100 Ethernet adapter, be sure to run the Ethernet controller diagnostics and record the Ethernet controller configuration information before you install the adapter.

## Ethernet Controller Messages

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

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

### Novell NetWare or IntraNetWare Server ODI

**Driver Messages:** The following error messages are for the Novell NetWare or IntraNetWare server ODI driver. The explanation and recommended action are included with each message.

---

**PCNTNW-NW-026 The MSM is unable to parse a required custom keyword.**

**Explanation:** The user entered an incorrect parameter keyword.

**Action:** Reload the driver using the correct keyword.

---

**PCNTNW-NW-054 The adapter did not respond to the initialization command.**

**Explanation:** The adapter did not respond when the driver tried to initialize it.

**Action:** Verify that the PCI Ethernet device type is set to the default (enabled) setting in the Configuration/Setup utility programs (see "PCI Bus Control" on page 30). If the Ethernet adapter is enabled, go to "Diagnostic Test Programs" on page 11 to run the diagnostic utility.

---

**PCNTNW-NW-058 The adapter did not respond to the initialization command.**

**Explanation:** The interrupt request (IRQ) setting might not be valid or the EEPROM information might be incorrect.

**Action:** Make sure the IRQ settings are correct in the Configuration/Setup utility programs. See "PCI Bus Control" on page 30 for information on setting the interrupt requests. If the IRQ settings are correct, replace the system board.

---

**PCNTNW-NW-066 The cable might be disconnected from the adapter.**

**Explanation:** The cable might be disconnected from the server Ethernet port.

**Action:** Verify that a cable is connected to the Ethernet port.

---

**PCNTNW-NW-071 The matching virtual adapter could not be found.**

**Explanation:** You tried to load another instance of the driver with a different I/O address. This new adapter could not be found.

**Action:** If you installed an Ethernet adapter, such as an IBM Netfinity 10/100 Fault Tolerant Adapter, as part of Ethernet redundancy (failover), make sure that the adapter is seated correctly. If the adapter is seated correctly, replace the adapter.

---

**PCNTNW-NW-072 A resource tag is unavailable.**

**Explanation:** The driver tried to allocate some resources that were not available.

**Action:** Add or free some memory in the server. Then, restart the server.

---

**PCNTNW-NW-073 Unable to allocate memory.**

**Explanation:** The driver failed to allocate the memory needed for normal operation.

**Action:** Add more memory, or free some memory resources in the server. Then, restart the server.

---

**PCNTNW-NW-074 The hardware interrupt cannot be set.**

**Explanation:** An attempt was made to initialize a given hardware interrupt. The attempt was not successful.

**Action:** Verify that the PCI Ethernet device type is set to the default (enabled) position in the Configuration/Setup utility programs (see "PCI Bus Control" on page 30).

Make sure that the interrupt request numbers are set correctly. If you are using an ISA adapter, make sure resources are reserved as ISA Legacy in the Configuration/Setup utility programs (see "Plug and Play" on page 31.)

---

**PCNTNW-NW-075 The Multiple Link Interface Driver (MLID) cannot be registered with the Link Support Layer (LSL).**

**Explanation:** An error occurred while the driver was trying to register with the LSL.

**Action:** Check the version of the NetWare or IntraNetWare Operating System. Make sure that this driver is correct for the version of NetWare or IntraNetWare that you are using. Restart the server.

---

**PCNTNW-NW-079 The Multiple Link Interface Driver (MLID) did not initialize MSMTx Free Count.**

**Explanation:** The MSMTx Free Count is not initialized correctly.

**Action:** Restart the server.

---

**PCNTNW-NW-086 The driver parameter block is too small.**

**Explanation:** The driver parameter block is too small.

**Action:** Restart the server.

---

**PCNTNW-NW-087 The media parameter block is too small.**

**Explanation:** The driver media parameter block is too small.

**Action:** Restart the server.

---

**PCNTNW-NW-091 The hardware configuration conflicts.**

**Explanation:** You tried to load a new frame type for the existing controller. The hardware assumptions made in doing so are incorrect. This error can also occur if you try to specify a mode (such as, redundancy) that conflicts with another specified mode.

**Action:** Make sure that your hardware configuration matches the software settings. See "PCI Bus Control" on page 30 for information on viewing and changing interrupt requests.

---

**PCNTNW-NW-126 The group bit in the node address override was cleared.**

**Explanation:** The IEEE address has a group bit indicating that an address belongs to a group of stations. This bit is used only as a destination address; it cannot be used as a source address. You tried to enter a source address with this bit set. The driver cleared the group bit of the source address.

**Action:** None necessary, message is for information only.

---

**PCNTNW-NW-127 The local bit in the node address override was set.**

**Explanation:** The local bit in the IEEE address format indicates that the addresses are being managed locally. If you use the node address override capabilities of this driver to enter a new address, the local bit must be set. You entered an address without the local bit set. The driver has set the local bit.

**Action:** None necessary, message is for information only.

---

**PCNTNW-NW-164 The device was not found.**

**Explanation:** The driver cannot find an Ethernet controller in the server.

**Action:** Verify that the PCI Ethernet device type is set to the default (enabled) position in the Configuration/Setup utility programs (see "PCI Bus Control" on page 30). If the Ethernet adapter is enabled, go to "Diagnostic Test Programs" on page 11 to run the diagnostic utility.

---

---

**PCNTNW-NW-165 The device was not found at IOADDRESS.**

**Explanation:** The Ethernet controller cannot be found at the I/O address specified.

**Action:** The Ethernet controller does not require a parameter for the I/O address. Remove the I/O address parameter.

---

**PCNTNW-NW-167 PCI scan specified, device not found.**

**Explanation:** The driver cannot locate the Ethernet controller on the PCI bus.

**Action:** Verify that the PCI Ethernet device type is set to the default (enabled) position in the Configuration/Setup utility programs (see "PCI Bus Control" on page 30).

If the problem persists, go to "Diagnostic Test Programs" on page 11 to run the diagnostic utility.

---

**PCNTNW-NW-180 The DMA parameter is not necessary for PCI device.**

**Explanation:** The Ethernet controller does not require a DMA setting.

**Action:** None necessary, message is for information only.

---

**NDIS 2.01 (OS/2) Driver Messages:** The following error messages are for the NDIS 2.01 (OS/2) drivers. The explanation and recommended action are included with each message.

---

**PCNTND-1 Unable to open the Protocol Manager.**

**Explanation:** The NDIS stack is not configured correctly.

**Action:** Check and correct your configuration.

---

**PCNTND-6 Out of memory while allocating buffers.**

**Explanation:** The driver could not allocate the requested buffers.

**Action:** Check your system configuration. Edit the PROTOCOL.INI file to reduce the number of Tx buffers and Rx buffers specified for the driver.

---

**PCNTND-7 A Protocol Manager device error occurred.**

**Explanation:** The NDIS stack is not configured correctly.

**Action:** Check and correct your configuration.

---

**PCNTND-8 Bad status for the Protocol Manager.**

**Explanation:** The NDIS stack is not configured correctly in the PROTOCOL.INI file.

**Action:** Check and correct your configuration.

---

**PCNTND-9 Cannot find the PROTOCOL.INI entry.**

**Explanation:** The NDIS stack is not configured correctly in the PROTOCOL.INI file.

**Action:** Check and correct your configuration.

---

**PCNTND-10 The Protocol Manager Input Output Control (IOCTL) failed.**

**Explanation:** The NDIS stack is not configured correctly in the PROTOCOL.INI file.

**Action:** Check and correct your configuration.

---

**PCNTND-11 Protocol Manager registration failed.**

**Explanation:** The NDIS stack is not configured correctly.

**Action:** Check and correct your configuration.

---

---

**PCNTND-15     Device not found.**

**Explanation:** The driver cannot find an Ethernet controller in the server.

**Action:** Verify that the PCI Ethernet device type is set to the default (enabled) position in the Configuration/Setup utility programs (see "PCI Bus Control" on page 30). If the Ethernet adapter is enabled, go to "Diagnostic Test Programs" on page 11 to run the diagnostic utility.

---

**PCNTND-16     PCI scan specified, device not found.**

**Explanation:** The driver cannot locate the Ethernet controller on the PCI bus.

**Action:** Verify that the PCI Ethernet device type is set to the default (enabled) position in the Configuration/Setup utility programs (see "PCI Bus Control" on page 30). If the Ethernet adapter is enabled, go to "Diagnostic Test Programs" on page 11 to run the diagnostic utility.

---

**PCNTND-21     The adapter failed the checksum test.**

**Explanation:** The driver cannot find an Ethernet controller.

**Action:** Verify that the PCI Ethernet device type is set to the default (enabled) position in the Configuration/Setup utility programs (see "PCI Bus Control" on page 30). If the Ethernet adapter is enabled, go to "Diagnostic Test Programs" on page 11 to run the diagnostic utility.

---

**PCNTND-23     WARNING: PCNET IRQ found = xx**

**Explanation:** The interrupt request (IRQ) setting (xx) in the PROTOCOL.INI file does not match the hardware IRQ setting.

**Action:** Remove the IRQ setting from the PROTOCOL.INI file or change the IRQ setting in the PROTOCOL.INI file to match the IRQ setting shown in the **PCI Routing** selection of the System Information menu in the Configuration/Setup Utility. (See "PCI Routing" on page 23.)

---

**PCNTND-24     WARNING: PCNET IRQ does not match PROTOCOL.INI.**

**Explanation:** The interrupt request (IRQ) setting in the PROTOCOL.INI file does not match the hardware IRQ setting.

**Action:** Remove the IRQ setting from the PROTOCOL.INI file or change the IRQ setting in the PROTOCOL.INI file to match the IRQ setting shown in the **PCI Routing** selection of the System Information menu in the Configuration/Setup Utility. (See "PCI Routing" on page 23.)

---

**PCNTND-25     PCI scan specified, PCI bus not found!**

**Explanation:** The driver cannot locate the PCI bus on your server.

**Action:** Go to "Diagnostic Test Programs" on page 11 to run the diagnostic utility.

---

**PCNTND-29     WARNING: DMA number is not necessary for PCI device.**

**Explanation:** The Ethernet controller does not require a DMA setting.

**Action:** Remove the DMA setting in the PROTOCOL.INI file.

---

**PCNTND-33     PCNET device with specified IOBASE is already in use.**

**Explanation:** The specified I/O address number is already in use by another Ethernet controller or device.

**Action:** Remove the I/O address setting in the PROTOCOL.INI file.

---

## NDIS 4.0 (Windows NT) Driver Messages:

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

---

**PermaNet(tm) Server: No Secondary Adapter Found. Grouping Mode is disabled.**

**Explanation:** The failover option requires an adapter that is compatible with the device driver of the Ethernet controller on the system board. No such adapter was found.

**Action:** Make sure the correct adapter is installed.

---

**PermaNet(tm) Server: Problem Occurs on the Primary Adapter. Switching over to the Secondary Adapter.**

**Explanation:** The system detected a problem with the primary Ethernet connection and has transferred all network traffic to the secondary Ethernet controller.

**Action:** Identify the cause of the failure on the primary Ethernet connection. Restoring the operational state of the primary connection will cause the network traffic to automatically transfer to the primary Ethernet controller.

---

**PermaNet(tm) Server: Switching back to Primary Adapter.**

**Explanation:** The primary Ethernet connection is now operating correctly. Network traffic will automatically transfer to the primary Ethernet controller.

**Action:** None needed, message is for information only.

**UNIX Messages:** The following error messages are for the SCO UNIX LLI driver.

---

**pnt0-2 PCI search specified, PCI device not found!**

**Explanation:** The driver cannot locate the Ethernet controller on the PCI bus.

**Action:** Run the NETCONFIG program to search for another Ethernet controller.

Verify that the PCI Ethernet device type is set to the default (enabled) position in the Configuration/Setup utility programs (see "PCI Bus Control" on page 30).

If the problem persists, go to "Diagnostic Test Programs" on page 11 to run the diagnostic utility.

---

**pnt0-6 Cannot allocate memory for the adapter during an interrupt. Please check your Streams parameters.**

**Explanation:** On a SunSoft Solaris system, this message indicates that the system is out of Streams memory blocks.

**Action:** Use the CRASH utility to increase the number of Streams memory blocks.

Modify the interrupt request (IRQ) settings in the Configuration/Setup utility programs, or run the NETCONFIG program to match the hardware settings.

---

**pnt0-7 Cannot allocate memory for the adapter during reset. Please check your Streams parameters.**

**Explanation:** The system is out of Streams memory blocks.

**Action:** Use the CRASH utility to increase the number of Streams memory blocks.

---

**pnt0-11 Device not found!**

**Explanation:** The driver cannot find an Ethernet controller.

**Action:** Verify that the PCI Ethernet device type is set to the default (enabled) position in the Configuration/Setup utility programs (see "PCI Bus Control" on page 30). If the Ethernet adapter is enabled, go to "Diagnostic Test Programs" on page 11 to run the diagnostic utility.

---

**pnt0-12            Device failed checksum test!**

**Explanation:** The driver cannot find an Ethernet controller.

**Action:** Verify that the PCI Ethernet device type is set to the default (enabled) position in the Configuration/Setup utility programs (see "PCI Bus Control" on page 30). If the Ethernet adapter is enabled, go to "Diagnostic Test Programs" on page 11 to run the diagnostic utility.

---

**pnt0-13            add\_intr\_handler failed! Interrupts already enabled.**

**Explanation:** The interrupt request (IRQ) that was specified, or the IRQ that was found, conflicts with other devices in the server.

**Action:** Modify your hardware settings.

Run the NETCONFIG program to match the hardware settings.

---

**pnt0-14            Cannot locate hardware.**

**Explanation:** The SunSoft Solaris driver cannot find any Ethernet controller.

**Action:** Verify that the PCI Ethernet device type is set to the default (enabled) position in the Configuration/Setup utility programs (see "PCI Bus Control" on page 30). If the Ethernet adapter is enabled, go to "Diagnostic Test Programs" on page 11 to run the diagnostic utility.

---

**pnt0-15            No more devices to open.**

**Explanation:** The SunSoft Solaris driver cannot find any more Ethernet controllers.

**Action:** Verify that additional Ethernet adapters are present or replace the Ethernet adapter that fails to respond. If the problem persists, go to "Diagnostic Test Programs" on page 11 to run the diagnostic utility.

---

**pnt0-17            Device fault...Reset initiated!**

**Explanation:** The SunSoft Solaris driver has been reset due to a device fault.

**Action:** Verify that additional Ethernet adapters are present or replace the Ethernet adapter that fails to respond. If the problem persists, go to "Diagnostic Test Programs" on page 11 to run the diagnostic utility.

---

**pnt0-19            IRQ found for PCnet hardware does not match space.c  
(or pnt.conf)!**

**Explanation:** This is a warning message referring to the interrupt request (IRQ) that the SunSoft Solaris driver found in the system.

**Action:** Ignore this message if you are sure that this is what you want to do. Otherwise, run the NETCONFIG program to match the hardware settings.

---

**pnt0-20            add\_intr\_handler failed! Unknown interrupt type.**

**Explanation:** The interrupt request (IRQ) that was specified, or the IRQ that was found, conflicts with other devices in the server.

**Action:** Modify your hardware settings.

Run the NETCONFIG program to search for another Ethernet controller.

---

**pnt0-21            add\_intr\_handler failed! Out of range interrupt number.**

**Explanation:** The interrupt request (IRQ) that was specified, or the IRQ that was found, conflicts with other devices in the server.

**Action:** Modify your hardware settings.

Run the NETCONFIG program to search for another Ethernet controller.

---

**pnt0-22            add\_intr\_handler failed! Out of range IPL.**

**Explanation:** The interrupt request (IRQ) that was specified, or the IRQ that was found, conflicts with other devices in the server.

**Action:** Modify your hardware settings.

Run the NETCONFIG program to search for another Ethernet controller.

---

---

**pnt0-23            add\_intr\_handler failed! Vector already occupied.**

**Explanation:** The interrupt request (IRQ) that was specified, or the IRQ that was found, conflicts with other devices in the server.

**Action:** Modify your hardware settings.  
Run the NETCONFIG program to search for another Ethernet controller.

---

**pnt0-24            add\_intr\_handler failed! Vector already shared at different IPL.**

**Explanation:** The interrupt request (IRQ) that was specified, or the IRQ that was found, conflicts with other devices in the server.

**Action:** Modify your hardware settings.  
Run the NETCONFIG program to search for another Ethernet controller.

---

**pnt0-26            The DMA number is not necessary for PCI device.**

**Explanation:** The Ethernet adapter does not require a DMA setting.

**Action:** Edit the SPACE.C file to delete the DMA parameter.

---

**pnt0-29            The IRQ number is already in use.**

**Explanation:** The specified I/O address is already in use.

**Action:** Run the NETCONFIG program to modify your hardware settings.

---

**pnt0-31            I/O address is not necessary for the PCI device.**

**Explanation:** The I/O address specified is not required.

**Action:** Remove the assigned I/O address specified for the Ethernet controller.

## Failover for Redundant Ethernet

Your Netfinity 5000 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 your server. If you install this NIC adapter and connect it to the same logical segment as the primary Ethernet controller, you can configure the server to support a *failover* function. You can configure either the integrated Ethernet controller or the NIC adapter as the primary Ethernet controller. In failover mode, if the primary Ethernet controller detects a link failure, all Ethernet traffic associated with it is switched to the redundant (secondary) controller. This switching occurs without any user intervention. 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.

### Notes

1. 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.
2. Your operating system determines the maximum number of IBM Netfinity 10/100 Fault Tolerant Adapters that you can install in your server. See the documentation that comes with the adapter for more information.

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

## Configuring Failover on OS/2

1. Install the redundant NIC adapter according to the instructions provided with the adapter and in “Installing or Removing Adapters” on page 57.
2. Use the ServerGuide CDs to install the AMD PCNet Ethernet Family adapter device driver.
3. Using the MPTS utility program, select the driver from the list and select the **Edit** button.

### Note

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

4. Change the PermaNet Server Feature keyword to **TRUE** and specify the Primary and Standby slots that contain the redundant pair. Refer to “System Board Illustration” on page 142 for the locations and slot

numbers of the PCI slots. The integrated controller is located in slot 9.

5. To enable the writing of messages to the IBMCOM\LANTRAN.LOG file when a failover occurs:
  - a. Copy the file PCNETOS2.EXE from the OS2 directory of the diskette created by the ServerGuide program to your hard disk drive.
  - b. Add the following statement to the CONFIG.SYS file:  

```
Run=d:\path\PCNETOS2.EXE
```

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

The failover function is now enabled.

## Configuring Failover on Windows NT

1. Install the redundant NIC adapter according to the instructions provided with the adapter and in "Installing or Removing Adapters" on page 57.
2. Use the ServerGuide CDs to install the AMD PCNet Ethernet Family adapter device driver.
3. From the NT desktop, select **Control Panel**, then select the **Network** icon, then the **Adapters** tab.
4. Highlight one of the adapters that will be in the redundant pair and then select the **Properties...** button.
5. Check the **Grouping** box. This will show the possible combinations for redundant pairs.
6. Select the adapter pair you want and then select **OK**. Note that the integrated Ethernet controller is located at PCI bus 0, slot 9.
7. Select **Close** to exit from the Network setup.

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

If a failover occurs, a message is written to the NT Event Viewer log. If the DMI instrumentation code for the integrated Ethernet controller is active (PCNET.EXE was run), a pop-up message is generated also.

## Configuring Failover on IntraNetWare

1. Install the redundant NIC adapter according to the instructions provided with the adapter and in "Installing or Removing Adapters" on page 57.
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 the integrated Ethernet controller. When the slot number of the integrated Ethernet controller is determined, reload the driver with the appropriate parameters.

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

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

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

# Identifying Problems Using Status LEDs

Your server has LEDs to help you identify problems with some server components. These LEDs are part of the diagnostics built into the server. By following the path of lights, you can quickly identify the type of system error that occurred.

Status LEDs are located on the following components:

- Operator LED panel  
For more information, see “Front Panel Indicators” on page 85.
- Hard disk drive trays  
For more information, see “Controls” on page 82.
- Power supply  
For more information, see “Power Supply LEDs.”
- System board  
See “System Board LEDs” on page 142 for locations of the LEDs on the system board.

**Power Supply LEDs:** The AC Power LEDs, located on the rear of the power supply, provide status information about the power supply. See “Front Panel Indicators” on page 85 for the location of these LEDs.

The following table describes the AC Power LEDs.

AC Power LED	Description and Action
On	The power supply is on and operating correctly.
Off	There is an AC power problem. Possible causes: <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>
<b>No beep, fans running, and AC power LED blinking</b>	System held in reset Possible causes: <ol style="list-style-type: none"><li>1. If an optional VRM is installed and no optional processor. <b>Action:</b> Remove the optional VRM.</li><li>2. If optional VRM failed. <b>Action:</b> Replace the optional VRM.</li><li>3. If primary VRM failed. <b>Action:</b> Replace the system board.</li><li>4. If system board failed. <b>Action:</b> Replace system board.</li></ol>

**LED Diagnostics:** The diagnostics built into your server allow you to quickly identify the type of system error that occurred. When the System Error LED on the information LED panel is illuminated, use the following information to isolate the problem. An error message usually appears on the display monitor as well.

- If the System Error LED on the information LED panel on the front of the server is on, a system error was detected. Check the LEDs on the power supplies and at any Ethernet adapters, then open the cover and check to see which of the LEDs on the system board inside the server are on. (See “System Board LEDs” on page 142 for the location of the LEDs.)

System Board LED	Description
Service Processor Error LED on	<p>An error has occurred in the service processor.</p> <p><b>Actions:</b></p> <ol style="list-style-type: none"> <li>1. Try a reset by turning of the system, jumper/short J39, and turn on the system.</li> <li>2. Replace the system board.</li> </ol>
NMI LED on	<p>A non-maskable interrupt occurred. The PCI 1 or PCI 2 LED will probably also be on.</p> <p><b>Actions:</b></p> <ol style="list-style-type: none"> <li>1. If the PCI 1 or PCI 2 LED is on, follow the instructions for those LEDs.</li> <li>2. If the PCI 1 or PCI 2 LED is not on, restart the server. If the problem persists (the NMI LED stays on), go to “General Checkout” on page 5.</li> </ol>
SMI LED on	<p>A system-management interrupt occurred. This is an indication of service processor activity, and is not an error.</p> <p><b>Actions:</b> No action is required.</p>
PCI 1 LED on	<p>An error occurred on PCI bus 0. An adapter in PCI slot 5 or the system board caused the error.</p> <p><b>Actions:</b> Check the error log for additional information. If the error log indicates a problem with the integrated Ethernet controller, replace the system board.</p>
PCI 2 LED on	<p>An error occurred on PCI Bus 1. An adapter in PCI slot 1, 2, 3, or 4 or the system board caused the error.</p> <p><b>Actions:</b></p> <ol style="list-style-type: none"> <li>1. Check the error log for additional information.</li> <li>2. If you cannot correct the problem from the information in the error log, try to determine the failing adapter by removing one adapter at a time from the secondary PCI bus (PCI slots 1–4) and restarting the server after each adapter is removed.</li> </ol>

<b>System Board LED</b>	<b>Description</b>
DIMM 1 Error LED on	The DIMM in DIMM slot 1 has failed. <b>Action:</b> Replace the DIMM in DIMM slot 1.
DIMM 2 Error LED on	The DIMM in DIMM slot 2 has failed. <b>Action:</b> Replace the DIMM in DIMM slot 2.
DIMM 3 Error LED on	The DIMM in DIMM slot 3 has failed. <b>Action:</b> Replace the DIMM in DIMM slot 3.
DIMM 4 Error LED on	The DIMM in DIMM slot 4 has failed. <b>Action:</b> Replace the DIMM in DIMM slot 4.
FAN 1 LED on	Fan 1 has failed or is operating too slowly. <b>Note:</b> A failing fan can also cause the TEMP and DASD 1 LEDs to be on. <b>Action:</b> Replace fan 1.
FAN 2 LED on	Fan 2 has failed or is operating too slowly. <b>Note:</b> A failing fan can also cause the TEMP and DASD 1 LEDs to be on. <b>Action:</b> Replace fan 2.
TEMP LED on	The system temperature has exceeded the maximum rating. <b>Actions:</b> <ol style="list-style-type: none"> <li>1. Check to see if a fan has failed. If it has, replace the fan.</li> <li>2. Make sure the room temperature is not too hot.</li> </ol>
Integrated Voltage Regulator Error LED on	The voltage regulator for the primary microprocessor slot has failed. <b>Actions:</b> Replace the system board.
Secondary Processor VRM Error LED on	The voltage regulator module (VRM) for the secondary microprocessor slot has failed. <b>Actions:</b> <ol style="list-style-type: none"> <li>1. Turn off the server, reseal the VRM, and restart the server.</li> <li>2. If the problem persists, replace the VRM.</li> </ol>
Primary Microprocessor Error LED on	The microprocessor in the primary microprocessor slot has failed. <b>Actions:</b> <ol style="list-style-type: none"> <li>1. Turn off the server, reseal the microprocessor, and restart the server.</li> <li>2. If the problem persists, replace the microprocessor.</li> </ol>
Secondary Microprocessor Error LED on	The microprocessor in the secondary microprocessor slot has failed. <b>Actions:</b> <ol style="list-style-type: none"> <li>1. Turn off the server, reseal the microprocessor and VRM; then restart the server.</li> <li>2. If the problem persists, replace the microprocessor.</li> </ol>
Power Supply 1 LED on	The primary power supply has failed. <b>Action:</b> Replace the primary power supply replaced.
Power Supply 2 LED on	The secondary power supply has failed. <b>Action:</b> Replace the secondary power supply.

---

<b>System Board LED</b>	<b>Description</b>
DASD 1 LED on	A hot-swap hard disk drive has failed. <b>Actions:</b> <ol style="list-style-type: none"><li>1. Check the error log for additional information. If the error log indicates a temperature problem and the fans are working correctly, check the system for proper air flow.</li><li>2. If the amber Hard Disk Status LED on one of the hot-swap hard disk drives is on, replace the hard disk drive.</li></ol>

---

- System Error LED on the information LED panel on the front of the server is off. The diagnostics have not detected a system error.

## Recovering BIOS

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

### Note

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

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

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

### To recover the BIOS:

1. See "Option Installation" on page 125 through "Preparing a Tower Model" on page 126 or through "Preparing a Rack Model" on page 128 for instructions on powering off the server and removing the cover. Then, refer to the system-board diagram inside your server for the location of the switch block.
2. Locate switch 5 (see "System Board Switches" on page 147).
3. Set switch 5 on the switch block to On, to set boot block recovery mode.
4. Insert the BIOS flash diskette in the diskette drive.
5. Restart the server.

Nothing appears on the display monitor, but the diskette drive activity LED and periodic beeps indicates that BIOS recovery is under way. Recovery is complete when slow beeps are concluded by a string of fast beeps and the Post Complete light on the operator LED panel is on.

6. Remove the flash diskette from the diskette drive.
7. Turn the server off.
8. Set switch 5 to Off, to return to normal startup mode.
9. Restart the server. The system should start up normally.

## Resolving Configuration Conflicts

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

**Resolving Memory-Address Conflicts:** The Configuration/Setup Utility program program might change the memory-address space used by some hardware options. If this happens, the new address might conflict with addresses defined for use through expanded memory specification (EMS). (EMS is used only with DOS.)

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

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

You can resolve memory-address conflicts by changing either the software or hardware configuration setup.

## 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 8 Kb (1 Kb = approximately 1000 bytes) of space in the hex C0000 to C7FFF EMS memory area. EMS device drivers must use addresses different from those assigned to video read-only memory (ROM). You can use the Configuration/Setup Utility program to view or change the current setting for video ROM. For information about using the Configuration/Setup utility programs, see "Configuration/Setup Utility Usage" on page 22.

If the SVGA or EMM386 device driver is causing the memory-address conflict, refer to your DOS documentation. For conflicts caused by device drivers supplied with application programs instead of those supplied with DOS, refer to the documentation that comes with the device drivers.

## Changing the Hardware Configuration

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

## Resolving Resource Conflicts

The resources used by your server consist of IRQs, DMA, I/O port addresses, and memory. This information is useful when a resource configuration conflict occurs.

Conflicts in the configuration occur if:

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

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

The Configuration/Setup Utility program configures the system hardware and PCI interrupt requests. The program does not consider the requirements of the operating system or the application programs. See “Resolving Software Configuration Conflicts” on page 51 for additional information.

## Resolving Hardware Configuration

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

1. Run the Configuration/Setup Utility program to view and change resources used by the system board functions. Record the current settings before making any changes. (See “Configuration/Setup Utility” on page 20 for instructions.)
2. Determine which adapter or device is causing the conflict.
3. Change adapter jumpers or switches. Some devices use jumpers and switches to define the system resources that the device needs. If the settings are incorrect or set to use a resource that cannot be shared, a conflict occurs and the device will remain deactivated by the configuration program.
4. Remove the device or adapter. Some configurations are not supported. If you must remove an adapter, see “Installing or Removing Adapters” on page 57.

## Resolving Software Configuration

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

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

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

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

### Note

Start the Configuration/Setup Utility program to view the addresses used by your system board functions.

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

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

## Using the SCSISelect Utility Program

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

You can use the SCSISelect Utility program to:

- View and change the device configuration
- Perform a low-level format or verify the media on a SCSI hard disk drive.

## Starting the SCSISelect Utility Program

### Note

The SCSI controller in your server is a dual channel device. Select channel B for internal devices, channel A for external devices. The default selection is channel A.

You can access this program when you start the server. The SCSISelect prompt appears after the IBM Netfinity Logo appears. Press **Ctrl+A** immediately after the SCSISelect prompt appears; then, select channel B for internal devices.

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

**SCSISelect Utility Program Choices:** The following choices appear on the SCSISelect Utility program menu:

- Configure/View Host Adapter Settings
- SCSI Disk Utilities

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

- Host Adapter SCSI ID  
Select this choice to change the SCSI ID of the SCSI controller from its default value of 7. Do not assign the SCSI controller to a SCSI ID already in use, such as 14, which is used by the daughterboard card (SAF-TE) on the DASD backplane.
- SCSI Parity Checking  
The default value is *Enabled*. This value should not be changed.

- **Host Adapter SCSI Termination**  
The default value is *Enabled*. This value should not be changed.
- **Boot Device Options**  
Select this choice to configure startable device parameters. Before you can make updates, you must know the ID of the device whose parameters you want to configure.
- **SCSI Device Configuration**  
Select this choice to configure SCSI device parameters. Before you can make updates, you must know the ID of the device whose parameters you want to configure.
- **Advanced Configuration Options**  
Select this choice to view or change the settings for advanced configuration options. These options include enabling support for large hard disk drives and support for BIOS parameters if BIOS is enabled.

To reset to the the host adapter defaults, press **F6**; then, follow the instructions on the screen.

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

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

#### Note

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

#### Unexpected SCSI Command Failure

```

Target SCSI ID:          4
SCSI CDB Sent:          03 00 00 00 0E 00 07 00 02 00
Host Adapter Status:    00h - No host adapter error
Target Status:          02h - Check condition
Sense Key:              02h - Not ready
+Sense Code:            04h
+Sense Code Qualifier:  02h
  
```

Press 'Esc' to continue.

**Performing a Low-Level Disk Format:** You can perform a low-level format on hard disk drives using the *Format Disk* feature of the SCSISelect Utility program.

Depending on the hard disk capacity, the low-level format program could take up to two hours.

**When To Use the Format Disk Program:** Use the Format Disk program:

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

**Note**

For information about backing up all of your files, see your operating-system documentation.

## **Starting the Low-Level Format**

**Attention**

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

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

**Note**

Hard disk drives normally contain more tracks than their stated capacity, to allow for defective tracks. A message appears on the screen if the defect limit is reached. If this happens, replace the drive.

3. To install an operating system after the hard disk drive is formatted, refer to the ServerGuide information in the “ServerGuide and Netfinity Manager Information” section of this *Server Library* that comes with your server.

**Verifying the Disk Media:** Select **Verify Disk Media** to scan the selected hard disk drive for media defects, such as bad tracks. All recoverable defects will be remapped.

The Verify Disk Media program takes about 15 to 20 minutes to complete.

---

## Locations

The following information supports the Netfinity 5000 - Type 8659 server.

- “Adapters” on page 56.
- “Battery” on page 61.
- “Bays” on page 64.
- “Changing Jumper Positions” on page 75.
- “Completing the Installation” on page 77.
- “Completing the Tower Model Installation” on page 77.
- “Controls” on page 82.
- “DASD Fan Assembly Removal” on page 90.
- “Ethernet Connector” on page 91.
- “Expansion Bays” on page 92.
- “External Options” on page 94.
- “Hot Swap Backplane Assembly Removal” on page 96.
- “Input/Output Connectors” on page 97.
- “Installing a Server in a Rack Enclosure” on page 99.
- “Internal Drives Installation or Removing” on page 113.
- “Keyboard and Mouse Connectors” on page 114.
- “Management Port C” on page 115.
- “Memory Modules” on page 116.
- “Microprocessors” on page 118.
- “Option Installation” on page 125.
- “Parallel Port Connector” on page 131.
- “Power Supplies” on page 132.
- “Power Supply Removal” on page 133.
- “Rear Fan Assembly Removal” on page 134.
- “SCSI Connectors” on page 135.
- “SCSI Jumpers” on page 137.
- “Security” on page 139.
- “Serial Port Connectors” on page 141.
- “System Board Illustration” on page 142.
- “System Board Removal/Replacement” on page 145.
- “System Board Switches” on page 147.
- “Universal Serial Bus Ports” on page 149.
- “Updating the Server Configuration” on page 150.
- “Video Port Connector” on page 151.

## Adapters

Adding an adapter, such as a communication adapter, extends the capabilities and power of your server. For example, you can add a RAID (redundant array of independent disks) adapter that can enhance logical-drive capacity and performance.

**Adapter Considerations:** Your Netfinity 5000 supports ISA and PCI adapters. You can install up to six adapters in the connectors on the system board.

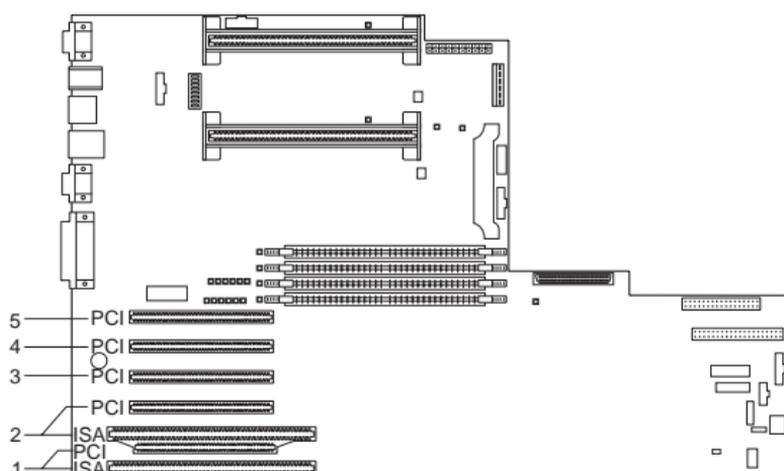
The system board in your server contains 16-bit, ISA-bus expansion connectors and 32-bit, PCI-bus expansion connectors. One of the expansion slots is a shared PCI/ISA slot. One of the expansion slots supports only ISA adapters. The remaining four slots support only PCI adapters. Your server supports only 5.0-volt adapters on the PCI bus.

### Notes

1. You can install PCI adapters in slots 1–5. Slots 1–4 are on PCI bus 1, slot 5 is on PCI bus 0. Both PCI buses are primary buses; when the system scans the buses to see what devices are on them, it scans PCI bus 0 first.
2. You can install ISA adapters in the slots 1 and 2.

**Note:** If an ISA adapter is not a Plug and Play device, you must allocate the system resources that the adapter will use. Use the Plug and Play choice in the Advanced Setup selection of the Configuration/Setup Utility program to allocate resources.

The following figure shows the location of the PCI and ISA expansion slot connectors on the system board.



**Note**

Expansion slot 1 and 2 are shared slot. A shared slot can be used by an adapter installed in either the PCI connector or the adjacent ISA connector, but not both.

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

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

**Attention**

To avoid possible damage to adapters and server components, be sure that the adapters you install do not touch each other or the other components (such as the microprocessor) inside the server.

**Installing or Removing Adapters:** This section gives the procedure for installing an adapter. If you want to remove an adapter, reverse the following steps.

**Before you begin**

- Read "Safety Information" on page 174.
- Read the documentation that comes with the option.

1. Review the instructions that come with the adapter to determine if the adapter must be installed in a certain slot; otherwise, use any available, bus-compatible slot.

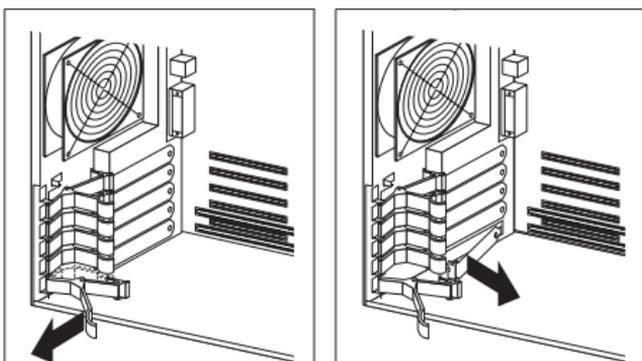
**Note**

If you install a video adapter, the server automatically disables the video controller on the system board. IBM recommends that the video be installed in slot 5.

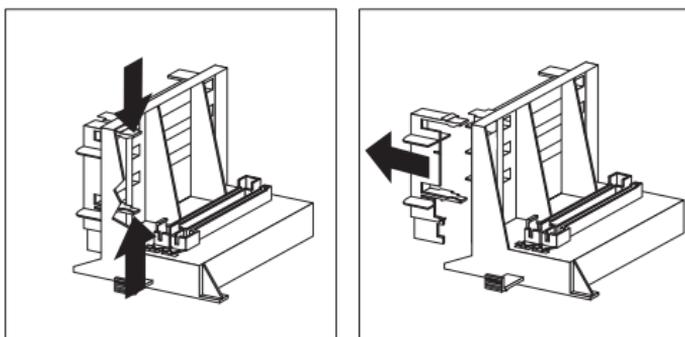
2. If you have not done so, remove the server cover. See "Option Installation" on page 125.
3. Remove the expansion-slot cover.
  - a. Release the slot retaining clamp by pulling the curved arm on the clamp away from the system board.

**Note**

The slot retaining clamp might differ slightly from this illustration.



- b. Remove the expansion slot cover from the slot opening.
- 4. If the adapter is a full-length card, continue with this step. Otherwise, go to step 5 on page 59.
  - a. Remove the card support bracket retaining clip.



- b. If the adapter is a full length card in slot 1 or 2, ensure that the card support bracket has the appropriate card support installed for that slot.

**Card Type**

ISA  
PCI

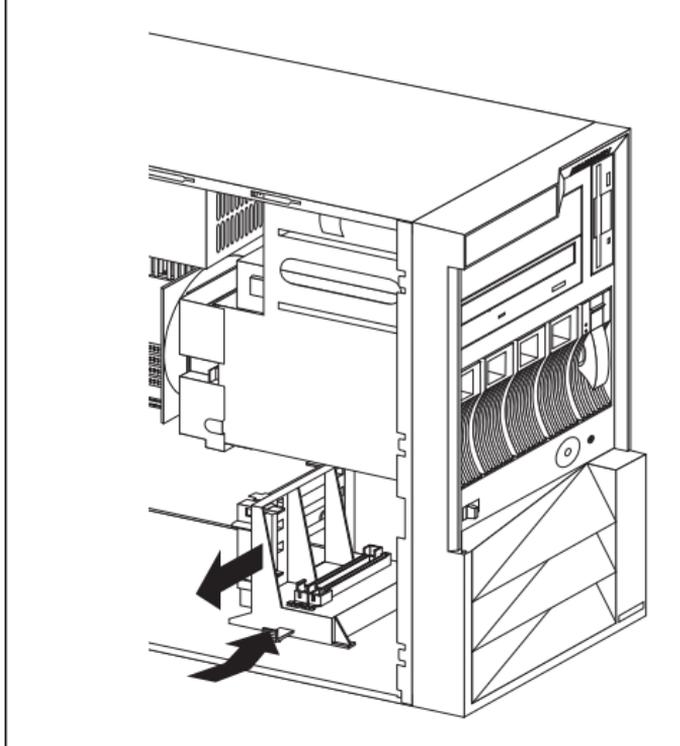
**Card Support Color**

Black  
White

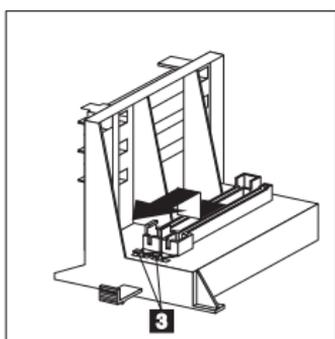
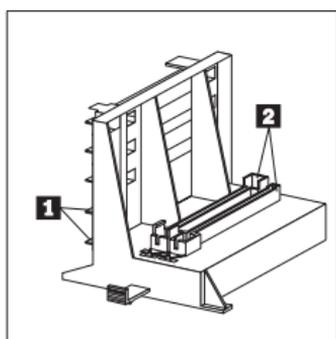
Each card support is also identified on the tab as ISA or PCI.

### Note

You might find it easier to replace the card support with the appropriate color card support if you remove the card support bracket from the server first.

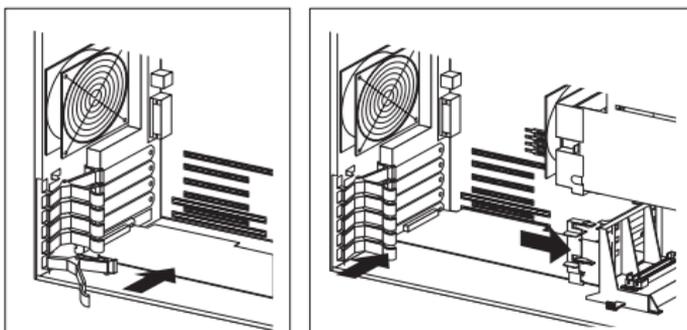


- 1) To remove a card support from a slot **1** or storage location **2**, gently release the card support tab **3** and slide the card support away from the system board until the card support is free.



- 2) To insert a card support in a slot or a storage location, place the card support in the slot or storage opening and slide the card support toward the system board until the tab clicks into place.
  - c. If you removed the card support bracket from the server, replace it in the server now.
5. Touch the static-protective package to any *unpainted* metal surface on the server; then, remove the adapter from the package.

6. Install the adapter:
  - a. Carefully grasp the adapter and align it with the expansion slot (and with the card support bracket if a full-length adapter).
  - b. Press the adapter *firmly* into the connector until fully seated.



- c. Fit the foot of the slot retaining clamp to the top of the expansion slot.
    - d. Push the curved arm of the slot retaining clamp toward the adapter until the clamp is locked into place.
    - e. If necessary, connect any internal cables to the adapter. Refer to the documentation that comes with the option.
    - f. If you removed the card-guide retaining clip in step 4a on page 58, reinstall it now.
  7. If you want to install or remove any other options, do so now. Otherwise, go to “Completing the Installation” on page 77.

## Battery

IBM has designed this product with your safety in mind. The lithium battery must be handled correctly to avoid possible danger.



### Caution

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

#### **Do not:**

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

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

### Note

In the U.S., please 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.

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

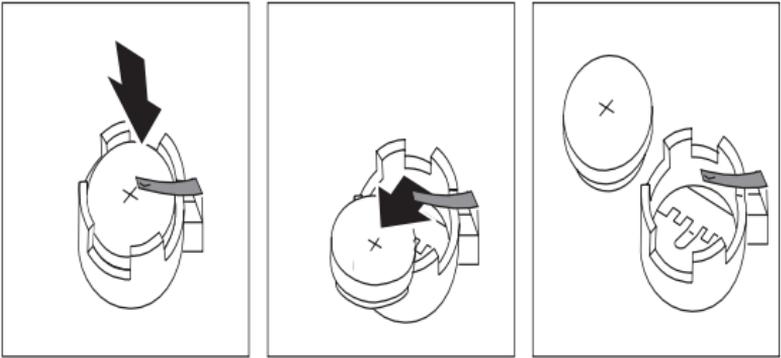
- Read "Safety Information" on page 174.
- Followed any special handling and installation instructions supplied with the replacement battery.
- Removed the server side cover (see "Option Installation" on page 125).

### Note

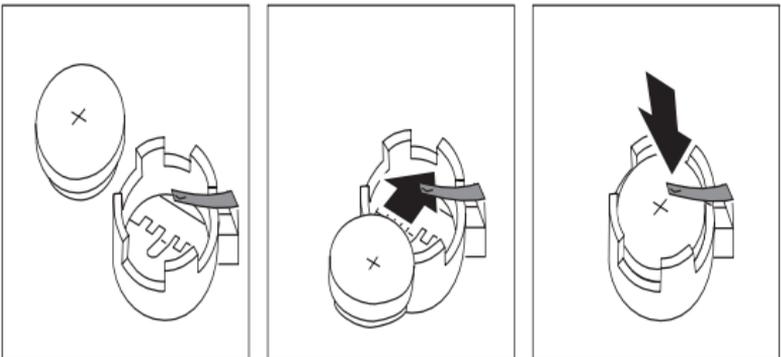
After you replace the battery, you must reconfigure your system and reset the system date and time.

### To replace the battery:

1. Unplug the server.
2. Locate the battery on the system board (see “System Board Illustration” on page 142).
3. 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 front 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.



4. 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.



5. Reinstall the server covers and complete the installation (see “Completing the Installation” on page 77).
6. 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 24.
  - To reset the power-on password, go to “Using the Power-on Password Menu” on page 26.

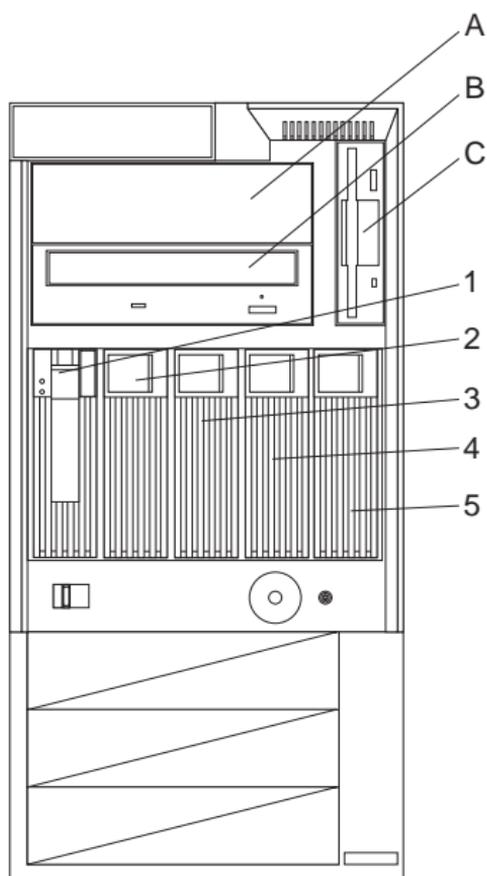
- To reconfigure your system, follow the instructions given in “Configuration/Setup Utility” on page 20 (all models).

## Bays

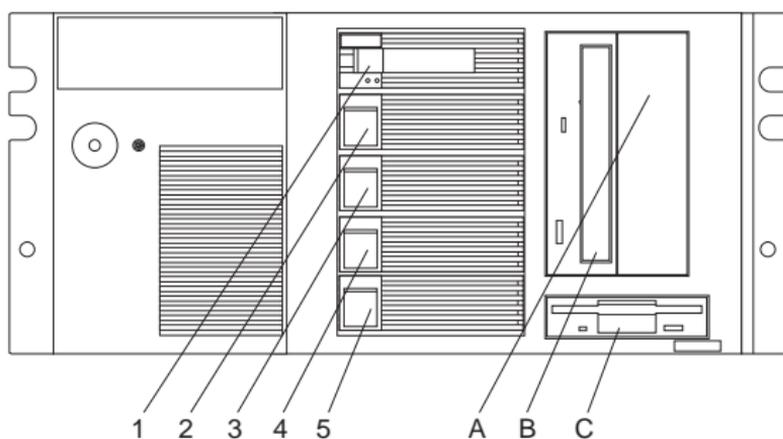
Internal drives are installed in *bays*. The bays are referred to as bay A, bay B, bay C, bay 1, bay 2, and so on.

The following illustrations show the locations of the bays in your server.

### Tower model



### Rack model



Your server comes with a CD-ROM drive installed in bay B and a diskette drive installed in bay C.

Bay	Drive Width	Drive Type	Drive Height
A	5.25-inch	Removable media drive <sup>1</sup> only	41.3 mm (1.6 in.)
B	5.25-inch	CD-ROM	41.3 mm (1.6 in.)
C	3.5-inch	Diskette drive	25.4 mm (1.0 in.)
1 through 5	3.5-inch	Hot-swap hard disk	25.4 mm (1.0 in.) – Slim line (SL) 41.3 mm (1.6 in.) <sup>2</sup> – Half height (HH)
<b>Notes:</b> <ol style="list-style-type: none"> <li>1. Removable media includes CD-ROMs, optical discs, and tapes. It does not include hard disk drives.</li> <li>2. A 41.3 mm drive installed in bays 1 through 5 will occupy two bays.</li> </ol>			

Table 1. Maximum Allowable Drive Sizes

**Types of Cables:** Drives connect to your server with cables. Each cable connector is designed to fit a corresponding connector on a drive.

Three types of internal cables connect to the drives in your server:

- A four-wire power cable connects to each drive.
- A flat-ribbon signal cable connects to IDE devices.
  - One flat-ribbon cable connects the internal diskette drive.

The connector on one end of this cable attaches to the system board. The primary diskette drive installed in your server (usually known as drive A) is attached to the connector on the other end of this cable.

**Note**

The primary diskette drive must always be attached to the drive connector on the end of this cable.

- A second flat-ribbon cable connects the CD-ROM drive.

This cable has two drive connectors. A third connector attaches to the system board. The CD-ROM drive that comes with your server is attached to the connector on the end of this cable.

- Another cable connects internal SCSI devices. This SCSI cable has two connectors that connect to SCSI devices:
  - One to the backplane of the DASD hot-swap enclosure

- One to a SCSI device you install in the open 5.25-inch bay

A third connector attaches to the SCSI connector on the system board.

External SCSI devices usually come with a SCSI cable. You attach one end of this SCSI cable to the SCSI connector on the back of the server, and the other end to the SCSI device. You usually can attach additional SCSI devices to this cable.

**SCSI Devices:** Your Netfinity 5000 supports drives that comply with American National Standards Institute (ANSI) SCSI Standards X3.131-1986 (SCSI), X3.131-1994, (SCSI-2), X3.277-1996 (SCSI-3 Fast-20 parallel interface), and X3.253-1995 (SCSI-3 parallel interface).

For a complete list of the SCSI devices supported on your Netfinity 5000, go to <http://www.pc.ibm.com/support/> on the World Wide Web.

If you install additional SCSI devices, you must set a unique identification (ID) for each SCSI device. This enables the SCSI controller to identify the devices and ensure that different devices do not attempt to transfer data at the same time.

**Note**

Any information about SCSI drives also applies to other SCSI devices, such as scanners and printers.

**SCSI IDs:** If you install SCSI devices, you must set a unique identification (ID) for each SCSI device that you connect to your server. This enables the SCSI controller to identify the devices and ensure that different devices do not attempt to transfer data at the same time.

The SCSI controller in your server supports SCSI IDs 0 to 15; ID 7 is reserved for the controller, ID 14 is reserved for the daughterboard (SAF-TE) on the DASD backplane. Use the SCSISelect Utility program to view the SCSI IDs of SCSI devices in your server. (See "Using the SCSISelect Utility Program" on page 52 for more information.)

**Note**

A daughterboard is a secondary adapter that can be plugged into another adapter or the system board. The SAF-TE daughterboard on the DASD backplane makes available the status information about the DASD drives that meet the following conditions:

- The drives are part of a RAID environment
- The status information comes from a supported IBM RAID adapter

If you install wide (16-bit) SCSI devices, you can set the IDs to any whole number between 0 and 6, or to any whole number between 8 and 13, or to 15. If you install narrow (8-bit) SCSI devices, you can set the IDs to any whole number between 0 and 6.

Your server automatically sets SCSI IDs for hot-swap hard disk drives, according to the jumper settings on the DASD backplane. Your server uses the hard disk drive SCSI IDs to send status information to the indicator lights on each hard disk drive. See “Front Panel Indicators” on page 85 for the location and identification of the hard disk drive status lights.

Table 2 shows the default SCSI IDs that the backplane assigns for hot-swap hard disk drives.

Bay	1	2	3	4	5
ID	0	1	2	3	4

You can change the default ID addresses of the drives by changing the jumper settings on the DASD backplane. See “SCSI Jumpers” on page 137.

**Termination Requirements:** The UltraSCSI controller and the backplane of the hot-swap bays provide termination for the internal SCSI bus (cable) in your server. There are no termination requirements for any SCSI devices you install in the hard disk drive bays or attach to this cable.

If you attach a SCSI cable and devices to the external SCSI connector, set the termination for the last device on that SCSI cable to Enabled. Refer to the instructions that come with the SCSI device for more information about termination.

## Preinstallation Steps (All Bays)

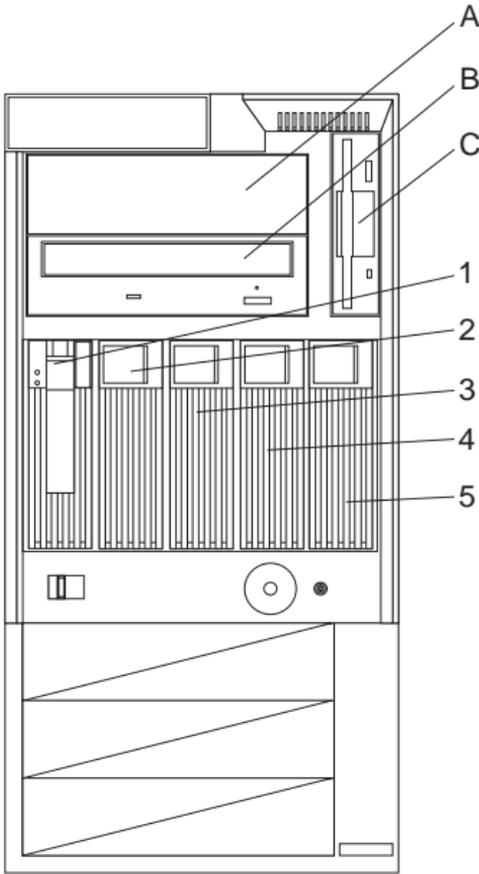
**Before you begin, be sure you have:**

- Read “Safety Information” on page 174.
- Read the documentation that comes with the option.
- Read “Termination Requirements.”
- Verified that you have all cables, drive trays, and any other equipment specified in the documentation that comes with the internal drive.

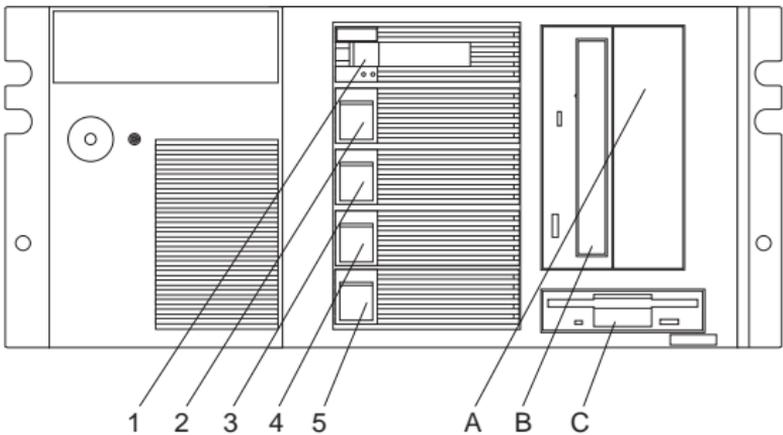
Before you can install drives in your Netfinity 5000, you might need to perform certain preinstallation activities. Some of the steps are required only during the initial installation of an option.

1. Choose the bay in which you want to install the drive. (Refer to Table 1 on page 65 for the drive types and sizes available for each bay.)

### Tower model



### Rack model



2. Touch the static-protective bag containing the drive to any unpainted metal surface on the server; then, remove the drive from the bag.

3. Check the instructions that come with the drive if you need to set any switches or jumpers on the drive, or if you need to attach a tray to the drive.

#### What to do next

- To install a removable-media drive, go to “Installing or Removing Drives in Bays A and B (Removable Media).”
- To install a diskette drive, go to “Installing or Removing a Drive in Bay C (Diskette Drive)” on page 70.
- To install a hard disk drive, go to “Installing or Removing Drives in Bays 1 through 5 (Hard Disk Drives)” on page 72.

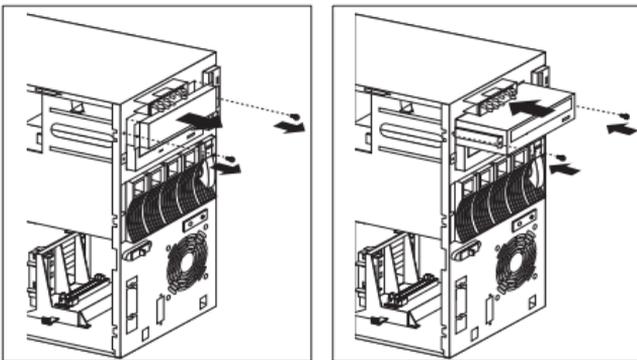
## Installing or Removing Drives in Bays A and B (Removable Media):

This section gives the procedure for installing a removable-media drive. If you want to remove a drive, reverse the following steps.

#### Before you begin

- Read “Safety Information” on page 174.
- Read “Preinstallation Steps (All Bays)” on page 67 and the instructions that come with the option.
- Read “Termination Requirements” on page 67

1. If you have not done so already, remove the server cover and the front bezel. See “Option Installation” on page 125.
2. Remove the bay cover plate, if present.
  - a. Remove the screws on either side of the cover plate that secure the plate to the target bay.
  - b. Remove the cover plate from the server front panel. (Save the cover plate for future use.)

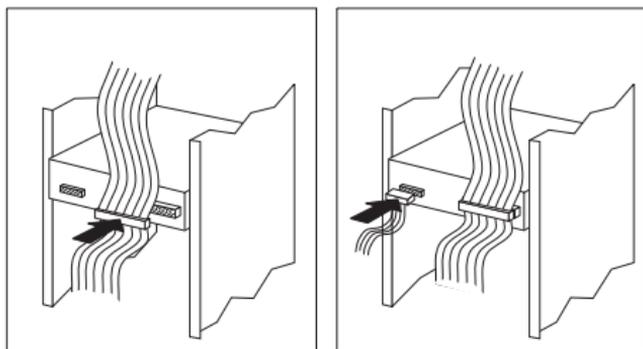


3. Using the instructions that come with the drive, together with these instructions, check that any switches or jumpers on the drive are set correctly. Change the settings if necessary. For information about termination requirements, see “Termination Requirements” on page 67.
4. Position the drive with the connectors facing the rear of the server.

5. Slide the drive into the bay until it stops.
6. Reinstall and tighten the screws that you removed in step 2 on page 69.
7. Connect the drive to the available connector on the SCSI cable or the IDE cable, as appropriate.

**Note**

If you have difficulty connecting a cable, turn the cable connector over and try again; cable connectors are keyed to connect only one way.



8. Connect one of the 4-pin power cables to the drive.
9. If you want to install or remove any other options, do so now. Otherwise, go to “Completing the Installation” on page 77.

## Installing or Removing a Drive in Bay C

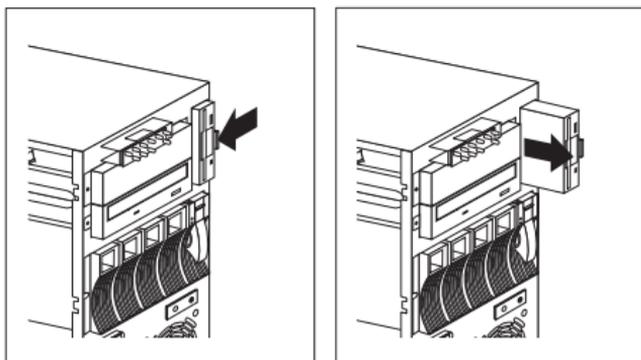
**(Diskette Drive):** This section gives the procedure for installing or removing a diskette drive.

**Before you begin**

- Read “Safety Information” on page 174.
- Read the documentation that comes with the option.

### To remove a drive in bay C:

1. Locate the drive-release tab on the diskette drive.



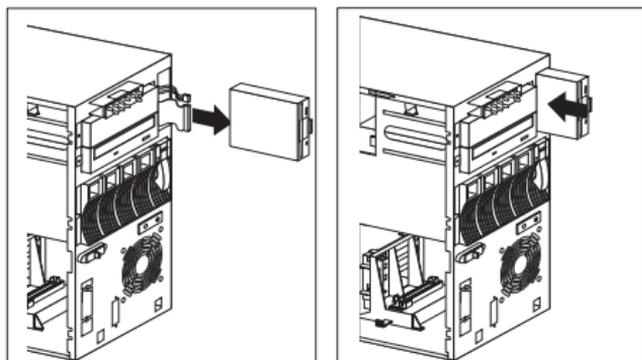
2. Press the tab against the drive and hold it there while pulling the drive out.
3. Disconnect the diskette drive cable and power cable from the drive.
4. If you want to install or remove any other options, do so now. Otherwise, go to "Completing the Installation" on page 77.

### To install a drive in bay C:

1. If you have not done so, remove the server cover and front bezel. See "Option Installation" on page 125.
2. Using the instructions that come with the drive, together with these instructions, check that any switches or jumpers on the drive are set correctly. Change the settings if necessary. For information about termination requirements, see "Termination Requirements" on page 67.
3. Insert the drive into the bay.
  - a. Position the drive so that the connectors face the rear of the server and the diskette eject button is toward the outside of the server.
  - b. Connect the diskette drive cable and power cable to the drive.

#### Note

If you have difficulty connecting a cable, turn the cable connector over and try again; cable connectors are keyed to connect only one way.



- c. Locate the drive-release tab on the diskette drive.
  - d. Press the tab against the drive and hold it there; slide the drive into the bay until it clicks into place.
4. If you want to install or remove any other options, do so now. Otherwise, go to “Completing the Installation” on page 77.

**Installing or Removing Drives in Bays 1 through 5 (Hard Disk Drives):** This section gives the procedure for installing a hard disk drive. If you want to remove a drive, reverse the following steps.

**Note**

To minimize the possibility of damage to the hard disk drives when you are installing a hard disk drive in a rack model, install the rack model in the rack before installing the hard disk drives.

**Attention:** To avoid damage to a hard disk drive, **do not** remove the drive from the hot-swap bay until it has had time to spin down (approximately 30 seconds). Handle the drive gently.

**Before you begin**

- Read “Safety Information” on page 174.
- Read “Termination Requirements” on page 67

Your Netfinity 5000 contains hardware that lets you replace a hard disk drive without turning off the Netfinity 5000. These drives are known as *hot-swappable* or *hot-swap* drives.

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

**Notes**

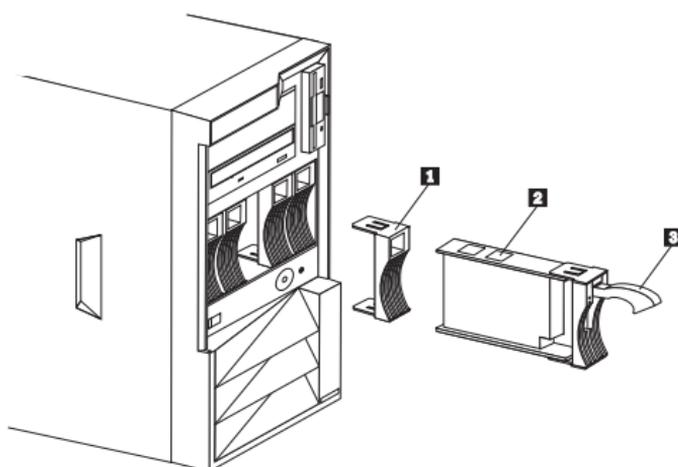
1. The Netfinity 5000 EMI integrity and cooling are both protected by having the hot-swap bays covered or occupied. When you install a drive, save the filler panel from the bay, in case you later remove the drive and do not replace it with another.
2. The hot-swap bays connect to a SCSI backplane. This backplane is the printed circuit board behind the hot-swap bays.

To install a drive in a hot-swap bay:

1. Remove the filler panel **1** from one of the empty hot-swap bays by inserting your finger into the depression at the top of the filler panel (tower model) or left side of the filler panel (rack model) and pulling it away from the server.

#### Attention

To maintain proper system cooling, do not operate the Netfinity 5000 for more than two minutes without either a drive or a filler panel installed for each bay.



- 1** Filler panel
- 2** Drive
- 3** Tray handle

2. 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-tray assembly into the bay until the drive connects to the backplane.
  - d. Push the tray handle toward the drive until the handle locks.
3. Check the hard disk drive status indicators to verify that the hard disk drives are operating properly. See "Front Panel Indicators" on page 85 for details.

#### Notes

1. There are no termination requirements for any SCSI hard disk drives installed in the hard drive bays. Termination is achieved through the DASD backplane.
2. If your Netfinity 5000 has a RAID adapter or controller, you might want to reconfigure your disk arrays after installing hard disk drives; consult the documentation that came with your adapter or controller.

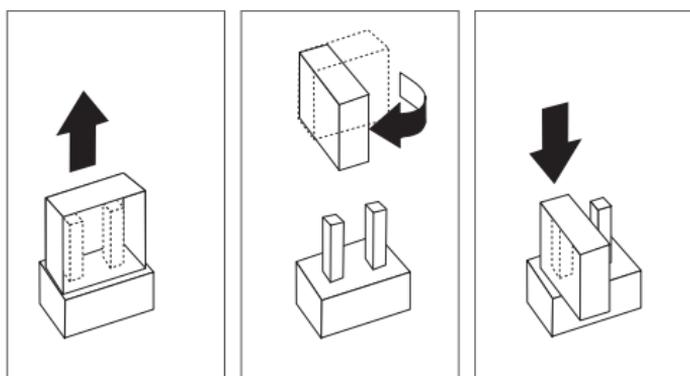
4. If you want to install or remove any other options, do so now. Otherwise, go to “Completing the Installation” on page 77.

## Changing Jumper Positions

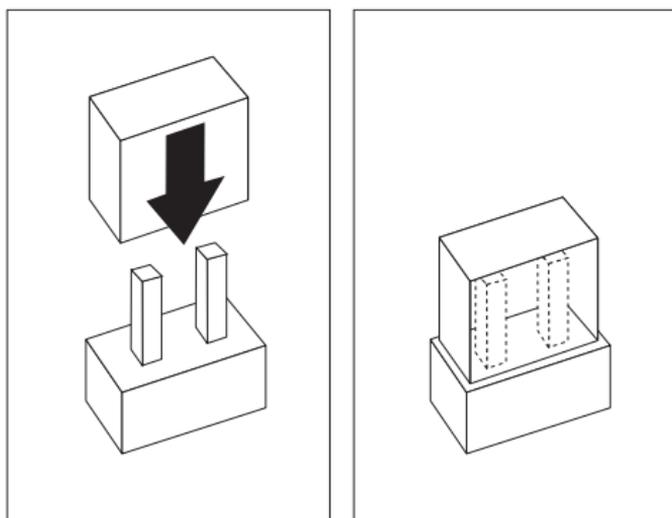
The DASD backplane, which is the Netfinity 5000 SCSI backplane, contains two-pin jumper blocks, which are behind the daughterboard (SAF-TE) on the DASD backplane. Jumper block J4 controls the addressing of the SCSI hard disk drive hot-swap bays. See “SCSI Jumpers” on page 137 for details.

**Two-Pin Jumper Blocks:** Covering both pins with a jumper specifies one function of the jumper block. Covering one pin only or removing the jumper entirely changes the function of the jumper block. To change a jumper's position for a two-pin jumper block:

1. Turn off the server; then disconnect the server power cord.
2. Remove the server cover (see “Option Installation” on page 125).
3. Locate the jumper block, removing any adapters or components that may hinder access to the jumper block.
4. Do one of the following:
  - Remove a jumper by performing either action:
    - Lift the jumper straight off the pin block.
    - 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.



- Place a jumper by aligning the holes in the bottom of the jumper with the two pins on the pin block, and then sliding the jumper onto these pins.



5. Replace any components or adapters that you might have removed.
6. Reinstall the server cover and connect the cables (see “Completing the Installation” on page 77 for instructions).

## Completing the Installation

### Before you begin

- Complete all the installation procedures for the internal options you have chosen to install.
- Read “Safety Information” on page 174.

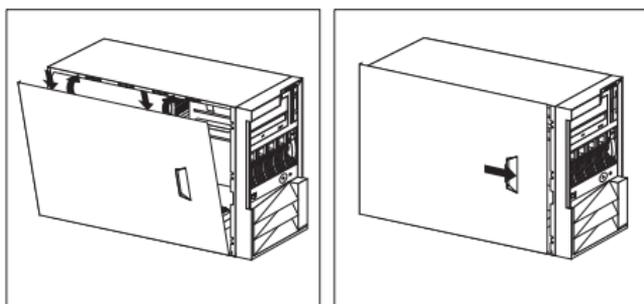
- If you have a tower model, continue with “Completing the Tower Model Installation.”
- If you have a rack model, go to “Completing the Rack Model Installation” on page 80.

## Completing the Tower Model Installation

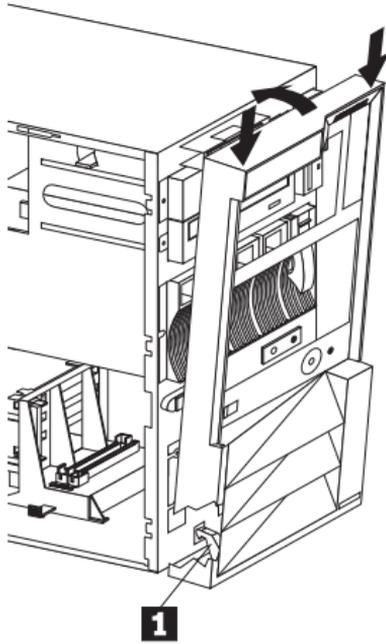
1. Install the cover on the server.
  - a. Align the left-side cover with the left side of the server, about 25 mm (1 inch) from the front of the server; place the bottom of the left-side cover on the bottom rail of the left-side frame.
  - b. Insert the tabs at the top of the cover into the slots at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

### Note

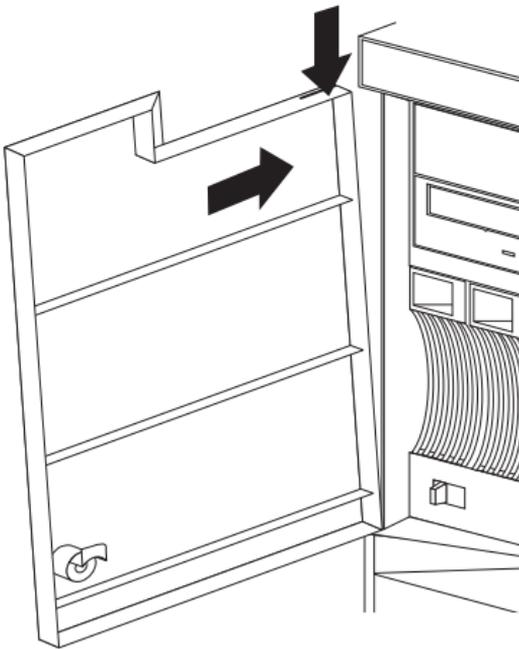
Be sure the front edge of the cover is flat against the server.



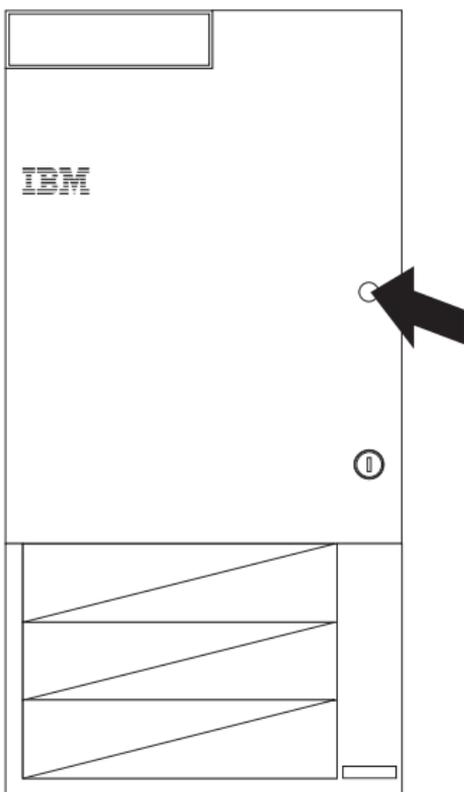
2. Replace the bezel, if it was removed.
  - a. Place the bezel tabs **1** in the slots at the bottom front of the server.
  - b. Press the top of the bezel toward the server front until the bezel clicks into place.



3. Replace the server door, if it was removed.
  - a. Set the door on the bottom hinge.
  - b. Press the flange downward while pressing the top of the door toward the server, until the flange connects with the top hinge. Release the flange.



4. Close and lock the server door.



#### **Attention**

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

5. Reconnect the cables to the back of the server; then, plug the power cords into properly grounded electrical outlets.
6. If you have a modem or fax machine attached to the server, reconnect the telephone line to the wall outlet and the server.

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

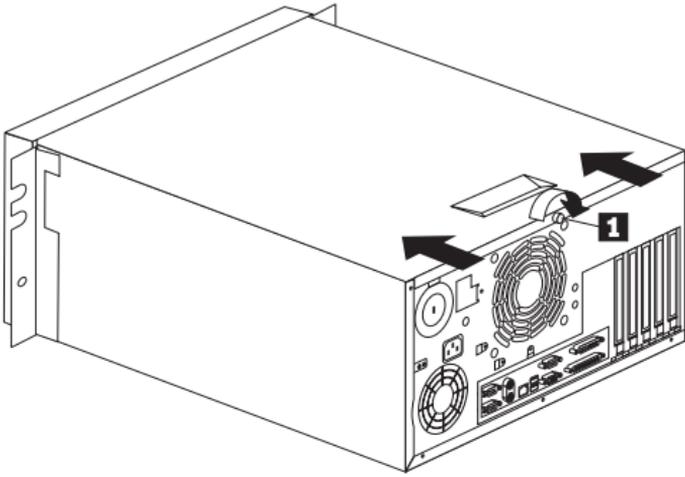
When you have completed installing the covers and cables, go to "Updating the Server Configuration" on page 150.

## Completing the Rack Model Installation

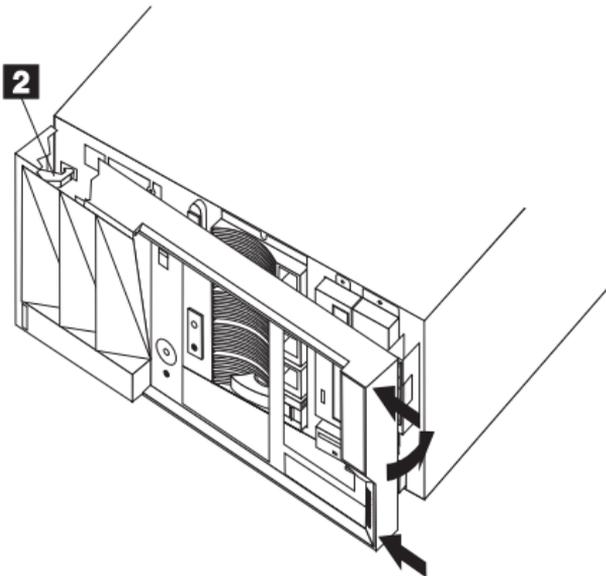
1. Replace the top cover:
  - a. Align the top cover with the top of the server, about 25 mm (1 inch) from the front of the server.
  - b. Hold the cover against the server and slide the cover toward the front of the server until the cover clicks into place.

### Note

Be sure the front edge of the cover is flat against the server.



- c. Turn the captive thumbscrew **1** until the cover is secured.
2. Replace the bezel, if it was removed.
    - a. Place the bezel tabs **2** in the slots at the left front of the server.



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

3. Attach the monitor, keyboard, and power cables to the corresponding connectors on the server. Refer to the rack documentation for instructions.
4. If you have a modem or fax machine attached to the server, reconnect the telephone line to the wall outlet and the server.



≥32 kg (70.5 lbs)

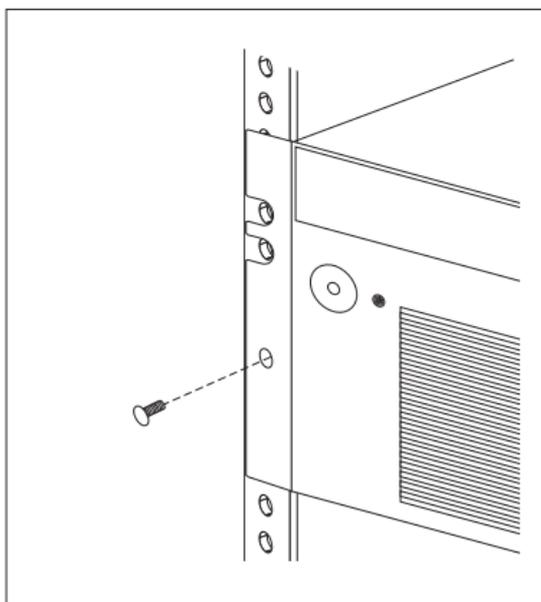


≥55 kg (121.2 lbs)

### Caution

Use safe lifting practices when lifting your machine.

5. If you are installing the rack model in the rack for the first time, go to “Installing the Server in the Rack Enclosure” on page 108, and then go to “Updating the Server Configuration” on page 150. Otherwise, continue with the following instructions to secure the rack model in the rack.
  - a. Slide the rack model into the rack.



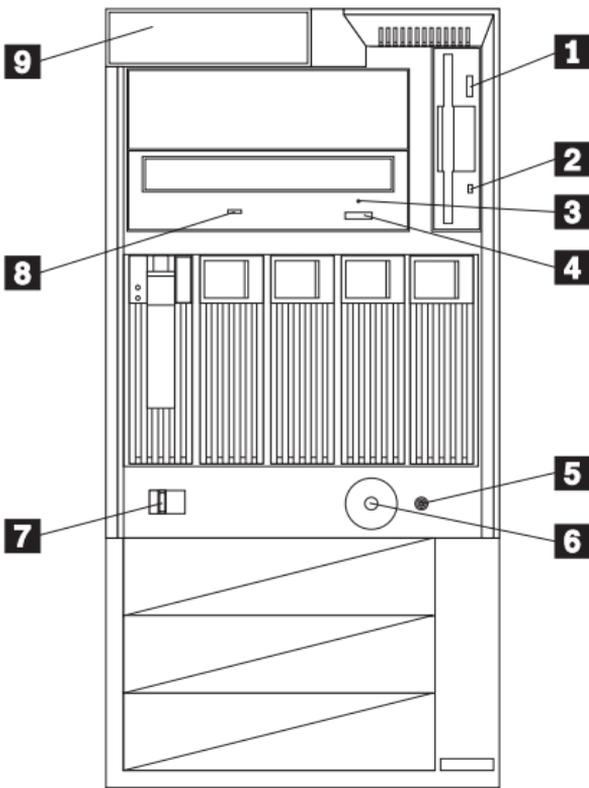
- b. Locate the screws that you removed in step 3 on page 128.
- c. Insert the screws through the bracket, mounting rail, and cage nut.

### What to do next

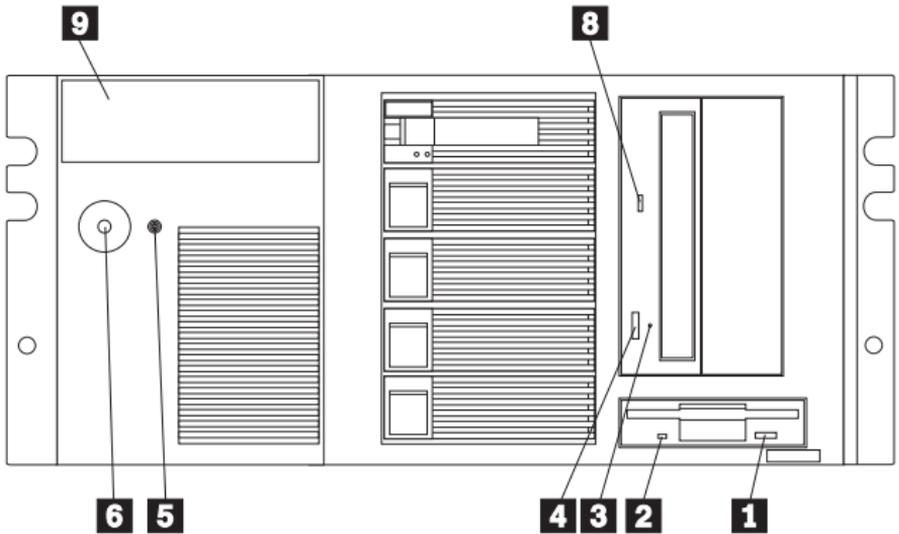
When you have completed installing the cover and cables, go to “Updating the Server Configuration” on page 150.

# Controls

## Tower model



## Rack model



- 1 Diskette-Eject Button:** Press this button to release a diskette from the drive.
- 2 Diskette Drive In-Use Light:** This light comes on when the diskette drive is accessed.
- 3 CD-ROM Manual Tray-Release Opening:** Insert a straightened paper clip in the opening to release the CD-ROM tray when using the CD-ROM eject button is not successful.

- 4 CD-ROM Eject Button:** Press this button to release a CD from the CD-ROM drive.

**Note**

If the CD-ROM tray does not extend out, insert the end of a straightened paper clip into the manual tray-release opening and gently pull the tray open.

- 5 Reset Button:** Press this button to reset the server.

- 6 Power-on switch:** Use this switch to turn on your server, or to return the server to *Standby mode* (power is present but the server is not turned on).

**Important**

After you plug the server power cord into an outlet, wait 20 seconds before pressing the power switch. (During this time, the system-management processor is initializing and the power-on switch does not respond.)



**Caution**

The Power-On 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 automatic restart feature, which enables the server to restart following a momentary power loss, means that the server is never completely turned off. Do not set the server to the Standby mode if any drive in-use light is on. This might damage the information stored on a hard disk drive or on a diskette. A Power-On Switch protector, which prevents the Power-On Switch from being pushed accidentally, is shipped with the server.

To toggle the server between Standby mode and actively running, press and release the Power-On Switch.

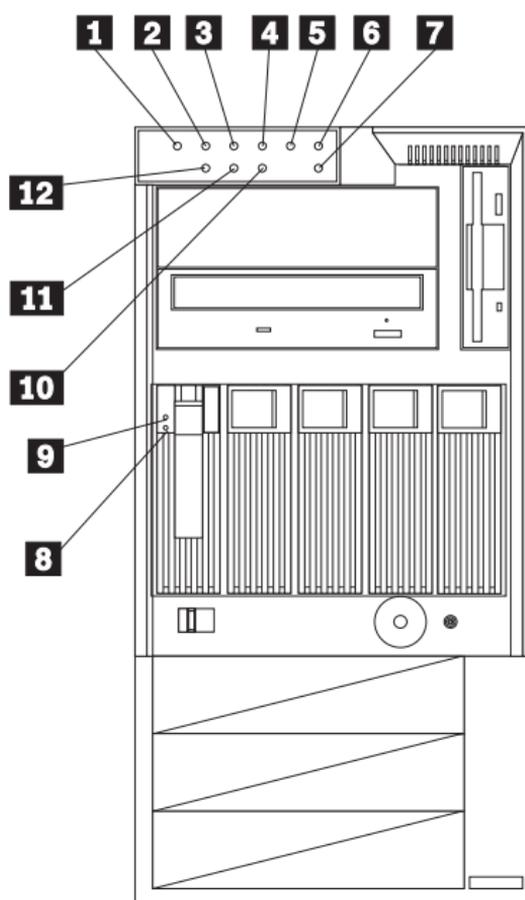
- 7 Side-Cover Release Lever:** Use this lever to release the left-side cover.

- 8 CD-ROM Drive In-Use Light:** This light comes on when the CD-ROM drive is accessed.

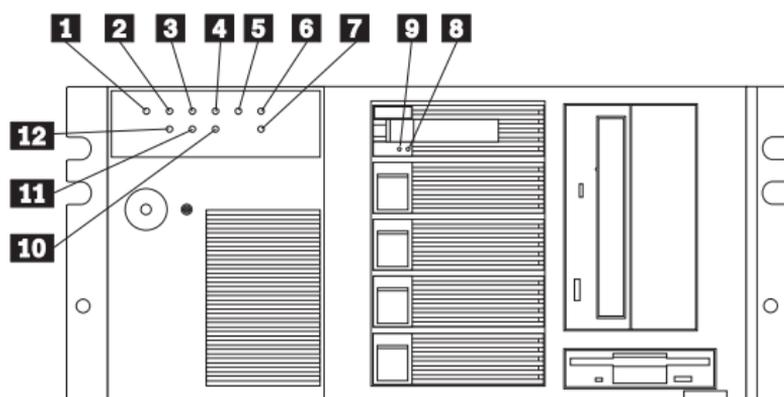
- 9** **Operator LED Panel** This panel contains LEDs that light to indicate conditions on the server, such as power on or a system error (see “Front Panel Indicators” on page 85).

**Front Panel Indicators:** The following illustrations identify the indicators located on the front panel of the server.

**Tower model**



**Rack model**

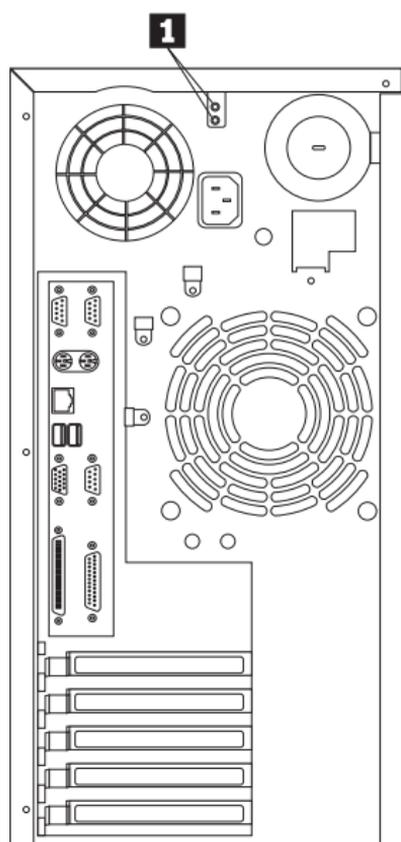


- 1**  **Power-On Light:** This green LED blinks when the server is in Standby mode (power is present but the server is not turned on). The blinking changes to a solid (continuous) light when you turn on your server remotely (Unattended mode) or by pressing the Power-On Switch. If this light is not on, the power cord is not connected or the power supply has failed.
- 2** **OK**  **POST Complete Light:** This green LED lights when the server completes the power-on self-test (POST) without any errors.
- 3**  **SCSI Hard Disk Drive In-Use Light:** This green LED lights when your server is accessing a SCSI device. If this light remains illuminated, it might indicate that either the SCSI bus or the system microprocessor has stopped.
- 4**  **Primary Microprocessor Activity Light:** This green LED blinks to indicate the activity of a microprocessor installed in the primary microprocessor socket. The LED comes on during POST to indicate the presence of the microprocessor.
- 5**  **Secondary Microprocessor Activity Light:** This green LED blinks to show the activity of a microprocessor installed in the secondary microprocessor socket. The LED lights during POST to indicate the presence of the microprocessor. When you install a secondary microprocessor, it becomes the startup microprocessor.
- 6**  **System Error Light:** This amber LED shows that a system error occurred. System errors can include high temperature, excess current, or failure or errors in the microprocessor, system fan, memory, PCI bus, SCSI bus, USB, hard disk drive, diskette drive, serial port, keyboard interface, or power supply. When this LED is on, one or more LEDs on the system board also might be on, indicating where the error occurred (see “System Board LEDs” on page 142).
- 7**  **Reserved:** This LED is reserved for future use.

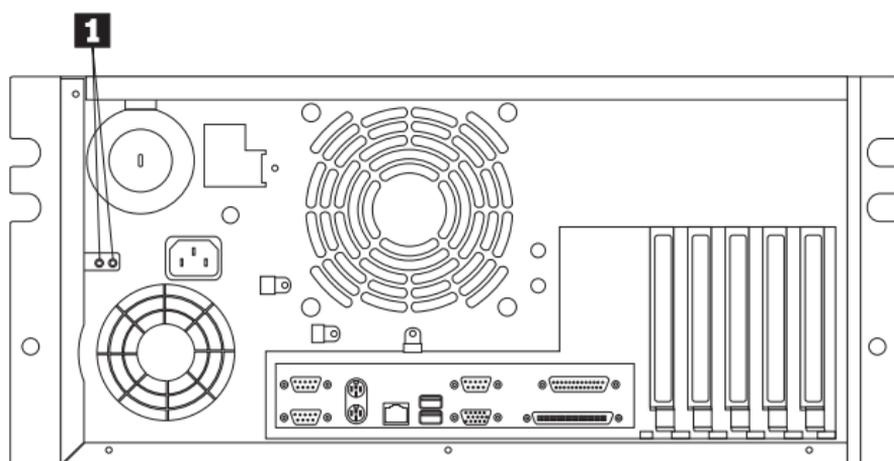
- 8**  **Hard Disk Drive Status Light (Amber):** In a RAID environment, this amber LED lights continuously when the drive is faulty and needs to be replaced. You can replace these hot-swappable drives without turning off the server. If you do not have a RAID environment, this LED is not operational.
- 9**  **Hard Disk Drive Activity Light (Green):** This green LED lights when the hard disk drive is being accessed.
- 10**  **Ethernet Transmit/Receive Activity Light:** This green LED shows transmission and reception activity on the network.
- 11**  **Ethernet Link Status Light:** This green LED shows an active link connection on the 10BASE-T or 100BASE-TX interface.
- 12**  **Ethernet Speed Light:** This green LED lights when the Ethernet LAN speed is 100 Mbps.

The following illustrations identify the indicators located on the back of the server.

### Tower model



### Rack model



- 1 Power Supply Lights:** These green LEDs indicate a power good status for each of the 175-watt modules in the power supply. If any power supply light is not illuminated when the Power-On Light on the front of the server is on, there is a problem with that power supply. The power supply shipped with the server has two lights, one for each module in

the power supply. The optional additional power supply has one power module and one green LED. See “Power Supplies” on page 132 for more information about the power supplies.

## DASD Fan Assembly Removal

### Before you begin

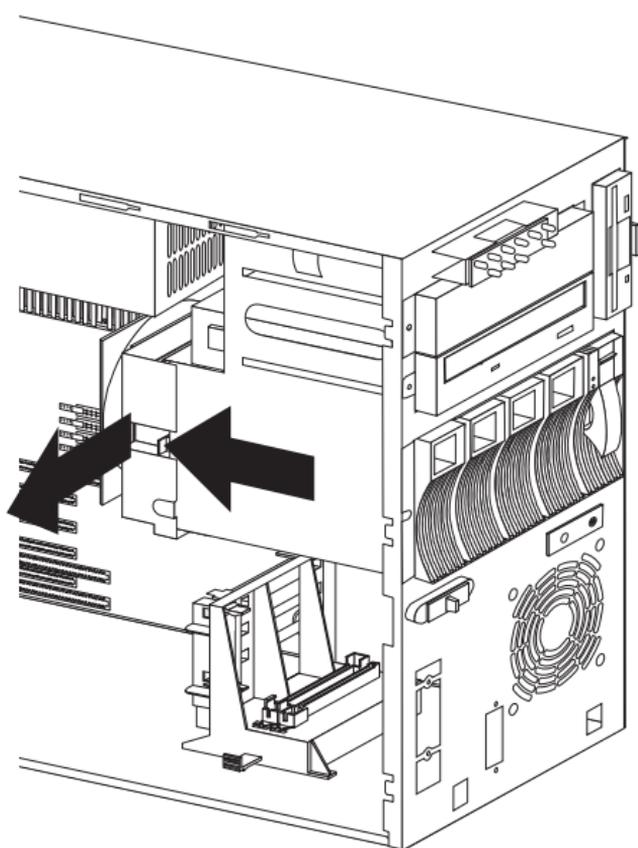
- Read “Safety Information” on page 174.
- Turn off the server, if it is on.

### Attention

When removing or replacing the fan, be sure to route the cables correctly to avoid damage to the SCSI cables and connectors.

To remove the DASD fan assembly, do the following:

1. Remove the side cover, see “Option Installation” on page 125.



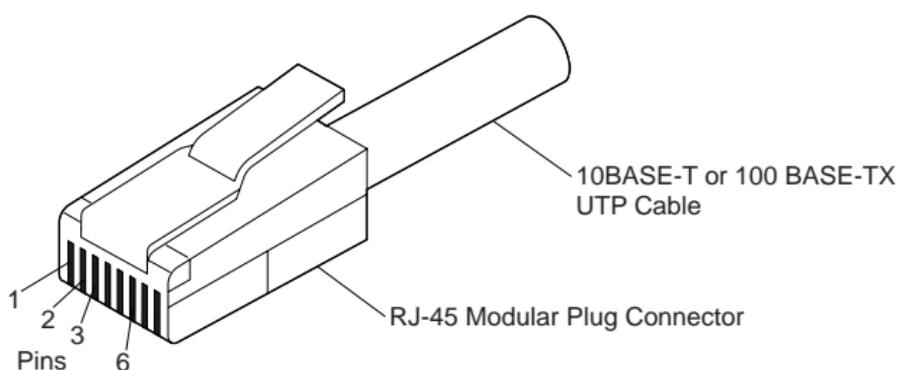
2. Release the fan assembly latch and slide the fan assembly out of the server.

## Ethernet Connector

The system board in your Netfinity 5000 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 twisted-pair cable. The connector enables an Ethernet network to attach to the internal transceiver in your server. The 100BASE-TX Fast Ethernet standard requires that the cabling in the network be Category 5 or higher.

See “Configuring the Ethernet Controller” on page 32 for additional information about the Ethernet controller.

Table 3 shows the pin-number assignments for the RJ-45 connector. These assignments apply to both 10BASE-T and 100-BASE-TX devices.



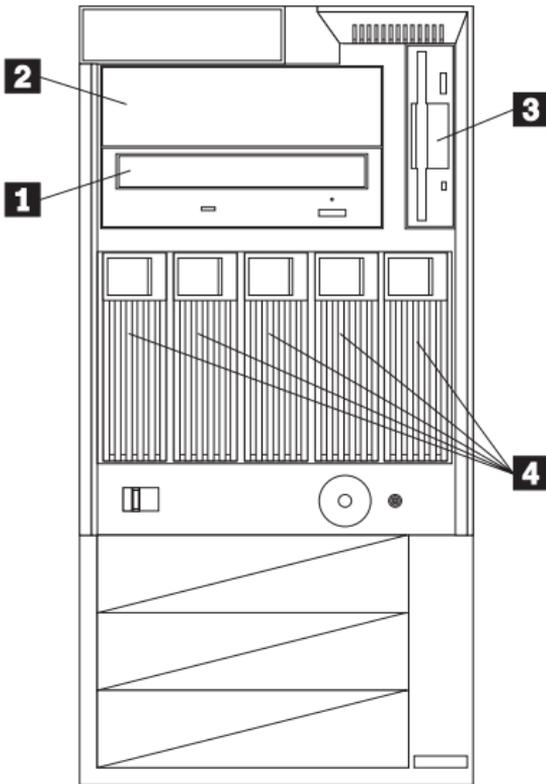
*Table 3. Ethernet Connector Pin-Number Assignments*

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

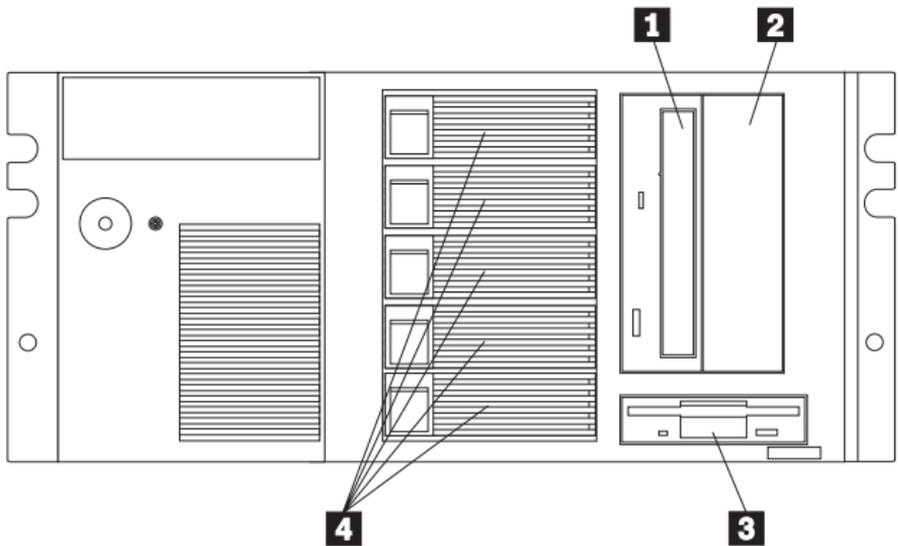
## Expansion Bays

Your server comes with one 3.5-inch, 1.44 MB diskette drive, and one 5.25-inch CD-ROM drive. The following illustrations show the server front view with the door (if any) removed.

### Tower model



### Rack model



- 1 CD-ROM Drive:** Your server comes with an IDE CD-ROM drive.
- 2 Open Bay (5.25-inch):** The design of your server accommodates an additional 5.25-inch half-height device, such as tape or a rewritable optical disk drive.

For information on the supported types of drives and their installation, see “Internal Drives Installation or Removing” on page 113.

**3 Diskette Drive:** The 3.5-inch, 1.44 MB (MB is approximately 1 000 000 bytes) diskette drive uses 1 MB (unformatted) or 2 MB (unformatted) diskettes.

**4 Open Bays (3.5-inch):** The 3.5-inch open bays are for hot-swap SCSI hard disk drives only.

For information on the supported types of drives and their installation, see “Internal Drives Installation or Removing” on page 113.

## External Options

The information in this section supplements the instructions that come with the external options (SCSI drives, printers, modems, and other serial and parallel devices). To connect external options, see the documentation that comes with the options.

**Adding External SCSI Devices:** Your server comes with a 16-bit UltraSCSI controller on the system board, which provides two independent SCSI channels. This controller has two 68-pin, shielded, high-density connectors: one internal, on the controller, and one external, on the back of the server. You can use these connectors to install an additional internal SCSI device in your server or to attach up to fifteen external SCSI devices to your server.

The internal SCSI connector provides support for SCSI devices installed inside the server. The external SCSI connector provides support for external SCSI devices.

### Notes

- If you plan to install both internal and external SCSI devices, you must follow the instructions given in “Internal Drives Installation or Removing” on page 113 in addition to the instructions in this section. Read “Internal Drives Installation or Removing,” and then return here.

For additional information about SCSI configurations supported, see <http://www.pc.ibm.com/netfinity/>

- Do not exceed the following cable lengths:
  - If you connect one or more Fast SCSI devices to the SCSI controller, the total length of all cables (internal and external) must not exceed 3 meters (9.8 feet).
  - If you do not connect Fast SCSI devices to the SCSI controller, the total length of all cables must not exceed 6 meters (19.7 feet).

You must set a unique SCSI ID for each external SCSI device so that the controller can identify the devices. The controller can then ensure that different devices do not attempt to transfer data at the same time. Therefore, do not set the SCSI IDs for external devices to the values you used for the controller.

If you plan to attach an external SCSI device, you might need to order an additional SCSI cable. To use an external device with the Netfinity 5000, you must connect it to the external SCSI connector, using a SCSI cable. This SCSI cable must have the proper connector for the SCSI

external connector on one end, and the proper connector for the external device on the other end. If a SCSI cable does not come with the external device, or if it is the wrong type, you will need to order one.

**Attaching External Options: To attach an external option:**

1. Turn off the server and all attached devices.
2. Follow the instructions that come with the option and the illustration in “Input/Output Connectors” on page 97 to connect it to the server.

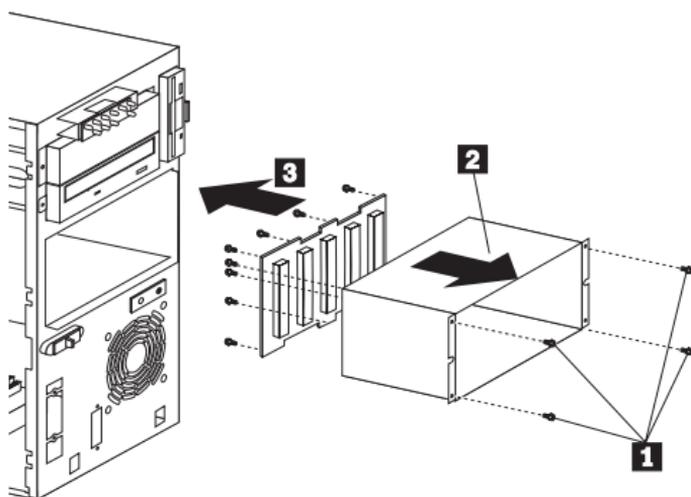
# Hot Swap Backplane Assembly Removal

## Before you begin

- Read “Safety Information” on page 174.
- Turn off the server, if it is on.

To remove the hot swap backplane assembly, do the following:

1. Remove the side cover and front bezel, see “Option Installation” on page 125.
2. Disconnect the cables attached the hot swap backplane assembly.

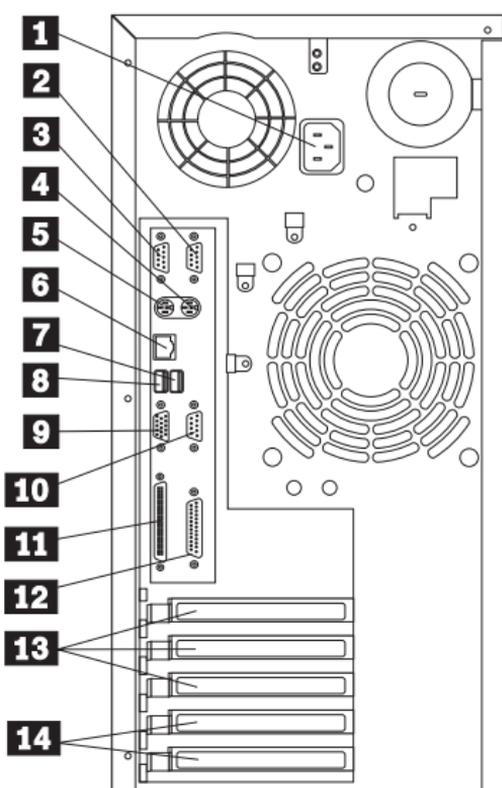


3. Remove the 5 pack cage assembly screws **1**
4. Slide the 5 pack cage assembly out of the server **2**
5. Remove the hot swap backplane assembly screws **3** to separate the card from the cage assembly.

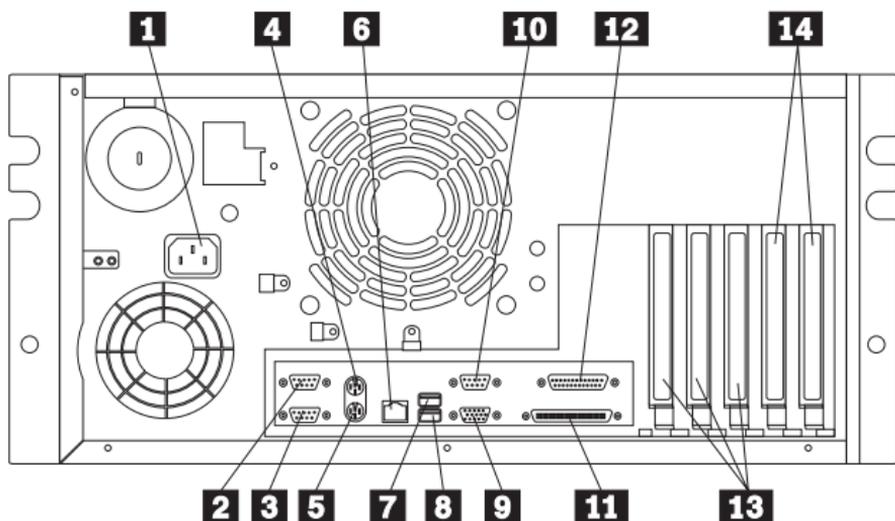
## Input/Output Connectors

The following illustrations identify the connectors located on the back of the server.

### Tower model



### Rack model



- 1 Power Connector:** The server power cable connects here.
- 2 Serial Connector A:** Signal cables for modems or other serial devices connect here to the 9-pin serial connector for serial port A. See “Devices and I/O Ports” on page 23 for port assignment information.

- 3 Serial Connector B:** Signal cables for modems or other serial devices connect here to the 9-pin serial connector for serial port B. See “Devices and I/O Ports” on page 23 for port assignment information.
- 4 Mouse Connector:** The mouse cable connects here. This connector is sometimes called the auxiliary-device port.
- 5 Keyboard Connector:** The keyboard cable connects here.
- 6 Ethernet Connector:** An unshielded, twisted-pair cable with an RJ-45 connector attaches here to the 10/100 Ethernet controller on the system board.
- 7 Universal Serial Bus (USB) Connector 1:** Attach I/O devices with universal serial bus (USB) connectors to USB connector 1. You need a 4-pin cable to connect a device to this port.
- 8 Universal Serial Bus (USB) Connector 2:** Attach I/O devices with universal serial bus (USB) connectors to USB connector 2. You need a 4-pin cable to connect a device to this port.
- 9 Monitor Connector:** The monitor signal cable connects here.
- 10 Management C Connector:** The cable to attach a modem that is dedicated to communication with the system-management processor connects here.
- 11 SCSI Connector:** External SCSI devices attach here. For more information, see “External Options” on page 94.
- 12 Parallel Connector:** A signal cable for a parallel device, such as a printer, connects here.
- 13 PCI Expansion Slots:** Cables to the external connectors on PCI adapters connect here (slots 3, 4, and 5).
- 14 PCI/ISA Expansion Slots:** Cables to the external connectors on either ISA or PCI adapters connect here (slots 1 and 2).

## Installing a Server in a Rack Enclosure

Use the following instructions for installing a Netfinity 5000 rack model in a server rack enclosure.

- If you have a rack model, your server comes with the necessary rack mounting hardware. Review the preinstallation information in “Before You Begin” on page 100; then, continue at “Installing the Rack Model in a Rack Enclosure” on page 102.
- If your Netfinity 5000 is a tower model and you want to install it as a rack model in a server rack enclosure, you must order the Netfinity Rack Mount Kit. This kit contains the appropriate front, top, and bottom covers, in addition to the brackets and the cable-management arm that you need to install the server into the rack. Follow the instructions that are included in the Rack Mount Kit.

## Before You Begin

- You will need the following items:
  - Flat-blade screwdriver
  - 8-inch adjustable wrench or pliers
  - Tape
  - Pencil

Some of the installation procedures require two people.

- Before you begin to install your server in the rack enclosure, review the safety and handling guidelines specified under “Safety Information” on page 174. These guidelines will help you work safely while working with your server and options.
- Review the documentation that comes with your rack enclosure for additional safety, cabling, and operating considerations.
- To ensure cabinet stability, install the servers starting from the bottom of the rack enclosure.

### Note

If you are installing different server models in the rack enclosure, install the heaviest models in the lower part of the rack enclosure.

- Ensure that you plan the rack enclosure installation within the guidelines for:
  - Heat generation
  - Electrical requirements
  - Air flow
  - Mechanical loading
- Verify that the rack enclosure can meet the following rack model operating parameters:

### Size

- Depth: 560 mm (22.05 in.)
- Height: 230 mm (9.06 in.)
- Width: 420 mm (16.54 in.)

### Weight

- Typical server as shipped: 39 kg (85.8 lb)

### Environment

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

- Server off: 8% to 80%
- Maximum altitude: 2133 m (7000 ft)

### **Electrical Input**

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

### **Total Power Available for Drives**

- Nominal Operating Current allowed:
  - +5 V dc line: 5.3 A
  - +12 V dc line: 5.0 A

### **Heat Output**

- Approximate heat output in British Thermal Units (Btu) per hour:
  - Minimum configuration: 350 Btu (102 watts)
  - Maximum configuration: 860 Btu (251 watts)

### **Acoustical Noise Emissions Values**

- Sound power, idling
  - 6.2 bel for open bay system (no hard disk drives installed)
  - 6.3 bel for system with one hard disk drive installed)
- Sound power, operating
  - 6.2 bel for open bay system (no hard disk drives installed)
  - 6.3 bel for system with one hard disk drive installed)
- Sound pressure, idling
  - 47 dBA for open bay system (no hard disk drives installed)
  - 48 dBA for system with one hard disk drive installed)
- Sound pressure, operating
  - 47 dBA for open bay system (no hard disk drives installed)
  - 48 dBA for system with one hard disk drive installed)

## Installing the Rack Model in a Rack

**Enclosure:** During this procedure, you must install parts on the rack enclosure and the server. This process can be divided into three parts:

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

### Before you begin

- Read “Safety Information” on page 174 and the safety information in your rack enclosure documentation.
- Turn off the server, if it is on.
- Refer to your rack enclosure documentation for additional information on preparing the rack.

**Preparing the Server:** In this section, you will use the following parts:

- One cable arm bracket
- The inner slide from two slide bracket assemblies
- 6 pan-head short screws (M4 by 5 mm)



≥32 kg (70.5 lbs)



≥55 kg (121.2 lbs)

### Caution

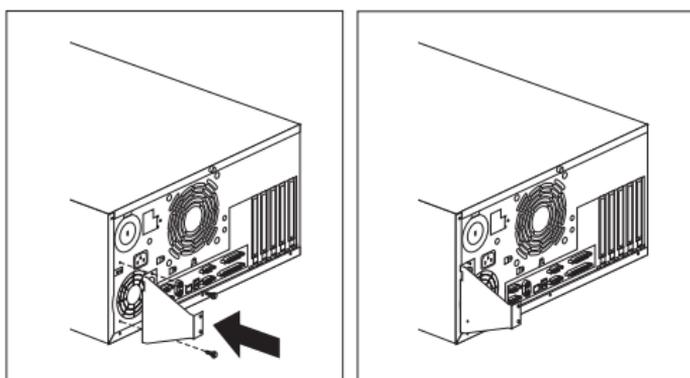
Use safe lifting practices when lifting your machine.

### Attention

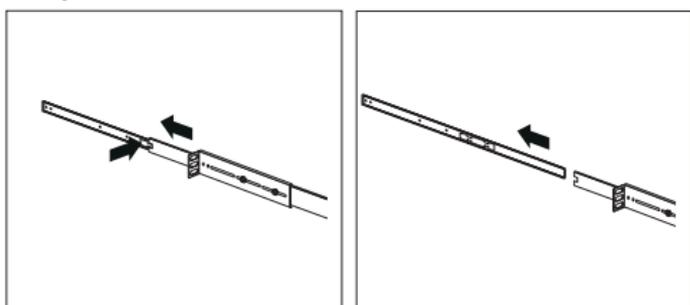
To avoid damage to internal components, use only the pan-head short screws (M4 by 5 mm) included with the Rack Mount Kit.

To prepare the Netfinity 5000 for installation in a rack enclosure:

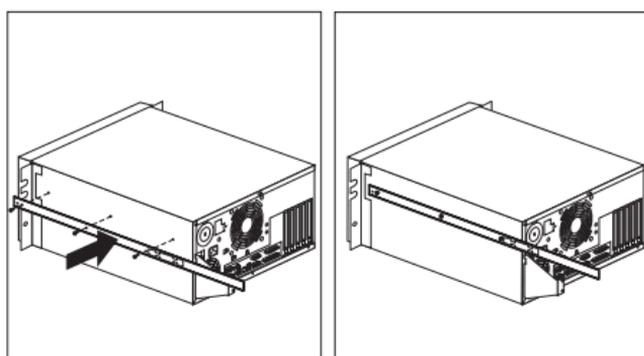
1. Attach the cable-arm bracket to the rear of the server.
  - a. Remove the two screws at the left of the primary power supply.
  - b. Align the cable-arm bracket with the screw holes, keeping the solid arm of the bracket toward the side of the server. Make sure the openings in the bracket align with the power supply LEDs and the fan.
  - c. Attach the bracket with the two screws you removed in step 1a.



2. Attach the inner slide section of each slide rail to the side of the server.
  - a. Pull the inner slide until the safety latch locks.
  - b. Press the safety latch; then, pull the inner slide firmly until it detaches from the outer slide rail.



- c. Align the holes on the inner slide with the holes on sides of the server; then, attach the slide with three pan-head short screws (M4 by 5 mm).



**Preparing the Rack Enclosure:** In this section, you will use the following parts:

- Two slide bracket assemblies
- Two slide rails (fitted to system unit)
- One cable-management arm
- Ten long screws (M6 by 16 mm)
- Ten cage nuts
- Installation template

**Attention**

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

**Note**

This procedure requires two people.

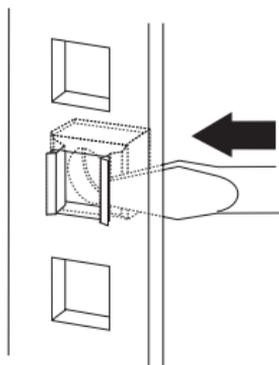
**To attach the mounting hardware to the rack enclosure:**

1. Mark the positions of the slide brackets on the mounting rails on the rack enclosure.
  - a. Position the template on the front mounting rail on the rack enclosure, aligning the holes. Secure the template in place with tape.
  - b. Mark the holes for the slide brackets and cage nuts. If you prefer, mark *all* the cage nut positions on the rack at this time.
  - c. Carefully remove the tape from the mounting rails, and attach the template to the rear mounting rails. Mark the locations for the slide brackets and cage nuts.

**Notes**

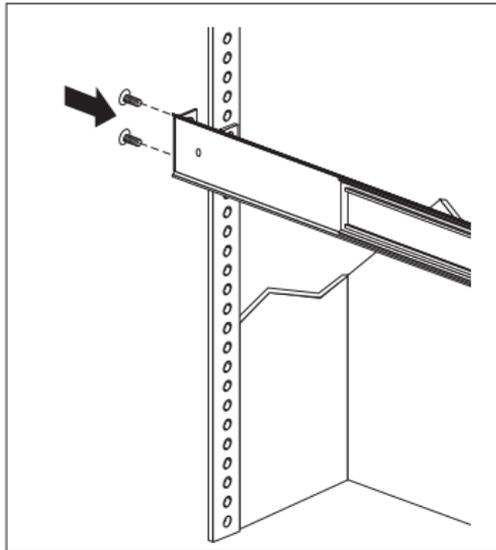
1. You must align the slide brackets correctly, or the installation cannot be completed.
2. The slide rails have four screws each to allow for length adjustment.

2. Install the cage nuts in the marked positions as shown.

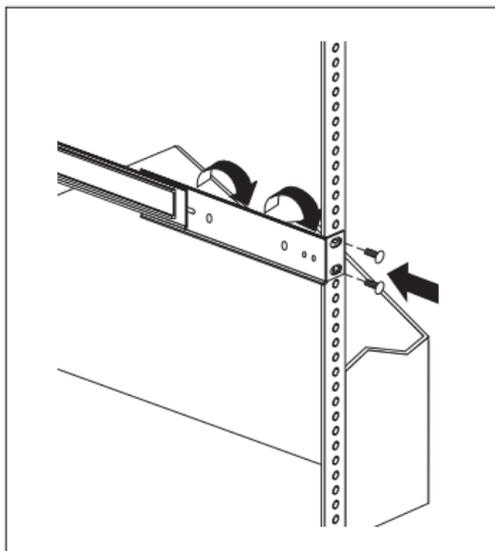


3. Attach the slide rail to the left side of the rack enclosure.

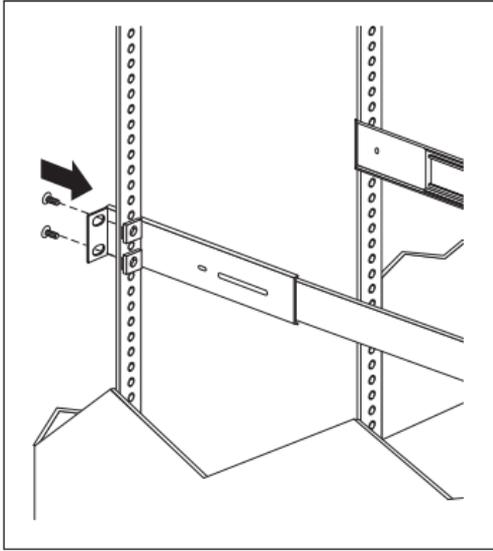
- a. Extend the outer slide rail until the slide bracket is flush against the outside of the left front mounting rail. Align the slide rail with the cage nuts on the mounting rail.
- b. From the front of the rack enclosure, insert two long screws through the slide bracket and mounting rail. Press the slide bracket until it is flush with the outer edge of the mounting rail; then, tighten the screws.



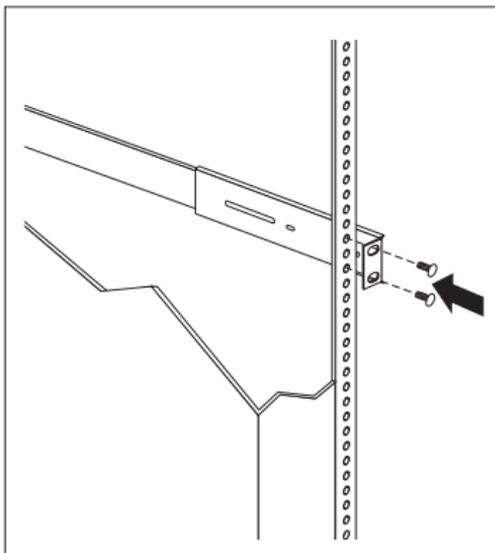
- c. Attach the slide bracket to the left rear side of the rack enclosure.
  - 1) Align the holes on the slide bracket with the cage nuts on the rear mounting rail.
  - 2) From the rear of the rack enclosure, insert two long screws through the slide bracket and mounting rail; then, tighten the screws.
  - 3) If it was necessary to adjust the length of the slide rails, tighten the nuts on the slide rail, using pliers, a socket wrench, or an adjustable wrench.



4. Attach the slide rail to the right side of the rack enclosure.
  - a. Extend the outer slide rail until the slide bracket is flush against the outside of the right front mounting rail. Align the slide bracket with the cage nuts on the mounting rail.
  - b. From the front of the rack enclosure, insert two long screws through the slide bracket and mounting rail. Press the slide rail so that it is flush with the outer edge of the mounting rail and tighten the screws.

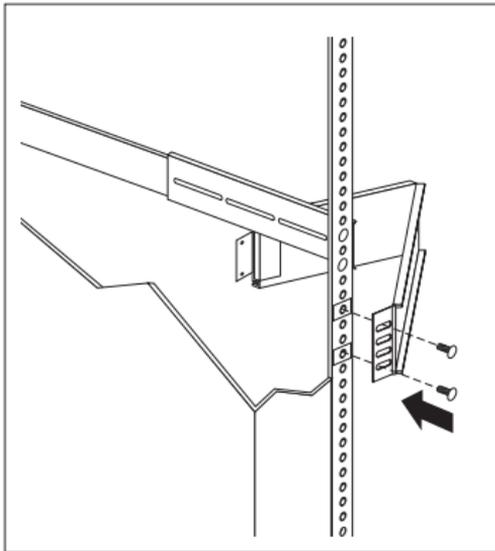


- c. Attach the slide bracket to the right rear of the rack enclosure.
    - 1) Align the holes on the bracket with the cage nuts on the rear mounting rail.



- 2) From the rear of the rack enclosure, insert a long screw through holes in the slide bracket and mounting rail; then, tighten the screws.
5. Attach the cable-management arm to the right rear of the rack enclosure.

- a. Align the holes on the cable-management arm mounting panel with the cage nuts on the rear mounting rail.



- b. From the rear of the rack enclosure, insert a long screw through the holes in the cable-management arm mounting panel and cage nut; then, tighten the screws.

#### Notes

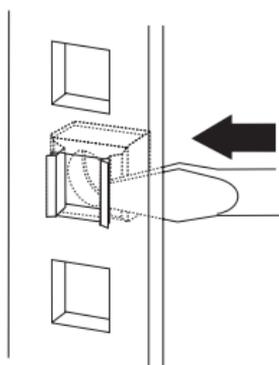
1. You can choose to wait to attach the cable-management arm to the rack until after you have attached the other end of the cable-management arm to the server.
2. To facilitate alignment of the cable-management arm, be sure to insert the screws through the first and fourth holes, as shown.

**Installing the Server in the Rack Enclosure:** In this section, you will use the following parts:

- Four long screws (M6 by 16 mm)
- Two cage nuts
- One cable-management arm
- Cable ties

**To install the server into the rack enclosure:**

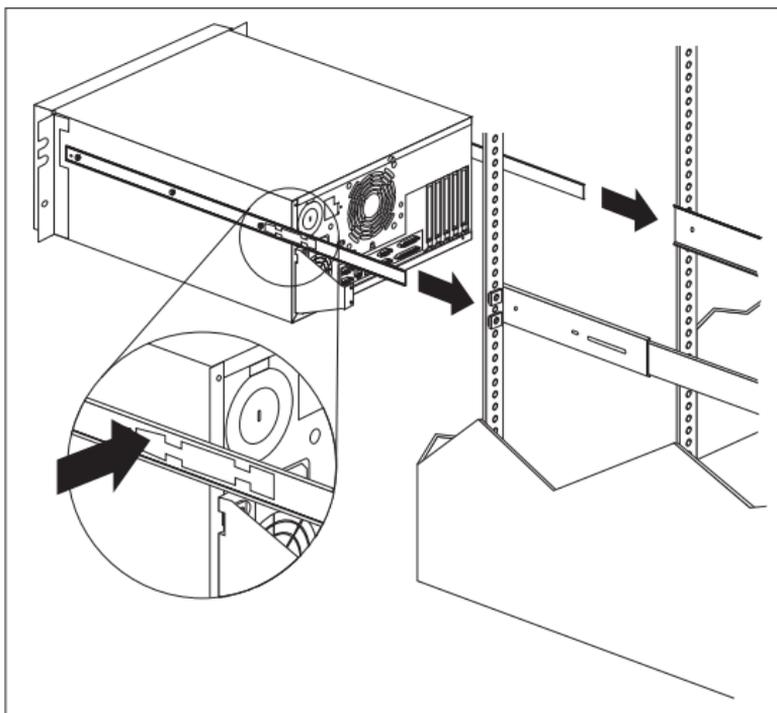
1. If you have not done so already, install a cage nut in each front mounting rail in the marked positions, as shown.



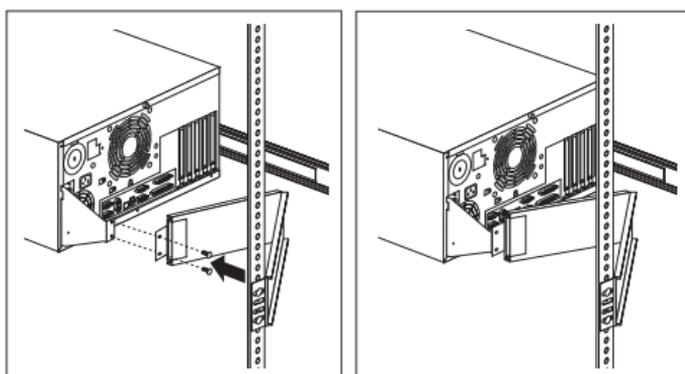
2. Position the Netfinity 5000 horizontally, with the 3.5-inch drive bays on the top.
3. Align the inner slides on the sides of the server with the slide rails; then, slide the server onto the outer slide, until the slide rails click into place.

**Note**

When the rack model is fully extended, safety latches on the slide rails lock into place. This prevents the server from being accidentally pulled out too far and dropped. To release the safety latch, press in.



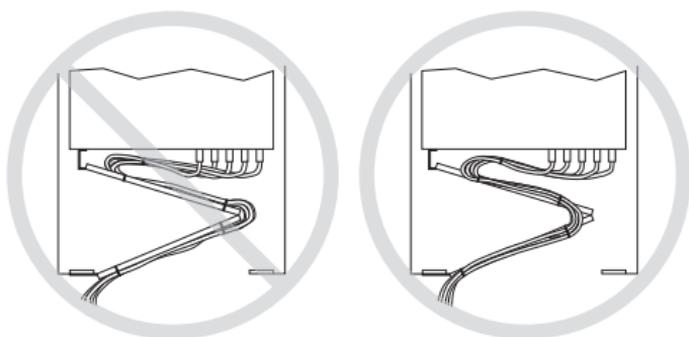
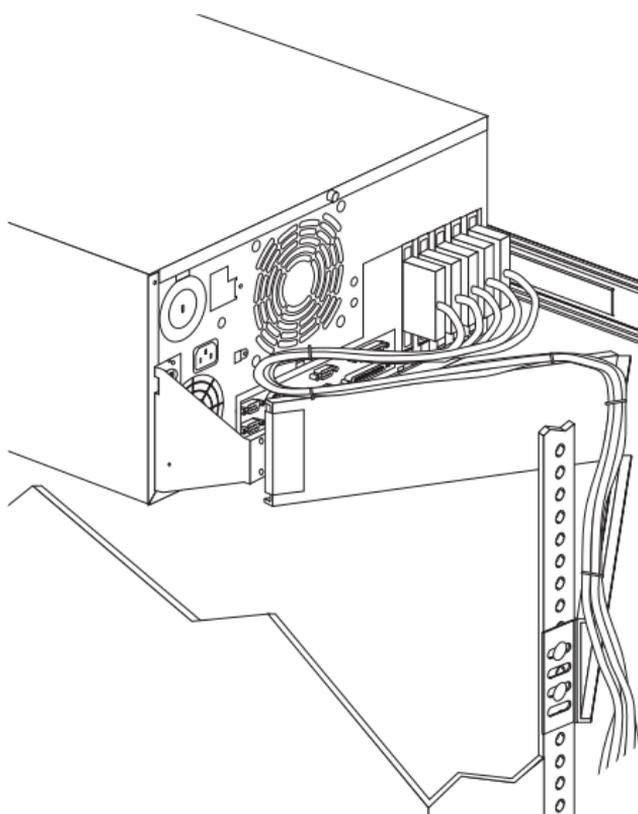
4. Press the safety latches and slide the rack model about halfway into the rack enclosure.
5. Attach the cable-management arm to the cable-arm bracket, using two long (M6 by 16 mm) screws.



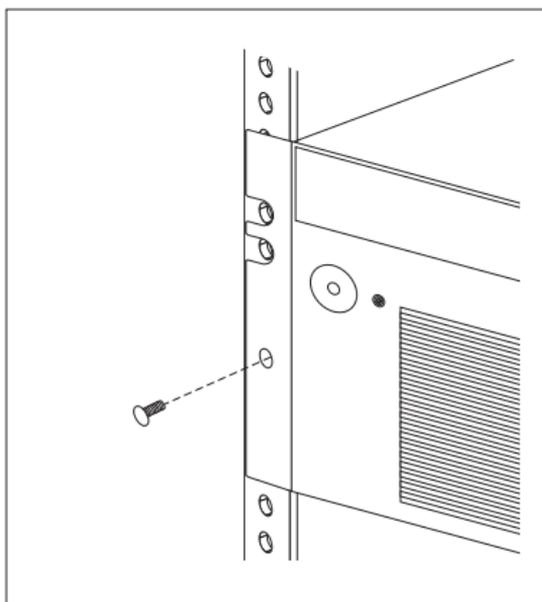
6. If you have not done so already, attach the cable-management arm to the rack as described in steps 5a on page 107 and 5b on page 107.
7. Attach the monitor, keyboard, and power cables to the corresponding connectors on the server. Refer to the rack enclosure documentation for instructions.
8. Attach the cables to the cable-management arm using the cable ties provided.

**Note**

Be sure to route the cables above the top edge or below the bottom edge of the cable-management arm, to avoid overstressing the cables.



9. Secure the rack model in the rack enclosure.
  - a. Slide the rack model into the rack enclosure.
  - b. Secure the server to both sides of the rack enclosure by inserting a long screw (M6 by 16 mm) through the chassis bracket, mounting rail, and cage nut.



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

## Removing the Rack Model from a Rack

**Enclosure:** In some configurations, installing options in the rack model might be more convenient if you remove the server from the rack enclosure. For example, you might prefer to remove the server if you are installing an internal drive in a rack model that is installed in the bottom bay in a rack enclosure.

### Before you begin

- Read "Safety Information" on page 174.
- Turn off the server.
- Follow any additional installation and safety instructions that come with the rack.



### Caution

Use safe lifting practices when lifting your machine.

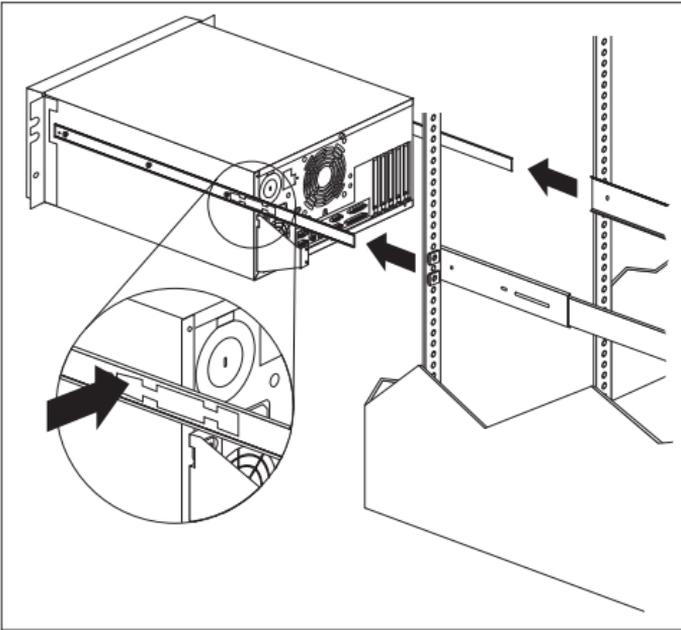
To remove the Netfinity 5000 from a rack enclosure:

1. Remove the screws from each front bracket. Set the screws aside for later use.
2. Slide the server out of the rack.
3. If you have a modem or fax machine attached to the server, disconnect the telephone line from the wall outlet and the server.

**Note**

If you are in the United Kingdom, you must perform this step before disconnecting the power cord.

4. Disconnect all cables and power cords from the rear of the server.
5. Remove the two screws from the cable-arm bracket.
6. Press the safety release latch on each slide rail.



7. Lift the server at a slight angle, and pull it from the slide rails. Then place the server on a flat, nonconductive surface.

## **Internal Drives Installation or Removing**

Drives are devices that your server uses to store and retrieve data. You can add drives to your server to increase storage capacity and to enable your server to read other types of media. Go to “Bays” on page 64 for the bay location required for installed drives.

## Keyboard and Mouse Connectors

Your server provides one keyboard port and one auxiliary-device port. An auxiliary device can be a mouse or other pointing device.

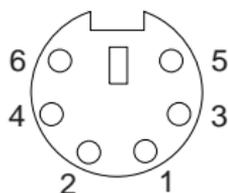


Table 4 shows the pin-number assignments for the keyboard and auxiliary-device port connectors.

*Table 4. Keyboard and Auxiliary-Device Port Connectors Pin-Number Assignments*

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

## Management Port C

Your 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.

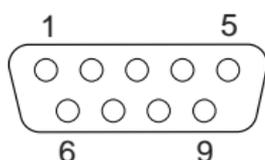


Table 10 on page 141 shows the pin-number assignments for the serial port connectors. The pin-number assignments conform to the industry standard.

## Memory Modules

Adding system memory to your server is an easy way to make programs run faster. You can increase the amount of system memory by installing options called *memory modules*. The server uses a noninterleaved memory configuration, with error correcting code (ECC) data protection.

### Notes

1. Your server comes with one or more dual-inline memory modules (DIMM)s installed.
2. The server supports 100 MHz, 64 MB, 128 MB, and 256 MB DIMMs.
3. Install only registered SDRAM ECC DIMMs.
4. When you are installing memory modules, you might find it more efficient to install them in adjacent connectors, with no vacant memory connectors in between. For example, if your server only has one DIMM installed in memory connector J15, install additional memory in the J16 memory connector; then, continue with connectors J17 and J22.
5. If you are installing DIMMs of different sizes, you might find it more efficient to install DIMMs with the greater memory capacity starting with connector J15. For example, when installing two 256 MB DIMMs, install the DIMMs in memory connectors J15 and J16.
6. After installing or removing a DIMM, you must save the new configuration information using the Configuration/Setup Utility program. See "Configuration/Setup Utility Usage" on page 22.

## Installing or Removing Memory Modules:

This section gives the procedure for installing memory modules. If you want to remove a memory module, reverse the following steps.

### Before you begin

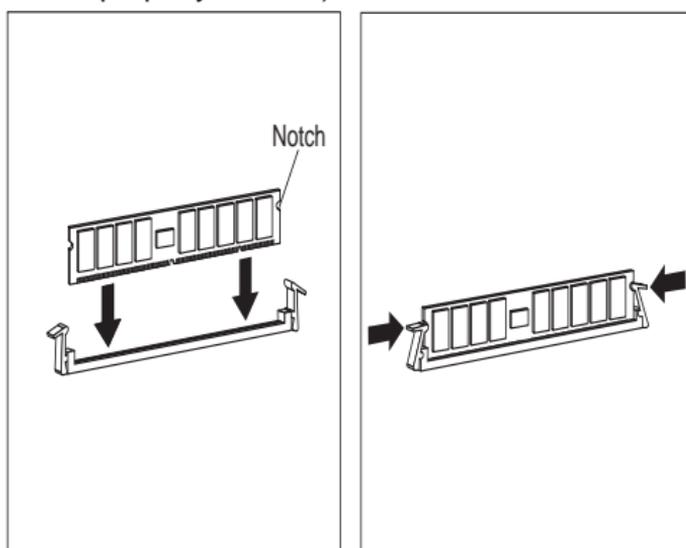
- Read "Safety Information" on page 174.
- Read the documentation that comes with the option.

1. If you have not done so, remove the server cover. See “Option Installation” on page 125.
2. Locate the memory-module connectors on the system board (see “System Board Connectors” on page 143).

#### Notes

1. Each connector slot contains two keys (dividers), which are used to assure that a memory-module can be installed only in the correct position.
2. A retaining clip at each end of the connector locks the memory module into place.

3. Press the retaining clips at the ends of the connector downward to the open position.
4. Touch the static-protective package containing the DIMM to any *unpainted* metal surface on the server; then, remove the memory module from the package.
5. Position the DIMM so that the two key slots (openings in the connector pins) on the bottom edge align with the corresponding sections in the connector.
6. After aligning the DIMM, push the DIMM firmly straight down into the connector. (The retaining clips on both sides of the connector automatically come up into the notches on the sides of the DIMM when the DIMM is properly seated.)



#### Note

Adding or removing DIMMs changes the configuration information in the server. When you restart the server, the system displays POST error 164. Select **Continue**; then, in the Configuration/Setup Utility program, select **Save Settings**.

7. If you want to install or remove any other options, do so now. Otherwise, go to “Completing the Installation” on page 77.

## Microprocessors

When you install an additional microprocessor, your Netfinity 5000 can operate as a symmetric multiprocessing (SMP) server. With SMP, certain operating systems and application programs can distribute the processing load between microprocessors. This enhances performance for database and point-of-sale applications, integrated manufacturing solutions, and other applications.

**Installing Microprocessor Upgrades:** Your server comes with an Intel Pentium II microprocessor. This microprocessor incorporates MMX technology with built-in ECC level two (L2) cache. For the latest information about microprocessor upgrades available for your server, contact your IBM reseller, IBM marketing representative, or see <http://www.pc.ibm.com/us/compat/> on the World Wide Web. If you do upgrade the microprocessor, use the instructions that come with the upgrade along with the instructions in "Installing or Replacing a Microprocessor" on page 119.

### Attention

- If you install an additional microprocessor that is different from the currently installed microprocessor, your server operation might be unreliable. To prevent this, use a microprocessor with the same internal and external clock speed, and the same cache size and voltage requirements as those of the currently installed microprocessor. Microprocessor internal and external clock frequencies and cache size must be identical.
- The voltage-regulator module (VRM) for the additional microprocessor plugs into a connector on the system board (see "System Board Connectors" on page 143 for the location of the VRM connector). Because each microprocessor has specific power and voltage requirements, be sure to use the VRM that comes with the microprocessor.

**Note:** The voltage regulator function for the microprocessor that is shipped with your server is built into the system board.

- If you select a setting for the frequency switch that is greater than the actual frequency of the microprocessor, you might damage the microprocessor. The frequency switch settings are shown in Table 5 on page 124.

## Installing or Replacing a Microprocessor



This section gives the procedure for installing microprocessors. If you want to remove a microprocessor, reverse the order of the following steps.

### Before you begin:

- Read “Safety Information” on page 174.
- Thoroughly review the documentation that comes with the microprocessor, so that you can determine whether you need to update the server BIOS. The “ServerGuide and Netfinity Manager Information” section of this *Server Library* includes IBM Update Connector, which keeps your BIOS and device drivers current. You can also obtain the latest level of BIOS for your server through the World Wide Web and the IBM Personal Computer Company Bulletin Board System (BBS). See the “Getting Help Information” section of this *Server Library* for the appropriate World Wide Web addresses and bulletin board telephone numbers.
- For a list of supported operating systems, see <http://www.pc.ibm.com/compat/> on the World Wide Web.

## Notes

1. If you have not already done so, go to <http://www.pc.ibm.com/support/> on the World Wide Web and download the appropriate flash update program. Review the applicable README files, and use this information to create a *Flash Utility Diskette*. Perform the POST/BIOS (flash) update procedure.
2. The microprocessor in your server comes with an attached heat sink. The microprocessor plugs into the microprocessor socket on the system board and is stabilized with a plastic bracket attached to the system board.
3. If you replace the microprocessor with one that has a different speed, you must change the switch settings on the system board. To locate the switches, see "System Board Connectors" on page 143. For information about the appropriate switch settings, see Table 11 on page 147, or see the label inside the server cover.

### Attention:

If you select a setting for the frequency switch that is greater than the actual frequency of the microprocessor, you might damage the microprocessor.

## To install a microprocessor:

1. If you have not done so, remove the server cover. See "Option Installation" on page 125.
2. If you are installing an additional microprocessor, remove the terminator card from the secondary microprocessor connector. Otherwise, go to step 3.
  - a. Spread apart the posts of the secondary microprocessor connector bracket until the top of the terminator card is past the restraining latches.
  - b. Lift the terminator card out of the connector.

### Note

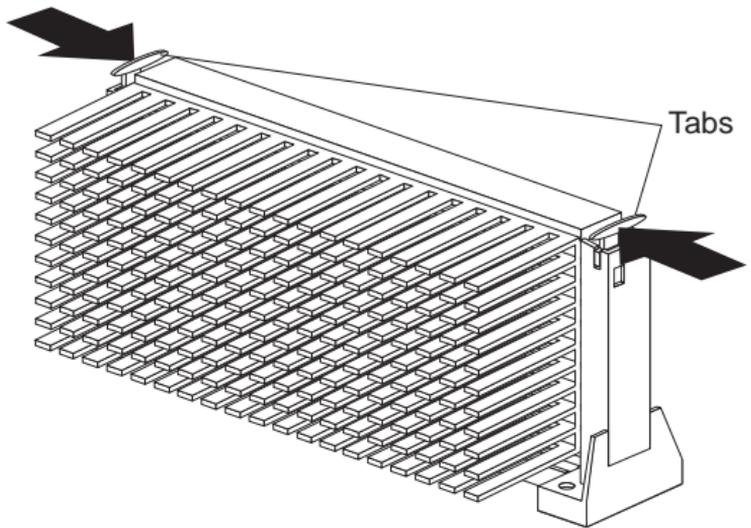
When you install a second microprocessor, it becomes the startup (boot) microprocessor.

3. Carefully remove the microprocessor from the static-protective package.

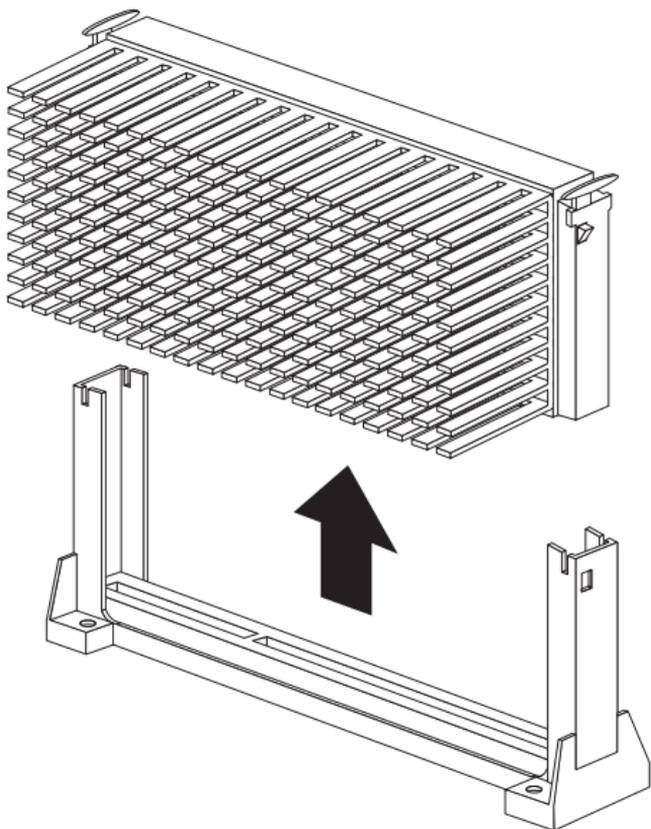
4. If you are replacing a microprocessor, remove the existing microprocessor from its socket. Otherwise, go to step 5 on page 122.
  - a. Locate the microprocessor socket on the system board. (See the illustration in “System Board Illustration” on page 142.)
  - b. Place your index fingers on the small retainer tabs on the top of the microprocessor. Push in toward the microprocessor until the tabs release.

**Note**

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



- c. Lift the microprocessor out of the connector.

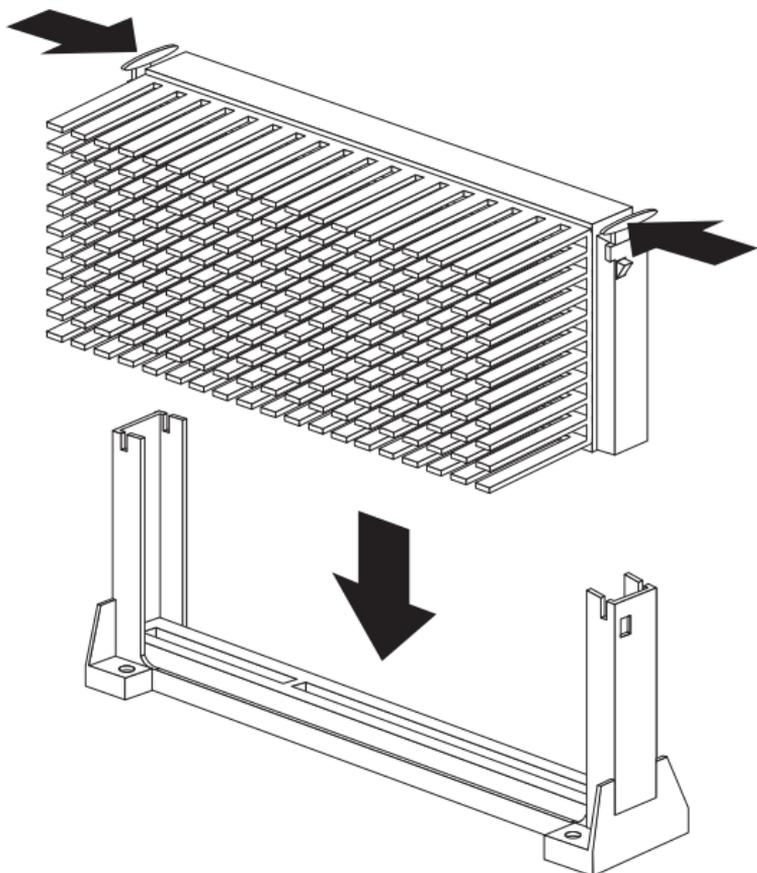


- d. Store the old microprocessor in a static-protective package.
5. Touch the static-protective package that contains the new microprocessor to any *unpainted* metal surface in the server; then, remove the new microprocessor.
6. Press inward on the retainer tabs until they click into place.

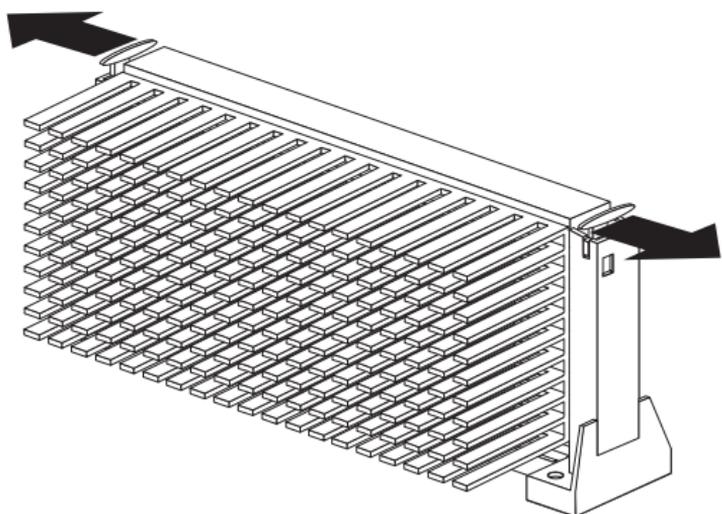
**Note**

For the location of the retainer tabs, see the illustration in step 4b on page 121.

7. Align the new microprocessor with the microprocessor connector on the system board and slide it into the guides. Press the microprocessor down until it snaps into place and is fully seated in the connector.



8. Pull outward on the retainer tabs.

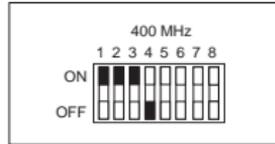
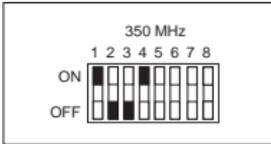


9. If you replaced the microprocessor with one that has a different speed, you must change the switch settings on the system board. To locate the switches, see “System Board Connectors” on page 143.

**Note**

If the processor in you system does not react to switch changes, it is not an error.

Table 5. Switch Settings for Microprocessor Speed



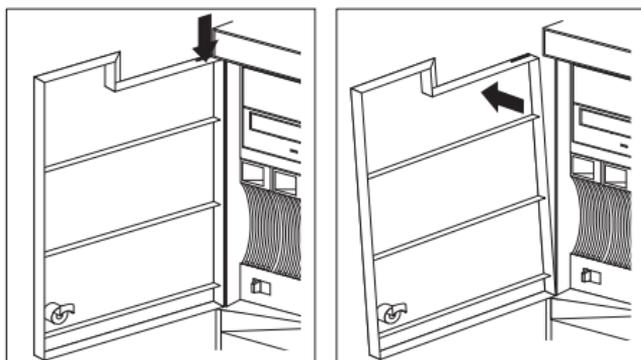
10. Because you installed a new microprocessor in your server, you must reconfigure your server. Follow the procedure described in “Configuration/Setup Utility Usage” on page 22.
11. Because you installed a new microprocessor in your server, you might need to make changes to your operating system.
  - If your operating system does not support SMP, install one of the SMP operating systems that your server supports. See <http://www.pc.ibm.com/netfinity/> on the World Wide Web.
  - If your operating system does support SMP, refer to your operating-system documentation. You might need to make changes so that the operating system recognizes the new microprocessor.
  - On some operating systems, if you install a second microprocessor it might be necessary to reinstall the operating system. See the documentation that comes with the new microprocessor.
12. If you want to install or remove any other options, do so now. Otherwise, go to “Completing the Installation” on page 77.

## Option Installation

### Before you begin

- Be sure your current server configuration is working properly.
- Locate the key to the cover lock, if any.
- Obtain a small, flat-blade screwdriver.
- Read “Safety Information” on page 174.
- If you are preparing a rack model, you might want to install it in the rack first before installing options. See “Installing a Server in a Rack Enclosure” on page 99 for instructions on installing your rack model.

1. Unlock and open the server door, if any. For convenience during these procedures, you might prefer to remove the door completely.
  - a. Locate the flange on the top edge of the front door, near the hinge.
  - b. Press the flange downward while pressing out on the door; then, lift the door off the hinge. Set the door aside.



8



### 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 any media (diskettes or CDs) from the drives, and then turn off all attached devices and the server.
3. If you have a tower model, continue with “Preparing a Tower Model” on page 126.

If you have a rack model installed in a rack enclosure, go to “Preparing a Rack Model” on page 128.

**Preparing a Tower Model:** The hard disk drives in Netfinity 5000 are hot-swappable. If you are installing only a hard disk drive (bays 1 through 5), go directly to “Internal Drives Installation or Removing” on page 113. Otherwise, continue with the following steps.

1. If you have a modem or fax machine attached to the server, disconnect the telephone line from the wall outlet and the server.

**Note**

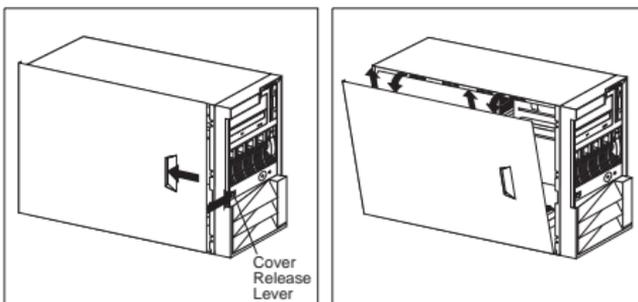
If you are in the United Kingdom, you must perform this step before disconnecting the power cord.



**Caution**

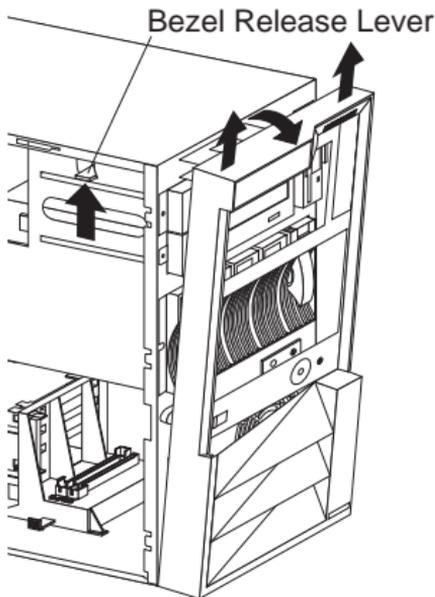
The Power-on switch on the front of the server does not turn off the electrical current supplied to the server. The server also might have more than one power cord. To remove all electrical current from the server, ensure that all power cords are disconnected from the power source.

2. Unplug all power cords (cables) from electrical outlets, and then disconnect all other cables from the back of the server.
3. Open the server door, if you have not already done so.
4. Remove the left-side cover.
  - a. Locate the cover-release lever on the front of the server and slide it to the right.



- b. Slide the left-side cover back about 25 mm (1 inch); then, lift the cover and remove it.
- c. Store the cover in a safe place.

5. If you are installing or removing a drive in bays A to C, remove the front bezel.
  - a. Locate the blue bezel release lever on the left side of the server in the top front corner.



- b. Move the lever upward following the curve of the lever opening.
  - c. Lift the bezel tabs out of the slots at the bottom and pull the bezel out from the server front.
6. Install (or remove) the desired options.

<b>Option</b>	<b>Go To:</b>
Adapters	"Adapters" on page 56
Memory modules	"Memory Modules" on page 116
Internal drives	"Internal Drives Installation or Removing" on page 113
Microprocessors	"Microprocessors" on page 118
Power supply	"Power Supplies" on page 132
External options	"External Options" on page 94
Security options	"Security" on page 139

## Preparing a Rack Model

### Before you begin

Read the documentation that comes with the rack enclosure for additional safety and operating information.

The hard disk drives in Netfinity 5000 are hot-swappable. If you are installing only a hard disk drive (bays 1 through 5), go directly to “Internal Drives Installation or Removing” on page 113. Otherwise, continue with the following steps.

1. If you have a modem or fax machine attached to the server, disconnect the telephone line from the wall outlet and the server.

### Note

If you are in the United Kingdom, you must perform this step before disconnecting the power cord.

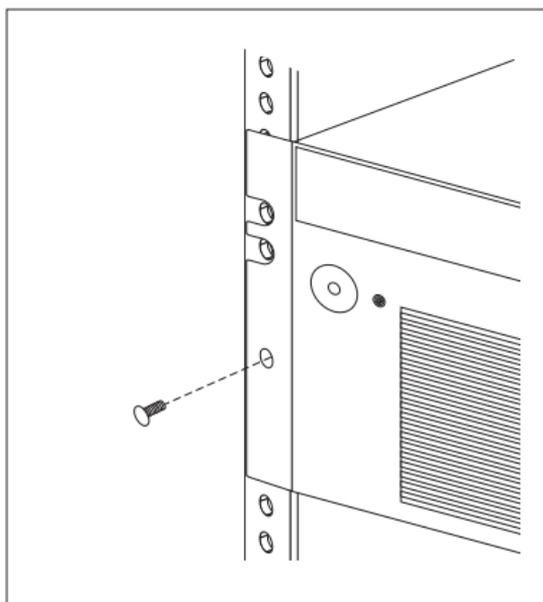
6



### Caution

The Power-on switch 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.

2. Unplug all power cords (cables) from electrical outlets, and then disconnect all other cables from the back of the server.
3. Remove the screws from the brackets on either side of the server, and set them aside.

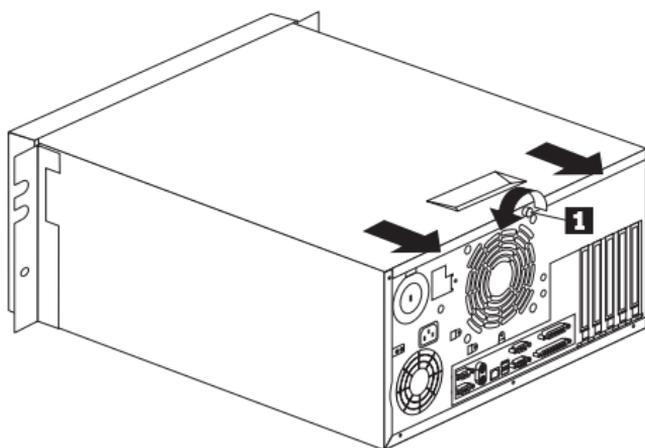


4. Pull the rack model out of the rack enclosure until both slide rails lock.

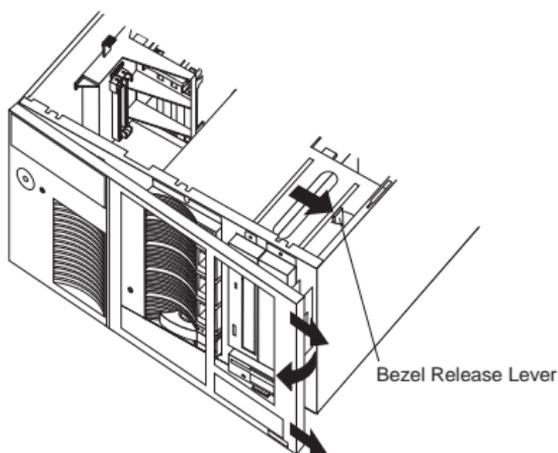
**Note**

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

5. Remove the top cover.
  - a. Locate the captive thumbscrew **1** on the back of the cover and turn it to release the cover.



- b. Slide the cover back about 25 mm (1 inch); then, lift the cover and remove it.
- c. Set the cover aside in a safe place.
- a. If you are installing or removing a drive in bays A to C, remove the front bezel.
  - 1) Locate the blue bezel release lever on the top of the server, in the right front corner.
  - 2) Move the lever toward the right, following the curve of the lever opening.

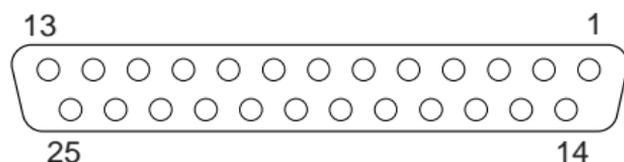


- 3) Lift the bezel tabs out of the slots at the left and pull the bezel away from the server front.
- b. If necessary, remove the server from the rack enclosure before installing options. For more information about removing the server from the rack enclosure, see “Removing the Rack Model from a Rack Enclosure” on page 111.
6. Install (or remove) the desired options.

<b>Option</b>	<b>Go To:</b>
Adapters	“Adapters” on page 56
Memory modules	“Memory Modules” on page 116
Internal drives	“Internal Drives Installation or Removing” on page 113
Microprocessors	“Microprocessors” on page 118
Power supply	“Power Supplies” on page 132
External options	“External Options” on page 94
Security options	“Security” on page 139

## Parallel Port Connector

Parallel ports are used to communicate with printers and other devices, such as some CD-ROM and tape drives. Your server provides one 25-pin, D-shell connector on the back of the server.



This parallel port connector conforms to the Institute of Electrical and Electronics Engineers (IEEE) Standard 1284. There are three standard modes of operation:

- Standard Parallel Port (SPP)
- Enhanced Parallel Port (EPP)
- Extended Capability Port (ECP)

Table 6 shows the pin-number assignments for the parallel port connector. The signal names for all three modes are shown. SPP and ECP signal names are the same; EPP signal names that are different are shown in parentheses.

*Table 6. Parallel Port Connector Pin-Number Assignments*

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

## Power Supplies

Your Netfinity server is shipped with a 350-watt power supply that provides redundant power through the use of two internal power modules. If your server load does not exceed 175 watts, and a problem occurs with one of the power modules in the power supply, the other module takes over the load. For power loads above 175 watts, you can install a second, optional, power supply to provide redundant power for the server. The second power supply contains one 175-watt power module. With the optional second power supply installed, if a problem occurs with any of the power modules, the remaining two power modules supply the needed 350 watts of power.

The LEDs on the back of each power supply indicate the status of each of the power modules. If an LED is not on, there is a problem with the power supply module, and the power supply must be replaced.

- To install or remove the optional second power supply, see the instructions that come with the option.
- To replace the 350-watt power supply, see “Power Supply Removal” on page 133.

If you want to install or remove any other options, do so now. Otherwise, go to “Completing the Installation” on page 77.

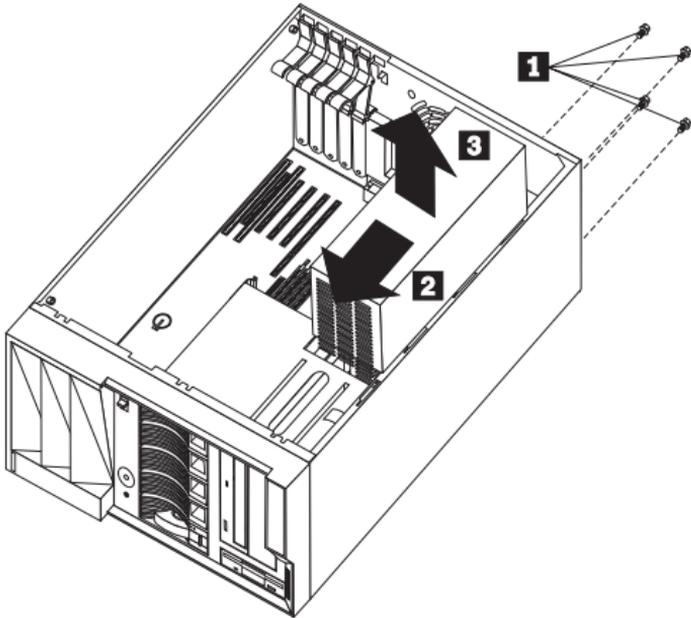
# Power Supply Removal

## Before you begin

- Read “Safety Information” on page 174.
- Turn off the server, if it is on.

To remove the power supply, do the following:

1. Remove the side cover, see “Option Installation” on page 125.



2. Disconnect the power supply cables.
3. Remove the power supply screws **1**.
4. Slide the power supply toward the front of the server **2** and lift the power supply out of the server **3**.

## Rear Fan Assembly Removal

### Before you begin

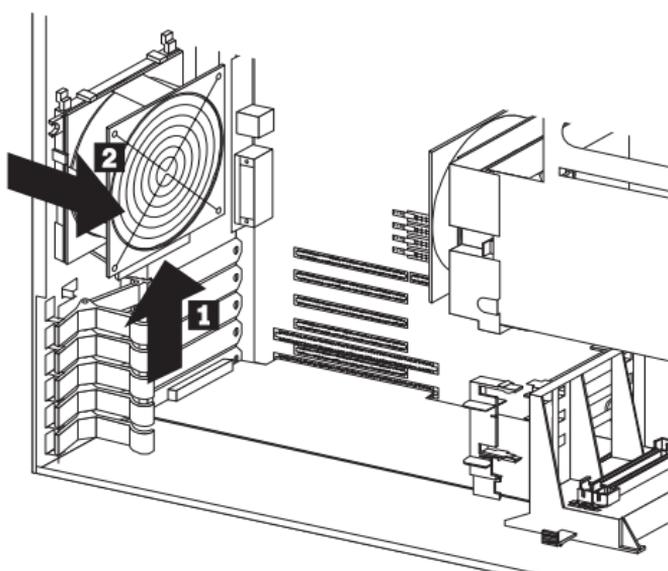
- Read “Safety Information” on page 174.
- Turn off the server, if it is on.

### Attention

When removing or replacing the fan, be sure to route the cables correctly to avoid damage to the SCSI cables and connectors.

To remove the rear fan assembly, do the following:

1. Remove the side cover, see “Option Installation” on page 125.



2. Release the fan assembly latch and slide the fan up slightly **1**.
3. Remove the fan assembly from the server **2**

## SCSI Connectors

Your server comes with a 16-bit UltraSCSI controller on the system board, which provides two independent SCSI channels. This controller has two 68-pin, shielded, high-density connectors: one internal, on the controller, and one external, on the back of the server. You can use these connectors to install an additional internal SCSI device in your server or to attach up to fifteen external SCSI devices to your server.

**Internal SCSI Connector:** A 2-drop, 68-pin (16-bit) cable is installed in your server. One drop is connected to the backplane, the other drop can connect to an additional SCSI removable media device (not a hard disk drive). This cable is connected to the internal connector for the 16-bit UltraSCSI controller. You can use this cable to install an additional internal SCSI device in your server.

**External SCSI Connector:** To attach an external SCSI device to your server, connect an external SCSI cable from the SCSI device to the SCSI connector on the back of the server. Ensure that the last device on the external SCSI cable is terminated. Table 7 shows the pin-number assignments for the 68-pin SCSI connectors.

*Table 7. The 68-Pin SCSI Port Connector  
Pin-Number Assignments*

<b>Pin</b>	<b>Signal</b>	<b>Pin</b>	<b>Signal</b>
1	Ground	35	Data 12
2	Ground	36	Data 13
3	Ground	37	Data 14
4	Ground	38	Data 15
5	Ground	39	Data P1
6	Ground	40	Data 0
7	Ground	41	Data 1
8	Ground	42	Data 2
9	Ground	43	Data 3
10	Ground	44	Data 4
11	Ground	45	Data 5
12	Ground	46	Data 6
13	Ground	47	Data 7
14	Ground	48	Data P0
15	Ground	49	Reserved
16	Ground	50	-PRSN
17	Terminal power	51	Terminal power
18	Terminal power	52	Terminal power
19	Reserved	53	Reserved
20	Ground	54	Ground
21	Ground	55	-Attention
22	Ground	56	Ground
23	Ground	57	-Busy
24	Ground	58	-Acknowledge
25	Not connected	59	-Reset
26	Ground	60	-Message
27	Ground	61	-Select
28	Ground	62	-Control/Data
29	Ground	63	-Request
30	Ground	64	-Input/Output
31	Ground	65	Data 8
32	Ground	66	Data 9
33	Ground	67	Data 10
34	Ground	68	Data 11

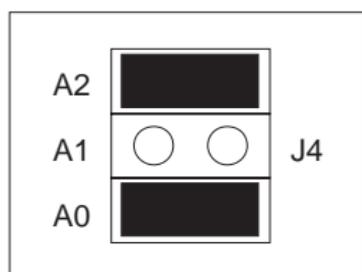
## SCSI Jumpers

The option jumper block on the DASD (SCSI) backplane defines the SCSI IDs for hot-swap drives. See the illustration in “DASD Backplane Jumper Block Location” on page 138 for the location of the option jumper block.

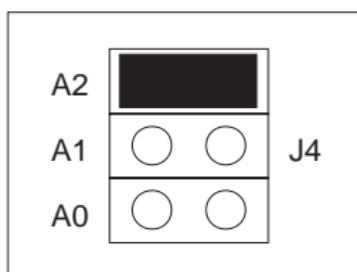
The following table summarizes the settings for the DASD backplane SCSI option jumper block (J4).

Pins	Description
1-2 (A0)	Removing the jumper from these two pins reverses the SCSI IDs on the backplane. For the tower model, these two pins are jumpered; for the rack model, the jumper usually is removed.
3-4 (A1)	Reserved. No jumper.
5-6 (A2)	These pins are always jumpered.

### Tower Addressing



### Rack (Reversed) Addressing

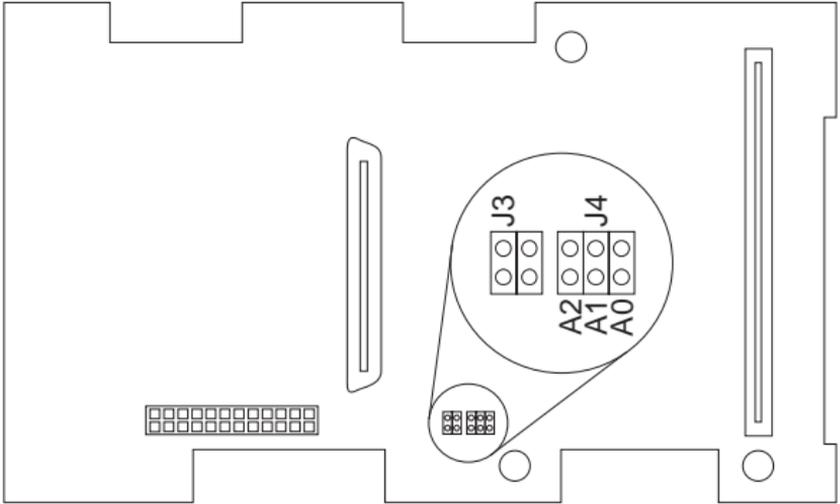


The following table shows the SCSI IDs that you can use for hot-swap drives.

J4 Pins 1-2 (A0)	Bay 1	Bay 2	Bay 3	Bay 4	Bay 5
Jumpered (tower orientation)	0	1	2	3	4
Jumper removed, DASD enclosure not rotated	4	3	2	1	0
Jumper removed, DASD enclosure rotated for rack orientation	0	1	2	3	4

**Notes:** When the DASD enclosure on a tower model has been rotated for rack-mount orientation and the jumper has been removed, the bays correspond to the rack model illustration on page 64.

**DASD Backplane Jumper Block Location:** The following illustration shows the location of the DASD backplane SCSI option jumper block (J4).



## Security

You can add elements to your server to help to protect the server itself from theft and tampering, and to help to protect the data and programs stored in the server from unauthorized access and use.

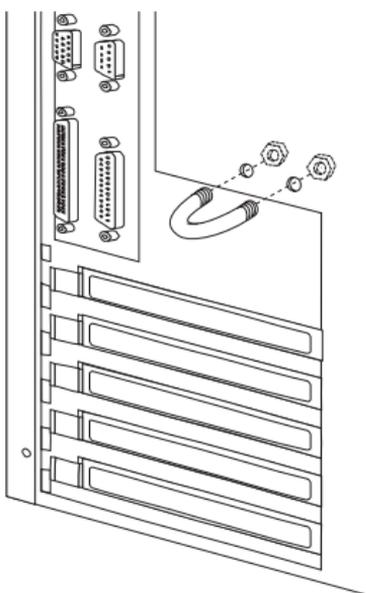
**Installing a U-Bolt and Security Cable:** You can help to deter unauthorized removal of your tower model Netfinity 5000 by installing a U-bolt and security cable on the rear of your server.

### Before you begin

- Obtain the following:
  - A U-bolt
  - A flat-blade screwdriver
  - An adjustable wrench
  - A 19 mm (3/4 in.) U-bolt or wire rope (similar to National Manufacturing No. 3230, Stock No. 176-735)
  - Threaded nuts that fit the U-bolt
  - A security cable
  - A lock, such as a combination lock or padlock
- Read “Safety Information” on page 174.

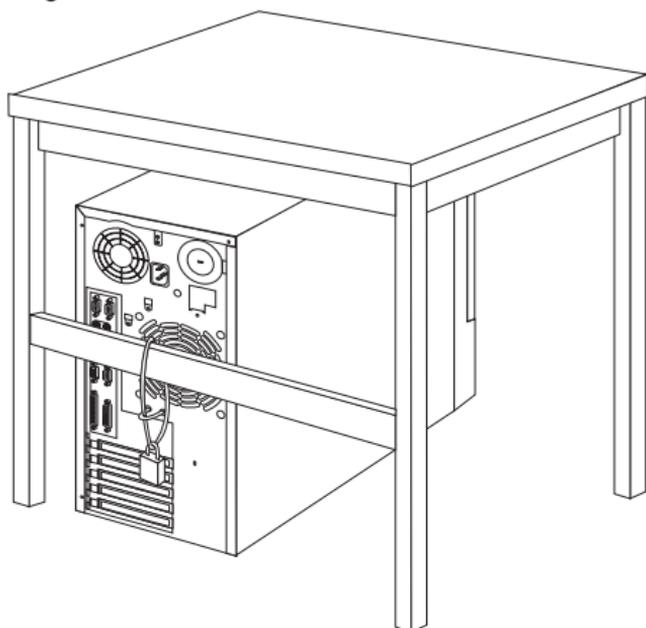
### To install a U-bolt and security cable:

1. Remove the server cover. See “Option Installation” on page 125.
2. Insert the U-bolt through the holes and secure it in place with the nuts.



3. If you have completed installing the U-bolt and do not want to install any other internal options, replace the server cover and reconnect all external cables and power cords (see “Completing the Installation” on page 77 if you need additional information).
4. Thread the cable through the U-bolt and around an object that is not a part of or permanently secured to the building structure or foundation, and from which it cannot be removed; then, fasten the cable ends together with a lock.

The following illustration shows an example of how this might work.



## Serial Port Connectors

Serial ports are used to communicate with printers, plotters, external modems, auxiliary terminals, and other computers. Your server provides two serial ports (A and B), and a special type of serial port (Management Port C, described on the next page). You can add more serial ports by installing a serial adapter in one of the expansion slots.

### 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. See the “Advanced System Management Information” section of this *Server Library* for information about configuring serial ports A and C.

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

The serial ports transmit and receive data and commands at a rate of 300 bits per second (bps) up to 115 200 bps. The bits-per-second measurement is commonly referred to as the *baud rate*.

Each of the two serial connectors provided on your Netfinity 5000 uses a 9-pin, D-shell connector.

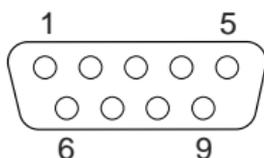


Table 10 shows the pin-number assignments for the serial port connectors. The pin-number assignments conform to the industry standard.

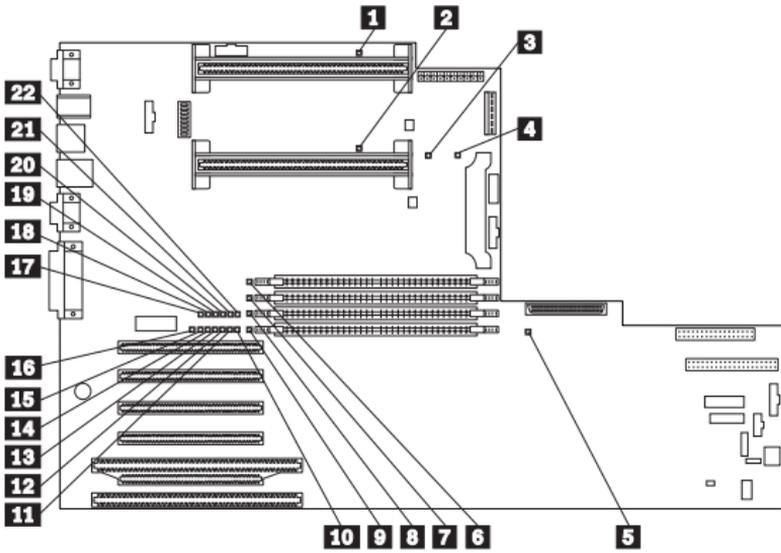
*Table 10. Serial Port Connector Pin-Number Assignments*

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

## System Board Illustration

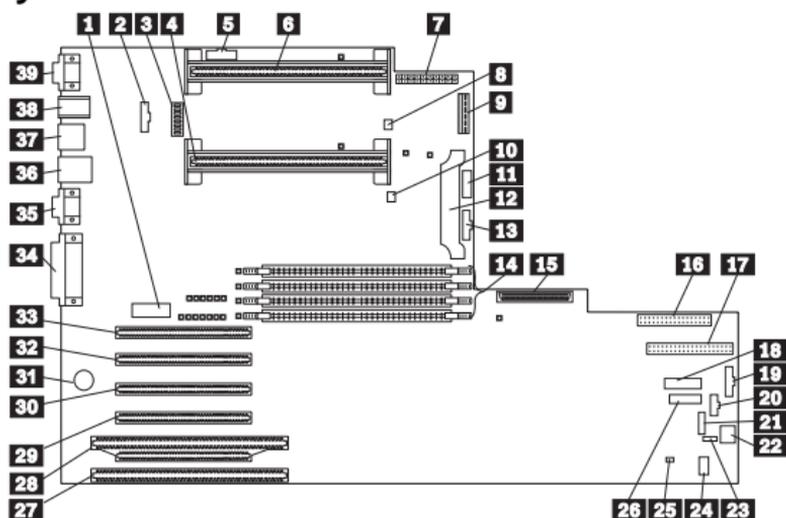
The following illustrations show some of the system board components. Refer to the label inside the system cover for detailed information.

### System Board LEDs:



- 1** Microprocessor 1 error LED (CR1)
- 2** Microprocessor 2 error LED (CR5)
- 3** Integrated voltage regulator error LED (CR4)
- 4** Voltage regulator module (VRM) error LED (CR12)
- 5** Service Processor error LED (CR49)
- 6** DIMM 1 error LED (CR13)
- 7** DIMM 2 error LED (CR14)
- 8** DIMM 3 error LED (CR21)
- 9** DIMM 4 error LED (CR22)
- 10** System-management interrupt (SMI) LED (CR29)
- 11** Non-maskable interrupt (NMI) error LED (CR28)
- 12** PCI bus 1 error LED (CR27)
- 13** PCI bus 0 error LED (CR26)
- 14** Reserved (CR25)
- 15** DASD error LED (CR24)
- 16** Temperature error LED (CR23)
- 17** Fan 1 (DASD) error LED (CR15)
- 18** Fan 2 (rear) error LED (CR16)
- 19** Reserved (CR17)
- 20** Reserved (CR18)
- 21** Power supply 1 error LED (CR19)
- 22** Power supply 2 error LED (CR20)

## System Board Connectors



- 1** Systems management adapter connector (J21)
- 2** Fan 2 connector (J6)
- 3** System switch block (SW1)
- 4** Microprocessor 2 connector (U21)
- 5** Reserved (J1)
- 6** Microprocessor 1 connector (U2)
- 7** Power connector (J3)
- 8** Reserved (J8)
- 9** Power connector (J4)
- 10** Reserved (J12)
- 11** Power supply data connector (J10)
- 12** Voltage regulator module (VRM) connector (U20)
- 13** Fan 1 connector (J13)
- 14** DIMM 1 (J15), DIMM 2 (J16), DIMM 3 (J17), and DIMM 4 (J22) connectors
- 15** SCSI connector (J18)
- 16** Diskette drive connector (J23)
- 17** IDE connector (J3)
- 18** Operator LED panel (J29)
- 19** Reserved (J31)
- 20** Power-on switch panel (J34)
- 21** RS-485 connector (J35)
- 22** Reserved (J37)
- 23** Reserved (J36)
- 24** Reserved (J41)
- 25** Service processor reset connector (J39)
- 26** Reserved (J32)
- 27** ISA connector (J40)
- 28** PCI/ISA connector, PCI bus 1 (J38)
- 29** PCI connector, PCI bus 1 (J33)
- 30** PCI connector, PCI bus 1 (J30)
- 31** Battery
- 32** PCI connector, PCI bus 1 (J28)
- 33** PCI connector, PCI bus 0 (J24)
- 34** Parallel/SCSI connectors (J19)

- 35** Video port and Management C port connectors (J11) (Management C port connector is above the video connector.)
- 36** USB 1 and USB 2 port connectors (J9) (USB 2 is below USB 1)
- 37** Ethernet connector (J7)
- 38** Mouse and keyboard connectors (J5) (The mouse connector is above the keyboard connector)
- 39** Serial port A and B connectors (J2) (Serial port B is below serial port A)

# System Board Removal/Replacement

## Before you begin

- Read “Safety Information” on page 174.
- If possible, before replacing the system board, record the server configuration.
- Turn off the server, if it is on.

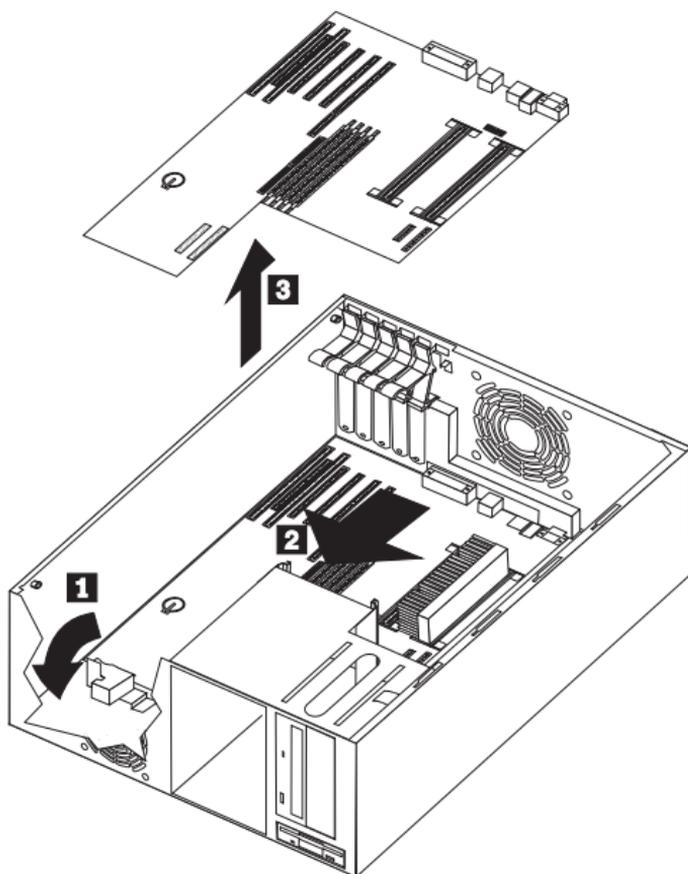
## Attention

- If possible, save the existing system configuration or obtain a previously saved copy.
- After replacing system board, flash the system with the latest level BIOS match the BIOS level currently installed on the system.
- During the flash procedure you will be asked if the machine type and serial number information needs to be updated. Answer yes; then, manually enter the machine type and serial number information. Use the Backspace key if necessary to enter the information. Some system functions rely on the accuracy the VDP information.

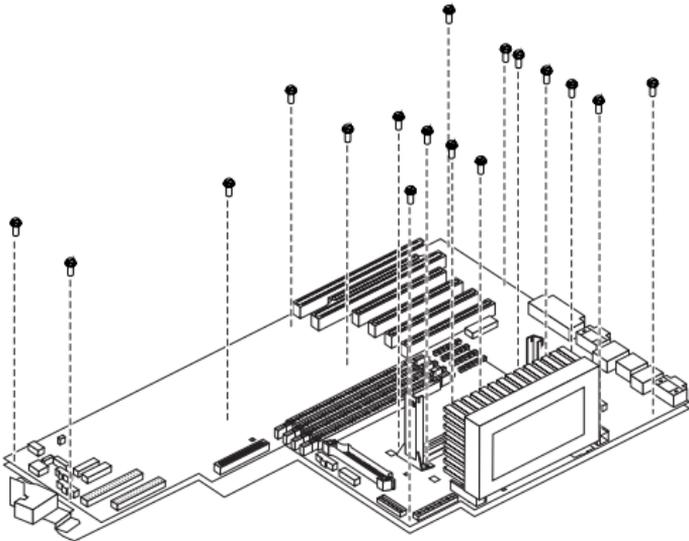
To remove the system board, do the following:

To replace the system, reverse the removal procedure.

1. Remove the side cover, card support bracket and retainer clip, see “Option Installation” on page 125.
2. Remove the rear fan assembly, see “Rear Fan Assembly Removal” on page 134.



3. Release the system board back-plate release latch **1**.
4. Slide the system board and back plate toward the front of the system **2** and lift the system board and back-plate **3** out of the server.
5. Disconnect all cables attached to the system board.



6. Remove the system board mounting screws to separate the system board from the back-plate.

# System Board Switches

The following table provides the system switch identifiers and descriptions of these switches. The system switch block is identified by key **3** in the illustration at “System Board Connectors” on page 143.

**Note**

Turn off the server and disconnect the power cord before moving any switches.

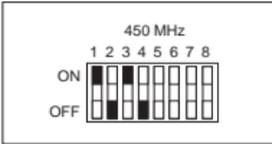
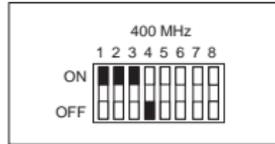
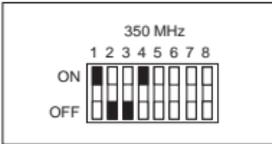
*Table 11. System Board Switch Block SW1*

Identifier	Switch Description
1	Switches 1, 2, 3, and 4 in combination specify the frequency for the microprocessor. See Table 12 on page 148 for details.
2	Switches 1, 2, 3, and 4 in combination specify the frequency for the microprocessor. See Table 12 on page 148 for details.
3	Switches 1, 2, 3, and 4 in combination specify the frequency for the microprocessor. See Table 12 on page 148 for details.
4	Switches 1, 2, 3, and 4 in combination specify the frequency for the microprocessor. See Table 12 on page 148 for details.
5	When On, perform BIOS recovery using boot block (boot block recovery).  The recovery boot block is in a protected area of flash memory that cannot be overwritten. When the BIOS becomes corrupted (for example, if a power failure occurs during a flash update), the recovery boot block can be used to restore the BIOS. The code in the recovery boot block enables the server to start up and read a flash diskette. The flash utility automatically recovers the system BIOS from the BIOS recovery files on the diskette. When the flash is complete, the switch must be moved to the Off position.  The default setting is Off (disabled).
6	When On, sets the host bus speed to 66 MHz. When Off, the host bus speed is 100 MHz.  The default setting is Off.
7	Power-on override.  When On, overrides the power-on switch and forces power-on mode. The system will always boot without the use of the power-on switch.  The default setting is Off (disabled).
8	When On, bypass the power-on password. When Off, require the user to enter the power-on password at startup if one is set.  The default setting is Off.

**Note**

If the processor in your system does not react to switch changes, it is not an error.

Table 12. Switch Settings for Microprocessor Speed



## Bypassing an Unknown Power-on Password

**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 one 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 27 for details.) Start the Configuration/Setup Utility programs and change the power-on password. See “Using the Power-on Password Menu” on page 26.
- Change switch 8 on the system switch block to On (Bypass Power-On Password). See “System Board Connectors” on page 143 for the location of the switch block.

## Universal Serial Bus Ports

The universal serial bus (USB) is an emerging serial interface standard for telephony and multimedia devices. Each USB port is a single connector for devices that previously used serial, parallel, keyboard, mouse, and game ports. USB technology uses Plug and Play technology to determine which type of device has been attached to the connector. Each USB device is accessed by a unique USB address. A device called a hub is used to convert a single USB connector 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 feet 4.9 inches) per segment.

### Note

If more than one USB device is to be attached, the devices must be connected to a hub. Your Netfinity 5000 does not support a keyboard attached to the system USB port.

Your Netfinity 5000 comes with two USB ports. Table 13 shows the pin-number assignments for the USB port connectors.

*Table 13. USB Port Connector Pin-Number Assignments*

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

## Updating the Server Configuration

When you start your server for the first time after you add or remove an internal option or an external small computer systems interface (SCSI) device, you might see a message telling you the configuration has changed. You might need to install device drivers (required only if the option has a device driver). Refer to the documentation that comes with your option for information about installing any required device drivers.

### Notes

1. If you remove the last (terminated) SCSI device from the external SCSI cable connected to the SCSI connector on the back of the server, the server might not recognize any SCSI devices that are still connected on that SCSI channel (cable).
2. When a hard disk drive is added and you want to include it in your startup sequence, use the **Start Options** selection of the Configuration/Setup Utility programs (see "Start Options" on page 29).
3. When you install an ISA legacy adapter, you must allocate system resources to support it (see "Plug and Play" on page 31).
4. You can find the list of supported hardware and software for your server at <http://www.pc.ibm.com/compat> on the World Wide Web.

### What to do next

- Device drivers to install? See the instructions that come with the option to determine if device drivers are required, and, if so, how to install them.
- If you do not need to install any device drivers or update the system configuration, your server is ready to use.

## Video Port Connector

The video port is where you can attach a video monitor to your Netfinity 5000. Your server provides a 15-pin video port connector.

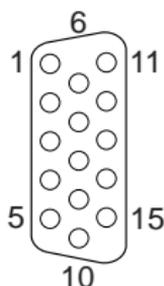


Table 14 shows the pin-number assignments for the video port connector.

*Table 14. Video Port Connector Pin-Number Assignments*

Pin	Signal
1	Red
2	Green or monochrome
3	Blue
4	Not connected
5	Ground
6	Red ground
7	Green ground or monochrome ground
8	Blue ground
9	+5v (DDC power)
10	Ground
11	Not connected
12	Display data channel (DDC data)
13	Horizontal synchronization (Hsync)
14	Vertical synchronization (Vsync)
15	Display data channel (DDC clock)

# Symptom-to-FRU Index

This index supports Netfinity 5000 - Type 8659 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 5.

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</b></li><li>2. System Board</li></ol>
1-1-4 (BIOS ROM checksum failed)	<ol style="list-style-type: none"><li>1. <b>DIMM</b></li><li>2. System Board</li></ol>
1-2-1 (Programmable Interval Timer failed)	<ol style="list-style-type: none"><li>1. <b>System Board</b></li></ol>
1-2-2 (DMA initialization failed)	<ol style="list-style-type: none"><li>1. <b>System Board</b></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>
<b>1-2-4</b> RAM refresh verification failed	1. <b>System Board</b>
<b>1-3-1</b> (1st 64K RAM test failed)	1. <b>DIMM</b>
<b>1-3-2</b> (1st 64K RAM parity test failed)	1. <b>DIMM</b> 2. <b>System Board</b>
<b>2-1-1</b> (Secondary DMA register failed)	1. <b>System Board</b>
<b>2-1-2</b> (Primary DMA register failed)	1. <b>System Board</b>
<b>2-1-3</b> (Primary interrupt mask register failed)	1. <b>System Board</b>
<b>2-1-4</b> (Secondary interrupt mask register failed)	1. <b>System Board</b>
<b>2-2-1</b> (Interrupt vector loading failed)	1. <b>System Board</b>
<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</b> 2. <b>System Board</b>
<b>2-2-4</b> (CMOS configuration info validation failed)	1. <b>Battery</b> 2. <b>System Board</b>
<b>2-3-1</b> (Screen initialization failed)	1. <b>System Board</b>
<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><b>DIMM</b></li> <li>System Board</li> </ol>
<b>3-1-4</b> (Time-Of-Day clock failed)	<ol style="list-style-type: none"> <li><b>Battery</b></li> <li>System Board</li> </ol>
<b>3-2-1</b> (Serial port failed)	<ol style="list-style-type: none"> <li><b>System Board</b></li> </ol>
<b>3-2-2</b> (Parallel port failed)	<ol style="list-style-type: none"> <li><b>System Board</b></li> </ol>
<b>3-2-3</b> (Math coprocessor failed)	<ol style="list-style-type: none"> <li><b>Optional Processor</b> (if installed)</li> <li>Processor</li> </ol>
<b>3-2-4</b> (Failure comparing CMOS memory size against actual)	<ol style="list-style-type: none"> <li><b>DIMM</b></li> <li>Battery</li> </ol>
<b>3-3-1</b> (Memory size mismatch occurred)	<ol style="list-style-type: none"> <li><b>DIMM</b></li> <li>Battery</li> </ol>
<b>3-3-2</b> (Critical SMBUS error occurred)	<ol style="list-style-type: none"> <li><b>Disconnect the server power cord from outlet, wait 30 seconds and retry.</b></li> <li>Memory DIMMs</li> </ol>
<b>3-3-3</b> (No memory in system)	<ol style="list-style-type: none"> <li><b>Install or reseat the memory modules</b></li> <li>DIMMs</li> <li>System Board</li> </ol>
Two Short Beeps (Information only, the configuration has changed)	<ol style="list-style-type: none"> <li><b>Run Diagnostics</b></li> <li>Run Configuration/Setup</li> </ol>
Three Short Beeps	<ol style="list-style-type: none"> <li><b>DIMM</b></li> <li>System Board</li> </ol>
One Continuous Beep	<ol style="list-style-type: none"> <li><b>Processor</b></li> <li>Optional Processor (if installed)</li> <li>System Board</li> </ol>
Repeating Short Beeps	<ol style="list-style-type: none"> <li><b>Keyboard</b></li> <li>System Board</li> </ol>
One Long and One Short Beep	<ol style="list-style-type: none"> <li><b>Video adapter</b> (if present)</li> <li>System Board</li> <li></li> </ol>
One Long and Two Short Beeps	<ol style="list-style-type: none"> <li><b>Video adapter</b> (if present)</li> <li>System Board</li> </ol>
Two Long and Two Short Beeps	<ol style="list-style-type: none"> <li><b>Video adapter</b></li> </ol>

## No Beep Symptoms

No Beep Symptom	FRU/Action
No beep and the system operates correctly.	<ol style="list-style-type: none"> <li>1. <b>Speaker</b></li> <li>2. System Board</li> </ol>
No Beeps occur after successfully completing POST (The Power-On Status is disabled.)	<ol style="list-style-type: none"> <li>1. <b>Run Configuration/Setup, set the Start Options Power-On Status to enable.</b></li> <li>2. Check speaker connection.</li> <li>3. Speaker</li> <li>4. System Board</li> </ol>
<b>No AC power</b> (Power supply AC LED is off)	<ol style="list-style-type: none"> <li>1. <b>Check the power cord</b></li> <li>2. Power Supply (If two are installed, swap them to determine if one is defective.)</li> <li>3. Hot Swap Power AC Inlet Box</li> </ol>
<b>No beep and no video</b>	<ol style="list-style-type: none"> <li>1. <b>See “Undetermined Problems” on page 165.</b></li> </ol>
<b>No beep, fans running, and AC power LED blinking</b> <b>(System held in reset)</b>	<ol style="list-style-type: none"> <li>1. <b>If an optional VRM is installed and no optional processor, remove the optional VRM.</b></li> <li>2. If optional VRM failed, replace optional VRM.</li> <li>3. If primary VRM failed, replace system board.</li> <li>4. If system board failed, replace system 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 a warning error and may not indicate a hardware failure.

For all other 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>005-XXX-000</b> (Failed Video test)	1. <b>System Board</b>
<b>011-XXX-000</b> (Failed COM1 Serial Port test)	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>System Board</b>
<b>075-XXX-000</b> (Failed Power Supply test)	1. <b>Power Supply</b>
<b>089-XXX-001</b> (Failed Microprocessor test)	1. <b>Microprocessor</b> 2. System Board
<b>089-XXX-002</b> (Failed Optional Microprocessor test)	1. <b>Optional Microprocessor</b> 2. VRM for Optional Microprocessor
<b>165-XXX-000</b> (Failed System Board test)	1. <b>System Board</b> 2. Hot-Swap Drive Backplane
<b>180-XXX-001</b> (Failed Information Panel LED test)	1. <b>Information LED Panel</b> 2. Power-on Panel
<b>180-XXX-003</b> (Failed System Board LED test)	1. <b>System Board</b>
<b>180-XXX-005</b> (Failed SCSI Backplane LED test)	1. <b>SCSI Backplane</b> 2. SCSI Backplane Cable 3. System Board

Error Code/Symptom	FRU/Action
<b>201-XXX-001</b> (Failed Memory test)	1. <b>DIMM Location J15</b>
<b>201-XXX-002</b> (Failed Memory test)	1. <b>DIMM Location J16</b>
<b>201-XXX-003</b> (Failed Memory test)	1. <b>DIMM Location J17</b>
<b>201-XXX-004</b> (Failed Memory test)	1. <b>DIMM Location J22</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. <b>Diskette Drive</b>
<b>215-XXX-000</b> (Failed IDE test)	1. <b>System Board</b>
<b>217-XXX-000</b> (Failed BIOS Fixed Disk test) <div data-bbox="135 1110 480 1296" style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p><b>Note</b></p> <p>If RAID is configured, the fixed disk number refers to the RAID logical drive.</p> </div>	1. <b>Fixed Disk 1</b>
<b>217-XXX-001</b> (Failed BIOS Fixed Disk test) <div data-bbox="135 1436 480 1622" style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p><b>Note</b></p> <p>If RAID is configured, the fixed disk number refers to the RAID logical drive.</p> </div>	1. <b>Fixed Disk 2</b>
<b>217-XXX-002</b> (Failed BIOS Fixed Disk test) <div data-bbox="135 1761 480 1947" style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p><b>Note</b></p> <p>If RAID is configured, the fixed disk number refers to the RAID logical drive.</p> </div>	1. <b>Fixed Disk 3</b>

Error Code/Symptom	FRU/Action
<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 drive.</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 drive.</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 drive.</p>	<p>1. <b>Fixed Disk 6</b></p>
<p><b>301-XXX-000</b> (Failed Keyboard test)</p>	<p>1. <b>Keyboard</b></p>
<p><b>405-XXX-000</b> (Failed Ethernet test)</p>	<p>1. <b>System Board</b></p>

## 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/Setup utility 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 your 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>

## 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</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> </ol>
<b>106</b> (System and processor error)	<ol style="list-style-type: none"> <li>1. <b>System Board</b></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> </ol>
<b>151</b> (Real time clock error)	<ol style="list-style-type: none"> <li>1. <b>Run Diagnostics</b></li> <li>2. Battery</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</li> <li>3. System Board</li> </ol>
<b>162</b> (Device Configuration Error) <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <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</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</li> <li>3. System Board</li> </ol>
<b>164</b> (Memory configuration changed)	<ol style="list-style-type: none"> <li>1. <b>Run Configuration/Setup</b></li> <li>2. DIMM</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</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> </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. 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>Processor 1</b></li> <li>2. System Board</li> </ol>
<b>196</b> (Processor 2 is not functioning)	<ol style="list-style-type: none"> <li>1. <b>VRM</b></li> <li>2. Processor 2</li> <li>3. 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. 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. System Board</li> </ol>
<b>201</b> (Memory test error)	<ol style="list-style-type: none"> <li>1. <b>DIMM</b></li> <li>2. 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> </ol>
<b>262</b> (DRAM parity configuration error)	<ol style="list-style-type: none"> <li>1. <b>Run Configuration/Setup</b></li> <li>2. Battery</li> <li>3. System Board</li> </ol>

Error Code/Symptom	FRU/Action
<b>289</b> (DIMM has been disabled the user or system)	<ol style="list-style-type: none"> <li>1. <b>Run Configuration/Setup, if disabled by user</b></li> <li>2. Ensure if a DIMM was added/changed that the power was disconnected.</li> <li>3. Disabled DIMM, if not disabled by user.</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</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>

Error Code/Symptom	FRU/Action
<p><b>1600, 1601</b>            (The system is able to communicate to the Service Processor, but the Service Processor failed to respond at the start of POST.)            Do the following before replacing a FRU:</p> <ol style="list-style-type: none"> <li>1. Remove the AC power to the system, wait 20 seconds; then, re-connect the AC power. Wait 30 seconds; then, power-on the system.</li> <li>2. Flash update the Service Processor.</li> </ol>	<ol style="list-style-type: none"> <li>1. <b>System Board</b></li> </ol>
<p><b>1762</b>            (Fixed Disk Configuration error)</p>	<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>
<p><b>178X</b>            (Fixed Disk error)</p>	<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>
<p><b>1800</b>            (No more hardware interrupt available for PCI adapter)</p>	<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>
<p><b>1801</b>            (No room for PCI option ROM)</p>	<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>
<p><b>1802</b>            (No more I/O space available for PCI adapter)</p>	<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>
<p><b>1803</b>            (No more memory (above 1MB for PCI adapter)</p>	<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>
<p><b>1804</b>            (No more memory (below 1MB for PCI adapter)</p>	<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>
<p><b>1805</b>            (PCI option ROM checksum error)</p>	<ol style="list-style-type: none"> <li>1. <b>Remove Failing PCI Card</b></li> <li>2. System Board</li> </ol>

<b>Error Code/Symptom</b>	<b>FRU/Action</b>
<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>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</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> </ol>
<b>000120P0, 000120P1, 000120P2, 000120PF</b> (Processor cache error)	<ol style="list-style-type: none"> <li>1. <b>Failing Processor</b></li> </ol>
<b>01295085</b> (ECC checking hardware test error)	<ol style="list-style-type: none"> <li>1. <b>Processor</b></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>
<b>I9990650</b> (AC power has been restored)	<ol style="list-style-type: none"> <li>1. <b>Check cable</b></li> <li>2. Check for interruption of power supply</li> <li>3. Power Cable</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>

---

## 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 Resource Conflicts" on page 50.
2. A corrupt CMOS can cause undetermined problems.

Check the LEDs on all the power supplies. If the LEDs indicate the power supplies are working correctly, return here and do the following:

1. Power-off the computer.
2. Be sure the system is cabled correctly.
3. Remove or disconnect the following (one at a time) until you find the failure (power-on the computer and reconfigure each time).
  - Any external devices
  - 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)
  - Secondary microprocessor VRM, if installed

**Note**

Minimum operating requirements are:

Power Supply

Power AC Inlet Box

System Board (Use switch 7 on the switch block on the system board to bypass the power switch button. Also, verify that the J10 connector is installed correctly.)

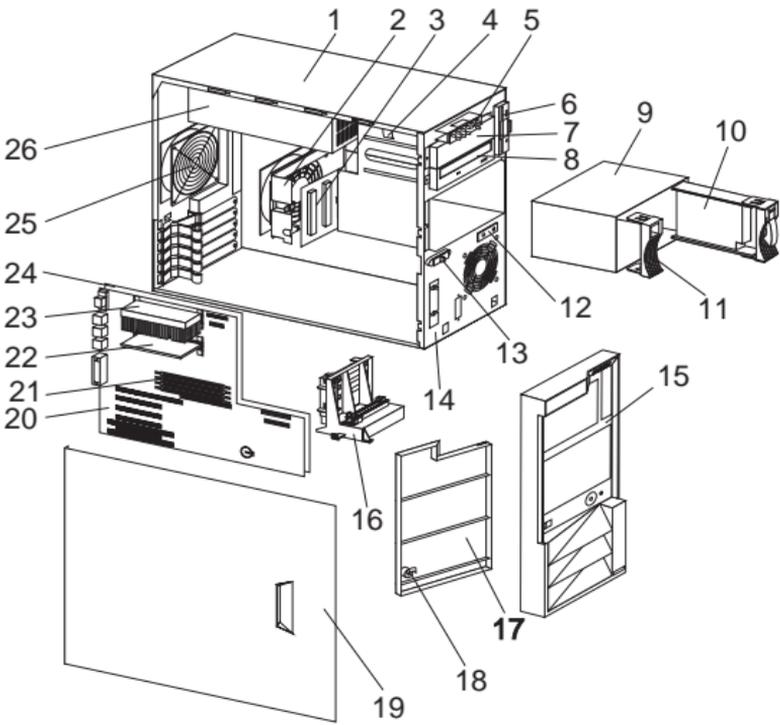
Memory-Module Kits (Minimum requirement = 1 bank of 64 MB DIMMs)

4. Power-on the computer. If the problem remains, suspect the following FRUs in the order listed:
  - Power Supply
  - Processor
  - System 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.

# Parts Listing (Type 8659)



# System

<b>Index</b>	<b>System (Netfinity 5000 - Type 8659) Models 12Y, 1SY, 22Y, 2SY, 31Y, 3RY</b>	<b>FRU No.</b>
1	L Cover Complete (Tower Models 12Y, 22Y, 31Y)	61H0263
2	Fan Housing (Rack/Tower Models 12Y, 1SY, 22Y, 2SY, 31Y, 3RY)	20L1294
3	Hot Swap Backplane Assembly (Tower Models 12Y, 22Y, 31Y)	20L1435
3	Hot Swap Backplane Assembly (Rack Models 1SY, 2SY, 3RY)	20L1434
4	Bezel Latch (Tower Models 12Y, 22Y, 31Y)	20L1293
5	INT LED Card Assembly (Rack/Tower Models 12Y, 1SY, 22Y, 2SY, 31Y, 3RY)	61H0344
6	1.44 MB Diskette Drive (Gray) (Rack/Tower Models 12Y, 1SY, 22Y, 2SY, 31Y, 3RY)	76H4091
7	5.25 Blank Bezel Assembly (Rack/Tower Models 12Y, 1SY, 22Y, 2SY, 31Y, 3RY)	12J3073
8	32X CD-ROM Drive (Rack/Tower Models 12Y, 1SY, 22Y, 2SY, 31Y, 3RY)	02K3414
9	5 Pack Cage Assembly (Rack/Tower Models 12Y, 1SY, 22Y, 2SY, 31Y, 3RY)	61H0290
10	Fixed Disk Drive (Option only) (Rack/Tower Models 12Y, 1SY, 22Y, 2SY, 31Y, 3RY)	N/A
11	Hot Swap Bezel Filler Assembly (Rack/Tower Models 12Y, 1SY, 22Y, 2SY, 31Y, 3RY)	20L1447
12	Power and Reset Switches Cable (Rack/Tower Models 12Y, 1SY, 22Y, 2SY, 31Y, 3RY)	61H0299
13	Cover Latch (Tower Models 12Y, 22Y, 31Y)	20L1290
14	Base Assembly (Rack/Tower Models 12Y, 1SY, 22Y, 2SY, 31Y, 3RY)	61H0292
15	Front Bezel Assembly (Tower Models 12Y, 22Y, 31Y)	61H0269
15	Front Bezel Assembly (Rack Models 1SY, 2SY, 3RY)	61H0343
16	Option Card Support Assembly (Rack/Tower Models 12Y, 1SY, 22Y, 2SY, 31Y, 3RY)	20L1295
17	Door Assembly (Tower Models 12Y, 22Y, 31Y)	61H0278
18	Keylock Assembly (Tower Models 12Y, 22Y, 31Y)	20L1264
19	Cover Assembly (Rack Models 1SY, 2SY, 3RY)	61H0348
20	System Board without Memory, Processor, or Cache (Rack/Tower Models 12Y, 1SY, 22Y, 2SY, 31Y, 3RY)	61H0504

<b>Index</b>	<b>System (Netfinity 5000 - Type 8659) Models Models 12Y, 1SY, 22Y, 2SY, 31Y, 3RY</b>	<b>FRU No.</b>
21	64 MB DIMM SD Registered (Rack/Tower Models 12Y, 1SY, 22Y, 2SY, 31Y, 3RY)	61H0088
21	128 MB R-DIMM (Option only) (Rack/Tower Models 12Y, 1SY, 22Y, 2SY, 31Y, 3RY)	28L1015
21	256 MB R-DIMM (Option only) (Rack/Tower Models 12Y, 1SY, 22Y, 2SY, 31Y, 3RY)	01K7391
22	Terminator Card (Rack/Tower Models 12Y, 1SY, 22Y, 2SY, 31Y, 3RY)	61H0539
23	350 MHz/100 Processor (Tower Model 12Y)	02K2776
23	400 MHz/100 Processor (Tower Model 22Y)	20L1430
23	450 MHz/100 Processor (Rack/Tower Models 31Y, 3RY)	01K1578
23	450 MHz/100 Processor (Tower Model 31Y)	01K1578
24	Planar Backplate (Rack/Tower Models 12Y, 1SY, 22Y, 2SY, 31Y, 3RY)	11L2398
25	Rear Fan Assembly with Bracket (Rack/Tower Models 12Y, 1SY, 22Y, 2SY, 31Y, 3RY)	20L1397
26	Power Supply 350 Watt (Rack/Tower Models 12Y, 1SY, 22Y, 2SY, 31Y, 3RY)	01K9862
	2-Drop SCSI Controller to Hot-Swap Backplane Cable (Rack/Tower Models 12Y, 1SY, 22Y, 2SY, 31Y, 3RY)	61H0310
	5.25 DASD Slide Bracket (Rack/Tower Models 12Y, 1SY, 22Y, 2SY, 31Y, 3RY)	12J5681
	Battery (Rack/Tower Models 12Y, 1SY, 22Y, 2SY, 31Y, 3RY)	33F8354
	CD-ROM IDE Cable (Rack/Tower Models 12Y, 1SY, 22Y, 2SY, 31Y, 3RY)	61H0314
	Chassis Assembly (Tower Models 12Y, 22Y, 31Y)	61H0312
	Chassis Assembly (Rack Models 1SY, 2SY, 3RY)	61H0324
	EMC Shield (Rack/Tower Models 12Y, 1SY, 22Y, 2SY, 31Y, 3RY)	61H0255
	LED cable Assembly (Rack Models 1SY, 2SY, 3RY)	11L1358
	Diskette Drive Cable (Rack/Tower Models 12Y, 1SY, 22Y, 2SY, 31Y, 3RY)	61H0308
	Diskette Drive Holder Bracket (Rack/Tower Models 12Y, 1SY, 22Y, 2SY, 31Y, 3RY)	12J3065
	Foot, 4 each (Tower Models 12Y, 22Y, 31Y)	61H0294
	Keyboard (Gray) (Tower Models 12Y, 22Y, 31Y)	
	See, "Keyboards" on page 171 .	

<b>Index</b>	<b>System (Netfinity 5000 - Type 8659) Models Models 12Y, 1SY, 22Y, 2SY, 31Y, 3RY</b>	<b>FRU No.</b>
	Miscellaneous Parts Kit (Rack/Tower Models 12Y, 1SY, 22Y, 2SY, 31Y, 3RY)	61H0359
	Molding, Cable Duct (Rack/Tower Models 12Y, 1SY, 22Y, 2SY, 31Y, 3RY)	61H0353
	Mouse (Tower Models 12Y, 22Y, 31Y)	76H0889
	Power Supply 175 Watt Plug In (Option only) (Rack/Tower Models 12Y, 1SY, 22Y, 2SY, 31Y, 3RY)	01K9864
	Real Time Clock (Rack/Tower Models 12Y, 1SY, 22Y, 2SY, 31Y, 3RY)	20L1271
	Service Label (Rack/Tower Models 12Y, 1SY, 22Y, 2SY, 31Y, 3RY)	11L2393
	LED Cable Assembly (Tower Models 12Y, 22Y, 31Y)	61H0316
	LED Spacer Assembly Bracket (Tower Models 12Y, 22Y, 31Y)	20L1291
	I/O Bracket Clip (Rack/Tower Models 12Y, 1SY, 22Y, 2SY, 31Y, 3RY)	61H0261
	Rack Mount Bracket (Rack Models 1SY, 2SY, 3RY)	20L1292
	SCSI Controller to SCSI Device 2-Drop Cable (Option only) (Rack/Tower Models 12Y, 1SY, 22Y, 2SY, 31Y, 3RY)	11L2363
	Slide/Bracket Assembly (Rack Models 1SY, 2SY, 3RY)	20L1448
	Rear Bracket for Cable (Rack Models 1SY, 2SY, 3RY)	20L1449
	Chassis Cover Plate (Rack/Tower Models 12Y, 1SY, 22Y, 2SY, 31Y, 3RY)	20L1450
	Power Cord (Rack/Tower Models 12Y, 1SY, 22Y, 2SY, 31Y, 3RY)	6952301
	Voltage Regulator Module (Option only) (Rack/Tower Models 12Y, 1SY, 22Y, 2SY, 31Y, 3RY)	01K7113

# Keyboards

Keyboards	FRU No.
Arabic	02K0870
Belgian-French	02K0871
Belgian-UK/Dutch	02K0872
Brazil/Portugal	02K0869
Bulgarian	02K0873
Chinese/US	02K0900
Czech	02K0874
Danish	02K0875
Dutch	02K0876
French	02K0877
French/Canadian-ID 058	02K0863
French/Canadian-ID 445	02K0865
German	02K0878
Greek	02K0879
Hebrew	02K0880
Hungarian	02K0881
Icelandic	02K0882
Italian	02K0883
Japan	02K0899
Latin/Spanish	02K0867
Norwegian	02K0884
Polish	02K0885
Portuguese	02K0886
Romania	02K0887
Russian	02K0888
Serbian/Cyrillic	02K0889
Slovak	02K0890
Spanish	02K0891
Swed/Finn	02K0892
Swiss French/German	02K0893
Thailand	02K0902
Turkish (ID 179)	02K0894
Turkish (ID 440)	02K0895
UK English	02K0896
US English	02K0861
UK English (ISO Compliant)	02K0898
Yugoslavia/Lithuania	02K0897



---

## 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.

Safety Information . . . . .	174
General Safety . . . . .	174
Electrical Safety . . . . .	175
Safety Inspection Guide . . . . .	176
Handling Electrostatic Discharge-Sensitive Devices . . . . .	178
Grounding Requirements . . . . .	178
Send Us Your Comments! . . . . .	204
Problem Determination Tips . . . . .	205
Phone Numbers, U.S. and Canada . . . . .	206
Trademarks . . . . .	208

---

## 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

**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 your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.

**Do not:**

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

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



**Caution:**

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

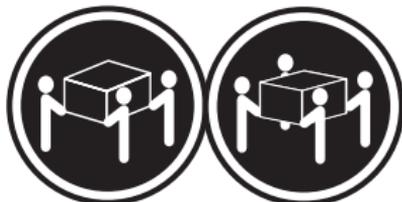
Use of controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.

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

**Danger**

Some CD-ROM drives contain an embedded Class 3A or Class 3B laser diode. Note the following.

Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam.



≥32 kg (70.5 lbs)

≥55 kg (121.2 lbs)

**Caution:**

Use safe lifting practices when lifting your 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.



## Perigo

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

**Para evitar choques elétricos:**

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

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

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

### Para Conectar

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.



**Cuidado:**

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

**Não:**

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

Descarte a bateria conforme requerido pelas disposições e regulamentações locais.



**Cuidado:**

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

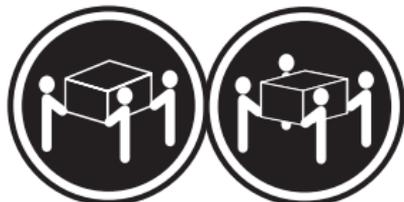
A utilização de controles ou ajustes ou a execução de procedimentos diferentes daqueles especificados nesta publicação pode resultar em exposição perigosa à radiação.

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

**Perigo**

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

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



≥32 kg (70,5 lbs)

≥55 kg (121,2 lbs)

**Cuidado:**

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



**Cuidado:**

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.



**Cuidado:**

Quando o suporte do cabo de alimentação estiver instalado no cabo de alimentação, o servidor deve estar conectado a uma fonte de energia de fácil acesso.



50 kg (110 lbs)

**Cuidado:**

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

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

拔掉

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

• 聲明 2



注意：

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

嚴禁：.

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

處理廢棄電池時，請遵照當地法令規章處理。

• 聲明 3



注意：

安裝光碟機時，請注意下列事項：

不依此處所指示的控制、調整或處理步驟，恐有遭致輻射之虞。

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

• 聲明 4



危險

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

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

• 聲明 5



$\geq 32$  公斤 (70.5 磅)



$\geq 55$  公斤 (121.2 磅)

注意：  
提昇機器時，請使用安全提昇措施。

• 聲明 6



注意：  
伺服器前面的電源控制按鈕無法關閉供應伺服器的電流。本伺服器可能有一條以上的電源線。如要移除伺服器上的所有電流，請確認所有電源線已與電源分離。

• 聲明 7



注意：  
如電源線上安裝了電源線托架裝置，則所使用的電源必須是伺服器容易使用為原則。

• 聲明 12



>50 公斤 (110 磅)

注意：  
請勿將任何重量超過 50 公斤 (110 磅) 的東西置於伺服器的抽屜上方。



**Danger**

**Pour éviter tout risque de choc électrique, ne manipulez aucun câble et n'effectuez aucune opération d'installation, d'entretien ou de reconfiguration de ce produit au cours d'un orage.**

**Pour éviter tout risque de choc électrique :**

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

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

**Le courant électrique passant dans les câbles de communication, ou les cordons téléphoniques et d'alimentation peut être dangereux. Pour éviter tout risque de choc électrique, lorsque vous installez ou que vous déplacez le présent produit ou des périphériques qui lui sont raccordés, reportez-vous aux instructions ci-dessous pour connecter et déconnecter les différents cordons.**

#### **Connexion**

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 pas débrancher les cordons alimentation des socles de prise de courant.
3. Débranchez les câbles d'interface des prises.
4. Débranchez tous les câbles des unités.



**Attention:**

Remplacez la pile usagée par une pile de référence identique exclusivement - voir la référence IBM - ou par une pile équivalente recommandée par le fabricant. Si votre système est doté d'un module contenant une pile au lithium, vous devez le remplacer uniquement par un module identique, produit par le même fabricant. La pile contient du lithium et présente donc un risque d'explosion en cas de mauvaise manipulation ou utilisation.

- Ne la jetez pas à l'eau.
- Ne l'exposez pas à une température supérieure à 100 °C.
- Ne cherchez pas à la réparer ou à la démonter.

Pour la mise au rebut, reportez-vous à la réglementation en vigueur.



**Attention:**

Si une unité de CD-ROM est installée, prenez connaissance des informations suivantes :

Pour éviter tout risque d'exposition au rayon laser, respectez les consignes de réglage et d'utilisation des commandes, ainsi que les procédures décrites dans le présent document.

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

**Danger**

Certaines unités de CD-ROM contiennent une diode laser de classe 3A ou 3B. Prenez connaissance des informations suivantes :

Rayonnement laser lorsque le carter est ouvert. Évitez de regarder fixement le faisceau ou de l'observer à l'aide d'instruments optiques. Évitez une exposition directe au rayon.



≥32 kg



≥55 kg

**Attention:**

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



**Attention:**

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.



**Attention:**

Lorsqu'une patte de fixation du cordon d'alimentation est installée, branchez le serveur sur une prise de courant électrique facile d'accès.



50 kg

**Attention:**

Ne posez pas d'objet dont le poids dépasse 50 kg sur les modèles tiroir de serveur.



## Vorsicht

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

### **Aus Sicherheitsgründen:**

- **Gerät nur an eine Schutzkontaktsteckdose mit ordnungsgemäß geerdetem Schutzkontakt anschließen.**
- **Alle angeschlossenen Geräte ebenfalls an Schutzkontaktsteckdosen mit ordnungsgemäß geerdetem Schutzkontakt anschließen.**

**Signalkabel möglichst einhändig anschließen oder lösen, um einen Stromschlag durch Berühren von Oberflächen mit unterschiedlichem elektrischem Potential zu vermeiden.**

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

#### **Kabel anschließen**

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.



**Achtung:**

Eine verbrauchte Batterie nur durch eine Batterie mit der IBM Teilenummer 33F8354 oder durch eine vom Hersteller empfohlene Batterie ersetzen. Wenn Ihr System ein Modul mit einer Lithium-Batterie enthält, ersetzen Sie es immer mit dem selben Modultyp vom selben Hersteller. Die Batterie enthält Lithium und kann bei unsachgemäßer Verwendung, Handhabung oder Entsorgung explodieren.

**Die Batterie nicht**

- mit Wasser in Berührung bringen.
- über 100 C erhitzen.
- reparieren oder zerlegen.

Die örtlichen Bestimmungen für die Entsorgung von Sondermüll beachten.



**Achtung:**

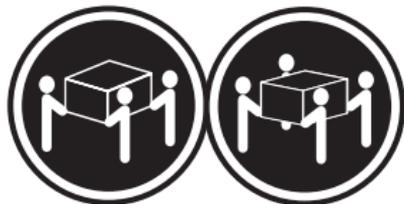
Wenn ein CD-ROM-Laufwerk installiert ist, beachten Sie folgendes. Steuer- und Einstellelemente sowie Verfahren nur entsprechend den Anweisungen im vorliegenden Handbuch einsetzen. Andernfalls kann gefährliche Laserstrahlung auftreten.

Das Entfernen der Abdeckungen des CD-ROM-Laufwerks kann zu gefährlicher Laserstrahlung führen. Es befinden sich keine Teile innerhalb des CD-ROM-Laufwerks, die vom Benutzer gewartet werden müssen. Die Verkleidung des CD-ROM-Laufwerks nicht öffnen.

**Vorsicht**

Manche CD-ROM-Laufwerke enthalten eine eingebaute Laserdiode der Klasse 3A oder 3B. Die nachfolgend aufgeführten Punkte beachten.

Laserstrahlung bei geöffneter Tür. Niemals direkt in den Laserstrahl sehen, nicht direkt mit optischen Instrumenten betrachten und den Strahlungsbereich meiden.



≥32 kg

≥55 kg

**Achtung:**

Beim Anheben der Maschine die vorgeschriebenen Sicherheitsbestimmungen beachten.



**Achtung:**

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.



**Achtung:**

Wenn am Netzkabel eine Kabelhalterung angebracht ist, muß der Server an eine leicht zugängliche Netzsteckdose angeschlossen werden.



50 kg

**Achtung:**

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.



≥32 kg



≥55 kg

**Attenzione:**

Durante il sollevamento della macchina seguire delle norme di sicurezza.



**Attenzione:**

Il pulsante del controllo dell'alimentazione situato nella parte anteriore del servente non disattiva la corrente elettrica fornita al servente. Il servente potrebbe anche avere più di un cavo di alimentazione. Per disattivare la corrente elettrica del servente, assicurarsi che tutti i cavi di alimentazione siano scollegati dalla sorgente di alimentazione.



**Attenzione:**

Quando sul cavo di alimentazione è installata l'opzione di sostegno del cavo, il servente deve essere collocato in prossimità di una presa elettrica facilmente accessibile.



50 kg

**Attenzione:**

Non poggiare oggetti che pesano più di 50 kg sulla parte superiore del servente.



**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 배선 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.	



**주의:**

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

다음은 주의하십시오.

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

지역 법령이나 규정의 요구에 따라 배터리를 처분하십시오.



**주의:**

CD-ROM 드라이브가 설치되어 있으면 다음 사항을 명심하십시오.

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

CD-ROM 드라이브의 덮개를 제거하면 위험한 레이저 방사능이 노출될 수 있습니다.

CD-ROM 드라이브 내에는 정비할 수 있는 부품이 없습니다. CD-ROM 드라이브 덮개를 제거하지 않도록 하십시오.

경고문 4

위험

일부 CD-ROM 드라이브에는 클래스 3A 또는 3B 레이저 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 꺼도 서버로 공급되는 전류가 차단되지 않습니다. 또한 서버에 둘 이상의 전선이 연결되어 있는 경우가 있습니다. 서버에서 모든 전류를 차단하려면 모든 전선이 전원으로부터 차단되어 있는지 확인하십시오.

경고문 7



주의:

전선 브래킷 옵션이 전선에 설치되어 있으면 서버는 쉽게 액세스할 수 있는 전원으로 연결되어야 합니다.

경고문 12



50kg(110 파운드) 이상

주의:

서랍형 모델의 서버 상단에는 50kg(110 파운드)이 넘는 물체를 올려 놓지 않도록 하십시오.



## Peligro

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

**Para evitar una posible descarga:**

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

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

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

### Instrucciones de conexión

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.



**Percaución:**

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.



**Percaución:**

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

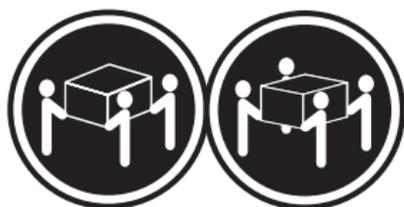
Si se llevan a cabo controles o ajustes o se utilizan métodos que no se atengan a lo aquí especificado, se puede producir una exposición peligrosa a las radiaciones.

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

## Peligro

Algunas unidades de CD-ROM tienen incorporado un diodo de láser de Clase 3A o de Clase 3B. Tenga en cuenta la siguiente información.

Cuando la unidad está abierta se generan emisiones de rayos láser. No dirija la mirada al haz, no lo observe directamente con instrumentos ópticos y evite la exposición directa.



≥32 kg

≥55 kg

### Precaución:

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



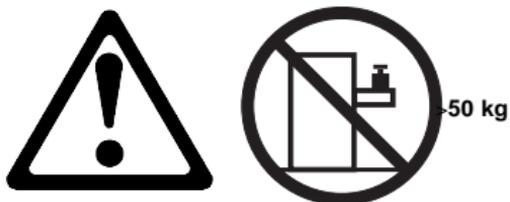
### Precaución:

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.



### Precaución:

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.



**Percaución:**

**No coloque ningún objeto cuyo peso sea superior a los 50 kilos sobre la bandeja modelo del servidor.**

---

## Send Us Your Comments!

We want to know your opinion about this manual (part number 10L9837). Your input will help us to improve our publications.

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

Name \_\_\_\_\_

Phone Number \_\_\_\_\_

1. Do you like this manual?

- Yes       No

\_\_\_\_\_  
\_\_\_\_\_

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

\_\_\_\_\_  
\_\_\_\_\_

3. What is your service experience level?

- Less than five years  
 More than five years

\_\_\_\_\_  
\_\_\_\_\_

4. Which Servers do you service most?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Thanks in advance for your response!**

---

## Problem Determination Tips

Due to the variety of hardware and software combinations that can be encountered, use the following information to assist you in problem determination. If possible, have this information available when requesting assistance from Service Support and Engineering functions.

- Machine type and model
- Processor or hard disk upgrades
- Failure symptom
  - Do diagnostics fail?
  - What, when, where, single, or multiple systems?
  - Is the failure repeatable?
  - Has this configuration ever worked?
  - If it has been working, what changes were made prior to it failing?
  - Is this the original reported failure?
- Reference/Diagnostics version
  - Type and version level
- Hardware configuration
  - Print (print screen) configuration currently in use
  - BIOS level
- Operating system software
  - Type and version level

### 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 205.

### 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

---

## Trademarks

The following terms are trademarks of the IBM Corporation in the United States or other countries or both:

HelpCenter	HelpFax
IBM	OS/2
NetBAY3	Netfinity
Netfinity Manager	ThinkPad
SystemXtra	

The following terms are trademarks of other companies:

Notes                      Lotus Development Corporation

MMX and Pentium are trademarks or registered trademarks of Intel Corporation.

UNIX is a trademark or registered trademark of X/Open Company Limited.

Windows NT is a trademark or registered trademark of Microsoft Corporation.





Part Number: 10L9837

Printed in U.S.A.

S10L-9837-00

