NETWORK PERIPHERALS
Bringing Workgroups Together

NuLink 2000
Fast Ethernet-to-FDDI Bridge
User's Guide

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Wichtige Sicherheitshinweise

1. Lesen Sie bitte alle Anweisungen durch.
2. Heben Sie diese Anleitung für den späteren Gebrauch auf.
3. Beachten Sie alle am Gerät angebrachten Warnhinweise und Anweisungen.
4. Ziehen Sie das Netzkabel des Geräts aus der Steckdose, bevor Sie es reinigen. Verwenden Sie keine flüssigen Reiniger oder Sprühmittel. Verwenden Sie zur Reinigung ein feuchtes Tuch.
5. Stellen Sie das Gerät nicht in der Nähe von Wasser auf.
6. Stellen Sie das Gerät nicht auf einen instabilen Wagen, Ständer oder Tisch. Wenn das Gerät herunterfällt, kann es schwer beschädigt werden.
7. Die Schlitze und Öffnungen an der Rück- und Unterseite des Gehäuses dienen zur Belüftung, um einen zuverlässigen Betrieb zu gewährleisten und eine Überhitzung des Geräts zu verhindern. Diese Öffnungen dürfen nicht blockiert werden, indem das Gerät auf einem Bett oder Sofa, einem Teppich oder ähnlichen Oberflächen aufgestellt wird. Das Gerät darf nicht in der Nähe von oder über Heizkörpern aufgestellt werden, und es darf nicht in einem Einbausystem installiert werden, ohne daß ausreichende Belüftung gewährleistet ist.
8. Das Gerät darf nur mit der auf dem Typenschild ausgewiesenen Netzspannung betrieben werden. Wenn Sie sich nicht sicher sind, ob die Netzspannung mit der angegebenen Spannung übereinstimmt, fragen Sie Ihren Händler oder Ihre Elektrizitätsgesellschaft.
9. Das Gerät ist mit einem Schutzkontaktstecker (mit zusätzlichem Erdungskontakt) ausgestattet. Stecken Sie den Stecker nur in eine geerdete Steckdose. Umgehen Sie diese Erdung nicht, indem Sie das Gerät an eine ungeerdete Steckdose anschließen (über eine Euro-Verlängerung oder Euro-Doppelsteckdose).
10. Stellen Sie keine Gegenstände auf das Netzkabel, und stellen Sie das Gerät nicht an einem Ort auf, wo Leute auf das Netzkabel treten müßten.
11. Stellen Sie sicher, daß die Nennleistung eines Verteilers nicht durch die Gesamtaufnahmeleistung aller angeschlossenen Geräte überschritten wird, wenn dieses Gerät über ein Verlängerungskabel mit Mehrfachsteckdosen betrieben wird. Die Gesamtaufnahmeleistung aller an einer Steckdose angeschlossenen Geräte darf die Absicherungsleistung dieser Steckdose nicht überschreiten.
12. Stecken Sie keine Gegenstände durch die Ventilationsöffnungen in das Gerät, da diese dort mit gefährlicher Spannung in Berührung kommen (Gefahr eines Stromschlages) oder einen Kurzschluß verursachen können. Verschütten Sie keinerlei Flüssigkeiten auf das Gerät.

13. Versuchen Sie nicht, das Gerät selbst zu warten, da Sie nach Öffnen des Gehäuses Punkte, die gefährliche Spannungen führen, berühren oder sich anderen Gefahren aussetzen könnten. Lassen Sie alle Wartungsarbeiten von qualifiziertem Wartungspersonal ausführen.
14. Ziehen Sie das Netzkabel unter den folgenden Umständen aus der Steckdose, und lassen Sie Wartungsarbeiten von qualifiziertem Wartungspersonal ausführen:

- Wenn Stecker oder Netzkabel beschädigt oder das Kabel ausgefranst ist,
- Wenn eine Flüssigkeit in das Gerät gelangt ist,
- Wenn das Gerät Regen oder Wasser ausgesetzt war,
- Wenn das Gerät trotz Befolgung der Bedienungsanleitung nicht gemäß funktioniert. Stellen Sie nur solche Regler ein, die in der Bedienungsanleitung beschrieben sind, da es sonst zu Beschädigungen kommen kann, die möglicherweise kostspielige Reparaturen durch qualifiziertes Personal erfordern, um das Gerät wieder betriebsfähig zu machen.
- Wenn das Gerät heruntergefallen ist oder das Gehäuse beschädigt wurde,
- Wenn das Leistungsverhalten des Geräts sich so verändert hat, daß Wartungsarbeiten erforderlich zu sein scheinen.

15. Das Gerät wird durch Ziehen des Netzsteckers ausgeschaltet. Das Gerät sollte deshalb in der Nähe der Steckdose installiert werden, und die Steckdose sollte leicht zugänglich sein.

Federal Communications Commission Notice

This product 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 he interference at his own expense.

Serviceability

This product is not field-serviceable and should be returned to Network Peripherals for any servicing.

Grounding

Power to this unit must always contain an adequate grounding source.

WARNING: Observe precautions for handling electrostatic sensitive devices.

Table of Contents

List of Figures

List of Tables

Preface

In this User's Guide, "bridge" refers to the NuLink 2000 Fast Ethernet-to-FDDI Bridge.

About This Guide

Use this document to install, configure, and manage the bridge in an FDDI network.

Who This Guide is For

This User's Guide is written for the network administrator or person in charge of setting up systems on a network. It assumes a working knowledge of VT-100 terminals, modems, and FDDI.

Technical Support

Network Peripherals offers lifetime technical support and remote diagnostics capabilities as part of the NuCare Service and Support Program for the bridge. For details regarding NuCare or return of materials, contact Network Peripherals Technical Support.

Free Phone Support

- +800-674-8855, North America
- +408-321-7300, Corporate headquarters
- +886-2-2999-8188, Asia, South America, and Europe

Free E-mail Support

- support@npix.com, North America, South America and Europe
- support@npix.com.tw, Asia

Free FAX Support

- +408-321-9218, North America, South America and Europe
- +886-2-2999-8187, Asia

Free FAXBack

Product Information, FAQs, and Tips

- +408-321-7380

Free Anonymous FTP

(Latest drivers and software)

- ftp.npix.com

Free World Wide Web

Product information/FAQs/tips/drivers/software

- http://www.npix.com

1
Bridge Overview

This chapter provides an overview of the functions and characteristics of the bridge. It also illustrates how the bridge can connect to an FDDI backbone.

Package Contents

The bridge has these functions:

- NuLink 2000 Fast Ethernet-to-FDDI Bridge
- Power cord
- Mounting brackets and screws
- Diskette containing MIBs
- Release Notes
- User's Guide
- Quick Installation Guide

Summary of Functions

All three models of the bridge have these functions:

- Auto-sensing 10/100 Mbps connections
- Configurable full duplex and half duplex Fast Ethernet
- A 10Base-T/100Base-TX Fast Ethernet port that can be replaced by a 100Base-FX Fast Ethernet port
- IP fragmentation management
- Distributed wire speed architecture that assures high performance
- Support of FDDI SNAP, Ethernet 802.2, and Ethernet 802.3 frame types
- Learns approximately 4000 addresses in CAM
- Configurable MAC address filtering and aging
- Management through SNMP, Telnet, and the RS-232 console port
- Redundant power supply connection

In addition to the above, the DAS model supports an optical bypass switch to guard against ring failure.

About the Bridge

The bridge is a stand-alone Fast Ethernet-to-FDDI translating and learning device suitable for networks where new Fast Ethernet workgroups are forming and require FDDI backbone connectivity. It is available in three models.

One model has a dual attached station (DAS) fiber-optic FDDI connection with an optical bypass switch connector (Figure 1).

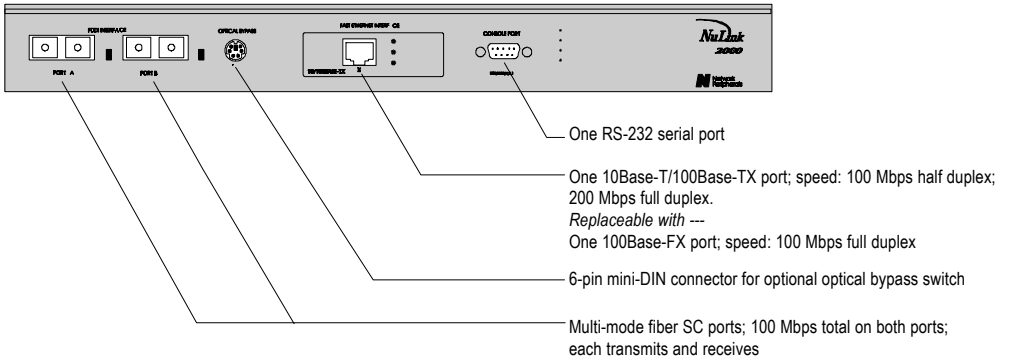


Figure 1. DAS Fiber-Optic Model

One model has a single-attached station (SAS) fiber-optic FDDI connection (Figure 2).

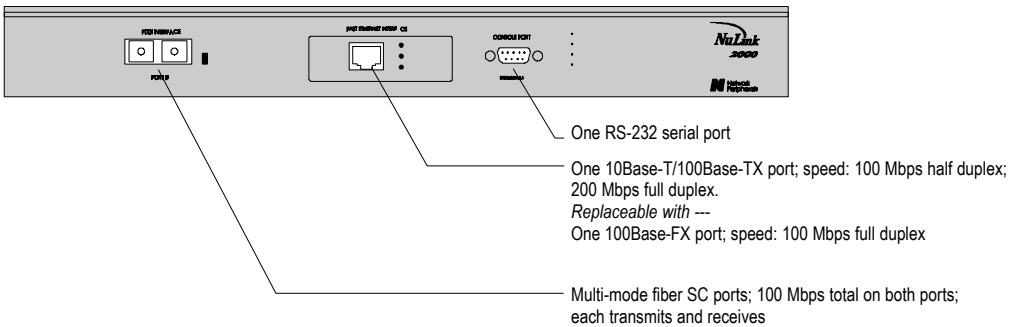


Figure 2. SAS Fiber-Optic Model

One model has a SAS copper FDDI connection (Figure 3).

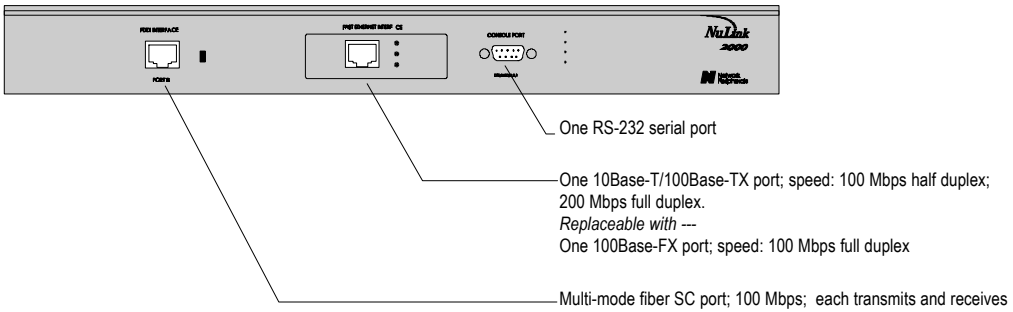


Figure 3. SAS Copper Model

In all three models, the 10Base-T/100Base-TX port labeled FAST ETHERNET INTERFACE can be replaced by a 100Base-FX port on NPI's NuModule FE-833 Fast Ethernet Media Adapter (Fiber Module version) that can be purchased separately.

This port mix is also ideal for migrating from an Ethernet client base to Fast Ethernet now and from Fast Ethernet to FDDI later.

Connecting Workgroups to an FDDI Backbone

As shown in the figures that follow, any of these models can support configurations where Fast Ethernet workgroups require connection to an FDDI backbone. Figure 4 shows how you can connect a DAS model.

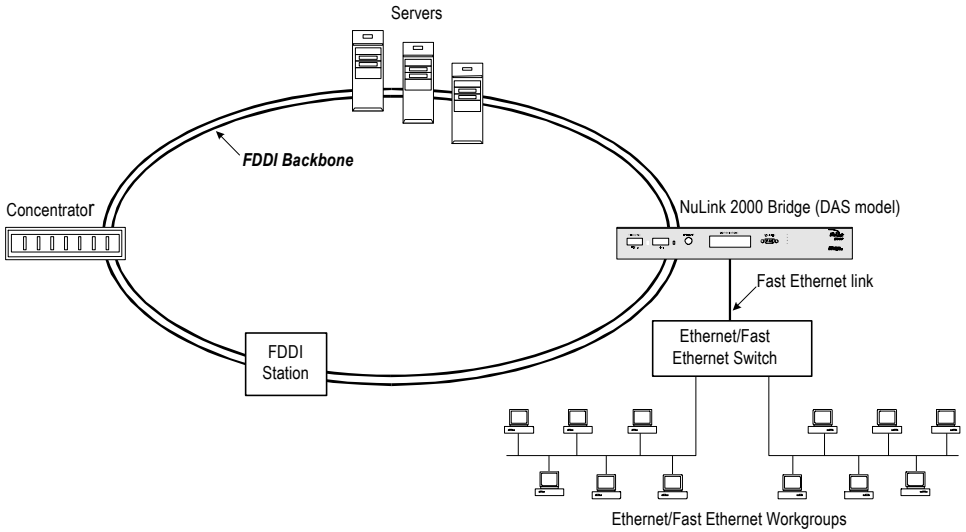


Figure 4. DAS NuLink Connected Directly to the FDDI Backbone

As shown in Figure 5, a SAS model can be connected through a concentrator.

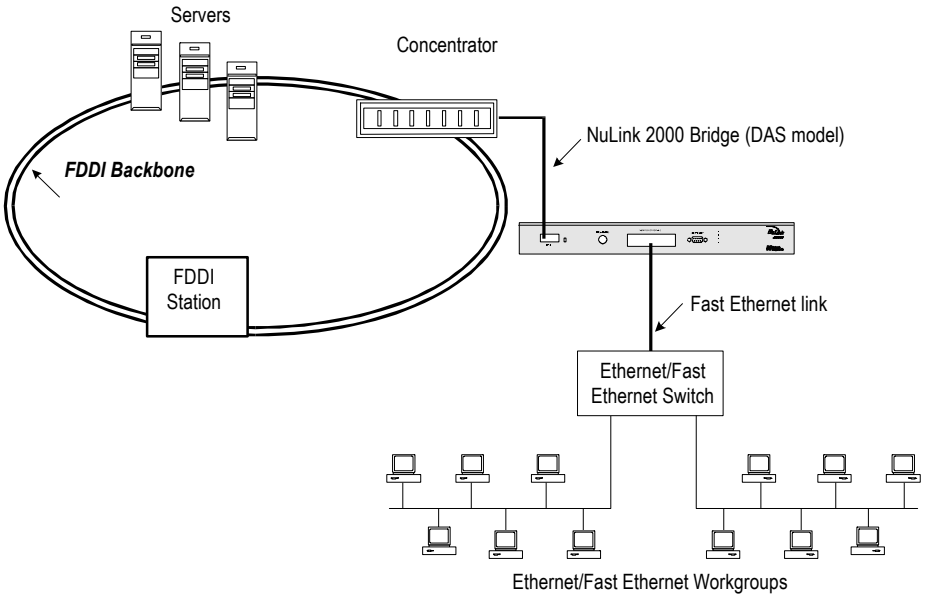


Figure 5. SAS NuLink Connected Through an FDDI Concentrator

Preventing Ring Failures

The DAS model has an optical bypass switch that you can use. As your FDDI network grows, so does the possibility of multiple ring failures. When two ring failures occur, the ring is wrapped in both cases, effectively segmenting the ring into two separate rings that cannot communicate with each other. Subsequent failures cause even more ring segmentation. To prevent ring segmentation, you can add an optical bypass switch to your network. When connected to the DAS model, this switch prevents ring segmentation by eliminating failed stations from the ring (Figures 6 and 7).

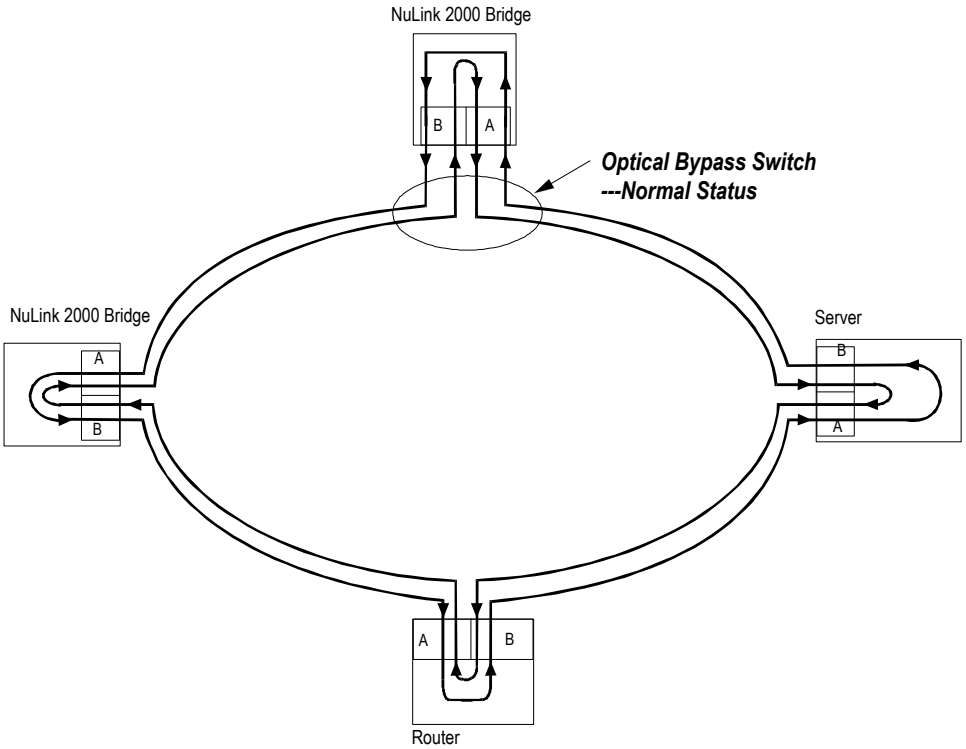


Figure 6. Optical Bypass Switch in Normal Status

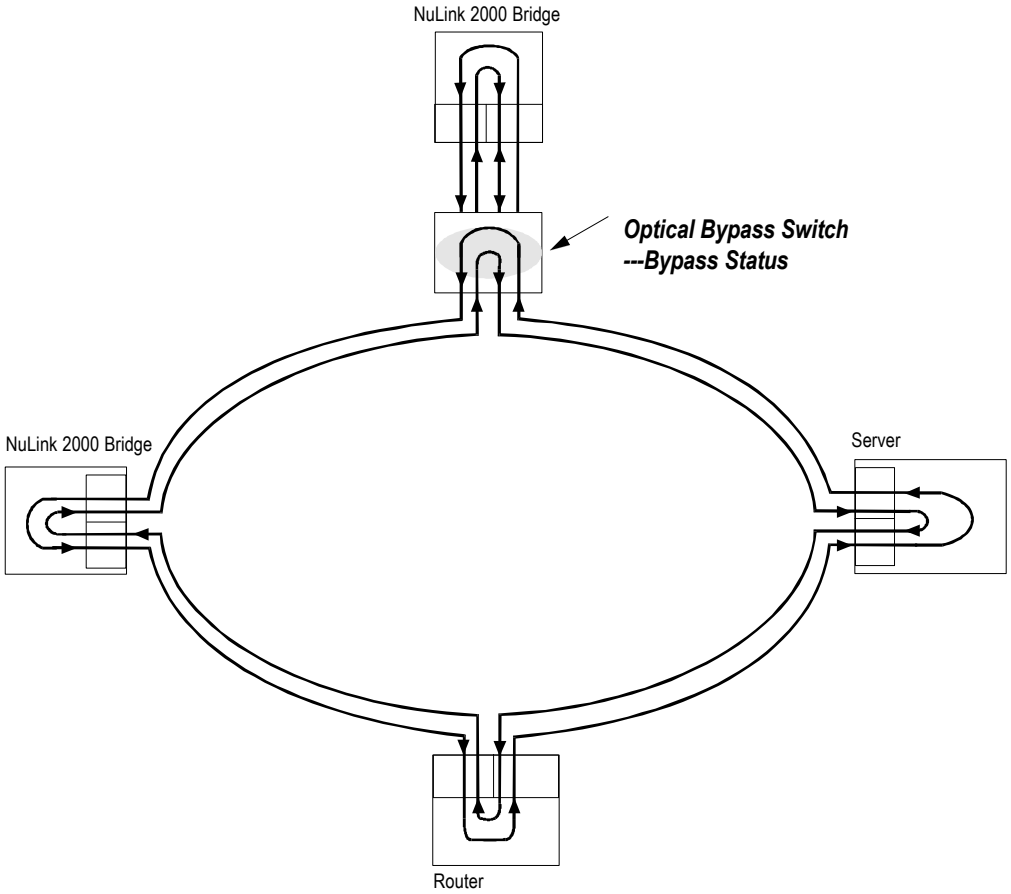


Figure 7. Optical Bypass Switch in Bypass Status

Each model has one internal power supply and an external connector for an NPI redundant power supply (RPS model 600). If the internal power supply fails and the RPS is connected, the RPS will provide system power automatically.

Bridge Defaults

The following table shows defaults set at the factory for the bridge. You can change any of these defaults, as explained in the chapter about managing the bridge. Absence of a parameter or attribute from this table means the parameter or attribute is not set.

Table 1. Bridge Factory Defaults

Function	Default Setting
T Notify	30 seconds
T Request	8 milliseconds
IP address	0.0.0.0
Subnet mask	255.255.255.0
Default gateway	0.0.0.0
Address aging interval	5 (minutes)
SNMP:	
Community string GET	Public
Community string SET	Private
System name	NuLink 2000
IP address of trap-receiving management stations	0.0.0.0
FDDI Port (DAS or SAS):	
Port status	Enabled
Link error rate alarm	8
Link error rate cutoff	7
Fast Ethernet Port:	
Port status	Enabled
Auto-negotiation	Enabled
IP Fragmentation:	
Status	Enabled
Ignore “Don’t Fragment” Flag	No

LEDs

The following table explains bridge-level LED status indicators on the front panel of the bridge.

Table 2. Bridge-Level LED Display Status

LED	Color	Indicates
Power	Green	Internal power supply of bridge is active.
	Blinking Green	Internal power supply of bridge is inactive; connected RPS is supplying power.
RPS	Green	Active RPS is connected to bridge.
SNMP	Green	SNMP agent is ready.
	Blinking green	Bridge is receiving SNMP packet. After POST, the POST failed.
Console	Green	RS-232 link is present.
	Blinking green	After POST, the POST failed.

The following table explains port LED status indicators on the front panel of the bridge.

Table 3. Port LED Display Status

LED	Color	Indicates
FDDI:	Off	FDDI is in Reset state.
	Red	Port has been disabled by SMT.
	Steady amber	Port initialized and ready for connection.
	Flashing green	Port is in standby mode.
	Green	Port has an active link to connected device.
10Base-T/100Base-TX:		
10M/ACT	Green	10Base-T link is present.
	Blinking green	Port is transmitting/receiving packets.
100M/ACT	Green	100Base-TX link is present.
	Blinking green	Port is transmitting/receiving packets.
FDX/COL	Green	Full duplex mode is enabled.
	Amber	Collision occurred in half duplex mode.

Managing the Bridge

Once you have installed the bridge and made the necessary connections (Chapter 2), you can manage the bridge from a management console out-of-band, through Telnet, or through any SNMP-compliant workstation.

Out-of-Band Management

The console program built into the bridge is usable at a VT100 terminal that becomes the management console. The console program can be accessed through the console port in the front panel of the bridge. A direct connection to the console port is made using a null modem adapter and a standard serial cable to a workstation. A personal computer running terminal emulation software to emulate a VT100 terminal is usually the best way to manage the bridge through the console port. Out-of-band management of the bridge is also possible through a direct or remote connection through a modem attached to the bridge with a standard serial cable. For the console program, see Chapter 3, Chapter 4, Appendix B, and Appendix C. For connection details, see Appendix A.

Management through Telnet

Any Telnet device that emulates a VT100 terminal can communicate with the bridge over the network. After a one-time set-up of IP parameters you can manage the bridge at a Telnet device, using the same console program just described under *Out-of-Band Management*.

Chapter 5 describes how to set up the IP parameters initially and communicate through Telnet.

Using MIBs

The MIBs on the diskette shipped with the bridge are for Ethernet (RFC 1512) and FDDI (RFC 1398). If these MIBs are installed at the management console, any SNMP-based network management application can manage the bridge. You will have the capability to view MIB object details or change MIB values. For details about compiling, viewing, or editing these MIBs, see the manual accompanying the desired network management application.

2
Installing the Bridge

This chapter explains how to select a location for the bridge, describes tabletop, shelf, and rack mounting, and gives connection guidelines.

Selecting a Location for the Bridge

You can install any model of the bridge on a table or in a rack. Observe the following guidelines when choosing a good location for the bridge:

- Make sure the location is in a ventilated area that is dust free.
- Make sure the location is away from heat vents, warm air exhaust from other devices, and direct sunlight.
- Avoid proximity to large electric motors or other electromagnetic equipment.
- Temperature ranges from 32 to 104 degrees F (0 to 40 degrees C).
- Humidity should be less than 90%, non-condensing.
- A power outlet should be within 6 feet of the device.

For a detailed list of the bridge's technical specifications, see the appendix titled *Technical Specifications*.

Tabletop or Shelf Mounting

Choose a sturdy, level surface. The surface chosen must support at least 1.5 kg. Allow enough ventilation space between the bridge and the objects around it.

Rack Mounting

The bridge can be installed in an EIA standard-size, 19-inch rack. To install:

1. Attach the mounting brackets on each side of the bridge, as in Figure 8. The mounting brackets and screws are included in the device package.

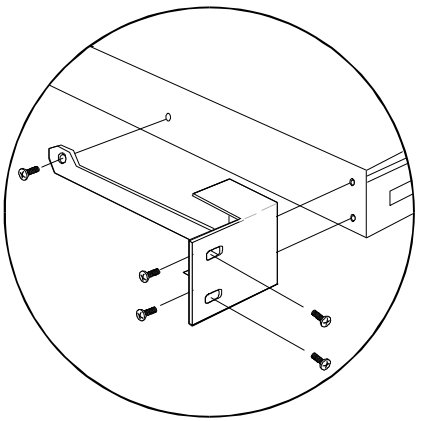


Figure 8. Connecting Mounting Brackets

2. Insert the bracketed bridge into the 19-inch rack and secure with the screws included in the bridge package. Ensure that the ventilation holes are not obstructed.
3. Connect the cables.

Communication Mode

Regardless of the bridge model, if auto-negotiation is off, ensure that the Fast Ethernet port on each end of the Fast Ethernet link is configured to the same communication mode. That is, if one Fast Ethernet port is set for full duplex operation, the other should also be set for full duplex operation.

FDDI Cabling Guidelines

Figure 9 shows how to connect the DAS fiber-optic model of the bridge to a dual-ring FDDI network. If desired, an optical bypass switch can also be connected, as shown.

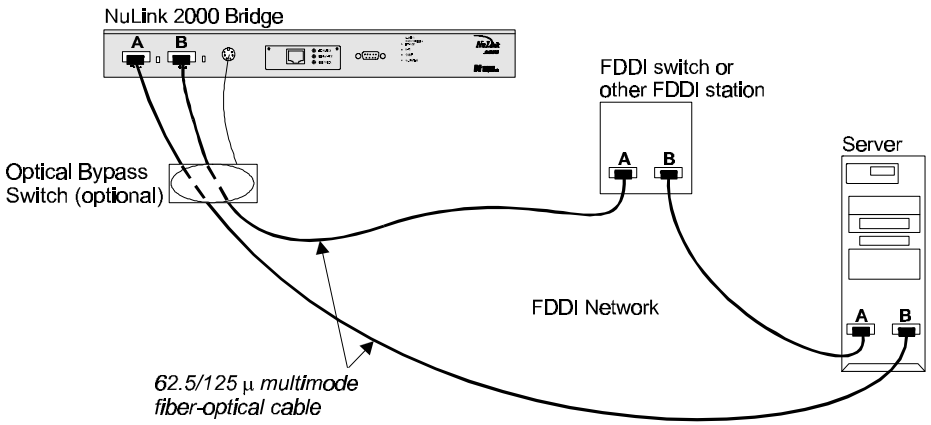


Figure 9. DAS Connection

The SAS fiber-optic model (Figure 10) is connected to a single-ring FDDI network.

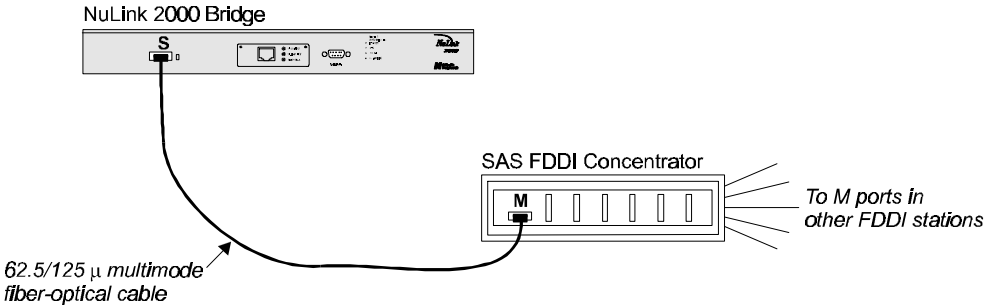


Figure 10. SAS Fiber-Optic Connection

Figure 11 shows how to connect the SAS copper model to an FDDI network through an FDDI concentrator with TP-PMD copper ports.

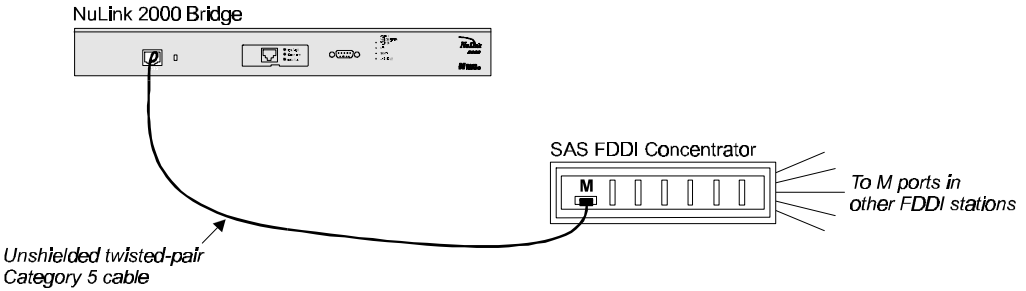


Figure 11. SAS Copper Connection

FDDI rules have established certain FDDI port-function connections as valid and certain connections as undesirable. These connections are shown in the following rules matrix.

Table 4. Rules Matrix for FDDI Port Functions

		Other Port:			
		A	**B**	**S**	**M**
Port in bridge:	**A**	Undesirable	Valid	Undesirable	Valid
	B	Valid	Undesirable	Undesirable	Valid
	S	Undesirable	Undesirable	Valid	Valid

FDDI port functions are as follows:

- **A** The port of the DAS connects to the incoming primary ring and the outgoing secondary ring of the FDDI dual ring.
- **B** This port of the DAS connects to the outgoing primary ring and the incoming secondary ring of the FDDI dual ring.
- **S** The SAS connects to a concentrator.

Fast Ethernet Cabling Guidelines

When you want to use the bridge's 10Base-T/100Base-TX port or the optional 100Base-FX port to connect the Fast Ethernet side of the network, connect it as shown in Figure 12.

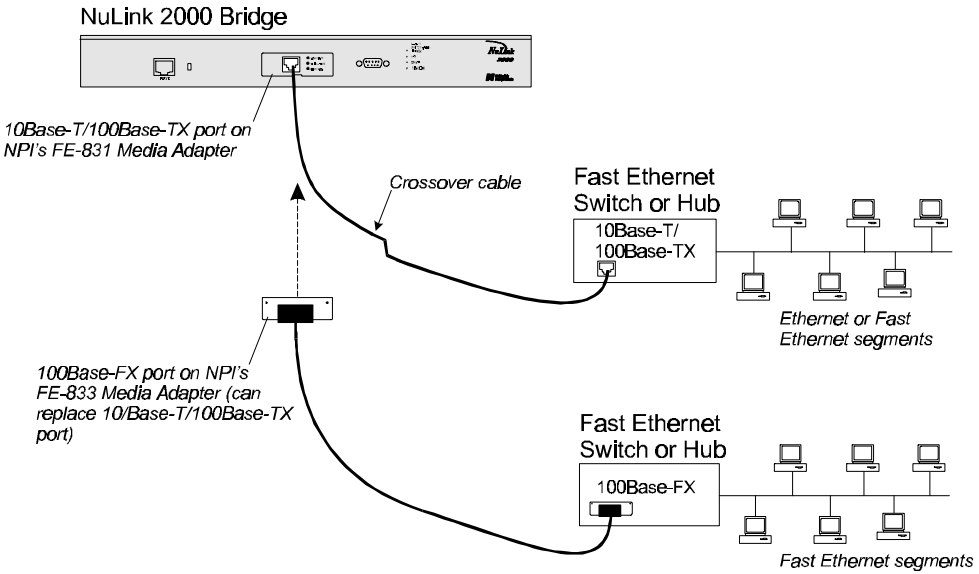


Figure 12. Fast Ethernet Connections

Connecting Fiber Optic Cables

When handling fiber optic cable connectors, observe these precautions:

- Do not touch the tip of the steel ferrule through which the optical fiber passes. Touching the tip could mar its delicate surface and destroy its ability to transmit light.
- Whenever the cable is not connected, keep the protective cap on the connector.
- Fiber optic cable has a limited turn radius. Do not bend it in a turn radius tighter than one inch or in a way that could damage the fiber or cause signal loss.

To connect a fiber optic cable:

1. Unpack the cable and remove the plastic protective caps or plugs from each end.
2. Remove the connector plug from the bridge.
3. Make sure the fiber-optic cable is properly oriented with its connector on the bridge. Most fiber-optic cables have raised keys on one side of the connectors. There are also keyway notches on the inside of the connector on the card; you should orient the cable so that the keys on the cable connectors line up with the keyway notches on the card (Figure 13).
4. Plug the cable into the connector on the bridge. You should hear a distinctive “click”, telling you that the cable is properly mated with the card connector.

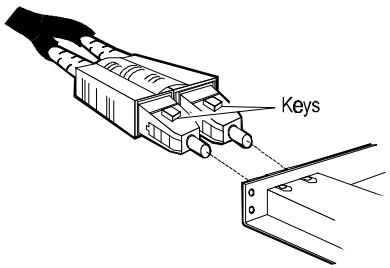


Figure 13. Aligning SC Type Fiber-Optic Cable Connectors

Connecting an Optical Bypass Switch

If you want to use an optical bypass switch in your network with the bridge, you should choose one that conforms to FDDI industry standards, such as AMP’s optical bypass module #99507-6.

For the bridge to correctly detect the optical bypass switch, you must connect the optical bypass switch to the bridge before turning on the switch.

To connect an optical bypass switch:

1. Make sure the pins on the switch cable connector are aligned with the holes in the connector on the bridge.
2. Plug the switch cable into the Optical Bypass connector on the bridge.

Connecting to a Redundant Power Supply

A redundant power supply (RPS), model RPS-600, provides backup power for the bridge. Its connector is on the rear panel of the bridge.

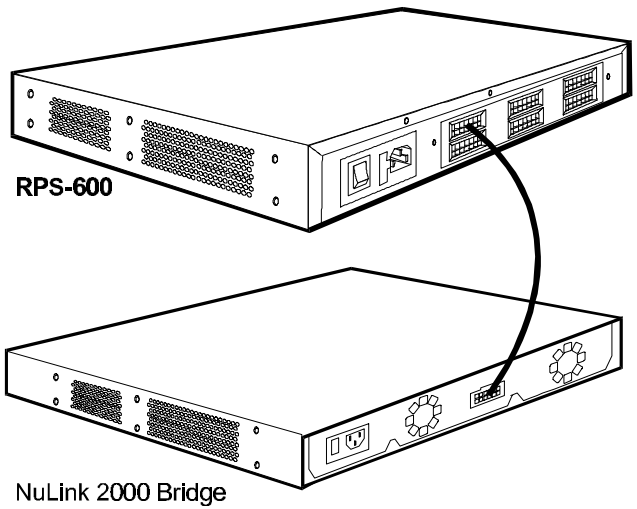


Figure 14. Redundant Power Connections

The DC power consumption of the bridge is 7A@5.3VDC. Before connecting bridges to the RPS-600, you need to calculate the overall DC power consumption carefully.

3

Console Program Essentials

This chapter describes most of the bridge's console program options and how to configure the bridge using them. Specifically, it describes the following tasks:

- Configuring the system, including password changing
- Configuring the ports
- Checking connections
- Updating system software
- IP fragmentation management
- Address aging
- Viewing statistics
- Resetting the system

When installing the bridge for the first time, you must configure the system as described in this chapter.

Accessing the Main Menu

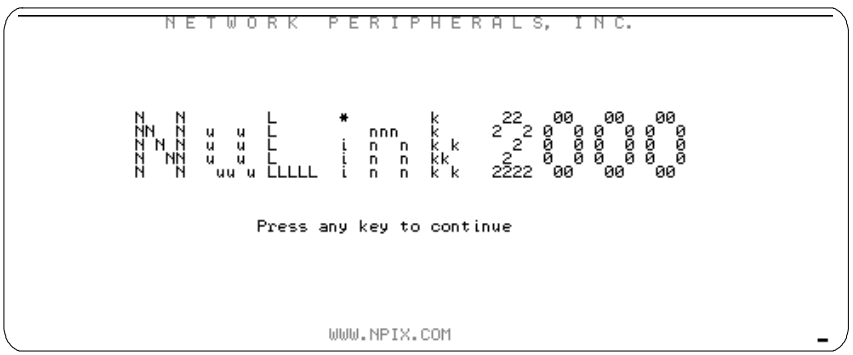
The menu-driven interface built into the bridge is called the console program. The console program—which runs in text mode—is accessed through a serial connection between a management console and the console

port of the bridge. The management console used for the connection can be a VT100 terminal or a PC running VT100 terminal emulation software.

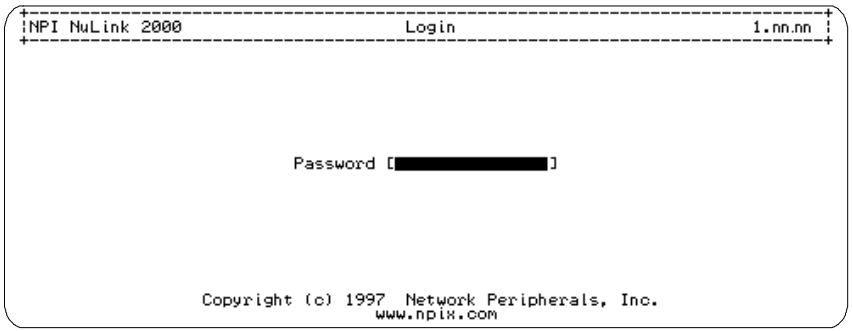
Alternatively, the console program can be accessed through a remote connection via Telnet. In this setup, a modem is connected to the console (serial) port by an RS-232 cable. See Chapter 5 and Appendix A for connection details.

To access the console program:

1. Connect a terminal (or a PC with terminal emulation software) to the console port using a null modem adapter and a serial cable.
2. Set your terminal to the following settings:
   - Baud—9600
   - Parity—None
   - Data Bits—8
   - Stop Bit—1
3. If your settings are correct, the title screen automatically displays at the end of the boot sequence.



4. When you press a key to continue, the Login screen appears.



5. If you are accessing the console program for the first time or if you have not established a password, just press any key to go to the Main menu. (The default is no password.)
6. If you have already established a password, enter it (see *Changing a Password* later in this chapter).

Console Program Command Overview

Once you gain access to the built-in console program as just described, the Main menu appears.

You can view a brief description of each option in this menu at the bottom of the screen. To view each option's description, press the Tab key.

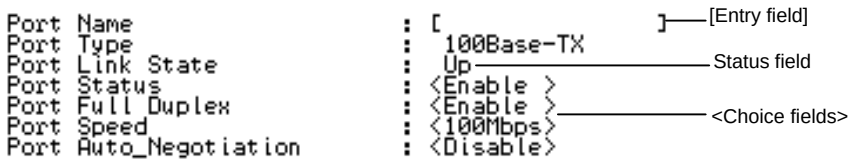
NOTE: Whenever you change the configuration, always allow a few seconds for the bridge to process the change. Do not turn off the bridge immediately after making changes; otherwise, you might lose the new settings.

Navigating the Console Program Screens

To do this…	Use this key…
Highlight an option.	↑ or ↓
Select a highlighted option.	Enter
Toggle between options in a choice field.	Spacebar
Move to the next entry field or command.	Tab
Move one line up to the previous field.	↑
Move one line down to the next field.	↓
Move to the next entry field; move to the next position in a field; move to the opposite column in a menu.	→
Go to the previous entry field; go to the previous position in a field; move to the opposite column in a menu.	←
Leave the current screen and return to the title screen (discards any changes in the current screen)	Ctrl N

Field Types

A typical console program screen contains several types of fields, as shown in the following figure.



Time-Out

After 5 minutes of inactivity during a console program session, the bridge leaves the current screen and returns to the title screen. Any changes in the current screen are discarded.

Confirmation Prompt

After you make changes in a data entry screen and choose **Exit**, the following prompt displays:

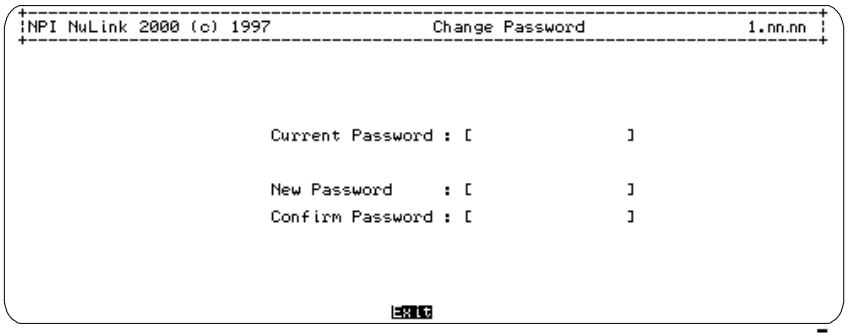
```
Items have been changed.  Save configuration?(y/n)
```

Choose **y** (yes) to save the changes and make the new settings take effect, or **n** (no) to discard them.

Changing a Password

Access rights to the console program can be controlled by requiring a password for logging in. If you want to establish a password or change an existing password:

1. From the Main menu, select **Configuration**.
2. Select **Change Password** from the Configuration menu. The Change Password screen appears.



Parameters in this screen are described in the following paragraphs.

Current Password: If you change a password, you need to enter the current password in this field before typing in a new password.

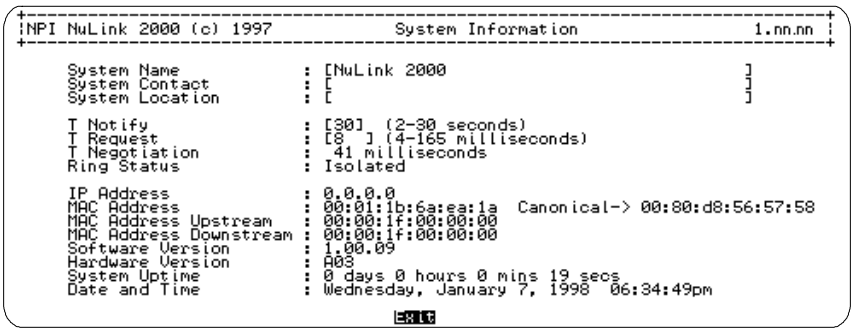
New Password: When the bridge is installed for the first time, enter the password in this field. A password can be up to 15 alphanumeric characters with no spaces between them. It is case sensitive.

Confirm Password: Confirm the new password by retyping it. After making these entries, select **EXIT**.

NOTE: Remember your password! If you forget it, the only way to regain access to the console program is to contact NPI Technical Support.

Entering and Viewing System Information

When the bridge is installed for the first time, it uses the default values set at the factory, and you can change these values depending on your particular environment. With the Main menu displayed, select **System Information**. The system Information screen appears.



Parameters in this screen are described in the following paragraphs.

: Enter a unique name for this bridge, up to
alphanumeric characters.
should use a descriptive name to help identify the purpose of the bridge in relation to your network. For example, “Backbone bridge Bldg. 1” or

System Contact: Enter a brief description of where the bridge is located,
128 alphanumeric characters Like the name, the location is descriptive and used for reference purposes. For example, “SuperAjang.”

: Enter a brief description of where the bridge is located,
128 alphanumeric characters Like the name, the location is descriptive and used for reference purposes. For example, “13th Floor.”

(Notify Timer) Enter the interval after which this bridge transmits a Neighbor Information Frame (NIF) to its upstream neighbor in

to transmit an NIF request at a specified interval. This verifies that the device is connected to the ring and is useful in duplicate address detection

T Request: Enter the number of milliseconds that becomes this bridge’s

initialized, a TTRT is established through bidding that occurs in the claim process. In this process, each station puts in its T Request as a bid, and the

as the TTRT.

T Negotiation: This view-only field shows the winning station's T Request determined through negotiation during the claim process just described for T Request. This applies to all stations on the ring.

Ring Status: This view-only field shows the FDDI ring's condition. **Isolated** means that Ring Management (RMT) is in effect and no error conditions have been detected. **Non Operational** (Non_Op) means there is an error condition. If external FDDI connections are present, the FDDI ring is encountering problems. These problems are usually fixed automatically by FDDI Recovery. If no external FDDI connections are present, then a hardware failure has occurred and you should contact NPI Technical Support. **Operational** (Ring_Op) means the ring is up, with active external connections. **Detect** means an FDDI trace is propagated. If the trace does not successfully complete, the bridge remains in Detect state. If the bridge is isolated from the ring and remains in Detect state, contact NPI Technical Support. **Non Operational Duplicate** (Non_Op_Dup) means the address of the MAC under control is a duplicate of the address of another MAC on the ring; the ring is not operational. **Operational Duplicate** (Ring_Op_Dup) means the address of the MAC under control is a duplicate of the address of another MAC on the ring; the ring is still operational. **Directed** means the MAC under control is instructed to send Beacon frames notifying the ring of the stuck condition. **Trace** means a trace has been initiated.

IP Address: This view-only field shows the unique IP address of this bridge. An IP address has the format n.n.n.n where n is an integer between 0 and 255. An example IP address is 199.182.70.253. The bridge comes with a default address of 0.0.0.0.

MAC Address: This view-only field shows the unique and permanent MAC address assigned to the bridge. (Each bridge's MAC address is on a label affixed to the rear panel of the bridge.) You cannot change the MAC address of your bridge.

MAC Address Upstream: This view-only field shows the MAC address of the next station upstream from the bridge. Knowing this address can be helpful in fault location.

This view-only field shows the MAC address of the next station downstream from the bridge. Knowing this

Software version: This view-only field shows the version of the currently-

is helpful when troubleshooting or upgrading new software.

Hardware Version This view-only field shows the hardware version of the bridge. This information is helpful when troubleshooting or upgrading

System Uptime: This view-only field shows how long the bridge has been

Date and Time: This view-only field shows the current date and time

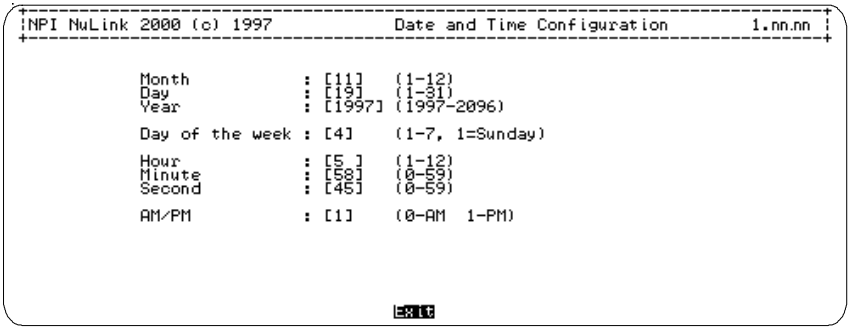
To have any changes entered take effect, and to leave this screen, select **EXIT**

Setting the Date and Time

You can set the bridge's real-time clock and calendar through the

calendar, or both:

1. From the Main menu, select **Configuration**
2. **Date and Time** from the Configuration menu. The Date and

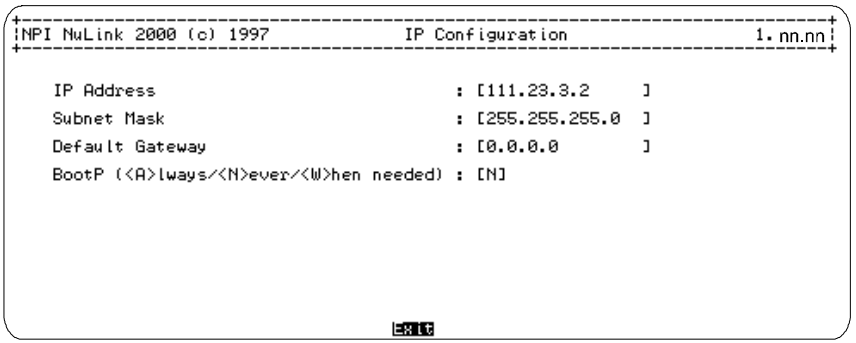


3. Enter the correct settings as indicated on the screen. Make sure you enter 0 or 1 for a.m. or p.m. respectively.
4. To make the settings take effect, select **EXIT**.

Configuring IP

The bridge can accommodate IP on the Fast Ethernet side of a network, if the IP address, a subnet mask, and a default gateway are configured. When necessary, BootP must also be configured. To configure any of these IP parameters:

1. From the Main menu, select **Configuration**.
2. Select **IP Configuration** from the Configuration menu. The IP Configuration screen appears.



Parameters in this screen are described in the following paragraphs.

IP Address: Enter the unique IP address of this bridge. An IP address has the format n.n.n.n where n is an integer between 0 and 255. An example IP address is 199.182.70.253. The bridge comes with a default address of 0.0.0.0, where the last two integers are the decimal equivalent of the last two hexadecimal bytes assigned in the bridge's permanent MAC address. You can use this value as the bridge IP address or specify a new one if there is an address duplication or the address does not match your network ID.

Subnet Mask: Specify the subnet mask to use with the bridge's IP address. The default subnet mask value is 255.255.255.0.

Default Gateway: Specify an IP address for a gateway or router. An entry in this field tells the bridge which device is responsible for the delivery of all IP packets sent by the bridge. This address is required if the bridge and the network management station are on different networks or subnets. The default value of this parameter is 0.0.0.0, which means no gateway exists and the network management station is on the same network.

BootP: Use this parameter to configure the BootP function of the bridge. If you have a BootP server on your network you can configure one of the actions shown. In addition to mapping an IP address, BootP can assign the subnet mask and default gateway. Using a BootP server avoids the trouble of having to configure devices individually.

A (Always) means an IP address will be automatically mapped to the bridge each time it is turned on.

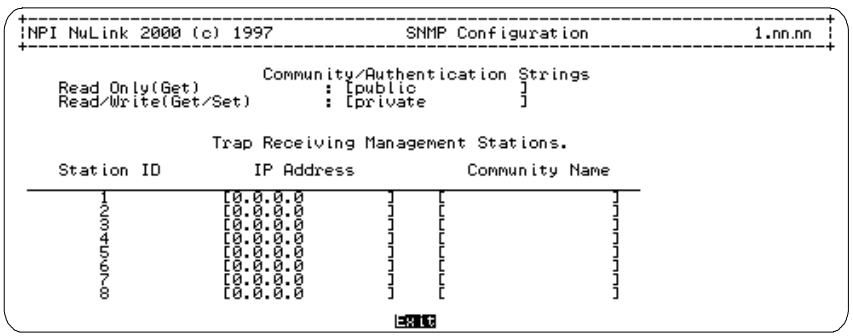
N (Never) means the BootP server never requests an IP address.

W (When) means the BootP server obtains the bridge IP address when you turn on the bridge and the default IP address has been set to 0.0.0.0.

Configuring SNMP

bridge management uses SNMP to collect basic information and network statistics. The bridge supports SNMP which enables it to be managed by a management station (the management console connected to the bridge's console port). To configure SNMP:

3. From the Main menu, select **Configuration**.
4. Select **SNMP Configuration** from the Configuration menu. The SNMP Configuration screen appears.



Parameters in this screen are described in the following paragraphs.

You can set an access right (read-only or read/write) for each community name associated with traps. Before data can be retrieved from the bridge,

the system must at least supply one of the community names that you specify.

Community Authentication Strings: You can set access rights for any stations in the ring associated with a community name. If you want SNMP to "view" but not update management information held by stations in a certain community, enter that community name in the **Read Only** field. If you want SNMP to "view" and update information held by stations in a certain community, enter that community name in the **Read/Write** field.

Station ID: this view-only column is for information purposes only, to show the maximum number of stations that can receive traps.

IP Address: You can assign selected stations to receive traps from the bridge. Enter the IP address of the network management station that will receive traps from the bridge.

Community Name: Use this field to assign a station on the ring to receive traps. Enter the community name, up to 15 alphanumeric characters, that matches this station with the sending station.

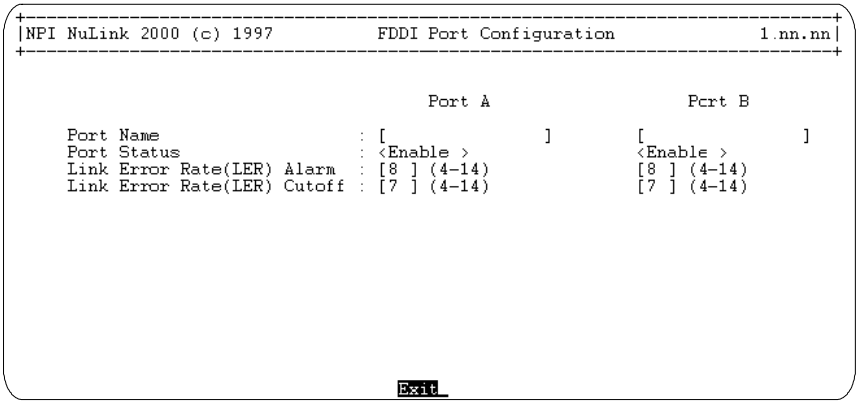
Configuring FDDI Ports

This section describes how to configure the two ports on the DAS type, the port on the fiber-optic SAS type, and the port on the UTP SAS type.

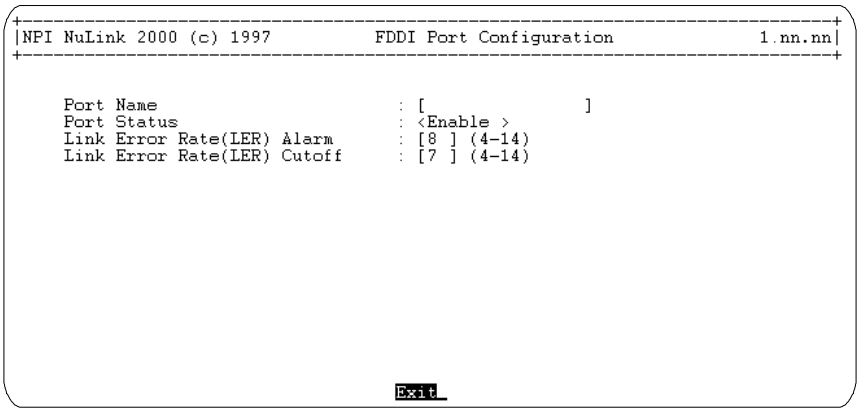
Before configuring a port, check the factory defaults listed in Chapter 1 to determine whether it is necessary to change them. To configure an FDDI port:

1. From the Main menu, select **Configuration**.
2. Select **FDDI Port Configuration** from the Configuration menu. The FDDI Port Configuration screen appears.

Sample screen for DAS model—



Sample screen for SAS (fiber or UTP) model—



Parameters in this screen are described in the following paragraphs.

Port Name: Enter a unique name for the selected port, up to 15 alphanumeric characters. This name is used for reference purposes.

Port Status: Use this field to enable or disable the FDDI port. A disabled port does not transmit any packets to the connected segment, nor forward any received packets to the backplane. Press the space bar to toggle between **Enable** and **Disable**.

Link Error Rate (LER) Alarm: Enter the LER desired for the FDDI port. The value reported for the current LER, the alarm, and cutoff thresholds is the exponent of the bit error rate. Therefore, 14 is a very low (good) error rate and 4 is a very high (bad) error rate. The FDDI port implements a link error detection feature that allows the bridge to issue an alarm (set at the alarm threshold) and then cut off the link at the cut-off threshold, specified in the next parameter. The default threshold for alarms is 10^{-8} and the default cutoff is 10^{-7} bit error rate. Some errors will occur from normal connection/ disconnection of the link but the LER should typically be better than 10^{-12} BER.

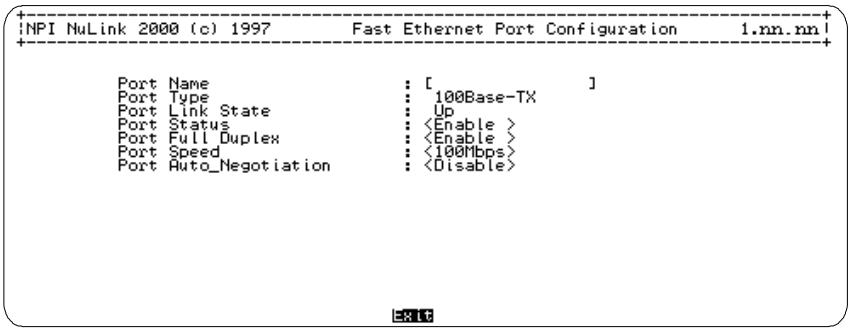
Link Error Rate (LER) Cutoff: Enter the threshold at which the bridge should cut off the link. The default threshold for alarms is 10^{-8} and the default cutoff is 10^{-7} bit error rate. The value reported for the current LER, the alarm, and cut-off thresholds is the exponent of the bit error rate.

Configuring the Fast Ethernet Port

This section describes how to configure the 10Base-T/100Base-TX port or the 100Base-FX port for the Fast Ethernet interface part of the bridge. All models of the bridge are shipped with the 10Base-T/100Base-TX port installed but this port can be replaced with the 100Base-FX port on NPI's FE-833 Media Adapter.

To configure either of these ports:

1. From the Main menu, select **Configuration**.
2. Select **FE Port Configuration** from the Configuration menu. The **FE** Port Configuration screen appears.



Parameters in this screen are described in the following paragraphs.

Port Name: Enter a unique name for the selected port, up to 15 alphanumeric characters. This name is used for reference purposes.

Port Type: This view-only field shows the type of port currently selected, either 100Base-TX or 100Base-FX.

Port Link State: This view-only field shows the current status of the link, Down or Up, between the selected port and the connected node.

Port Full Duplex: This field is a choice field when auto-negotiation is disabled, and a view-only field when auto-negotiation is enabled. When auto-negotiation is disabled, use this field to enable or disable full duplex mode for the port. Full duplex transmissions effectively double your bandwidth by carrying out transmission and receipt of packets at the same time. To make full duplex mode work properly, both ends of the link should be configured to full duplex mode

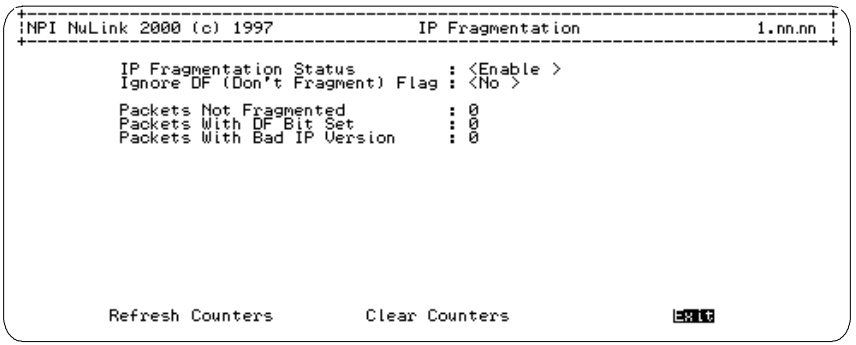
Port Speed: Use this field to specify the speed of the Fast Ethernet port in the bridge. Port speed can be either 100Mbps or 10Mbps depending on auto-negotiation.

Port Auto-Negotiation: Use this field to enable or disable auto-negotiation. Auto-negotiation decides the port speed and duplex mode of the port on link-up.

Managing IP Fragmentation

IP fragmentation translates between FDDI and Ethernet packet sizes for all IP client-server traffic. IP fragmentation supports FDDI traffic at the largest transmission size possible, optimizing performance and peer-to-peer FDDI networking in a UNIX environment. Fragmenting and reassembling the packets introduces considerable overhead that affects performance. It also increases the risk of dropped packets. You can manage fragmentation so that these situations are avoided or minimized. To do this:

1. From the Main menu, select **Configuration**.
2. Select **IP Fragmentation Management** from the Configuration menu. The **IP Fragmentation** screen appears.



Parameters in this screen are described in the following paragraphs.

IP Fragmentation Status: You can enable or disable IP fragmentation by toggling in this field with the space bar. If enabled, the bridge fragments IP packets longer than 1518 bytes and transmits the fragments to the Fast Ethernet side. If disabled, the bridge drops any packets longer than 1518 bytes.

Ignore DF (Don't Fragment) Flag: Press the space bar to toggle between Yes (ignore the flag) and No (act according to the flag). If you choose **Yes** and IP fragmentation status is enabled, all packets longer than 1518 bytes will be fragmented and transmitted.

If you choose **No**, the Don't Fragment flag in the packet's header determines whether the packet is fragmented. That is, if the Don't Fragment flag is not in the header, the packet is fragmented. If you choose No and the Don't Fragment flag is in the header, packets longer than 1518 bytes will be dropped.

Packets Not Fragmented: This view-only field is a counter that lets you monitor the number of IP packets longer than 1518 bytes not fragmented at the FDDI port.

Packets With DF Bit Set: For cases in which the Ignore Don't Fragment Flag is not set, this view-only field is a counter that shows the number of packets that are dropped because the packet's source has specified no fragmentation.

Packets With Bad IP Version: This view-only field is a counter that shows the number of IP packets greater than 1518 bytes that have not been fragmented because they are not IP version 4.

To view the latest contents of these three counters, select **Refresh Counters.**

To reset these three counters to zero, select **Clear Counters**.

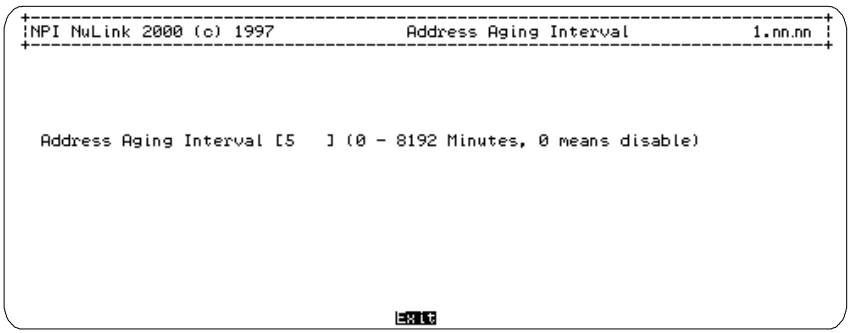
Setting the Address Aging Interval

The bridge implements an aging algorithm that removes a station's address from the Address Table if that station has not transmitted a packet within a programmable aging interval. In typical implementations, stations will generate periodic keep-alive messages to the server which prevents their address from aging out of the table.

If a station has not transmitted a packet within a specified aging time (aging interval), which you can set, the bridge removes the station's address from the Address Table.

To set the address aging interval:

1. From the Main menu, select **Configuration**.
2. Select **Address Aging Interval** from the Configuration menu. The Address Aging Interval screen appears.



Address Aging Interval: Enter the number of minutes that constitute the interval. The default is 5 minutes, and 0 means no aging.

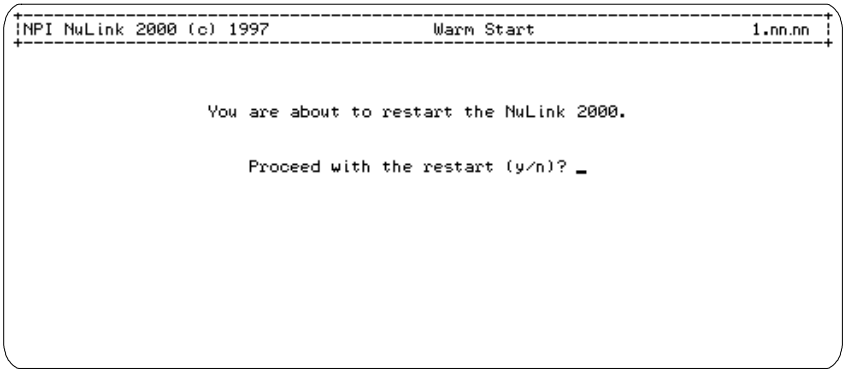
Restarting and Resetting

There are two types of system resetting: warm start and factory reset. A warm start resets the bridge and keeps the current settings. A factory reset starts the bridge again and returns the configuration to the factory default settings.

Warm Start

After you have entered all desired configuration changes, you must reset the bridge to make the changes take effect. To do this:

1. From the Main menu, select **Utilities**.
2. Select **Warm Start** from the Utilities menu. The Warm Start screen appears.



To continue with a warm start, enter **y** (yes). The warm start data screen appears, then when the warm start is completed, the NuLink 2000 title screen appears.

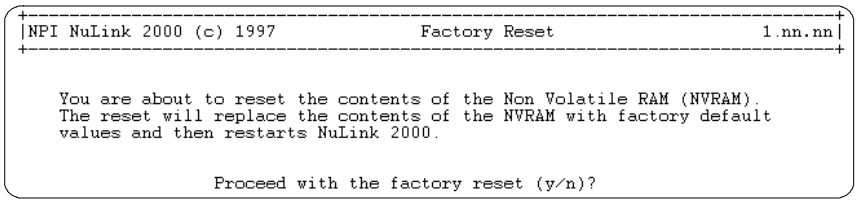
To leave this screen and leave the current configuration intact, select **n (no)**. The Main menu returns.

Factory Reset

A factory reset starts the bridge again and returns it to factory settings (system defaults). This reset also returns the IP address to the factory default.

To perform a factory reset:

1. From the Main menu, select **Configuration**.
2. Select **Factory Reset** from the Configuration menu. The Facotry Reset screen appears.



To continue with a factory reset, select **y** (yes). The factory settings are now in effect.

To leave this screen and leave the current configuration intact, select **n (no)**. The Main menu returns.

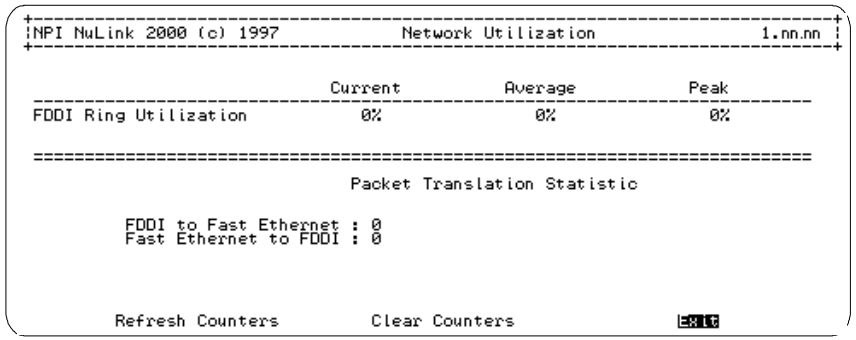
4
Viewing Statistics

You can view statistics about FDDI network utilization and statistics about the FDDI and Fast Ethernet ports. Information presented in these screens helps you determine the overall network demands on the FDDI ring, the load on the FDDI ring generated by the bridge, and the load on the Ethernet segment. The values reported in these screens represent the accumulated count since the bridge was turned on or reset.

Network Utilization

In the context of network utilization, think of an FDDI network as having the potential to carry more information rather than as being a faster connection. If the applications running over the network do not use the available bandwidth efficiently, you will not see much improvement in the performance of your network by using FDDI. You can judge the degree of network utilization by viewing FDDI ring utilization and packet translation counters. To do this:

1. From the Main menu, select **Statistics**.
2. Select **FDDI Network Utilization** from the Statistics menu. The Network Utilization screen appears.



Parameters in this screen are described in the following paragraphs.

FDDI Ring Utilization: This counter shows the load being carried by the entire ring as a percentage of ring capacity. **Current** shows the percentage of capacity being used presently; **Average** shows the percentage of capacity used from the last startup to the present; and **Peak** shows the percentage of capacity used at the time of highest volume from the last startup to the present.

Packet Translation Statistic: To bridge between two heterogeneous networks, packets received from the FDDI network and destined for Fast Ethernet need to be translated. Likewise, packets received from Fast Ethernet and destined for FDDI need to be translated to look like FDDI packets. These rules apply only to data frames. Management frames are not forwarded, and need no translation. **FDDI to Fast Ethernet** shows the number of packets from FDDI to Fast Ethernet; **Fast Ethernet to FDDI** shows the number of packets transmitted from Fast Ethernet to FDDI.

To view the latest contents of these counters, select **Refresh Counters.**

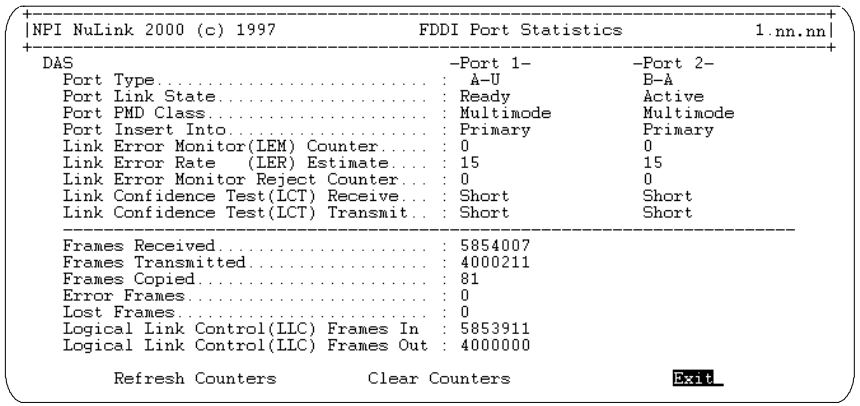
To reset these counters to zero, select **Clear Counters**.

FDDI Port Statistics

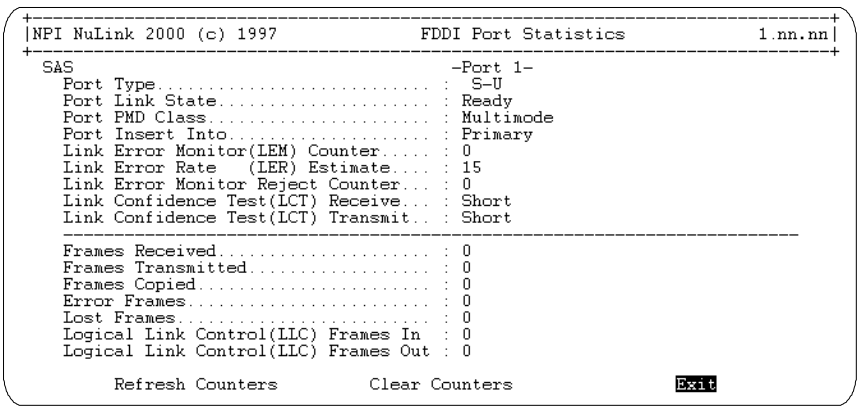
To view various statistics about the FDDI ports on the bridge:

1. From the Main menu, select **Statistics**.
2. Select **FDDI Port Statistics** from the Statistics menu. The FDDI Port Statistics screen appears.

   Sample screen for DAS model—



   Sample screen for SAS model—



Items in this screen are described in the following paragraphs.

DAS, SAS, etc.: The bridge automatically labels this screen to identify which of the three models of bridge is installed in the bridge and being reported.

Port Type: Displays the port function type in the bridge (on the left of the dash) and the port function type to which it is connected (on the right of the dash). Port function types are as follows:

- **A** The port of the DAS connects to the incoming primary ring and the outgoing secondary ring of the FDDI dual ring.
- **B** This port of the DAS connects to the outgoing primary ring and the incoming secondary ring of the FDDI dual ring.
- **S** The SAS connects to a concentrator.

Port Link State: Displays one of the following states:

Disabled:	Port is disabled, and the status is durable.
Inactive:	Port is disabled, but the status is not durable.
Ready:	Port is enabled, ready to accept a link.
Active:	Port is enabled, and the connection is established.

Port PMD Class: Identifies the physical cabling medium in use. Multimode is multimode fiber; UTP is unshielded twisted pair.

Port Insert Into: Identifies which of the FDDI dual rings, primary or secondary, that this port is inserted into.

Link Error Monitor (LEM) Counter: This counter indicates the quality of the FDDI connection. It counts link errors seen by this receiver.

Link Error Rate (LER) Estimate: This counter is a Bit Error Rate (BER) indicator. The count range is 0-15 representing BER 10^{-0} (or 1) to BER 10^{-15}. A normal LER is 12-15. If this estimate is higher than 15, check the cabling on the port. A link will automatically be removed from the ring if the LER reaches a cutoff value of 10^{-x}, where x is specified by you.

Link Error Monitor Reject Counter: This counter reports the number of link errors detected by the bridge.

Link Confidence Test (LCT) Receive: This field indicates the Received status of the LCT. Values are Short, Medium, Long, and Extended. Short and Medium indicate acceptable error levels. Long is acceptable but indicates a high error rate. Extended indicates that the connection is being withheld in accordance with the connection policy.

Link Confidence Test (LCT) Transmit: This field indicates the Transmitted status of the LCT. Values are Short, Medium, Long, and Extended. Short and Medium indicate acceptable error levels. Long is acceptable but indicates a high error rate. Extended indicates that the connection is being withheld in accordance with the connection policy.

Frames Received: This counter shows the number of good frames seen by the bridge, including frames not copied by the bridge.

Frames Transmitted: This counter shows the number of FDDI packets transmitted by the MAC, including all Ethernet to FDDI traffic, SMT, and LLC management packets.

Frames Copied: This counter shows the number of directed and non-unicast frames addressed to bit set A and successfully copied into the bridge's receive buffers (bit set C) by this MAC. This count does not include MAC frames.

Error Frames: This counter shows the number of error frames detected by this bridge and not by any previous station.

Lost Frames: This counter shows the number of instances that this MAC detected a format error during frame reception such that the frame was stripped.

Logical Link Control (LLC) Frames In: This counter shows the number of LLC frames received through the FDDI port.

Logical Link Control (LLC) Frames Out: This counter shows the number of Logical Link Control frames sent through the FDDI port.

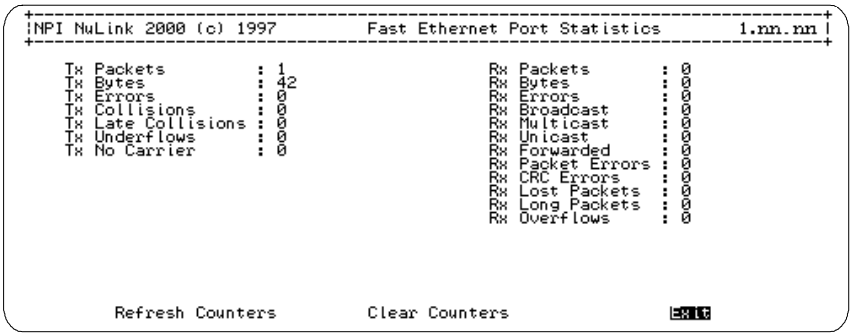
To view the latest contents of these counters, select **Refresh Counters.**

To reset most counters to zero, select **Clear Counters**. These three counters cannot be reset: Frames Copied, Error Frames, Lost Frames.

Fast Ethernet Port Statistics

To view various statistics about the Fast Ethernet port on the bridge:

3. From the Main menu, select **Statistics**.
4. Select **FE Port Statistics** from the Statistics menu. The Fast Ethernet Port Statistics screen appears.



Items in this screen are described in the following paragraphs.

Tx Packets: The number of all packets transmitted by the port.

Tx Bytes: The sum of all bytes transmitted by the port.

Tx Errors: The number of transmit errors. This number is the sum of Tx Late Collisions, Tx Underflows, and Tx No Carrier counts.

Tx Collisions: The number of frames that were transmitted after at least one collision.

Tx Late Collisions: The number of collision conditions that occurred one slot time after the transmit process was initiated.

Tx Underflows: The number of times that the transmitter has truncated a message because it could not read data from memory fast enough.

Tx No Carrier: The number of times a frame was transmitted while the network interface is in the Link Fail state.

Rx Packets: The number of all packets received by the port.

Rx Bytes: The sum of all bytes transmitted by the port.

Rx Errors: The number of receive errors seen by the port. See also *Tx Errors* described earlier.

Rx Broadcast: The number of frames received by the port that are addressed to all MAC addresses on the network.

Rx Multicast: The number of frames received by the port that is addressed to a group of MAC addresses (that is, several devices) on the network.

Rx Unicast: (Same as Directed) The number of frames received by the port that are addressed to a single MAC address.

Rx Forwarded: The number of frames received by the Fast Ethernet port that were given to the FDDI port for transmission.

Rx Packet Errors: The number of incoming frames that contained a non-integer multiple of eight bits.

Rx CRC Errors: The number of frames with cyclic redundancy check (CRC) errors that are received on the selected port.

Rx Lost Packets: The number of lost packets received on the port. Lost frames result from the lack of internal receive buffer space.

Rx Long Packets: The number of packets received that exceeded the maximum packet size (1518 bytes).

Rx Overflows: The number of times the Fast Ethernet port has lost all or part of the incoming frame, because of an inability to move data from the receive FIFO into a memory buffer before the internal FIFO overflowed.

To view the latest contents of these counters, select **Refresh Counters.**

To reset these counters to zero, select **Clear Counters**.

5
Using Telnet

This chapter describes how to use a Telnet device for managing the bridge. Once a Telnet connection with the bridge is established over the network, you can manage the bridge at a Telnet device, using the same console program described in this User's Guide.

Initial Set-Up

Once a Telnet connection with the bridge is established over the network, you can manage the bridge at a Telnet device, using the same console program described in Chapter 3.

Before you can establish a Telnet connection between the bridge and a Telnet device, you must set the following IP parameters at the bridge's console that is connected directly to the bridge:

- The IP address of the bridge
- The default gateway IP address, if required

To set these parameters, see *Configuring IP* in Chapter 3.

Making a Telnet Connection

After the initial IP parameter set-up just described:

1. Make the Telnet connection at the Telnet device.

2. If you have established a password at the bridge's console, an access verification screen may display asking you to enter a password.
3. Enter the **password** if requested.
4. After you make the Telnet connection, and enter the password if requested, the NuLink 2000 title screen appears.
5. When the NuLink 2000 title screen appears, you can now use the console program as described in Chapters 3 and 4 and Appendixes B and C.

If the Telnet connection is broken during a session, you can make a new connection by repeating all required steps.

Limitations

When using Telnet, keep the following in mind:

- Only one active Telnet session at a time can access the bridge. (An active session is one that has progressed past the access verification screen.)
- A Telnet session and a console program session cannot be active concurrently.
- If a connection is attempted while another session is active, the access verification screen displays a message about only one connection allowed.
- After 5 minutes of inactivity, a Telnet connection is automatically broken.

A
Cable Pin-Outs

This appendix gives pin-out, pin assignment, and connection information for network cable and RS-232 serial cable required for the bridge.

Network Cable

Straight-Through Cable

Pin		Pin
1	⟷	1
2	⟷	2
3	⟷	3
6	⟷	6

Crossover Cable

Pin		Pin
1	⟷	3
2	⟷	6
3	⟷	1
6	⟷	2

Cable Selection

Connection Type	Cable Type
Bridge-to-bridge	Crossover
End-station-to-bridge	Straight through
Hub-to-bridge	Crossover

RS-232 Cable

The bridge provides one RS-232 console port for out-of-band management.

Pin	Description
1	DCD (Data Carrier Detect)
2	RX (Receive)
3	TX (Transmit)
4	N/A
5	GND (Ground)
6	N/A
7	RTS (Request To Send)
8	CTS (Clear To Send)
9	N/A

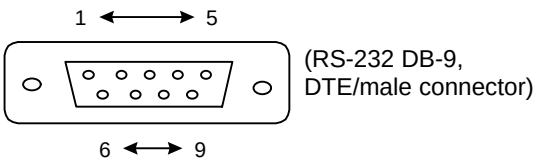


Figure 15. Pin-Out and Pin-Assignment of Console Port

When connecting a terminal directly to the bridge, use either a null modem cable or a null modem adapter on a serial (straight through) cable.

When connecting a terminal remotely to the bridge, use just a serial (straight through) cable; no null modem adapter is necessary.

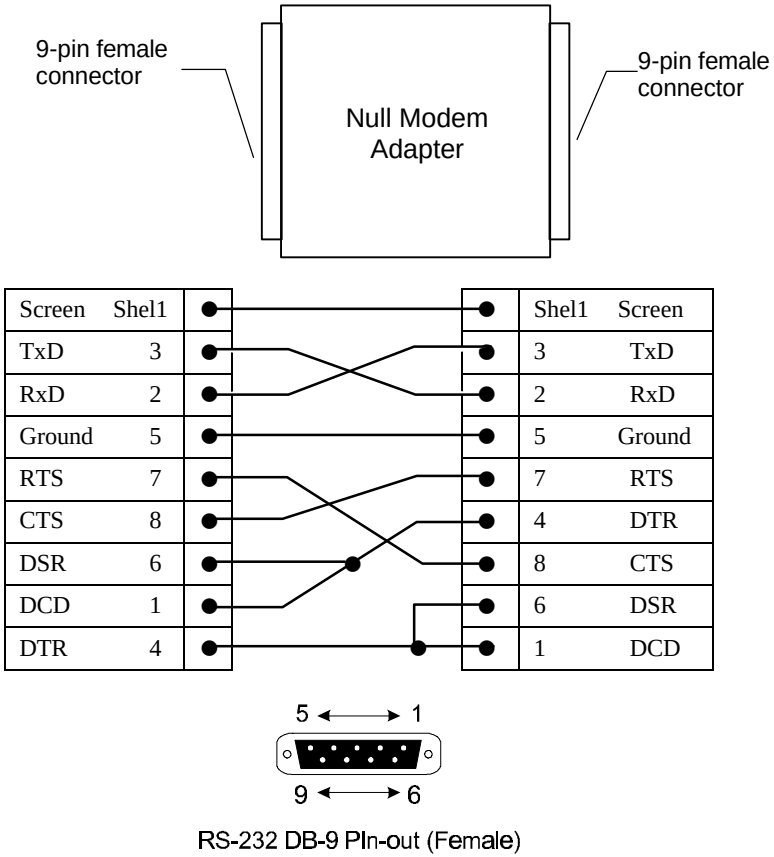


Figure 16. Pin-Out and Pin-Assignment of Null Modem Adapter

The bridge's console connector is wired as for a DTE, and is ready to be connected to a modem (DCE) directly.

The RS-232 serial cable is a straight-through cable which is used to connect a remote out-of-band SNMP management station to the bridge (Figure 17).

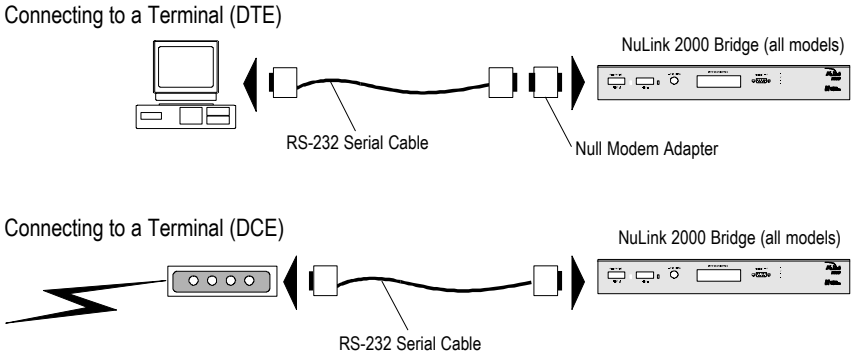


Figure 17. Out-of-Band Connections

B
Updating Software

You can update bridge software by any of these methods:

- Obtaining the new software from the World Wide Web then install it as described under *Installing*
- Obtaining the new the software from the FTP server then install it as described under *Installing*
- Obtaining the new software from the diskette, if one is supplied by NPI, using the procedure described under *Installing*.

You must have a station that is running a TFTP server and connected to the bridge.

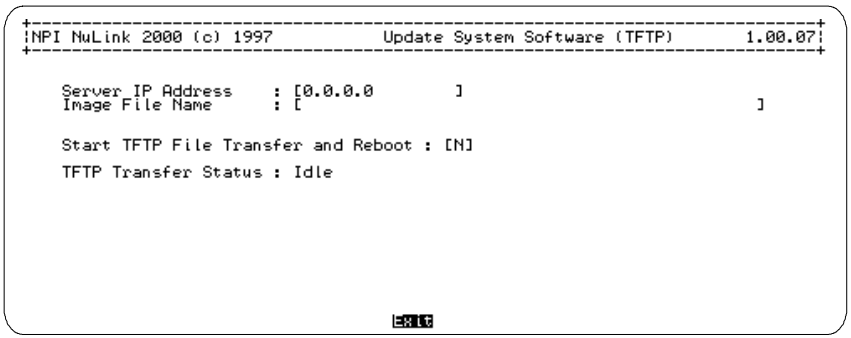
Obtaining New Bridge Software

1. From the World Wide Web, go to NPI's Web site at **http://www.npix.com**, then select the applicable binary file from the location given in the Release Notes for the update.
2. From NPI's FTP server, use the FTP software installed on your PC, connect to **FTP.NPIX.COM**, log in as **Anonymous**, then select the applicable binary file from the location given in the Release Notes for the update.
3. From the diskette (if one is included), select the binary file identified in the Release Notes for the upgrade.
4. Save the selected binary file in the desired directory on a station that is running the TFTP server and connected to the bridge.

Installing New Bridge Software

Once new bridge software has been obtained and placed in the desired location as described under *Obtaining New Software*, you can install it from the console program.

1. From the Main menu, select **Utilities**.
2. Select **Update System Software** from the Utilities menu. The Update System Software screen appears.



Parameters in this screen are described in the following paragraphs.

Server IP Address: Enter the IP address of the station where the new software resides and that is running the TFTP server.

Image File Name: Enter the complete path name and name of the new binary software file obtained from the Web, the FTP server, or the diskette if one is included.

Start TFTP File Transfer and Reboot: Enter **Y** to start the update process. The bridge begins the update process. During this process, the Console and SNMP LEDs blink green. If the bridge discovers an invalid file during the update process, the update stops.

When the update is completed, the bridge automatically reboots.

TFTP Transfer Status: Various status messages in this view-only field indicate the progress of the file transfer. When a completion message displays, transfer is successful. If any error message displays:

1. Make sure the TFTP server is operational.
2. Make sure all the information you entered in the procedure are correct.
3. Retry the Update System Software procedure. If the TFTP transfer status still does not indicate successful completion, contact NPI Technical Support.

WARNING: Never turn off the bridge while its LEDs are cycling or before the update is completed. Doing so will corrupt the software; you will not be able to continue or restart the update.

The configuration in effect when the update began is retained. If you want to return to the default settings, perform a factory reset as described in Chapter 3.

Network Management Software

If you are using an SNMP-compliant network management system to manage the bridge, it usually needs to be upgraded with a MIB along with the bridge software. You can obtain the upgrade MIBs supplied by NPI from NPI's Web site or from the FTP server as described earlier, or you can install it directly from the diskette if one is supplied by NPI.

To install the MIBs, follow the directions in your network management system vendor's documentation.

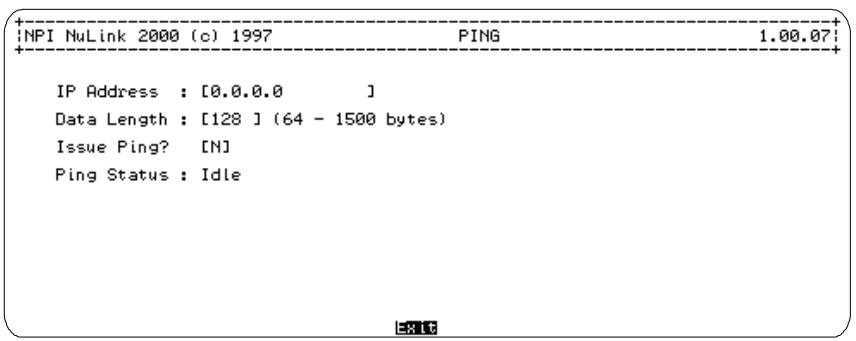
C
Troubleshooting

This appendix gives you directions on how to verify an FDDI or Fast Ethernet communication link, and also describes the Power-On Self-Test (POST) diagnostics routine.

Verifying Communication Links

You can issue a Ping command at the management console to see if a specified station is active or if the link between the bridge and the specified station is up. To do this:

1. From the Main menu, select **Utilities**.
2. Select **PING** from the Utilities menu. The PING screen appears.



Parameters in this screen are described in the following paragraphs.

IP Address: Enter the IP address of the station you want to check.

Data Length: Enter the length of the packet that you want the Ping command to send.

Issue Ping? When you are ready to verify the link to the specified station, enter **Y**. :

Ping Status: Various status messages in this view-only field indicate the progress and result of the Ping operation. Key status messages are as follows:

Idle means there is no Ping command being executed.

Response received OK means the Ping operation was successful; the link exists.

Response timed out means the station you are attempting to verify did not respond to the Ping command within the pre-defined request period.

NetWare Environments

Generally the bridge can operate with NetWare devices on Ethernet and FDDI without any modifications to the client or server. If the clients are unable to find their servers, however, verify that compatible frame types are being used. Table 5 shows the possible Ethernet frame Type and the corresponding FDDI frame type.

Table 5. Frame Type Compatibility

Ethernet Format		FDDI Format
ETHERNET_II	⇐⇒	FDDI_SNAP
ETHERNET_802.2	⇐⇒	FDDI_802.2
ETHERNET_802.3	⇐⇒	ETHERNET_802.3
ETHERNET_SNAP (EtherTalk-2)	⇐⇒	FDDI_SNAP (FDDITalk)

ETHERNET_802.3: This set of frame formats is not recommended because it results in improperly formed frames on both Ethernet and FDDI.

ETHERNET_SNAP (EtherTalk-2): This format is only supported when bound to the AppleTalk protocol, which is only relevant for Ethernet servers supporting AppleTalk clients. The ETHERNET_SNAP format is not supported for other protocol types.

POST Diagnostics

When the bridge is turned on for the first time, it runs a Power-On Self-Test (POST) diagnostics routine. As the POST runs, its test results are displayed at the management console. On completion of the POST, the NuLink 2000 title screen displays, and you can proceed to use the console program.

If any test fails, the display stops with the results displayed. The SNMP and CONSOLE LEDs on the management console will be blinking green. You should contact NPI Technical Support for assistance.

D
Technical Specifications

This appendix lists the design and operating specifications of the bridge.

Physical

28.58 cm deep x 39.4 cm wide x 2.5 cm high (11.25 x 15.5 x 1.75 inches)

3.6 kg (8 lb.)

Electrical

Input voltage: 100 to 240 VAC, 50/60 Hz

Power Consumption: 45W

Electromagnetic

FCC Part 15, Subpart B, Class A

EN 55022 (ACISPR 22A: 1985)

Safety: UL 1950, cUL, EN 60950, TUV

Environmental

Operating/Storage temperature: 0°C to 50°C / -10°C to 65°C

Operating humidity: <95% (non-condensing)

Port Characteristics

DAS model:

- One DAS fiber-optic SC-type connector accommodates multimode fiber; 100 Mbps throughput; for FDDI
- One 10Base-T/100Base-TX auto-negotiation/auto-sensing switching port (RJ-45 type); replaceable with one 100Base-FX port on NPI's FE-833 Media Adapter; for Fast Ethernet
- One console port, RS-232, supports serial cable connection
- One optical bypass switch connection

SAS fiber-optic model:

- One SAS fiber-optic SC-type connector accommodates multimode fiber; 100 Mbps throughput; for FDDI
- One 10Base-T/100Base-TX auto-negotiation/auto-sensing switching port (RJ-45 type); replaceable with one 100Base-FX port on NPI's FE-833 Media Adapter; for Fast Ethernet
- One console port, RS-232, supports serial cable connection

SAS copper model:

- One SAS copper UTP Category 5 RJ-45 connector for FDDI
- One 10Base-T/100Base-TX auto-negotiation/auto-sensing switching port (RJ-45 type); replaceable with one 100Base-FX port on NPI's FE-833 Media Adapter; for Fast Ethernet
- One console port, RS-232, supports serial cable connection

Management

Out-of-band management using a built-in console program at a directly-connected VT100 terminal.

SNMP-compliant in-band management.

Indicators

For each FDDI port: Link present, in Reset, disabled, ready, deferred

For the Fast Ethernet port: Link present, traffic detected (LINK/ACT) full duplex connection, collision detected (FDX/COL)

For the bridge: Power, RPS (Redundant Power Supply), SNMP, and Console LEDs

Booting and Configuration

Software is downloadable.

Configuration is stored in NVRAM.

Industry Standards Complied With

IEEE 802.1 standards document of 10Base-T

IEEE 802.3u standards document for 100Base-TX/FX

IEEE 802.2 standards document

Ethernet 802.3

FDDI SMT version 7.2 and above

RFC 1213, Network Management of TCP/IP-Based Internets (MIB-II)

RFC 1398, Definitions of Managed Objects for the Ethernet-like Interface Types

RFC 1512, FDDI

Index

M

N

O

P

R

S

T

U

W