**3Com**®

# Installing the SuperStack® II NETBuilder® SI Bridge/Router

**http://www.3com.com/**

## Electromagnetic Compatibility Information

**Classes**
Various national agencies (in the United States, The Federal Communications Commission (FCC)) govern the levels of electromagnetic emissions from digital devices. Electromagnetic emissions can interfere with radio and television transmission. To reduce the risk of harmful interference these agencies have established requirements for manufacturers of digital devices

The manufacturer of a digital device must test and label a product to inform an end-user of the maximum emission level from the product when used in accordance with its instructions. The emission levels encountered are classified as Class A or Class B. A system that meets the Class A requirement can be

marketed for use in an industrial or a commercial area. A system that meets the more stringent Class B requirement can be marketed for use in a residential area in addition to an industrial or a commercial area.

The end user is generally held responsible for ensuring that her system is suitable for its environment as stated in the above paragraph and bears the financial responsibility for correcting any harmful interference.

**Modifications**
Modifications or changes made to this device, and not approved by 3Com, may void the authority granted by the FCC, or other such agency, to operate this equipment.

**Shielded Cables**
Connections between 3Com equipment and other equipment and peripherals must be made using shielded cables in order to maintain compliance with FCC, and other agency, electromagnetic frequency emissions limits. This statement does not apply to the ISDN cable or 10BASE-T cables.

**Federal Communications Commission Notice**

This equipment has been tested and found to comply with the limits for a Class B 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 create radio frequency energy and, if not installed and used inaccordance with the instruction manual, may cause harmful interference to radio communications. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try and correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna.

■   Increase the separation between the equipment and the receiver.

■   Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

■   Consult the dealer or an experienced radio/TV technician for help.

In order to meet FCC Class B limits, this equipment must be used only with cables which comply with IEEE 802.3.

The user may find the following booklet prepared by the Federal Communication Commission helpful:

*How to Identify and Resolve Radio-TV Interference Problems*

This booklet is available from the U.S. Government Printing Office, Washington, DC 20402, Stock No. 004-000-00345-4.

**Canadian Notice**

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the interference-causing equipment standard entitled "Digital Apparatus," ICES-003 of the Department of Communications.

*Avis Canadien*
*Cet appareil numérique respecte les limites bruits radioélectriques applicables aux appareils numériques de Classe A prescrites dans la norme sur le matériel brouilleur: "Appareils Numériques", NMB-003 édictée par le ministre des Communications.*

**Japanese Notice**

この装置は，クラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。　VCCI－A

## Canadian Certification Notice

The Industry Canada label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational, and safety requirements. The Department does not guarantee the equipment will operate to the users' satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the inside wiring associated with a single line individual service may be extended by means of a certified connector assembly. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines, and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

**CAUTION:** *Users should not attempt to make electrical ground connections by themselves, but should contact the appropriate inspection authority or an electrician, as appropriate.*

## FCC Part 68

This eqquipment complies with Part 68 of the Federal Communications Commission (FCC) rules. On the product is a label that contains the FCC registration number for this device. If requested, this information must be provided to the telephone company.

This equipment is designed to be connected to the telephone network or premises wiring using a compatible modular jack which is Part 68 compliant. See installation instructions for details.

If this device causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. The telephone company may request that you disconnect the equipment until the problem is resolved.

The telephone company may make changes in its facilities, equipment, operations or procedures that could affect the operation of this equipment If this happens, the telephone company will provide advance notice in order for you to make necessary modifications to maintain uninterrupted service.

If trouble is experienced with this equipment or for repair or warranty information, please follow the applicable procedures explained in the "Technical Support" section of this manual.

### CSU/DSU Module

This device is intended to connect to Digital Data Services in the USA. Please inform the telephone company of the following information pertaining to this device before installation. Note that this device does not handle encoded analogue content and therefore does not require that a Digital Affidavit be filed with the telephone company.

| | |
|---|---|
| FCC Registration Number | See label on product |
| Required connector (USOC) | RJ-48S |
| Service Order Code (SOC) | 6.OF |
| Facility Interface Codes (FIC) | 04DU5-56, 04DU5-64 |

### NT1 Module

This device is intended to connect to ISDN Basic Rate Service in the USA. Please inform the telephone company of the following information pertaining to this device before installation. Note that this device does not handle encoded analogue content and therefore does not require that a Digital Affidavit be filed with the telephone company.

| | |
|---|---|
| FCC Registration Number | See label on product |
| Required Connector (USOC) | RJ-49 |
| Service Order Code (SOC) | 6.OF |
| Facility Interface Codes (FIC) | 02IS5 |

## CE Notice

Marking by the symbol **C€0344X** indicates compliance of this equipment with the EMC, Telecom and Low Voltage Directives of the European Community. Such marking is indicative that this equipment meets or exceeds the following technical standards:

**EN55022** — Limits and methods of measurement of radio interference characteristics of information technology equipment.

**EN50082-1** — Electromagnetic compatibility - generic immunity standard part 1: residential, commercial, and light industrial.

**CTR2** — Connection of WAN ports to X.25 packet switching and X.21 leased line services.

**CTR 3** — Connection to Basic Rate ISDN services.

**EN 60950** — Safety of Information Technology Equipment including Electrical Business Equipment.

**EN 41003** — Particular safety requirements for electrical equipment to be connected to Telecom networks.

# CONTENTS

## 5    INSTALLING OR REMOVING AN INTERFACE MODULE

## A    PROVISIONING YOUR ISDN LINE

## B    TECHNICAL SUPPORT

# INDEX

# 3COM CORPORATION LIMITED WARRANTY

# ABOUT THIS GUIDE

This guide includes complete hardware installation and cabling information for the SuperStack® II NETBuilder® SI bridge/routers.

This guide is intended for the following audience:

- Inexperienced end users configuring their first internetworking device
- Experienced network administrators who are configuring the central node as well as the peripheral node (boundary router)
- Experienced system integrators

*If release notes are shipped with your product and the information there differs from the information in this guide, follow the instructions in the release notes.*

Most user guides and release notes are available in Adobe Acrobat Reader Portable Document Format (PDF) or HTML on the 3Com World Wide Web site:

**http://www.3com.com/**

## Conventions

Table 1 lists notice icons that are used throughout this guide.

**Table 1**   Notice Icons

| Icon | Notice Type | Alerts you to... |
|------|-------------|------------------|
| | Information note | Important features or instructions |
| | Caution | Risk of personal safety, system damage, or loss of data |
| | Warning | Risk of severe personal injury |

**Year 2000 Compliance**

For information on Year 2000 compliance and 3Com products, visit the 3Com Year 2000 Web page:

`http://www.3com.com/products/yr2000.html`

# 1

# USING THE SUPERSTACK II BRIDGE/ROUTER IN YOUR NETWORK

This chapter provides an overview of the networking capability provided by the LAN, WAN, and serial ports on the SuperStack II NETBuilder SI bridge/router.

## Ethernet LAN Ports

The SuperStack II NETBuilder SI bridge/router provides connection to two Ethernet LANs using either 10BASE-T or 100BASE-TX Ethernet. Boundary router models have one port disabled. If you upgrade to full router software, the second port will be functional.

*Leaf node Boundary Routing® is not available on the model 5xx bridge/routers.*

## WAN Port

The WAN port can be an ISDN S/T (model 43x and 53x — no integrated NT1), ISDN U (model 44x and 54x — integrated NT1), 56/64 Kbps Carrier Service Unit/Data Service Unit (CSU/DSU) (model 45x and 55x), or T1/Fractional T1 CSU/DSU (model 46x and 56x) port, depending on the interface module installed.

For boundary routers, only one serial or WAN port can be active at a time. The remaining ports are used for back-up only.

## ISDN Port (Model 43x, 53x, 44x and 54x)

The ISDN port provides a basic rate interface (BRI). The BRI delivers two bearer (B) channels and one delta (D) channel. Each B channel can transmit up to 64 kilobits per second (kbps); the D channel transmits information about the call to computers at the switching system at a rate of 16 kbps. You can use both B channels together for a combined data rate of 128 kbps, or use each 64 kbps B channel separately.

*Some ISDN lines support up to 56 Kbps per B channel. For more information, contact your ISDN service provider.*

Order ISDN lines from the phone company. See Appendix A for more information about ordering ISDN lines.

*Installations in Hong Kong should be configured to originate and receive ISDN calls at 64 Kbps. Due to the variety of ISDN switches in the Hong Kong Telcom network, the SuperStack II NETBuilder SI bridge/router does not handle rate adapted ISDN calls at 56 Kbps properly.*

**56/64K CSU/DSU Port (Model 45x and 55x)**
A CSU/DSU is equivalent to a modem for a digital line. The 56/64K CSU/DSU port connects directly to a Digital Data Service (DDS).

Order DDS lines from the phone company. Contact your phone company for more information about DDS lines and the services available for them.

**T1/FT1 CSU/DSU Port (Model 46x and 56x)**
A CSU/DSU is equivalent to a modem for a digital line. The T1/FT1 CSU/DSU port connects directly to a T1 line or a fractional T1 line. Fractional T1 consists of 24 channels (DS0s) at 64 Kbps each, so you can connect to one or more DS0s with the T1/FT1 port.

Order T1 lines from the phone company. Contact your phone company for more information about T1 lines and the services available for them.

**Serial Ports**
The serial ports on the SuperStack II NETBuilder SI bridge/routers are multifunction Flex-WAN ports that provide connection to industry-standard V.35, RS-232, RS-449, RS-530, or X.21 Data Communications Equipment (DCE) or Data Terminal Equipment (DTE) serial devices. DCEs include modems and CSU/DSUs. DTEs include terminals, computers, and mainframes.

*If you are using two SuperStack II NETBuilder SI bridge/routers connected directly to each other by the serial ports (back-to-back), the bridge/routers do not meet radiated emissions specifications.*

For boundary routers, only one serial or WAN port can be active. The remaining ports are used for back-up only.

You will need to use a special 3Com cable with a Flex-WAN connector on one end and the appropriate connector for your serial device on the other end. See "Serial Connectors and Flex-WAN Cables" on page 45 for information about ordering Flex-WAN cables from 3Com.

## Telco Services

To create a WAN, you must buy lines and services from a telecommunications company (Telco). Services include dial-up lines, leased lines, and packet-switched services.

*Dial-up* lines, like ISDN, allow you to dial your destination only when you need to and hang up when your call is complete. A *leased* line is always available between two locations.

*Packet-switched* services, like Frame Relay, use a combination of leased or dial-up lines with Telco-owned switching between two sites. These services free you from the cost of owning the line the entire length.

Table 2 describes dial-up and leased line services available for the WAN and serial ports. Table 3 describes packet-switched services.

**Table 2**   Dial-Up and Leased Line Services

| Telco Line | Protocol | Serial Device (Required on Serial Ports) | Data Transfer Rate |
|---|---|---|---|
| **Dial-Up Lines:** | | | |
| Plain Old Telephone Service (POTS) | PPP | Modem | Up to 56 Kbps |
| ISDN BRI | PPP/Multilink PPP | TA | 2 channels up to 64 kbps each* |
| Switched 56 | PPP | CSU/DSU | 56 Kbps |
| **Leased Lines:** | | | |
| E1 | PPP | CSU/DSU | 2.048 Mbps |
| T1 | PPP | CSU/DSU | 1.544 Mbps |
| Fractional T1 | PPP | CSU/DSU | Up to 24 channels (DS0s) at 64 Kbps each |
| Digital Data Service (DDS) | PPP | CSU/DSU | Up to 64 Kbps |

* Some ISDN lines support up to 56 Kbps per B channel. For more information, contact your ISDN service provider.

**Table 3**   Packet-Switched Services

| Packet-Switched Services/Protocol | Telco Line | Serial Device Required on Serial Ports | Data Transfer Rate |
|---|---|---|---|
| X.25 | POTS | Modem | Up to 56 Kbps |
| Frame Relay | Leased line | CSU/DSU | Up to 2.048 Mbps |
| SMDS | Leased line | CSU/DSU | Up to 2.048 Mbps |

# 2

# INSTALLING THE HARDWARE

This chapter describes how to install your SuperStack II NETBuilder SI bridge/router.

## Required Equipment

Table 4 lists the items you receive in the shipping carton and items you need to provide.

**Table 4**   Equipment Received and Equipment Needed

| Shipping carton contents | ■ SuperStack II NETBuilder SI bridge/router |
|---|---|
| | ■ Power cable |
| | ■ Models 44x and 54x: ISDN U cable |
| | ■ Models 45x, 55x, 46x and 56x: CSU/DSU loopback plug |
| | ■ Rack-mount kit |
| | ■ Models 46x and 56x: RJ-48 T1 cable |
| | ■ Software CD-ROM* (except for boundary router models) |
| | ■ Documentation and documentation CD-ROM |
| **What you need to provide** | ■ Synchronous serial devices like a channel service unit/digital service unit (CSU/DSU), modem, or ISDN TA. |
| | ■ NT1 for models 43x and 53x in the U.S. and Canada |
| | ■ Interface module (available from 3Com — optional) |
| | ■ 10BASE-T or 100BASE-TX network cables |
| | ■ Flex-WAN cables (available from 3Com). See " Serial Connectors and Flex-WAN Cables" on page 45 for more information about ordering Flex-WAN cables. |
| | ■ Models 43x and 53x: ISDN S/T cable |
| | ■ Models 45x and 55x: CSU/DSU cable |
| | ■ Terminal, PC, or modem and cable |

\* The software is preinstalled in the flash memory drive of the bridge/router and automatically loads when you turn on the power. The software CD-ROM is for software recovery purposes only.

⚡ **WARNING:** *To eliminate cable noise emission in excess of FCC regulations, part 15, subpart J, and EN55022B, all interconnection cables should be equipped with shielded connectors, the backshells of which must completely surround the cable shield.*

For more information on cables, see Chapter 3.

## Mounting the Bridge/Router

You can mount your bridge/router on a tabletop, stack several with brackets, or mount the bridge/router in a rack.

### Mounting Kit

The mounting kit contains the following hardware:

**Figure 1**   Mounting Kit Contents

Two brackets
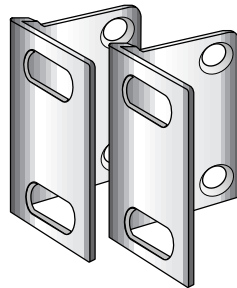
Four 8-32 Phillips flathead screws for use when stacking bridge/routers
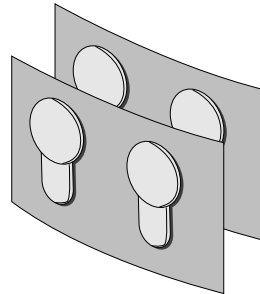
Four adhesive-backed rubber feet

### Installing on a Tabletop

If you plan to install your bridge/router on a tabletop, attach the rubber feet as shown.

Attach feet to corners of chassis bottom
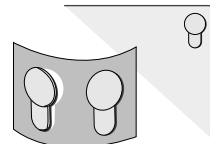
Flex plastic sheet until feet pop loose

**Stacking with Brackets**
See Figure 2 to securely stack several bridge/routers on a tabletop.

**Figure 2**   Stacking Bridge/Routers



Attach brackets as shown to lock two units together

Place screws in holes as shown

Bottom bracket acts as a support
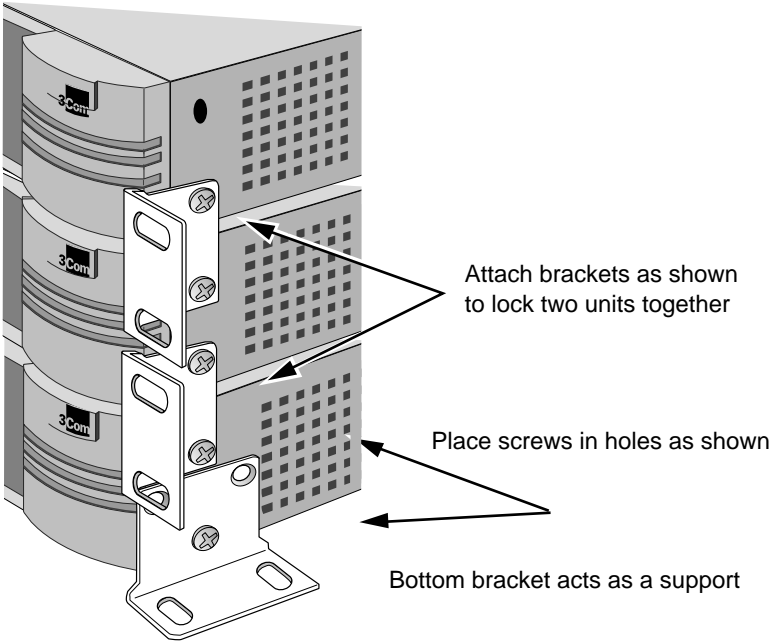
**Installing in a Rack**
To install the bridge/router in a rack, follow these steps:

**1** Secure the rack-mount brackets to each side of the chassis using two flathead screws per bracket.
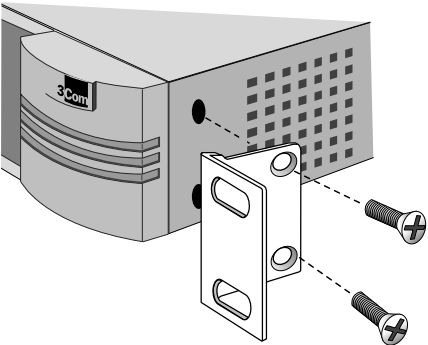
**2** Hold the chassis between the poles of the rack and attach the brackets to the rack using panhead screws (you must provide these screws). Tighten each screw securely.
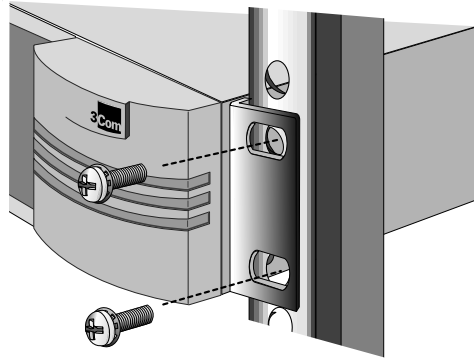


⚠️ **CAUTION:** *Using fewer than two screws to secure the brackets to the rack may cause the boundary router to fall and sustain damage not covered by the warranty.*

**Cabling the Connectors**

The SuperStack II NETBuilder SI bridge/router has two Ethernet ports, either two or four serial ports depending on the model, and one of the following WAN ports: ISDN S/T (43x and 53x), ISDN U (44x and 54x), 56/64 Kbps CSU/DSU (45x and 55x), or T1/FT1 CSU/DSU (46x and 56x). This section describes how to cable each port on your bridge/router.

Boundary router models can use only one Ethernet port and only one serial or WAN port can be active at a time. You can cable the remaining serial or WAN ports to be used as back-up. If you upgrade to full router software, the second Ethernet port and back-up serial ports will be functional.

**Cabling the LAN Connectors**
You can cable one or two Ethernet connectors using either 10BASE-T or 100BASE-TX cabling. If you have a boundary router, cable only the L1 connector.
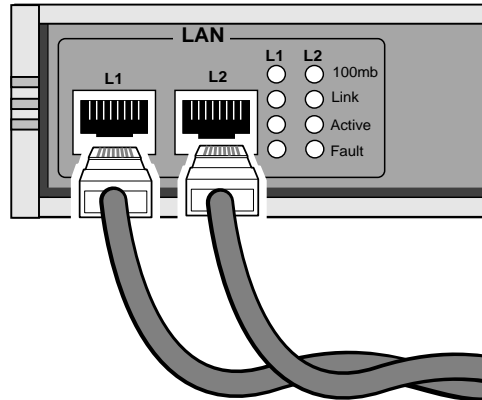


10BASE-T or 100BASE-TX  cables

For more information about Ethernet connectors and cables, see " LAN Connector and Cables" on page 37.

**Cabling the WAN Connector**
This section describes the WAN connector for each bridge/router model.

### Model 43x and 53x ISDN S/T

Models 43x and 53x bridge/routers have an ISDN S/T connector.
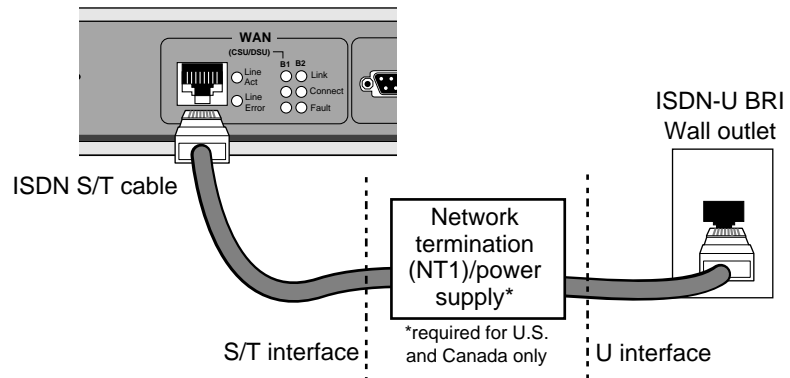
The ISDN S/T port uses an RJ-45 connector. In the U.S. and Canada, purchase an NT1 from an ISDN equipment vendor, and use it between the bridge/router and the ISDN outlet. In other countries, you do not need to provide an NT1 because the function is provided by the ISDN equipment at the customer site.

For more information on ISDN cables, see "ISDN S/T Cable" on page 42.

### Model 44x and 54x ISDN U

Models 44x and 54x bridge/routers have an ISDN U connector.
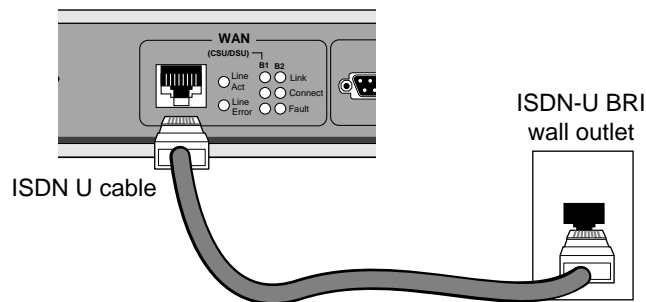


The ISDN U port uses an RJ-45 connector. In the U.S. and Canada, you do not need a separate NT1 between the bridge/router and the ISDN outlet because the NT1 is built into the model 44x bridge/router.

For more information on ISDN cables, see "ISDN S/T Cable" on page 42.

### Model 45x and 54x 56/64K CSU/DSU

Models 45x and 55x bridge/routers have a 56/64K CSU/DSU connector.
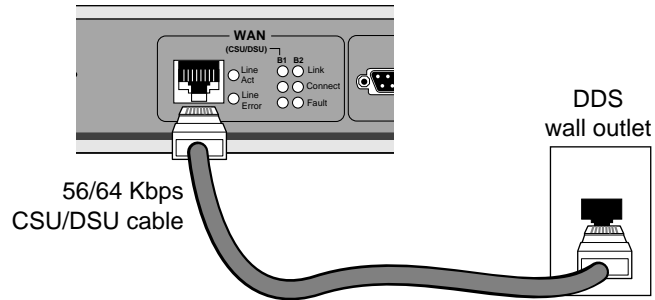


The 56/64K CSU/DSU port uses an RJ-48S connector.

For more information on CSU/DSU cables, see "56/64K CSU/DSU Cable" on page 44.

### Model 46x and 56x T1/FT1

Models 46x and 56x bridge/routers have a T1/FT1 RJ-48 connector.
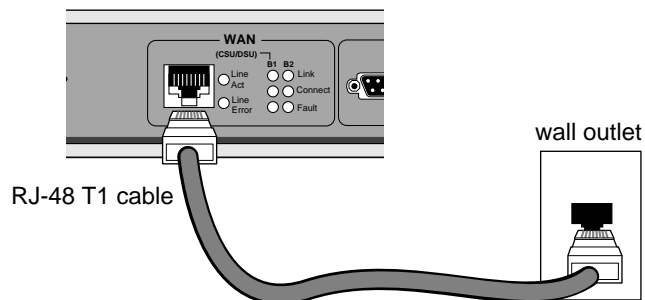


The T1/FT1 Telco port uses an RJ-48 connector.

**Cabling the Serial Connectors**    The SuperStack II bridge/router has either two or four Flex-WAN serial connectors depending on the model. Order the appropriate Flex-WAN cable from 3Com for your serial device. See "Serial Connectors and Flex-WAN Cables" on page 45 for more information about the Flex-WAN cables.

Model 4xx



Flex-WAN cables

Connect to RS-232, RS-449, V.35 or X.21 DTE or DCE or RS-530 DCE

Model 5xx



Flex-WAN cables

Connect to RS-232, RS-449, V.35 or X.21 DTE or DCE or RS-530 DCE
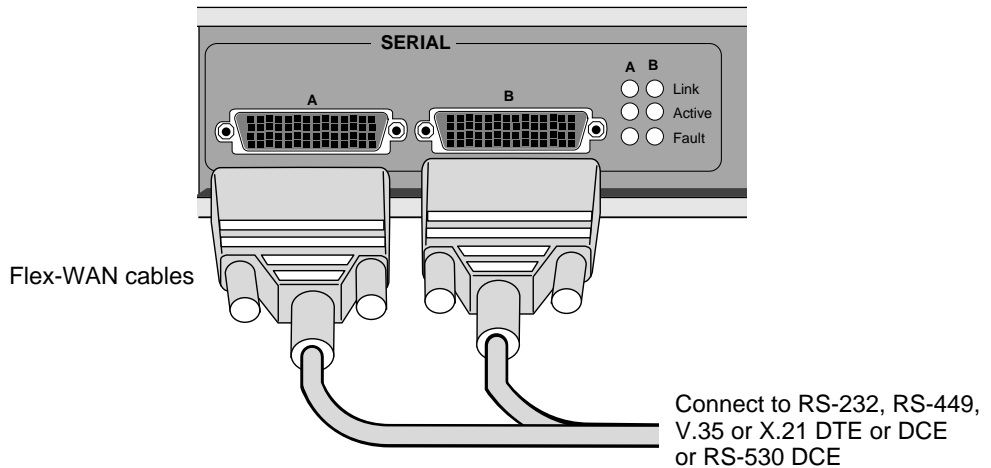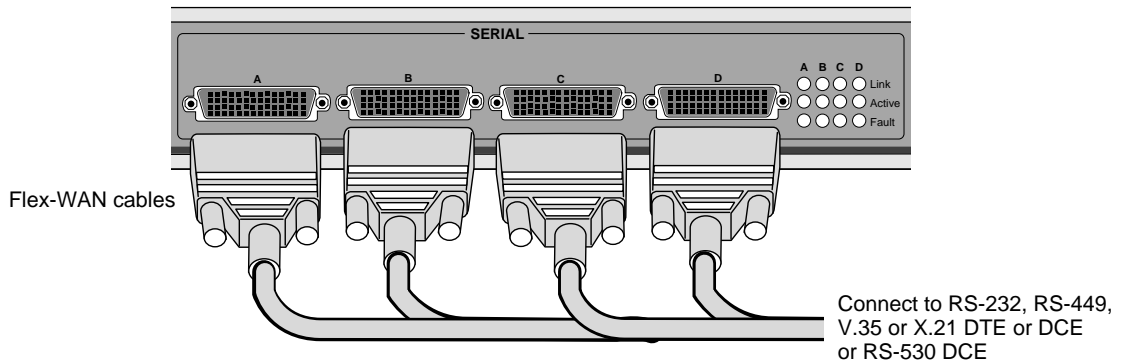
| **Attaching a Redundant Power System** | You can attach your SuperStack II bridge/router to a SuperStack II Redundant Power System (RPS). |

SuperStack II bridge/router



Wall outlet

Power cable

SuperStack II Redundant Power System

RPS cable
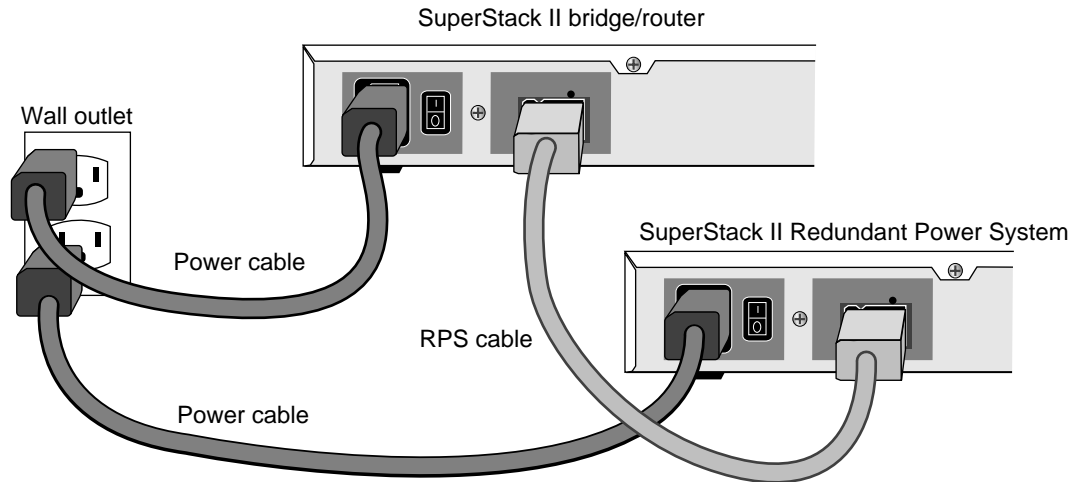
Power cable

For full power supply redundancy, attach one end of the RPS cable to the rear panel on the bridge/router and the other end to the RPS. Then attach one end of the power cord to the rear panel on the bridge/router and the other end to a power outlet.

In this configuration, the internal supply provides power. If the internal supply fails or is switched off, or if there is a power failure, the RPS is activated and the bridge/router reboots.

To reset a bridge/router in this configuration, turn the power off, wait 5 seconds and turn it back on. The bridge/router switches to the RPS, then switches back to the internal supply to reboot.

*CAUTION: For system susceptibility protection, always leave the AC cord attached to the bridge/router and to a power outlet.*

*Internal power supply failure is rare. If it occurs, the power switch on your bridge/router will not operate. To reboot, unplug the RPS cable and then plug it back in. Replace your bridge/router with another bridge/router that has a functioning internal power supply as soon as possible. Contact your 3Com representative to replace your bridge/router.*

| **Connecting a PC, Terminal, or Modem** | Connect a PC running a terminal emulation program, a terminal, or a modem to the console port on the SuperStack II bridge/router to configure the bridge/router software and review startup and system operation messages. |

To connect a PC, terminal, or modem to the bridge/router, follow these steps:

**1** Obtain a cable to connect the device to the console port on the bridge/router. See " Console Connector and Cables" on page 35 for cable pinouts.

The console port is a 9-pin male connector.

For the PC, use a 9-pin female to 9-pin female null modem-type cable.

For the terminal, use a 9-pin female to 25-pin null modem-type cable.

For the modem, use a 9-pin female to 25-pin male straight-through-type cable.

**2** Connect one end of the cable to the console port on the SuperStack II system and the other end to the serial port on the back of your device.

**3** Verify that configurable parameters of your device match the configuration settings of the console port specified in Table 5.

**Table 5** Console Port Configuration Settings

| Characteristic | Setting |
| --- | --- |
| Baud rate | 9600 |
| Databits | 8 |
| Parity | None |
| Stop bits | 1 |
| DTR | Ignored |
| Duplex | Full |
| Echo | Off |
| Flow control | X-on/X-off |

**4** Turn on the device.

| **Shutting Down** | If your SuperStack II system is not connected to an RPS, turn off the power by pressing the off (0) side of the power switch on the back panel. If your system is connected to an RPS, turn off the power by unplugging the RPS cable from the system and then pressing the off (0) side of the power switch. |

# **3** FEATURES AND SPECIFICATIONS

This chapter provides an overview of the SuperStack II NETBuilder SI bridge/router and includes the following information:

- Features
- Back and Front Panels
- Normal LED Meanings
- DIP Switches
- Hardware Interrupt Switch
- Serial Device Requirements
- Physical Specifications

**Features**

Table 6 lists features of the SuperStack II NETBuilder SI bridge/router.

**Table 6**   Features of the SuperStack II NETBuilder SI Bridge/Router

| Feature | | Description |
| --- | --- | --- |
| Processor | | Motorola 68360 28.1 MHz |
| Ethernet ports | | Two LAN ports that can be used with 10BASE-T or 100BASE-TX Ethernet. |
| | *Boundary routers (model 4xx only)* | One active Ethernet port. If you upgrade to full router software, the second port will be functional. |
| WAN port | | The WAN port can be an ISDN S/T, ISDN U, or 56/64 Kbps CSU/DSU port, depending on the interface module installed. |
| | *Boundary routers (model 4xx only)* | One active serial or WAN port. The remaining two ports can be used for back-up. |
| | Models 43x and 53x | WAN port is an **ISDN S/T** port |
| | Models 44x and 54x | WAN port is an **ISDN U** port |
| | Models 45x and 55x | WAN port is a **56/64 Kbps CSU/DSU** port |
| | Models 46x and 56x | WAN port is a **T1/FT1 CSU/DSU** port |

(continued)

**Table 6** Features of the SuperStack II NETBuilder SI Bridge/Router (continued)

| Feature | | Description |
|---------|---|-------------|
| Memory | | 8 MB flash memory and 16 MB DRAM. |
| Serial ports | | Two (model 4xx) or four (model 5xx) Flex-WAN serial ports that can connect to RS-232, V.35, RS-449, X.21, or RS-530 interfaces. See "Serial Connectors and Flex-WAN Cables" on page 45 for information about Flex-WAN cables. |
| | *Boundary routers (model 4xx only)* | One active serial or WAN port. The remaining two ports can be used for back-up. |

**Back and Front Panels**

Figure 3 shows the back panel of the SuperStack II bridge/router.

**Figure 3** Back Panel



On/off switch

Power receptacle

RPS connector

Product information label
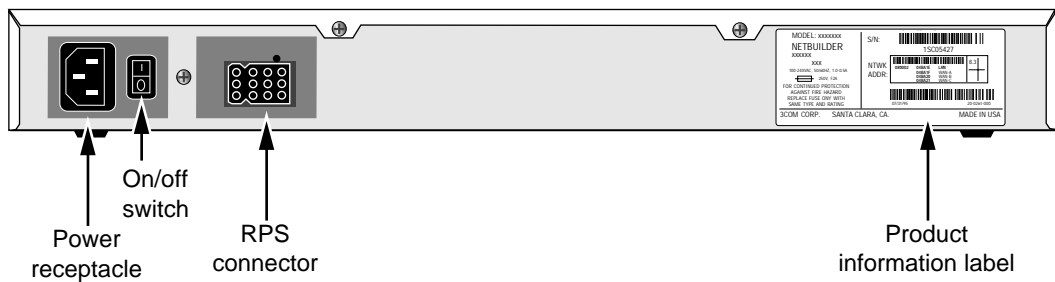
Figure 4 shows the front panel of the model 4xx bridge/router and the model 5xx bridge/router.

**Figure 4** Models 4xx and 5xx Chassis Front Panel
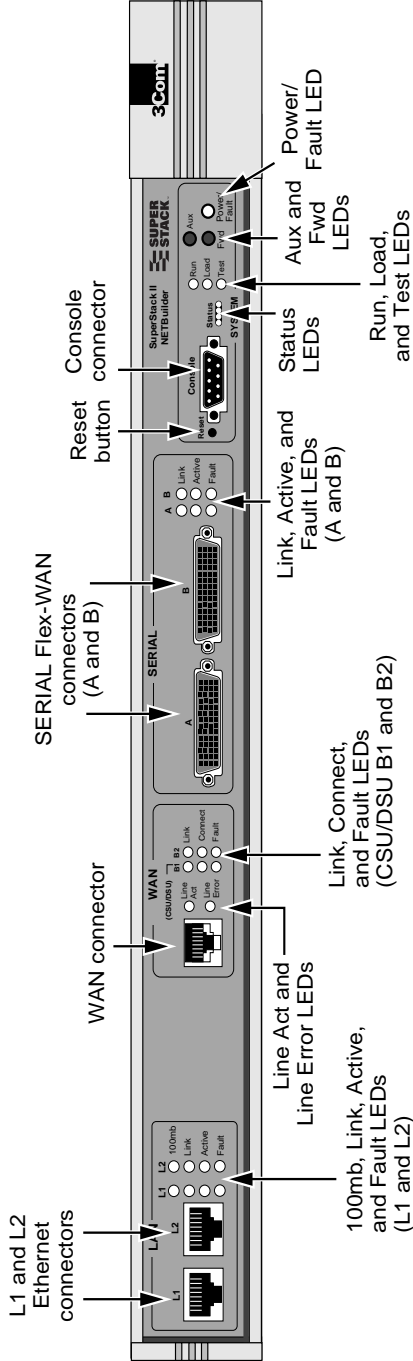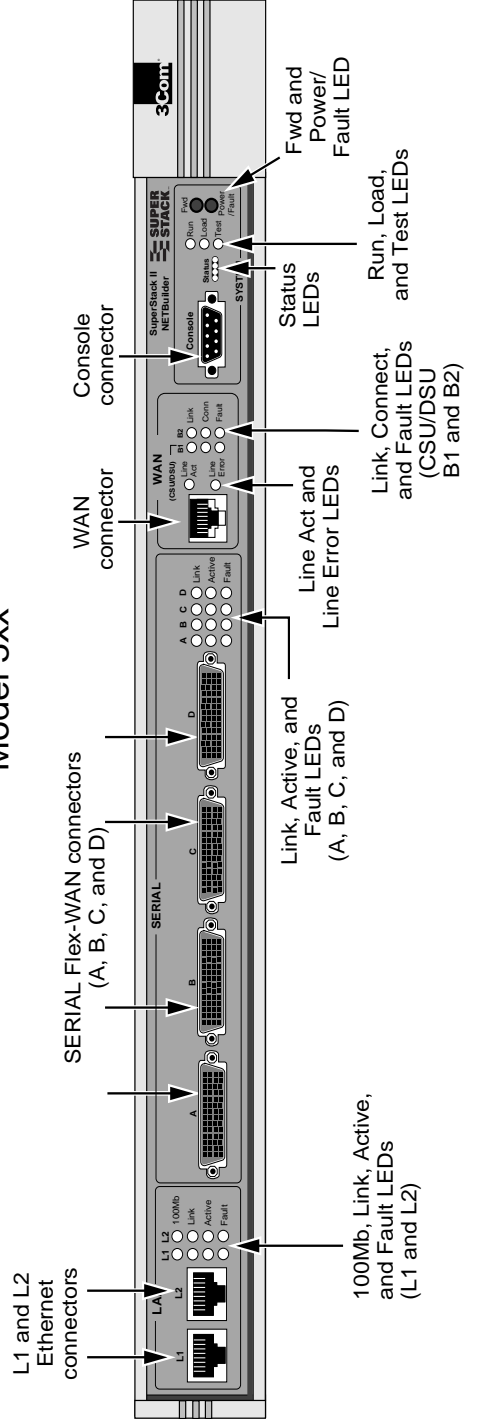
| | |
|---|---|
| **Normal LED Meanings** | The following sections describe the normal operation of the SuperStack II bridge/router LEDs. For information about LED error modes, see the SuperStack II bridge/router software guide. |

**System LEDs**    The system LEDs are on the right side of the SuperStack II front panel.

Normal operation

Lights green when unit has power. Lights amber if there is a problem with power. When unlit, power to unit is off. — **Power /Fault**

Flashes green each time a packet is forwarded between two ports. — **Fwd**

**Aux** Reserved for future use (model 4xx only).

**Run** Lights green when the software has successfully loaded and is running.

**Load** Unlit in normal operation. Flashes green during startup to indicate system is loading software. Lights amber when there is a load problem.

**Test** Unlit in normal operation. Lights amber during startup to indicate system is running self-tests.

**Status** Provides additional status for the Run, Load, and Test LEDs.

**Serial LEDs**    The following figure describes the serial LEDs.

**Link** Lights green when the path is up.

**Active** Lights green when there is a physical connection to a serial device such as a CSU/DSU or modem

**Fault** Unlit in normal operation. Lights amber if an error in the frames is detected.

Normal operation        * Model 5xx only
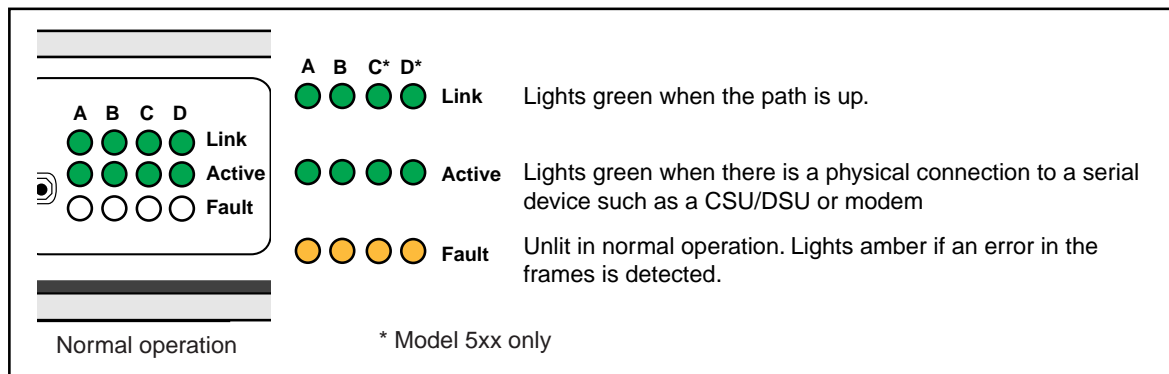
**WAN LEDs**    The following figure describes the WAN LEDs when using an ISDN
connection or a CSU/DSU connection.

| | | |
|---|---|---|
| | **(CSU/DSU)** B1 B2 | *The CSU/DSU uses only the B1 LEDs.* |
| **WAN** | ⬤ ⬤ **Link** | Lights green when the path is up. |
| **(CSU/DSU)** B1 B2 | ⬤ ⬤ **Connect** | Lights green when an end-to-end connection exists or is in progress. |
| ⬤ **Line Act**  ⬤ ⬤ **Link** | ◯ ◯ **Fault** | Lights amber when an error in the frames is detected. |
| ◯ **Line Error**  ◯ ◯ **Fault**   ⬤ ⬤ **Connect** | *ISDN only* | |
| | ⬤ **Line Act** | (D channel). Lights green when the ISDN line is activated. |
| Normal operation | ◯ **Line Error** | (D channel). Lights amber to indicate a loss of signal, such as a disconnected cable. |

**LAN LEDs**    The following figure describes the LAN LEDs.

| | | |
|---|---|---|
| | L1 L2 | |
| **LAN** | ⬤ ⬤ **100mb** | Lights green when 100BASE-TX Ethernet is in use. |
| **L2**  L1 L2 | ⬤ ⬤ **Link** | Lights green when the path is up. |
| ⬤ ◯ **100mb** | ◐ ◐ **Active** | Flashes green when a packet is detected on the LAN. |
| ⬤ ⬤ **Link** | ◯ ◯ **Fault** | Lights amber when a an error is detected or the self-test has failed. |
| ◐ ◐ **Active** | | |
| ◯ ◯ **Fault** | | |
| Normal operation | | |
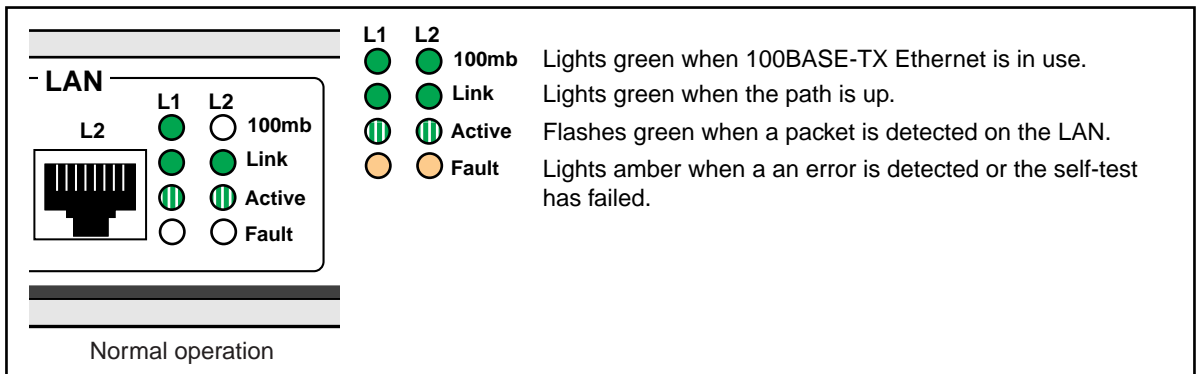
**DIP Switches**

DIP switches are located on the left side of the bridge/router (when facing the front panel) and are for 3Com use only.

⚠ *CAUTION: To avoid accidentally erasing your flash memory or reinitializing the EEPROM, make sure all switches are in the down position.*

Left side of unit
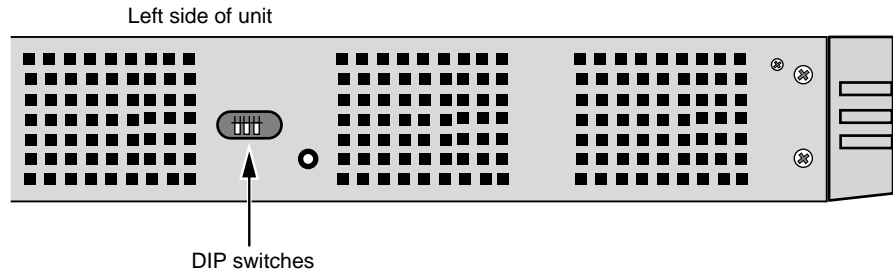


DIP switches

**Hardware Interrupt Switch**

The hardware interrupt switch is located on the left side of the bridge/router (when facing the front panel). It is recessed into an opening near the DIP switches. Press the switch with a nonconductive object, such as a plastic stylus, to activate the monitor firmware utility.

Left side of unit



Hardware interrupt switch
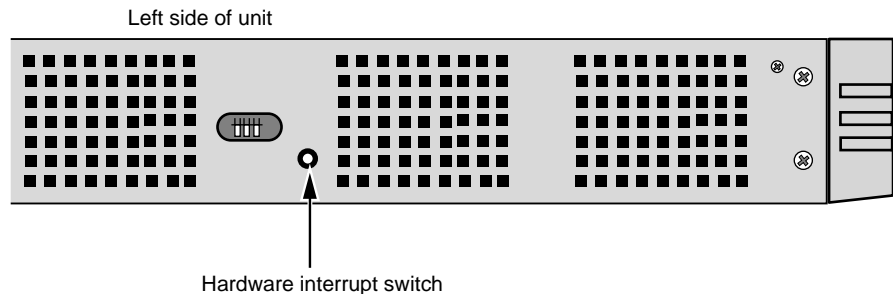
⚠ *WARNING: Use only a nonconductive object, such as a plastic stylus, to press the hardware interrupt switch. Do not use the tip of a pencil. Graphite particles from the pencil may cause you to receive an electric shock and may damage components on the motherboard.*

**Reset Button**

Pressing the Reset button resets the bridge/router. The reset button on the model 4xx bridge/router is on the front panel as shown in Figure 4. The reset button on the model 5xx bridge/router is on the left side of the bridge/router (when facing the front panel) as shown in Figure 5.

**Figure 5**   Reset Switch (Model 5xx)

Left side of unit



Reset switch
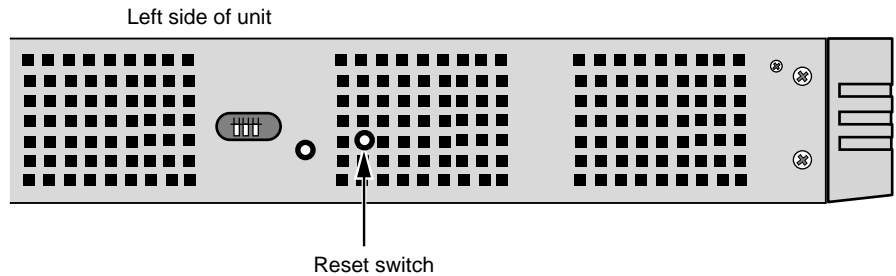
| **Serial Device Requirements** | Serial devices using the V.25bis command set over a SuperStack II bridge/router must support: |
|---|---|

Serial devices using the V.25bis command set over a SuperStack II bridge/router must support:

- High-level data link control (HDLC) with NRZ.
- CRN command.
- 8 (data bits), N (no parity), and 1 (stop bit) if a parity option is provided.
- V.25bis addressed mode.
- Synchronous data and DTE connection. The SuperStack II NETBuilder bridge/router does **not** support an asynchronous serial connection.

Serial devices using the DTR command set over a SuperStack II bridge/router RS-232 interface must support:

- DTR State to Dial: HIGH.
- DTR State Hangup: Low.
- DTR State Answer: HIGH.
- Synch Data Xmt (synchronous data and DTE connection). The SuperStack II NETBuilder bridge/router does **not** support an asynchronous serial connection.
- Auto Answer mode.
- User-stored phone number.

**Physical Specifications**

Table 7 provides the environmental requirements of the SuperStack II bridge/routers.

**Table 7**   Environmental Requirements

| Parameter | Minimum Requirement | Maximum Requirement |
| --- | --- | --- |
| **Temperature** | | |
| Operating | 5 °C | 40 °C |
| Nonoperating | -40 °C | 75 °C |
| **Altitude** | | |
| Operating | 15,000 ft | 15,000 ft |
| Nonoperating | 40,000 ft | 40,000 ft |
| **Relative Humidity** | | |
| Operating | 10% noncondensing | 90% noncondensing |
| Nonoperating | 10% noncondensing | 90% noncondensing |

# 4

# CONNECTORS AND CABLES

This chapter describes each connector and the cables that can be used with each connector on the bridge/router.

## Console Connector and Cables

You can connect a PC running a terminal emulation program, a terminal, or a modem to the Console connector on the SuperStack II bridge/router.

⚠️ *WARNING: To eliminate cable noise emission in excess of FCC Part 15, Subpart J, and EN55022 B, this device cable should be shielded and have connectors with metallic backshells.*

### PC Cable

Figure 6 shows the pinouts for a 9-pin female to 9-pin null modem-type cable.

**Figure 6**   9-pin to 9-pin PC Cable (Null Modem-Type)



**To Console port**

**9-pin female connector**

**To PC serial port**

**9-pin female connector**
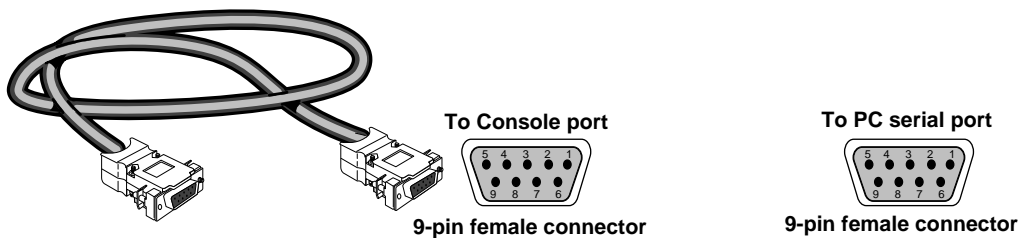
| Name | Abbr | Pin | | Pin | Abbr | Name |
|---|---|---|---|---|---|---|
| Receive Data | RxD | 2 | ← | 3 | TxD | Transmit Data |
| Transmit Data | TxD | 3 | → | 2 | RxD | Receive Data |
| Carrier Detect | CD | 1 | ← | 7 | RTS | Request to Send |
| Clear to Send | CTS | 8 | | 8 | CTS | Clear to Send |
| Request to Send | RTS | 7 | | 1 | CD | Carrier Detect |
| Signal Ground | Gnd | 5 | → | 5 | GND | Signal Ground |
| Data Terminal Ready | DTR | 4 | → | 6 | DSR | Data Set Ready |
| Data Set Ready | DSR | 6 | ← | 4 | DTR | Data Terminal Ready |

**Terminal Cable**   Figure 7 shows the pinouts for a 9-pin female to 25-pin null modem-type cable.

**Figure 7**   9-pin to 25-pin Terminal Cable (Null Modem-Type)



**To Console port**

**9-pin female connector**

**To terminal**

**25-pin male or female connector**

| Name | Abbr | Pin | | Pin | Abbr | Name |
|---|---|---|---|---|---|---|
| Receive Data | RxD | 2 | ← | 2 | TxD | Transmit Data |
| Transmit Data | TxD | 3 | → | 3 | RxD | Receive Data |
| Carrier Detect | CD | 1 | | 4 | RTS | Request to Send |
| Clear to Send | CTS | 8 | | 5 | CTS | Clear to Send |
| Request to Send | RTS | 7 | | 8 | CD | Carrier Detect |
| Signal Ground | GND | 5 | | 7 | GND | Signal Ground |
| Data Terminal Ready | DTR | 4 | → | 6 | DSR | Data Set Ready |
| Data Set Ready | DSR | 6 | ← | 20 | DTR | Data Terminal Ready |

**Modem Cable**   Figure 8 shows the pinouts for a 9-pin female to 25-pin male straight-through-type cable.

**Figure 8**   9-pin to 25-pin Modem Cable (Straight-Through-Type)



**To Console port**

**9-pin female connector**

**To modem**

**25-pin male connector**

| Name | Abbr | Pin | | Pin | Abbr | Name |
|---|---|---|---|---|---|---|
| Transmit Data | TxD | 3 | → | 2 | TxD | Transmit Data |
| Receive Data | RxD | 2 | ← | 3 | RxD | Receive Data |
| Request to Send | RTS | 7 | → | 4 | RTS | Request to Send |
| Carrier Detect | CD | 1 | ← | 8 | CD | Carrier Detect |
| Clear to Send | CTS | 8 | ← | 5 | CTS | Clear to Send |
| Signal Ground | GND | 5 | | 7 | GND | Signal Ground |
| Data Set Ready | DSR | 6 | ← | 6 | DSR | Data Set Ready |
| Data Terminal Ready | DTR | 4 | | 20 | DTR | Data Terminal Ready |

**LAN Connector and Cables**

The two Ethernet connectors, labeled L1 and L2, can be cabled using either 10BASE-T or 100BASE-TX cabling.

Boundary router models can use only the L1 Ethernet port. If you upgrade to full router software, the second port will be functional.

The following figure shows the pinouts of the L1 and L2 connectors (RJ-45). The connector bodies connect the cable shield to chassis ground.
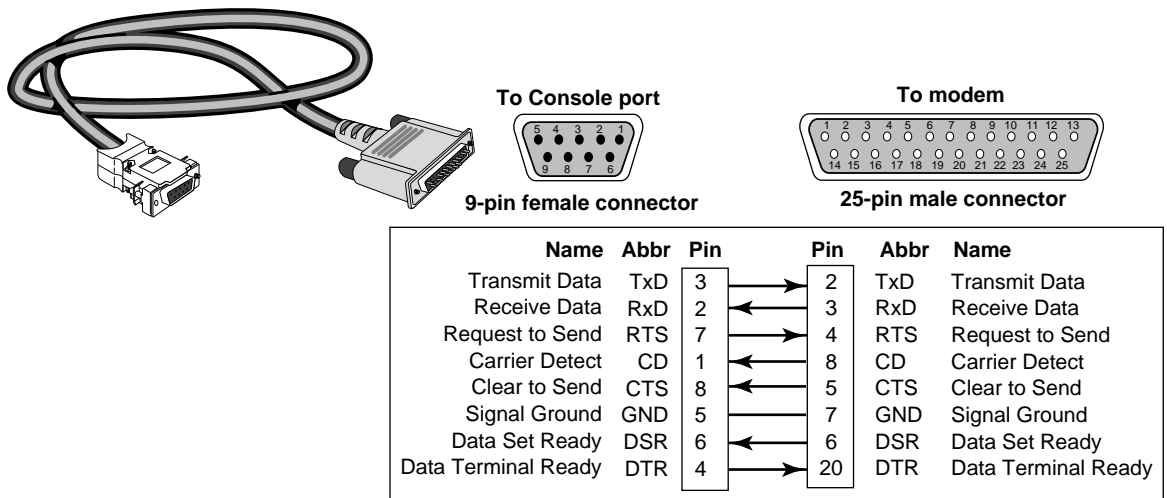
**Figure 9**   Ethernet Connector
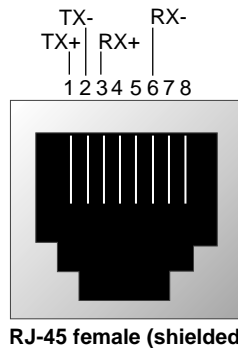


**RJ-45 female (shielded)**

**10BASE-T Cabling**

Table 8 lists supported 10BASE-T cable types and emissions classes.

**Table 8**   10BASE-T Cable Types and Emissions Compliance

| Cable Type | | Emissions Compliance* | |
| --- | --- | --- | --- |
| | | FCC and VCCI Class A | EN55022 Class B |
| UTP† | 100 ohm: | | |
| | Category 3 | yes | no |
| | Category 4 | yes | no |
| | Category 5 | yes | no |
| Shielded TP† | 100 ohm: | | |
| | Category 3 | yes | yes |
| | Category 4 | yes | yes |
| | Category 5 | yes | yes |

* Shielding of all cable types should be terminated 360 degrees at the cable plug.
† All UTP compliance testing was accomplished using cables built with Stewart Connector Co. connector, part number 940 SP-36-08-08.

### Cabling Standards

Cabling should be installed in accordance with the following standards:

- EIA/TIA-568 – Commercial building telecommunications wiring standard

- TSB-36 – Additional cable specifications for unshielded twisted pair cables

- IBM cabling guidelines

**100BASE-TX Cabling**  Table 9 lists supported 100BASE-TX cable types and emissions classes.

**Table 9**  Cable Support and Emissions Compliance

| | | Emissions Compliance* | |
| --- | --- | --- | --- |
| **Cable Type** | **Connectors** | **FCC Class A VCCI Class A** | **EN55022 Class B VDE Class B** |
| Category 5 UTP | Category 5 RJ-45 (including jacks) | Yes | No |
| Category 5 shielded UTP | Category 5 RJ-45 (including jacks) | Yes | Yes |

* Shielding of all cable types should be terminated 360º at the cable plug.

The three types of Fast Ethernet interfaces are:

- **TX** — Runs over Category 5 UTP and Category 5 shielded UTP.

- **FX** — Runs over fiber. FX does **not** connect to the SuperStack II NETBuilder SI bridge/router, but you can use FX in your network between appropriate devices.

- **T4** — Runs over Category 3 or better UTP or shielded UTP. T4 does **not** connect to the SuperStack II NETBuilder SI bridge/router, but you can use T4 in your network between appropriate devices.

Follow the steps in the next section to design a valid Fast Ethernet network.

### Creating a Valid Network

A Fast Ethernet network consists of *collision domain diameters* formed by cabling and/or repeaters between two DTE devices. A *DTE device* is a bridge/router, switch, or end station that contains a media access controller (MAC). Repeaters usually do not contain a MAC.

To create a valid collision domain diameter, you must adhere to the following maximum cable span lengths along with the collision domain diameter guidelines in Table 9:

- **UTP (running TX or T4)** — Maximum cable span length is ≤100 m.

- **Fiber (running FX)** — Maximum cable span length is ≤412 m.

Figure 10 shows examples of collision domain diameters.

**Figure 10** Collision Domain Diameter Examples
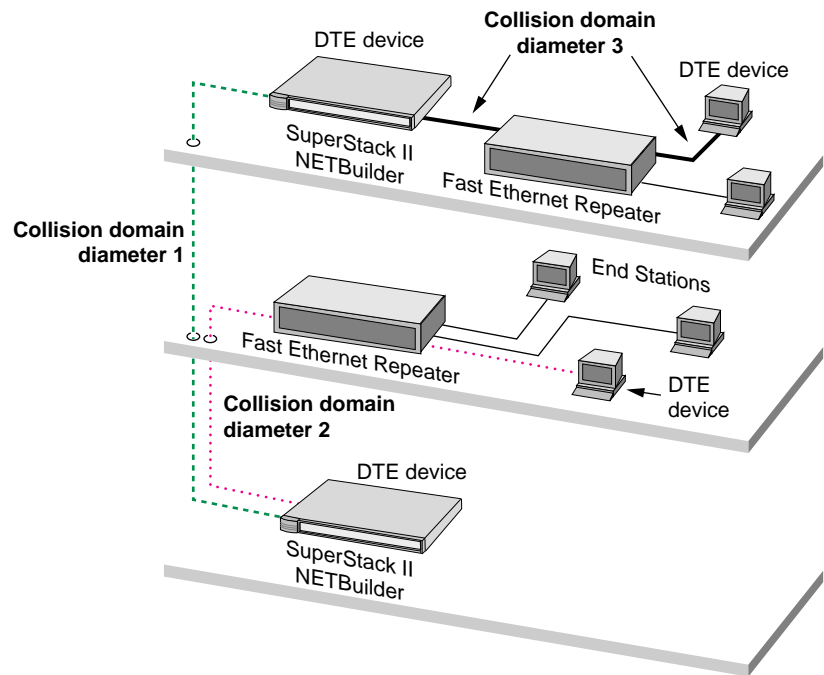


To determine a valid collision domain diameter, follow these steps:

**1** Determine which interfaces will be used: TX, FX, or T4.

**2** Add up the combined length of all cabling to be used.

**3** Determine which class of repeaters, if any, are used in the collision domain diameter.

**4** Determine the maximum cable length by referring to Table 10, which contains cabling and repeater guidelines for three scenarios shown in Figure 11, Figure 12, and Figure 13.

For expanded guidelines, refer to the IEEE Standard 802.3.

**Figure 11** Collision Domain Diameter with No Repeater
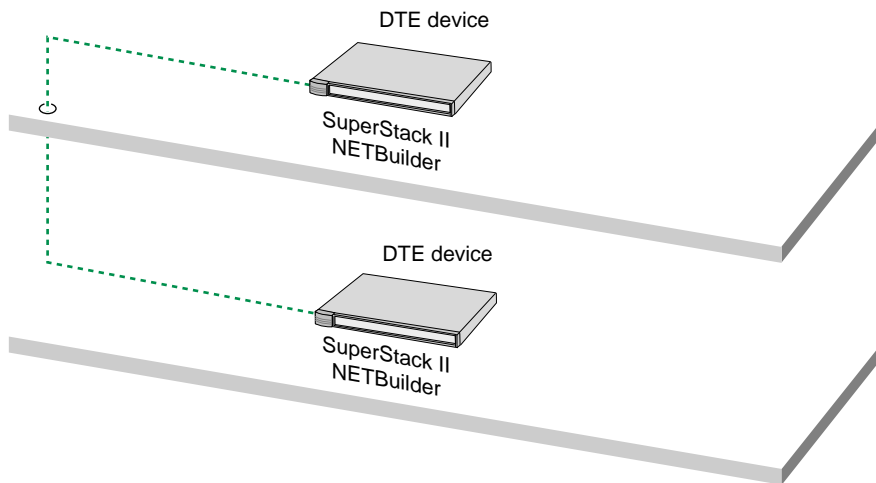


**Figure 12** Collision Domain Diameter with One Repeater
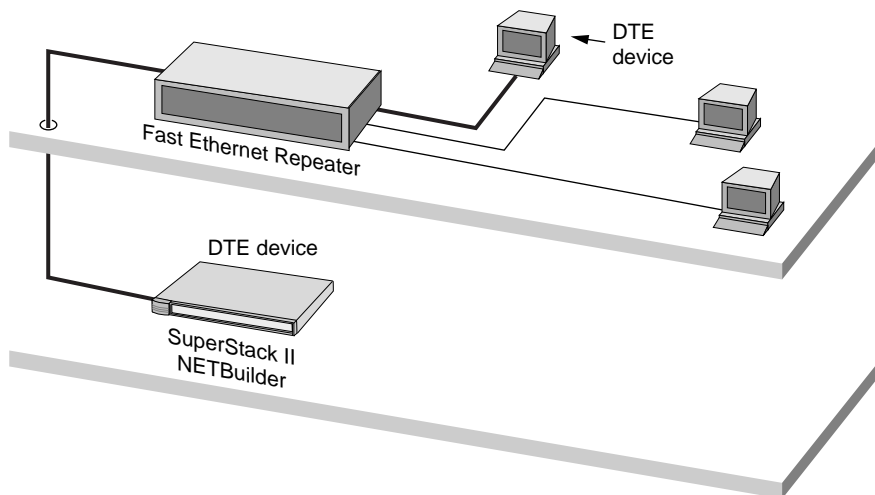
**Figure 13** Collision Domain Diameter with Two Repeaters
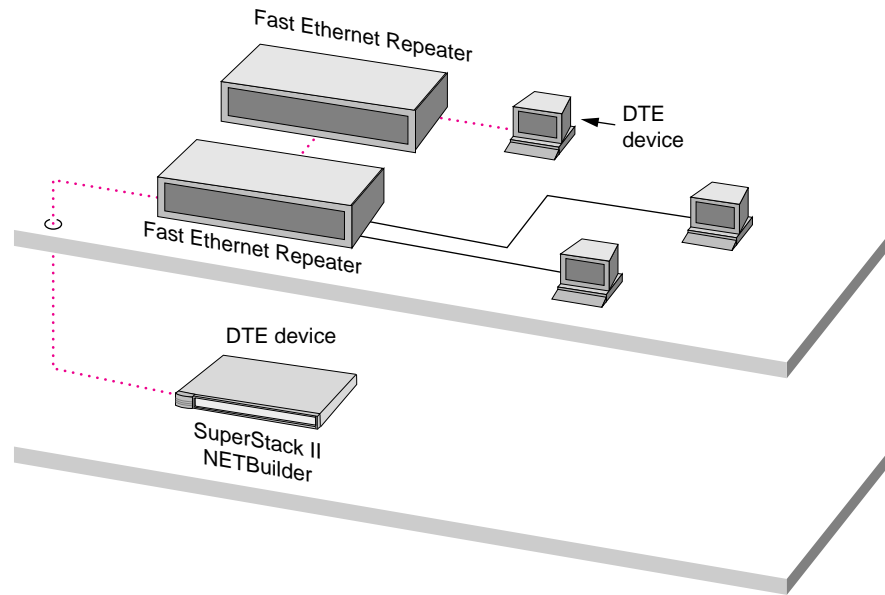


**Table 10** Maximum Cable Length in Example Collision Domain Diameters

| Scenario | Maximum Combined Cable Length, by Interface | | | |
| --- | --- | --- | --- | --- |
| | TX and/or T4 | FX Only | FX & TX | FX & T4 |
| No Repeaters (see Figure 11) | **100 m** | **412 m** | not applicable | not applicable |
| One Class 1 repeater* (see Figure 12) | **200 m** — 100 m *max.* on each side of the repeater | **272 m** | **260.8 m** 100 m *max.* TX Remaining length of FX | **231 m** 100 m *max.* T4 Remaining length of FX |
| One Class 2 repeater† (see Figure 12) | **200 m** — 100 m *max.* on each side of the repeater | **320 m** | **308.8 m** 100 m *max.* TX Remaining length of FX | **304 m‡** 100 m *max.* T4 Remaining length of FX |
| Two Class 2 repeaters (see Figure 13) | **205 m** — 100 m *max.* per cable span | **228 m** | **216.2 m** 105 m *max.* total TX, 100 m *max.* per TX cable span Remaining length of FX | **263.3 m‡** 105 m *max.* total T4, 100 m *max.* per T4 cable span Remaining length of FX |

* A high-delay repeater as specified in IEEE 802.3 standards. A Class 1 repeater usually connects dissimilar media, for instance, UTP to fiber.
† A low-delay repeater as specified in IEEE 802.3 standards. A Class 2 repeater usually connects similar media, for instance, UTP to UTP.
‡ This scenario is unlikely, because Class 2 repeaters do not usually connect FX to T4.

## WAN Connector and Cables

The WAN connector can be an ISDN S/T (model 43x and 53x), ISDN U (model 44x and 54x), 56/64 Kbps CSU/DSU (model 45x and 55x), or T1/FT1 CSU/DSU (model 46x and 56x) connector, depending on the interface module installed.

### ISDN S/T Cable

To connect a model 43x or model 53x bridge/router to an ISDN network, use a Category 5 shielded twisted-pair cable with an RJ-45 connector on both ends. 3Com does not supply this cable.

Figure 14 shows the pin assignments of the ISDN S/T cable.

**Figure 14**   ISDN S/T Cable



| Name | Abbr. | Pin | | Pin | Abbr. | Name |
|------|-------|-----|---|-----|-------|------|
| Not connected | NC | 1 | | 1 | NC | Not connected |
| Not connected | NC | 2 | | 2 | NC | Not connected |
| Transmit Data+ | TxD+ | 3 | | 3 | TxD+ | Transmit Data+ |
| Receive Data+ | RxD+ | 4 | | 4 | RxD+ | Receive Data+ |
| Receive Data- | RxD- | 5 | | 5 | RxD- | Receive Data- |
| Transmit Data- | TxD- | 6 | | 6 | TxD- | Transmit Data- |
| Not connected | NC | 7 | | 7 | NC | Not connected |
| Not connected | NC | 8 | | 8 | NC | Not connected |

To WAN port — RJ-45 male (shielded)

To wall outlet or NT1 — RJ-45 male (shielded)

**ISDN U Cable**  To connect a model 44x or model 54x bridge/router to an ISDN network, use a Category 5 shielded twisted-pair cable with an RJ-45 connector on the bridge/router end, and an RJ-11 connector at the wall. This cable comes with your bridge/router.

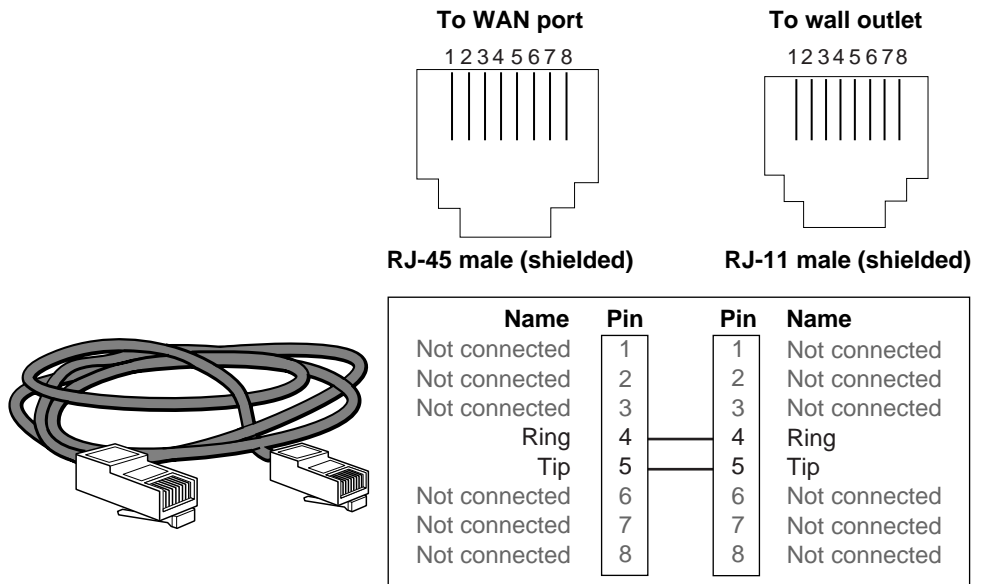Figure 15 shows the pinouts of the ISDN U cable.

**Figure 15**   ISDN U Cable

| | **To WAN port** | | | **To wall outlet** | |
|---|---|---|---|---|---|
| | 1 2 3 4 5 6 7 8 | | | 1 2 3 4 5 6 7 8 | |
| | **RJ-45 male (shielded)** | | | **RJ-11 male (shielded)** | |

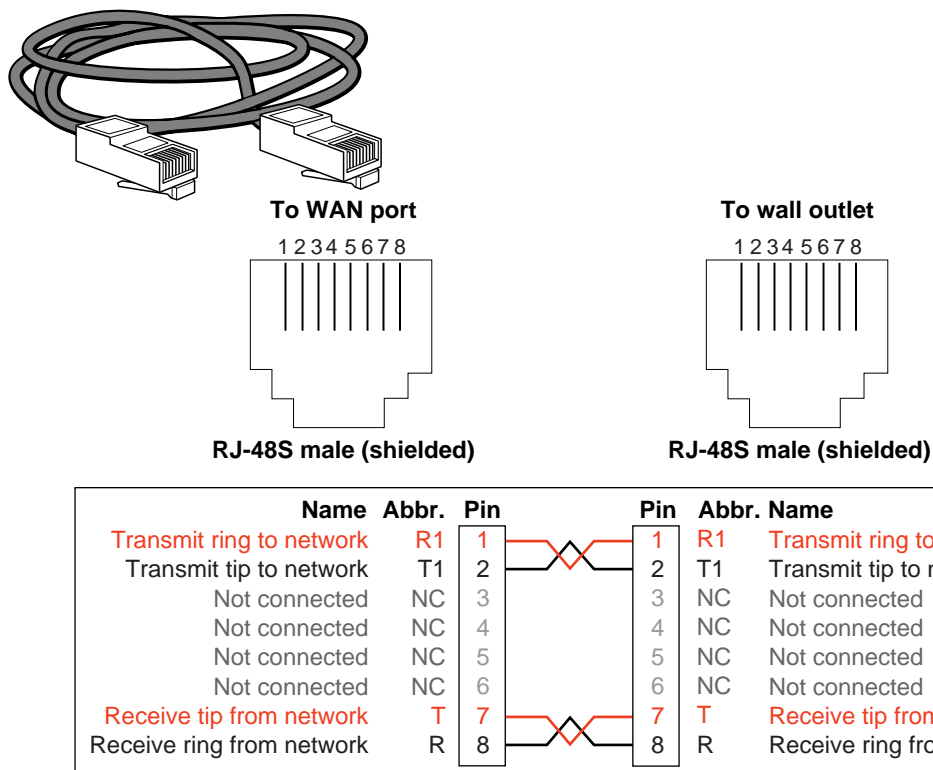| **Name** | **Pin** | **Pin** | **Name** |
|---|---|---|---|
| Not connected | 1 | 1 | Not connected |
| Not connected | 2 | 2 | Not connected |
| Not connected | 3 | 3 | Not connected |
| Ring | 4 | 4 | Ring |
| Tip | 5 | 5 | Tip |
| Not connected | 6 | 6 | Not connected |
| Not connected | 7 | 7 | Not connected |
| Not connected | 8 | 8 | Not connected |

**56/64K CSU/DSU Cable**
To connect a model 45x or model 55x bridge/router to a data digital service (DDS), use a cable with an RJ-48S connector. 3Com supplies this cable.

Figure 16 shows the pin assignments of the cable with both ends terminated in RJ-48S connectors.
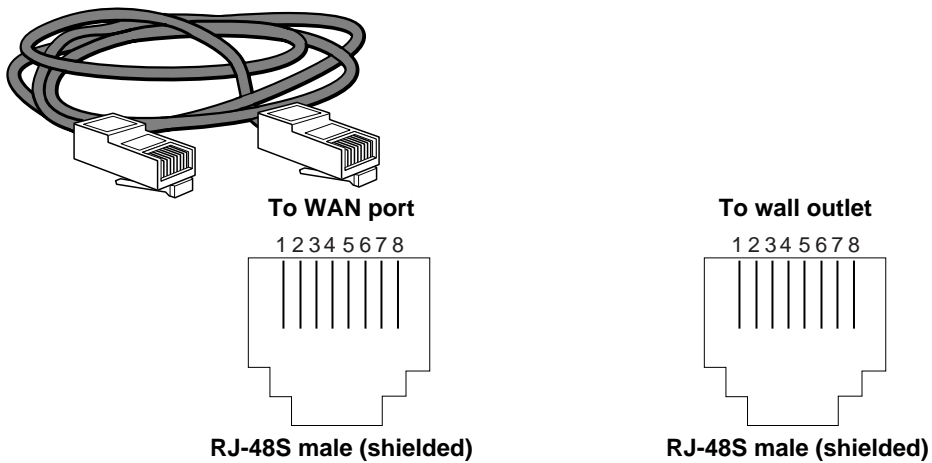
**Figure 16**   CSU/DSU Cable



**To WAN port**

1 2 3 4 5 6 7 8

**RJ-48S male (shielded)**

**To wall outlet**

1 2 3 4 5 6 7 8

**RJ-48S male (shielded)**

| Name | Abbr. | Pin | | Pin | Abbr. | Name |
|---|---|---|---|---|---|---|
| Transmit ring to network | R1 | 1 | | 1 | R1 | Transmit ring to network |
| Transmit tip to network | T1 | 2 | | 2 | T1 | Transmit tip to network |
| Not connected | NC | 3 | | 3 | NC | Not connected |
| Not connected | NC | 4 | | 4 | NC | Not connected |
| Not connected | NC | 5 | | 5 | NC | Not connected |
| Not connected | NC | 6 | | 6 | NC | Not connected |
| Receive tip from network | T | 7 | | 7 | T | Receive tip from network |
| Receive ring from network | R | 8 | | 8 | R | Receive ring from network |

**RJ-48 T1 Cable**    To connect a model 46x or model 56x bridge/router to a T1 or fractional T1 line, use a cable with an RJ-48 connector. 3Com does not supply this cable.

Figure 16 shows the pin assignments of the cable with both ends terminated in RJ-48 connectors.

**Figure 17**   RJ-48 T1 Cable



**To WAN port**

1 2 3 4 5 6 7 8

**RJ-48S male (shielded)**

**To wall outlet**

1 2 3 4 5 6 7 8

**RJ-48S male (shielded)**

| Name | Abbr. | Pin | | Pin | Abbr. | Name |
|---|---|---|---|---|---|---|
| Receive ring from network | R1 | 1 | | 1 | R1 | Receive ring from network |
| Receive tip from network | T1 | 2 | | 2 | T1 | Receive tip from network |
| Not connected | NC | 3 | | 3 | NC | Not connected |
| Transmit tip from network | T | 4 | | 4 | T | Transmit tip to network |
| Transmit ring to network | R | 5 | | 5 | R | Transmit ring to network |
| Not connected | NC | 6 | | 6 | NC | Not connected |
| Not connected | NC | 7 | | 7 | NC | Not connected |
| Not connected | NC | 8 | | 8 | NC | Not connected |

**Serial Connectors and Flex-WAN Cables**

The serial connectors on the bridge/router can be connected to DTE and DCE devices with the following interfaces:
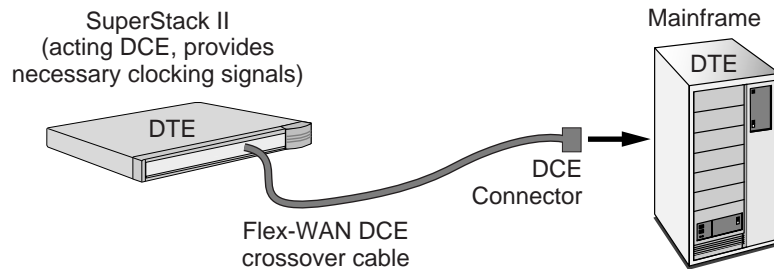
- RS-232
- V.35
- X.21
- RS-449
- RS-530 (DCE only)

DTEs include mainframes and automatic teller machines. DCEs include modems and CSU/DSUs.

A DCE must always connect to a DTE, and vice versa. If you need to connect a DTE to a DTE, or a DCE to a DCE, you can use a crossover cable between the two devices.

For example, a SuperStack II bridge/router is a DTE. To connect the bridge/router to another DTE, such as a mainframe, use a crossover Flex-WAN DCE cable. The DCE cable has a DCE connector on the end that connects to the mainframe (see Figure 18).

**Figure 18**   Connecting the Bridge/Router to a DTE Using a DCE Cable

SuperStack II
(acting DCE, provides
necessary clocking signals)

Mainframe

DTE

DTE

DCE
Connector

Flex-WAN DCE
crossover cable

To connect the bridge/router to a DCE, such as a modem, use a straight-through Flex-WAN DTE cable. The DTE cable has a DTE connector on the end that connects to the modem (see Figure 19).

**Figure 19**   Connecting the Bridge/Router to a DCE Using a DTE Cable

SuperStack II

DCE

DTE

DTE
connector

Modem

Flex-WAN DTE
straight-through cable
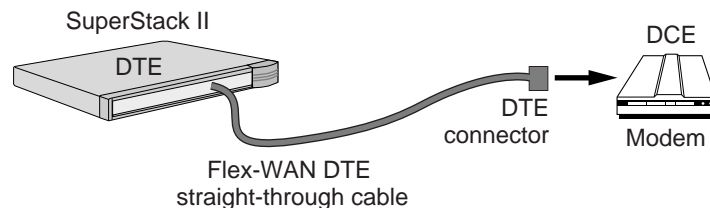
Flex-WAN cables can be purchased from 3Com. Table 11 lists each Flex-WAN cable and part number. Cable pinouts are provided in the following sections.

**Table 11**   Flex-WAN Cables

| Cable Length | Cable Type | Part Number | Pinouts |
|---|---|---|---|
| **4 ft.** | **RS-232 DTE** (straight-through cable to connect to a DCE) | 3C89002 | page 48 |
| | **RS-232 DCE** (crossover cable to connect to a DTE) | 3C89004 | page 49 |
| | **V.35 DTE** (straight-through cable to connect to a DCE) | 3C89006 | page 50 |
| | **V.35 DCE** (crossover cable to connect to a DTE) | 3C89008 | page 51 |
| | **X.21 DTE** (straight-through cable to connect to a DCE) | 3C89010 | page 52 |
| | **X.21 DCE** (crossover cable to connect to a DTE) | 3C890012 | page 53 |
| | **RS-449 DTE** (straight-through cable to connect to a DCE) | 3C890014 | page 54 |
| | **RS-449 DCE** (crossover cable to connect to a DTE) | 3C890016 | page 55 |
| | **RS-530 DTE** (straight-through cable to connect to a DCE) | 3C890018 | page 55 |
| | **V.35 extended shroud DTE** (straight-through cable to connect to a DCE)* | 3C890020 | page 50 |
| | **V.35 extended shroud DCE** (crossover cable to connect to a DTE)* | 3C89022 | page 51 |
| **10 ft.** | **RS-232 DTE** (straight-through cable to connect to a DCE) | 3C89001 | page 48 |
| | **RS-232 DCE** (crossover cable to connect to a DTE) | 3C89003 | page 49 |
| | **V.35 DTE** (straight-through cable to connect to a DCE) | 3C89005 | page 50 |
| | **V.35 DCE** (crossover cable to connect to a DTE) | 3C89007 | page 51 |
| | **X.21 DTE** (straight-through cable to connect to a DCE) | 3C89009 | page 52 |
| | **X.21 DCE** (crossover cable to connect to a DTE) | 3C890011 | page 53 |
| | **RS-449 DTE** (straight-through cable to connect to a DCE) | 3C890013 | page 54 |
| | **RS-449 DCE** (crossover cable to connect to a DTE) | 3C890015 | page 55 |
| | **RS-530 DTE** (straight-through cable to connect to a DCE) | 3C890017 | page 55 |
| | **V.35 extended shroud DTE** (straight-through cable to connect to a DCE)* | 3C890019 | page 50 |
| | **V.35 extended shroud DCE** (crossover cable to connect to a DTE)* | 3C890021 | page 51 |

* The V.35 extended shroud cable is required for some equipment, particularly IBM legacy equipment.

**RS-232 DTE Cable Pinouts**

This cable connects the bridge/router to an RS-232 DCE.
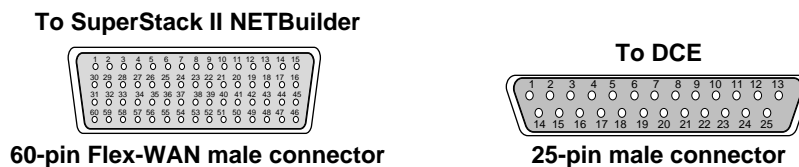
**Figure 20** Flex-WAN and RS-232 DTE Connectors

**To SuperStack II NETBuilder**

**60-pin Flex-WAN male connector**

**To DCE**

**25-pin male connector**

**Table 12** RS-232 DTE Cable Pinouts

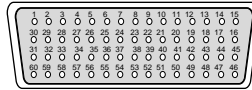| Flex-WAN Connector | | | RS-232 DTE Connector | | |
|---|---|---|---|---|---|
| Signal | Pin | Direction | Pin | Signal | Twisted Pair* |
| DCD/LL | 33 | ← | 8 | DCD | 1 |
| DSR/DTR | 34 | ← | 6 | DSR | 2 |
| CTS/RTS | 35 | ← | 5 | CTS | 3 |
| RxD/TxD | 36 | ← | 3 | RxD | 4 |
| TxC/Nil | 37 | ← | 15 | TxC | 5 |
| RxC/TxCE | 38 | ← | 17 | RxC | 6 |
| TxCE/TxC | 39 | → | 24 | TxCE | 7 |
| TxD/RxD | 41 | → | 2 | TxD | 8 |
| RTS/CTS | 42 | → | 4 | RTS | 9 |
| DTR/DSR | 43 | → | 20 | DTR | 10 |
| LL/DCD | 44 | → | 18 | LTST | 11 |
| Circuit Ground | 45 | - | 7 | Circuit Ground | 12 |
| Shield Ground | 46 | Cable Shield | 1 | Shield Ground | - |
| Shorting Group 1 | 50 51 52 | - | - | - | - |

* Unused twisted wires of a twisted pair should be connected to Shield Ground. In this cable this is one wire of each of the twisted pairs 1 to 12.

**RS-232 DCE Cable Pinouts**
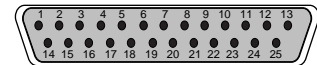
This cable connects the bridge/router to an RS-232 DTE.

**Figure 21** Flex-WAN and RS-232 DCE Connectors

**To SuperStack II NETBuilder**



**60-pin Flex-WAN male connector**

**To DTE**



**25-pin female connector**

**Table 13** RS-232 DCE Cable Pinouts

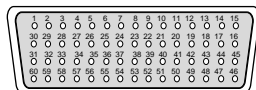| Flex-WAN Connector | | | RS-232 DCE Connector | | |
|---|---|---|---|---|---|
| Signal | Pin | Direction | Pin | Signal | Twisted Pair* |
| DCD/LL | 33 | ← | 18 | LTST | 1 |
| DSR/DTR | 34 | ← | 20 | DTR | 2 |
| CTS/RTS | 35 | ← | 4 | RTS | 3 |
| RxD/TxD | 36 | ← | 2 | TxD | 4 |
| RxC/TxCE | 38 | ← | 24 | TxCE | 5 |
| TxCE/TxC | 39 | → | 15 | TxC | 6 |
| Nil/RxC | 40 | → | 17 | RxC | 7 |
| TxD/RxD | 41 | → | 3 | RxD | 8 |
| RTS/CTS | 42 | → | 5 | CTS | 9 |
| DTR/DSR | 43 | → | 6 | DSR | 10 |
| LL/DCD | 44 | → | 8 | DCD | 11 |
| Circuit Ground | 45 | - | 7 | Circuit Ground | 12 |
| Shield Ground | 46 | Cable Shield | 1 | Shield Ground | - |
| Shorting Group 1 | 50 | - | - | - | - |
| | 51 | | | | |

* Unused twisted wires of a twisted pair should be connected to Shield Ground. In this cable this is one wire of each of the twisted pairs 1 to 12.

**V.35 DTE Cable Pinouts**

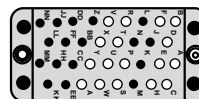This cable connects the bridge/router to a V.35 DCE.

**Figure 22** Flex-WAN and V.35 DTE Connectors

**To SuperStack II NETBuilder**



**60-pin Flex-WAN connector**

**To DCE**



**V.35 male connector**

**Table 14** V.35 DTE Cable Pinouts

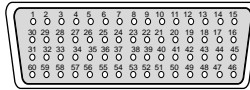| Flex-WAN Connector | | | V.35 DTE Connector | | |
| --- | --- | --- | --- | --- | --- |
| Signal | Pin | Direction | Pin | Signal | Twisted Pair* |
| SD/RD- | 17 | → | Q | SD- | 1 |
| SD/RD+ | 18 | → | P | SD- | |
| SCTE/SCT- | 19 | → | W | SCTE- | 2 |
| SCTE/SCT+ | 20 | → | U | SCTE+ | |
| TxC/RxC- | 23 | ← | AA | SCT- | 3 |
| TxC/RxC+ | 24 | ← | Y | SCT+ | |
| RxC/TxCE- | 25 | ← | X | SCR- | 4 |
| RxC/TxCE+ | 26 | ← | V | SCR+ | |
| RxD/TxD- | 27 | ← | T | RD- | 5 |
| RxD/TxD+ | 28 | ← | R | RD+ | |
| DCD/LL | 33 | ← | F | RLSD | 6 |
| DSR/DTR | 34 | ← | E | DSR | 7 |
| CTS/RTS | 35 | ← | D | CTS | 8 |
| RTS/CTS | 42 | → | C | RTS | 9 |
| DTR/DSR | 43 | → | H | DTR | 10 |
| LL/DCD | 44 | → | K | LT | 11 |
| Circuit Ground | 45 | - | B | Ground | 12 |
| Shield Ground | 46 | Cable Shield | A | Shield Ground | - |
| Shorting Group 1 | 48 49 | - | - | - | - |
| Shorting Group 2 | 50 51 52 | - | - | - | - |
| Shorting Group 3 | 53 54 55 56 | - | - | - | - |

* Unused twisted wires of a twisted pair should be connected to Shield Ground. In this cable this is one wire of each of the twisted pairs 6 to 12.

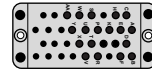**V.35 DCE Cable Pinouts**    This cable connects the bridge/router to a V.35 DTE.

**Figure 23**   Flex-WAN and V.35 DCE Connectors

**To SuperStack II NETBuilder**



**60-pin Flex-WAN connector**

**To DTE**



**V.35 female connector**

**Table 15**   V.35 DCE Cable Pinouts

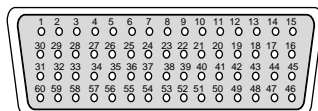| Flex-WAN Connector | | | V.35 DCE Connector | | |
|---|---|---|---|---|---|
| Signal | Pin | Direction | Pin | Signal | Twisted Pair* |
| SD/RD- | 17 | → | T | RD- | 1 |
| SD/RD+ | 18 | → | R | RS- | |
| SCTE/SCT- | 19 | → | AA | SCT- | 2 |
| SCTE/SCT+ | 20 | → | Y | SCT+ | |
| Nil/SCR- | 21 | → | X | SCR- | 3 |
| Nil/SCR+ | 22 | → | V | SCR+ | |
| RxC/TxCE- | 25 | ← | W | SCTE- | 4 |
| RxC/TxCE+ | 26 | ← | U | SCTE+ | |
| RxD/TxD- | 27 | ← | S | SD- | 5 |
| RxD/TxD+ | 28 | ← | P | SD+ | |
| DCD/LL | 33 | ← | K | LT | 6 |
| DSR/DTR | 34 | ← | H | DTR | 7 |
| CTS/RTS | 35 | ← | D | RTS | 8 |
| RTS/CTS | 42 | → | C | CTS | 9 |
| DTR/DSR | 43 | → | E | DSR | 10 |
| LL/DCD | 44 | → | F | RLSD | 11 |
| Circuit Ground | 45 | - | B | Ground | 12 |
| Shield Ground | 46 | Cable Shield | A | Shield Ground | - |
| Shorting Group 1 | 48 49 | - | - | - | - |
| Shorting Group 2 | 50 51 | - | - | - | - |
| Shorting Group 3 | 53 54 55 56 | - | - | - | - |

* Unused twisted wires of a twisted pair should be connected to Shield Ground. In this cable this
  is one wire of each of the twisted pairs 6 to 12.

**X.21 DTE Cable Pinouts**   This cable connects the bridge/router to an X.21 DCE.
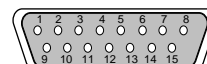
**Figure 24**   Flex-WAN and X.21 DTE Connectors

**To SuperStack II NETBuilder**

**To DCE**



**60-pin Flex-WAN male connector**

**15-pin male connector**

**Table 16**   X.21 DTE Cable Pinouts

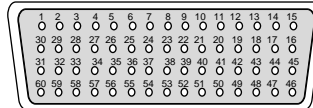| Flex-WAN Connector | | | X.21 DTE Connector | | |
|---|---|---|---|---|---|
| **Signal** | **Pin** | **Direction** | **Pin** | **Signal** | **Twisted Pair*** |
| CTS/RTS+ | 1 | ← | 5 | Indicate+ | 1 |
| CTS/RTS- | 2 | ← | 12 | Indicate- | |
| RTS/CTS+ | 9 | → | 3 | Control+ | 2 |
| RTS/CTS- | 10 | → | 10 | Control- | |
| TxD/RxD+ | 11 | → | 2 | Transmit+ | 3 |
| TxD/RxD- | 12 | → | 9 | Transmit- | |
| Circuit Ground | 15 | - | 8 | Control GND | 4 |
| RxC/TxCE- | 25 | ← | 13 | Timing- | 5 |
| RxC/TxCE+ | 26 | ← | 6 | Timing+ | |
| RxD/TxD- | 27 | ← | 11 | Receive- | 6 |
| RxD/TxD+ | 28 | ← | 4 | Receive+ | |
| Shield Ground | 46 | Cable Shield | 1 | Shield Ground | - |
| Shorting Group 1 | 47 48 | - | - | - | - |
| Shorting Group 2 | 51 52 | - | - | - | - |

* Unused twisted wires of a twisted pair should be connected to Shield Ground. In this cable this is one wire of twisted pair 4.

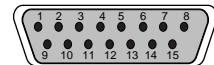**X.21 DCE Cable Pinouts**   This cable connects the bridge/router to an X.21 DTE.

**Figure 25**   Flex-WAN and X.21 DCE Connectors

**To SuperStack II NETBuilder**



**60-pin Flex-WAN male connector**

**To DTE**



**15-pin female connector**

**Table 17**   X.21 DCE Cable Pinouts

| Flex-WAN Connector | | | X.21 DCE Connector | | |
|---|---|---|---|---|---|
| Signal | Pin | Direction | Pin | Signal | Twisted Pair* |
| CTS/RTS+ | 1 | ← | 1 | Control+ | 1 |
| CTS/RTS- | 2 | ← | 2 | Control- | |
| RTS/CTS+ | 9 | → | 5 | Indicate+ | 2 |
| RTS/CTS- | 10 | → | 12 | Indicate- | |
| TxD/RxD+ | 11 | → | 4 | Receive+ | 3 |
| TxD/RxD- | 12 | → | 11 | Receive- | |
| Circuit Ground | 15 | - | 8 | Control GND | 4 |
| TxC/RxC- | 23 | ← | 13 | Timing- | 5 |
| TxC/RxC+ | 24 | ← | 6 | Timing+ | |
| RxD/TxD- | 27 | ← | 9 | Transmit- | 6 |
| RxD/TxD+ | 28 | ← | 2 | Transmit+ | |
| Shield Ground | 46 | Cable Shield | 1 | Shield Ground | - |
| Shorting Group 1 | 47 48 | - | - | - | - |

* Unused twisted wires of a twisted pair should be connected to Shield Ground. In this cable this is one wire of twisted pair 4.

**RS-449 DTE Cable Pinouts**

This cable connects the bridge/router to an RS-449 DCE.
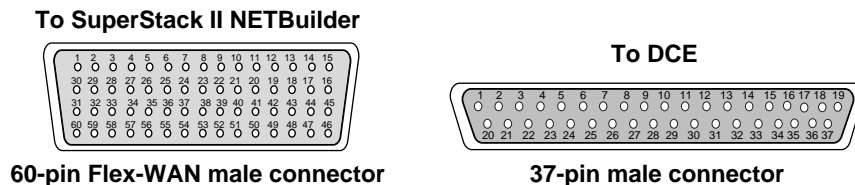
**Figure 26**   Flex-WAN and RS-449 DTE Connectors



**To SuperStack II NETBuilder**

**60-pin Flex-WAN male connector**

**To DCE**

**37-pin male connector**

**Table 18**   RS-449 DTE Cable Pinouts

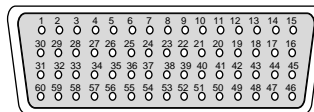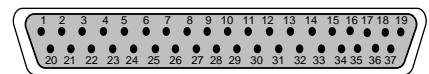| Flex-WAN Connector | | | RS-449 DTE Connector | | |
|---|---|---|---|---|---|
| Signal | Pin | Direction | Pin | Signal | Twisted Pair |
| CTS/RTS+ | 1 | ← | 9 | CS+ | 1 |
| CTS/RTS- | 2 | ← | 27 | CS- | |
| DSR/DTR+ | 3 | ← | 11 | DM+ | 2 |
| DSR/DTR- | 4 | ← | 29 | DM- | |
| DCD/DCD+ | 5 | ← | 13 | RR+ | 3 |
| DCD/DCD- | 5 | ← | 31 | RR- | |
| DTR/DSR+ | 7 | → | 12 | TR+ | 4 |
| DTR/DSR- | 8 | → | 30 | TR- | |
| RTS/CTS+ | 9 | → | 7 | RS+ | 5 |
| RTS/CTS- | 10 | → | 25 | RS- | |
| TxD/RxD+ | 11 | → | 25 | SD+ | 6 |
| TxD/RxD- | 12 | → | 4 | SD- | |
| TxCE/TxC+ | 13 | → | 17 | TT+ | 7 |
| TxCE/TxC- | 14 | → | 35 | TT- | |
| Circuit Ground | 15 | - | 19 | SGRC | 8 |
| Circuit Ground | 16 | - | 20 | SGRC | |
| TxC/RxC- | 23 | ← | 23 | ST- | 9 |
| TxC/RxC+ | 24 | ← | 5 | ST+ | |
| RxC/TxCE- | 25 | ← | 26 | RT- | 10 |
| RxC/TxCE+ | 26 | ← | 8 | RT+ | |
| RxD/TxD- | 27 | ← | 24 | RD- | 11 |
| RxD/TxD+ | 28 | ← | 6 | RD+ | |

(continued)

**Table 18**   RS-449 DTE Cable Pinouts (continued)

| Flex-WAN Connector | | | RS-449 DTE Connector | | |
|---|---|---|---|---|---|
| Signal | Pin | Direction | Pin | Signal | Twisted Pair |
| LL/DCD | 44 | → | 10 | LLSC | 12 |
| Circuit Ground | 45 | – | 37 | Circuit Ground | |
| Shield Ground | 46 | Cable Shield | 1 | Shield Ground | - |
| Shorting Group 1 | 48 49 | - | - | - | - |
| Shorting Group 2 | 51 52 | | | | - |

**RS-449 DCE Cable Pinouts**

This cable connects the bridge/router to an RS-449 DTE.

**Figure 27**   Flex-WAN and RS-449 DCE Connectors

**To SuperStack II NETBuilder**



**60-pin Flex-WAN male connector**

**To DTE**

**37-pin female connector**

**Table 19**   RS-449 DCE Cable Pinouts

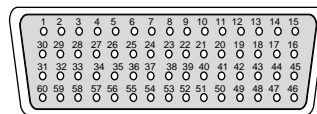| Flex-WAN Connector | | | RS-449 DCE Connector | | |
|---|---|---|---|---|---|
| Signal | Pin | Direction | Pin | Signal | Twisted Pair |
| CTS/RTS+ | 1 | ← | 7 | RS+ | 1 |
| CTS/RTS- | 2 | ← | 25 | RS- | |
| DSR/DTR+ | 3 | ← | 12 | TR+ | 2 |
| DSR/DTR- | 4 | ← | 30 | TR- | |
| DCD/DCD+ | 5 | ← | 13 | RR+ | 3 |
| DCD/DCD- | 5 | ← | 31 | RR- | |
| DTR/DSR+ | 7 | → | 11 | DM+ | 4 |
| DTR/DSR- | 8 | → | 29 | DM- | |
| RTS/CTS+ | 9 | → | 9 | CS+ | 5 |
| RTS/CTS- | 10 | → | 27 | CS- | |
| TxD/RxD+ | 11 | → | 6 | RD+ | 6 |
| TxD/RxD- | 12 | → | 24 | RD- | |

**Table 19** RS-449 DCE Cable Pinouts (continued)

| Flex-WAN Connector | | | RS-449 DCE Connector | | |
|---|---|---|---|---|---|
| Signal | Pin | Direction | Pin | Signal | Twisted Pair |
| (continued) | | | | | |
| TxCE/TxC+ | 13 | → | 5 | ST+ | 7 |
| TxCE/TxC- | 14 | → | 23 | ST- | |
| Circuit Ground | 15 | - | 19 | SGRC | 8 |
| Circuit Ground | 16 | - | 20 | SGRC | |
| TxC/RxC- | 23 | ← | 26 | RT- | 9 |
| TxC/RxC+ | 24 | ← | 8 | RT+ | |
| RxC/TxCE- | 25 | ← | 35 | TT- | 10 |
| RxC/TxCE+ | 26 | ← | 17 | TT+ | |
| RxD/TxD- | 27 | ← | 22 | SD- | 11 |
| RxD/TxD+ | 28 | ← | 4 | SD+ | |
| Nil/LL | 29 | ← | 10 | LLSC | 12 |
| Circuit Ground | 30 | - | 37 | Ground | |
| Shield Ground | 46 | Cable Shield | 1 | Shield Ground | - |
| Shorting Group 1 | 48 49 | - | - | - | - |

**RS-530 DTE Cable Pinouts**

This cable connects the bridge/router to an RS-530 DCE.

**Figure 28**   Flex-WAN and RS-530 DTE Connectors

**To SuperStack II NETBuilder**
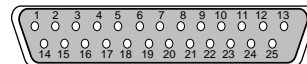


**60-pin Flex-WAN male connector**

**To DCE**



**25-pin male connector**

**Table 20**   RS-530 DTE Cable Pinouts

| Flex-WAN Connector | | | RS-530 DTE Connector | |
| --- | --- | --- | --- | --- |
| **Signal** | **Pin** | **Direction** | **Pin** | **Signal** |
| CTS/RTS+ | 1 | ← | 5 | CTS+ |
| CTS/RTS- | 2 | ← | 13 | CTS- |
| DSR/DTR+ | 3 | ← | 6 | DSR+ |
| DSR/DTR- | 4 | ← | 22 | DSR- |
| DCD/DCD+ | 5 | ← | 8 | DCD+ |
| DCD/DCD- | 5 | ← | 10 | DCD- |
| DTR/DSR+ | 7 | → | 20 | DTR+ |
| DTR/DSR- | 8 | → | 23 | DTR- |
| RTS/CTS+ | 9 | → | 4 | RTS+ |
| RTS/CTS- | 10 | → | 19 | RTS- |
| TxD/RxD+ | 11 | → | 2 | TxD+ |
| TxD/RxD- | 12 | → | 14 | TxD- |
| TxCE/TxC+ | 13 | → | 24 | TxCE+ |
| TxCE/TxC- | 14 | → | 11 | TxCE- |
| TxC/RxC- | 23 | ← | 12 | TxC- |
| TxC/RxC+ | 24 | ← | 15 | TxC+ |
| RxC/TxCE- | 25 | ← | 9 | RxC- |
| RxC/TxCE+ | 26 | ← | 17 | RxC+ |
| RxD/TxD- | 27 | ← | 16 | RxD- |
| RxD/TxD+ | 28 | ← | 3 | RxD+ |
| LL/DCD | 44 | ← | 18 | LL |
| Circuit Ground | 45 | - | 7 | Circuit Ground |
| Shield Ground | 46 | Cable Shield | 1 | Shield Ground |
| Shorting Group 1 | 47 48 49 | - | - | - |

# 5

# INSTALLING OR REMOVING AN INTERFACE MODULE

This chapter describes how to install or remove interface modules in SuperStack II NETBuilder SI bridge/routers.

The following table lists each model number and the interface module it contains.

| Model | Module Installed |
|-------|------------------|
| 43x/53x | ISDN S/T port with no interface module |
| 44x/54x | ISDN U interface module |
| 45x/55x | 56/64 Kbps CSU/DSU module |
| 46x/56x | T1/FT1 CSU/DSU module |

You can change any model 4xx bridge/router to another model 4xx, or any model 5xx bridge/router to another model 5xx bridge/router by installing, removing, or replacing the interface module.
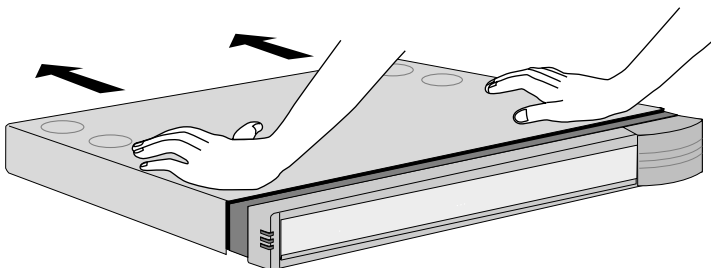
## Removing the Cover

To remove the cover, follow these steps:

1 Remove the power cord and all cables from the chassis.

2 If the bridge/router is mounted with brackets, unmount it and remove the brackets.

3 Remove the two screws from the back of the chassis.
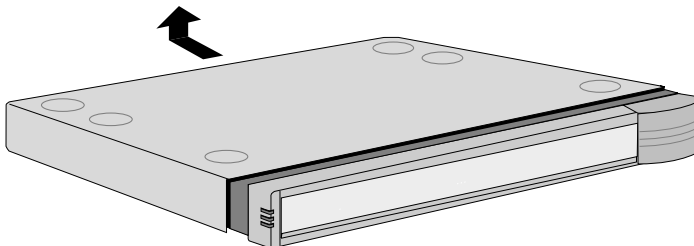

Remove screws
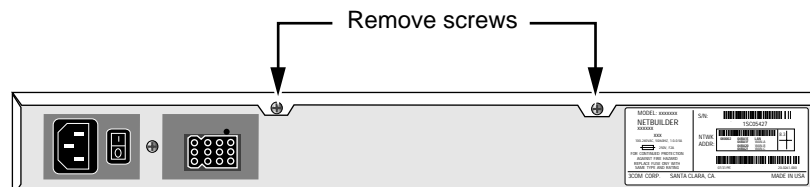
**4** Remove the cover.
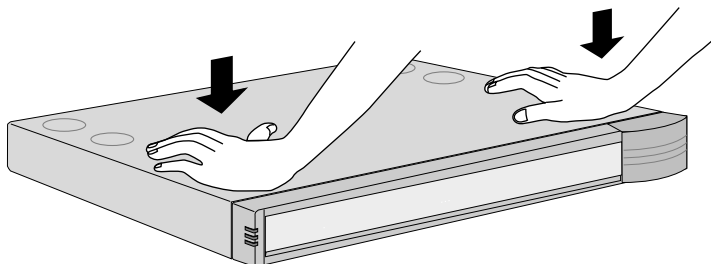
With the front panel facing you, push down on cover with both hands
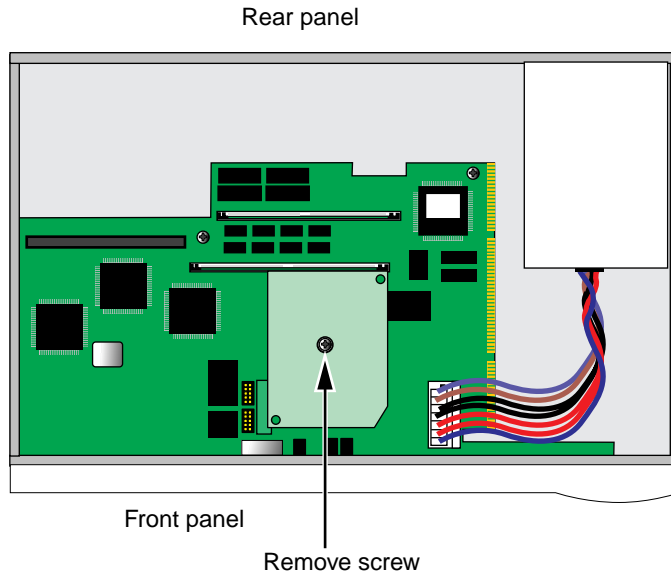
Slide cover back slightly
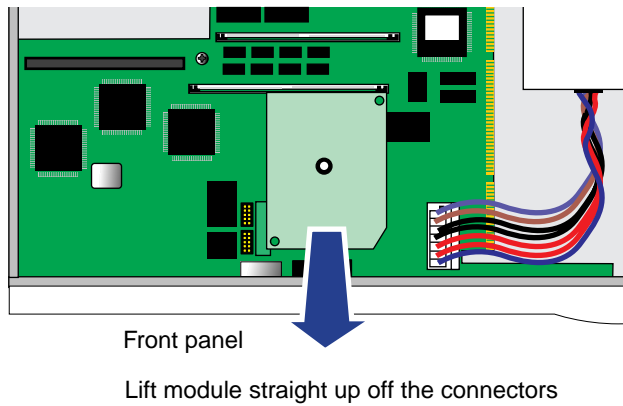
Lift cover away from chassis

**Removing an Existing Module (Model 4xx)**

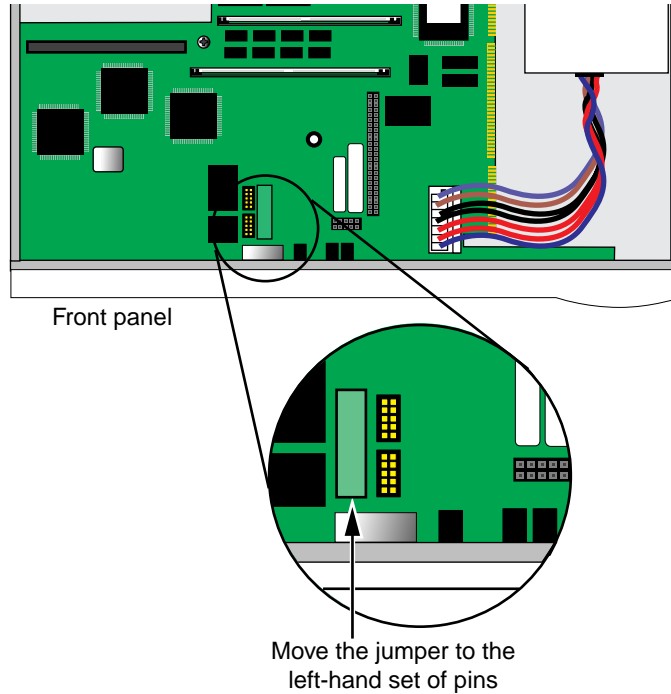To remove an existing module from a model 4xx bridge/router, follow these steps:

**1** Remove the screw from the standoff.

Rear panel



Front panel

Remove screw

**2** Remove the module.



Front panel

Lift module straight up off the connectors

**3** If you are not installing another module, change the jumper to the left-hand set of pins and reinstall the screw on the standoff.

Front panel

Move the jumper to the
left-hand set of pins

**4** Reinstall the cover and the cover screws.

⚠ *CAUTION: The DIP switches should all be in the down position. The DIP switches are accessible through an opening on the side of the chassis.*

Install screws

DIP switches should all
be in the down position

**5** If the bridge/router was mounted with brackets, reinstall the brackets and remount it.

**6** Reconnect the power cord and all cables.

**Installing a New Module (Model 4xx)**

To install a new module in a model 4xx bridge/router, follow these steps:

**1** Remove the screw from the standoff if necessary.



Front panel

Remove screw

**2** Move the jumper to the right-hand set of pins.



Front panel

Move the jumper to the
right-hand set of pins

**3** Insert the new module.



Front panel

Connectors

Connectors
(on underside
of module)

Install module by matching connectors

**4** Reinstall the screw on the standoff.

**5** Reinstall the cover and the cover screws.

⚠ *CAUTION: The DIP switches should all be in the down position. The DIP switches are accessible through an opening on the side of the chassis.*
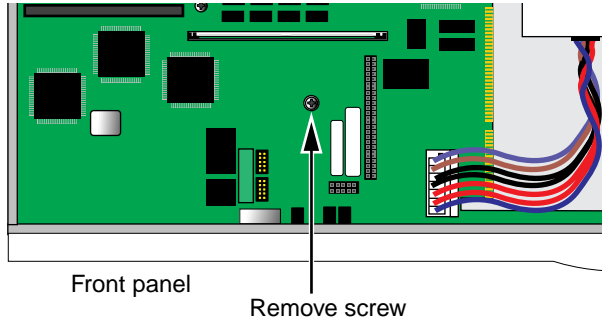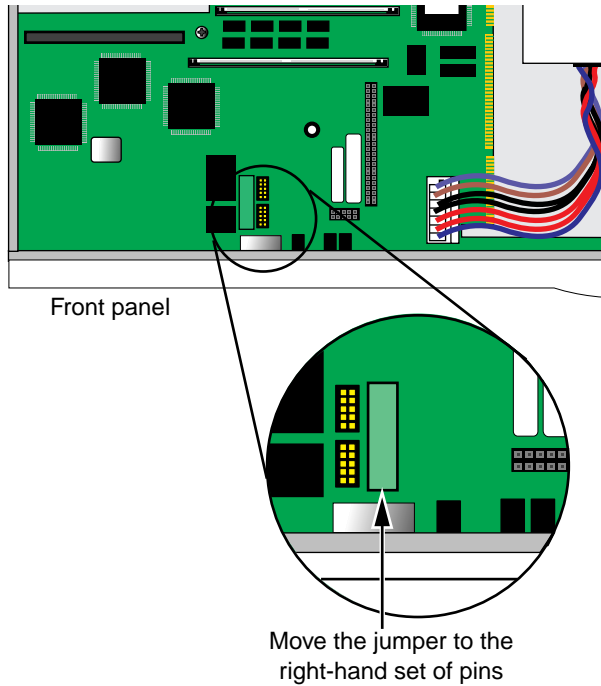


Install screws

DIP switches should all
be in the down position

**6** If the bridge/router was mounted with brackets, reinstall the brackets and remount it.

**7** Reconnect the power cord and all cables.

| **Removing an Existing Module (Model 5xx)** | To remove an existing module from a model 5xx bridge/router, follow these steps: |

**1** Remove the screw from the standoff.

Rear panel

Front panel

Remove screw

**2** Remove the module.

Front panel

Lift module straight up off the connectors

**3** If you are not installing another module, change the jumper to the left-hand set of pins and reinstall the screw on the standoff.



Front panel

Move the jumper to the
left-hand set of pins

**4** Reinstall the cover and the cover screws.

⚠ *CAUTION: The DIP switches should all be in the down position. The DIP switches are accessible through an opening on the side of the chassis.*



Install screws

DIP switches should all
be in the down position

**5** If the bridge/router was mounted with brackets, reinstall the brackets and remount it.

**6** Reconnect the power cord and all cables.
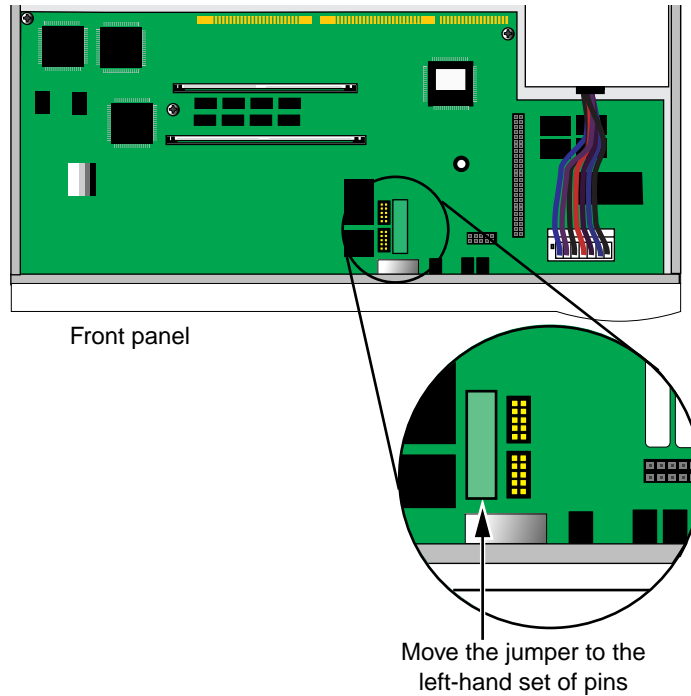
**Installing a New Module (Model 5xx)**

To install a new module in a model 5xx bridge/router, follow these steps:

**1** Remove the screw from the standoff if necessary.

Rear panel

Front panel

Remove screw

**2** Move the jumper to the right-hand set of pins.



Front panel

Move the jumper to the
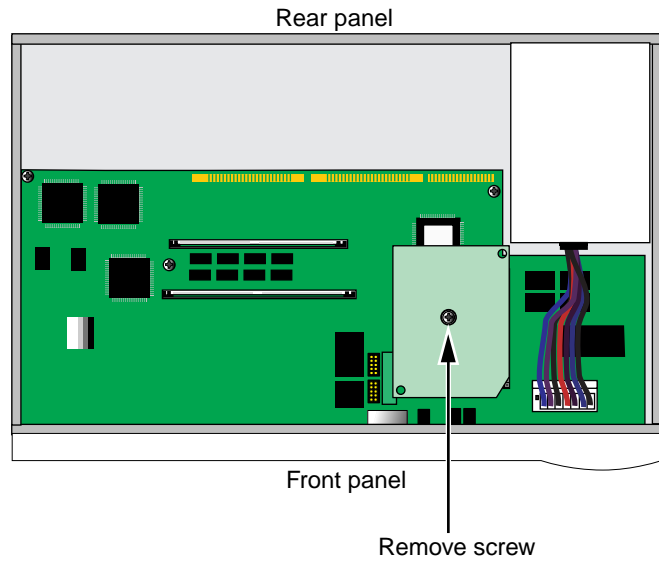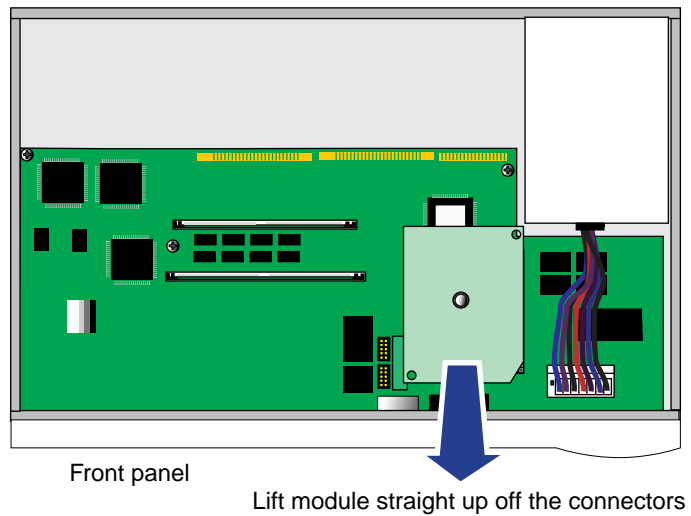right-hand set of pins

**3** Insert the new module.



Front panel

Connectors

Connectors
(on underside
of module)

Install module by matching connectors

**4** Reinstall the screw on the standoff.

**5** Reinstall the cover and the cover screws.

⚠️ *CAUTION: The DIP switches should all be in the down position. The DIP switches are accessible through an opening on the side of the chassis.*
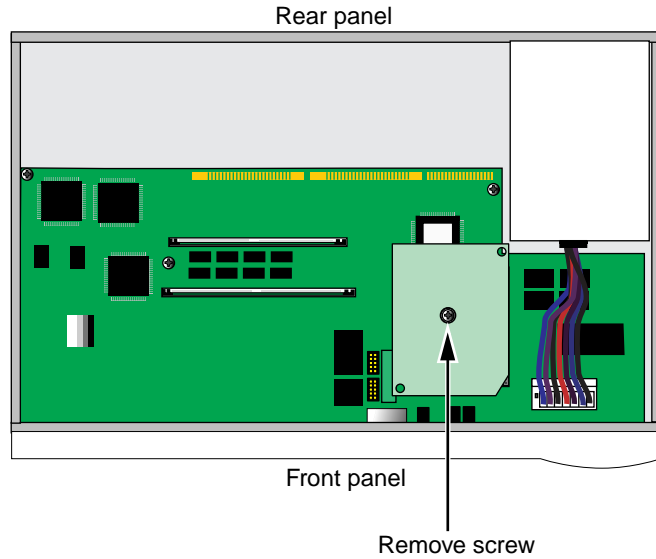
Install screws

DIP switches should all
be in the down position

**6** If the bridge/router was mounted with brackets, reinstall the brackets and remount it.
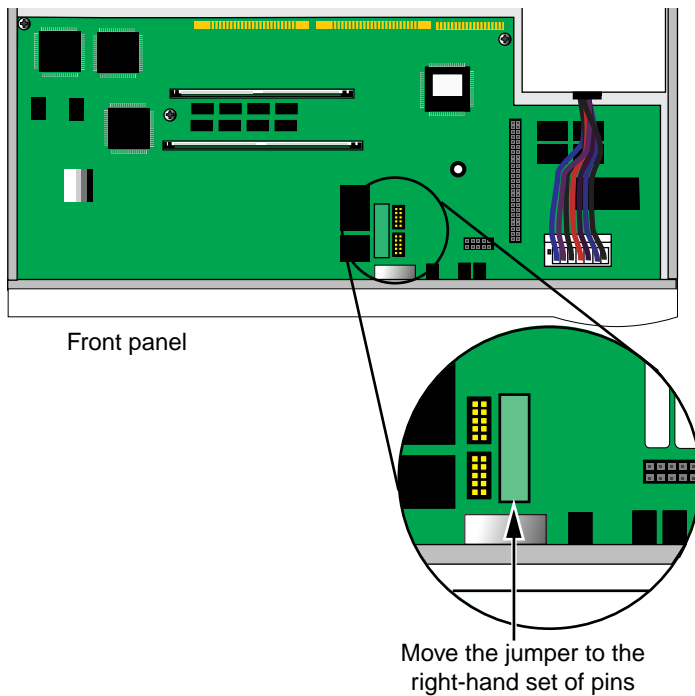
**7** Reconnect the power cord and all cables.

# A
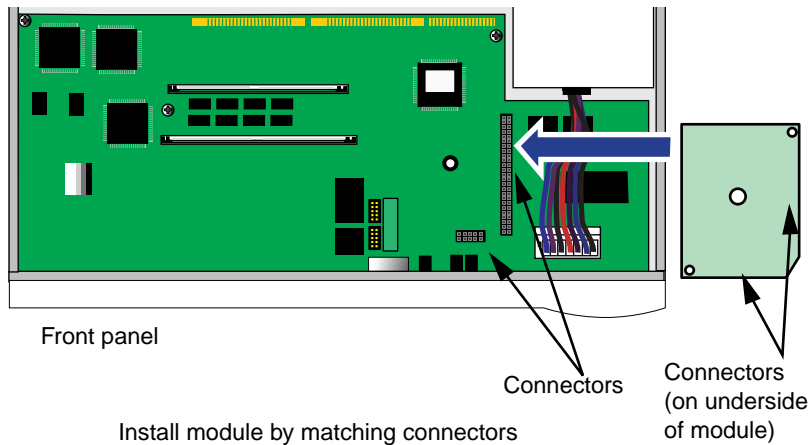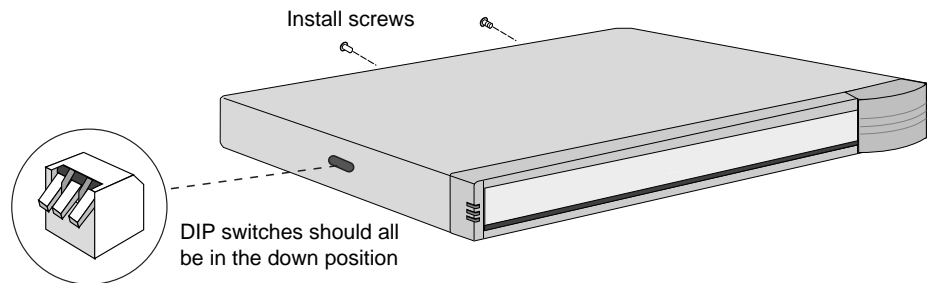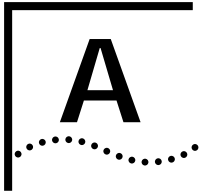
# PROVISIONING YOUR ISDN LINE

This appendix provides U.S., Canadian, German, and Dutch provisioning information for the built-in ISDN port on model 43x, 53x, 44x and 54x SuperStack II NETBuilder SI bridge/routers.

## Ordering U.S. and Canadian ISDN BRI Services

To order ISDN service from your telephone company, follow these steps:

**1** Call the telephone company and ask for the ISDN representative.

**2** Tell the representative you want ISDN service for a SuperStack II NETBuilder SI bridge/router, and that you have the following information:

- Line provisioning
- ISDN outlet type

**3** Tell the representative that the Bellcore ISDN ordering code (IOC) is "Capability R." The IOC tells the telephone company which parameter settings to use for SuperStack II bridge/routers.

> *Not all Regional Bell Operating Companies use IOCs.*

**4** If you have a model 43x or model 53x bridge/router with an ISDN S/T connector, ask for an NT1 to connect your SuperStack II bridge/router to the ISDN line. (You can also purchase an NT1 from a reseller.)

**5** Ask for the following information to fill out the ISDN Information Sheet:

- **ISDN Switch Type.** Ask the representative which ISDN switch type your line uses. Place a check mark next to that switch on the ISDN Information Sheet. Each switch type has a corresponding provisioning information table later in this section.

- **Number of ISDN Phone Numbers.** Your ISDN line can support one or two phone numbers. Specify how many phone numbers you are ordering.

- **Phone Numbers.** Ask the telephone representative for your ISDN phone numbers and write them in the space provided.

- **Service Profile ID (SPID) Number.** Ask the telephone representative for your SPID numbers. ((For a point-to-point line only one SPID may be provided. For a multipoint line, the telephone representative should provide two SPID numbers.) A SPID number has 10–15 characters; for example, 0155512120. Your switch type may not require the SPID number.

*Your telephone company gives you the phone number and SPID number after it installs your line.*

| ISDN Information Sheet 3Com SuperStack II NETBuilder SI Bridge/Router | |
|---|---|
| ISDN Switch Type | |
| AT&T 5ESS NI1 | ❐ |
| AT&T 5ESS Custom | ❐ |
| Northern Telecom DMS 100 | ❐ |
| Siemens EWSD | ❐ |
| Number of ISDN phone numbers (1 or 2) | |
| Phone number 1 | |
| Phone number 2 | |
| SPID number for phone number 1 | |
| SPID number for phone number 2 | |

*If your telephone company has the IOC for a SuperStack II bridge/router or boundary router, you do not need to complete step 6.*

**6** Provide provisioning information that corresponds to your ISDN switch using the tables in the following sections.

**Switch Provisioning Tables**   This section provides provisioning information for the following switch types in the U.S. and Canada:

- AT&T 5ESS
- AT&T 5ESS Custom
- DMS 100 and National ISDN 1
- Siemens EWSD

### AT&T 5ESS Switch

To order ISDN service for an AT&T 5ESS switch, provide the telephone company with the information in Table 21.

**Table 21** Ordering ISDN Service for an AT&T 5ESS Switch

| Required Information | Specification |
|---|---|
| Line type | National ISDN 1 line |
| Line code | 2B1Q (2B+D) |
| Interface type | S/T interface with NT1 (model 43x) or U interface (model 44x) and RJ-45 jack |
| Maximum terminals (MAXTERM) | 1 |
| Maximum B channels (MAXB CHNL) | 2 |
| Actual user | Yes |
| Circuit-switched data | 2 |
| Circuit-switched data channel | Any |
| Terminal type | A-Basic or E-Type (data only) Terminal |
| Display | No |
| Circuit-switched data limit | 2 |
| Voice or data | Data |
| Call appearance | Idle |
| **DN (directory number) must be set as follows:** | |
| **Parameter** | **Setting** |
| B1 | Circuit-switched data |
| B2 | Circuit-switched data |
| D | Signaling only |
| MAXTERM | 1 |
| MAXB CHNL | 2 |
| ACT USR | Y |
| CSD | 2 |
| CSD CHL | Any |
| TERMTYP | TYPEA or TYPEE |
| Display | No |
| CSD Limit | 2 |
| CA PREF | 1 |

### AT&T 5ESS Custom Switch

To order ISDN service for an AT&T 5ESS custom switch, provide the telephone company with the information in Table 22.

**Table 22**   Ordering ISDN Service for an AT&T 5ESS Custom Switch

| Required Information | Specification |
| --- | --- |
| Line type | ISDN line with point-to-point configuration |
| Line code | 2B1Q (2B+D) |
| Interface type | S/T interface with NT1 (model 43x) or U interface (model 44x) and RJ-45 jack |
| Maximum terminals (MAXTERM) | 1 |
| Maximum B channels (MAXB CHNL) | 2 |
| Circuit-switched data (CSD) | 2 |
| Circuit-switched data channel (CSD CHL) | Any |
| Terminal type (TERMTYP) | A-Basic or E-Type (data only) Terminal |
| Display | No |
| Voice or data | Data |
| Call appearance preference | Idle |
| **DN must be set as follows:** | |
| **Parameter** | **Setting** |
| B1 | Circuit-switched data |
| B2 | Circuit-switched data |
| D | Signaling only |
| ACT USR | Yes |
| TERMTYP | TYPEA or TYPEE |
| CSD Limit | 2 |
| CA PREF | 1 |

*A point-to-point configuration on a SuperStack II bridge/router or boundary router is selected by setting the SPIDn1 and SPIDn2 parameters to none.*

### DMS 100 and National ISDN 1

To order ISDN service for a DMS 100 or National ISDN 1 switch, provide the telephone company with the information in Table 23.

**Table 23** Ordering ISDN Service for a DMS 100 Switch

| Required Information | Specification |
| --- | --- |
| Line type | DMS 100 or National ISDN 1 line |
| Line code | 2B1Q (2B+D) |
| Interface type | S/T interface with NT1 (model 43x) or U interface (model 44x) and RJ-45 jack |
| Circuit-switched option | Yes |
| Bearer Restriction option | No packet mode data (NOPMD) |
| Protocol | Functional version 0 (PVC 0) for DMS 100 |
| | Functional version 2 (PVC 2) for National ISDN |
| SPID suffix | 1 in North America only |
| Terminal endpoint identifier (TEI) | Dynamic |
| Ring | No |
| Key system (EKTS) | No |
| Voice or data | Data |
| **DN must be set as follows:** | |
| **Parameter** | **Setting** |
| B1 | Circuit-switched data |
| B2 | Circuit-switched data |
| D | Signaling only |
| MAXTERM | 1 |
| MAXB CHNL | 2 |
| ACT USR | Y |
| CSD | 2 |
| CSD CHL | Any |
| Display | No |
| CSD Limit | 2 |
| CA PREF | 1 |

### Siemens EWSD Switch

To order ISDN service for a Siemens EWSD switch, provide the phone company with the information in Table 23.

**Table 24**   Ordering ISDN Service for a Siemens EWSD Switch

| Required Information | Specification |
| --- | --- |
| Line Type | National ISDN 1 line |
| Line Code | 2B1Q (2B+D) |
| Interface Type | S/T interface with NT1 (model 43x) or U interface (model 44x) and RJ-45 jack |
| Circuit-switched Option | Yes |
| Bearer Restriction Option | No packet mode data (NOPMD) |
| Protocol | PPP |
| SPID suffix | 1 |
| Terminal Endpoint Identifier (TEI) | Dynamic |
| Ring | No |
| Maximum Keys | 64 |
| Key System (EKTS) | No |
| Voice or Data | Data |
| Lower Layer Compatibility Option for Data | B channels |

**SPIDs**   When you request services, you may also need the following information about SPIDs and other service attributes:

- Request multipoint, initializing terminal service; the maximum number of terminals is two. The service provider supplies you with two SPIDs.

- If you request ISDN service from an AT&T 5ESS service provider and the switch is running custom (or non-National ISDN 1) software, the format is:

  01 + 7-digit telephone number + 1-digit suffix.

- If you request a different telephone numbers for each B channel, the suffix can be the same. A suffix of 0 is typical in this case. If you decide to use the same telephone number for both B channels, use a different suffix so that the two SPIDs are unique.

- If you request NI-1 (National ISDN 1) service from an AT&T 5ESS service provider, the format is:

  01 + 7-digit telephone number + 1-digit suffix + 2-digit TID (terminal identifier).

■ The SPID numbers must be unique. The 2-digit TID can be any number from 0 to 62. The TID has no effect on the operation of the SuperStack II bridge/router, but it is a necessary part of the SPID that the bridge/router uses to gain access to the ISDN network.

■ If you request ISDN service from a Northern Telecom DMS-100 service provider, the format is:

Area code + 7-digit telephone number + 0 to 8 digit suffix + 2 digit TID.

■ The TID can be any number from 0 to 62, but needs to be unique so that the SPIDs are also unique. This format applies when the switch is running Custom and NI-1 (North American 3) versions of software.

■ If you order AT&T 5ESS Custom ISDN services, choose either a Type A or Type E terminal. The Type E terminal is preferable because it is for data only.

■ **Do not** request supplementary services, such as autohold or conference, because a SuperStack II bridge/router does not support them.

**NT1s and Power Supplies**

The models 43x and 53x bridge/routers do not come with an NT1. North American telephone companies require an NT1 and a power supply for every ISDN line. Your service provider or telephone company can provide you with an NT1 and power supply for a small monthly fee. However, you may prefer to purchase it from an ISDN equipment vendor. The NT1 and power supply may come in a single, standalone box or the two may be in separate units. In this discussion, the two units together are referred to as an NT1.

**i** *The model 44x and model 54x bridge/routers have an integrated NT1.*

Telephone companies in North America use two kinds of NT1s, differentiated by the data encoding scheme used in transmitting data between the NT1 and the telephone company's equipment. The two data encoding schemes are 2B1Q (two bits mapped into one quaternary symbol) and alternate mark inversion (AMI). The 2B1Q scheme is the dominant method in use today. The AMI scheme is older and rarely used.

| **Ordering German ISDN BRI Services** | To order German ISDN services, follow these steps: |

**1** Acquire a form entitled "Telefondienstauftrag im ISDN (Euro-ISDN-Anschluß)" from the Telekom.

**2** At the top of the form, select "Neuanschluß."

**3** Under "Auftraggeber," provide the requested information.

**4** Under "Anschluß," specify "Basisanschluß als Standardanschluß."

By specifying "Basisanschluß als Standardanschluß, " you are requesting standard basic rate interface (BRI) service. Under "Anschrift Standort," provide the requested information.

**5** Under "Anschlußnutzung," specify "Mehrgeräteanschluß."

By specifying "Mehrgeräteanschluß," you are requesting a connection for multiple types of equipment, such as bridge/routers, telephones, faxes, and computers.

**6** Sign your name at the bottom of the form.

*The SuperStack II bridge/router software does not currently support the 1TR6 switch type. If you have an existing 1TR6 connection, request that the connection be changed to a Euro-ISDN connection using this form. In case the Telekom requests this information, the approval number for Germany (Bundesamt Für Zulassungen In Der Telekommunikation) is A115352E.*

*When ordering ISDN lines in Germany, make sure to order point-to-multipoint ISDN lines. The SuperStack II bridge/router does not support point-to-point configurations when attached to the German ISDN network.*

**Ordering Dutch
ISDN BRI Services**

To order ISDN services from the Dutch PTT, follow these steps:

**1** Acquire a form entitled "Aanvraag formulier ISDN aansluiting from the Dutch PTT."

**2** Under 1, specify "Nieuwe ISDN-aansluiting".

**3** Under 3, specify the requested connection date.

**4** Under 4, specify "Enkelvoudige ISDN-2 aansluiting".

**5** Under 7, specify how many phone numbers you want to assign to the ISDN line (MSN).

**6** Under 8, specify any extra services required.

**7** Provide the requested information for parts 13 through 22.

**8** Sign your name at the bottom of the form.
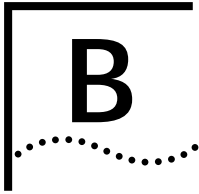
# B  TECHNICAL SUPPORT

3Com provides easy access to technical support information through a variety of services. This appendix describes these services.

Information contained in this appendix is correct at time of publication. For the very latest, 3Com recommends that you access the 3Com Corporation World Wide Web site.

## Online Technical Services

3Com offers worldwide product support 24 hours a day, 7 days a week, through the following online systems:

- World Wide Web site
- 3Com FTP site
- 3Com Bulletin Board Service (3Com BBS)
- 3ComFacts℠ automated fax service

## World Wide Web Site

Access the latest networking information on the 3Com Corporation World Wide Web site by entering the URL into your Internet browser:

`http://www.3com.com/`

This service provides access to online support information such as technical documentation and software library, as well as support options ranging from technical education to maintenance and professional services.

## 3Com FTP Site

Download drivers, patches, and software across the Internet from the 3Com public FTP site.  This service is available 24 hours a day, 7 days a week.

To connect to the 3Com FTP site, enter the following information into your FTP client:

■ Hostname: `ftp.3com.com` (or `192.156.136.12`)

■ Username: `anonymous`

■ Password: `<your Internet e-mail address>`

*A user name and password are not needed with Web browser software such as Netscape Navigator and Internet Explorer.*

**3Com Bulletin Board Service**

The 3Com BBS contains patches, software, and drivers for 3Com products. This service is available through analog modem or digital modem (ISDN) 24 hours a day, 7 days a week.

### Access by Analog Modem

To reach the service by modem, set your modem to 8 data bits, no parity, and 1 stop bit. Call the telephone number nearest you:

| Country | Data Rate | Telephone Number |
| --- | --- | --- |
| Australia | Up to 14,400 bps | 61 2 9955 2073 |
| Brazil | Up to 14,400 bps | 55 11 5181 9666 |
| France | Up to 14,400 bps | 33 1 6986 6954 |
| Germany | Up to 28,800 bps | 4989 62732 188 |
| Hong Kong | Up to 14,400 bps | 852 2537 5601 |
| Italy | Up to 14,400 bps | 39 2 27300680 |
| Japan | Up to 14,400 bps | 81 3 3345 7266 |
| Mexico | Up to 28,800 bps | 52 5 520 7835 |
| P.R. of China | Up to 14,400 bps | 86 10 684 92351 |
| Taiwan, R.O.C. | Up to 14,400 bps | 886 2 377 5840 |
| U.K. | Up to 28,800 bps | 44 1442 438278 |
| U.S.A. | Up to 28,800 bps | 1 408 980 8204 |

### Access by Digital Modem

ISDN users can dial in to the 3Com BBS using a digital modem for fast access up to 56 Kbps. To access the 3Com BBS using ISDN, use the following number:

**1 408 654 2703**

**3ComFacts Automated Fax Service**
The 3ComFacts automated fax service provides technical articles, diagrams, and troubleshooting instructions on 3Com products 24 hours a day, 7 days a week.

Call 3ComFacts using your Touch-Tone telephone:

**1 408 727 7021**

## Support from Your Network Supplier

If additional assistance is required, contact your network supplier. Many suppliers are authorized 3Com service partners who are qualified to provide a variety of services, including network planning, installation, hardware maintenance, application training, and support services.

When you contact your network supplier for assistance, have the following information ready:

- Product model name, part number, and serial number
- A list of system hardware and software, including revision levels
- Diagnostic error messages
- Details about recent configuration changes, if applicable

If you are unable to contact your network supplier, see the following section on how to contact 3Com.

## Support from 3Com

If you are unable to obtain assistance from the 3Com online technical resources or from your network supplier, 3Com offers technical telephone support services. To find out more about your support options, please call the 3Com technical telephone support phone number at the location nearest you.

When you contact 3Com for assistance, have the following information ready:

- Product model name, part number, and serial number
- A list of system hardware and software, including revision levels
- Diagnostic error messages
- Details about recent configuration changes, if applicable

Below is a list of worldwide technical telephone support numbers:

| Country | Telephone Number | Country | Telephone Number |
|---|---|---|---|
| **Asia Pacific Rim** | | | |
| Australia | 1 800 678 515 | P.R. of China | 10800 61 00137 or |
| Hong Kong | 800 933 486 | | 021 6350 1590 |
| India | 61 2 9937 5085 | Singapore | 800 6161 463 |
| Indonesia | 001 800 61 009 | S. Korea | |
| Japan | 0031 61 6439 | From anywhere in S. Korea: | 82 2 3455 6455 |
| Malaysia | 1800 801 777 | From Seoul: | 00798 611 2230 |
| New Zealand | 0800 446 398 | Taiwan, R.O.C. | 0080 611 261 |
| Pakistan | 61 2 9937 5085 | Thailand | 001 800 611 2000 |
| Philippines | 1235 61 266 2602 | | |

**Europe**

From anywhere in Europe, call:  +31 (0)30 6029900 phone
+31 (0)30 6029999 fax

From the following European countries, you may use the toll-free numbers:

| Country | Telephone Number | Country | Telephone Number |
|---|---|---|---|
| Austria | 06 607468 | Netherlands | 0800 0227788 |
| Belgium | 0800 71429 | Norway | 800 11376 |
| Denmark | 800 17309 | Poland | 0800 3111206 |
| Finland | 0800 113153 | Portugal | 05 05313416 |
| France | 0800 917959 | South Africa | 0800 995014 |
| Germany | 0130 821502 | Spain | 900 983125 |
| Hungary | 00800 12813 | Sweden | 020 795482 |
| Ireland | 1 800 553117 | Switzerland | 0800 55 3072 |
| Israel | 177 3103794 | U.K. | 0800 966197 |
| Italy | 1678 79489 | | |

| Country | Telephone Number | Country | Telephone Number |
|---|---|---|---|
| **Latin America** | | | |
| Argentina | 541 312 3266 | Colombia | 571 629 4847 |
| Brazil | 55 11 523 2725, ext. 422 | Mexico | 01 800 849 2273 |
| **North America** | 1 800 NET 3Com | | |
| | (1 800 638 3266) | | |

**Returning Products for Repair**

Before you send a product directly to 3Com for repair, you must first obtain a Return Materials Authorization (RMA) number. Products sent to 3Com without RMA numbers will be returned to the sender unopened, at the sender's expense.

To obtain an RMA number, call or fax:

| Country | Telephone Number | Fax Number |
| --- | --- | --- |
| Asia, Pacific Rim | 65 543 6342 | 65 543 6348 |
| Europe, South Africa, and Middle East | 011 44 1442 435860 | 011 44 1442 435718 |

From the following European countries, you may call the toll-free numbers; select option 2 and then option 2:

| | |
| --- | --- |
| Austria | 06 607468 |
| Belgium | 0800 71429 |
| Denmark | 800 17309 |
| Finland | 0800 113153 |
| France | 0800 917959 |
| Germany | 0130 821502 |
| Hungary | 00800 12813 |
| Ireland | 1800553117 |
| Israel | 177 3103794 |
| Italy | 1678 79489 |
| Netherlands | 0800 0227788 |
| Norway | 800 11376 |
| Poland | 00800 3111206 |
| Portugal | 05 05313416 |
| South Africa | 0800 995014 |
| Spain | 900 983125 |
| Sweden | 020 795482 |
| Switzerland | 0800 55 3072 |
| U.K. | 0800 966197 |

| Country | Telephone Number | Fax Number |
| --- | --- | --- |
| Latin America | 1 408 326 2927 | 1 408 764 6883 |
| U.S.A. and Canada | 1 800 876 3266, option 2 | 1 408 764 7120 |

3/26/98

# INDEX

# 3Com Corporation LIMITED WARRANTY

**HARDWARE**

3Com warrants its hardware products to be free from defects in workmanship and materials, under normal use and service, for the following lengths of time from the date of purchase from 3Com or its authorized reseller:

| | |
|---|---|
| Network Interface Cards | Lifetime |
| Other hardware products<br>　*unless otherwise specified above | 1 year* |
| Spare parts and spares kits | 90 days |

If a product does not operate as warranted above during the applicable warranty period, 3Com shall, at its option and expense, repair the defective product or part, deliver to Customer an equivalent product or part to replace the defective item, or refund to Customer the purchase price paid for the defective product. All products that are replaced will become the property of 3Com. Replacement products may be new or reconditioned. Any replaced or repaired product or part has a ninety (90) day warranty or the remainder of the initial warranty period, whichever is longer.

**SOFTWARE**

3Com warrants that the software programs licensed from it will perform in substantial conformance to the program specifications therefor for a period of ninety (90) days from the date of purchase from 3Com or its authorized reseller. 3Com warrants the media containing software against failure during the warranty period. No updates are provided. 3Com's sole obligation with respect to this express warranty shall be (at 3Com's discretion) to refund the purchase price paid by Customer for any defective software products, or to replace any defective media with software which substantially conforms to applicable 3Com published specifications. Customer assumes responsibility for the selection of the appropriate applications program and associated reference materials. 3Com makes no warranty or representation that its software products will meet Customer's requirements or work in combination with any hardware or applications software products provided by third parties, that the operation of the software products will be uninterrupted or error free, or that all defects in the software products will be corrected. For any third party products listed in the 3Com software product documentation or specifications as being compatible, 3Com will make reasonable efforts to provide compatibility, except where the non-compatibility is caused by a "bug" or defect in the third party's product.

**YEAR 2000 WARRANTY**

In addition to the Hardware Products Warranty and Software Products Warranty identified above, 3Com warrants that all Heritage 3Com products sold or licensed to Customer on and after January 1, 1998 that are date sensitive will continue performing properly with regard to such date data on and after January 1, 2000, provided that all other products used by Customer in connection or combination with the 3Com products, including hardware, software, and firmware, accurately exchange date data with the 3Com products, with the exception of those products identified at 3Com's Web site, http://www.3com.com/products/yr2000.html, as not meeting this standard. A product is considered a "Heritage 3Com product" if it is a member of a product family which was manufactured by 3Com prior to its merger with US Robotics Corporation. This Year 2000 limited warranty does not apply to Heritage US Robotics Corporation products. If it appears that any such product does not perform properly with regard to such date data on and after January 1, 2000, and Customer notifies 3Com before the later of April 1, 2000, or ninety (90) days after purchase of the product from 3Com or its authorized reseller, 3Com shall, at its option and expense, provide a software update which would effect the proper performance of such product, repair such product, deliver to Customer an equivalent product to replace such product, or if none of the foregoing is feasible, refund to Customer the purchase price paid for such product.

Any software update or replaced or repaired product will carry a Year 2000 Warranty for ninety (90) days or until April 1, 2000, whichever is later.

**OBTAINING WARRANTY SERVICE**

Customer must contact 3Com's Corporate Service Center or an Authorized 3Com Service Center within the applicable warranty period to obtain warranty service authorization. Dated proof of purchase may be required. Products returned to 3Com's Corporate Service Center must be pre-authorized by 3Com with a Return Material Authorization (RMA) number marked on the outside of the package, and sent prepaid and packaged appropriately for safe shipment, and it is recommended that they be insured. The repaired or replaced item will be shipped to Customer, at 3Com's expense, not later than thirty (30) days after receipt of the defective product by 3Com.

*Dead- or Defective-on-Arrival.* In the event a product completely fails to function or exhibits a defect in materials or workmanship within the first forty-eight (48) hours of installation but no later than thirty (30) days after the date of purchase, and this is verified by 3Com, it will be considered dead- or defective-on-arrival (DOA) and a replacement shall be provided by advance replacement. The replacement product will normally be shipped not later than three (3) business days after 3Com's verification of the DOA product, but may be delayed due to export or import procedures. When an advance replacement is provided and Customer fails to return the defective product to 3Com within fifteen (15) days after shipment of the replacement, 3Com will

charge Customer for the replacement product, at list price.

3Com shall not be responsible for any software, firmware, information, or memory data of Customer contained in, stored on, or integrated with any products returned to 3Com for repair, whether under warranty or not.

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| **WARRANTIES EXCLUSIVE** | IF A 3COM PRODUCT DOES NOT OPERATE AS WARRANTED ABOVE, CUSTOMER'S SOLE REMEDY FOR BREACH OF THAT WARRANTY SHALL BE REPAIR, REPLACEMENT, OR REFUND OF THE PURCHASE PRICE PAID, AT 3COM'S OPTION. TO THE FULL EXTENT ALLOWED BY LAW, THE FOREGOING WARRANTIES AND REMEDIES ARE EXCLUSIVE AND ARE IN LIEU OF ALL OTHER WARRANTIES, TERMS, OR CONDITIONS, EXPRESS OR IMPLIED, EITHER IN FACT OR BY OPERATION OF LAW, STATUTORY OR OTHERWISE, INCLUDING WARRANTIES, TERMS, OR CONDITIONS OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, AND SATISFACTORY QUALITY. 3COM NEITHER ASSUMES NOR AUTHORIZES ANY OTHER PERSON TO ASSUME FOR IT ANY OTHER LIABILITY IN CONNECTION WITH THE SALE, INSTALLATION, MAINTENANCE OR USE OF ITS PRODUCTS. |

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