3Com®

Installing the OfficeConnect™ NETBuilder® Bridge/Router

The network serial connector and the ISDN cable are TNV connection points as defined by EN 41 003. The ports 10BASE-T, 10BASE2, Console, and Flex-WAN are SELV ports as defined by EN 41 003.

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 his 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. For information on shielded cables, refer to the *WAN Cabling and Connectivity Guide*.

Federal Communications Commission (FCC) 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 in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. 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 as 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 B 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.OY
Facility Interface Codes (FIC)	04DUS-56, 04DUS-64

NTI 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.OY
Facility Interface Codes (FIC)	02IS5

CE Notice

Marking by the following symbol $C\epsilon0344X$ indicates compliance of this equipment with the EMC and Telecom Directives of the European Community. Such marking is indicative that this equipment meets or exceeds the following technical standards:

EN 55022 — Limits and methods of measurement of radio interference characteristics of information technology equipment.

EN 50082-1 — Electromagnetic compatibility — generic immunity standard part 1: residential, commercial, and light industrial.

I-CTR2 — For connection to X.25 packet switched services and X.21 leased lines.

I-CTR3 — For connection to basic rate ISDN services.

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LIMITED WARRANTY

ABOUT THIS GUIDE

Introduction

This guide provides hardware installation, troubleshooting and cabling information for your OfficeConnect™ NETBuilder® bridge/router.

For information on configuring the software for your OfficeConnect NETBuilder bridge/router, refer to *Using OfficeConnect NETBuilder Software.*

For information on configuring bridging and routing protocols and features that enhance or fine-tune the performance of your bridge/routers such as dial-up or data compression, refer to the network configuration examples in *Using OfficeConnect NETBuilder Software* and the *NETBuilder Family Bridge/Router Easy Step Configuration Map.* For more detailed configuration information, you will need to order *Using NETBuilder Family Software* and *Reference* for *NETBuilder Family Software* from 3Com.

This guide is intended for an audience with the following range of experience:

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

If the information in the release notes shipped with your product differs from the information in this guide, follow the release notes.

Conventions

Table 1 and Table 2 list conventions that are used throughout this guide.

Table 1 Notice Icons

Icon	Type	Description
	Information Note	Information notes call attention to important features or instructions.
	Caution	Cautions alert you to personal safety risk, system damage, or loss of data.
	Warning	Warnings alert you to the risk of severe personal injury.

Table 2 Text Conventions

Convention	Description
Syntax	The word "syntax" means you must evaluate the syntax provided and supply the appropriate values. Placeholders for values you must supply appear in angle brackets. Example:
	Enable RIPIP using:
	`SETDefault !<port> -RIPIP CONTrol = Listen`
	In this example, you must supply a port number for <port>.
Commands	The word "command" means you must enter the command exactly as shown in text and press the Return or Enter key. Example:
	Remove the IP address by entering:
	`SETDefault !0 -IP NETaddr = 0.0.0.0`
	This guide always gives the full form of a command in uppercase and lowercase letters. However, you can abbreviate commands by entering only the uppercase letters and the appropriate value. Commands are not case-sensitive.
Screen displays	This typeface represents information as it appears on the screen.
The words "enter" and "type"	When you see the word "enter" in this guide, you must type something, and then press the Return or Enter key. Do not press the Return or Enter key when an instruction simply says "type."

(continued)

Table 2   Text Conventions

Convention	Description
[Key] names	Key names appear in text in one of two ways:
	■ Referred to by their labels, such as "the Return key" or "the Escape key"
	■ Written with brackets, such as [Return] or [Esc].
	If you must press two or more keys simultaneously, the key names are linked with a plus sign (+). Example:
	Press [Ctrl]+[Alt]+[Del].
Menu commands and *buttons*	Menu commands or button names appear in italics. Example:
	From the *Help* menu, select *Contents*.
Words in *italicized* type	Italics emphasize a point or denote new terms at the place where they are defined in the text.
Words in **bold-face** type	Bold text denotes key features.

Lithium Battery Powered IC Replacement Marking

IC U30 is not a user serviceable part.

CAUTION: *Danger of explosion if IC (U30) is incorrectly replaced. Do not replace this part. Please send to an authorized 3Com Service Center for repair.*

1

ABOUT YOUR OFFICECONNECT BRIDGE/ROUTER

This chapter summarizes features of the OfficeConnect NETBuilder bridge/routers and describes how they fit in your network. This chapter also lists features of your specific bridge/router model, the package contents, and equipment you will need to get up and running.

i *Throughout this guide, the general term "bridge/router" is used for both bridge/routers and boundary routers.*

Introducing the OfficeConnect Bridge/Router

All OfficeConnect bridge/routers provide connectivity among small, midsize, and large branch offices, and a corporate local area network (LAN). 3Com offers the model 116, 117, 120 KF, 122 K, 126 K, 127 K, 132, 136, 142 U, 146 U, 147 U, 142 S/T, 145 S/T, 145 U, 146 S/T, and 147 S/T OfficeConnect bridge/routers, and the model 111, 121K, 131, 141 U, and 141 S/T OfficeConnect boundary routers.
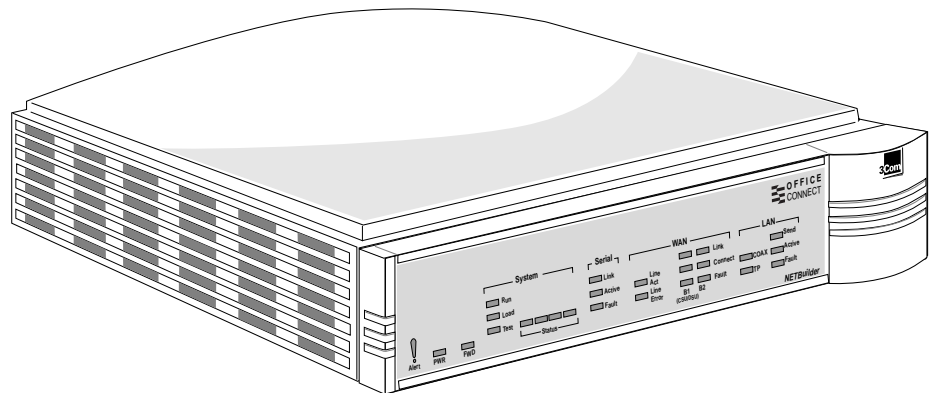
Figure 1-1 OfficeConnect NETBuilder Bridge/Router

Each model offers a different set of software that allows it to perform a specific function within the network.

Equipment Checklist

All OfficeConnect bridge/routers are shipped with the following items:

- Power adapter
- ISDN CSU/DSU cable
- Twisted pair Ethernet 10BASE-T cable
- Console cable
- Stacking clips and plastic feet
- System software
- *Installing the OfficeConnect NETBuilder Software*, *Using OfficeConnect NETBuilder Software, and NETBuilder Family Bridge/Router Easy Step Configuration Map*

The *NETBuilder Family User Guides* on CD-ROM, which contains the 3Com library of technical publications, is also included with the model 112, 116, 117, 120 KF, 122 K, 126 K, 127 K, 132, 136, 142 S/T, 145 S/T, 145 U, 146 S/T, 147 S/T, 142 U, 146 U, and 147 U OfficeConnect bridge/routers. You will want to order the *Using NETBuilder Family Software*, and *Reference for NETBuilder Family Software* from 3Com if you prefer printed copies of the publications, or if you have a model 111, 121K, 131, 141 S/T, and 141 U OfficeConnect boundary router. The *WAN Cabling and Connectivity Guide* can be found on the 3Com Corporation World Wide Web site by entering our URL into your internet browser:

http://www.3Com.com

You must supply these items to complete the installation:

- Flex-WAN cable with appropriate serial connector for your wide area network device. This cable may be purchased from your local 3Com sales representative.
- Terminal for connecting to the OfficeConnect bridge/router. You can also connect to the OfficeConnect bridge/router using terminal emulation software on a personal computer.

It is also helpful to have a connection from the OfficeConnect bridge/router to a network server offering Trivial File Transfer Protocol (TFTP) software. This connection can be used to download new software and to capture memory dumps.

Where Do I Go From Here?

Table 1-1 provides a quick reference to the information in this guide, *Using OfficeConnect NETBuilder Software*, and the *NETBuilder Family Bridge/Router Easy Step Configuration Map* included with this guide.

Table 1-1 Task Quick Reference

Task or information	Where to look
Installation and cabling	Chapter 2, Chapter 4
Accessing the user interface	*Using OfficeConnect NETBuilder Software*
Basic system administration	*Using OfficeConnect NETBuilder Software*
Troubleshooting	Chapter 3
Flex-WAN serial port	Chapter 5 and *Using OfficeConnect NETBuilder Software*
Serial port configuration	Chapter 2 and *Using OfficeConnect NETBuilder Software*
Ordering Flex-WAN cable	Chapter 4
ISDN WAN port	Chapter 2 and Chapter 5, and *Using OfficeConnect NETBuilder Software*
ISDN WAN port configuration	*Using OfficeConnect NETBuilder Software* and Map
Ordering ISDN lines	Chapter 5
Ethernet LAN port	*Using OfficeConnect NETBuilder Software*
Point-to-Point Protocol (PPP)	*Using OfficeConnect NETBuilder Software* and Map
X.25	*Using OfficeConnect NETBuilder Software* and Map
Frame Relay	*Using OfficeConnect NETBuilder Software* and Map
SMDS	*Using OfficeConnect NETBuilder Software* and Map
Bridging	*Using OfficeConnect NETBuilder Software* and Map
Routing	*Using OfficeConnect NETBuilder Software* and Map
IP routing	*Using OfficeConnect NETBuilder Software* and Map
IPX routing	*Using OfficeConnect NETBuilder Software* and Map
Boundary Routing	*Using OfficeConnect NETBuilder Software*

The best sources to turn to for extensive information about configuring your OfficeConnect bridge/router are the *Using NETBuilder Family Software* and *Reference for NETBuilder Family Software*. Information about hardware and cabling can also be found in the *WAN Cabling and Connectivity Guide*. You can find this guide on the 3Com Corporation World Wide Web site by entering:

http://www.3Com.com/

2 INSTALLING THE HARDWARE

This chapter describes how to install your OfficeConnect NETBuilder bridge/router hardware.

Cabling the Bridge/Router

This section describes the procedures for attaching cables to the OfficeConnect bridge/router.

Figure 2-1 shows the back panel connectors on the OfficeConnect bridge/routers. Refer to this figure when you attach or plug in cables.

There is no installed WAN port on the model 11x OfficeConnect NETBuilder bridge/router.
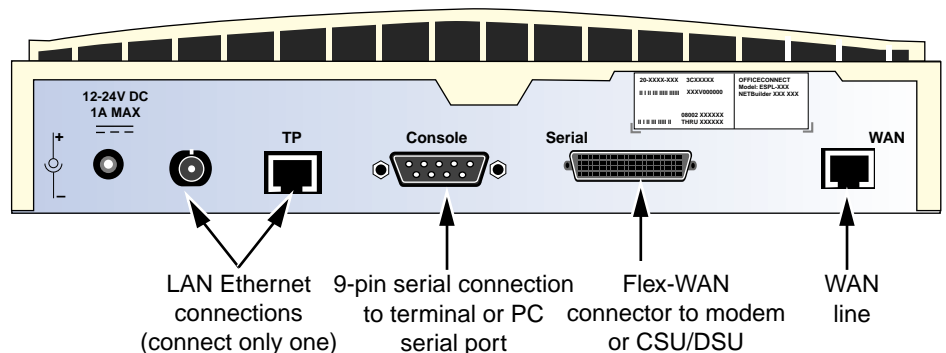
Figure 2-1   OfficeConnect Back Panel Connectors

Chapter 4 provides pinouts of the Telco WAN connectors and the serial connectors supported by the Flex-WAN port.

Cabling the Ethernet Connector

The OfficeConnect bridge/router accepts *either* a 10BASE-2 coaxial or 10BASE-T twisted pair (TP) Ethernet cable connection.

Attach a coaxial Ethernet cable to the BNC connector using a t-connector, or plug the 8-foot twisted pair cable supplied with the OfficeConnect bridge/router into the slot labeled TP.

Only one Ethernet connection is allowed.

Attaching a Terminal or Personal Computer to the Console Port

Use the console cable supplied with the OfficeConnect bridge/router to attach a terminal to the connector labeled Console. The Console port accepts connection from a standard ASCII terminal with a DB-25 connector. Attaching a terminal to the OfficeConnect bridge/router allows you to configure software and perform diagnostics.

You can also attach a personal computer such as an IBM PC or Apple Macintosh to the OfficeConnect bridge/router. To connect to the OfficeConnect bridge/router this way, the personal computer must be running a terminal emulation application that allows it to operate in VT100 terminal emulation mode. VT100 terminal emulation mode is available from the Terminal application provided with Microsoft Windows and is available from most off-the-shelf modem communication programs.

The default baud rate for the Console port is 9600 baud, so your terminal or the terminal emulation application must be set to 9600 baud. After you have accessed the software, you can reconfigure the console port baud rate to accommodate other terminal baud rates as described in Chapter 3 in *Using OfficeConnect NETBuilder Software*.

Use the following terminal or terminal emulation mode settings:

- 9600 baud
- No parity
- X-On/X-Off flow control
- 8 bits
- 1 stop bit

Cabling the Serial Port   Attach the special 3Com Flex-WAN cable to the port labeled Serial.

You attach the Flex-WAN end of the cable to the OfficeConnect bridge/router port. The other end of the cable has the appropriate connector (V.35, X.21, or RS-232) for a serial modem or CSU/DSU device.

You should have ordered the Flex-WAN cable when you ordered your OfficeConnect bridge/router. Refer to *Using OfficeConnect NETBuilder Software* for information on how to contact 3Com if you need to order a Flex-WAN cable, or refer to Chapter 4 for cable pinout information.

Cabling the ISDN Port   Plug the 8-foot RJ-45 cable supplied with the OfficeConnect bridge/router into the port labeled WAN.

ISDN connections to a model 14xS/T OfficeConnect bridge/router used in the U.S. and Canada also require a network termination (NT1) device and power supply. These can be leased from the telephone company or purchased from an ISDN equipment vendor. In other countries, you do not need to provide this equipment because the function of the equipment is provided by the ISDN equipment provided at the customer site

Model 14xU OfficeConnect bridge/router does not require an external NT1 for installation in North America.

See Chapter 5 for information about ordering ISDN line service and NT1 devices.

Hardware Recommendation   When attaching thin Ethernet segments to stacked OfficeConnect bridge/routers, 3Com suggests that you use 50 Ohm BNC connectors, part number 10-02914 (Goal Post Adapter) from MilesTek. To order, call MilesTek at 1-800-524-7444 or FAX 1-817-455-2111.

Installing the OfficeConnect on a Tabletop

Attach the plastic feet supplied with your OfficeConnect bridge/router if you plan to install it on a tabletop; see Figure 2-2.

Remove feet from their adhesive backing.

Attach feet to the bottom of the chassis, using the semi-circle marks for placement.
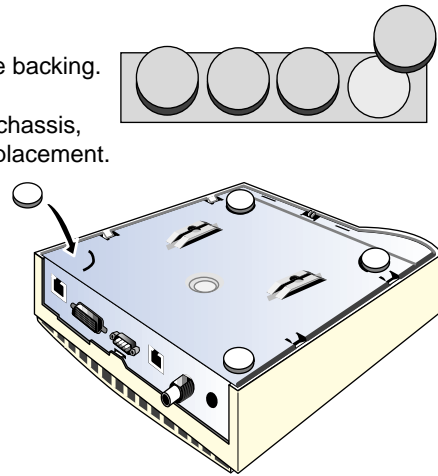
Figure 2-2 Attaching Plastic Feet to OfficeConnect Bridge/Router

Stacking OfficeConnect Bridge/Routers

You can stack up to four OfficeConnect systems together using the stacking clips. Attach all cables to the units first. Follow the instructions in Figure 2-3 and Figure 2-4.

Two holes in top edge

Clip spikes fit into top edge holes

Insert the clip into the top slot on the side of the first unit as shown. The spikes on the clip should fit into the two holes on the top edge of the chassis and the clip tab should snap into the top slot (below the two holes). Press firmly until the clip snaps into place.

Top slot in chassis side

Clip tab fits in top slot
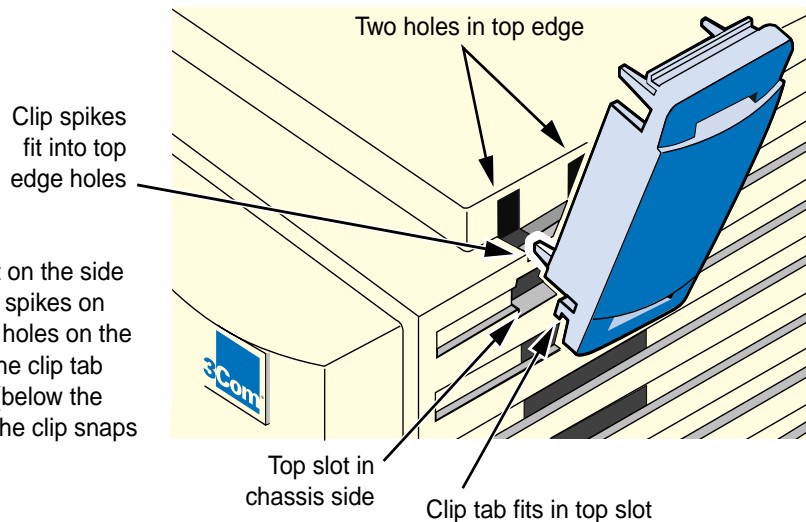
Figure 2-3 Inserting Stacking Clip on Side of Chassis

Insert the top half of the clips into the next chassis as shown. The top spikes on the clips provide support for the additional chassis and the top tab on the clip snaps into the bottom slot on the upper chassis.

Repeat these steps to add additional units to a stack.

Clip tab fits into bottom slot in chassis

Clip spikes rest underneath chassis for support
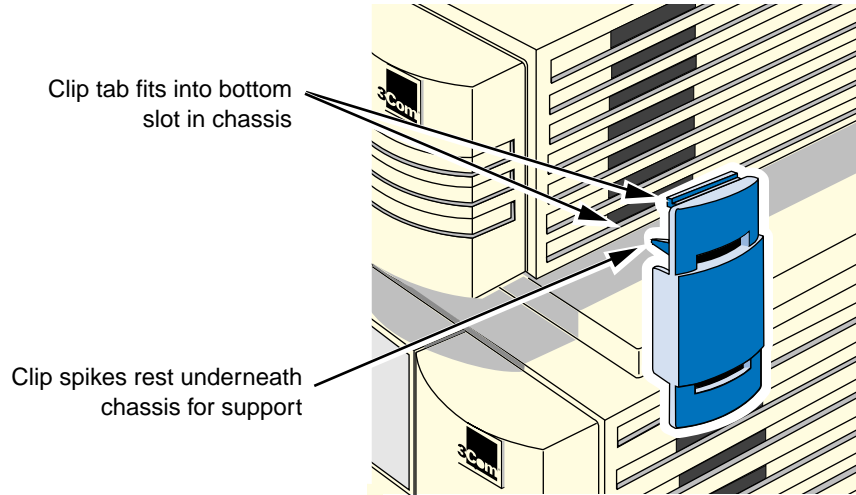
Figure 2-4   Inserting Top of Clips into Next Chassis

Figure 2-5 shows three OfficeConnect bridge/routers stacked together correctly using stacking clips.
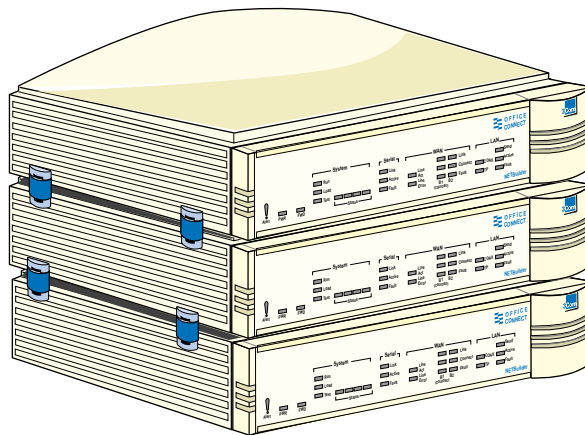
Figure 2-5   Stacked OfficeConnect Bridge/Routers

Mounting the OfficeConnect on the Wall

To mount the OfficeConnect bridge/router on the wall, see Figure 2-6 and Figure 2-7.

Front view

Side view

.050"
(1.2mm)

5.6" (142mm)

Mount two Phillips or flat-blade #4 (2.5mm) pan-head screws
5.6" (142mm) apart on wall at desired height

Leave a .050" (1.2mm) gap
between screw head and wall
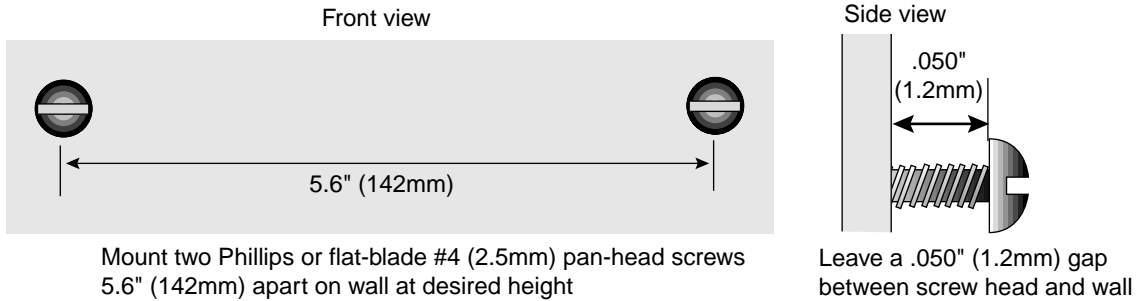
Figure 2-6   Securing Screws for Mounting Brackets

Side view

Connector end

Connector end

Wall mount brackets

Install the OfficeConnect chassis connector-end up. Push the screw heads through the bracket holes. Slide the chassis down until it sits firmly on the screwheads.
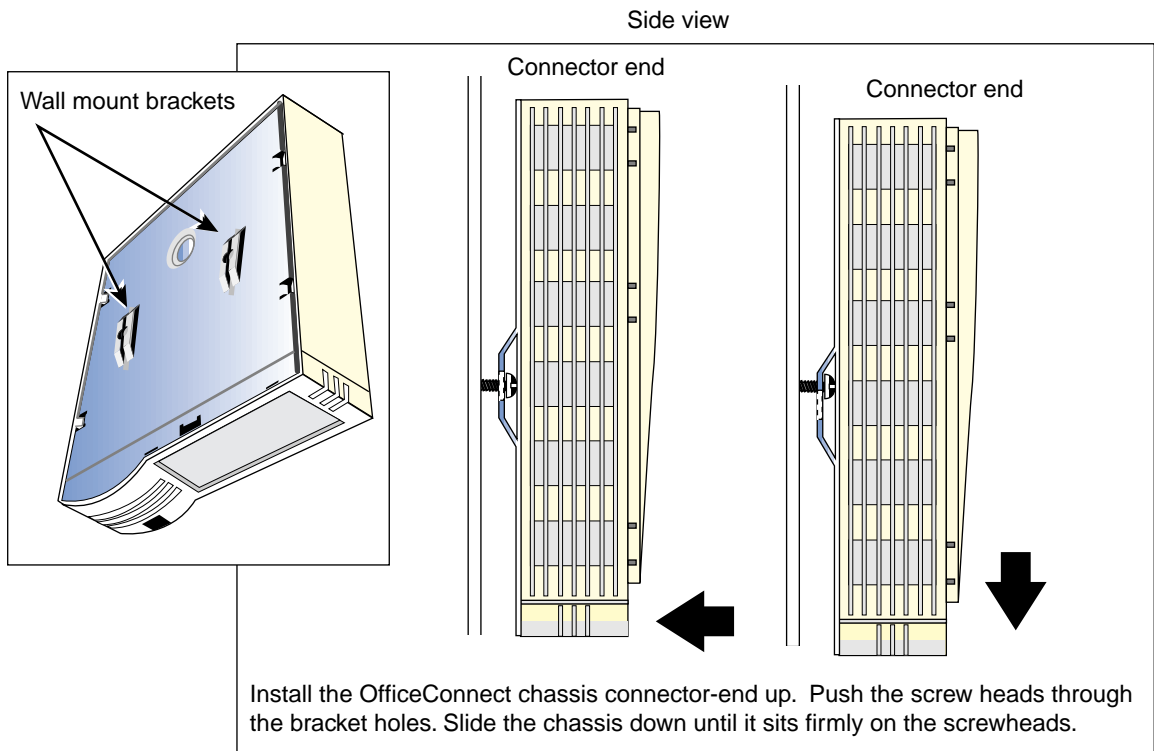
Figure 2-7   Attaching OfficeConnect Bridge/Router to Wall

Connecting and Turning on Power	Attach the power cord to the power receptacle on the back panel. This receptacle is labeled with the electrical rating for the power adapter included with your OfficeConnect bridge/router.

The OfficeConnect bridge/router does not have a power switch.

■ To turn power on, plug the other end of the power cord into an electrical outlet.

CAUTION: Make certain you plug the OfficeConnect bridge/router into an easily accessible electrical outlet located near the unit.

■ To turn power off or reset the bridge/router, unplug the power cord.

Environmental Requirements	Table 2-1 provides the environmental requirements for all OfficeConnect bridge/routers.

Table 2-1   OfficeConnect Bridge/Router Environmental Requirements

Parameter	Minimum Requirement	Maximum Requirement
Temperature		
Operating	-5° C	45° C
Nonoperating	-40° C	75° C
Altitude		
Operating	0 ft	15,000 ft
Nonoperating	0 ft	40,000 ft
Relative Humidity		
Operating	10% noncondensing	90% noncondensing
Nonoperating	10% noncondensing	90% noncondensing

Installing OfficeConnect NETBuilder Interface Modules

These instructions apply to models 11x, 12x, and 14x U OfficeConnect™ NETBuilder® bridge/routers and boundary routers.

Complete the following sections to install an ISDN U, 56K/64K CSU/DSU, or T1/FT1 CSU/DSU module in your OfficeConnect NETBuilder bridge/router.

CAUTION: Before attempting to remove an installed module, read the instructions in this guide.

External Power Supply

UL Listed when used with listed Information Technology Equipment (ITE) limited power source or Class 2 power supply, CN rated input: 120V ac, 60 Hz; rated output: 12-24 V dc maximum, 1A maximum.

cUL Listed when used with listed Information Technology Equipment (ITE) limited power source or Class 2 power supply, CN, rated input: 120V ac, 60 Hz; rated output: 12-24 V dc maximum, 1A maximum.

"CN" indicates that the component has been evaluated to Canadian requirements.

Removing the Label

On the back of the unit, if the WAN port is covered by a blank label, remove the label.
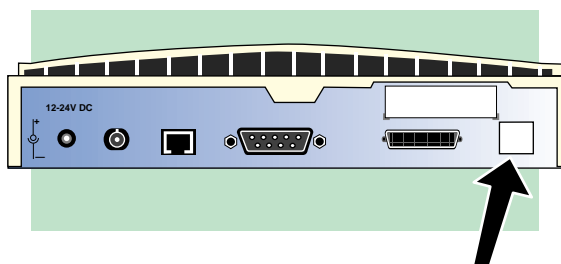
Remove blank label
if necessary

Removing the Cover

To remove the cover, follow these steps:

1 Unplug the power cord and remove all network cables from your OfficeConnect bridge/router.

WARNING: To avoid electrical hazard, all cables must be unplugged from the unit before opening the cover.

Lithium Battery Powered IC Replacement Marking

IC U30 is not a user serviceable part.

CAUTION: Danger of explosion if IC (U30) is incorrectly replaced. Do not replace this part. Please send to an authorized 3Com Service Center for repair.
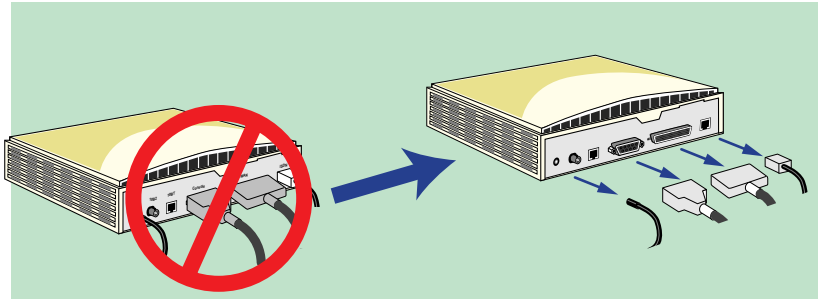
2 Use a flat-blade screwdriver to pry the four side tabs away from the chassis and lift the chassis slightly.
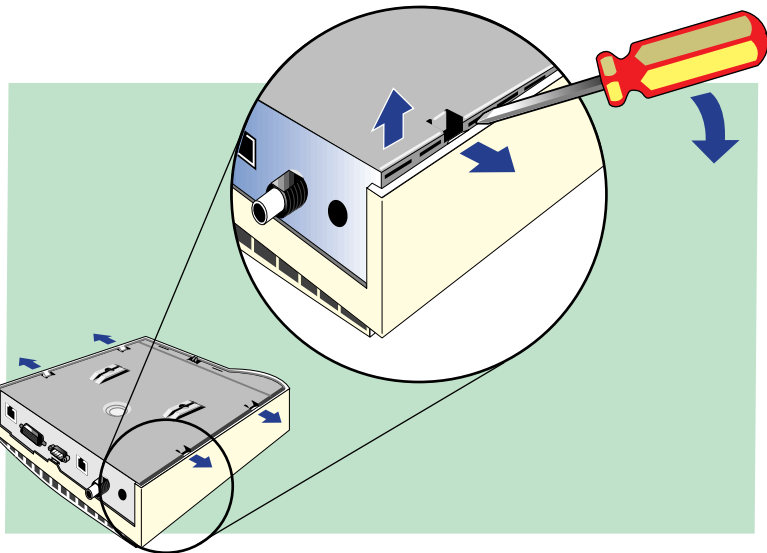
3 Pry the tab away from the rear panel of the cover.
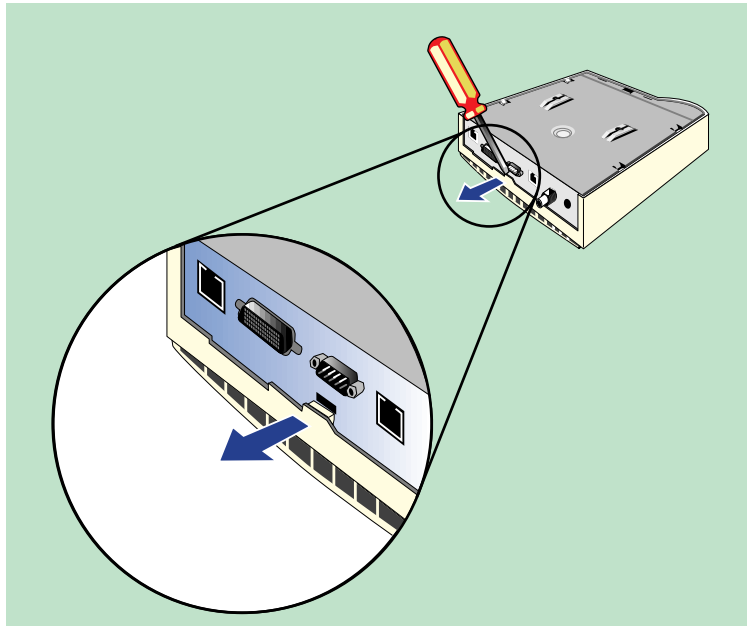
4 Gently pry the tab on the cover away from the front panel of the chassis.
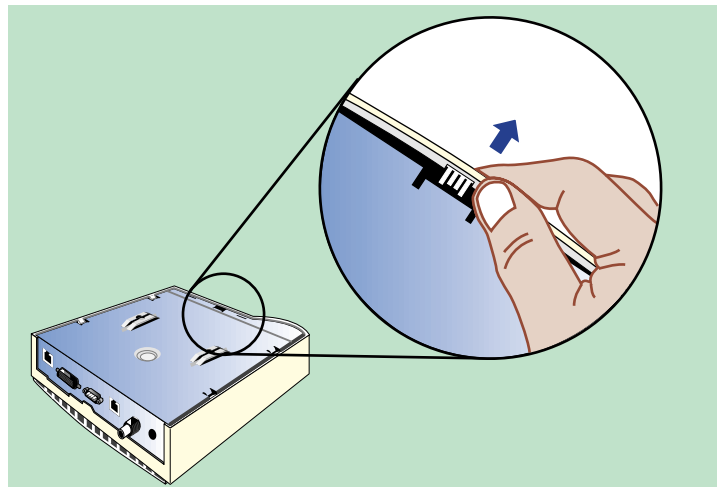
5 Lift the chassis out of the cover.
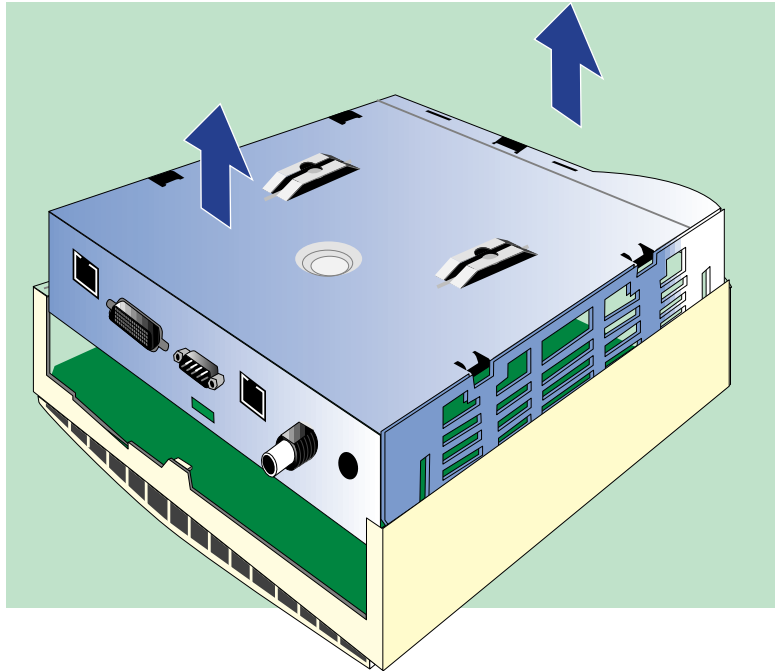
Removing an Existing Module

To remove an existing module, follow these steps. If there is no module installed, proceed to "Installing the Module" on page 2-13:

⚠ *CAUTION: Read these instructions before attempting to remove the module.*

1 Disengage tab on standoff, as shown here.
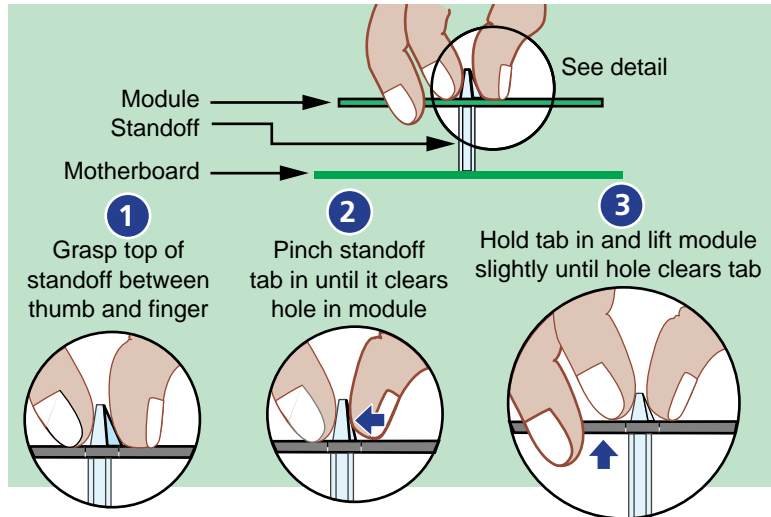
2 Remove the module as shown.
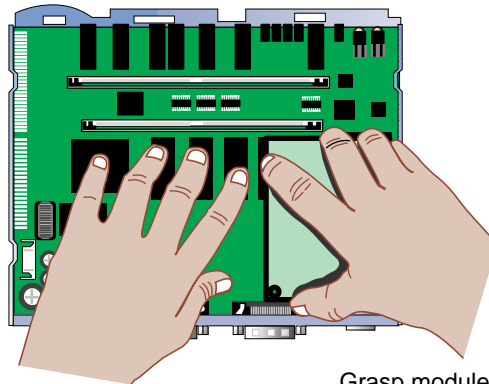
Press firmly on motherboard to hold it in place. Place fingers carefully to avoid breaking any components.

Grasp module and pull straight up to disengage connectors.

Installing the Module

To install an ISDN U, CSU/DSU, or T1/FT1 CSU/DSU module, follow these steps:

1 Install the module as shown here:

Connectors

module

Standoff on motherboard

Match module connectors and standoff hole with the connectors and standoff on motherboard and press module firmly into place.
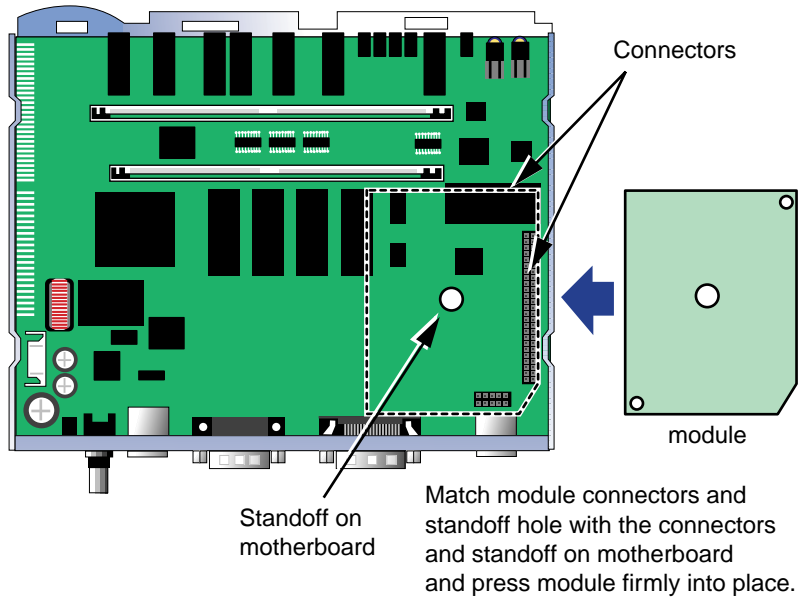
2 Reinstall the cover.

  a Align the sides and back of the cover with the sides and back of the chassis.

  b Press the cover down until it snaps into place.
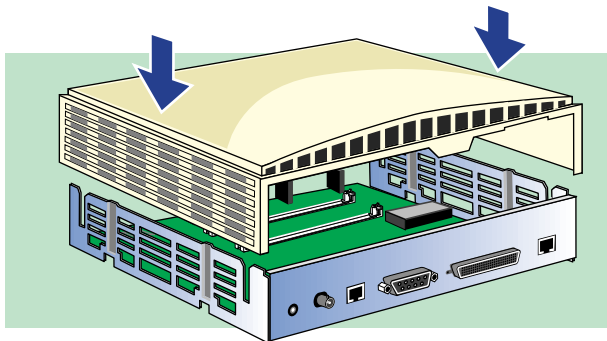
3 Place the module upgrade sticker included with your module on the back of the unit.
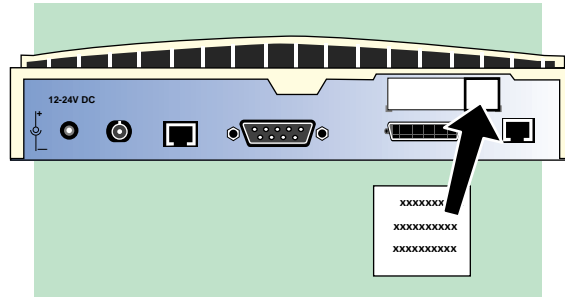
4 Reattach the cables to your bridge/router. For more information on attaching cables, see *Installing the OfficeConnect NETBuilder Bridge/Router*.

3

TROUBLESHOOTING

This chapter describes the front panel LED descriptions and loopback tests for serial, ISDN lines, and the CDU/DSU. Use the information in this chapter to help you troubleshoot line connection and system problems that might occur with your OfficeConnect bridge/router.

Front Panel LEDs   Figure 3-1 shows the OfficeConnect bridge/router front panel LEDs.

General status LEDs   System LEDs Serial LEDs   WAN LEDs   LAN LEDs
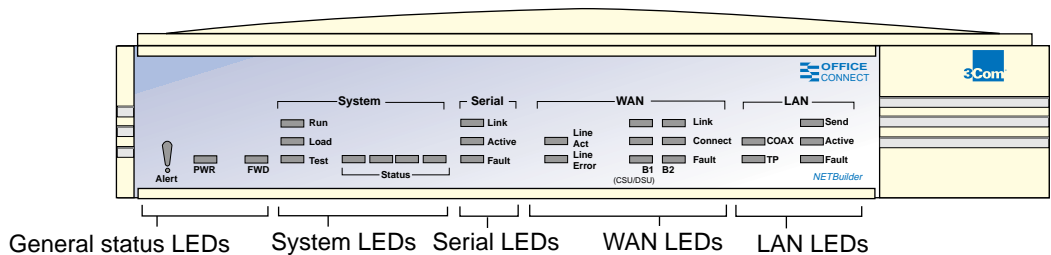
Figure 3-1   Front Panel LEDs

The following figures describe the front panel LEDs.

General Status LEDs   The general status LEDs, Alert, PWR, and FWD, are on the left side of the OfficeConnect front panel.

System LEDs   The following figure describes the System LEDs.

System ☐ Run ☐ Load ☐ Test ☐ ☐ ☐ ☐ **Status**	☐ **Run** When lit, indicates normal operation. ☐ **Load** When lit, indicates system is loading software. ☐ **Test** When lit, indicates system self testing. ☐ ☐ ☐ ☐ System status LEDs indicate operating **Status** status. See the troubleshooting section.
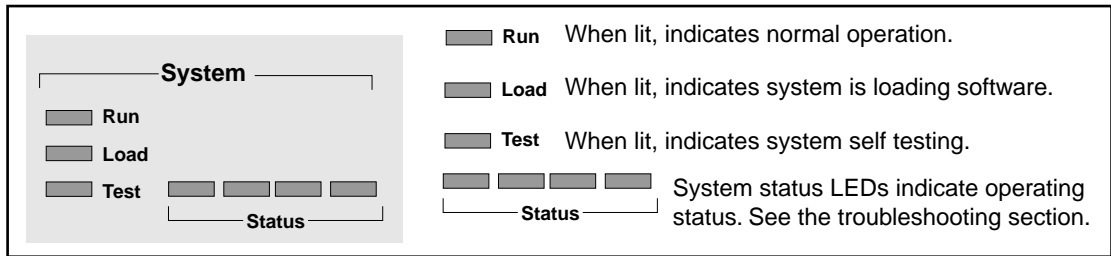
Serial LEDs   The following figure describes the Serial LEDs.

Serial ☐ Link ☐ Active ☐ Fault	☐ **Link** When lit, indicates the path is up. ☐ **Active** When lit, indicates a physical connection to an active device such as a Digital Service Unit (DSU) or modem has been established. ☐ **Fault** If yellow, indicates an error in a received frame.
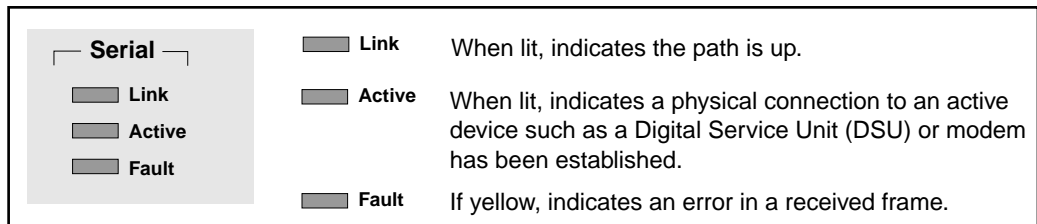
WAN LEDs   The following figure describes the WAN LEDs when using an ISDN connection or a CSU/DSU connection.

WAN ☐ **Line Act** ☐ **Line Error** ☐ ☐ **Link** ☐ ☐ **Connect** ☐ ☐ **Fault** **B1** **B2** (CSU/DSU)	☐ **Line ACT** (D channel). When lit, indicates normal operation. ☐ **Line Error** (D channel). When lit, indicates a loss of signal. ☐ ☐ **Link** When lit, indicates path is up. ☐ ☐ **Connect** When lit, a connection exists or is in progress. ☐ ☐ **Fault** When lit, an error has been detected. **B1** **B2** (CSU/DSU)
For ISDN connections, B1 and B2 identify channels.	
For CSU/DSU connections, B1 and B2 are used for troubleshooting.	

LAN LEDs   The following figure describes the LAN LEDs.
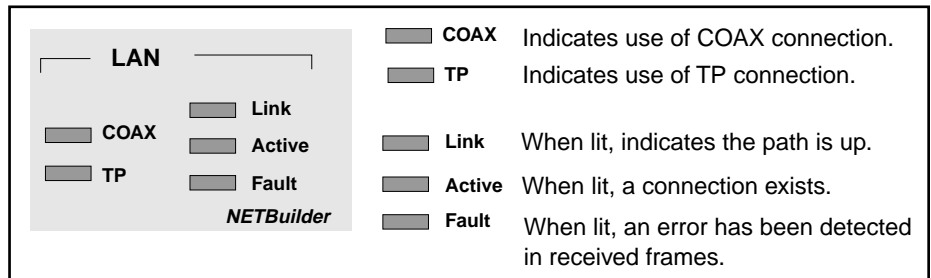
Troubleshooting   This section describes how to troubleshoot your OfficeConnect
NETBuilder bridge/router using the front panel LEDs.

LED colors   The Alert LED lights orange when there is any problem with the
OfficeConnect bridge/router. Look for yellow LEDs for an indication of
the area that is causing problems.

If the PWR LED lights yellow at any time after the startup process, the
bridge/router has encountered a problem during system test or system
software load.

**Troubleshooting
During the Load
Phase**   If the Load LED in the System LED area is yellow, a problem occurred
during the system software load phase. Compare your System LEDs
with the following examples and follow the instructions for
troubleshooting.
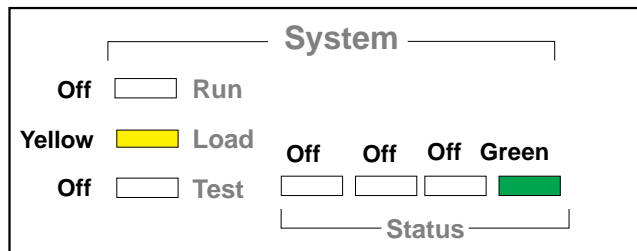
Meaning   File system empty.

Action   Refer to "Reloading System Software" in Appendix A in *Using
OfficeConnect NETBuilder Software* to reload the system software.

System

Off	Run
Yellow	Load
Off	Test

Status: Off Off Green Off
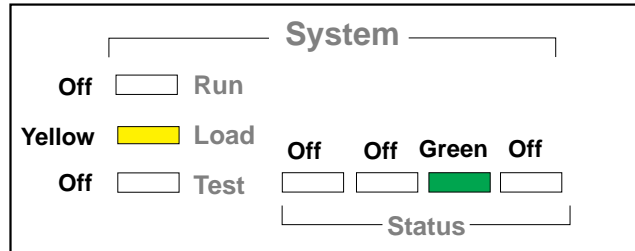
Meaning Possible read-only memory corruption; cannot seek file.

Action Refer to "Reloading System Software" in Appendix A in *Using OfficeConnect NETBuilder Software* to reload the system software.

System

Off	Run
Yellow	Load
Off	Test

Status: Off Off Green Green
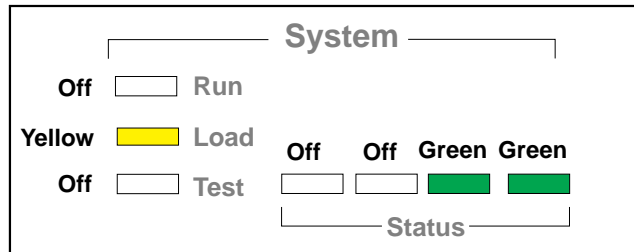
Meaning The software image file has been detected or boot source and image file names do not match.

Action Refer to "Reloading System Software" in Appendix A of *Using OfficeConnect NETBuilder Software* to reload the system software.

System

Off	Run
Yellow	Load
Off	Test

Status: Off Green Off Green
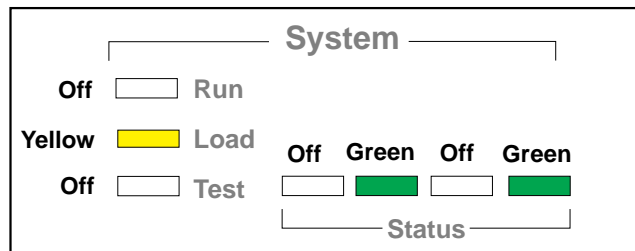
Meaning File too large.

Action Check to see if the file is larger than available flash memory or DRAM. Turn the power off, then on to retry the system software load. If the load is unsuccessful, contact 3Com technical support.
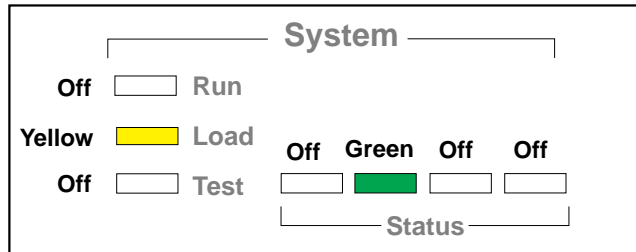
Meaning   File read or decompression error.

Action   Refer to "Reloading System Software" in Appendix A in *Using OfficeConnect NETBuilder Software* to reload the system software.
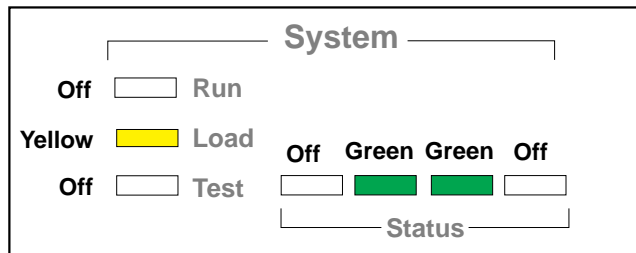
Meaning   File checksum error.

Action   Refer to "Reloading System Software" in Appendix A of *Using OfficeConnect NETBuilder Software* to reload the system software.
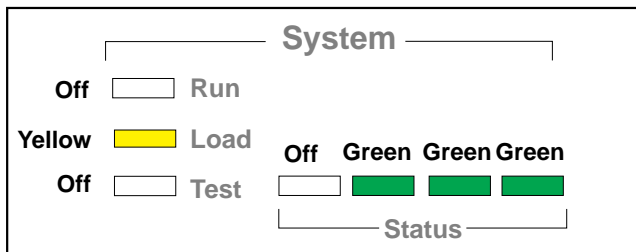
Meaning   Unspecified fatal error.

Action   Refer to Appendix A in *Using OfficeConnect NETBuilder Software*.
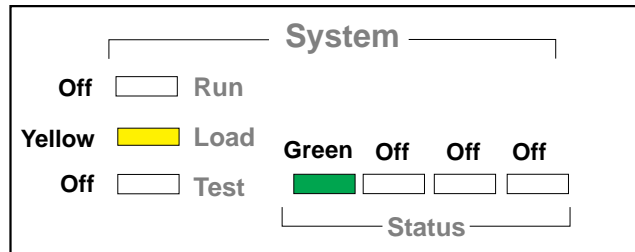
Meaning   Unable to transmit BOOTP request.

Action   Check cable connections. Bridge/router may not be connected correctly to the Ethernet network.
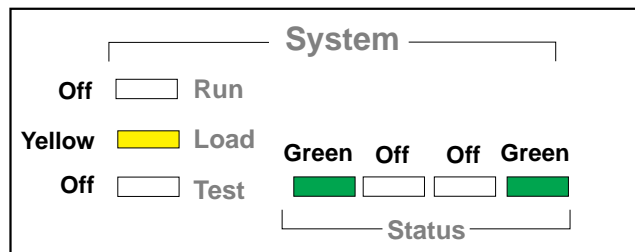
Meaning   No response to BOOTP request. BOOTP server not present or is incorrectly configured.

Action   Check Trivial File Transfer Protocol (TFTP)/BOOTP server configuration and verify the media access control (MAC) address of the bridge/router. Turn power off then on to retry the system software load. If the load is unsuccessful, refer to "Reloading System Software" in Appendix A in *Using OfficeConnect NETBuilder Software.*
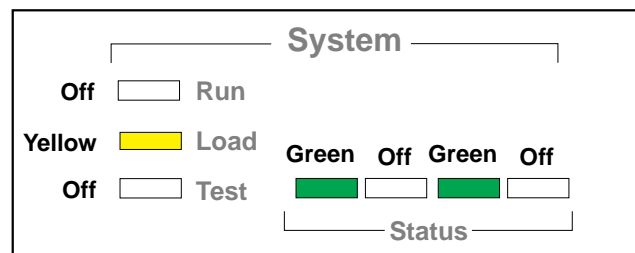
Meaning   No response from TFTP server to Address Resolution Protocol (ARP) request. TFTP server is not present or may be incorrectly configured.

Action   Check TFTP server configuration and verify the MAC address of the bridge/router. Turn power off then on to retry the system software load. If the load is unsuccessful, contact 3Com technical support for assistance.

```
┌─────────────────────────────────────────────┐
│              ── System ──                    │
│                                              │
│   Off  ☐  Run                                │
│                                              │
│ Yellow ▇  Load    Green  Off  Green Green    │
│   Off  ☐  Test    ▇▇    ☐    ▇▇   ▇▇        │
│                     ── Status ──             │
└─────────────────────────────────────────────┘
```
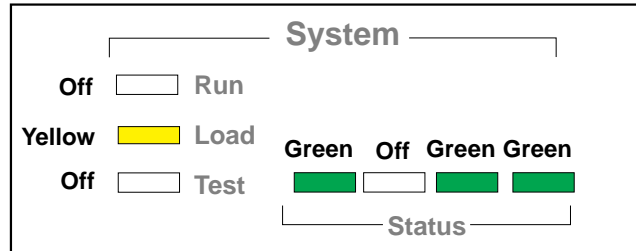
Meaning   No response to TFTP request. TFTP server is not present. Incorrect download file or file incorrectly configured.

Action   Make sure the MAC address is initialized correctly. Turn power off then on to retry the system software load. If the load is unsuccessful, contact 3Com technical support for assistance.

Troubleshooting During the Test Phase   When the software load is complete, the system begins the test phase. If the System Test LED turns yellow, a problem occurred during the system test phase.

```
┌─────────────────────────────────────────────┐
│              ── System ──                    │
│                                              │
│   Off   ☐  Run                               │
│                                              │
│  Green  ▇  Load    Off   Off  Green Green     │
│ Yellow  ▇  Test    ☐    ☐    ▇▇   ▇▇        │
│                     ── Status ──             │
└─────────────────────────────────────────────┘
```
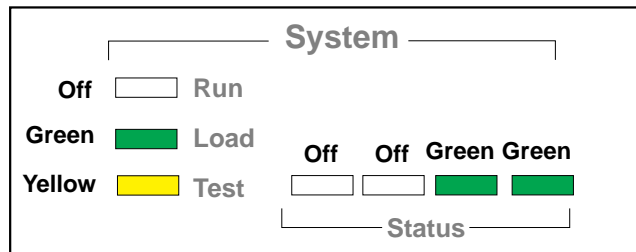
Meaning   EEPROM checksum test failed.

Action   Refer to Appendix B in *Using OfficeConnect NETBuilder Software.*

Errors Indicated by the Serial LEDs If the Fault LED in the Serial LED section of your OfficeConnect bridge/router turns yellow, it means an error has been detected in a received frame. The following figure shows this example.

```
        ┌── Serial ──┐
  Off  ┌──────┐  Link
  Off  ┌──────┐  Active
Yellow ┌──────┐  Fault
```
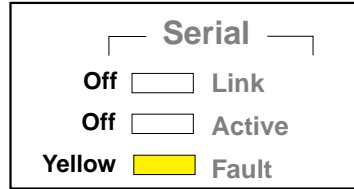
Errors Indicated by the WAN LEDs This section describes how the WAN LEDs indicate errors on systems using ISDN or CSU/DSU connections.

On a Bridge/Router Using an ISDN Connection

The following figures show how the WAN LEDs indicate errors on a bridge/router using an ISDN connection.

```
        ┌──────────── WAN ──────────┐
                 ┌──────┐  ┌──────┐  Link
        ┌──────┐ Line
        └──────┘ Act    ┌──────┐  ┌──────┐  Connect
Yellow  ┌──────┐ Line   ┌──────┐  ┌──────┐  Fault
        └──────┘ Error     B1       B2
                        (CSU/DSU)
```
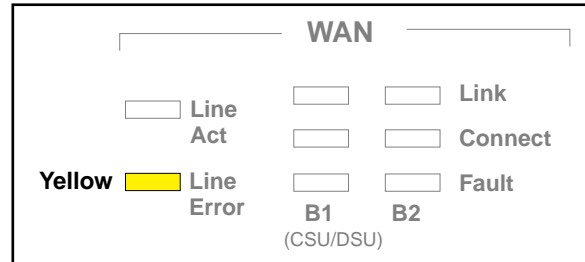
Meaning Indicates a disconnected cable, or a loss of phantom power.

Action Check all cable connections.

```
        ┌──────────── WAN ──────────┐
        ┌──────┐ Line  ┌──────┐  ┌──────┐  Link
        └──────┘ Act
        ┌──────┐ Line   ┌──────┐  ┌──────┐  Connect
        └──────┘ Error  ┌──────┐  ┌──────┐  Fault  B1 or B2 yellow
                          B1       B2
                        (CSU/DSU)
```
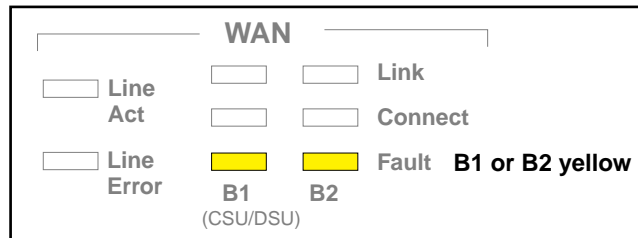
Meaning An error in received frames has been detected on either channel B1 or channel B2.

On a Bridge/Router Using a CSU/DSU LED Connection

The following figures show how the WAN LEDs indicate errors and status on a bridge/router using a CSU/DSU connection.
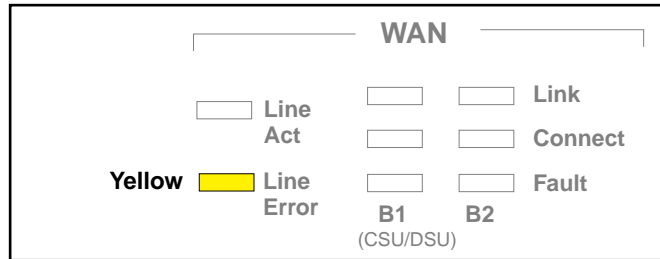
Meaning   Indicates loss of signal. Call your Telco provider for assistance.
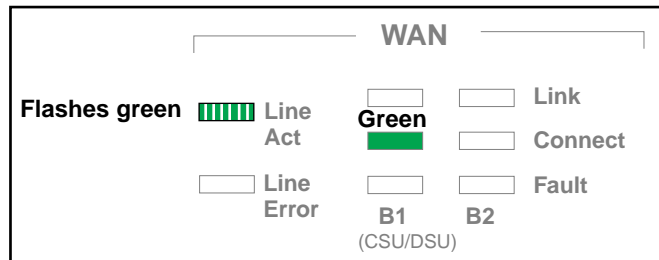
Meaning   Indicates normal operation.
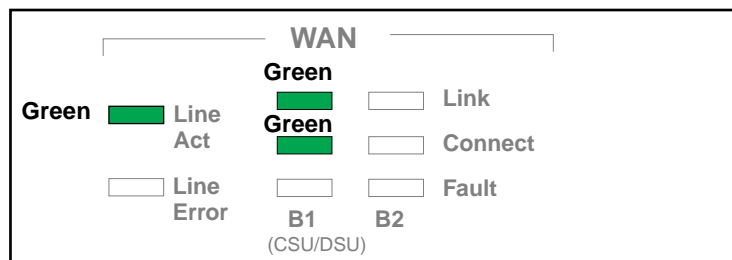
Meaning   Indicates normal operation. Indicates the Data Link protocol is operational.

.
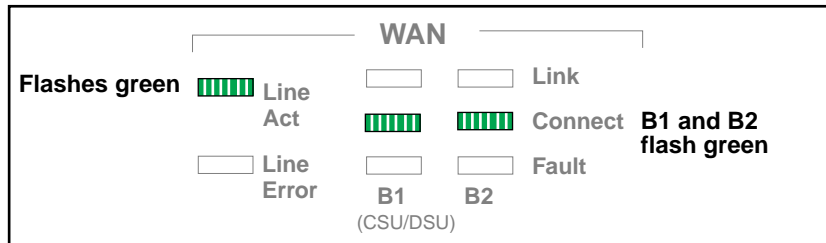
Meaning   Flashes on B1 and B2 Connect LEDs indicate a CO(Telco Central Office)
            initiated loopback test or a remote initiated loopback test.
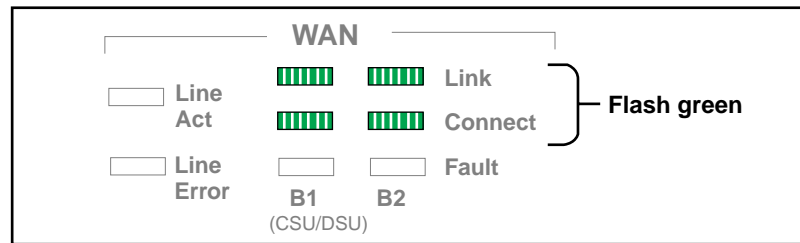
Meaning   Flashes on both B1 or B2 Link and Connect LEDs indicate a
            self-initiated loopback test is in progress.

4

CABLES

This chapter provides tables listing the pinouts of the ISDN port and serial cables supported on the Flex-WAN port. These cables include:

- Flex-WAN to X.21 DTE
- Flex-WAN to V.35 DTE and DCE
- Flex-WAN to RS-232 DTE and DCE
- ISDN RJ-45 and 56K CSU/DSU RJ-48S
- RJ-48 T1

Flex-WAN Serial Connector

Figure 4-1 shows the pin configuration of the Flex-WAN connector.
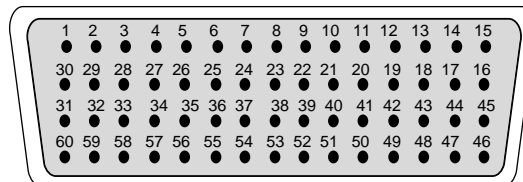
Figure 4-1 Flex-WAN Connector

Each table listing the serial cable pinouts in this chapter lists both the Flex-WAN and the serial cable pinouts. These tables can be used to construct custom cables for the OfficeConnect bridge/router.

X.21 DTE Connector

Figure 4-2 shows the pin configuration of the X.21 DTE connector.
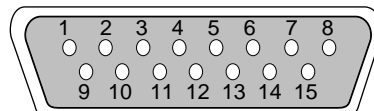
Figure 4-2 X.21 DTE Connector

Table 4-1 lists the pin assignments of a cable with one end terminated in the Flex-WAN connector and the other end terminated in an X.21 DTE 15-pin male D-sub connector.

Table 4-1   Flex-WAN to X.21 DTE Cable Pinouts

Signal	From	Signal	To	Pair	Note
GND MODE_2	J1-48 J1-47	——	——	——	JUMPED TOGETHER
GND MODE_DCE	J1-51 J1-52	——	——	——	JUMPED TOGETHER
SHIELD GND	J1-46	SHIELD GND	J2-1	SINGLE	
CTS/RTS+	J1-1	INDICATION+	J2-5	1	
CTS/RTS-	J1-2	INDICATION-	J2-12	1	
RTS/CTS+	J1-9	CONTROL+	J2-3	2	
RTS/CTS-	J1-10	CONTROL-	J2-10	2	
TXD/RXD+	J1-11	TRANSMIT+	J2-2	3	
TXD/RXD-	J1-12	TRANSMIT-	J2-9	3	
SIGNAL GND	J1-15	SIGNAL GND	J2-8	4	2
				4	1, 2
RXC/TXCE+	J1-26	TIMING+	J2-6	5	
RXC/TXCE-	J1-25	TIMING-	J2-13	5	
RXD/TXD+	J1-28	RECEIVE+	J2-4	6	
RDX/TXD-	J1-27	RECEIVE-	J2-11	6	
SIGNAL GND	J1-16	SIGNAL GND	J2-8	JUMPER	1, 2

Note 1: All spare wires are soldered together with a jumper wire and plugged into J1-16.
Note 2: All spare wires are soldered together with a jumper wire and plugged into J2-8.

V.35 DTE Connector   Figure 4-3 shows the pin configuration of the V.35 DTE connector.

Figure 4-3   V.35 DTE Connector

Table 4-2 lists the pin assignments of a cable with one end terminated in the Flex-WAN connector and the other end terminated in a V.35 DTE 34-pin male connector (ISO 2593). See Figure 4-1 for an illustration of the Flex-WAN connector.

Table 4-2   Flex-WAN to V.35 DTE Cable Pinouts

Signal	From	Signal	To	Pair	Note
MODE_1 GND	J1-49 J1-48	——	——	——	JUMPED TOGETHER
MODE_0 GND MODE_DCE	J1-50 J1-51 J1-52	——	——	——	JUMPED TOGETHER
TXC/NIL RXC/TXCE RXD/TXD GND	J1-53 J1-54 J1-55 J1-56	——	——	——	JUMPED TOGETHER
SHIELD GND	J1-46	SHIELD GND	J2-A	SINGLE	
TXD/RXD+	J1-18	SD+	J2-P	1	
TXD/RXD-	J1-17	SD-	J2-S	1	
TXCE/TXC+	J1-20	SCTE+	J2-U	2	
TXCE/TXC-	J1-19	SCTE-	J2-W	2	
TXC/RXC+	J1-24	SCT+	J2-Y	3	
TXC/RXC-	J1-23	SCT-	J2-AA	3	
RXC/TXCE+	J1-26	SCR+	J2-V	4	
RXC/TXCE-	J1-25	SCR-	J2-X	4	
RXD/TXD+	J1-28	RD+	J2-R	5	
RXD/TXD-	J1-27	RD-	J2-T	5	
DCD/LL	J1-33	RLSD	J2-F	6	
				6	1, 2
DSR/DTR	J1-34	DSR	J2-E	7	
				7	1, 2
CTS/RTS	J1-35	CTS	J2-D	8	
				8	1, 2
RTS/CTS	J1-42	RTS	J2-C	9	
				9	1, 2
DTR/DSR	J1-43	DTR	J2-H	10	
				10	1, 2
LL/DCD	J1-44	LT	J2-K	11	
				11	1, 2
SIGNAL GND	J1-45	SIGNAL GND	J2-B	12	2
				12	1, 2
SIGNAL GND	J1-16	SIGNAL GND	J2-B	JUMPER	1, 2

Note 1: All spare wires are soldered together with a jumper wire and plugged into J1-16.
Note 2: All spare wires are soldered together with a jumper wire and plugged into J2-B.

V.35 DCE Connector Figure 4-4 shows the pin configuration of the V.35 DCE connector.

Figure 4-4 V.35 DCE Connector

Table 4-3 lists the pin assignments of a cable with one end terminated in the Flex-WAN connector and the other end terminated in a V.35 DCE 34-pin female connector (ISO 2593). See Figure 4-1 for an illustration of the Flex-WAN connector.

Table 4-3 Flex-WAN to V.35 DCE Cable Pinouts

| Signal	From	Signal	To	Pair	Note
MODE_1 GND	J1-49 J1-48	——	——	——	JUMPED TOGETHER
MODE_0 GND	J1-50 J1-51	——	——	——	JUMPED TOGETHER
TXC/NIL RXC/TXCE RXD/TXD GND	J1-53 J1-54 J1-55 J1-56	——	——	——	JUMPED TOGETHER
SHIELD GND	J1-46	SHIELD GND	J2-A	SINGLE	
TXD/RXD+	J1-18	RD+	J2-R	1	
TXD/RXD-	J1-17	RD-	J2-T	1	
TXCE/TXC+	J1-20	SCT+	J2-Y	2	
TXCE/TXC-	J1-19	SCT-	J2-AA	2	
NIL/RXC+	J1-22	SCR+	J2-V	3	
NIL/RXC-	J1-21	SCR-	J2-X	3	
RXC/TXCE+	J1-26	SCTE+	J2-U	4	
RXC/TXCE-	J1-25	SCTE-	J2-W	4	
RXD/TXD+	J1-28	SD+	J2-P	5	
RXD/TXD-	J1-27	SD-	J2-S	5	
DCD/LL	J1-33	LT	J2-K	6 6	 1, 2
DSR/DTR	J1-34	DTR	J2-H	7 7	 1, 2
CTS/RTS	J1-35	RTS	J2-C	8 8	 1, 2
(continued)					

Table 4-3   Flex-WAN to V.35 DCE Cable Pinouts (continued)

Signal	From	Signal	To	Pair	Note
RTS/CTS	J1-42	XTS	J2-D	9 9	 1, 2
DTR/DSR	J1-43	DSR	J2-E	10 10	 1, 2
LL/DCD	J1-44	RLSD	J2-F	11 11	 1, 2
SIGNAL GND	J1-45	SIGNAL GND	J2-B	12 12	2 1, 2
SIGNAL GND	J1-16	SIGNAL GND	J2-B	JUMPER	1, 2

Note 1: All spare wires are soldered together with a jumper wire and plugged into J1-16.
Note 2: All spare wires are soldered together with a jumper wire and plugged into J2-B.

RS-232 DTE Connector

Figure 4-5 shows the pin configuration of the RS-232 DTE connector.

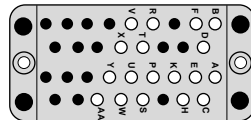**Figure 4-5**   RS-232 DTE Connector

Table 4-4 lists the pin assignments of a cable with one end terminated in the Flex-WAN connector and the other end terminated in an RS-232 DTE 25-pin male D-sub connector. See Figure 4-1 for an illustration of the Flex-WAN connector.

Table 4-4   Flex-WAN to RS-232 DTE Cable Pinouts

Signal	From	Signal	To	Pair	Note
MODE_0 GND MODE_DCE	J1-50 J1-51 J1-52	——	——	——	JUMPED TOGETHER
SHIELD GND	J1-46	SHIELD GND	J2-1	SINGLE	
SIGNAL GND	J1-45	SIGNAL GND	J2-7	1	2
				1	1, 2
LL/DCD	J1-44	LT	J2-18	2	
				2	1, 2
DTR/DSR	J1-43	DTR	J2-20	3	
				3	1, 2
(continued)					

Table 4-4 Flex-WAN to RS-232 DTE Cable Pinouts (continued)

Signal	From	Signal	To	Pair	Note
RTS/CTS	J1-42	RTS	J2-4	4	
				4	1, 2
TXD/RXD	J1-41	TXD	J2-2	5	
				5	1, 2
TXCE/TXC	J1-39	TXCE	J2-24	6	
				6	1, 2
RXC/TXCE	J1-38	RXC	J2-17	7	
				7	1, 2
TXC/NIL	J1-37	TXC	J2-15	8	
				8	1, 2
RXD/TXD	J1-36	RXD	J2-3	9	
				9	1, 2
CTS/RTS	J1-35	CTS	J2-5	10	
				10	1, 2
DSR/DTR	J1-34	DSR	J2-6	11	
				11	1, 2
DCD/LL	J1-33	DCD	J2-8	12	
				12	1, 2
SIGNAL GND	J1-56	SIGNAL GND	J2-7	JUMPER	1, 2

Note 1: All spare wires are soldered together with a jumper wire and plugged into J1-56.
Note 2: All spare wires are soldered together with a jumper wire and plugged into J2-7.

RS-232 DCE Connector

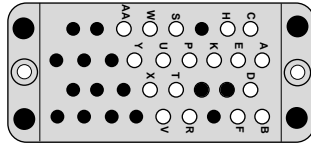Figure 4-6 shows the pin configuration of the RS-232 DCE connector.
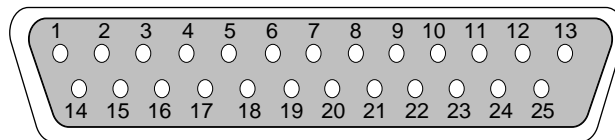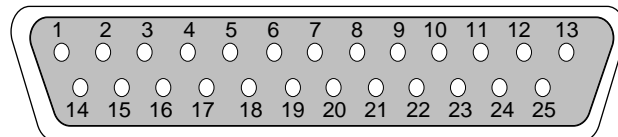

Figure 4-6 RS-232 DCE Connector

Table 4-5 lists the pin assignments of a cable with one end terminated in the Flex-WAN connector and the other end terminated in an RS-232 DCE 25-pin female D-sub connector. See Figure 4-1 for an illustration of the Flex-WAN connector.

Table 4-5   Flex-WAN to RS-232 DCE Cable Pinouts

Signal	From	Signal	To	Pair	Note
MODE_0 GND	J1-50 J1-51	——	——	——	JUMPED TOGETHER
SHIELD GND	J1-46	SHIELD GND	J2-1	SINGLE	
SIGNAL GND	J1-45	SIGNAL GND	J2-7	1	2
				1	1, 2
LL/DCD	J1-44	DCD	J2-8	2	
				2	1, 2
DTR/DSR	J1-43	DSR	J2-6	3	
				3	1, 2
RTS/CTS	J1-42	CTS	J2-5	4	
				4	1, 2
TXD/RXD	J1-41	RXD	J2-3	5	
				5	1, 2
NIL/RXC	J1-40	RXC	J2-17	6	
				6	1, 2
TXCE/TXC	J1-39	TXC	J2-15	7	
				7	1, 2
RXC/TXCE	J1-38	TXCE	J2-24	8	
				8	1, 2
RXD/TXD	J1-36	TXD	J2-2	9	
				9	1, 2
CTS/RTS	J1-35	RTS	J2-4	10	1, 2
				10	
DSR/DTR	J1-34	DTR	J2-20	11	
				11	1, 2
DCD/LL	J1-33	LT	J2-18	12	
				12	1, 2
SIGNAL GND	J1-56	SIGNAL GND	J2-7	JUMPER	1, 2

Note 1: All spare wires are soldered together with a jumper wire and plugged into J1-56.
Note 2: All spare wires are soldered together with a jumper wire and plugged into J2-7.

ISDN RJ-45 Connector

To connect the OfficeConnect bridge/router to an ISDN network, use the ISDN cable with an RJ-45 connector.

Table 4-6 lists the pin assignments of a Category 5 shielded twisted-pair ISDN cable with both ends terminated in RJ-45 shielded connectors.

i *The model 14xS/T OfficeConnect bridge/router uses two pairs and the model 14xU uses a single pair.*

Table 4-6 ISDN RJ-45 Cable Pinouts

Pair.	P1	P2	Signal
1	4	4	NC1+
	5	5	NC1-
2	1	1	TP0+
	2	2	TP0-
3	3	3	TP1+
	6	6	TP1-
4	7	7	Reserved+
	8	8	Reserved-
	SHLD	SHLD	Drain Wire

Figure 4-7 shows the RJ-45 plug.

12345678
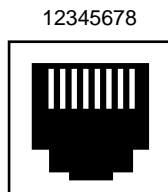
Figure 4-7 RJ-45 plug

56K CSU/DSU RJ-48S Connector	To connect the OfficeConnect bridge/router to a 56K CSU/DSU network, use a cable with an RJ-48S connector.

Table 4-7 lists the pin assignments using the RJ-48S connector.

Table 4-7 Table 4-7 CSU/DSU RJ-48S Cable Pinouts

Pin Number	Definition
1	R1, transmit ring to network
2	T1, transmit tip to network
3	(not used)
4	(not used)
5	(not used)
6	(not used)
7	T, receive tip from network
8	R, receive ring from network

Figure 4-8 shows the RJ-48S plug.
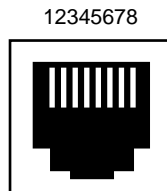
Figure 4-8 RJ-48S plug

RJ48 T1 Cable   To connect a model 12xT bridge/router to a T1 or fractional T1 line, use a cable with an RJ-48 connector. This cable is provided witht the T1/FT1 module..

Figure 4-9 shows the pin assignments of the cable with both ends terminated in RJ-48 connectors.

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

Figure 4-9   RJ-48 T1 Cable

5 ORDERING YOUR WAN LINES

This chapter provides information needed to order leased lines, and 3Com-specific information for ordering ISDN line service from North American (U.S. and Canadian), German, and Dutch suppliers. For all other countries, no 3Com-specific information is known to be required to order ISDN service.

If your WAN lines are not provisioned correctly, you will not be able to use your OfficeConnect bridge/router to access a remote network.

Gathering Information About Serial WAN Lines

Use Table 5-1 to gather information about serial WAN line services on the OfficeConnect bridge/router from your network service provider, then use the information to configure your line.
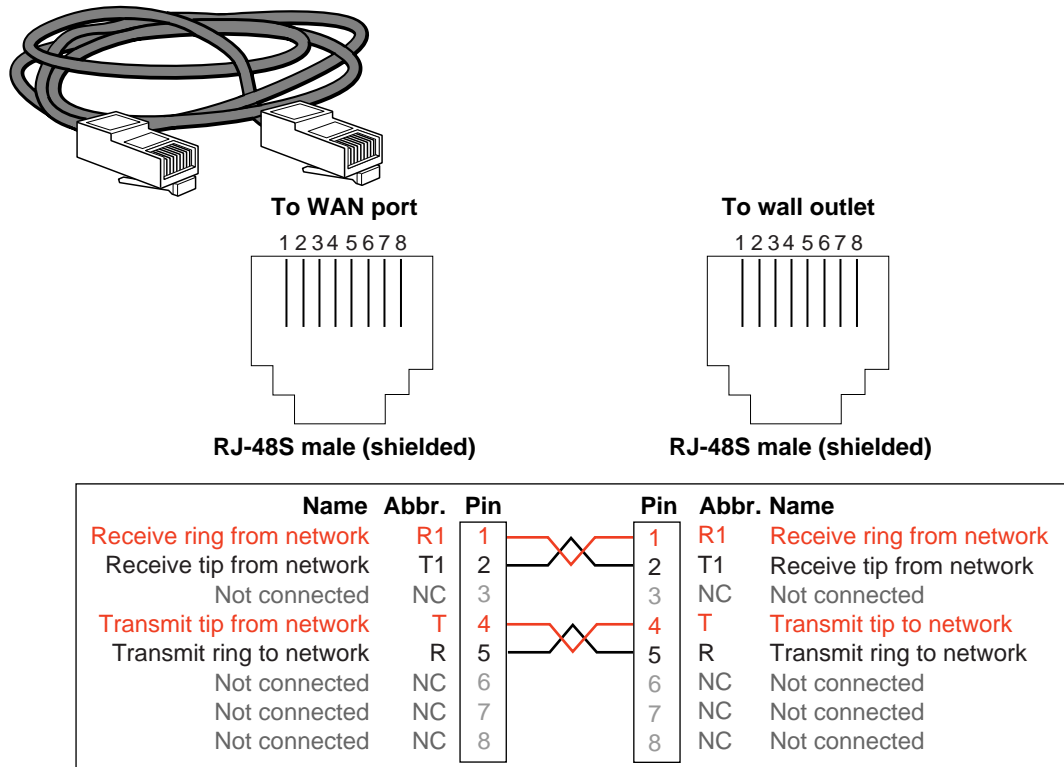
Table 5-1 Serial WAN Line Configuration Information

Line Characteristic	Supported by OfficeConnect	Supplied by provider
Baud rate	1.2 to 2048 kbps	_____
Clocking	Internal and external	_____
Duplex mode	Full	_____
Encoding	NZR and NZRI	_____
Transmission Idle signal	Flag and mark	_____

Ordering U.S. and Canadian ISDN BRI Services

This section describes how to order ISDN services for the OfficeConnect bridge/router in the U.S. and Canada.

For additional information about ISDN, refer to the *Using NETBuilder Family Software*.

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 to place an order for ISDN service for an OfficeConnect bridge/router with a BRI, and that you have the following information:

- Line provisioning
- ISDN outlet type
- Network terminator (NT1), for model 14x S/T only

3 Give the representative the Bellcore ISDN ordering code (IOC). This is also referred to as line provisioning. The IOC tells the telephone company which parameter settings to use for OfficeConnect bridge/routers. The IOC for this product is "Capability R."

Not all Regional Bell Operating Companies use IOCs. If the representative has the IOC for OfficeConnect bridge/router listed, skip to step 7; otherwise, continue on to step 4.

4 Ask the representative which ISDN switch type your line uses. Place a check mark in the appropriate box on the ISDN Information Sheet at the end of this procedure.

5 Ask for an RJ-45 connector to be installed with your new ISDN outlet.

6 If you have a model 14X S/T, ask for an NT1 to connect your bridge/router to the ISDN line. (Or, you can purchase an NT1 from a reseller; refer to "NT1s and Power Supplies" on page 5-8 for more information about NT1s.) The model 14xU bridge/router does not require an external NT1.

7 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 telephone company may not require the SPID number.

ISDN Information Sheet 3Com OfficeConnect Bridge/Router System
ISDN Switch Type
AT&T 5ESS NI1   ❐
AT&T 5ESS Custom   ❐
Northern Telecom DMS 100 ❐   or National ISDN
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

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

If your telephone company has the IOC for an OfficeConnect bridge/router, you do not need to complete step 8.

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

This completes the ISDN ordering process for OfficeConnect bridge/routers with a BRI. Keep this information sheet handy; you will need it when you install your bridge/router.

AT&T 5ESS Switch (North America Only)

To order ISDN service for an AT&T 5ESS switch, provide the telephone company with the information in Table 5-2.

Table 5-2 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 14xS/T) or ISDN U interface (for model 14xU) 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 (North America Only)

To order ISDN service for an AT&T 5ESS custom switch, provide the telephone company with the information in Table 5-3.

Table 5-3   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 14xS/T) or ISDN U interface (for model 14xU) 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

i *A point-to-point configuration on an OfficeConnect bridge/router is selected by setting the SPIDn1 and SPIDn2 parameters to none.*

DMS 100 and National ISDN (North America Only)

To order ISDN service for a DMS 100 or National ISDN switch, provide the telephone company with the information in Table 5-4.

Table 5-4 Ordering ISDN Service for a DMS 100 or National ISDN Switch

Required Information	Specification
Line type	DMS 100 or National ISDN 1line (in North America)
Line code	2B1Q (2B+D)
Interface type	S/T interface with NT1 (model 14xS/T) or ISDN U interface (for model 14xU) 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 (North America Only)

To order ISDN service for a Siemens EWSD switch, provide the phone company with the information in Table 5-4.

Table 5-5   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 14xS/T) or ISDN U interface (for model 14xU) 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

Service Profile Identifiers

When you request services in North America, you may also need the following information about Service Profile Identifiers (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 two 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 OfficeConnect 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 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 an OfficeConnect bridge/router with an ISDN interface does not support them.

NT1s and Power Supplies

North American telephone companies require a network termination device type 1 (NT1) and a power supply for every ISDN line. For a small monthly fee, your service provider or telephone company can provide you with an NT1 and power supply and can explain how to connect and use them. However, you may prefer to purchase these devices 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.

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.

Two power sources are available from an NT1 for CPE equipment. An ISDN telephone uses one power source. The OfficeConnect bridge/router does not use either source. Instead, it detects the presence or absence of *phantom power* that may be available from your ISDN line, and can determine whether or not a telephone cord is plugged in.

Not all NT1s provide phantom power; for example, the AMI NT1 from AT&T does not. If you connect the OfficeConnect bridge/router to an NT1 that does not provide phantom power, you must turn off phantom power detection before you can dial successfully.

To turn off phantom power detection enter:

`SETDefault!<connectorID>-PATH PhantomPower=Disable|Enable`

For more information on this parameter, refer to *Reference for NETBuilder Family Software.*

Ordering German ISDN BRI Services

To order German ISDN services for an OfficeConnect bridge/router, 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 OfficeConnect 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 for use with the OfficeConnect bridge/routers in Germany, make sure to order point-to-multipoint ISDN lines. The OfficeConnect bridge/routers do 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 for an OfficeConnect bridge/router, 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.

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Network adapters	Lifetime
Ethernet stackable hubs and Unmanaged Ethernet fixed port repeaters	Lifetime* (One year if not registered)
*Power supply and fans in these stackable hubs and unmanaged repeaters	One year
Other hardware products	One year
Spare parts and spares kits	90 days

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