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## Safety Information


 **Danger:** Before you begin to install this product, read the safety information in *Caution: Safety Information—Read This First*, SD21-0030. This booklet describes safe procedures for cabling and plugging in electrical equipment.


 **Varning — livsfara:** Innan du börjar installera den här produkten bör du läsa säkerhetsinformationen i dokumentet *Varning: Säkerhetsföreskrifter— Läs detta först*, SD21-0030. Där beskrivs hur du på ett säkert sätt ansluter elektrisk utrustning.

 **Fare:** Før du begynner å installere dette produktet, må du lese sikkerhetsinformasjonen i *Advarsel: Sikkerhetsinformasjon — Les dette først*, SD21-0030 som beskriver sikkerhetsrutinene for kabling og tilkobling av elektrisk utstyr.

 **Fare!** Før du installerer dette produkt, skal du læse sikkerhedsforskrifterne i *NB: Sikkerhedsforskrifter—Læs dette først* SD21-0030. Vejledningen beskriver den fremgangsmåde, du skal bruge ved tilslutning af kabler og udstyr.


 **Gevaar:** Voordat u begint met de installatie van dit product, moet u eerst de veiligheidsinstructies lezen in de brochure *PAS OP! Veiligheidsinstructies—Lees dit eerst*, SD21-0030. Hierin wordt beschreven hoe u elektrische apparatuur op een veilige manier moet bekabelen en aansluiten.


 **Gevaar** Voordat u begint met het installeren van dit product, dient u eerst de veiligheidsrichtlijnen te lezen die zijn vermeld in de publikatie *Caution: Safety Information - Read This First*, SD21-0030. In dit boekje vindt u veilige procedures voor het aansluiten van elektrische apparatuur.


 **Vorsicht:** Bevor mit der Installation des Produktes begonnen wird, die Sicherheitshinweise in *Achtung: Sicherheitsinformationen—Bitte zuerst lesen*, IBM Form SD21-0030. Diese Veröffentlichung beschreibt die Sicherheitsvorkehrungen für das Verkabeln und Anschließen elektrischer Geräte.





危険： 導入作業を開始する前に、安全に関する小冊子SD21-0030 の「最初にお読みください」(Read This First)の項をお読みください。この小冊子は、電気機器の安全な配線と接続の手順について説明しています。


 **Danger :** Avant d'installer le présent produit, consultez le livret *Attention : Informations pour la sécurité — Lisez-moi d'abord*, SD21-0030, qui décrit les procédures à respecter pour effectuer les opérations de câblage et brancher les équipements électriques en toute sécurité.


 **Danger:** Avant de procéder à l'installation de ce produit, lisez d'abord les consignes de sécurité dans la brochure *ATTENTION: Consignes de sécurité—A lire au préalable*, SD21-0030. Cette brochure décrit les procédures pour câbler et connecter les appareils électriques en toute sécurité.

 **Pericolo:** prima di iniziare l'installazione di questo prodotto, leggere le informazioni relative alla sicurezza riportate nell'opuscolo *Attenzione: Informazioni di sicurezza — Prime informazioni da leggere* in cui sono descritte le procedure per il cablaggio ed il collegamento di apparecchiature elettriche.

 **Perigo:** Antes de iniciar a instalação deste produto, leia as informações de segurança *Cuidado: Informações de Segurança — Leia Primeiro*, SD21-0030. Este documento descreve como efectuar, de um modo seguro, as ligações eléctricas dos equipamentos.

 **Peligro:** Antes de empezar a instalar este producto, lea la información de seguridad en *Atención: Información de Seguridad — Lea Esto Primero*, SD21-0030. Este documento describe los procedimientos de seguridad para cablear y enchufar equipos eléctricos.

 **Perigo:** Antes de começar a instalar este produto, leia as informações de segurança contidas em *Cuidado: Informações Sobre Segurança—Leia Isto Primeiro*, SD21-0030. Esse folheto descreve procedimentos de segurança para a instalação de cabos e conexões em equipamentos elétricos.

 **VAARA:** Ennen kuin aloitat tämän tuotteen asennuksen, lue julkaisussa *Varoitus: Turvaohjeet—Lue tämä ensin*, SD21-0030, olevat turvaohjeet. Tässä kirjasessa on ohjeet siitä, miten sähkölaitteet kaapeloidaan ja kytketään turvallisesti.



위험: 이 제품을 설치하기 전에 반드시  
"주의: 안전 정보-시작하기 전에"  
(SD21-0030) 에 있는 안전 정보를  
읽으십시오.



危險：安裝本產品之前，請先閱讀  
"Caution: Safety Information--Read  
This First" SD21-0030 手冊中所提  
供的安全注意事項。這本手冊將會說明  
使用電器設備的纜線及電源的安全程序。



Uwaga:  
Przed rozpoczęciem instalacji produktu należy zapoznać się z instrukcją:  
"Caution: Safety Information - Read This First", SD21-0030.  
Zawiera ona warunki bezpieczeństwa przy podłączaniu do sieci elektrycznej  
i eksploatacji.



**Upozornění:** než zahájíte instalaci tohoto produktu, přečtěte si  
nejprve bezpečnostní informace v pokynech „Bezpečnostní  
informace“ č. 21-0030. Tato brožurka popisuje bezpečnostní  
opatření pro kabeláž a zapojení elektrického zařízení.



**Vigyázat:** Mielőtt megkezdi a berendezés üzembe helyezését, olvassa el a  
*Caution: Safety Information— Read This First*, SD21-0030 könyvecskében leírt  
biztonsági információkat. Ez a könyv leírja, milyen biztonsági intézkedéseket kell  
megtenni az elektromos berendezés huzalozásakor illetve csatlakoztatásakor.



Pozor: Preden začnete z instalacijo tega produkta  
preberite poglavje: "Opozorilo: Informacije  
o varnem rokovanju-preberi pred uporabo,"  
SD21-0030. To poglavje opisuje pravilne  
postopke za kabliranje,



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## About This Manual

This manual explains how to plan for, install, administer, and service an IBM 8271 Nways Ethernet LAN Switch Model 108 or Model 216

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## Who Should Read This Manual

Different sections of this manual are intended for different audiences.

<b>Planning</b>	Network planner or administrator
<b>Installation</b>	Technician or electrician
<b>Configuration</b>	Network administrator
<b>Service</b>	Service engineer or network administrator

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## How This Manual Is Organized

- Chapter 1, Physical Characteristics and Features of the IBM 8271 Nways LAN Switch provides a brief overview of the 8271.
- Chapter 2, Network Planning and Installation Preparations explains how to plan for installing and configuring an 8271.
- Chapter 3, Installation describes installation and cabling procedures.
- Chapter 4, Configuring the 8271 explains how to configure the 8271.
- Chapter 5, Using the Statistics Panels explains how to view 8271 statistics.
- Chapter 6, Troubleshooting provides troubleshooting procedures.
- Chapter 7, Downloading Software and BootP Information describes procedures for downloading new code.

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## Prerequisite Publications

*Caution: Safety Information—Read This First*, Form Number SD21-0030-02

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## Related Publications

If you need information about permanently installed cabling for Ethernet 10BASE-T and IBM 8271 installations, consult the EIA/TIA-568 *Commercial Building Telecommunications Wiring Standard*, which is available for a fee from Global Engineering Documents, 1-800-854-7179.

Another related publication, available from IBM, is "An Inside Look at IBM Workgroup Hubs and Switches" May 1995, form number GG24-2528-00.



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## Chapter 1. Physical Characteristics and Features of the IBM 8271 Nways LAN Switch

LAN switches are important network components and considered the most cost-effective way to address the current performance concerns of workgroup LANs. LAN segmentation improves LAN performance by reducing contention, and LAN switches offer a high-performance, low-cost method for interconnecting LAN segments. The IBM 8271 Nways LAN Switch (hereafter referred to as the *8271*, *Model 108* or *Model 216*), creates multiple, concurrent paths among connected Ethernet LAN segments, each path supporting the full 10-Mbps Ethernet bandwidth. This chapter discusses the characteristics of the 8271.

The 8271 forwards Ethernet frames among multiple, shared or dedicated Ethernet LAN segments via Ethernet 10BASE-T or attachment unit interface (AUI) connections. Similar in function to a multiport Ethernet transparent bridge, the 8271 uses Ethernet MAC addresses to forward Ethernet frames from one of its ports to another.

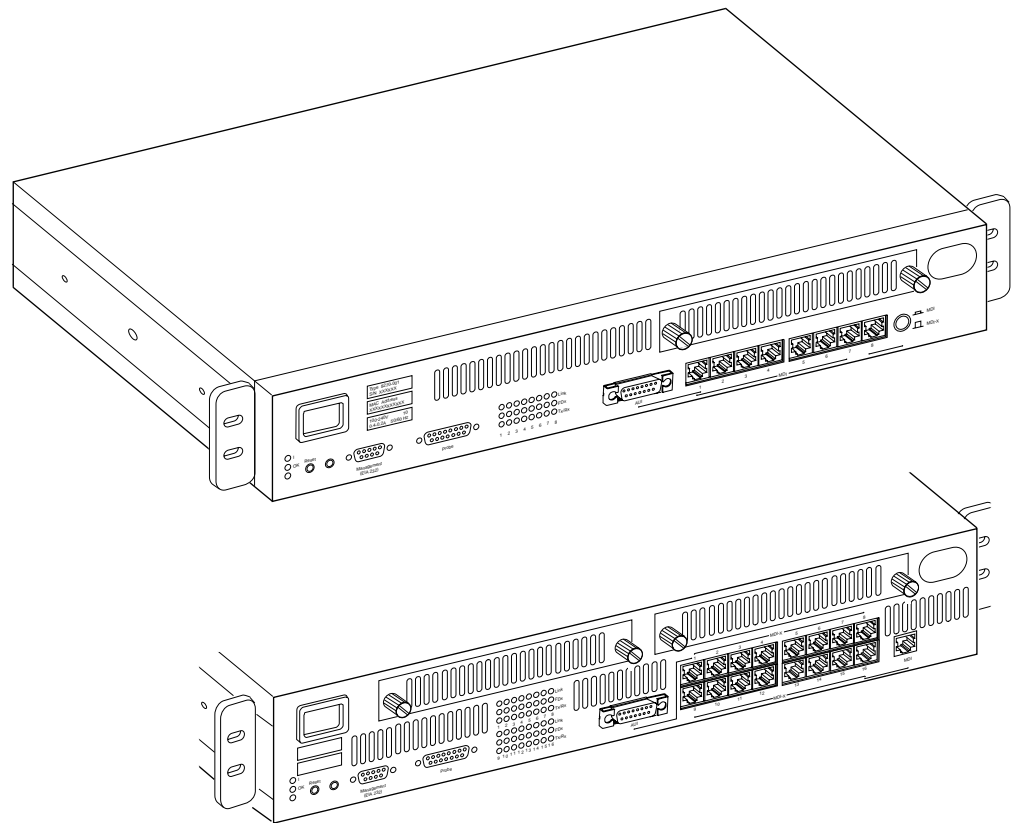


Figure 1-1. The IBM 8271 Nways LAN Switch Model 108 and Model 216



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## Product Features

The 8271 comes preconfigured with the appropriate default settings for Plug and Play capability. You do not have to configure the 8271. The 8271 includes the following features:

### IEEE 802.3 compliance

Full compliance with the IEEE 802.3 Ethernet Standard.

### Transparent switching

Plug and Play provides the following advantages:

- Automatic learning of network configuration.
- Transparency to high-level protocol.

### Variable switching modes

The 8271 provides the following switching modes:

- **Cut-through mode**, which provides the benefits of high-speed (less than 50 microseconds delay) switching. Frames are forwarded as soon as the address has been received.
- **Store-and-forward mode**, which provides more error isolation when the operating environment demands it. The entire frame must be received and checked before it is forwarded.
- **Adaptive mode** offers the benefits of both modes. You can configure the 8271 to alternate automatically between cut-through and store-and-forward switching based on user-specified thresholds.

### Runt-Free Switching

For added reliability, when the 8271 is operating in Cut-through mode it will not forward packets of less than 64 bytes, thus further reducing the possibility of collisions.

### Virtual Switching

The virtual switch feature allows you to divide a single 8271 into as many as eight separate domains, or virtual switches, each with its own Internet Protocol (IP) address. Packets are forwarded between ports in the same domain only.

### 8271 MAC and IP address

The 8271 comes with a factory-assigned station address (also called a *MAC address*). You can also configure the 8271 with an IP address.

### MAC Addresses

The 8271 supports a maximum of 1790 active Ethernet MAC addresses per port, but no more than 10 000 for each 8271.

You can configure address table aging parameters by port and for the entire 8271. You can also configure the 8271 to clear space in the address tables when a user-specified threshold is exceeded.

## **MAC address filtering**

You can restrict access between certain users or segments. The 8271 controls traffic on the network by allowing up to 100 MAC addresses to be selectively filtered at the port of entry into the 8271.

## **EtherPipes**

You can configure ports in connected 8271s to create two to four parallel links, thus increasing capacity between 8271s to support up to 40 Mbps half-duplex (HDX) or 80 Mbps full-duplex (FDX).

## **Management**

Console management via the serial port or Telnet. You can download software upgrades through the serial port or by means of TFTP.

You can initiate a download command from the console menu or as a result of corrupted flash detection during the power-on self-test (POST). When you initiate this command, the 8271 accepts the new downloaded file using the Xmodem file transfer protocol in a terminal emulator.

## **Simple Network Management Protocol**

The 8271 selectively accepts either Ethernet or IEEE 802.3 management frames.

## **Statistics**

The 8271 keeps statistics by port, connected station, and for the entire switch.

## **Ease and adaptability**

The 8271 provides

- Plug and Play for transparent forwarding
- Easy installation
- Rack or surface mounting

# Physical Characteristics

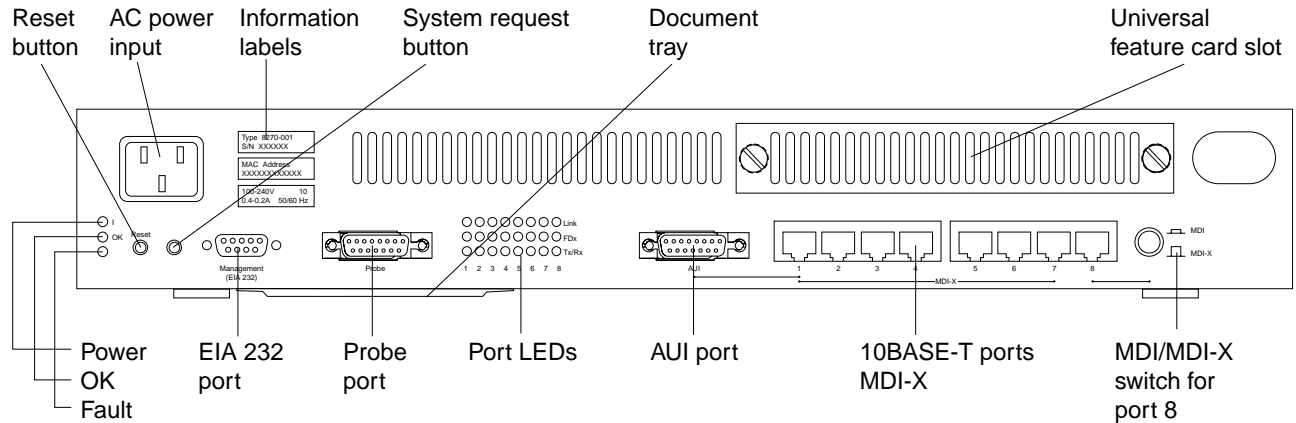


Figure 1-2. Locations of LEDs, Switches, and Connectors for Model 108

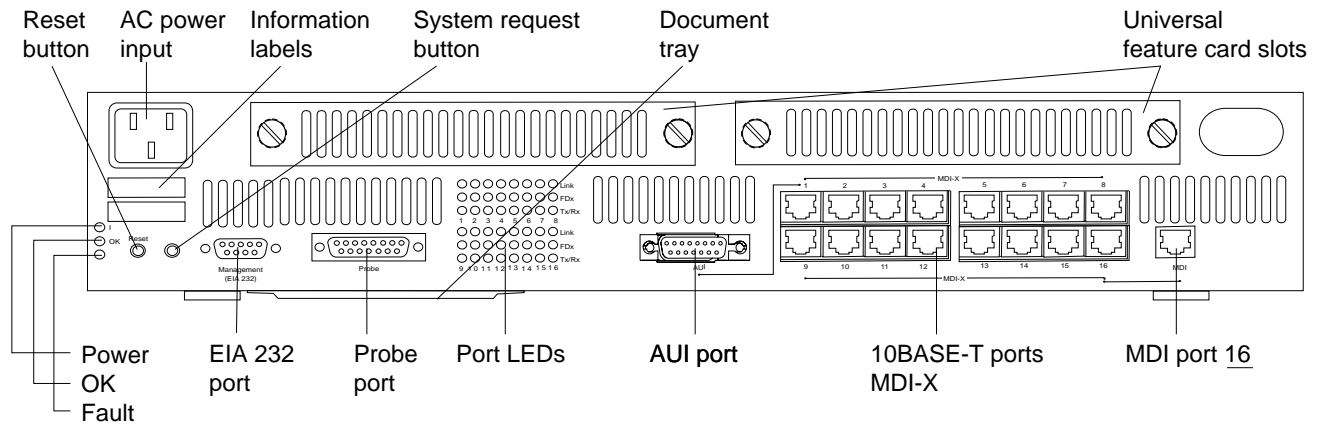


Figure 1-3. Locations of LEDs, Switches, and Connectors for Model 216

## EIA 232 Port

This 9-pin, male, management port functions as a data terminal equipment (DTE) port.

With this port you can attach a terminal or terminal emulator to use when customizing the switch’s configuration, monitoring switch activity and status, and testing the switch. Console access can be either local, by direct attachment to the EIA 232 port, or remote, through a modem connection.

## Service Information Card

Store the Service Information Card in the document tray shown in Figure 1-2 and Figure 1-3. This card explains the LEDs and their meanings, and provides space for you to record cabling information.

## Ethernet Ports

Whether connected to shared- or dedicated-media LAN segments, you can connect each of the fixed 10BASE-T ports on the switch to a port on any external 10BASE-T hub or repeater, using your own UTP cable. Alternatively, a 10BASE-T port on the 8271 can be connected directly to an HDX or FDX Ethernet LAN workstation without an intervening Ethernet repeater or hub.

### ***RJ-45 Connectors***

- Model 108 includes eight shielded RJ-45 connectors for 10BASE-T connection.
- Model 216 includes sixteen shielded RJ-45 connectors for 10BASE-T connection.

### ***Duplex Mode***

- Ports allow HDX connections to other switches, hubs and end nodes, or FDX connections to other switches and end nodes.

### ***MDI or MDI-X***

- Model 108 ports 1–7 are configured as medium-dependent interface crossed (MDI-X). Port 8 has a push button to convert from medium-dependent interface (MDI) to MDI-X.
- Model 216 ports 1–15 are configured as MDI-X. Port 16 has two connectors; one is MDI-X and the other is MDI. You can use only one of these connections at any time.

### ***AUI connector***

- One automatically configured AUI connector.
- Use the AUI port in place of the first 10BASE-T port. All ports, including the AUI port, are FDX capable.
- The AUI port enables you to connect an 8271 to a 10BASE5, 10BASE2, or 10BASE-Fn network segment by using the appropriate transceiver or medium attachment unit.

### ***Shielded Twisted-Pair Cables***

- Support for the IBM Cabling System via 150-ohm, shielded twisted-pair (STP) cables with impedance-matching baluns.

## EtherProbe Port

The EtherProbe port is labeled “Probe” (see Figure 1-2 on page 1-4 and Figure 1-3 on page 1-4).

A network analyzer attached to the EtherProbe port can monitor any of the 10-Mbps Ethernet ports. FDX ports can be monitored by an HDX network analyzer by configuring the port to monitor either transmitted or received data.

## Universal Feature Card Slot and Cards

Model 108 has one UFC slot and Model 216 has two UFC slots that will accommodate optional, field-installable, UFCs that provide either additional connections or functionality. (See Figure 1-2 on page 1-4 and Figure 1-3 on page 1-4.)

Current UFCs provide the following types of connections:

- One-port, 100BASE-T Ethernet
- One-port, 100BASE-FX Ethernet
- Three-port, 10BASE-FL Ethernet
- Four-port, 10BASE-T Ethernet

Future UFCs will provide the following types of connections:

- One-port, 155-Mbps ATM
- One-port, FDDI DAS/Fiber
- One-port, FDDI SAS/Fiber
- One-port, FDDI SAS/UTP
- One-port RMON

## Reset Button

**Attention:** The 8271 has a Reset button, that is located on the front panel of the switch. Pressing the Reset button resets the hardware and software and clears all tables and memory, including the address tables. Pressing the Reset button does not clear those values stored in non-volatile random access memory (NVRAM).

## System Request Button

**Attention:** This unlabeled button is located on the front panel beside the Reset button. Pressing the button causes the System Request Menu to appear on the console device attached to the EIA 232 port. See “Initiating a Download with the System Request Menu” on page 7-3 for more information.

**Note:** This function should be used only at the direction of service personnel.

## Status and Activity Indicators

The 8271 has three general status LEDs, and each 10BASE-T and AUI port has three LEDs. Refer to Figure 1-2 on page 1-4 and Figure 1-3 on page 1-4 for the locations of all the LEDs.

Table 1-1 lists the status LEDs and their meanings.

*Table 1-1 (Page 1 of 2). Status LEDs and Their Meanings*

LED	Position	State	Meaning
(Power) (green)	Top	On	The 8271 power supply current is good.
		Off	The 8271 power supply current is bad.
OK (green)	Middle	On	The 8271 is working correctly.
		Off	The 8271 is not working correctly.

Table 1-1 (Page 2 of 2). Status LEDs and Their Meanings

LED	Position	State	Meaning
Unlabeled (Fault) (amber)	Bottom	On	A power-on failure has occurred.
		Off	The 8271 is working correctly.
		Blinking	Diagnostics are in progress.

Table 1-2 lists the port LEDs and their meanings.

Table 1-2. Port LEDs and Their Meanings

LED	Position	Meaning When On
Link (green)	Top	A cable is connected to the 10BASE-T port, the port detects that a device is connected to the other end of the cable, and the port is receiving a link pulse from the device.
FDX (green)	Middle	The port has been set to full-duplex mode.
Tx/Rx (green)	Bottom	Data is being transmitted or received by the port.

**Note:** The port 1 Tx/Rx LED might blink even if there is no device attached to it because port 1 defaults to AUI. This is normal.

## Physical Dimensions

Table 1-3. Port LEDs and Their Meanings

	Model 108	Model 216
Width	440 mm (17.3 in.)	440 mm (17.3 in.)
Depth	356 mm (14 in.)	356 mm (14 in.)
Height	66 mm (2.6 in.)	88 mm (3.5 in.)
Weight	6.4 kg (14 lb)	7.8 kg (17 lb)

## Power Requirements

The 8271's auto-ranging power supply operates on line voltage in the range of 100 to 127 or 200 to 250 V ac, and 50/60 Hz. An appropriate power cord is shipped with the 8271.

## Operating Environment

Temperature	10° to 40° C (50° to 104° F)
Relative Humidity	8% to 80%
Maximum Wet-Bulb Temperature	27° C (81° F)
Calorific Value	
Model 108	70 kcal/hr (275 BTU/hr)
Model 216	125 kcal/hr (500 BTU/hr)
Electrical Power	
Model 108	0.16 kVA
Model 216	0.24 kVA
Capacity of Exhaust	0.4 m <sup>3</sup> /min (10.6 ft <sup>3</sup> / min)
Noise Level	56 dB
Leakage/Starting Current	0.5 ma/40 amperes/half cycle

## Functional Overview

The 8271 forwards Ethernet frames at media speeds. With a parallel internal design, the 8271 can maintain media-speed frame transfer between each of the possible four (for the Model 108) or eight (for the Model 216) distinct pairs of ports simultaneously. This feature means Model 108 provides up to 40 Mbps in HDX mode and up to 80 Mbps if all ports are FDX-enabled. The Model 216 provides up to 80 Mbps in HDX mode and up to 160 Mbps in FDX mode. Networks with traffic patterns able to take full advantage of the 8271 could sustain throughput equivalent to four or eight 20-Mbps connections.

You can connect the 8271 fixed ports to the following devices:

- Another switch
- Shared media
- Dedicated media

### Shared Media

*Shared-media* LAN segments consist of two or more Ethernet LAN stations that are part of the same collision domain and share the 10 Mbps associated with that segment. The collision domains of attached segments stop at the 8271.

### Dedicated Media

*Dedicated-media* LAN segments consist of a single Ethernet LAN station that is able to use the entire 10 Mbps (HDX) or 20 Mbps (FDX) associated with that segment. The collision domains of attached segments stop at the 8271.

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## Management and Control

You can configure the 8271 by connecting a DEC VT-100-compatible terminal to the EIA 232 port on the front panel of the switch. You can connect this terminal directly to the 8271, or you can connect remotely using a modem. You can also use this terminal to view status and statistics, load code and to control 8271 functionality.

As an alternative to management via the serial connection, the 8271 contains an SNMP (MIB-II compliant) management agent that allows you to examine and modify management data, and to obtain status on, or control of, 8271 operation using your own SNMP management station, such as the IBM NetView for AIX program or the IBM NetView for Windows program.

You can also use a Telnet session to view or control the 8271.

Upgrades to the functional code within the 8271 can be effected through the same serial port on the front of the switch used for configuration. The code is downloaded from a workstation using the Xmodem protocol.

Code upgrades can also be accomplished using TFTP.





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## Chapter 2. Network Planning and Installation Preparations

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### Preparations

The following suggestions will help you prepare for the installation of your 8271 switch:

1. Make a sketch of the network to which you will be adding one or more 8271s, especially if your institution is a large one. Be sure to include major elements of the network such as hubs and concentrators as well as servers, bridges, and routers.
2. Get connectivity and physical planning information about the network segments to which you will be attaching your 8271.
3. If you will be using permanently installed telecommunications wiring, get information about the cabling installation that will allow you to determine the termination points of every cable, the cable type, connector type (if any), and the distance between termination points.
4. Get building floor-plans and wiring closet layouts.

---

### Rules to Remember

This section will help you understand the physical configuration restrictions for the 8271. In brief, you must remember the following rules when planning to install the 8271:

- For shared-media LAN segments, acceptable cabling distances are defined by the hub or concentrator attached to the 8271 port.
- Use a star-wired topology when interconnecting 8271s.
- Read the *READ.ME* file shipped with this product for any new restrictions or cautions.

The following sections provide greater detail about the physical restrictions.

### Cables and Distances between Devices

Devices attached to the RJ-45 jacks on the front of the 8271 follow the cabling rules established in the IEEE 802.3 standard for 10BASE-T Ethernet implementations. For installations where permanently installed building cabling is available, UTP category 3, 4, or 5 cabling up to 100 m (328 ft), including patch and equipment cabling, can be used. Termination hardware should always match the category of cable that is terminated on it.

IBM Cabling System 150-ohm, STP cables (types 1 and 9) can also be used following the same distance restrictions as the UTP cables. Because the RJ-45 connectors on the 8271 use pins 1, 2, 3, and 6, a cable with an IBM STP data connector on one end and an RJ-45 connector on the other must be constructed. Figure B-3 on page B-3 illustrates how to build this cable.

Installations using 150-ohm, STP or STP-A cabling must use impedance-matching baluns at each workstation or repeater attached to the 8271. In addition, each port

on the 8271 that uses 150-ohm, STP or STP-A cable should have a balun attached to it.

For installations where cabling will be done using patch cables, the same distance limitations apply. Be careful to make sure that the patch cables are made up of components that are at least category 3 UTP or better. IBM Cabling System 150-ohm, type 6 patch cables can also be used following the same rules as for permanently installed STP or STP-A cables.

The AUI connector on port 1 and the Probe port require a standard AUI cable. It is constructed like the one in Figure B-5 on page B-3. The maximum length of an AUI cable between the 8271 and the transceiver is 50 m (164 ft). AUI cables provide a means of connecting 10BASE2, 10BASE5, and fiber network segments.

**Note:** If an AUI cable is attached to the AUI connector of port 1, you cannot use the RJ-45 connector at port 1 to provide attachment to another segment.

### Crossover Cables

Crossover cables are used when connecting like ports, MDI to MDI or MDI-X to MDI-X. All other 10BASE-T connections use straight-through cables. Figure B-1 on page B-2 and Figure B-2 on page B-2 illustrate the correct wiring of straight-through and crossover for UTP cables. Figure B-3 on page B-3 and Figure B-4 on page B-3 illustrate the correct wiring of straight-through and crossover for STP cables.

## Interconnecting 8271s

You can connect 8271s together to form large networks without violating the 10BASE-T repeater rule, because the 8271 is a switch and not a repeater. As in other configurations, the effective capacity between the 8271s is 20 Mbps, when the ports on both switches are set up for FDX operation.

The topology of a cascaded network of 8271s is very important from a performance perspective. A star-wired topology as shown in Figure 2-1 on page 2-3 must be used to achieve maximum bandwidth, and it provides a preferred topology for network problem determination because no single cable carries all of the traffic on the network. If the topology connected the 8271s serially, each connecting cable and 8271 could potentially divide the network should a failure occur, and capacity would also be reduced.

Note that Figure 2-1 on page 2-3 shows the lower six Model 108s connected at port 8 (in MDI connection), and the Model 216s connected at the MDI port 16. This is recommended because the MDI makes it easy to get the connection working regardless of the cable type (crossover or straight-through) available.

Creating parallel paths directly between two 8271s will result in unsatisfactory network operation unless the spanning tree algorithm or an EtherPipe is configured. Because the spanning tree algorithm was designed especially to prevent loops in networks that use transparent bridging, the algorithm will block a port of one of the 8271s in the parallel paths. If the port in the primary path fails, the port that has been blocked will change automatically to the forwarding state, keeping the network working.

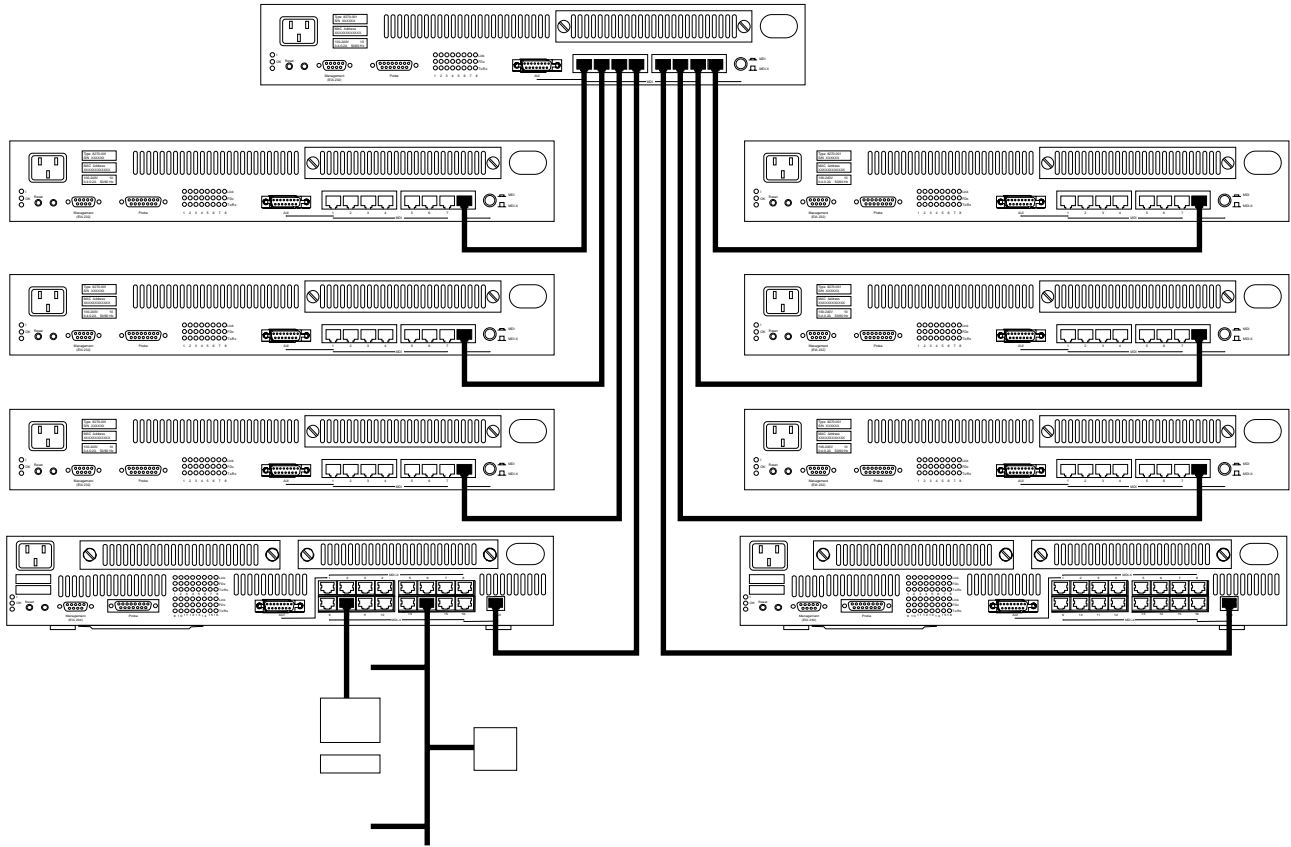


Figure 2-1. Interconnected 8271s

## Sample Applications

The 8271 allows you to make incremental changes in your network to address both immediate and long-range performance challenges. For example, an Ethernet LAN of 24 stations and 2 servers might experience performance problems as a result of increased traffic. As it is currently structured, the LAN looks like the one in Figure 2-2. All of the stations are attached to four, eight-port, 10BASE-T repeaters located in a single wiring closet.

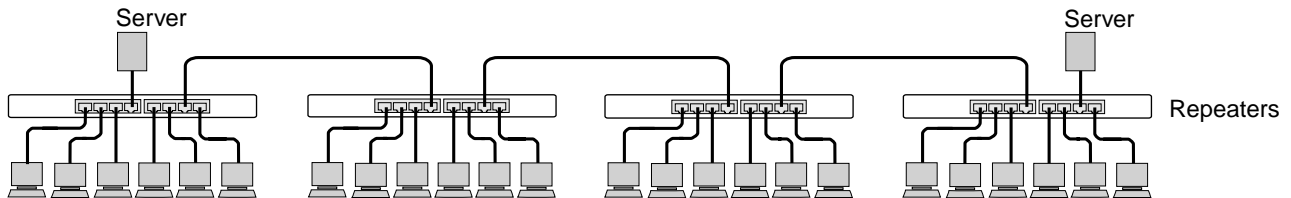


Figure 2-2. Typical Ethernet LAN

Include the 8271 and divide the LAN into four segments of six stations each. Connect the repeater for each segment to a port on the 8271 using a UTP patch cable. Finally, remove the two servers from the repeaters to which they have been attached and move their cables to two ports on the 8271 (see Figure 2-3).

Each group of six users attached to a repeater now shares a dedicated 10-Mbps path to the server. Each of the servers now has a dedicated, 10-Mbps path upon which to service requests. The overall capacity of this solution is 30 Mbps—a threefold increase.

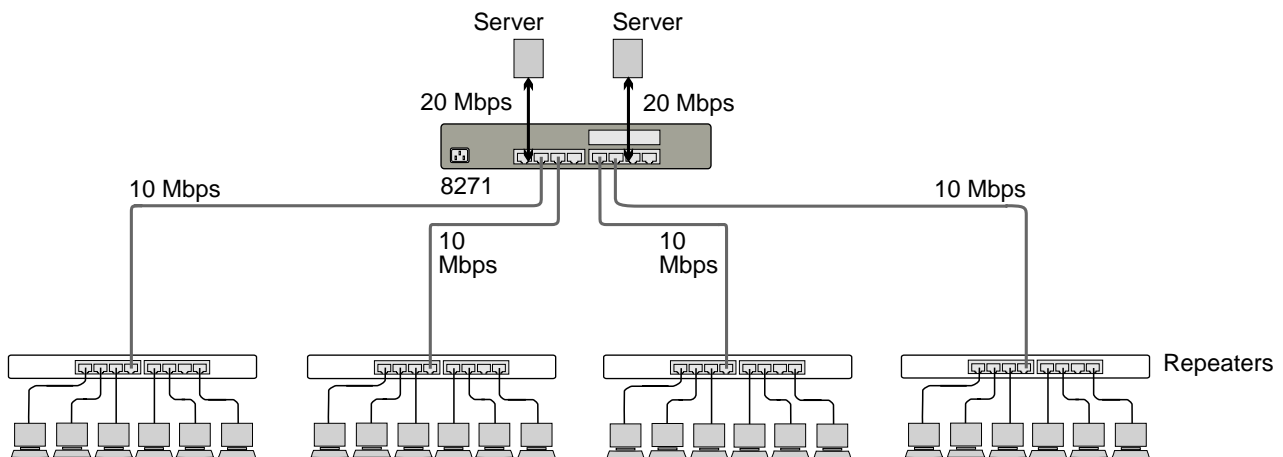


Figure 2-3. Adding the 8271 to a Typical Ethernet LAN

Typically, the first point of congestion in your newly configured network would be the servers. Because the normal mode of operation for an Ethernet adapter is half duplex, the servers can either send or receive information with one other segment attached to the switch. However, if the servers are equipped with full-duplex adapters, such as the IBM EtherStreamer MC 32 Adapter, and are attached as a single-station segment as shown in Figure 2-3, they can send and receive data simultaneously. Each server now has a 20-Mbps access to the network. If you use an IBM Dual EtherStreamer MC 32 Adapter, which requires two ports on the 8271, each server now has a 40-Mbps access to the network, as shown in Figure 2-4 on page 2-5.

As more and more high-demand LAN applications become available, users will migrate from shared-media LANs to dedicated-media LANs. A logical first step in that migration is to move users from the shared-media LAN segments shown in Figure 2-2 to single-station segments, each attached directly to a port of an 8271 switch. Just remove the 8-port repeaters and replace them with 8271 switches. You can link switches by connecting them port-to-port as shown in Figure 2-4. The throughput for this configuration is 80 Mbps, an eightfold increase over the original 10BASE-T LAN. By using full-duplex adapters you can double the available capacity at each of the client stations, as shown at the bottom of Figure 2-4.

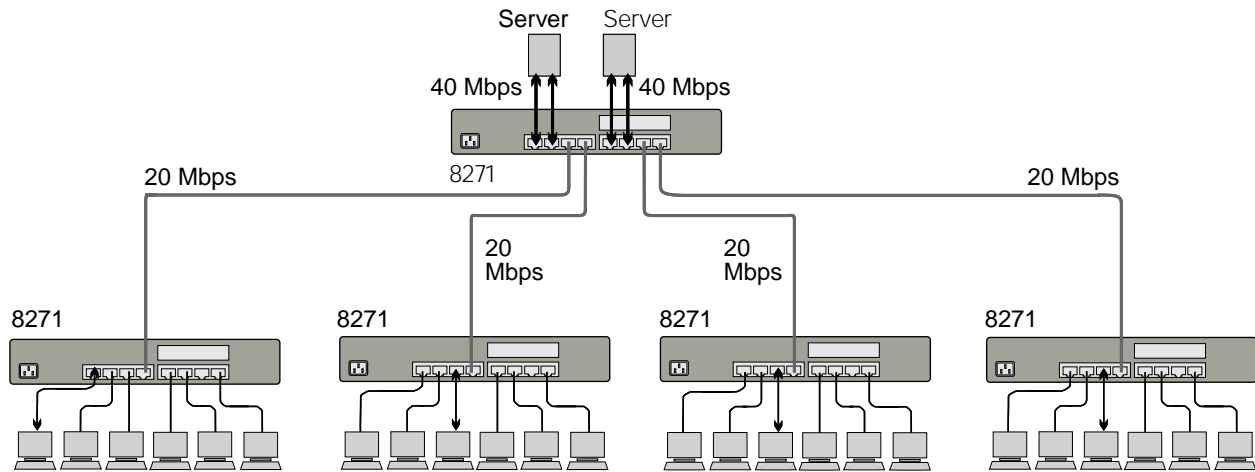


Figure 2-4. Relieving Server Congestion

## Filling Out the Planning Charts and Worksheets

As part of the planning process, the following charts and worksheets might be useful for you. Copies of the charts are available in Appendix A, "Planning Charts." Depending upon your network installation, you might not need all of the charts and worksheets provided. For example, a network of a single 8271 and eight directly attached, single-station segments would not need the Locator Charts. On the other hand, the 8271 Cabling Chart and the Configuration Parameter Worksheet are useful for even the smallest LAN segment.

### Rack Inventory Chart

The Rack Inventory Chart allows you to keep track of all components installed in each rack in your establishment to facilitate planning and installation. This chart is particularly useful for larger installations. See Appendix A, "Planning Charts."

### The IBM 8271 Cabling Chart

The information on the Cabling Chart is used by the installer to place the 8271 in its assigned location and connect the appropriate cables to it.

In the section labeled "Port Type," for port 1, check the box to indicate whether an AUI or 10BASE-T connection is required. Remember that you can select only one connection.

In the section labeled "Cable Type":

1. For port 1 with an AUI connection, check the AUI box.

2. For all 10BASE-T connections, choose either UTP for 100-ohm, unshielded twisted-pair cables or STP for 150-ohm, shielded twisted-pair cables.
3. Then, choose whether the cable should be straight-through or crossover, depending upon the device at the other end. Straight-through cables are required between an 8271 and a single-station segment (MDI-X-to-MDI connections). MDI-to-MDI or MDI-X-to-MDI-X connections use crossover cables. Remember that port 8 on Model 108 can use either kind of cable for any connection. On Model 216 you select the appropriate connector (MDI or MDI-X) as port 16.

Table 2-1 lists the types of ports usually found on attached devices.

*Table 2-1. Typical Port Types*

<b>Connecting Device</b>	<b>Typical Port Type</b>
Hub, repeater	MDI-X
Server, personal computer, workstation	MDI
Model 108 ports 1–7	MDI-X
Model 108 port 8	MDI or MDI-X switchable
Model 216 ports 1–15	MDI-X
Model 216 port 16	MDI or MDI-X

4. Check the box at the EIA 232 port if a cable will be permanently attached. For example, for easy access to the out-of-band management features of the 8271, you might want it permanently attached to a modem. Indicate whether a null modem is required.
5. In the “Connect to” section of the chart, supply enough information to make attachment to the device at the other end of the port. For example, a connection to a 10BASE-T repeater in another wiring closet might contain the cable termination points in both closets, the cable number, the unit number of the repeater, and the number of the port through which it will be connected to the 8271. On the other hand, if the repeater is in the same room or rack as the 8271, the repeater’s unit number and the port to be used for connection to the 8271 is sufficient.

For the EIA 232 port, indicate whether the 8271 is permanently attached to a modem or console.

### **The Service Information Card**

Complete this card and place it in the document tray under the left, front edge of the 8271. Some of the information on the planning charts is duplicated on the card. Should the 8271 require service, the card will be more readily available than the planning charts.

---

## **Planning for Configuration and Management**

Under some conditions, the 8271 can be used just as it comes from the factory. However, to do so would be suitable in small and simple network environments only. Any SNMP-managed network requires some configuration changes.

To use SNMP management, you must first enter the initial IP address and configure SNMP parameters from the console or with BootP. You can use either

the console, Telnet, or an SNMP managing entity, such as Netview for AIX or Windows with the MIBs loaded to view or change all parameters or management information (except for the spanning tree parameters). You can view but not change the spanning tree parameters from an SNMP manager.

## Filling Out the IBM 8271 Configuration Parameters Worksheet

You should prepare one of these worksheets for each 8271 you plan to install in your network. The items on the worksheet follow the same order as the prompts that appear on the console attached to the EIA 232 port.

**Step 1.** Copy the IBM 8271 Configuration Parameters Worksheet found in Appendix A, "Planning Charts."

**Step 2.** Fill out this worksheet while you read through "Configuring the 8271 Using Console Panels" on page 4-8. Be sure to indicate the locally assigned unit number at the top of the worksheet. The worksheet should be filled out either before you configure the 8271 or while you are configuring it. It is important to have a completed, accurate worksheet on file because it represents the only backup for the configuration data in the 8271 itself.

## Filling Out the Locator Charts

Each of the attaching devices in your establishment is assigned to a specific physical location. Further, each attaching device has a unique identification number. You have used these identifiers to indicate specific attaching devices on your cabling charts.

On the network, however, an attaching device is known not by its location or assigned identification number, but by its MAC address. This address can be one of two types: universally administered or locally administered. Find out the MAC address of each attached device, using its documentation if necessary.

In addition, the 8271 has a universally administered base MAC address that can be displayed on the console by looking at the System Information Menu. It is also printed on the label as shown in Figure 2-5 on page 2-8. Each port and each configured virtual switch also require a MAC address. The base MAC address ends in 0 and each port increments the number by one. For example, the port 1 MAC address is the same as the base MAC except that it ends in 1, port 5 ends in 5, and so forth. Each configured virtual switch or domain assumes the MAC address of the lowest-numbered port in the domain.



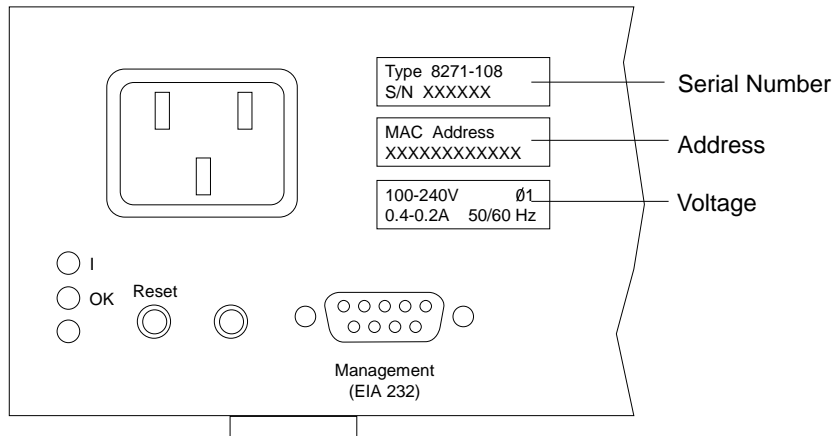


Figure 2-5. 8271 Labels

The locator charts relate adapter addresses to the physical location and device identification numbers. These charts are useful for problem determination and should be kept current, especially in larger installations.

- Step 1.** Make a copy of the charts found on pages A-14 and A-15.
- Step 2.** On the Adapter Address to Physical Location Locator Chart, record the addresses of all devices in the network in numerical order.
- Step 3.** On the Physical Location to Adapter Address Locator Chart, record the physical locations of all devices by building and room number.
- Step 4.** In the “Device Identification” column on both charts, in addition to entering the device identification, you should also indicate such functions as switches, hubs, print servers, file servers, gateways, and bridges.

---

## Chapter 3. Installation

This chapter explains the equipment that you need to install the 8271 and describes the installation procedure.

Before installing the 8271, be sure to read "Electronic Emission Notices" in Appendix C on page C-1.

---

### Installation Summary

Table 3-1 outlines the steps you must complete to install the 8271.

*Table 3-1. 8271 Installation Procedures*

Step	Procedure	Reference
1.	Read the safety manual shipped with the 8271.	Form number SD21-0030
2.	Plan for installation.	Chapter 2, "Network Planning and Installation Preparations"
3.	Unpack the 8271.	"Unpacking Instructions"
4.	Gather materials.	"Gather the Other Materials You Will Need" on page 3-2
5.	Install the UFC.	"Installing a Universal Feature Card" on page 3-2
6.	Mount the 8271.	"Setup" on page 3-3
7.	Connect the 8271 to the network.	"Cabling" on page 3-5
8.	Verify the operation of the 8271.	"Powering On the 8271" on page 3-8
<b>Note:</b> Complete the following step only if you will be customizing the configuration of the 8271 or monitoring its activity.		
9.	Configure the 8271.	Chapter 4, "Configuring the 8271"

---

### Unpacking Instructions

There are no special safety precautions that need to be taken when unpacking the 8271. Simply follow these steps:

- Step 1.** Open the large carton.
- Step 2.** Remove the power cord, publication package, and cable management bracket.
- Step 3.** Remove the 8271 from its protective packaging.
- Step 4.** Visually inspect the 8271 to ensure that it was not damaged during shipment.
- Step 5.** Verify that the items listed here are in the package.

Along with this manual, the package should contain:

- One 8271 with mounting brackets attached
- One cable management bracket
- One SNMP MIB diskette

- One power cord
- One safety manual
- One Service Information Card

If any item is missing or damaged, contact your place of purchase.

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## Gather the Other Materials You Will Need

To install the 8271, you need the following items:

- If the unit will be installed in a rack, you need:
  - A rack inventory chart and a cabling chart from your network administrator.
  - Screws (two for Model 108, four for Model 216) appropriate for your rack and a suitable screwdriver. (Make sure that you have the appropriate screws before you begin installation.)
  - The cable management bracket (shipped with the 8271).
- If the unit will be installed on a surface (such as a tabletop), you will need:
  - A cabling chart from your network administrator.
  - A flat-tip screwdriver for reattaching the mounting brackets to the 8271.

---

## Installing a Universal Feature Card

Follow these steps to install a UFC if you have received one.

- Step 1.** Remove the UFC from its box.
- Step 2.** Remove the plate covering the UFC slot on the front of the 8271 by removing the two thumbscrews holding it in place. See Figure 3-1. Retain the plate and thumbscrews for use in the event that the UFC is ever removed.
- Step 3.** Insert the card in the UFC slot carefully, making sure that the connector on the card is seated in the connector at the back of the slot.
- Step 4.** Secure the card with the two thumbscrews attached to it. This is illustrated in the publication that is shipped with the UFC.

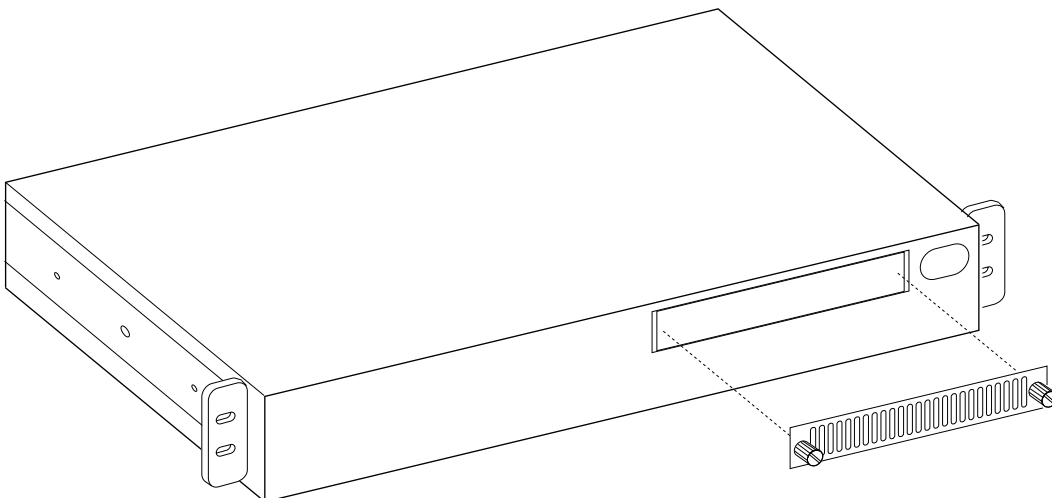


Figure 3-1. Removing the UFC Slot Cover

**Step 5.** Continue with the instructions under “Setup” on page 3-3.

---

## Setup

Use the IBM 8271 Cabling Chart in Appendix A, “Planning Charts,” to determine whether the switch will be mounted in a rack or on a surface (such as a tabletop).

**Step 1.** If the 8271 is to be rack mounted (the preferred mounting style), continue with “Rack Mounting the 8271.”

**Step 2.** If it is to be surface mounted, go to “Surface Mounting the 8271” on page 3-4.

## Rack Mounting the 8271

Follow these steps to mount the 8271 in a rack:

**Step 1.** Look at the rack inventory chart provided by your network administrator to determine where in the rack the 8271 should be mounted.

**Step 2.** Obtain two screws that fit the mounting holes in the rack and put them and the cable management bracket within reach of the front of the rack.

**Step 3.** Place the 8271 in the rack, lining up the holes on the rack with those on the mounting brackets. Only two holes are needed for mounting Model 108. Model 108 takes up 1.5 units in a standard EIA rack. When the top of the Model 108 is even with an EIA unit boundary, the bottom bracket holes align with holes in the rack. When the top of the 8271 is in the middle of an EIA unit, the top bracket holes will align with holes in the rack.

Model 216 takes up 2 units in a standard EIA rack and requires four screws.

**Step 4.** While supporting the 8271, secure only the left-hand side of the unit with one of the screws.

**Step 5.** Align the hole in the cable management bracket with the hole on the right-hand mounting bracket and the rack. Using the other screw, secure the cable management bracket and the right-hand side of the unit in the rack, as shown in Figure 3-2 on page 3-4.

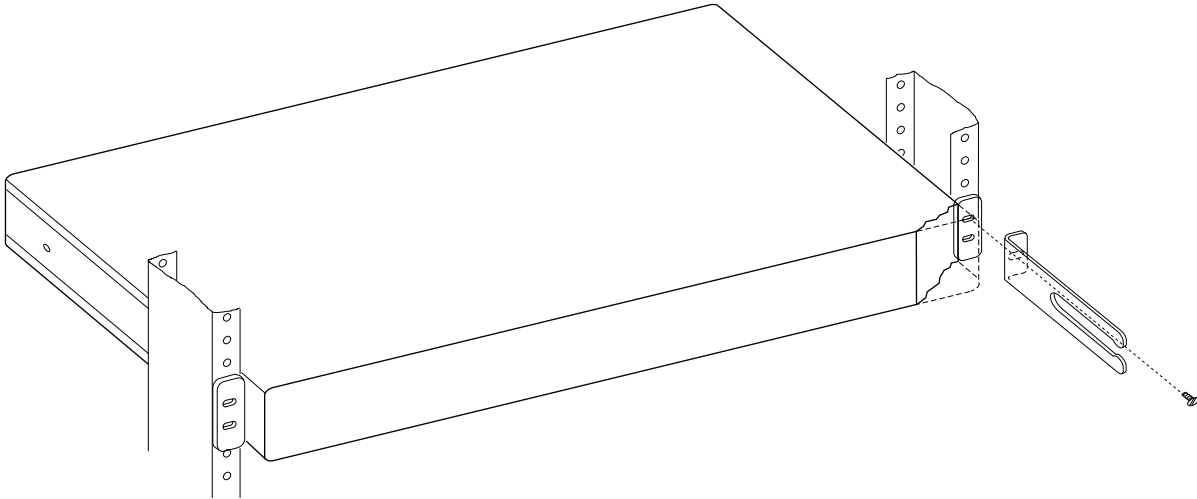


Figure 3-2. Rack Mounting the 8271

**Step 6.** Continue with the instructions under “Cabling” on page 3-5.

## Surface Mounting the 8271

**Step 1.** Using a screwdriver, loosen the four screws that attach the two mounting brackets to the sides of the 8271.

**Note:** Do not remove the center screw on each side of the 8271. This screw secures the cover to the unit.

**Step 2.** Rotate the brackets and reattach them to the 8271 as shown in Figure 3-3.

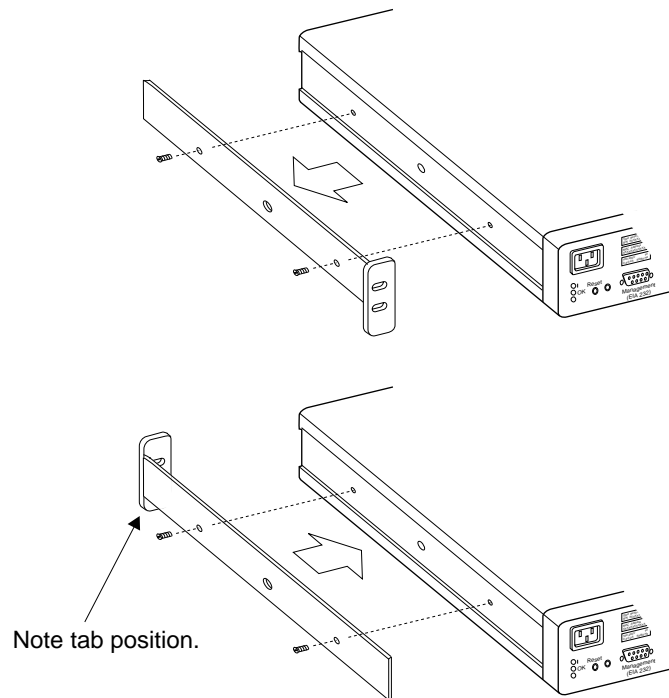


Figure 3-3. Attaching the Mounting Brackets for Surface Mounting

**Step 3.** Continue with the instructions under “Cabling” on page 3-5.

---

## Cabling

This section provides instructions for connecting devices (such as hubs, servers, personal computers, and workstations) to an 8271. Remember these tips when connecting cables:

- Avoid stretching or bending the cables excessively.
- Avoid routing the cables near potential sources of electromagnetic interference, such as motorized devices and fluorescent lights.
- Avoid trip hazards by routing the cables away from aisles and other areas where people walk. If such routes cannot be avoided, use floor cable covers or similar material to secure and protect the cables.
- Be sure that the cables connected to the 8271 are supported so that the cable connectors are not excessively strained.
- Use a category 3 or better UTP cable or a 150-ohm, STP or STP-A cable with an impedance-matching balun at each end.

### Connecting Devices to the 10BASE-T Ports

If you will not be using building wiring (in-the-wall cables) to connect the device to the 8271, perform the following steps. If you will be using building wiring, follow the steps beginning with step 1 on page 3-6.

Follow these steps to connect one or more devices to the 10BASE-T ports on an 8271:

- Step 1.** Using the IBM 8271 Cabling Chart provided by your network administrator as a guide, connect the cables between the 8271 and other devices as illustrated in Figure 3-4 on page 3-6. Remember that MDI-to-MDI and MDI-X-to-MDI-X connections require crossover cables and MDI-X-to-MDI connections require straight-through cables.

**Notes:**

- a. Do not use the 10BASE-T connector of port 1 if you plan to use the AUI connector of port 1. They are mutually exclusive.
- b. For Model 216, you can only use either the MDI or MDI-X connector on port 16. The two are mutually exclusive.

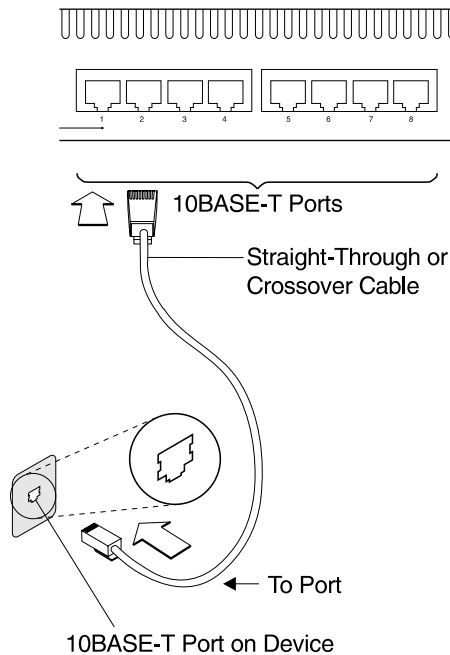


Figure 3-4. Connecting Devices to 10BASE-T Ports

- Step 2.** Dress the 8271 end of the cables to the right, through the cable management bracket.
- Step 3.** Label each end of the cables so that it will be easy to find the device if you have to troubleshoot a network problem. You should also put the information on the “Cable Destination” area of the Service Information Card.

Suggested information to place on the label includes the room location of the device at the other end, a unique cable identification number, the MAC address of the connected device, and the number of the port to which the cable is attached.

- Step 4.** To continue installing the 8271, go to “Connecting to the AUI Port” on page 3-7 if you plan to connect an AUI cable. Otherwise, go to “Powering On the 8271” on page 3-8.

## Connecting Devices to the 10BASE-T Ports Using Building Wiring

If you will use building wiring (in-the-wall cables) to connect the device to the 8271, perform the following steps:

- Step 1.** Using the IBM 8271 Cabling Chart provided by your administrator as a guide, connect the cables between the devices and the faceplates as illustrated in Figure 3-5 on page 3-7. Remember that MDI-to-MDI and MDI-X-to-MDI-X connections require crossover cables and MDI-X-to-MDI connections require straight-through cables.

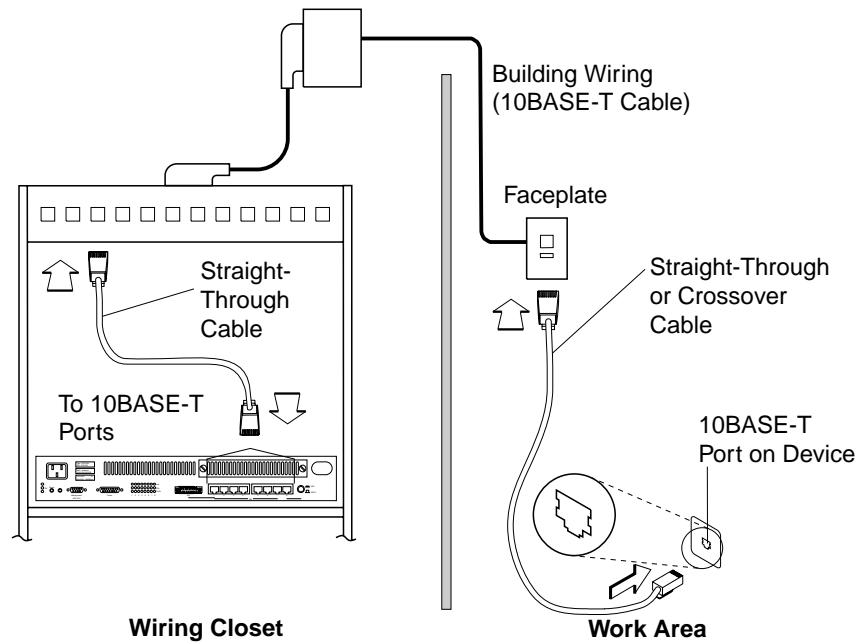


Figure 3-5. Connecting Devices to 10BASE-T Ports Using Building Wiring

- Step 2.** Label the faceplate using local practices, so that it will be easier to find the device if you have to troubleshoot a network problem.
- Step 3.** In the wiring closet, connect a cable to the 10BASE-T connector on the patch panel or other equipment where the building wiring terminates. Connect the other end of the cable to a 10BASE-T port on the 8271.
- Note:** Do not use the 10BASE-T connector of port 1 if you plan to use the AUI connector of port 1. They are mutually exclusive.
- Step 4.** Label this cable.
- Step 5.** To continue installing the 8271, go to “Connecting to the AUI Port” if you plan to connect an AUI cable. Otherwise, go to “Powering On the 8271” on page 3-8.

## Connecting to the AUI Port

To connect the 8271 to a 10BASE5, 10BASE2, or 10BASE-Fn network segment via the AUI port, perform the following steps:

- Step 1.** Disable the Signal Quality Error (SQE) (also known as the *heartbeat*) on the external transceiver, as described in the transceiver documentation.
- Step 2.** The 8271 AUI port has a slide latch that secures AUI cables or media access units. Open the latch by sliding it to the left. The slide latch is shown in Figure 3-6.



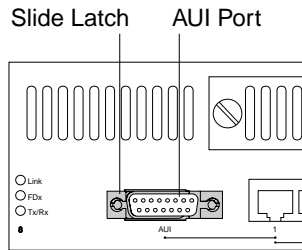


Figure 3-6. Slide Latch on the AUI Port

**Step 3.** Connect one end of the AUI cable to the AUI port of the 8271 and the other end to a 10BASE5, 10BASE2, or 10BASE-Fn transceiver media access unit as indicated by the cabling chart. See Figure 3-7 for an illustration of these connections.

Depending on the type of transceiver you use and the distance between the transceiver and the 8271, you might be able to connect the transceiver directly to the 8271 without using an AUI cable.

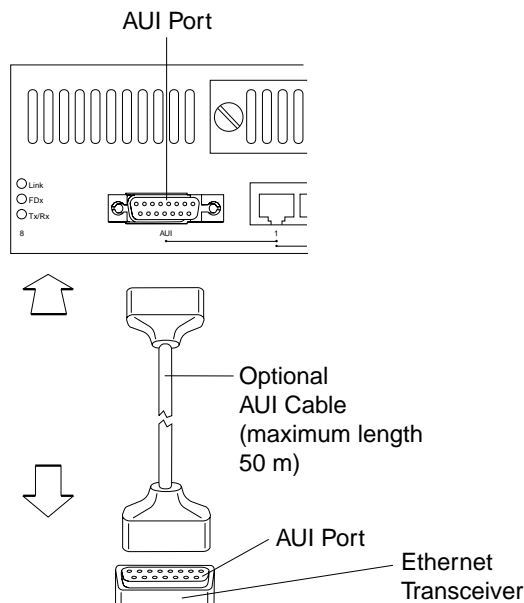


Figure 3-7. Connecting an AUI Cable

**Step 4.** Secure the AUI cable (or the transceiver) in place on the 8271 port by pushing the slide latch on the 8271 AUI port to the right.

## Powering On the 8271

To power on the 8271 and to verify that it is operating correctly, perform the following steps:

- Step 1.** Connect the power cord to the 8271 and then to an electrical outlet. The 8271 does not have a power switch. The 8271 is powered on when you plug in the power cord.
- Step 2.** Verify that the Power LED (I) on the left side of the front panel of the 8271 is lit. If it is not lit, make sure that the outlet is working correctly. If

the outlet is working but the Power LED is not lit, contact your place of purchase.

**Step 3.** Verify that a Link LED is lit for each 10BASE-T port that is connected to a powered-on device. If not, see Chapter 6, "Troubleshooting."

**Note:** The AUI port does not have a corresponding Link LED. If you are using the AUI connector, the port 1 Link LED will not be lit.

**Step 4.** Verify that diagnostics have been completed successfully.

The 8271 automatically performs diagnostics once it is connected to a power supply. Diagnostics can last up to 5 minutes. (The Model 216 will take longer than the Model 108.) Figure 3-8 shows the pattern of the Status LEDs as the 8271 performs diagnostics.

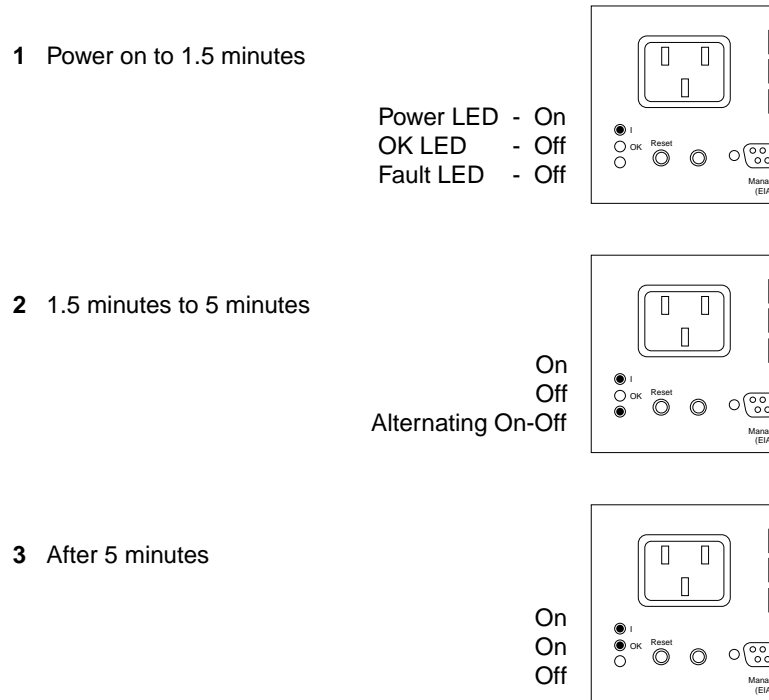


Figure 3-8. Pattern of the Status LEDs during Diagnostics

When diagnostics have been completed, the Tx/Rx LEDs will blink if the 8271 detects activity. Note that the Tx/Rx LED that corresponds to port 1 will blink when the 8271 sends frames even if a device is not attached to that port. Port 1 defaults to an active AUI port if a 10BASE-T connection is not made to port 1.

Table 3-2. Normal States of LEDs

LED	Normal State
Power (I)	On
OK	On
Fault (unlabeled)	Off

- a** If the LEDs are not in the normal state, go to Chapter 6, “Troubleshooting.”
- b** If diagnostics have been completed successfully and all of the LEDs are in the normal state, physical installation of the 8271 is complete.

To continue with the installation, go to Chapter 4, “Configuring the 8271.”

---

## Chapter 4. Configuring the 8271

You do not have to configure the 8271 for it to work in your network; it is shipped with default configuration parameters and can function with these defaults. However, a console interface via the EIA 232 port is provided for customizing the configuration of the 8271, monitoring its activity, and troubleshooting problems. This chapter tells you how to set up a console session and configure the 8271.

For illustration purposes, you will notice some of the domains have been named according to possible realistic scenarios. For example, you may see a domain named *finance* instead of *Domain n* or *Default*.

---

### Default Configuration Parameters

Parameter	Default Setting
<b>Virtual Switch Assignment</b>	All ports are assigned to <b>domain 0</b> , which is named <b>Default</b> . For further information, see “Configuring Virtual Switch Ports” on page 4-13.
<b>IP Address</b>	<b>0.0.0.0</b> For further information, see “Configuring IP Parameters” on page 4-17.
<b>Default Gateway</b>	<b>0.0.0.0</b> For further information, see “Configuring IP Parameters” on page 4-17.
<b>Subnet Mask</b>	<b>0.0.0.0</b> For further information, see “Configuring IP Parameters” on page 4-17.
<b>IP State</b>	<b>BootP When Needed</b> For further information, see “Configuring IP Parameters” on page 4-17.
<b>Send Authentication Traps</b>	<b>Yes</b> For further information, see “Configuring SNMP” on page 4-19.
<b>Participate in Spanning Tree</b>	<b>No</b> For further information, see “Configuring Spanning Tree” on page 4-22.
<b>Switch Priority</b>	<b>32768</b> (if participating in Spanning Tree) For further information, see “Configuring Spanning Tree” on page 4-22.
<b>Switch Hello Time</b>	<b>2 seconds</b> (if participating in Spanning Tree) For further information, see “Configuring Spanning Tree” on page 4-22.

<b>Switch Maximum Message Age</b>	<b>20 seconds</b> (if participating in Spanning Tree) For further information, see “Configuring Spanning Tree” on page 4-22.
<b>IP Packet Type</b>	Ethernet For further information, see “Configuring IP Parameters” on page 4-17.
<b>Switch Forward Delay</b>	<b>15 seconds</b> (if participating in Spanning Tree) For further information, see “Configuring Spanning Tree” on page 4-22.
<b>Port Priority</b>	<b>128</b> (if participating in Spanning Tree) For further information, see “Setting Port Priority” on page 4-24.
<b>Port Cost</b>	<b>100</b> (if participating in Spanning Tree) For further information, see “Setting Port Path Cost” on page 4-26.
<b>All Port Switching Modes</b>	<b>(Auto)Adaptive</b> For further information, see “Viewing or Changing Port Switching Mode” on page 4-47.
<b>All Port Status</b>	<b>Enabled</b> For further information, see “Viewing Port Configuration” on page 4-30.

You can change any of the preceding default parameters for the 8271 through a PC or other DTE to the EIA 232 port on the 8271. To do so, continue with “Preparing to Configure the 8271.”

---

## Preparing to Configure the 8271

Preparations for configuring the 8271 involve configuring UFCs (see “Configuring Universal Feature Cards”) and setting IP parameters (unless you are connecting directly to a console) in one of the following two ways:

- Using BootP then SNMP
- Using a console session and then SNMP

To use BootP, see Chapter 7, “Downloading Software and BootP Information.” To use SNMP see “Configuration Using the SNMP-Based Manager” on page 4-3. To use a console session, continue with “Setting Up a Console Session” on page 4-4.

## Configuring Universal Feature Cards

If you are installing a UFC with your 8271, go to the configuration instructions shipped with it now.

If you are required to load new microcode, do so before continuing. If you configure the 8271 and then load new microcode, the configuration data might be lost.

---

## Configuration Using the SNMP-Based Manager

Each 8271 kit has a diskette containing the private MIBs necessary for managing an 8271 with an SNMP-based network manager, such as Nways Campus Manager LAN for AIX, Nways Manager for Windows, or Nways Campus Manager LAN for HP-UX.

The SNMP agent in an 8271 maintains five management information bases (MIBs), consisting of objects that contain information about the 8271's identity, status, and resources. The SNMP network manager can request that the 8271 report information in the MIBs or set values in the MIBs.

Four of the five MIBs are standard MIBs. The 8271 SNMP agent implements some elements of each of these five MIBs, which are listed in Table 4-1 along with the Internet Requests for Comments (RFCs) that define them. These standard MIBs are included with most SNMP management applications.

MIB	RFC
The IBM 8271 MIB	N/A
Management Information Base for Network Management of TCP/IP-based Internets: MIB-II	1213
Evolution of Interfaces Group of MIB-II	1573
Definitions of Managed Objects for the Ethernet-like Interface Types	1643
Definitions of Managed Objects for Bridges	1493
<b>Note:</b> Printed copies of RFCs are available for a fee from:  SRI International, Room EJ291 333 Ravenswood Avenue Menlo Park, CA 94025 (415) 859-3695 (415) 859-6387 FAX (415) 859-6028  Request a softcopy of an RFC through an Internet mail gateway service (ATTMAIL, MCIMAIL, CompuServe, BITNET, and so on) as follows: Address: <i>SERVICE@NIC.DDN.MIL</i> Subject: RFC <i>number</i> <i>number</i> is the number of the RFC you are requesting.	

**Step 1.** If your network is SNMP managed, give this diskette to the network management operator so that it can be compiled into the SNMP-based network manager.

**Step 2.** If you are not currently using an SNMP manager, store the diskette for future use.

**Note:** If you are using SNMP management, once you have entered the initial IP address and SNMP configuration parameters from the console, you can use either the console or an SNMP managing entity with the MIBs loaded to view or change all parameters or management information except spanning tree parameters.

## Setting Up a Console Session

You can set up a console session locally by directly connecting a PC or other DTE to the EIA 232 port on the 8271. You also can set up a console session remotely by connecting a modem to the EIA 232 port and then dialing in from your remote station. To connect a terminal directly to the 8271, follow the directions under "Connecting a Local Terminal." To use a modem, follow the directions under "Connecting a Modem to Allow Remote Terminal Access" on page 4-5.

### Connecting a Local Terminal

To connect a terminal to the 8271, perform the following steps:

**Step 1.** Begin running your terminal emulation software on the PC or other DTE to which you will be connecting the 8271.

**Step 2.** Set the terminal as follows:

**Note:** All emulators do not have all the options listed below.

Baud rate	1200, 2400, 4800, 9600, 19200, 38400 (9600 is the default)
Parity	None
Data bits	8
Stop bits	1
Handshaking	None
Terminal emulation	VT100
Duplex	Full
Soft flow control (XON/XOFF)	Off
Hard flow control (RTS/CTS)	Off
Line wrap	Off
Screen scroll	On
CR translation	CR
Backspace (BS) translation	Destructive
Break length (milliseconds)	350

Enquiry (ENQ)	Off
EGA/VGA true underline	Off
Terminal width	890
ANSI 7- or 8-bit commands	7

- Step 3.** If you are using Microsoft Windows terminal emulation, disable the “Use Function, Arrow, and Ctrl Keys for Windows” option, located in the Terminal Preferences menu under “Settings.”
- Step 4.** Connect the EIA 232 port on the 8271 to your PC or DTE device using a null-modem cable or straight-through cable and null-modem adapter. The 8271 has a 9-pin, male connector. For pinout and cable information, see Appendix B, “Cable and Pin Information.”
- Step 5.** Plug in the 8271 if you have not already done so, or press the reset button. (Note that the 8271 does not have a power switch; the 8271 is powered on when you plug in the power cord.) The 8271 will then perform a series of self-test diagnostics, which last about 4 minutes.
- Step 6.** When diagnostics have been completed, continue with the steps under “Beginning the Console Session” on page 4-6.

### Connecting a Modem to Allow Remote Terminal Access

You can monitor the 8271 remotely by using any Hayes-compatible modem. To connect a modem to the 8271, perform the following steps:

- Step 1.** Set up your modem according to its instructions. Place it near the 8271.
- Step 2.** Connect the cable from the EIA 232 port on the modem to the EIA 232 port on the 8271. (For cable information, see Appendix B, “Cable and Pin Information.”)
- Step 3.** Set the modem as follows:

**Note:** All modems might not have all these options. Also, some modems use slightly different names for the options.

Wait for connection	45 seconds
Pause between calls	6 seconds
Auto baud detect	On
Drop DTR between calls	Yes
Send CR between calls	Yes
Send init if CD high	Yes
Maximum dial attempts	999

- Step 4.** Prepare your remote terminal by following steps 1 and 2 under “Connecting a Local Terminal” on page 4-4.
- Step 5.** Dial in to the 8271 modem from your remote site.
- Step 6.** Continue with “Beginning the Console Session” on page 4-6.



---

## Beginning the Console Session

After you have connected and configured a local or remote terminal, proceed as follows:

- Step 1.** Press **Enter** repeatedly until a menu similar to the one in Figure 4-1 appears on your display. If no menu appears, make sure that you have made all of the correct settings and are using the correct type of cables.

```
IBM 8271 Nways LAN Switch Model-216 Manager Version 1.0

(c) Copyright Cisco Systems, Inc., 1995 - All rights reserved.
(c) Copyright International Business Machines Corporation, 1995 -
    All rights reserved.

MAC Address:      00 04 AC A4 00 00

System Contact:  John Smith

Type Password, then press <ENTER>:

-- No password has been set, press <ENTER> to continue. --
```

Figure 4-1. Copyright Panel

- Step 2.** Type the password, if one has been configured. The default password is pressing Enter.

**Note:** If you have forgotten your password, press the System Request button to access the System Request Menu, and then Clear NVRAM. This will clear the password but will also set all configuration parameters to their default values, clearing any values you have entered.

- Step 3.** Then, press **Enter** to advance to the Main Menu as shown in Figure 4-2 on page 4-7.

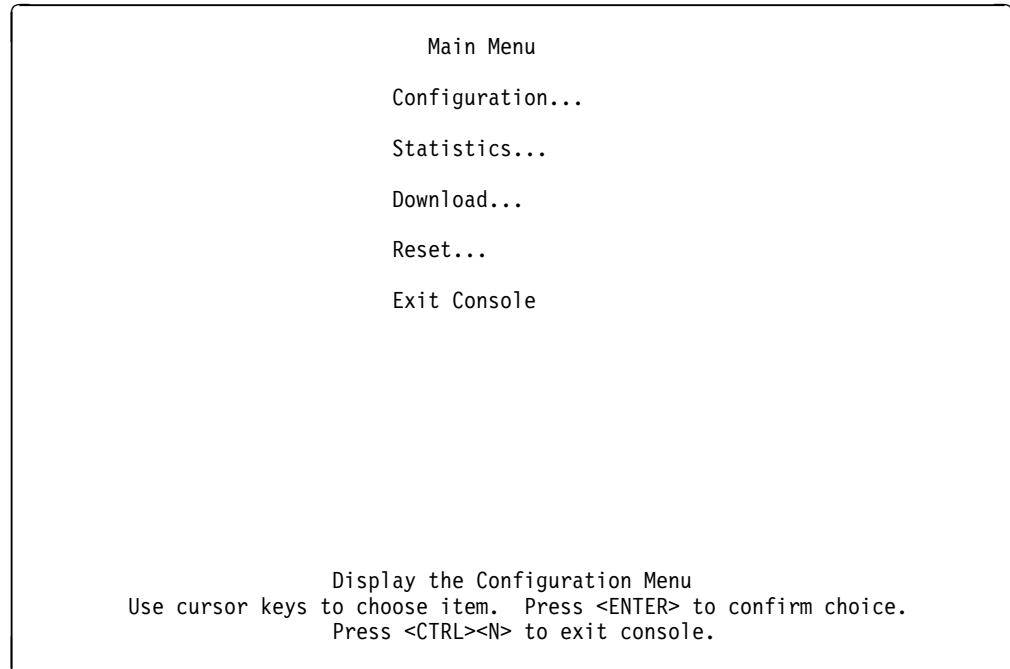


Figure 4-2. Main Menu

### Configuration Menu

Selecting the Configuration Menu will provide you with a series of panels that enable you to configure the 8271. For details about the configuration process, go to “Configuring the 8271 Using Console Panels” on page 4-8.

### Statistics Menu

Selecting the Statistics Menu will provide you with information that allows you to monitor the 8271. For an overview of this information, go to Chapter 5, “Using the Statistics Panels.”

### Download Menu

Allows downloading new microcode via the EIA 232 port or TFTP as explained in Chapter 7, “Downloading Software and BootP Information.”

### Reset Menu

Displays a panel for resetting the 8271, resetting the address tables for either the 8271 or the individual ports, and running diagnostics. See “Reset Menu” on page 4-56 for more information.

---

## Making and Saving Changes and Other Shortcuts

Follow these guidelines during a console session:

- To make changes to a parameter, move the cursor to the parameter name and press **Enter**. You will then be prompted to enter the new data or select from a list of valid choices.
- To save in NVRAM any changes made to the configuration panels, select the **Return to Previous Menu** or **Return** item from the panel whose settings you want to save.

**Note:** Selecting the Return to Previous Menu or Return item is the only way to save any changes made to the configuration panels.

- To return to the main menu, press **Ctrl+N**. Changes made to the current panel will *not* be saved.
- To refresh the console screen at any time, press **Ctrl+L**.
- To exit a prompt without taking action, press **Esc** one or more times.

---

## Configuring the 8271 Using Console Panels

This section provides reference information on the menus and panels you can use to customize the 8271 configuration.

**Step 1.** Obtain a completed IBM 8271 Configuration Parameters Worksheet from your network administrator. This worksheet will tell you which parameters to change, which settings to use, and which pages in this chapter to reference.

**Step 2.** Change or enter values according to the worksheet as follows:

- From the Main Menu shown in Figure 4-2 on page 4-7, select **Configuration...** to advance to the Configuration menu shown in Figure 4-3

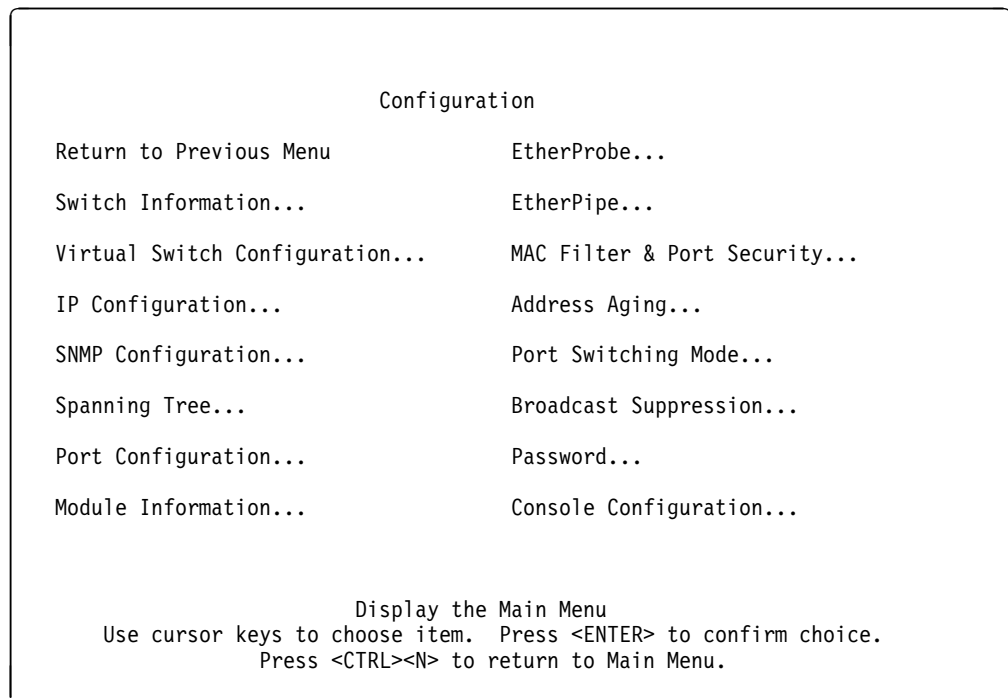


Figure 4-3. Configuration Menu

- From the Configuration menu, select the menu item you want to work with by using the arrow keys to space over to that item and pressing **Enter**. The following list defines the menu options available from the Configuration menu:

**Return to Previous Menu**

Returns you to the previous menu and saves any new values that you selected.

**Switch Information Menu**

Displays the Switch Information Menu. See “Viewing Switch Information” on page 4-10 for more information.

**Virtual Switch Configuration Menu**

Displays a panel for configuring domains. See “Configuring Virtual Switch Domains” on page 4-12 for more information.

**IP Configuration Menu**

Displays a panel for changing IP addresses and subnet masks and for sending PINGs. See “Configuring IP Parameters” on page 4-17 for more information.

**SNMP Configuration Menu**

Displays a panel for changing attributes related to SNMP. See “Configuring SNMP” on page 4-19 for more information.

**Spanning Tree Menu**

Displays a panel for viewing or changing spanning tree information. See “Configuring Spanning Tree” on page 4-22 for more information.

**Port Configuration Menu**

Displays a panel for changing the activation or duplex mode of one or more of the ports. See “Viewing Port Configuration” on page 4-30 for more information.

**Module Information Menu**

Displays information about installed UFCs. See “Viewing the Module Information Panel” on page 4-32 for more information.

**EtherProbe Menu**

Displays a panel for choosing which Ethernet port to monitor with the Probe port. See “Configuring EtherProbe” on page 4-33 for more information.

**EtherPipe Menu**

Displays a panel for creating, changing, and deleting an EtherPipe (made up of multiple links) between two 8271s to increase capacity. See “EtherPipe Configuration” on page 4-34 for more information.

**MAC Filter & Port Security Menu**

Displays a panel for establishing and deleting address filters. See “Configuring the MAC Filter & Port Security” on page 4-37 for more information.

**Address Aging Menu**

Displays a panel for defining address aging rules. See “Configuring Address Aging” on page 4-43 for more information.

**Port Switching Mode Menu**

Displays a panel for defining the Port Switching mode. See “Viewing or Changing Port Switching Mode” on page 4-47 for more information.

### Password Menu

Displays a panel for setting up and changing the password for access to the console. See “Configuring and Changing the Password” on page 4-51 for more information.

### Console Configuration

Displays a panel for configuring the EIA 232 port. See “Configuring the Console” on page 4-52 for more information.

The following sections describe the menus, panels, and functions available from the Configuration menu.

When you have changed all of the required configuration parameters, return to the Main Menu. Configuration is complete.

## Viewing Switch Information

Use the Switch Information panel to view or change the system description, identification, MAC address, interface description, system name, system location, or system contact.

Switch Information	
Return to Previous Menu	
System Description	IBM 8271-216 Nways LAN Switch
System ID	1.3.6.1.4.1.2.3.10
MAC Address	00 04 AC A4 00 00
Interface Description	8271 HW Rev 1; SW 9.1.1 (Rev.A)
System Name	Payroll
System Location	Bridge 200
System Contact	John Smith
DRAM Installed	4 MB
FLASH Memory Installed	512 KB
Time of Day...	Thu. May 9, 1996 10:34:45

Display the Configuration Menu  
Use cursor keys to choose item. Press <ENTER> to confirm choice.  
Press <CTRL><N> to return to Main Menu.

Figure 4-4. Switch Information Menu

The following list defines information and parameters available on the Switch Information panel:

### System Description

Shows the full name and version identification of the system's hardware type.

**System ID**

Shows the unique identification code for this 8271 that was assigned at the factory. It serves a purpose similar to that of a serial number.

**MAC Address**

Displays the MAC address of the 8271.

**Interface Description**

Shows the hardware and microcode version of the 8271.

**System Name**

Displays the locally assigned name for this 8271.

**System Location**

Displays the locally assigned location for this 8271.

**System Contact**

Displays the locally assigned contact name for this 8271.

**Enhanced Features**

Displays the state of the enhanced feature set.

**DRAM Installed**

Displays the number of megabytes of memory installed.

**Time of Day**

Allows you to set the internal clock of the 8271.

## Configuring Virtual Switch Domains

From the Configuration menu, select **Virtual Switch Configuration**. You can partition a single 8271 into multiple (up to eight) domains. Each domain acts like a separate switch. A domain can be configured with its own IP address and managed with SNMP. Any domain can participate independently in the spanning tree protocol. Once domains have been established, packets are forwarded between ports belonging to the same domain only.

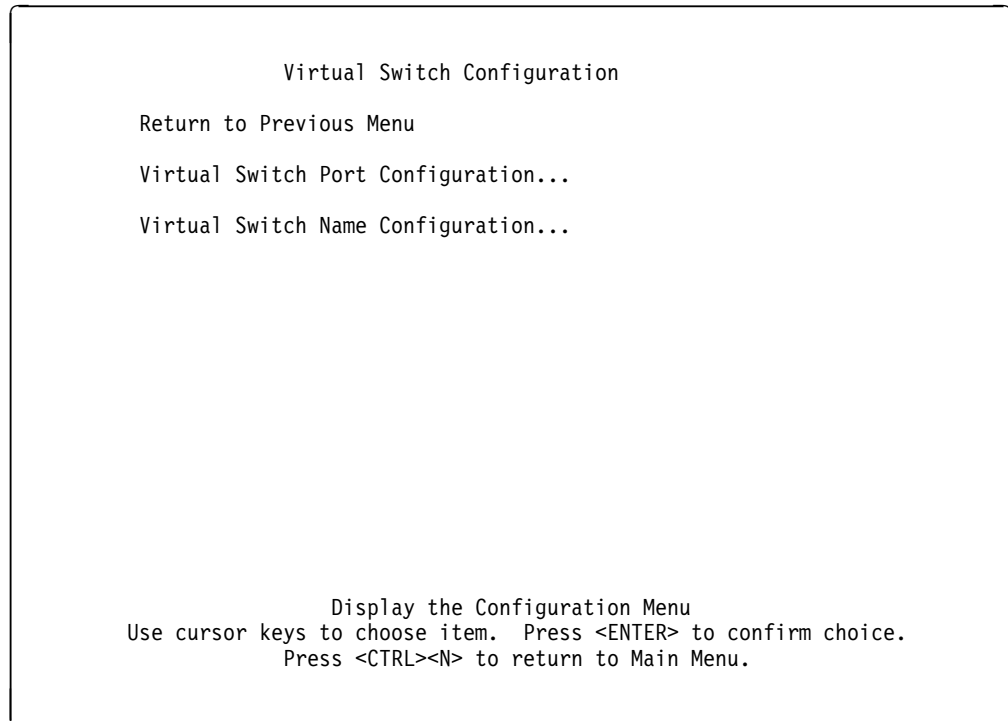


Figure 4-5. Virtual Switch Configuration Menu

The following definitions explain the panels you can access from the Virtual Switch Configuration menu:

### Virtual Switch Port Configuration Menu

Displays the Virtual Switch Port Configuration Menu, which you use to assign ports to domains by choosing from a list of domain names. If you want to define domain names other than the defaults you must first go to "Naming Virtual Switch Domains" on page 4-15. See "Configuring Virtual Switch Ports" on page 4-13 for more information.

### Virtual Switch Name Configuration Menu

Displays a list of domain names and allows you to change them. See "Naming Virtual Switch Domains" on page 4-15 for more information.

## Configuring Virtual Switch Ports

From the Configuration menu, select **Virtual Switch Configuration**, and then select **Virtual Switch Port Configuration....** Use the **Change** option to assign ports to a particular domain.

```
Virtual Switch Port Configuration

Port          Domain
 1            default
 2            default
 3            default
 4            default
 5            default
 6            default
 7            default
 8            default
 9            default
10            finance
11            finance
12            default
13            finance
14            development
Return  More   Change

Return to previous menu
Use cursor keys to choose item. Press <ENTER> to confirm choice.
Press <CTRL><N> to return to Main Menu.
```

Figure 4-6. Virtual Switch Port Configuration Panel (1 of 2)



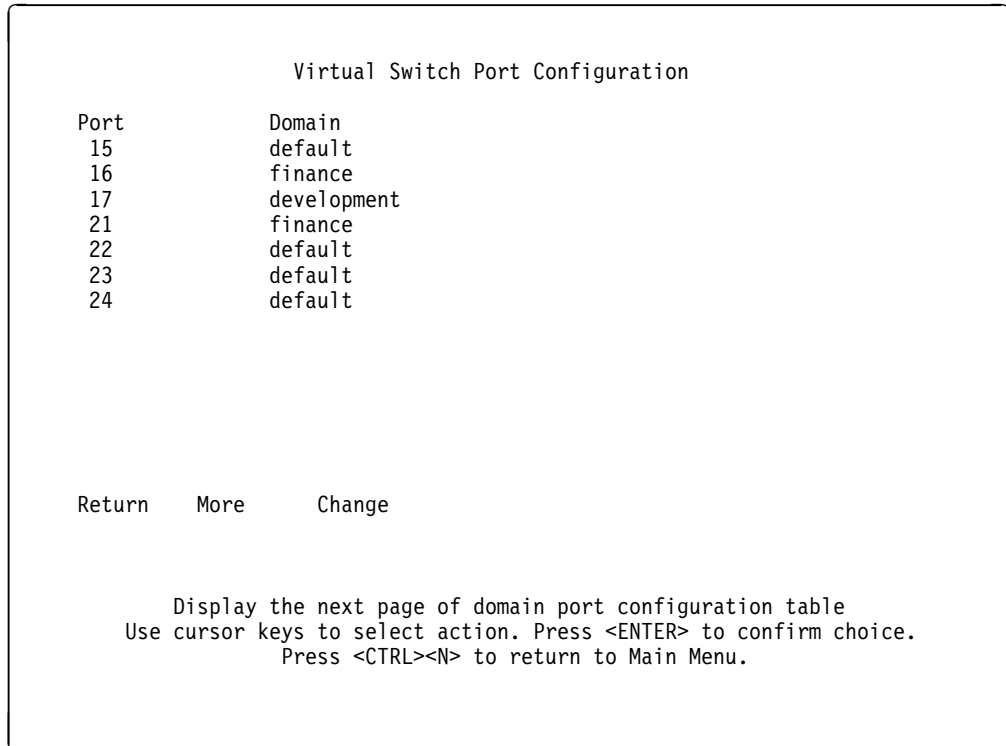


Figure 4-7. Virtual Switch Port Configuration Panel (2 of 2)

The **Port** column displays the number of the port that you want to assign to a domain (0–7). All ports are initially assigned to domain 0, named “default.”

When you select **Change**, you are prompted for the port number that is to be assigned to another domain. When you enter the port number, you are presented with a list of domain names from which to choose.

**Note:** For each domain that you establish, you must set up IP parameters, SNMP trap tables, and spanning tree parameters.

## Naming Virtual Switch Domains

From the Configuration menu, select **Virtual Switch Configuration**, and then select **Virtual Switch Name Configuration...** Use the **Change** option to create names for domains by changing those listed. You can create names to assign to Domains 1–7 but the name for Domain 0, “default,” does not appear because it cannot be changed.

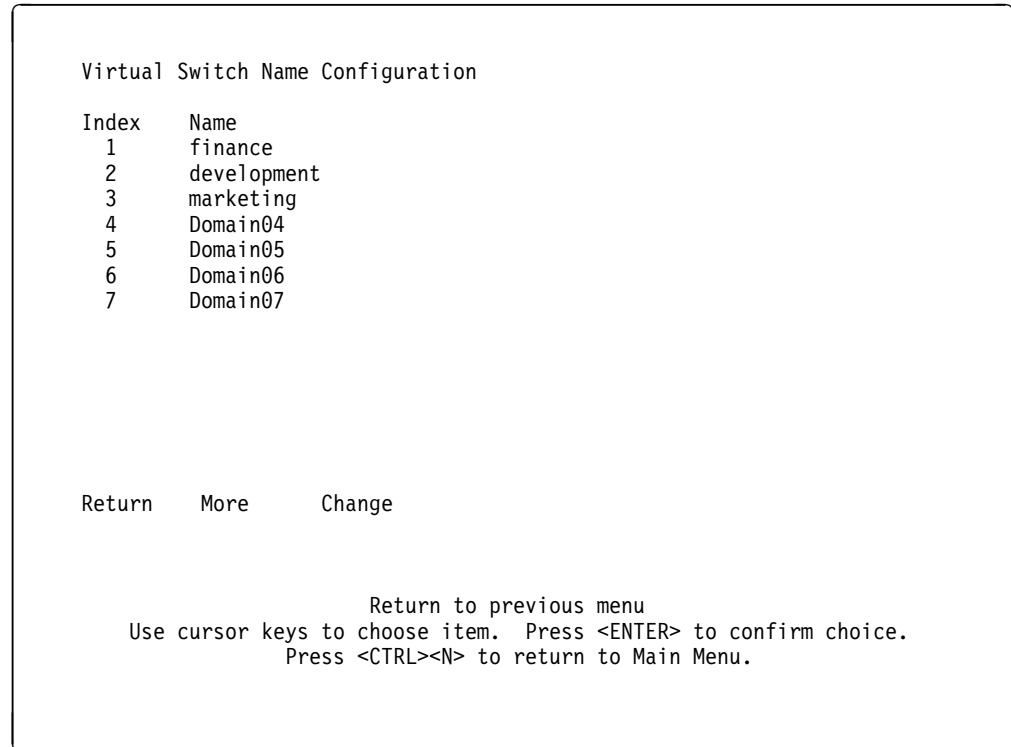


Figure 4-8. Virtual Switch Name Configuration Panel

## Selecting Virtual Switch Domains to Define Parameters

Use the Virtual Switch Domain Selection menu to select which domain to work with when defining parameters that exist for each domain such as IP, SNMP, and spanning tree parameters. This menu appears only if more than one domain has been defined. Then, it appears automatically when a menu has been chosen that has domain-specific parameters such as IP address.

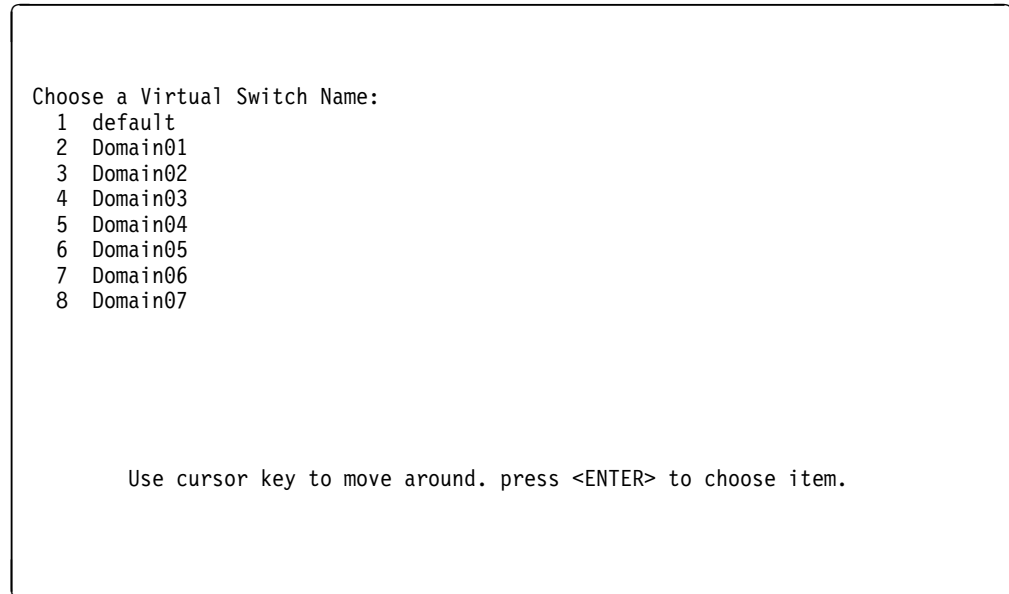


Figure 4-9. Virtual Switch Domain Selection Panel

## Configuring IP Parameters

From the Configuration menu, select **IP Configuration....** Move the cursor to the parameter you want to change and enter new parameters. Use the IP Configuration panel to set the IP address, gateway address, subnet mask, and IP state, and to send PINGs. The settings take effect when you exit this menu.

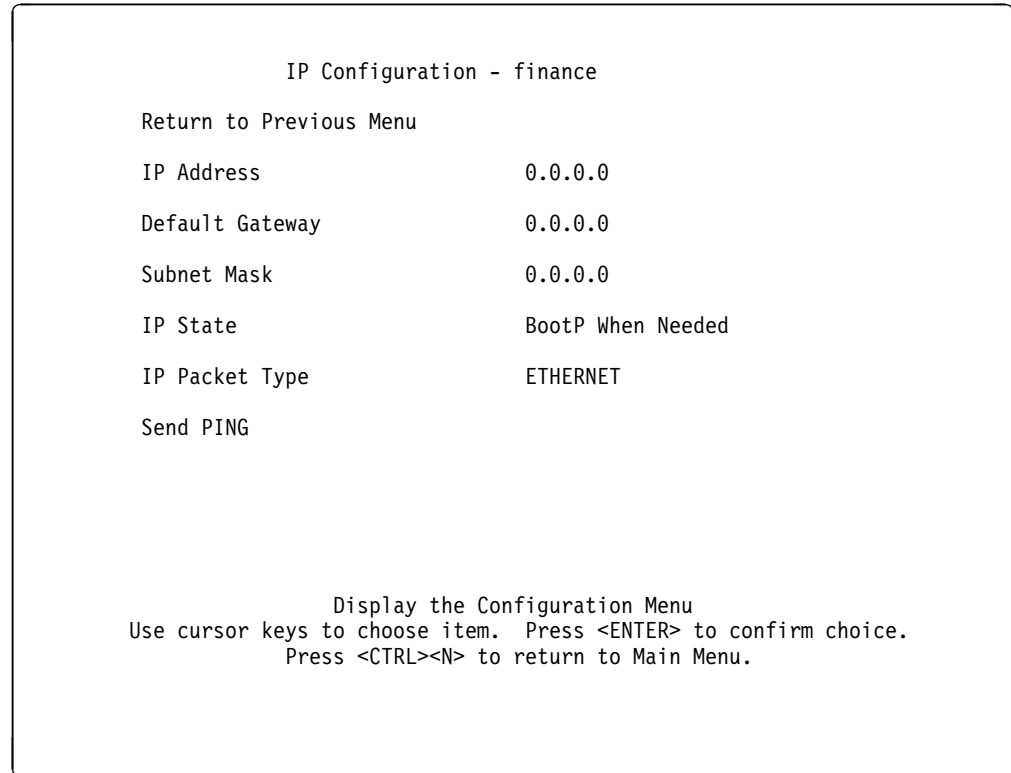


Figure 4-10. IP Configuration Panel

The following list defines parameters displayed on the IP Configuration panel:

IP addresses are always entered as a set of 4 decimal numbers from 0 through 255. The numbers must be separated by periods. The default is 0.0.0.0. If the default is used, no SNMP management will be available.

### **IP Address**

Displays the current IP address.

The default IP address is 0.0.0.0.

### **Default Gateway**

Displays the default gateway address.

The default gateway address is 0.0.0.0.

### **Subnet Mask**

Displays the current subnet mask.

The default subnet mask is 0.0.0.0.

### **IP State**

The choices are IP Disabled, BootP When Needed, and BootP Always.

The default is BootP When Needed.

**IP Disabled**

The domain will not process any IP or Address Resolution Protocol (ARP) frames it receives. It will not respond to SNMP, PING, Telnet, or ARP frames that are received.

**BootP When Needed**

IP is enabled for the domain and will function immediately, if a non-0 IP address has been stored in NVRAM. If the IP address is 0 (0.0.0.0), BootP requests will be broadcast by the 8271, in an effort to learn its IP address. Until it receives a reply, this is the only IP function that will work.

**BootP Always**

IP is enabled for the domain but will not function until a BootP reply has been received. If a non-0 IP address for the domain is stored in NVRAM, it will be cleared to 0 when the 8271 is booted.

**IP Packet Type**

Describes the type of management packets that the switch will receive and transmit for SNMP, Telnet, BootP, and TFTP. Choices are Ethernet or IEEE 802.3.

**Send PING**

The system prompts you to enter an IP address. The 8271 then sends a PING to that address.

**BootP**

When you select either of the BootP options above, the 8271 repeats BootP requests at regular intervals, beginning at 1 second each and eventually decreasing to every 5 minutes until it receives a valid reply. The BootP requests will also cease if a valid IP address is configured or the IP state is set to IP Disabled.

Once the 8271 stops sending BootP requests on a domain, it does not resume sending requests or recognize BootP responses on that domain unless the 8271 is reset. The parameters in a BootP response that are recognized and recorded in NVRAM are:

- IP Address
- Default Gateway
- Subnet Mask
- TFTP Bootfile Name
- TFTP Server Address

**Note:** See “BootP” on page 7-4 for information on preparing the response file for the BootP server.

## Configuring SNMP

From the Configuration menu, select **SNMP Configuration....** Use the SNMP Configuration menu to set specific attributes related to SNMP.

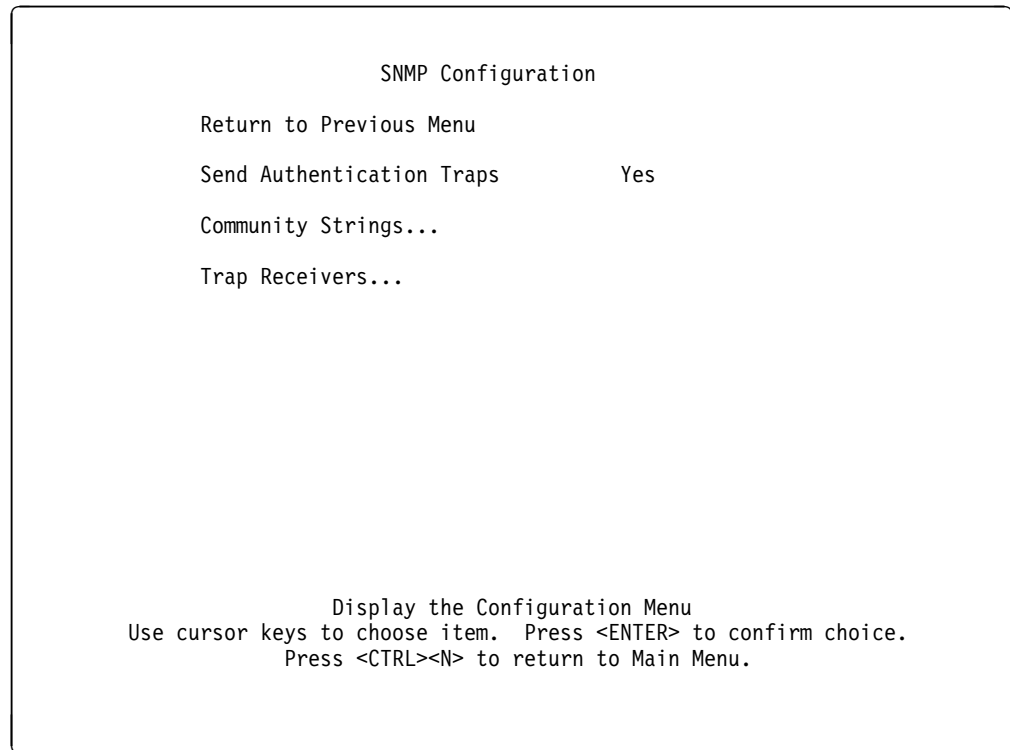


Figure 4-11. SNMP Configuration Menu

The following list defines functions and parameters available on the SNMP Configuration menu.

### Send Authentication Failure Traps

Indicates whether an authentication trap should be issued to Trap Receivers whenever authentication of an SNMP request fails. Traps indicating cold and warm boots are always sent.

The default entry is Yes.

### Community Strings Menu

Allows you to display and change the list of community names. Table entries are saved across resets.

### Trap Receiver Menu

Displays a table of managers to which to send traps. Entries in the table are saved across resets and power cycles.

## Setting Community Strings Parameters

From the Configuration menu, select **SNMP Configuration...**, and then **Community Strings...** Use the options at the bottom of the panel to configure the community names for the 8271. A community name is a name associated with the 8271 and a set of SNMP Managers allowed to manage it with the specified privilege level. Entries are saved when you exit the menu.

Community Strings		
Index	Community Name	Mode
1	public	Read
2	management	Read/Write

Return    Add Entry    Delete Entry    Change Entry    Clear Table

Return to previous menu  
Use cursor keys to choose item. Press <ENTER> to confirm choice.  
Press <CTRL><N> to return to Main Menu.

Figure 4-12. Community Strings Panel

The following list defines functions available on the Community Strings panel:

- Mode**            If you select Read, SNMP managers can only view SNMP information. If you select Read/Write, SNMP managers can both view and change SNMP information.
- Add Entry**      Used to add a community name and access mode.
- Delete Entry**    Used to delete a community name.
- Change Entry**    Used to modify a community name or access mode.
- Clear Table**     Used to delete all community names.

Entries are displayed in the order in which they are entered. There is a limit of 10 community names.

## Setting Trap Receivers

From the Configuration menu, select **SNMP Configuration...**, and then **Trap Receivers...** Use the options at the bottom of the panel to tell the 8271 where to send traps. The table contains the IP address of each SNMP manager, a corresponding community name, and the domain in which the SNMP manager can be accessed. Entries take effect when you exit the menu.

Trap Receivers			
	IP Address	Community Name	Domain
1	9.67.240.54	management	default

Return    Add Entry    Delete Entry    Change Entry    Clear Table

Return to previous menu  
Use cursor keys to select action. Press <ENTER> to confirm choice.  
Press <CTRL><N> to return to Main Menu.

Figure 4-13. Trap Receivers Panel

The following list defines the functions available on the Trap Receivers panel:

**Exit**    Used to return to the previous menu.

**Add Entry**  
Used to add a new entry to the trap receivers panel.

**Delete Entry**  
Used to delete an entry from the trap receivers panel.

**Change Entry**  
Used to modify an entry in the trap receivers panel.

**Clear Table**  
Used to delete all trap receivers panel entries.

The trap receivers panel contains a maximum of six entries. IP addresses are always entered as a set of 4 decimal numbers, from 0 through 255. The numbers must be separated by periods.



## Configuring Spanning Tree

From the Configuration menu, select **Spanning Tree...** Use the Spanning Tree Menu to specify whether the 8271 is participating in the spanning tree protocol and, if so, to configure spanning tree switch and port parameters. These parameters take effect when you exit this menu.

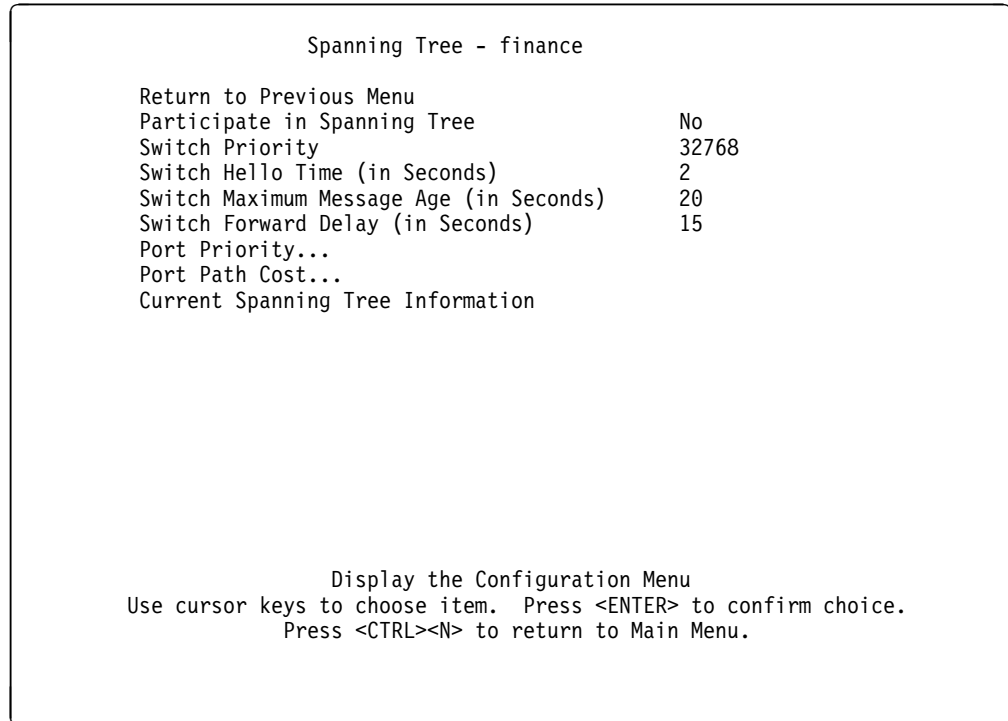


Figure 4-14. Spanning Tree Menu

The following list defines parameters and functions available on the Spanning Tree panel:

### Participate in Spanning Tree

Select Yes or No. Select Yes to participate in the spanning tree protocol. If you select No, the remaining values on the menu will be saved but will have no effect.

The default entry is No.

**Switch Priority** Enter a priority value for this 8271 in the range of 0 to 65535 (decimal). The lower the priority value, the higher the priority. The bridge or switch with the lowest priority value in a spanning tree becomes the root bridge. (To change individual port priorities, select the Port Priority menu option.)

The default is 32768.

### Switch Hello Time (in Seconds)

When this 8271 is the root switch, Switch Hello Time is the time the switch waits before sending the next configuration message.

The minimum value is 1.

The maximum value is the lower of 10 or:

$$[(\text{Switch Maximum Message Age} \div 2) - 1]$$

The default is 2.

The valid range for this parameter is displayed when you select Switch Hello Time.

### **Switch Maximum Message Age (in Seconds)**

Enter the maximum message age used when this 8271 is the root switch. This parameter limits the amount of time the switch allows a frame to stay on the network.

The minimum value is the higher of 6 or:

$$[2 \times (\text{Switch Hello Time}) + 1]$$

The maximum cannot be more than the lower of 40 or:

$$[2 \times (\text{Switch Forward Delay} - 1)]$$

The default is 20.

The range limits that appear when you select this parameter are calculated using the values currently selected for Switch Hello Time and Switch Forward Delay.

### **Switch Forward Delay (in Seconds)**

Enter the time the 8271 waits between transitions from listening to learning, and from learning to forwarding.

The minimum is the larger of 4 or:

$$[\text{Switch Maximum Message Age} + 2 + 1]$$

The maximum is 30.

The default is 15.

The lower range limit that appears when you select this parameter reflects the value currently selected for Switch Maximum Age.

### **Port Priority Menu**

Displays a list of port priorities. This menu is active only when the Participate in Spanning Tree option is set to Yes. See "Setting Port Priority" on page 4-24 for more information.

### **Port Path Cost Menu**

Displays a list of port path costs. This menu is active only when the Participate in Spanning Tree option is set to Yes. See "Setting Port Path Cost" on page 4-26 for more information.

### **Current Spanning Tree Information**

Displays the 8271's view of the current spanning tree. This menu is active only when the Participate in Spanning Tree option is set to Yes. See "Viewing Current Spanning Tree Information" on page 4-28 for more information.

## Setting Port Priority

From the Configuration menu, select **Spanning Tree...**, and then **Port Priority...**. Use the Port Priority panel to view and change spanning tree priorities for each port.

Port Priority		
Port		Priority
1		128
2		128
3		128
4		128
5		128
6		128
7		128
8		128
9		128
10		128
11		128
12		128
13		128
14		128
Return	More	Change

Return to previous menu  
Use cursor keys to choose item. Press <ENTER> to confirm choice.  
Press <CTRL><N> to return to Main Menu.

Figure 4-15. Port Priority Panel (1 of 2)

Port Priority	
Port	Priority
15	128
16	128
17	128
21	128
22	128
23	128
24	128

Return    More    Change

Return to previous menu  
Use cursor keys to choose item. Press <ENTER> to confirm choice.  
Press <CTRL><N> to return to Main Menu.

Figure 4-16. Port Priority Panel (2 of 2)

Select the port whose priority value you want to change, press **Enter**, and then enter the new value.

**Note:** The port with the lowest priority value has the highest priority and will forward the spanning tree frames.

The possible range is 0 through 255 (decimal).

The default is 128. If all ports have the same priority value, the lowest port number forwards the spanning tree frames.

## Setting Port Path Cost

From the Configuration menu, select **Spanning Tree...**, and then **Port Path Cost...** Use the Port Path Cost panel to view and change the spanning tree path cost associated with each port. The spanning tree uses port path costs to determine which port to select as a forwarding port.

Port Path Cost		
Port		Cost
1		100
2		100
3		100
4		100
5		100
6		100
7		100
8		100
9		100
10		100
11		100
12		100
13		100
14		100

Return    More    Change

Display next page of Port Priority Table  
Use cursor keys to select action. Press <ENTER> to confirm choice.  
Press <CTRL><N> to return to Main Menu.

Figure 4-17. Port Path Cost Panel (1 of 2)

Port Path Cost	
Port	Cost
15	100
16	100
17	100
21	10
22	100
23	100
24	100

Return    More    Change

Display next page of Port Path Cost Table  
 Use cursor keys to select action. Press <ENTER> to confirm choice.  
 Press <CTRL><N> to return to Main Menu.

Figure 4-18. Port Path Cost Panel (2 of 2)

Select the port whose cost you want to change, press **Enter**, and then enter a new value. When the spanning tree reconfigures itself, it selects forwarding ports based on the port cost. Therefore, assign lower numbers to ports attached to faster media (such as FDX Ethernet or EtherPipe), and higher numbers to ports attached to slower media (such as 2400-baud modem links). The possible range is 0 to 65535. The default is 100. The recommended path cost is:

$$\text{Path Cost} = 1000 \div \text{LAN speed in Mbps}$$

## Viewing Current Spanning Tree Information

From the Configuration menu, select **Spanning Tree...**, and then **Current Spanning Tree Information...** Use the Current Spanning Tree Information panel to view a summary of all spanning tree information for each port. You can only view the information on this panel.

```
Current Spanning Tree Information - Domain01
Hello Time: 2, Max Message Age: 20, Forward Delay: 15
Root: 34463.08005A9100A0, Root Port: This Switch is Root
Port ID      Port Cost  Port STS  Desig Cost  Designated Switch/Bridge ID  Desig PortID  #Topo Time Since
-----
128.01      100 FWD    0 34463.08005A9100A0 128.01  1  0:18:57
128.02      100 FWD    0 34463.08005A9100A0 128.02  1  0:18:57
128.03      100 FWD    0 34463.08005A9100A0 128.03  1  0:18:57
128.04      100 FWD    0 34463.08005A9100A0 128.04  1  0:18:57
128.05      100 FWD    0 34463.08005A9100A0 128.05  1  0:18:57
128.06      100 FWD    0 34463.08005A9100A0 128.06  1  0:18:57
128.07      100 FWD    0 34463.08005A9100A0 128.07  1  0:18:57
128.08      100 FWD    0 34463.08005A9100A0 128.08  1  0:18:57

Return

Configure Spanning Tree and port parameters
Use cursor keys to select action. Press <ENTER> to confirm choice.
Press <CTRL><N> to return to Main Menu.
```

Figure 4-19. Current Spanning Tree Information Panel

The following list defines the information available on this panel:

### Hello Time

Displays the Hello Time, in seconds, that is advertised by the root and used by all devices and switches in the active topology of the spanning tree network.

### Max Message Age

Displays the Maximum Message Age, in seconds, that is advertised by the root and used by all devices and switches in the spanning tree network.

### Forward Delay

Displays the Forward Delay Time, in seconds, that is advertised by the root and used by all devices and switches in the spanning tree network.

**Root** Displays the priority and MAC address of the device in the spanning tree that this switch has accepted as the root device.

### Root Port

Displays the number of the port on this switch that is closest to the root. This switch communicates with the root through this port. If there is no root port, this switch has been accepted as the root of the spanning tree network.

**Port ID** Displays the port ID that is used to determine the role of the port in the spanning tree. The port ID is expressed in the form <port priority>.<port number>.

**Port Cost**

Displays the Port Path Cost for each port on the switch. The Port Path Cost helps determine the role of the port in the spanning tree.

**Port STS (Status)**

Displays the current status of this port within the spanning tree:

<b>DSB</b>	Disabled
<b>BLK</b>	Blocked
<b>LSN</b>	Listening
<b>LRN</b>	Learning
<b>FWD</b>	Forwarding

The rules that define the state of the port are as follows:

- A port on a network segment with no other switch or bridge is always forwarding.
- If two ports of the 8271 are connected to the same network segment and there is no other bridge or switch, the port with the smaller ID is forwarded and the other is blocked.
- When the switch is booted, all ports are blocked initially, and then some of them change to a different state: listening, learning, and forwarding, in that order. To see the change in states you must repeatedly exit from this menu, and then select it again. All ports that are going to change states from blocking to forwarding will have done so after two to three times the value of:

[Switch Maximum Message Age + (2 × Switch Forward Delay)]

**Designated Cost**

Displays the cost for a packet to travel from this port to the root in the current spanning tree configuration. The slower the media, the higher the cost.

**Designated Switch/Bridge ID**

Displays the priority and MAC address of the device through which this port has determined it must communicate with the root of the spanning tree.

**Designated Port ID**

Displays the port on the designated bridge through which this switch will communicate with the root of the spanning tree. This information is useful if the 8271 is the designated bridge on one or more network segments.

**# Topo Changes**

Displays the number of topology changes, that is, the number of times the port has entered the forwarding state plus the number of times the port has made the transition from forwarding to blocking. The counter is reset when the switch is reset or the spanning tree is turned on.

**Time Since Last Change**

Displays the time since the last time that the port entered the forwarding state or made the transition from forwarding to blocking.



## Viewing Port Configuration

From the Configuration menu, select **Port Configuration....** Use the Port Configuration panel to enable or disable a specific port. In addition, you can use it to change the communication mode (half- or full-duplex) for each port.

Port Configuration							
Port	Type	Link	MDI/MDI-X	Speed	Mode	Duplex	Enabled/Disabled
1	AUI	up	MDI-X	10	A-CT	Full	Enabled
2	10BaseT	down	MDI-X	10	A-CT	Full	Enabled
3	10BaseT	down	MDI-X	10	A-CT	Half	Enabled
4	10BaseT	down	MDI-X	10	A-CT	Full	Enabled
5	10BaseT	down	MDI-X	10	A-CT	Full	Enabled
6	10BaseT	down	MDI-X	10	A-CT	Full	Enabled
7	10BaseT	down	MDI-X	10	A-CT	Full	Enabled
8	10BaseT	down	MDI-X	10	A-CT	Full	Enabled
9	10BaseT	up	MDI-X	10	A-CT	Full	Enabled
10	10BaseT	up	MDI-X	10	A-CT	Full	Enabled
11	10BaseT	up	MDI-X	10	A-CT	Full	Enabled
12	10BaseT	up	MDI-X	10	A-CT	Full	Enabled
13	10BaseT	up	MDI-X	10	A-CT	Half	Enabled
14	10BaseT	up	MDI-X	10	A-CT	Half	Enabled
Return	More	Change					

Return to previous menu  
Use cursor keys to choose item. Press <ENTER> to confirm choice.  
Press <CTRL><N> to return to Main Menu.

Figure 4-20. Port Configuration Panel (1 of 2)

Port Configuration							
Port	Type	Link	MDI/MDI-X	Speed	Mode	Duplex	Enabled/Disabled
15	10BaseT	up	MDI-X	10	A-CT	Half	Enabled
16	10BaseT	up	N/A	10	A-CT	Half	Enabled
17	100BaseFx	down		100	A-SF	Half	Enabled
21	10BaseT	down	MDI-X	10	A-CT	Half	Enabled
22	10BaseT	down	MDI-X	10	A-CT	Half	Enabled
23	10BaseT	down	MDI-X	10	A-CT	Half	Enabled
24	10BaseT	down	MDI-X	10	A-CT	Half	Enabled

Return    More    Change

Display the next page of port configuration table  
 Use cursor keys to select action. Press <ENTER> to confirm choice.  
 Press <CTRL><N> to return to Main Menu.

Figure 4-21. Port Configuration Panel (2 of 2)

The following list defines the parameters and functions available on the Port Configuration panel:

**Type** Displays the port type. For Model 108, Ports 2 through 8 are 10BASE-T; for Model 216, Ports 2 through 16 are 10BASE-T. Port 1 can be either AUI or 10BASE-T.

If a UFC is installed in Model 108, each of its ports and port types will be listed here starting at port 9.

For Model 216, the following port numbers apply:

- UFC slot 1 reserves ports 17 through 20.
- UFC slot 2 reserves ports 21 through 24.

**Note:** If a one port UFC is inserted in slot 2, the following ports would exist: 1 through 15, 21.

**Link** Indicates whether the port is up or down.

**MDI/MDI-X**

Indicates whether the port is media dependant interface (MDI) or media dependant interface crossed (MDI-X). For Model 108, ports 1–7 are always MDI-X; port 8 is switchable. For Model 216, ports 1–15 are always MDI-X; you choose the type of port, MDI-X or MDI, for port 16.

**Speed** Displays the speed of the port in Mbps.

**Mode** Indicates the switching mode of the port. See “Viewing or Changing Port Switching Mode” on page 4-47.

**Duplex** Displays and allows you to change the setting of duplex mode for the port. The default is half. Changes to the duplex settings are made immediately by the 8271

**Enabled/Disabled**

Displays and allows you to change the operational status of the ports. An asterisk (\*) indicates that a change has been made during the current panel session. The default is Enabled.

## Viewing the Module Information Panel

From the Configuration menu, select **Module Information....** The Module Information panel displays information about installed UFCs.

Module Information					
Module	Status	Model	Revision	Ports	Up Time
1	up	8271	1	16	27:27:57
2	up	100F	0	1	27:27:57
3	up	10T	11	4	27:27:57

Return

Return to previous menu  
Use cursor keys to select action. Press <ENTER> to confirm choice.  
Press <CTRL><N> to return to Main Menu.

Figure 4-22. Module Information Menu

The following list defines information available on the Module Information panel:

**Module** Displays module number. The 8271 is listed as Module 1. An installed UFC will appear as Module 2.

**Status** Indicates whether the module is up or down.

**Type** Indicates the type of module or UFC.

**Revision**  
Displays the revision level of the module.

**Ports** Indicates the number of ports on the module.

**Up Time**  
Displays how long the module has been up.

## Configuring EtherProbe

From the Configuration menu, select **EtherProbe....** From the EtherProbe Configuration panel, select the port to monitor with the Probe port. You can also select which traffic to probe.

EtherProbe Configuration

Return to Previous Menu

EtherProbe Port Number                      0

Traffic to Probe                                      None

Display the Configuration Menu  
Use cursor keys to choose item. Press <ENTER> to confirm choice.  
Press <CTRL><N> to return to Main Menu.

*Figure 4-23. EtherProbe Configuration Panel*

The following list defines functions available on the EtherProbe Configuration panel:

### **EtherProbe Port Number**

Allows you to select the 10BASE Ethernet port that will be monitored by the Probe port. Select port 0 to disable the Probe port.

### **Traffic to Probe**

Allows you to select to monitor transmit or receive if the port is an FDX port. Both transmit and receive are provided if the port is HDX. If the Probe port is not in use, "None" will be displayed.

## EtherPipe Configuration

From the Configuration menu, select **EtherPipe**. Use the EtherPipe menu to choose to configure EtherPipe or obtain information on active EtherPipes.

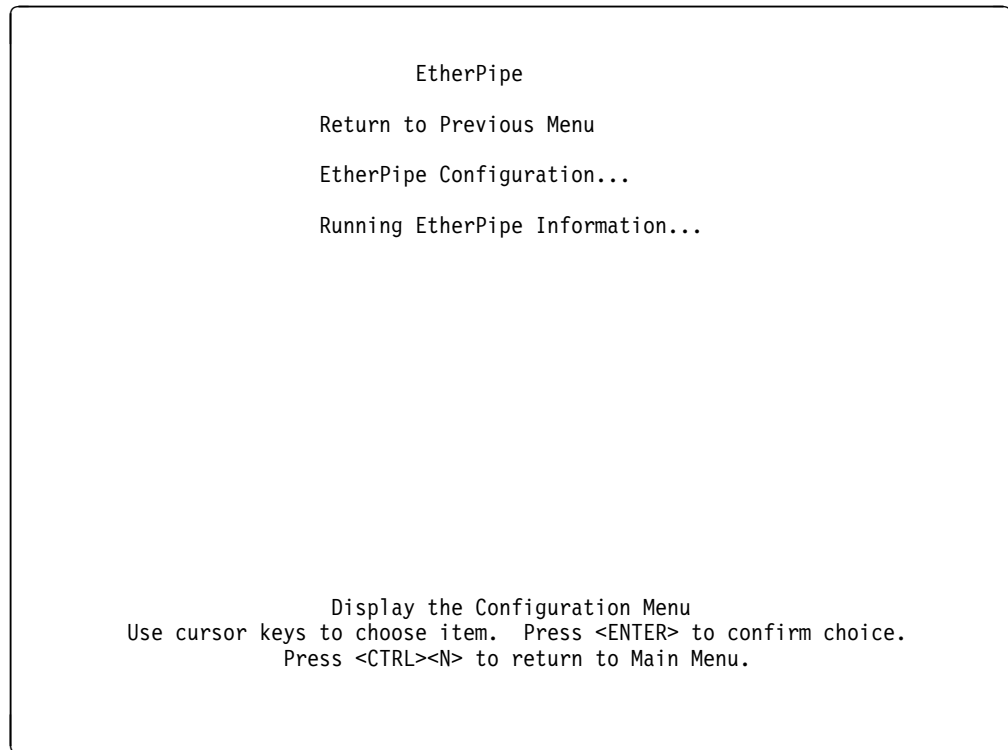


Figure 4-24. EtherPipe Menu

The following list describes functions available from the EtherPipe menu:

### **EtherPipe Configuration**

Displays the EtherPipe Configuration Menu.

### **Running EtherPipe Information**

Displays the status of the configured EtherPipes.

## Configuring EtherPipes

From the Configuration menu, select **EtherPipe**, and then **EtherPipe Configuration....** Use the EtherPipe configuration panel to add, delete, and change EtherPipes. EtherPipes consist of two to four channels (port connections). A single EtherPipe can consist of a combination of HDX and FDX connections; for example, an EtherPipe containing three ports can have one HDX and two FDX connections. However, both ports in each interconnected pair must be either HDX or FDX. In addition, all ports in a single EtherPipe must belong to the same domain on the 8271.

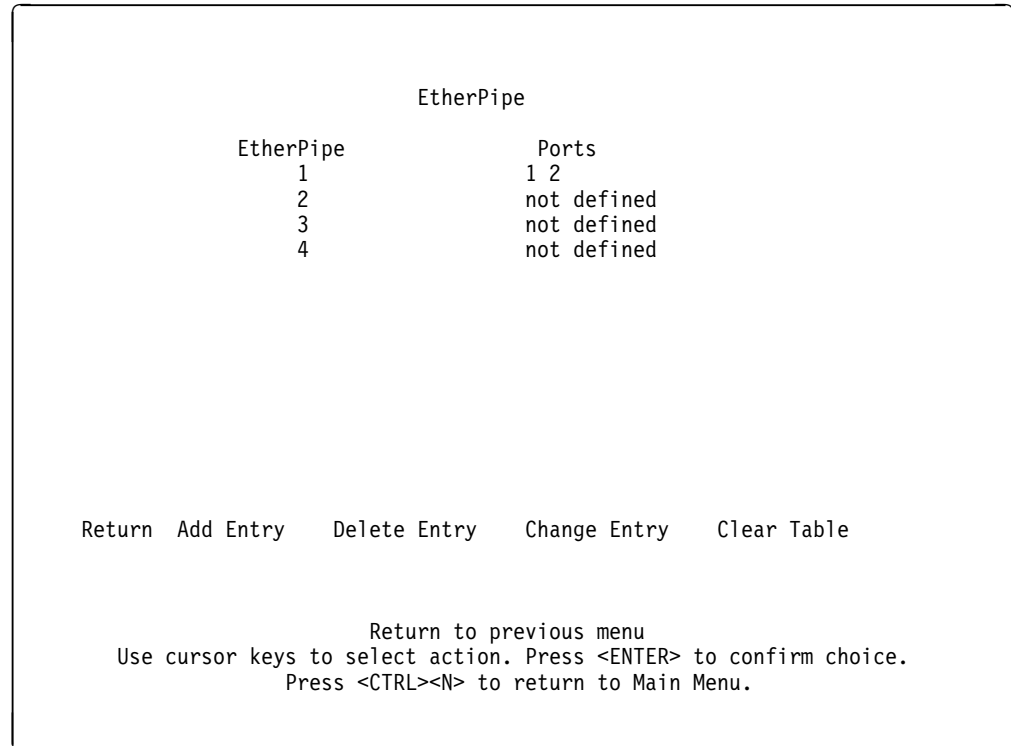


Figure 4-25. EtherPipe Configuration Panel

The following list defines functions available on the EtherPipe panel:

### Add Entry

Used to select the 2–4 port numbers for an EtherPipe to be established. The port numbers are entered from lowest to highest, separated by spaces.

### Notes:

1. You must define the EtherPipes for both connected 8271s before physically connecting the linked ports. Make sure that you have either disabled the ports or disconnected the cables before you configure EtherPipes on the 8271s, or you will create loops.
2. When you physically connect the linked ports, make sure that the ports with the lowest port numbers are connected together, the ports with the next-lowest port numbers are connected to each other, and so forth. For example, if an EtherPipe links ports 3, 6, and 7 of one 8271 and ports 2, 4, and 5 of another 8271, the ports must be connected to

each other in the following manner: port 3 to port 2, port 6 to port 4, and port 7 to port 5.

**Delete Entry**

Used to delete a selected EtherPipe.

**Change Entry**

Used to reenter port numbers in a selected EtherPipe. The port numbers are entered from lowest to highest, separated by spaces.

**Note:** The ports must be disabled or disconnected before you change an EtherPipe.

**Clear Table**

Used to delete all EtherPipes.

## Viewing the Running EtherPipe Information Panel

From the Configuration menu, select **EtherPipe**, and then **Running EtherPipe Information....** Use the Running EtherPipe Information panel to display information about active EtherPipes.

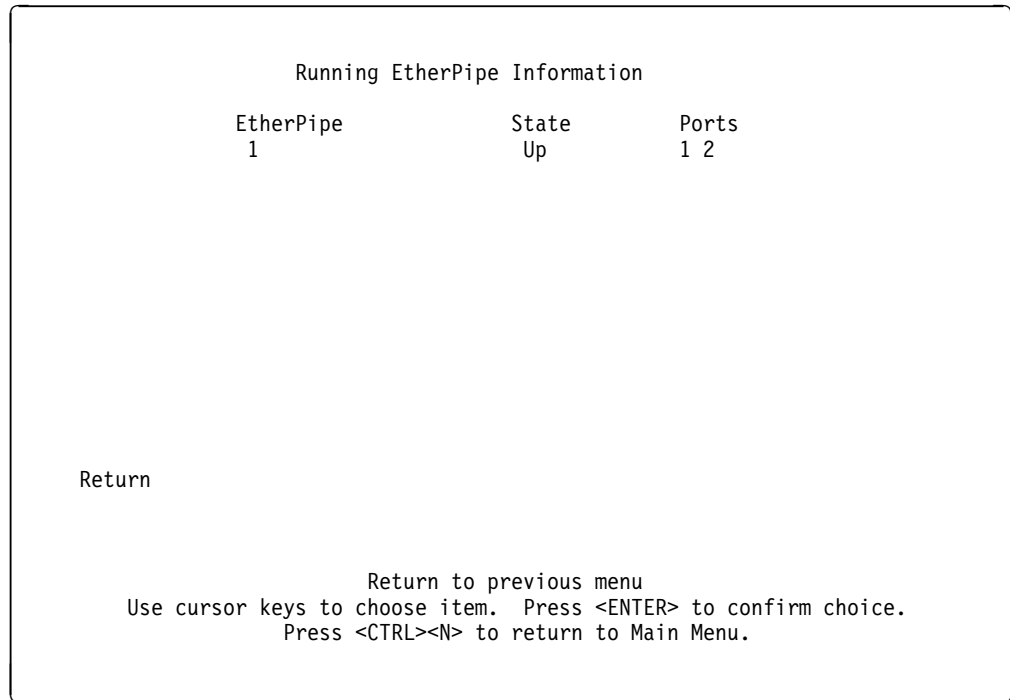


Figure 4-26. Running EtherPipe Information Menu

The following list describes the information available on the Running EtherPipe panel:

**EtherPipe**

Shows the EtherPipe number.

**State**

Indicates whether the EtherPipe is up or down.

**Ports**

Shows the ports assigned to the EtherPipe.

## Configuring the MAC Filter & Port Security

From the Configuration menu, select **MAC Filter & Port Security...** Use the MAC Filter & Port Security menu to configure MAC address filters, configure port security attributes, or view port filters.

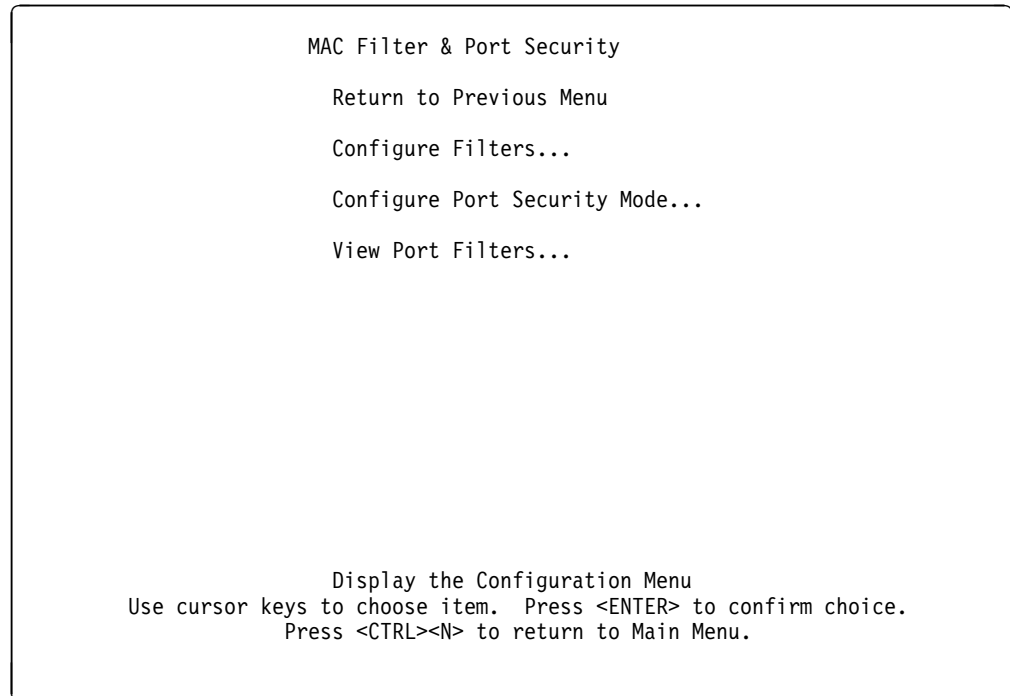


Figure 4-27. MAC Filter & Port Security Menu

The following list defines the options available from this menu:

### **Configure Filters**

Used to configure MAC address filters.

### **Configure Port Security Mode**

Used to specify the security attributes of a port.

### **View Port Filters**

Displays the filtered MAC addresses and the ports that use them. Port 0 refers to the 8271 system module.



## Configuring MAC Filters

From the Configuration menu, select **MAC Filter & Port Security**, and then **Configure Filters...** Use the Configure Filters panel to restrict certain users from communicating with other users by specifying up to 100 source or destination MAC addresses to be filtered at the port of entry into the 8271. MAC addresses can be unicast, multicast, or broadcast. All 100 addresses can be associated with one port or divided among all ports.

Configure Filters

Index	MAC Address	Type	Applied Ports	Exit Ports
1	10005A 4315CF	src	4	

Filter Type:  
Block any packet with Source Address  
Block any packet with Destination Address  
Allow any packet with the designated Source address to port(s)....  
Force any packet with the designated Destination Address to port(s)....  
Please enter the MAC address (xx xx xx xx xx xx): 01 04 27 99 01 04

Please enter the port(s) to apply this filter:  
Null input causes the filter to be applied to all ports.

Return    Zoom    More    Add Entry    Delete Entry    Clear Table

Press <ESC> to cancel. Press <ENTER> to confirm choice.  
Press <CTRL><N> to return to Main Menu.

Figure 4-28. Filter Configuration Menu

The following list defines functions available from this panel:

### Add Entry

Used to specify the filter type, the MAC address you want to filter, and the ports to which this filter will be applied.

### Delete Entry

Used to specify a filter you want to remove.

### Clear Table

Clears the address table.

**Zoom** Displays the complete list of Applied and Exit ports for the filter.

### Filter Type

**Block any packet with Source Address** Listed as *src* in the Type field.

**Block any packet with Destination Address** Listed as *dst* in the Type field.

**Allow any packet with the designated Source address to ports** Listed as *src* in the Type field.

**Force any packet with the designated Destination Address to ports** Listed as *dst* in the Type field.

When you choose any of the Filter Type options, you are prompted to enter the port to which the filter applies. This is the port where the filtering takes place. After you have entered it, this port number appears in the Applied Ports column.

When you choose “Allow any packet with the designated Source address to ports” or “Force any packet with the designated Destination Address to ports,” you are also prompted to enter the port that is to receive the filtered data. This port appears in the Exit Ports column.

**Notes:**

1. If you set up a filter for broadcast packets, hosts on the other side of the 8271 will not see the ARP broadcast packets. To prevent this, let the 8271 learn the host addresses before implementing the filter. Some hosts might time out their local address entries and attempt to relearn them with a broadcast ARP.
2. If a filter is set up with the EtherPipe option, filters must be created for all ports in the EtherPipe.

## Configuring Port Security Mode

From the Configuration menu, select **MAC Filter & Port Security**, and then **Configure Port Security Mode**. Use the Configure Port Security Mode panel to define the security attributes of each port. This function totally blocks (secures) specific address types at selected ports. Addresses that have been allowed or forced by a configured filter are not blocked.

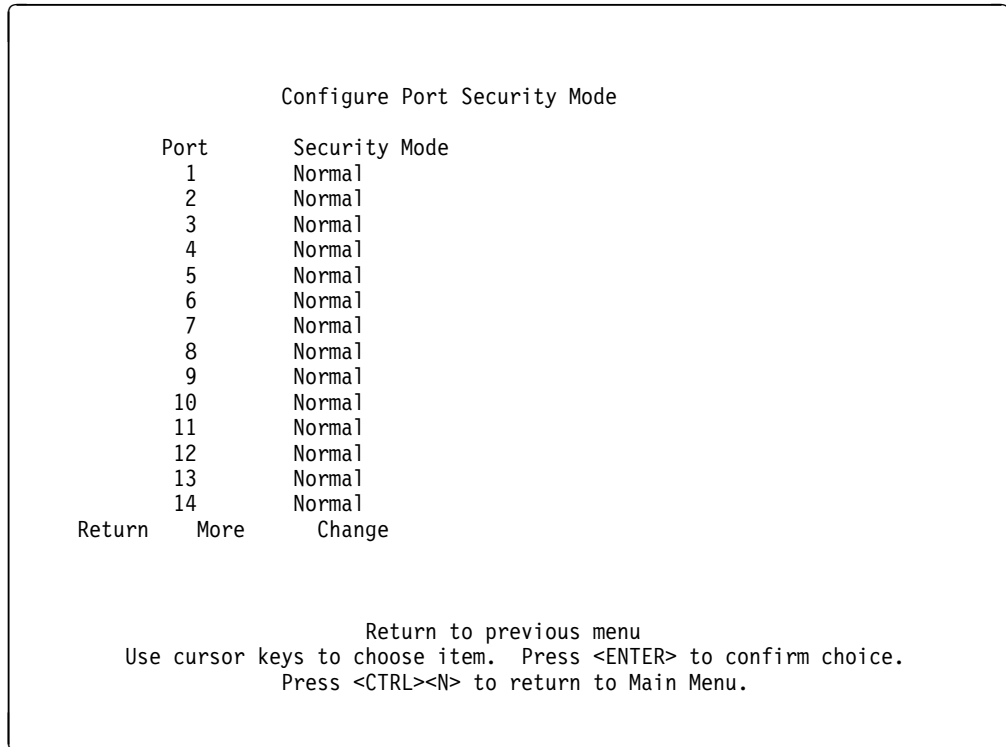


Figure 4-29. Configure Port Security Mode (1 of 2)

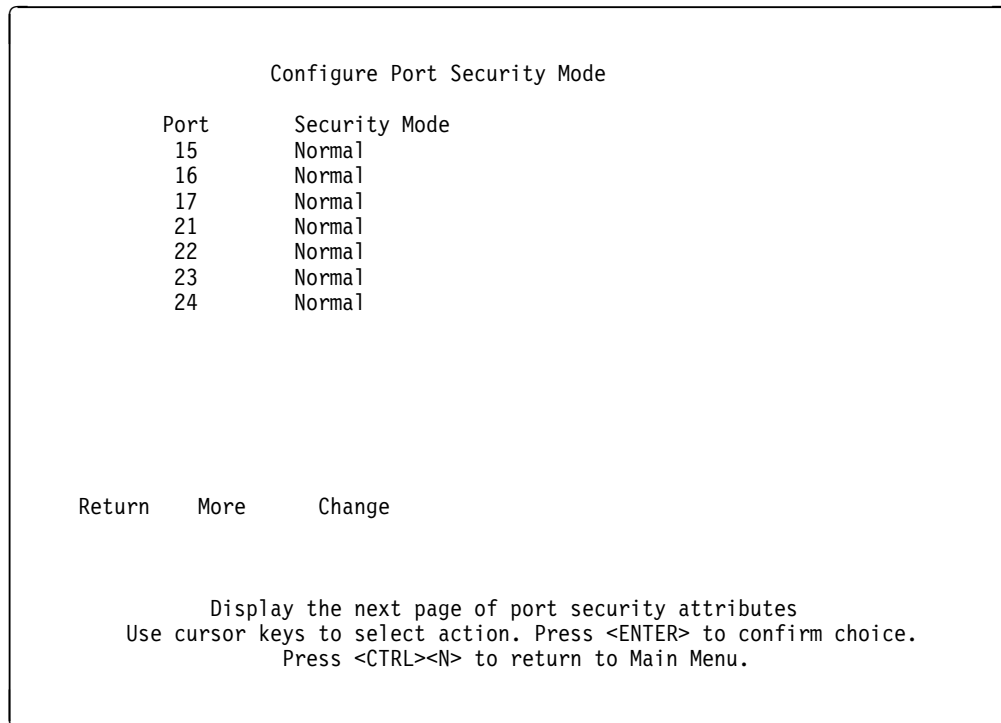


Figure 4-30. Configure Port Security Mode (2 of 2)

The following list defines functions available on this panel:

**Normal** No security mode is defined for a port. This is the default.

**Secure source addresses**

Block all source addresses, except those allowed by a configured filter.

**Secure destination addresses**

Block all destination addresses, except those forced by a configured filter.

**Secure both source and destination addresses**

Block all source and destination addresses, except those allowed or forced by a configured filter.

## Viewing Port Filters

From the Configuration menu, select **MAC Filter & Port Security...** Then, select **View Port Filters...** Use the View Port Filters panel to display the defined filters and security mode for the specified port.

```
Port 1 View Port Filters

Index  MAC Address  Description
  1    10005A 4315CF  This address is blocked

Return  More

Port 1 Security Mode:  Secure destination addresses

Return to previous menu
Use cursor keys to choose item. Press <ENTER> to confirm choice.
Press <CTRL><N> to return to Main Menu.
```

Figure 4-31. View Port Filters Panel

## Configuring Address Aging

From the Configuration menu, select **Address Aging....** Use the Address Aging menu to configure Port or Master address table aging.

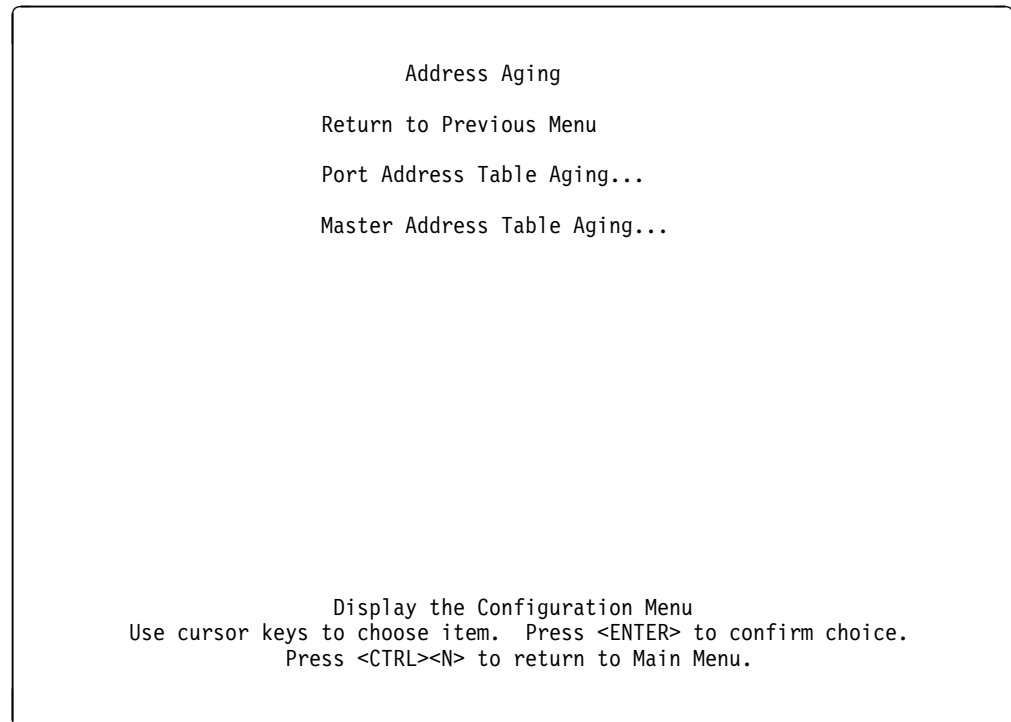


Figure 4-32. Address Aging Menu

The following list defines functions available on the Address Aging panel:

### **Port Address Table Aging**

Used to configure the aging time and level for each port.

### **Master Address Table Aging**

Used to configure aging time and level for the 8271.

## Viewing or Changing Port Address Table Aging

From the Configuration menu, select **Address Aging...**, and then **Port Address Table Aging...** Use the Port Address Table Aging panel to change the aging time and level from the defaults for each port.

Port Address Table Aging			
Port	Aging Time (min.)	Demand	Aging Level
1	15		90%
2	15		90%
3	15		90%
4	15		90%
5	15		90%
6	15		90%
7	15		90%
8	15		90%
9	15		90%
10	15		90%
11	15		90%
12	15		90%
13	15		90%
14	15		90%
Return	More	Change	

Return to previous menu  
Use cursor keys to choose item. Press <ENTER> to confirm choice.  
Press <CTRL><N> to return to Main Menu.

Figure 4-33. Port Address Table Aging Panel (1 of 2)

Port Address Table Aging			
Port	Aging Time (min.)	Demand	Aging Level
15	15		90%
16	15		90%
17	15		50%
21	15		50%
22	15		50%
23	15		50%
24	15		50%

Return      More      Change

Display the next page of port address aging table  
 Use cursor keys to select action. Press <ENTER> to confirm choice.  
 Press <CTRL><N> to return to Main Menu.

Figure 4-34. Port Address Table Aging Panel (2 of 2)

The following list defines the information available on the Port Address Table Aging panel:

**Aging Time**

Defines the time an inactive MAC address will remain in the Port Address Table after the Demand Aging Level is reached. The default is 15 minutes. A value of 0 will disable the removal of addresses based on age.

**Demand Aging Level**

Defines how full the Port Address Table must be in order for addresses to be purged. The default is 90%. A value of 0 will disable the removal of addresses when the threshold has been reached.



## Viewing or Changing Master Address Table Aging

From the Configuration Menu, select **Address Aging...**, and then **Master Address Table Aging...** Use the Master Address Table Aging panel to define the aging time and level for the 8271.

Master Address Table Aging

Return

Aging Time	15 minutes
Demand Aging Level	90%

Modify address aging interval for master address table (0 means disable)  
Use cursor keys to select action. Press <ENTER> to confirm choice.  
Press <CTRL><N> to return to Main Menu.

Figure 4-35. Master Address Table Aging Panel

The following list defines the information available on the Master Address Table Aging panel:

### **Aging Time**

Defines the time an inactive MAC address will remain in the Master Address Table after the Demand Aging Level is reached. The default is 15 minutes. A value of 0 will disable the removal of addresses based on age.

### **Demand Aging Level**

Defines how full the Master Address Table must be in order for addresses to be cleared. When the threshold is reached, the addresses are cleared based on a random algorithm that is weighted to clear remote addresses first. The default is 90%. A value of 0 will disable the removal of addresses when the threshold has been reached.

## Viewing or Changing Port Switching Mode

From the Configuration menu, select **Port Switching Mode...** Use the Port Switching Mode panel to change the port switching mode, error watermark, and runt-free mode.

Port Switching Mode			
Port	Switching Mode	Error Watermark	Runt-free Mode
1	Auto	50%	off
2	Auto	50%	off
3	Auto	50%	off
4	Auto	50%	off
5	Auto	50%	off
6	Auto	50%	off
7	Auto	50%	off
8	Auto	50%	off
9	Auto	50%	off
10	Auto	50%	off
11	Auto	50%	off
12	Auto	50%	off
13	Auto	50%	off
14	Auto	50%	off
Return	More	Change	

Return to previous menu  
Use cursor keys to choose item. Press <ENTER> to confirm choice.  
Press <CTRL><N> to return to Main Menu.

Figure 4-36. Port Switching Mode Panel (1 of 2)

Port Switching Mode			
Port	Switching Mode	Error Water Mark	Runt-free Mode
15	Auto	50%	off
16	Auto	50%	off
17	Auto	50%	off
21	Auto	50%	off
22	Auto	50%	off
23	Auto	50%	off
24	Auto	50%	off

Return    More    Change

Display the next page of switching mode water marks  
Use cursor keys to select action. Press <ENTER> to confirm choice.  
Press <CTRL><N> to return to Main Menu.

Figure 4-37. Port Switching Mode Panel (2 of 2)

The following list explains the information available on the Port Switching Mode panel:

**Cut-Through Mode**

The highest-speed switching mode.

**Store-and-Forward Mode**

The mode that provides improved error isolation at the expense of some speed.

**Auto (Adaptive) Mode**

The 8271 will automatically alternate between cut-through and store-and-forward mode based on the specified error watermark. It will operate in cut-through mode until the ratio of error packets to total packets reaches the percentage specified in the error watermark. Then, the 8271 changes to store-and-forward mode. It will change back to cut-through mode when the percentage of error packets falls 5% below the error watermark. Auto mode is also called *adaptive mode*.

The default switching mode is Auto.

**Error Watermark**

The threshold at which the 8271 switches from cut-through to store-and-forward mode. It is expressed as a percentage and is calculated by dividing the number of error packets received by the total number of packets. The error watermark is applicable in Auto mode only. The default is 50%.

### Runt-Free Mode

Turning on Runt-Free Mode stops the 8271 from forwarding packets of fewer than 64 bytes. The default is off.

## Broadcast Suppression

Provides the ability to suppress all broadcast packets from a port if the rate of broadcast packets exceeds a specified (user-defined) threshold. Broadcast packets are allowed from that port once the rate of packets falls below the user-defined threshold.

Broadcast Suppression		
Port	Broadcast Suppression	Broadcast Water Mark
1	off	
2	off	
3	off	
4	off	
5	off	
6	off	
7	off	
8	off	
9	off	
10	off	
11	off	
12	off	
13	off	
14	off	
Return	More	Change

Return to previous menu  
Use cursor keys to choose item. Press <ENTER> to confirm choice.  
Press <CTRL><N> to return to Main Menu.

Figure 4-38. Broadcast Suppression Panel (1 of 2)

Broadcast Suppression		
Port	Broadcast Suppression	Broadcast Water Mark
15	off	
16	off	
17	off	
21	off	
22	off	
23	off	
24	off	

Return    More    Change

Display the next page of broadcast suppression parameters  
 Use cursor keys to select action. Press <ENTER> to confirm choice.  
 Press <CTRL><N> to return to Main Menu.

Figure 4-39. Broadcast Suppression Panel (2 of 2)

The following list defines functions available on the Broadcast Suppression panel:

**Broadcast Suppression**

Used to enable or disable broadcast suppression. The default is off (no broadcast suppression).

**Broadcast Water Mark**

Establishes the broadcast suppression threshold.

## Configuring and Changing the Password

From the Configuration menu, select **Password...** Use the Password menu to add, change, or delete a password. If you establish a password, users must enter it to obtain access to the Main Menu.

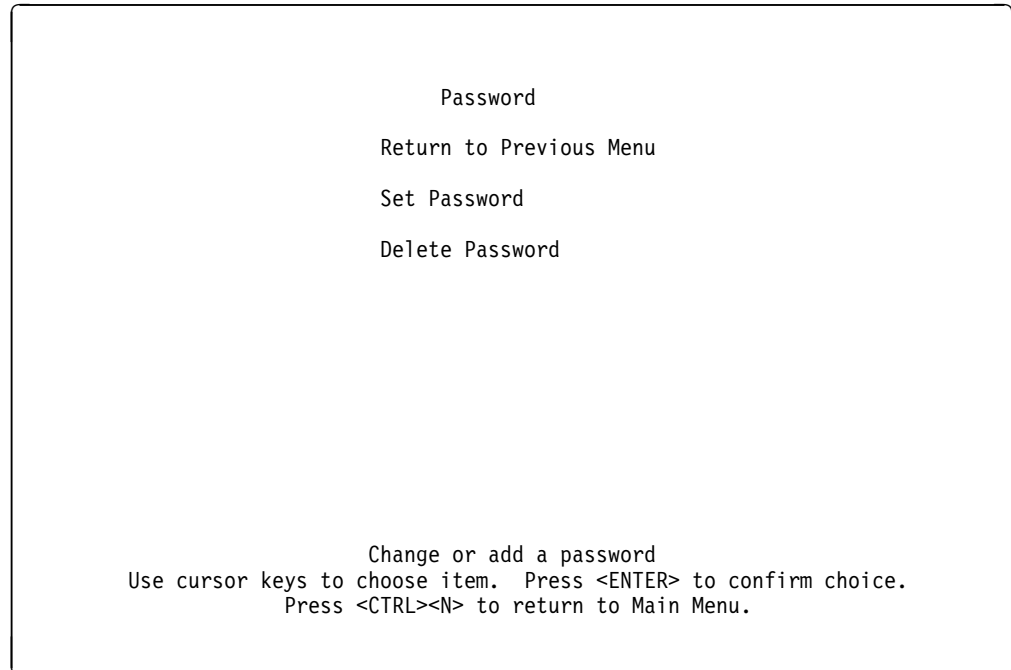


Figure 4-40. Password Panel

The following list defines functions available on the Password panel:

### **Set Password**

Used to establish or change the password. The default is no password.

### **Delete Password**

Used to delete the password.

The system prompts you to enter the password before it allows you to change or delete the password. If you are establishing a new password, press **Enter** at the Old Password prompt.

**Note:** The password is case sensitive.

The password is saved across resets and power cycles.

**Note:** If you have forgotten your password, press the System Request button to access the System Request Menu, and then Clear NVRAM. This will clear the password, but also set all configuration parameters to their default value, clearing any data you have entered.

## Configuring the Console

From the Configuration menu, select **Console Configuration....** Use the Console Configuration menu to configure for a serial link or Telnet console session and to set the console time-out value.

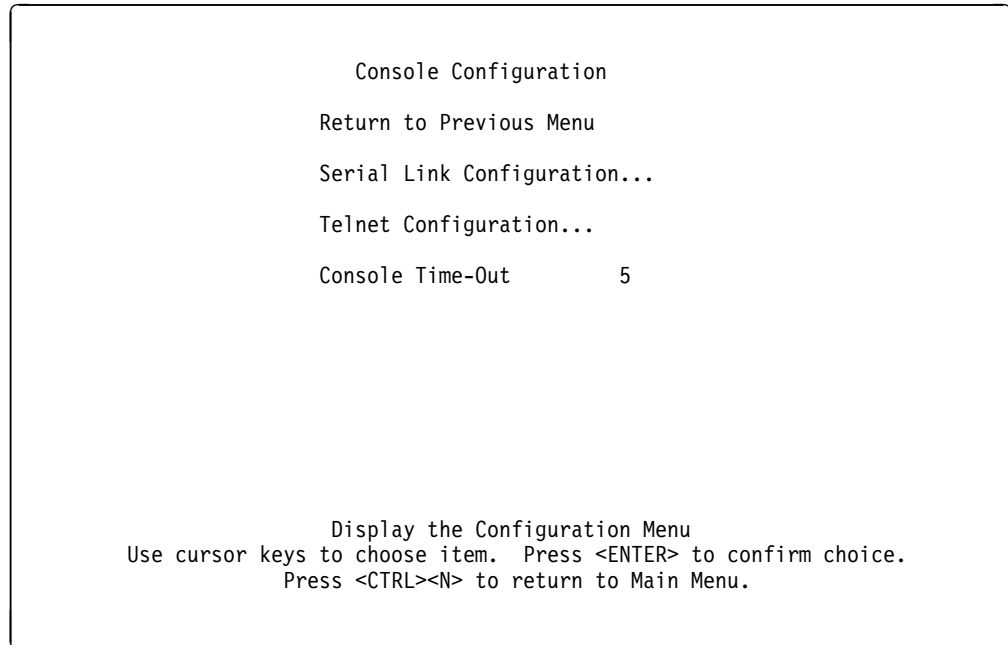


Figure 4-41. Console Configuration Menu

The following list defines functions available on the Console Configuration menu:

### **Serial Link Configuration**

Used to configure a console session with a device attached to the EIA 232 port.

### **Telnet Configuration**

Used to configure a console session via Telnet.

### **Console Time-Out**

Used to set the number of minutes a console session will remain idle before timing out. Unsaved screen entries are lost when the console times out.

## Configuring Serial Link for the Console

From the Configuration menu, select **Console Configuration...**, and then **Serial Link Configuration...** Use the Serial Link Configuration panel to change the default parameters of the EIA 232 port, if necessary, to set up a console session with an attached device.

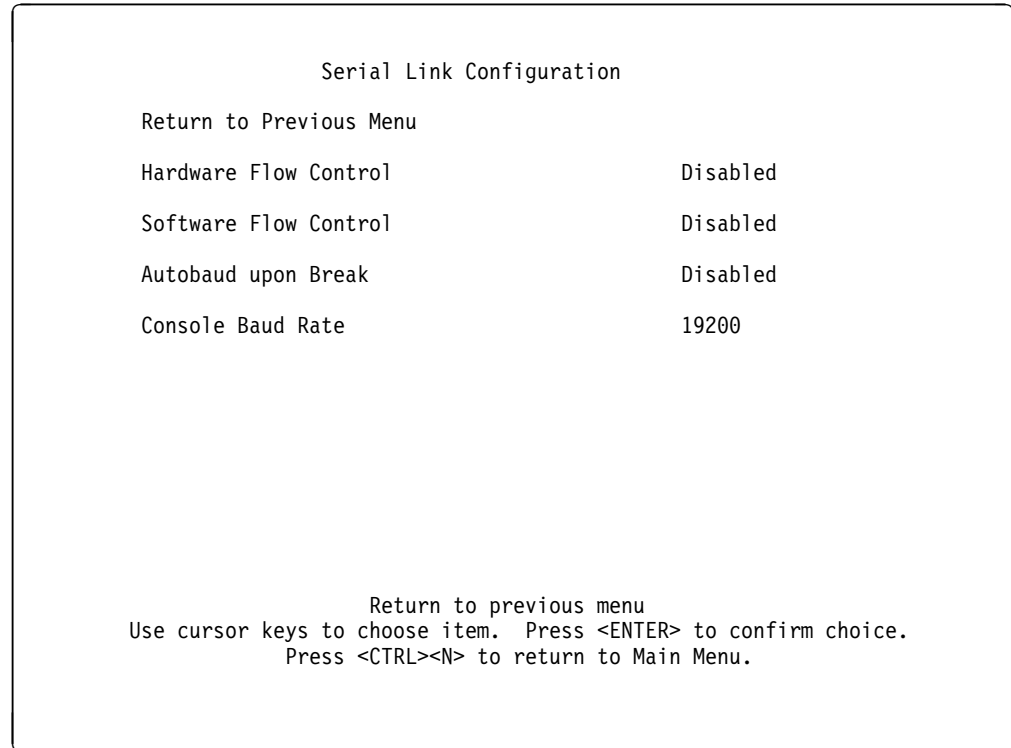


Figure 4-42. Serial Link Configuration Panel

The following list defines functions available on the Serial Link Configuration panel:

### **Hardware Flow Control**

Used to enable or disable hardware flow control. The default is Disabled.

### **Software Flow Control**

Used to enable or disable software flow control. The default is Disabled.

### **Autobaud upon Break**

Used to enable or disable autobaud upon break. The default is Enabled. When set to Enabled, a baud rate change can be accomplished by changing the baud rate of the terminal emulator, disconnecting and reconnecting the EIA 232 cable, and then pressing enter until a panel appears.

### **Console Baud Rate**

Used to display and change the 8271 EIA 232 port baud rate.

Acceptable baud rates for the console are 1200, 2400, 4800, 9600, 19200, 38400, or Autobaud.

The default value for this parameter is 9600.

Make sure that your terminal emulator baud rate matches the console baud rate you set.



## Configuring Telnet for a Console Session

From the Configuration menu, select **Console Configuration...**, and then **Telnet Configuration....** Use the Telnet Configuration panel to configure the 8271 for a Telnet console session.

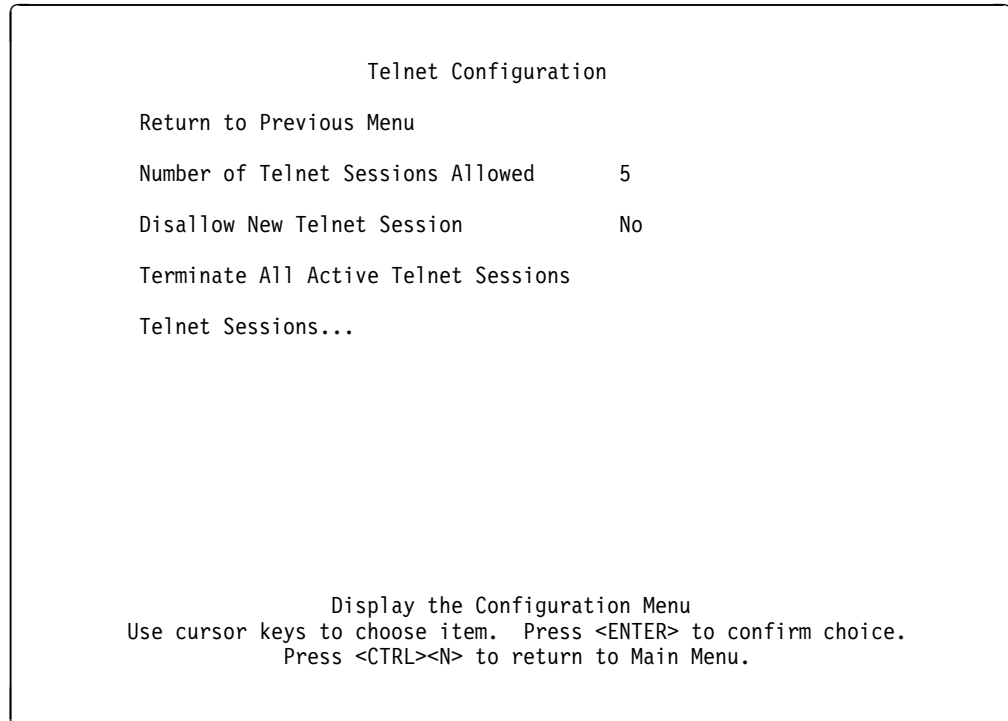


Figure 4-43. Telnet Configuration Menu

The following list defines information and functions available on the Telnet Configuration panel:

**Number of Telnet Sessions Allowed**

Defines the number of Telnet sessions allowed. The default is 5.

**Disallow New Telnet Sessions**

Disallows new Telnet sessions. The default is No.

**Terminate All Active Telnet Sessions**

All active Telnet sessions are stopped.

**Telnet Sessions**

Displays any active Telnet sessions.

## Viewing or Closing Active Telnet Sessions

From the Configuration menu, select **Console Configuration...**, and then **Telnet Configuration....** Select **Telnet Sessions....** Use the Telnet Sessions panel to view or close any active Telnet sessions.

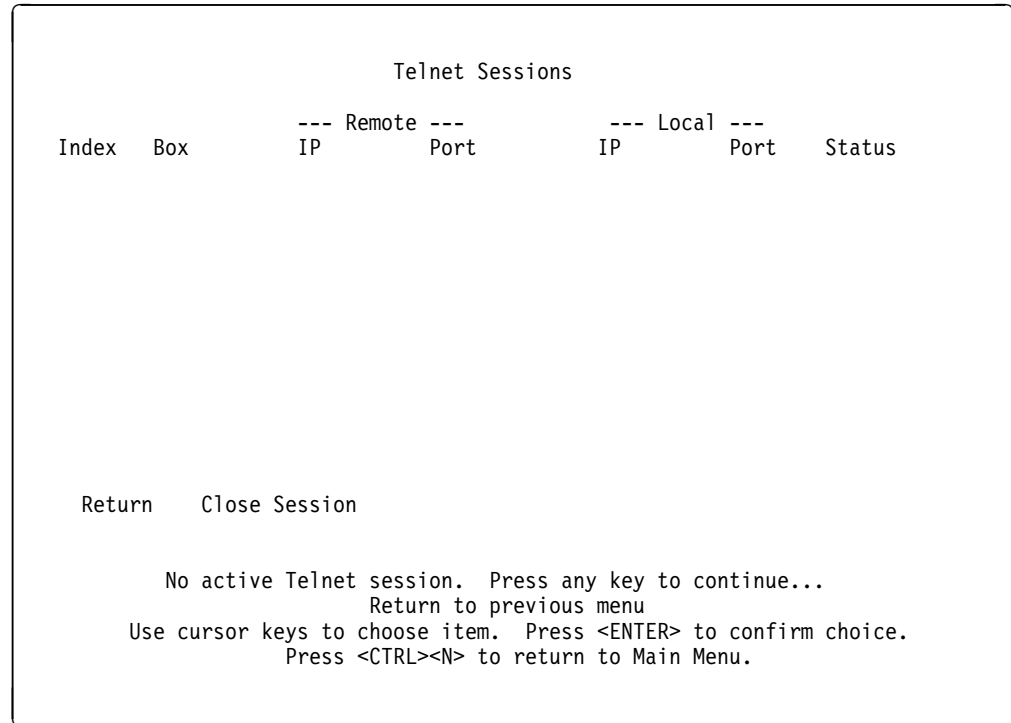


Figure 4-44. Telnet Sessions Panel

---

## Resetting the 8271

Resetting the 8271 will interrupt all network traffic through the 8271.

Depending on whether you want to reset the 8271 with diagnostics (a cold boot) or without diagnostics (a warm boot), perform one of the following steps:

- Disconnect the power cord from the 8271 and then reconnect it. This will reset the switch and start system self-diagnostics.
- Press the Reset button on the front panel of the 8271. The 8271 will be reset, but it will not perform system self-diagnostics.
- From the Main Menu, select **Reset...** (see Figure 4-2 on page 4-7) to reset the switch either with or without system self-diagnostics.

**Note:** LED indications that show the result of diagnostic tests are not given in real time. You must reset the switch with diagnostics in order to determine whether the LEDs are alerting you to a problem with the 8271.

## Reset Menu

From the Main Menu, select **Reset....** Use the Reset menu to reset the 8271 and to download the microcode.

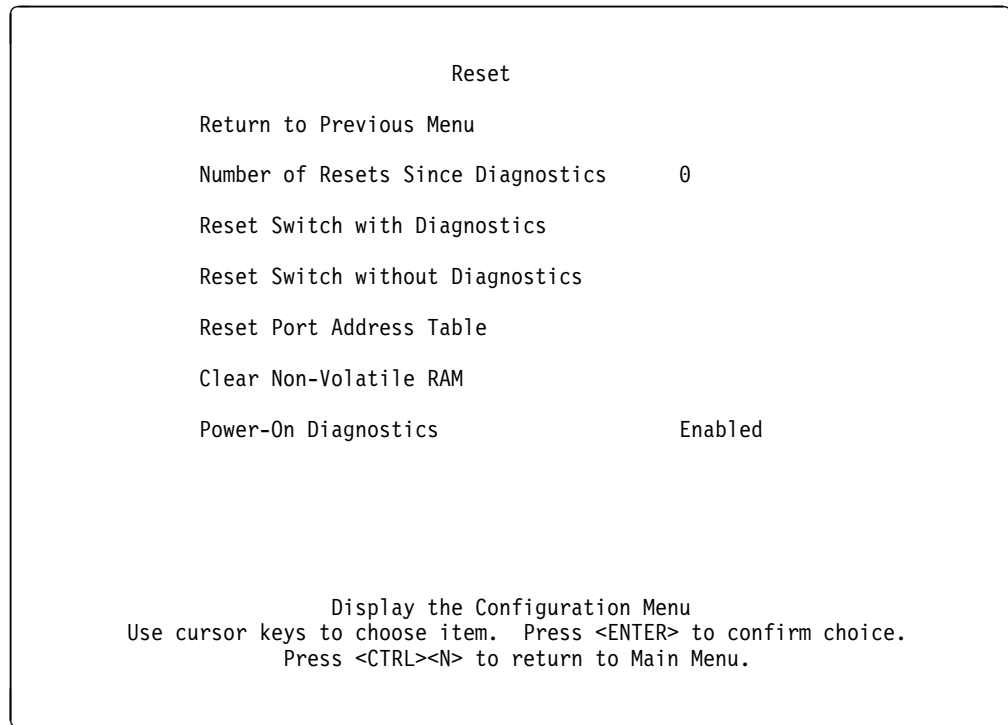


Figure 4-45. Reset Menu

The following list defines information and functions available on the Reset menu:

### **Number of Resets since Diagnostics**

Displays the number of times the unit has been reset since the unit was powered on or ran power-on diagnostics. This number is not reset to 0 when you reset the address table for the port.

### **Reset Switch with Diagnostics**

Resets the 8271 hardware, runs diagnostic tests, clears all counters including address tables, and starts the 8271. This does not clear any user-configured parameters. When the 8271 restarts, parameters from NVRAM are used to initiate the operational parameters.

### **Reset Switch without Diagnostics**

Resets the switch hardware, clears all counters including address tables, and starts the 8271. This does not clear any user-configured parameters. When the 8271 restarts, parameters from NVRAM are used to initiate operational parameters.

### **Reset Port Address Table**

Allows you to select all ports or individual ports in order to clear table entries, set all port traffic counters to 0, and set Time since Last Reset to 0.

### Clear Non-Volatile RAM

Deletes all user-configured parameters, such as IP address and baud rate information, and resets the 8271.

**Note:** Clearing NVRAM erases all configuration parameters. If you are using the EtherPipe feature, be sure to disconnect the affected ports or disable them on the Port Configuration Menu and reset the switch **before** clearing NVRAM. If you are using the spanning tree option, it will be turned off and port costs and priorities will be lost, which can result in loops. Use the menus to reestablish port costs and priorities. If you are using an SNMP manager, reconfigure all IP and SNMP parameters.

### Power-On Diagnostics

Enables or disables the running of power-on diagnostics when the 8271 is powered on. The default is Enabled.

If the 8271 is connected to a terminal via the EIA 232 port, the diagnostic messages shown in Figure 4-46 should appear after you reset the 8271 with diagnostics. An abbreviated version of these messages will appear if you reset the 8271 without diagnostics.

```
IBM Nways System Software Version 9.1.1 (Rev.A), Copyright 1994, 1995,.
System started on Fri. May 10, 1996 14:31:35
4 Megabytes System memory
2 Megabytes Network memory
- Initialization started
- File system initialized
- System temperature is within safe operating levels
- Warmboot initialization started
- Checking file system integrity
- LAN ports detected:
  - 10Base-T : 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
  - 100Base-F : 17
  - 10Base-T : 21 22 23 24
- Initializing Ports: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 21 22 23 24
- Initializing system address table
- No existing diagnostic information, forcing diagnostic mode
- Starting Power Up Diagnostics test
  - UART loopback test on diagnostic port...Passed
  - UART loopback test on console port...Passed
  - RTC memory test...Passed
  - Real Time Clock test...Passed
  - CPU loopback test.....Passed
  - Ethernet Port loopback test.....Passed
  - Ethernet Port fast transmit loopback test.....Passed
  - Ethernet Port fast receive loopback test.....Passed
  - Ethernet Port cross port loopback test.....Passed
  - Ethernet Port broadcast test.....Passed
  - 100Base loopback test...Passed
  - 100Base cross port loopback test...Passed
  - 100Base port broadcast test...Passed
  - CPU broadcast test...Passed
- Completed Power Up Diagnostics test
Nways Switch initiating bootp requests on one or more domains
- System initialization complete
- Enabling port: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 21 22 23 24

Press RETURN key to activate console...
```

Figure 4-46. Messages during Diagnostics



---

## Chapter 5. Using the Statistics Panels

This chapter provides information about monitoring the 8271 via the console interface. Before proceeding with the information in this chapter, make sure that you have performed the following steps:

- Attach a PC or other DTE device to the EIA 232 port on the 8271 by following the steps under “Connecting a Local Terminal” on page 4-4 or “Connecting a Modem to Allow Remote Terminal Access” on page 4-5.
- At the main menu (see “Beginning the Console Session” on page 4-6), use the arrow keys to go to **Statistics...** and Press **Enter**. This brings up the Statistics menu, from which you can view 8271 statistics.

---

### Viewing Statistics

Use the statistics information panels to view statistics for the system as a whole or for individual ports. You cannot change the information that appears on statistics panels. To view the Statistics Menu, select **Statistics...** from the Main Menu.

```
Statistics

Return to Previous Menu
Switch Statistics...
Port Statistics...
Address Tables...
Spanning Tree Bridge Information...
Current Spanning Tree Information...
Virtual Switch Statistics...
IEEE 802.3 Statistics...
Diagnostic Test Results...
Message Log Information...

Display information about switch utilization
Use cursor keys to choose item. Press <ENTER> to confirm choice.
Press <CTRL><N> to return to Main Menu.
```

Figure 5-1. Statistics Menu

The following list describes the panels available from the Statistics menu:

#### **Switch Statistics Menu**

Displays information about switch utilization. See “Viewing Switch Statistics” on page 5-2 for more information.

**Port Statistics Menu**

Displays information about a particular port. See “Viewing Port N Statistics” on page 5-4 for more information.

**Address Tables Menu**

Displays the port selection for port and system address tables. See “Viewing Address Tables” on page 5-5 for more information.

**Spanning Tree Bridge Information**

Displays spanning tree information used only when this switch is the root. See “Viewing the Spanning Tree Bridge Information” on page 5-9 for more information.

**Current Spanning Tree Information**

Displays the 8271’s view of the current spanning tree. See “Viewing Current Spanning Tree Information” on page 5-10 for more information.

**Virtual Switch Statistics**

Displays the selection for separate domain statistics. See “Viewing Virtual Switch Statistics” on page 5-12 for more information.

**IEEE 802.3 Statistics Menu**

Displays the IEEE 802.3 statistics. See “Viewing IEEE 802.3 Statistics” on page 5-13 for more information.

**Diagnostic Test Results**

Provides the ability to display the results of diagnostic tests and any errors that might have occurred during power-up diagnostics. See “Diagnostic Test Results” on page 5-13 for more information.

**Message Log Information**

Provides the ability to display any message recorded by the system (ER\_Error\_log function). See “Message Log Information” on page 5-13 for more information.

## Viewing Switch Statistics

From the Statistics menu, select **Switch Statistics....** The Switch Statistics panel displays information about stations connected to the 8271.

Switch Statistics	
Return to Previous Menu	
System Up Time	2 Hr, 1 Min, 47 Sec
Board Temperature	Normal
Currently Active Stations	58
Largest Number of Stations	58
Maximum Number of Stations	10000
Buffer Overruns	0
Software Frames	0
Error Frames Received	0
Frames Lost	0
Short Frames	0
Oversize Frames	0
Bad Entry Port Frames	0
Pending Send Requests	0
Dropped Frames	0
Maximum Hash Chain	3
Hash Table Full	0
Reset Statistics	

Return to previous menu  
Press <ENTER> to exit menu.  
Press <CTRL><N> to return to Main Menu.

Figure 5-2. Switch Statistics Panel

The following list defines information available on the Switch Statistics panel:

**System Up Time**

Displays the length of time since the last reset or power cycle.

**Currently Active Stations**

Displays the number of entries in the address table, representing the number of currently active stations, or nodes, on all ports of the 8271.

**Largest Number of Stations**

Displays the most stations ever active on all ports at one time since the last reset or power cycle.

**Maximum Number of Stations**

Displays the maximum number of stations that the 8271 can support simultaneously. This is different from the Maximum Number of Stations value that appears in the Port Statistics menu, which is the number of addresses for a specific port.



## Viewing Port N Statistics

From the Statistics menu, select **Port Statistics....** The Port *N* Statistics panel displays detailed information about a particular port *N*, where *N* is the number of the port, in the range of 1 to 24.

Port 1 Statistics	
Return to Previous Menu	
Local Frames Received	0
Frames Switched by Hardware	0
All Forwarded Frames	0
Number of Learned Stations	0
Frames Delivered for Learning	0
Broadcast Frames Received	0
Local Address Entries	1
Remote Address Entries	19
Currently Active Stations	20
Largest Number of Stations	20
Maximum Number of Stations	1790
Hash Bucket Overflows	0
Hash Table Overflows	0
Octets Received	0
Octets Transmitted	0
Time Since Last Reset	0 Hr, 28 Min, 41 Sec
Reset Statistics	

Return to previous menu  
Use cursor keys to choose item. Press <ENTER> to confirm choice.  
Press <CTRL><N> to return to Main Menu.

Figure 5-3. Port 1 Statistics Panel

The following list describes information available on the Port *N* Statistics panel:

### Local Frames Received

Displays the number of frames that are confined to this segment and are not forwarded by the switch.

### Frames Switched by Hardware

Displays the number of frames received on this port and forwarded by the 8271 hardware to another port.

### All Forwarded Frames

Displays the number of frames received on this port and forwarded by the 8271 hardware or software.

### Frames from Unknown Stations

Displays the number of frames received on this port and forwarded to the system module for processing because the source or destination station address was not in the port's forwarding table.

### Frames Delivered to Software

Displays the number of frames received on this port and forwarded to the system module for processing.

### Broadcast Packets Received

Displays the number of broadcast frames received on this port without errors.

**Local Address Entries**

Displays the number of stations on this port that belong to the local segment.

**Remote Address Entries**

Displays the number of stations on this port that belong to another segment.

**Currently Active Stations**

Displays the sum of local and remote stations.

**Largest Number of Stations**

Displays the largest number of stations active since the last reset of the 8271.

**Maximum Number of Stations**

Displays the maximum number of stations that the port can support simultaneously.

**Time since Last Reset**

Displays the hours, minutes, and seconds since the port traffic counters were last reset.

**Reset Statistics**

Resets the traffic counters for this port.

## Viewing Address Tables

From the Statistics menu, select **Address Tables...** Use the Address Tables menu to select the address table for the 8271, a specific domain, or a specific port.

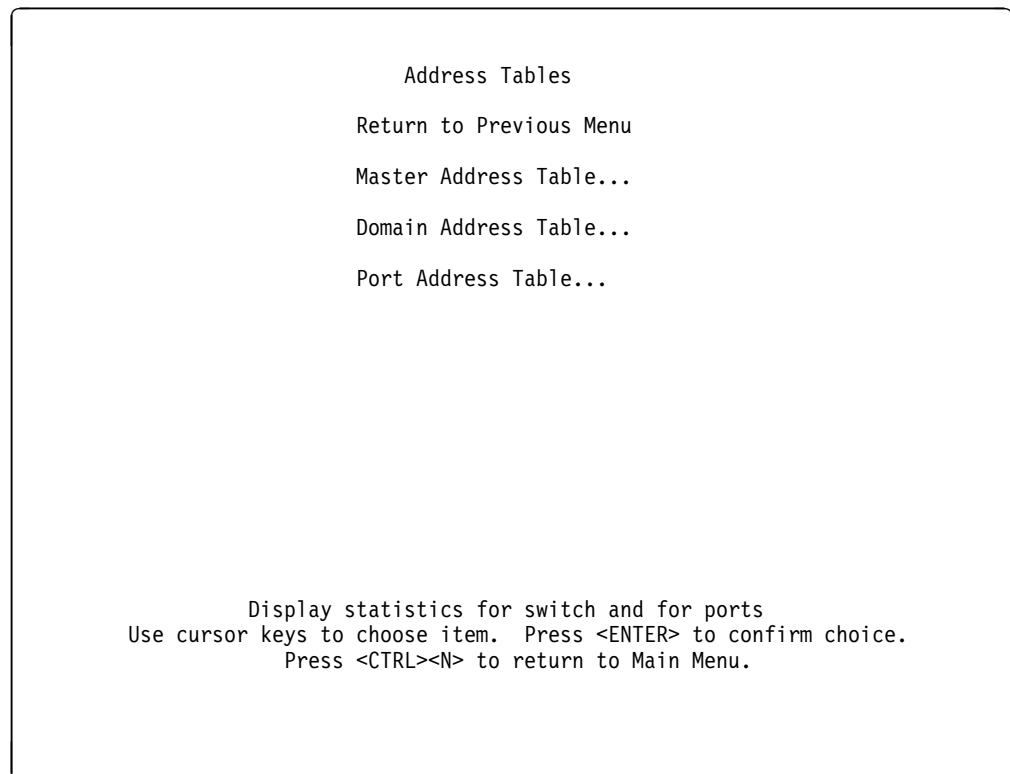


Figure 5-4. Address Tables Menu

The following list defines functions available on the Address Tables menu:

**Master Address Table**

Displays a table of station addresses from all ports known to the 8271. See “Viewing the Master Address Table” for more information.

**Domain Address Table**

Displays the address table for the selected domain. See “Viewing the Domain Address Table” on page 5-7 for more information.

**Port Address Table**

Displays the address table for the selected port. See “Viewing the Port N Address Table” on page 5-8 for more information.

## Viewing the Master Address Table

From the Statistics menu, select **Address Tables...** and then **Master Address Table...** The Master Address Table displays the station addresses of all ports known to the 8271 in the order in which they are encountered. The table can contain up to 10 000 entries.

Master Address Table		
Address	Local Port	Ports (filtered/secured ports high-lighted)
0004AC A40000	Swch Base Adr	1 2 3 4 5 6 7 8 9 12 15 22 23 24
0004AC A40000	Swch Base Adr	10 11 13 16 21
0004AC A40000	Swch Base Adr	14 17
0004AC A40020	Domain 0	1 2 3 4 5 6 7 8 9 12 15 22 23 24
0004AC A40021	Domain 1	10 11 13 16 21
0004AC A40022	Domain 2	14 17
0180C2 000000	STP Multicast	1 2 3 4 5 6 7 8 9 12 15 22 23 24
0180C2 000000	STP Multicast	10 11 13 16 21
0180C2 000000	STP Multicast	14 17
0180C2 000001	Multicast	1 2 3 4 5 6 7 8 9 12 15 22 23 24
0180C2 000001	Multicast	10 11 13 16 21
0180C2 000001	Multicast	14 17
0180C2 000002	Multicast	1 2 3 4 5 6 7 8 9 12 15 22 23 24

Return   More   Search

Return to Previous Menu  
Use cursor keys to choose item. Press <ENTER> to confirm choice.  
Press <CTRL><N> to return to Main Menu.

Figure 5-5. Master Address Table

The following list describes the information available on the Master Address Table:

**Address**

Displays the MAC address of a node.

**Local Port**

Describes the type of address or association of the address with the listed port.

**Ports**

Displays the ports whose address tables include this MAC address.

## Viewing the Domain Address Table

From the Statistics menu, select **Address Tables...** and then **Domain Address Table...** The Domain Address Table displays the station addresses of all ports known to the selected domain in the order in which they are encountered.

Domain Address Table - finance		
Address	Local Port	Ports (filtered/secured ports high-lighted)
0004AC A40000	Swch Base Adr	10 11 13 16 21
0004AC A40021	Domain 1	10 11 13 16 21
0180C2 000000	STP Multicast	10 11 13 16 21
0180C2 000001	Multicast	10 11 13 16 21
0180C2 000002	Multicast	10 11 13 16 21
0180C2 000003	Multicast	10 11 13 16 21
0180C2 000004	Multicast	10 11 13 16 21
0180C2 000005	Multicast	10 11 13 16 21
0180C2 000006	Multicast	10 11 13 16 21
0180C2 000007	Multicast	10 11 13 16 21
0180C2 000008	Multicast	10 11 13 16 21
0180C2 000009	Multicast	10 11 13 16 21
0180C2 00000A	Multicast	10 11 13 16 21

Return   More   Search

Return to Previous Menu  
Use cursor keys to choose item. Press <ENTER> to confirm choice.  
Press <CTRL><N> to return to Main Menu.

Figure 5-6. Domain Address Table

The following list describes information available on the Domain Address Table:

**Address**

Displays the MAC address of a node.

**Local Port**

Describes the type of address or association of the address with the listed port.

**Ports**

Displays the ports whose address tables include this MAC address.

## Viewing the Port N Address Table

From the Statistics menu, select **Address Tables...** and then **Port Address Table...** Use the Port *N* Address Table to view the MAC addresses of nodes connected to a specific port in the order they are encountered and to view the spanning tree status of this port. This table includes MAC addresses from which this port has received packets or to which it has sent packets. It can contain up to 1700 entries.

Port 1 Address Table						
Address	Local Port	SrcPkts	DstPkts	SrcBytes	DstBytes	
0004AC A40000	Swch Base Adr	0	0	0	0	
0004AC A40020	Domain 0	0	0	0	0	
0180C2 000000	STP Multicast	0	0	0	0	
0180C2 000001	Multicast	0	0	0	0	
0180C2 000002	Multicast	0	0	0	0	
0180C2 000003	Multicast	0	0	0	0	
0180C2 000004	Multicast	0	0	0	0	
0180C2 000005	Multicast	0	0	0	0	
0180C2 000006	Multicast	0	0	0	0	
0180C2 000007	Multicast	0	0	0	0	
0180C2 000008	Multicast	0	0	0	0	
0180C2 000009	Multicast	0	0	0	0	
0180C2 00000A	Multicast	0	0	0	0	
0180C2 00000B	Multicast	0	0	0	0	
Return	More					Search

Return to Previous Menu  
Use cursor keys to choose item. Press <ENTER> to confirm choice.  
Press <CTRL><N> to return to Main Menu.

Figure 5-7. Port 1 Address Table

The following list describes information available on the Port *N* Address Table:

### Address

Displays the MAC address of a node. Ports that belong to an EtherPipe are designated as *primary* or *secondary*.

### Local Port

Displays the port to which the node is attached.

## Viewing the Spanning Tree Bridge Information

From the Statistics menu, select **Spanning Tree Bridge Information....** The Spanning Tree bridge information panel displays the spanning tree information that is used only when this 8271 is the root bridge. This information is stored in NVRAM.

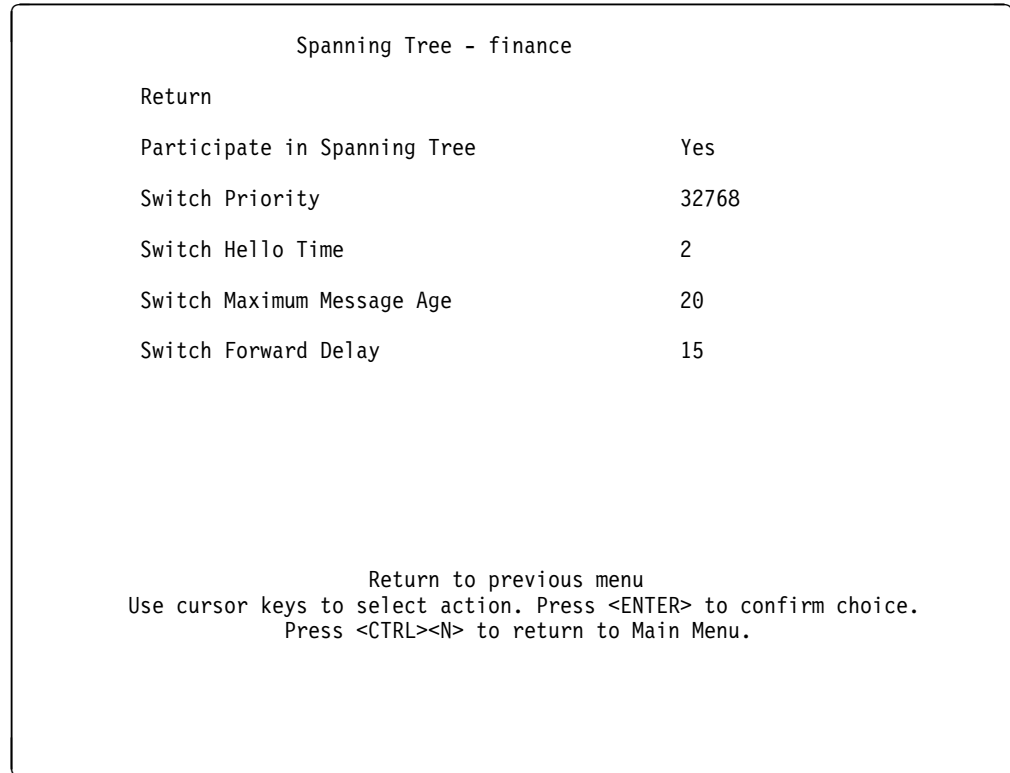


Figure 5-8. Spanning Tree Bridge Information Panel

The following list describes the information available on the Spanning Tree bridge information panel:

### **Participate in Spanning Tree**

Indicates whether or not the switch is participating in the spanning tree protocol.

### **Switch Priority**

Displays the priority value for this 8271 when it is the root. When this 8271 is the root, it has the lowest priority value in the spanning tree.

### **Switch Hello Time**

Displays the amount of time the 8271 waits before sending the next configuration message when this switch is the root.

### **Switch Maximum Message Age**

Displays the maximum message age advertised when this 8271 is the root switch.

### **Switch Forward Delay**

Displays the time the 8271 waits between transitions from listening to learning, and from learning to forwarding when it is the root.

## Viewing Current Spanning Tree Information

From the Statistics menu, select **Current Spanning Tree Information....** The Current Spanning Tree Information panel displays a summary of all spanning tree information for each port. You cannot change information on this panel.

**Note:** When the 8271 is configured with EtherPipes, spanning tree packets use the primary (lowest-numbered) port of the EtherPipe.

```
Current Spanning Tree Information - default

Hello Time: 3, Max Message Age: 21, Forward Delay: 17
Root: 30000.FFFF0000001F, Root Port: This Bridge is Root
Port ID  Port Cost STS  Port Cost Designated  Designated  #Topo  Time Since
      ID  Cost STS  Cost Switch/Bridge ID  PortID  Chgs  Last Change
128.01  0 FWD  0 30000.FFFF0000001F 128.01  1    0:27:45

Return

Return to Statistics Main Menu
Use cursor keys to select action. Press <ENTER> to confirm choice.
Press <CTRL><N> to return to Main Menu.
```

Figure 5-9. Current Spanning Tree Information Panel

The following list describes the information available on the Current Spanning Tree Information panel:

### Hello Time

Displays the Hello Time, in seconds, that is advertised by the root and used by all devices and switches in the active topology of the spanning tree network.

### Max Message Age

Displays the Maximum Message Age, in seconds, that is advertised by the root and used by all devices and switches in the spanning tree network.

### Forward Delay

Displays the Forward Delay Time, in seconds, that is advertised by the root and used by all devices and switches in the spanning tree network.

**Root** Displays the priority and MAC address of the device in the spanning tree that this switch has accepted as the root device.

### Root Port

Displays the number of the port on this switch that is closest to the root. This switch communicates with the root through this port. If there is no root port, this switch has been accepted as the root of the spanning tree network.

**Port ID** Displays the port ID that is used to determine the role of the port in the spanning tree. The port ID is expressed in the form <port priority>.<port number>.

**Port Cost**

Displays the Port Path Cost for each port on the switch. The Port Path Cost helps determine the role of the port in the spanning tree.

**Port STS (status)**

Displays the current status of this port within the spanning tree:

**DSB** Disabled

**BLK** Blocked

**LSN** Listening

**LRN** Learning

**FWD** Forwarding

The rules that define the state of the port are as follows:

- A port on a network segment with no other switch or bridge is always forwarding.
- If two ports of the 8271 are connected to the same network segment and there is no other bridge or switch, the port with the smaller ID is forwarded and the other is blocked.
- When the switch is booted, all ports are blocked initially, and then some of them change to a different state: listening, learning, and forwarding, in that order. To see the change in states you must repeatedly exit from this menu, and then select it again. All ports that are going to change states from blocking to forwarding will have done so after two to three times the value of:

[Switch Maximum Message Age + (2 × Switch Forward Delay)]

**Designated Cost**

Displays the cost for a packet to travel from this port to the root in the current spanning tree configuration. The slower the media, the higher the cost.

**Designated Switch/Bridge ID**

Displays the Priority and Station address of the device through which this port has determined it must communicate with the root of the spanning tree.

**Designated Port ID**

Displays the port on the designated bridge through which this switch will communicate with the root of the spanning tree. This information is useful if the 8271 is the designated bridge on one or more network segments.

**# Topo Changes**

Displays the number of topology changes, that is, the number of times the port has entered the FORWARDING state plus the number of times the port has made the transition from FORWARDING to BLOCKING. The counter is reset when the switch is reset or the spanning tree is turned on.

**Time Since Last Change**

Displays the time since the last time that the port entered the forwarding state or made the transition from forwarding to blocking.



## Viewing Virtual Switch Statistics

From the Statistics menu, select **Virtual Switch Statistics....** The Virtual Switch Statistics panel displays the current number of stations and the largest number of stations in the master address table for the selected virtual switch.

```
Virtual Switch Statistics - default
Return to Previous Menu
Currently Active Stations           20
Largest Number of Stations         20
Maximum Number of Stations         10000

Display statistics for switch and for ports
Press <ENTER> to exit menu.
Press <CTRL><N> to return to Main Menu.
```

Figure 5-10. Virtual Switch Statistics Panel

The following list describes the information available on the virtual switch Statistics panel:

### Currently Active Stations

Displays the number of stations currently in the master address table that are recognized by ports belonging to this virtual switch.

### Largest Number of Stations

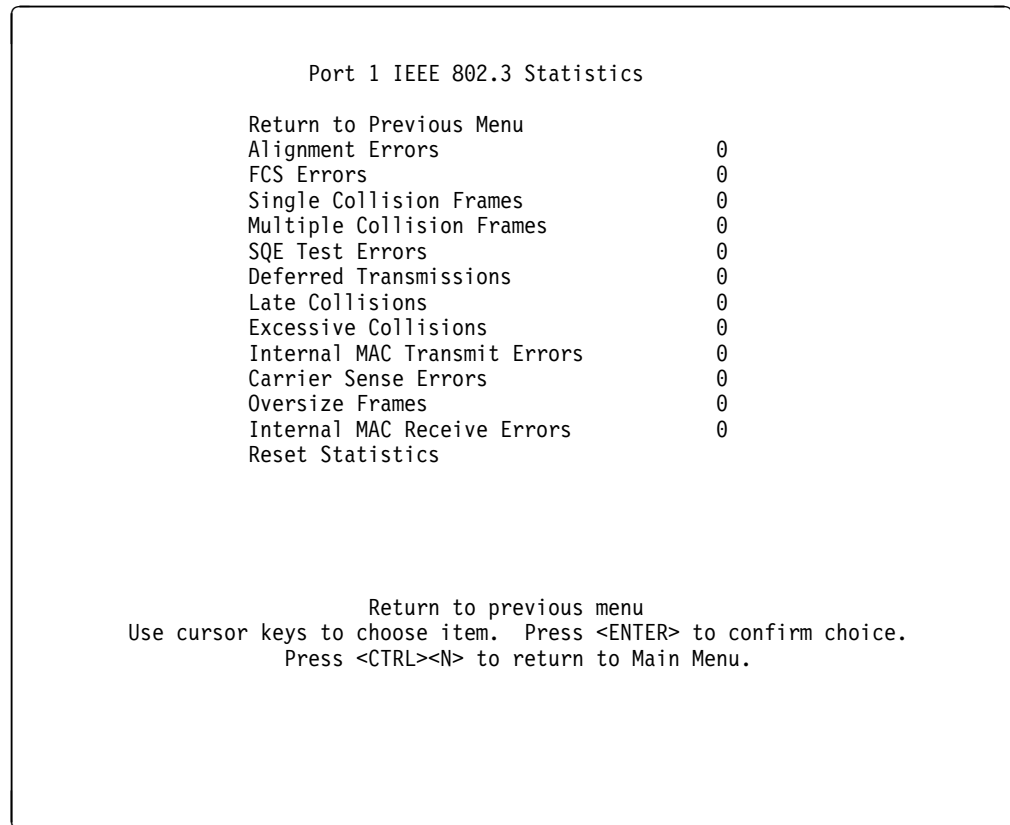
Displays the largest number of stations in the master address table since the last reset or power cycle that are recognized by ports belonging to this virtual switch.

### Maximum Number of Stations

Displays the maximum number of stations allowable on the virtual switch.

## Viewing IEEE 802.3 Statistics

From the Statistics menu, select **IEEE 802.3 Statistics...** The IEEE 802.3 Statistics panel displays the 802.3 statistics for the selected port.



Port 1 IEEE 802.3 Statistics	
Return to Previous Menu	
Alignment Errors	0
FCS Errors	0
Single Collision Frames	0
Multiple Collision Frames	0
SQE Test Errors	0
Deferred Transmissions	0
Late Collisions	0
Excessive Collisions	0
Internal MAC Transmit Errors	0
Carrier Sense Errors	0
Oversize Frames	0
Internal MAC Receive Errors	0
Reset Statistics	

Return to previous menu  
Use cursor keys to choose item. Press <ENTER> to confirm choice.  
Press <CTRL><N> to return to Main Menu.

Figure 5-11. IEEE 802.3 Statistics Panel

The data on this panel is useful for technical experts in solving complex problems. The meanings of the individual items are sufficiently detailed as to go beyond the scope of this user's guide.

## Diagnostic Test Results

Provides the ability to display the results of diagnostic tests and any errors that might have occurred during power-up diagnostics.

## Message Log Information

Provides the ability to display any message recorded by the system (ER\_Error\_log function).



---

## Chapter 6. Troubleshooting

This chapter contains procedures that help you troubleshoot problems with an 8271 and its connections to other devices.

---

### Obtaining Service

There are no serviceable parts inside the 8271. Do not remove the cover of the 8271 for any reason. The 8271 and its UFCs are individually replaceable, if they become defective. See "Warranty Service" on page C-5 for information concerning service for the product. In the U.S., call **1-800-IBM-SERV (426-7378)**. In Canada, call &IBM. at **1-800-565-3344**.

---

### Troubleshooting in a Network

The 8271 console and SNMP management agent give you access to important statistics and other information about the network, as seen by the 8271. (See Chapter 5, "Using the Statistics Panels" on page 5-1). The "Viewing Port N Statistics" on page 5-4 can be helpful in isolating network-level problems.

The EtherProbe allows a network analyzer to be attached to the 8271 to monitor, in real time, activity at the switch. See "Configuring EtherProbe" on page 4-33 for information on configuring EtherProbe.

---

### Start of Troubleshooting Process

If one or more devices (such as PCs) connected to an 8271 are unable to communicate with other devices in the network, use the following steps to start the troubleshooting process:

- Step 1. Locate the 8271 to which the device is connected. Use the network sketch, the label on the cable connected to the device, or other network records to help you locate the 8271.
- Step 2. If you have a UFC and the problem is related to it, use its documentation to assist in troubleshooting.
- Step 3. If you have set up a console session (see Chapter 4, "Configuring the 8271"), it can be used to determine whether diagnostics have been completed correctly. A list of normal diagnostic messages is shown on page 4-57.
- Step 4. Observe the LEDs on the 8271 front panel. Figure 1-2 on page 1-4 illustrates the LEDs. For explanations of the LEDs, see "Understanding the LEDs" on page 6-2. Review this section before proceeding with the troubleshooting process.
- Step 5. In Table 6-3 on page 6-3, locate the symptom that best describes the communication problem and the LED pattern you observed. Then, go to the section that contains the recommended actions for resolving the problem and follow that procedure.

## Understanding the LEDs

Table 6-1 lists the 8271 status LEDs and their meanings.

Table 6-1. 8271 Status LEDs and Their Meanings

LED	Position	State	Meaning
(Power) (green)	Top	On	The 8271 power supply is good.
		Off	The 8271 power supply is bad.
OK (green)	Middle	On	The 8271 is working correctly.
		Off	The 8271 is not working correctly.
Unlabeled (Fault) (amber)	Bottom	On	A power-on failure has occurred.
		Off	The 8271 is working correctly.
		Blinking	Diagnostics are in progress.

Table 6-2 lists the port LEDs and their meanings.

Table 6-2. Port LEDs and Their Meanings

LED	Position	Meaning When On
Link (green)	Top	A cable is connected to the 10BASE-T port, the port detects that a device is connected to the other end of the cable, and the port is receiving a link pulse from the device.
FDX (green)	Middle	The port is in full-duplex mode.
Tx/Rx (green)	Bottom	Data is being transmitted or received by the 8271.

**Note:** The port 1 Tx/Rx LED might blink even if there is no device attached to it. This is normal.

---

## Choosing a Troubleshooting Procedure

Use Table 6-3 to determine which troubleshooting procedure you should use.

Table 6-3. Symptom, LED State, and Recommended Procedure

Symptom and LED State	Go to:
All of the LEDs are off.	"Procedure A"
The Fault (amber) LED is on or the OK LED is off.	"Procedure B"
None of the devices connected to the 8271 can communicate, the Fault (amber) LED is off, and the Power LED is on.	"Procedure C" on page 6-4
A single device connected to the 8271 is having trouble communicating and all of the LED indications are normal.	"Procedure C" on page 6-4
A single device connected to the 8271 cannot communicate and the Link LED for its link segment is off.	"Procedure C," Step 3 on page 6-4 .
None of the devices connected to the 8271 can communicate with devices in the 10BASE5, 10BASE2, or 10BASE-Fn portion of the network.	"Procedure D" on page 6-5
A UFC's Fault (amber) LED is on or a device connected to a UFC is experiencing problems.	See the service and troubleshooting sections in the UFC documentation

**Note:** *Link segment* refers to a single cable or interconnected cables between an 8271 10BASE-T or AUI port and the device at the other end.

### Procedure A

Use this procedure if all of the LEDs are off:

- Step 1.** Verify that the power cord is connected at both ends and that the power outlet is working.
- Step 2.** If the power cord is connected correctly, the outlet is working, and the problem persists, the problem is in the 8271. See "Warranty Service" on page C-5.

### Procedure B

Use this procedure if the Fault (amber) LED is on:

- Step 1.** Reset the 8271 by disconnecting the power cord, waiting 10 seconds, and then reconnecting it to the electrical outlet.
- Step 2.** If the problem does not go away, the problem is in the 8271. See "Warranty Service" on page C-5.

## Procedure C

Use this procedure if one or more devices is having a communication problem, the Fault (amber) LED is off, the Power LED is on, or one or more Link LEDs is off:

- Step 1.** Reset the 8271 by disconnecting the power cord, waiting 10 seconds, and then reconnecting it to the electrical outlet.
- a** If the problem goes away, no further action is required.
  - b** If the problem persists, continue with step 2.
- Step 2.** Observe the Link LED for each 8271 10BASE-T port to which a cable is connected.
- a** If a Link LED is off, continue with step 3.
  - b** If all of the Link LEDs are on, go to step 7.
- Step 3.** For each 8271 10BASE-T port whose Link LED is off, perform the following steps:
- a** Verify that each cable in the link segment is connected at both ends.  
  
Be sure to check each cable in the link segment from the 8271 to the device at the other end. Use the cable label to identify the cable or cables in the link segment. Check any building wiring (in-the-wall cable) connections carefully. Also, verify that the Link LED on the connected device is on, which indicates that the link segment is connected.  
  
If the connected device does not have a Link LED, run its diagnostics.
  - b** If the Link LED is on, go to step 6.
  - c** If the Link LED is off, continue with step 4.
- Step 4.** Verify that you are using the correct type of cable. If you are connecting the 8271 to a hub, repeater, or another 8271, with MDI-X ports, use a crossover cable. If you are connecting the 8271 to a server, PC, or workstation, use a straight-through cable.
- a** If the Link LED is on, go to step 6.
  - b** If the Link LED is off, continue with step 5.
- Step 5.** Verify that each cable in the link segment is good. If you do not have cable testing equipment, replace the cable with a cable that is the correct kind and known to be good.
- If the problem persists, there might be a problem with the adapter that is preventing the device from communicating on the network. Run the adapter diagnostics or have someone else test the adapter.

- Step 6.** If the 8271 is connected to another 10BASE-T repeater, perform the following steps:
- a** Verify that the 8271 duplex setting matches the attached device.
  - b** Verify that the other repeater is operating correctly.
  - c** Verify that only one cable interconnects the two repeaters. In other words, only one port on the 8271 should be connected to a port on the other repeater. Moreover, a 10BASE-T port and the AUI port on the 8271 should not be connected to a 10BASE-T port and an AUI port on the other repeater.
- Step 7.** If the 8271 is connected to a 10BASE5, 10BASE2, or 10BASE-Fn transceiver and none of the devices connected to the 8271 can communicate with the devices in the 10BASE5, 10BASE2, or 10BASE-Fn portion of the network, go to “Procedure D.”
- If the 8271 is not connected to a 10BASE5, 10BASE2, or 10BASE-Fn transceiver, continue with step 8.
- Step 8.** For each device that is having a communication problem, connect its link segment to another 10BASE-T port on the 8271. Try each of the remaining ports to determine whether the problem will go away.
- a** If the problem goes away, the problem might be in the 8271. See “Warranty Service” on page C-5.
  - b** If the problem persists, continue with step 9.
- Step 9.** The problem does not appear to be in the 8271 and the cables and devices connected to the 8271. The problem might be in the network applications or other software running on the devices that are having the communication problem. Refer to the software documentation for software problem determination procedures, or consult your network administrator for assistance.

## Procedure D

Use the following procedure if none of the devices connected to the 8271 can communicate with devices in the 10BASE5, 10BASE2, or 10BASE-Fn portion of the network.

- Step 1.** Verify that the heartbeat is turned off on the transceiver attached to the AUI port.
- Step 2.** Verify that no cable is connected to the port 1, 10BASE-T connector.
- Step 3.** Verify that the 8271 is connected to a transceiver on the 10BASE5, 10BASE2, or 10BASE-Fn cable.
- If an AUI cable is used to connect the 8271 to the transceiver, verify that the cable is connected at both ends.
- If the 8271 is connected directly to the transceiver without an AUI cable, verify that the 8271 port is firmly connected to the AUI port on the transceiver.
- Step 4.** Verify that the AUI cable is good.



If an AUI cable connects the 8271 to the transceiver, replace the AUI cable with an AUI cable that is known to be good.

**Step 5.** Verify that the transceiver is good.

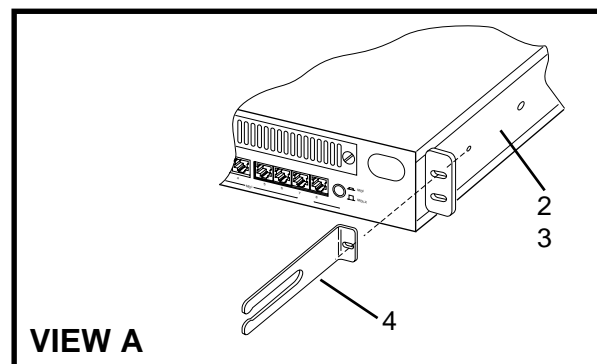
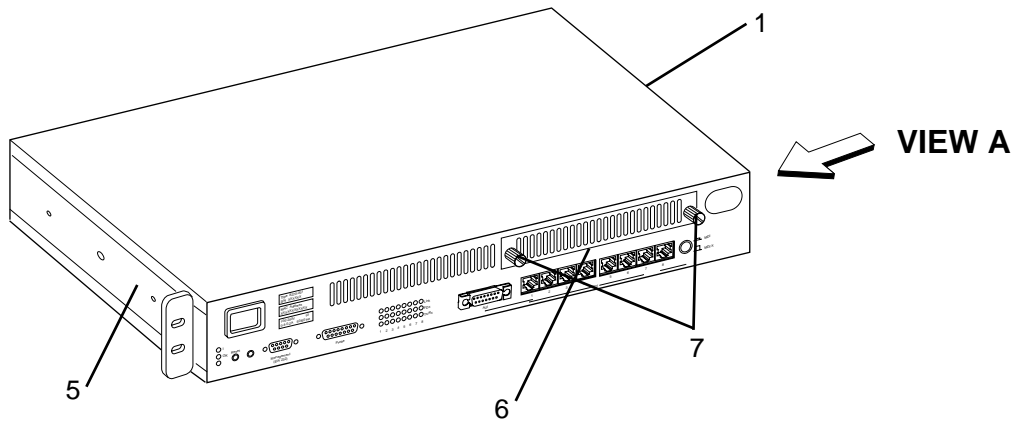
Replace the transceiver, or connect the 8271 to another transceiver (on the same cable) that is known to be good. Most transceivers have LEDs indicating power, traffic, and link. Refer to the transceiver documentation.

**Step 6.** If the problem persists, the problem might be in the 8271. See “Warranty Service” on page C-5.

## Parts Listing

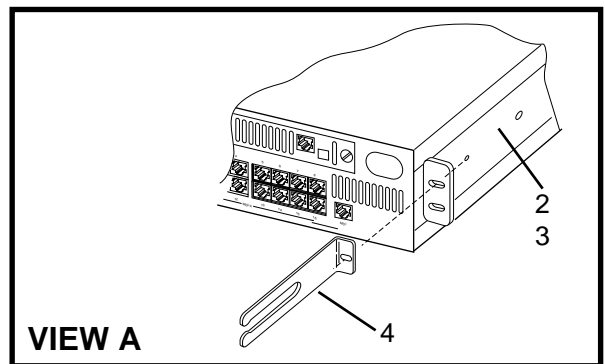
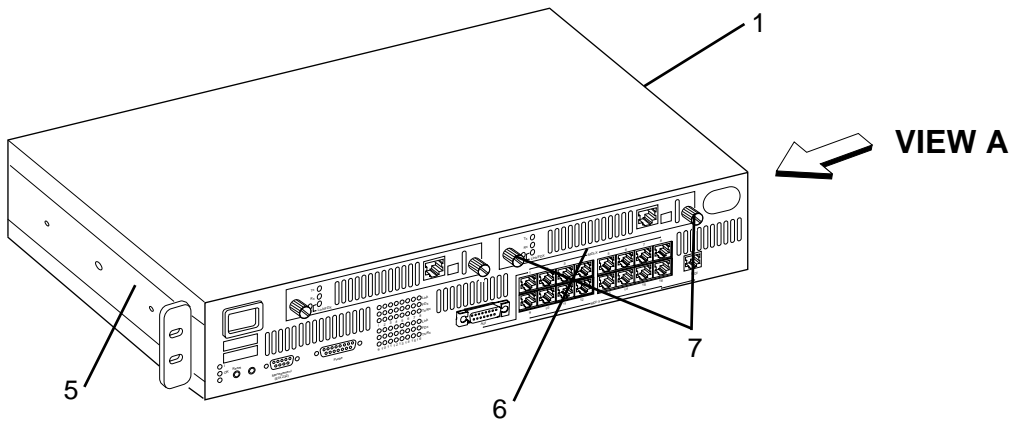
The Parts Listing contains reference drawings and a corresponding index for all replaceable parts. The Index provides part numbers, the quantity required (units), and a description of the part.

### Assembly 1: Final Assembly 8271 Model 108



Asm-Index	Part Number	Units	Description
1-1	13H9163	1	Final Asm
-2	13H8962	1	Bracket, Mounting B
-3	92G8546	4	Screws M4 x 8, Pan Head
-4	13H8966	1	Bracket Asm,Cable Management
-5	13H8961	1	Bracket, Mounting A
-6	13H8967	1	Blank Universal Feature Slot Cover
-7	42H0242	2	Thumbscrews M4 x 8

## Assembly 2: Final Assembly 8271 Model 216



Asm-Index	Part Number	Units	Description
2-1	55H7132	1	Final Asm
-2	41H7022	1	Bracket, Mounting B
-3	92G8546	4	Screws M4 x 8, Pan Head
-4	13H8966	1	Bracket Asm,Cable Management
-5	41H7017	1	Bracket, Mounting A
-6	13H8967	2	Blank Universal Feature Card Slot Cover
-7	42H0242	4	Thumbscrews M4 x 8

### Assembly 3: Line Cords

Asm-Index	Part Number	Units	Description
3-1	34G0232	1	Line Cord,125V,2.8m -Japan
-2	13F9940	1	Line Cord,250V,2.8m -Australia, New Zealand, China
-3	13F9959	1	Line Cord,125V,1.8m -Philippines, South Korea, Taiwan
-4	13F9979	1	Line Cord,250V,2.8m - Angola, Austria, Belgium, Bulgaria, Czech Republic, Egypt, Finland, France, Germany, Greece, Hungary, Iceland, Indonesia, Iran, Lebanon, Luxembourg, Mozambique, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Spain, Sudan, Sweden, Syria, Turkey, Yugoslavia, Zaire
-5	13F9997	1	Line Cord,250V,2.8m -Denmark
-6	14F0015	1	Line Cord,250V,2.8m -Bangladesh, Myanmar, Namibia, Pakistan, South Africa, Sri Lanka, Swaziland, Zimbabwe
-7	14F0033	1	Line Cord,250V,2.8m -Bahrain, Brunei, Cyprus, Ghana, Hong Kong, Iraq, India, Ireland, Jordan, Kenya, Kuwait, Libya, Macao, Malaysia, Malawi, Malta, Nigeria, Oman, Qatar, Sierra Leone, Singapore, Somalia, Tanzania, Uganda, United Arab Emirates, U.K., Yemen, Zambia
-8	14F0051	1	Line Cord,250V,2.8m -Switzerland
-9	14F0069	1	Line Cord,250V,2.8m -Ethiopia, Italy
-10	14F0087	1	Line Cord,250V,2.8m -Israel
-11	1838574	1	Line Cord,250V,2.8m -Thailand
-12	6952300	1	Line Cord,100-125V,2.8m -Liberia, Saudi Arabia
-13	6952301	1	Line Cord,125V,1.8m -U.S.A., Canada

---

## Chapter 7. Downloading Software and BootP Information

This chapter provides information on the download procedure that sends software upgrades to the 8271 flash EEPROM using TFTP, or via the Serial Port.

---

### Serial Port/TFTP Downloading with the Download Menu

This section provides information on initiating the download procedure with the Download Menu.

Follow these steps to begin a software upgrade:

- Step 1.** If you are downloading via the serial port, insert the upgrade diskette in your workstation drive. Make sure that your terminal supports Xmodem protocol.
- Step 2.** If you are downloading via TFTP, copy the IBM binary file 8271\_XXXX.gz from the disk provided to the TFTP server and prepare the TFTP server.
- Step 3.** If you have not already done so, start a console session as described in “Beginning the Console Session” on page 4-6, and advance to the Main Menu.
- Step 4.** Select Download on the Main Menu as shown in Figure 4-2 on page 4-7.

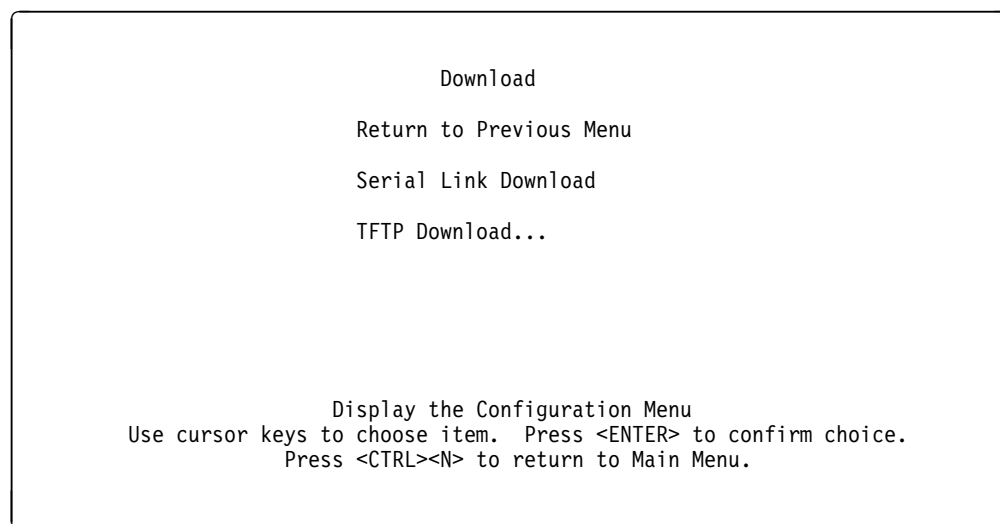


Figure 7-1. Download Menu

- Step 5.** When the Download Menu appears (see Figure 7-1), select Serial Link Download or TFTP Download.
- Step 6.** If you chose Serial Link Download, go to step 8.
- Step 7.** If you chose TFTP Download, go to step 12 on page 7-2.
- Step 8.** Confirm the download when you are prompted to do so by the following message:

Please confirm new code download via serial port (Y or N):

**Step 9. The following messages appear:**

Console: Beginning Xmodem download of main image  
Console: Waiting for binary file....

**Step 10. Use a terminal emulator program on your PC to download the binary file using Xmodem protocol.**

**The download takes approximately 5 minutes at 9600 baud.**

**When the download is complete, the following messages appear:**

Console: Beginning Xmodem download of main image  
Console: Waiting for binary file.... Done  
Console: Preparing Flash...Done.  
Console: Saving Main Image into Flash...Done

Please confirm switch reset (Y or N):

**Step 11. Confirm the reset and the procedure is complete.**

**Step 12. When the TFTP Download Menu appears (see Figure 7-2), fill in the fields and then select Execute Network Download.**

**Step 13. Confirm the download when you see the message:**

Please confirm new code download via network (Y or N):

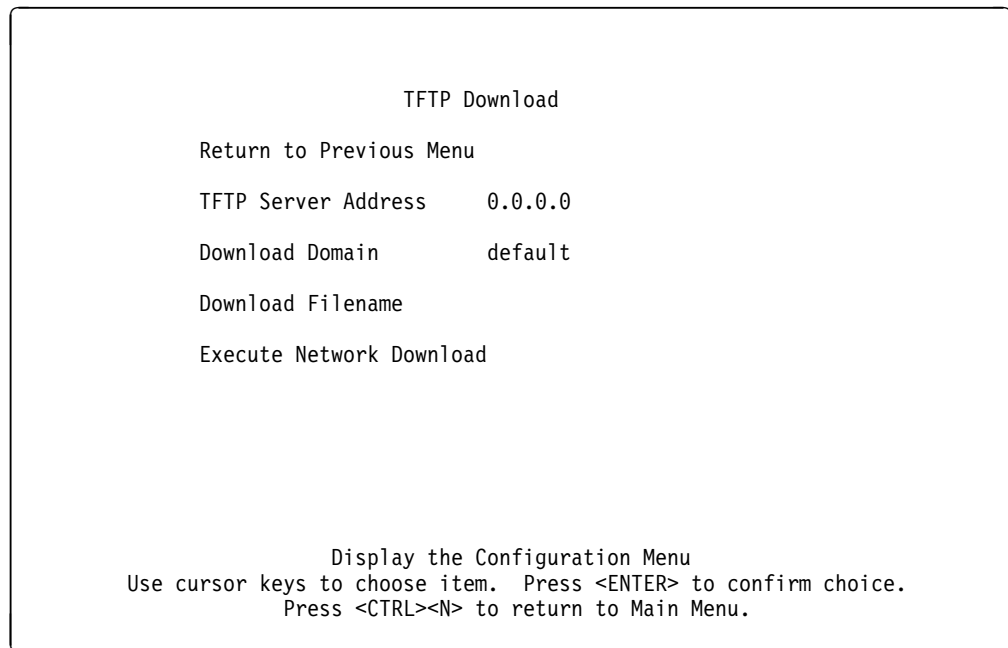


Figure 7-2. TFTP Download Menu

**Step 14. Press Enter when you see the message:**

Download complete - reset switch to activate new software.  
Press <Enter> to continue.....

**Step 15. Reset the 8271, as instructed, to activate the new code.**

---

## Initiating a Download with the System Request Menu

This section provides information on initiating the download procedure with the System Request Menu.

**Note:** This function should be used only at the direction of service personnel.

Follow these steps to begin a software upgrade:

- Step 1.** If you have not already done so, start a console session as described in “Beginning the Console Session” on page 4-6, and advance to the Copyright screen.
- Step 2.** Press the System Request button, the unlabeled button on the lower left portion of the front panel beside the Reset button. The console will display the menu as shown in Figure 7-3.

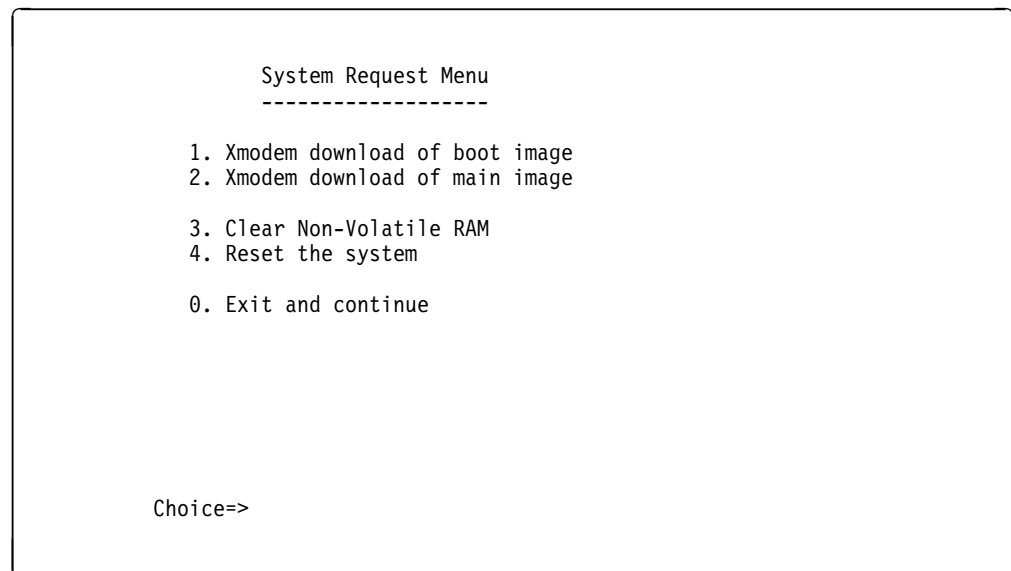


Figure 7-3. System Request Menu

**Step 3.** Select your Download option from the console. and continue with the procedure.

**Step 4.** The following messages appear:

```
SYSREQ: Beginning Xmodem download of main(or boot) image
SYSREQ: Waiting for binary file....
```

**Step 5.** Use a terminal emulator program on your PC to download the binary file using Xmodem protocol.

The download takes approximately 5 minutes at 9600 baud.

When the download is complete, the following messages appear:

```
SYSREQ: Beginning Xmodem download of main image
SYSREQ: Waiting for binary file.... Done
SYSREQ: Preparing Flash....Done.
SYSREQ: Saving Main Image into Flash...Done
```

```
SYSREQ: Press any key to return to menu.
```

---

## BootP

The Bootstrap Protocol (referred to as *BootP*) function allows the 8271 to participate in RFC 951-compliant environments. BootP uses User Datagram Protocol (UDP) to formulate a network request to allow a device to configure its IP address for a given logical 8271.

### BootP Procedure

- Step 1. Edit the BootPTAB file on the BootP server (see “Editing the BootPTAB File” on page 7-5). Make sure that the IP address is already configured on the 8271.
- Step 2. Initiate the BootP daemon (*BootPD*) on the BootP server.
- Step 3. Make sure that the IP State in the IP Configuration Menu is set to BootP When Needed or BootP Always.
- Step 4. Initiate the BootP transfer by resetting the 8271. A BootP is automatically initiated after diagnostics have been completed.

**Note:** Do not configure multiple BootP servers to a single 8271.

The BootP sequence consists of IP address determination and bootfile selection, if configured, using BootP request and reply.

In order for you to utilize the BootP function, a BootP server must be configured on the network. This BootP server must reside on the same subnet as the 8271. A typical implementation might consist of a BootP daemon (BootPD or *IN.BootPD*) or something similar. BootPD reads a startup file called *BootPTAB*. This file contains various strings that describe how BootP clients are configured. An entry is made in the BootPTAB file for each BootP client (in this case, the 8271) on the network. Figure 7-4 on page 7-5 displays an example of a BootPTAB file for configuring two 8271s.

The 8271 BootP function has been tested in the following environments:

- Solaris with an HP version of CMU BootP
- Santa Cruz Operation UNIX with an SCO BootP
- LattisNet DOS Network Management Station
- IBM NetView for AIX
- IBM OS/2

## Editing the BootPTAB File

Figure 7-4 shows an example of a BootPTAB file.

```
#Blank lines and lines beginning with '#' are ignored.
#Legend:
#   first field--hostname (may be full domain name)
#   bf--bootfile
#   bs--bootfile size
#   cs--cookie servers
#   ds--domain name servers
#   gw--gateway address list
#   ha--host hardware address
#   hd--bootfile home directory
#   hn--send hostname
#   ht--hardware type
#   im--impress servers
#   ip--host IP address
#   lg--log servers
#   lp--LPR servers
#   ns--IEN-116 name servers
#   rl--resource location protocol servers
#   sm--subnet mask
#   tc--template host (points to similar host entry)
#   to--time offset (seconds)
#   ts--time servers
#   vm--vendor magic cookie selector

#Be certain to include backslashes where they are needed.
Define different master entries for each 8271 (or virtual switch).
S82711:\
    hn:\
    ht=ether:\
    vm=rfc1048:\
    ha=008024016851:\
    ip=134.177.169.111:\
    sm=255.255.0.0:\
    gw=134.177.169.201:\
    bf=/etc/8271_XXXX.gz:

S82712:\
    hn:\
    ht=ether:\
    vm=rfc1048:\
    ha=00802401685D:\
    ip=134.177.169.48:\
    sm=255.255.0.0:\
    gw=134.177.169.201:\
    bf=/etc/8271_XXXX.gz:
```

Figure 7-4. Example of a BootPTAB File



Configure the BootPTAB file to the 8271 to which the BootP server is attached. Associate the MAC address and the IP address for Domain 0 as listed in the Master Address Table (see “Viewing the Master Address Table” on page 5-6).

**Note:** Do not use the MAC address in the System Information Menu.

Figure 7-5 displays the address for Domain 0. The address for the 8271 (008024 016850) is the address on the System Information Menu. The address that is loaded for Domain 0 in the BootPTAB file is 008024 016851. If other 8271s were configured, the address associated with those 8271s is entered in the BootPTAB file in the BootP server associated with that 8271. (In this example, the second 8271 has the address 008024 01685D.)

If the 8271 has virtual switch configured, a BootP server is attached to each configured domain. The BootPTAB file contains the address for that specific domain.

Master Address Table		
Address	Local Port	Ports (filtered/secured ports high-lighted)
0004AC A40000	Swch Base Adr	1 2 3 4 5 6 7 8 9 12 15 22 23 24
0004AC A40000	Swch Base Adr	10 11 13 16 21
0004AC A40000	Swch Base Adr	14 17
0004AC A40020	Domain 0	1 2 3 4 5 6 7 8 9 12 15 22 23 24
0004AC A40021	Domain 1	10 11 13 16 21
0004AC A40022	Domain 2	14 17
0180C2 000000	STP Multicast	1 2 3 4 5 6 7 8 9 12 15 22 23 24
0180C2 000000	STP Multicast	10 11 13 16 21
0180C2 000000	STP Multicast	14 17
0180C2 000001	Multicast	1 2 3 4 5 6 7 8 9 12 15 22 23 24
0180C2 000001	Multicast	10 11 13 16 21
0180C2 000001	Multicast	14 17
0180C2 000002	Multicast	1 2 3 4 5 6 7 8 9 12 15 22 23 24

Return   More   Search

Return to Previous Menu  
Use cursor keys to choose item. Press <ENTER> to confirm choice.  
Press <CTRL><N> to return to Main Menu.

Figure 7-5. Example of a Master Address Table

**Note:** BootP has a limitation with respect to the gateway entry. The server device IP address is written into the “gw” gateway address filed when the configuration is downloaded. Thus, you must configure the gateway address on the 8271 at the end of the download sequence. Refer to your UNIX operating system environment manual for further information.

## **BootP/TFTP Limitations**

- Do not configure multiple BootP servers to handle the same hardware address.
- When you use the virtual switch function, BootP configures the IP address of the BootP-connected network.
- The IBM BootP implementation does not need or handle any BootP extensions.
- If the download is interrupted or corrupted, you must download a new image using the serial port download (see “Serial Port/TFTP Downloading with the Download Menu”).
- If the network broadcast traffic is 200 packets per second or more, the TFTP request might not be initiated by the 8271. You must reset the 8271 and download a new image using the serial port download (see “Serial Port/TFTP Downloading with the Download Menu”).
- The BootP function might not work if BootP request and reply frames must cross token-ring segments.

## **Error Messages**

During the BootP download procedure, the 8271 might encounter certain error conditions. When this occurs, the 8271 sends error messages to the console.



---

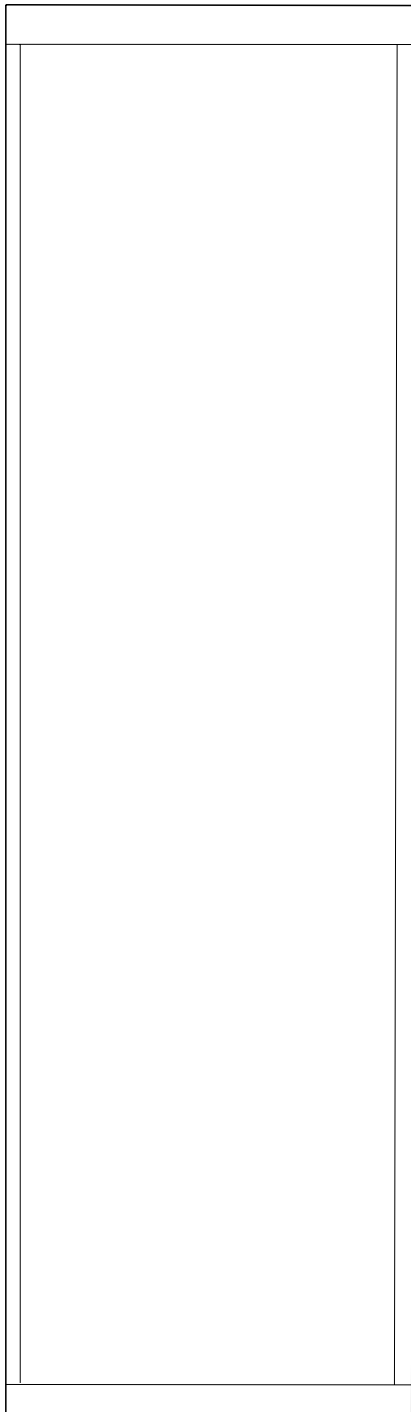
## Appendix A. Planning Charts

The planning charts on the following pages can be photocopied and used for planning the installation and configuration of the 8271s in your network.

# Rack Inventory Chart

Date

Wiring Closet Number  Rack Number  Planner's Initials

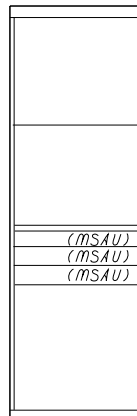


## Instructions

Fill out a Rack Inventory Chart for each equipment rack.

1. Enter the wiring closet location number, the equipment rack identification number, and the planner's initials.
2. Using the template for the Rack Inventory Chart that ships with this manual, draw an outline of each component that will be installed in the rack.
3. The slots at the bottom of the distribution panel template are used only for the lowermost distribution panel in a rack. The slots indicate that there are 38.1 mm (1-1/2 in.) between that panel and the next unit in the rack.
4. Write the unit identification number and component type on each component on the chart.

## Example



# IBM 8271 Cabling Chart

Segment

Unit Number

Building

Location

Date

Rack Mount

Surface Mount

Universal Feature Card #1 Cabling  
 UFC Type

Universal Feature Card #2 Cabling  
 UFC Type

Port Number	1	2	3	4
Cable Type				
Connect to:				

Port Number	1	2	3	4
Cable Type				
Connect to:				

8271 Port Number	1	2	3	4	5	6	7	8	Management
Port in Use	AUI 10BASE-T <input type="checkbox"/> <input type="checkbox"/>	10BASE-T	10BASE-T	10BASE-T	10BASE-T	10BASE-T	10BASE-T	10BASE-T <input type="checkbox"/> MDI <input type="checkbox"/> MDI-X	EIA 232-C
Cable Type	<input type="checkbox"/> UTP <input type="checkbox"/> STP	<input type="checkbox"/> UTP <input type="checkbox"/> STP	<input type="checkbox"/> UTP <input type="checkbox"/> STP	<input type="checkbox"/> UTP <input type="checkbox"/> STP	<input type="checkbox"/> UTP <input type="checkbox"/> STP	<input type="checkbox"/> UTP <input type="checkbox"/> STP	<input type="checkbox"/> UTP <input type="checkbox"/> STP	<input type="checkbox"/> UTP <input type="checkbox"/> STP	<input type="checkbox"/> Serial <input type="checkbox"/> Null Modem
Connect to (ie, Port Number, Device, and Location)	<input type="checkbox"/> Crossover <input type="checkbox"/> Straight-through <input type="checkbox"/> AUI	<input type="checkbox"/> Crossover <input type="checkbox"/> Straight-through	<input type="checkbox"/> Crossover <input type="checkbox"/> Straight-through	<input type="checkbox"/> Crossover <input type="checkbox"/> Straight-through	<input type="checkbox"/> Crossover <input type="checkbox"/> Straight-through	<input type="checkbox"/> Crossover <input type="checkbox"/> Straight-through	<input type="checkbox"/> Crossover <input type="checkbox"/> Straight-through	<input type="checkbox"/> Crossover <input type="checkbox"/> Straight-through	

8271 Port Number	9	10	11	12	13	14	15	16	
Port in Use	10BASE-T	10BASE-T	10BASE-T	10BASE-T	10BASE-T	10BASE-T	10BASE-T	10BASE-T <input type="checkbox"/> MDI-X	10BASE-T <input type="checkbox"/> MDI
Cable Type	<input type="checkbox"/> UTP <input type="checkbox"/> STP	<input type="checkbox"/> UTP <input type="checkbox"/> STP	<input type="checkbox"/> UTP <input type="checkbox"/> STP	<input type="checkbox"/> UTP <input type="checkbox"/> STP	<input type="checkbox"/> UTP <input type="checkbox"/> STP	<input type="checkbox"/> UTP <input type="checkbox"/> STP	<input type="checkbox"/> UTP <input type="checkbox"/> STP	<input type="checkbox"/> UTP <input type="checkbox"/> STP	<input type="checkbox"/> UTP <input type="checkbox"/> STP
Connect to (ie, Port Number, Device, and Location)	<input type="checkbox"/> Crossover <input type="checkbox"/> Straight-through <input type="checkbox"/> AUI	<input type="checkbox"/> Crossover <input type="checkbox"/> Straight-through	<input type="checkbox"/> Crossover <input type="checkbox"/> Straight-through	<input type="checkbox"/> Crossover <input type="checkbox"/> Straight-through	<input type="checkbox"/> Crossover <input type="checkbox"/> Straight-through	<input type="checkbox"/> Crossover <input type="checkbox"/> Straight-through	<input type="checkbox"/> Crossover <input type="checkbox"/> Straight-through	<input type="checkbox"/> Crossover <input type="checkbox"/> Straight-through	<input type="checkbox"/> Crossover <input type="checkbox"/> Straight-through

---

## IBM 8271 Configuration Parameters Worksheet

### Switch Information Menu

“Viewing Switch Information” on page 4-10

Unit Number \_\_\_\_\_

System Name \_\_\_\_\_

System Location \_\_\_\_\_

System Contact \_\_\_\_\_

Enhanced Features \_\_\_\_\_

## Virtual Switch Port Configuration Menu

“Configuring Virtual Switch Ports” on page 4-13

Record in the table the name of the domain associated with each port.

Port	Domain Name
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	



## Virtual Switch Name Configuration Menu

“Naming Virtual Switch Domains” on page 4-15

Record in the table the name assigned to each domain.

Index	Domain Name
1	
2	
3	
4	
5	
6	
7	

# IP Configuration Menu

“Configuring IP Parameters” on page 4-17

Domain Name	Parameter	Value
	IP Address Default: 0.0.0.0	____.____.____.____
	Default Gateway Default: 0.0.0.0	____.____.____.____
	Subnet Mask Default: 0.0.0.0	____.____.____.____
	IP State Default: BootP When Needed	_____
	IP Address Default: 0.0.0.0	____.____.____.____
	Default Gateway Default: 0.0.0.0	____.____.____.____
	Subnet Mask Default: 0.0.0.0	____.____.____.____
	IP State Default: BootP When Needed	_____
	IP Address Default: 0.0.0.0	____.____.____.____
	Default Gateway Default: 0.0.0.0	____.____.____.____
	Subnet Mask Default: 0.0.0.0	____.____.____.____
	IP State Default: BootP When Needed	_____
	IP Address Default: 0.0.0.0	____.____.____.____
	Default Gateway Default: 0.0.0.0	____.____.____.____
	Subnet Mask Default: 0.0.0.0	____.____.____.____
	IP State Default: BootP When Needed	_____

Make additional copies of this page if you have more than four domains.

## SNMP Configuration Menu

“Configuring SNMP” on page 4-19

### Send Authentication-Failure Traps

Mark the appropriate box.

Default: Yes

Yes	No
<input type="checkbox"/>	<input type="checkbox"/>

## Community Strings Menu

“Setting Community Strings Parameters” on page 4-20

Index	Community Name	Mode	
		R	W
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

# Trap Receivers Menu

“Setting Trap Receivers” on page 4-21

Domain Name	Index	IP Address	Trap Community Name
	1	____.____.____.____	
	2	____.____.____.____	
	3	____.____.____.____	
	4	____.____.____.____	
	5	____.____.____.____	
	6	____.____.____.____	
	1	____.____.____.____	
	2	____.____.____.____	
	3	____.____.____.____	
	4	____.____.____.____	
	5	____.____.____.____	
	6	____.____.____.____	
	1	____.____.____.____	
	2	____.____.____.____	
	3	____.____.____.____	
	4	____.____.____.____	
	5	____.____.____.____	
	6	____.____.____.____	
	1	____.____.____.____	
	2	____.____.____.____	
	3	____.____.____.____	
	4	____.____.____.____	
	5	____.____.____.____	
	6	____.____.____.____	

Make additional copies of this page if you have more than four domains.

# Spanning Tree Menu

“Configuring Spanning Tree” on page 4-22

Domain	Parameter	Value
	Participate in Spanning Tree Default: No	Yes _____ No _____
	Switch Priority Range: 0 to 65 535 Default: 32 768	
	Switch Hello Time Range (in seconds): 1 to 10 Default: 2	
	Switch Maximum Message Age Range (in seconds): 6 to 40 Default: 20	
	Switch Forward Delay Range (in seconds): 4 to 30 Default: 15	
	Participate in Spanning Tree Default: No	Yes _____ No _____
	Switch Priority Range: 0 to 65 535 Default: 32 768	
	Switch Hello Time Range (in seconds): 1 to 10 Default: 2	
	Switch Maximum Message Age Range (in seconds): 6 to 40 Default: 20	
	Switch Forward Delay Range (in seconds): 4 to 30 Default: 15	
	Participate in Spanning Tree Default: No	Yes _____ No _____
	Switch Priority Range: 0 to 65 535 Default: 32 768	
	Switch Hello Time Range (in seconds): 1 to 10 Default: 2	
	Switch Maximum Message Age Range (in seconds): 6 to 40 Default: 20	
	Switch Forward Delay Range (in seconds): 4 to 30 Default: 15	
	Participate in Spanning Tree Default: No	Yes _____ No _____
	Switch Priority Range: 0 to 65 535 Default: 32 768	
	Switch Hello Time Range (in seconds): 1 to 10 Default: 2	
	Switch Maximum Message Age Range (in seconds): 6 to 40 Default: 20	
	Switch Forward Delay Range (in seconds): 4 to 30 Default: 15	

Make additional copies of this page if you have more than three domains.

## Spanning Tree – Port Priority Menu

“Setting Port Priority” on page 4-24

Record in the table the priority for each port.

Range: 1 to 255

Default: 128

Port:	1	2	3	4	5	6	7	8
Priority:								

Port:	9	10	11	12	13	14	15	16
Priority:								

Port:	17	18	19	20	21	22	23	24
Priority:								

## Spanning Tree – Port Path Cost Menu

“Setting Port Path Cost” on page 4-26

Record in the table the cost of each port.

Range: 1 to 65 535

Default: 100

Port:	1	2	3	4	5	6	7	8
Path Cost:								

Port:	9	10	11	12	13	14	15	16
Path Cost:								

Port:	17	18	19	20	21	22	23	24
Priority:								

## Port Configuration Menu

“Viewing Port Configuration” on page 4-30

Mark the appropriate box to select the activation and duplex mode for each port.

Default: Enabled, Half Duplex

Port:	1	2	3	4	5	6	7	8
Enabled								
Disabled								
Half Duplex								
Full Duplex								

Port:	9	10	11	12	13	14	15	16
Enabled								
Disabled								
Half Duplex								
Full Duplex								

Port:	17	18	19	20	21	22	23	24
Enabled								
Disabled								
Half Duplex								
Full Duplex								

## EtherPipe Menu

“Configuring EtherPipes” on page 4-35

Write the port numbers in each EtherPipe in the table.

EtherPipe	Ports
1	
2	
3	
4	



## MAC Filter Configuration Menu

“Configuring MAC Filters” on page 4-38

Filter Number	MAC Address	Filter Type	Applied Ports	Exit Ports
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

---

Make additional copies of this page if you have more than thirty filters.

## Port Security Mode Menu

“Configuring Port Security Mode” on page 4-40

Record in the table the security mode for each port.

Possible values include the following options:

- Normal
- Secure Source Address
- Secure Destination Address
- Secure both source and destination address

Default: Normal

Port	Security Mode
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	

## Port Address Table Aging Menu

“Viewing or Changing Port Address Table Aging” on page 4-44

Record in the table the aging time and demand aging level for each port.

### Aging Time:

Range (in minutes): 0 to 999 (0 is disabled)

Default: 15 minutes Value: \_\_\_\_\_

### Demand Aging Level (%)

Range (in percent): 50, 60, 70, 80, or 90

Default: 90%

Port	Aging Time (min)	Demand Aging Level (%)
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		

## Master Address Table Aging Menu

“Viewing or Changing Master Address Table Aging” on page 4-46

### Address Aging Time:

Range (in minutes): 0 to 9999

Default: 120 minutes Value: \_\_\_\_\_

### Demand Aging Level:

Range (in percent): 0 to 90

Default: 50% Value: \_\_\_\_\_

## Port Switching Mode Menu

“Viewing or Changing Port Switching Mode” on page 4-47

Record in the table the switching mode of each port.

**Switching Mode:**

Auto, Cut-through, or Store and Forward

Default: Auto

**Error Water Mark:**

Range (in percent): 0 to 100

Default: 50%

**Runt-Free Mode**

On or Off

Default: Off

Port	Switching Mode	Error Water Mark	Runt-Free Mode
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			

## Password Menu

“Configuring and Changing the Password” on page 4-51

Current Password:\_\_\_\_\_ New Password:\_\_\_\_\_

## Console Serial Configuration Menu

“Configuring Serial Link for the Console” on page 4-53

Hardware Flow Control:\_\_\_\_\_

Software Flow Control:\_\_\_\_\_

Autobaud upon Break:\_\_\_\_\_

### Console Baud Rate

Mark the appropriate box to select the console baud rate.

Default: 9600

Baud Rate	1200	2400	4800	9600	19200
Set to:					

## Console Telnet Configuration Menu

“Configuring Telnet for a Console Session” on page 4-54

Number of Telnet Sessions Allowed:\_\_\_\_\_

Disallow New Telnet Session:\_\_\_\_\_

# Adapter Address to Physical Location Locator Chart

Adapter Address	Physical Location	Device Identification	Segment Number	Hub/Switch Unit No.







---

## Appendix B. Cable and Pin Information

This appendix provides information on cables that can be used with the 8271. It also provides minimum pin-out information so that you can verify that the cables that you are using are correctly wired.

---

### Connecting to the Network

Table B-1 lists the types of connections that are used when connecting the 8271 to the network. Remember to use crossover cables when connecting port types that are alike (MDI to MDI, or MDI-X to MDI-X). Use straight-through cables for all other connections.

*Table B-1. Typical Port Types*

Connecting Device	Typical Port Types
Hub or repeater	MDI-X
Server, PC, workstation	MDI
Model 108 ports 1–7	MDI-X
Model 108 port 8	MDI or MDI-X switchable
Model 216 ports 1–15	MDI-X
Model 216 port 16	MDI or MDI-X

---

### Connecting to the Management (EIA 232) Port

Table B-2 lists the type of cables that are used when connecting to the EIA 232 port on the 8271.

*Table B-2. Connecting the 8271 to the EIA 232 Port*

Cable Function	Cable Type or Cable Solution
Connect a modem to the EIA 232 port	Connect one end of a straight-through EIA 232 modem cable to the EIA 232 port and the other to the modem.
Connect a PC or other DTE device to the EIA 232 port	Connect one end of a crossover EIA 232 cable to the EIA 232 port and the other end to the PC or DTE device. Attach a null-modem adapter to the EIA 232 port. Then, attach a straight-through modem cable to the null-modem adapter.

---

## Twisted-Pair Cable Pin-Outs

When connecting devices to the 10BASE-T ports on the 8271, you must use either a straight-through or a crossover twisted-pair cable. Diagrams of each of these cables follow.

### Straight-Through UTP Cable

Use a straight-through cable to connect MDI-X ports to MDI ports.

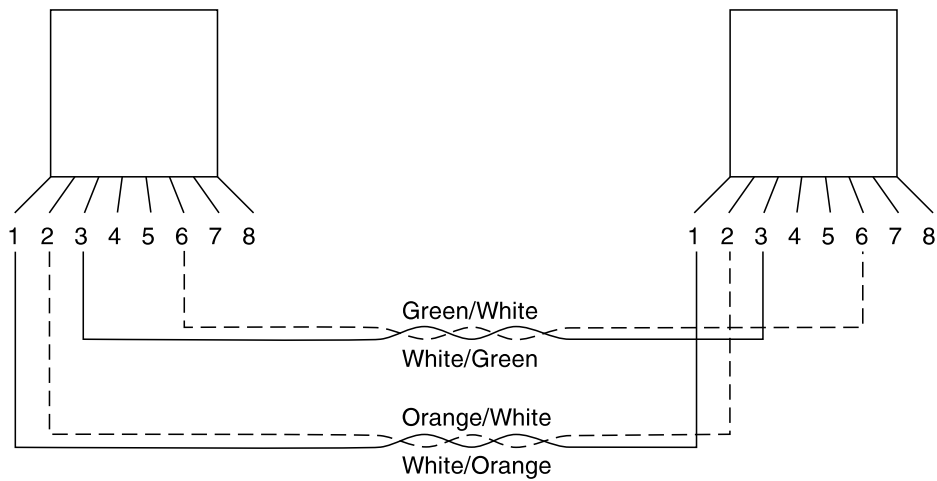


Figure B-1. Straight-Through Cable

### Crossover UTP Cable

Use a crossover cable to connect MDI ports to MDI ports or MDI-X ports to MDI-X ports.

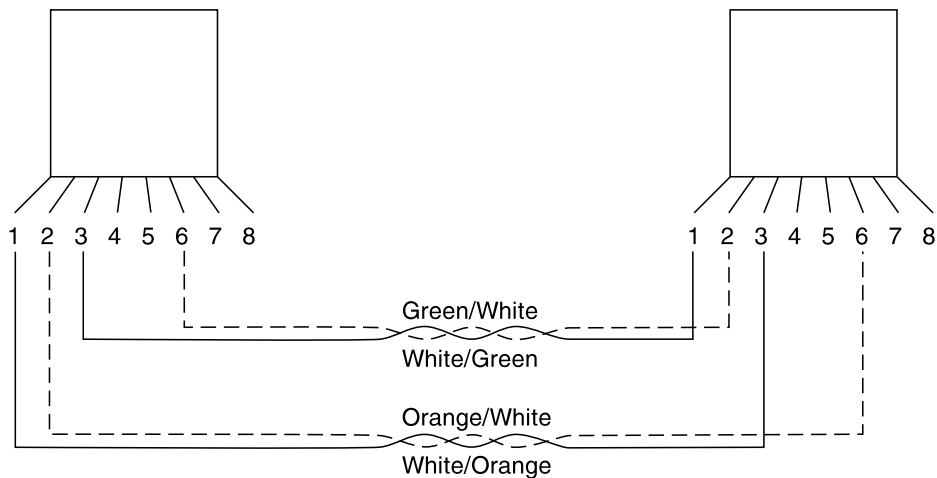


Figure B-2. Crossover UTP Cable

## IBM STP Data Connector-to-RJ-45 Straight-Through Cable

Use a straight-through cable to connect MDI ports to MDI-X ports.

RJ-45 Pins	IBM Cabling System Data Connector Color Code
1	Red
2	Green
3	Black
6	Orange

Figure B-3. IBM Cabling System Data Connector-to-RJ-45 Straight-Through Cable

## IBM STP Data Connector-to-RJ-45 Crossover Cable

Use a crossover cable to connect MDI ports to MDI ports or MDI-X ports to MDI-X ports.

RJ-45 Pins	IBM Cabling System Data Connector Color Code
1	Red
2	Green
3	Black
6	Orange

Figure B-4. IBM Cabling System Data Connector-to-RJ-45 Crossover Cable

## AUI Cable Pin-Out

Figure B-5 shows the pin-out of an AUI cable. Use an AUI cable when connecting an Ethernet transceiver to the AUI port on the 8271.

Signal Name	Transceiver End 15-Pin Female	Switch End 15-Pin Male
Control In Circuit A	2	2
Data Out Circuit A	3	3
Data In Circuit Shield (Common Drain)	4	4
Data In Circuit A	5	5
Voltage Common	6	6
Control In Circuit B	9	9
Data Out Circuit B	10	10
Data In Circuit B	12	12
Voltage Plus	13	13

Figure B-5. Pin-Out of the AUI Cable

## EIA 232 Port and Cable Pin-Outs

The 8271 has an EIA 232 port wired as a DTE. For this reason, you cannot use a straight-through modem cable to connect a terminal directly to the EIA 232 port.

For a terminal connection, you can use either a null-modem cable, or a modem cable with a null-modem adapter attached. For a modem connection, you can use a standard modem cable.

This section provides pin-out information for the cables you can use to connect to the EIA 232 port.

### EIA 232 Port Pin-Out

Pin	Signal Name
Shell	CHS GND
3	TXD
2	RXD
7	RTS
8	CTS
6	DSR
5	SIG GND
1	CD
4	DTR
9	RI

Figure B-6. Pin-Out of the EIA 232 Port

### EIA 232 Modem Cable Connections

Use a straight-through modem cable to connect the EIA 232 port of the 8271 to a modem.

Signal Name	Modem End 25-Pin Male	Switch End 9-Pin Female
TXD	2	3
RXD	3	2
RTS	4	7
CTS	5	8
DSR	6	6
GND	7	5
DCD	8	1
DTR	20	4
RI	22	9

Figure B-7. EIA 232 Modem Cable

### EIA 232 Null-Modem Connections

Use a null-modem (crossover) cable shown in Figure B-8 on page B-5 to connect the EIA 232 port to a terminal (DTE) with a 25-pin connector. Alternatively you can use a modem cable and a null-modem adapter. DTR (pin 20) and RTS (pin 4) must be on, or high, on your terminal or in your terminal emulation program.

Signal Name	Terminal /PC End 25-Pin Male	Switch End 9-Pin Female
TXD	2	3
RXD	3	2
RTS	4	7
CTS	5	8
DSR	6	6
GND	7	5
DCD	8	1
DTR	20	4
RI	22	9

Figure B-8. EIA 232 Null-Modem Cable for Terminal with 25-Pin Connector

Use a null-modem (crossover) cable shown in Figure B-9 to connect the EIA 232 port to a terminal (DTE) with a 9-pin connector. Alternatively you can use a modem cable and a null-modem adapter. DTR (pin 4) and RTS (pin 7) must be on, or high, on your terminal or in your terminal emulation program.

Signal Name	Terminal /PC End 9-Pin Male	Switch End 9-Pin Female
TXD	3	3
RXD	2	2
RTS	7	7
CTS	8	8
DSR	6	6
GND	5	5
DCD	1	1
DTR	4	4
RI	9	9

Figure B-9. EIA 232 Null Modem Cable for Terminal with 9-Pin Connector



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## Appendix C. Notices and Product Warranty

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**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.

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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.

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Cable

This product is in conformity with the protection requirements of EU Council Directive 89/336/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility. IBM cannot accept responsibility for any failure to satisfy the protection requirements resulting from a non-recommended modification of the product, including the fitting of non-IBM option cards.

This product has been tested and found to comply with the limits for Class A Information Technology Equipment according to CISPR 22/European Standard EN 55022. The limits for Class A equipment were derived for commercial and industrial environments to provide reasonable protection against interference with licensed communication equipment. **Warning:** 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.

Dieses Gerät ist berechtigt in Übereinstimmung mit dem deutschen EMVG vom 9.Nov.92 das EG-Konformitätszeichen zu führen. Der Au8271teller der Konformitätserklärung ist die IBM United Kingdom Laboratories Limited, Mail Point 147, Hursley Park Winchester, Hampshire S021 2JN, England.

Dieses Gerät erfüllt die Bedingungen der EN 55022 Klasse A. Für diese Klasse von Geräten gilt folgende Bestimmung nach dem EMVG: Geräte dürfen an Orten, für die sie nicht ausreichend entstört sind, nur mit besonderer Genehmigung des Bundesministers für Post und Telekommunikation oder des Bundesamtes für Post und Telekommunikation betrieben werden. Die Genehmigung wird erteilt, wenn keine elektromagnetischen Störungen zu erwarten sind. Auszug aus dem EMVG vom 9.Nov.92, Para.3, Abs.4)

Hinwies:

Dieses Genehmigungsverfahren ist von der Deutschen Bundespost noch nicht veröffentlicht worden.

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**Warranty Period\*:** One Year

*\*Contact your place of purchase for warranty service information.*

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# Glossary

This glossary includes terms and definitions from the *IBM Dictionary of Computing* (New York; McGraw-Hill, Inc., 1994).

- The symbol (A) identifies definitions from the *American National Standard Dictionary for Information Systems*, ANSI X3.172-1990, copyright 1990 by the American National Standards Institute (ANSI). Copies can be purchased from the American National Standards Institute, 1430 Broadway, New York, New York 10018.
- The symbol (E) identifies definitions from the ANSI/EIA Standard-440-A, *Fiber Optic Terminology*.
- The symbol (I) identifies definitions from published parts of the *Information Technology Vocabulary*, developed by Subcommittee 1, Joint Technical Committee 1, of the International Organization for Standardization and the International Electrotechnical Commission (ISO/IEC JTC1/SC1).
- The symbol (T) identifies definitions from draft international standards, committee drafts, and

working papers being developed by ISO/IEC JTC1/SC1.

The following cross-references are used in this glossary:

**Contrast with:** This refers to a term that has an opposed or substantively different meaning.

**Synonym for:** This indicates that the term has the same meaning as a preferred term, which was defined in its correct place in the glossary.

**Synonymous with:** This is a backward reference from a defined term to all other terms that have the same meaning.

**See:** This refers the reader to multiple-word terms that have the same last word.

**See also:** This refers the reader to related terms that have a related, but not synonymous, meaning.

**Deprecated term for:** This indicates that the term should not be used. It refers to a preferred term, which is defined in its proper place in the glossary.

## A

**ac.** Alternating current.

**adapter.** In a communicating device, a circuit card that, with its associated software and/or microcode, enables the device to communicate over the network.

**address.** (1) A name, label, or number identifying a location in storage, a device in a system or network, or any other data source. (2) In data communication, the unique code assigned to each device or workstation connected to a network.

**Address Resolution Protocol (ARP).** A protocol that dynamically maps between Internet addresses, baseband adapter addresses, X.25 addresses, and token-ring adapter addresses on a local area network.

**AIX.** Advanced Interactive Executive. See *AIX operating system*.

**AIX operating system.** IBM's implementation of the UNIX operating system. The RISC System/6000 system, among others, runs the AIX operating system.

**ANSI.** American National Standards Institute

**ARP.** Address Resolution Protocol.

**ATM.** asynchronous transfer mode

**attach.** To make a device a part of a network logically.

**Note:**

Not to be confused with *connect*, which implies physically connecting a device to a network.

**attachment unit interface (AUI).** In a local area network, the interface between the medium attachment unit and the data terminal equipment within a data station. (I) (A) See also *transceiver cable*.

## B

**balun.** A transformer used to connect balanced cables, such as twisted-pair cables, to unbalanced cables, such as coaxial cables, by matching the electrical characteristics of the cables.

**bandwidth.** (1) The difference, expressed in hertz, between the highest and the lowest frequencies of a range of frequencies. For example, analog transmission by recognizable voice telephone requires a bandwidth of about 3000 hertz (3 kHz). (2) The bandwidth of an optical link designates the information-carrying capacity of the link and is related to the maximum bit rate that a fiber link can support.

**baud.** (1) A unit of signaling speed equal to the number of discrete conditions or signal events per second; for example, one baud equals one-half dot cycle per second in Morse code, one bit per second in a train of binary signals, and one 3-bit value per second in a train of signals each of which can assume one of eight different states. (A) (2) In asynchronous transmission, the unit of modulation rate corresponding to one unit interval per second; that is, if the duration of the unit interval is 20 milliseconds, the modulation rate is 50 baud. (A)

**bootstrap.** (1) A sequence of instructions whose execution causes additional instructions to be loaded and executed until the complete computer program is in storage. (T) (2) A technique or device designed to bring itself into a desired state by means of its own action, for example, a machine routine whose first few instructions are sufficient to bring the rest of itself into the computer from an input device. (A)

**bridge.** (1) An attaching device that connects two LAN segments to allow the transfer of information from one LAN segment to the other. A bridge can connect the LAN segments directly by network adapters and software in a single device, or it can connect network adapters in two separate devices through software and use of a telecommunications link between the two adapters. (2) A functional unit that connects two LANs that use the same logical link control (LLC) procedures but may use the same or different medium access control (MAC) procedures. (T)

**Note:** A bridge connects networks or systems of the same or similar architectures, whereas a gateway connects networks or systems of different architectures.

**bridge ID.** The bridge label combined with the adapter address of the adapter connecting the bridge to the LAN segment with the lowest LAN segment number; it is used by the automatic single-route broadcast function in IBM bridge programs.

**broadcast.** (1) Transmission of the same data to all destinations. (T) (2) Simultaneous transmission of the same data to more than one destination. (3) A packet delivery system where a copy of a given packet is given to all hosts attached to the network. Broadcast can be implemented in hardware (Ethernet, for example) or software. Contrast with *multicast*.

**BTU.** British thermal unit

**buffer.** (1) A portion of storage used to hold input or output data temporarily. (2) A routine or storage used to compensate for a difference in data rate or time of occurrence of events, when transferring data from one device to another. (A)

## C

**C.** Celsius.

**cable segment.** A section of cable between components or devices on a network. A segment can consist of a single patch cable, multiple patch cables connected together, or a combination of building cable and patch cables connected together. See *LAN segment*, *ring segment*.

**cascade.** To connect in a series or in a succession of stages so that each stage derives from or acts upon the product of the preceding stage.

**client.** (1) A user. (2) A functional unit that receives shared services from a server. (T)

**collision.** When a frame from a transmitting adapter encounters any other signal in its path (frame, noise, or another type of signal), the adapter stops transmitting and a collision is registered.

**community.** An administrative relationship between Simple Network Management Protocol (SNMP) entities.

**community name.** An opaque string of octets identifying a community.

**configuration.** (1) The manner in which the hardware and software of an information processing system are organized and interconnected. (T) (2) The devices and programs that make up a system, subsystem, or network. (3) The task of defining the hardware and software characteristics of a system or subsystem.

**configuration management.** The monitoring and control of information required to identify physical and logical network resources, their states, and their interdependencies. Services include customization, network resource inventory, and assistance to other network management disciplines.

**configuration parameters.** Variables in a configuration definition, the values of which characterize the relationship of a product, such as a bridge, to other products in the same network.

**congestion.** See *network congestion*.

**connect.** In a LAN, to physically join a cable from a station to an access unit or network connection point. Contrast with *attach*.

**connectivity.** (1) The capability of a system or device to be attached to other systems or devices without modification. (T) (2) The capability to attach a variety of functional units without modifying them.

**connector.** A means of establishing electrical flow.

**contention.** In a LAN, a situation in which two or more data stations are allowed by the protocol to start transmitting concurrently and thus risk collision. (T)

## D

**DAS.** (1) data access system (2) dual attaching system (FDDI)

**data terminal equipment (DTE).** (1) That part of a data station that serves as a data source, data sink, or both. (I) (A) (2) Equipment that sends or receives data, or both.

**dB.** Decibel.

**decibel (dB).** (1) One tenth of a bel. (2) A unit that expresses the ratio of two power levels on a logarithmic scale. (3) A unit for measuring relative power. The number of decibels is 10 times the logarithm (base 10) of the ratio of the measured power levels; if the measured levels are voltages (across the same or equal resistance), the number of decibels is 20 times the log of the ratio.

**default.** Pertaining to an attribute, value, or option that is assumed when none is explicitly specified. (I)

**default value.** (1) A value assumed when no value has been specified. (2) A value that is automatically supplied or assumed by the CallPath for Workstations subsystem and the program, or the switch and the program, when no value is supplied by the program.

**destination.** Any point or location, such as a node, station, or particular terminal, to which information is to be sent.

**destination address.** A field in the medium access control (MAC) frame that identifies the physical location to which information is to be sent. Contrast with *source address*.

**device.** (1) An input/output unit such as a terminal, display, or printer. See also *attaching device*. (2) A physical entity attached to the network that requires data transportation service. (3) An input/output (I/O) unit such as a terminal, display, printer, or telephone.

**diagnostics.** The process of investigating the cause or the nature of a condition or problem in a product or system.

**domain.** (1) That part of a computer network in which the data processing resources are under common control. (T) (2) In the Internet, a part of a naming hierarchy in which the domain name consists of a sequence of names (labels) separated by periods



(dots). (3) In OSI, an administrative partition of a complex distributed system.

**DRAM.** dynamic random access memory

**DTE.** Data terminal equipment. (A)

**duplex.** Pertaining to communication in which data can be sent and received at the same time. Synonymous with *full-duplex*. Contrast with *half-duplex*.

## E

**EEPROM.** electrically erasable programmable read only memory

**EGA.** enhanced graphics adapter

**EIA/TIA.** Electronic Industries Association/Telecommunications Industries Association. (USA)

**EIA 232.** In data communications, a specification of the Electronic Industries Association (EIA) that defines the interface between data terminal equipment (DTE) and data circuit-terminating equipment (DCE), using serial binary data interchange.

**equipment rack.** Synonym for *rack*.

**establishment.** A user's premises that do not extend across public rights of way (for example, a single office building, warehouse, or campus).

**Ethernet.** (1) A 10-Mbps baseband local area network that allows multiple stations to access the transmission medium at will without prior coordination, avoids contention by using carrier sense and deference, and resolves contention by collision detection and transmission. Ethernet uses carrier sense multiple access with collision detection (CSMA/CD). (2) A passive coaxial cable whose interconnections contain devices or components, or both, that are all active. It uses CSMA/CD technology to provide a best-effort delivery system.

**execute.** To perform the actions specified by a program or a portion of a program. (T)

**exit.** To execute an instruction within a portion of a computer program in order to terminate the execution of that portion. Such portions of computer programs include loops, subroutines, modules, and so on. (T)

## F

**F.** Fahrenheit.

**faceplate.** A wall-mounted or surface-mounted plate for connecting data and voice connectors to a cabling system.

**FDDI.** fiber distributed data interface (100 Mbit/s fiber optic LAN)

**filter.** A device or program that separates data, signals, or material in accordance with specified criteria. (A)

**frame.** (1) A data structure that consists of fields, predetermined by a protocol, for the transmission of user data and control data. The composition of a frame, especially the number and types of fields, may vary according to the type of protocol. (2) The unit of transmission in some local area networks, including the IBM Token-Ring Network; it includes delimiters, control characters, information, and checking characters. (3) A packet that is transmitted over a serial line or LANs. See also *packet*.

**ft<sup>3</sup>.** foot cubed, feet cubed

**full-duplex.** Synonym for *duplex*.

## H

**half-duplex (HDX).** In data communication, pertaining to transmission in only one direction at a time. Contrast with *duplex*.

**HDX.** Half-duplex.

**hr.** hour, hours

**Hz.** symbol for Hertz (ISO 1000 - derived unit, frequency in cycles per second)

## I

**IEEE.** Institute of Electrical and Electronics Engineers.

**Internet.** The largest internet in the world consisting of large national backbone networks and a myriad of regional and campus networks all over the world. The Internet uses the Internet protocol suite. See also *internet*.

**in.** inch (2.540 centimeters)

**Internet Protocol (IP).** (1) A protocol that routes data through a network or interconnected networks. IP acts as an interface between the higher logical layers and the physical network. This protocol, however, does not

provide error recovery, flow control, or guarantee the reliability of the physical network. IP is a connectionless protocol. (2) A protocol used to route data from its source to its destination in an Internet environment.

**IP.** Internet Protocol.

**IP address.** A 32-bit address assigned to devices or hosts in an IP internet that maps to a physical address. The IP address is composed of a network and host portion.

## K

**Kcal.** kilocalorie

**Kva.** kilovolt-amperes

## L

**LAN.** Local area network.

**LAN segment.** (1) Any portion of a LAN (for example, a single bus or ring) that can operate independently but is connected to other parts of the establishment network via bridges. (2) An entire ring or bus network without bridges. See *cable segment, ring segment*.

**lb.** Pound.

**LED.** Light-emitting diode.

**light-emitting diode (LED).** A semiconductor chip that gives off visible or infrared light when activated.

**link.** The logical connection between nodes including the end-to-end link control procedures.

**local area network (LAN).** (1) Physical network technology that transfers data at high speed over short distances. (2) A network in which a set of devices are connected to one another for communication and that can be connected to a larger network. See also *Ethernet*. (3) A computer network located on a user's premises within a limited geographical area. Communication within a local area network is not subject to external regulations; however, communication across the LAN boundary may be subject to some form of regulation. (T)

## M

**m<sup>3</sup>.** meter cubed, meters cubed

**ma.** milliamperes

**MAC.** Medium access control.

**management information base (MIB).** A collection of objects that can be accessed by means of a network management protocol.

**MB.** (1) For processor storage and real and virtual memory, 1048 576 bytes. (2) For disk storage capacity and transmission rates, 1 000 000 bytes.

**Mb.** Megabit.

**Mbps.** One million bits per second.

**MDI.** media dependent interface

**MDI-X.** media dependent interface crossed

**MIB.** (1) Management information base. (2) MIB module.

**min.** minute, minutes

**mm.** Millimeter, millimeters.

**modem (modulator/demodulator).** (1) A functional unit that modulates and demodulates signals. One of the functions of a modem is to enable digital data to be transmitted over analog transmission facilities. (T) (A) (2) A device that converts digital data from a computer to an analog signal that can be transmitted in a telecommunication line, and converts the analog signal received to data for the computer.

**multicast.** (1) Transmission of the same data to a selected group of destinations. (T) (2) A special form of broadcast where copies of the packet are delivered to only a subset of all possible destinations. Contrast with *broadcast*.

## N

**NetView.** A host-based IBM licensed program that provides communication network management (CNM) or communications and systems management (C&SM) services.

**network administrator.** A person who manages the use and maintenance of a network.

**network congestion.** An undesirable overload condition caused by traffic in excess of what a network can handle.

**network management.** The process of planning, organizing, and controlling a communications-oriented system.

**node.** (1) In a network, a point at which one or more functional units connect channels or data circuits. (I) (2) In network topology, the point at an end of a branch. (T) (3) The representation of a state or an

event by means of a point on a diagram. (A) (4) In a tree structure, a point at which subordinate items of data originate. (A) (5) An endpoint of a link or a junction common to two or more links in a network. Nodes can be processors, communication controllers, cluster controllers, or terminals. Nodes can vary in routing and other functional capabilities.

**NVRAM.** non volatile random access memory

## O

**ohm.** A unit of electrical resistance equal to that of a conductor in which a current of one ampere is produced by a potential of one volt across its terminals.

## P

**packet.** (1) In data communication, a sequence of binary digits, including data and control signals, that is transmitted and switched as a composite whole. (I) Contrast with *frame*.

**packet internet groper (PING).** A program used in TCP/IP networks to test the ability to reach destinations by sending the destinations an Internet Control Message Protocol (ICMP) echo request and waiting for a reply. The term, ping, is used as a verb.

**panel.** A formatted display of information that appears on a display screen.

**parameter.** (1) A variable that is given a constant value for a specified application and that may denote the application. (I) (A) (2) An item in a menu or for which the user specifies a value or for which the system provides a value when the menu is interpreted. (3) Data passed between programs or procedures.

**password.** In computer security, a string of characters known to the computer system and a user, who must specify it to gain full or limited access to a system and to the data stored within it.

**path.** (1) In a network, any route between any two nodes. A path may include more than one branch. (T) (2) The route traversed by the information exchanged between two attaching devices in a network. (3) The series of transport network components (path control and data link control) that are traversed by the information exchanged between two network accessible units (NAUs). A path consists of a virtual route and its route extension, if any.

**path cost.** A value, maintained by each IBM bridge program that uses the automatic single-route bridge function, that indicates to the automatic single-route bridge function the relative length of the path between the root bridge and a designated or standby bridge.

**personal computer (PC).** (1) A microcomputer primarily intended for stand-alone use by an individual. (T) (2) A desk-top, floor-standing, or portable microcomputer that usually consists of a system unit, a display monitor, a keyboard, one or more diskette drives, internal fixed-disk storage, and an optional printer. PCs are designed primarily to give independent computing power to a single user and are inexpensively priced for purchase by individuals or small businesses.

**PING.** packet internet groper

**plug.** (1) A connector designed to insert into a receptacle or socket. (2) To insert a connector into a receptacle or socket.

**port.** (1) An access point for data entry or exit. (2) A connector on a device to which cables for other devices such as display stations and printers are attached. (3) The representation of a physical connection to the link hardware. A port is sometimes referred to as an adapter, however, there can be more than one port on an adapter. A single DLC process can control one or more ports. (4) An abstraction used by transport protocols to distinguish among multiple destinations within a host machine.

**POST.** Power-on self-test.

**power-on self-test (POST).** A series of diagnostic tests that are run automatically by a device when the power is switched on.

**primary path.** The channel an operation first uses.

**problem determination.** The process of determining the source of a problem; for example, a program component, a machine failure, telecommunication facilities, user or contractor-installed programs or equipment, an environment failure such as a power loss, or user error.

## R

**rack inventory chart.** An IBM Token-Ring Network planning chart indicating the location of the components installed in an equipment rack.

**RAM.** Random access memory. (A)

**random access memory (RAM).** (1) A storage device in which data can be written and read. (2) A storage device into which data is entered and from which data is retrieved in a nonsequential manner.

**repeater.** A device used to amplify or reshape signals.

**reset.** On a virtual circuit, re-initialization of data flow control. At reset, all data in transit are eliminated.

**ring segment.** A ring segment is any section of a ring that can be isolated (by unplugging connectors) from the rest of the ring. A segment can consist of a single lobe, the cable between access units, or a combination of cables, lobes, and/or access units. See *cable segment*, *LAN segment*.

**root.** The bridge with the lowest numbered bridge identifier in the network. It is responsible for periodically initiating configuration bridge protocol data units to other bridges in the network.

## S

**SAS.** single attaching system

**serial port.** On personal computers, a port used to attach devices such as display devices, letter-quality printers, modems, plotters, and pointing devices such as light pens and mice; it transmits data 1 bit at a time.

**session.** (1) In network architecture, for the purpose of data communication between functional units, all the activities which take place during the establishment, maintenance, and release of the connection. (T) (2) A logical connection between two network accessible units (NAUs) that can be activated, tailored to provide various protocols, and deactivated, as requested. Each session is uniquely identified in a transmission header (TH) accompanying any transmissions exchanged during the session. (3) The period of time during which a user of a terminal can communicate with an interactive system, usually, elapsed time between logon and logoff.

### Simple Network Management Protocol (SNMP).

(1) An IP network management protocol that is used to monitor routers and attached networks. (2) A TCP/IP-based protocol for exchanging network management information and outlining the structure for communications among network devices. SNMP is an application layer protocol. Information on devices managed is defined and stored in the application's Management Information Base (MIB).

**SNMP.** Simple Network Management Protocol.

**source address.** A field in the medium access control (MAC) frame that identifies the location from which information is sent. Contrast with *destination address*.

**spanning tree.** The method by which bridges automatically develop a routing table and update that table in response to changing topography to ensure that there is only one route between any two LANs in the bridged LAN. This method prevents packet looping, where a packet returns in a circuitous route back to the sending router.

**SQE.** system queue element

**star.** A wiring arrangement in which an individual cable runs from each work area to a concentration point.

**station.** (1) An input or output point of a system that uses telecommunication facilities; for example, one or more systems, computers, terminals, devices, and associated programs at a particular location that can send or receive data over a telecommunication line. (2) A location in a device at which an operation is performed; for example, a read station.

**STP.** shielded twisted pair (cable)

**subnet mask.** A bit template that identifies to the TCP/IP protocol code the bits of the host address that are to be used for routing for specific subnets.

## T

**telephone twisted pair.** One or more twisted pairs of copper wire in the unshielded voice-grade cable commonly used to connect a telephone to its wall jack. Also referred to as *unshielded twisted pair* (UTP).

**Telnet.** In TCP/IP, an application protocol that allows a user at one site to access a remote system as if the user's display station were locally attached. Telnet uses the Transmission Control Protocol as the underlying protocol.

**TFTP.** Trivial File Transfer Protocol.

**threshold.** (1) A level, point, or value above which something is true or will take place and below which it is not true or will not take place. (2) In IBM bridge programs, a value set for the maximum number of frames that are not forwarded across a bridge due to errors, before a *threshold exceeded* occurrence is counted and indicated to network management programs. (3) An initial value from which a counter is decremented to zero, or a value to which a counter is incremented or decremented from an initial value. When the counter reaches zero or the threshold value, a decision is made and/or an event occurs.

**time-out.** (1) An event that occurs at the end of a predetermined period of time that began at the occurrence of another specified event. (1) (2) A time interval allotted for certain operations to occur: for example, response to polling or addressing before system operation is interrupted and restarted. (3) A parameter related to an enforced event designed to occur at the conclusion of a predetermined elapsed time. A time-out condition can be canceled by the receipt of an appropriate time-out cancellation signal.

**topology.** The physical or logical arrangement of nodes in a computer network. Examples are ring topology and bus topology.

**transceiver.** A physical device that connects a host interface to a local area network, such as Ethernet. Ethernet transceivers contain electronics that apply signals to the cable and sense collisions.

**transceiver cable.** In communications, the cable and its connectors that connects the input/output adapter to the transceiver.

**transmit.** To send information from one place for reception elsewhere. (A)

**transparent bridging.** A method for tying individual local area networks (LANs) together through the medium access control (MAC) level. A transparent bridge keeps the tables that hold MAC addresses so that frames seen by the bridge can be forwarded to another LAN if the tables indicate to do so.

**trap.** A vital part of the Simple Network Management Protocol (SNMP). A trap is specified data that is sent by a managed node (agent function) to a management station to report an exception condition.

**tree.** A physical topology consisting of a hierarchy of master-slave connections between a concentrator and other FDDI nodes (including subordinate concentrators).

**tree network.** A network in which there is exactly one path between any two nodes. (T)

**Trivial File Transfer Protocol (TFTP).** In the Internet suite of protocols, a protocol for file transfer that requires minimal overhead and minimal capability. TFTP uses the connectionless datagram delivery services of the User Datagram Protocol (UDP), which allows hosts that have no disk storage to implement TFTP in read-only memory (ROM) and use it to boot themselves.

**twisted pair.** A transmission medium that consists of two insulated electrical conductors twisted together to reduce noise. (T)

## U

**UDP.** user datagram protocol

**UFC.** Universal Feature Card

**UTP.** unshielded twisted pair (cable)

**Universal Feature Card (UFC).** An adapter that can be installed in the Universal Feature Slot of the 8271 Nways LAN Switch to provide additional connections.

**unshielded twisted pair (UTP).** See *telephone twisted pair*.

## V

**V.** Volt.

**V ac.** Volts alternating current.

**VGA.** virtual graphics adapter

## W

**wiring closet.** A room that contains one or more distribution panels and equipment racks that are used to interconnect cables. Sometimes called a *network wiring closet* to distinguish it from a telephone wiring closet.

**workstation.** (1) A functional unit at which a user works. A workstation often has some processing capability. (T)

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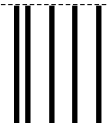
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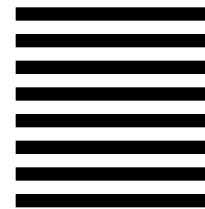
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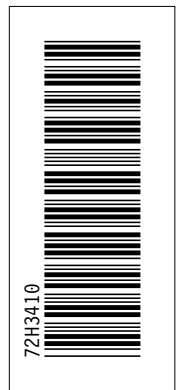
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