

IBM® Netfinity® 4000R

User's Handbook



IBM® Netfinity® 4000R

User's Handbook

Note

Before using this information and the product it supports, be sure to read the general information under Appendix C, "Product warranties and notices" on page 93.

Third Edition (February 2000)

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Contents

Safety information statements	v
-------------------------------	---

Section 1. IBM Netfinity 4000R server

Chapter 1. Introducing your IBM Netfinity 4000R	3
Inventory list	3
Features at a glance	4
Model specifications	5
What your IBM Netfinity 4000R offers	6
Reliability, availability, and serviceability features	6
Upgradable BIOS	7
Placement considerations	8
System specifications	9
Controls, indicators, and connectors	10
Chapter 2. Installing the server in the rack enclosure	15
What you will need	15
Preparing the server	16
Preparing the rack	17
Installing the server	20
Removing the server from the rack	23
Chapter 3. Configuring Your Server	25
Configuration Overview	25
The Configuration/Setup Utility Program	25
Using the Configuration/Setup Utility Program Main Menu	26
Chapter 4. Installing the operating system	33
What you need	33
Before you begin	33
What to do	33
Chapter 5. Solving problems	37
General symptoms	37
Power-on self-test (POST)	37
Power-On Self-Test (POST) Messages	38
Power-on Self Test (POST) Beep Codes	43
Diagnostic utility	45

Section 2. Netfinity Manager

Chapter 6. Netfinity Manager	49
Managing your IBM Netfinity server with Netfinity Manager	49
Netfinity Manager documentation	50
Road map	50
Chapter 7. Netfinity Manager system requirements	51
Chapter 8. Starting the Netfinity Manager installation program	53

Chapter 9. Netfinity Manager database support	59
DB2 database support	59
Lotus Notes database support	64
ODBC database support	66
Chapter 10. Starting Netfinity Manager	71
Netfinity Manager Service Manager	71
Netfinity Manager service descriptions	72
Delaying Netfinity Manager startup on OS/2 systems	78
Chapter 11. Getting more information about Netfinity Manager	79
Chapter 12. Installation options	81
Automated installation	81
Customized installation	82

Section 3. Appendixes 85

Appendix A. Help and service information	87
Step 1: Troubleshooting	87
Step 2: Preparing for the service call	87
Step 3: Placing the service call to IBM	87
Getting additional help, service, and information	88
Appendix B. Server records	91
Serial number	91
Appendix C. Product warranties and notices	93
Notices	98
Trademarks	99
Index	103

Safety information statements



Before installing this product, read the Safety Information.

Antes de instalar este produto, leia as Informações de Segurança.

在安裝本產品之前，請仔細閱讀 **Safety Information** (安全信息)。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Ennen kuin asennat tämän tuotteen, lue turvaohjeet kohdasta Safety Information.

Avant d'installer ce produit, lisez les consignes de sécurité.

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

Πριν εγκαταστήσετε το προϊόν αυτό, διαβάστε τις πληροφορίες ασφάλειας (safety information).

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

Prima di installare questo prodotto, leggere le Informazioni sulla Sicurezza

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

Пред да се инсталира овој продукт, прочитајте информацијата за безбедност.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

Les sikkerhetsinformasjonen (Safety Information) før du installerer dette produktet.

Przed zainstalowaniem tego produktu, należy zapoznać się z książką "Informacje dotyczące bezpieczeństwa" (Safety Information).

Antes de instalar este produto, leia as Informações sobre Segurança.

Перед установкой продукта прочтите инструкции по технике безопасности.

Pred inštaláciou tohto zariadenia si pečítajte Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

Antes de instalar este producto lea la información de seguridad.

Läs säkerhetsinformationen innan du installerar den här produkten.

安裝本產品之前，請先閱讀「安全資訊」。

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.

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.

This book contains information notices that relate to a specific topic. The **Caution** and **Danger** notices also appear in a multilingual safety booklet. 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 are 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.

Section 1. IBM Netfinity 4000R server

Chapter 1. Introducing your IBM Netfinity 4000R	3
Inventory list	3
Features at a glance	4
Model specifications	5
What your IBM Netfinity 4000R offers	6
Reliability, availability, and serviceability features	6
Upgradable BIOS	7
Placement considerations	8
System specifications	9
Controls, indicators, and connectors	10
Front View	10
Back View	12
Chapter 2. Installing the server in the rack enclosure	15
What you will need	15
Preparing the server	16
Preparing the rack	17
Installing the server	20
Removing the server from the rack	23
Chapter 3. Configuring Your Server	25
Configuration Overview	25
The Configuration/Setup Utility Program	25
Using the Configuration/Setup Utility Program Main Menu	26
System Summary	27
System Information	27
Product Data	27
Devices and I/O Ports	27
Date and Time	28
System Security	28
Start Options	30
Advanced Setup	30
Error Logs	31
Save Settings	31
Restore Settings	31
Load Default Settings	31
Exit Setup	31
Resolving Software Configuration Conflicts	31
Chapter 4. Installing the operating system	33
What you need	33
Before you begin	33
What to do	33
Chapter 5. Solving problems	37
General symptoms	37
Power-on self-test (POST)	37
Power-On Self-Test (POST) Messages	38
POST Message Table	38
Power-on Self Test (POST) Beep Codes	43

POST Beep Code Descriptions	43
POST Beep Code Table	45
Diagnostic utility	45

Chapter 1. Introducing your IBM Netfinity 4000R

This chapter provides an overview of the server features and components.

We appreciate your decision to purchase an IBM® Netfinity® server. Your IBM Netfinity 4000R is a one-U-high¹ rack-mounted enterprise-class appliance for high-volume network transaction processing, such as Web site queries and displays. Your server is a preconfigured device in which it is not necessary to add hardware to attain functionality. Unpack the IBM Netfinity 4000R, mount it in a rack, install a supported operating system and your own selection of software, and the server is ready to “plug-in-and-go.” It may be used primarily as a transaction-processor reporting to another server, or as a server itself.

Your IBM Netfinity server comes with a one-year limited warranty and IBM Netfinity Server Start Up Support.

If you have access to the World Wide Web, you can obtain up-to-date information about your Netfinity server model and other IBM Netfinity server products at the following address: <http://www.ibm.com/netfinity/>

Inventory list

You should have the following items:

- One Netfinity 4000R server
- One rack mounting kit
 - Two slide-rail assemblies
 - One bag of screws and nut bars
- One IEC power cord
- One console bus cable (1.2 m in length)
- The *Netfinity 4000R System* CD
- The *Netfinity 4000R Diagnostic* CD
- The *Netfinity Manager* CD
- The *Safety Information* booklet
- The *IBM Netfinity 4000R User's Handbook* (this publication)

Note: The power cord that comes with your server must be plugged into a properly-grounded power distribution unit (PDU).

The *Netfinity 4000R System* compact disc (CD) that comes with your system contains an installation utility to install the operating system, device drivers to use with your operating system, and instructive text files.

The *Netfinity 4000R Diagnostic* compact disc (CD) that comes with your system contains a hard disk drive diagnostic utility.

The *Netfinity Manager* CD that comes with your system contains the complete Netfinity Manager product.

¹ Racks are marked in vertical increments of 1.75 inches each. Each increment is referred to as a unit, or a “U.” A one-U-high device is 1.75 inches tall.

Features at a glance

The following table summarizes the features of the Netfinity 4000R. Where multiple quantities are specified (1 or 2 microprocessors, for example), the actual number depends on your model of server. The model number is on the small label on the lower right front of the server, and on the label on the bottom of the server. See the model specifications on page 5.

<p>Type</p> <ul style="list-style-type: none"> • Rack-mount only <p>Microprocessor</p> <ul style="list-style-type: none"> • 1 or 2 Intel® Pentium® III microprocessors with MMX™ technology • 512 KB of level-2 cache (min) <p>Memory</p> <ul style="list-style-type: none"> • 128 MB (min) up to 2 GB • Four dual-inline memory-module (DIMM) sockets • 128 MB, 256 MB, or 512 MB DIMMs • 100 MHz, error correcting code (ECC) registered synchronous dynamic random access memory (SDRAM) <p>Hard disk drives</p> <ul style="list-style-type: none"> • One or two internal SCSI hard disk drives • 9 GB² to 18 GB each • Maximum: 36 GB <p>SCSI controller</p> <p>Adaptec AHA-2940UW/B SCSI adapter</p>	<p>CD-ROM drive</p> <ul style="list-style-type: none"> • Standard: IDE • Slim height <p>Expansion slots</p> <ul style="list-style-type: none"> • Two 32-bit PCI slots <ul style="list-style-type: none"> – Standard: One single-channel UltraWide SCSI adapter in full length slot, controlling the hard disk drives – One half-length slot <p>Upgradable microcode</p> <ul style="list-style-type: none"> • BIOS code upgrades (when available) can update EEPROMs on the system board⁴ <p>Power supply</p> <ul style="list-style-type: none"> • 150 W with voltage auto-selection (110, 120, 220, 240 V ac) • Built-in overload protection • Automatic restart after a momentary loss of power 	<p>Integrated functions</p> <ul style="list-style-type: none"> • Two serial ports • Two Universal Serial Bus (USB) ports³ • One IDE internal connector, supports the system IDE CD-ROM drive • Two full-duplex 10/100 Mbps Ethernet controllers <ul style="list-style-type: none"> – Intel Ethernet 82559 controller – One 10BASE-T/100BASE-TX port per controller (two ports total) – Redundant Ethernet capability, through the connection of both Ethernet ports to the same LAN • CT 69000 video controller • 2 MB video memory <p>Supported operating systems</p> <ul style="list-style-type: none"> • Microsoft Windows NT Server 4.0
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² GB equals approximately 1 000 000 000 bytes.

³ The operating system must support USB in order for you to use USB.

⁴ BIOS upgrades must be placed on a CD for use on the server. If you are unable to create a CD from the downloaded BIOS upgrade, contact the IBM Help Center to order a BIOS upgrade CD.

Model specifications

Machine Type	Model	Features
8652/8653	31Y	<ul style="list-style-type: none"> • Microprocessors: One 750 MHz with 100 MHz front side bus • Memory: 256 MB • Hard disk drives: One 9.1 GB, 7200 RPM
8652/8653	41Y	<ul style="list-style-type: none"> • Microprocessors: Two 750 MHz with 100 MHz front side bus • Memory: 512 MB • Hard disk drives: Two 9.1 GB, 7200 RPM
8652/8653	42Y	<ul style="list-style-type: none"> • Microprocessors: Two 750 MHz with 100 MHz front side bus • Memory: 1 GB • Hard disk drives: Two 9.1 GB, 7200 RPM
8652/8653	43Y	<ul style="list-style-type: none"> • Microprocessors: Two 750 MHz with 100 MHz front side bus • Memory: 2 GB • Hard disk drives: Two 9.1 GB, 7200 RPM
8652/8653	44Y	<ul style="list-style-type: none"> • Microprocessors: Two 750 MHz with 100 MHz front side bus • Memory: 512 MB • Hard disk drives: Two 18 GB, 7200 RPM
8653	45Y	<ul style="list-style-type: none"> • Microprocessors: Two 750 MHz with 100 MHz front side bus • Memory: 1 GB • Hard disk drives: Two 9.1 GB, 7200 RPM with IBM Netfinity ServeRAID 3L Ultra2 SCSI Controller
8653	46Y	<ul style="list-style-type: none"> • Microprocessors: Two 750 MHz with 100 MHz front side bus • Memory: 2 GB • Hard disk drives: Two 18 GB, 7200 RPM with IBM Netfinity ServeRAID 3L Ultra2 SCSI Controller
8652/8653	51Y	<ul style="list-style-type: none"> • Microprocessors: One 650 MHz with 100 MHz front side bus • Memory: 256 MB • Hard disk drives: One 9.1 GB, 7200 RPM
8652/8653	61Y	<ul style="list-style-type: none"> • Microprocessors: Two 650 MHz with 100 MHz front side bus • Memory: 512 MB • Hard disk drives: Two 9.1 GB, 7200 RPM
8652	62Y	<ul style="list-style-type: none"> • Microprocessors: Two 650 MHz with 100 MHz front side bus • Memory: 1 GB • Hard disk drives: Two 9.1 GB, 7200 RPM
8653	62Y	<ul style="list-style-type: none"> • Microprocessors: Two 650 MHz with 100 MHz front side bus • Memory: 512 MB • Hard disk drives: Two 9.1 GB, 7200 RPM with IBM Netfinity ServeRAID 3L Ultra2 SCSI Controller
8652	63Y	<ul style="list-style-type: none"> • Microprocessors: Two 650 MHz with 100 MHz front side bus • Memory: 2 GB • Hard disk drives: Two 9.1 GB, 7200 RPM
8652	64Y	<ul style="list-style-type: none"> • Microprocessors: Two 650 MHz with 100 MHz front side bus • Memory: 2 GB • Hard disk drives: Two 18 GB, 7200 RPM

What your IBM Netfinity 4000R offers

The IBM Netfinity 4000R is designed to be cost effective, powerful, and flexible. Your server offers:

- Impressive performance using an innovative approach to SMP on models with two Pentium III microprocessors.

- Large system memory

The memory subsystem in your server supports up to 2 GB of system memory. The memory controller provides error correcting code (ECC) support for 100 MHz SDRAM memory.

- Integrated network environment support

Your Netfinity 4000R comes with two 10/100 Mbps Ethernet Controllers on the system board. Each Ethernet controller has an interface for connecting to 10-Mbps or 100-Mbps networks. The server automatically selects between 10BASE-T and 100BASE-TX. Each controller provides full-duplex (FDX) capability. Full duplex allows simultaneous transmission and reception of data on the Ethernet local area network (LAN).

- Redundant Ethernet connection

Your server 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 Ethernet connection. This switching occurs without data loss and without user intervention.

Reliability, availability, and serviceability features

Three of the most important factors 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 possibly diagnose the failure and have it repaired with minimal inconvenience.

The following is a partial list of the built-in RAS features on the IBM Netfinity server.

- Power-on self-test (POST)
- Customer support center 24 hours per day⁵
- Error checking and correcting (ECC) memory
- Error codes and messages
- Upgradable BIOS
- Automatic restart after power failure
- Parity checking on the SCSI bus and serial ports
- Redundant Ethernet capabilities

⁵ Response time will vary, depending on the number and nature of calls received.

Upgradable BIOS

When BIOS upgrades are available, you can download a CD image from the <http://www.ibm.com/pc/support> Web pages. Instructions for applying the BIOS upgrade will be on the CD. If you are unable to create a CD yourself, you can order a BIOS upgrade CD from the IBM HelpCenter (1-800-772-2227 in the United States, 1-800-565-3344 in Canada).

Placement considerations

Generally, the number of servers you can install in a rack depends on how many power distribution units (PDUs), uninterruptible power supplies (UPSs), and other devices you have installed in the rack.

Notes:

1. You must connect the power cord of each IBM Netfinity 4000R to a properly-grounded PDU. See the ServerProven list at <http://www.ibm.com/pc/compat> to locate a PDU.
2. For air flow reasons, when IBM Netfinity 4000Rs are mounted in succession in a rack, there must be no intervening spaces between the IBM Netfinity 4000Rs.

With the use of the console cable that comes with your server, the server can be attached to a console selector switch, to connect to a console (monitor, mouse, and keyboard).

System specifications

Size

- Depth: 646 mm (25.4 in.) including front bezel
- Width: 430 mm (16.9 in.), 484 mm (19.1 in) including mounting flanges
- Height: 44 mm (1.73 in.)

Weight

- Maximum configuration (as shipped): 10.43 kg (23.0 lb)
- Maximum configuration with slide rails attached: 11.34 kg (25.0 lb)

Environment

- Air temperature:
 - System on:
 - At altitude 0–914 m (3000 ft): 10° to 35°C (50° to 95°F)
 - At altitude 914 m (3000 ft)–2134 m (7000 ft): 10° to 32°C (50° to 90°F)
 - System off: –40° to 70°C (–40° to 158°F)
- Humidity:
 - System on: 8% to 80%
 - System off: 8% to 80%

Heat output⁷

- Approximate heat output in British thermal units (Btu) per hour:
 - Maximum configuration (as shipped): 306 Btu/hour (90 watts)
 - Maximum configuration (theoretical)⁶: 545.6 Btu/hour (160 watts)

Electrical input⁷

- Sine-wave input (50/60 Hz) is required
- Input voltage:
 - Low range:
 - Minimum: 90 V ac
 - Maximum: 137 V ac
 - High range:
 - Minimum: 180 V ac
 - Maximum: 265 V ac
 - Input kilovolt-amperes (kVA) (approximately):
 - Maximum (configuration as shipped): 0.3 kVA

Acoustical noise-emission values⁸

- Average sound-pressure levels:
 - 49 dBA idle
 - 50 dBA operating
- Declared (upper limit) sound power levels:
 - 6.4 bels idle
 - 6.5 bels operating

⁶ Under typical maximum configurations, the heat output will be substantially below the theoretical maximum.

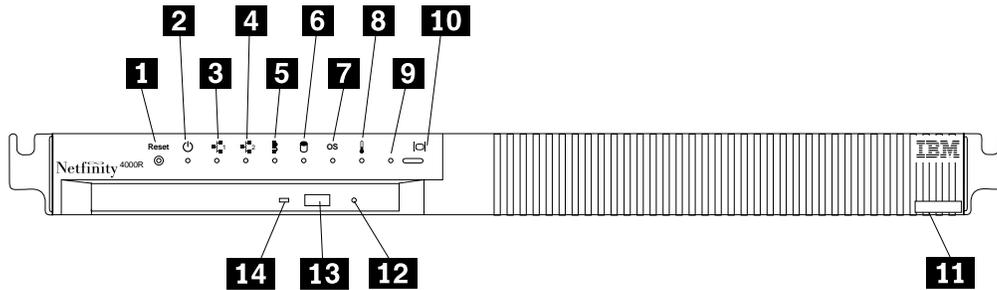
⁷ Power consumption and heat output vary depending on the number and type of optional features installed and the power-management optional features in use.

⁸ These levels were measured in controlled acoustical environments according to ISO 7779, and are reported in accordance with ISO 9296. The declared sound power levels indicate an upper limit, below which a large portion of machines operate. Sound pressure levels in your location might exceed the average 1-meter values stated because of room reflections and other nearby noise.

Controls, indicators, and connectors

The most commonly used controls and status indicators are on the front of your server. All connectors are on the back of your server.

Front View



- 1** **Reset** **Reset button:** Press this button to reset the server. You might need to use a pen or the end of a straightened paper clip to press the button.
- 2**  **Power-on light:** This green LED lights when you turn on your server by pressing the Power-on switch. If this light does not come on after you have pressed the power-on switch, the power cord is not connected or the power supply has failed.
- 3**  **Ethernet 1:** This yellow LED lights when there is transaction activity on Ethernet port 1.
- 4**  **Ethernet 2:** This yellow LED lights when there is transaction activity on Ethernet port 2.
- 5**  **Interconnect:** Reserved.
- 6**  **Hard disk drive:** Reserved.
- 7** **OS** **Operating system:** Reserved.
- 8**  **Temperature:** Reserved.
- 9**  **Console:** Reserved.
- 10**  **Select button:** Reserved.
- 11** **Label:** This label shows the server serial number, type, and model number.
- 12** **CD-ROM manual tray-release opening:** If using the CD-ROM eject button does not eject the tray, insert a straightened paper clip in this opening to release the tray.

13

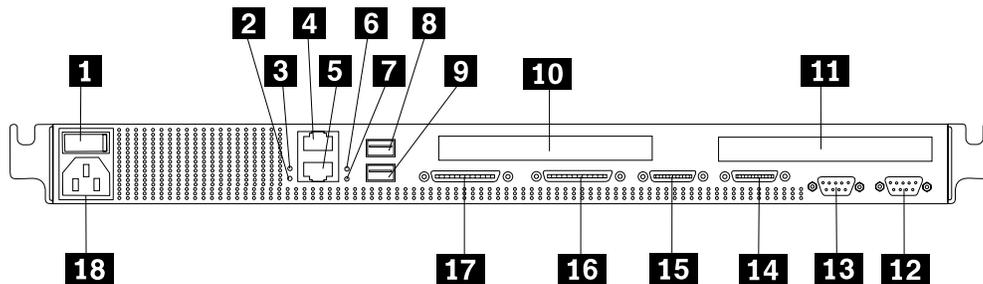
CD-ROM eject button: Press this button to release a CD from the CD-ROM drive.

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

14

CD-ROM drive in-use light: This light comes on when the CD-ROM drive is accessed.

Back View



- 1 Power-on switch:** Use this switch to turn on your server.
- 2 Ethernet 1 link indicator:** This LED lights when there is an active link connection on the 10BASE-T or 100BASE-TX interface for Ethernet port 1.
- 3 Ethernet 2 link indicator:** This LED lights when there is an active link connection on the 10BASE-T or 100BASE-TX interface for Ethernet port 2.
- 4 Ethernet connector 2:** An unshielded, twisted-pair cable with an RJ-45 connector attaches here to the 10/100 Ethernet controller on the system board.
- 5 Ethernet connector 1:** An unshielded, twisted-pair cable with an RJ-45 connector attaches here to the 10/100 Ethernet controller on the system board.
- 6 Ethernet 2 speed indicator:** This LED lights when the speed of the Ethernet LAN connected to Ethernet port 2 is 100 Mbps.
- 7 Ethernet 1 speed indicator:** This LED lights when the speed of the Ethernet LAN connected to Ethernet port 1 is 100 Mbps.
- 8 Universal Serial Bus (USB) connector 1:** Reserved.
- 9 Universal Serial Bus (USB) connector 2:** Reserved.
- 10 PCI slot 1:** This slot contains the SCSI controller for the hard disk drives. You can connect an IBM-approved external tape drive to the connector on the SCSI adapter. See the Server-Proven list on <http://www.ibm.com/compat/> to locate external tape drives.
- 11 PCI slot 2:** This half-length slot can contain a second PCI adapter. Which adapter is present, if any, depends upon which server model you have.
- 12 Serial connector A:** Signal cables for modems or other serial devices connect here to the 9-pin serial connector for serial port A. You might need to use a cable that has minimal bulk on its connector.
- 13 Serial connector B:** Signal cables for modems or other serial devices connect here to the 9-pin serial connector for serial port B. You might need to use a cable that has minimal bulk on its connector.
- 14 Console bus connector:** Reserved.
- 15 Console bus connector:** Use the console bus cable to connect the console bus connector to a console selector switch. See step 4 on page 21 for details.

- 16** **Option 2:** Reserved.
- 17** **Option 1:** Reserved.
- 18** **Power cord connector:** Attach the power cord here.

Controls, indicators, and connectors

Chapter 2. Installing the server in the rack enclosure

This chapter provides instructions for installing your server in a rack enclosure.

Important

- If a Netfinity EXP15 is installed in the same rack as the IBM Netfinity 4000R, the IBM Netfinity 4000R must be installed with at least one U (1.75 in. of vertical measurement) between itself and the Netfinity EXP15. This might require moving the Netfinity EXP15 to a different position in the rack.
- For air flow reasons, when IBM Netfinity 4000Rs are mounted in succession in a rack, there must be no intervening spaces between the IBM Netfinity 4000Rs.

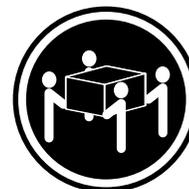
4



≥18 kg (37 lbs)



≥32 kg (70.5 lbs)



≥55 kg (121.2 lbs)

CAUTION:
Use safe practices when lifting.

This chapter is divided into three sections: preparing the server, preparing the rack, and installing the server.

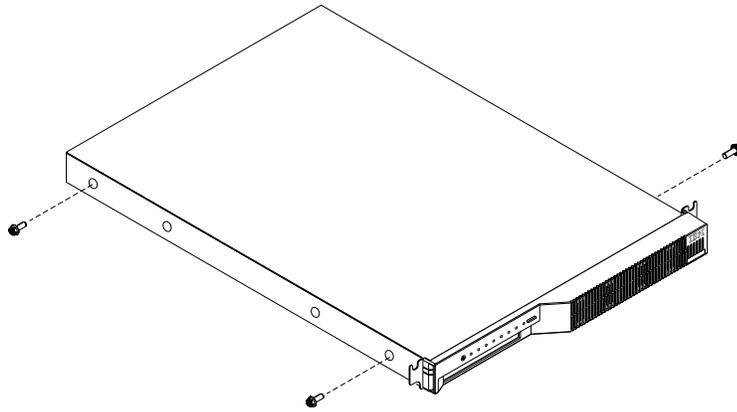
What you will need

In addition to the items in the inventory list in Chapter 1, “Introducing your IBM Netfinity 4000R,” you will need the following items to install the server in a rack:

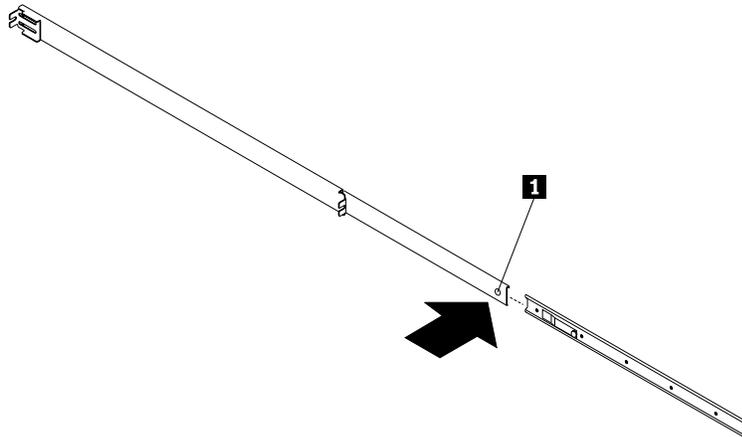
- Phillips screwdriver
- Flat-blade screwdriver
- Pliers or box wrench
- The documentation that comes with the rack

Preparing the server

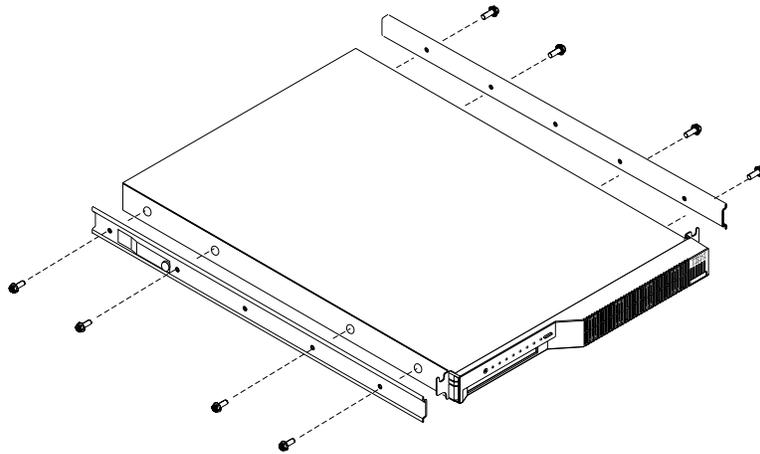
1. Remove the two screws from the left side of the server. (These screws also hold the top cover on—do not attempt to remove the cover.)
2. Remove the screw from the right side of the server.



3. Attach the inner slide section of each slide rail assembly to the side of the server.
 - a. Pull the inner slide from each slide rail assembly until the safety latch locks.
 - b. Press the safety latch **1**; then, pull the inner slide firmly until it detaches from the outer slide rail.



- c. Align the holes on the inner slide with the holes on the side of the server; then, attach the slide with screws from the rack mount kit and the screws you removed earlier.



Preparing the rack

Important:

1. Installing the server in a rack might require two people.
2. To ensure cabinet stability, install heavier devices such as UPSs starting from the bottom of the rack enclosure.
3. If you are installing different server and server models in the rack enclosure, install the heaviest models in the lower part of the rack enclosure.
4. If you are installing multiple servers in the rack, install all the nut bars and slide rails for all the servers first, then install each server in the rack.
5. Review the documentation that comes with your rack enclosure for safety or cabling considerations. Ensure that your planned installation is within the rack enclosure guidelines for heat generation, electrical requirements, air flow and mechanical loading.

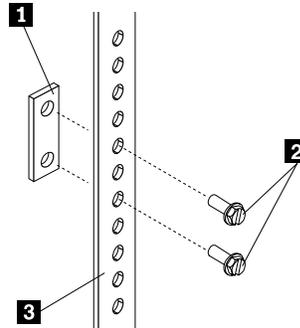
Complete the following procedure to attach the mounting hardware to the rack enclosure.

Notes:

- a. You must align the slide rails correctly or the installation cannot be completed.
 - b. The slide rail assemblies each have two screws on the rear bracket to allow for length adjustment.
1. Select the U-unit the server will occupy in the rack.

2. Attach a nut bar to the front rack rail:

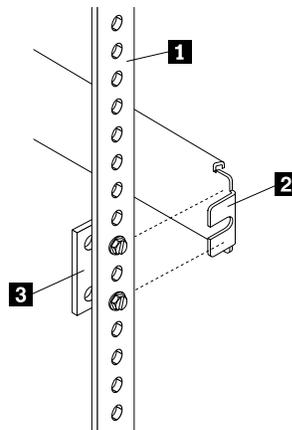
- a. Position a nut bar **1** behind the front rack rail **3**, in the U-unit for the server.
- b. Insert two screws (M6 by 16 mm) **2** through the holes in the rack rail and the nut bar.
- c. Tighten the screws until the nut bar is approximately 4 mm (.16 in.) from the rack rail.



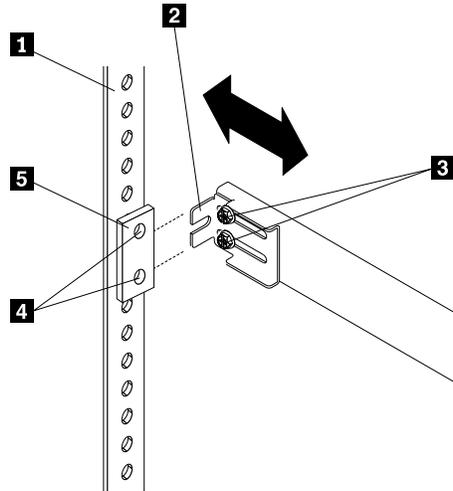
3. Attach nut bars to the other three corners of the U-unit in the same way.

4. Attach the slide rail assemblies to each side of the rack.

- a. Place the tabs of the slide rail assembly front bracket **2** between the front rack rail **1** and the nut bar **3**. The bracket fits *between* the top and bottom screws.



- b. Place the tabs **2** of the slide rail assembly rear bracket between the nut bar **5** and the rear rack rail **1**. If necessary, loosen the screws **3** at the rear of the slide-rail to fit the rack. Tighten the adjustment screws **3**.



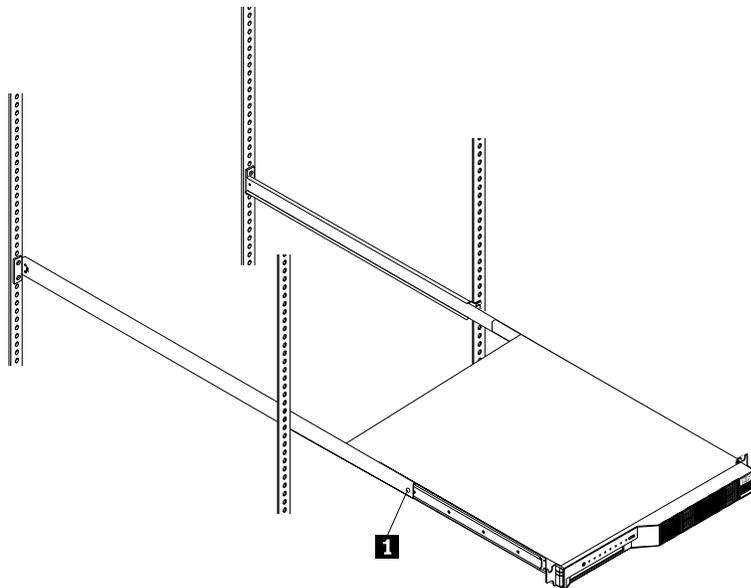
- c. Push the slide-bracket assemblies to the outermost positions on the rack. Make sure that the slides on the slide-rail assembly will extend out from the front of the rack.
- d. Tighten the screws at the front and rear of the U-unit.
- e. Attach the other slide rail assembly into the U-unit in the same way.

Installing the server

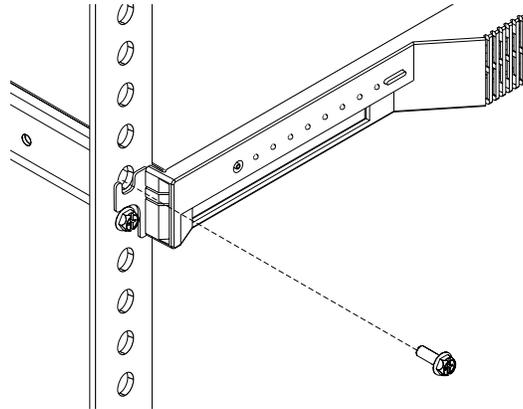
Complete the following procedure to install the server into the rack enclosure.

1. Mount the server on the slide rails.
 - a. Extend the slide rails until they lock into place.
 - b. Position the server horizontally, with the LED panel at the left.
 - c. Align the inner slides on the sides of the server with the slide rails; then, slide the server onto the outer slide about 5 cm (2 in.), until the server stops.
 - d. Press the safety latches **1** on the slide rails and slide the server further onto the outer slide, until the slide rails click into place.
 - e. Press the safety latches **1** on the slide rails again and slide the server part of the way into the rack enclosure.

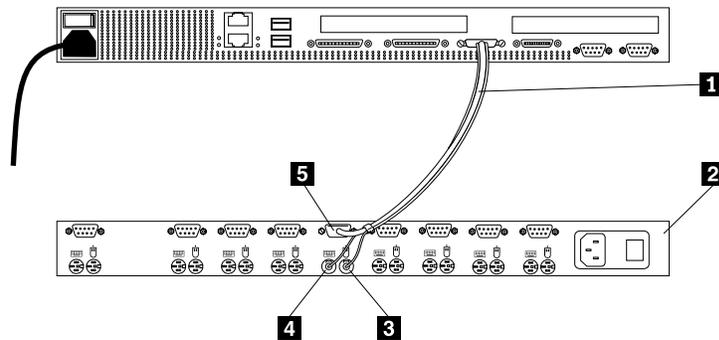
Note: When the server is fully extended, safety latches on the slide rails lock into place. This prevents the server from being accidentally pulled out too far and dropped. To release the safety latch, press in.



2. Install the server in the rack.
 - a. Remove the top screw holding the front of each slide rail assembly in the rack.
 - b. Slide the server the rest of the way into the rack enclosure.
 - c. Reinsert the screws you removed, putting them through the slot in the server mounting flange, the mounting rail, the slide-rail assembly bracket, and the nut bar. Tighten the screws.



3. Connect the console bus cable **1** to the console bus port.
4. Connect the other end of the console bus cable **1** to a console selector switch **2**.



- 1** Console cable
- 2** Console selector switch
- 3** Mouse connector
- 4** Keyboard connector
- 5** Monitor connector

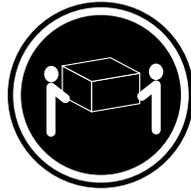
A console selector switch enables multiple servers to use the same console.

5. Connect the keyboard, mouse, and monitor to the console selector switch. If you have more Netfinity 4000R servers than one console selector switch can accommodate, see the documentation that came with your switch for information about using multiple switches.
6. Connect all device cables and connectors to the server.
7. Connect the power cord to the server. Connect the other end of the power cord to a properly-grounded power distribution unit (PDU). See the ServerProven list at <http://www.ibm.com/pc/compat> to locate a PDU.

8. Connect the PDU power cable to a properly-grounded power outlet.
9. Turn on the PDU, the console selector switch, and the monitor.
10. Turn on the server by setting the power-on switch at the rear of the server to On.

Removing the server from the rack

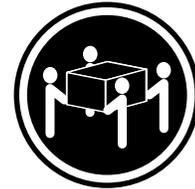
4



≥18 kg (37 lbs)



≥32 kg (70.5 lbs)



≥55 kg (121.2 lbs)

CAUTION:
Use safe practices when lifting.

To pull the server forward, or to remove it from the rack, perform the following steps.

1. Shut down the server operating system.
2. Set the server power-on switch to Off.
3. Disconnect the power cable and all other cables from the rear of the server.
4. On each side of the server front, remove the screw holding the mounting flange to the rack (the top screw).
5. Pull the server forward until the safety latch on the slide rails locks.
6. To remove the server completely from the rack, press the safety latch on each slide rail; then, pull the server from the slide rails. Place the server on a flat, non-conductive surface.

Chapter 3. Configuring Your Server

This chapter provides information about the Configuration/Setup Utility program that comes with your server.

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

Configuration Overview

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

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

Your server comes with a built-in Configuration/Setup Utility program. With this program, you can configure system board functions, such as serial port assignments; change interrupt request (IRQ) settings; and change the startup sequence for drives that you install. You also can use this utility program to set passwords for starting up the server and accessing the Configuration/Setup Utility program.

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

1. Run the Configuration/Setup Utility program and record the current configuration settings.
2. Set jumpers or switches on the device.
See the device installation instructions.
3. Install software programs.
See the installation instructions that come with the software.
4. Resolve configuration conflicts.

The Configuration/Setup Utility Program

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

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

Using the Configuration/Setup Utility Program Main Menu

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

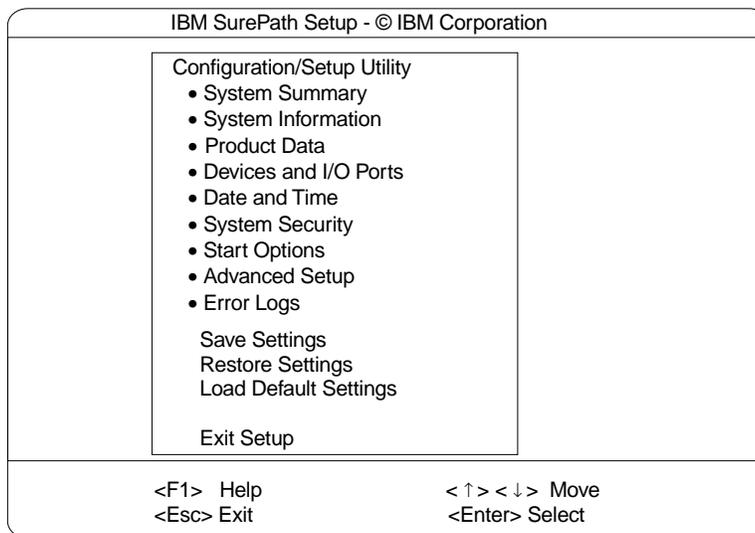
Always run the Configuration/Setup Utility program if you receive an error message instructing you to do so. Review this chapter and the information that comes with the option before making changes. Also, record the current settings before making any changes.

To start the Configuration/Setup Utility program:

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

Using the Configuration/Setup Utility Program Main Menu

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



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

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

To change configuration settings:

1. Use the Up Arrow (↑) or Down Arrow (↓) key to highlight the menu item for the configuration setting that you want to change; then, press **Enter**.
2. Use the Left Arrow (←) or Right Arrow (→) key to choose the appropriate setting for the selected menu item; then, press **Enter**.
3. Repeat step 1 through step 2 for each setting that you want to change. Press **Esc** to return to the Configuration/Setup Utility program main menu.
4. After making changes, you can select:

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

System Summary

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

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

System Information

Select this choice to display information about your Netfinity 4000R, and to view the IRQ settings for the Ethernet controllers on the system board, and other PCI adapters that are installed.

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

PCI Routing

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

Product Data

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

Devices and I/O Ports

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

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

To display or change the assignments for devices or serial ports:

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

Using the Configuration/Setup Utility Program Main Menu

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

Notes:

1. The universal serial bus (USB) is configured automatically.
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 setting in the Configuration/Setup Utility program.

Date and Time

Select this choice to set the system date and time.

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

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

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

System Security

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

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

To set, change, or delete a password:

1. Select **System Security**.
2. Select **Power-On password**.
3. Follow the instructions on the screen.

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

Type of Password	Results
No password set	<ul style="list-style-type: none">• No password required to start system.• You can access all choices on the Configuration/Setup Utility program main menu.
Power-on password	<ul style="list-style-type: none">• You must enter the password to complete the system startup.• You can access all the choices on the Configuration/Setup Utility program main menu.

Using the Power-On Password Menu

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

To set a power-on password:

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

The Power-on Password menu appears.

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

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

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

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

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

When a power-on password is set, POST does not complete until you enter the password.

To delete a power-on password:

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

The Power-on Password menu appears.

2. Select **Delete Power-on Password**; then, press **Enter**.

3. A confirmation window appears. Press **Enter** to delete the power-on password. Press **Esc** to cancel the request and return to the System Security menu.

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

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

The Power-on Password screen appears.

2. Select **Allow for unattended boot with password**. Press the Left Arrow (←) key or Right Arrow (→) key to toggle the entry to **On**.

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

Start Options

Start options take effect when you start your server.

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

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

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

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

The **Start Options** choice appears only on the full Configuration/Setup Utility program menu.

Advanced Setup

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

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

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

Cache Control

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

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

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

PCI Bus Control

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

- **PCI Primary Bus MLT:** This setting is for the primary master latency timer (MLT). It can be used to help tune performance of the Netfinity 4000R.
- **PCI Secondary BUS MLT:** This setting is for the secondary master latency timer (MLT). It can be used to help tune performance of the Netfinity 4000R.
- **PCI Interrupt Routing:** This choice can be used to manually override the interrupts for PCI devices. Any changes that you make in PCI Interrupt Routing will not be reflected in the IRQ settings displayed in the PCI Routing selection of the System Information menu until you restart the Netfinity 4000R.

Memory Settings

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

If a memory error is detected during POST or memory configuration, the Netfinity 4000R can automatically disable the failing row of memory and continue operating with reduced memory capacity. If this occurs, you must manually enable the row of memory after the problem is corrected. Choose **Memory Settings** from the Advanced Setup menu; then use the the Up Arrow (↑) or Down Arrow (↓) key to highlight the row that you want to enable. Use the Left Arrow (←) or Right Arrow (→) key to select **Enable**.

Error Logs

Select **Error Logs** to choose to view the POST error log.

POST Error Log

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

Save Settings

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

Restore Settings

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

Load Default Settings

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

Exit Setup

Select **Exit Setup** to exit from the Configuration/Setup Utility program. If you have made any changes, you will be asked if you want to make the changes or exit without making the changes.

Resolving Software Configuration Conflicts

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

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

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

Using the Configuration/Setup Utility Program Main Menu

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

Note: Start the Configuration/Setup Utility program to view the addresses used by your system board functions. (See “The Configuration/Setup Utility Program” on page 25 for instructions.)

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

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

Chapter 4. Installing the operating system

This chapter provides instructions for installing and configuring the operating system in your server.

What you need

To install Microsoft® Windows NT® Server 4.0 on the server, you need the following items:

- A licensed copy of the Windows NT Server 4.0 CD
- Windows NT Service Pack 5 (see the Microsoft Web site for instructions on downloading and installing the service pack)
- The *Netfinity 4000R System* CD that comes with your server

Before you begin

If you have a RAID SCSI adapter installed in your server, you must create your RAID configuration before installing the operating system. Use the ServeRAID CD that came with your system to create the RAID configuration.

What to do

Complete the following procedure to install Windows NT Server 4.0 and Service Pack 5. This procedure is the only way to install the necessary device drivers for the server.

This procedure involves several steps, multiple system restarts, and some swapping of CDs. Follow all onscreen directions, except as noted at specific points. Supply all requested information; read and agree to all License Agreements presented.

Note: There can be many activities between any of the steps listed here.

1. Insert the Netfinity 4000R System CD in the CD drive and set the power-on switch to On. A series of logo and setup screens displays, some of which remain for several seconds; this is normal.
2. When the NOS Selection and Installation Method screen displays, **Microsoft Windows NT Server 4.0** and **Customized Installation** are pre-selected; click the right-arrow (the "Next" button) at the bottom of the screen.
3. Partition and format the hard disk drive as desired.
The minimum partition is 300MB, with a maximum of 4GB.
4. The system restarts. Look at the startup screens to verify which SCSI adapter is in your server; you will need this information in the next step.
5. When the system displays the Supported Adapters/Controllers screen:
 - a. In the **Hard Disk Adapters/Controllers** box, select the SCSI adapter that is in your server.
 - b. In the **Network Adapters/Controllers** box, make sure to select the Ethernet driver for the controller on the system board. If your server model

has an Ethernet adapter installed in the second PCI slot, also select the driver for that Ethernet adapter.

6. When the Starting the Installation screen displays, write down the tips and then click the right-arrow at the bottom of the screen.
7. When the system displays the window about searching for a network adapter:
 - a. Click the **Select From List** button.
 - b. Select IBM 10/100 EtherJet PCI Adapter from the list that displays; click **OK**; then, click the **Next** button.

The program takes you through configuring network protocols and services. Specify the network information as requested.

8. When the Detected Display popup window is displayed, click OK. Click OK on the Display Properties window to accept the current settings. You will address the video information later in this procedure.
9. Follow the instructions to restart the computer.
10. When the system has restarted completely and the Windows NT desktop displays on the monitor, insert the *Netfinity 4000R System* CD in the CD-ROM drive.
11. Unpack the video driver to your hard disk drive, as follows:
 - a. From the Windows NT desktop, click **Start** → **Programs** → **Windows NT Explorer**, or double-click **My Computer**; then, double-click the CD-ROM drive icon, **Images, EN**, and **CT69000**.
 - b. When a popup window about the Readme file opens, click **Yes**.
 - c. In the IBM Netfinity 4000R CT9000 Video Driver - Welcome window, click **Next**.
 - d. In the Installation Folder window, select the location on your hard disk drive you want the video driver unpacked into; this is the location from which the driver will be installed later. Make note of this location; then, click **Continue**.

The program unpacks the driver and closes.

 - e. Close the windows that opened in this step.
 - f. Remove the *Netfinity 4000R System* CD from the drive.

12. With the cursor on the desktop background, right-click the mouse. Click **Properties** from the menu.
13. From the Display Properties window:
 - a. Click the **Settings** tab.
 - b. Click the **Display Type** button
 - c. Click the **Change** button
 - d. Click the **Have Disk** button

- e. In the box labeled **Copy manufacturer's files from**, type the path to the folder on your hard disk drive where you unpacked the video driver, as follows:

d:\directory

where *d* is the drive letter for the hard disk drive, and *directory* is the directory, or folder. Click **OK**.

- f. Select

Chips Video Accelerator (65545/48/50/54/55 68554 69000)

from the list of drivers on the CD.

- g. On the Third-party Drivers popup window, click **Yes**.

- h. On the Installing Driver popup window, read the information; then, click **OK**. Click **Close** on the Display Type window and the Display Properties window.

- 14. When asked if you want to restart the system now, click **Yes**.
- 15. When the system restarts and displays the New graphics driver has been installed message, click **OK**.
- 16. In the Display Properties window, set the properties for your display; then, click the **Test** button to test the new properties.
- 17. Click the **Apply** button to see the results. Change the properties if needed, or click **OK** to accept the properties.
- 18. Install the Windows NT Service Pack 5, using the instructions from Microsoft Corporation.
- 19. Restart the system for the changes to take effect.

Install any additional software for your use, such as system administrative or maintenance software or application programs.

Your server is ready for use.

Chapter 5. Solving problems

This chapter provides information on IBM Netfinity 4000R error conditions, POST beep codes, error codes, error messages, and any diagnostic tools that might be available.

General symptoms

If...	Then...
<ul style="list-style-type: none">Your server does not start when you press the power switchYour server starts but does not respond to communication requests	Follow the instructions in Appendix A, "Help and service information" on page 87 to place a service call to IBM.
Your server beeps during POST, before the display is initialized	Record the number of beeps. Then, follow the instructions in Appendix A, "Help and service information" on page 87 to place a service call to IBM.

Power-on self-test (POST)

Each time you turn on your server, it performs a series of tests that check the operation of the base computer. This series of tests is called the *power-on self-test (POST)*.

POST does the following:

- Checks basic system-board operations
- Checks the memory operation
- Compares the current system configuration with that established by the Configuration/Setup Utility program
- Starts the video operation
- Verifies that the hard disk drive and the CD-ROM drive are working

Power-On Self-Test (POST) Messages

The following table shows error messages that can appear on the screen during the power-on self-test (POST).

Notes:

1. The actions for some of the messages require you to run the Configuration/Setup Utility program. For information about using these programs, see “Using the Configuration/Setup Utility Program Main Menu” on page 26.
2. If a password prompt appears with a POST message, type the administrator or power-on password; then, press **Enter**.

POST Message Table

POST Message	Description
062	<p>The Netfinity 4000R failed to boot on three consecutive attempts.</p> <p>All caches are disabled. This can be caused by repeatedly turning the Netfinity 4000R on and then off or resetting the Netfinity 4000R.</p> <p>Action: Start the Configuration/Setup Utility program and verify that all settings are correct. (See Chapter 3, “Configuring Your Server.”) Use the Cache Control selection in the Advanced Setup menu of the Configuration/Setup Utility program to enable the caches. (See “Advanced Setup” on page 30.)</p> <p>If the problem persists, have the system serviced. When the problem is corrected, make sure to enable the caches.</p>
101 102	<p>An error occurred during the system board and microprocessor test.</p> <p>Action: Have the system serviced.</p>
106	<p>An error occurred during the system board and microprocessor test.</p> <p>Action: Have the system serviced.</p>
114	<p>An adapter read-only memory (ROM) error occurred.</p> <p>Action: Have the system serviced.</p>
129	<p>An error was detected in the L1 cache of one of the microprocessors.</p> <p>Action: Have the system serviced.</p>
151	<p>A real-time clock (RTC) error occurred.</p> <p>Action: Have the system serviced.</p>
161	<p>The real-time clock battery has failed.</p> <p>Action: Have the system serviced.</p>
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 test programs might isolate the failing device, but you must have the system serviced.</p>

POST Message	Description
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, have the system serviced.</p> <p>The server can be used 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: If POST error message 289 also occurred, follow the instructions for that error message first. Have the system serviced.</p>
175	<p>A vital product data (VPD) error occurred.</p> <p>Action: Have the system serviced.</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, have the system serviced.</p>
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. For information about using the configuration programs, see "Using the Configuration/Setup Utility Program Main Menu" on page 26.</p> <p>If this information cannot be restored, have the system serviced.</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. For information about using the configuration programs, see "Using the Configuration/Setup Utility Program Main Menu" on page 26.</p> <p>If this information cannot be restored, have the system serviced.</p>
186	<p>A system board or hardware error occurred.</p> <p>Action: Have the system serviced.</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, have the system serviced.</p>
188	<p>A vital product data (VPD) error occurred.</p> <p>Action: Have the system serviced.</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 system board problem <p>Action: Have the system serviced.</p>
229	<p>An error was detected in the L2 cache of one of the microprocessors.</p> <p>Action: Have the system serviced.</p>
289	<p>An error occurred during POST memory tests and a failing DIMM was disabled.</p> <p>Note: The Netfinity 4000R can be used with decreased memory.</p> <p>Action: Have the system serviced.</p>

POST Messages

POST Message	Description
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, have the keyboard, cable, and system serviced.</p> <p>Note: If you have just connected a new mouse or other pointing device, turn off the server and disconnect that device. Wait at least 5 seconds, and then, turn on the server. If the error message goes away, replace the device.</p>
604	<p>An error occurred during a diskette drive test.</p> <p>Action: Have the system serviced.</p>
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 programs. If the setting is not correct, change it. For information about using the configuration programs, see "Using the Configuration/Setup Utility Program Main Menu" on page 26.</p> <p>If the problem persists, have the system serviced.</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, have the system serviced.</p>
1162	<p>The serial port configuration conflicts with another device in the system.</p> <p>Action: Make sure the IRQ and I/O port assignments needed by the serial port are available. (See Chapter 3, "Configuring Your Server.")</p>
1800	<p>A PCI adapter has requested a hardware interrupt that is not available.</p> <p>Action: Make sure that the PCI adapter and all other adapters are set correctly in the configuration programs. If the interrupt resource settings are not correct, change the settings. For information about using the configuration programs, see "PCI Bus Control" on page 30.</p>
1801	<p>A PCI adapter has requested memory resources that are not available.</p> <p>Action: Make sure that the PCI adapter and all other adapters are set correctly in the configuration programs. If the memory resource settings are not correct, change the settings. For information about using the configuration programs, see "Using the Configuration/Setup Utility Program Main Menu" on page 26.</p>
1802	<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 programs. For information about using the configuration programs, see "Using the Configuration/Setup Utility Program Main Menu" on page 26.2. If the I/O port resource settings are correct, the PCI adapter might be defective. Have the system serviced.

POST Message	Description
1803	<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 programs. If the memory resource settings are not correct, change the settings. For information about using the configuration programs, see "Using the Configuration/Setup Utility Program Main Menu" on page 26. 2. If the memory resource settings are correct, the PCI adapter might be defective. Have the system serviced.
1804	<p>A PCI adapter has requested a memory address that is not available.</p> <p>Action: Have the system serviced.</p>
1805	<p>A PCI adapter ROM error occurred.</p> <p>Action: Have the system serviced.</p>
1806	<p>A PCI-to-PCI bridge error occurred. More than one PCI bus tried to access memory below 1 MB.</p> <p>Action: Have the system serviced.</p>
1808	<p>Unsupported PCI device is installed.</p> <p>Action: Have the system serviced.</p>
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, have the system serviced. 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; follow your operating system instructions to shut down and restart the Netfinity 4000R. 4. During server startup, watch for messages indicating a hardware problem. <p>If the same error message appears, have the system serviced.</p>
2400	<p>An error occurred during the video controller (on the system board) test. This error can be caused by a failing monitor, a failing system board, or, if a video adapter is installed, a failing video adapter.</p> <p>Action: Verify that the monitor is connected correctly to the video connector. If the monitor is connected correctly, have the system serviced.</p>
2462	<p>A video memory configuration error occurred.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. Make sure that the monitor cables are correctly and securely connected to the server. 2. If the problem persists, have the system serviced.
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, have the system serviced.</p>

POST Messages

POST Message	Description
8603	<p>An error occurred during the mouse (pointing device) and mouse (pointing device) controller test. This error can be caused by the addition or removal of a mouse, or by a failing system board.</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, and 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, have the mouse (pointing device) serviced.</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, have the system serviced.</p>
00012000	<p>Processor machine check.</p> <p>Action:</p> <ol style="list-style-type: none"> 1. Update the system BIOS. Refer to the "Upgradable BIOS" on page 7 for information about obtaining updates. 2. If the problem persists, replace the microprocessor.
00019501	<p>Processor 1 is not functioning.</p> <p>Action: Have the system serviced.</p>
00019502	<p>Processor 2 is not functioning.</p> <p>Action: Have the system serviced.</p>
00019701	<p>Processor 1 failed the built-in self test.</p> <p>Action: Have the system serviced.</p>
00019702	<p>Processor 2 failed the built-in self-test.</p> <p>Action: Have the system serviced.</p>
01298001	<p>No update data for the processor 1 (the primary microprocessor).</p> <p>Action: Update the system BIOS to a level that supports the microprocessors installed in the server. Refer to the "Upgradable BIOS" on page 7 for information about obtaining updates.</p>
01298002	<p>No update data for processor 2 (the secondary microprocessor).</p> <p>Action: Update the system BIOS to a level that supports the microprocessors installed in the server. Refer to the "Upgradable BIOS" on page 7 for information about obtaining updates.</p>
01298101	<p>Bad update data for processor 1 (the primary microprocessor).</p> <p>Action: Update the system BIOS to a level that supports the microprocessors installed in the server. Refer to the "Upgradable BIOS" on page 7 for information about obtaining updates.</p>
01298102	<p>Bad update data for processor 2 (the secondary microprocessor).</p> <p>Action: Update the system BIOS to a level that supports the microprocessors installed in the server. Refer to the "Upgradable BIOS" on page 7 for information about obtaining updates.</p>
I9990301	<p>A hard disk drive error occurred.</p> <p>Action: Have the system serviced.</p>

POST Message	Description
I9990305	<p>POST could not find an operating system.</p> <p>Action: Install an operating system. If you have already installed the operating system, check the drive startup sequence (see “Start Options” on page 30). 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 have to reinstall the operating system.</p> <p>If you cannot reinstall the operating system, have the system serviced.</p>
Other Numbers	<p>POST found an error.</p> <p>Action: Follow the instructions on the screen.</p>

Power-on Self Test (POST) Beep Codes

The successful completion of POST is indicated by one beep and the appearance of the first screen of your operating system or application program. More than one beep indicates that POST detected an error.

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.

POST Beep Code Descriptions

The following list contains more detailed descriptions of the possible types of beeps that your server might emit.

No beeps

If no beep occurs after your server successfully completes POST have the system serviced.

Continuous beep

This indicates that your boot microprocessor has failed, or your system board or speaker subsystem might contain a failing component. If the system continues through POST with no errors, have the system serviced. If no video appears, the boot processor has failed.

One short beep

If one beep occurs after your Netfinity 4000R successfully completes POST, then POST has no configuration or functional errors to report. One beep also occurs after your server completes POST if you enter an incorrect power-on password.

Two short beeps

This beep combination indicates that POST encountered an error. The Configuration/Setup Utility program will display additional information; follow the instructions displayed. See “Power-On Self-Test (POST) Messages” on page 38 for explanations of any POST error messages.

Three short beeps

This beep combination indicates a system memory error. This combination occurs only if the video BIOS cannot display the error message.

Repeating short beeps

This beep combination indicates that your server system board might contain a failing component, your keyboard might be defective, or a key on the keyboard might be stuck.

POST Beep Codes

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, have the keyboard, cable, and system serviced.

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

One long and one short beep

This beep combination indicates that POST encountered an error on a video adapter. Have the system serviced.

One long and two short beeps

This beep combination indicates that a video I/O adapter ROM is not readable, or the video subsystem is defective. This beep combination might also indicate that your server system board contains a failing component.

One long and three short beeps

This beep combination indicates that 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

This beep combination indicates that POST does not support the optional video adapter. This beep combination occurs when a video adapter is installed that is incompatible with your server.

POST Beep Code Table

Beep Code	Description
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.
1-2-4	RAM refresh verification has failed.
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.
	Action: If the problem persists, have the system serviced.
2-3-1	Screen initialization has failed.
	Action: If the problem persists, have the system serviced.
3-3-2	I2C bus has failed.
	Action: Turn off the server and then restart the server. If the problem persists, have the system serviced.

Diagnostic utility

If you suspect a problem with a hard disk drive, or have received an error message indicating a hard disk drive problem, or are preparing to make a service call to the IBM HelpCenter, run the hard disk drive diagnostic utility and record the results.

To run the hard disk drive utility,

- Insert the *Netfinity 4000R Diagnostic* CD in the CD-ROM drive
- Restart the server.
- When the menu is presented, press 1 to select the diagnostics.
- Select the test to run, or other options in the utility.

Section 2. Netfinity Manager

Chapter 6. Netfinity Manager	49
Managing your IBM Netfinity server with Netfinity Manager	49
Netfinity Manager documentation	50
Road map	50
Chapter 7. Netfinity Manager system requirements	51
Chapter 8. Starting the Netfinity Manager installation program	53
Chapter 9. Netfinity Manager database support	59
DB2 database support	59
System requirements	59
Installing and configuring the database	60
Activating the database	61
Granting and revoking database privileges	61
Deleting the database	63
Lotus Notes database support	64
System requirements	64
Installing the database	64
Browsing the Netfinity Manager Lotus Notes database	65
ODBC database support	66
System requirements	66
ODBC database configuration	67
Creating the Netfinity tables	67
Supported and certified databases	69
Chapter 10. Starting Netfinity Manager	71
Netfinity Manager Service Manager	71
Netfinity Manager service descriptions	72
Advanced System Management	73
Alert Manager	73
Alert on LAN configuration	73
Capacity Management	73
Cluster Manager	74
Critical File Monitor	74
DMI Browser	74
ECC Memory Setup	74
Event Scheduler	74
File Transfer	74
Power-On Error Detect	74
Predictive Failure Analysis	75
Process Manager	75
RAID Manager	75
Remote Session	75
Remote System Manager	75
Remote Workstation Control	75
Screen View	75
Security Manager	76
Serial Connection Control	76
Service Configuration Manager	76

Software Inventory	76
System Diagnostics Manager	76
System Information Tool	77
System Monitor	77
System Partition Access	77
System Profile	77
Update Connector Manager	77
Web Manager Configuration	78
Delaying Netfinity Manager startup on OS/2 systems	78
Chapter 11. Getting more information about Netfinity Manager	79
Chapter 12. Installation options	81
Automated installation	81
Customized installation	82

Chapter 6. Netfinity Manager

Netfinity Manager is a group of distributed applications designed to enhance the hardware systems-management capabilities of a network. Netfinity Manager has a flexible, modular design that allows for a variety of system-specific installations. Each of these installation configurations provides a set of Netfinity Manager services that enables you to perform, locally, a variety of powerful hardware systems-management and monitoring functions.

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 bidirectional file and directory transfers, 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 some services to be started 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 in the managing system network 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

The 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, the Netfinity Manager systems can be accessed and managed from anywhere in the world.

Managing your IBM Netfinity server with Netfinity Manager

The copy of Netfinity Manager that is included with the IBM Netfinity 4000R 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 IBM appliance, 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 IBM Netfinity 4000R. 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: Netfinity Manager and Client Services for Netfinity Manager are supported on systems running many operating systems, including OS/2, Windows 95, Windows 98, and Novell NetWare. The Netfinity 4000R supports Windows NT 4.0; therefore this section provides instructions for Windows NT 4.0 installations only. For information on how to install Netfinity Manager or Client Services for Netfinity Manager on a system other than your Netfinity 4000R, that is running OS/2 Warp Connect, OS/2 Warp 4.0, Windows 95, Windows 98, Windows NT 3.51, Novell NetWare, or SCO UnixWare, refer to the online documentation included on your Netfinity Manager CD-ROM. For information about the online information included with your Netfinity Manager CD-ROM, see Chapter 11, “Getting more information about Netfinity Manager” on page 79.

Netfinity Manager documentation

Online versions of all Netfinity Manager documentation are included in the \DOCS directory on the Netfinity Manager CD that comes with your server. These documents are provided in Adobe Acrobat format (*.PDF). For more information on included documentation, see Chapter 11, “Getting more information about Netfinity Manager” on page 79.

Road map

Use Table 1 to find the information you need to get started with Netfinity Manager.

<i>Table 1. Getting Started Road Map</i>	
If you want to ...	Refer to ...
Install Netfinity Manager	Chapter 8, “Starting the Netfinity Manager installation program” on page 53
Learn about installation options	Chapter 12, “Installation options” on page 81
Learn about Netfinity Manager database support	Chapter 9, “Netfinity Manager database support” on page 59
Learn about system requirements	Chapter 7, “Netfinity Manager system requirements” on page 51
Read about Netfinity Manager	Chapter 6, “Netfinity Manager” on page 49
Start the installation program	Chapter 8, “Starting the Netfinity Manager installation program” on page 53
Start Netfinity Manager	Chapter 10, “Starting Netfinity Manager” on page 71
Install Client Services for Netfinity Manager	Chapter 11, “Getting more information about Netfinity Manager” on page 79

Chapter 7. Netfinity Manager 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

Netfinity Manager supports the following SNA protocol stacks:

Operating System	Supported SNA Stack
Windows NT	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 running the Microsoft SNA Server client. Netfinity Manager supports only server-to-server communications between systems running Microsoft SNA Server software. However, Netfinity Manager systems running Microsoft SNA Server can communicate with 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.

Chapter 8. Starting the Netfinity Manager installation program

This chapter gives instructions for installing Netfinity Manager on a server. Netfinity Manager can be installed on the IBM Netfinity 4000R, but not all options apply to the IBM Netfinity 4000R. These options are identified in this section.

For instructions on installing Client Services for Netfinity Manager, see the documentation listed in Chapter 11, "Getting more information about Netfinity Manager" on page 79.

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

1. Start the computer with Windows NT 4.0.
2. Place the Netfinity Manager CD into the CD-ROM drive.
3. Click the **Start** button.
4. Click **Run...** from the Start button menu.

5. Type

`x:\WINNT\MANAGER\NETFINST`

where *x* is the drive letter of the CD-ROM drive in the **Command Line** field and then click **OK**.

6. 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.

7. 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).

8. Click **OK** to save these settings and open the Netfinity Manager Installation Program window (see Figure 1 on page 54).

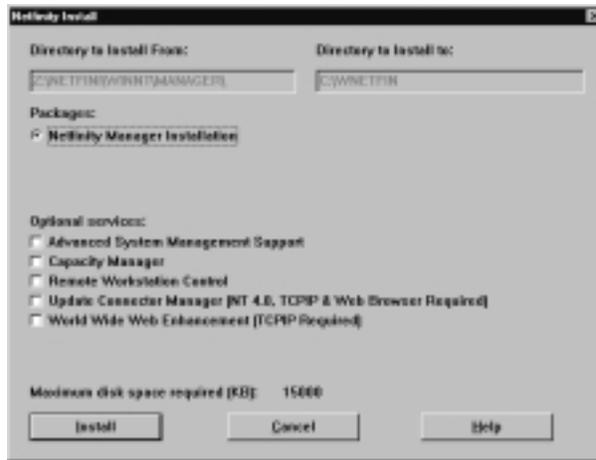


Figure 1. The Netfinity Manager Installation Program

9. Select installation options.

There is only one installation configuration for Netfinity Manager. However, the Netfinity installation 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 an easy to use resource management and planning tool for network managers and administrators, allowing remote performance monitoring of every server on the network.

- 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.

10. Install Netfinity Manager.

When an installation configuration has been chosen, click **Install**. The installation program copies all program files required by the installation configuration. A window appears, displaying the name of the file currently being copied, as well as the percentage of the installation that is complete.

Note: Click **Cancel** to halt 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 base program that enables local use of the service will be installed only if the required hardware or system configuration is present.

11. 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.

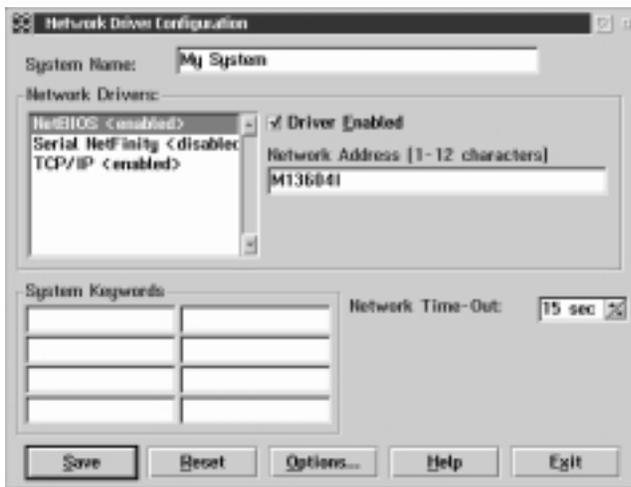


Figure 2. Netfinity Manager Installation — Network Driver Configuration Window

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 has been selected.
- 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 the IPX or TCP/IP Network Driver is selected.
- 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 all required information has been entered, 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 Options (optional)

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

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 taskbar. 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.

- Require 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 implement one or more of the available Netfinity Manager Options:

- 1) Click **Options...**
 - 2) Select the Netfinity Manager options to be enabled.
 - 3) Click **Save**.
- f. Set the Network Timeout Value (optional).

The **Network Timeout** 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 Timeout 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 folder.

12. 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 Netfinity Manager for Windows 95 is being installed, 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 changes are automatically made 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.
13. The installation is now complete. Shut down and restart the system for the system configuration changes to take effect.

Chapter 9. Netfinity Manager database support

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

Note: Discussion of platforms other than those supported on the IBM Netfinity 4000R applies only if you are installing Netfinity Manager on a network management station other than the IBM Netfinity 4000R or if you will be exporting data to a remote database server running a platform other than those supported by the IBM Netfinity 4000R.

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 64.
- If support for ODBC database export is being installed, see “ODBC database support” on page 66.

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

The minimum requirements for Netfinity Manager database export are:

- Netfinity Manager for OS/2:
 - DB2 Client Version (refer to Table 2 on page 69)
 - DB2 Version (refer to Table 2 on page 69)
- Netfinity Manager for Windows 95:
 - DB2 Client for Windows 95 (refer to Table 2 on page 69)
 - DB2 Version (refer to Table 2 on page 69)

- Netfinity Manager for Windows NT:
 - DB2 Client for Windows NT (refer to Table 2 on page 69)
 - DB2 Version (refer to Table 2 on page 69)

Attention:

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

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

Installing and configuring the database

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

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

1. Start a DB2 command window.

Note: If it's 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 so the tables can be configured. For information on configuring the database for ODBC, refer to, “ODBC database configuration” on page 67. For information on creating the tables, refer to, “Creating the Netfinity tables” on page 67.
5. Finally, you must bind the database. For information on binding the database, refer to, “Activating the database” on page 61.

Installing the database on OS/2

Note: OS/2 is not supported on the IBM Netfinity 4000R. However, the IBM Netfinity 4000R can be managed from an OS/2 system.

1. Insert the Netfinity Manager CD into the CD-ROM drive (in this example, drive D; individual drive letters might be different).
2. Start an OS/2 window or full-screen session.
3. Make the CD-ROM drive the active drive.

Type D: and then press Enter.

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

```
NETFINDB CREATE /DBNAME=databasename /DRIVE=d
```

where *databasename* is the name of the database and *d* is the drive where the database will be located.

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

5. Press Enter.

Activating the database

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

1. Connecting to the Database

- a. Start a DB2 command window.
- b. Type the following command:

```
DB2 CONNECT TO databasename
```

where *databasename* is the name of the database as specified in the database installation step.

- c. Press Enter.

2. Bind the package and the database

To prepare SQL statements stored in the bind file and store the package in the database, perform the following steps from a system on which Netfinity Manager for OS/2, Netfinity Manager for Windows 95, or Netfinity Manager for Windows NT has been installed:

- a. Open a DB2 command window.
- b. In the DB2 command window, type the following command:

```
DB2 BIND x:\directory\DB2SQLC0.bnd
```

where *x:\directory* is the name of the drive and directory where Netfinity Manager is installed.

- c. Press Enter.

Granting and revoking database privileges

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

Note: If your primary system is OS/2, refer to “Database privileges on OS/2 systems” on page 62.

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 now connect to the database.

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. For information on using the Database Administration Tool, refer to “Creating the Netfinity tables” on page 67.
- *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

Note: OS/2 is not supported on the IBM Netfinity 4000R. However, the IBM Netfinity 4000R can be managed from an OS/2 system.

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

Type the following command at the OS/2 prompt:

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

and then press Enter.

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

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

Type the following command at the OS/2 prompt:

```
DB2 CONNECT RESET
```

and then press Enter.

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

To grant or revoke table privileges on OS/2:

- a. Insert the Netfinity Manager CD into the CD-ROM drive (in this example, drive D; individual drive letters might be different).

- b. Make the CD-ROM drive the active drive.

Type D: and then press Enter.

- c. Type the following command:

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

where

- *id* is the user ID to be granted access
- *databasename* is the name of the database as specified during NETFINDB execution
- *privilegecode* is one of the following privilege codes:
 - ALL
 - ALTER
 - CONTROL
 - DELETE
 - INDEX
 - INSERT
 - REFERENCES
 - SELECT
 - UPDATE

d. Press Enter to execute the command.

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

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

To configure Netfinity Manager to discontinue export data through ODBC for use on DB2, refer to “ODBC database support” on page 66.

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” on page 64.

1. Start a DB2 command window.

2. Type

```
DB2 DROP DATABASE databasename
```

where

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

3. Press Enter.

Deleting the database on OS/2

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

Type E: and press Enter.

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

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

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

5. Press Enter.

To configure Netfinity Manager to discontinue export data through ODBC for use on DB2, refer to “ODBC database support” on page 66.

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 (refer to Table 2 on page 69)
- Lotus Notes client (refer to Table 2 on page 69)

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 Manager 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 (refer to Table 2 on page 69)
 - ODBC (refer to Table 2 on page 69)
 - ODBC support for one or more of the following database management systems (DBMS; refer to Table 2 on page 69):
 - IBM DB2
 - Microsoft SQL Server
- Windows 95, with:
 - ODBC (refer to Table 2 on page 69)
 - ODBC support for one or more of the following database management systems (DBMS; refer to Table 2 on page 69):
 - IBM DB2
 - Microsoft SQL Server
- OS/2 (refer to Table 2 on page 69)
 - Microsoft SQL Server (using the Visigenic driver provided with Microsoft SQL Server)
 - or*
 - IBM DB2

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 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 folder or Netfinity program group (see Figure 3 on page 68). Double-click this icon to open the Netfinity Manager Database Administration window.



Figure 3. The Netfinity program group on an OS/2 Warp Version 4.0 system

2. Select a DBMS.

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



Figure 4. The Netfinity Database Administrator window

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 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.

<i>Table 2 (Page 1 of 2). Supported Netfinity Databases.. Reference by operating system and database client version.</i>					
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

Table 2 (Page 2 of 2). 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
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.

Chapter 10. Starting Netfinity Manager

To start Netfinity Manager:

1. Open the Netfinity folder or program group.

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

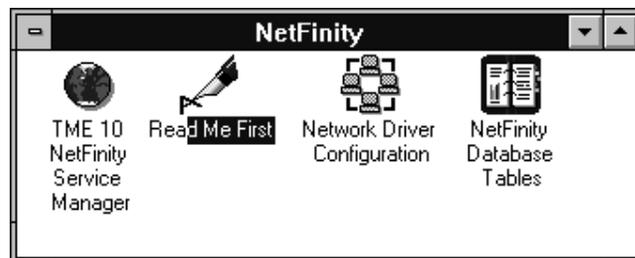


Figure 5. The Netfinity Folder

Notes:

- a. In your Netfinity 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 folder also contains the Network Driver Configuration object, which you can use to reconfigure your network protocols and system keywords, and the Netfinity 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 Chapter 9, "Netfinity Manager database support" on page 59.
 - c. The Netfinity 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 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 Service Manager window. The services that are available for use depend on the installation configuration that was selected during installation.

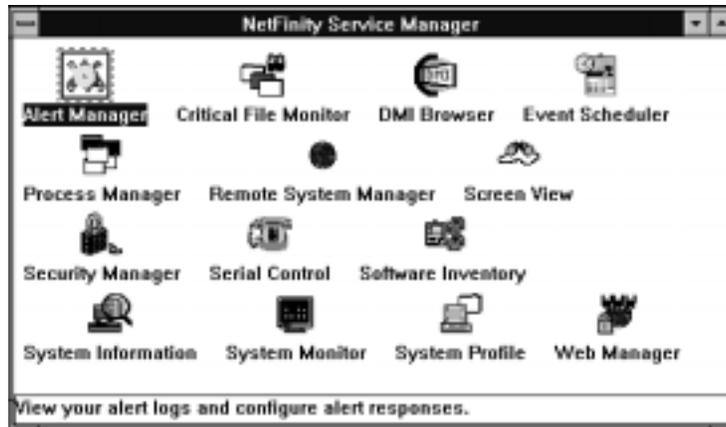


Figure 6. Netfinity Service Manager

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 the individual services to be accessed remotely by Netfinity Manager, 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

Note: Although Advanced System Management is not included with or supported on the IBM Netfinity 4000R, the IBM Netfinity 4000R can manage servers that have an IBM Advanced System Management Adapter, Netfinity Advanced System Management Processor, or Netfinity Advanced System Management PCI Adapter.

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 timeouts 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 both stand-alone 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 upon whether the systems in 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 remote performance monitoring of every server 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 both stand alone 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, all mouse clicks and keystrokes 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 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.

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.

Note: Although Advanced System Management is not included with or supported on the IBM Netfinity 4000R, the IBM Netfinity 4000R can manage servers that have an IBM Advanced System Management Adapter, Netfinity Advanced System Management Processor, or Netfinity Advanced System Management PCI Adapter.

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 both stand-alone 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

Note: OS/2 is not supported on the IBM Netfinity 4000R. However, the IBM Netfinity 4000R can be managed by an OS/2 system.

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 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 Network Interface** object. This will open the Netfinity Network Interface context menu.
4. Click **Settings** to open the Netfinity 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 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.

Chapter 11. 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.

Chapter 12. 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

Usually, not all users need to have access to all services. For security reasons, 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 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
```

Section 3. Appendixes

Appendix A. Help and service information

During the warranty period, you can get toll-free technical support 24 hours a day, 7 days a week⁹ to answer questions about your server (toll-free technical support is available in the United States, Puerto Rico, and Canada only). If you need warranty service, return or exchange is available.

Before calling, please prepare for your call by following these steps.

Step 1: Troubleshooting

1. Remove and reattach all cables.
2. Inspect the server for any damage.
3. Retrace all steps in the installation and setup instructions.
4. If you have not already done so, run the hard disk drive diagnostics from the *Netfinity 4000R Diagnostic* CD to determine if the hard disk drives are defective. Record the results of the test.

Step 2: Preparing for the service call

To assist the technical support representative, have the following information available:

1. Server name and description
2. Proof of purchase
3. Server model, serial number, and manual (the model and serial number are on the small label on the lower right front of the server and on the label on the bottom of the server)
4. Exact wording of the error message (if any)
5. Description of the problem
6. Hardware and software configuration information for your system
7. Results of the disk drive diagnostics (were the drives defective?)

If possible, be at your computer. Your technical support representative might want to walk you through the problem during the call.

Step 3: Placing the service call to IBM

Use one of the following numbers:

- In the United States and Puerto Rico, call 1-800-772-2227.
- In Canada, call 1-800-565-3344.
- In all other countries, contact your IBM reseller, IBM marketing representative, or your place of purchase.

⁹ Response time will vary depending on the number and nature of calls received.

If service is required, shipping materials and instructions will be sent to you to return the server to IBM or its authorized service representative.

Getting additional 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/software/os/warp-server	IBM OS/2 Warp Server
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.

Appendix B. Server records

This appendix contains forms for recording information about your server, which can be helpful if you ever need to have your server serviced.

Serial number

Record and retain the following information.

Product name	IBM Netfinity 4000R
Model/type (M/T)	_____
Serial number (S/N)	_____

The model and type (M/T) numbers and the serial number (S/N) for your server are located on a label on the lower right front of the server (see the object labeled **11** on page 10) and a label on the bottom of the server.

Appendix C. Product warranties and notices

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 - IBM Netfinity 4000R

Warranty Period* - One Year

**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.

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 fulfils 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**.

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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.

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Electronic emission notices

Federal Communications Commission (FCC) 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.

The following statements are the electronic emission notices. **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.

Industry Canada Class A emission compliance statement

This Class A digital apparatus complies with Canadian ICES-003.

Avis de conformité à la réglementation d'Industrie Canada

Cet appareil numérique de classe A est conforme à la norme NMB-003 du Canada.

Power cord notice

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.

Index

Special Characters

&nvr. (NVRAM) configuration 26

Numerics

9-pin serial port 12

A

Alert Manager 73
Alert on LAN configuration 73
analysis, predictive failure 75
assistance 89
automated installation 81

B

back view 12
BIOS 4, 7

C

cable
 power vii
cache
 control 30
 internal level-2 size 4
Cache Control 30
Capacity Management 73
CD-ROM drive 11
 eject button 11
 manual tray release 10, 11
CID installation
 command line parameters 82
Cluster Manager 74
Configuration Manager 76
configuration, Web Manager 78
configuring your server 25
connection control, serial 76
connector
 expansion slots 12
 identified 12
 rear view of server 12
 serial device 12
 universal serial bus (USB) 28
controls 10
Critical File Monitor 74
customized installation 82

D

database support
 DB2 59
 Lotus Notes Database support 64
 ODBC 66
Date and Time 28
date, setting 28
DB2 database support 59
delaying Netfinity Manager startup on OS/2
 systems 78
description 12
detect power-on error 74
device drivers 34
directories 65
DMI Browser 74
drivers, network 56
dual-inline memory module (DIMM)
 See memory module (DIMM)

E

ECC Memory Setup 74
editing the INSTALL.INI 82
electronic emission notices 100
enabling a row of memory 31
Enhanced Parallel Port (EPP) 27
error logs 31
error, power-on detect 74
ethernet 6
Event Scheduler 74
exiting from the Configuration/Setup Utility
 program 27, 31
expansion slots
 location 12
Extended Capabilities Port (ECP) 27

F

failure analysis, predictive 75
File Transfer 74
force remote logons 57
forgotten power-on password 29

H

heat output 9
help 89
home page, IBM Personal Computer 88

I

- I/O ports 27
- information tool, system 77
- INSTALL.INI, editing 82
- installation options 54
- installation, Netfinity Manager
 - network driver configuration 56
- Internet home page 88
- inventory, software 76

L

- LED (light-emitting diode)
 - CD-ROM in-use 11
 - Console 10
 - Ethernet 10
 - power-on 10
 - temperature 10
- lights
 - See LED (light-emitting diode)
- Load Default Settings 31
- locations
 - features 12
 - power switch 12
- Lotus Notes database support 64

M

- Main Menu, Configuration/Setup Utility program 26
- memory 4
 - configuration error 39
 - disabled 31
 - enabling a row of 31
 - settings 31
- memory module (DIMM) 4
- menu, Configuration/Setup Utility program 26

N

- Netfinity Manager
 - database support 59
 - delaying starting on OS/2 systems 78
 - description 49
 - documentation 79
 - getting more information 79
 - installation 53
 - installation options 81
 - online documentation 79
 - Service Manager 71
 - starting 71
 - supported database formats 59
 - system requirements 51
- Netfinity Manager configuration
 - Advanced System Management support
 - installation 54
 - Capacity Management installation (Windows NT only) 54

- Netfinity Manager configuration (*continued*)
 - installation options 54
 - Remote Workstation Control installation 54
 - Update Connector Manager 54
 - World Wide Web Enhancement 55
- Netfinity Manager database support
 - database configuration, ODBC 67
 - deleting the DB2 database 63
 - granting access to the DB2 database 62
 - installation, DB2 59
 - installation, Lotus Notes 64
 - installation, ODBC 66
 - installing the DB2 database 60
 - Lotus Notes database, browsing 65
 - revoking access to the DB2 database 62, 63
 - supported database formats 59
 - system requirements, 59
 - system requirements, Lotus Notes 64
 - system requirements, ODBC 66
- Netfinity Manager installation options
 - automated 81
 - automated installation 81
 - CID installation 81
 - customized installation 82
- Netfinity Manager installation program 53
- Netfinity Manager keywords
 - assigning during installation 57
 - assigning keywords 57
 - for systems 57
- Netfinity Manager system requirements
- Netfinity options
 - Force Remote Logons 57
 - Service Execution Alerts 57
- noise level 9

O

- ODBC database support 66
- operating system
 - drivers needed 33
 - installing 33
 - supported 33

P

- partition access, system 77
- PCI bus control 30
- POST
 - battery failure 38
 - beep codes 43
 - description of 37
 - during configuration 25
 - enhanced 30
 - error messages 38
 - forgotten power-on password 29
 - message table 38

POST (*continued*)
 quick 30
 table, message 38
POST error log 31
power
 cord 101
power switch 12
Power-On Error Detect 74
Predictive Failure Analysis 75
problems, general 37
Process Manager 75
product data 27
profile, system 77

R

rack
 installing in 15
 mounting 15
 moving in 23
 removing from 23
RAID Manager 75
random-access memory 4
rear view 12
registered synchronous dynamic random access
 memory (SDRAM) 4
remote
 session 75
 System Manager 75
 Workstation Control 75
removing services 82
Restore Settings 31
restoring configuration settings 31
road map 50

S

Save Settings 31
scheduler, event 74
Screen View 75
SDRAM 4
Security Manager 76
Serial Connection Control 76
serial number 10, 87, 91
serial port
 assignment 27
 description 12
 location 12
 universal bus 28
server
 controls 10
 features 4, 6
 front view 10
 model and type 10, 87, 91
 powering off 12
 rear view 12

server (*continued*)
 reset button 10
 serial number 10, 87, 91
service descriptions, Netfinity Manager 72
service execution alerts 57
shadowing, ROM 30
SMP (symmetric multiprocessing) 6
Software Inventory 76
specifications 9
starting Netfinity Manager 71
starting the Netfinity Manager installation program 53
symmetric multiprocessing (SMP) 6
system
 specifications 9
 system card data 27
 system information 27
 System Information Tool 77
 system memory 6
 System Monitor 77
 System Partition Access 77
 System Profile 77
 system summary 27

T

time, setting 28
turning off the system
 location of power switch 12
turning on the system
 location of power switch 12

U

unattended startup with password 28, 29
unattended-start mode 28
universal serial bus (USB) port 12
Update Connector Manager 77

V

view
 front 10
 IRQ settings 27
 rear 12
virus checking 30

W

Web Manager Configuration 78
World Wide Web home page 88
write-back, microprocessor cache 30
write-through, microprocessor cache 30



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