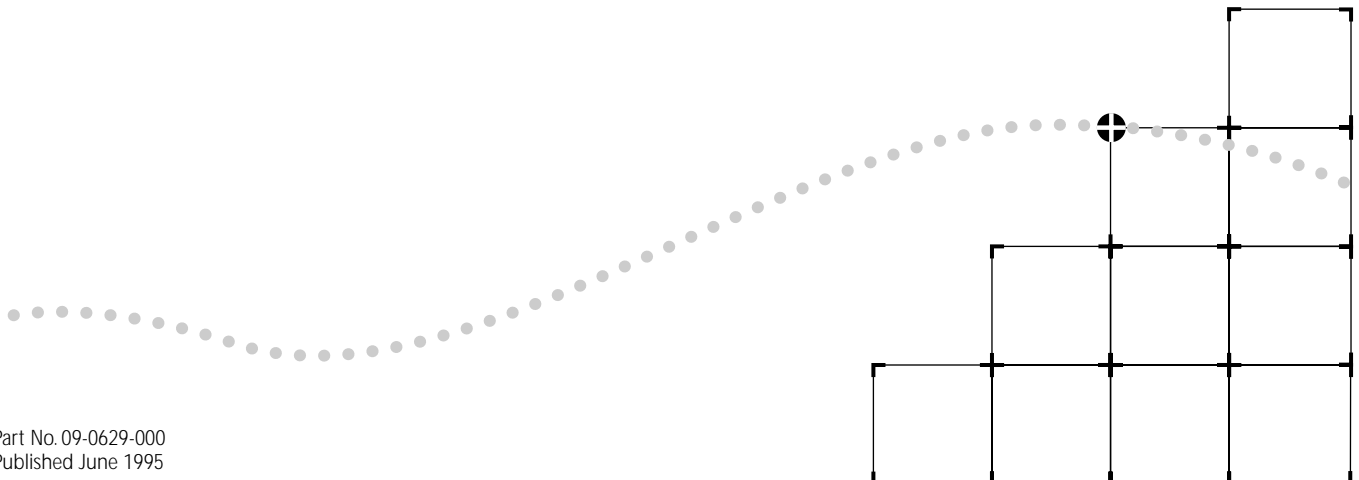




# NETBUILDER II<sup>®</sup> FAST ETHERNET 100BASE-TX/100BASE-FX MODULE INSTALLATION GUIDE

A member of the NETBuilder II family



3Com Corporation ■ 5400 Bayfront Plaza ■ Santa Clara, California ■ 95052-8145

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Guide written by Ramona Boersma. Edited by Pat Vaughn. Technical illustration and production by Ramona Boersma.

# ABOUT THIS GUIDE

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## Introduction

This guide describes how to install, cable, and troubleshoot the Fast Ethernet 100BASE-TX module and the Fast Ethernet 100BASE-FX module for the NETBuilder II® system. The information in this guide applies to all NETBuilder II chassis.

For more information about NETBuilder II base system installation, refer to the *NETBuilder II Base System Installation Guide*.

This guide is intended for the system administrator, network equipment installer, or network manager who is responsible for installing and managing the network hardware. It assumes a working knowledge of network operations, but it does not assume prior knowledge of 3Com® internetworking equipment.



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

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## Conventions

Table 2 and Table 1 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
"Enter" vs. "Type"	When the word "enter" is used in this guide, it means type something, then press the Return or Enter key. Do not press the Return or Enter key when an instruction simply says "type."
"Syntax" vs. "Command"	<p>When the word "syntax" is used in this guide, it indicates that the general form of a command syntax is provided. You must evaluate the syntax and supply the appropriate port, path, value, address, or string; for example:</p> <p>Enable RIPIP by using the following syntax:</p> <pre>SETDefault !&lt;port&gt; -RIPIP CONTrol = Listen</pre> <p>In this example, you must supply a port number for !&lt;port&gt;.</p> <p>When the word "command" is used in this guide, it indicates that all variables in the command have been supplied and you can enter the command as shown in text; for example:</p> <p>Remove the IP address by entering the following command:</p> <pre>SETDefault !0 -IP NETaddr = 0.0.0.0</pre> <p> For consistency and clarity, the full form syntax (upper- and lowercase letters) is provided. However, you can enter the abbreviated form of a command by typing only the uppercase portion and supplying the appropriate port, path, address, value, and so forth. You can enter the command in either upper- or lowercase letters at the prompt.</p>
Text represented as <code>screen display</code>	<p>This <code>typeface</code> is used to represent displays that appear on your terminal screen, for example:</p> <pre>NetLogin:</pre>
Text represented as <b>commands</b>	<p><b>This typeface</b> is used to represent commands that you enter, for example:</p> <pre>SETDefault !0 -IP NETaddr = 0.0.0.0</pre>
Keys	<p>When specific keys are referred to in the text, they are called out by their labels, such as "the Return key" or "the Escape key," or they may be shown as [Return] or [Esc].</p> <p>If two or more keys are to be pressed simultaneously, the keys are linked with a plus sign (+), for example:</p> <p>Press [Ctrl]+[Alt]+[Del].</p>
<i>Italics</i>	<i>Italics</i> are used to denote <i>new terms</i> or <i>emphasis</i> .

# 1

## INSTALLATION

This chapter describes how to install the Fast Ethernet 100BASE-TX or 100BASE-FX module into the NETBuilder II® system and includes information on the following:

- Preinstallation procedure
- Installation in a NETBuilder II 4- or 8-Slot chassis
- Installation in a NETBuilder II 8-Slot Extended chassis
- Cabling the module

For information about the module's features, refer to Chapter 2.

---

### Before Installing the Module

Before you install the module into the NETBuilder II system, follow these steps:

- 1 Observe appropriate electrostatic discharge (ESD) precautions.

ESD can damage circuit board components. Failures resulting from ESD may not be covered under your warranty. To prevent this, follow these handling procedures:

- Keep the module in its antistatic shielded bag until you are ready to install.
- Do not touch pins, leads, or solder connections on the module.
- Handle the module by the edges only.
- Store or ship the module in static-protective packaging.

Observe proper grounding techniques when handling the module: use a foot strap and grounded mat, or wear a grounded static discharge wrist strap.

- 2 Inspect the module for shipping damage.

If you find any damage, contact the shipping company to file a report. If the module must be returned to your network supplier, ship it in its original shipping carton. If the original carton was damaged in shipment, repack the module in a carton that provides equivalent protection.

- 3 Verify that you have received all the contents.

When you purchase the Fast Ethernet module, you receive the following:

- Fast Ethernet 100BASE-TX or 100BASE-FX module
- This guide
- *NETBuilder II VFG-243/1991 Configuration Exceptions List*

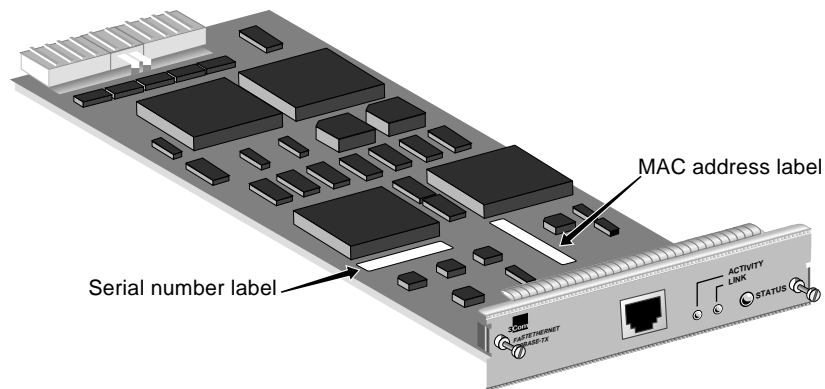
If an item is missing from an undamaged carton, contact your network supplier to obtain a replacement.

- 4 Write down the serial number and the MAC address on the following line. You will need this information if you have to contact your network supplier.

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*Serial number example: S/N:1DW12345 (100BASE-TX) or 1FF12345 (100BASE-FX)*

*MAC address example: 080002 1A4B5C*



The MAC address is also encoded in the module's EEPROM. Use the procedure in the *NETBuilder II Base System Installation Guide* to display the MAC address encoded in the EEPROM.

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## Software/Hardware Compatibility

The Fast Ethernet 100BASE-TX and 100BASE-FX modules need version 8.2 or later of the NETBuilder Family Bridge/Router software and version 2.1 or later of the CEC firmware.

The NETBuilder II chassis supports up to three Fast Ethernet modules.

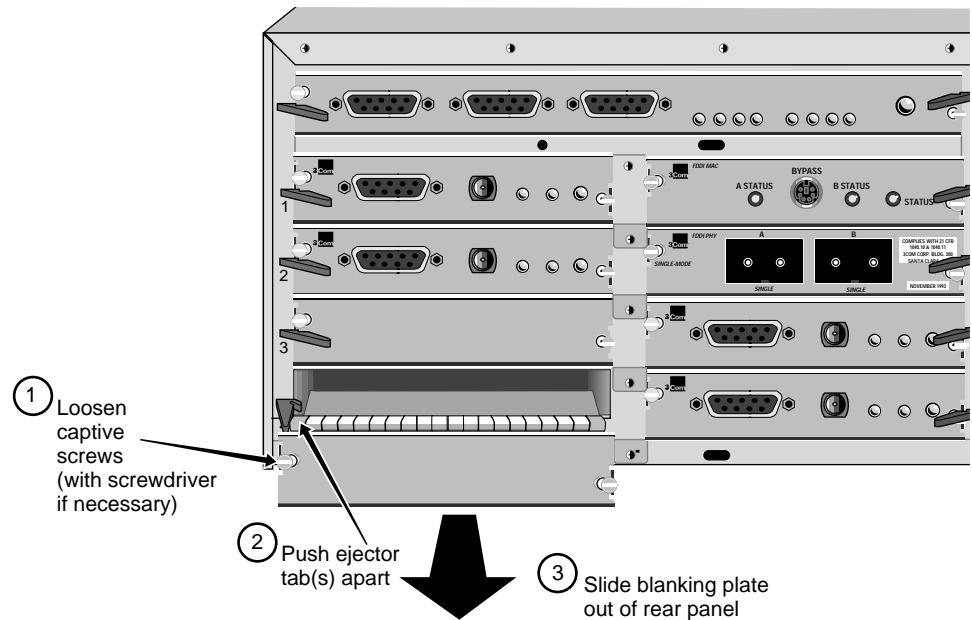
Installing in the 4- or 8-Slot Chassis

Use this procedure to install the module into the NETBuilder II 4- or 8-Slot chassis. To install in the NETBuilder II 8-Slot Extended chassis, see the next section.

- You will need a small flat-blade screwdriver.
- You can safely install a module without turning off or rebooting the NETBuilder II system.

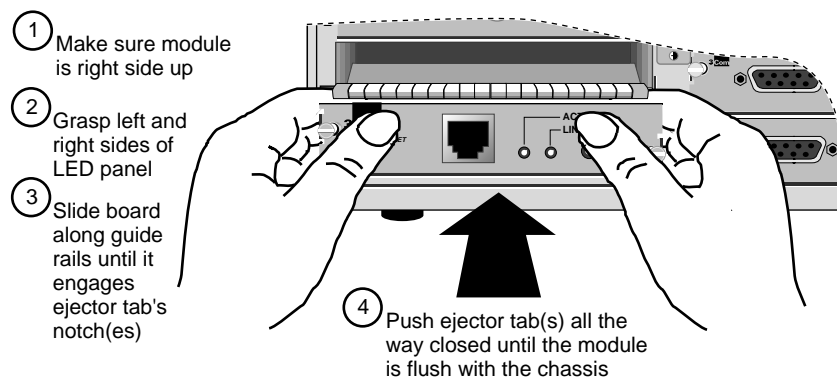
- 1 Remove the blanking plate from the I/O slot you have selected.

You do not need to remove the cable strain relief bracket that came with your NETBuilder II chassis.



**CAUTION:** Only remove the blanking plate from an I/O slot that will house the Fast Ethernet module. All unused I/O slots require blanking plate covers to maintain proper cooling of the unit and regulatory compliance. Failure to cover open slots can result in overheating of the NETBuilder II system and voiding of the warranty.

- 2 Insert the module into the slot.



- 3 Tighten the captive screws with a screwdriver. Do **not** overtighten.

A solid connection of the connector/LED panel to the chassis is required for proper operation. Do **not** use the screws to force the board into place.

See "Cabling the Module" on page 1-6 to finish installation.

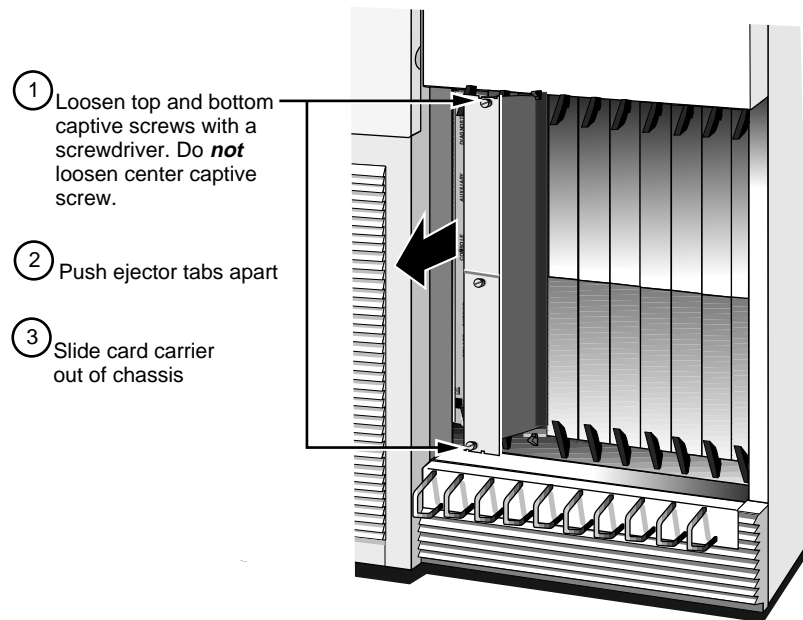
## Installing in the Extended Chassis

Use this procedure to install the module into the NETBuilder II 8-Slot Extended chassis. To install in the NETBuilder II 4- or 8-Slot chassis, see the previous section.

- You will need a small flat-blade screwdriver.
  - You can safely install a module without turning off or rebooting the NETBuilder II system.
- 1 Remove the card carrier from the I/O slot you have selected.

The card carrier acts as a blanking plate when a module is not installed.

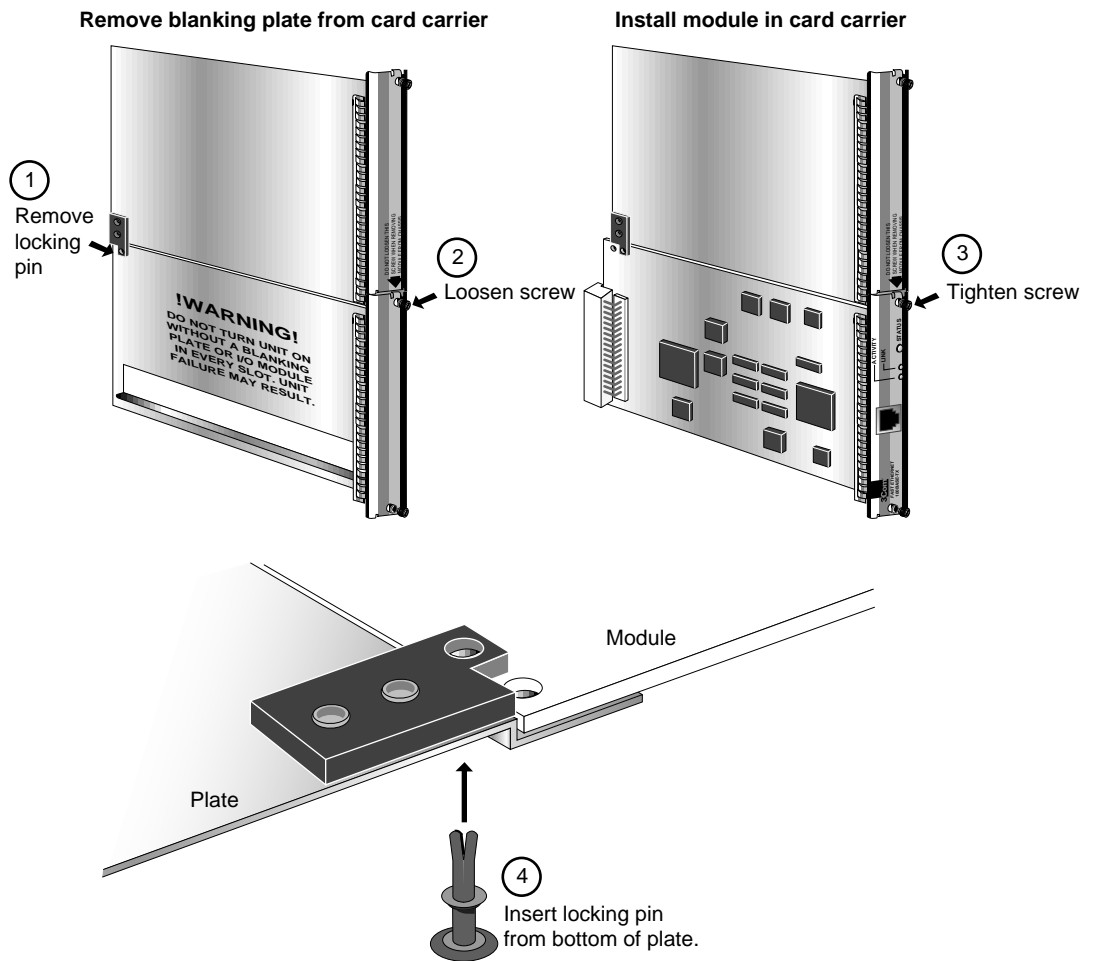
You do not need to remove the cable strain relief bracket that came with your NETBuilder II chassis.



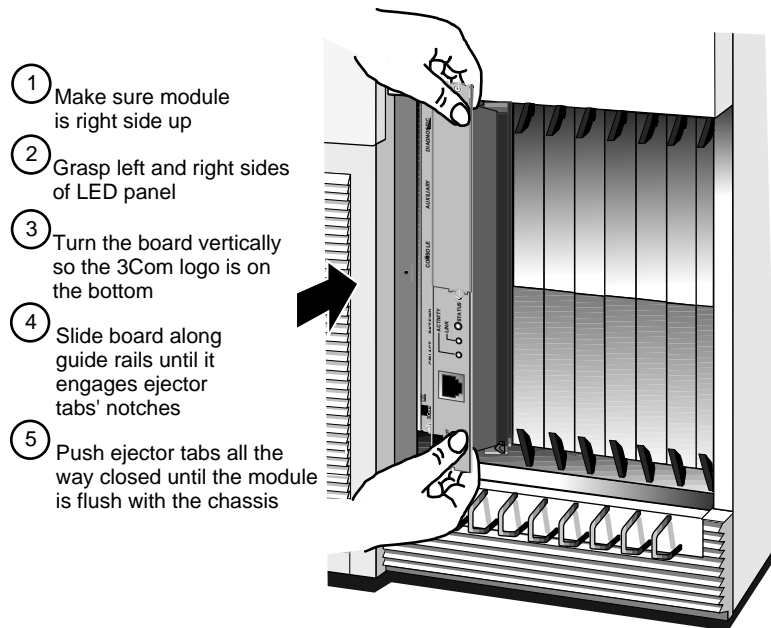
**CAUTION:** Only remove the card carrier from an I/O slot that will house the Fast Ethernet module. All unused I/O slots must be covered by a card carrier to maintain proper cooling of the unit and regulatory compliance. Failure to cover open slots can result in overheating of the NETBuilder II base system and voiding of the warranty.



2 Install the module in the card carrier.



3 Insert the card carrier into the slot.



- 4 Tighten the captive screws with a screwdriver. Do **not** overtighten.

A solid connection of the connector/LED panel to the chassis is required for proper operation. Do **not** use the screws to force the board into place.

See "Cabling the Module" to finish installation.

## Cabling the Module

This section contains cabling, compliance, network, and pinout information for both Fast Ethernet modules.

## Cables and Compliance

Table 1-2 lists supported cabling and emissions compliance.

**Table 1-1** Cable Support and Emissions Compliance

	Cable Type	Connectors	Emissions Compliance*	
			FCC Class A VCCI Class A	EN55022 Class B VDE Class B
<b>100BASE-TX</b>	Category 5 UTP	Category 5 RJ-45 (including jacks)	Yes	No
	Category 5 shielded UTP	Category 5 RJ-45 (including jacks)	Yes	Yes
<b>100BASE-FX</b>	Multi-mode duplex fiber of 62.5/125 $\mu\text{m}$	Duplex SC	Yes	Yes

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

## Cabling Guidelines

There are three types of Fast Ethernet interfaces:

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

- **T4** — Runs over Category 3 or better UTP or shielded UTP. T4 does **not** connect to either of the NETBuilder II Fast Ethernet modules, but you can use T4 in your network between appropriate devices.

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

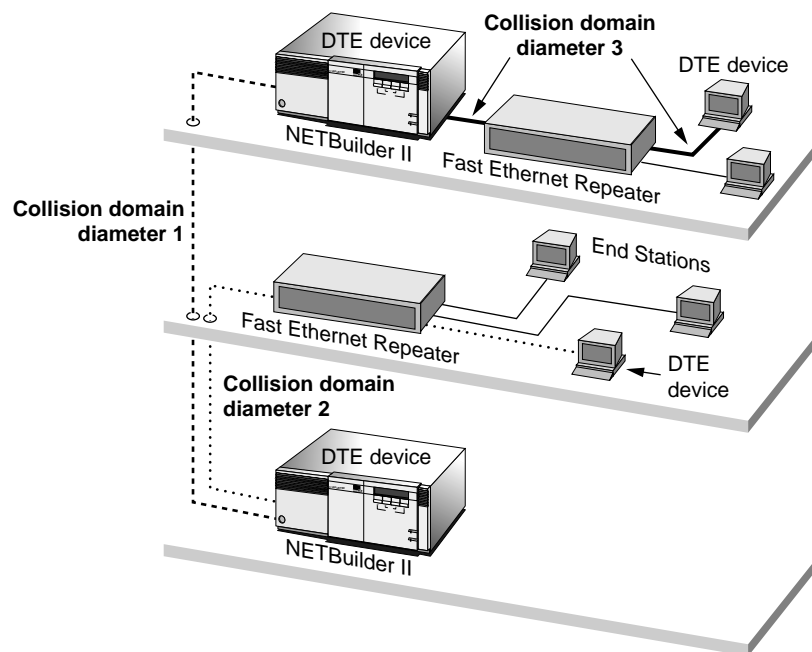
### Creating a Valid Network

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 1-2:

- **UTP (running TX or T4)** — Maximum cable span length is  $\leq 100$  m.
- **Fiber (running FX)** — Maximum cable span length is  $\leq 412$  m.

Figure 1-1 shows examples of collision domain diameters.



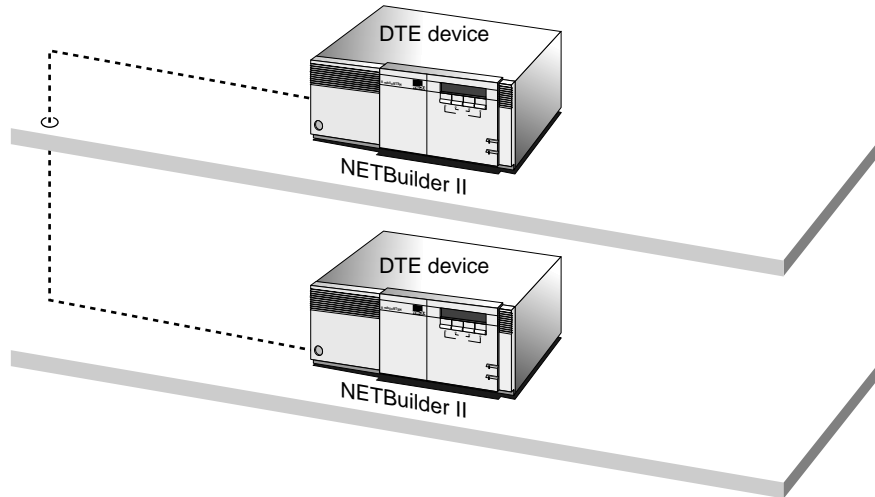
**Figure 1-1** Collision Domain Diameter Examples

To determine a valid collision domain diameter:

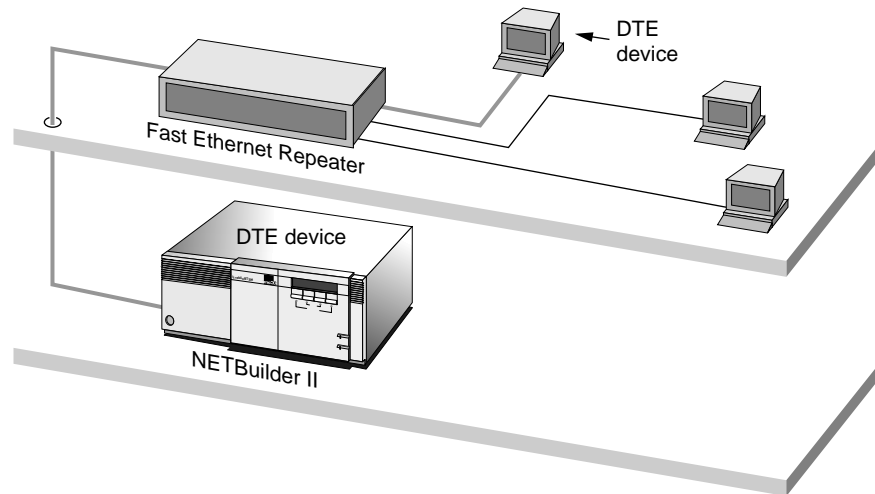
- 1 Determine which interfaces will be used: TX, FX, or T4.
- 2 Add up the combined length of all cabling to be used.
- 3 Determine which class of repeaters, if any, are used in the collision domain diameter.

- Determine the maximum cable length by referring to Table 1-2, which contains cabling and repeater guidelines for three scenarios shown in Figure 1-2, Figure 1-3, and Figure 1-4.

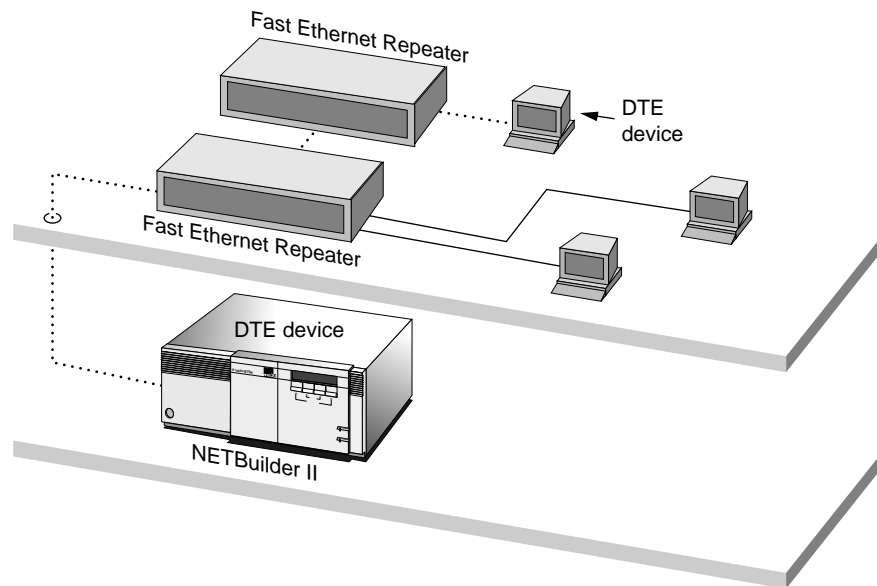
For expanded guidelines, see the IEEE Standard 802.3.



**Figure 1-2** Collision Domain Diameter with No Repeater



**Figure 1-3** Collision Domain Diameter with One Repeater



**Figure 1-4** Collision Domain Diameter with Two Repeaters

**Table 1-2** Maximum Cable Length in Example Collision Domain Diameters

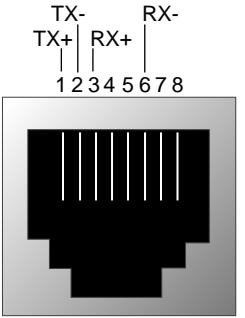
	Maximum Combined Cable Length, by Interface			
No Repeaters (see Figure 1-2)	<b>100 m</b>	<b>412 m</b>	not applicable	not applicable
One Class 1 repeater* (see Figure 1-3)	<b>200 m</b> — 100 m <i>max.</i> on each side of the repeater	<b>272 m</b>	<b>260.8 m</b> <ul style="list-style-type: none"> <li>■ 100 m <i>max.</i> TX</li> <li>■ Remaining length of FX</li> </ul>	<b>231 m</b> <ul style="list-style-type: none"> <li>■ 100 m <i>max.</i> T4</li> <li>■ Remaining length of FX</li> </ul>
One Class 2 repeater† (see Figure 1-3)	<b>200 m</b> — 100 m <i>max.</i> on each side of the repeater	<b>320 m</b>	<b>308.8 m</b> <ul style="list-style-type: none"> <li>■ 100 m <i>max.</i> TX</li> <li>■ Remaining length of FX</li> </ul>	<b>304 m‡</b> <ul style="list-style-type: none"> <li>■ 100 m <i>max.</i> T4</li> <li>■ Remaining length of FX</li> </ul>
Two Class 2 repeaters (see Figure 1-4)	<b>205 m</b> — 100 m <i>max.</i> per cable span	<b>228 m</b>	<b>216.2 m</b> <ul style="list-style-type: none"> <li>■ 105 m <i>max.</i> total TX, 100 m <i>max.</i> per TX cable span</li> <li>■ Remaining length of FX</li> </ul>	<b>263.3 m‡</b> <ul style="list-style-type: none"> <li>■ 105 m <i>max.</i> total T4, 100 m <i>max.</i> per T4 cable span</li> <li>■ Remaining length of FX</li> </ul>

\* 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.

**RJ-45 Pinout** The following figure shows the pinout for the RJ-45 connector on the Fast Ethernet 100BASE-TX module. The connector body connects the cable shield to chassis ground.



**RJ-45 Female (shielded)**



# 2

## OVERVIEW OF THE MODULE

This chapter describes the features, specifications, and typical use of the Fast Ethernet 100BASE-TX/100BASE-FX module for the NETBuilder II system.

### Module Features

Table 2-1 summarizes the Fast Ethernet 100BASE-TX/100BASE-FX module features.

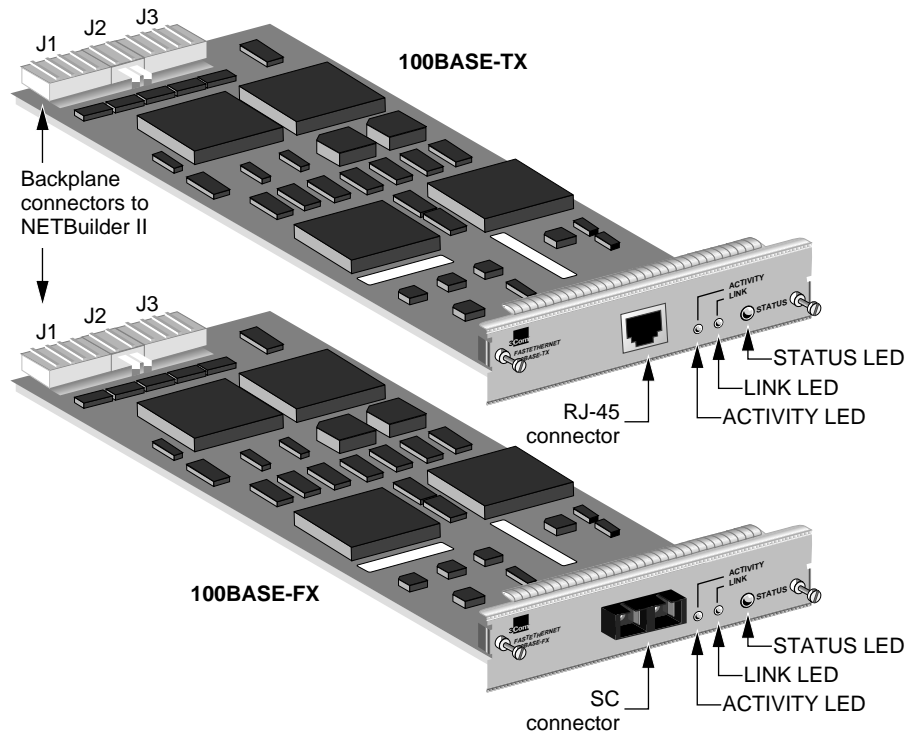
**Table 2-1** Fast Ethernet 100BASE-TX/100BASE-FX Module Features

Feature	Summary
Hot-swap capability	Allows you to install or remove and reinstall the module without turning off the NETBuilder II system.
Cable support:	
100BASE-TX	Supports Category 5 UTP or shielded UTP cabling. See "Cabling the Module" <a href="#">on page 1-6</a> for more information.
100BASE-FX	Supports multi-mode duplex fiber of 62.5/125 $\mu\text{m}$ . See "Cabling the Module" <a href="#">on page 1-6</a> for more information.
Accessible information on the EEPROM	Provides Fast Ethernet 100BASE-TX/100BASE-FX module product information that can be accessed via the software or the Monitor utility.
On-board RISC CPU	Provides full network rate filtering.
Parallel Tasking™ chip	Provides highest performance with 3Com adapters.
64 KB multipacket memory buffering	Enhances performance by smoothing traffic bursts.



## Specifications

This section describes the Fast Ethernet 100BASE-TX/100BASE-FX module components and gives the specifications of the board.



**LEDs** The Fast Ethernet 100BASE-TX/100BASE-FX module has three LEDs for displaying information. Table 2-2 describes each of the LEDs.

**Table 2-2** Fast Ethernet 100BASE-TX/100BASE-FX Module LEDs

LED	State	Meaning
<b>STATUS</b>	Off	Not functioning; it may be disabled or there is no power to the system.
	Red	Module failure or in monitor mode.
	Green	Functioning normally.
	Yellow	Interface is operational but has been disabled in the configuration.
	Yellow flashing	Self-test mode.
	Red/Yellow flashing	Disconnected cable.
<b>ACTIVITY</b>	Off	No activity on the network.
	Green	Network activity; module is functioning normally. The green light appears intermittently, whenever data is received and transmitted on the network.
<b>LINK</b>	Off	No cable or bad connection.
	Green	Valid idle symbols received.

**Connectors** Table 2-3 describes the Fast Ethernet 100BASE-TX/100BASE-FX module's connectors.

**Table 2-3** Fast Ethernet 100BASE-TX/100BASE-FX Module Connectors

Location	Connector(s)	No. of Pins	Purpose
Backplane connector	J1 and J3	48-pin	Connects module to the core bus.
	J2	8-pin	Power connector.
Front LED/connector panel:			
100BASE-TX	RJ-45	8-pin	Connects module to Fast Ethernet cabling.
100BASE-FX	SC	Duplex	

## Physical Specifications

Table 2-4 and Table 2-5 list the module's physical dimensions and the maximum current consumption.

**Table 2-4** Physical Dimensions

Attribute	Description
Length	8.8 in (22.3 cm)
Width	3.9 in (9.9 cm)
Height	0.5 in (1.3 cm)
Weight	0.75 lb (0.34 kg)

**Table 2-5** Maximum Current Consumption

+5 Volts	-5 Volts	+12 Volts	-12 Volts
1.0 amp	0.0 amp	0.0 amp	0.0 amp

# 3

## TROUBLESHOOTING AND REPLACING THE MODULE

This chapter describes how to troubleshoot the Fast Ethernet 100BASE-TX/100BASE-FX module.

### Troubleshooting

Table 3-1 describes common malfunctions that can occur with the module. If you are unable to resolve a problem, you will need to contact your network supplier. Refer to Appendix A, *Technical Support*, for information about who to contact in your area.

**Table 3-1** Troubleshooting the Module

Symptom	Cause and Action
The following message is displayed at startup:  Fast Ethernet 100BASE-TX Interface: Self Tests failed - slot X  (The value of X can be 1 through 4 or 1 through 8, depending on whether you have a 4- or an 8-slot NETBuilder II chassis.)	<i>Self-test failure</i> <ul style="list-style-type: none"><li>■ Check to see if the module is inserted completely into the NETBuilder II chassis.</li><li>■ Make sure there are no bent pins on the NETBuilder II backplane, module, or connector.</li></ul> If you still have a self-test failure, contact your network supplier.
The module's STATUS LED is <b>off</b> when there is power to the system and other installed modules are operating.	<i>Disabled module</i> <p>The module may not be properly connected to the NETBuilder II backplane. Remove and reinsert the module.</p> If it is still not working, replace the module.
The module's STATUS LED is <b>red</b> .	<i>Error Condition</i> <ul style="list-style-type: none"><li>■ Check that all cable connections are intact.</li><li>■ Check that the NETBuilder II base system is operating correctly.</li><li>■ Check that the network you are connected to is operating correctly.</li><li>■ Check that the connected serial device is operating correctly.</li></ul> If none of these actions solve the problem, replace the module and/or contact your network supplier for assistance.

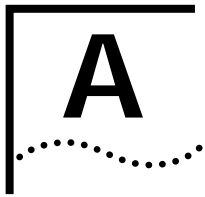
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## Replacing the Module

If any component in the module fails, you will need to replace the entire module. The module can be hot-swapped, which means that you can safely remove and install a new one without turning off or rebooting the NETBuilder II system.

To perform the following procedure, you may need a small flat-blade screwdriver. Follow these steps to remove and replace the module:

- 1 Disconnect any network cabling from the module.
- 2 Unscrew the two captive screws (use a screwdriver if necessary) that anchor the module in the slot until they disengage from the chassis. Do not remove the screws from the I/O panel.
- 3 Push the tab(s) outward from the module.  
The module will disengage from the NETBuilder II backplane and partially eject from the slot.
- 4 Use both hands to grasp the board and gently pull it from the slot.
- 5 Install the new module using the procedures outlined in Chapter 1, *Installation*.



# TECHNICAL SUPPORT

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

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## On-line Technical Services

3Com offers worldwide product support seven days a week, 24 hours a day, through the following on-line systems:

- 3Com Bulletin Board Service (3ComBBS)
- World Wide Web site
- Ask3Com<sup>SM</sup> on CompuServe<sup>®</sup>
- 3ComFacts<sup>SM</sup> automated fax service

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3ComBBS contains patches, software, and drivers for all 3Com products, as well as technical articles. This service is available via modem seven days a week, 24 hours a day. To reach the service, set your modem to 8 data bits, no parity, and 1 stop bit. Call the telephone number nearest you:

Country	Baud Rate	Telephone Number
Australia	up to 14400 baud	(61) (2) 955 2073
France	up to 14400 baud	(33) (1) 69 86 69 54
Germany	up to 9600 baud up to 9600 baud	(49) (89) 627 32 188 (49) (89) 627 32 189
Hong Kong	up to 14400 baud	(852) 537 5601
Italy (fee required)	up to 9600 baud	(39) (2) 273 00680
Japan	up to 14400 baud	(81) (3) 3345 7266
Singapore	up to 14400 baud	(65) 534 5693
Taiwan	up to 14400 baud	(886) (2) 377 5838 (886) (2) 377 5840
U.K.	up to 14400 baud	(44) (144) 227 8278
U.S.	up to 14400 baud	(1) (408) 980 8204

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- **CardFacts** provides adapter installation diagrams, configuration drawings, troubleshooting instruction, and technical articles.

Document 9999 provides you with an index of adapter documents.

- **NetFacts** provides data sheets and technical articles on 3Com Corporation's hub, bridge, router, terminal server, and software products.

Document 8888 provides you with an index of system product documents.

Call 3ComFacts using your touch-tone telephone. International access numbers are:

**Table A-1**

Country	Fax Number
Hong Kong	(852) 537 5610
U.K.	(44) (144) 227 8279
U.S.	(1) (408) 727 7021

Local access numbers are available within the following countries:

**Table A-2**

Country	Fax Number	Country	Fax Number
Australia	800 123853	Italy	1678 99085
Denmark	800 17319	Netherlands	06 0228049
Finland	98 001 4444	Norway	800 11062
France	05 90 81 58	Sweden	020 792954
Germany	0130 8180 63	U.K.	0800 626403

## 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:

- Diagnostic error messages
- A list of system hardware and software, including revision levels
- 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 receive support from your network supplier, technical support contracts are available from 3Com.

In the U.S. and Canada, call **(800) 876-3266** for customer service.

If you are outside the U.S. and Canada, contact your local 3Com sales office to find your authorized service provider:

Country	Telephone Number	Country	Telephone Number
Australia (Sydney)	(61) (2) 959 3020	Mexico	(525) 531 0591
(Melbourne)	(61) (3) 653 9515	Netherlands	(31) (3) 402 55033
Belgium	(32) (2) 7164880	Singapore	(65) 538 9368
Brazil	(55) (11) 241 1571	South Africa	(27) (11) 803 7404
Canada	(905) 882 9964	Spain	(34) (1) 3831700
France	(33) (1) 69 86 68 00	Sweden	(46) (8) 632 91 00
Germany	(49) (89) 6 27 32 0	Taiwan	(886) (2) 577 4352
Hong Kong	(852) 868 9111	United Arab Emirates	(971) (4) 349049
Italy	(39) (2) 273 02041	U.K.	(44) (1628) 897000
Japan	(81) (3) 3345 7251	U.S.	(1) (408) 492 1790

## Returning Products for Repair

A product sent directly to 3Com for repair must first be assigned a Return Materials Authorization (RMA) number. A product sent to 3Com without an RMA number 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
U.S. and Canada	(800) 876 3266, option 2	(408) 764 7120
Europe	(44) (1442) 278000	(44) (1442) 236824
Outside Europe, U.S. and Canada	(1) (408) 492 1790	(1) (408) 764 7290

## 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:

Internetworking products	One year
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

If a product does not operate as warranted 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.

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 pursuant to any warranty.

**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 magnetic media containing software against failure during the warranty period. No updates are provided. 3Com's sole obligation hereunder 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 3Com's applicable published specifications. Customer assumes responsibility for the selection of the appropriate applications program and associated reference materials. 3Com makes no warranty that its software products will 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.

**STANDARD WARRANTY SERVICE:** Standard warranty service for hardware products may be obtained by delivering the defective product, accompanied by a copy of the dated proof of purchase, to 3Com's Corporate Service Center or to an Authorized 3Com Service Center during the applicable warranty period. Standard warranty service for software products may be obtained by telephoning 3Com's Corporate Service Center or an Authorized 3Com Service Center, within the warranty period. 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, insured, and packaged appropriately for safe shipment. The repaired or replaced item will be shipped to Customer, at 3Com's expense, not later than thirty (30) days after receipt by 3Com.

**WARRANTIES EXCLUSIVE:** IF A 3COM PRODUCT DOES NOT OPERATE AS WARRANTED ABOVE, CUSTOMER'S SOLE REMEDY SHALL BE REPAIR, REPLACEMENT, OR REFUND OF THE PURCHASE PRICE PAID, AT 3COM'S OPTION. THE FOREGOING WARRANTIES AND REMEDIES ARE EXCLUSIVE AND ARE IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, EITHER IN FACT OR BY OPERATION OF LAW, STATUTORY OR OTHERWISE, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. 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.

3COM SHALL NOT BE LIABLE UNDER THIS WARRANTY IF ITS TESTING AND EXAMINATION DISCLOSE THAT THE ALLEGED DEFECT IN THE PRODUCT DOES NOT EXIST OR WAS CAUSED BY CUSTOMER'S OR ANY THIRD PERSON'S MISUSE, NEGLIGENCE, IMPROPER INSTALLATION OR TESTING, UNAUTHORIZED ATTEMPTS TO REPAIR, OR ANY OTHER CAUSE BEYOND THE RANGE OF THE INTENDED USE, OR BY ACCIDENT, FIRE, LIGHTNING, OR OTHER HAZARD.

**LIMITATION OF LIABILITY:** IN NO EVENT, WHETHER BASED IN CONTRACT OR TORT (INCLUDING NEGLIGENCE) SHALL 3COM BE LIABLE FOR INCIDENTAL, CONSEQUENTIAL, INDIRECT, SPECIAL, OR PUNITIVE DAMAGES OF ANY KIND, OR FOR LOSS OF REVENUE, LOSS OF BUSINESS, OR OTHER FINANCIAL LOSS ARISING OUT OF OR IN CONNECTION WITH THE SALE, INSTALLATION, MAINTENANCE, USE, PERFORMANCE, FAILURE, OR INTERRUPTION OF ITS PRODUCTS, EVEN IF 3COM OR ITS AUTHORIZED RESELLER HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Some states do not allow the exclusion of implied warranties or the limitation of incidental or consequential damages for consumer products, so the above limitations and exclusions may not apply to you. This warranty gives you specific legal rights which may vary from state to state.

**GOVERNING LAW:** This Limited Warranty shall be governed by the laws of the state of California.

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