IBM Netfinity

SP Switch
Installation and User's Guide
Release 1.5.1

IBM

IBM Netfinity

SP Switch
Installation and User's Guide
Release 1.5.1

> **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 91.

First Edition (February 2000)

Contents

Safety information

Before installing this product, read the Safety Information.

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

在安装本产品之前，请仔细阅读 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 pečítaje 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」。

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

About this book

This book contains instructions for installing and setting up an IBM® Netfinity® SP Switch that is to be used in an IBM Netfinity Server Cluster Solution.

This book is intended for the following audience:

- Network administrator—the individual responsible for configuring, managing, maintaining, and troubleshooting a network or LAN.

- Hardware administrator—the individual responsible for configuring, maintaining, and supporting an IBM Netfinity server.

This document is a replacement for *IBM Netfinity SP Switch Installation and User's Guide* that was shipped with the IBM Netfinity SP Switch. Refer to this release specific document for software upgrades to the IBM Netfinity SP Switch Administrator Utilities software. For additional documentation and software upgrades, go to the IBM support Web site at:

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

1. Click **Servers**.

2. Under family, click **Clustering**.

3. Under Technical Information, click **Downloadable files** for software upgrades or click **Online publications** for documentation.

Locate the IBM Netfinity SP Switch topic and download the files needed.

How this book is organized

This book has the following major sections:

- "Introduction" on page 1 contains a description of the IBM Netfinity SP Switch.

- "Cable management and labeling" on page 5 contains information about cable management and cable labeling for the IBM Netfinity SP Switch.

- "Installing the hardware" on page 7 contains procedures for installing and cabling the hardware.

- "Planning your IBM Netfinity SP Switch configuration" on page 15 contains an overview for planning for your required software configuration.

- "Installing the IBM Netfinity SP Switch software" on page 19 contains procedures for installing the necessary software to configure and run the IBM Netfinity SP Switch Administrator and System Diagnostics on the IBM Netfinity SP Switch.

- "Configuring the IBM Netfinity SP Switch software" on page 29 contains procedures for configuring and managing the software and running System Diagnostics on the IBM Netfinity SP Switch.

- "Troubleshooting the IBM Netfinity SP Switch" on page 63 contains information on isolating and recovering from some problems that might occur.

- "Replacing parts" on page 73 contains instructions on replacing certain components in your IBM Netfinity SP Switch.

- Appendix A, "Getting help, service, and information" on page 79 contains instructions on how and where to obtain service.

- Appendix C, "Product warranties and notices" on page 91 contains your hardware warranty, notices, and trademarks.

Related publications

During the hardware installation of the IBM Netfinity SP Switch, you might need to refer to one or more of the following publications.

- *APC Smart-UPS Uninterruptible Power Supply Model 1400/3000*. This book contains information that can help you optimize the performance and service life of your UPS; it also contains information pertaining to power distribution of your hardware.

- *IBM 9306 Model 900 Netfinity Rack Planning and Installation Guide*. This book contains information about the IBM 9306 Model 900 Netfinity Rack. It also contains a product description, a list of available options, option and equipment installation guidelines, and a description of the IBM Netfinity Rack Configurator program.

- *IBM DB2 Universal Database EEE Installation and User's Guide*. This book contains information about the IBM DB2 database software package. It also contains installation and management instructions for the DB2 database software.

- *IBM Client Services for Netfinity Manager User's Guide*. This book contains information on managing alerts and error messages through the IBM Netfinity SP Switch using IBM Netfinity Manager software.

- *IBM Netfinity Advanced System Management Interconnect Cable Option*. This book provides installation and operating instructions for the Advanced System Management Interconnect cable and the RS485 connection to the IBM Netfinity SP Switch.

- *IBM Netfinity Advanced System Management PCI Adapter Installation Instructions*. This book provides installation and operating instructions for the Advanced System Management PCI adapter and the RS485 connections.

- *IBM Netfinity Advanced Cluster Enabler Software Installation Guide for Oracle Parallel Server*. This book provides an overview of installing the Operating System Dependent (OSD) software in an IBM Netfinity Cluster Solution.

- *IBM Netfinity 7000 M10 Server Library*. This book contains detailed instructions for installing and setting up your IBM Netfinity 7000 M10 servers.

- *IBM Netfinity Manager User's Guide*. This book contains information on managing alerts and error messages through the IBM Netfinity SP Switch using IBM Netfinity Manager software.

- *IBM Netfinity SP Host adapter Installation and User's Guide*. This book contains information about and installation instructions for the IBM Netfinity SP Host adapter.

- *Microsoft® Windows NT Installation and User's Guide*. This book contains information about and installation instructions for Microsoft Windows NT® and TCP/IP

- *Quick Beginnings for DB2® Enterprise - Extended Edition for Windows NT*. This book contains information about and installation instructions for IBM DB2 EEE Universal Database.

Introduction

The IBM Netfinity Server Cluster Solution consists of a parallel or distributed system of interconnected computers used as a single unified computing resource or *solution*. This cluster solution, when used with the IBM Netfinity SP Switch and the cabled IBM Netfinity SP Host adapters, is referred to as an IBM Netfinity SP Switch fabric.

The IBM Netfinity SP Switch is a *scalable* and *parallel* switch. The IBM Netfinity SP Switch is designed to provide high-performance communication between servers; using redundant network topology provides high system availability.

> **Attention:** Do not connect the IBM Netfinity SP Switch to a telephone line.

The IBM Netfinity SP Switch is used with:

- IBM Netfinity SP Host adapter
- IBM Netfinity SP Switch cable
- IBM Netfinity 7000 M10 server
- IBM Netfinity 9306 Rack Enclosure unit

This book provides a description of the components in the IBM Netfinity SP Switch and installation and service instructions for the components and software. The IBM Netfinity SP Switch fabric supports eight IBM Netfinity 7000 M10 servers (nodes) in an IBM Netfinity Cluster Solution (the IBM Netfinity SP Switch fabric can support up to fourteen nodes with an optional switch card installed).
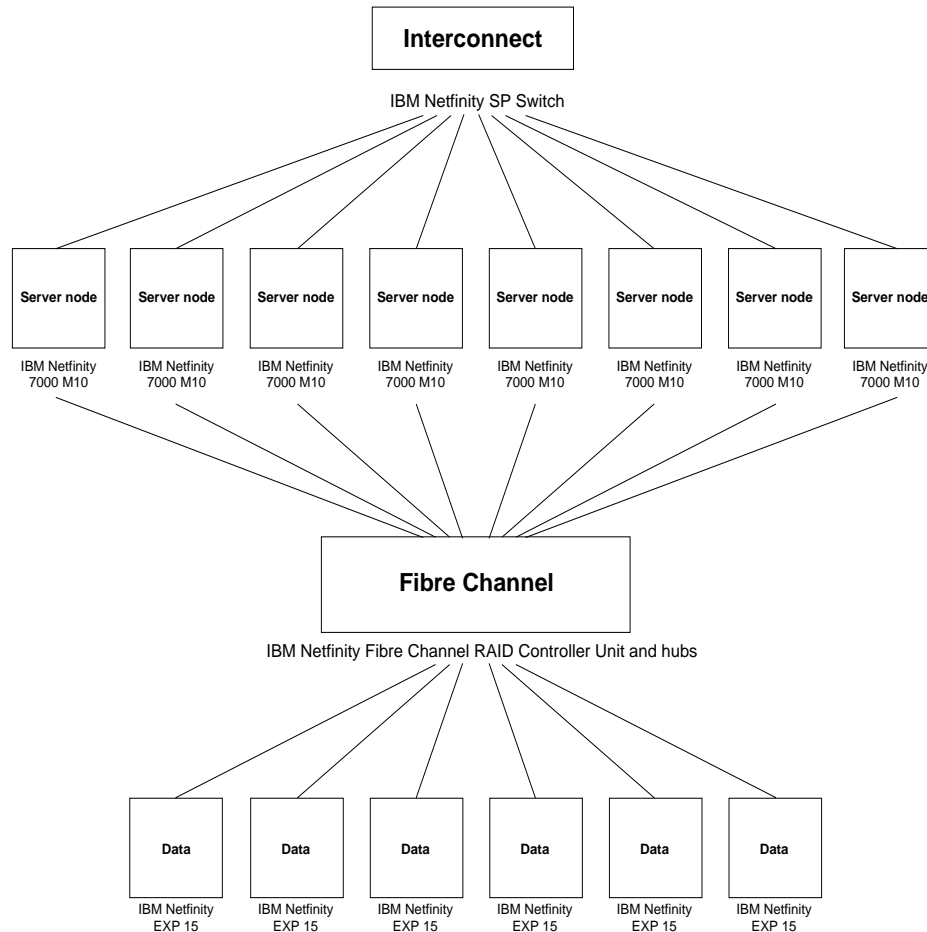
The IBM Netfinity SP Switch hardware consists of the following major components:

- One 8-port switch card (an optional 8-port switch card is available separately)

- Eight interposer cards (one for each port)

- Two power supplies (the second power supply provides redundancy)

- Two power-converter cards (the second power converter card provides redundancy)

- Two fan assemblies, each containing two fans (the second fan assembly provides redundancy)

- One service processor card

- One display panel with a 2-row by 16-character display panel, power indicator, fault indicator, on/off switch, and two display (cursor) control buttons

- One cable-management tray

- Two RS485 jack assemblies

At least one IBM Netfinity SP Host adapter and one IBM Netfinity SP Switch cable is required for each server (node) in the IBM Netfinity Cluster Solution. You can also install an additional IBM Netfinity SP Host adapter in each server (node) for improved performance and to provide dual IBM Netfinity SP Switch fabric support. An IBM Netfinity SP Host adapter is installed in each server (node) and connected to the IBM Netfinity SP Switch by an IBM Netfinity SP Switch cable.

The IBM Netfinity SP Switch and the IBM Netfinity SP Host adapter are designed to operate within an IBM Netfinity Cluster Solution. This cluster solution requires Microsoft Windows NT 4.0 Enterprise Edition with Service Pack 4 or Service Pack 5 The IBM Netfinity SP Switch solution supports:

- IBM Netfinity Fibre Channel RAID Support Version 6.2 or later

- Oracle Parallel Server Version 8.1.5 for Windows NT

- IBM Netfinity Advanced Cluster Enabler Version 2.0

  Refer to *IBM Netfinity Advanced Cluster Enabler Software Installation Guide for Oracle Parallel Server*. This book provides an overview of installing the Operating System Dependent (OSD) software in an IBM Netfinity Cluster Solution.

- IBM DB2® Universal Database EEE Version 5.2 or later

  Refer to *Quick Beginnings for DB2 Enterprise - Extended Edition for Windows NT* for a description of the IBM DB2 Universal Database software installation and configuration process.

Cable management and labeling

The complexity of hardware configurations and the potential distances between hardware components, are making cable management and labeling increasingly important. Cable management and labeling needs have expanded from the traditional labeling of network connections to labeling most cable connections among servers, disk subsystems, multiple network connections, power configurations, and video subsystems. Fibre-channel configurations, server clusters, multiple unique clusters located in the same rack or across multiple racks, and clusters where components might not be physically located in the same room, building, or site are just a few examples of today's complex hardware configurations.

Benefits of more detailed cable management and labeling include:

- Ease of installation
- Ongoing cluster and systems management
- Increased serviceability

Be sure to label your cables. For detailed instructions on cable management, go to the IBM support Web site at:

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

1. Click **Servers**.

2. Under family, click **Clustering**.

3. Under Technical Information, click **Hints and tips**.

4. Click **Servers - Cable management and labeling for solutions utilizing racks, n-node Clustering or Fiber Channel**.

Installing the hardware

The following section contains an inventory list and detailed rack installation instructions for an IBM Netfinity SP Switch.

Inventory list

> **Note:** The wrap plug that is packaged with your IBM Netfinity SP Switch should be stored in a safe place should diagnostic testing be required.

The following items are packaged in the IBM Netfinity SP Switch box:

__ 1. One IBM Netfinity SP Switch

__ 2. Two power cords

__ 3. One wrap plug

__ 4. Two IBM 9306 Model 900 PC Server Rack Enclosure rails (one rail marked *L* for the left side and one rail marked *R* for the right side of the IBM Netfinity SP Switch).

__ 5. One or more packages of screws, some of which are optional replacement screws

__ 6. *IBM Netfinity SP Switch Installation and User's Guide*

__ 7. One cable-management tray

Tool requirements

The following tools are required for the installation of the IBM Netfinity SP Switch:

- Flat-blade screwdriver
- Philips-head screwdriver
- Cage-nut insertion tool

Installing the IBM Netfinity SP Switch into an IBM 9306 Model 900 PC Server Rack Enclosure

- Statement 6

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

- Statement 9

CAUTION:
Never remove the cover on a power supply or any part (service processor and AC box) that has the following label attached.

Hazardous voltage, current, and energy levels are present inside the power supplies, service processor, and AC box. There are no serviceable parts inside the power supplies, service processor, or AC box. If you suspect a problem with one of these parts, contact an IBM service technician.

- Statement 12

>**50 kg (110 lbs)**

CAUTION:
Do not place any object weighing more than 50 kg (110 lbs) on top of the rack model of the server.
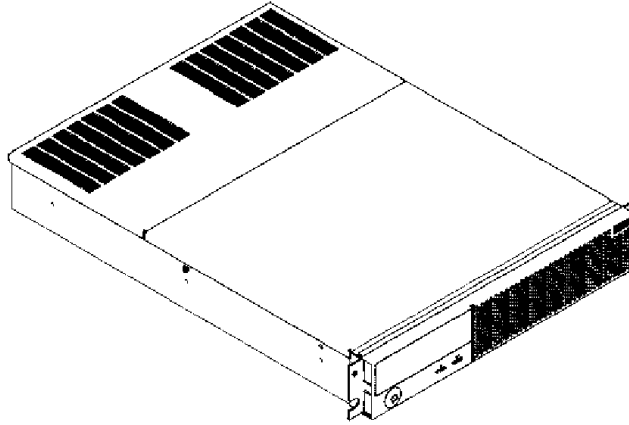
The IBM Netfinity SP Switch consists of the following major hardware components:

- One 8-port switch card (an optional 8-port switch card is available separately)

- Eight interposer cards, one for each port on the switch card

- Two power supplies

- Two power-converter cards

- Two fan assemblies, each containing two fans

- One service processor card

- One display panel with a 2-row by 16-character display panel, power indicator, fault indicator, on/off switch, and two display (cursor) control buttons

- One cable-management tray

- Two RS485 jack assemblies

The following steps describe installing an IBM Netfinity SP Switch into an IBM 9306 Model 900 PC Server Rack Enclosure.

Important: You must install cage nuts (provided in your IBM Netfinity SP Switch package) in the appropriate holes in your IBM 9306 Model 900 PC Server Rack Enclosure. These cage nuts are required to receive the screws for the IBM Netfinity SP Switch. Use the Cage Nut Insertion Tool (provided in your IBM 9306 Model 900 PC Server Rack Enclosure package) to correctly install the cage nuts.

Refer to *IBM 9306 Model 900 Netfinity Rack Planning and Installation Guide* for detailed hardware installation instructions.

> **Caution:**
>
> 1. Before installing your IBM Netfinity SP Switch, review the documentation that comes with your rack enclosure for safety or cabling considerations. Ensure that your planned installation is within the guidelines of the rack for heat generation, electrical requirements, air flow, and mechanical loading. Verify that the rack can meet the operating parameters, as detailed in Appendix B, "Specifications" on page 89.
>
> 2. The IBM Netfinity SP Switch must be connected to a properly wired and grounded power source.
>
> 3. Two people might be needed to install the IBM Netfinity SP Switch into the IBM 9306 Model 900 PC Server Rack Enclosure.
>
> 4. Leave at least 1U clearance above and below the IBM Netfinity SP Switch after it is installed in the rack for ease of cable installation in the cable-management tray.

1. Review the safety information provided with your IBM server.
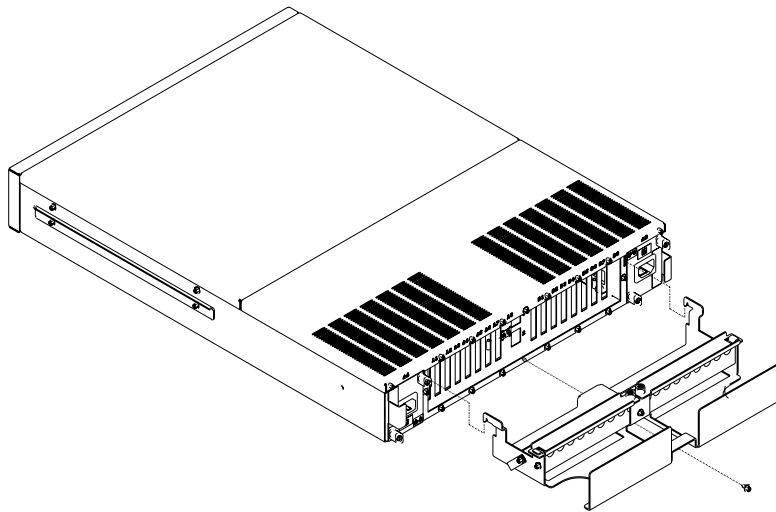
2. From the rear of the IBM Netfinity SP Switch, loosen the center-bottom screw with a flat-blade screwdriver.

3. Slide the two cable-management tray hooks (one on each side of the cable-management tray) into the two slots located on the IBM Netfinity SP Switch (located between the two power supplies) and slip the cable-management tray center slot over the screw loosened in step 2. Tighten the center-bottom screw.

4. Select an available 2U slot on your IBM 9306 Model 900 PC Server Rack Enclosure (referred to as the rack).

5. Using the Cage Nut Insertion Tool, install four cage nuts in the rear slots selected (two for the left rail and two for the right rail) and four cage nuts in the front slots selected (two for the left rail and two for the right rail) to hold the screws for the IBM Netfinity SP Switch rails and proceed to the next step to prepare the left rail (marked *L*) to be installed in the rack.

6. Loosen the two adjustment screws in the center of the rail to allow the rail to be extended to fit the rack.

7. From the front of the rack, align the bottom-front hole of the rail with the front hole of the slot; then insert and hand tighten the screw provided.

8. From the rear of the rack, adjust the rail to the correct depth of your rack, and align the two rear holes of the rail with the two rear holes on the slot of the rack.

9. Insert two screws (provided with your rails) into the aligned holes and tighten them with a flat-blade screwdriver.

10. Tighten the two rail-adjustment screws to lock the adjusted rail that allows the IBM Netfinity SP Switch to slide along the rails.
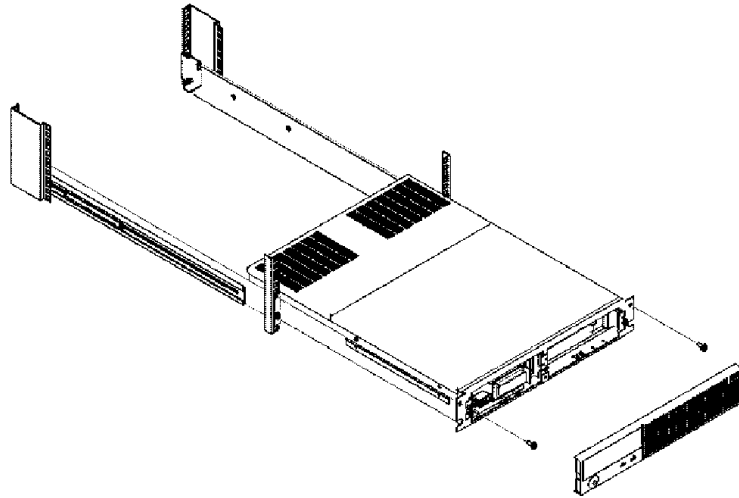
11. Repeat steps 6 on page 10 through 10 to install the right rail (marked *R*) into the rack.

12. From the front of the rack, slide the IBM Netfinity SP Switch along the previously installed rails (insert the rear of the switch into the rails first).

13. From the front of the rack, align the left and right sides of the IBM Netfinity SP Switch mounting screw holes with the left and right screw holes in the slot (the screw holes are located above the front rail screws). Insert and hand-tighten the screws.
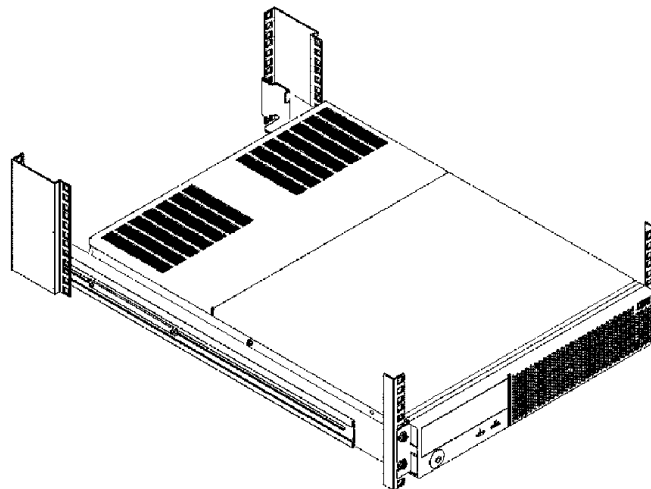
14. Tighten all screws.

> **Note:** An APC Smart-UPS or similar uninterruptable power supply is necessary to provide backup electrical power. Refer to *APC Smart-UPS Uninterruptible Power Supply Model 1400/3000* for detailed power connection instructions.

15. From the rear of the IBM Netfinity SP Switch, connect a power cord to the right power supply and a power cord to the left power supply. Power-on the IBM Netfinity SP Switch.

    Refer to section "IBM Netfinity SP Switch display panel messages" on page 67 for a complete description of the front panel buttons.

Installing an IBM Netfinity SP Host adapter

- Statement 6

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

Notes:

1. Refer to the *IBM Netfinity 7000 M10 Server Library* legal and safety information for safety concerns while installing this adapter.

2. If you have configured your server for one IBM Netfinity SP Host adapter and you are upgrading your server with a second IBM Netfinity SP Host adapter, install the second IBM Netfinity SP Host adapter in a PCI slot with a higher PCI bus address. Refer to the I/O components section of your *IBM 7000 M10 Server Library* for detailed hardware information.

3. If you have installed two IBM Netfinity SP Host adapters in your server, and you want to disable one of the adapters, remove the IBM Netfinity SP Host adapter from the Windows NT properties. To remove the adapter properties:

   a. Click **Start** → **Settings** → **Control Panel**.

   b. Double-click **Network**.

   c. Click **Adapters**.

   d. Click **IBM Netfinity SP Host adapter**.

   e. Click **Remove**.

   Physically remove the IBM Netfinity SP Host adapter from your server.

4. Label the IBM Netfinity SP Switch cables for future reference.

5. The wrap plug that is packaged with your IBM Netfinity SP Switch should be stored in a safe place should diagnostic testing be required.

---

1. Review the safety information provided with your IBM server.

2. Install an IBM Netfinity SP Host adapter into an available PCI slot in each IBM Netfinity 7000 M10. If you purchased an additional IBM Netfinity SP Host adapter, install it into another available PCI slot in your server.

   Refer to the option installation section of the *IBM Netfinity 7000 M10 Server Library* and to the *IBM Netfinity SP Host adapter Installation and User's Guide* for detailed installation instructions.

Planning your IBM Netfinity SP Switch configuration

The following sections describe the types of IBM Netfinity SP Switch configurations that are supported.

> **Note:** If you want to run the IBM Netfinity SP Switch Administrator software or start the IBM Netfinity SP Switch fabric from a server (node) that uses an IBM Netfinity SP Host adapter as the only network adapter, you must install the Microsoft Loopback Adapter option. Send a PING command to the default Microsoft Loopback Adapter address to check if it has been installed on your server (node):
>
>   PING 127.0.0.1
>
> If the PING command times out, install the Microsoft Loopback Adapter option. The following describes the installation steps for the Microsoft Loopback Adapter option:
>
> 1. Click **Start** → **Settings** → **Control Panel**
> 2. Double-click **Network**
> 3. Click **Adapters** → **Add**
> 4. Click **MS Loopback Adapter** and then click **OK**. The MS Loopback Adapter Card Setup window opens.
> 5. Click **OK** to accept the default Frame Type address. If the device drivers for the Microsoft Loopback Adapter option were not installed during the Microsoft Windows NT 4.0 installation, insert your *Microsoft Windows NT 4.0* CD into your CD-ROM drive now.
> 6. Click **Close**. The Microsoft Loopback Adapter device drivers Bind to TCP/IP. Specify the Binding order as:
>   - IBM Netfinity SP Host adapter device drivers
>   - Microsoft Loopback Adapter device drivers
>
>   The Microsoft TCP/IP Properties window opens.
> 7. Click **Specify an IP address**. Type a unique TCP/IP IP address in the IP Address field.
> 8. Type your site subnet mask address in the Subnet Mask field.
> 9. Click **OK**.
> 10. Click **Yes** when prompted to shut down and restart your server.
> 11. When your server (node) is operational, Send a **PING** command to the default Microsoft Loopback Adapter option address:
>
>   PING 127.0.0.1
>
>   If the command times out, contact IBM for service (see Appendix A, "Getting help, service, and information" on page 79 for instructions on contacting IBM for service).

Compact installation

If you want to install the minimum amount of software to manage your IBM Netfinity SP Switch from a remote workstation, use the following configuration:

External LAN
Adapter Required

Client

IBM Netfinity
7000 M10

IBM Netfinity
7000 M10

IBM Netfinity
7000 M10

IBM Netfinity
7000 M10

Remote
Work Station

Server node

Server node

Server node

Server node

External LAN
Adapter Required

Server node

RS485

Interconnect

IBM Netfinity
7000 M10

IBM Netfinity SP Switch

Requires
RS485
Connection

Server node

Server node

Server node

Server node

IBM Netfinity
7000 M10

IBM Netfinity
7000 M10

IBM Netfinity
7000 M10

IBM Netfinity
7000 M10

Install the IBM SP Switch Administrator software only. The IBM Netfinity SP Switch can be managed from a remote location:

- On a workstation without an IBM Netfinity SP Host adapter installed

- On a workstation that is not connected to an IBM Netfinity SP Switch fabric

An external network adapter is required for a Compact installation, with TCP/IP configured and network access allowed from your workstation to the primary node in the IBM Netfinity SP Switch fabric.

Custom installation

The custom IBM Netfinity SP Switch installation consists of all of the supported software management configurations, but is designed to provide the user with the ability to install just the IBM Netfinity SP Switch configuration software and the IBM SP Services option, or the device drivers, and the IBM SP Services option. The custom installation option is designed for the advanced user.
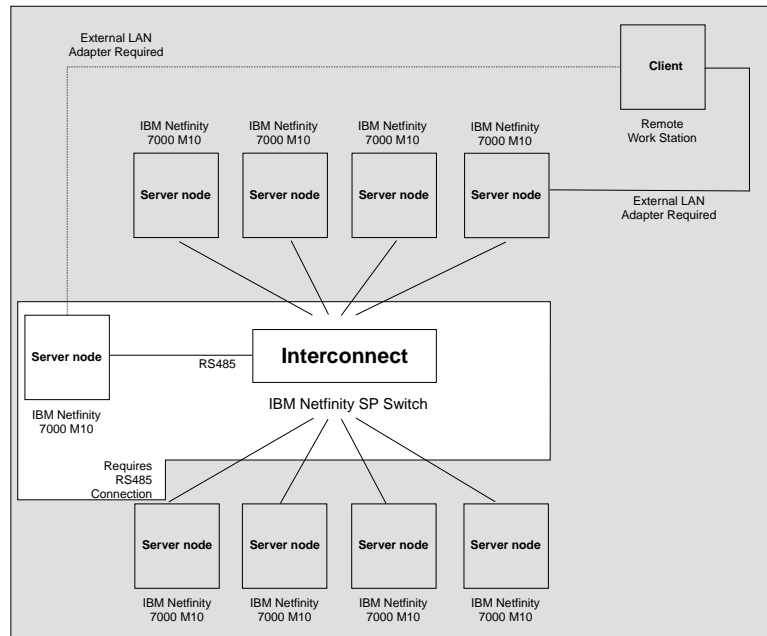
The IBM Netfinity SP Switch configuration software allows the user to:

- Change the device name displayed on the display panel of the IBM Netfinity SP Switch
- Power-on or power-off the IBM Netfinity SP Switch

through the RS485 service processor communication interface.

The device drivers and services options allow the user to install and manage IBM Netfinity SP Host adapters on a switch fabric. The services option installed alone allows the user to communicate with the switch fabric through the RS485 link.

Refer to section "Using the IBM Netfinity SP Switch Configuration Utility" on page 54 for detailed instructions on the setup and operation of the IBM Netfinity SP Switch Configuration Utility.

Typical installation

The typical IBM Netfinity SP Switch software installation includes all of the options on the custom installation selection. All hardware and software management options and the user documentation are installed.

External LAN
Adapter Required

Client

Remote
Work Station

IBM Netfinity
7000 M10

IBM Netfinity
7000 M10

IBM Netfinity
7000 M10

IBM Netfinity
7000 M10

Server node

Server node

Server node

Server node

External LAN
Adapter Required

Server node

RS485

Interconnect

IBM Netfinity
7000 M10

IBM Netfinity SP Switch

Requires
RS485
Connection

Server node

Server node

Server node

Server node

IBM Netfinity
7000 M10

IBM Netfinity
7000 M10

IBM Netfinity
7000 M10

IBM Netfinity
7000 M10

The switch fabric can be managed locally and each node has at least one IBM
Netfinity SP Host adapter installed and connected to an IBM Netfinity SP Switch.
An external network adapter is not required for the switch fabric management.

Installing the IBM Netfinity SP Switch software

> **Important:**
>
> 1. The IBM Netfinity SP Switch software must be installed on each server (node) in the cluster.
>
> 2. The IBM Netfinity SP Switch software is supported only on an IBM Netfinity 7000 M10 server.
>
> 3. If you are reinstalling or upgrading the IBM Netfinity SP Switch software, you must uninstall the currently installed release of the software.
>
> 4. If you successfully uninstalled a previous version of the IBM Netfinity SP Switch software and files are left in the subdirectory where the IBM Netfinity SP Switch software was installed, manually remove these files and subdirectories from your computer. If the uninstallation fails, contact IBM for service (see Appendix A, "Getting help, service, and information" on page 79 for instructions on contacting IBM for service).
>
> 5. If you install an external LAN adapter in your server, it must be the first adapter in the TCP/IP binding order to be used by the IBM Netfinity SP Switch.
>
> 6. The IBM Netfinity SP Switch software uses your TCP/IP Services file to allow network access to the switch fabric services. A default port number of 6745 is used. If this port number is not available in your TCP/IP Services file, you will be prompted to type a new port number for the IBM Netfinity SP Switch. The same port number must be used on all servers (nodes).
>
> 7. IBM Netfinity Manager Version 5.2 or later must be installed on your server (node) if you want to manage alerts and error messages through the Netfinity Manager.
>
>   Refer to *IBM Client Services for Netfinity Manager User's Guide* and *IBM Netfinity Manager User's Guide* for information on managing alerts and error messages through the Netfinity Manager software.

Before you begin the software installation, the following items are required:

- At least one IBM Netfinity SP Host adapter in each server (node) in the cluster

- Windows NT 4.0 Enterprise Edition with Service Pack 4 or Service Pack 5 on each server (node)

- TCP/IP installed and configured on each server (node)

To install the software for the IBM Netfinity SP Switch, follow these instructions:

1. Download the *IBM Netfinity SP Switch Release 1.5.1* software from the IBM support Web site at:

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

   a. Click **Servers**.

   b. Under family, click **Clustering**.

   c. Under Technical Information, click **Downloadable files**.

   Locate the IBM Netfinity SP Switch topic and download the file to a temporary directory. You must have at least 50 Megabytes of space available on your harddrive to unload and install the software.

2. Double-click **SETUP.EXE** (the file you just downloaded).

   A warning message appears:

```
This product is supported only on
Netfinity 7000 M10 Systems
```

Click **Ok** to proceed to the Welcome screen.
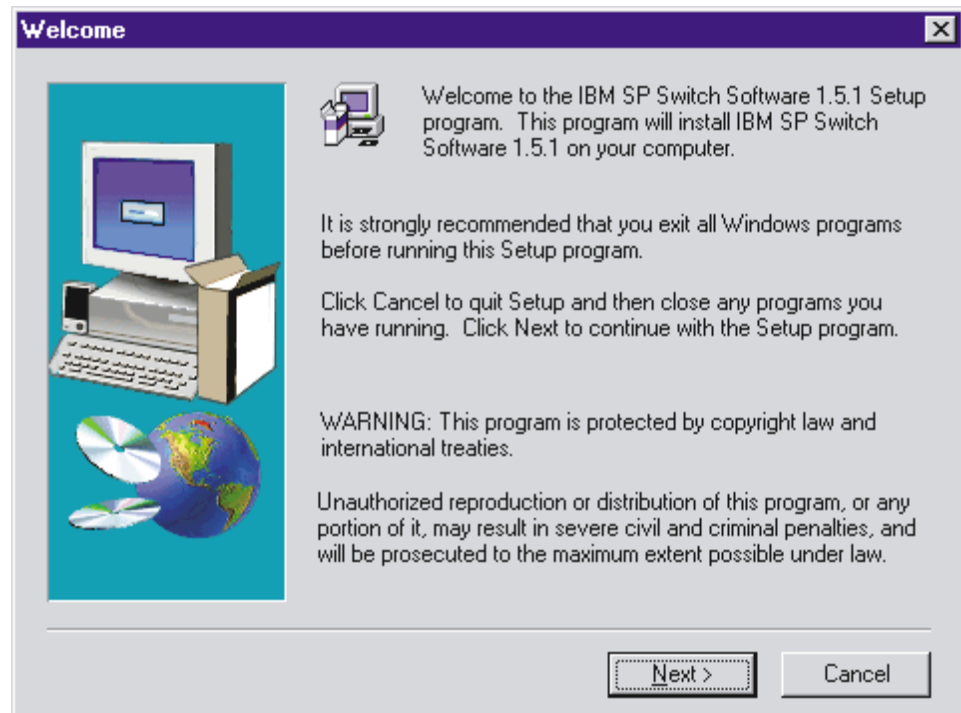
> **Note:** You must stop and close any open or running applications before the IBM
> Netfinity SP Switch Release 1.5 software can be installed.

3. Click **Next**.

4. Click **Yes** or **No** to the license and warranty statement.

5. If you click **Yes** to the license and warranty statement, proceed to step 6 on page 21. If you click **No**, the software installation process will terminate.

Setup Type ☒

Click the type of Setup you prefer, then click Next.

Compact
Custom
Typical

Description

Program will be installed with the most common options. Recommended for most users.

< Back   Next >   Cancel
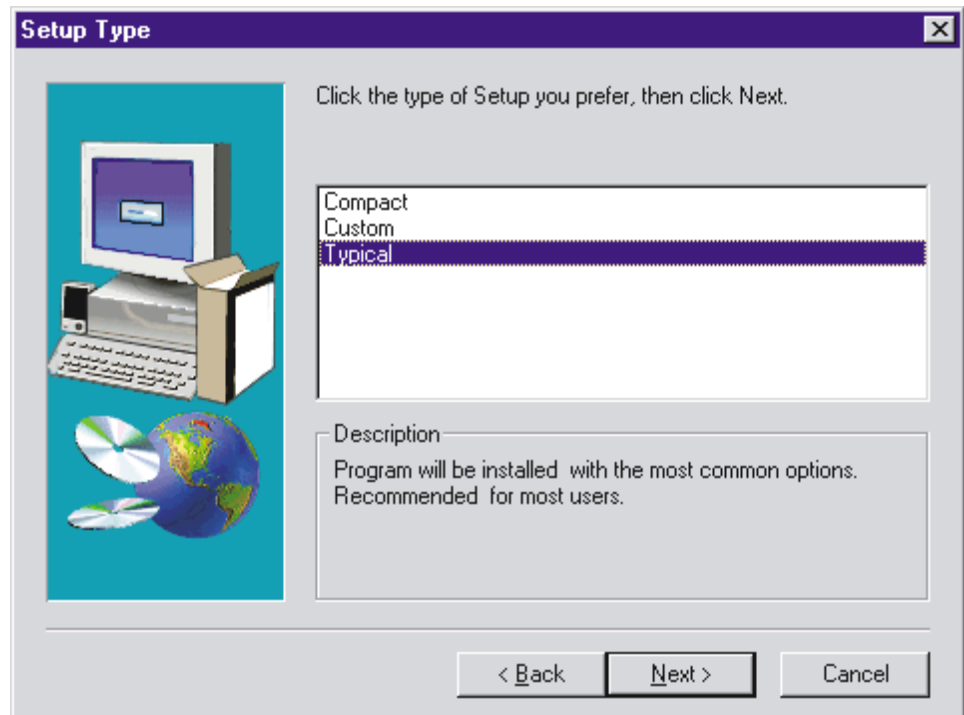
Note: You must have an external LAN adapter installed in your server (node) for a remote software installation.

---

6. In the Setup Type window, select one of the following:

- **Compact:** Install the IBM Netfinity SP Switch Administrator software and the online documentation for remote switch fabric management.

- **Custom:** You will be prompted to choose from the following

  - **IBM Netfinity SP Switch Administrator:** With this software you can configure and manage your IBM Netfinity SP Switch fabric from a remote server (or workstation). You must have an external LAN adapter attached to your server (or workstation) to perform a remote IBM Netfinity SP Switch Administrator software installation, however an IBM Netfinity SP Host adapter is not required.

  - **IBM SP Device Drivers:** These are the IBM Netfinity SP Host adapter device drivers performance tools, and PC-Doctor diagnostics for the IBM Netfinity SP Host adapter. This service must be installed to support a server (node) on an IBM Netfinity SP Switch. At least one IBM Netfinity SP Host adapter must be installed in your server (node). The IBM SP Services option is also required to be installed with this option.

  - **IBM Netfinity SP Switch documentation:** This book in an online format.

  - **IBM SP Switch Configuration:** This software controls the communication between the RS485 link on the IBM Netfinity SP Switch and the IBM Netfinity Advanced Systems Management PCI adapter in the IBM Netfinity 7000 M10.

– **IBM SP Services:** These are the software service tools for sending alerts to the IBM Netfinity SP Switch via the RS485 bus. This service must be installed if you are installing the IBM SP Switch Configuration option.

- **Typical:** Install the IBM Netfinity SP Host adapter device drivers, all IBM SP Switch Administrator software, switch services, switch configuration software, and the IBM Netfinity SP Switch documentation.

7. Click **Next**.

8. If you choose a Custom installation in step 6 on page 21, the Select Components window opens. Otherwise, proceed to step 13.
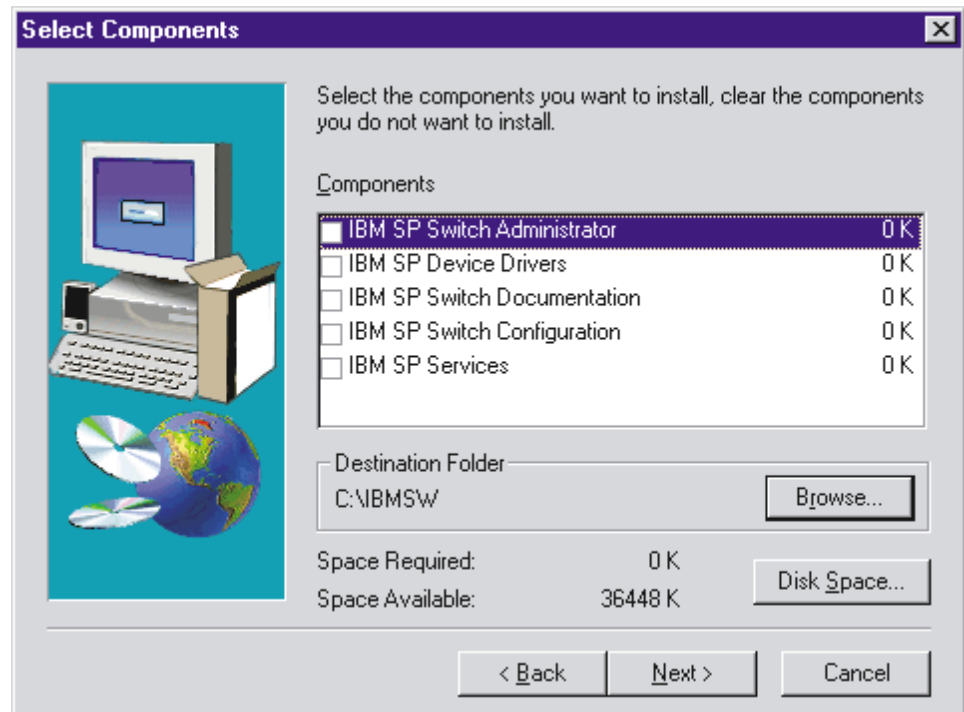
9. Select the components that you want to install by clicking the check boxes next to the component descriptions.

10. Select a destination folder in which to install the IBM Netfinity SP Switch software.

   a. To accept the default path, click **Next** and then proceed to step 15 on page 23.

   b. To select a different directory, click **Browse** and select the desired directory name. Click **OK**.

11. Click **Next**.

12. Proceed to step 15 on page 23.

13. If you choose a Typical installation, select a destination folder in which to install the IBM Netfinity SP Switch software.

Choose Destination Location

Setup will install IBM SP Switch Software 1.5.1 in the following folder.

To install to this folder, click Next.

To install to a different folder, click Browse and select another folder.

You can choose not to install IBM SP Switch Software 1.5.1 by clicking Cancel to exit Setup.

Destination Folder

C:\IBMSW

Browse...

< Back   Next >   Cancel
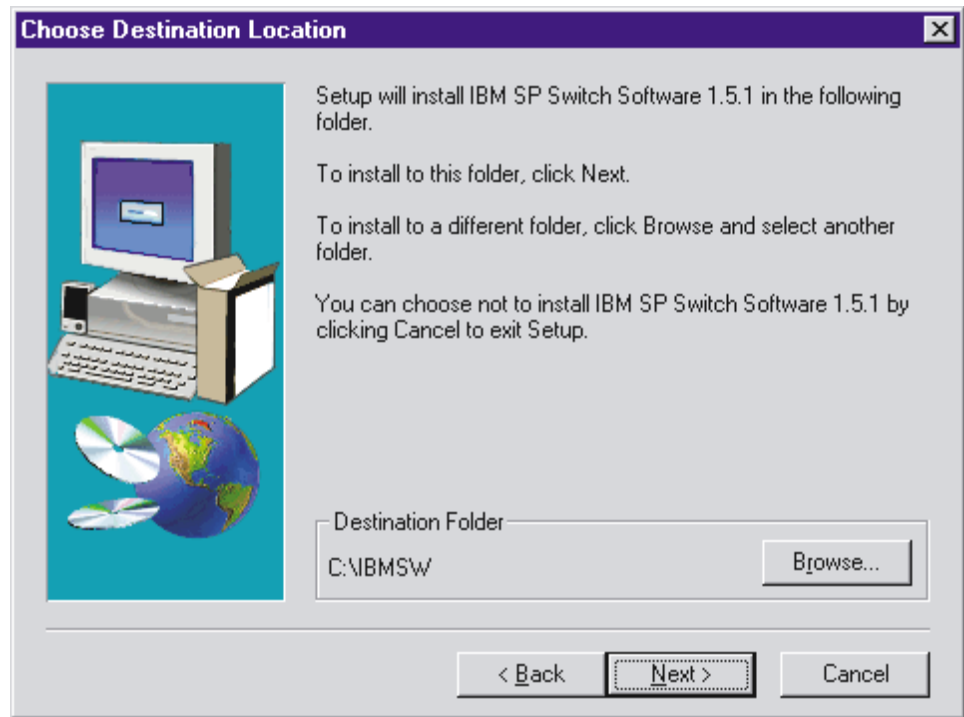
a. To accept the default path, click **Next** and then proceed to step 15.

b. To select a different directory, click **Browse** and select the desired directory name.

c. Click **OK**.

> **Note:** If you are installing the IBM SP Switch online documentation on your computer and you do not have Adobe Acrobat Reader installed, you will be prompted to install Adobe Acrobat Reader. If you click **No** on the prompt, the online documentation will not be installed.

14. Click **Next**.

15. Select a program folder in which to add the IBM Netfinity SP Switch software.
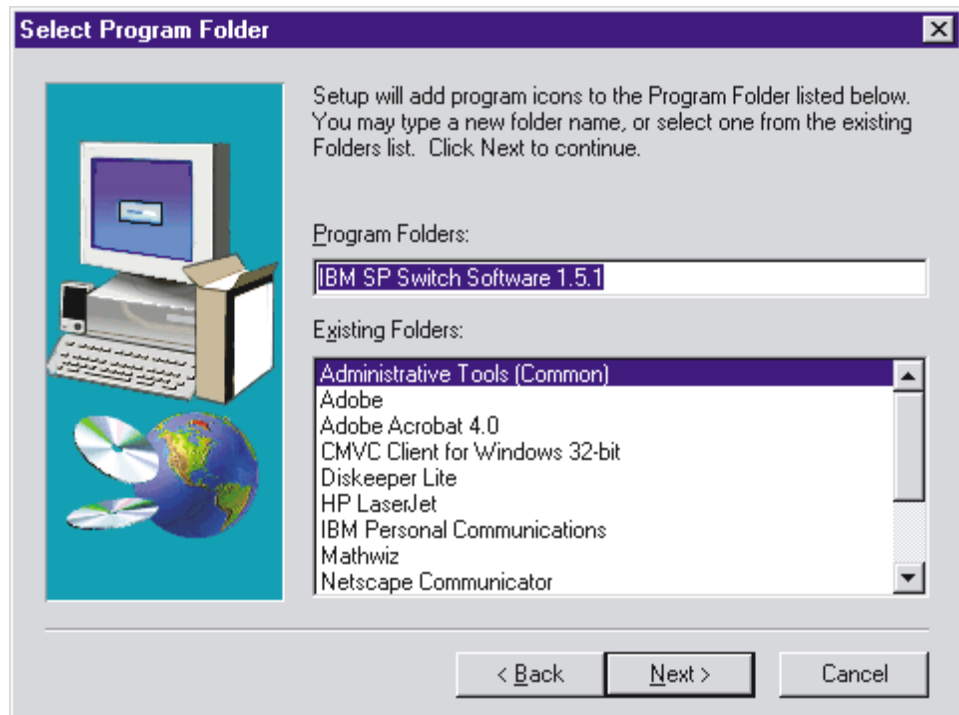
16. Click **Next**. If you are installing another version of the IBM Netfinity SP Switch software on top of a previously installed version, the IBM SP Upgrade Option window opens.
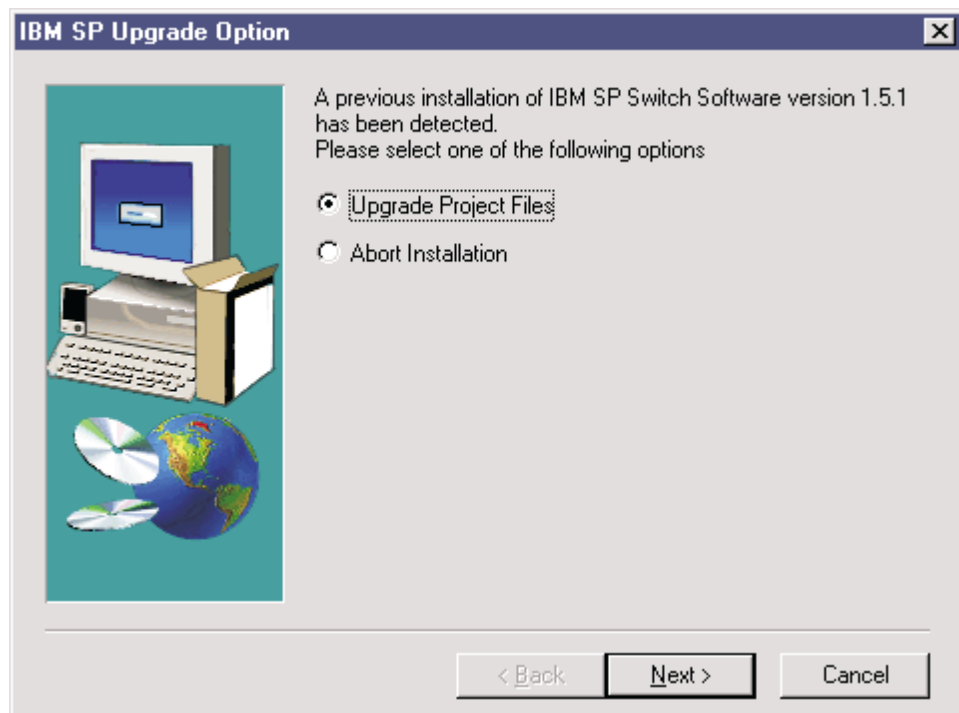
If this is a new installation of the IBM Netfinity SP Switch software, proceed to step 17 on page 25. Otherwise, follow these instructions:

a. Select **Upgrade Project Files** and click **Next**.

b. Click **Ok** in the Information pop-up window concerning stopping all running services. All IBM Netfinity SP Switch project files are updated.

c. Click **Ok** in the Installation Complete pop-up window.

d. Proceed to step 21 on page 26.

17. In the IBM SP Adapter Selection window, choose between a single or dual adapter configuration. If you are installing one IBM Netfinity SP Host adapter in your server, choose **Single adapter configuration**. If you are installing two IBM Netfinity SP Host adapters in your server, choose **Dual adapter configuration**.
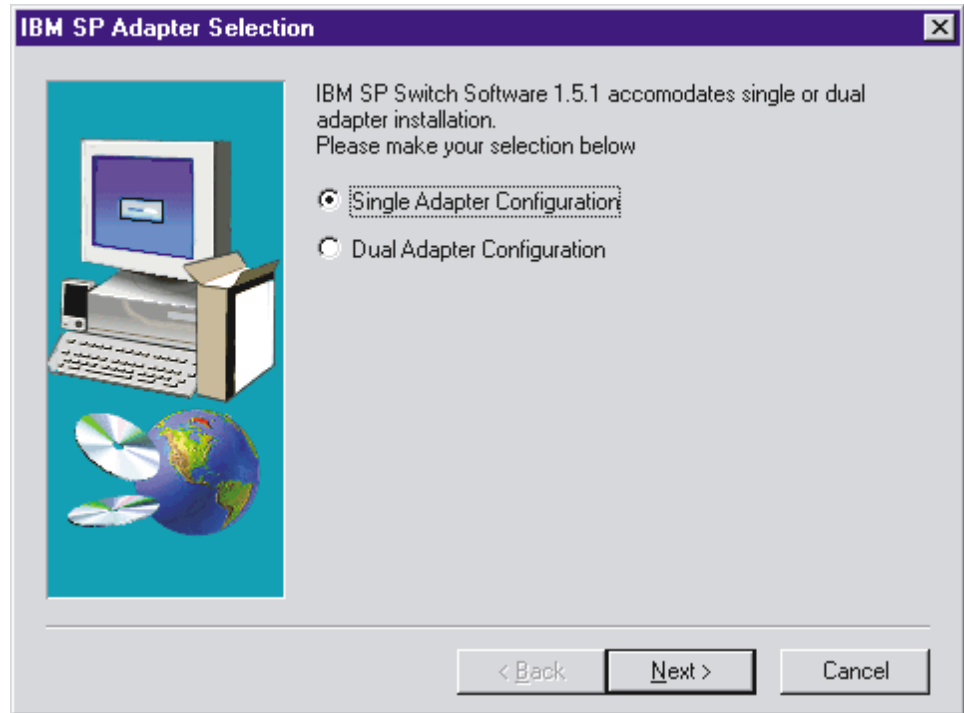
18. Click **Next**. The IBM Netfinity SP Host Adapter0 Configuration window opens.
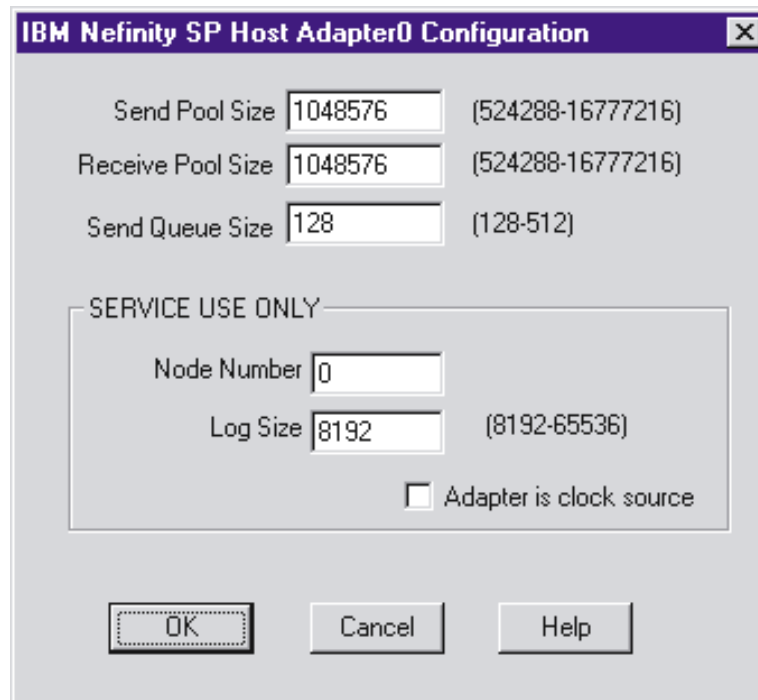
19. Click **OK**.

    If you selected a dual adapter configuration in step 17 on page 25, the IBM Netfinity SP Host Adapter1 Configuration window opens. Click **OK**.

    If your TCP/IP IP addresses have not been configured on your IBM Netfinity SP Host adapters, the Windows NT Network window opens. Update the IP address section and configure TCP/IP in the Network window. All TCP/IP addresses for a single switch fabric should be on the same Subnet Mask. If all network addresses have been configured, proceed with step 24.

    Refer to *Microsoft Windows NT Installation and User's Guide* for detailed instructions for configuring TCP/IP.

20. Click **OK** when TCP/IP has been configured.

21. The **Dependency Manager** window opens. Do not create a dependency list at this time. Refer to section "Using the IBM Netfinity SP Dependency Manager" on page 49 for details on how, when, and why you should create a dependency list.
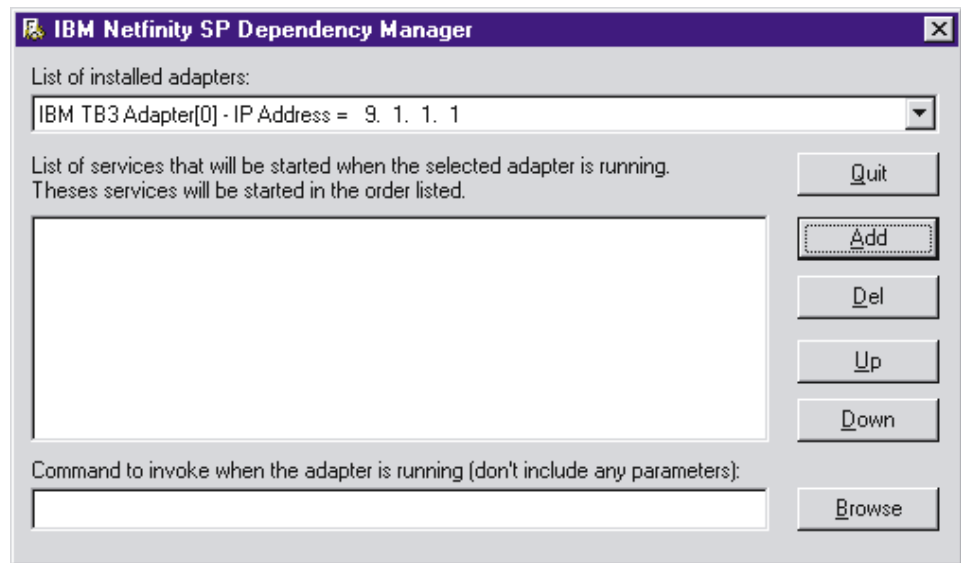
22. Click **Quit** and respond **Yes** to the confirmation pop-up window.

23. Click **Yes** when prompted to view the readme file to check for any last minute software updates.

    The following software components are copied to the desired directory for a typical installation:

    - IBM Netfinity SP Switch Dependency Manager
    - IBM Netfinity SP Switch Diagnostics
    - IBM Netfinity SP Switch Administrator
    - IBM Netfinity SP Switch Configuration Utility
    - IBM Netfinity SP Switch Port Reservation Utility

    and the Windows NT 4.0 Registry Keys are updated.

24. Select **Yes, I want to restart my computer now** when the Restarting Windows window opens.

Restarting Windows

Setup has finished copying files to your computer. Before you can use the program, you must restart Windows or your computer.

Choose one of the following options and click OK to finish setup.

⦿ Yes, I want to restart my computer now.

○ No, I will restart my computer later.

[OK]
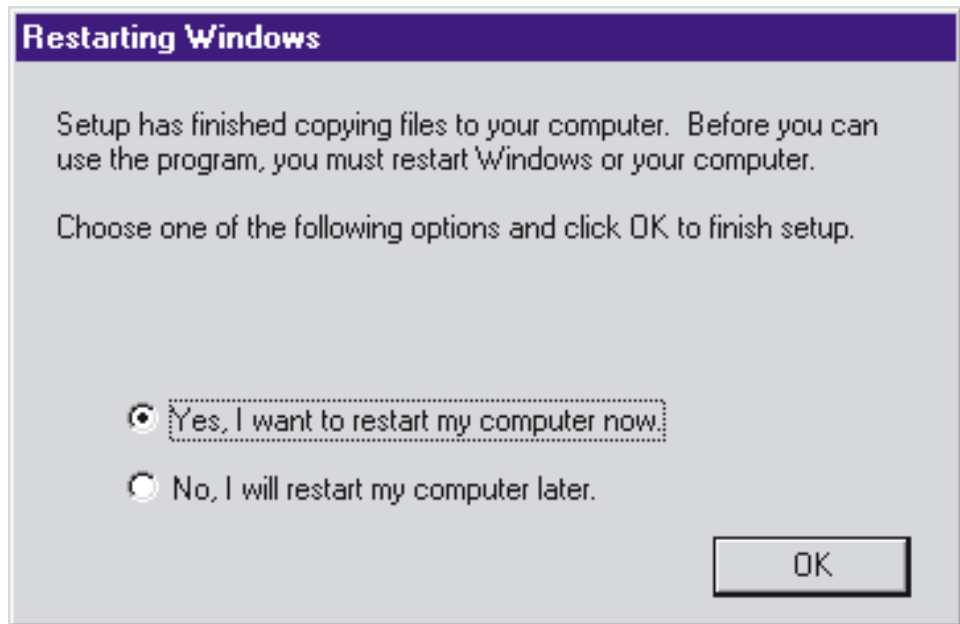
25. Click **OK**.

> **Note:** The server must be restarted for the settings to take effect.

26. Repeat steps 1 on page 19 through step 25 to install the IBM Netfinity SP Switch software on each server (node).

Configuring the IBM Netfinity SP Switch software

> **Important:**
>
> 1. To run the IBM Netfinity SP Switch Administrator software from a remote location, the remote computer and the primary node must have an external LAN adapter and the remote computer must be connected to the primary node.
>
> 2. You must configure and start the IBM Netfinity SP Switch fabric before running any additional software applications that access the IBM Netfinity SP Switch interconnect network.
>
> 3. Configuring a node as a primary node will not degrade the performance on that server while software applications are running.
>
> 4. Use the Windows NT event viewer to check for problems logged in the event viewer pertaining to the switch fabric.
>
> 5. Once the switch fabric has been configured, if you change your switch topology, you must shut down and restart each node attached to your IBM Netfinity SP Host adapters, and you must power-off (then power-on) the IBM Netfinity SP Switch to reset the switch.
>
> 6. If your switch fabric has been configured, and you recable one or more nodes to another switch fabric, follow these instructions:
>
>   - If the recabled node is not used in another switch fabric, from the Windows NT Services option, stop *IBM TB3 Switch Manager Service*; recable the node.
>
>   - If the recabled node is used in another switch fabric, the node is assigned to the new switch fabric when the node is recabled, the new switch fabric started, and the new node restarted.

This section describes the configuration and management of the IBM Netfinity SP Switch Administrator software. The combination of the IBM Netfinity SP Switch, configured and clustered servers (nodes), and cabled hardware topology makes up an IBM Netfinity SP Switch fabric. The IBM Netfinity SP Switch fabric servers (nodes) consist of:

- **One primary node:**
   Manages the status of all servers (nodes) on the switch fabric. The primary node controls the online and offline status of all servers (nodes) on the switch fabric.

- **One backup node:**
   Provides functional failover support for the primary node.

- **Secondary node:**
   All other servers (nodes) attached to the IBM Netfinity SP Switch fabric.

Before you run the IBM Netfinity SP Switch Administrator software, make sure that the following services and processes are running:

- **Device Driver:**

   1. Click **Start** → **Settings** → **Control Panel**.

   2. Double-click **Devices**.

   3. Scroll through the list of device drivers and make sure that IBMTB3N and IBMTB3 are started. If these drivers are not started as Automatic, manually start them.

- **Switch Services:**

  1. Click **Start** → **Settings** → **Control Panel**.

  2. Double-click **Services**.

  3. Scroll through the list of processes and make sure that IBM TB3 Switch Manager Service is started. If this service is not started as Automatic, manually start it.

- **Switch Manager:**

  1. Using the right mouse button, click the Windows NT task bar.

  2. Select **Task Manager**.

  3. Click **Processes**. Scroll through the list of processes and make sure that SwMgr.exe is started. There will be one switch manager service started for each IBM Netfinity SP Host adapter installed. If this process is not started, manually start it as a new task. If you have 2 IBM Netfinity SP Host adapters installed, and only one switch manager service is started, stop the switch manager service and manually restart both switch manager services as new tasks.

Starting the IBM Netfinity SP Switch Administrator software

> **Note:** If no nodes are displayed in the IBM Netfinity SP Switch Administrator window, from the IBM Netfinity SP Switch Administrator menu bar:
>
>   1. Click **View**.
>
>   2. Click **Options**. Add the IP address or TCP/IP hostname of an active node within the subnet that you expected to see in the IBM Netfinity SP Switch Administrator window. See on page 52 for instructions on using the Options component.

To start the IBM Netfinity SP Switch Administrator software:

1. Click **Start** → **Programs**.

2. Click the program folder where the IBM Netfinity SP Switch Administrator was installed.

3. Double-click **IBM Netfinity SP Switch Administrator**.

The IBM Netfinity SP Switch Administrator window opens.
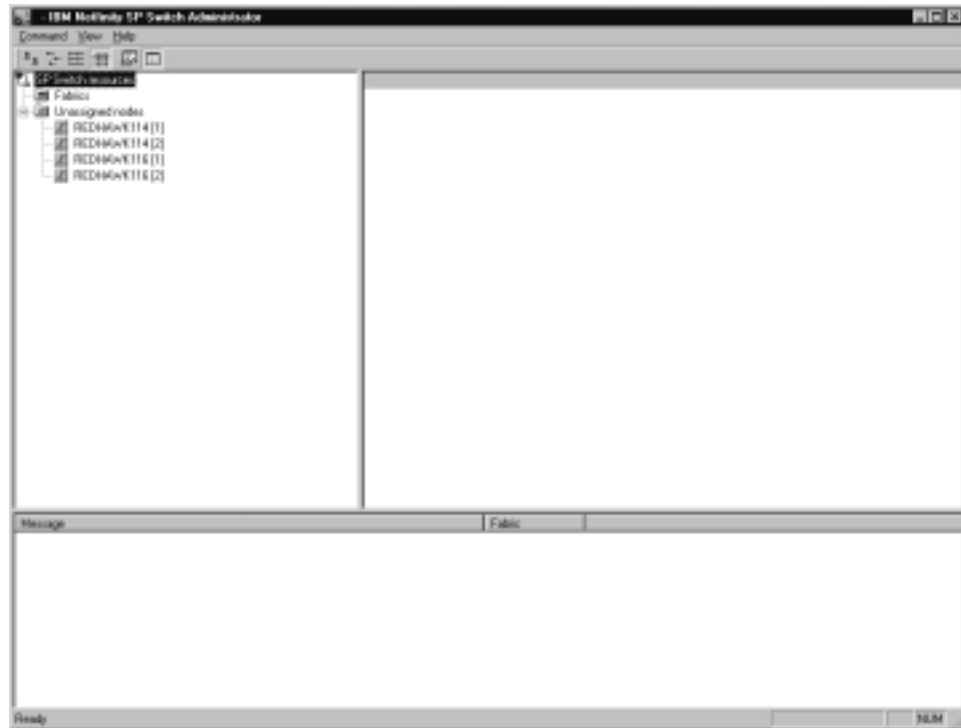
The IBM Netfinity SP Switch Administrator window is composed of three major components or internal windows:

- **Fabric view** - The fabric view window graphically displays all IBM Netfinity SP Switch fabrics, fabric components and unassigned nodes. This window is in the upper left corner of the IBM Netfinity SP Switch Administrator window. Component properties and actions are called from this view. Placing the cursor over a switch fabric, or one of the switch fabric components, will display the component status in a text pop-up window. Right-clicking a fabric icon or other component icon brings-up menu command options.

- **Node view** - The Node view window displays nodes within the selected IBM Netfinity SP Switch fabric. This window is in the upper right portion of the IBM Netfinity SP Switch Administrator window. The node information displayed shows:

  – Node name and IBM Netfinity SP Host adapter occurrence

  – Node number (a unique node identifier set by the IBM Netfinity SP Switch Administrator software that starts at zero and progresses to $N-1$ where N is the number of nodes in the switch fabric)

  – Type of node

  – IBM Netfinity SP Switch IP address

  – External network IP address (if an external network adapter is installed)

  – Node PCI slot number where the IBM Netfinity SP Host adapter is installed

  – Port number where the IBM Netfinity SP Host adapter is attached to the IBM Netfinity SP Switch

- **Message window** - The Message window contains the detailed communication output from the IBM Netfinity SP Switch fabrics. This window is in the bottom

portion of the IBM Netfinity SP Switch Administrator window. The following messages are displayed after a command has completed:

– **Attempt to bring primary node offline is not allowed.**

 The **offline** command cannot be directed at the primary node. There is no action taken.

– **Node number** d **is already online.** (Where d is the node number).

 Node d is the target of an **online** command, but the node is already online. There is no action taken.

– **Node number** d **is already offline.** (Where d is the node number).

 Node d is the target of an **offline** command, but the node is already offline. There is no action taken.

– **Cannot bring node offline.**

 Check the error logs on the primary node. Resolve the problem, then retry the command.

– **Cannot bring the switch fabric online.**

 The following situations may solve the problem:

 - Start the switch fabric with a different primary node

 - Verify that the node is cabled to the IBM Netfinity SP Switch and that the switch is turned on

 - Incorrect jack label A or B-d (Where d is the correct jack label position). Specify the correct jack label

 - The **start** command was issued for the switch fabric, but the wrong jack label was specified for the primary node. Specify the correct jack label

 - Power-off then power-on the IBM Netfinity SP Switch.

The following messages are displayed from the service processor through the RS485 port:

– **IBM Netfinity SP Switch** x **has a failure in power supply A** (where x is the serial number of the IBM Netfinity SP Switch)

 Power supply A in the IBM Netfinity SP Switch has failed. Replace the power supply.

– **IBM Netfinity SP Switch** x **has a failure in power supply B** (where x is the serial number of the IBM Netfinity SP Switch)

 Power supply B in the IBM Netfinity SP Switch has failed. Replace the power supply.

– **IBM Netfinity SP Switch** x **has a failure in fan A** (where x is the serial number of the IBM Netfinity SP Switch)

 Fan Assembly A in the IBM Netfinity SP Switch has failed. Replace the fan assembly.

– **IBM Netfinity SP Switch** x **has a failure in fan B** (where x is the serial number of the IBM Netfinity SP Switch)

 Fan Assembly B in the IBM Netfinity SP Switch has failed. Replace the fan assembly.

- **IBM Netfinity SP Switch** x **has exceeded maximum recommended temperature** (where x is the serial number of the IBM Netfinity SP Switch)

  Check for air-flow blockages on your IBM Netfinity SP Switch. If no air-flow blockage exists, call IBM for service.

- **IBM Netfinity SP Switch** x **has exceeded maximum recommended temperature on board A** (where x is the serial number of the IBM Netfinity SP Switch)

  The A-side temperature of the switch card has exceeded levels required for safe operation of the IBM Netfinity SP Switch. Check for air-flow blockages on your IBM Netfinity SP Switch. If no air-flow blockage exists, call IBM for service.

- **IBM Netfinity SP Switch** x **has exceeded maximum recommended temperature on board B** (where x is the serial number of the IBM Netfinity SP Switch)

  The B-side temperature of the switch card has exceeded levels required for safe operation of the IBM Netfinity SP Switch. Check for air-flow blockages on your IBM Netfinity SP Switch. If no air-flow blockage exists, call IBM for service.

- **IBM Netfinity SP Switch** x **is no longer responding** (where x is the serial number of the IBM Netfinity SP Switch)

  The IBM Netfinity SP Switch is not responding to communication requests. Ensure that the IBM Netfinity SP Switch is powered on. If power is present at the switch, power the switch off and then on again. If this does not work, call IBM for service.

- **IBM Netfinity SP Switch** x **has been found** (where x is the serial number of the IBM Netfinity SP Switch)

  The IBM Netfinity SP Switch is powered on and operational.

The following messages are generated by a node running the IBM Netfinity SP Switch Administrator software:

- **Resigning switch primaryship.** x (where x is the node name)

  The node is unable to continue functioning as the primary node. If the switch fabric was restarted and a different node selected as the primary node, the current primary node would no longer function as the primary node. No action is required from the user unless a new primary node fails to take control of the switch fabric.

- **Possible protocol problem on node. No data traffic on switch.**

  There is a problem with the device driver or the start fabric command has failed. Restart the node to reattach it to the switch fabric. If this fails, call IBM for service.

- **Primary backup node not responding. Current primary backup node number** x (where x is the node number).

  The primary node has lost contact with the backup node, so a new backup node is chosen by the IBM Netfinity SP Switch Administrator software. No action is required from the user. Determine the problem with node x and restart the node.

- **Switch to Switch links not initialized during Estart.**

For a 12 node configuration, one of the links between switch card A or switch card B is not functioning. For a 14 node configuration, the link between switch card A and switch card B is not functioning. Ensure that the IBM Netfinity SP Host adapters are cabled correctly to the IBM Netfinity SP Switch, and the IBM Netfinity SP Switch cables are functioning correctly. Verify that all physical cable connections correspond to the wiring instructions on the Fabric Properties window

– **Could not communicate over the switch. Switch service DBupdate broadcast failed.**

A temporary error occurred. Retry the operation. If the problem persists, restart the node and move the primary to another node in the cluster. If this does not fix the problem, call IBM for service.

– **Switch adapter hardware/microcode error.**

A temporary error has occurred. Run diagnostics on the IBM Netfinity SP Host adapter. If the IBM Netfinity SP Host adapter fails diagnostic testing, call IBM for service.

– **Switch adapter error threshold exceeded.**

Ensure that the IBM Netfinity SP Host adapter cables are tightly connected. If this does not solve the problem, replace the cable displayed in the error message.

– **Switch service failed to generate routes.**.

Restart the IBM Netfinity SP Switch and the node receiving the failure. If the problem persists, call IBM for service.

– **Could not communicate with switch adapter.**

Check for loose IBM Netfinity SP Host adapter cables. Ensure that the failing node is online, and the switch fabric is started. Verify that all physical cable connections correspond to the wiring instructions on the Fabric Properties window

– **Switch port cannot be disabled** `frame-number slot-number switch-chip-id port-mask`**.**

The IBM Netfinity SP Switch has failed or the IBM Netfinity SP Host adapter attached to the listed switch port has failed. Run diagnostics on the IBM Netfinity SP Host adapter that appears to have failed. If the IBM Netfinity SP Host adapter fails the diagnostic tests, call IBM for service.

– **Switch cable mis-wired.**

A cabling error has been detected in the switch fabric. Ensure that each IBM Netfinity SP Host adapter is cabled correctly. Verify that all physical cable connections correspond to the wiring instructions on the Fabric Properties window

– **Switch board hardware error.** `frame-number slot-number`

Switch card A or switch card B has failed. Call IBM for service.

Configuring a switch fabric using eight IBM Netfinity SP Host adapters on a single switch card

> **Notes:**
>
> 1. The selected node is used as the primary node.
>
> 2. Assign one node to the switch fabric. All other unassigned nodes that are members of the cabled hardware topology are assigned to the switch fabric when it is started.
>
> 3. The switch fabric name must be unique.

From the IBM Netfinity SP Switch Administrator window:

1. Using the right mouse button, click a node in the Unassigned nodes list to assign the node to the switch fabric.
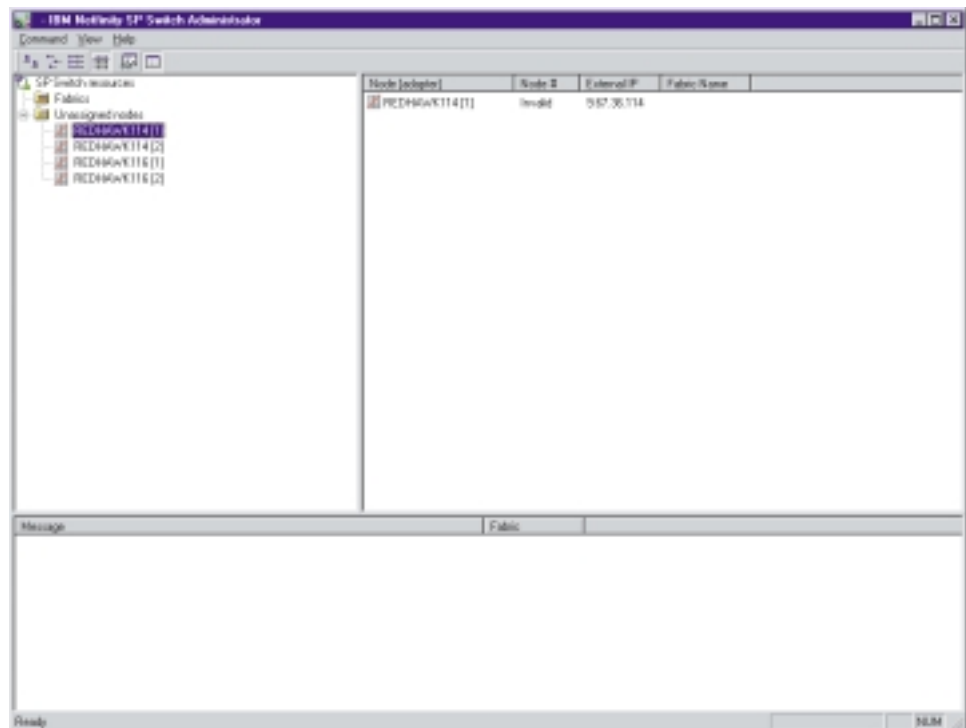
2. Click **Assign fabric name**.

3. The Assign fabric name window opens.

4. Type the name of the IBM Netfinity SP Switch fabric that you want to use. The node that you selected is assigned to this switch fabric.

5. Click **OK**.

   The IBM Netfinity SP Switch Administrator window displays the switch fabric.
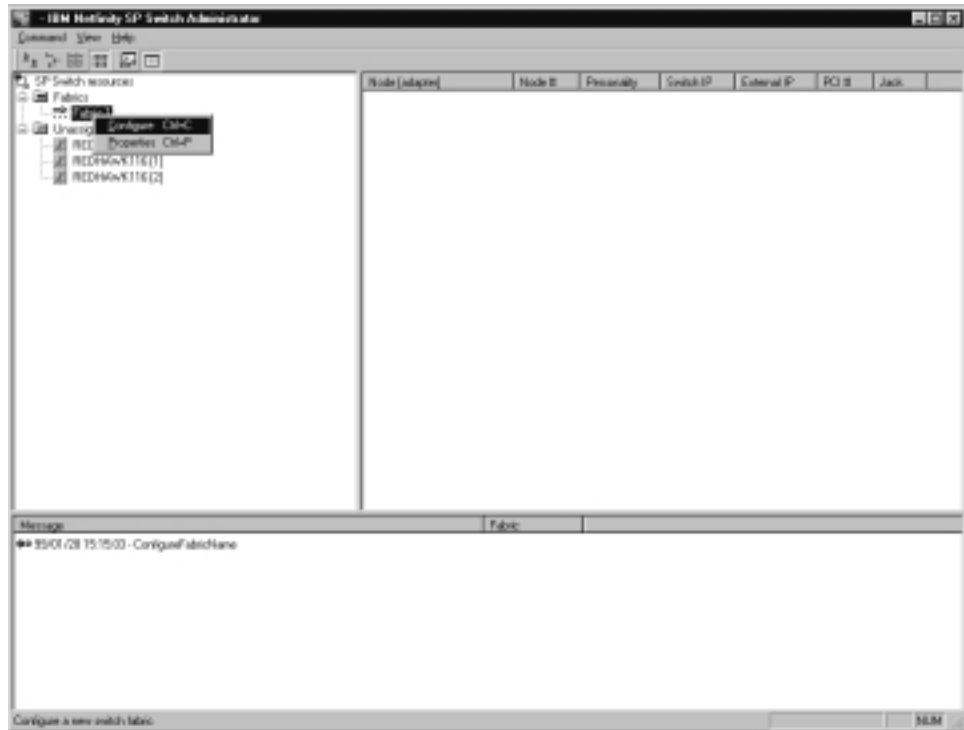
6. Using the right mouse button, click your fabric name under the Fabrics folder.

7. Click **Configure**.

8. The Configure Topology window opens.
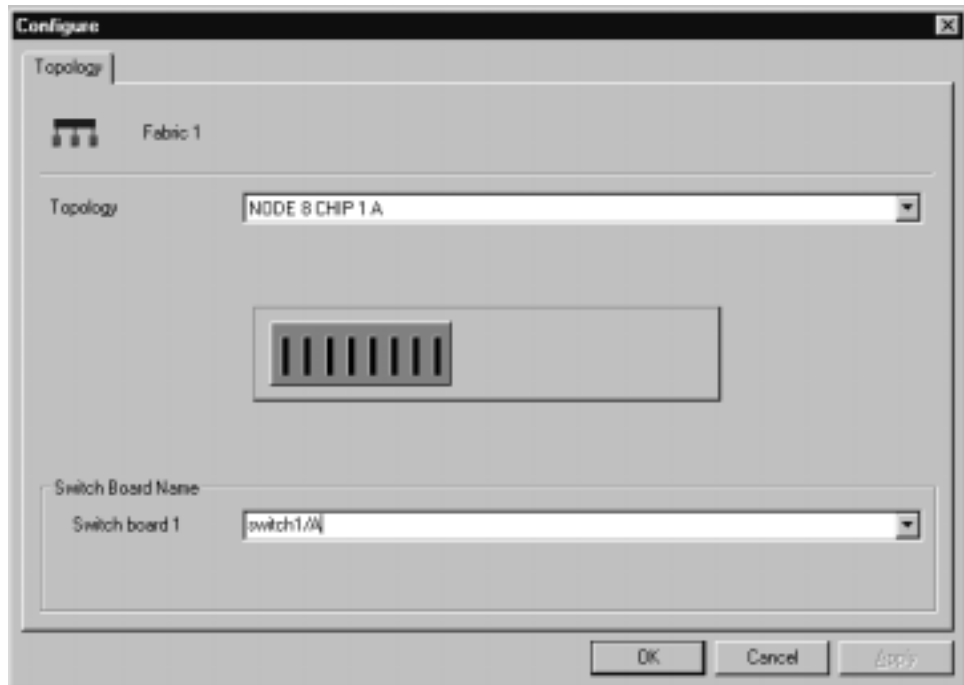
This figure represents a possible eight-node configuration (using one IBM Netfinity SP Host adapter in each node) or a four-node configuration (using two IBM Netfinity SP Host adapters in each node).

9. Select the eight-node configuration from the Topology pull-down list.

10. Type the switch board name that correctly represents your IBM Netfinity SP Switch and IBM Netfinity SP Host adapter wiring configuration. The name can be a total of 18 characters. The last two characters must be /A. The A corresponds to the side of the IBM Netfinity SP Switch where the switch card and interposers are installed. A1 through A8 is stamped above the interposers.

11. Click **OK**.

12. The Wiring Instructions window opens.

Use the cabling instructions in this window as a guide for the IBM Netfinity SP Host adapter connections from your nodes to the switch card connections (interposers) on your IBM Netfinity SP Switch.

13. Loosen the two thumbscrews holding the two cable-retaining bars on the cable-management tray on the IBM Netfinity SP Switch (one thumbscrew on each cable-retaining bar) and remove the cable-retaining bars. You will replace the cable-retaining bars after you have cabled each node to the IBM Netfinity SP Switch.

14. Using an IBM Netfinity SP Switch cable, attach one end of the cable to the IBM Netfinity SP Host adapter.

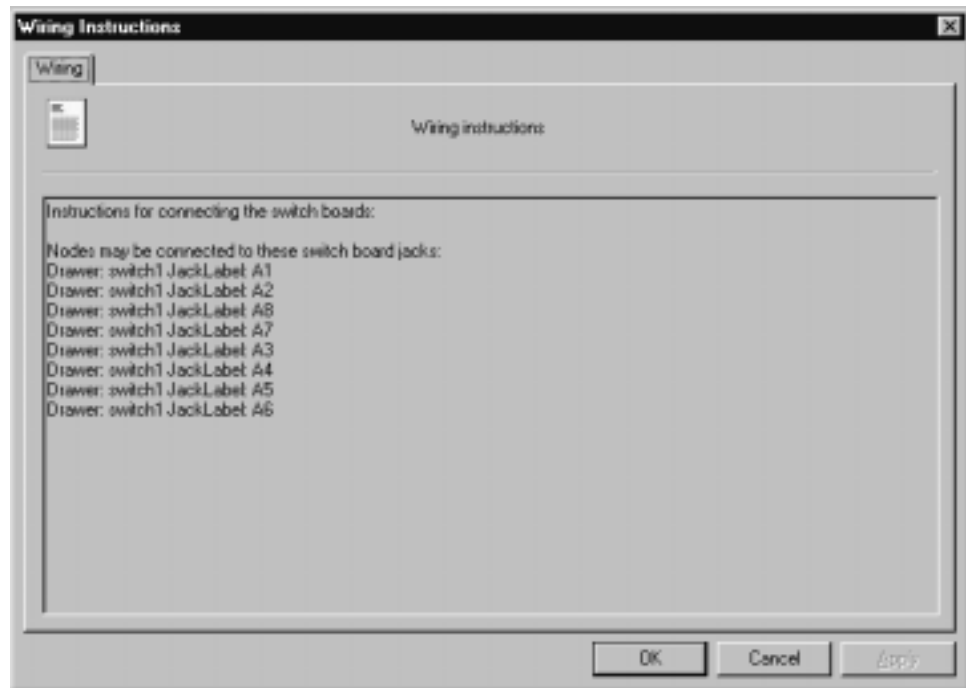15. Lay the other end of the IBM Netfinity SP Switch cable across the cable-retaining block and attach the 50-pin connector to an available interposer card on the rear of the IBM Netfinity SP Switch.

16. Repeat steps 14 and 15 for each cable that you want to attach.

17. Replace the cable-retaining bars.

18. Click **OK**.

You are returned to the IBM Netfinity SP Switch Administrator window. The switch fabric is configured and is ready to be brought online.
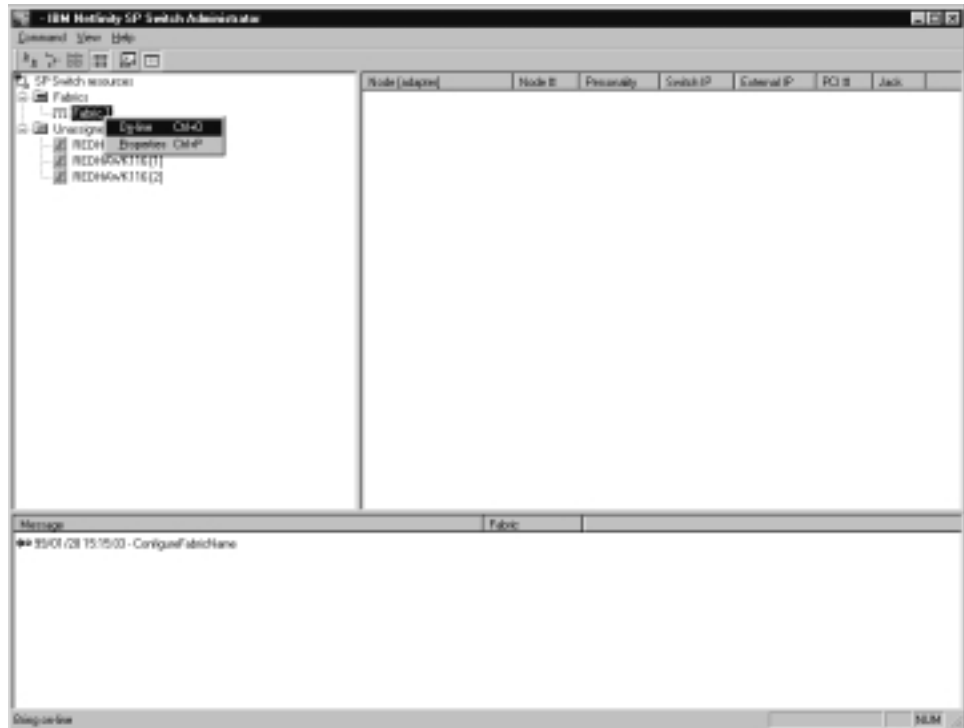
19. Using the right mouse button, click your switch fabric name and click **On-line**. The Start Fabric window opens.
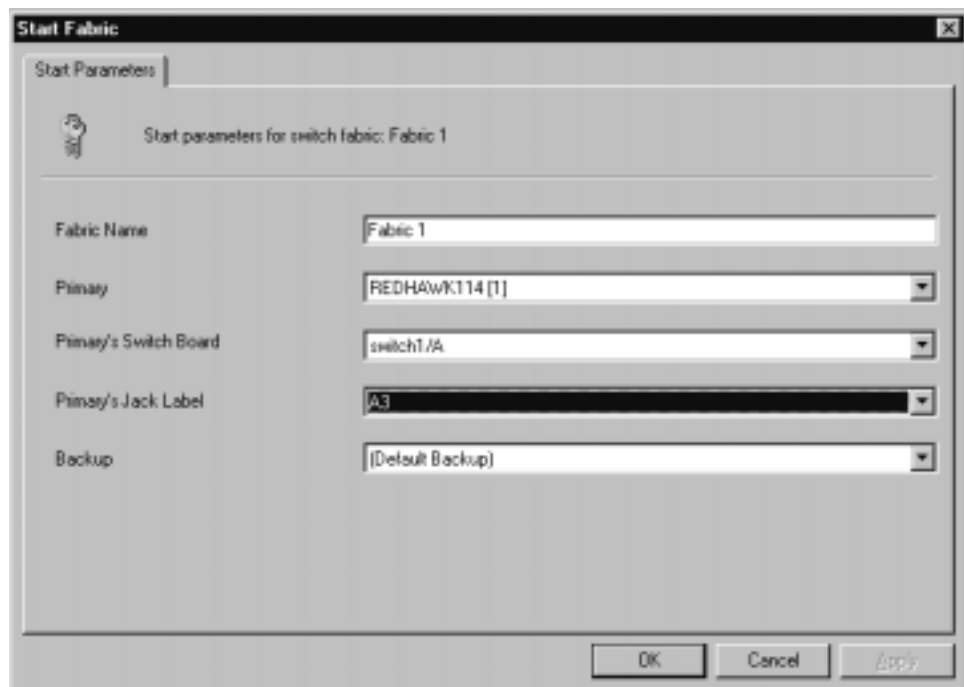
20. In the Fabric Name field, type the fabric name that you assigned in step 2 on page 35.

21. In the Primary field, choose the node that you selected in step 1 on page 35. If you want to assign another primary node, you must assign another node to your switch fabric. See step 1 on page 35 for instructions on assigning nodes to a switch fabric.

22. Select the switch board from the Primary's Switch Board pull-down list.

23. Select the jack label from the Primary's Jack Label pull-down list.

24. Select a new backup node name from the Backup pull-down list (or keep the default name).

25. Click **OK**.

26. The **IBM Netfinity SP Switch Administrator Autostart** pop-up window opens.

27. Click:

   * **Yes** to enable the primary node as the **Autostart** node (only one node can be designated as the **Autostart** node). If the fabric is shut-down (the switch fabric is off-line), or if the fabric is not started, the autostart node starts the IBM Netfinity SP Switch fabric automatically, without the necessity of issuing a **Start** command from the IBM Netfinity SP Switch Administrator.
   * **No** to remove the autostart option from any node in the IBM Netfinity SP Switch fabric. The **Start** command must be issued manually from the IBM Netfinity SP Switch Administrator to start the fabric, if the fabric is shut-down (the switch fabric is off-line).

The IBM Netfinity SP Switch is now configured and started. The IBM Netfinity SP Switch Administrator window displays the nodes attached to the switch fabric

Configuring a switch fabric using 12 IBM Netfinity SP Host adapters on dual switch cards

Notes:

1. The IBM Netfinity SP Switch Card Option is required to support this configuration.

2. The selected node is used as the primary node.

3. Assign one node to the switch fabric. All other unassigned nodes that are members of the cabled hardware topology are assigned to the switch fabric when it is started.

4. The switch fabric name must be unique.

From the IBM Netfinity SP Switch Administrator window:

1. Using the right mouse button, click a node in the Unassigned nodes list to assign the node to the switch fabric.

2. Click **Assign fabric name**.

3. The Assign fabric name window opens.

4. Type the name of the IBM Netfinity SP Switch fabric that you want to use. The node selected is assigned to this switch fabric.

5. Click **OK**.

   The IBM Netfinity SP Switch Administrator window displays the switch fabric.
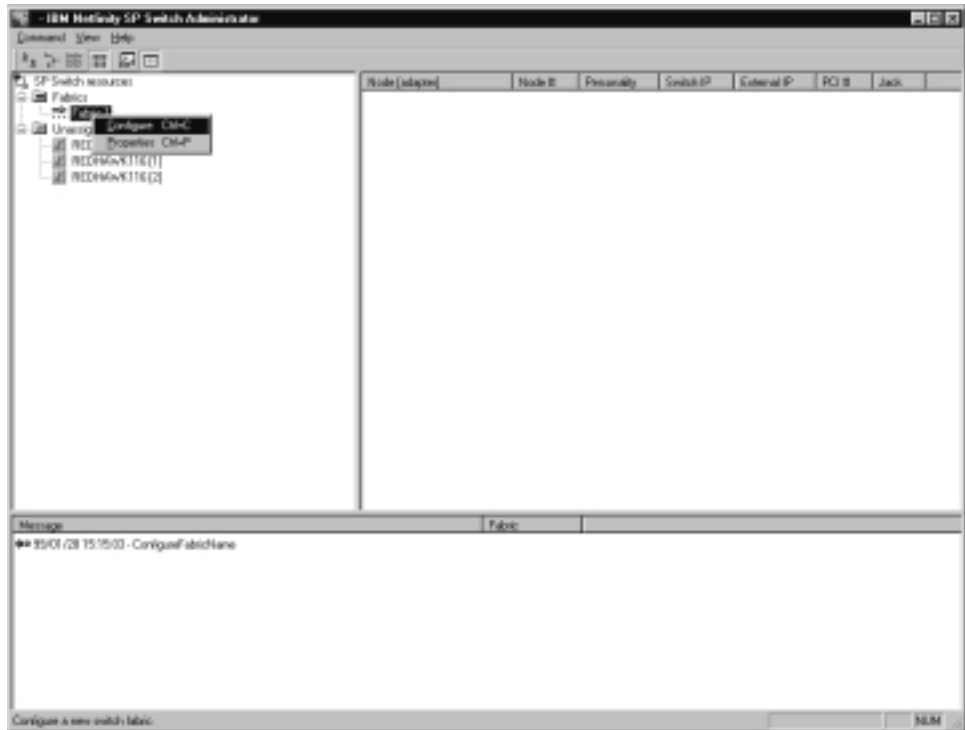
6. Using the right mouse button, click your fabric name under the Fabrics folder.

7. Click **Configure**.

8. The Configure Topology window opens.
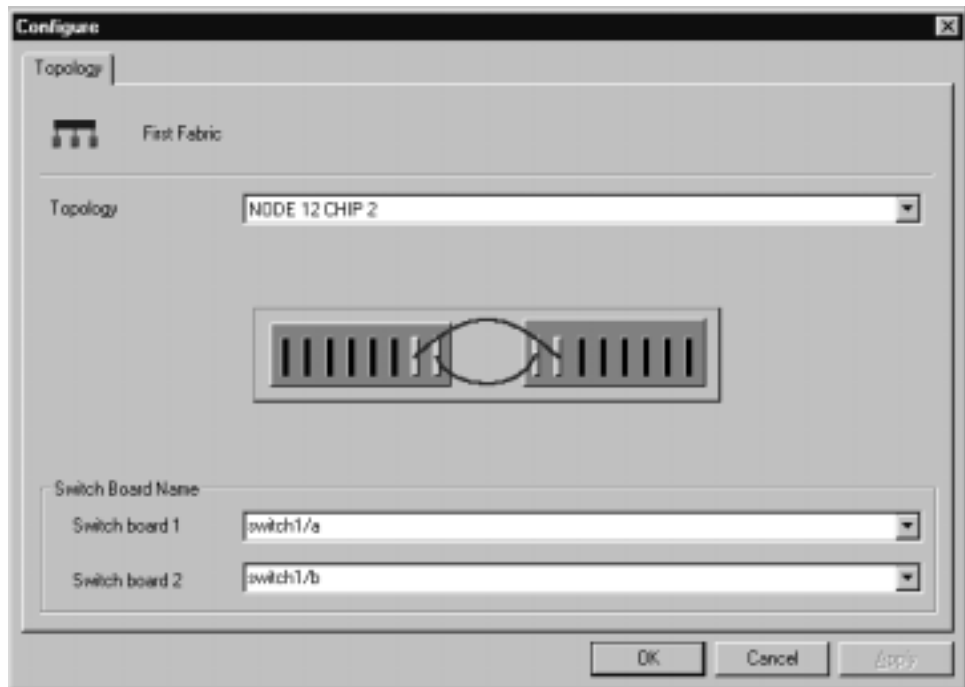
This figure represents a possible 12-node configuration on two switch cards with two IBM Netfinity SP Host adapters and two IBM Netfinity SP 0.53 M cables. The second IBM Netfinity SP 0.53 M cable provides improved network throughput for the switch cards.

9. Select the 12-node configuration from the Topology pull-down list.

10. Type the switch board name that correctly represents your IBM Netfinity SP Switch. The name can be a total of 18 characters. The last two characters must be /A or /B. The A or B corresponds to the side of the IBM Netfinity SP Switch where the switch cards and interposers are installed. A1 through A8 and B1 through B8 are stamped into the rear of the IBM Netfinity SP Switch above the installed interposers.

11. Cable one end of the first 0.53 M cable to port A7 and the other end of the cable to port B2. Cable one end of the second 0.53 M cable to port A8 and the other end of the cable to port B1 as specified in the wiring diagram window.

12. Click **OK**.

13. The Wiring Instructions window opens.

Use the cabling instructions in this window as a guide for the IBM Netfinity SP Host adapter connections from your nodes to the switch card connections (interposers) on your IBM Netfinity SP Switch.

14. Loosen the two thumbscrews holding the two cable-retaining bars on the cable-management tray on the IBM Netfinity SP Switch (one thumbscrew on each cable-retaining bar) and remove the cable-retaining bars. You will replace the cable-retaining bars after you have cabled each node to the IBM Netfinity SP Switch.

15. Using an IBM Netfinity SP Switch cable, attach one end of the cable to the IBM Netfinity SP Host adapter.

16. Lay the other end of the IBM Netfinity SP Switch cable across the cable-retaining block and attach the 50-pin connector to an available interposer card on the rear of the IBM Netfinity SP Switch.

17. Repeat steps 15 and 16 for each cable that you want to attach.

18. Replace the cable-retaining bars.

19. Click **OK**. You are returned to the IBM Netfinity SP Switch Administrator window. The switch fabric is configured on both IBM Netfinity SP Host adapters

and is ready to be brought online. Power-off and then power-on the IBM Netfinity SP Switch to reset the internal switch clock and synchronize the two switch cards.
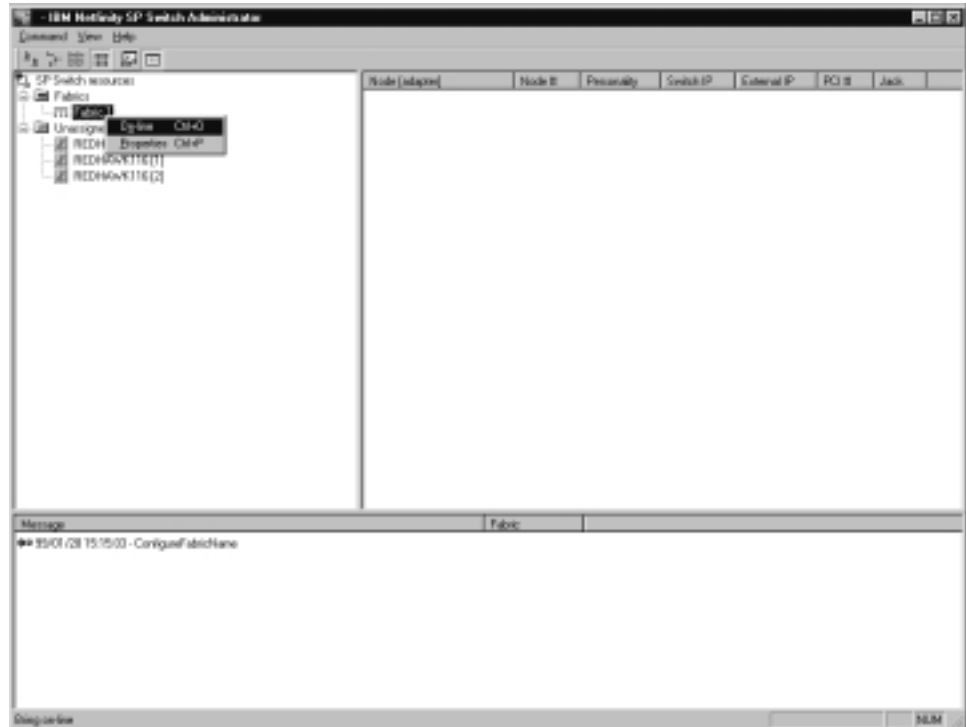
20. Using the right mouse button, click your switch fabric name and click **On-line**.

21. The Start Fabric window opens.
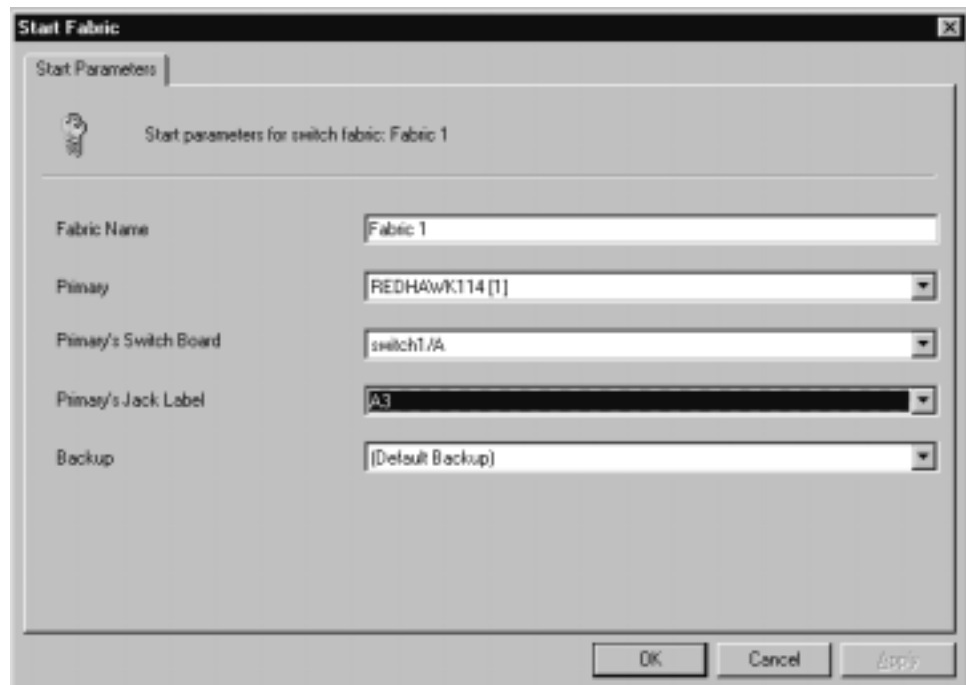
22. In the Fabric Name field, type the fabric name that you assigned in step 2 on page 40.

23. In the Primary field, select the node that you chose in step 1 on page 39. If you want to assign another primary node, you must assign another node to your switch fabric. See step 1 on page 39 for instructions on assigning nodes to a switch fabric.

24. Select the switch board from the Primary's Switch Board pull-down list.

25. Select the jack label from the Primary's Jack Label pull-down list.

26. Select a new backup node name from the Backup pull-down list (or keep the default name). The primary and backup nodes must not be the same.

27. Click **OK**.

28. The **IBM Netfinity SP Switch Administrator Autostart** pop-up window opens.

29. Click:

   • **Yes** to enable the primary node as the **Autostart** node (only one node can be designated as the **Autostart** node). If the fabric is shut-down, (the switch fabric is off-line), or if the fabric is not started, the autostart node starts the IBM Netfinity SP Switch fabric automatically, without the necessity of issuing a **Start** command from the IBM Netfinity SP Switch Administrator.
   • **No** to remove the autostart option from any node in the IBM Netfinity SP Switch fabric. The **Start** command must be issued manually from the IBM Netfinity SP Switch Administrator to start the fabric, if the fabric is shut-down (the switch fabric is off-line).

The IBM Netfinity SP Switch is now configured and started. The IBM Netfinity SP Switch Administrator window displays the nodes attached to the switch fabric.

Configuring a switch fabric using 14 IBM Netfinity SP Host adapters on dual switch cards

> **Notes:**
>
> 1. The IBM Netfinity SP Switch Card Option is required to support this configuration.
>
> 2. The selected node is used as the primary node.
>
> 3. Assign one node to the switch fabric. All other unassigned nodes that are members of the cabled hardware topology are assigned to the switch fabric when it is started.
>
> 4. The switch fabric name must be unique.

From the IBM Netfinity SP Switch Administrator window:

1. Using the right mouse button, click a node in the Unassigned nodes list to assign the node to the switch fabric.

2. Click **Assign fabric name**.

3. The Assign fabric name window opens.

4. Type the name of the IBM Netfinity SP Switch fabric that you want to use. The node name that you typed is assigned to this switch fabric.

5. Click **OK**.

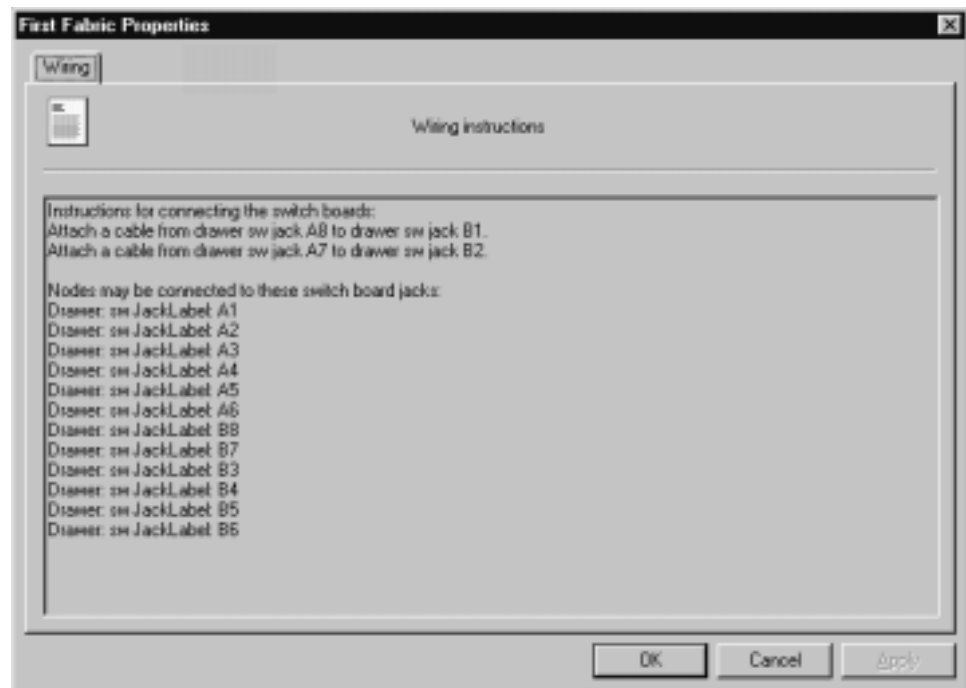   The IBM Netfinity SP Switch Administrator window displays the switch fabric.
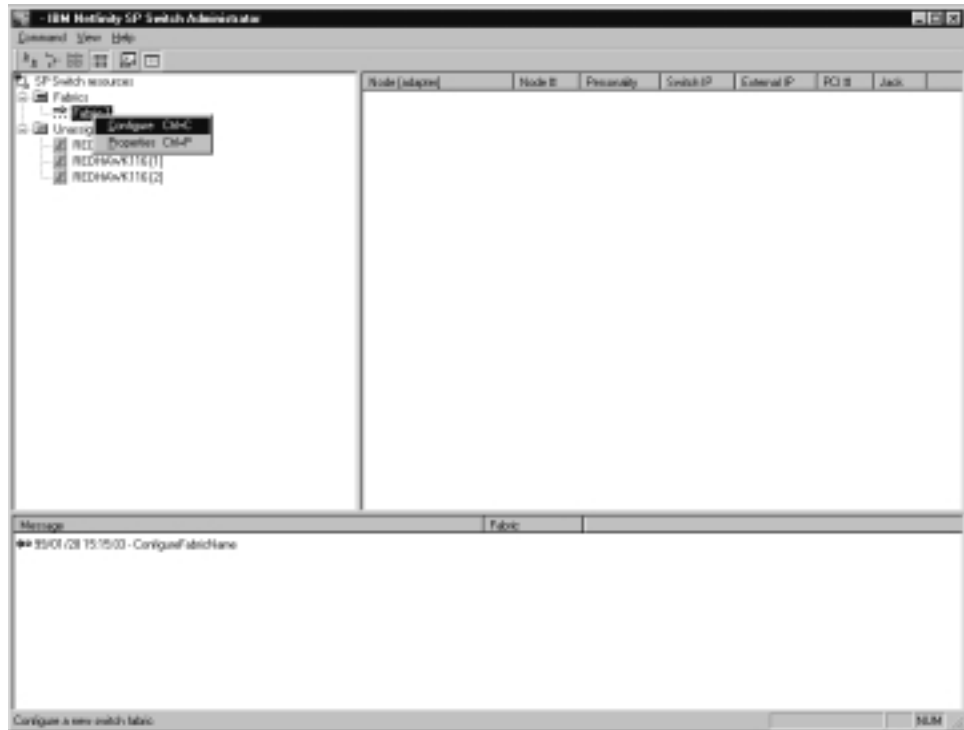
6. Using the right mouse button, click your fabric name under the Fabrics folder.

7. Click **Configure**.

8. The Configure Topology window opens.
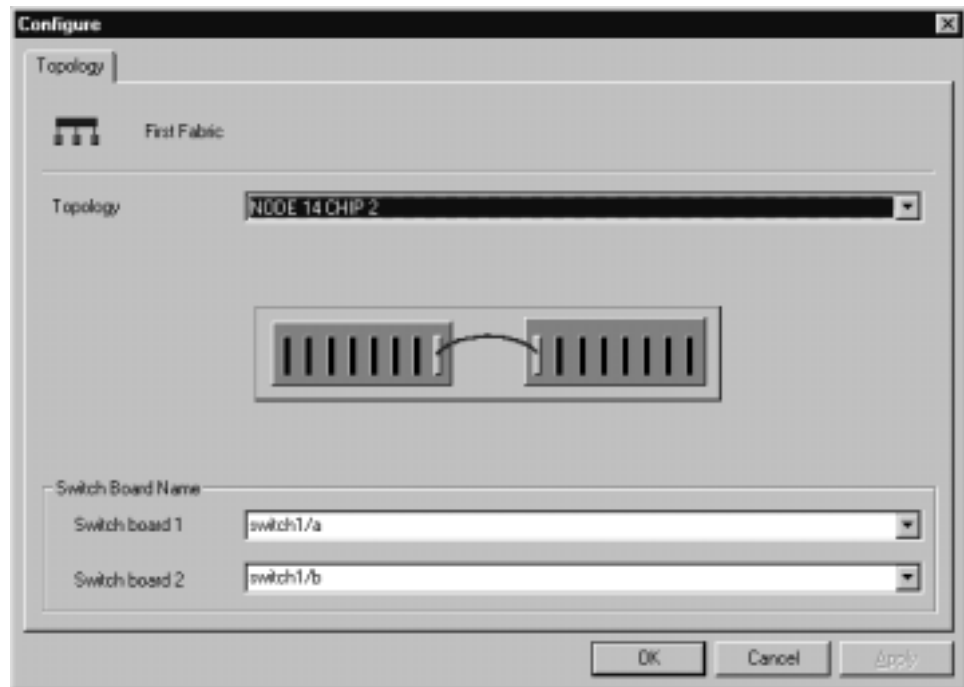
This figure represents a possible 14-node configuration on two switch cards with two IBM Netfinity SP Host adapters and one IBM Netfinity SP 0.53 M cable.

9. Select 14-node configuration from the Topology pull-down list.

10. Type the switch board name that correctly represents your IBM Netfinity SP Switch. The name can be a total of 18 characters. The last two characters must be `/A` or `/B`. The `A` or `B` corresponds to the side of the IBM Netfinity SP Switch where the switch cards and interposers are installed. `A1` through `A8` and `B1` through `B8` are stamped into the rear of the IBM Netfinity SP Switch above the installed interposers.

11. Cable one end of the 0.53 M cable to port `A8` and the other end of the cable to port `B1` as specified in the wiring diagram window.

12. Click **OK**.

13. The Wiring Instructions window opens.

Use the cabling instructions in this window as a guide for the IBM Netfinity SP Host adapter connections from your nodes to the switch card connections (interposers) on your IBM Netfinity SP Switch.

14. Loosen the two thumbscrews holding the two cable-retaining bars on the cable-management tray on the IBM Netfinity SP Switch (one thumbscrew on each cable-retaining bar) and remove the cable-retaining bars. You will replace the cable-retaining bars after you have cabled each node to the IBM Netfinity SP Switch.

15. Using an IBM Netfinity SP Switch cable, attach one end of the cable to the IBM Netfinity SP Host adapter.

16. Lay the other end of the IBM Netfinity SP Switch cable across the cable-retaining block and attach the 50-pin connector to an available interposer card on the rear of the IBM Netfinity SP Switch.

17. Repeat steps 15 and 16 for each cable that you want to attach.

18. Replace the cable-retaining bars.

19. Click **OK**. You are returned to the IBM Netfinity SP Switch Administrator window. The switch fabric is configured on both IBM Netfinity SP Host adapters and ready to be brought online. Power-off and then power-on the IBM Netfinity

SP Switch to reset the internal switch clock and synchronize the two switch cards.
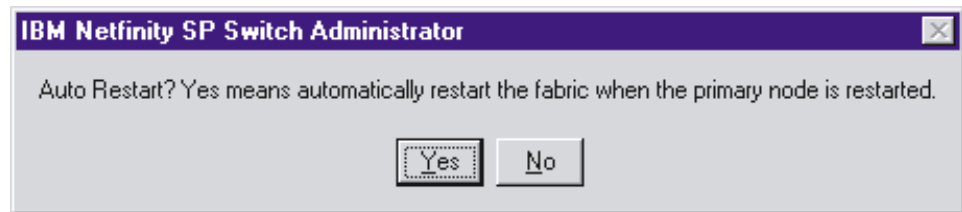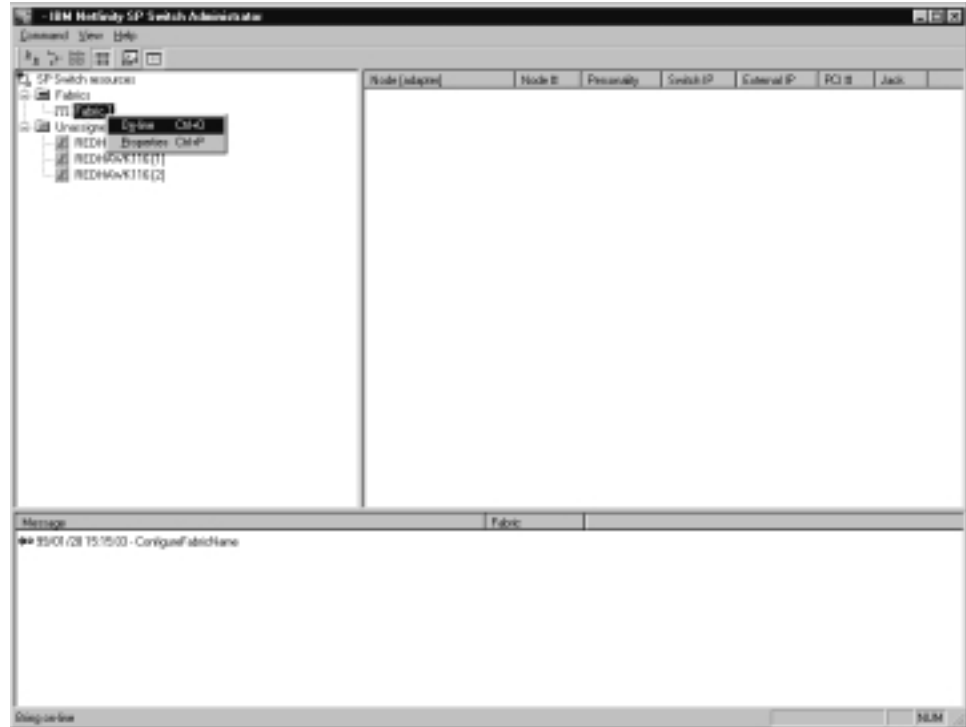

20. Using the right mouse button, click your switch fabric name and click **On-line**.

21. The Start Fabric window opens.
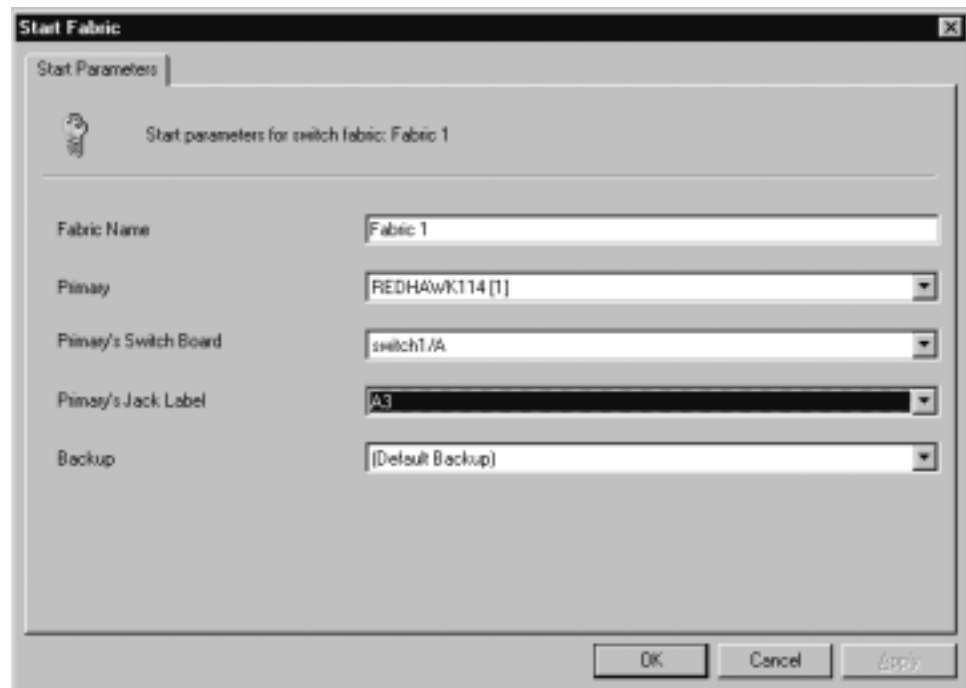
22. In the Fabric Name field, type the fabric name that you assigned in step 2 on page 45.

23. In the Primary field, select the node that you chose in step 1 on page 44. If you want to assign another primary node, you must assign another node to

your switch fabric. See step 1 on page 44 for instructions on assigning nodes to a switch fabric.

24. Select the switch board from the Primary's Switch Board pull-down list.

25. Select the jack label from the Primary's Jack Label pull-down list.

26. Select a new backup node name from the Backup pull-down list (or keep the default name). The primary and backup nodes must not be the same.

27. Click **OK**.

28. The **IBM Netfinity SP Switch Administrator Autostart** pop-up window opens.

29. Click:

   - **Yes** to enable the primary node as the **Autostart** node (only one node can be designated as the **Autostart** node). If the fabric is shut-down (the switch fabric is off-line), or if the fabric is not started, the autostart node starts the IBM Netfinity SP Switch fabric automatically, without the necessity of issuing a **Start** command from the IBM Netfinity SP Switch Administrator.
   - **No** to remove the autostart option from any node in the IBM Netfinity SP Switch fabric. The **Start** command must be issued manually from the IBM Netfinity SP Switch Administrator to start the fabric, if the fabric is shut-down (the switch fabric is off-line).

The IBM Netfinity SP Switch is now configured and started. The IBM Netfinity SP Switch Administrator window displays the nodes attached to the switch fabric.

Using the IBM Netfinity SP Dependency Manager

The Dependency Manager allows you to build a dependency list to prevent certain services or applications from executing until your IBM Netfinity SP Host adapter device drivers are started.

The following service must be started after the IBMTB3_IP_0 (and IBMTB3_IP_1 if you have installed two IBM Netfinity SP Host adapters), if you have installed IBM Netfinity Advanced Cluster Enabler for Oracle Parallel Service (OPS) V. 2.0.0:

- OracleNMService

The following service must be started after the IBMTB3_IP_0 (and IBMTB3_IP_1 if you have installed two IBM Netfinity SP Host adapters), if you have installed IBM Netfinity Availability Extensions for Microsoft Cluster Service (MSCS):

- IBMCS
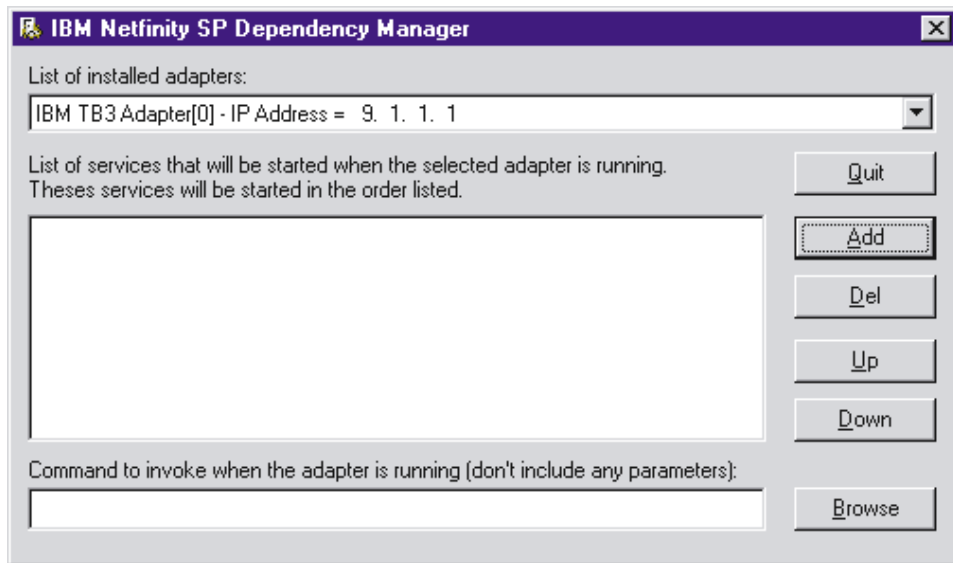
To build a dependency list:

1. From the list of installed adapters, select an adapter to create a dependency. If more than one adapter is installed, and the adapters are connected to different switch fabrics, select each adapter separately to build a dependency list. If you have a single adapter, or if multiple adapters are connected to the same switch fabric, select only one of the adapters to create your dependency list.

2. Click **Add** to bring-up a list of services. Select one or more services that you want to add to your dependency list. The services that you add will be started as **Manual**, instead of **Automatic** or **Disabled**.

3. Click **Browse** to select an application instead of a service to be run after the IBM Netfinity SP Host adapter device drivers have started.

4. Click the exit button, close the window and exit the Dependency Manager window, or click the **Quit** button.

5. Click **Yes** in the **IBM Netfinity SP Dependency Manager** pop-up window to save your selections and exit.

6. Click **Yes** to the confirmation pop-up window.

   The dependencies will take effect when the dependent services are stopped and restarted.

Managing the IBM Netfinity SP Switch fabric

Notes:

1. Do not run the IBM Netfinity SP Switch Administrator software from a secondary node if the secondary node does not have an external network adapter.

2. If you issue the **Delete Fabric** command on a switch fabric that contains nodes that are unreachable through your network, you will not be able to permanently delete the switch fabric. If the disabled node is brought on-line, the IBM Netfinity SP Switch Administrator will recreate the deleted switch fabric and reassign the node to it.

The following commands are available through the IBM Netfinity SP Switch Administrator software to manage your IBM Netfinity SP Switch. These switch fabric commands are run from the IBM Netfinity SP Switch Administrator menu bar, or by right-clicking your switch fabric or node in the IBM Netfinity SP Switch Administrator window.

- Command

  - **Off-line**: This command can be issued on a switch fabric or on an individual server (node). You can use the Off-line command to take a switch fabric offline. The servers (nodes) attached to this switch fabric cannot be accessed through the IBM Netfinity SP Switch while the switch fabric is offline.

    Using the right mouse button, click a node to perform the same command on a node instead of a switch fabric:

    - **Off-Line:** This command will bring a node offline and stop network IP traffic from flowing through this node

  - **On-line**: This command can be issued on a switch fabric or on an individual server (node). The On-line command brings the switch fabric online and allows the servers (nodes) to send data across the network.

    Using the right mouse button, click a node to perform the same command on a node instead of a switch fabric:

    - **On-Line:** This command will bring a node online and allow network IP traffic to flow through this node

  - **Configure**: This command can be issued on a switch fabric or on a switch card. This command cannot be issued on an individual server (node). The Configure command opens the Configure Topology window. You can configure the IBM Netfinity SP Switch fabric by following the hardware cabling shown in the window.

  - **Properties**: This command can be issued only on a switch fabric and cannot be issued on an individual server (node). The Properties command opens the Fabric Properties Discovery window and lists all of the servers (nodes) attached to the switch fabric and the status of the nodes.

  - **Create Fabric**: This command is issued from a server (node) in the Unassigned Node list. This command opens the Assign Fabric Name window. Servers (nodes) are assigned to this switch fabric and can be used after configuration. The assigned fabric name must be unique (unique to other switch fabrics) and cannot exceed 16 characters in length. All unassigned nodes that are members of the cabled hardware topology are assigned to the switch fabric when the switch fabric is started.

  - **Delete Fabric**: This command is issued on a switch fabric from the Menu Bar or, by using the right mouse button, clicking a switch fabric in the SP Switch Resources window. This command removes the servers (nodes) from the switch fabric and places the nodes in an unassigned node status and deletes the switch fabric. The unassigned nodes can be used to create a new switch fabric.

  - **Exit**: This command closes the IBM Netfinity SP Switch Administrator window. Communication through the IBM Netfinity SP Switch is not interrupted.

- View

– **Toolbar**: You can use this command to toggle the toolbar on or off.

By clicking the icons (located below the menu bar), you can select a direct path or shortcut to the following commands:

- View Large Icons

- View Small Icons

- View Node List

- View Node Details

- View Current Messages

- View All Messages

– **Status Bar**: This command shows or hides the switch fabric status bar located at the bottom of the IBM Netfinity SP Switch Administrator window. The status bar displays the definition of the Menu Bar commands when the mouse pointer highlights the command.

– **Refresh**: This command activates a query on the switch fabric and updates the contents of the IBM Netfinity SP Switch Administrator windows with the latest status of the switch fabric.

– **Large Icons**: This command displays the servers (nodes) in the IBM Netfinity SP Switch Administrator window as large icons.

– **Small Icons**: This command displays the servers (nodes) in the IBM Netfinity SP Switch Administrator window as small icons.

– **List**: This command displays the server (node) names in the IBM Netfinity SP Switch Administrator window.

– **Details**: This command displays the server (node) names in the IBM Netfinity SP Switch Administrator window and displays the server (node):

- Node number

- Personality

- External IP address

- SP switch IP address

- Node PCI slot number

- Jack label

– **All Messages**: This command displays any messages generated from all of the switch fabrics with network connectivity to the node where the IBM Netfinity SP Switch Administrator is running.

– **Current Messages**: This command displays the messages generated from the selected switch fabric that is managed by the IBM Netfinity SP Switch Administrator.

– **Options**: This command opens the Options window so that you can add or remove network IP addresses or host names. These IP addresses or host names are resolved to a subnet mask and expand the search capability for the IBM Netfinity SP Switch Administrator in relation to other switch fabrics and unassigned nodes. The Default language selection on the Options window selects the language conforming to the code page loaded by the Windows NT operating system. The current supported languages are:

- English

- French

- German

- Italian

- Spanish

- Japanese

Click **OK** to save your selections or click **Cancel** to close this window and keep the default selections.
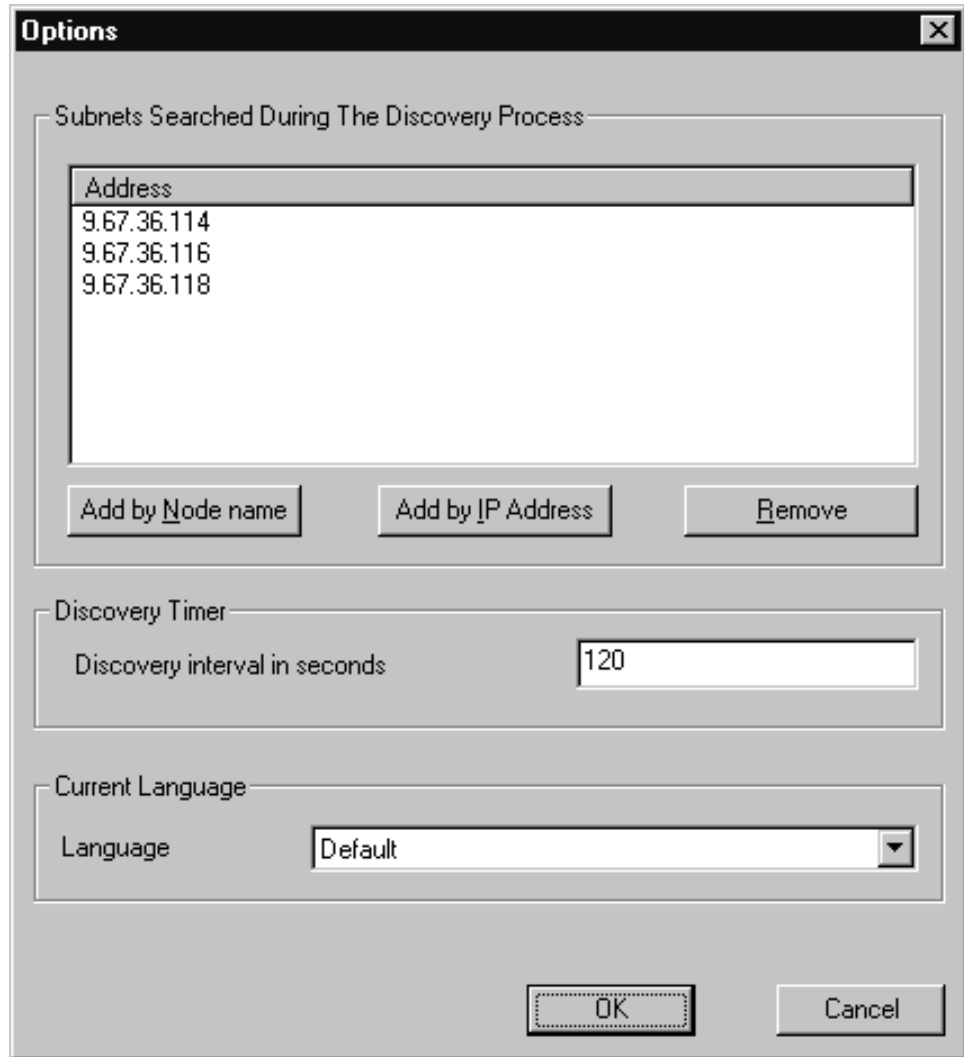
- Help

    - **Help Contents**: This displays a help index.

    - **About**: The version/release of the IBM Netfinity SP Switch Administrator.

Using the IBM Netfinity SP Switch Configuration Utility

> **Important:**
>
> 1. The IBM Netfinity Advanced Systems Management PCI adapter must be installed in your node and its accompanying device drivers installed and operational before using the IBM Netfinity SP Switch Configuration Utility. The latest device drivers are on the IBM WEB site at:
>
>   http://www.ibm.com/pc/support
>
>   a. Click **Servers**.
>
>   b. Under family click **IBM Netfinity 7000 M10**.
>
>   c. Under Technical information click **Downloadable files**.
>
>   d. Download the correct device drivers.
>
>   For more information on your IBM Netfinity Advanced Systems Management PCI adapter, see the *Advanced System Management* section of your server library.
>
> 2. Take the switch fabric offline before you power-off the IBM Netfinity SP Switch through the configuration utility.
>
> 3. The IBM Netfinity SP Switch Configuration Utility is supported on a Netfinity 7000 M10 only.

This section describes the IBM Netfinity SP Switch Configuration Utility. To use the configuration utility, the IBM Netfinity Advanced System Management PCI adapter must be installed in your server with an IBM Netfinity Advanced System Management Interconnect Cable option. Using a standard, customer supplied, 10BaseT Ethernet cable, connect one end of the cable to the RS485 port on the rear of the IBM Netfinity SP Switch, and the other end to the Advanced System Management Interconnect Cable option on your server.
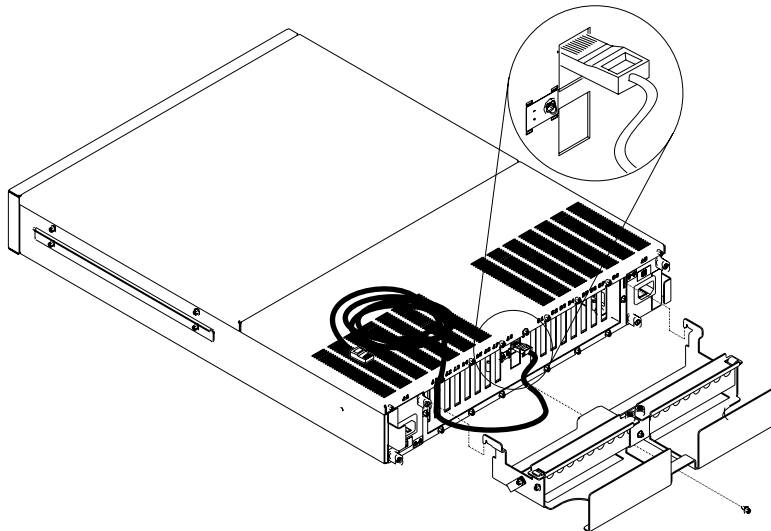
Refer to the *IBM Netfinity Advanced System Management PCI Adapter Installation Instructions* book for information on installing and using the advanced system management adapter.

Refer to the *IBM Netfinity Advanced System Management Interconnect Cable Option* book for information on installing and using the interconnect cable option.

The configuration utility allows communication from a server to an IBM Netfinity SP Switch through the RS485 port and the service processor. The configuration utility:

- Allows the user to set the system switch clock for one cascaded switch fabric per IBM Netfinity SP Switch (master/slave configuration) or two independent eight node switch fabrics (master/master configuration).

    - Master/slave configuration
        1. From the **Switch Configuration Utility**, click **Clock**.
        2. Select **1 fabric (default)**.
    - Master/master configuration
        1. From the **Switch Configuration Utility**, click **Clock**.
        2. Select **2(8 node) fabrics**.

- Displays the status of the IBM Netfinity SP Switch

- Turns power on or turns power off to the IBM Netfinity SP Switch

- Changes the name displayed on the IBM Netfinity SP Switch

- Displays any alerts generated by the IBM Netfinity SP Switch

- Displays all IBM Netfinity SP Switch units attached to the RS485 bus.

To start the IBM Netfinity SP Switch Configuration Utility:

1. Click **Start** → **Programs**.

2. Click the program folder where the IBM Netfinity SP Switch Administrator was installed.

3. Double-click **Switch Configuration Utility**. The Switch Configuration Utility window opens.
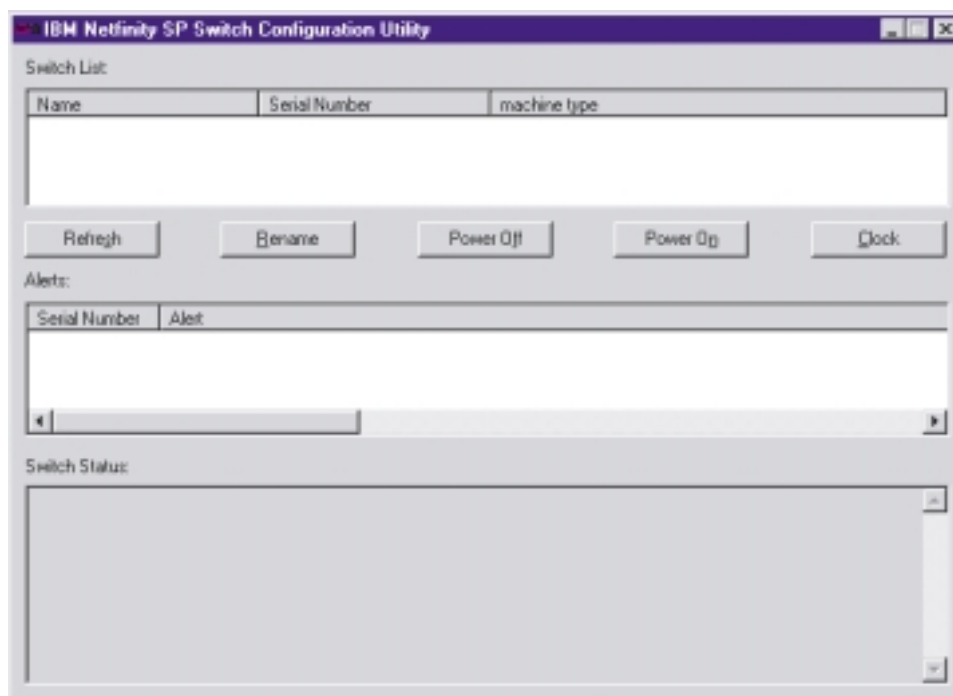
4. Choose the task you wish to perform on the IBM Netfinity SP Switch from the buttons provided. The status messages are displayed in the Switch Status window. Any alerts encountered are displayed in the Alerts window. Press the Refresh button for up-to-date status on the selected switch.

The IBM Netfinity SP Switch can be located at any point within the Advanced System Management (ASM) interconnect network (refer to the *IBM Netfinity Advanced System Management Interconnect Cable Option* book for information and examples of a normal interconnect network). Alerts that are generated by the IBM Netfinity SP Switch are broadcast on the ASM interconnect network, which allows the ASM processor or the PCI adapter on the ASM interconnect network with the necessary communications resources to forward any alerts to a remote system management workstation.

The following example shows a network gateway, which forwards the system management data generated by the IBM Netfinity SP Switch along the ASM interconnect network to a remote system management workstation. Four devices are connected to the ASM interconnect network in the following manner:

- One IBM Netfinity 7000 M10 with an external modem is connected to an IBM Netfinity Advanced System Management PCI adapter.

- The IBM Netfinity 7000 M10 is connected to the IBM Netfinity SP Switch via an IBM Netfinity SP Host adapter and cable.

- Another Netfinity 7000 M10 is connected to the first Netfinity 7000 M10 through the IBM Netfinity Advanced System Management Interconnect Cable Option.

- The second Netfinity 7000 M10 is connected to a third Netfinity 7000 M10 through an Advanced System Management PCI Adapter option and an IBM Netfinity Advanced System Management Interconnect Cable Option.

- The third Netfinity 7000 M10 is connected to a fourth Netfinity 7000 M10 through an Advanced System Management PCI Adapter option and an IBM Netfinity Advanced System Management Interconnect Cable Option.

- The fourth Netfinity 7000 M10 is then connected to the IBM Netfinity SP Switch via an IBM Netfinity SP Host adapter and cable.

The fourth Netfinity 7000 M10 with the Advanced System Management PCI adapter acts as a network gateway, forwarding system management data generated by the IBM Netfinity SP Switch and other systems in the ASM interconnect network bus to a system management administration system connected to the external network. The Netfinity 7000 M10 is configured to use a modem to forward the system management data to the system management administration system as well as providing redundancy in case of an external network failure. The local network management of the IBM Netfinity SP Switch is possible if the IBM Netfinity SP Switch Administrator software is installed and configured using the `Custom` or `Typical` software installation setup type on the Netfinity 7000 M10 systems.

Using the alert functions under the Netfinity Manager software, the Netfinity 7000 M10 can communicate alerts to and from each server in the ring. The Netfinity 7000 M10 can also be configured to send alerts or pages through the external network or modem concerning all of the servers or the IBM Netfinity SP Switch.

Refer to *IBM Netfinity Manager User's Guide* for information on installing and configuring the Netfinity Manager software for generating alerts through the RS485 port.

Changing configurations from one switch fabric to two switch fabrics

The following steps describe changing your SP Switch configuration from one switch fabric to two switch fabrics:

1. From the IBM Netfinity SP Switch Administrator window, issue an **Offline** command to stop the switch fabric in question.

2. From the **Command** menu bar, click **Delete fabric**.

3. Close and exit all Windows programs.

4. Shut-down and power-off all nodes.

5. Change all IBM Netfinity SP Host adapter cables and disconnect the cascaded cable.

6. Power-on all nodes.

7. Launch the IBM Netfinity SP Switch Configuration Utility.

8. From the **Switch Configuration Utility**, click **Clock** and select **2(8 node) fabrics**.

9. Power-off then power-on the IBM Netfinity SP Switch to reset the switch settings.

10. Launch the IBM Netfinity SP Switch Administrator software.

11. Click **Assign fabric name** to name fabric number one and repeat this step to assign a name for fabric number two. Do not issue the **Online** command at this time.

12. Configure fabric number one with an eight node topology. Refer to section " Configuring a switch fabric using eight IBM Netfinity SP Host adapters on a single switch card" on page 35 for configuration instructions for an eight node topology.

13. Configure fabric number two with an eight node topology. Refer to section " Configuring a switch fabric using eight IBM Netfinity SP Host adapters on a single switch card" on page 35 for configuration instructions for an eight node topology.

14. Issue the **Online** command for fabric number one and fabric number two.

15. Ping each node in each fabric to ensure proper network connectivity.

    The IBM Netfinity SP Switch is now configured with two switch fabrics instead of one.

Changing configurations from two switch fabrics to one switch fabric

The following steps describe changing your SP Switch configuration from two switch fabrics to one switch fabric:

1. From the IBM Netfinity SP Switch Administrator window, issue an **Offline** command to stop the switch fabrics in question.

2. From the **Command** menu bar, click **Delete fabric** for both switch fabrics.

3. Close and exit all Windows programs.

4. Shut-down and power-off all nodes.

5. Change all IBM Netfinity SP Host adapter cables and connect the cascaded cable.

6. Power-on all nodes.

7. Launch the IBM Netfinity SP Switch Configuration Utility.

8. From the **Switch Configuration Utility**, click **Clock** and select **1 fabric (default)**.

9. Power-off then power-on the IBM Netfinity SP Switch to reset the switch settings.

10. Launch the IBM Netfinity SP Switch Administrator software.

11. Click **Assign fabric name** to name your new single switch fabric. Do not issue the **Online** command at this time.

12. Configure the single switch fabric with a 12 or 14 node topology. Refer to section "Configuring a switch fabric using 12 IBM Netfinity SP Host adapters on dual switch cards" on page 39 for configuration instructions for a 12 node topology or section "Configuring a switch fabric using 14 IBM Netfinity SP Host adapters on dual switch cards" on page 44 for configuration instructions for a 14 node topology.

13. Issue the **Online** command for your new single switch fabric.

14. Ping each node in the switch fabric to ensure proper network connectivity.

    The IBM Netfinity SP Switch is now configured with a single switch fabric.

Using the Switch Port Reservation Utility

This section describes the IBM Netfinity SP Switch Port Reservation Utility.

To start the Switch Port Reservation Utility:

1. Click **Start** → **Programs**.

2. Click the program folder where the IBM Netfinity SP Switch Administrator was installed.

3. Double-click **Switch Port Reservation Utility**. The IBM Netfinity SP Switch Port Reservation Utility window opens.
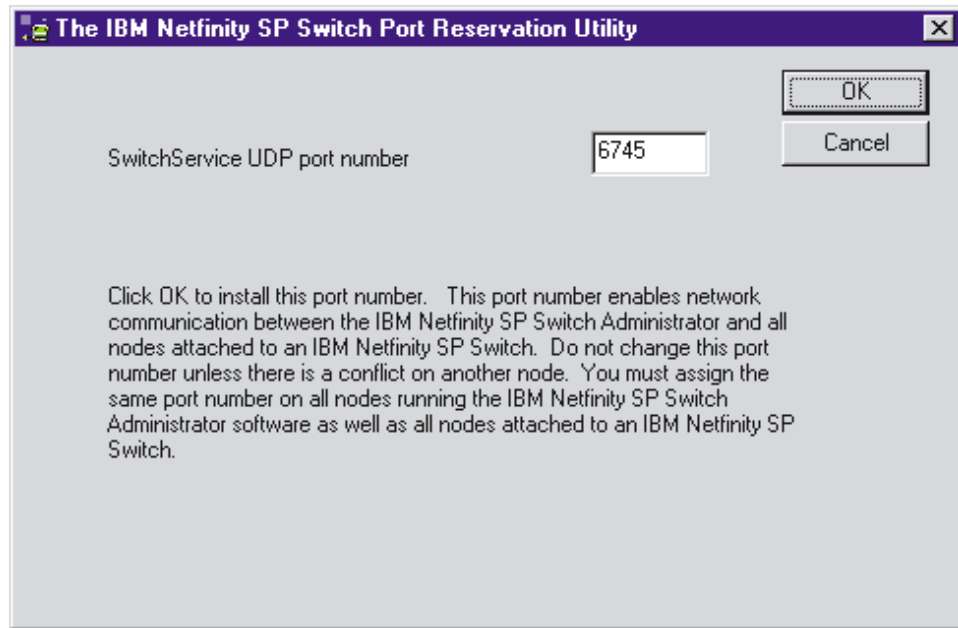
The IBM Netfinity SP Switch software uses your TCP/IP Services file to allow network access to the switch fabric services. A default port number of 6745 is used. If this port number is not available in your TCP/IP Services file, use the port reservation utility to assign a new port number for the IBM Netfinity SP Switch Administrator software. The same port number must be used on all servers (nodes).

Diagnostics

> **Important:** The IBM Netfinity SP Switch diagnostics test the IBM Netfinity SP Host adapter, not the connections and links to the cluster or the IBM Netfinity SP Switch.

The following instructions describe starting and running the IBM Netfinity SP Host adapter diagnostics. To start the IBM Netfinity SP Host adapter diagnostics:

1. Click **Start** → **Programs**.

2. Click the program folder where the IBM Netfinity SP Switch Administrator was installed.

3. Double-click **PC-Doctor**. The OK to Continue with Diagnostics window opens.
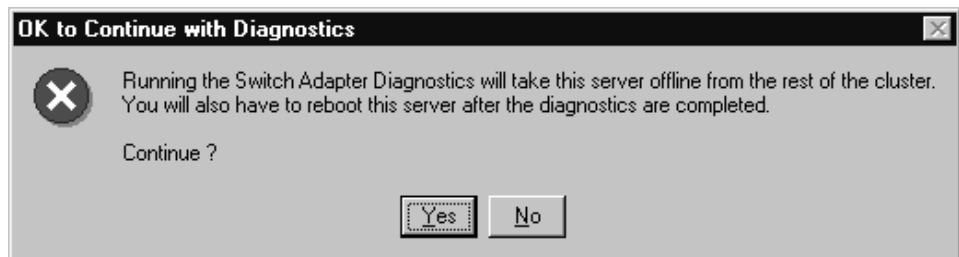
4. Take the server (node) offline from the cluster. The diagnostic tests are run only on the IBM Netfinity SP Host adapter and the IBM Netfinity SP Switch cable on the individual server (node) and not on the entire cluster. When the

diagnostic tests are complete, you must restart the server (node) to reconnect to the cluster.

5. Click **Yes** on the OK to Continue with Diagnostics window. The following diagnostic window opens.
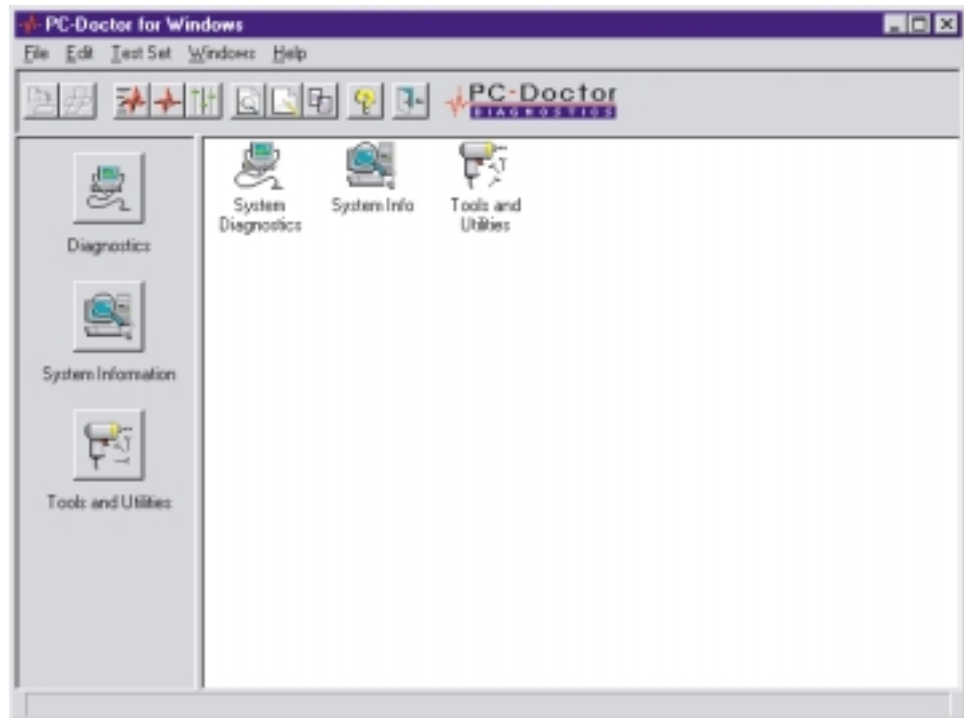
6. Click the **Diagnostics** icon on the left of the PC-Doctor for Windows window to add the **Switch Adapter** icons to the diagnostics window. The diagnostics window is updated with the switch adapter icons.
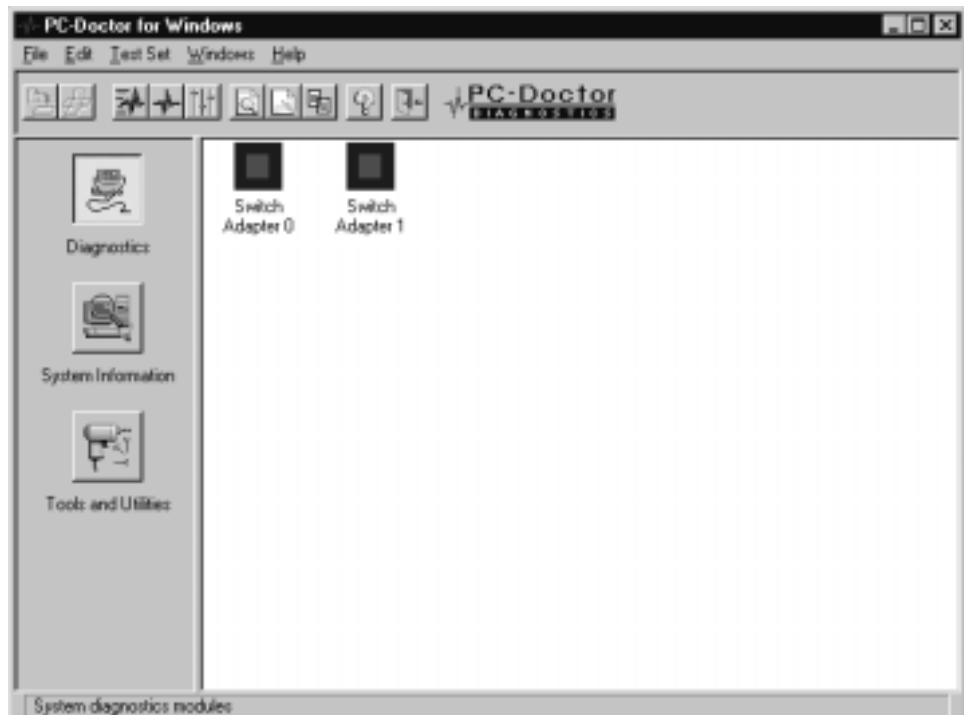
7. You can run the IBM Netfinity SP Host adapter diagnostic tests collectively or selectively. To collectively run all diagnostic tests that have been defined for the IBM Netfinity SP Host adapter, Double-click the **Switch Adapter** icon representing the IBM Netfinity SP Host adapter you want to test (switch adapter 0 or switch adapter 1). To run the IBM Netfinity SP Host adapter diagnostic tests selectively, continue with the next step.

8. From the PC-Doctor for Windows screen tool bar, click **Test Set**, and click one of the following options:

   - **Run Quick Test Set**: This option is designed to run test modules in a mode that offers maximum diagnostic coverage in the minimum amount of time.

   - **Run Normal Test Set**: This option is a complete set of all diagnostic tests. The normal tests run all test modules including the External Wrap Test which requires that you uncable the IBM Netfinity SP Switch and insert a cable wrap plug onto the IBM Netfinity SP Switch cable.

   Note: The External Wrap Test will not be run in the **Run Quick Test Set** option.

To customize the settings and types of diagnostic tests, click **TestSet** → **Custom Test Settings** The selected test components are run when you select the **Run Quick Test Set** or the **Run Normal Test Set** options. The test sets are chosen when you click on the **Details** buttons.

To browse the log of all test results and events collected during the execution of each test module, from the PC-Doctor for Windows screen Tool Bar, click **Windows** → **Testlog**

Troubleshooting the IBM Netfinity SP Switch

The following tables list some problems that might occur. The first column contains a description of the problem. The second column contains a brief explanation of the problem. The last column provides a course of action to resolve the problem. These tables cover the System Diagnostics and IBM Netfinity SP Switch Administrator software for the IBM Netfinity SP Switch.

Diagnostic Problems

Problem	Explanation	Action
Switch Adapter Configuration/Setup Error - error code 425-027-*XXX*.	The device driver cannot be opened.	Install the device driver; then shut down and restart the server (node).
Switch Adapter test has failed - error code 425-25X-XXX.	The server cannot connect to or recognize the IBM Netfinity SP Switch because the device driver or the diagnostic software has failed.	1. Reinstall the device driver. 2. Reinstall the diagnostic software.
Switch Adapter test has failed - error code 425-26X-*XXX*.	An IBM Netfinity SP Host adapter has failed.	Replace the IBM Netfinity SP Host adapter.

Event Problems

Problem	Explanation	Action
The server (node) cannot communicate with another node, but the node is listed as part of the cluster in the IBM Netfinity SP Switch Administrator software.	This node is disconnected from the IBM Netfinity SP Switch, or there is a problem with the IBM Netfinity SP Switch Administrator software, or there is something wrong with the IBM Netfinity SP Host adapter.	1. Verify the physical cable connections between the node and the IBM Netfinity SP Switch. 2. Verify that the node is online in the IBM Netfinity SP Switch Administrator software. 3. Under the Windows NT Services panel, determine that the IBM Netfinity SP Switch Administrator software is running. 4. Turn off the IBM Netfinity SP Switch (to recycle the IBM Netfinity SP Switch messages). 5. Restart the node. 6. After a five-minute wait, if the node has not rejoined the cluster, contact IBM for service (see Appendix A, "Getting help, service, and information" on page 79 for instructions on contacting IBM for service).
No primary or backup node is listed in the IBM Netfinity SP Switch Administrator software.	The primary and backup nodes are disconnected from the IBM Netfinity SP Switch fabric, or there is a failure in the IBM Netfinity SP Switch Administrator software on both the primary and backup nodes.	1. Verify the physical cable connections between the primary and backup nodes and the IBM Netfinity SP Switch. 2. Verify that the primary and backup nodes are running. If they are not running, restart them. 3. Restart the primary and backup nodes. 4. Re-create the switch fabric on your original primary node. If a problem occurs creating the switch fabric using your original primary and backup nodes, create the switch fabric on a secondary node. 5. After the switch fabric has been created, if the previously defined primary and backup nodes do not join the switch fabric, contact IBM for service (see Appendix A, "Getting help, service, and information" on page 79 for instructions on contacting IBM for service).
IBM Netfinity SP Switch configuration error: error code *xxx-yyy* from every server (node) in the cluster when a node is brought online.	All nodes in the IBM Netfinity SP Switch fabric are in an offline state because the primary and backup nodes failed.	1. Shut down all servers (nodes). 2. Turn off the IBM Netfinity SP Switch (to recycle the IBM Netfinity SP Switch messages). 3. When the system shutdown is completed on all servers (nodes), turn on the IBM Netfinity SP Switch and restart all servers (nodes). This will clear all status codes in the IBM Netfinity SP Switch and allow the IBM Netfinity SP Switch to restart normally.

Problem	Explanation	Action
Can not start a switch fabric.	• The IBM Netfinity SP Switch is powered off • The primary node switch port is disabled • The Primary's Switch Board or Primary's Jack Label entry fields in the Start Fabric window is incorrect • Not all device drivers and services are running • An eight IBM Netfinity SP Host adapter configuration is connected to switch card B instead of switch card A	• Verify that the IBM Netfinity SP Switch is powered on • Choose a different node as a primary node • Ensure that you are using the correct Primary's Switch Board and Primary's Jack Label values • Verify that all device drivers and switch services are started and running on all nodes in your switch fabric • Verify that all physical cable connections correspond to the wiring instructions on the Fabric Properties window • Power-off then power-on the IBM Netfinity SP Switch to enable the primary node switch port
After starting the switch fabric, a node remains in the Unassigned Nodes list.	• The node is not connected to the IBM Netfinity SP Switch • All of the necessary device drivers and services are not started • There is a problem with the IBM Netfinity SP Host adapter or IBM Netfinity SP Switch cable • An eight IBM Netfinity SP Host adapter configuration is connected to switch card B instead of switch card A	• Restart the node • Verify that all device drivers and switch services are started and running on all nodes in your switch fabric • Verify that all physical cable connections correspond to the wiring instructions on the Fabric Properties window • Run diagnostics on the IBM Netfinity SP Host adapter. If the IBM Netfinity SP Switch cable fails diagnostic testing, replace the IBM Netfinity SP Switch cable. • Recable the node to a different IBM Netfinity SP Switch port
Node **Online** command fails.	• The node is not connected to the IBM Netfinity SP Switch • All of the necessary device drivers and services are not started • Bad cable connection • Node is powered off	• Restart the node • Verify that all device drivers and switch services are started and running on all nodes in your switch fabric • Verify that all physical cable connections correspond to the wiring instructions on the Fabric Properties window • Verify that the node is powered on and Windows NT 4.0 EE is running properly

Problem	Explanation	Action
All of the nodes attached to switch card B are not part of the switch fabric.	• The IBM Netfinity SP Switch cable between switch card A and switch card B is missing or bad • An eight IBM Netfinity SP Host adapter configuration is connected to switch card A and no nodes are cabled to switch card B	• Verify that all physical cable connections correspond to the wiring instructions on the Fabric Properties window • Verify that the IBM Netfinity SP Host adapter cables are functioning properly • Power-off and then power-on the IBM Netfinity SP Switch
Two IBM Netfinity SP Host adapters are installed in a node but only one is displayed in the IBM Netfinity SP Switch Administrator software.	Only one IBM Netfinity SP Host adapter has been installed.	• Ensure that you select Dual Adapter Configuration on the IBM SP Adapter Selection window during the IBM Netfinity SP Switch Administrator software installation or install the second adapter manually • Verify that all physical cable connections correspond to the wiring instructions on the Fabric Properties window • Run diagnostics on the IBM Netfinity SP Host adapter. If the IBM Netfinity SP Switch cable fails diagnostic testing, replace the IBM Netfinity SP Switch cable.
Cannot PING all of the nodes in a switch fabric.	If you have recabled any of the nodes in the switch fabric, this is normal.	Restart all of the nodes in the switch fabric and restart the switch fabric.
The IBM Netfinity SP Switch Administrator displays each switch card on a different IBM Netfinity SP Switch.	The switch card names were specified incorrectly in the Primary's Switch Board field on the Start Fabric window during the IBM Netfinity SP Switch Administrator software configuration steps.	The switch card name must include two components separated by a / character. The first naming component represents the IBM Netfinity SP Switch name and should be identical for both switch cards. The second naming component is the switch card identifier and must be A or B.
Cannot delete a switch fabric.	You cannot delete a switch fabric. As long as a node is a member of a switch fabric, the switch fabric will be displayed.	Make all of the nodes attached to the switch fabric, members of another switch fabric. The old switch fabric name will not be displayed in the IBM Netfinity SP Switch Administrator.
In a 12 or 14-node configuration, only the nodes on the same switch card as the primary node are listed as part of the switch fabric.	The IBM Netfinity SP Switch is clocked to support two eight node switch fabrics (master/master configuration).	Using the Configuration Utility (see section "Using the IBM Netfinity SP Switch Configuration Utility" on page 54), set the system clock on the IBM Netfinity SP Switch (click the **Clock** button and select one switch fabric) to support one cascaded switch fabric (master/slave configuration).

IBM Netfinity SP Switch display panel messages

The messages and menus on the display panel and power to the IBM Netfinity SP Switch can be controlled by pressing the following control buttons.
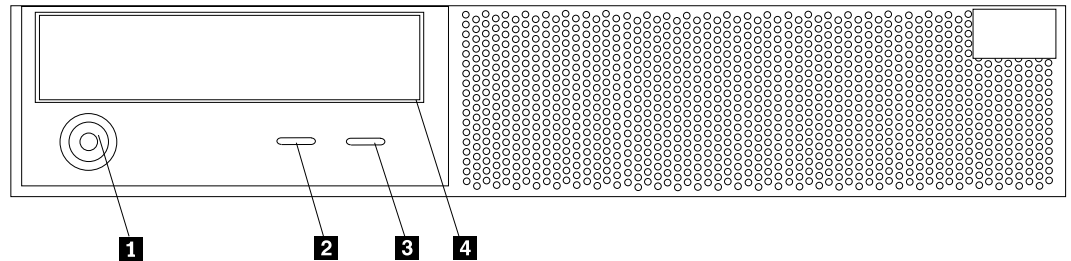
1   **Power Control Button:** Press this button to manually turn the IBM Netfinity SP Switch on or off.

2   **Scroll Button:** Press this button to select an action to perform on a system monitoring message; then press the Enter button to perform the action. You can choose from the following actions:

- **Keep** to retain the message on the display panel and enable the system error light to continue to flash

- **Remind** to retain the message on the display panel and enable the system error light to flash slowly

- **Clear** to clear the message from the display panel and enable the system error light to stop flashing

3   **Enter Button:** Press this button to perform an action on system monitoring messages that appear on the display panel.

4   **Display Panel:** The LED lights and displayed messages give status information for your IBM Netfinity SP Switch.

The display panel contains LED lights that indicate hardware conditions.

- **System Error Light:** This amber light is lit when a system error occurs. Information about the condition is displayed on the display panel. There are four error conditions for the error light:

  - **Off:** The System Error Light is not lit when no messages are present or pending from the service processor.

  - **Slow Blink:** The service processor has generated an error message and it is in the remind mode.

  - **Rapid Blink:** The service processor has generated an error message and it is displayed on the display panel.

  - **Solid Amber:** The service processor is not functioning. contact IBM for service (see Appendix A, "Getting help, service, and information" on page 79 for instructions on contacting IBM for service).

- **System Power Light:** When this light is lit, system power is present in the IBM Netfinity SP Switch and power is present in the switch cards. When this light flashes, AC power is present at the power supplies. When the system power light is not lit, AC power is not present at the power supplies.

The following table lists the error messages that might appear on the IBM Netfinity SP Switch display panel. The first column contains the message displayed on the display panel. The second column contains a brief explanation of the problem. The last column provides a course of action to resolve the problem.

Message	Explanation	Action
Netfinity M3529 S/N xxxxxxxx	The IBM Netfinity SP Switch model number and serial number are displayed, where xxxxxxxx is the machine serial number.	Any error messages detected will replace this message on the IBM Netfinity SP Switch display panel.
<KEEP>Remind Clr	All functions are displayed on the display panel.	Press the Scroll button to advance to the desired function. Press Enter to make your selection.
Fan 1A Fail	Fan 1 Bank A; the fan speed has dropped below the levels required to cool the IBM Netfinity SP Switch.	Replace the A fan assembly.
Fan 2A Fail	Fan 2 Bank A; the fan speed has dropped below the levels required to cool the IBM Netfinity SP Switch.	Replace the A fan assembly.
Fan 1B Fail	Fan 1 Bank B; the fan speed has dropped below the levels required to cool the IBM Netfinity SP Switch.	Replace the B fan assembly.
Fan 2B Fail	Fan 2 Bank B; the fan speed has dropped below the levels required to cool the IBM Netfinity SP Switch.	Replace the B fan assembly.
Ambient Warm	The inlet (ambient) temperature has exceeded levels required for safe operation of the IBM Netfinity SP Switch.	Check for air-flow blockages on your IBM Netfinity SP Switch. If no air-flow blockage exists, call IBM for service.
Switch A Warm	The A-side temperature of the switch card has exceeded levels required for safe operation of the IBM Netfinity SP Switch.	Check for air-flow blockages on your IBM Netfinity SP Switch. If no air-flow blockage exists, call IBM for service.
Switch B Warm	The B-side temperature of the switch card has exceeded levels required for safe operation of the IBM Netfinity SP Switch.	Check for air-flow blockages on your IBM Netfinity SP Switch. If no air-flow blockage exists, call IBM for service.

Message	Explanation	Action
Ambient Hot	The inlet (ambient) temperature has exceeded levels required for safe operation of the IBM Netfinity SP Switch.	Check for air-flow blockages on your IBM Netfinity SP Switch. If no air-flow blockage exists, call IBM for service.
Switch A Hot	The A-side temperature of the switch card has exceeded levels required for safe operation of the IBM Netfinity SP Switch.	Check for air-flow blockages on your IBM Netfinity SP Switch. If no air-flow blockage exists, call IBM for service.
Switch B Hot	The B-side temperature of the switch card has exceeded levels required for safe operation of the IBM Netfinity SP Switch.	Check for air-flow blockages on your IBM Netfinity SP Switch. If no air-flow blockage exists, call IBM for service.
Power 1A Fail	Power supply 1A has failed.	Reseat power supply 1A. If this does not resolve the problem, replace power supply 1A.
Power 1B Fail	Power supply 1B has failed.	Reseat power supply 1B. If this does not resolve the problem, replace power supply 1B.
Power 2A Fail	Power converter card 2A has failed.	Reseat power-converter card 2A. If this does not resolve the problem, replace power-converter card 2A.
Power 2B Fail	Power converter card 2B has failed.	Reseat power-converter card 2B. If this does not resolve the problem, replace power-converter card 2B.
Power 1A Removed	Power supply 1A was not detected by the service processor.	Ensure that power supply 1A has been installed. Reseat power supply 1A if it has already been installed in your IBM Netfinity SP Switch.
Power 1B Removed	Power supply 1B was not detected by the service processor.	Ensure that power supply 1B has been installed. Reseat power supply 1B if it has already been installed in your IBM Netfinity SP Switch.
Power 2A Removed	Power converter card 2A was not detected by the service processor.	Ensure that power-converter card 2A has been installed. Reseat power-converter card 2A if it has already been installed.
Power 2B Removed	Power converter card 2B was not detected by the service processor.	Ensure that power-converter card 2B has been installed. Reseat power-converter card 2B if it has already been installed.
Fan Bank A Remvd	Fan assembly A was not detected by the service processor.	Ensure that fan assembly A has been installed. Reseat fan assembly A if it has already been installed.
Fan Bank B Remvd	Fan assembly B was not detected by the service processor.	Ensure that fan assembly B has been installed. Reseat fan assembly B if it has already been installed.
Cable A Removed	The internal A cable was not detected by the service processor.	Call IBM for service.
Cable B Removed	The internal B cable was not detected by the service processor.	Call IBM for service.
I2C Error	The service processor card has failed.	Call IBM for service.

Message	Explanation	Action
!!BAD VPD INFO!!	The display panel microcode has not been loaded correctly or the display panel cannot be accessed by the service processor.	Call IBM for service.

Performance and tuning

You might be able to improve data-transfer performance in an IBM Netfinity SP Switch by changing the settings in the IBM Netfinity SP Host adapter device drivers or by reducing noise while performing I/O operations on a buffer.

Changing IBM Netfinity SP Host adapter device driver settings

You can use the IBM Netfinity SP Host adapter device driver to tune the performance of data transfers in an IBM Netfinity SP Switch. The initial settings of the IBM Netfinity SP Host adapter device-driver fields have been optimized for the average user. If you believe that your IBM Netfinity SP Host adapter performance can be improved, follow these steps:

1. Click **Start** → **Settings** → **Control Panel**

2. Double-click **Network** → **Adapters**

3. Click **IBM Netfinity SP Host adapter** → **Properties**

The following IBM Netfinity SP Host Adapter Configuration window opens.

```
IBM Nefinity SP Host Adapter0 Configuration                    ☒

          Send Pool Size  1048576     (524288-16777216)

       Receive Pool Size  1048576     (524288-16777216)

        Send Queue Size   128         (128-512)

       ┌─ SERVICE USE ONLY ─────────────────────────────┐
       │                                                 │
       │        Node Number  0                           │
       │                                                 │
       │           Log Size  8192        (8192-65536)    │
       │                                                 │
       │                      ☐ Adapter is clock source  │
       │                                                 │
       └─────────────────────────────────────────────────┘


          ┌─────────┐    ┌─────────┐    ┌─────────┐
          │   OK    │    │ Cancel  │    │  Help   │
          └─────────┘    └─────────┘    └─────────┘
```
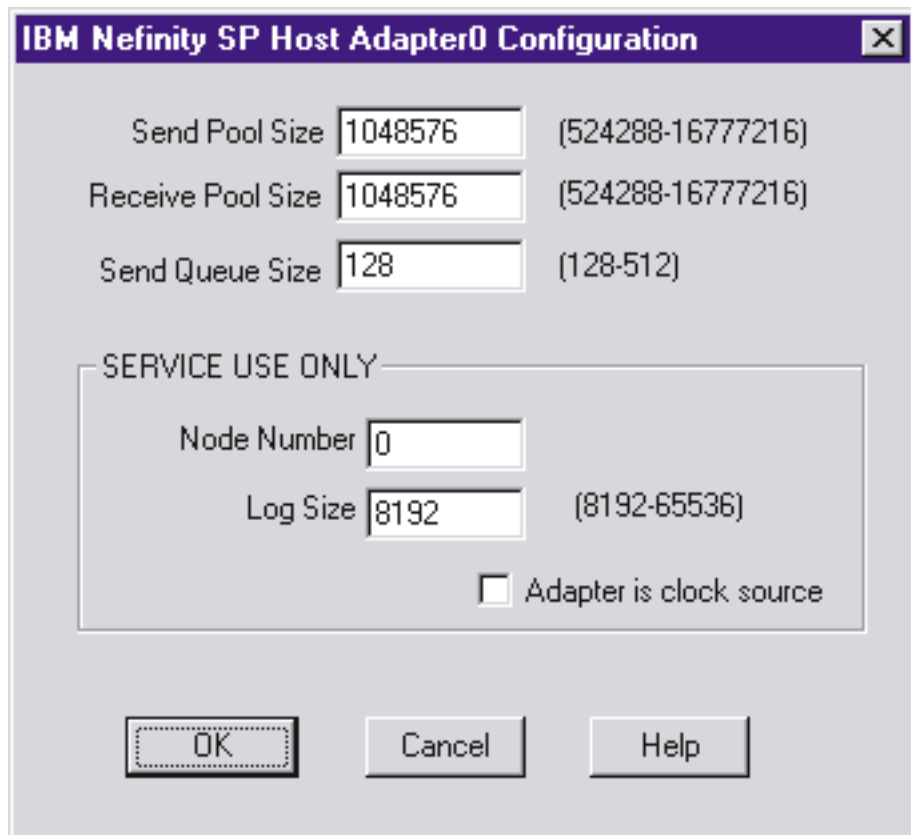
Notes:

1. Do not change the default settings in the IBM Netfinity SP Host Adapter Configuration window unless a qualified person, such as a network administrator, has determined that system performance can be improved by changing the pool or queue size.

2. Each IBM Netfinity SP Host adapter has its own configuration window, denoted by Adapter0 (if one IBM Netfinity SP Host adapter is installed), or Adapter1 (if two IBM Netfinity SP Host adapters are installed) in the window title. The example configuration window in this book denotes a single IBM Netfinity SP Host adapter installed and uses Adapter0 in the window title.

If the pool sizes are increased, less memory will be available for other running applications. If the pool sizes are decreased, more memory will be available for other running applications, but data transfer through the IBM Netfinity SP Host adapter might be degraded.

To help you determine if you need to change the **Send Pool Size** value, from a Windows NT command prompt, type `tbstats -g`. The number of delays encountered as a result of the send pool size will be listed beside the Send Cluster Shortage heading. If this number exceeds your network administrator's recommended number of wait states for network traffic, or if the average number of wait states significantly increases, increase the Send Pool Size (keeping the increase within the range listed on the IBM Netfinity SP Host Adapter Configuration window) to the value determined by your network administrator.

The **Receive Pool Size** field is the buffer for inbound data packets from the IBM Netfinity SP Host adapter. This value has been optimized for the average user.

Change this field only if you believe that data-transfer performance has been degraded as a result of a small buffer size.

To help you determine a **Receive Pool Size** buffer size balance, from a Windows NT command prompt, type `tbstats -g`. The number of delays encountered as a result of the receive pool size will be listed next to the Received Packets Lost heading. If this number exceeds your network administrator's recommended number of wait states for network traffic, or the number of dropped data packets significantly increases, increase the receive pool size (keeping the increase within the range listed on the IBM Netfinity SP Host Adapter Configuration window) to the value determined by your network administrator.

An increase in the receive pool size will reduce the amount of memory available for other running applications and can degrade the performance of those applications.

The **Send Queue Size** field contains the number of data packets that the IBM Netfinity SP Host adapter will store while awaiting processing. Because increasing the send queue size will reduce the available amount of memory for other resources and sub systems, change this field only after careful consideration of system use.

To help you determine a **Send Queue Size** buffer size balance, from a Windows NT command prompt, type `tbstats -g`. The number of data packets queued as a result of the send queue size will be listed beside the Send Packets Queued heading. If this number increases significantly during normal operation, increase the send queue size. This will decrease the number of times data packets must be requeued.

Reducing noise

> **Note:** If you change from the default settings for noise levels, no data trace information can be logged for problem analysis.

Reducing noise while writing to or reading from an I/O buffer can increase the performance of data-packet transfers. To override the default noise levels controlled by the IBM Netfinity SP Switch device driver:

1. From a Windows NT command prompt, type `tbcbuf -s`.

2. Override the default data entries by typing zero (these values are in hexadecimal).

3. Press Enter.

The new value for the noise level will remain in effect until you restart the server (node). To permanently retain the new noise-level setting, update the Windows NT registry:

`HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services` `\IBMTB3\Parameters\DebugDD\`*registry entry*

Change the *registry entry* to 0.

Replacing parts

- Statement 9

⚠

CAUTION:
Never remove the cover on a power supply or any part (service processor and AC box) that has the following label attached.

Hazardous voltage, current, and energy levels are present inside the power supplies, service processor, and AC box. There are no serviceable parts inside the power supplies, service processor, or AC box. If you suspect a problem with one of these parts, contact an IBM service technician.

The following section provides information on replacing certain failed components in your IBM Netfinity SP Switch.

Attention: Static electricity, though harmless to you, can seriously damage server (node) or IBM Netfinity SP Switch components. When you handle server (node) or IBM Netfinity SP Switch components, take these precautions to avoid damage from static electricity:

- Limit your movement. Movement can cause static electricity to build up around you.

- Always handle components carefully. Handle adapters and the IBM Netfinity SP Switch components by their edges. Never touch any exposed circuitry.

- Prevent others from touching components.

- When you are installing an option or servicing the IBM Netfinity SP Switch, touch the frame of the IBM Netfinity SP Switch for at least two seconds. (This reduces static electricity from the components and from your body.)

- When possible, install the serviceable component directly into the IBM Netfinity SP Switch without setting the component down. When this is not possible, place the static-protective package that the serviceable component comes in on a smooth, level surface and place the component on it.

- Do not place the serviceable components on any metal surface.

The following components in your IBM Netfinity SP Switch are not hot-swappable and therefore must be replaced by qualified personnel. Refer to Appendix A, "Getting help, service, and information" on page 79 for information on contacting IBM.

- One display panel

- Eight interposers

- One switch card
- One service processor

The following components in your IBM Netfinity SP Switch can be replaced without turning off the IBM Netfinity SP Switch These components are known as *hot-swappable* or *hot-swap* components.

- Two fan assemblies, each containing two fans
- Two power-converter cards
- Two power supplies

Removing the front bezel

To remove the front IBM Netfinity SP Switch bezel, grasp the ends of the front bezel firmly, and gently pull it forward, tilting the bezel slightly downward as you pull it forward.

Replacing the A fan assembly
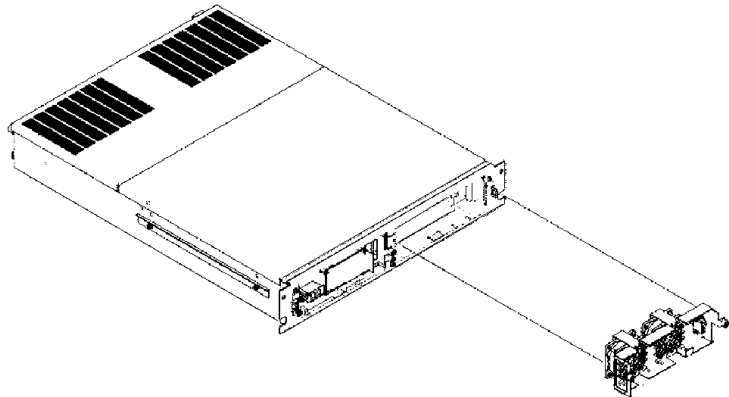
1. Remove the front IBM Netfinity SP Switch bezel. (See "Removing the front bezel.")
2. With a Philips-head screwdriver, loosen the two screws located to the left and right of the A fan assembly (labeled A).
3. Grasp the tab in the top center of the A fan assembly and gently pull the A fan assembly forward.
4. Replace the A fan assembly and reverse the previous steps to reassemble your IBM Netfinity SP Switch.

Replacing the B fan assembly
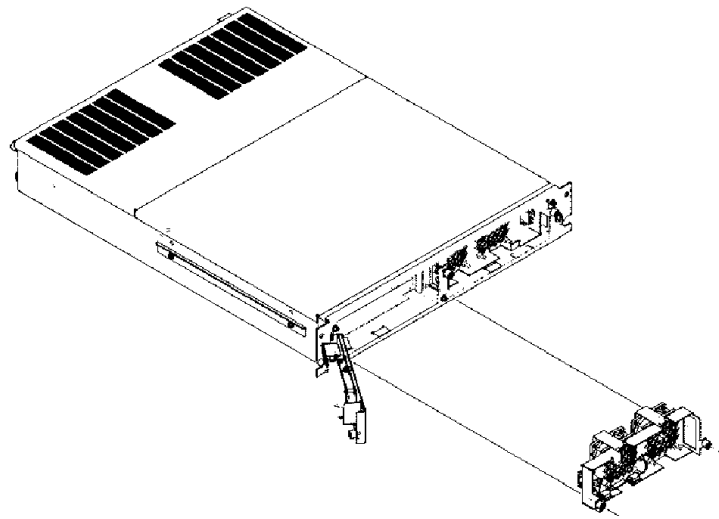
1. Remove the front IBM Netfinity SP Switch bezel. (See "Removing the front bezel" on page 74.)

2. Remove the display panel assembly by loosening the screw (located to the right of the display panel) with a Philips-head screwdriver.

3. Swing the display panel from right to left on the hinged-support to free a path to remove the B fan assembly.

4. With a Philips-head screwdriver, loosen the two screws located to the left and right of the B fan assembly (labeled B).

5. Grasp the tab in the top center of the B fan assembly and gently pull the B fan assembly forward.

6. Replace the B fan assembly and reverse the previous steps to replace the display panel and reassemble your IBM Netfinity SP Switch.

Replacing the A power-converter card
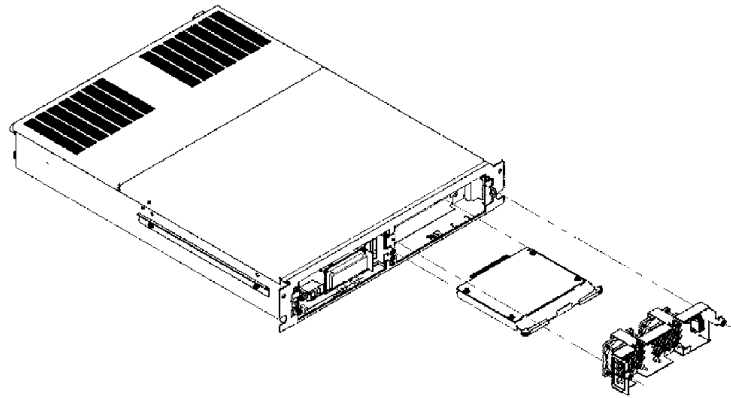
1. Follow the procedures in "Removing the front bezel" on page 74 to remove the front bezel and "Replacing the A fan assembly" on page 74 to remove the A fan assembly.

2. Pull the power-converter card bracket levers (one to the right and one to the left of the power-converter card bracket) forward simultaneously to release the card from the service processor, and gently slide the entire power-converter card bracket forward and out of the power-converter card bracket rails holding it.

3. Slide the new power-converter card along the power-converter card bracket rails until contact is made with the service processor.

4. Simultaneously close the power-converter card bracket levers (one to the right and one to the left of the power-converter card bracket) by pressing forward on them until they latch securely.

5. Replace the A fan assembly and reassemble your IBM Netfinity SP Switch.

Replacing the B power-converter card
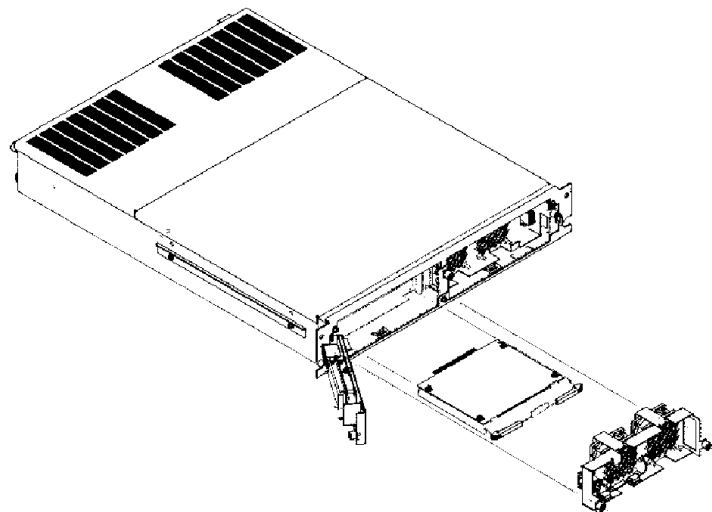
1. Follow the procedures in "Removing the front bezel" on page 74 to remove the front bezel and "Replacing the B fan assembly" on page 75 to remove the B fan assembly.

2. Pull the power-converter card bracket levers (one to the right and one to the left of the power-converter card bracket) forward simultaneously to release the card from the service processor, and gently slide the entire power-converter card bracket forward and out of the power-converter card bracket rails holding it.

3. Slide the new power-converter card along the power-converter card bracket rails until contact is made with the service processor.

4. Simultaneously close the power-converter card bracket levers (one to the right and one to the left of the power-converter card bracket) by pressing forward on them until they latch securely.

5. Replace the B fan assembly and reassemble your IBM Netfinity SP Switch.
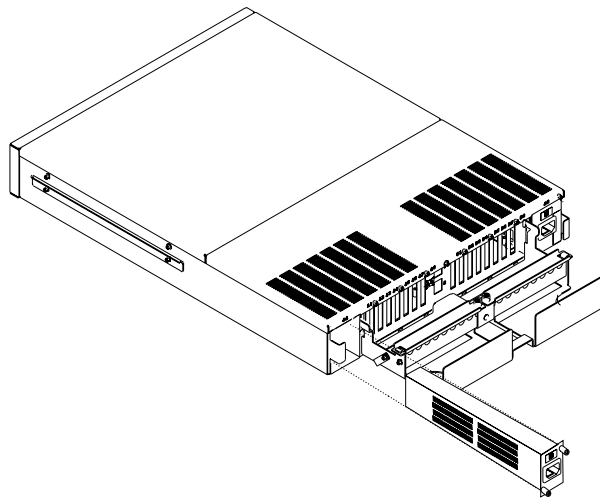
Replacing the A power supply

> **Note:** Each power supply is keyed to fit into the rear of the IBM Netfinity SP Switch in only one way.

1. At the rear of the IBM Netfinity SP Switch, on the side marked A, unplug the power cord to the power supply.

2. Loosen the two screws on the power supply with a Philips-head screwdriver.

3. Grasp the tab at the right side of the power supply, and firmly pull the power supply straight out of the IBM Netfinity SP Switch.

4. Insert a new power supply into the IBM Netfinity SP Switch and tighten the two screws on the power supply.

5. Plug in the power cord.

Replacing the B power supply

> **Note:** Each power supply is keyed to fit into the rear of the IBM Netfinity SP Switch in only one way.
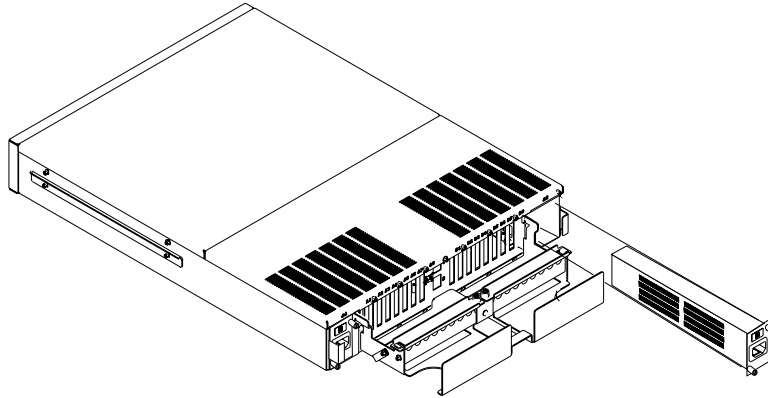
1. At the rear of the IBM Netfinity SP Switch, on the side marked B, unplug the power cord to the power supply.

2. Loosen the two screws on the power supply with a Philips-head screwdriver.

3. Grasp the tab at the right side of the power supply, and firmly pull the power supply straight out of the IBM Netfinity SP Switch.

4. Insert a new power supply into the IBM Netfinity SP Switch and tighten the two screws on the power supply.

5. Plug in the power cord.

Appendix A. Getting help, service, and information

If you need help, service, technical assistance, or just want more information about IBM products, you will find a wide variety of sources available from IBM to assist you.

For example, IBM maintains pages on the World Wide Web where you can get information about IBM products and services, find the latest technical information, and download device drivers and updates. Some of these pages are:

`http://www.ibm.com`	Main IBM home page
`http://www.ibm.com/pc`	IBM Personal Computing
`http://www.ibm.com/pc/support`	IBM Personal Computing Support
`http://www.ibm.com/pc/us/ibmpc`	IBM Commercial Desktop PCs (U.S.)
`http://www.ibm.com/pc/us/intellistation`	IBM IntelliStation Workstations (U.S.)
`http://www.ibm.com/pc/us/accessories`	Options by IBM (U.S.)
`http://www.ibm.com/pc/us/netfinity`	IBM Netfinity Servers (U.S.)
`http://www.ibm.com/pc/us/server/sguide`	IBM ServerGuide (U.S.)
`http://www.ibm.com/pc/us/netfinity/system_management`	IBM Systems Management (U.S.)
`http://www.ibm.com/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.

Service support

With the original purchase of an IBM hardware product, you have access to extensive support coverage. During the IBM hardware product warranty period, you may call the IBM Personal Computer HelpCenter (1-800-772-2227 in the U.S.) for hardware product assistance covered under the terms of the IBM hardware warranty. See "Getting help by telephone" on page 83 for HelpCenter telephone numbers in other countries.

The following services are available during the warranty period:

- Problem determination - Trained personnel are available to assist you with determining if you have a hardware problem and deciding what action is necessary to fix the problem.

- IBM hardware repair - If the problem is determined to be caused by IBM hardware under warranty, trained service personnel are available to provide the applicable level of service.

- Engineering change management - Occasionally, there might be changes that are required after a product has been sold. IBM or your reseller, if authorized by IBM, will make Engineering Changes (ECs) available that apply to your hardware.

Be sure to retain your proof of purchase to obtain warranty service.

Please have the following information ready when you call:

- Machine Type and Model
- Serial numbers of your IBM hardware products
- Description of the problem
- Exact wording of any error messages
- Hardware and software configuration information

If possible, be at your computer when you call.

The following items are not covered:

- Replacement or use of non-IBM parts or nonwarranted IBM parts

  Note: All warranted parts contain a 7-character identification in the format IBM FRU XXXXXXX.

- Identification of software problem sources
- Configuration of BIOS as part of an installation or upgrade
- Changes, modifications, or upgrades to device drivers
- Installation and maintenance of network operating systems (NOS)
- Installation and maintenance of application programs

Refer to your IBM hardware warranty for a full explanation of IBM's warranty terms.

Before you call for service

Many computer problems can be solved without outside assistance, by using the online help or by looking in the online or printed documentation that comes with your computer or software. Also, be sure to read the information in any README files that come with your software.

Most computers, operating systems, and application programs come with documentation that contains troubleshooting procedures and explanations of error messages. The documentation that comes with your computer also contains information about the diagnostic tests you can perform.

If you receive a POST error code when you turn on your computer, refer to the POST error-message charts in your hardware documentation. If you do not receive a POST error code, but suspect a hardware problem, refer to the troubleshooting information in your hardware documentation or run the diagnostic tests.

If you suspect a software problem, consult the documentation (including README files) for the operating system or application program.

Getting customer support and service

Purchasing an IBM PC hardware product entitles you to standard help and support during the warranty period. If you need additional support and services, a wide variety of extended services are available for purchase that address almost any need.

Using the World Wide Web

On the World Wide Web, the IBM Personal Computing Web site has up-to-date information about IBM Personal Computer products and support. The address for the IBM Personal Computing home page is:

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

You can find support information for your IBM products, including supported options, on the IBM Personal Computing Support page at:

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

If you select Profile from the support page, you can create a customized support page that is specific to your hardware, complete with Frequently Asked Questions,

Parts Information, Technical Hints and Tips, and Downloadable Files. You will
have the information you need, all in one place. In addition, you can choose to
receive e-mail notifications whenever new information becomes available about
your registered products. You also can access online support forums, which are
community sites monitored by IBM support staff.

For information about specific Personal Computer products, visit the following
pages:

```
http://www.ibm.com/pc/us/intellistation
```

```
http://www.ibm.com/pc/us/ibmpc
```

```
http://www.ibm.com/pc/us/netfinity
```

```
http://www.ibm.com/pc/us/thinkpad
```

```
http://www.ibm.com/pc/us/accessories
```

```
http://www.direct.ibm.com/content/home/en_US/aptiva
```

You can select a country-specific Web site from these pages.

Using electronic support services

If you have a modem, you can get help from several popular services. Online
information services provide assistance through question-and-answer message
areas, live chat rooms, searchable databases, and more.

Technical information is available on a wide range of topics, such as:

- Hardware setup and configuration
- Preinstalled software
- Windows, OS/2, and DOS
- Networking
- Communications
- Multimedia

In addition, the latest device driver updates are available.

Commercial online services, such as America Online (AOL), contain information
about IBM products. (For AOL, use the keyword **IBM**.)

Getting information by fax

If you have a touch-tone telephone and access to a fax machine, in the U.S. and
Canada you can receive by fax marketing and technical information on many
topics, including hardware, operating systems, and local area networks (LANs).
You can call the IBM Automated Fax System 24 hours a day, 7 days a week.
Follow the recorded instructions, and the requested information will be sent to your
fax machine.

In the U.S. and Canada, to access the IBM Automated Fax System, call
1-800-426-3395.

Getting help online

Online Housecall is a remote communication tool that allows an IBM technical-support representative to access your PC by modem. Many problems can be remotely diagnosed and corrected quickly and easily. In addition to a modem, a remote-access application program is required. This service is not available for servers. There might be a charge for this service, depending on the request.

For more information about configuring your PC for Online Housecall:

- In the U.S., call 1-800-772-2227.
- In Canada, call 1-800-565-3344.
- In all other countries, contact your IBM reseller or IBM marketing representative.

Getting help by telephone

During the warranty period, you can get help and information by telephone through the IBM PC HelpCenter. Expert technical-support representatives are available to assist you with questions you might have on the following:

- Setting up your computer and IBM monitor
- Installing and setting up IBM options purchased from IBM or an IBM reseller
- 30-day, preinstalled-operating-system support
- Arranging for service (on-site or carry-in)
- Arranging for overnight shipment of customer-replaceable parts

In addition, if you purchased an IBM PC Server or IBM Netfinity Server, you are eligible for IBM Start Up Support for 90 days after installation. This service provides assistance for:

- Setting up your network operating system
- Installing and configuring interface cards
- Installing and configuring network adapters

Please have the following information ready when you call:

- Machine Type and Model
- Serial numbers of your computer, monitor, and other components, or your proof of purchase
- Description of the problem
- Exact wording of any error messages
- Hardware and software configuration information for your system

If possible, be at your computer when you call.

In the U.S. and Canada, these services are available 24 hours a day, 7 days a week. In the U.K., these services are available Monday through Friday, from 9:00 a.m. to 6:00 p.m.[1]

Country		Telephone number
Austria	Österreich	1-546 585 075

---

[1] Response time will vary depending on the number and complexity of incoming calls.

Country		Telephone number
Belgium - Dutch	Belgie	02-717-2504
Belgium - French	Belgique	02-717-2503
Canada	Canada	1-800-565-3344
Denmark	Danmark	03-525-6905
Finland	Suomi	9-22-931805
France	France	01-69-32-40-03
Germany	Deutschland	069-6654-9003
Ireland	Ireland	01-815-9207
Italy	Italia	02-4827-5003
Luxembourg	Luxembourg	298-977-5060
Netherlands	Nederland	020-504-0531
Norway	Norge	2-305-3203
Portugal	Portugal	01-791-5147
Spain	España	091-662-4270
Sweden	Sverige	08-632-0063
Switzerland - German	Schweiz	01-212-1810
Switzerland - French	Suisse	022-310-0418
Switzerland - Italian	Svizzera	091-971-0523
United Kingdom	United Kingdom	01475-555555
U.S.A. and Puerto Rico	U.S.A. and Puerto Rico	1-800-772-2227

In all other countries, contact your IBM reseller or IBM marketing representative.

Getting help around the world

If you travel with your computer or need to move it to another country, you can register for International Warranty Service. When you register with the International Warranty Service Office, you will receive an International Warranty Service Certificate that is honored virtually worldwide, wherever IBM or IBM resellers sell and service IBM PC products.

For more information or to register for International Warranty Service:

- In the U.S. or Canada, call 1-800-497-7426.
- In Europe, call 44-1475-893638 (Greenock, U.K.).
- In Australia and New Zealand, call 61-2-9354-4171.

In all other countries, contact your IBM reseller or IBM marketing representative.

Purchasing additional services

During and after the warranty period, you can purchase additional services, such as support for IBM and non-IBM hardware, operating systems, and application programs; network setup and configuration; upgraded or extended hardware repair services; and custom installations. Service availability and name might vary by country.

Enhanced PC support line

Enhanced PC Support is available for desktop and mobile IBM computers that are not connected to a network. Technical support is provided for IBM computers and IBM or non-IBM options, operating systems, and application programs on the Supported Products list.

This service includes technical support for:

- Installing and configuring your out-of-warranty IBM computer
- Installing and configuring non-IBM options in IBM computers
- Using IBM operating systems in IBM and non-IBM computers
- Using application programs and games
- Tuning performance
- Installing device drivers remotely
- Setting up and using multimedia devices
- Identifying system problems
- Interpreting documentation

You can purchase this service on a per-call basis, as a multiple-incident package, or as an annual contract with a 10-incident limit. For more information about purchasing Enhanced PC Support, see "Ordering support line services" on page 86.

900-number operating system and hardware support line

In the U.S., if you prefer to obtain technical support on a pay-as-you-go basis, you can use the 900-number support line. The 900-number support line provides support for IBM PC products that are out of the warranty period.

To access this support, call 1-900-555-CLUB (2582). You will be notified of the charge per minute.

Network and server support line

Network and Server Support is available for simple or complex networks made up of IBM servers and workstations using major network operating systems. In addition, many popular non-IBM adapters and network interface cards are supported.

This service includes all of the features of the Enhanced PC Support Line, plus:

- Installing and configuring client workstations and servers
- Identifying system problems and correcting problems on the client or the server
- Using IBM and non-IBM network operating systems
- Interpreting documentation

You can purchase this service on a per-call basis, as a multiple-incident package, or as an annual contract with a 10-incident limit. For more information about

purchasing Network and Server Support, see "Ordering support line services" on page 86.

Ordering support line services

Enhanced PC Support Line and Network and Server Support Line services are available for products on the Supported Products list. To receive a Supported Products list:

- In the U.S.:

    1. Call 1-800-426-3395.
    2. Select document number 11683 for Network and Server support.
    3. Select document number 11682 for Enhanced PC support.

- In Canada, contact IBM Direct at 1-800-465-7999, or:

    1. Call 1-800-465-3299.
    2. Select the HelpWare catalog.

- In all other countries, contact your IBM reseller or IBM marketing representative.

For more information or to purchase these services:

- In the U.S., call 1-800-772-2227.
- In Canada, call 1-800-465-7999.
- In all other countries, contact your HelpCenter.

Warranty and repair services

You can upgrade your standard hardware warranty service or extend the service beyond the warranty period.

Warranty upgrades in the U.S. include:

- Carry-in service to on-site service

    If your warranty provides carry-in repair service, you can upgrade to on-site repair service, either standard or premium. The standard upgrade provides a trained servicer within the next business day (9 a.m. to 5 p.m., local time, Monday though Friday). The premium upgrade provides 4-hour average response, 24 hours a day, 7 days a week.

- On-site service to premium on-site service

    If your warranty provides for on-site service, you can upgrade to premium on-site service (4-hour average on-site response, 24 hours a day, 7 days a week).

You also can extend your warranty. Warranty and Repair Services offers a variety of post-warranty maintenance options, including ThinkPad EasyServ Maintenance Agreements. Availability of the services varies by product.

For more information about warranty upgrades and extensions:

- In the U.S., call 1-800-426-4968.
- In Canada, call 1-800-465-7999.
- In all other countries, contact your IBM reseller or IBM marketing representative.

Ordering publications

Additional publications are available for purchase from IBM. For a list of publications available in your country:

- In the U.S., Canada, and Puerto Rico, call 1-800-879-2755.
- In other countries, contact your IBM reseller or IBM marketing representative.

Appendix B. Specifications

The following table contains the specifications for the IBM Netfinity SP Switch.

Size (Rack Model)	**Environment**	**Acoustical Noise Emissions Values**

• Depth: 622 mm (24.5 in.)
• Height: 89 mm (3.5 in.)
• Width: 440 mm (17.3 in.)
 	
Weight
• Unpacked configuration: 11.4 kg (25 lb.)
 	
Clearance
• Minimum top clearance: 4 mm (0.16 in.)
 	
Electrical Input
• Sine-wave input (50 to 60 Hz) is required
 	
• Input voltage
  – Low range
    - Minimum: 90 V ac
    - Maximum: 137 V ac
  – High range
    - Minimum: 180 V ac
    - Maximum: 265 V ac
  – Input kilovolt-amperes (KVA) approximately
    - Minimum configuration as shipped: 0.042 KVA
    - Maximum configuration: 0.065 KVA
	• Air temperature
	  – System on: 10° to 35° C (50° to 95° F)
	    Altitude: 0 to 914 m (3000 ft.)
	  – System on: 10° to 32° C (50° to 89.6° F)
	    Altitude: 914 m (3000 ft.) to 2133 m (7000 ft.)
	  – System off: 10° to 43° C (50° to 110° F)
	    Maximum altitude: 2133 m (7000 ft.)
	• Humidity
	  – System on: 8% to 80%; maximum wetbulb 23° C (73.4° F)
	  – System off: 8% to 80%; maximum wetbulb 27° C (80.6° F)
	• Altitude: 0 to 2133 m (0 to 7000 ft.)
	
	Electrostatic Discharge
	• Tested to 12 KV
	
	Immunity
	• Verified to comply with EN 50082-1
		• Average sound pressure level at bystander position (1 meter):
		  – 39 dB
		• Declared (upper limit) sound power levels:
		  – 5.3 bels
		
		These levels are measured in controlled acoustical environments according to ISO 7779, and are reported in accordance with ISO 9296. Sound pressure levels in your location might exceed the average 1-meter values stated because of room reflections and other nearby noise. The declared sound power levels indicate an upper limit, below which a large portion of machines operate.
		
		Heat Output
		• Approximate heat output in British thermal units (Btu) per hour:
		  – Minimum configuration: 143 Btu
		  – Maximum configuration: 221 Btu
		
		Safety Standards
		• UL 1950
		• CSA C22.2 No. 950-M93
		• EN 60950 and countries deviations
		• IEC 950
		• NOM-019

Appendix C. Product warranties and notices

This appendix contains warranty statements, emissions notices, general-information notices, and trademarks.

Warranty Statements

The warranty statements consist of two parts: Part 1 and Part 2. Part 1 varies by country. Part 2 is the same for both statements. Be sure to read both the Part 1 that applies to your country and Part 2.

- **United States, Puerto Rico, and Canada (Z125-4753-05 11/97)**
  (Part 1 - General Terms on page 91)
- **Worldwide except Canada, Puerto Rico, Turkey, and United States (Z125-5697-01 11/97)**
  (Part 1 - General Terms on page 93)
- **Worldwide Country-Unique Terms**
  (Part 2 - Country-Unique Terms on page 95)

IBM Statement of Limited Warranty for United States, Puerto Rico, and Canada (Part 1 - General Terms)

This Statement of Limited Warranty includes Part 1 - General Terms and Part 2 - Country-unique Terms. **The terms of Part 2 may replace or modify those of Part 1**. *The warranties provided by IBM in this Statement of Limited Warranty apply only to Machines you purchase for your use, and not for resale, from IBM or your reseller. The term "Machine" means an IBM machine, its features, conversions, upgrades, elements, or accessories, or any combination of them. The term "Machine" does not include any software programs, whether pre-loaded with the Machine, installed subsequently or otherwise. Unless IBM specifies otherwise, the following warranties apply only in the country where you acquire the Machine. Nothing in this Statement of Warranty affects any statutory rights of consumers that cannot be waived or limited by contract. If you have any questions, contact IBM or your reseller.*

Machine -   IBM Netfinity SP Switch

Warranty Period* -   Three Years

*Contact your place of purchase for warranty service information. Some IBM Machines are eligible for On-site warranty service depending on the country where service is performed.

The IBM Warranty for Machines
IBM warrants that each Machine 1) is free from defects in materials and workmanship and 2) conforms to IBM's Official Published Specifications. The warranty period for a Machine is a specified, fixed period commencing on its Date of Installation. The date on your sales receipt is the Date of Installation, unless IBM or your reseller informs you otherwise.

During the warranty period IBM or your reseller, if approved by IBM to provide warranty service, will provide repair and exchange service for the Machine, without charge, under the type of service designated for the Machine and will manage and install engineering changes that apply to the Machine.

If a Machine does not function as warranted during the warranty period, and IBM or your reseller are unable to either 1) make it do so or 2) replace it with one that is at least functionally equivalent, you may return it to your place of purchase and your money will be refunded. The replacement may not be new, but will be in good working order.

Extent of Warranty
The warranty does not cover the repair or exchange of a Machine resulting from misuse, accident, modification, unsuitable physical or operating environment, improper maintenance by you, or failure

caused by a product for which IBM is not responsible. The warranty is voided by removal or alteration of Machine or parts identification labels.

THESE WARRANTIES ARE YOUR EXCLUSIVE WARRANTIES AND REPLACE ALL OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OR CONDITIONS OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THESE WARRANTIES GIVE YOU SPECIFIC LEGAL RIGHTS AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM JURISDICTION TO JURISDICTION. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF EXPRESS OR IMPLIED WARRANTIES, SO THE ABOVE EXCLUSION OR LIMITATION MAY NOT APPLY TO YOU. IN THAT EVENT, SUCH WARRANTIES ARE LIMITED IN DURATION TO THE WARRANTY PERIOD. NO WARRANTIES APPLY AFTER THAT PERIOD.

Items Not Covered by Warranty
IBM does not warrant uninterrupted or error-free operation of a Machine.

Unless specified otherwise, IBM provides non-IBM machines **WITHOUT WARRANTIES OF ANY KIND.**

Any technical or other support provided for a Machine under warranty, such as assistance via telephone with "how-to" questions and those regarding Machine set-up and installation, will be provided **WITHOUT WARRANTIES OF ANY KIND.**

Warranty Service
To obtain warranty service for the Machine, contact your reseller or IBM. In the United States, call IBM at 1-800-772-2227. In Canada, call IBM at 1-800-565-3344. You may be required to present proof of purchase.

IBM or your reseller provides certain types of repair and exchange service, either at your location or at a service center, to keep Machines in, or restore them to, conformance with their Specifications. IBM or your reseller will inform you of the available types of service for a Machine based on its country of installation. IBM may repair the failing Machine or exchange it at its discretion.

When warranty service involves the exchange of a Machine or part, the item IBM or your reseller replaces becomes its property and the replacement becomes yours. You represent that all removed items are genuine and unaltered. The replacement may not be new, but will be in good working order and at least functionally equivalent to the item replaced. The replacement assumes the warranty service status of the replaced item.

Any feature, conversion, or upgrade IBM or your reseller services must be installed on a Machine which is 1) for certain Machines, the designated, serial-numbered Machine and 2) at an engineering-change level compatible with the feature, conversion, or upgrade. Many features, conversions, or upgrades involve the removal of parts and their return to IBM. A part that replaces a removed part will assume the warranty service status of the removed part.

Before IBM or your reseller exchanges a Machine or part, you agree to remove all features, parts, options, alterations, and attachments not under warranty service.

You also agree to

1. ensure that the Machine is free of any legal obligations or restrictions that prevent its exchange;
2. obtain authorization from the owner to have IBM or your reseller service a Machine that you do not own; and
3. where applicable, before service is provided
   a. follow the problem determination, problem analysis, and service request procedures that IBM or your reseller provides,
   b. secure all programs, data, and funds contained in a Machine,
   c. provide IBM or your reseller with sufficient, free, and safe access to your facilities to permit them to fulfill their obligations, and
   d. inform IBM or your reseller of changes in a Machine's location.

IBM is responsible for loss of, or damage to, your Machine while it is 1) in IBM's possession or 2) in transit in those cases where IBM is responsible for the transportation charges.

Neither IBM nor your reseller is responsible for any of your confidential, proprietary or personal information contained in a Machine which you return to IBM or your reseller for any reason. You should remove all such information from the Machine prior to its return.

Production Status
Each IBM Machine is manufactured from new parts, or new and used parts. In some cases, the Machine may not be new and may have been previously installed. Regardless of the Machine's production status, IBM's appropriate warranty terms apply.

Limitation of Liability
Circumstances may arise where, because of a default on IBM's part or other liability, you are entitled to recover damages from IBM. In each such instance, regardless of the basis on which you are entitled to claim damages from IBM (including fundamental breach, negligence, misrepresentation, or other contract or tort claim), IBM is liable for no more than

1. damages for bodily injury (including death) and damage to real property and tangible personal property; and

2. the amount of any other actual direct damages, up to the greater of U.S. $100,000 (or equivalent in local currency) or the charges (if recurring, 12 months' charges apply) for the Machine that is the subject of the claim.

   This limit also applies to IBM's suppliers and your reseller. It is the maximum for which IBM, its suppliers, and your reseller are collectively responsible.

UNDER NO CIRCUMSTANCES IS IBM LIABLE FOR ANY OF THE FOLLOWING: 1) THIRD-PARTY CLAIMS AGAINST YOU FOR DAMAGES (OTHER THAN THOSE UNDER THE FIRST ITEM LISTED ABOVE); 2) LOSS OF, OR DAMAGE TO, YOUR RECORDS OR DATA; OR 3) SPECIAL, INCIDENTAL, OR INDIRECT DAMAGES OR FOR ANY ECONOMIC CONSEQUENTIAL DAMAGES (INCLUDING LOST PROFITS OR SAVINGS), EVEN IF IBM, ITS SUPPLIERS OR YOUR RESELLER IS INFORMED OF THEIR POSSIBILITY. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU.

IBM Statement of Warranty Worldwide except Canada, Puerto Rico, Turkey, United States (Part 1 - General Terms)

This Statement of Warranty includes Part 1 - General Terms and Part 2 - Country-unique Terms. **The terms of Part 2 may replace or modify those of Part 1**. *The warranties provided by IBM in this Statement of Warranty apply only to Machines you purchase for your use, and not for resale, from IBM or your reseller. The term "Machine" means an IBM machine, its features, conversions, upgrades, elements, or accessories, or any combination of them. The term "Machine" does not include any software programs, whether pre-loaded with the Machine, installed subsequently or otherwise. Unless IBM specifies otherwise, the following warranties apply only in the country where you acquire the Machine. Nothing in this Statement of Warranty affects any statutory rights of consumers that cannot be waived or limited by contract. If you have any questions, contact IBM or your reseller.*

Machine - IBM Netfinity SP Switch

Warranty Period* - Three Years

*Contact your place of purchase for warranty service information. Some IBM Machines are eligible for On-site warranty service depending on the country where service is performed.

The IBM Warranty for Machines
IBM warrants that each Machine 1) is free from defects in materials and workmanship and 2) conforms to IBM's Official Published Specifications. The warranty period for a Machine is a specified, fixed period commencing on its Date of Installation. The date on your sales receipt is the Date of Installation, unless IBM or your reseller informs you otherwise.

During the warranty period IBM or your reseller, if approved by IBM to provide warranty service, will provide repair and exchange service for the Machine, without charge, under the type of service designated for the Machine and will manage and install engineering changes that apply to the Machine.

If a Machine does not function as warranted during the warranty period, and IBM or your reseller are unable to either 1) make it do so or 2) replace it with one that is at least functionally equivalent, you may return it to your place of purchase and your money will be refunded. The replacement may not be new, but will be in good working order.

Extent of Warranty
The warranty does not cover the repair or exchange of a Machine resulting from misuse, accident, modification, unsuitable physical or operating environment, improper maintenance by you, or failure caused by a product for which IBM is not responsible. The warranty is voided by removal or alteration of Machine or parts identification labels.

THESE WARRANTIES ARE YOUR EXCLUSIVE WARRANTIES AND REPLACE ALL OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OR CONDITIONS OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THESE WARRANTIES GIVE YOU SPECIFIC LEGAL RIGHTS AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM JURISDICTION TO JURISDICTION. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF EXPRESS OR IMPLIED WARRANTIES, SO THE ABOVE EXCLUSION OR LIMITATION MAY NOT APPLY TO YOU. IN THAT EVENT, SUCH WARRANTIES ARE LIMITED IN DURATION TO THE WARRANTY PERIOD. NO WARRANTIES APPLY AFTER THAT PERIOD.

Items Not Covered by Warranty
IBM does not warrant uninterrupted or error-free operation of a Machine.

Unless specified otherwise, IBM provides non-IBM machines **WITHOUT WARRANTIES OF ANY KIND.**

Any technical or other support provided for a Machine under warranty, such as assistance via telephone with "how-to" questions and those regarding Machine set-up and installation, will be provided **WITHOUT WARRANTIES OF ANY KIND.**

Warranty Service
To obtain warranty service for the Machine, contact your reseller or IBM. You may be required to present proof of purchase.

IBM or your reseller provides certain types of repair and exchange service, either at your location or at a service center, to keep Machines in, or restore them to, conformance with their Specifications. IBM or your reseller will inform you of the available types of service for a Machine based on its country of installation. IBM may repair the failing Machine or exchange it at its discretion.

When warranty service involves the exchange of a Machine or part, the item IBM or your reseller replaces becomes its property and the replacement becomes yours. You represent that all removed items are genuine and unaltered. The replacement may not be new, but will be in good working order and at least functionally equivalent to the item replaced. The replacement assumes the warranty service status of the replaced item.

Any feature, conversion, or upgrade IBM or your reseller services must be installed on a Machine which is 1) for certain Machines, the designated, serial-numbered Machine and 2) at an engineering-change level compatible with the feature, conversion, or upgrade. Many features, conversions, or upgrades involve the removal of parts and their return to IBM. A part that replaces a removed part will assume the warranty service status of the removed part.

Before IBM or your reseller exchanges a Machine or part, you agree to remove all features, parts, options, alterations, and attachments not under warranty service.

You also agree to

1. ensure that the Machine is free of any legal obligations or restrictions that prevent its exchange;
2. obtain authorization from the owner to have IBM or your reseller service a Machine that you do not own; and
3. where applicable, before service is provided
   a. follow the problem determination, problem analysis, and service request procedures that IBM or your reseller provides,
   b. secure all programs, data, and funds contained in a Machine,
   c. provide IBM or your reseller with sufficient, free, and safe access to your facilities to permit them to fulfil their obligations, and

     d. inform IBM or your reseller of changes in a Machine's location.

IBM is responsible for loss of, or damage to, your Machine while it is 1) in IBM's possession or 2) in transit in those cases where IBM is responsible for the transportation charges.

Neither IBM nor your reseller is responsible for any of your confidential, proprietary or personal information contained in a Machine which you return to IBM or your reseller for any reason. You should remove all such information from the Machine prior to its return.

Production Status
Each IBM Machine is manufactured from new parts, or new and used parts. In some cases, the Machine may not be new and may have been previously installed. Regardless of the Machine's production status, IBM's appropriate warranty terms apply.

Limitation of Liability
Circumstances may arise where, because of a default on IBM's part or other liability, you are entitled to recover damages from IBM. In each such instance, regardless of the basis on which you are entitled to claim damages from IBM (including fundamental breach, negligence, misrepresentation, or other contract or tort claim), IBM is liable for no more than

1. damages for bodily injury (including death) and damage to real property and tangible personal property; and

2. the amount of any other actual direct damages, up to the greater of U.S. $100,000 (or equivalent in local currency) or the charges (if recurring, 12 months' charges apply) for the Machine that is the subject of the claim.

   This limit also applies to IBM's suppliers and your reseller. It is the maximum for which IBM, its suppliers, and your reseller are collectively responsible.

UNDER NO CIRCUMSTANCES IS IBM LIABLE FOR ANY OF THE FOLLOWING: 1) THIRD-PARTY CLAIMS AGAINST YOU FOR DAMAGES (OTHER THAN THOSE UNDER THE FIRST ITEM LISTED ABOVE); 2) LOSS OF, OR DAMAGE TO, YOUR RECORDS OR DATA; OR 3) SPECIAL, INCIDENTAL, OR INDIRECT DAMAGES OR FOR ANY ECONOMIC CONSEQUENTIAL DAMAGES (INCLUDING LOST PROFITS OR SAVINGS), EVEN IF IBM, ITS SUPPLIERS OR YOUR RESELLER IS INFORMED OF THEIR POSSIBILITY. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU.

Part 2 - Worldwide Country-Unique Terms

ASIA PACIFIC

AUSTRALIA: The IBM Warranty for Machines: The following paragraph is added to this Section:
The warranties specified in this Section are in addition to any rights you may have under the Trade Practices Act 1974 or other legislation and are only limited to the extent permitted by the applicable legislation.

Extent of Warranty: The following replaces the first and second sentences of this Section:
The warranty does not cover the repair or exchange of a Machine resulting from misuse, accident, modification, unsuitable physical or operating environment, operation in other than the Specified Operating Environment, improper maintenance by you, or failure caused by a product for which IBM is not responsible.

Limitation of Liability: The following is added to this Section:
Where IBM is in breach of a condition or warranty implied by the Trade Practices Act 1974, IBM's liability is limited to the repair or replacement of the goods or the supply of equivalent goods. Where that condition or warranty relates to right to sell, quiet possession or clear title, or the goods are of a kind ordinarily acquired for personal, domestic or household use or consumption, then none of the limitations in this paragraph apply.

PEOPLE'S REPUBLIC OF CHINA: Governing Law: The following is added to this Statement:
The laws of the State of New York govern this Statement.

INDIA: Limitation of Liability: The following replaces items 1 and 2 of this Section:

1. liability for bodily injury (including death) or damage to real property and tangible personal property will be limited to that caused by IBM's negligence;
2. as to any other actual damage arising in any situation involving nonperformance by IBM pursuant to, or in any way related to the subject of this Statement of Warranty, IBM's liability will be limited to the charge paid by you for the individual Machine that is the subject of the claim.

NEW ZEALAND: The IBM Warranty for Machines: The following paragraph is added to this Section:
The warranties specified in this Section are in addition to any rights you may have under the Consumer Guarantees Act 1993 or other legislation which cannot be excluded or limited. The Consumer Guarantees Act 1993 will not apply in respect of any goods which IBM provides, if you require the goods for the purposes of a business as defined in that Act.

Limitation of Liability: The following is added to this Section:
Where Machines are not acquired for the purposes of a business as defined in the Consumer Guarantees Act 1993, the limitations in this Section are subject to the limitations in that Act.

<u>**EUROPE, MIDDLE EAST, AFRICA (EMEA)**</u>

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**.

Notices

References in this publication to IBM products, programs, or services do not imply that IBM intends to make these available in all countries in which IBM operates. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Subject to IBM's valid intellectual property or other legally protectable rights, any functionally equivalent product, program, or service may be used instead of the IBM product, program, or service. The evaluation and verification of operation in conjunction with other products, except those expressly designated by IBM, are the responsibility of the user.

IBM may have patents or pending patent applications covering subject matter in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to:

> IBM Director of Licensing
> IBM Corporation
> North Castle Drive
> Armonk, NY 10504-1785
> U.S.A.

Licensees of this program who wish to have information about it for the purpose of enabling: (i) the exchange of information between independently created programs and other programs (including this one) and (ii) the mutual use of the information which has been exchanged, should contact IBM Corporation, Department 80D, P.O. Box 12195, 3039 Cornwallis, Research Triangle Park, NC 27709, U.S.A. Such information may be available, subject to appropriate terms and conditions, including in some cases, payment of a fee.

Any references in this publication to non-IBM Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this IBM product and use of those Web sites is at your own risk.

Trademarks

The following terms are trademarks of the IBM Corporation in the United States or other countries:

DB2
IBM
Netfinity

Microsoft, Windows, and Windows NT are trademarks or registered trademarks of the Microsoft Corporation.

Other company, product, and service names may be trademarks or service marks of others.

Electronic emission notices

The following sections provide information on emission notices and specifications.

Class A 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.

Other notices

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.

Australia and New Zealand Class A statement

Attention: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

United Kingdom telecommunications safety requirement

Notice to Customers

This apparatus is approved under approval number NS/G/1234/J/100003 for indirect connection to public telecommunication systems in the United Kingdom.

European community directive conformance statement

This product is in conformity with the protection requirements of EC Council Directive 89/336/EEC on the approximation of the laws of the Member States relating to electro-magnetic compatibility.

Attention: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Taiwanese Electromagnetic Interference (EMI) Statement

警告使用者：
這是甲類的資訊產品，在
居住的環境中使用時，可
能會造成射頻干擾，在這
種情形下，使用者會被要
求採取某些適當的對策。

Power cords

For your safety, IBM provides a power cord with a grounded attachment plug to use with this IBM product. To avoid electrical shock, always use the power cord and plug with a properly grounded outlet.

IBM power cords used in the United States and Canada are listed by Underwriter's Laboratories (UL) and certified by the Canadian Standards Association (CSA).

For units intended to be operated at 115 volts: Use a UL-listed and CSA-certified cord set consisting of a minimum 18 AWG, Type SVT or SJT, three-conductor cord, a maximum of 15 feet in length and a parallel blade, grounding-type attachment plug rated 15 amperes, 125 volts.

For units intended to be operated at 230 volts (U.S. use): Use a UL-listed and CSA-certified cord set consisting of a minimum 18 AWG, Type SVT or SJT, three-conductor cord, a maximum of 15 feet in length and a tandem blade, grounding-type attachment plug rated 15 amperes, 250 volts.

For units intended to be operated at 230 volts (outside the U.S.): Use a cord set with a grounding-type attachment plug. The cord set should have the appropriate safety approvals for the country in which the equipment will be installed.

IBM power cords for a specific country or region are usually available only in that country or region.

IBM power cord part number	Used in these countries and regions
13F9940	Argentina, Australia, China (PRC), New Zealand, Papua New Guinea, Paraguay, Uruguay, Western Samoa
13F9979	Afghanistan, Algeria, Andorra, Angola, Austria, Belgium, Benin, Bulgaria, Burkina Faso, Burundi, Cameroon, Central African Rep., Chad, Czech Republic, Egypt, Finland, France, French Guiana, Germany, Greece, Guinea, Hungary, Iceland, Indonesia, Iran, Ivory Coast, Jordan, Lebanon, Luxembourg, Macau, Malagasy, Mali, Martinique, Mauritania, Mauritius, Monaco, Morocco, Mozambique, Netherlands, New Caledonia, Niger, Norway, Poland, Portugal, Romania, Senegal, Slovakia, Spain, Sudan, Sweden, Syria, Togo, Tunisia, Turkey, former USSR, Vietnam, former Yugoslavia, Zaire, Zimbabwe
13F9997	Denmark
14F0015	Bangladesh, Burma, Pakistan, South Africa, Sri Lanka
14F0033	Antigua, Bahrain, Brunei, Channel Islands, Cyprus, Dubai, Fiji, Ghana, Hong Kong, India, Iraq, Ireland, Kenya, Kuwait, Malawi, Malaysia, Malta, Nepal, Nigeria, Polynesia, Qatar, Sierra Leone, Singapore, Tanzania, Uganda, United Kingdom, Yemen, Zambia
14F0051	Liechtenstein, Switzerland
14F0069	Chile, Ethiopia, Italy, Libya, Somalia
14F0087	Israel
1838574	Thailand
62X1045	Bahamas, Barbados, Bermuda, Bolivia, Brazil, Canada, Cayman Islands, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Japan, Korea (South), Liberia, Mexico, Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Suriname, Taiwan, Trinidad (West Indies), United States of America, Venezuela

Appendix D. Index

V

voltage   89

W

warranty extensions and upgrades   86
warranty service   83
weight   89
World Wide Web home page   79, 81
wrap plug   7, 13, 61

IBM®

Part Number: 09N7722

Printed in U.S.A.