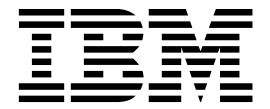


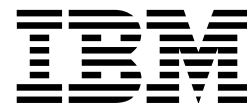
IBM® Netfinity® 7600



User's Reference



IBM[®] Netfinity[®] 7600



User's Reference

NOTE

Before using this information and the product it supports, be sure to read the general information in “Appendix A. Product warranties and notices,” on page 161.

First Edition (March 2000)

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Contents

Safety	v
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Chapter 1.Introducing the IBM Netfinity 7600	1
Server specifications	2
Notices used in this book	3
Server features	3
Reliability, availability, and serviceability	4
Controls and indicators	5
Information LED panel	8

Chapter 2.Arranging your workspace ...	11
Comfort	11
Glare and lighting	11
Air circulation	11
Electrical outlets and cable lengths	12

Chapter 3.Configuring your server	13
Using the Configuration/Setup Utility program	13
Starting the Configuration/Setup Utility program	13
Choices available from the Configuration/Setup main menu	14
Using passwords	17
Power-on password	17
Administrator password	18
Using the SCSISelect utility program	19
Starting the SCSISelect utility program	20
Choices available from the SCSISelect menu	20

Chapter 4.Introducing ServerGuide	23
ServerGuide provides the following to make setup easier	23
Features at a glance	24
Setup and Configuration overview	25
System Partition	25
Network operating system (NOS) installation overview	26
Setting up multiple servers	26
Installing your NOS without ServerGuide	26
Additional programs included with ServerGuide	27
NOS updates	27
Applications	27
Installing applications	27
Error symptoms	27

Chapter 5.Using Netfinity Manager	29
Managing your IBM Netfinity server with Netfinity Manager	29
Netfinity Manager documentation	30
Netfinity Manager system requirements	30
Netfinity Manager for OS/2 system requirements	30
Netfinity Manager for Windows 95 and Windows 98 system requirements	31
Netfinity Manager for Windows NT system requirements	31
Starting the Netfinity Manager installation program	32
Netfinity Manager database support	38
DB2 database support	39
System requirements	39

Installing and configuring the database	39
Activating the database	40
Granting and revoking database privileges	40
Deleting the database	42
Lotus Notes database support	43
System requirements	43
Installing the database	43
Browsing the Netfinity Manager Lotus Notes database	44
ODBC database support	44
System requirements	44
ODBC database configuration	45
Creating the Netfinity Manager tables	46
Supported and certified databases	47
Starting Netfinity Manager	48
Netfinity Manager Service Manager	49
Netfinity Manager service descriptions	50
Advanced System Management	51
Alert Manager	51
Alert on LAN configuration	51
Capacity Management	51
Cluster Manager	51
Critical File Monitor	51
DMI Browser	52
ECC Memory Setup	52
Event Scheduler	52
File Transfer	52
Power-On Error Detect	52
Predictive Failure Analysis	52
Process Manager	52
RAID Manager	52
Remote Session	53
Remote System Manager	53
Remote Workstation Control	53
Screen View	53
Security Manager	53
Serial Connection Control	53
Service Configuration Manager	53
Software Inventory	54
System Diagnostics Manager	54
System Information Tool	54
System Monitor	54
System Partition Access	54
System Profile	54
Update Connector Manager	54
Web Manager Configuration	55
Delaying Netfinity Manager startup on OS/2 systems	55
Getting more information about Netfinity Manager	55
Installation options	56
Automated installation	56
Customized installation	58

Chapter 6.Installing options	61
Major components of the Netfinity 7600 server	61
Component locations	63
I/O board component locations	63
Processor board component locations	64
Processor board LEDs	64
Processor board connectors	65
Processor board jumpers	66
Memory board component locations	67

Before you begin	68
System reliability considerations	68
Working inside the server with the power on	68
Handling static-sensitive devices	69
Safety information statements	69
Removing the server top cover and bezel	71
Removing the top cover	71
Removing the media-bay bezel	72
Working with adapters	72
Adapter considerations	73
Installing a hot-plug adapter	74
Installing internal drives	75
Internal drive bays	76
Installing a hot-swap hard disk drive	77
Installing a 5.25-inch removable-media drive	78
Installing memory-module kits	80
Installing a microprocessor kit	83
Installing a hot-swap power supply	87
Replacing a hot-swap fan	89
Completing the installation	90
Installing the media-bay bezel	90
Installing the top cover	91
Reconfiguring the server	91
Connecting external options	92
Input/Output ports	92
Parallel port	93
Viewing or changing the parallel-port assignments	93
Parallel port connector	94
Video port	95
Keyboard port	95
Auxiliary-device (pointing device) port	96
Ultra2 SCSI ports	96
SCSI cabling requirements	97
Setting SCSI IDs	97
SCSI connector pin-number assignments	97
Serial ports	98
Viewing or changing the serial-port assignments	98
Serial-port connectors	99
Universal Serial Bus ports	99
USB cables and hubs	99
USB-port connectors	99
Ethernet port	100
Configuring the Ethernet controller	100
Failover for redundant Ethernet	100
Ethernet port connector	103
Advanced System Management ports	103
Cabling the server	104
Installing the server in a rack	105
Chapter 7. Solving problems	107
Diagnostic tools overview	107
POST	109
POST beep code descriptions	109
POST beep codes	111
POST error messages	112
Event/error logs	121
Small computer system interface messages	121
Diagnostic programs and error messages	122
Text messages	123
Starting the diagnostic programs	123
Viewing the test log	124
Diagnostic error message tables	124
Recovering BIOS	132
Identifying problems using status LEDs	132

Power supply LEDs	133
Diagnostic panel LEDs	134
Light path diagnostics	135
Noncritical light path diagnostics	138
Troubleshooting charts	138
Troubleshooting the Ethernet controller	143
Network connection problems	143
Ethernet controller troubleshooting chart	144
Ethernet controller messages	145
Novell NetWare or IntraNetWare server ODI driver messages	145
NDIS 4.0 (Windows NT) driver messages	147
UNIX messages	148
Replacing the battery	151
Getting help, service, and information	153
Service support	154
Before you call for service	154
Getting customer support and service	155
Using the World Wide Web	155
Using electronic support services	155
Getting information by fax	156
Getting help online	156
Getting help by telephone	156
Getting help around the world	157
Purchasing additional services	158
Enhanced PC support line	158
900-number operating system and hardware support line	158
Network and server support line	158
Ordering support line services	159
Warranty and repair services	159
Ordering publications	159

Appendix A. Product warranties and notices 161

Warranty Statements	161
IBM Statement of Limited Warranty for United States, Puerto Rico, and Canada (Part 1 - General Terms)	161
IBM Statement of Warranty Worldwide except Canada, Puerto Rico, Turkey, United States (Part 1 - General Terms)	164
Part 2 - Worldwide Country-Unique Terms	166
Notices	170
Edition Notice	170
Year 2000 readiness and instructions	171
Trademarks	171
Important notes	172
Electronic emission notices	172
Federal Communications Commission (FCC) Statement	172
Industry Canada Class A emission compliance statement	173
Australia and New Zealand Class A statement	173
United Kingdom telecommunications safety requirement	173
European community directive conformance statement	173
Taiwan electrical emission statement	174
Japanese Voluntary Control Council for Interference (VCCI) statement	174
Power cords	174

Index 177

Safety

Before installing this product, read the Safety Information book.

مج، يجب قراءة دات السلامة

Antes de instalar este produto, leia o Manual de Informações sobre Segurança.

安装本产品前请先阅读《安全信息》手册。

Prije instalacije ovog proizvoda pročitajte priručnik sa sigurnosnim uputama.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs hæftet med sikkerhedsforskrifter, før du installerer dette produkt.

Lue Safety Information -kirjanen, ennen kuin asennat tämän tuotteen.

Avant de procéder à l'installation de ce produit, lisez le manuel Safety Information.

Vor Beginn der Installation die Broschüre mit Sicherheitshinweisen lesen.

Πριν εγκαταστήσετε αυτό το προϊόν, διαβάστε το εγχειρίδιο Safety Information.

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

Przed zainstalowaniem tego produktu należy przeczytać broszurę Informacje Dotyczące Bezpieczeństwa.

Prima di installare questo prodotto, leggere l'opuscolo contenente le informazioni sulla sicurezza.

本製品を導入する前に、安全情報資料を御読みください。

이 제품을 설치하기 전에, 안전 정보 책자를 읽어보십시오.

Пред да го инсталирате овој производ прочитајте ја книгата со безбедносни информации.

Lees voordat u dit product installeert eerst het boekje met veiligheidsvoorschriften.

Les heftet om sikkerhetsinformasjon (Safety Information) før du installerer dette produktet.

Prije instalacije ovog proizvoda pročitajte priručnik sa sigurnosnim uputama.

Antes de instalar este produto, leia o folheto Informações sobre Segurança.

Перед установкой продукта прочтите брошюру по технике безопасности (Safety Information).

Pred inštaláciou tohto produktu si pre ítajte Informa nú brožúrku o bezpe nosti.

Preden namestite ta izdelek, preberite knjižico Varnostne informacije.

Antes de instalar este producto, lea la Información de Seguridad.

Läs säkerhetsinformationen innan du installerar den här produkten.

在安裝本產品之前，也請先閱讀「安全性資訊」小冊子。

Installálás el tt olvassa el a Biztonsági el írások kézikönyvét !

Statement 1



Danger

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

To avoid a shock hazard:

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

To connect:

1. Turn everything OFF.
2. First, attach all cables to devices.
3. Attach signal cables to connectors.
4. Attach power cords to outlet.
5. Turn device ON.

To disconnect:

1. Turn everything OFF.
2. First, remove power cords from outlet.
3. Remove signal cables from connectors.
4. Remove all cables from devices.

Statement 2

CAUTION:



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

Do not:

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

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

Statement 3



CAUTION:

When laser products (such as CD-ROMs, DVD drives, fiber optic devices, or transmitters) are installed, note the following:

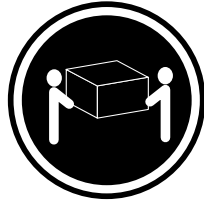
- Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.
- Use of controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.



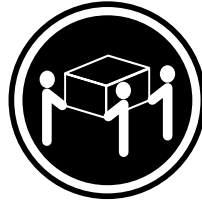
Danger

Some laser products contain an embedded Class 3A or Class 3B laser diode. Note the following. Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam.

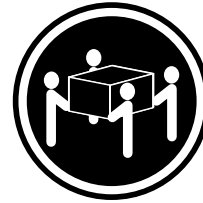
Statement 4



≥18 kg (37 lbs)



≥32 kg (70.5 lbs)



≥55 kg (121.2 lbs)

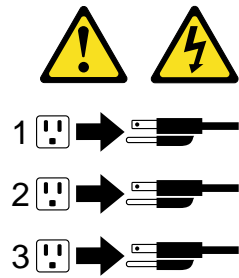
CAUTION:
Use safe practices when lifting.

Statement 5



CAUTION:

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



Chapter 1. Introducing the IBM Netfinity 7600

Your IBM® Netfinity® 7600 server is a high-performance server with the capability of microprocessor upgrade to a symmetric multiprocessing (SMP) server. It is ideally suited for networking environments that require superior microprocessor performance, efficient memory management, flexibility, and large amounts of reliable data storage.

Performance, ease of use, reliability, and expansion capabilities were key considerations during the design of your server. These design features make it possible for you to customize the system hardware to meet your needs today, while providing flexible expansion capabilities for the future.

Your IBM Netfinity 7600 server comes with a three-year limited warranty and 90-Day IBM Start Up Support. If you have access to the World Wide Web, you can obtain up-to-date information about your server model and other IBM server products at the following World Wide Web address:

<http://www.ibm.com/pc/us/netfinity/>

Server specifications

The following table provides a summary of the features and specifications for your Netfinity 7600 server.

<p>Microprocessor:</p> <ul style="list-style-type: none"> Intel® Pentium®III Xeon™ 32 KB of level-1 cache 1 MB of level-2 cache (min) Expandable to four microprocessors <p>Memory:</p> <ul style="list-style-type: none"> Maximum: 16 GB Type: ECC, SDRAM, Registered DIMMs Slots: 4-way interleaved, 16 slots <p>Drives standard:</p> <ul style="list-style-type: none"> Diskette: 1.44 MB CD-ROM: 40X IDE <p>Expansion bays:</p> <ul style="list-style-type: none"> Hot-swap: 10 slim-high or 7 half high Non-hot-swap: Two 5.25-inch <p>PCI expansion slots:</p> <ul style="list-style-type: none"> Four 33 MHz 64-bit Two 66 MHz 64-bit <p>Hot-swap power supplies:</p> <p>250 Watt (115-230 V ac)</p> <ul style="list-style-type: none"> Minimum: Three Maximum: Four <p>Redundant cooling:</p> <ul style="list-style-type: none"> Four hot-swap fan assemblies <p>Video:</p> <ul style="list-style-type: none"> S3 video controller Compatible with SVGA and VGA 4 MB video memory 	<p>Size</p> <ul style="list-style-type: none"> Height: 356 mm (14 in.) (8U) Depth: 650 mm (25.6 in.) Width: 440 mm (17.3 in.) Weight: 34.4 kg (76 lb.) to 61 kg (134 lb.) depending upon configuration <p>Integrated functions:</p> <ul style="list-style-type: none"> Netfinity Advanced System Management processor IBM ServeRAID controller (three channels) Dual Ultra2 (LVD) SCSI controller, one external port, one internal port One 10BASE-T/100BASE-TX AMD Ethernet controller Two serial ports One parallel port Two universal serial bus ports Keyboard port Mouse port Video port <p>Acoustical noise emissions:</p> <ul style="list-style-type: none"> Sound power, idling: 6.3 bel maximum Sound power, operating: 6.3 bel maximum Sound pressure, operating: 48 dBA maximum 	<p>Environment:</p> <ul style="list-style-type: none"> Air temperature: <ul style="list-style-type: none"> 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 89.6° 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: <ul style="list-style-type: none"> Server on: 8% to 80% Server off: 8% to 80% <p>Heat output:</p> <p>Approximate heat output in British Thermal Units (BTU) per hour</p> <ul style="list-style-type: none"> Minimum configuration: 1023.9 BTU Maximum configuration: 2764.6 BTU <p>Electrical input:</p> <ul style="list-style-type: none"> Sine-wave input (50-60 Hz) required Input voltage low range: <ul style="list-style-type: none"> Minimum: 90 V ac Maximum: 137 V ac Input voltage high range: <ul style="list-style-type: none"> Minimum: 180 V ac Maximum: 265 V ac Input kilovolt-amperes (kVA) approximately: <ul style="list-style-type: none"> Minimum: 0.08 kVA Maximum: 0.52 kVA
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Table 1. Features and specifications

Notices used in this book

This information product contains notices that relate to a specific topic. The Caution and Danger notices also appear in the multilingual safety booklet that came with your Netfinity product. Each notice is numbered for easy reference to the corresponding notices in the safety booklet.

The notice definitions are as follows:

- **Notes:** These notices provide important tips, guidance, or advice.
- **Attention:** These notices indicate possible damage to programs, devices, or data. An attention notice is placed just before the instruction or situation in which damage could occur.
- **Caution:** These notices indicate situations that can be potentially hazardous to you. A caution notice is placed just before descriptions of potentially hazardous procedure steps or situations.
- **Danger:** These notices indicate situations that can be potentially lethal or extremely hazardous to you. A danger notice is placed just before descriptions of potentially lethal or extremely hazardous procedure steps or situations.

Server features

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

- **Impressive performance using an innovative approach to SMP**
Your server supports up to four Pentium III Xeon microprocessors. Your server comes with one microprocessor installed; you can install additional microprocessors to enhance performance and provide SMP capability.
- **Integrated disk-array subsystem**
Although many operating systems provide software fault tolerance through mirroring, IBM provides hardware fault tolerance through the redundant array of independent disks (RAID) controller. The IBM ServeRAID™ controller is a standard feature. It provides three channels and supports RAID levels 0, 1, 1E, 5, and 5E.
- **Large data-storage and hot-swap capabilities**
All models of the server support up to 10 slim-high or 7 half high hot-swap hard disk drives. This *hot-swap* feature enables you to remove and replace hard disk drives without turning off the server.
- **Hot-plug PCI adapter capabilities**
Your server has four *hot-plug* slots for PCI adapters. With operating system support, you can replace failing hot-plug PCI adapters without turning off the server. If the *hot-add* feature is supported by your operating system and the PCI adapter, you can also add PCI adapters in these slots without turning off the server.
- **Redundant cooling and power capabilities**
The redundant cooling and hot-swap capabilities of the fans in your server enable continued operation if one of the fans fails, because you can replace a failing fan without turning off the server.
The server comes standard with three 250-watt power supplies, which support redundancy for a typical configuration. You can install one additional power supply.

- **Large system memory**
The memory bus in your server supports up to 16 GB of system memory. The memory controller provides error correcting code (ECC) support for up to 16 industry-standard, 3.3 V, 168-pin, 8-byte, registered, dual inline memory modules (DIMMs). The memory controller also provides Chipkill™ memory protection. Chipkill memory protection is a technology that protects the system from component failure on a DIMM.
- **System-management capabilities**
Your server comes with a Netfinity Advanced System Management Processor. This processor, in conjunction with the Netfinity Manager software provided on your ServerGuide CDs, enables you to manage the functions of the server locally and remotely. The Netfinity Advanced System Management Processor also provides system monitoring, event recording, and dial-out alert capability.
Note: The Netfinity Advanced System Management Processor is sometimes referred to as the service processor.
Refer to “Chapter 5. Using Netfinity Manager,” on page 29 and “Advanced System Management ports” on page 103 for more information.
- **Integrated network environment support**
Your server comes with an Ethernet controller. This Ethernet controller has an interface for connecting to 10-Mbps or 100-Mbps networks. The server automatically selects between 10BASE-T and 100BASE-TX. The controller provides full-duplex (FDX) capability, which enables simultaneous transmission and reception of data on the Ethernet local area network (LAN).
- **Redundant network-interface card**
The addition of an optional, redundant network interface card (NIC) provides a failover capability to a redundant Ethernet connection. If a problem occurs with the primary Ethernet connection, all Ethernet traffic associated with this primary connection is automatically switched to the redundant NIC. This switching occurs without data loss and without user intervention.
- **IBM ServerGuide CDs**
The ServerGuide CDs included with your Netfinity server provide programs to help you set up your server and install the network operating system (NOS). The ServerGuide program detects the hardware options that are installed, and provides the correct configuration programs and device drivers. In addition, the ServerGuide CDs include a variety of application programs for your server.
For more information about the ServerGuide CDs, see “Chapter 4. Introducing ServerGuide,” on page 23.

Reliability, availability, and serviceability

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

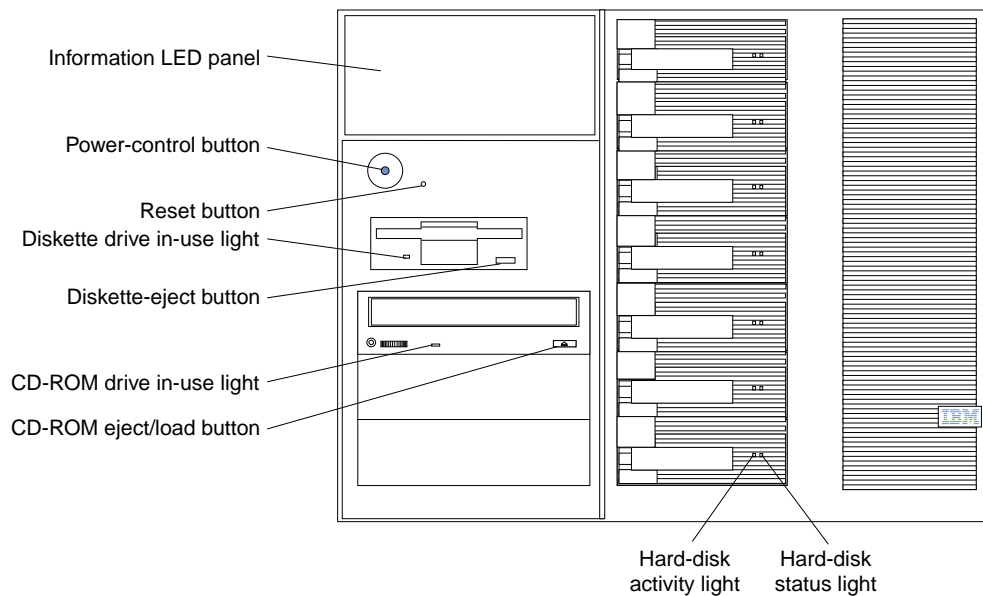
The following is an abbreviated list of the RAS features that your server supports.

- Menu-driven setup, system configuration, RAID configuration, and diagnostic programs
- Power-on self-test (POST)
- Integrated Netfinity Advanced System Management Processor
- Predictive Failure Analysis™ alerts
- Remote system problem-determination support

- Power and temperature monitoring
- Power-supply redundancy monitoring
- Fault-resistant startup
- Hot-swap drive bays
- Support for hot-plug PCI adapters
- Error codes and messages
- System error logging
- Upgradable BIOS, diagnostics, and Netfinity Advanced System Management Processor code
- Automatic restart after a power failure
- Parity checking on the SCSI bus and the PCI bus
- Error correcting code (ECC) memory
- Chip kill memory protection
- Redundant hot-swap power supplies and fans
- Redundant Ethernet capabilities (with optional adapter)
- Vital Product Data (VPD) on processors, processor board, I/O board, power supplies, hard disk backplane, power backplane and VRMs.
- Information and diagnostic LED panels
- Customer support center 24 hours per day 7 days a week¹

Controls and indicators

The following illustration shows the controls and indicators on the server.



Hard-disk drive status light: Each of the hot-swap drives has a status light. When this amber light is on continuously, the drive has failed. When the light flashes slowly (one flash per second), the drive is being rebuilt. When the light flashes rapidly (three flashes per second), the controller is identifying the drive.

¹.Service availability will vary by country. Response time will vary depending on the number and nature of incoming calls.

Hard-disk activity light: Each of the hot-swap drives has a hard-disk activity light. When this green light is flashing, the drive is being accessed.

CD-ROM eject/load button: Press this button to eject or retract the CD-ROM tray.

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

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

Diskette drive in-use light: When this light is on, the diskette drive is being accessed.

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

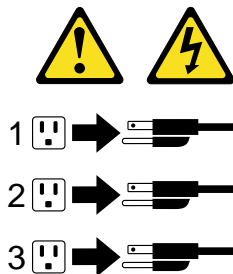
Power control button: Press this button to manually turn on or off the server.

Statement 5



CAUTION:

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



You can start the server in several ways:

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

Note: After you plug the power cords of your server into electrical outlets, wait 20 seconds before pressing the Power Control button. During this time, the system-management processor is initializing and the Power Control button does not respond.

- If the server is turned on, a power failure occurs, and unattended-start mode is enabled in the Configuration/Setup utility program, the server will start automatically when power is restored.
- If AC power is present, the server is off, and the wake-up feature is enabled in the Configuration/Setup utility program, the wake-up feature will turn on the server at the set time.
- If AC power is present, the server is off, and ring-signal detect is enabled in the Configuration/Setup utility program, you can turn on the server by telephone input.
- The Netfinity Advanced System Management Processor also can turn on the server.

You can turn off the server in several ways:

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

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

- You can press and hold the Power Control button for more than 4 seconds to cause an immediate shutdown of the server and place the server in standby mode. You can use this feature if the operating system stalls.

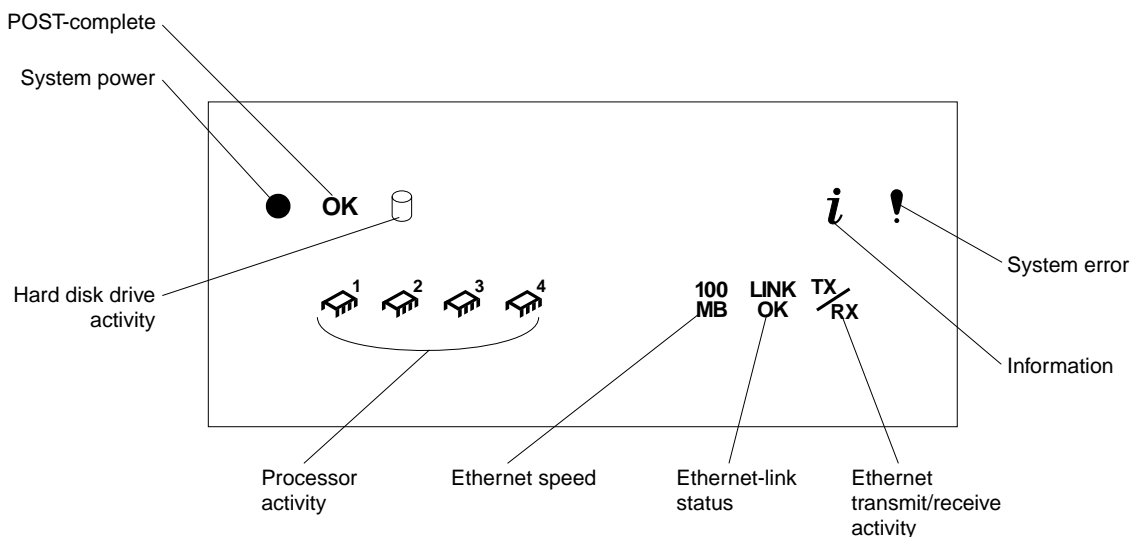
- You can disconnect the server power cords from the electrical outlets to shut off all power to the server.

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

Information LED panel: The lights on this panel give status information for your server. See “Information LED panel”.

Information LED panel

The following illustration shows the status lights on the Information LED panel.



System power light: When this green light is on, power is present in the server. When this light flashes, the server is in standby mode (the system power supply is turned off and ac current is present). When this light is off, the power subsystem, the ac power, or a light has failed.

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

POST-complete light: This green light is on when the power-on self-test (POST) completes without any errors.

Hard disk drive activity light: This green light flickers when there is activity on a hard disk drive.

Processor activity lights: One or more of these green lights are on when there is microprocessor activity. The number of lights that are on indicates the number of microprocessors with activity.

Information light: When this amber light is on, the server power supplies are nonredundant or some other noncritical event has occurred. The event is recorded in the Event log. See “Choices available from the Configuration/Setup main menu” on page 14 for instructions on viewing the Event log.

Ethernet transmit/receive activity light: When this green light is on, there is activity between the server and the network.

System error light: This amber light is on when a system error occurs. A light on the diagnostics LED panel will also be on to further isolate the error. (For more information, see “Diagnostic panel LEDs” on page 134.)

Ethernet-link status light: When this green light is on, there is an active connection on the Ethernet port.

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

Chapter 2. Arranging your workspace

To get the most from your server, arrange both the equipment you use and your work area to suit your needs and the kind of work you do. Your comfort is of foremost importance, but light sources, air circulation, and the location of electrical outlets also can affect the way you arrange your workspace.

Comfort

Although no single working position is ideal for everyone, here are a few guidelines to help you find a position that suits you best.

Sitting in the same position for a long time can cause fatigue. A good chair can make a big difference. The backrest and seat should adjust independently and provide good support. The seat should have a curved front to relieve pressure on the thighs. Adjust the seat so that your thighs are parallel to the floor and your feet are either flat on the floor or on a footrest.

When using the keyboard, keep your forearms parallel to the floor and your wrists in a neutral, comfortable position. Try to keep a light touch on the keyboard and your hands and fingers relaxed. You can change the angle of the keyboard for maximum comfort by adjusting the position of the keyboard feet.

Adjust the monitor so the top of the screen is at, or slightly below, eye level. Place the monitor at a comfortable viewing distance, usually 51 to 61 cm (20 to 24 in.), and position it so you can view it without having to twist your body. Also position other equipment you use regularly, such as the telephone or a mouse, within easy reach.

Glare and lighting

Position the monitor to minimize glare and reflections from overhead lights, windows, and other light sources. Even reflected light from shiny surfaces can cause annoying reflections on your monitor screen. Place the monitor at right angles to windows and other light sources, when possible. Reduce overhead lighting, if necessary, by turning off lights or using lower wattage bulbs. If you install the monitor near a window, use curtains or blinds to block the sunlight. You might have to adjust the Brightness and Contrast controls on the monitor as the room lighting changes throughout the day.

Where it is impossible to avoid reflections or to adjust the lighting, an antiglare filter placed over the screen might be helpful. However, these filters might affect the clarity of the image on the screen; try them only after you have tried all other methods of reducing glare.

Dust buildup compounds problems that are associated with glare. Remember to clean your monitor screen periodically using a soft cloth that is moistened with a nonabrasive liquid glass cleaner.

Air circulation

Your server and monitor produce heat. Your server has one or more fans that pull in fresh air and force out hot air. The monitor lets hot air escape through vents. Blocking the air vents can cause overheating, which might result in a malfunction or damage.

Place the server and monitor so that nothing blocks the air vents; usually, 15 cm (6 inches) of air space is sufficient. Also, make sure that the vented air is not blowing on someone else.

Electrical outlets and cable lengths

The location of electrical outlets and the length of power cords and cables that connect to the monitor, printer, and other devices might determine the final placement of your server.

When arranging your workspace:

- Avoid the use of extension cords. When possible, plug the server power cords directly into electrical outlets.
- Keep power cords and cables neatly routed away from walkways and other areas where they might get kicked accidentally.

For more information about power cords, see “Power cords” on page 174.

Chapter 3. Configuring your server

The following configuration programs are provided with your server:

- **Configuration/Setup Utility**

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

With the built-in SCSISelect Utility program, you can configure the devices attached to the integrated SCSI controller. See “Using the SCSISelect utility program” on page 19 for more information.
- **ServerGuide CDs**

The ServerGuide CDs include software setup and installation tools specifically designed for IBM Netfinity servers. You can use these CDs during the initial installation of your server to configure the server hardware and simplify your network operating system installation. The ServerGuide CDs also contain a collection of application programs, which you can install after your server is up and running. See “Chapter 4. Introducing ServerGuide,” on page 23 for more detailed information.
- **ServeRAID programs**

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

Using the Configuration/Setup Utility program

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

Starting the Configuration/Setup Utility program

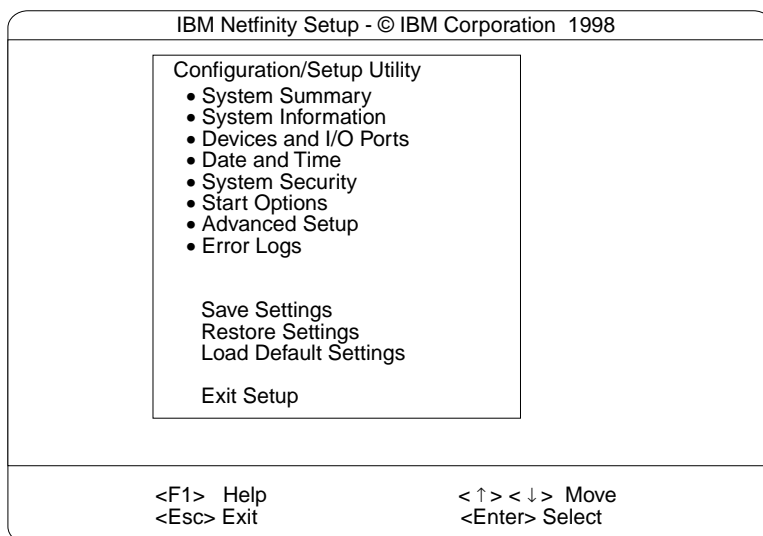
To start the Configuration/Setup Utility program:

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

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

Choices available from the Configuration/Setup main menu

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



Notes:

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

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

- **System Summary**

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

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

This choice appears on both the full and limited Configuration/Setup Utility menus.
- **System Information**

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

 - **Product Data**

Select this choice to view system information, such as the machine type and model, the server serial number, and the revision level or issue date of the BIOS stored in the flash electronically erasable programmable ROM (EEPROM).

— **System Card Data**

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

• **Devices and I/O Ports**

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

• **Date and Time**

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

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

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

• **System Security**

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

You can implement two levels of password protection:

— **Power-on Password**

Select this choice to set or change a power-on password. See "Using passwords" on page 17 for more information.

— **Administrator Password**

Select this choice to set or change an administrator password.

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

The administrator password provides access to all choices on the Configuration/Setup Utility main menu. You can set, change, or delete both the administrator and power-on passwords, and allow a power-on password to be changed by the user.

See "Using passwords" on page 17 for more information.

— **System Owner's Name**

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

• **Start Options**

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

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

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

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

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

- **Advanced Setup**

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

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

- **Processor Serial Number Access**

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

- **Core Chipset Control**

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

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

- **Cache Control**

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

- **PCI Slot/Device Information**

Select this choice to view and identify system resources used by PCI devices. PCI devices automatically communicate with the server configuration information. This usually results in automatic configuration of a PCI device.

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

After making changes, select:

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

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

- The default setting is Enable for all the controllers and PCI slots. If you select Disable, the system will not configure the disabled device and the operating system will not see the device. (This is equivalent to unplugging the device.)

- If the on-board SCSI controller is disabled and no other controller and mass storage device are installed, operating system startup cannot occur.
- If the video controller is disabled and no video adapter is installed, the server will have no video capability. However, turning the server off and on three times without completing POST results in a default startup that enables video again.
- **Memory Settings**
Select this choice to manually disable or enable a bank of memory.
If a memory error is detected during POST or memory configuration, the server can automatically disable the failing memory bank and continue operating with reduced memory capacity. If this occurs, you must manually enable the memory bank after the problem is corrected. Select **Memory Settings** from the Advanced Setup menu, use the arrow keys to highlight the bank that you want to enable; then, use the arrow keys to select **Enable**.
- **System Service Processor Settings**
Select this choice to enable or disable power supply redundancy monitoring.
- **Event/Error Logs**
Select this choice to view or clear error logs.
 - Select **Clear error logs** to clear the error or event log.
 - Select **POST Error Log** to view the three most recent error codes and messages that the system generated during POST.
 - Select **System Event/Error Log** to view the system event/error log. The system event/error log contains all the system error and warning messages that the system has generated. You can use the arrow keys to move between pages in the system event/error log.
- **Save Settings**
Select this choice to save your customized settings.
- **Restore Settings**
Select this choice to delete your changes and restore the previous settings.
- **Load Default Settings**
Select this choice to cancel your changes and restore the factory settings.
- **Exit Setup**
If you have made any changes, the program will prompt you to save the changes or exit without saving the changes.

Using passwords

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

Power-on password

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

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

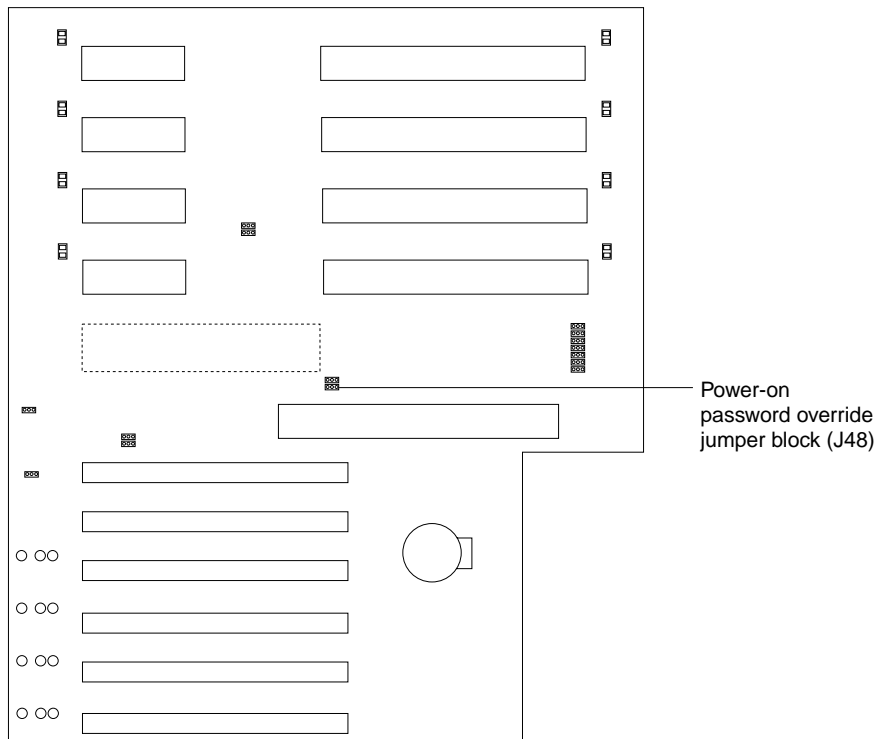
the power-on password, you can regain access to the server through one of the following methods:

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

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

- Enter the administrator password at the power-on prompt, if an administrator password has been set. Start the Configuration/Setup Utility program and change the power-on password.
- Change the position of the jumper on J48 to bypass the power-on password check. You can then start the Configuration/Setup Utility program and change the power-on password.

The following illustration the location of J48.



Administrator password

Select this choice to set an administrator password. The administrator password provides access to all choices on the Configuration/Setup Utility main menu. You can set, change, or delete both the administrator and power-on passwords, and allow a power-on password to be changed by the user.

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

The following table provides a summary of the password features.

Type of password	Results
Power-on password	<ul style="list-style-type: none">• Enter the password to complete the system startup.• All choices are available on the Configuration/Setup Utility main menu.
Administrator password	<ul style="list-style-type: none">• No password is required to start the system.• Enter the password to access the Configuration/Setup Utility program.• All choices are available on the Configuration/Setup Utility main menu.
Administrator <i>and</i> power-on password	<ul style="list-style-type: none">• You can enter either password to complete the system startup.• The administrator password provides access to all choices on the Configuration/Setup Utility main menu. You can set, change, or delete both the administrator and power-on passwords, and allow a power-on password to be changed by the user.• The power-on password provides access to a limited set of choices on the Configuration/Setup Utility main menu. This limited access might include changing or deleting the power-on password.

Table 2. Power-on and administrator password features

Using the SCSISelect utility program

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

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

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

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

Starting the SCSISelect utility program

To start the SCSISelect utility program:

1. Turn on the server.
2. When the <<< Press <CTRL><A> for SCSISelect™ Utility! >>> prompt appears, press Ctrl+A.
Note: If an administrator password has been set, a prompt appears asking you to enter the password to start the SCSISelect Utility program.
3. When prompted, select either channel A or channel B.
4. Use the arrow keys to select a choice from the menu.
 - Press Esc to return to the previous menu.
 - Press the F5 key to switch between color and monochrome modes (if your monitor permits).
5. Follow the instructions on the screen to change the settings of the selected items; then, press Enter.

Choices available from the SCSISelect menu

The following choices appear on the SCSISelect Utility menu:

- **Configure/View Host Adapter Settings**
Select this choice to view or change the SCSI controller settings. To reset the SCSI controller to its default values, press F6; then, follow the instructions that appear on the screen.
You can view or change the following controller settings:
 - **Host Adapter SCSI ID**
Select this choice to view the SCSI controller ID, normally 7.
 - **SCSI Parity Checking**
Select this choice to view the assigned value of *Enabled*.
 - **Host Adapter SCSI Termination**
Select this choice to view the assigned value of *Automatic*.
 - **Boot Device Options**
Select this choice to configure startable device parameters. Before you can make updates, you must know the ID of the device whose parameters you want to configure.
 - **SCSI Device Configuration**
Select this choice to configure SCSI device parameters. Before you can make updates, you must know the ID of the device whose parameters you want to configure.
Note: The Maximum Sync Transfer Rate represents the transfer rate for Ultra SCSI devices.
 - The transfer rate for Ultra-3 SCSI LVD devices is 160.0
 - The transfer rate for Ultra-2 SCSI LVD devices is 80.0
 - The transfer rate for Fast SCSI devices is 20.0

— **Advanced Configuration Options**

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

• **SCSI Disk Utilities**

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

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

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

• **Format Disk**

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

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

Use the Low-Level Format program:

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

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

To start the Low-Level Format program:

1. If the hard disk is working, make a backup copy of all the files and programs on the hard disk drive. (See your operating system information for instructions.)
2. Select **Format Disk**; then, follow the instructions on the screen.

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

Chapter 4. Introducing ServerGuide

The ServerGuide CDs include easy-to-use server software setup and installation tools, specifically designed for IBM Netfinity servers. The ServerGuide Netfinity Setup and Installation program detects the server model and hardware options installed and uses the information during setup to configure hardware. You can simplify Network operating system (NOS) installations because ServerGuide provides updated device drivers, and in some cases, installs them automatically.

If there is a newer version of ServerGuide available, you can purchase an update package. For details, see the *Software Coupon* form that comes with your *Netfinity Server Library*, or visit our Web site at: <http://www.ibm.com/pc/coupon>

ServerGuide provides the following to make setup easier

- Simple to use GUI interface with online help provided.
- Diskette-free setup; configuration programs displayed are based on detected hardware options.
- *Netfinity Performance Optimizer* program easily *tunes* your server for your specific environment.
- System BIOS update program; updates the BIOS level directly from the CD.
- Correct device drivers are provided based on the server model and hardware detected.
- NOS partition size and file system type are selectable during setup.
- Popular network operating system (NOS) updates provided on the ServerGuide *Operating System Updates CD*. No need to download and install diskettes.
- Includes Administrator tools such as Diskette Factory.
- Powerful application programs are provided at no additional charge.

Features at a glance

Summary of ServerGuide features:

Note: Exact features and functions can vary with the release of ServerGuide. To learn more about the release you that have, start the *Netfinity Setup and Installation* CD and view the online overview.

<p>Netfinity Setup and Installation CD</p> <p>Note: Requires a supported Netfinity server with an <i>enabled</i> startable (bootable) CD-ROM drive. Not all features are supported on all models.</p> <ul style="list-style-type: none"> Sets system date and time. Detects the ServeRAID adapter or controller and runs the ServeRAID configuration program. Updates the licensed internal code (firmware) level without creating diskettes. Checks the system BIOS level to see if a later level is available from the CD. Can update BIOS without creating diskettes. Updates firmware for Advanced System Management adapters and controllers. Provides the <i>Netfinity Performance Optimizer</i> program to easily <i>tune</i> your server for your environment. Creates a system partition on the default drive. You can run server-specific utility programs after setup. Detects installed hardware options and provides updated device drivers for most adapters and devices. 	<p>Netfinity Setup and Installation CD (Con'd.)</p> <ul style="list-style-type: none"> Diskette-free installation available fro Windows 2000, Windows NT, and NetWare. Provides a "Replicated" installation path for multiple Windows 2000, Windows NT Server 4.0, and Windows Enterprise Edition installations. Includes an online README file with links to tips for your particular hardware and NOS installation. <p>Note: Installation requires your NOS CD.</p> <p>Diskette Factory</p> <ul style="list-style-type: none"> With a few mouse-clicks, you can create diagnostic, device driver, adapter, and other diskettes for IBM Netfinity servers. Includes a vast library of fully-tested device drivers. The <i>Diskette Factory</i> CD links you to the Web to check for the latest diskette images (requires Windows and an Internet connection.) Search function helps locate diskettes by title or keywords. 	<p>Operating System Updates CD</p> <ul style="list-style-type: none"> Provides current updates from the software developer for supported network operating systems. Installs directly from CD; no diskettes are required. <p>Netfinity Applications CD</p> <ul style="list-style-type: none"> Installs powerful applications. Activation keys are not required. Diskettes are not required, installs applications directly from CD. <p>TechConnect CD</p> <p>The TechConnect CD is now included with your server. View or print server documentation. Topics can include:</p> <ul style="list-style-type: none"> Netfinity server manuals Technical publications Software integration guides (IBM Redbooks) Industry topics Marketing brochures <p>Note: No-cost subscription service is available; visit: www.ibm.com/pc/techconnect</p>
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Setup and Configuration overview

When you use the *Netfinity Setup and Installation* CD, you do not need setup diskettes. You can configure any supported IBM Netfinity server model. The setup program detects the server model, and displays only the ServeRAID or system configuration programs you need, all in a wizard interface.

The following is a brief explanation of a typical hardware configuration from ServerGuide:

Note: Exact features and functions can vary with the release of ServerGuide.

- When you start the *Netfinity Setup and Installation* CD, you are prompted for your language, country, and keyboard layout. (This information is stored and later passed on to the network operating system (NOS) installation program.)
- ServerGuide presents choices for running the configuration programs. For example:
 - The *Express* path runs the required programs for your server, based on the hardware detected.
 - The *Custom* path displays all programs available for your server, and you decide which programs to run.

Note: The following programs are optional if you select the Custom path. You can run any or all programs.

- The Set Date and Time feature is provided so you do not have to go into setup (F1) to access these settings.
- ServerGuide checks the server BIOS and microcode (firmware) levels for supported options, then checks the CD for a newer level. (CD content can be newer than the hardware.) ServerGuide can *flash* update the BIOS level.
- The ServeRAID configuration program starts, leading you through the entire configuration process.
- Before the setup program completes, ServerGuide creates a system partition on the default drive.
- The *Netfinity Performance Optimizer* program easily *tunes* your server for your specific environment.
- ServerGuide displays a confirmation record, so you know when you have completed all the required programs. Next, you are ready to install your NOS.

Notes:

1. Plug and Play adapters configure automatically. Legacy or non-IBM adapters might require switch settings, additional device drivers, and installation after installing the NOS. See the documentation that comes with the adapter.
2. Diagnostics for your server are either in Read-Only Memory (ROM), or on a separate diagnostics CD that comes with your server.

Looking for a list of compatible adapters? Visit the IBM *ServerProven* Web site at: <http://www.pc.ibm.com/compat>

System Partition

ServerGuide creates a system partition on the default drive. The system partition provides server-specific utility programs, such as the Service Processor DOS Utility Program.

To access programs on the system partition, restart the server and press Alt+F1 when the Alt+F1 prompt appears on the screen. The system partition menu displays the programs available for your server model.

Network operating system (NOS) installation

Note: To find out which servers run utility programs from the system partition, start the *Netfinity Setup and Installation* CD and view the online overview.

Network operating system (NOS) installation overview

You can use ServerGuide to shorten your installation time. ServerGuide provides the necessary device drivers, based on the hardware and NOS you are installing.

The following is a brief explanation of a typical ServerGuide NOS installation.

Note: Exact features and functions can vary with the release of ServerGuide.

- After you have completed the setup process, you are ready to load the operating system installation program. (You will need your copy of the NOS CD to complete the installation.)
- ServerGuide stores information about the server model, service processor, hard disk controllers, and network adapters. ServerGuide then checks the CD for newer device drivers. (ServerGuide stores this information for the NOS installation program.)
- ServerGuide presents partition options that are based on your NOS selection and hard disk drive size (if applicable).
- If you are installing from diskette, ServerGuide displays the required diskettes you must create as well as the optional diskettes you might want to create. The diskettes you can create are the device driver diskettes that match the installed adapters or controllers.
- ServerGuide will prompt you to insert your NOS CD and restart the server. At this point, the NOS program (for example, Microsoft Windows NT Server) takes control to complete the installation.

Setting up multiple servers

ServerGuide helps you set up multiple Windows 2000, Windows NT Server 4.0, and Windows NT Server 4.0 Enterprise Edition systems. During the ServerGuide setup, just select the option to create a *Replicated Installation Diskette*. The diskette you create will contain the server name, domain name, and all other information that is needed to complete multiple installations.

Use the *Replicated Installation Diskette*, along with ServerGuide, to set up multiple servers. You can modify the diskette if you want to install different options on one of the servers. Because ServerGuide also has the correct device drivers for your Netfinity server, you will save a lot of time in the process.

Installing your NOS without ServerGuide

If you have already configured the server hardware, and you decide not to use ServerGuide to install your NOS, do the following:

Download the latest NOS installation instructions and device drivers from the World Wide Web at:

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

1. Select **Servers**.
2. From the **Family** field, select your server model.

3. To download NOS installation instructions, click **Software information**. The information appears on the window.

Additional programs included with ServerGuide

As a convenience, ServerGuide comes with additional software to assist you with the server installation.

NOS updates

ServerGuide includes selected NOS updates that are provided by NOS software developers. Refer to the README file on the root directory of the ServerGuide *Operating System Updates* CD.

Applications

A variety of powerful applications are included with ServerGuide, and you do not need activation keys. Offerings can vary with the release. Check the *Netfinity Applications* CD labels for a list, or start the *Netfinity Setup and Installation* CD and view the online overview.

Installing applications

Installation instructions vary with the NOS you are using. Refer to the NOS-specific installation instructions that are printed on each ServerGuide *Netfinity Applications* CD label.

Note: You will also receive a *TechConnect* CD with your server. You must have Windows installed to run the TechConnect program. The program "autostarts" when the CD is inserted.

Error symptoms

This section provides ServerGuide error symptoms and troubleshooting tips.

Look for the symptom in the left column of the chart. Probable solutions to the problem are in the right column.

Setup	Action
<i>Netfinity Setup and Installation</i> CD will not start.	<ul style="list-style-type: none">• Be sure the system is a supported Netfinity server with a startable (bootable) CD-ROM drive.• If the startup (boot) sequence settings have been altered, be sure the CD-ROM is first in the boot sequence.• If more than one CD-ROM drive is installed, be sure that only one drive is set as the primary drive. Start the CD from the primary drive.
ServeRAID program cannot view all installed drives - or - cannot install NOS.	<ul style="list-style-type: none">• Be sure there are no duplicate SCSI IDs or IRQ assignments.• Be sure that the hard disk drive is connected properly.

Network operating system (NOS) installation

Setup	Action
The <i>Operating System Installation</i> program continuously loops.	Free up more space on the hard disk.
ServerGuide will not start <i>your</i> NOS CD.	Be sure the NOS CD you have is supported by ServerGuide. See the <i>Netfinity Setup and Installation</i> CD label for a list of NOS versions supported.
Cannot install NOS - option is grayed out.	Be sure the NOS is supported on your server. If the NOS is supported, either there is no logical drive defined (ServeRAID systems) or the ServerGuide system partition is not present. Run the setup and configuration program.
TechConnect CD	Action
Cannot start TechConnect CD.	Be sure you are starting the CD on a system with Microsoft Windows installed.
Cannot view publications from TechConnect CD, or text is unreadable.	Be sure you have the Adobe reader installed (available from the TechConnect CD).
Diskette Factory CD	Action
Get "time out" or "Unknown host" errors	Be sure you have access to the Internet through FTP directly.

Chapter 5. Using Netfinity Manager

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

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

- **Serial Connection Control**

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

- **Netfinity Manager for Web**

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

Managing your IBM Netfinity server with Netfinity Manager

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

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

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

Netfinity Manager documentation

The Netfinity directory on the *ServerGuide Netfinity Applications* CD contains online versions (*.PDF format) of all Netfinity Manager documentation. For more information on included documentation, see “Getting more information about Netfinity Manager” on page 55.

Netfinity Manager system requirements

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

- If you are installing Netfinity Manager for OS/2, see “Netfinity Manager for OS/2 system requirements”.
- If you are installing Netfinity Manager for Windows 95 (or Windows 98), see “Netfinity Manager for Windows 95 and Windows 98 system requirements” on page 31.
- If you are installing Netfinity Manager for Windows NT, see “Netfinity Manager for Windows NT system requirements” on page 31.

Netfinity Manager for OS/2 system requirements

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

- OS/2 version 3.0 or later
- Approximately 19 MB–22 MB of hard disk space (space required depends on system configuration)
- A LAN adapter card and one or more of the following communications protocols:
 - IBM TCP/IP for OS/2 version 1.2 or later (required for Netfinity Manager with Web Enhancement)
 - NetBIOS
 - Note:** The Netfinity Manager NetBIOS requirements are three names, two sessions, and nine network control blocks (NCBs).
 - IPX
 - SNA (IBM Communications Manager/2 version 1.1 only)
 - Note:** Systems using Netfinity Manager with Microsoft SNA Server cannot communicate with systems that run the Microsoft SNA Server client. Netfinity Manager supports only server-to-server communications between systems that run Microsoft SNA Server software. However, Netfinity Manager systems running Microsoft SNA Server can communicate with other Netfinity Manager systems using any of the other supported SNA stacks.
- A 9600 baud or greater modem (optional).

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

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

Netfinity Manager for Windows 95 and Windows 98 system requirements

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

- Microsoft Windows 95 or later
- Approximately 17 MB–20 MB of hard disk space (space required depends on system configuration)
- A LAN adapter card and one or more of the following communications protocols:
 - TCP/IP (must be WinSock Version 1.1-compatible; required for Netfinity Manager with Web Enhancement)
 - NetBIOS
 - Note:** The Netfinity Manager NetBIOS requirements are three names, two sessions, and nine network control blocks (NCBs).
 - IPX
 - SNA (PCOMM 4.1 or later SNA stack)
 - Note:** Systems using Netfinity Manager with Microsoft SNA Server cannot communicate with systems that run the Microsoft SNA Server client. Netfinity Manager supports only server-to-server communications between systems that run Microsoft SNA Server software. However, Netfinity Manager systems running Microsoft SNA Server can communicate with other Netfinity Manager systems using any of the other supported SNA stacks.
- A 9600 baud or greater modem (optional).

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

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

Netfinity Manager for Windows NT system requirements

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

- Microsoft Windows NT version 4.0 or later
- Approximately 17 MB–20 MB of hard disk space (space required depends on system configuration)
- A LAN adapter card and one or more of the following communications protocols:
 - TCP/IP (must be WinSock Version 1.1-compatible; required for Netfinity Manager with Web Enhancement)
 - NetBIOS
 - Note:** The Netfinity Manager NetBIOS requirements are three names, two sessions, and nine network control blocks (NCBs).
 - IPX
 - SNA (Microsoft SNA Server version 2.11 with Service Pack 1 and WCPIC32.DLL dated 01/22/97 or later. This DLL is available from Microsoft)

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

- A 9600 baud or greater modem (optional).

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

Notes:

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

Starting the Netfinity Manager installation program

For instructions on installing Client Services for Netfinity Manager, see the documentation listed in “Getting more information about Netfinity Manager” on page 55.

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

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

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

`x:\SCW95`

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

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

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

- e. Click **Install Product** to start the installation process.

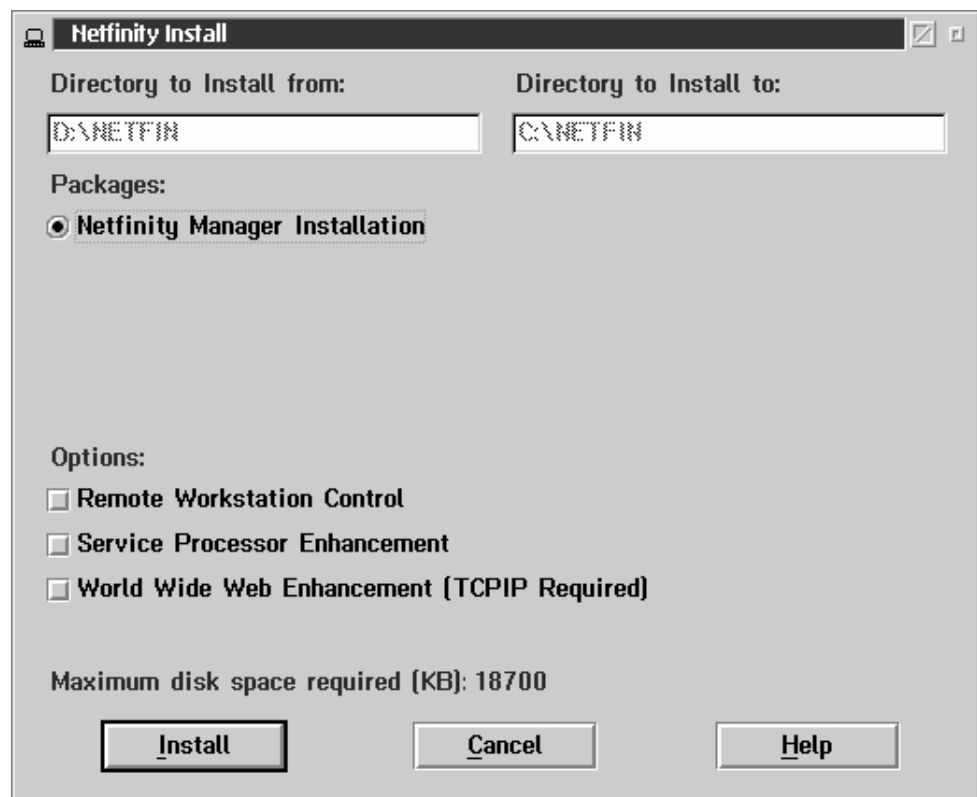
4. Choose a drive and directory from which the Netfinity Manager program files will be copied.

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

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

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

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



7. Select installation options.

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

The available installation options are:

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

8. Install Netfinity Manager.

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

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

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

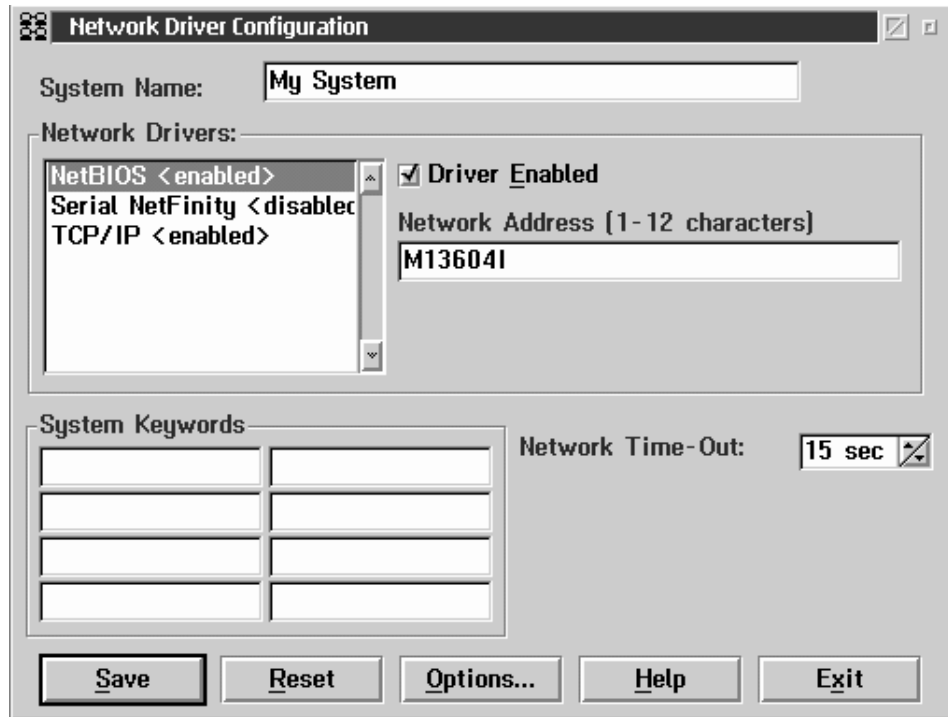
- Alert Manager
- Alert on LAN® Configuration (available only on systems running Windows 95 or later or Windows NT 4.0 or later)
- Capacity Management (available only on systems running Windows NT 4.0 or later)
- Cluster Manager (available only on systems running Windows NT 4.0 or later)
- Critical File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

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

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

9. Configure the Network Drivers.

If the installation configuration allows for network access, enter information regarding the communication protocols that are supported by the system. The Network Driver Configuration window will appear.



Follow these steps to continue configuring the system:

- a. Enter a System Name.

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

- b. Select a Network Driver.

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

Notes:

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

- c. Enable the Network Driver.

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

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

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

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

e. Select Netfinity Manager Options (optional)

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

- Force Remote Logons

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

- Service Execution Alerts

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

- Show Network Support

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

- Remote User Authorization for Screen Access

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

- Disable DNS Name Resolution

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

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

- (1) Click **Options...**
- (2) Select one or more Netfinity Manager options.
- (3) Click **Save**.

f. Set the Network Time-out Value (optional).

The **Network Time-out** field shows the number of seconds that Netfinity Manager will attempt to communicate with a remote system that is not responding. If Netfinity Manager does not establish contact with the remote system within this time, it cancels the communication attempt. The Network Time-out default setting is 15 seconds. This default setting might not need to be altered.

g. Save the configuration and continue.

Click **Save** to save the configuration. Then, click **Exit** to continue.

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

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

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

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

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

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

Netfinity Manager database support

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

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

- Alert Manager
- Software Inventory
- System Information Tool
- System Profile
- System Monitor

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

- If support for DB2 database export is being installed, see “DB2 database support”.
- If support for Lotus Notes database export is being installed, see “Lotus Notes database support” on page 43.
- If support for ODBC database export is being installed, see “ODBC database support” on page 44.

DB2 database support

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

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

System requirements

Netfinity Manager DB2 database export is supported on systems running Netfinity Manager for OS/2, Netfinity Manager for Windows 95, Netfinity Manager for Windows 98, and Netfinity Manager for Windows NT. For more information about supported version numbers refer to Table 3 on page 48.

Attention:

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

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

Installing and configuring the database

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

Note: If your primary system is OS/2, refer to “Installing the database on OS/2” on page 39.

1. Start a DB2 command window.

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

2. Type the following command:

```
DB2 CREATE databasename ON d
```

where

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

3. Press Enter.
4. Next, you must configure the tables for ODBC database support. For information on configuring the database for ODBC, refer to “ODBC database configuration” on page 45. For information on creating the tables, refer to “Creating the Netfinity Manager tables” on page 46.
5. Finally, you must bind the database. For information on binding the database, refer to “Activating the database”.

Installing the database on OS/2:

1. Insert the Netfinity Manager CD into the CD-ROM drive (in this example, drive D; individual drive letters might be different).
2. Start an OS/2 window or full-screen session.
3. Make the CD-ROM drive the active drive.
Type D: and then press Enter.
4. Type the following command at the OS/2 prompt:
NETFINDB CREATE /DBNAME=*dbname* /DRIVE=*d*
where *dbname* is the name of the database and *d* is the drive where the database will be located.
Note: If any part of the database already exists, the utility program will create only the portions of the database that are missing.
5. Press Enter.

Activating the database

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

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

Granting and revoking database privileges

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

Note: If your primary system is OS/2, refer to “Database privileges on OS/2 systems” on page 41.

1. Start a DB2 command window.
Notes:
 - a. If it is not already running, start the DB2 database manager.
 - b. If you are not connected to the DB2 Netfinity database, connect to the database now.
2. Type the following command:

```
DB2 GRANT privilegecode ON TABLE tablename TO userid
```

where

- *privilegecode* is one of the following privilege codes:
 - ALL
 - ALL PRIVILEGES
 - Note:** Grants all the appropriate privileges, except CONTROL, on the database.
 - ALTER
 - CONTROL
 - DELETE
 - INDEX
 - INSERT
 - REFERENCES
 - SELECT
 - UPDATE
- *tablename* is the name of the table as specified during database installation. A listing of the Netfinity database table names can be found in the *Netfinity User's Guide* (Appendix H: Netfinity Relational Database Tables).
 - Note:** The Netfinity Database Administration Tool can also be used to GRANT or REVOKE privileges.
- *userid* is the user ID to be granted access

3. Press Enter to execute the command.

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

Database privileges on OS/2 systems:

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

Type the following command at the OS/2 prompt:

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

and then press Enter.

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

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

Type the following command at the OS/2 prompt:

```
DB2 CONNECT RESET
```

and then press Enter.

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

To grant or revoke table privileges on OS/2:

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

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

where

- *id* is the user ID to be granted access

- *dbname* is the name of the database as specified during NETFINDB execution
- *privilegecode* is one of the following privilege codes:
 - ALL
 - ALTER
 - CONTROL
 - DELETE
 - INDEX
 - INSERT
 - REFERENCES
 - SELECT
 - UPDATE

d. Press Enter to execute the command.

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

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

To configure Netfinity Manager to discontinue export data through ODBC for use on DB2, refer to “ODBC database support” on page 44.

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

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

Deleting the database

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

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

1. Start a DB2 command window.
2. Type

```
DB2 DROP DATABASE dbname
```

where

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

3. Press Enter.

Deleting the database on OS/2: 1. Insert the *Netfinity Manager CD-ROM* into the database server CD-ROM drive (in this example, the CD-ROM drive is E).

2. Start an OS/2 window or full-screen session.
3. Make the CD-ROM drive the active drive.

Type E: and press Enter.

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

```
NETFINDB DELETE /DBNAME=dbname
```

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

5. Press Enter.

To configure Netfinity Manager to discontinue export data through ODBC for use on DB2, refer to “ODBC database support” on page 44.

Lotus Notes database support

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

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

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

System requirements

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

- Lotus Notes
- Lotus Notes client

For information on what versions of Lotus Notes and the Lotus Notes client are supported, see Table 3 on page 48. See the *Notes Administrator's Guide* for general system requirements and supported communications protocols.

Installing the database

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

1. Copy NETFINDB.NTF from the Netfinity program directory to the Notes data directory on the Lotus Notes server.
2. Start Lotus Notes on the server.
3. Click **New Database...** from the Notes File pull-down menu.
This opens the New Database window.
4. Click **Netfinity Database** from the Template selection list.
5. Check the **Inherit Future Design Changes** check box.

This enables future releases of Netfinity Manager to automatically apply changes to this Netfinity Manager database.

6. Click **Local** from the Servers selection list.

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

7. Type in the **Filename** field:

NETFINDB.NSF

8. Type in the **Title** field:

Netfinity Database

9. Click **New** to create the database and close the New Database window.
10. Double-click the Netfinity Database icon in the Lotus Notes workspace.
11. Click **Database** in the File pull-down menu.

12. Click **Access Control...** in the Database pull-down menu.
13. Set the Access Level for all Netfinity Manager systems that will be exporting data to this database to **Editor**.
14. Check the **Can Delete Documents** check box.
15. Click **OK**.

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

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

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

Browsing the Netfinity Manager Lotus Notes database

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

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

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

Note: Some menu selections will contain submenus.

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

ODBC database support

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

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

System requirements

The minimum requirements for Netfinity Manager ODBC database export are:

- Windows NT

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

For detailed information about supported ODBC platforms, see Table 3 on page 48.

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

ODBC database configuration

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

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

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

Notes:

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

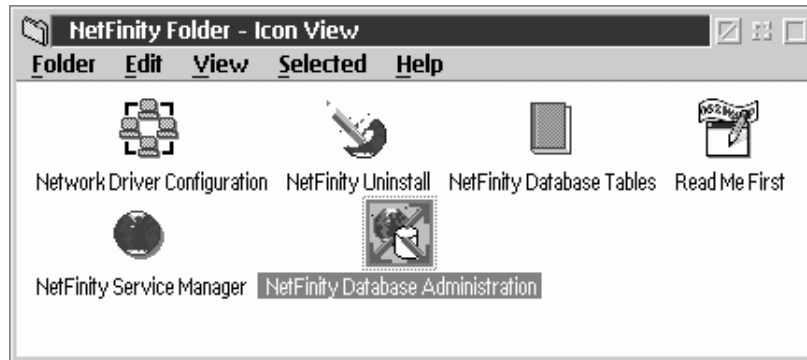
Note: If the Event Scheduler or Alert Manager will be used to export data using ODBC, continue to have the ID which made the database an ODBC source logged on during the time Event Scheduler will be exporting data.

Creating the Netfinity Manager tables

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

1. Open the Netfinity Manager Database Administration service.

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



2. Select a DBMS.

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



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

The following table actions are also available:

- Delete

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

- Grant

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

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

- Revoke

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

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

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

5. Click **OK**.

The Netfinity Manager Database Access window opens.

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

`netfin`

netfin is the qualifier name of the Netfinity Manager database.

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

8. Click **OK**.

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

Supported and certified databases

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

Table 3. Supported Netfinity Databases. Reference by operating system and database client version.

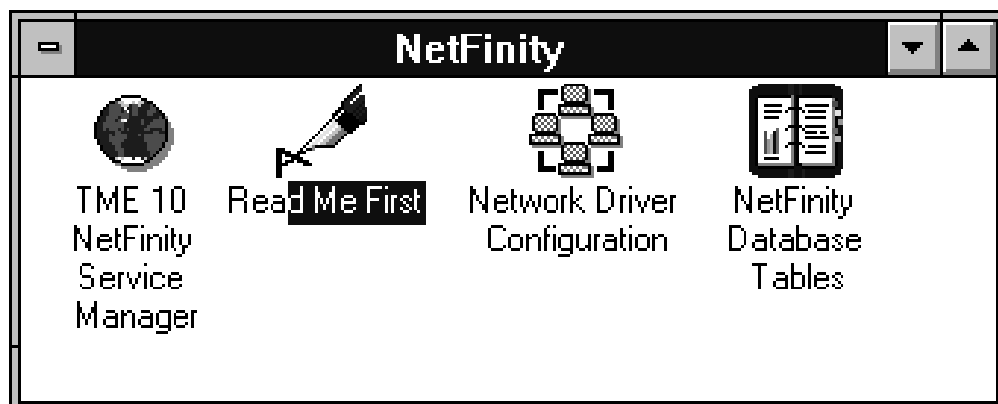
Product	Windows 95	Windows NT 3.51	Windows NT 4.0	OS/2 Warp Connect	OS/2 Warp 4.0
IBM DB2 Version 2.1.2	Yes	Yes	Yes	Yes	Yes
IBM DB2 Universal Database 5.0	Yes	Yes	Yes	Yes	Yes
ODBC - IBM DB2 Version 2.1.2	Yes, DB2 Driver	Yes, DB2 Driver	Yes, DB2 Driver	Yes, DB2 Driver	Yes, DB2 Driver
ODBC - IBM DB2 Universal Database 5.0	Yes, DB2 Driver	Yes, DB2 Driver	Yes, DB2 Driver	Yes, DB2 Driver	Yes, DB2 Driver
ODBC - Microsoft SQL Version 7.0	Yes, Microsoft SQL Driver	Yes, Microsoft SQL Driver	Yes, Microsoft SQL Driver	Yes, Visigenic Driver Version 1.10	No
ODBC - Microsoft SQL Version 6.5	Yes, Microsoft SQL Driver	Yes, Microsoft SQL Driver	Yes, Microsoft SQL Driver	No	No
Lotus Notes Version 4.5.2	Yes	Yes	Yes	Yes	Yes
Lotus Notes Version 4.5.3a	Yes	Yes	Yes	Yes	Yes
Lotus Notes Version 4.6	Yes	No	Yes	No	No
Lotus Notes Version 4.6a	Yes	No	Yes	No	No
Lotus Notes Version 4.63	Yes	No	Yes	No	No
Oracle Version 7.3	Yes, Oracle Driver Version 2.0.3.1.1	Yes, Oracle Driver Version 2.0.3.1.1	Yes, Oracle Driver Version 2.0.3.1.1	No	No
Oracle Version 8.0	Yes, Oracle Driver Version 8.0.3.0.0	No	Yes, Oracle Driver Version 8.0.3.0.0	No	No
Sybase SQL Version 11.0	Yes, Sybase Driver Version 10.0.3T4	Yes, Sybase Driver Version 10.0.3T4	Yes, Sybase Driver Version 10.0.3T4	No	No
Note: The above applies to Netfinity Manager Release 5.2.0 and later.					

Starting Netfinity Manager

To start Netfinity Manager:

1. Open the Netfinity Manager folder or program group.

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

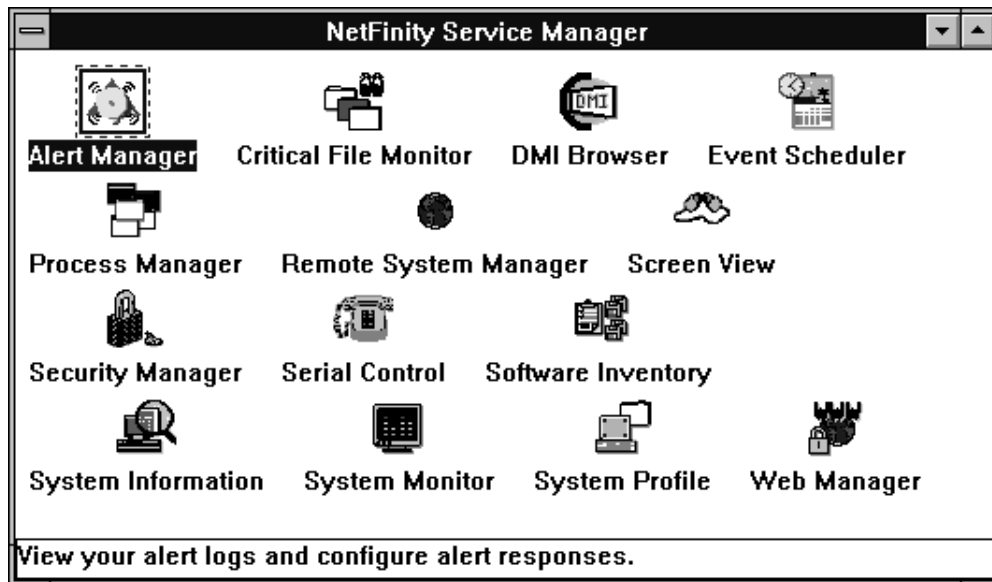


Notes:

- a. In your Netfinity Manager folder or program group is a document titled *Read Me First*, which contains information about Netfinity Manager that might not be covered in your documentation.
 - b. The Netfinity Manager folder also contains the Network Driver Configuration object, which you can use to reconfigure your network protocols and system keywords, and the Netfinity Manager Database Tables object, which contains a handy online reference for all of the data tables in the Netfinity Manager database. For more information on Netfinity Manager database support see "Netfinity Manager database support" on page 38.
 - c. The Netfinity Manager folder also contains a Netfinity Database Administration object. You can use Netfinity Database Administration to configure Netfinity Manager database support. For more information on Database Administration, see "ODBC Database Support" in *Netfinity Manager Quick Beginnings*.
2. Start the Netfinity Service Manager.
- To start the Netfinity Service Manager, double-click the Netfinity Service Manager object.

Netfinity Manager Service Manager

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



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

Netfinity Manager service descriptions

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

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

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

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

Advanced System Management

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

Alert Manager

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

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

Alert on LAN configuration

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

Capacity Management

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

Cluster Manager

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

Critical File Monitor

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

DMI Browser

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

ECC Memory Setup

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

Event Scheduler

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

File Transfer

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

Power-On Error Detect

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

Predictive Failure Analysis

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

Process Manager

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

RAID Manager

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

Remote Session

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

Remote System Manager

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

Remote Workstation Control

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

Screen View

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

Security Manager

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

Serial Connection Control

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

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

Service Configuration Manager

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

Software Inventory

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

System Diagnostics Manager

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

System Information Tool

The System Information Tool enables quick and convenient access to detailed information on the hardware and software configurations of the system. System Information Tool gathers information about almost any computer; however, the most detail is provided when this service is used with IBM computers. This service is available for both stand-alone and network use.

System Monitor

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

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

System Partition Access

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

System Profile

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

Update Connector Manager

Use Update Connector Manager to quickly and easily gather information about various updates that are available for your client systems. Once available updates are

discovered, use Update Connector Manager to apply updates to your systems remotely. Updates can be applied to individual systems, or you can apply multiple updates to multiple systems, all from Netfinity Manager. You can also use Update Connector Manager to remove previously applied updates. Update Connector Manager also includes a scheduler that you can use to discover, apply, or remove updates automatically and periodically.

Web Manager Configuration

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

Delaying Netfinity Manager startup on OS/2 systems

In some cases, it might be necessary for you to delay the automatic startup of the Netfinity Manager Network Interface (NETFBASE.EXE) in order to allow other time-sensitive applications to start up correctly or to allow your system to fully configure itself prior to beginning network operations. NETFBASE.EXE includes a parameter (WAIT) that you can use to specify the number of seconds that NETFBASE.EXE will wait before starting.

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

1. Shut down the Netfinity Manager Network Interface if it is running.
2. Open the Startup folder.
3. Using the right mouse button, click the **Netfinity Manager Network Interface** object. This will open the Netfinity Manager Network Interface context menu.
4. Click **Settings** to open the Netfinity Manager Network Interface **Settings** notebook.
5. In the **Parameters** field type

WAIT:x

where *x* is the number of seconds that you want the Netfinity Manager Network Interface to wait before starting.

6. Close the Netfinity Manager Network Interface **Settings** notebook.

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

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

Getting more information about Netfinity Manager

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

The \DOCS subdirectory contains the following files:

Filename	Document Title	Description
DOCSREAD.ME	DOCSREAD.ME	Text file that contains brief descriptions of each of the Adobe Acrobat-readable PDF file contained in this directory.
README.SCO	Client Services for Netfinity Manager for SCO UnixWare Read Me	Text file that contains installation and setup information for Client Services for Netfinity Manager for SCO UnixWare.
NFMGRQB.PDF	Netfinity Manager Quick Beginnings	Installation and setup information for Netfinity Manager.
NFMGRUG.PDF	Netfinity Manager User's Guide	Detailed information on how to use Netfinity Manager.
NFMGRCR.PDF	Netfinity Manager Command Reference	Detailed information on Netfinity Manager command line functions.
NFCSVCQB.PDF	Client Services for Netfinity Manager Quick Beginnings	Installation and setup information for Client Services for Netfinity Manager.
NFSVCUG.PDF	Client Services for Netfinity Manager User's Guide	Detailed information on how to use Client Services for Netfinity Manager.
NFSVCNW.PDF	Client Services for Netfinity Manager for NetWare User's Guide	Installation, setup, and usage information for Client Services for Netfinity Manager for NetWare.
ASMUPDT.PDF	Advanced System Management Information	Updated information on the Advanced System Management and Dynamic Connection Manager services. These services are included with this version of Netfinity Manager.
NFSCOBAS.PDF	Client Services for Netfinity Manager for SCO UnixWare User's Guide	Installation, setup, and usage information for Client Services for Netfinity Manager for SCO UnixWare.

Installation options

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

Automated installation

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

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

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

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

To create a source directory for a Netfinity Manager installation:

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

Important:

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

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

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

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

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

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

/R: *drive+path+filename*

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

/S: *drive+path*

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

/T: *drive*

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

/TU: *drive+path*

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

For example, the line:

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

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

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

Customized installation

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

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

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

```
[==]
```

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

For example:

```
;IBM SysMgt Install Script, Version 2 (Do not remove this comment line)
Netfinity Manager Installation [Manager 16900]
  Advanced System Management Support [ServProc 450]
  Capacity Manager Enhancement [CapMgt 5600]
  Remote Workstation Control [RWC 2000]
  World Wide Web Enhancement (TCPIP Required) [WebManager 3000] IsTcpi
[==]
Netfinity Manager CD for Windows 95/NT
[==]
NetFinity Admin
NULL Manager
  CL 0 1 NETFBASE.EXE
  CCL 0 1 NETDOM.INI
  CCL 0 1 NETNODES.INI
  CCL 0 1 INSTALL.BAT
  CCL 0 1 NETFINST.EXE
  CCL 0 1 INSTALL.INI
  CCL 0 1 WININST.HLP
  CL 0 1 APCKINST.DLL
;Screen Capture GUI
;NULL Manager
; CL 0 1 SAVEG.EXE
; CL 0 1 SAVEG.HLP
```

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

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

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

Option Name

Dll-entrypoint

```
option file
option file
...
install command
install command
...
```

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

Dll-entrypoint

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

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

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

Before:

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

After:

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

Chapter 6. Installing options

This chapter provides instructions to help you add options to your server.

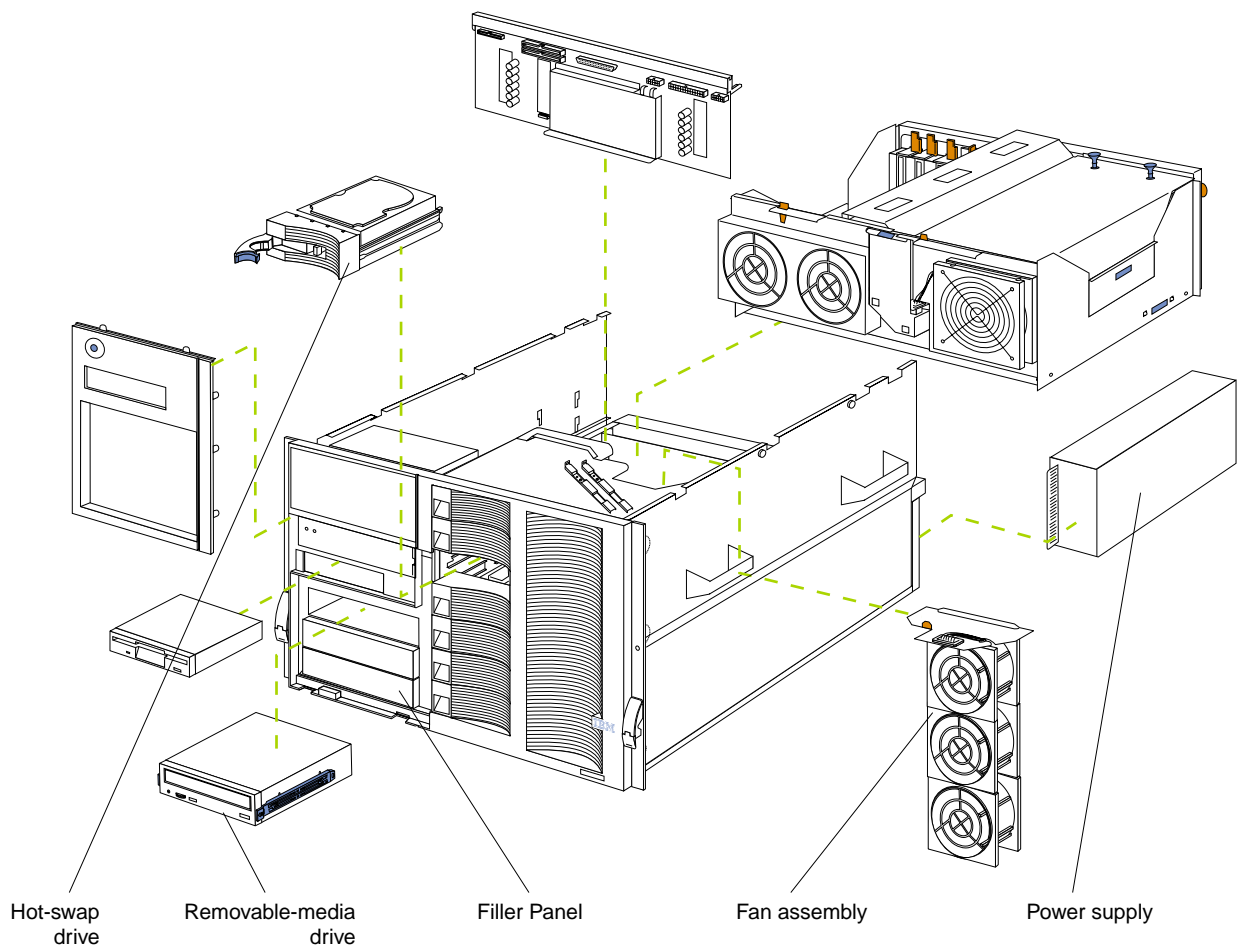
Major components of the Netfinity 7600 server

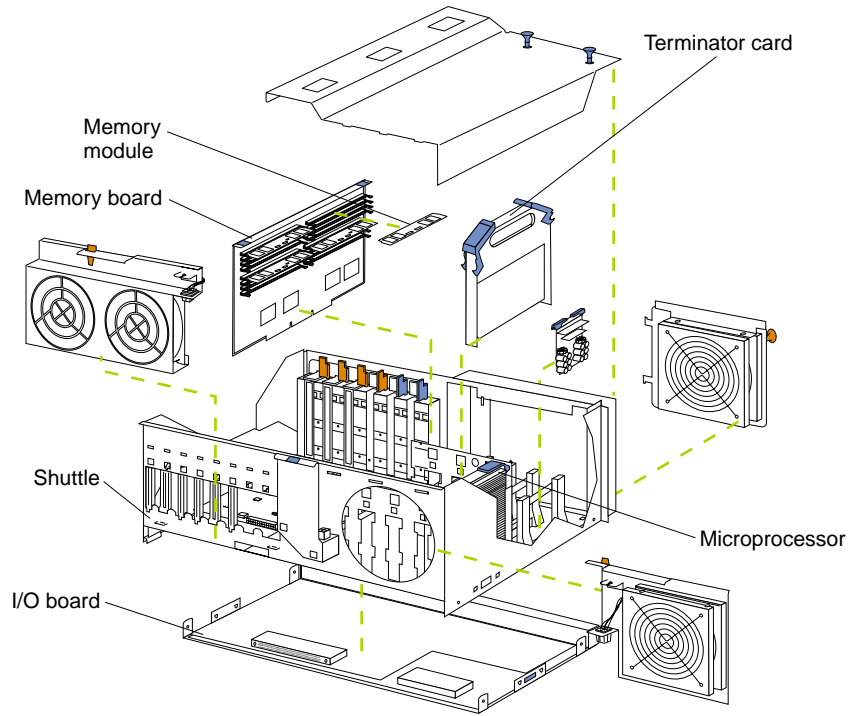
The orange color on components and labels in your server identifies hot-swap or hot-plug components. This means that you can install or remove the components while the system is running, provided that your system is configured to support this function. For complete information about installing or removing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

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

The following illustrations show the locations of the major components in your server.

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





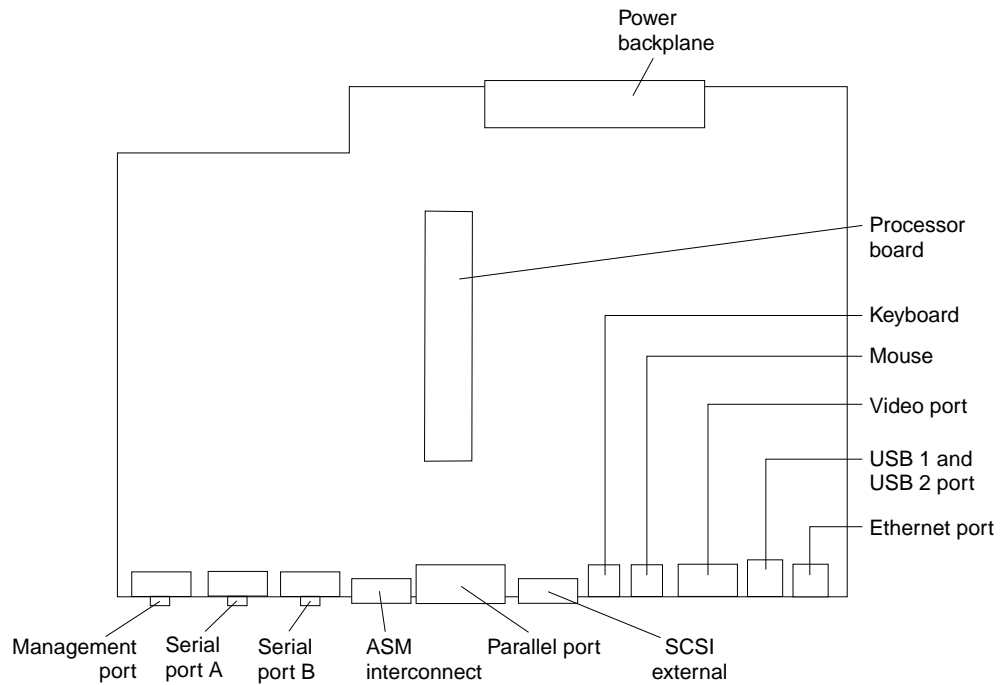
Component locations

This section provides illustrations of the I/O board, processor board, and memory board component locations.

I/O board component locations

The following illustration shows the location of the input/output connectors on the I/O board.

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



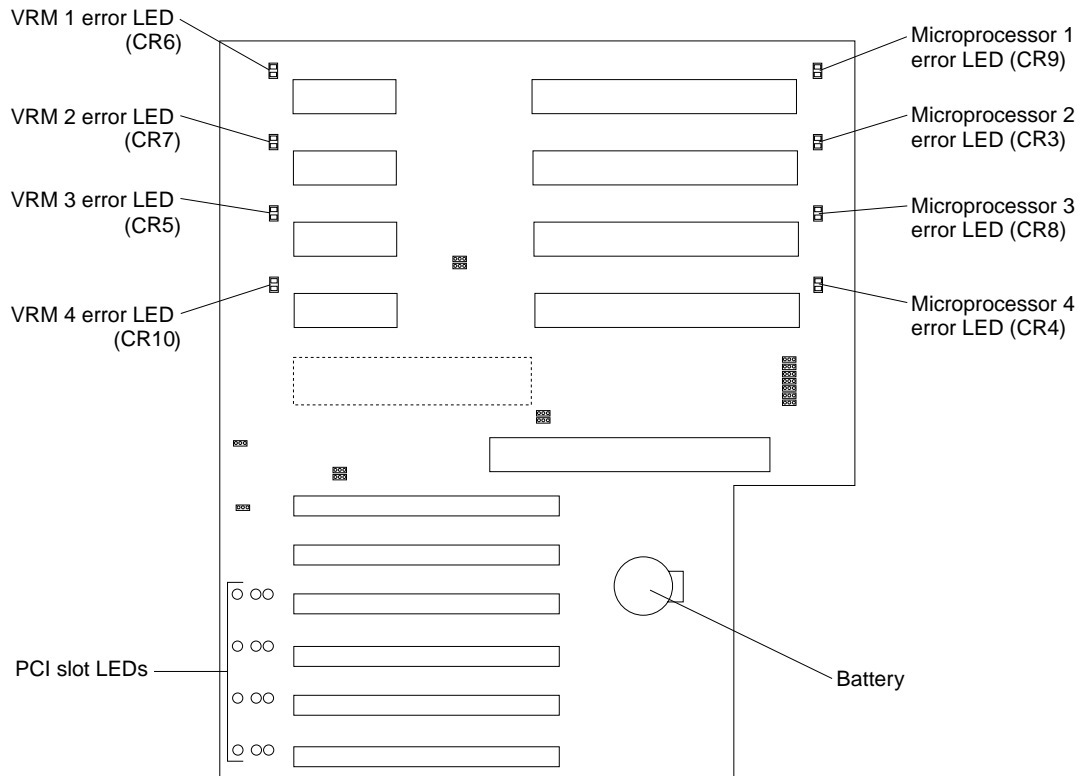
Processor board component locations

The following illustrations show the location of the LEDs, connectors, and jumpers on the processor board.

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

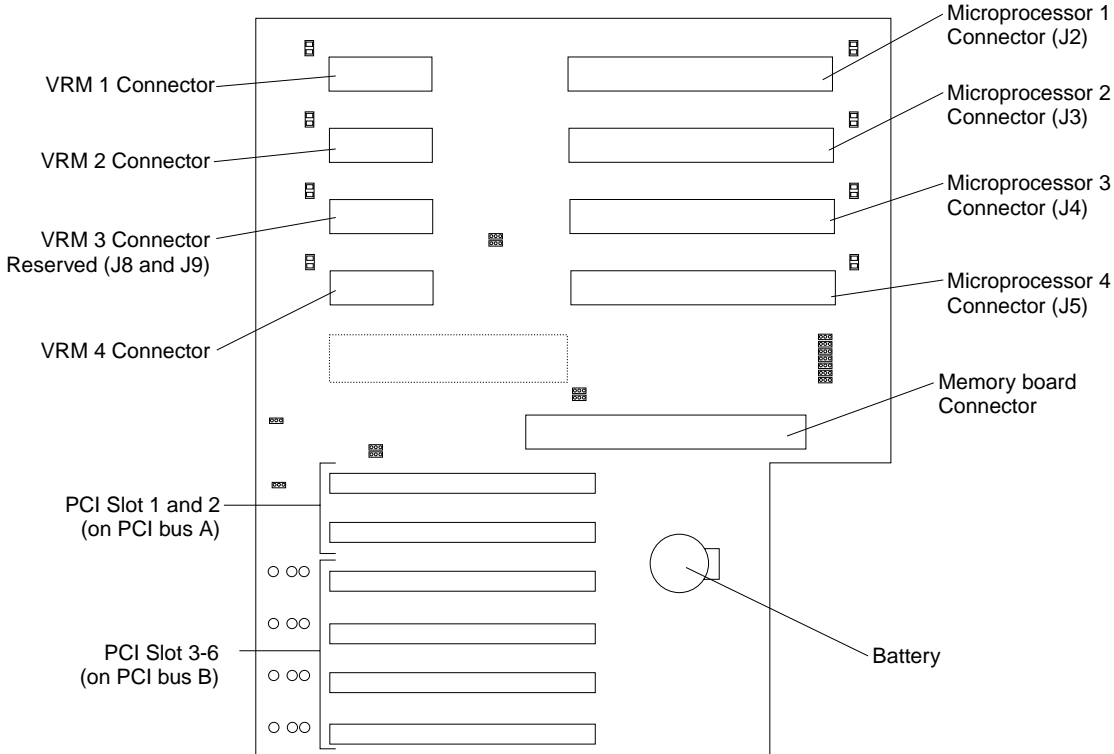
Processor board LEDs

The following illustration shows the location of the LEDs.



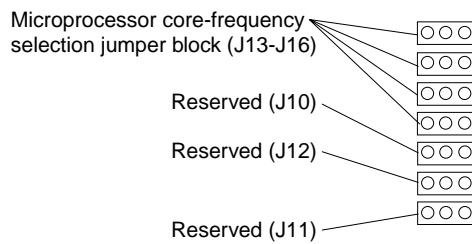
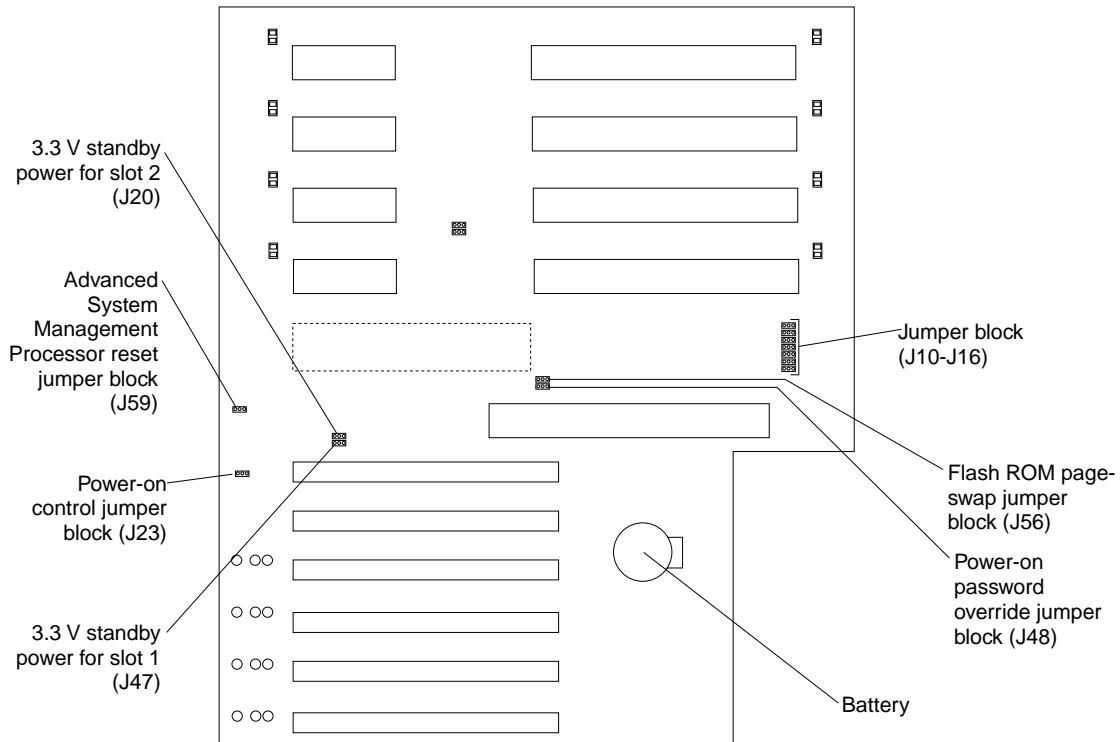
Processor board connectors

The following illustration shows the location of the connectors.



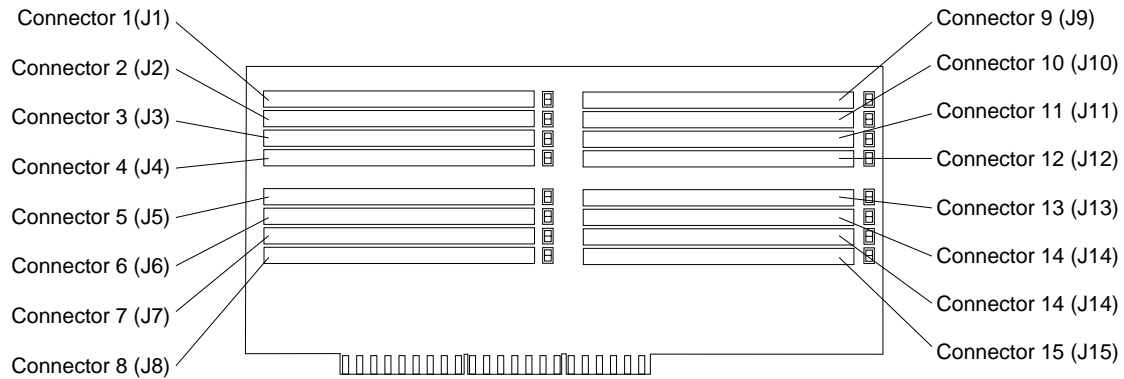
Processor board jumpers

The following illustration shows the location of the jumpers.

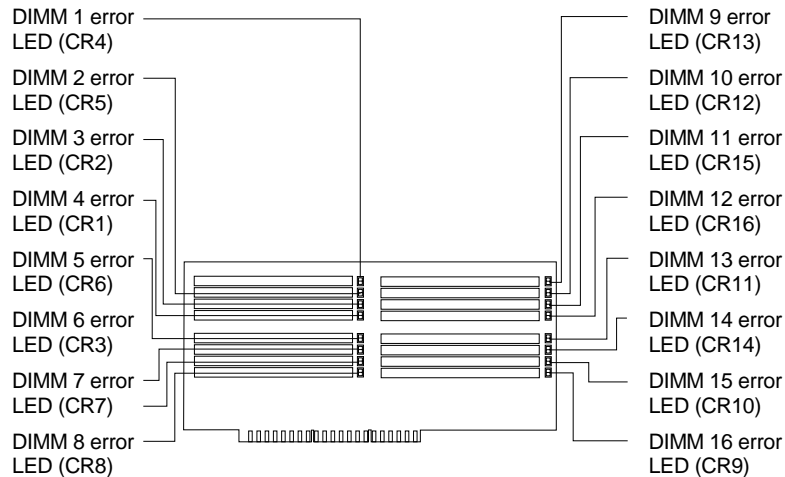


Memory board component locations

The following illustration shows the location of the DIMM connectors on the memory board.



The following illustration shows the location of the error LEDs on the memory board.



Before you begin

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

- Become familiar with the safety and handling guidelines provided in the Safety Information book, the requirements specified in “Safety information statements” on page 69, and the information in “Handling static-sensitive devices” on page 69. These guidelines will help you work safely while working with your server or options.
- You do not need to turn off the server to install or replace hot-swap power supplies, hot-swap drives, hot-swap fans, or hot-plug PCI adapters.
- The orange color on components and labels in your server identify hot-swap or hot-plug components. This means that you can install or remove the component while the system is running, provided that your system is configured to support this function.
- The blue color on components and labels identify touch points where you can grip a component, move a latch, and so on.
- Make sure that you have an adequate number of properly grounded electrical outlets for your server, monitor, and any other options that you intend to install.
- Back up all important data before you make changes to disk drives.
- For a list of supported options for the Netfinity 7600, refer to <http://www.ibm.com/pc/us/compat> on the World Wide Web.

System reliability considerations

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

- Each of the drive bays has either a drive or a filler panel installed.
- Each of the power supply bays has either a power supply or a filler panel installed.
- There is at least 50 mm (2 inches) of ventilated space at the sides of the server and 100 mm (4 inches) at the rear of the server.
- The top cover is in place during normal operation.
- The top cover is removed for no longer than 30 minutes while the server is operating.
- The processor housing cover over the processor and memory area is removed for no longer than 10 minutes while the server is operating.
- A removed hot-swap drive is replaced within ten minutes of removal.
- Cables for optional adapters are routed according to the instructions provided with the adapters.
- A failed fan is replaced within 48 hours.

Working inside the server with the power on

Your server supports hot plug, hot add, and hot swap devices and is designed to operate safely while turned on with the cover removed. Follow these guidelines when you work inside a server that is turned on:

- Avoid loose-fitting clothing on your forearms. Button long-sleeved shirts before working inside the server; do not wear cufflinks while you are working inside the server.

- Do not allow your necktie or scarf to hang inside the server.
- Remove jewelry, such as bracelets, necklaces, rings, and loose-fitting wrist watches.
- Remove items from your shirt pocket (such as pens or pencils) that could fall into the server as you lean over it.
- Take care to avoid dropping any metallic objects, such as paper clips, hair pins, or screws, into the server.

Handling static-sensitive devices

When you handle Electrostatic Discharge-Sensitive devices (ESD), take precautions to avoid damage from static electricity. For details on handling these devices, refer to the following Web site and use a search term of ESD:

<http://www.ibm.com>

Safety information statements

Before installing this product, read the Safety Information book.

ميج، يجب قراءة دات السلامة

Antes de instalar este produto, leia o Manual de Informações sobre Segurança.

安装本产品前请先阅读《安全信息》手册。

Prije instalacije ovog proizvoda pročitajte priručnik sa sigurnosnim uputama.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs hæftet med sikkerhedsforskrifter, før du installerer dette produkt.

Lue Safety Information -kirjanen, ennen kuin asennat tämän tuotteen.

Avant de procéder à l'installation de ce produit, lisez le manuel Safety Information.

Vor Beginn der Installation die Broschüre mit Sicherheitshinweisen lesen.

Πριν εγκαταστήσετε αυτό το προϊόν, διαβάστε το εγχειρίδιο Safety Information.

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

Przed zainstalowaniem tego produktu należy przeczytać broszurę Informacje Dotyczące Bezpieczeństwa.

Prima di installare questo prodotto, leggere l'opuscolo contenente le informazioni sulla sicurezza.

本製品を導入する前に、安全情報資料を御読みください。

이 제품을 설치하기 전에, 안전 정보 책자를 읽어보십시오.

Пред да го инсталирате овој производ прочитајте ја книгата со безбедносни информации.

Lees voordat u dit product installeert eerst het boekje met veiligheidsvoorschriften.

Les heftet om sikkerhetsinformasjon (Safety Information) før du installerer dette produktet.

Prije instalacije ovog proizvoda pročitajte priručnik sa sigurnosnim uputama.

Antes de instalar este produto, leia o folheto Informações sobre Segurança.

Перед установкой продукта прочтите брошюру по технике безопасности (Safety Information).

Pred inštaláciou tohto produktu si pre ítajte Informa nú brožúrku o bezpe nosti.

Preden namestite ta izdelek, preberite knjižico Varnostne informacije.

Antes de instalar este producto, lea la Información de Seguridad.

Läs säkerhetsinformationen innan du installerar den här produkten.

在安裝本產品之前，也請先閱讀「安全性資訊」小冊子。

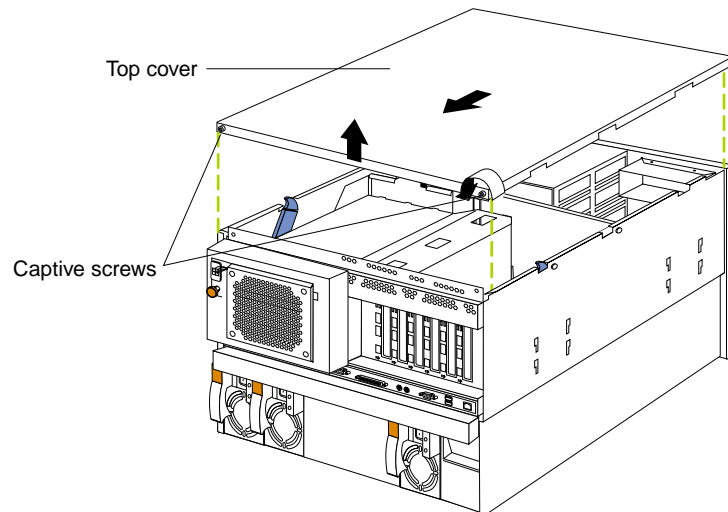
Installálás előtt olvassa el a Biztonsági elírások kézikönyvét !

Removing the server top cover and bezel

Review the information in “Before you begin” on page 68.

Removing the top cover

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

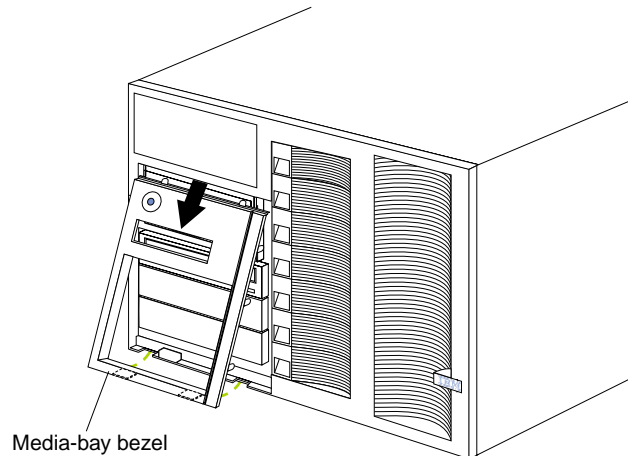


To remove the server top cover:

1. Loosen the two thumbscrews on the back edge of the top cover.
2. Slide the top cover slightly toward the rear of the server. Lift the cover off the server and set the cover aside.

Attention: For proper cooling and airflow, replace the top cover after installing or removing an option. Operating the server for extended periods of time (over 30 minutes) with the top cover removed might damage server components.

Removing the media-bay bezel



To remove the media-bay bezel:

1. Release the two tabs at the bottom edge of the media-bay bezel and pull the bottom of the bezel slightly away from the server.
2. Pull the media-bay bezel down to release the two tabs at the top edge of the bezel. Store the bezel in a safe place.

Working with adapters

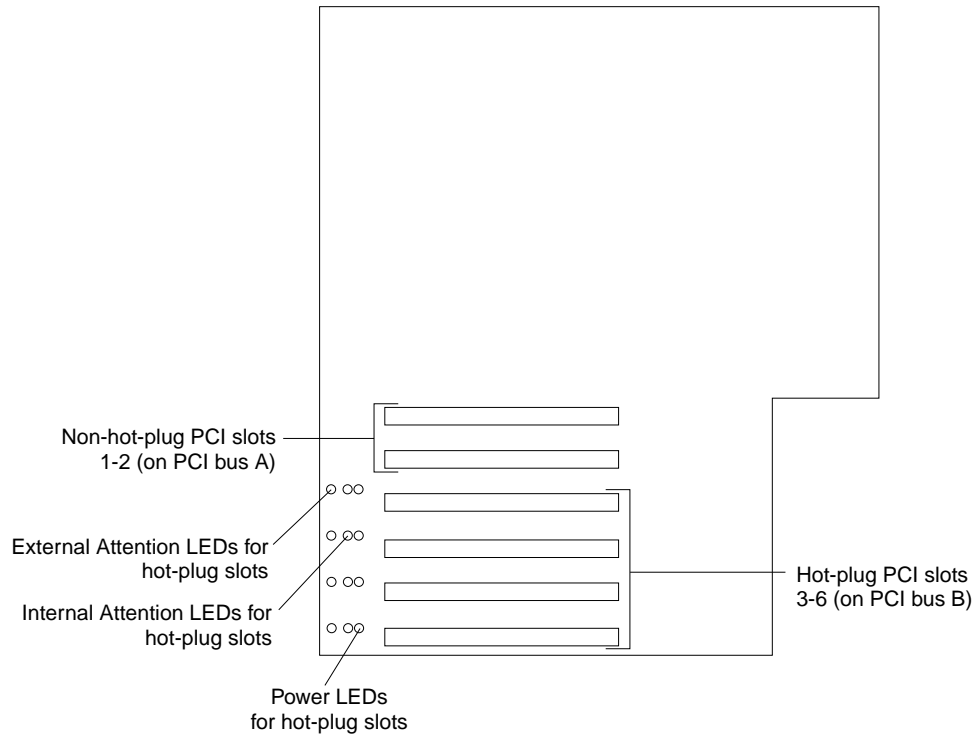
You can install up to six PCI adapters in the expansion connectors on the processor board. All six of the slots are peripheral component interconnect (PCI) expansion slots.

Your server comes with an integrated super video graphics array (SVGA) video controller, which is not removable. If you want to disable this controller and use a video adapter instead, you can install a video adapter in an expansion slot. When you install a PCI video adapter, the server BIOS automatically disables the integrated video controller.

Note: Video adapters are supported in all six PCI slots.

The following illustration shows the location of the 64-bit PCI expansion slots on the processor board.

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



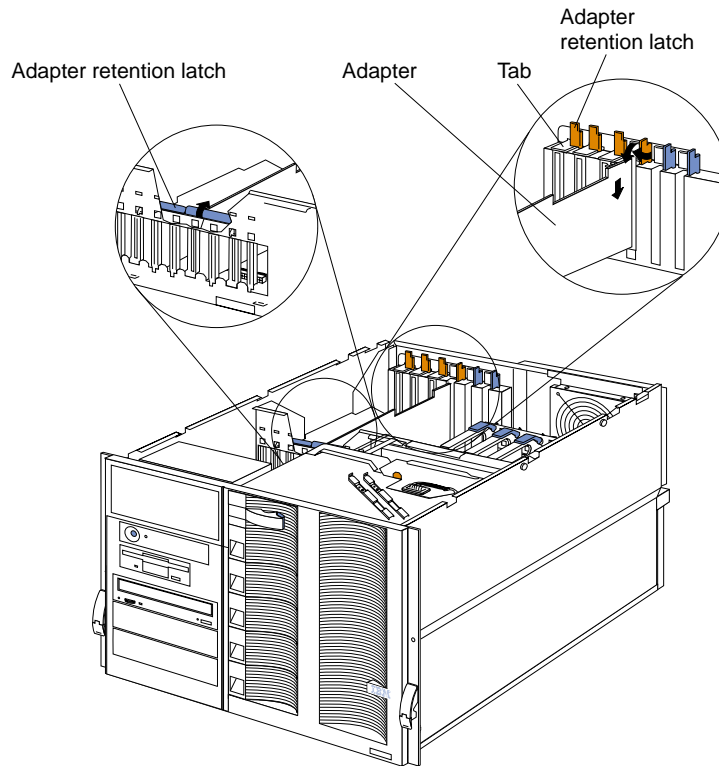
Adapter considerations

Before you continue with the adapter-installation procedure:

- Review the documentation that comes with the adapter and follow those instructions in addition to the instructions given in this chapter. If you need to change the switch or jumper settings on your adapter, follow the instructions that come with the adapter documentation.
- Slots 3 through 6 support 5.0V, 3.3V, and universal PCI adapters.
Note: Universal PCI adapters support both 3.3V and 5.0V operation.
- Slots 1 and 2 support 3.3 V and universal non-hot-swap PCI adapters only.
- Your server uses a rotational interrupt technique to configure PCI adapters. Because of this technique, you can install a variety of PCI adapters that currently do not support sharing of PCI interrupts.
- The system scans PCI slots 1 through 6 to assign system resources; then the system starts (boots) the PCI devices in the following order: processor board devices, slots 1 and 2, and then slots 3 through 6.
- The performance of the PCI adapters depends on the types of adapters in your system.

Installing a hot-plug adapter

Refer to the following illustration to install a hot-plug PCI adapter.



To install a hot-plug PCI adapter:

Attention:

- Do not remove a hot-plug adapter before performing the operating-system-defined procedure for disabling the hot-plug PCI slot that contains the adapter. Failure to do so might cause your system to lock up. Refer to your operating system documentation.
- When you handle Electrostatic Discharge-Sensitive devices (ESD), take precautions to avoid damage from static electricity. For details on handling these devices, refer to the following Web site and use a search term of ESD:

<http://www.ibm.com>

1. Review the information in “Before you begin” on page 68.
2. Remove the top cover.
3. Determine which expansion slot you will use for the adapter.

Note: You can install hot-plug PCI adapters in PCI slots 3-6 only.

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

Attention: Make sure the power light for the hot-plug PCI slot is off before you continue with the next step.

5. Remove the expansion-slot cover:
 - a. Rotate the adapter retention latch counterclockwise.
 - b. Lift the tab covering the top of the expansion-slot cover and then remove the expansion-slot cover from the server. Store it in a safe place for future use.
 - c. Press on the rear latch and lift the rear retainer clip.

Attention: You must install expansion-slot covers on all empty slots. This maintains the electromagnetic emissions characteristics of the system and ensures proper cooling of system components.
6. Refer to the documentation that comes with your adapter for any cabling instructions. It might be easier for you to route any cables before you install the adapter.
7. Remove the adapter from the static-protective package.

Attention: Avoid touching the components and gold-edge connectors on the adapter.
8. If you need to put down the adapter, place the adapter, component-side up, on a flat, static-protective surface.
9. Install the adapter:
 - a. Carefully grasp the adapter by its top edge or upper corners, and align it with the expansion slot on the processor board.
 - b. Press the adapter *firmly* into the expansion slot.

Attention: When you install an adapter in the server, be sure that it is completely and correctly seated in the processor board connector. Incomplete insertion might cause damage to the processor board or the adapter.
 - c. Lower the tab over the top corner of the adapter. Rotate the adapter retention latch clockwise until it snaps into place.
 - d. Lower the rear retainer clip over the top of the adapter until it snaps into place.
10. Connect any needed cables to the adapter.
11. Enable the PCI slot from your operating system. (Refer to the documentation that comes with your operating system for information about enabling a hot-plug PCI slot.) Make sure that the power light for the hot-plug PCI slot comes on.
12. If you have other options to install or remove, do so now; otherwise, go to “Completing the installation” on page 90.

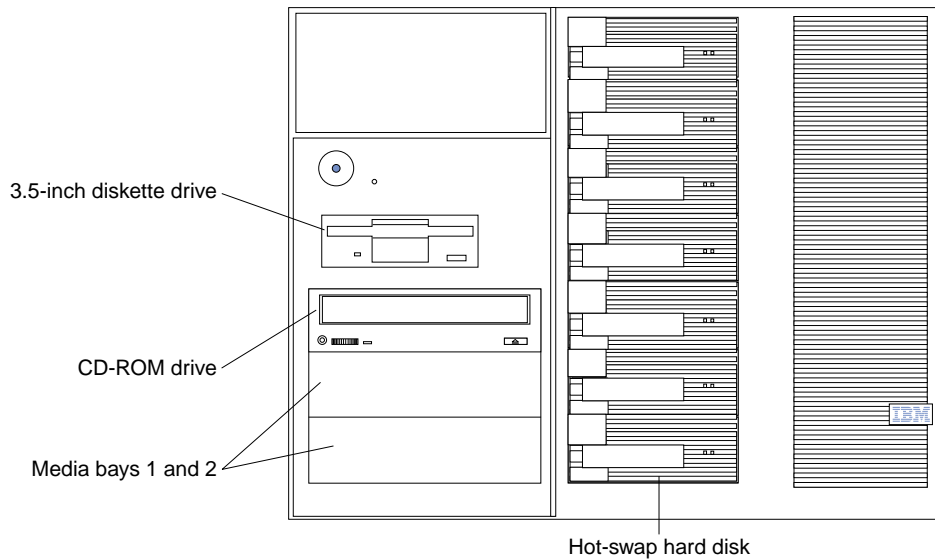
Installing internal drives

If you add different types of drives, your system can read multiple types of media and store more data. Several types of drives are available, such as:

- Diskette
- Hard disk
- CD-ROM
- Tape

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

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



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

Each hot-swap drive has two indicator lights on the front of the server. If the amber hard-disk status light for a drive is lit continuously, that individual drive is faulty and needs to be replaced. When the hard-disk status light indicates a drive fault, you can replace a hot-swap drive without turning off the server.

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

Internal drive bays

Internal drives are installed in *bays*.

- Your server comes with one CD-ROM drive and one 3.5-inch, 1.44 MB diskette drive.
- The left front bays support 5.25-inch, half-high, removable-media drives. Any two adjacent 5.25-inch, half-high bays can be converted to a single full-high bay.

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

- You cannot install hard disk drives in the left front bays. You can install hot-swap hard disk drives only in the hot-swap hard disk drive bays on the right front side of the server.
- If you are installing a device with a 50-pin connector in one of the left front bays, you will need a 68-to-50-pin converter (option number 32G3925).

- Your server supports ten 1-inch (26 mm) slim-high or seven 1.6-inch (42 mm) half-high, 3.5-inch hot-swap hard disk drives in the hot-swap bays.
- The hot-swap bays connect to a hard disk drive *backplane*. The backplane is a printed circuit board behind the bays.

Some drives have a special interface called *small computer system interface*, or SCSI. Using this interface, you can attach multiple drives to a single SCSI controller.

Notes:

1. Any information about SCSI drives also applies to other SCSI devices, such as scanners and printers.
2. If you plan to install both internal and external SCSI devices, you must follow the instructions in “Connecting external options” on page 92, in addition to the instructions in this section.

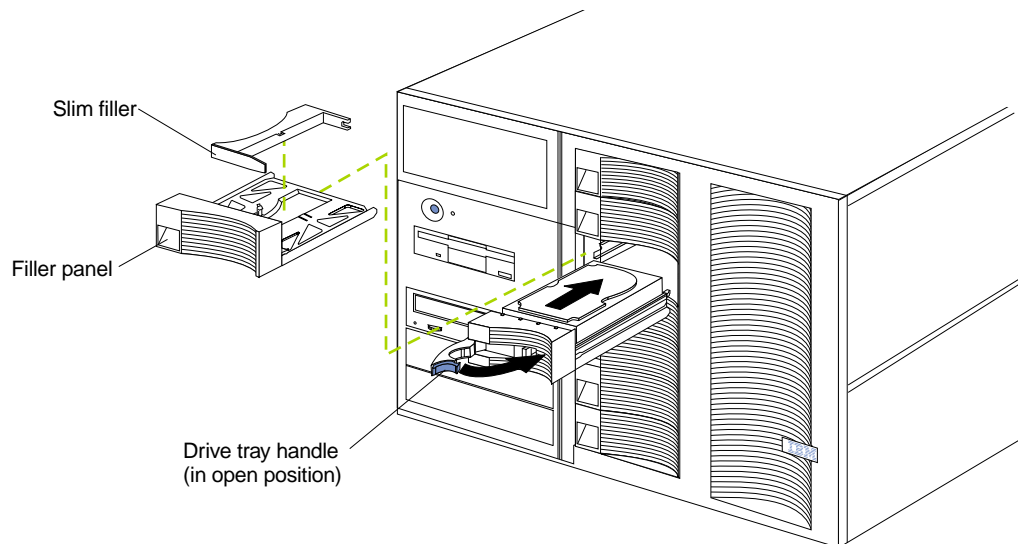
A 16-bit (wide) low voltage differential (LVD) SCSI cable connects the hard disk drive backplane to the ServeRAID adapter located in a PCI slot on the processor board. An additional 16-bit, two-drop SCSI cable comes with your server. It is located in the bottom of the server media bay and is restrained with a cable clamp.

If you want to install SCSI devices in the removable media bays:

1. Locate the internal SCSI connector on the power backplane.
2. Use the 16-bit two-drop SCSI cable located in the bottom of the server media bay.
3. Connect the SCSI device(s) in the removable media bay to the internal SCSI connector on the power backplane.

Installing a hot-swap hard disk drive

Refer to the following illustration when installing a hot-swap drive.



Note: You do not have to turn off the server to install hot-swap drives in these bays.

To install a drive in a hot-swap bay:

1. Review the information in “Before you begin” on page 68.

2. Remove the filler panel from one of the empty hot-swap bays by inserting your finger into the depression at the left side of the filler panel and pulling it away from the server.

Attention: To maintain proper system cooling, do not operate the server for more than 10 minutes without either a drive or a filler panel installed for each bay.

3. Install the hard disk drive in the hot-swap bay:
 - a. If there is a small gap above or below the drive, separate the slim filler from the filler panel and insert it in the gap.

Note: A drive placement guide is located on the inside edge of the bezel. The drive placement guide indicates the placement for slim-high and half-high drives. The guide also shows the SCSI ID assigned to the drive.

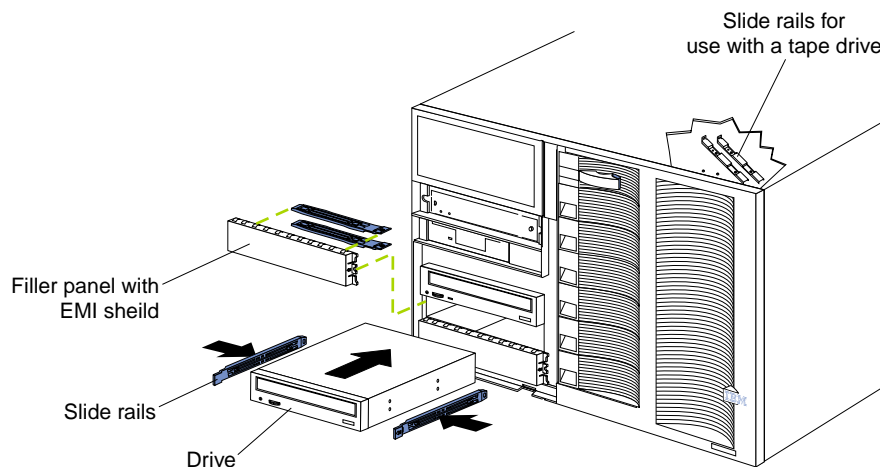
- b. Ensure the tray handle is open (that is, perpendicular to the drive).
 - c. Align the drive assembly with the guide rails in the bay.
 - d. Gently push the drive assembly into the bay until the drive stops.
 - e. Push the tray handle to the closed (locked) position.
 - f. Check the hard disk drive status indicators to verify that the hard disk drive is operating properly.

If the amber hard-disk status light for a drive is lit continuously, that individual drive is faulty and needs to be replaced. If the green hard-disk activity light is flashing, the drive is being accessed.

Note: Because your server has a RAID controller installed, you must configure your disk arrays after installing hard disk drives. Refer to the *ServeRAID* topic provided on this CD for information.

Installing a 5.25-inch removable-media drive

Refer to the following illustrations when installing a 5.25-inch removable media drive.



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

To install a removable-media drive in one of the left front bays:

Attention: When you handle Electrostatic Discharge-Sensitive devices (ESD), take precautions to avoid damage from static electricity. For details on handling these devices, refer to the following Web site and use a search term of ESD:

<http://www.ibm.com>

1. Review the information in “Before you begin” on page 68.
2. Turn off the server and all attached devices. Disconnect all external cables and remove the top cover.
3. Remove the media-bay bezel.
4. Remove the filler panel from the bay opening. Keep the filler panel nearby.

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

5. Touch the static-protective bag containing the drive to any unpainted metal surface on the server; then, remove the drive from the bag and place it on a static-protective surface.

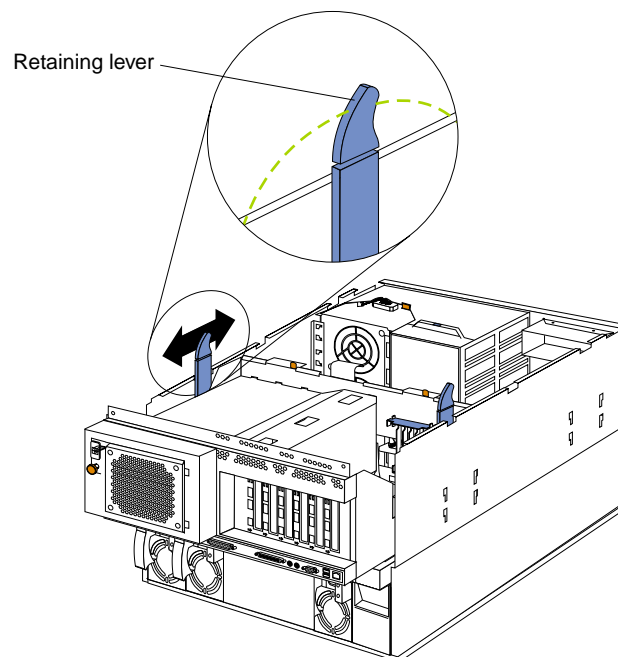
6. Remove the snap-on slide rails from the filler panel and snap the rails on the drive. Store the filler panel for later use.

Note: Slide rails for installing a tape drive are attached with screws. Use the screws to attach the rails to the side of the tape drive.

7. Align the slide rails on the drive with the guide rails in the bay; then, slide the drive into the bay until it snaps into place.

Note: If you are installing a tape drive, use the screws that are shipped next to the tape drive rails to attach the tape drive to the front of the chassis.

8. Disconnect the shuttle.



- a. Disengage the retaining levers.
- b. Move the retaining levers toward the rear of the server.

- c. Slide the shuttle out of the server.
9. If you are installing a SCSI device, go to step 10. If you are installing an IDE device, go to step 11 on page 80.
10. Install the two-drop SCSI cable:
 - a. Locate the two-drop SCSI cable. The two-drop SCSI cable is located in the bottom of your server between the open bays and the power supply area. It is folded and restrained with a cable clamp.
 - b. Connect one of the connectors on the two-drop SCSI cable to the back of the drive.
 - c. Connect the other end of the two-drop SCSI cable to the SCSI connector on the power backplane.
 - d. Go to step 12.
11. To install an IDE device, such as a CD-ROM or a DVD-ROM, use the two-drop IDE cable that comes with the option.
 - a. Remove the cable that connects the CD-ROM to the IDE connector on the power backplane.
 - b. Using the two-drop cable that came with your IDE option, connect the CD-ROM and IDE device you are installing to the IDE connector on the power backplane.
 - c. Set the jumper on the back of the new IDE option as secondary.
12. Connect a power cable to the back of the drive. Power cables for removable-media drives come installed in your server. The connectors are keyed and can be inserted only one way.
13. If you are installing another 5.25-inch drive, do so now. Otherwise, continue with step 14.
14. Connect the shuttle.
 - a. Disengage the retaining levers from the notches on the chassis.
 - b. Move the retaining levers toward the front of the server.
 - c. Secure the retaining levers in the horizontal position.
15. If you have other options to install or remove, do so now; otherwise, go to “Completing the installation” on page 90.

Installing memory-module kits

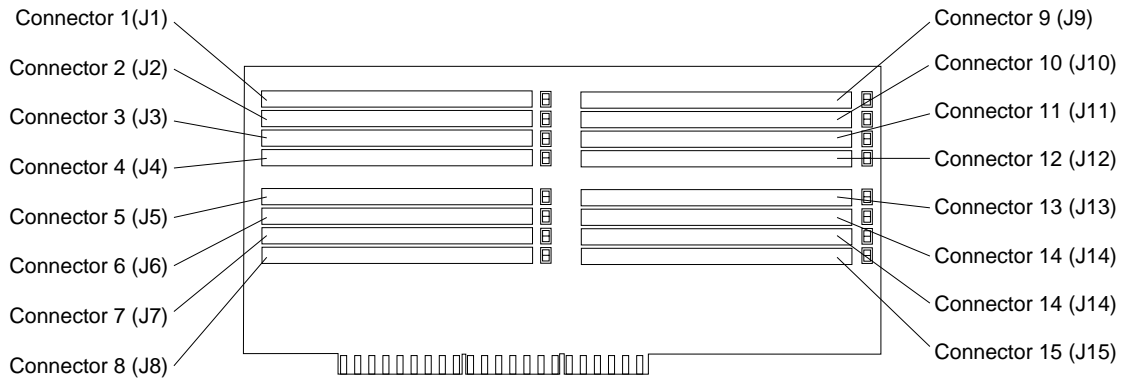
Before you continue with the memory-installation procedure, review the following:

- Review the information in “Before you begin” on page 68.
- All the DIMMs installed in each set must be the same size and speed, but all the sets do not have to contain DIMMs of the same size and speed.
- The memory board contains 16 DIMM connectors and supports 4-way memory interleaving.
- Install only 3.3 V, 168-pin, 8-byte, registered DIMMs. Only 100 MHz, 72-bit, registered, synchronous, error correcting code (ECC), SDRAM configuration DIMM memory is supported for the 128 MB, 256 MB, 512 MB and 1 GB (when available) DIMMs.
- If you install 4 GB of memory, some of the memory is reserved for system resources. The amount reserved for system resources depends on the configuration of the server.

- If you install 16 GB of memory, the Configuration/Setup Utility will display the memory that is usable by the network operating system. This amount of memory might differ from the amount of memory you have installed.
- Installing or removing DIMMs changes the configuration information in the server. Therefore, after installing or removing a DIMM, you must save the new configuration information using the Configuration/Setup Utility program. Refer to “Using the Configuration/Setup Utility program” on page 13 for more information.
- Install the DIMMs in the order provided in Table 4 on page 81.

The following illustration shows the location of the DIMM connectors.

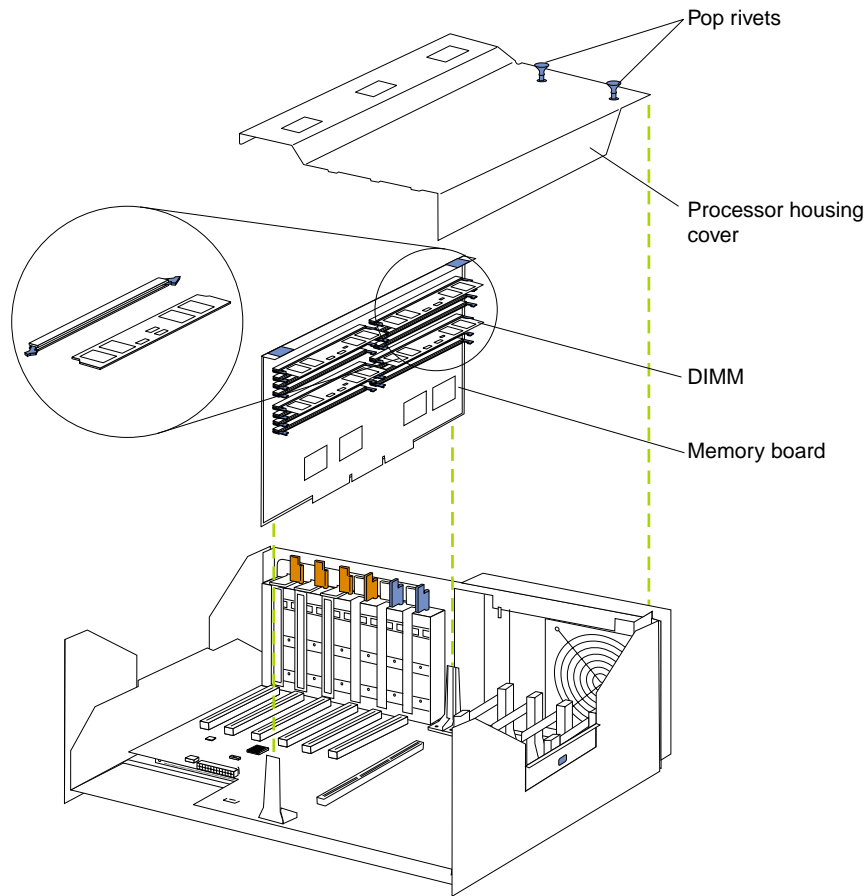
Note: The illustrations in this book might differ slightly from your hardware.



Set of 4 DIMMs	Install DIMMs in these connectors:
First set (shipped as standard)	J1, J5, J9, J13
2nd set	J2, J6, J10, J14
3rd set	J3, J7, J11, J15
4th set	J4, J8, J12, J16

Table 4. DIMM installation order

Refer to the following illustration when installing memory.



To install additional memory:

Attention: When you handle Electrostatic Discharge-Sensitive devices (ESD), take precautions to avoid damage from static electricity. For details on handling these devices, refer to the following Web site and use a search term of ESD:

<http://www.ibm.com>

1. Review “Before you begin” on page 68.
2. Turn off the server and all attached devices. Disconnect external cables and power cords and remove the top cover.
3. Pull up the two pop rivets on the processor housing cover and remove the cover from the processor housing.
4. Remove the memory board assembly:
 - a. Lift up on the memory board assembly and remove it from the server.
 - b. Place the memory board assembly on a static-protective surface, such as the static-protective package in which the option came.
5. Locate the DIMM connectors on the memory board. Determine the DIMM connectors into which you will install the DIMMs. (See the notes at the beginning of this procedure.)

6. Touch the static-protective package containing the DIMM option to any unpainted metal surface on the server. Then, remove the DIMM from the package.
Note: To avoid breaking the retaining clips or damaging the DIMM connectors, handle the clips gently.
7. To install the DIMMs, repeat the following steps for each DIMM that you install.
 - a. Turn the DIMM so that the pins align correctly with the DIMM connector.
 - b. Insert the DIMM by pressing the DIMM straight into the connector. Be sure that the retaining clips snap into the closed position.
8. Install the memory board assembly:
 - a. Hold the memory board assembly and align it over the memory board connector.
 - b. Insert the memory board assembly into the connector.
9. Install the processor housing cover and push the two pop rivets down to secure the cover.
10. If you have other options to install or remove, do so now; otherwise, go to “Completing the installation” on page 90.

Installing a microprocessor kit

Your server comes with one microprocessor installed on the processor board. If you install an additional microprocessor kit, your server can operate as a symmetric multiprocessing (SMP) server. With SMP, certain operating systems and application programs can distribute the processing load among the microprocessors.

Microprocessor speed (MHz)	Core/bus fraction	J13 Jumper	J14 Jumper	J15 Jumper	J16 Jumper
550	5.5	Pins 1 and 2	Pins 2 and 3	Pins 2 and 3	Pins 2 and 3
700	7.0	Pins 2 and 3	Pins 1 and 2	Pins 1 and 2	Pins 2 and 3
730	7.3	Pins 2 and 3	Pins 2 and 3	Pins 1 and 2	Pins 2 and 3
800	8.0	Pins 2 and 3	Pins 1 and 2	Pins 2 and 3	Pins 1 and 2

Table 5. Microprocessor core frequency selection

Notes:

1. Thoroughly review the documentation that comes with the microprocessor, so that you can determine whether you need to update the server basic input/output system (BIOS) code. The latest level of BIOS code for your server is available through the World Wide Web. Refer to “Getting help, service, and information” on page 153 for the appropriate World Wide Web addresses.
2. Obtain an SMP-capable operating system (optional). For a list of supported operating systems, see <http://www.ibm.com/pc/us/compat/> on the World Wide Web.

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

3. To order additional microprocessor options, contact your IBM reseller or IBM marketing representative.

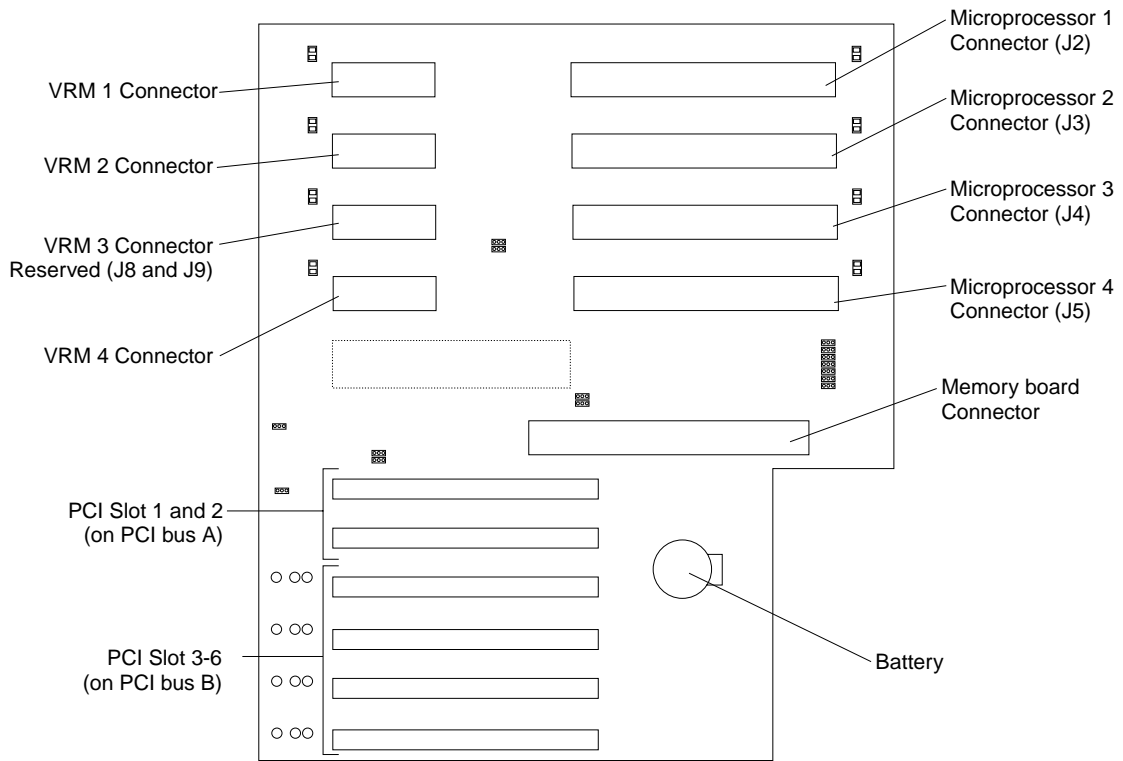
4. If you replace the microprocessor in your server with a microprocessor that operates at a different speed, be sure to set the microprocessor core-frequency-selection jumpers correctly. See Table 5 on page 83.
5. Your server comes standard with one microprocessor installed. The microprocessor is installed in microprocessor connector J2 and is the startup (boot) processor. A microprocessor installed in microprocessor connector J3 is processor 2; a microprocessor installed in microprocessor connector J4 is processor 3; a microprocessor installed in microprocessor connector J5 is processor 4. If more than one microprocessor is installed, the highest numbered processor is the one the server will start from. The lower numbered microprocessors are used as application processors.
6. Table 6 and the label on the inside cover of the server show the order in which additional microprocessors and voltage regulator modules (VRMs) must be installed.

Note: "T" indicates an installed terminator card; "X" indicates an installed microprocessor or VRM. A terminator card must be installed in each microprocessor connector that does not contain a microprocessor.							
One microprocessor installed							
Microprocessor connectors				VRM connectors			
J2 (P1)	J3 (P2)	J4 (P3)	J5 (P4)	J37 (VRM 1)	J38 (VRM 2)	J39 (VRM 3)	J41 (VRM 4)
X	T	T	T	X			
Two microprocessors installed							
Microprocessor connectors				VRM connectors			
J2 (P1)	J3 (P2)	J4 (P3)	J5 (P4)	J37 (VRM 1)	J38 (VRM 2)	J39 (VRM 3)	J41 (VRM 4)
X	X	T	T	X	X		
Three microprocessors installed							
Microprocessor connectors				VRM connectors			
J2 (P1)	J3 (P2)	J4 (P3)	J5 (P4)	J37 (VRM 1)	J38 (VRM 2)	J39 (VRM 3)	J41 (VRM 4)
X	X	X	T	X	X	X	
Four microprocessors installed							
Microprocessor connectors				VRM connectors			
J2 (P1)	J3 (P2)	J4 (P3)	J5 (P4)	J37 (VRM 1)	J38 (VRM 2)	J39 (VRM 3)	J41 (VRM 4)
X	X	X	X	X	X	X	X

Table 6. Microprocessor and VRM installation order

The following illustration shows the microprocessor and VRM connectors.

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

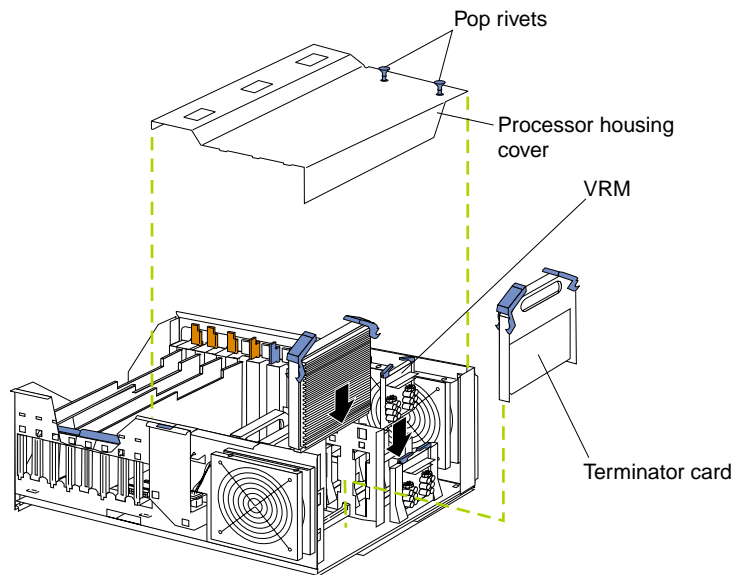


To install an additional microprocessor kit:

Attention: When you handle Electrostatic Discharge-Sensitive devices (ESD), take precautions to avoid damage from static electricity. For details on handling these devices, refer to the following Web site and use a search term of ESD:

<http://www.ibm.com>

1. Review “Before you begin” on page 68.
2. Turn off the server and all attached devices. Disconnect all external cables and power cords and remove the top cover.



3. Pull up the two pop rivets on the processor housing cover and remove the cover from the processor housing.
4. Determine the slots where you will install the microprocessor and VRM.
5. Remove the terminator card from the microprocessor connector.
6. Install the microprocessor:
 - a. Touch the static-protective package containing the new microprocessor to any *unpainted* metal surface on the server; then, remove the microprocessor from the package.
 - b. Hold the microprocessor by the open latches, and center the microprocessor over the microprocessor connector.

Attention: Make sure the microprocessor is oriented and aligned correctly before you try to close the latches.
 - c. Carefully close the latches to seat the microprocessor in the connector.
 - d. Store the terminator card in a safe place in the static-protective package that your new microprocessor comes in; you will need to install it again if you ever remove the microprocessor.

7. Install the voltage regulator module (VRM).
 - a. Center the VRM over the connector. Make sure that the VRM is oriented and aligned correctly.

Note: If you remove the microprocessor later, remember to install the terminator card in the appropriate microprocessor connector and to remove the VRM for that microprocessor.
 - b. Carefully close the latches to seat the VRM in the connector.
8. Install the processor housing cover and push down on the two pop rivets.
9. If you have other options to install or remove, do so now; otherwise, go to “Completing the installation” on page 90.

Installing a hot-swap power supply

Before you continue with the power supply-installation procedure, review the following.

Notes:

1. During normal operation, each power supply bay must have either a power supply or filler panel installed for proper cooling.
2. Before you install a power supply in the right-most power supply bay, you must disconnect the cable-management arm. You can connect the cable-management arm after installing the power supply.

Statement 8



CAUTION:

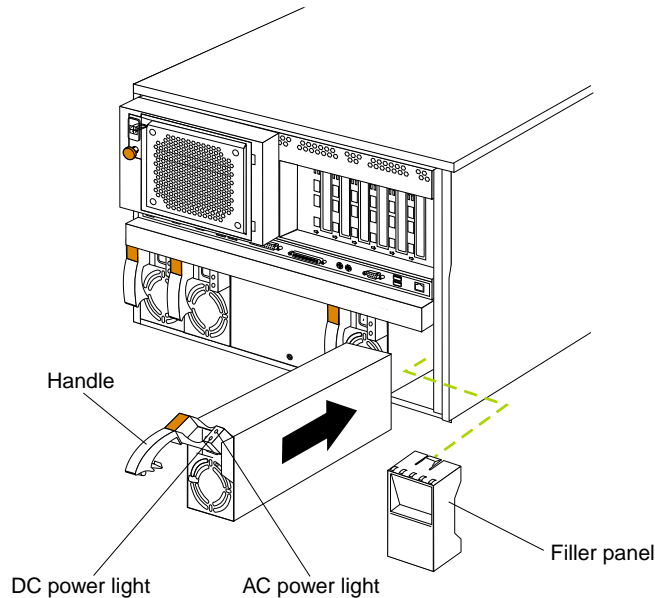
Never remove the cover on a power supply or any part that has the following label attached.



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

Refer to the following illustration to install a hot-swap power supply.

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



To install an additional power supply:

1. Review “Before you begin” on page 68.
2. Remove the filler panel.
3. Place the handle on the power supply in the open position.
4. Slide the power supply into the chassis and close the handle.
5. Plug one end of the power cord into the power supply; then, plug the other end of the cord into a properly grounded electrical outlet.
6. Verify that the DC Power light and the AC Power light on the power supply are lit, indicating that the power supply is operating properly.

Statement 6



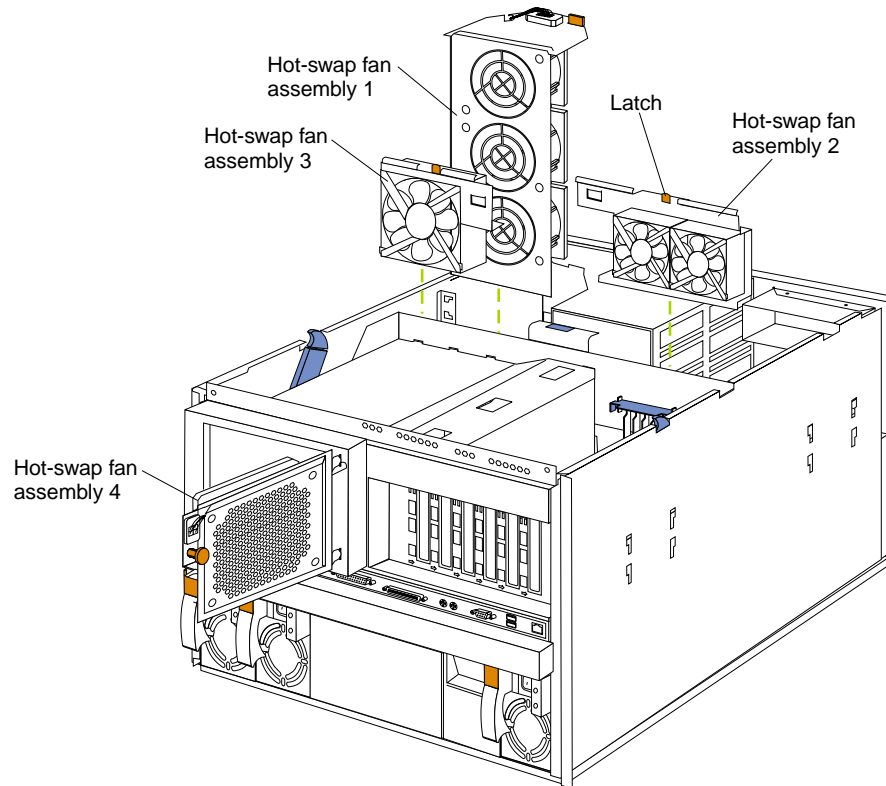
CAUTION:

If you install a strain-relief bracket option over the end of the power cord that is connected to the device, you must connect the other end of the power cord to an easily accessible power source.

Replacing a hot-swap fan

Refer to the following illustration to replace a hot-swap fan.

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



To replace a hot-swap fan assembly:

1. Review the information in “Before you begin” on page 68.
2. If you are replacing fan assembly 1, 2, or 3:
 - a. Remove the top cover.

Attention: To ensure proper system cooling, keep the cover removed for no more than 30 minutes during this procedure.

- b. Press the fan release latch and lift the fan assembly out of the server.

- c. Slide the replacement fan assembly into the server. The latch will snap into place and secure the fan in the server.
 - d. Replace the top cover
 3. If you are replacing fan assembly 4:
 - a. Pull out on the orange pop rivet on the rear fan bracket; then, lift the fan assembly up and out of the hinge cutouts.
 - b. Slide the replacement fan assembly into the server. (Make sure the fan assembly fits correctly into the hinge cutouts on the rear of the shuttle.)
 - c. When you have the fan assembly properly seated, push on the pop rivet until it clicks into place.

Completing the installation

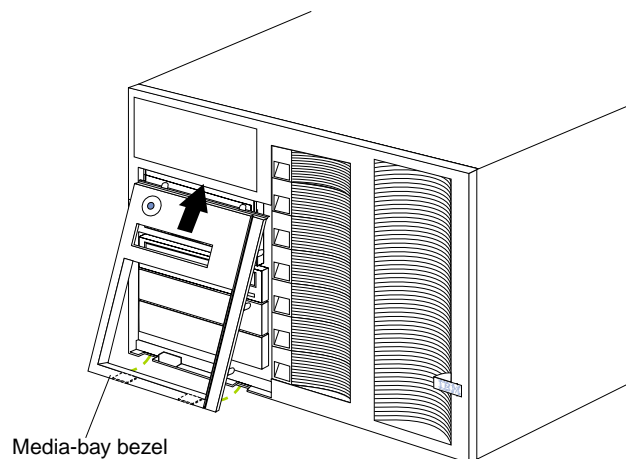
To complete your installation, you must reinstall the media bay bezel, reinstall the top cover, reconnect all the cables that you disconnected, and for certain options, run the Configuration/Setup Utility program. Follow the instructions in this section.

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

Installing the media-bay bezel

Refer to the following illustration to install the media-bay bezel.

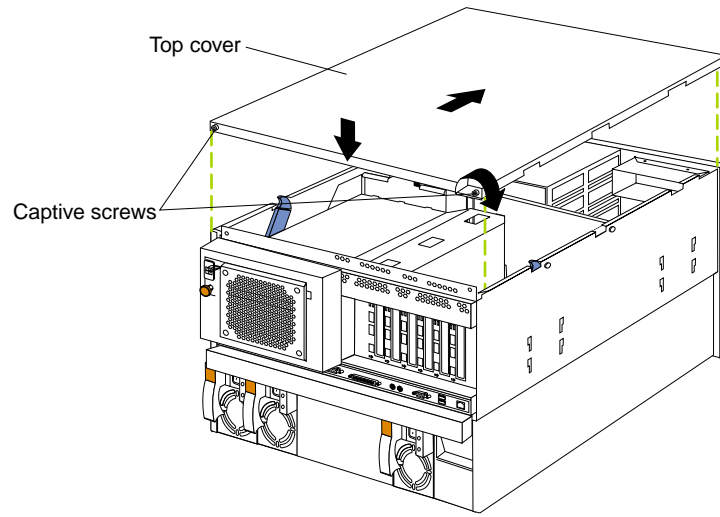
Note: The illustrations in this book might differ slightly from your hardware.



To install the media-bay bezel:

1. Insert the two tabs on the top of the media-bay bezel into the matching holes on the server chassis.
2. Push the bottom of the media-bay bezel toward the server until the two tabs at the bottom of the bezel snap into place.

Installing the top cover



To install the server top cover:

1. Before installing the cover, check that all cables, adapters, and other components are installed and seated correctly and that you have not left loose tools or parts inside the server.
2. Lower the cover with the rear edge of the cover about 25 mm (1 inch) back from the rear edge of the server.
3. Slide the cover forward.
4. Tighten the two captive screws on the back edge of the cover.
5. If you disconnected any cables from the back of the server, reconnect the cables; then, plug the power cords into properly grounded electrical outlets.

Note: If necessary, see “Cabling the server” on page 104 for connector locations.

Reconfiguring the server

When you start your server for the first time after you add or remove an internal option or an external SCSI device, you might see a message telling you that the configuration has changed. Run the Configuration/Setup Utility program to save the new configuration information. See “Chapter 3. Configuring your server,” on page 13.

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

If you have installed a new microprocessor, you might want to upgrade your operating system to support symmetric multiprocessing (SMP). Refer to “Chapter 4. Introducing ServerGuide,” on page 23.

If you have installed or removed a hard disk drive, refer to the *ServeRAID* topic provided on this CD for information about configuring your disk arrays.

Connecting external options

Review the information in “Before you begin” on page 68. Also, read the documentation that comes with your options.

To attach an external device:

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

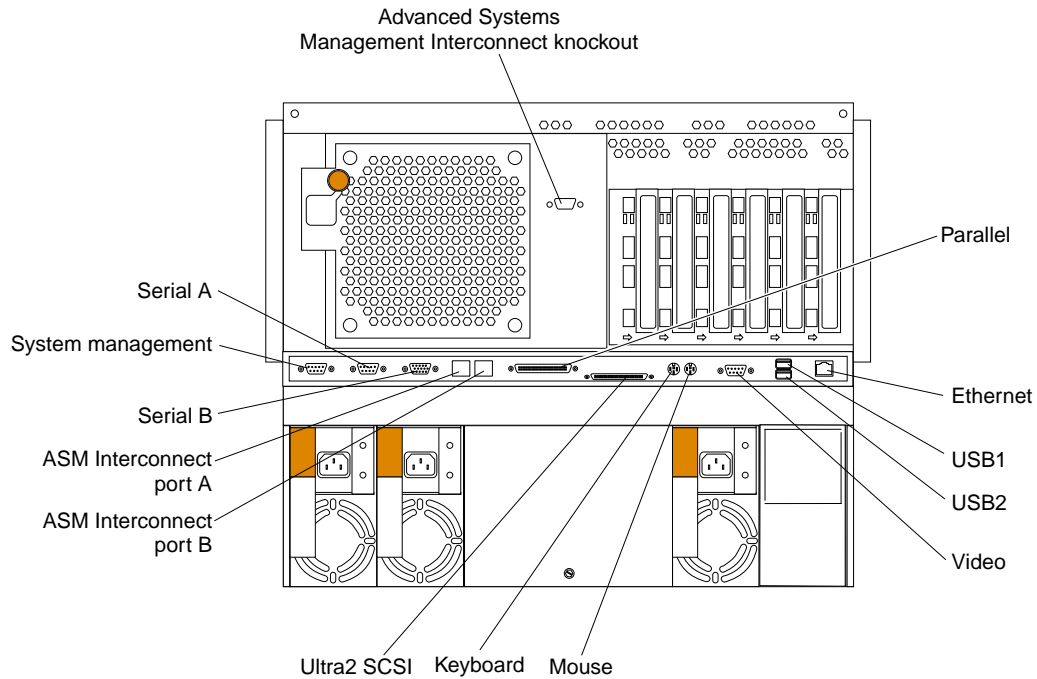
Note: If you are attaching a SCSI device, see page 97 for information about SCSI IDs and cables.

Input/Output ports

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

- One parallel port
- One video port
- One keyboard port
- One auxiliary-device port (mouse)
- One dual-channel Ultra2 SCSI port
- Two serial ports
- Two Universal Serial bus (USB) ports
- One Ethernet port
- Three communication ports dedicated to the Netfinity Advanced System Management processor

Refer to the following illustration for the location of input and output connectors.



Parallel port

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

Viewing or changing the parallel-port assignments

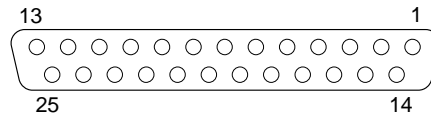
You can use the built-in Configuration/Setup Utility program to configure the parallel port as bidirectional; that is, so that data can be both read from and written to a device. In bidirectional mode, the server supports the ECP and EPP modes.

To view or change the parallel-port assignment:

1. Restart the server and watch the monitor screen.
2. When the message Press F1 for Configuration/Setup appears, press F1.
Note: The Devices and I/O Ports choice appears only on the full configuration menu. If you set two levels of passwords, you must enter the administrator password to access the full configuration menu.
3. From the main menu, select **Devices and I/O Ports**; then, press Enter.
4. Select the parallel port; then, use the arrow keys to advance through the settings available.
Note: When you configure the parallel port as bidirectional, use an IEEE 1284-compliant cable. The maximum length of the cable must not exceed 3 meters (9.8 feet).
5. Select **Save Settings**; then, select **Exit Setup** to exit from the Configuration/Setup Utility main menu.

Parallel port connector

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



Pin	I/O	SPP/ECP Signal	EPP Signal
1	O	-STROBE	-WRITE
2	I/O	Data 0	Data 0
3	I/O	Data 1	Data 1
4	I/O	Data 2	Data 2
5	I/O	Data 3	Data 3
6	I/O	Data 4	Data 4
7	I/O	Data 5	Data 5
8	I/O	Data 6	Data 6
9	I/O	Data 7	Data 7
10	I	-ACK	-ACK
11	I	BUSY	-WAIT
12	I	PE (paper end)	PE (paper end)
13	I	SLCT (select)	SLCT (select)
14	O	-AUTO FD (feed)	-AUTO FD
15	I	-ERROR	-ERROR
16	O	-INIT	-INIT
17	O	-SLCT IN	-SLCT IN
18	-	Ground	Ground
19	-	Ground	Ground
20	-	Ground	Ground
21	-	Ground	Ground
22	-	Ground	Ground
23	-	Ground	Ground
24	-	Ground	Ground
25	-	Ground	Ground

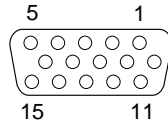
Table 7. Parallel-port connector pin-number assignments

Video port

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

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

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



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

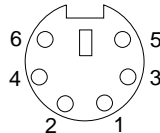
Table 8. Video-port connector pin-number assignments

Keyboard port

There is one keyboard port connector on the rear of your server.

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

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



Pin	I/O	Signal
1	I/O	Data
2	N/A	Reserved

Table 9. Keyboard connector pin-number assignments

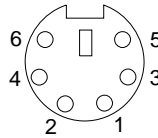
Pin	I/O	Signal
3	N/A	Ground
4	N/A	+5 V dc
5	I/O	Keyboard clock
6	N/A	Reserved

Table 9. Keyboard connector pin-number assignments

Auxiliary-device (pointing device) port

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

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



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

Table 10. Auxiliary-device connector pin-number assignments

Ultra2 SCSI ports

Your server comes with an IBM ServeRAID controller. This controller provides three independent SCSI channels. A 16-bit (wide) LVD SCSI cable connects the hard disk drive backplane to one channel of the RAID controller. Two 68-pin SCSI connectors for two additional channels are on the rear of the server. Refer to the *ServeRAID* topic provided on this CD for more information.

Your server has a dual-channel Ultra2 small computer system interface (SCSI) controller. This controller supports two independent SCSI channels: one external and one internal. Each of these channels supports up to 15 SCSI devices. You can use the external LVD SCSI channel connector, on the rear of your server, to connect different types of SCSI devices, such as drives or printers.

SCSI cabling requirements

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

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

Setting SCSI IDs

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

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

SCSI connector pin-number assignments

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



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

Table 11. 68-pin SCSI connector pin-number assignments

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

Table 11. 68-pin SCSI connector pin-number assignments

Serial ports

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

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

Viewing or changing the serial-port assignments

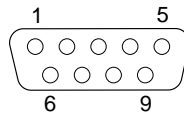
To view or change the serial-port assignments:

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

Note: The Devices and I/O Ports choice appears only on the full configuration menu. If you set two levels of passwords, you must enter the administrator password to access the full configuration menu.
4. Select the serial port; then, use the arrow keys to advance through the settings available.
5. Select **Save Settings**; then, select **Exit Setup** to exit from the Configuration/Setup Utility main menu.

Serial-port connectors

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



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		

Table 12. Serial-port connectors pin-number assignments

Universal Serial Bus ports

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

Notes:

1. If you attach a standard (non-USB) keyboard to the keyboard connector, the USB ports and devices will be disabled during the power-on self-test (POST).
2. If you install a USB keyboard that has a mouse port, the USB keyboard emulates a mouse and you will not be able to disable the mouse settings in the Configuration/Setup Utility program.
3. Check to make sure your NOS supports USB devices.

USB cables and hubs

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

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

USB-port connectors

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

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

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

Table 13. USB-port connector pin-number assignments

Ethernet port

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

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

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

Configuring the Ethernet controller

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

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

Failover for redundant Ethernet

The IBM Netfinity 10/100 Fault Tolerant Adapter is an optional redundant network interface card (NIC adapter) that you can install in your server. If you install this NIC adapter and connect it to the same logical LAN segment as the primary Ethernet controller, you can configure the server to support a *failover* function. You can configure either the integrated Ethernet controller or the NIC adapter as the primary Ethernet controller. In failover mode, if the primary Ethernet controller detects a link failure, all Ethernet traffic associated with it is switched to the redundant (secondary) controller. This switching occurs without any user intervention. When the primary link is restored to an operational state, the Ethernet traffic switches back to the primary Ethernet controller. The switch back to the primary Ethernet controller can be automatic or manually controlled, depending on the setup and operating system.

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

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

Considerations when combining failover and hot-plug

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

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

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

Windows NT Server:

IBM offers hot-plug support for Windows NT Server Version 4.0. Failover can work in conjunction with hot-plug support or independently. If you are not using hot-plug support, go to “Windows NT Server failover setup” on page 102.

Windows NT Server hot-plug setup:

IBM Netfinity Hot Plug PCI for Windows NT Server 4.0 package is available for download from the IBM Web site at:

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

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

1. IBM Netfinity PCI Hotplug for Windows NT 4.0 Failover DMI Agent
2. IBM Netfinity PCI Hotplug for Windows NT 4.0 Solution
3. IBM Netfinity 10/100 Fault Tolerant Adapter device drivers

Note: The order of installation is important. You must install the IBM Netfinity Hot Plug for Windows NT

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

To install the IBM Netfinity PCI Hotplug for Windows NT 4.0 Failover DMI Agent:

1. Download the IBM Netfinity PCI Hotplug for Windows NT 4.0 Failover DMI Agent file from the Netfinity Support web page and extract the files onto a diskette.
2. Insert the diskette into the diskette drive.

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

To install the IBM Netfinity PCI Hotplug for Windows NT 4.0 Solution package:

1. Download the IBM Netfinity PCI Hotplug for Windows NT 4.0 Solution file from the Netfinity Support web page and extract the files onto a diskette.
2. Log on to Windows NT Server as a user in the Administrator group.
3. Insert the diskette into the diskette drive.
4. From the Start menu, select the **Run** option.
5. Type A:\SETUP.EXE in the Open box.
6. Click **OK**. The Setup wizard opens.
7. Follow the instructions given by the setup wizard until the program is installed.

Windows NT Server failover setup:

To install the IBM Netfinity 10/100 Fault Tolerant Adapter device drivers:

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

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

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

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

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

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

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

IntraNetWare:

The IBM PCI Hot Plug System Bus Driver Diskette for Novell Netware V4.41, V4.42, and V5.0 is available for download from the IBM Web site at:

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

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

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

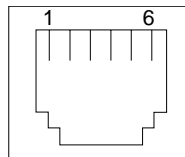
Note: If the primary adapter was hot-replaced while the Ethernet traffic was being handled by the secondary Ethernet controller, the traffic does not automatically switch back to the primary adapter when the primary adapter comes back online. In this case, issue the command:

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

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

Ethernet port connector

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



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

Table 14. Ethernet RJ-45 connector pin-number assignments.

Advanced System Management ports

Your server has three communication ports dedicated to the Netfinity Advanced System Management Processor. One port uses a standard D-shell serial-port

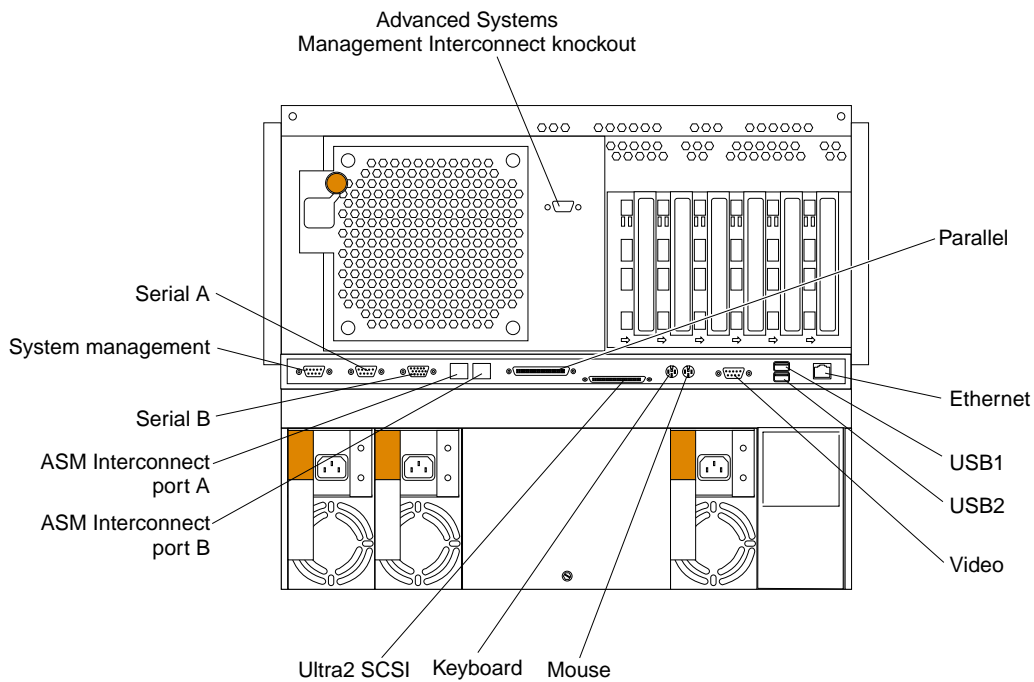
connector, connector C. The other two ports, which are used for the ASM Interconnect function, use a dual RJ-45 connector.

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

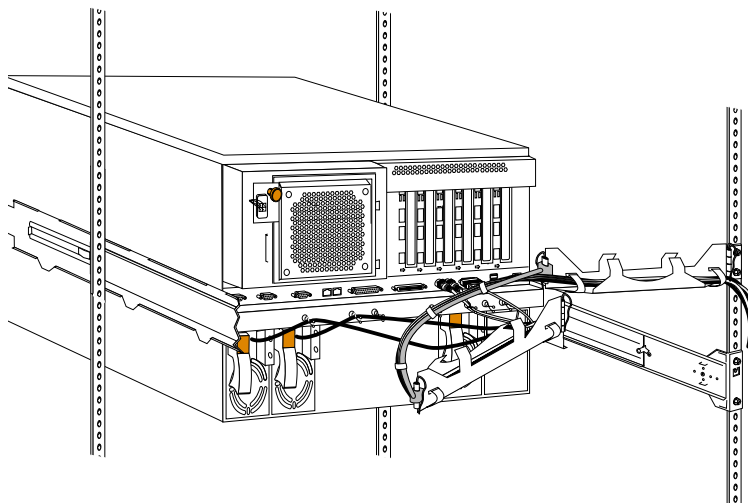
The ASM Interconnect function uses the RJ-45 system-management connectors. This function enables you to connect the Advanced System Management Processors of several rack-mounted servers so that they can communicate with each other in half-duplex mode.

Cabling the server

Refer to the following illustration for the location of input and output connectors.



Refer to the following illustration for an example of proper cable routing.



Installing the server in a rack

Refer to the *Rack Installation Instructions* for rack installation and removal instructions.

Chapter 7. Solving problems

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

If you cannot locate and correct the problem using the information in this section, refer to “Getting help, service, and information” on page 153 for more information.

Diagnostic tools overview

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

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

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

- **Diagnostic programs and error messages**

The server diagnostic programs are stored in upgradable read-only memory (ROM) on the processor board. These programs are the primary method of testing the major components of your server. See “Diagnostic programs and error messages” on page 122 for more information.

- **Light path diagnostics**

Your server has light-emitting diodes (LEDs) to help you identify problems with server components. These LEDs are part of the light-path diagnostics that are built into your server. By following the *path of lights*, you can quickly identify the type of system error that occurred. See “Identifying problems using status LEDs” on page 132 for more information.

- **Troubleshooting charts**

These charts list problem symptoms, along with suggested steps to correct the problems. See the “Troubleshooting charts” on page 138 for more information.

- **Customized support page**

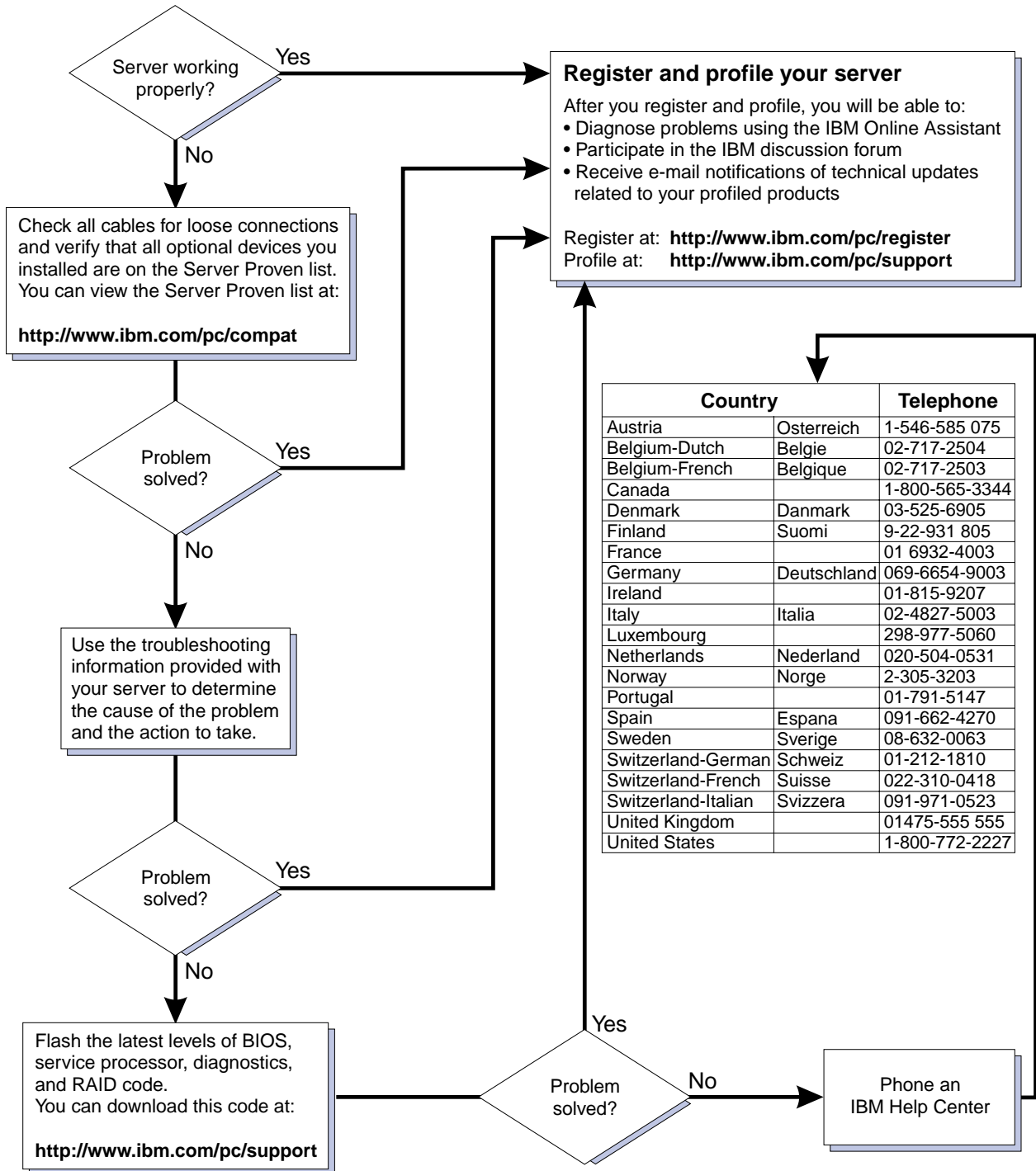
You can create a customized support page that is specific to your hardware, complete with Frequently Asked Questions, Parts Information, Technical Hints and Tips, and Downloadable files. In addition, you can choose to receive electronic mail (e-mail) notifications whenever new information becomes available about your registered products.

After you register and profile your Netfinity products, you can diagnose problems using the IBM Online Assistant and you can participate in the IBM discussion forum. For more detailed information about registering and creating a customized profile for your IBM products, visit the following addresses on the Web:

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



Support for Netfinity servers



POST

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

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

If POST detects a problem, more than one beep sounds and an error message appears on your screen. See “POST beep code descriptions” and “POST error messages” on page 112 for more information.

Notes:

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

POST beep code descriptions

Beep codes are sounded in a series of beeps. For example, a 1-2-4 beep code sounds like one beep, a pause, two consecutive beeps, another pause, and four more consecutive beeps.

The possible types of beep codes that your server might emit include the following:

No beeps

If no beep occurs after your server completes POST (that is, after the System POST Complete (OK) light on the operator information panel is illuminated), call for service.

Continuous beep

Your startup (boot) microprocessor has failed, the processor board, I/O board, or speaker subsystem might contain a failing component. If the system continues through POST with no errors, call for service. If no video appears, the startup processor has failed; replace the startup processor.

One short beep

One beep indicates that your server successfully completed POST. POST detected no configuration or functional errors. One beep also occurs after your server completes POST if you enter an incorrect power-on password.

Two short beeps

POST encountered an error. The Configuration/Setup Utility program will display additional information; follow the instructions that appear on the screen. See “POST error messages” on page 112 for descriptions of the text messages that might appear.

Three short beeps

A system memory error has occurred. This combination occurs only if the video Basic Input/Output System (BIOS) cannot display the error message. Replace the failing memory module.

Repeating short beeps

The system board might contain a failing component, your keyboard might be defective, or a key on the keyboard might be stuck. Ensure that:

1. Nothing is resting on the keyboard and pressing a key.
2. No key is stuck.

3. The keyboard cable is connected correctly to the keyboard and to the correct connector on the server.

Running the diagnostic tests can isolate the server component that failed, but you must have your system serviced. If the error message remains, call for service.

Note: If you just connected a new mouse or other pointing device, turn off the server and disconnect that device. Wait at least 5 seconds; then, turn on the server. If the error message goes away, replace the device.

One long and one short beep

POST encountered an error on a video adapter. If you are using the integrated video controller, call for service. If you are using an optional video adapter, replace the failing video adapter.

One long and two short beeps

A video I/O adapter ROM is not readable, or the video subsystem is defective. If you hear this beep combination twice, both the system board and an optional video adapter have failed the test. This beep combination might also indicate that the system board contains a failing component.

One long and three short beeps

The system-board video subsystem has not detected a monitor connection to the server. Ensure that the monitor is connected to the server. If the problem persists, replace the monitor.

Two long and two short beeps

POST does not support the optional video adapter. This beep combination occurs when you install a video adapter that is incompatible with your server. Replace the optional video adapter with one that the server supports or use the integrated video controller.

POST beep codes

Beep code	Description	Action	
1-1-1	Adapter, DIMM, or I/O board and processor board has failed	Call for service.	
1-1-2	Microprocessor register test has failed.		
1-1-3	CMOS write/read test has failed.		
1-1-4	BIOS ROM checksum has failed.		
1-2-1	Programmable Interval Timer test has failed.		
1-2-2	DMA initialization has failed.		
1-2-3	DMA page register write/read test has failed.		
1-4-3	Interrupt vector loading test has failed.		
2-1-1	Secondary DMA register test has failed.		
2-1-2	Primary DMA register test has failed.		
2-1-3	Primary interrupt mask register test has failed.		
2-1-4	Secondary interrupt mask register test has failed.		
2-2-1	Interrupt vector loading has failed.		
2-2-2	Keyboard controller test has failed.		
2-2-3	CMOS power failure and checksum checks have failed.		
2-2-4	CMOS configuration information validation has failed.		
2-3-2	Screen memory test has failed.		
2-3-3	Screen retrace tests have failed.		
2-3-4	Search for video ROM has failed.		
2-4-1	Screen test indicates the screen is operable.		
3-1-1	Timer tick interrupt test has failed.		
3-1-2	Interval timer channel 2 test has failed.		
3-1-3	RAM test has failed above address hex 0FFFF.		
3-1-4	Time-of-Day clock test has failed.		
3-2-1	Serial port test has failed.		
3-2-2	Parallel port test has failed.		
3-2-3	Math Coprocessor test has failed.		
3-2-4	Comparison of CMOS memory size against actual has failed.		
2-3-1	Screen initialization has failed.		Turn off the server and then restart the server. If the problem persists, call for service.
3-3-2	I2C bus has failed.		
1-2-4	RAM refresh verification has failed.		Reseat the memory modules or install a memory module. If the problem persists, call for service.
1-3-1	First 64 Kb RAM test has failed.		
1-3-2	First 64 Kb RAM parity test has failed.		
3-3-1	A memory size mismatch has occurred.		
3-3-3	No memory has been detected in the system.		

Table 15. POST beep codes

POST error messages

The following tables provide information about the POST error messages that can appear during startup.

POST message	Description
062	<p>The server failed to boot on three consecutive attempts.</p> <p>All caches are disabled. Repeatedly turning the server on and then off or resetting the server might cause this problem.</p> <p>Action: Start the Configuration/Setup Utility program and verify that all settings are correct. Use the Cache Control selection in the Advanced Setup menu of the Configuration/Setup Utility program to enable the caches.</p> <p>If the problem persists, call for service. When the problem is corrected, be sure to enable the caches.</p>
101 102 106	<p>An error occurred during the system board and microprocessor test.</p> <p>Action: Call for service.</p>
114	<p>An adapter read-only memory (ROM) error occurred.</p> <p>Action: Remove the options. If you can start the server without the options installed, reinstall each option one at a time and retest after each is reinstalled. When an option fails, replace it.</p> <p>If you cannot isolate and correct the problem, call for service.</p>
129	<p>An error was detected in the L1 cache of one of the microprocessors.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. If you just installed a microprocessor, verify that the microprocessor is installed and seated correctly. 2. If the problem persists, check to see if the system has isolated the problem to a microprocessor: <ul style="list-style-type: none"> • If the System Error light on the operator information panel is on, check to see if the CPU LED on the diagnostic LED panel is on. If it is on, check the Microprocessor Error LEDs next to the microprocessor sockets. <ul style="list-style-type: none"> — If a Microprocessor LED is on, run the diagnostic program for the microprocessor indicated by the LED. If the tests fail, replace the indicated microprocessor. — If the microprocessor tests do not fail, call for service. • If no error LED is on, the error logs in the Configuration/Setup Utility program might provide additional information about the microprocessor error. <p>If the problem persists, call for service.</p>
151	<p>A real-time clock (RTC) error occurred.</p> <p>Action: Call for Service.</p>
161	<p>The real-time clock battery has failed.</p> <p>Action: Replace the battery yourself or call for service.</p> <p>You can use the server until you replace the battery. However, you must run the Configuration/Setup Utility program and set the time and date and other custom settings each time you turn on the server.</p>

Table 16. POST error messages

POST message	Description
162	<p>A change in device configuration occurred. This error occurs under one or more of the following conditions:</p> <ul style="list-style-type: none"> • A new device has been installed. • A device has been moved to a different location or cable connection. • A device has been removed or disconnected from a cable. • A device is failing and is no longer recognized by the server as being installed. • An external device is not turned on. • An invalid checksum is detected in the battery-backed memory. <p>Action: Verify that all external devices are turned on. You must turn on external devices before turning on the server.</p> <p>If you did not add, remove, or change the location of a device, a device is probably failing. Running the Diagnostic program might isolate the failing device.</p> <p>If you cannot isolate and correct the problem, call for service.</p>
163	<p>The time of day has not been set.</p> <p>Action: Set the correct date and time. If the date and time are set correctly and saved, but the 163 error message reappears, call for service.</p> <p>You can use the server until the system is serviced, but any application programs that use the date and time will be affected.</p>
164	<p>A change in the memory configuration occurred. This message might appear after you add or remove memory.</p> <p>Note: The server can be used with decreased memory capacity.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. If POST error message 289 also occurred, follow the instructions for that error message first. 2. If you just installed or removed memory, run the Configuration/Setup Utility program; then, exit, saving the new configuration settings. If the message appears again, shutdown the server, reseal the memory modules, and restart the server. 3. If the problem persists, check to see if the system has isolated the problem to a memory module: <ul style="list-style-type: none"> • If the System Error light on the operator information panel is on, check to see if the MEM LED on the diagnostic LED panel is on. If it is on, check the DIMM Error LEDs next to the memory sockets. If a DIMM Error LED is on, run the diagnostic program for the memory. <ul style="list-style-type: none"> — If the tests fail, replace the DIMM. If the problem persists after you replace the DIMM, call for service. — If the memory tests do not fail, call for service. • If no error LED is on, the error logs in the Configuration/Setup Utility program might provide additional information on the memory error. <p>If the problem persists, call for service.</p>
175	<p>A vital product data (VPD) error occurred.</p> <p>Action: Call for service.</p>
176 177 178	<p>A security hardware error occurred.</p> <p>Action: Check for indications that someone has tampered with the server. If no one has tampered with the server, call for service.</p>

Table 16. POST error messages

POST message	Description
184	<p>The power-on password information stored in your server has been removed.</p> <p>Action: From the Configuration/Setup Utility program main menu, select System Security. Then, follow the instructions on the screen.</p> <p>If this information cannot be restored, call for service.</p>
185	<p>A power failure damaged the stored information about the drive-startup sequence.</p> <p>Action: From the Configuration/Setup Utility program main menu, select Start Options; then, follow the instructions on the screen.</p> <p>If this information cannot be restored, call for service.</p>
186	<p>A system board or hardware error occurred.</p> <p>Action: Call for service.</p>
187	<p>The VPD serial number is not set.</p> <p>Action: The system serial number is set in the VPD EEPROM at the time of manufacturing. If the system board has been replaced, the system serial number will be invalid and should be set. From the main menu of the Configuration/Setup Utility program, select System Information, then select Product Data. If the problem persists, call for service.</p>
188	<p>A vital product data (VPD) error occurred.</p> <p>Action: Call for service.</p>
189	<p>An attempt has been made to access the server with invalid passwords. After three incorrect attempts, the server locks up; that is, the logon data fields are no longer available to the user.</p>
201	<p>An error occurred during the memory controller test. This error can be caused by:</p> <ul style="list-style-type: none"> • Incorrectly installed memory • A failing memory module • A processor-board problem • A memory-board problem <p>Action:</p> <ol style="list-style-type: none"> 1. If you just installed memory, verify that the new memory is correct for your server. Also verify that the memory is installed and seated correctly. 2. If the problem persists, check to see if the system has isolated the problem to a memory module: <ul style="list-style-type: none"> • If the System Error light on the operator information panel is on, check to see if the MEM LED on the diagnostic LED panel is on. If it is on, check the DIMM Error LEDs next to the memory sockets. If a DIMM Error LED is on, run the diagnostic program for the memory. • If the tests fail, replace the DIMM. If the problem persists after you replace the DIMM, call for service. • If the memory tests do not fail, call for service. 3. If no error LED is on, the error logs in the Configuration/Setup Utility program might provide additional information on the memory error. <p>If the problem persists, call for service.</p>

Table 16. POST error messages

POST message	Description
229	<p>An error was detected in the L2 cache of one of the microprocessors.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. If you just installed a microprocessor, verify that the microprocessor is installed and seated correctly. 2. If the problem persists, check to see if the system has isolated the problem to a microprocessor: <ul style="list-style-type: none"> • If the System Error light on the operator information panel is on, check to see if the CPU LED on the diagnostic LED panel is on. If it is on, check the Microprocessor Error LEDs next to the microprocessor sockets. <ul style="list-style-type: none"> — If a Microprocessor LED is on, run the diagnostic program for the microprocessor indicated by the LED. (If the Secondary Microprocessor Error LED is on, run the "Alt CPU" diagnostic program.) If the tests fail, replace the microprocessor. — If the microprocessor tests do not fail, call for service. • If no error LED is on, the error logs in the Configuration/Setup Utility program might provide additional information on the microprocessor error. <p>If the problem persists, call for service.</p>
262	<p>A memory parity configuration error occurred.</p> <p>Action: Call for service.</p>
289	<p>An error occurred during POST memory tests and a failing DIMM was disabled.</p> <p>Note: You can use the server with decreased memory.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. If you just installed memory, verify that the new memory is correct for your server. Also verify that the memory is installed and seated correctly. Start the Configuration/Setup Utility program and select Memory Settings from the Advanced Setup menu to enable the DIMM. 2. If the problem remains, replace the failing DIMM. <p>If the problem persists, call for service.</p>
301 303	<p>An error occurred during the keyboard and keyboard controller test. These error messages also might be accompanied by continuous beeping.</p> <p>Action: Ensure that:</p> <ol style="list-style-type: none"> 1. Nothing is resting on the keyboard and pressing a key. 2. No key is stuck. 3. The keyboard cable is connected correctly to the keyboard and to the correct connector on the server. <p>Running the diagnostic tests can isolate the server component that failed, but you must have your system serviced. If the error message remains, call for service.</p> <p>Note: If you just connected a new mouse or other pointing device, turn off the server and disconnect that device. Wait at least 5 seconds; then, turn on the server. If the error message goes away, replace the device.</p>
602	<p>Invalid diskette boot record</p> <p>Action:</p> <ol style="list-style-type: none"> 1. Replace the diskette. 2. If the problem persists, make sure that the diskette drive cables are correctly and securely connected. 3. If the problem remains, replace the diskette drive. <p>If the problem persists, call for service.</p>

Table 16. POST error messages

POST message	Description
604	<p>An error occurred during a diskette drive test.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. Verify that the Configuration/Setup Utility program correctly reflects the type of diskette drive that you have installed. 2. Run the diagnostic tests. If the diagnostic tests fail, call for service.
662	<p>A diskette drive configuration error occurred.</p> <p>Action: If you removed a diskette drive, make sure that the diskette drive setting is correct in the Configuration/Setup Utility program. If the setting is not correct, change it.</p> <p>If the problem persists, call for service.</p>
962	<p>A parallel port configuration error occurred.</p> <p>Action: If you changed a hardware option, make sure that the parallel port setting is correct in the Configuration/Setup Utility program. If the setting is not correct, change it.</p> <p>If the problem persists, call for service.</p>
11xx	<p>An error occurred during the system-board serial port test.</p> <p>Action: If you have a modem, serial printer, or other serial device attached to your server, verify that the serial cable is connected correctly. If it is, use the following procedure:</p> <ol style="list-style-type: none"> 1. Turn off the server. 2. Disconnect the serial cable from the serial port. 3. Wait five seconds; then, turn on the server. <p>If the POST error message does not reappear, either the serial cable or the device is probably failing. See the documentation that comes with the serial device for additional testing information.</p> <p>If the POST error message reappears, call for service.</p>
1162	<p>The serial port configuration conflicts with another device in the system.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. Make sure the IRQ and I/O port assignments needed by the serial port are available. 2. If all interrupts are being used by adapters, you might need to remove an adapter to make an interrupt available to the serial port, or force other adapters to share an interrupt.
1301	<p>Cable to Information LED panel not detected.</p> <p>Action: Make sure that the cable to the operator information panel is connected.</p> <p>If the problem persists, call for service.</p>
1302	<p>Cable to Power and Reset pushbuttons not detected.</p> <p>Action: Make sure that the cable to the Power and Reset pushbuttons is connected.</p> <p>If the problem persists, call for service.</p>
1303	<p>I2C cable to Power Backplane not detected.</p> <p>Action: Make sure that the cable to the power backplane is connected.</p> <p>If the problem persists, call for service.</p>
1304	<p>Cable to Diagnostic LED panel not detected.</p> <p>Action: Make sure that the cable to the diagnostic LED panel is connected.</p> <p>If the problem persists, call for service.</p>

Table 16. POST error messages

POST message	Description
1600	<p>The Netfinity Advanced System Management processor is not functioning.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. Verify that the jumpers for the system-management processor are set correctly. 2. Disconnect the server from all electrical sources, wait for 30 seconds, reconnect the server to the electrical sources, and restart the server. <p>If the problem persists, call for service.</p>
1601	<p>The BIOS needs to be updated.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. Disconnect the server from all electrical sources, wait for 30 seconds, reconnect the server to the electrical sources, and restart the server. 2. If the problem persists, update the BIOS. <p>If the problem persists, call for service.</p>
1800	<p>A PCI adapter has requested a hardware interrupt that is not available.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. Make sure that the PCI adapter and all other adapters are set correctly in the Configuration/Setup Utility program. If the interrupt resource settings are not correct, change the settings. 2. If all interrupts are being used by other adapters, you might need to remove an adapter to make an interrupt available to the PCI adapter, or force other adapters to share an interrupt.
1962	<p>No valid startup devices were found. The system cannot find the startup drive or operating system.</p> <p>Action: Be sure that the drive you want to start from is in the startup sequence.</p> <ol style="list-style-type: none"> 1. Select Start Options from the Configuration/Setup Utility program main menu. If you are unable to set the startup sequence, call for service. 2. Check the list of startup devices in the Startup device data fields. Is the drive you want to start from in the startup sequence? <ul style="list-style-type: none"> Yes Exit from this screen; then, select Exit Setup to exit the Configuration/Setup menu. Go to step 3. No Follow the instructions on the screen to add the drive; then, save the changes and exit the Configuration/Setup menu. Restart the server. 3. Is an operating system installed? <ul style="list-style-type: none"> Yes Turn off the server. Go to step 4. No Install the operating system in your server; then, follow your operating system instructions to shut down and restart the server. 4. During server startup, watch for messages indicating a hardware problem. <p>If the same error message appears, call for service.</p>
2400	<p>An error occurred during the testing of the video controller on the system board. This error can be caused by a failing monitor, a failing system board, or a failing video adapter (if one is installed).</p> <p>Action: Verify that the monitor is connected correctly to the video connector. If the monitor is connected correctly, call for service.</p>
2462	<p>A video memory configuration error occurred.</p> <p>Action: Make sure that the monitor cables are correctly and securely connected to the server.</p> <p>If the problem persists, call for service.</p>
5962	<p>An IDE CD-ROM configuration error occurred.</p> <p>Action: Check the signal and power cable connections to the CD-ROM drive.</p> <p>If the problem persists, call for service.</p>

Table 16. POST error messages

POST message	Description
8603	<p>An error occurred during the mouse (pointing device) controller test. The addition or removal of a mouse, or a failing system board can cause this error.</p> <p>Note: This error also can occur if electrical power was lost for a very brief period and then restored. In this case, turn off the server for at least 5 seconds; then, turn it back on.</p> <p>Action: Ensure that the keyboard and mouse (pointing device) are attached to the correct connectors. If they are connected correctly, use the following procedure:</p> <ol style="list-style-type: none"> 1. Turn off the server. 2. Disconnect the mouse from the server. 3. Turn on the server. <p>If the POST error message does not reappear, the mouse is probably failing. See the documentation that comes with the mouse for additional testing information. If the problem remains, replace the mouse or pointing device.</p> <p>If the POST error message reappears, run the diagnostic tests to isolate the problem. If the diagnostic tests do not find a problem and the POST error message remains, call for service.</p>
00012000	<p>Processor machine check.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. Update the system BIOS. 2. If the problem persists, replace the microprocessor.
00019501	<p>Processor 1 is not functioning.</p> <p>Action: Replace microprocessor 1. (The Microprocessor 1 Error LED will be on.)</p> <p>If the problem persists, call for service.</p>
00019502	<p>Processor 2 is not functioning.</p> <p>Action: Replace microprocessor 2. (The Microprocessor 2 Error LED will be on.)</p> <p>If the problem persists, call for service.</p>
00019503	<p>Processor 3 is not functioning.</p> <p>Action: Replace microprocessor 2. (The Microprocessor 3 Error LED will be on.)</p> <p>If the problem persists, call for service.</p>
00019504	<p>Processor 4 is not functioning.</p> <p>Action: Replace microprocessor 4. (The Microprocessor 4 Error LED will be on.)</p> <p>If the problem persists, call for service.</p>
00019701	<p>Processor 1 failed the built-in self test.</p> <p>Action: Replace microprocessor 1. (The Microprocessor 1 Error LED will be on.)</p> <p>If the problem persists, call for service.</p>
00019702	<p>Processor 2 failed the built-in self test.</p> <p>Action: Replace microprocessor 2. (The Microprocessor 2 Error LED will be on.)</p> <p>If the problem persists, call for service.</p>

Table 16. POST error messages

POST message	Description
00019703	<p>Processor 3 failed the built-in self test.</p> <p>Action: Replace microprocessor 3. (The Microprocessor 3 Error LED will be on.)</p> <p>If the problem persists, call for service.</p>
00019704	<p>Processor 4 failed the built-in self test.</p> <p>Action: Replace microprocessor 4. (The Microprocessor 4 Error LED will be on.)</p> <p>If the problem persists, call for service.</p>
00180100	<p>A PCI adapter has requested memory resources that are not available.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. Make sure that the PCI adapter and all other adapters are set correctly in the Configuration/Setup Utility program. If the memory resource settings are not correct, change the settings. 2. If all memory resources are being used, you might need to remove an adapter to make memory available to the PCI adapter. Disabling the adapter BIOS on the adapter might correct the error. Refer to the documentation provided with the adapter.
00180200	<p>A PCI adapter has requested an I/O address that is not available, or the PCI adapter might be defective.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. Make sure that the I/O address for the PCI adapter and all other adapters are set correctly in the Configuration/Setup Utility program. 2. If the I/O port resource settings are correct, the PCI adapter might be defective. Call for service.
00180300	<p>A PCI adapter has requested a memory address that is not available, or the PCI adapter might be defective.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. Make sure that the memory address for all other adapters are set correctly in the Configuration/Setup Utility program. If the memory resource settings are not correct, change the settings. 2. If the memory resource settings are correct, the PCI adapter might be defective. Call for service.
00180400	<p>A PCI adapter has requested a memory address that is not available.</p> <p>Action: If all memory addresses are being used, you might need to remove an adapter to make memory address space available to the PCI adapter. Disabling the adapter BIOS on the adapter might correct the error. Refer to the documentation provided with the adapter.</p>
00180500	<p>A PCI adapter ROM error occurred.</p> <p>Action: Remove the PCI adapters. If you can start the server without the adapters, reinstall each adapter one at a time and retest after each is reinstalled. When an adapter fails, replace it.</p> <p>If you cannot isolate and correct the problem, call for service.</p>
00180600	<p>A PCI-to-PCI bridge error occurred. More than one PCI bus tried to access memory below 1 MB.</p> <p>Action: Remove the PCI adapter that has the PCI bridge. If you can start the server without the adapter, reinstall and retest the adapter. If the adapter fails, replace it.</p> <p>If you cannot isolate and correct the problem, call for service.</p>

Table 16. POST error messages

POST message	Description
00180700	<p>xxxxyyyy Planar PCI device does not respond. (Where xxxx is the PCI vendor ID and yyyy is the PCI device ID.)</p> <p>Action: Remove the PCI adapters. If you can start the server without the adapters, reinstall each adapter one at a time and retest after each is reinstalled. When an adapter fails, replace it.</p> <p>If you cannot isolate and correct the problem, call for service.</p>
00180800	<p>An unsupported PCI device is installed.</p> <p>Action: Remove the PCI adapters. If you can start the server without the adapters, reinstall each adapter one at a time and retest after each is reinstalled. When an adapter fails, replace it.</p> <p>If the problem persists, call for service.</p>
00181000	<p>PCI error.</p> <p>Action: Remove the PCI adapters. If you can start the server without the adapters, reinstall each adapter one at a time and retest after each is reinstalled. When an adapter fails, replace it.</p> <p>If the problem persists, call for service.</p>
01295085	<p>The ECC checking hardware test failed.</p> <p>Action: Call for service.</p>
01298001	<p>No update data is available for processor 1.</p> <p>Action: Update the system BIOS to a level that supports the microprocessors installed in the server.</p>
01298002	<p>No update data is available for processor 2.</p> <p>Action: Update the system BIOS to a level that supports the microprocessors installed in the server.</p>
01298003	<p>No update data is available for processor 3.</p> <p>Action: Update the system BIOS to a level that supports the microprocessors installed in the server.</p>
01298004	<p>No update data is available for processor 4.</p> <p>Action: Update the system BIOS to a level that supports the microprocessors installed in the server.</p>
01298101	<p>The update data for processor 1 is incorrect.</p> <p>Action: Update the system BIOS to a level that supports the microprocessors installed in the server.</p>
01298102	<p>The update data for processor 2 is incorrect.</p> <p>Action: Update the system BIOS to a level that supports the microprocessors installed in the server.</p>
01298103	<p>The update data for processor 3 is incorrect.</p> <p>Action: Update the system BIOS to a level that supports the microprocessors installed in the server.</p>
01298104	<p>The update data for processor 4 is incorrect.</p> <p>Action: Update the system BIOS to a level that supports the microprocessors installed in the server.</p>
01298200	<p>Microprocessor speed mismatch</p> <p>Action: The microprocessors installed do not run at the same speed; install microprocessors with identical speeds.</p>

Table 16. POST error messages

POST message	Description
I9990301	A hard disk drive error occurred. Action: Call for service.
I9990305	POST could not find an operating system. Action: Install an operating system. If you have already installed the operating system, check the drive startup sequence. If the drive sequence is correct, run the diagnostic tests to verify that the hard disk drive is functioning correctly. If there is a problem with the hard disk drive (such as a bad sector), you might need to reinstall the operating system. If you cannot reinstall the operating system, call for service.
I9990650	AC power has been restored. Action: No action is required. This message appears each time AC power is restored to the server after an AC power loss.
Other Numbers	POST found an error. Action: Follow the instructions on the screen.

Table 16. POST error messages

Event/error logs

The POST error log contains the three most recent error codes and messages that the system generated during POST. The System Event/Error Log contains all error messages issued during POST and all system status messages from the Netfinity Advanced System Management Processor.

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

Small computer system interface messages

The following table lists actions to take if you receive a SCSI error message.

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

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

SCSI Messages	Description
All	<p>One or more of the following might be causing the problem.</p> <ul style="list-style-type: none"> • A failing SCSI device (adapter, drive, controller) • An improper SCSI configuration • Duplicate SCSI IDs in the same SCSI chain • An improperly installed SCSI terminator • A defective SCSI terminator • An improperly installed cable • A defective cable <p>Action:</p> <p>Verify that:</p> <ul style="list-style-type: none"> • The external SCSI devices are turned on. External SCSI devices must be turned on <i>before</i> the server. • The cables for all external SCSI devices are connected correctly. • The last device in each SCSI chain is terminated properly. • The SCSI devices are configured correctly. <p>If the above items are correct, run the diagnostic programs to obtain additional information about the failing device. If the error remains or recurs, call for service.</p>

Table 17. SCSI messages

Diagnostic programs and error messages

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

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

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

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

The error code format is as follows:

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

where:

- fff** is the three-digit function code that indicates the function being tested when the error occurred. For example, function code 089 is for the microprocessor.
- ttt** is the three-digit failure code that indicates the exact test failure that was encountered. (These codes are for trained service personnel and are described in the *Hardware Maintenance Manual*.)

iii	is the three-digit device ID. (These codes are for trained service personnel and are described in the <i>Hardware Maintenance Manual</i> .)
date	is the date that the diagnostic test was run and the error recorded.
cc	is the check digit that is used to verify the validity of the information.
text message	is the diagnostic message that indicates the reason for the problem.

Text messages

The diagnostic text message format is as follows:

Function Name: Result (test specific string)

where:

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

Result can be one of the following:

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

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

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

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

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

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

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

Starting the diagnostic programs

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

To start the diagnostic programs:

1. Turn on the server and watch the screen.

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

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

Notes:

- a. If the server stops during testing and you cannot continue, restart the server and try running the diagnostic programs again. If the problem persists, call for service.
- b. The keyboard and mouse (pointing device) tests assume that a keyboard and mouse are attached to the server.
- c. If you run the diagnostic programs with no mouse attached to your server, you will not be able to navigate between test categories using the **Next Cat** and **Prev Cat** buttons. All other functions provided by mouse-selectable buttons are also available using the function keys.
- d. The regular mouse test cannot test a USB mouse.
- e. You can view server configuration information (such as system configuration, memory contents, interrupt request (IRQ) use, direct memory access (DMA) use, device drivers, and so on) by selecting **Hardware Info** from the top of the screen.

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

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

Viewing the test log

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

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

To view the test log:

1. Turn on the server and watch the screen.
If the server is on, shut down your operating system and restart the server.
2. When the message **F2 for Diagnostics** appears, press **F2**.
If a power-on password or administrator password is set, the server prompts you for it. Type in the appropriate password; then, press **Enter**.
3. When the Diagnostic Programs screen appears, select **Utility** from the top of the screen.
4. Select **View Test Log** from the list that appears; then, follow the instructions on the screen.

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

Diagnostic error message tables

The following tables provide descriptions of the error messages that might appear when you run the diagnostic programs.

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

Code	Function	Result	Text message	Action
001	Core system	Failed	Processor board, ECC Test	Call for service.
			System board	
005	Video port		Processor and system boards	
011	Serial port		Integrated serial port	
014	Parallel port		Integrated parallel port	
015	USB interface	Aborted	Can NOT test USB interface while it is in use. Note: If you have a USB keyboard or mouse attached, you cannot run the diagnostic program for the USB interface.	<ol style="list-style-type: none"> 1. Turn off the server. 2. Replace the USB keyboard and mouse with a standard keyboard and mouse. 3. Turn on the server. 4. Run the diagnostic test again.
		Failed	System board	Call for service.
020	PCI interface	Failed	System board	Call for service.
			Tab on PCI Hot Swap slot # <i>n</i> is bad (where <i>n</i> is the number of the failing PCI slot) Note: For normal operation, the Power LED for the hot-plug PCI slot will be on and the Attention Led will be off.	<p>Make sure the tab and latch on hot-plug PCI slot <i>n</i> are closed correctly.</p> <p>If the problem persists, call for service.</p>
030	SCSI interface	Failed	SCSI adapter in slot <i>n</i> failed register/counter/power test (where <i>n</i> is the slot number of the failing adapter)	<p>Refer to the information provided with the adapter for instructions.</p> <p>If the problem persists, call for service.</p>
			SCSI controller on system board failed register/counter/power test	Call for service.
035	ServeRAID	Aborted	Test setup error: No ServeRAID adapter found on system board or PCI bus	<p>Make sure the ServeRAID adapter is properly installed.</p> <p>If the problem remains, replace the ServeRAID adapter.</p> <p>If the problem persists, call for service.</p>

Code	Function	Result	Text message	Action
035	ServeRAID	Failed	Adapter in slot <i>n</i> ; adapter/drive configuration error (where <i>n</i> is the slot number of the failing adapter)	Run the ServeRAID Configuration Utility. If the problem remains, replace the ServeRAID adapter in slot <i>n</i> .
			Adapter in slot <i>n</i> ; internal error (where <i>n</i> is the slot number of the failing adapter)	
			Logical drive <i>m</i> on adapter in slot <i>n</i> (where <i>m</i> is the number of the failing logical drive and <i>n</i> is the slot number of the adapter)	If the problem persists, call for service.
			On system board; internal error	Run the ServeRAID Configuration Utility. If the problem persists, call for service.
			On system board; adapter/drive configuration error	
			Logical drive on system board adapter	Call for service.
			Adapter in slot <i>n</i> ; memory allocation error (where <i>n</i> is the slot number of the failing adapter)	
			On system board; memory allocation error	
			On system board; PCI configuration error	
			On system board; POST error	Replace the ServeRAID adapter in slot <i>n</i> . If the problem persists, call for service.
			Adapter in slot <i>n</i> ; POST error (where <i>n</i> is the slot number of the failing adapter)	
			Adapter in slot <i>n</i> ; PCI configuration error (where <i>n</i> is the slot number of the failing adapter)	
			SCSI drive on adapter in slot <i>n</i> , SCSI ID <i>m</i> (where <i>n</i> is the slot number of the adapter and <i>m</i> is the SCSI ID of the drive)	Check the cable and power connections on the drive. If the problem persists, call for service.
075	Power supply	Failed	Voltage sensed by the system is out of range	Call for service.

Code	Function	Result	Text message	Action
089	Microprocessor	Failed	Invalid microprocessor in slot xyz or BIOS setup problem (where xyz identifies the microprocessor that is causing the error message)	<ol style="list-style-type: none"> 1. Check the system error log for the related error messages. 2. If your server does not have the latest level BIOS installed, update the BIOS. 3. If the problem remains, replace the xyz microprocessor and run the test again.
			Processor in socket id xyz is installed but not functioning (where xyz identifies the microprocessor that is causing the error message)	
			Microprocessor in socket id xyz (where xyz identifies the microprocessor that is causing the error message) Note: The Microprocessor Error LED associated with the microprocessor will be lit.	<ol style="list-style-type: none"> 1. Reseat the microprocessor. 2. If the problem remains, replace the microprocessor.
			Processor in socket id xyz is defective (where xyz identifies the microprocessor that is causing the error message)	<p>Replace the microprocessor.</p> <p>If the problem persists, call for service.</p>

Code	Function	Result	Text message	Action
089	Microprocessor	Failed	Test setup error: Application microprocessor not installed or BIOS setup problem	<ol style="list-style-type: none"> 1. Verify that the Application microprocessor is installed and seated correctly. 2. Check the system error log for related error messages. 3. If your server does not have the latest level BIOS installed, update the BIOS. 4. If the problem remains, replace the application microprocessor and run the test again. <p>If the problem persists, call for service.</p>
			VRM corresponding to Microprocessor in socket xyz is defective (where xyz identifies the microprocessor whose VRM is causing the error message)	<p>Replace the VRM.</p> <p>If the problem remains, call for service.</p>
			VRM corresponding to Microprocessor in socket id xyz is not installed (where xyz identifies the microprocessor whose VRM is causing the error message)	<p>Install a VRM.</p> <p>If the problem persists, call for service.</p>
165	Service processor	Failed	Netfinity Advanced System Management Processor on system board	Call for service.
175	System thermal	Failed	<p>Fan # <i>n</i></p> <p>(where <i>n</i> is the number of the failing fan)</p> <p>Note: The fan LED on the diagnostic LED panel will be lit.</p>	Replace the indicated fan
			Temperature sensed on processor board is out of range	If one of the fan LEDs on the diagnostic LED panel is on, replace the indicated fan. If the problem persists, call for service.
180	Status display	Failed	Diagnostic LED panel	Call for service.
			Operator information panel	
			LED on hot-swap SCSI backplane	
			LED on processor board	
			LED on system board	

Code	Function	Result	Text message	Action
201	System memory	Failed	DIMMs in location DIMM n (where n is the number of the socket that contains the failing DIMM)	<ol style="list-style-type: none"> 1. Reseat the failing DIMM. 2. If the problem remains, replace the DIMM. If the problem persists, call for service.
			Test setup error: Corrupt BIOS in ROM	If your server does not have the latest level BIOS installed, update the BIOS to the latest level. If the problem persists, call for service.
			Test setup error: Corrupt DMI BIOS, information in BIOS is not as expected	
202	System cache	Aborted	Test setup error: BIOS cannot access VPD information	If your server does not have the latest level BIOS installed, update the BIOS to the latest level and run the diagnostic program again. If the problem persists, call for service.
			Test setup error: Corrupt DMI BIOS. Information in BIOS is not as expected	
			Test setup error: No L2 cache detected on microprocessor socket id xyz or BIOS setup problem (where xyz identifies the microprocessor that is causing the error message)	<ol style="list-style-type: none"> 1. If your server does not have the latest level BIOS installed, update the BIOS to the latest level 2. Run the diagnostic program again. 3. If the problem remains, replace the failing processor. If the problem persists, call for service.
			Test setup error: Unknown hardware problem associated with microprocessor in socket id xyz. (where xyz identifies the microprocessor that is causing the error message)	
			Failed	
Warning	Test setup error: Cache is disabled. Use system setup to enable before retrying the test	Use the Cache Control choice from the Advanced Setup menu to enable the cache. If the problem persists, call for service.		

Code	Function	Result	Text message	Action
206	Diskette drive	Failed	Internal diskette drive bay	Call for service.
215	CD-ROM	Failed	On system board	Call for service
		Aborted	The CD-ROM drive is not present	Verify that the cables are properly connected. If the problem persists, call for service.
217	Hard disk drive	Failed	BIOS drive # <i>n</i> (where <i>n</i> is the drive bay number)	Call for service
264	Magnetic tape drive	Aborted	Test setup error: No tape drive found	Check the cable and power connections to the drive. Refer to the information that is provided with the tape drive. If the problem persists, call for service.
		Failed	The load/mount test failed for device <i>n</i> on adapter <i>m</i> (where <i>n</i> is the number of the device and <i>m</i> is the adapter number)	Refer to the information provided with the tape drive. If the problem persists, call for service. Note: The push button test is applicable only to SCSI tape drives that have a push button.
			The Self-diagnostic failed for device <i>n</i> on adapter <i>m</i> . (where <i>n</i> is the number of the device and <i>m</i> is the adapter number)	
			The unload/eject test failed for device <i>n</i> on adapter <i>m</i> (where <i>n</i> is the number of the device and <i>m</i> is the adapter number)	
			The unload/eject push button test failed for device <i>n</i> on adapter <i>m</i> (where <i>n</i> is the number of the device and <i>m</i> is the adapter number)	
			The Read/Write Self-diagnostic failed for device <i>n</i> on adapter <i>m</i> (where <i>n</i> is the number of the device and <i>m</i> is the adapter number)	
		Insert a new tape cartridge; then, run the diagnostic test again. Refer to the information that is provided with the tape drive. If the problem persists, call for service.		
301	Keyboard	Failed	On system board keyboard test failed	1. Verify that the keyboard cable is connected. 2. If the problem remains, replace the keyboard cable. If the problem persists, call for service.

Code	Function	Result	Text message	Action
302	Mouse	Failed	On system board pointing device test failed.	Replace the pointing device. If the problem persists, call for service.
305	Video monitor		Any message	Refer to the information that came with the monitor.
405	Ethernet	Failed	In PCI slot <i>n</i> (where <i>n</i> is the PCI slot number in which the failing Ethernet adapter is installed)	Replace the Ethernet adapter in slot <i>n</i> . If the problem persists, call for service.
			On system board	Call for service.
415	Analog/digital modem	Not applicable	No modem was detected	<ol style="list-style-type: none"> 1. Verify that the modem is properly attached to the server. 2. If the problem remains, replace the modem. <p>If the problem persists, call for service.</p>
			PCI modem detected but not enabled	<ol style="list-style-type: none"> 1. Change the configuration to enable the modem. 2. If the problem remains, replace the modem. <p>If the problem persists, call for service.</p>
		Failed	Modem reset failed	<p>Replace the modem.</p> <p>If the problem persists, call for service.</p>
			No dial tone detected	<ol style="list-style-type: none"> 1. Make sure that the phone line attached to the modem has a dial tone. (Connect a phone to the line and listen, if necessary.) If there is no tone, have the phone line serviced. 2. If the problem remains, replace the modem. <p>If the problem persists, call for service.</p>

Recovering BIOS

If the BIOS code in your server gets 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.
- Contact your IBM service representative.

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

To recover the BIOS:

1. Turn off the server and peripheral devices and disconnect all external cables and power cords; then, remove the cover.
2. Locate jumper J56 on the processor board. See “Component locations” on page 63.
3. Move J56 to pins 1 and 2 to enable BIOS recovery mode.
4. Insert the BIOS flash diskette into the diskette drive.
5. Restart the server.

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

6. Remove the flash diskette from the diskette drive.
7. Turn off the server.
8. Move J56 to pins 2 and 3 to return to normal startup mode.
9. Restart the server. The system should start up normally.

Identifying problems using status LEDs

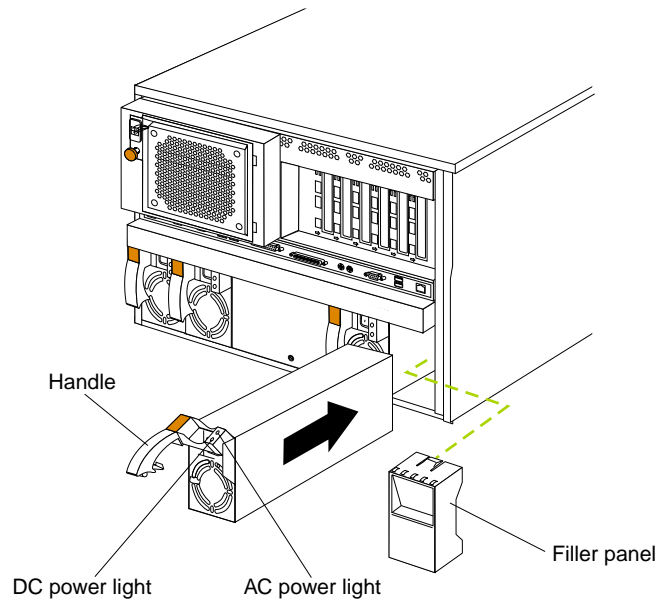
Your server has LEDs to help you identify problems with some server components. These LEDs are part of the light path diagnostics built into the server. By following the *path* you can quickly identify the type of system error that occurred.

Status LEDs are located on the following components:

- Information panel
- Hard disk drive trays
- Power supply
- Diagnostic panel
- Processor board

Power supply LEDs

The AC and DC power LEDs on the power supply provide status information about the power supply. The following illustration shows the location of the AC and DC power LEDs.



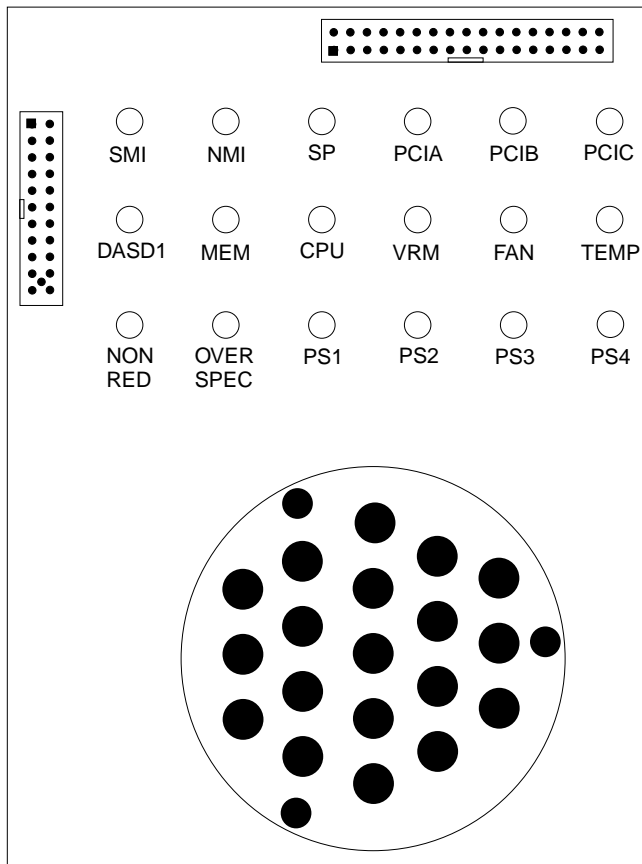
The following table describes the AC and DC power LEDs.

AC power LED	DC power LED	Description and action
On	On	The power supply is on and operating correctly.
On	Off	<p>There is a DC power problem.</p> <p>Possible causes:</p> <ol style="list-style-type: none"> The server is not turned on (the power LED is blinking on the front of the server). Action: Press the power-control button to start the server. The power supply has failed. Action: Replace the power supply. <p>If the problem persists, have the system serviced.</p>

AC power LED	DC power LED	Description and action
Off	Off	<p>There is an AC power problem.</p> <p>Possible causes:</p> <ol style="list-style-type: none"> There is no AC power to the power supply. <p>Actions: Verify that:</p> <ul style="list-style-type: none"> The electrical cord is properly connected to the server. The electrical outlet functions properly. <ol style="list-style-type: none"> The power supply has failed. <p>Action: Replace the power supply.</p> <p>If the problem persists, have the system serviced.</p>

Diagnostic panel LEDs

The following illustration shows the LEDs on the diagnostics panel inside the server. See "Light path diagnostics" on page 135 for information on identifying problems using these LEDs.



Light path diagnostics

You can use the light path diagnostics built into your server to quickly identify the type of system error that occurred. Your server is designed so that LEDs remain illuminated when the server shuts down, as long as the power supplies are operating properly. This feature helps you to isolate the problem if an error causes the server to shut down.

System error LED (on the information LED panel)	Diagnostics panel LED on	Cause	Action
On A system error was detected. Check to see which of the LEDs on the diagnostics panel inside the server are on.	None	The system error log is 75% or more full or a PFA alert was logged.	Check the system error log and correct any problems. Disconnecting the server from all power sources for at least 20 seconds will turn off the system error LED.
On	SMI	A systems management event occurred.	Restart the server. If the problem persists, have the system serviced.
On	NMI	A nonmaskable interrupt occurred. The PCIA or PCIB LED will probably also be on.	<ol style="list-style-type: none"> 1. If the PCIA or PCIB LED is on, follow the instructions for those LEDs. 2. If the PCIA or PCIB LED is not on, restart the server. If the problem persists, have the system serviced.
On	SP	The service processor has failed.	Have the system serviced.
On	PCIA	An error occurred on PCI bus A. An adapter in PCI slot 1 or 2, or the processor board caused the error.	<ol style="list-style-type: none"> 1. Check the error log for additional information. 2. If you cannot correct the problem from the information in the error log, try to determine the failing adapter by removing one adapter at a time from PCI bus A (PCI slots 1–2) and restarting the server after each adapter is removed. If the problem persists, have the system serviced.

Table 18. Light path diagnostics

System error LED (on the information LED panel)	Diagnostics panel LED on	Cause	Action
On	PCIB	An error occurred on PCI bus B. An adapter in PCI slot 3, 4, 5, or 6 or the processor board caused the error.	<ol style="list-style-type: none"> 1. Check the error log for additional information. 2. If you cannot correct the problem from the information in the error log, try to determine the failing adapter by removing one adapter at a time from PCI bus B (PCI slots 3–6) and restarting the server after each adapter is removed. <p>If the problem persists, have the system serviced.</p>
On	PCIC	An error occurred on PCI bus C. An error on the I/O board caused the problem.	<p>Check the error log for additional information. If the error log indicates a problem with the integrated SCSI controller, the Ethernet controller, or video controller, have your system serviced.</p> <p>If the problem persists, have the system serviced.</p>
On	DASD	A hot-swap hard disk drive has failed on SCSI channel B.	<ol style="list-style-type: none"> 1. Check the error log for additional information. If the error log indicates a temperature problem and the fans are working correctly, have the system serviced. 2. If the amber hard disk status LED on one of the hot-swap hard disk drives is on, refer to “Controls and indicators” on page 5 for more information.
On	MEM	A memory error occurred.	<ol style="list-style-type: none"> 1. Check the DIMM error LEDs on the memory board. 2. Replace the DIMM indicated by the lit DIMM error LED.

Table 18. Light path diagnostics

System error LED (on the information LED panel)	Diagnostics panel LED on	Cause	Action
On	CPU	One of the microprocessors has failed, or a microprocessor is installed in the wrong connector.	<ol style="list-style-type: none"> 1. Check the microprocessor error LEDs on the memory board. If a microprocessor error LED is on for a microprocessor connector that has a terminator card installed instead of a microprocessor, the microprocessors are not installed in the correct order. See "Installing a microprocessor kit" on page 83 for information about the correct order for installing microprocessors and VRMs. Otherwise, continue with the next step. 2. Turn off the server, reseal the microprocessor indicated by the lit microprocessor error LED, and restart the server. 3. If the problem persists, replace the microprocessor. <p>If the problem persists, have the system serviced.</p>
On	VRM	One of the voltage regulator modules on the processor board has failed.	<ol style="list-style-type: none"> 1. Check the VRM error LEDs on the processor board. 2. Turn off the server, reseal the VRM indicated by the lit VRM error LED, and restart the server. 3. If the problem persists, replace the VRM. <p>If the problem persists, replace the VRM.</p>
On	FAN	One of the fan assemblies has failed or is operating too slowly. Note: A failing fan can also cause the TEMP and DASD LEDs to be on.	The LED on the failing fan assembly will be lit. Replace the fan assembly.
On	TEMP	The system temperature has exceeded the maximum rating.	<ol style="list-style-type: none"> 1. Check to see if a fan has failed. If it has, replace the fan. 2. Make sure the room temperature is not too high. See "Server specifications" on page 2 3. Check for blocked air flow. <p>If the problem persists, have the system serviced.</p>
On	OVER SPEC	The server is drawing more power than the power supplies are rated for.	Either add a power supply or remove a device from the server.
On	PS1	The first power supply has failed.	Replace the first power supply.
On	PS2	The second power supply has failed.	Replace the second power supply.

Table 18. Light path diagnostics

System error LED (on the information LED panel)	Diagnostics panel LED on	Cause	Action
On	PS3	The third power supply has failed.	Replace the third power supply.
On	PS4	The fourth power supply has failed.	Replace the fourth power supply.
Off	None	The light path diagnostics have not detected a system error.	None

Table 18. Light path diagnostics

Noncritical light path diagnostics

Table 19 describes the light path diagnostics for noncritical events.

Information LED (on the information LED panel)	Diagnostics panel LED on	Cause	Action
On A noncritical event has occurred.	NON RED	The server power subsystem is no longer redundant.	To restore redundancy, either add another power supply to increase the power available or remove a device from the server to reduce the power usage.
	None	Some noncritical event has occurred.	Read the event log to determine the cause.
Off	None	The light path diagnostics have not detected a noncritical event.	None

Table 19. Noncritical light path diagnostics

Troubleshooting charts

You can use the troubleshooting charts in this section to find solutions to problems that have definite symptoms.

If you cannot find the problem in the troubleshooting charts, go to “Starting the diagnostic programs” on page 123 to test the server. If you have run the diagnostic test programs or if running the tests does not reveal the problem, call for service.

Look for the symptom in the left column of the chart. Instructions and probable solutions to the problem are in the right column. If you have just added new software or a new option and your server is not working, do the following before using the troubleshooting charts:

- Remove the software or device that you just added.
- Run the diagnostic tests to determine if your server is running correctly.
- Reinstall the new software or new device.

Device	Suggested action
CD-ROM drive	Verify that:
CD-ROM drive is not recognized.	<ol style="list-style-type: none"> 1. The primary IDE channel is enabled in the Configuration/Setup Utility program. 2. All cables and jumpers are installed correctly. 3. The correct device driver is installed for the CD-ROM drive.
Diskette drive	If there is a diskette in the drive, verify that:
Diskette drive in-use light stays on, or the system bypasses the diskette drive.	<ol style="list-style-type: none"> 1. The diskette drive is enabled in the Configuration/Setup Utility program. 2. The diskette is good and not damaged. (Try another diskette if you have one.) 3. The diskette contains the necessary files to start the server. 4. Your software program is OK. <p>If the diskette drive in-use light stays on, or the system continues to bypass the diskette drive, call for service.</p>
Expansion enclosure problems	Verify that:
The SCSI expansion enclosure used to work, but does not work now.	<ol style="list-style-type: none"> 1. The cables for all external SCSI options are connected correctly. 2. The last option in each SCSI chain, or the end of the SCSI cable, is terminated correctly. 3. Any external SCSI option is turned on. You must turn on an external SCSI option before turning on the server. <p>For more information, see your SCSI and expansion enclosure documentation.</p>
General problems	Call for service.
Problems such as broken cover locks or indicator lights not working.	
Intermittent problems	Verify that:
A problem occurs only occasionally and is difficult to detect.	<ol style="list-style-type: none"> 1. All cables and cords are connected securely to the rear of the server and attached options. 2. When the server is turned on, air is flowing from the rear of the server at the fan grill. If there is no air flow, the fan is not working. This causes the server to overheat and shut down. 3. Ensure that the SCSI bus and devices are configured correctly and that the last external device in each SCSI chain is terminated correctly. <p>If the items above are correct, call for service.</p>
Keyboard, mouse, or pointing-device problems	1. Make sure that the keyboard cable is properly connected to the server.
All or some keys on the keyboard do not work.	<ol style="list-style-type: none"> 2. Make sure that the server and the monitor are turned on. 3. Try using another keyboard. <p>If the items above are correct, call for service.</p>
The mouse or pointing device does not work.	<ol style="list-style-type: none"> 1. Verify that the mouse or pointing-device cable is securely connected and the device drivers are installed correctly. 2. Try using another mouse or pointing device. <p>If the problem remains, call for service.</p>

Table 20. Troubleshooting charts

Device	Suggested action
Memory problems	Verify that:
The amount of memory displayed is less than the amount of memory installed.	<ol style="list-style-type: none"> 1. The memory modules are seated properly. 2. You have installed the correct type of memory. 3. If you changed the memory, you updated the memory configuration with the Configuration/Setup Utility program. 4. All banks of memory on the DIMMs are enabled. The server might have automatically disabled a DIMM bank when it detected a problem or a DIMM bank could have been manually disabled. <p>If the above items are correct, run the memory diagnostic program. The system might have detected a bad memory module and automatically reallocated memory to enable you to continue to operate. If the memory tests fail, call for service or replace the failing DIMM.</p>
Microprocessor problems	The startup (boot) microprocessor is not working properly.
The server emits a continuous tone during POST.	<p>Verify that the startup microprocessor is seated properly. If it is, replace the startup microprocessor.</p> <p>If the problem remains, call for service.</p>
Monitor	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.
Testing the monitor.	If you still cannot find the problem, call for service.
The screen is blank.	<p>Verify that:</p> <ol style="list-style-type: none"> 1. The server power cords are plugged into the server and a working electrical outlet. 2. The monitor cables are connected properly. 3. The monitor is turned on and the Brightness and Contrast controls are adjusted correctly. <p>If the items above are correct and the screen remains blank, call for service.</p>
Only the cursor appears.	Call for service.
The monitor works when you turn on the server, but goes blank when you start some application programs.	<p>Verify that:</p> <ol style="list-style-type: none"> 1. The primary monitor cable is connected to the video port. 2. You installed the necessary device drivers for the applications. <p>If the items above are correct and the screen remains blank, call for service.</p>
Wavy, unreadable, rolling, distorted screen, or screen jitter.	<p>If the monitor self-tests show the monitor is OK, consider the location of the monitor. Magnetic fields around other devices (such as transformers, appliances, fluorescent lights, and other monitors) can cause screen jitter or wavy, unreadable, rolling, or distorted screen images. If this happens, turn off the monitor. (Moving a color monitor while it is turned on might cause screen discoloration.) Then move the device and the monitor at least 305 mm (12 in.) apart. Turn on the monitor.</p> <p>Notes:</p> <ol style="list-style-type: none"> 1. To prevent diskette drive read/write errors, be sure the distance between monitors and diskette drives is at least 76 mm (3 in.). 2. Non-IBM monitor cables might cause unpredictable problems. 3. An enhanced monitor cable with additional shielding is available for the 9521 and 9527 monitors. For information about the enhanced monitor cable, see your IBM reseller or IBM marketing representative. <p>If the problem remains, call for service.</p>

Table 20. Troubleshooting charts

Device	Suggested action
Wrong characters appear on the screen.	<p>If the wrong language is displayed, update the BIOS with the correct language.</p> <p>If the problem remains, call for service.</p>
Option problems	Verify that:
An IBM option that was just installed does not work.	<ol style="list-style-type: none"> 1. The option is designed for the server. Refer to the "Support for Netfinity Servers" flowchart for information about obtaining ServerProven™ compatibility information from the World Wide Web. 2. You followed the installation instructions that came with the option. 3. The option is installed correctly. 4. You have not loosened any other installed options or cables. 5. You updated the configuration information in the Configuration/Setup Utility program. Whenever memory or an option is changed, you must update the configuration. <p>If the problem remains, call for service.</p>
An IBM option that used to work does not work now.	<p>Verify that all of the option hardware and cable connections are secure.</p> <p>If the option comes with its own test instructions, use those instructions to test the option.</p> <p>If the failing option is a SCSI option, verify that:</p> <ol style="list-style-type: none"> 1. The cables for all external SCSI options are connected correctly. 2. The last option in each SCSI chain, or the end of the SCSI cable, is terminated correctly. 3. Any external SCSI option is turned on. You must turn on an external SCSI option before turning on the server. <p>If the problem remains, call for service.</p>
Parallel port	Verify that:
The number of parallel ports displayed is less than the number of parallel ports installed.	<ol style="list-style-type: none"> 1. Each port is assigned a unique address by the Configuration/Setup Utility program and none of the parallel ports are disabled. 2. The parallel-port adapter, if you installed one, is seated properly. <p>If the problem remains, call for service.</p>
Power problems	Verify that:
The server does not power on.	<ol style="list-style-type: none"> 1. The power cables are properly connected to the server. 2. The electrical outlet functions properly. 3. The type of memory installed is correct. 4. If you just installed an option, remove it, and restart the server. If the server now powers on, you might have installed more options than the power supply supports. 5. The LEDs on the power supply are on. <p>If the problem remains, call for service.</p>

Table 20. Troubleshooting charts

Device	Suggested action
Printer problems	Verify that:
The printer does not work.	<ol style="list-style-type: none"> 1. The printer is turned on and is online. 2. The printer signal cable is connected to the correct serial or parallel port on the server. <p>Note: Non-IBM printer cables might cause unpredictable problems.</p> <ol style="list-style-type: none"> 3. You have assigned the printer port correctly in your operating system or application program. 4. You have assigned the printer port correctly using the Configuration/Setup Utility program. <p>If the items above are correct and the printer still does not work, run the tests described in the documentation that comes with your printer. If the tests show that the printer is OK, call for service.</p>
Serial port problems	Verify that:
The number of serial ports identified by the operating system is less than the number of serial ports installed.	<ol style="list-style-type: none"> 1. Each port is assigned a unique address by the Configuration/Setup Utility program and none of the serial ports are disabled. <p>Note: The ASM Interconnect connector is the same as a serial port connector, but it is used only by the integrated Netfinity Advanced System Management Processor, and is not available for use by the operating system. This port does not appear in the Configuration/Setup Utility program menus; it can be configured using Netfinity Manager.</p> <ol style="list-style-type: none"> 2. The serial-port adapter, if you installed one, is seated properly. <p>If the problem still exists, call for service.</p>
A serial device does not work.	<p>Verify that:</p> <ol style="list-style-type: none"> 1. The device is compatible with the server. 2. The serial port is enabled and is assigned a unique address. 3. Make sure that the device is not connected to the management port C. <p>Note: The management C connector is the same as a serial port connector, but it is used only by the integrated Netfinity Advanced System Management Processor and is not available for use by the operating system. This port does not appear in the Configuration/Setup Utility program menus; it can be configured using Netfinity Manager.</p> <p>If the problem still exists, call for service.</p>
Service processor problems	Disconnect the server from all electrical sources, wait for 30 seconds, reconnect the server to the electrical sources, and restart the server.
Netfinity Service Processor Manager reports a general monitor failure	If a problem remains, call for service.

Table 20. Troubleshooting charts

Device	Suggested action
Software problem	To determine if problems are caused by the software, verify that:
Suspected software problem.	<ol style="list-style-type: none"> 1. Your server has the minimum memory requirements needed to use the software. For memory requirements, refer to the information that comes with the software. Note: If you have just installed an adapter or memory, you might have a memory address conflict. 2. The software is designed to operate on your server. 3. Other software works on your server. 4. The software that you are using works on another system. <p>If you received any error messages when using the software program, refer to the information that comes with the software for a description of the messages and solutions to the problem.</p> <p>If the items above are correct and the problem remains, contact your place of purchase.</p>
Universal Serial Bus (USB) port problems	Verify that:
A USB device does not work.	<ol style="list-style-type: none"> 1. You are not trying to use a USB device during POST if you have a standard (non-USB) keyboard attached to the keyboard port. Note: If a standard (non-USB) keyboard is attached to the keyboard port, then the USB is disabled and no USB device will work during POST. 2. The correct USB device driver is installed. 3. Your operating system supports USB devices. <p>If the problem still exists, call for service.</p>

Table 20. Troubleshooting charts

Troubleshooting the Ethernet controller

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

Network connection problems

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

- Make sure that the cable is installed correctly.

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

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

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

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

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

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

— The Ethernet Link Status light illuminates when the Ethernet controller receives a LINK pulse from the hub. If the light is off, there might be a defective connector or cable, or a problem with the hub.

— The Ethernet Transmit/Receive Activity light illuminates when the Ethernet controller sends or receives data over the Ethernet Network. If the Ethernet

Transmit/Receive Activity light is off, make sure that the hub and network are operating and that the correct device drivers are loaded.

— The Ethernet Speed 100 Mbps light illuminates when the Ethernet controller LAN speed is 100 Mbps.

- Make sure that you are using the correct device drivers, supplied with your server.
- Check for operating system-specific causes for the problem.
- Make sure that the device drivers on the client and server are using the same protocol.
- Test the Ethernet controller.

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

Ethernet controller troubleshooting chart

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

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

Table 21. Ethernet troubleshooting chart

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

Table 21. Ethernet troubleshooting chart

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 4.0 (Windows NT)
- SCO™ UNIX LLI

Novell NetWare or IntraNetWare server ODI driver messages

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

PCNTNW-NW-026	The MSM is unable to parse a required custom keyword. Explanation: The user entered an incorrect parameter keyword. Action: Reload the driver using the correct keyword.
PCNTNW-NW-054	The adapter did not respond to the initialization command. Explanation: The adapter did not respond when the driver tried to initialize it. Action: Verify that the Ethernet controller is enabled. If the Ethernet controller is enabled, go to “Starting the diagnostic programs” on page 123 to run the diagnostic programs.
PCNTNW-NW-058	The adapter did not respond to the initialization command. Explanation: The interrupt request (IRQ) setting might not be valid or the EEPROM information might be incorrect. Action: Make sure the IRQ settings are correct in the Configuration/Setup Utility program. for information on setting the interrupt requests. If the IRQ settings are correct, call for service.
PCNTNW-NW-066	The cable might be disconnected from the adapter. Explanation: The cable might be disconnected from the server Ethernet port. Action: Verify that a cable is connected to the Ethernet port.
PCNTNW-NW-071	The matching virtual adapter could not be found. Explanation: You tried to load another instance of the driver with a different I/O address. This new adapter could not be found. Action: Verify that you installed an IBM Netfinity 10/100 Fault Tolerant Adapter and make sure that the adapter is seated correctly. If the adapter is seated correctly, call for service.
PCNTNW-NW-072	A resource tag is unavailable. Explanation: The driver tried to allocate some resources that were not available. Action: Add more memory, or free some memory resources in the server. Then, restart the server.
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 Ethernet controller is enabled. If the Ethernet controller is enabled, go to “Starting the diagnostic programs” on page 123 to run the diagnostic programs. If you have an Ethernet adapter installed, make sure that the adapter does not share an IRQ with any other device.
PCNTNW-NW-075	The Multiple Link Interface Driver (MLID) cannot be registered with the Link Support Layer (LSL). Explanation: An error occurred while the driver was trying to register with the LSL. Action: Check the version of the NetWare or IntraNetWare Operating System. Make sure that this driver is correct for the version of NetWare or IntraNetWare that you are using. Restart the server.
PCNTNW-NW-079	The Multiple Link Interface Driver (MLID) did not initialize MSMTx Free Count. Explanation: The MSMTx Free Count is not initialized correctly. Action: Restart the server. If the problem persists, call for service.

Table 22. Novell NetWare or IntraNetWare ODI driver messages for the Ethernet controller

PCNTNW-NW-086	The driver parameter block is too small. Explanation: The driver parameter block is too small. Action: Restart the server. If the problem persists, call for service.
PCNTNW-NW-087	The media parameter block is too small. Explanation: The driver media parameter block is too small. Action: Restart the server. If the problem persists, call for service.
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.
PCNTNW-NW-126	The group bit in the node address override was cleared. Explanation: The IEEE address has a group bit that indicates that an address belongs to a group of stations. This bit is used only as a destination address; it cannot be used as a source address. You tried to enter a source address with this bit set. The driver cleared the group bit of the source address. Action: None necessary, message is for information only.
PCNTNW-NW-127	The local bit in the node address override was set. Explanation: The local bit in the IEEE address format indicates that the addresses are being managed locally. If you use the node address override capabilities of this driver to enter a new address, the local bit must be set. You entered an address without the local bit set. The driver has set the local bit. Action: None necessary, message is for information only.
PCNTNW-NW-164	The device was not found. Explanation: The driver cannot find an Ethernet controller in the server. Action: Verify that the Ethernet controller is enabled. If the Ethernet controller is enabled, go to "Starting the diagnostic programs" on page 123 to run the diagnostic programs.
PCNTNW-NW-165	The device was not found at IOADDRESS. Explanation: The Ethernet controller cannot be found at the I/O address specified. Action: The Ethernet controller does not require a parameter for the I/O address. Remove the I/O address parameter.
PCNTNW-NW-167	PCI scan specified, device not found. Explanation: The driver cannot locate the Ethernet controller on the PCI bus. Action: Verify that the Ethernet controller is enabled. If the problem persists, go to "Starting the diagnostic programs" on page 123 to run the diagnostic programs.
PCNTNW-NW-180	The DMA parameter is not necessary for PCI device. Explanation: The Ethernet controller does not require a DMA setting. Action: None necessary, message is for information only.

Table 22. Novell NetWare or IntraNetWare ODI driver messages for the Ethernet controller

NDIS 4.0 (Windows NT) driver messages

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

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

Table 23. NDIS (Windows NT) driver messages for the Ethernet controller

UNIX messages

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

pnt0-2	PCI search specified, PCI device not found! Explanation: The driver cannot locate the Ethernet controller on the PCI bus. Action: <ul style="list-style-type: none"> • Run the NETCONFIG program to search for another Ethernet controller • Verify that the Ethernet controller is enabled. If the Ethernet controller is enabled, run the diagnostic programs.
pnt0-6	Cannot allocate memory for the adapter during an interrupt. Please check your Streams parameters. Explanation: On a SunSoft Solaris system, this message indicates that the system is out of Streams memory blocks. Action: Use the CRASH utility to increase the number of Streams memory blocks. Modify the interrupt request (IRQ) settings in the Configuration/Setup Utility program, or run the NETCONFIG program to match the hardware settings.
pnt0-7	Cannot allocate memory for the adapter during reset. Please check your Streams parameters. Explanation: The system is out of Streams memory blocks. Action: Use the CRASH utility to increase the number of Streams memory blocks.

Table 24. UNIX LLI driver messages for the Ethernet controller

pnt0-11	<p>Device not found!</p> <p>Explanation: The driver cannot find an Ethernet controller. Action: Verify that the Ethernet controller is enabled. If the Ethernet controller is enabled, run the diagnostic programs.</p>
pnt0-12	<p>Device failed checksum test!</p> <p>Explanation: The driver cannot find an Ethernet controller. Action: Verify that the Ethernet controller is enabled. If the Ethernet controller is enabled, run the diagnostic programs.</p>
pnt0-13	<p>add_intr_handler failed! Interrupts already enabled.</p> <p>Explanation: The interrupt request (IRQ) that was specified, or the IRQ that was found, conflicts with other devices in the server. Action: Modify your hardware settings.</p>
pnt0-14	<p>Cannot locate hardware.</p> <p>Explanation: The SunSoft Solaris driver cannot find any Ethernet controller. Action: Verify that the Ethernet controller is enabled. If the Ethernet controller is enabled, run the diagnostic programs.</p>
pnt0-15	<p>No more devices to open.</p> <p>Explanation: The SunSoft Solaris driver cannot find any more Ethernet controllers. Action: Verify that additional IBM Netfinity 10/100 Fault Tolerant Adapters are present or replace the Ethernet adapter that fails to respond. If the problem persists, run the diagnostic programs.</p>
pnt0-17	<p>Device fault...Reset initiated!</p> <p>Explanation: The SunSoft Solaris driver has been reset due to a device fault. Action: Verify that additional IBM Netfinity 10/100 Fault Tolerant Adapters are present or replace the Ethernet adapter that fails to respond. If the problem persists, run the diagnostic programs.</p>
pnt0-19	<p>IRQ found for PCnet hardware does not match space.c (or pnt.conf)!</p> <p>Explanation: This is a warning message referring to the interrupt request (IRQ) that the SunSoft Solaris driver found in the system. Action: Ignore this message if you are sure that this is what you want to do. Otherwise, run the NETCONFIG program to match the hardware settings</p>
pnt0-20	<p>add_intr_handler failed! Unknown interrupt type.</p> <p>Explanation: The interrupt request (IRQ) that was specified, or the IRQ that was found, conflicts with other devices in the server. Action:</p> <ul style="list-style-type: none"> • Modify your hardware settings. • Run the NETCONFIG program to search for another Ethernet controller.
pnt0-21	<p>add_intr_handler failed! Out of range interrupt number.</p> <p>Explanation: The interrupt request (IRQ) that was specified, or the IRQ that was found, conflicts with other devices in the server. Action:</p> <ul style="list-style-type: none"> • Modify your hardware settings. • Run the NETCONFIG program to search for another Ethernet controller.
pnt0-22	<p>add_intr_handler failed! Out of range IPL.</p> <p>Explanation: The interrupt request (IRQ) that was specified, or the IRQ that was found, conflicts with other devices in the server. Action: Modify your hardware settings. Run the NETCONFIG program to search for another Ethernet controller.</p>

Table 24. UNIX LLI driver messages for the Ethernet controller

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

Table 24. UNIX LLI driver messages for the Ethernet controller

Replacing the battery

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

Statement 2

CAUTION:



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

Do not:

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

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

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

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

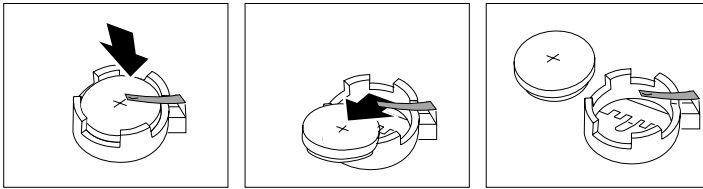
To order replacement batteries, call 1-800-772-2227 within the United States, and 1-800-465-7999 or 1-800-465-6666 within Canada. Outside the U.S. and Canada, call your IBM reseller or IBM marketing representative.

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

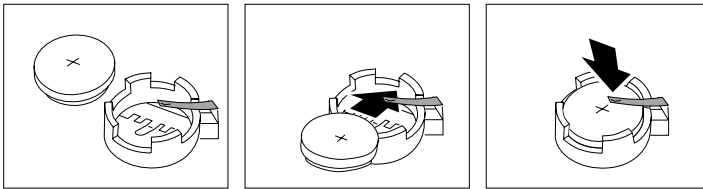
To replace the battery:

1. Read the information in “Before you begin” on page 68.
2. Follow any special handling and installation instructions supplied with the battery.
3. Turn off the server and all attached devices and disconnect all external cables and power cords (see “Safety information statements” on page 69); then remove the top cover.
4. Locate the battery on the processor board (see “Processor board component locations” on page 64).

5. Remove adapters as necessary so you can access the battery. (See “Working with adapters” on page 72.)
6. Lift and remove the plastic dividers by pressing the latches on the top ends of the dividers toward the dividers and lifting the dividers from the server.
7. Remove the battery:
 - a. Use one finger to lift the battery clip over the battery.
 - b. Use one finger to slightly slide the battery toward the rear of the server. The spring mechanism behind the battery will push it out toward you as you slide it forward.
 - c. Use your thumb and index finger to pull the battery from under the battery clip.
 - d. Ensure that the battery clip is touching the base of the battery socket by pressing gently on the clip.



8. 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.



9. Reinstall any adapters that you removed.
10. Insert the plastic dividers into the divider guides.
11. Reinstall the top cover.

Note: You must wait approximately 20 seconds after you plug the power cord of your server into an electrical outlet before the power control button becomes active.
12. Start the Configuration/Setup Utility program and set configuration parameters as needed. Refer to “Starting the Configuration/Setup Utility program” on page 13.

Getting help, service, and information

If you need help, service, technical assistance, or just want more information about IBM products, you will find a wide variety of sources available from IBM to assist you.

For example, IBM maintains pages on the World Wide Web where you can get information about IBM products and services, find the latest technical information, and download device drivers and updates. Some of these pages are:

http://www.ibm.com	Main IBM home page
http://www.ibm.com/pc	IBM Personal Computing
http://www.ibm.com/pc/support	IBM Personal Computing Support
http://www.ibm.com/pc/us/ibmpc	IBM Commercial Desktop PCs (U.S.)
http://www.ibm.com/pc/us/intellistation	IBM IntelliStation Workstations (U.S.)
http://www.ibm.com/pc/us/accessories	Options by IBM (U.S.)
http://www.ibm.com/pc/us/netfinity	IBM Netfinity Servers (U.S.)
http://www.ibm.com/pc/us/server/sguide	IBM ServerGuide (U.S.)
http://www.ibm.com/pc/us/netfinity/system_management	IBM Systems Management (U.S.)
http://www.ibm.com/pc/techconnect	IBM TechConnect

You can select a country-specific Web site from these pages.

You might also want to visit the Web pages of other companies for information about other operating systems, software, and accessories. The following are some other Web sites you might find helpful:

<http://www.lotus.com>

<http://www.tivoli.com>

<http://www.microsoft.com>

<http://www.novell.com>

<http://www.sco.com>

<http://www.adaptec.com>

<http://www.apcc.com>

<http://www.norton.com>

Help is also available from bulletin boards and online services, as well as by fax and telephone. This section provides information about these sources.

Services available and telephone numbers listed are subject to change without notice.

Service support

With the original purchase of an IBM hardware product, you have access to extensive support coverage. During the IBM hardware product warranty period, you may call the IBM Personal Computer HelpCenter™ (1-800-772-2227 in the U.S.) for hardware product assistance covered under the terms of the IBM hardware warranty. See “Getting help by telephone” on page 156 for HelpCenter telephone numbers in other countries.

The following services are available during the warranty period:

- Problem determination - Trained personnel are available to assist you with determining if you have a hardware problem and deciding what action is necessary to fix the problem.
- IBM hardware repair - If the problem is determined to be caused by IBM hardware under warranty, trained service personnel are available to provide the applicable level of service.
- Engineering change management - Occasionally, there might be changes that are required after a product has been sold. IBM or your reseller, if authorized by IBM, will make Engineering Changes (ECs) available that apply to your hardware.

Be sure to retain your proof of purchase to obtain warranty service.

Please have the following information ready when you call:

- Machine Type and Model
- Serial numbers of your IBM hardware products
- Description of the problem
- Exact wording of any error messages
- Hardware and software configuration information

If possible, be at your computer when you call.

A compatible monitor, keyboard, and mouse are required for many service activities. Before you have the computer serviced, be sure to have these components attached to your computer, either directly or through a console switch.

The following items are not covered:

- Replacement or use of non-IBM parts or nonwarranted IBM parts
Note: All warranted parts contain a 7-character identification in the format IBM FRU XXXXXXX.
- Identification of software problem sources
- Configuration of BIOS as part of an installation or upgrade
- Changes, modifications, or upgrades to device drivers
- Installation and maintenance of network operating systems (NOS)
- Installation and maintenance of application programs

Refer to your IBM hardware warranty for a full explanation of IBM's warranty terms.

Before you call for service

Many computer problems can be solved without outside assistance, by using the online help or by looking in the online or printed documentation that comes with your computer or software. Also, be sure to read the information in any README files that come with your software.

Most computers, operating systems, and application programs come with documentation that contains troubleshooting procedures and explanations of error messages.

The documentation that comes with your computer also contains information about the diagnostic tests you can perform.

If you receive a POST error code when you turn on your computer, refer to the POST error-message charts in your hardware documentation. If you do not receive a POST error code, but suspect a hardware problem, refer to the troubleshooting information in your hardware documentation or run the diagnostic tests.

If you suspect a software problem, consult the documentation (including README files) for the operating system or application program.

Getting customer support and service

Purchasing an IBM PC hardware product entitles you to standard help and support during the warranty period. If you need additional support and services, a wide variety of extended services are available for purchase that address almost any need.

Using the World Wide Web

On the World Wide Web, the IBM Personal Computing Web site has up-to-date information about IBM Personal Computer products and support. The address for the IBM Personal Computing home page is:

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

You can find support information for your IBM products, including supported options, on the IBM Personal Computing Support page at:

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

If you select Profile from the support page, you can create a customized support page that is specific to your hardware, complete with Frequently Asked Questions, Parts Information, Technical Hints and Tips, and Downloadable Files. You will have the information you need, all in one place. In addition, you can choose to receive e-mail notifications whenever new information becomes available about your registered products. You also can access online support forums, which are community sites monitored by IBM support staff.

For information about specific Personal Computer products, visit the following pages:

<http://www.ibm.com/pc/us/intellistation>

<http://www.ibm.com/pc/us/ibmpc>

<http://www.ibm.com/pc/us/netfinity>

<http://www.ibm.com/pc/us/thinkpad>

<http://www.ibm.com/pc/us/accessories>

http://www.direct.ibm.com/content/home/en_US/aptiva

You can select a country-specific Web site from these pages.

Using electronic support services

If you have a modem, you can get help from several popular services. Online information services provide assistance through question-and-answer message areas, live chat rooms, searchable databases, and more.

Technical information is available on a wide range of topics, such as:

- Hardware setup and configuration
- Preinstalled software
- Windows, and DOS
- Networking
- Communications
- Multimedia

In addition, the latest device driver updates are available.

Commercial online services, such as America Online (AOL), contain information about IBM products. (For AOL, use the keyword **IBM**.)

Getting information by fax

If you have a touch-tone telephone and access to a fax machine, in the U.S. and Canada you can receive by fax marketing and technical information on many topics, including hardware, operating systems, and local area networks (LANs). You can call the IBM Automated Fax System 24 hours a day, 7 days a week. Follow the recorded instructions, and the requested information will be sent to your fax machine.

In the U.S. and Canada, to access the IBM Automated Fax System, call 1-800-426-3395.

Getting help online

Online Housecall is a remote communication tool that allows an IBM technical-support representative to access your PC by modem. Many problems can be remotely diagnosed and corrected quickly and easily. In addition to a modem, a remote-access application program is required. This service is not available for servers. There might be a charge for this service, depending on the request.

For more information about configuring your PC for Online Housecall:

- In the U.S., call 1-800-772-2227.
- In Canada, call 1-800-565-3344.
- In all other countries, contact your IBM reseller or IBM marketing representative.

Getting help by telephone

During the warranty period, you can get help and information by telephone through the IBM PC HelpCenter. Expert technical-support representatives are available to assist you with questions you might have on the following:

- Setting up your computer and IBM monitor
- Installing and setting up IBM options purchased from IBM or an IBM reseller
- 30-day, preinstalled-operating-system support
- Arranging for service (on-site or carry-in)
- Arranging for overnight shipment of customer-replaceable parts

In addition, if you purchased an IBM PC Server or IBM Netfinity Server, you are eligible for IBM Start Up Support for 90 days after installation. This service provides assistance for:

- Setting up your network operating system
- Installing and configuring interface cards
- Installing and configuring network adapters

Please have the following information ready when you call:

- Machine Type and Model
- Serial numbers of your computer, monitor, and other components, or your proof of purchase

- Description of the problem
- Exact wording of any error messages
- Hardware and software configuration information for your system

If possible, be at your computer when you call.

In the U.S. and Canada, these services are available 24 hours a day, 7 days a week. In the U.K., these services are available Monday through Friday, from 9:00 a.m. to 6:00 p.m.¹

Country		Number
Austria	Österreich	1-546 585 075
Belgium - Dutch	Belgie	02-717-2504
Belgium - French	Belgique	02-717-2503
Canada	Canada	1-800-565-3344
Denmark	Danmark	03-525-6905
Finland	Suomi	9-22-931805
France	France	01-69-32-40-03
Germany	Deutschland	069-6654-9003
Ireland	Ireland	01-815-9207
Italy	Italia	02-4827-5003
Luxembourg	Luxembourg	298-977-5060
Netherlands	Nederland	020-504-0531
Norway	Norge	2-305-3203
Portugal	Portugal	01-791-5147
Spain	España	091-662-4270
Sweden	Sverige	08-632-0063
Switzerland - German	Schweiz	01-212-1810
Switzerland - French	Suisse	022-310-0418
Switzerland - Italian	Svizzera	091-971-0523
United Kingdom	United Kingdom	01475-555555
U.S.A. and Puerto Rico	U.S.A. and Puerto Rico	1-800-772-2227

In all other countries, contact your IBM reseller or IBM marketing representative.

Getting help around the world

If you travel with your computer or need to move it to another country, you can register for International Warranty Service. When you register with the International Warranty Service Office, you will receive an International Warranty Service Certificate that is honored virtually worldwide, wherever IBM or IBM resellers sell and service IBM PC products.

1. Response time will vary depending on the number and complexity of incoming calls.

For more information or to register for International Warranty Service:

- In the U.S. or Canada, call 1-800-497-7426.
- In Europe, call 44-1475-893638 (Greenock, U.K.).
- In Australia and New Zealand, call 61-2-9354-4171.

In all other countries, contact your IBM reseller or IBM marketing representative.

Purchasing additional services

During and after the warranty period, you can purchase additional services, such as support for IBM and non-IBM hardware, operating systems, and application programs; network setup and configuration; upgraded or extended hardware repair services; and custom installations. Service availability and name might vary by country.

Enhanced PC support line

Enhanced PC Support is available for desktop and mobile IBM computers that are not connected to a network. Technical support is provided for IBM computers and IBM or non-IBM options, operating systems, and application programs on the Supported Products list.

This service includes technical support for:

- Installing and configuring your out-of-warranty IBM computer
- Installing and configuring non-IBM options in IBM computers
- Using IBM operating systems in IBM and non-IBM computers
- Using application programs and games
- Tuning performance
- Installing device drivers remotely
- Setting up and using multimedia devices
- Identifying system problems
- Interpreting documentation

You can purchase this service on a per-call basis, as a multiple-incident package, or as an annual contract with a 10-incident limit. For more information about purchasing Enhanced PC Support, see "Ordering support line services".

900-number operating system and hardware support line

In the U.S., if you prefer to obtain technical support on a pay-as-you-go basis, you can use the 900-number support line. The 900-number support line provides support for IBM PC products that are out of the warranty period.

To access this support, call 1-900-555-CLUB (2582). You will be notified of the charge per minute.

Network and server support line

Network and Server Support is available for simple or complex networks made up of IBM servers and workstations using major network operating systems. In addition, many popular non-IBM adapters and network interface cards are supported.

This service includes all of the features of the Enhanced PC Support Line, plus:

- Installing and configuring client workstations and servers
- Identifying system problems and correcting problems on the client or the server
- Using IBM and non-IBM network operating systems
- Interpreting documentation

You can purchase this service on a per-call basis, as a multiple-incident package, or as an annual contract with a 10-incident limit. For more information about purchasing Network and Server Support, see “Ordering support line services”.

Ordering support line services

Enhanced PC Support Line and Network and Server Support Line services are available for products on the Supported Products list. To receive a Supported Products list:

- In the U.S.:
 1. Call 1-800-426-3395.
 2. Select document number 11683 for Network and Server support.
 3. Select document number 11682 for Enhanced PC support.
- In Canada, contact IBM Direct at 1-800-465-7999, or:
 1. Call 1-800-465-3299.
 2. Select the HelpWare™ catalog.
- In all other countries, contact your IBM reseller or IBM marketing representative.

For more information or to purchase these services:

- In the U.S., call 1-800-772-2227.
- In Canada, call 1-800-465-7999.
- In all other countries, contact your HelpCenter.

Warranty and repair services

You can upgrade your standard hardware warranty service or extend the service beyond the warranty period.

Warranty upgrades in the U.S. include:

- Carry-in service to on-site service

If your warranty provides carry-in repair service, you can upgrade to on-site repair service, either standard or premium. The standard upgrade provides a trained servicer within the next business day (9 a.m. to 5 p.m., local time, Monday through Friday). The premium upgrade provides 4-hour average response, 24 hours a day, 7 days a week.
- On-site service to premium on-site service

If your warranty provides for on-site service, you can upgrade to premium on-site service (4-hour average on-site response, 24 hours a day, 7 days a week).

You also can extend your warranty. Warranty and Repair Services offers a variety of post-warranty maintenance options, including ThinkPad® EasyServ Maintenance Agreements. Availability of the services varies by product.

For more information about warranty upgrades and extensions:

- In the U.S., call 1-800-426-4968.
- In Canada, call 1-800-465-7999.
- In all other countries, contact your IBM reseller or IBM marketing representative.

Ordering publications

Additional publications are available for purchase from IBM. For a list of publications available in your country:

- In the U.S., Canada, and Puerto Rico, call 1-800-879-2755.
- In other countries, contact your IBM reseller or IBM marketing representative.

Appendix A. Product warranties and notices

This chapter contains warranty and emission notices. It also contains trademarks and general-information notices.

Warranty Statements

The warranty statements consist of two parts: Part 1 and Part 2. Part 1 varies by country. Part 2 is the same for all countries. Be sure to read both the Part 1 that applies to your country and Part 2.

- **United States, Puerto Rico, and Canada (Z125-4753-05 11/97)**
(Part 1 - General Terms)
- **Worldwide except Canada, Puerto Rico, Turkey, and United States (Z125-5697-01 11/97)**
("Part 1 - General Terms," on page 164)
- **Worldwide Country-Unique Terms**
("Part 2 - Worldwide Country-Unique Terms" on page 166)

IBM Statement of Limited Warranty for United States, Puerto Rico, and Canada (Part 1 - General Terms)

This Statement of Limited Warranty includes Part 1 - General Terms and Part 2 - Country-unique Terms. ***The terms of Part 2 may replace or modify those of Part 1.*** The warranties provided by IBM in this Statement of Limited Warranty apply only to Machines you purchase for your use, and not for resale, from IBM or your reseller. The term "Machine" means an IBM machine, its features, conversions, upgrades, elements, or accessories, or any combination of them. The term "Machine" does not include any software programs, whether pre-loaded with the Machine, installed subsequently or otherwise. Unless IBM specifies otherwise, the following warranties apply only in the country where you acquire the Machine. Nothing in this Statement of Warranty affects any statutory rights of consumers that cannot be waived or limited by contract. If you have any questions, contact IBM or your reseller.

Machine - Netfinity 7600

Warranty Period* - Three Years

*Contact your place of purchase for warranty service information. Some IBM Machines are eligible for On-site warranty service depending on the country where service is performed.

The IBM Warranty for Machines

IBM warrants that each Machine 1) is free from defects in materials and workmanship and 2) conforms to IBM's Official Published Specifications. The warranty period for a Machine is a specified, fixed period commencing on its Date of Installation. The date on your sales receipt is the Date of Installation, unless IBM or your reseller informs you otherwise.

During the warranty period IBM or your reseller, if approved by IBM to provide warranty service, will provide repair and exchange service for the Machine, without charge, under the type of service designated for the Machine and will manage and install engineering changes that apply to the Machine.

If a Machine does not function as warranted during the warranty period, and IBM or your reseller are unable to either 1) make it do so or 2) replace it with one that is at least functionally equivalent, you may return it to your place of purchase and your money will be refunded. The replacement may not be new, but will be in good working order.

Extent of Warranty

The warranty does not cover the repair or exchange of a Machine resulting from misuse, accident, modification, unsuitable physical or operating environment, improper maintenance by you, or failure caused by a product for which IBM is not responsible. The warranty is voided by removal or alteration of Machine or parts identification labels.

THESE WARRANTIES ARE YOUR EXCLUSIVE WARRANTIES AND REPLACE ALL OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OR CONDITIONS OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THESE WARRANTIES GIVE YOU SPECIFIC LEGAL RIGHTS AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM JURISDICTION TO JURISDICTION. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF EXPRESS OR IMPLIED WARRANTIES, SO THE ABOVE EXCLUSION OR LIMITATION MAY NOT APPLY TO YOU. IN THAT EVENT, SUCH WARRANTIES ARE LIMITED IN DURATION TO THE WARRANTY PERIOD. NO WARRANTIES APPLY AFTER THAT PERIOD.

Items Not Covered by Warranty

IBM does not warrant uninterrupted or error-free operation of a Machine.

Unless specified otherwise, IBM provides non-IBM machines **WITHOUT WARRANTIES OF ANY KIND.**

Any technical or other support provided for a Machine under warranty, such as assistance via telephone with "how-to" questions and those regarding Machine set-up and installation, will be provided **WITHOUT WARRANTIES OF ANY KIND.**

Warranty Service

To obtain warranty service for the Machine, contact your reseller or IBM. In the United States, call IBM at 1-800-772-2227. In Canada, call IBM at 1-800-565-3344. You may be required to present proof of purchase.

IBM or your reseller provides certain types of repair and exchange service, either at your location or at a service center, to keep Machines in, or restore them to, conformance with their Specifications. IBM or your reseller will inform you of the available types of service for a Machine based on its country of installation. IBM may repair the failing Machine or exchange it at its discretion.

When warranty service involves the exchange of a Machine or part, the item IBM or your reseller replaces becomes its property and the replacement becomes yours. You represent that all removed items are genuine and unaltered. The replacement may not be new, but will be in good working order and at least functionally equivalent to the item replaced. The replacement assumes the warranty service status of the replaced item.

Any feature, conversion, or upgrade IBM or your reseller services must be installed on a Machine which is 1) for certain Machines, the designated, serial-numbered Machine and 2) at an engineering-change level compatible with the feature, conversion, or

upgrade. Many features, conversions, or upgrades involve the removal of parts and their return to IBM. A part that replaces a removed part will assume the warranty service status of the removed part.

Before IBM or your reseller exchanges a Machine or part, you agree to remove all features, parts, options, alterations, and attachments not under warranty service.

You also agree to

1. ensure that the Machine is free of any legal obligations or restrictions that prevent its exchange;
2. obtain authorization from the owner to have IBM or your reseller service a Machine that you do not own; and
3. where applicable, before service is provided
 - a. follow the problem determination, problem analysis, and service request procedures that IBM or your reseller provides,
 - b. secure all programs, data, and funds contained in a Machine,
 - c. provide IBM or your reseller with sufficient, free, and safe access to your facilities to permit them to fulfill their obligations, and
 - d. inform IBM or your reseller of changes in a Machine's location.

IBM is responsible for loss of, or damage to, your Machine while it is 1) in IBM's possession or 2) in transit in those cases where IBM is responsible for the transportation charges.

Neither IBM nor your reseller is responsible for any of your confidential, proprietary or personal information contained in a Machine which you return to IBM or your reseller for any reason. You should remove all such information from the Machine prior to its return.

Production Status

Each IBM Machine is manufactured from new parts, or new and used parts. In some cases, the Machine may not be new and may have been previously installed. Regardless of the Machine's production status, IBM's appropriate warranty terms apply.

Limitation of Liability

Circumstances may arise where, because of a default on IBM's part or other liability, you are entitled to recover damages from IBM. In each such instance, regardless of the basis on which you are entitled to claim damages from IBM (including fundamental breach, negligence, misrepresentation, or other contract or tort claim), IBM is liable for no more than

1. damages for bodily injury (including death) and damage to real property and tangible personal property; and
2. the amount of any other actual direct damages, up to the greater of U.S. \$100,000 (or equivalent in local currency) or the charges (if recurring, 12 months' charges apply) for the Machine that is the subject of the claim.

This limit also applies to IBM's suppliers and your reseller. It is the maximum for which IBM, its suppliers, and your reseller are collectively responsible.

UNDER NO CIRCUMSTANCES IS IBM LIABLE FOR ANY OF THE FOLLOWING: 1) THIRD-PARTY CLAIMS AGAINST YOU FOR DAMAGES (OTHER THAN THOSE UNDER THE FIRST ITEM LISTED ABOVE); 2) LOSS OF, OR DAMAGE TO, YOUR RECORDS OR DATA; OR 3) SPECIAL, INCIDENTAL, OR INDIRECT DAMAGES OR FOR ANY ECONOMIC CONSEQUENTIAL DAMAGES (INCLUDING LOST PROFITS OR SAVINGS), EVEN IF IBM, ITS SUPPLIERS OR YOUR RESELLER IS INFORMED OF THEIR POSSIBILITY.

SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU.

IBM Statement of Warranty Worldwide except Canada, Puerto Rico, Turkey, United States (Part 1 – General Terms)

This Statement of Warranty includes Part 1 - General Terms and Part 2 - Country-unique Terms. **The terms of Part 2 may replace or modify those of Part 1.** The warranties provided by IBM in this Statement of Warranty apply only to Machines you purchase for your use, and not for resale, from IBM or your reseller. The term "Machine" means an IBM machine, its features, conversions, upgrades, elements, or accessories, or any combination of them. The term "Machine" does not include any software programs, whether pre-loaded with the Machine, installed subsequently or otherwise. Unless IBM specifies otherwise, the following warranties apply only in the country where you acquire the Machine. Nothing in this Statement of Warranty affects any statutory rights of consumers that cannot be waived or limited by contract. If you have any questions, contact IBM or your reseller.

Machine - Netfinity 7600

Warranty Period* - Three Years

*Contact your place of purchase for warranty service information. Some IBM Machines are eligible for On-site warranty service depending on the country where service is performed.

The IBM Warranty for Machines

IBM warrants that each Machine 1) is free from defects in materials and workmanship and 2) conforms to IBM's Official Published Specifications. The warranty period for a Machine is a specified, fixed period commencing on its Date of Installation. The date on your sales receipt is the Date of Installation, unless IBM or your reseller informs you otherwise.

During the warranty period IBM or your reseller, if approved by IBM to provide warranty service, will provide repair and exchange service for the Machine, without charge, under the type of service designated for the Machine and will manage and install engineering changes that apply to the Machine.

If a Machine does not function as warranted during the warranty period, and IBM or your reseller are unable to either 1) make it do so or 2) replace it with one that is at least functionally equivalent, you may return it to your place of purchase and your money will be refunded. The replacement may not be new, but will be in good working order.

Extent of Warranty

The warranty does not cover the repair or exchange of a Machine resulting from misuse, accident, modification, unsuitable physical or operating environment, improper maintenance by you, or failure caused by a product for which IBM is not responsible. The warranty is voided by removal or alteration of Machine or parts identification labels.

THESE WARRANTIES ARE YOUR EXCLUSIVE WARRANTIES AND REPLACE ALL OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OR

CONDITIONS OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THESE WARRANTIES GIVE YOU SPECIFIC LEGAL RIGHTS AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM JURISDICTION TO JURISDICTION. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF EXPRESS OR IMPLIED WARRANTIES, SO THE ABOVE EXCLUSION OR LIMITATION MAY NOT APPLY TO YOU. IN THAT EVENT, SUCH WARRANTIES ARE LIMITED IN DURATION TO THE WARRANTY PERIOD. NO WARRANTIES APPLY AFTER THAT PERIOD.

Items Not Covered by Warranty

IBM does not warrant uninterrupted or error-free operation of a Machine.

Unless specified otherwise, IBM provides non-IBM machines **WITHOUT WARRANTIES OF ANY KIND.**

Any technical or other support provided for a Machine under warranty, such as assistance via telephone with "how-to" questions and those regarding Machine set-up and installation, will be provided **WITHOUT WARRANTIES OF ANY KIND.**

Warranty Service

To obtain warranty service for the Machine, contact your reseller or IBM. You may be required to present proof of purchase.

IBM or your reseller provides certain types of repair and exchange service, either at your location or at a service center, to keep Machines in, or restore them to, conformance with their Specifications. IBM or your reseller will inform you of the available types of service for a Machine based on its country of installation. IBM may repair the failing Machine or exchange it at its discretion.

When warranty service involves the exchange of a Machine or part, the item IBM or your reseller replaces becomes its property and the replacement becomes yours. You represent that all removed items are genuine and unaltered. The replacement may not be new, but will be in good working order and at least functionally equivalent to the item replaced. The replacement assumes the warranty service status of the replaced item.

Any feature, conversion, or upgrade IBM or your reseller services must be installed on a Machine which is 1) for certain Machines, the designated, serial-numbered Machine and 2) at an engineering-change level compatible with the feature, conversion, or upgrade. Many features, conversions, or upgrades involve the removal of parts and their return to IBM. A part that replaces a removed part will assume the warranty service status of the removed part.

Before IBM or your reseller exchanges a Machine or part, you agree to remove all features, parts, options, alterations, and attachments not under warranty service.

You also agree to

1. ensure that the Machine is free of any legal obligations or restrictions that prevent its exchange;
2. obtain authorization from the owner to have IBM or your reseller service a Machine that you do not own; and
3. where applicable, before service is provided
 - a. follow the problem determination, problem analysis, and service request procedures that IBM or your reseller provides,
 - b. secure all programs, data, and funds contained in a Machine,
 - c. provide IBM or your reseller with sufficient, free, and safe access to your facilities to permit them to fulfill their obligations, and
 - d. inform IBM or your reseller of changes in a Machine's location.

IBM is responsible for loss of, or damage to, your Machine while it is 1) in IBM's possession or 2) in transit in those cases where IBM is responsible for the transportation charges.

Neither IBM nor your reseller is responsible for any of your confidential, proprietary or personal information contained in a Machine which you return to IBM or your reseller for any reason. You should remove all such information from the Machine prior to its return.

Production Status

Each IBM Machine is manufactured from new parts, or new and used parts. In some cases, the Machine may not be new and may have been previously installed. Regardless of the Machine's production status, IBM's appropriate warranty terms apply.

Limitation of Liability

Circumstances may arise where, because of a default on IBM's part or other liability, you are entitled to recover damages from IBM. In each such instance, regardless of the basis on which you are entitled to claim damages from IBM (including fundamental breach, negligence, misrepresentation, or other contract or tort claim), IBM is liable for no more than

1. damages for bodily injury (including death) and damage to real property and tangible personal property; and
2. the amount of any other actual direct damages, up to the greater of U.S. \$100,000 (or equivalent in local currency) or the charges (if recurring, 12 months' charges apply) for the Machine that is the subject of the claim.

This limit also applies to IBM's suppliers and your reseller. It is the maximum for which IBM, its suppliers, and your reseller are collectively responsible.

UNDER NO CIRCUMSTANCES IS IBM LIABLE FOR ANY OF THE FOLLOWING: 1) THIRD-PARTY CLAIMS AGAINST YOU FOR DAMAGES (OTHER THAN THOSE UNDER THE FIRST ITEM LISTED ABOVE); 2) LOSS OF, OR DAMAGE TO, YOUR RECORDS OR DATA; OR 3) SPECIAL, INCIDENTAL, OR INDIRECT DAMAGES OR FOR ANY ECONOMIC CONSEQUENTIAL DAMAGES (INCLUDING LOST PROFITS OR SAVINGS), EVEN IF IBM, ITS SUPPLIERS OR YOUR RESELLER IS INFORMED OF THEIR POSSIBILITY. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU.

Part 2 - Worldwide Country-Unique Terms

ASIA PACIFIC

AUSTRALIA: The IBM Warranty for Machines: The following paragraph is added to this Section:

The warranties specified in this Section are in addition to any rights you may have under the Trade Practices Act 1974 or other legislation and are only limited to the extent permitted by the applicable legislation.

Extent of Warranty: The following replaces the first and second sentences of this Section:

The warranty does not cover the repair or exchange of a Machine resulting from misuse, accident, modification, unsuitable physical or operating environment, operation in other than the Specified Operating Environment, improper maintenance by you, or failure caused by a product for which IBM is not responsible.

Limitation of Liability: The following is added to this Section:

Where IBM is in breach of a condition or warranty implied by the Trade Practices Act 1974, IBM's liability is limited to the repair or replacement of the goods or the supply of equivalent goods. Where that condition or warranty relates to right to sell, quiet possession or clear title, or the goods are of a kind ordinarily acquired for personal, domestic or household use or consumption, then none of the limitations in this paragraph apply.

PEOPLE'S REPUBLIC OF CHINA: Governing Law: The following is added to this Statement:

The laws of the State of New York govern this Statement.

INDIA: Limitation of Liability: The following replaces items 1 and 2 of this Section:

1. liability for bodily injury (including death) or damage to real property and tangible personal property will be limited to that caused by IBM's negligence;
2. as to any other actual damage arising in any situation involving nonperformance by IBM pursuant to, or in any way related to the subject of this Statement of Warranty, IBM's liability will be limited to the charge paid by you for the individual Machine that is the subject of the claim.

NEW ZEALAND: The IBM Warranty for Machines: The following paragraph is added to this Section:

The warranties specified in this Section are in addition to any rights you may have under the Consumer Guarantees Act 1993 or other legislation which cannot be excluded or limited. The Consumer Guarantees Act 1993 will not apply in respect of any goods which IBM provides, if you require the goods for the purposes of a business as defined in that Act.

Limitation of Liability: The following is added to this Section:

Where Machines are not acquired for the purposes of a business as defined in the Consumer Guarantees Act 1993, the limitations in this Section are subject to the limitations in that Act.

EUROPE, MIDDLE EAST, AFRICA (EMEA)

The following terms apply to all EMEA countries.

The terms of this Statement of Warranty apply to Machines purchased from an IBM reseller. If you purchased this Machine from IBM, the terms and conditions of the applicable IBM agreement prevail over this warranty statement.

Warranty Service

If you purchased an IBM Machine in Austria, Belgium, Denmark, Estonia, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland or United Kingdom, you may obtain warranty service for that Machine in any of those countries from either (1) an IBM reseller approved to perform warranty service or (2) from IBM.

If you purchased an IBM Personal Computer Machine in Albania, Armenia, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Georgia, Hungary, Kazakhstan, Kirghizia, Federal Republic of Yugoslavia, Former Yugoslav Republic of Macedonia (FYROM), Moldova, Poland, Romania, Russia, Slovak Republic, Slovenia, or Ukraine, you may obtain warranty service for that Machine in any of those countries from either (1) an IBM reseller approved to perform warranty service or (2) from IBM.

The applicable laws, Country-unique terms and competent court for this Statement are those of the country in which the warranty service is being provided. However,

the laws of Austria govern this Statement if the warranty service is provided in Albania, Armenia, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Federal Republic of Yugoslavia, Georgia, Hungary, Kazakhstan, Kirghizia, Former Yugoslav Republic of Macedonia (FYROM), Moldova, Poland, Romania, Russia, Slovak Republic, Slovenia, and Ukraine.

The following terms apply to the country specified:

EGYPT: Limitation of Liability: The following replaces item 2 in this Section:
2. as to any other actual direct damages, IBM's liability will be limited to the total amount you paid for the Machine that is the subject of the claim.

Applicability of suppliers and resellers (unchanged).

FRANCE: Limitation of Liability: The following replaces the second sentence of the first paragraph of this Section:

In such instances, regardless of the basis on which you are entitled to claim damages from IBM, IBM is liable for no more than: (items 1 and 2 unchanged).

GERMANY: The IBM Warranty for Machines: The following replaces the first sentence of the first paragraph of this Section:

The warranty for an IBM Machine covers the functionality of the Machine for its normal use and the Machine's conformity to its Specifications.

The following paragraphs are added to this Section:

The minimum warranty period for Machines is six months.

In case IBM or your reseller are unable to repair an IBM Machine, you can alternatively ask for a partial refund as far as justified by the reduced value of the unrepaired Machine or ask for a cancellation of the respective agreement for such Machine and get your money refunded.

Extent of Warranty: The second paragraph does not apply.

Warranty Service: The following is added to this Section:

During the warranty period, transportation for delivery of the failing Machine to IBM will be at IBM's expense.

Production Status: The following paragraph replaces this Section:

Each Machine is newly manufactured. It may incorporate in addition to new parts, re-used parts as well.

Limitation of Liability: The following is added to this Section:

The limitations and exclusions specified in the Statement of Warranty will not apply to damages caused by IBM with fraud or gross negligence and for express warranty.

In item 2, replace "U.S. \$100,000" with "1.000.000 DEM."

The following sentence is added to the end of the first paragraph of item 2:

IBM's liability under this item is limited to the violation of essential contractual terms in cases of ordinary negligence.

IRELAND: Extent of Warranty: The following is added to this Section:

Except as expressly provided in these terms and conditions, all statutory conditions, including all warranties implied, but without prejudice to the generality of the foregoing all warranties implied by the Sale of Goods Act 1893 or the Sale of Goods and Supply of Services Act 1980 are hereby excluded.

Limitation of Liability: The following replaces items one and two of the first paragraph of this Section:

1. death or personal injury or physical damage to your real property solely caused by IBM's negligence; and 2. the amount of any other actual direct damages, up to the

greater of Irish Pounds 75,000 or 125 percent of the charges (if recurring, the 12 months' charges apply) for the Machine that is the subject of the claim or which otherwise gives rise to the claim.

Applicability of suppliers and resellers (unchanged).

The following paragraph is added at the end of this Section:

IBM's entire liability and your sole remedy, whether in contract or in tort, in respect of any default shall be limited to damages.

ITALY: Limitation of Liability: The following replaces the second sentence in the first paragraph:

In each such instance unless otherwise provided by mandatory law, IBM is liable for no more than: (item 1 unchanged) 2) as to any other actual damage arising in all situations involving non-performance by IBM pursuant to, or in any way related to the subject matter of this Statement of Warranty, IBM's liability, will be limited to the total amount you paid for the Machine that is the subject of the claim.

Applicability of suppliers and resellers (unchanged).

The following replaces the second paragraph of this Section:

Unless otherwise provided by mandatory law, IBM and your reseller are not liable for any of the following: (items 1 and 2 unchanged) 3) indirect damages, even if IBM or your reseller is informed of their possibility.

SOUTH AFRICA, NAMIBIA, BOTSWANA, LESOTHO AND SWAZILAND:

Limitation of Liability: The following is added to this Section:

IBM's entire liability to you for actual damages arising in all situations involving nonperformance by IBM in respect of the subject matter of this Statement of Warranty will be limited to the charge paid by you for the individual Machine that is the subject of your claim from IBM.

TURKIYE: Production Status: The following replaces this Section:

IBM fulfills customer orders for IBM Machines as newly manufactured in accordance with IBM's production standards.

UNITED KINGDOM: Limitation of Liability: The following replaces items 1 and 2 of the first paragraph of this Section:

1. death or personal injury or physical damage to your real property solely caused by IBM's negligence; 2. the amount of any other actual direct damages or loss, up to the greater of Pounds Sterling 150,000 or 125 percent of the charges (if recurring, the 12 months' charges apply) for the Machine that is the subject of the claim or which otherwise gives rise to the claim.

The following item is added to this paragraph:

3. breach of IBM's obligations implied by Section 12 of the Sale of Goods Act 1979 or Section 2 of the Supply of Goods and Services Act 1982.

Applicability of suppliers and resellers (unchanged).

The following is added to the end of this Section:

IBM's entire liability and your sole remedy, whether in contract or in tort, in respect of any default will be limited to damages.

NORTH AMERICA

CANADA: Warranty Service: The following is added to this section:

To obtain warranty service from IBM, call **1-800-565-3344**.

UNITED STATES OF AMERICA: Warranty Service: The following is added to this section:

To obtain warranty service from IBM, call **1-800-772-2227**.

Notices

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Year 2000 readiness and instructions

This is a Year 2000 Readiness Disclosure.

A product is Year 2000 Ready if the product, when used in accordance with its associated documentation, is capable of correctly processing, providing and/or receiving date data within and between the 20th and 21st centuries, provided all other products (for example, software, hardware, and firmware) used with the product properly exchange date data with it.

This IBM PC hardware product has been designed to process four-digit date information correctly within and between the 20th and 21st centuries. If your IBM computer is on when the century changes, you should turn it off and then back on again once, or restart the operating system, to ensure that the internal clock resets itself for the new century.

This IBM PC product cannot prevent errors that might occur if software you use or exchange data with is not ready for the Year 2000. IBM software that comes with this product is Year 2000 Ready. However, software from other companies might come with this IBM PC product. IBM cannot take responsibility for the readiness of that software. You should contact the software developers directly if you wish to verify readiness, understand limitations, or look for any software updates.

To learn more about IBM PC products and the Year 2000, visit our Web site at <http://www.ibm.com/pc/year2000>. The information and tools there can help you with your Year 2000 transition plan, especially if you have multiple IBM PCs. IBM encourages you to check periodically for updated information.

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Chipkill	PC 300
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EtherJet	ServeRAID
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HelpWare	ServerProven
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IntelliStation	TechConnect
Netfinity	ThinkPad
Netfinity Advanced System Management	Update Connector
Netfinity Manager	ValuePoint
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UNIX is a registered trademark in the United States and other countries and is licensed exclusively through The Open Group.

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Other company, product, and service names may be trademarks or service marks of others.

Important notes

Processor speeds indicate the internal clock speed of the microprocessor; other factors also affect application performance.

When referring to hard disk drive capacity, MB stands for 1000000 bytes and GB stands for 1000000000 bytes. Total user-accessible capacity may vary depending on operating environments.

Maximum internal hard disk drive capacities assume the replacement of any standard hard disk drives and population of all hard disk drive bays with the largest currently supported drives available from IBM.

Unless otherwise stated, IBM makes no representations or warranties with respect to non-IBM products. Support (if any) for the non-IBM products is provided by the third party, not IBM.

Some software may differ from its retail version (if available), and may not include user manuals or all program functionality.

Electronic emission notices

Federal Communications Commission (FCC) Statement

Federal Communications Commission (FCC) Class A Statement

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. IBM is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Industry Canada Class A emission compliance statement

Canadian Department of Communications Compliance Statement

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus as set out in the interference-causing equipment standard entitled *Digital Apparatus*, ICES-003 of the Department of Communications.

Avis de conformité aux normes du ministère des Communications du Canada

Cet appareil numérique respecte les limites de bruits radioélectriques applicables aux appareils numériques de Classe A prescrites dans la norme sur le matériel brouiller: *Appareils Numériques*, NMB-003 édictée par le ministre des Communications.

Australia and New Zealand Class A statement

Attention: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

United Kingdom telecommunications safety requirement

Notice to Customers

This apparatus is approved under approval number NS/G/1234/J/100003 for indirect connection to public telecommunication systems in the United Kingdom.

European community directive conformance statement

This product is in conformity with the protection requirements of EC Council Directive 89/336/EEC on the approximation of the laws of the Member States relating to electro-magnetic compatibility.

Attention: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Taiwan electrical emission statement

警告使用者：
這是甲類的資訊產品，在
居住的環境中使用時，可
能會造成射頻干擾，在這
種情況下，使用者會被要
求採取某些適當的對策。

Japanese Voluntary Control Council for Interference (VCCI) statement

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に
基づくクラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を
引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求
されることがあります。

Power cords

For your safety, IBM provides a power cord with a grounded attachment plug to use with this IBM product. To avoid electrical shock, always use the power cord and plug with a properly grounded outlet.

IBM power cords used in the United States and Canada are listed by Underwriter's Laboratories (UL) and certified by the Canadian Standards Association (CSA).

For units intended to be operated at 115 volts: Use a UL-listed and CSA-certified cord set consisting of a minimum 18 AWG, Type SVT or SJT, three-conductor cord, a maximum of 15 feet in length and a parallel blade, grounding-type attachment plug rated 15 amperes, 125 volts.

For units intended to be operated at 230 volts (U.S. use): Use a UL-listed and CSA-certified cord set consisting of a minimum 18 AWG, Type SVT or SJT, three-conductor cord, a maximum of 15 feet in length and a tandem blade, grounding-type attachment plug rated 15 amperes, 250 volts.

For units intended to be operated at 230 volts (outside the U.S.): Use a cord set with a grounding-type attachment plug. The cord set should have the appropriate safety approvals for the country in which the equipment will be installed.

IBM power cords for a specific country or region are usually available only in that country or region.

IBM power cord part number	Used in these countries and regions
13F9940	Argentina, Australia, China (PRC), New Zealand, Papua New Guinea, Paraguay, Uruguay, Western Samoa
13F9979	Afghanistan, Algeria, Andorra, Angola, Austria, Belgium, Benin, Bulgaria, Burkina Faso, Burundi, Cameroon, Central African Rep., Chad, Czech Republic, Egypt, Finland, France, French Guiana, Germany, Greece, Guinea, Hungary, Iceland, Indonesia, Iran, Ivory Coast, Jordan, Lebanon, Luxembourg, Macau, Malagasy, Mali, Martinique, Mauritania, Mauritius, Monaco, Morocco, Mozambique, Netherlands, New Caledonia, Niger, Norway, Poland, Portugal, Romania, Senegal, Slovakia, Spain, Sudan, Sweden, Syria, Togo, Tunisia, Turkey, former USSR, Vietnam, former Yugoslavia, Zaire, Zimbabwe
13F9997	Denmark
14F0015	Bangladesh, Burma, Pakistan, South Africa, Sri Lanka
14F0033	Antigua, Bahrain, Brunei, Channel Islands, Cyprus, Dubai, Fiji, Ghana, Hong Kong, India, Iraq, Ireland, Kenya, Kuwait, Malawi, Malaysia, Malta, Nepal, Nigeria, Polynesia, Qatar, Sierra Leone, Singapore, Tanzania, Uganda, United Kingdom, Yemen, Zambia
14F0051	Liechtenstein, Switzerland
14F0069	Chile, Ethiopia, Italy, Libya, Somalia
14F0087	Israel
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Index

A

- AC power 7
- acoustical noise emissions 2
- adapter
 - Netfinity 10/100 Fault Tolerant 100
 - NIC 100
- adapters
 - considerations 73
 - hot-swap devices 72
 - installing hot-plug 74
- adjusting
 - chair 11
- Advanced System Management Processor reset jumper block 66
- Air circulation 11
- air vents 11
- antiglare filter 11
- arranging your workspace 11
- auxiliary-device port
 - connector 96
 - description 96
 - pin assignments 96
- availability features 4

B

- battery replacement 151
- BIOS 83, 132

C

- cable lengths 12
- CD-ROM drive 75
- chair adjustment 11
- Class A electronic emission notice 172
- cleaning the monitor 11
- comfort 11
- components
 - color 61
 - major 61
- controls 11
- cover
 - removing 71
 - replacing 91

D

- depth 2
- diagnostic error messages 122
- diagnostic panel LEDs 134
- drive
 - bays 76
 - CD-ROM 75
 - diskette 75
 - hot-swap 77
 - SCSI 77
 - tape 75
- drive placement guide 78

E

- electrical outlets 12

- Electrical outlets and cable lengths 12
- electronic emission Class A notice 172
- environmental specifications
 - dimensions 2
- error messages
 - diagnostic 122
 - SCSI 121
- Ethernet adapter
 - troubleshooting 143
- Ethernet adapter failover 100
- Ethernet controller
 - configuring 100
 - failover 100
- Ethernet controller messages 145
- Ethernet port
 - connector 100
 - description 100
 - pin assignments 100
- Ethernet speed 100 Mbps 9
- Ethernet transmit/receive activity light 8
- Ethernet-link status light 9
- event/error logs 121
- extension cords 12

F

- fan, replacing 89
- FCC Class A notice 172
- filler panel
 - drive bay 78
 - hot-swap 77
 - power supply bay 88
- flash ROM page-swap jumper block 66

G

- getting
 - help 153
 - information 153
 - service 153
- Glare and lighting 11

H

- handling
 - static sensitive devices 69
- hard disk drive activity light 8
- heat output 2
- help 153
- hot-plug devices 72
- hot-swap and hot-plug devices
 - fans 89
 - hard disk drive 77
 - power supplies 88
- hot-swap drive
 - installing 77
 - support 76
- hot-swap fan
 - replacing 89
- hot-swap power supply
 - installing 88

I

- I/O board
 - external port connectors 63
 - internal port connectors 63
- IDE device
 - installing 80
- important notes 172
- indicators on front of server
 - hard-disk activity light 6
 - hard-disk drive status light 5
 - power control button 6
 - reset button 6
- information 153
- information light 8
- Input/Output locations 92
- installing
 - hot-swap drive 77
 - hot-swap power supply 88
 - IDE device 80
 - media-bay bezel 90
 - memory module 80
 - microprocessor 83
 - options 61
 - general information 68
 - power supply 88
 - SCSI device 77
- installing hot-plug adapter 74
- installing VRM 87
- introduction 1

K

- keyboard port
 - connector 95
 - description 95
 - pin assignments 95

L

- LEDs
 - diagnostic panel 134
 - power supply 133
- lengths
 - cable 12
- light
 - Ethernet transmit/receive 8
 - Ethernet-link status 9
 - hard disk drive activity 8
 - information 8
 - POST-complete 8
 - processor activity 8
 - system error 9
 - system power 8
- light path diagnostics 135
- lighting 11

M

- media-bay bezel
 - installing 90
 - removal 72
- memory board component locations 67
- memory module
 - installing 80
 - supported 80

- memory specifications 2
- microprocessor
 - installing 83
 - specifications 83
- monitor 11
- mouse port
 - connector 96
 - description 96
 - pin assignments 96

N

- Netfinity 10/100 Fault Tolerant adapter 100
- notices
 - electronic emission, Class A 172
 - FCC, Class A 172
 - miscellaneous 172
 - product 172
 - trademarks 171

O

- options, external
 - cabling requirements 97
 - connecting 97
 - installing 97

P

- parallel port
 - connector 94
 - description 93
 - pin assignments 94
 - viewing assignments 93
- password override switch 18
- pointing-device port
 - connector 96
 - description 96
 - pin assignments 96
- port
 - auxiliary-device 96
 - Ethernet 100
 - keyboard 95
 - mouse 96
 - parallel 93
 - pointing-device 96
 - SCSI 97
 - serial 98
 - Ultra-2 SCSI 96
 - USB 99
 - video 95
- POST beep codes 109
- POST error messages 112
- POST-complete light 8
- power backplane 77
- power cord 12
- power cord lengths 12
- power cords 174
- power supply 87
 - installing 88
- power supply LEDs 133
- power-on control jumper block 66
- power-on password 17
- power-on password override jumper block 66
- processor activity lights 8
- processor board
 - internal port connectors 65
 - jumpers 66
 - LEDs 64
- product

- notices 172

R

- RAS features 4
- recovering BIOS 132
- reliability features 4
- removing
 - cover 71
 - media-bay bezel 72
- replacing
 - cover 91
 - fan 89
- replacing the batter 151

S

- safety information
 - electrical vii, x
 - laser products viii
- safety information statements 69
- safety requirements
 - electronic emission Class A notice 172
 - FCC Class A notice 172
- SCSI cable
 - external devices 96
 - maximum length 96
- SCSI cabling requirements 97
- SCSI device
 - installing 77
- SCSI error messages 121
- SCSI IDs, assigning 78
- SCSI port
 - connector 97
 - description 97
 - pin assignments 97
- serial ports
 - connector 99
 - description 98
 - pin assignments 99
 - viewing assignments 98
- server
 - starting 7
 - stopping 7
- service 153
- serviceability features 4
- setting password override switch 18
- setting SCSI IDs 97
- specifications 2
- static electricity 69
- static sensitive devices
 - handling 69
- system error light 9
- system power light 8
- system reliability considerations 68

T

- trademarks 171
- troubleshooting 138

U

- Ultra-2 SCSI port
 - connector 96
 - description 96
 - pin assignments 96
- United States electronic emission Class A notice 172
- United States FCC Class A notice 172

- USB port
 - connector 99
 - description 99
 - pin assignments 99

V

- venting hot air 11
- video controller 72
- video port
 - connector 95
 - description 95
 - pin assignments 95
- voltage regulator module
 - installing 87
- VRM
 - installing 87
- VRM LED 135

W

- Web Site 1
- working inside the server with power on 68

Y

- year 2000 readiness and instructions 171



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