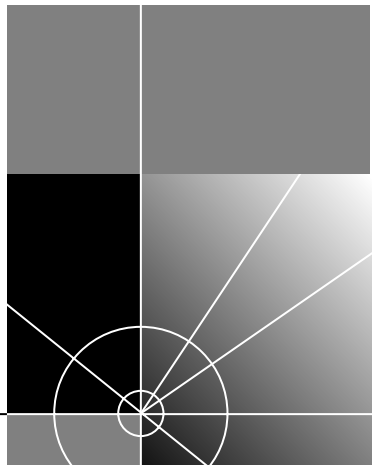
CoreBuilder™ 2500 Getting Started Guide



http://www.3com.com/
Part No. 801-00376-000
Published June 1997
Revision 02

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

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This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

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This equipment was tested and found to conform to the Council Directive 89/336/EEC for electromagnetic compatibility. Conformity with this Directive is based on compliance with the following harmonized standards:

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EN 50082-1 — Electromagnetic Compatibility Generic Immunity Standard: Residential, Commercial, and Light Industry

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Trademarks

Guide written, edited, and illustrated by Corrinne Hamilton, Lynne Gelfand, and Karin Johnson-Cryan. Icon illustrations by Revelle Taillon.

CONTENTS

About This Guide

Introduction

This guide provides all the information you need to set up your CoreBuilder™ switching hub and get it operating in your network: an overview of your system and step-by-step procedures for planning your configuration, installing your system, cabling, powering up, and troubleshooting. When you are ready to configure your CoreBuilder switching hub, refer to the *CoreBuilder 2500 Administration Console User Guide*.

If the information in the Installation and Release Notes shipped with your CoreBuilder system differs from the information in this guide, follow the Release Notes.

This guide is intended for the system administrator, network equipment technician, or network manager who is responsible for installing and managing the network hardware. It assumes a working knowledge of local area network (LAN) operations, but it does not assume prior knowledge of 3Com's CoreBuilder high-performance networking equipment.

How to Use This Guide

This table shows where to find specific information.

If you are looking for information on ...	Turn to ...
A CoreBuilder™ 2500 system and setup overview	Chapter 1
Unpacking and installing your system	Chapter 2 and *Unpacking Instructions*
Installing modules	Chapter 3
Planning your configuration and cabling your system	Chapter 4
Powering up your system	Chapter 5
Setting up management access	Chapter 6
Troubleshooting your system	Chapter 7
System specifications	Appendix A
Module and system pinouts	Appendix B
Site requirements and safety codes	Appendix C
FDDI standards	Appendix D
3Com Technical Support	Appendix E

Conventions

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

Table 1 Notice Icons

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

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 by using the following syntax: `SETDefault !<port> -RIPIP CONTrol = Listen` In this example, you must supply a port number for `<port>`.

(continued)

Table 2 Text Conventions (continued)

Convention	Description
`Commands`	The word "command" means you must enter the command exactly as shown in text and press the Return or Enter key. Example: To remove the IP address, enter the following command: **`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."
[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 **boldface** type	Bold text denotes key features.

CoreBuilder 2500 Documentation

This section describes the information that comprises the CoreBuilder 2500 documentation set. Paper documents are shipped with your system. Additional documents are included on the 3Com DocsOnCD compact disc. To order a paper copy of a document you see on the compact disc, or to order additional compact discs, call your sales representative.

Paper Documents

These documents are shipped with your CoreBuilder system and modules:

- *CoreBuilder 2500 Unpacking Instructions*

  How to unpack your CoreBuilder system, plus an inventory of the items shipped with your system.

- *CoreBuilder 2500 Software Installation and Release Notes*

  Information about the software release, including new features, bug fixes, any changes to the CoreBuilder system's documentation.

- *CoreBuilder 2500 Getting Started Guide (this guide)*

  All the procedures necessary for installing, cabling, powering up, configuring management to, and troubleshooting your CoreBuilder system.

- *CoreBuilder 2500 Intelligent Switching Administration Console Command Quick Reference card*

  The Intelligent Switching commands for the CoreBuilder system Administration Console.

- *CoreBuilder 2500 Extended Switching Administration Console Command Quick Reference* card

  The Extended Switching commands for the CoreBuilder system Administration Console. (Shipped with Extended Switching option package)

- *Module Installation Guides*

  An overview, installation instructions, LED status information, and pinout information for each module. (Shipped with individual modules)

Documents on CD-ROM

In addition to the paper documents shipped with your product, use the compact disc that comes with your system to view these books:

- *CoreBuilder 2500 Administration Console User Guide*

  Information about using the Administration Console to configure and manage your CoreBuilder system.

- *CoreBuilder 2500 Operation Guide*

  Information to help you understand system management and administration, bridging, Fast Ethernet, ATM, and FDDI technology. Also, how these concepts are implemented in the CoreBuilder system.

- *CoreBuilder 2500 Extended Switching User Guide*

  How the routing protocols and VLAN and RMON technologies are implemented in the CoreBuilder system. Also, information about using the Administration Console to configure and manage these features.

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Please include the following information when commenting:

- Document title
- Document part number (found on front or back page of document)
- Page number (if appropriate)

Example:

CoreBuilder 2500 Operation Guide
Part No. 801-00375-000
Page 2-5 (chapter 2, page 5)

1 System and Setup Overview

This chapter contains an overview of 3Com's CoreBuilder™ 2500 switching hub. It identifies the major features and components of the system.

This chapter also contains the "CoreBuilder Roadmap of Setup Tasks" on page 1-6, which highlights the major tasks required to get your CoreBuilder system installed and operating in your network. The roadmap also lists the specific CoreBuilder document that contains the information you need for each of the tasks.

About CoreBuilder Switching Hubs

The CoreBuilder 2500 switching hub is an exceptionally flexible platform providing low cost, high-performance networking. By increasing Ethernet performance through segmentation at the departmental, floor, or building level, the CoreBuilder 2500 system can help you take full advantage of client/server computing.

This powerful switch uses 3Com's new custom ASIC technology, which brings high performance and reliability to your network. The system also provides state-of-the-art network interfaces for all your networking configurations.

The CoreBuilder 2500 System Solution

Your CoreBuilder 2500 system allows you to create additional capacity and improve performance without increasing the complexity of your network. Listed here are several solutions provided by your new system. The CoreBuilder 2500 system:

- Improves performance by integrating segmented Ethernet-based LANs with your choice of Fast Ethernet, FDDI, or ATM
- Increases bandwidth to the server, either by creating a high-speed downlink to a centralized server or by supporting a local high-speed file server
- Switches bandwidth rather than sharing, which provides dedicated 10Mbps Ethernet segments
- Provides parallel communications between users and increases the aggregate bandwidth by allowing information to flow directly from one physical port to another
- Relies on segmentation, which increases bandwidth by dividing your network into smaller segments
- Allows you to add more switch ports as your network grows

- Connects to legacy backbones using FDDI or Fast Ethernet and connects to Ethernet LANs on non-10BASE-T media
- Makes a seamless transition from frame-based networks to ATM cell-based networks

Features of the CoreBuilder 2500 System

The CoreBuilder 2500 system combines Ethernet, FDDI, and Fast Ethernet switching, Ethernet-to-FDDI transparent bridging, VLAN, ATM, and intranetwork routing in a single system. These concepts are described in detail in the *CoreBuilder 2500 Operation Guide* and the *CoreBuilder 2500 Extended Switching User Guide*. By choosing the right mix of Ethernet, Fast Ethernet, FDDI, and ATM plug-in modules, you can maximize the performance of your network.

CoreBuilder switching hubs include integrated management to provide fault tolerance and maximum network availability. System management is accessible using:

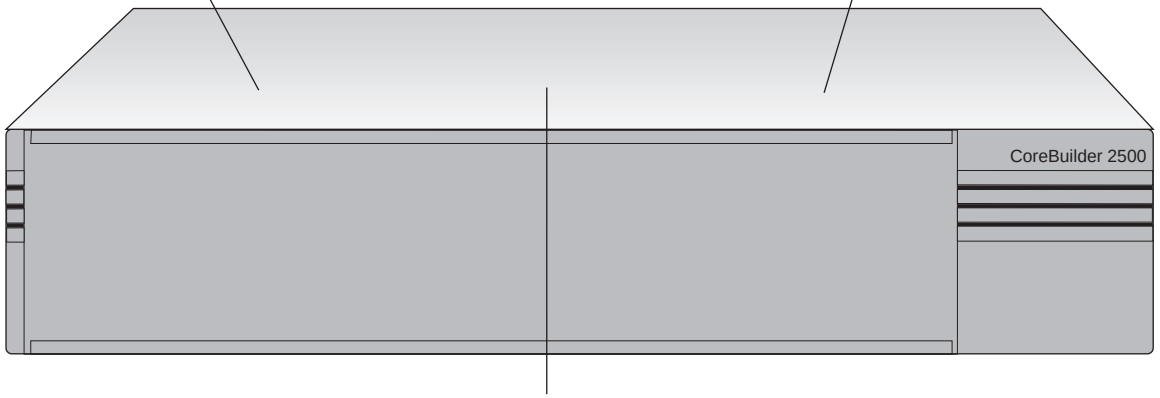
- CoreBuilder system's Administration Console
- Transcend Enterprise Manager for UNIX and Windows, 3Com's SNMP-based network management software for LAN switching systems
- Standard network manager based on SNMP, such as SunNet Manager, HP OpenView, or IBM's Netview AIX

The following sections identify and describe the major components of the CoreBuilder 2500 system.

System Overview — Front Panel

Backplane (Internal)
The backplane interconnects the system processor and the modules.

Power Supply (Internal)
CoreBuilder™ 2500 systems contain one 130-watt power supply. Optional redundant systems contain a second 130-watt power supply.



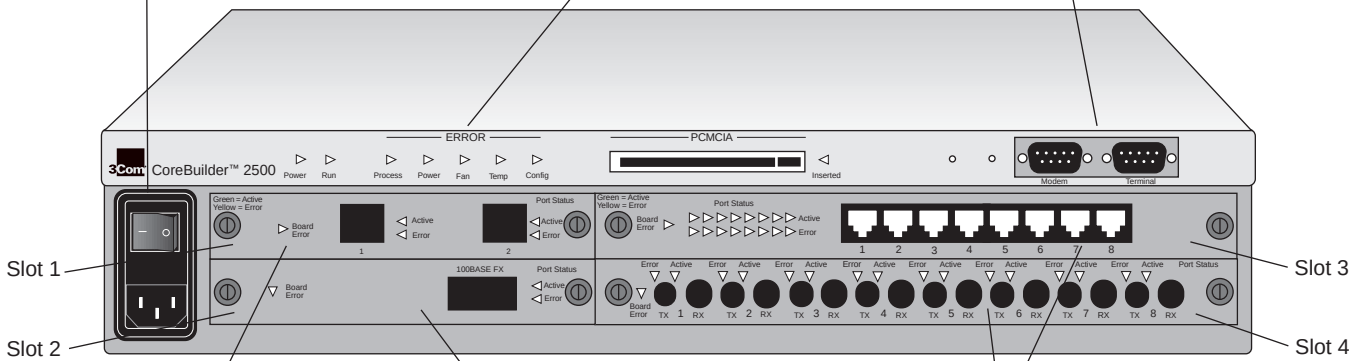
System Processor (Internal)
The system processor provides local and remote management and control of the system. Administration Console software resides on the processor.

System Overview — Back Panel

Power Switch Assembly
Contains the power switch, power outlet, and system fuse

System Processor LEDs
Provide system status information

System Processor Serial Ports
Allow you to connect a modem or terminal to the system for management access



FDDI Module
The CoreBuilder™ 2500 system supports up to 2 FDDI ports. FDDI modules allow you to connect up to two FDDI stations or connect to an FDDI trunk using the two FDDI ports. FDDI modules, which are installed in slot 1 or 2, are available with either fiber or copper connectors.

Fast Ethernet Module
The CoreBuilder 2500 system supports up to 2 Fast Ethernet (100 Mbps) ports. Fast Ethernet modules are installed in slot 1 or 2 and are available with either fiber or copper connectors.

ATM Module (not shown)
The CoreBuilder 2500 system supports one OC-3 155 Mbps interface into a high-speed slot. The ATM module is installed in slot 1 or 2.

Ethernet Modules
The CoreBuilder 2500 system supports up to 16 Ethernet ports. Ethernet modules are installed in slot 3 or 4 and are available in six different media options.

Modules

Each CoreBuilder 2500 system can accommodate up to two Ethernet modules in slots 3 and 4, and up to two high-speed modules (FDDI, Fast Ethernet, or ATM) in slots 1 and 2 for a maximum of two high-speed ports and sixteen Ethernet ports. Because of the range of media options available, a variety of configurations is possible.

The following figures illustrate the available Ethernet, FDDI, Fast Ethernet, and ATM modules.

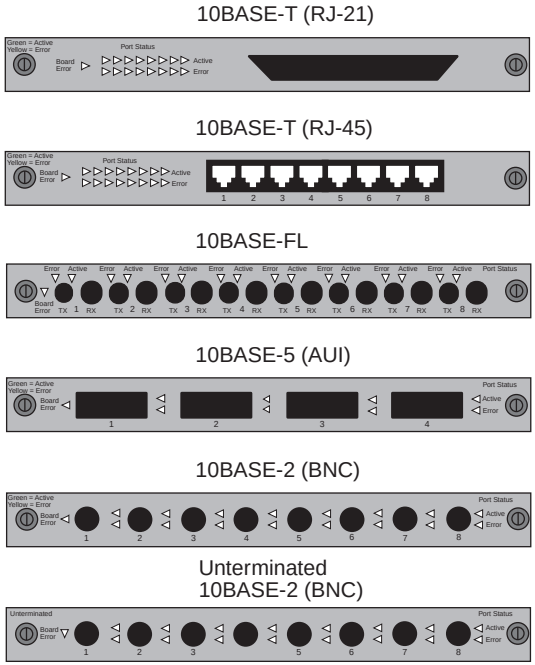


Figure 1-1 Ethernet Modules

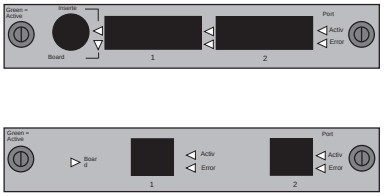


Figure 1-2 FDDI Modules

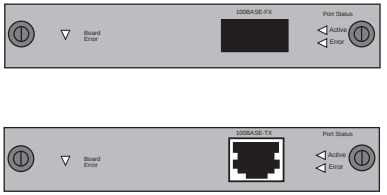
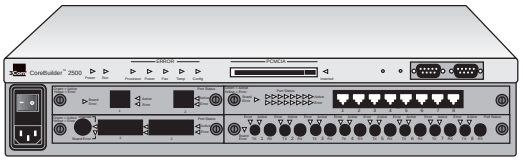


Figure 1-3 Fast Ethernet Modules

Figure 1-4 ATM Module

CoreBuilder Roadmap of Setup Tasks



1 **Unpacking**

See the unpacking instructions

2 **Installing the System**

See *Getting Started* Chapter 2

3 **Installing Modules**

See *Getting Started* or *Module Installation Guides*

4 **Cabling**

See *Getting Started* Chapter 4

5 **Powering Up**

See *Getting Started* Chapter 5

6 **Configuring**

See *Getting Started* Chapter 6

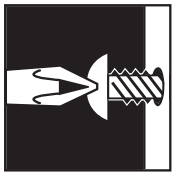
7 **Troubleshooting**

See *Getting Started* Chapter 7

8 **Administration and Operation**

See the *Administration Console User* and *Operation* Guides

2 INSTALLING THE SYSTEM



This chapter describes how to install your CoreBuilder™ 2500 system on a table top, in a free-standing stack, or in a distribution rack.

- To install the CoreBuilder system on a table top or in a free-standing stack, read these instructions:
  - "Before You Begin" (the next section)
  - "Installing the CoreBuilder System on a Table Top or in a Free-Standing Stack"
- To install the CoreBuilder system in a distribution rack, read these sections:
  - "Before You Begin" (the next section)
  - "Installing the CoreBuilder System in a Distribution Rack" on page 2-2

Before You Begin

Before beginning the installation procedures, be sure to:

- Read the appropriate configuration information in Chapter 4: *Cabling*.
- Move the CoreBuilder system close to where you plan to install it.
- Have a No. 2 Phillips screwdriver available.
- Have the hardware kit readily available. See Table 2-1.

Table 2-1 CoreBuilder™ System Hardware Kit

Item	Qty	To use in...
10/32 x 1/2 Phillips screws	4	Installing the distribution rack
"G" clips	4	Installing the distribution rack
M4 x 8 Phillips screws	4	Distribution rack mounting brackets (L-shaped)
M4 x 8 flathead screws	4	Distribution rack mounting brackets (U-shaped)
Rubber feet (self adhesive)	4	Table top or free-standing stack installation

Installing the CoreBuilder System on a Table Top or in a Free-Standing Stack

To install the CoreBuilder system on a table top or in a free-standing stack, follow the instructions:

1. Turn the system on its side.
2. Remove the protective covering from the rubber feet to expose the adhesive surface.
3. Place a rubber foot in each of the marked areas at the corners of the underside of the system.
4. Turn the system onto its feet.
5. If installing the system into a free-standing stack, place the system on top of another, ensuring that the rubber feet of the upper unit are securely located on top of the lower unit.
6. Be sure not to block the air intake and fan exhaust vents.

You are now ready to install the FDDI, Ethernet, Fast Ethernet, and/or ATM modules into the system. For installation instructions, see Chapter 3: *Installing Modules* or the media specific module installation guide for the module you are installing.

Installing the CoreBuilder System in a Distribution Rack

You can mount the CoreBuilder system into a 19-inch distribution rack. This section describes how to prepare the system and distribution rack for installation, and how to mount the system in the distribution rack.

Preparing the System and Rack

To prepare the system and distribution rack for installing the CoreBuilder system:

1. You can attach the CoreBuilder system to the rack using L-shaped mounting brackets or U-shaped mounting brackets. Choose a style of mounting bracket and its correct mounting hardware as shown in Figure 2-1 and attach them to the chassis.

The U-shaped bracket assists you with cable management. Cables can be dressed across the bracket and tie-wrapped.

You can install the CoreBuilder system with either the bezel or the rear panel (with the Ethernet, Fast Ethernet, FDDI, or ATM ports) facing front. Attach the mounting brackets to the end of the system that you want to face the front.

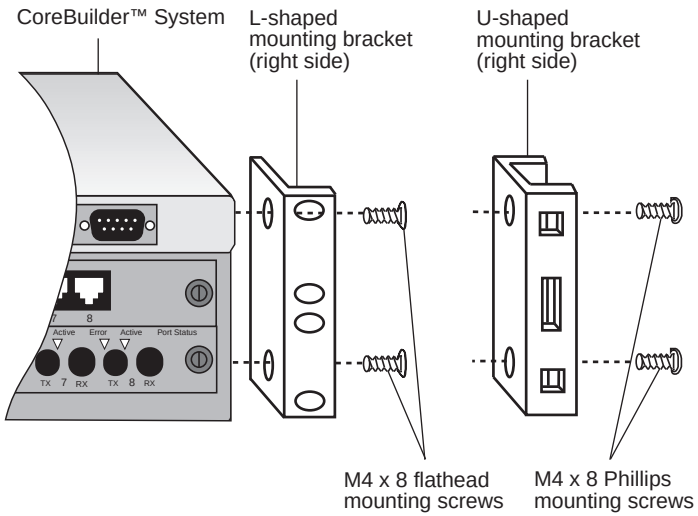


Figure 2-1 Installing System Mounting Brackets

2 Determine whether the distribution rack has threaded holes.

If the rack holes are not threaded, you will need to insert "G" clips into the holes you identify in the following steps. If the holes are threaded, you do not need to use "G" clips.

3 Locate the top of a universal mounting hole pattern on either mounting rail of the distribution rack.

In this pattern, the spacing between holes is ½ inch, ⅝ inch, ⅝ inch, and ½ inch. To find the top of the pattern, locate the midpoint between any two holes that are spaced .5" apart. Figure 2-2 shows the universal mounting hole pattern.

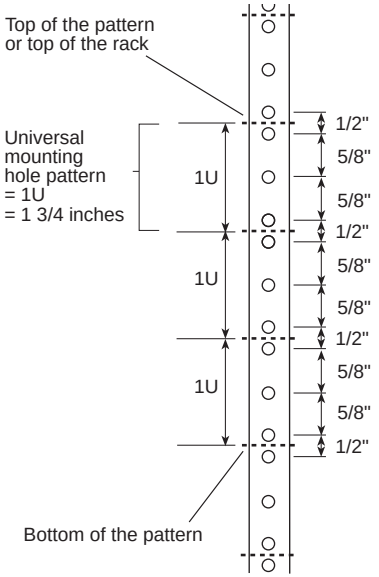


Figure 2-2 Universal Mounting Hole Pattern

4 Determine which holes to use to mount your system.

One CoreBuilder 2500 system is designed to mount in any 2U space of the rack (that is, the space occupied by 2 instances of the universal mounting hole pattern). Figure 2-3 illustrates the position of the CoreBuilder system, attached to holes 1 and 6.

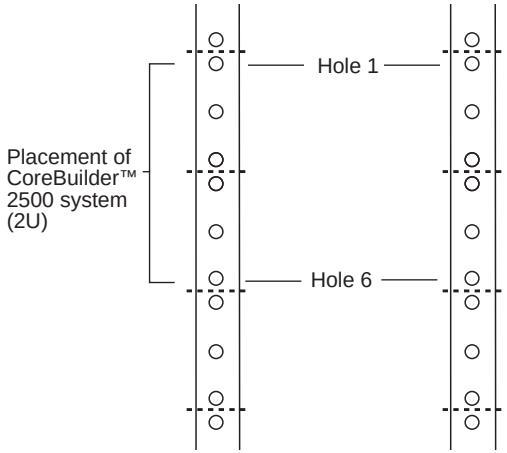


Figure 2-3 Placement of the CoreBuilder™ 2500 System in a Distribution Rack

Be sure that you select holes that are parallel to each other on the mounting rails.

5 If the rack does not have threaded holes, insert the "G" clips into the holes you have identified for mounting and then go to the next section.

If the holes are threaded, you do not need to insert "G" clips. Proceed to the next section to mount your system.

Mounting the CoreBuilder System into a Distribution Rack

To mount the system into a distribution rack:

1 Carefully lift the system into place, aligning the mounting brackets with the designated mounting holes.

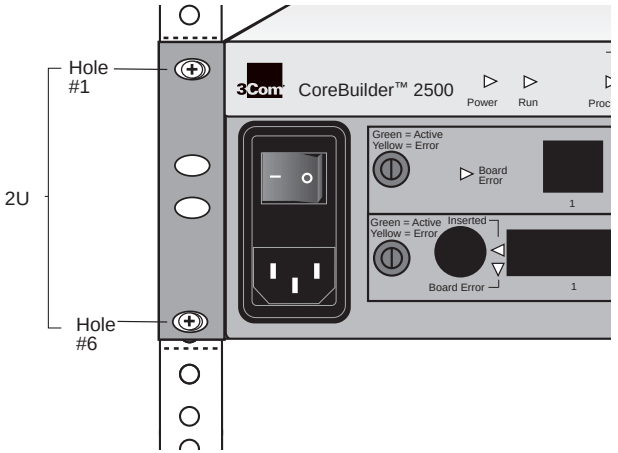


Figure 2-4 Aligning Mounting Bracket and Rack Holes

2 While holding the CoreBuilder system in place, insert the four mounting screws (10/32 x $^{1}/_{2}$ Phillips) into the designated mounting holes on both sides of the rack. See Figure 2-4.

3 Tighten the mounting screws. The system is now installed in the distribution rack.

Figure 2-5 shows two CoreBuilder 2500 systems installed in a distribution rack.

You are now ready to install the Ethernet, Fast Ethernet, FDDI, or ATM modules into the system. For installation instructions, see Chapter 3: *Installing Modules* or the media-specific module installation guide for the module you are installing.

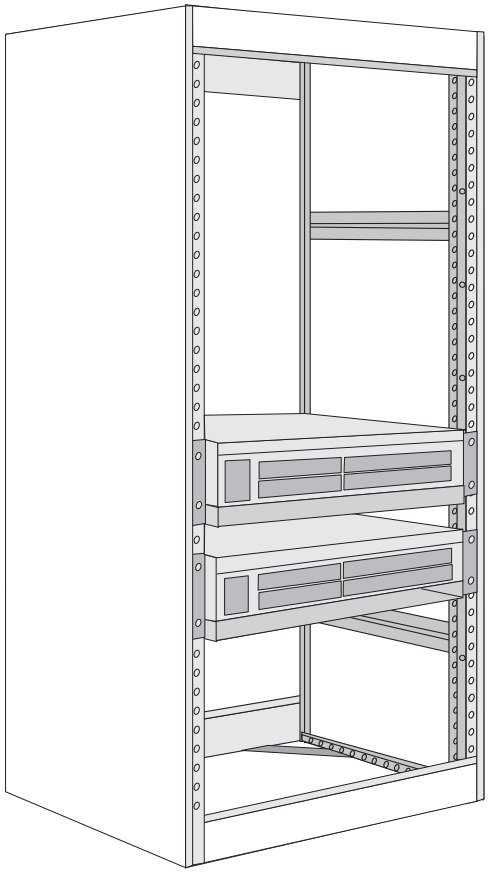


Figure 2-5 Two CoreBuilder™ 2500 Systems Installed in a Distribution Rack

3 INSTALLING MODULES

Your CoreBuilder™ 2500 system is shipped without any modules installed; protective faceplates cover the installation slots. To help you prepare the system for configuration, this chapter contains:

- Information on how to avoid electrostatic discharge (ESD) damage of modules
- Instructions for initial installation of modules

For specific module overview, LED status information, installation instructions, diagnostics information, and module pinout information, see the module installation guide shipped with each module.

Avoiding ESD Damage

ESD occurs when the module is improperly handled. ESD can damage components on a module, causing complete or intermittent failures.

To prevent ESD-related damage, handle the modules in the following manner:

- Always wear the ESD wrist strap provided with the system, ensuring that it makes good skin contact.
- Keep the module in its antistatic shielded sheet until you are ready to install it.
- Do not touch the pins, leads, or solder connections.
- Always handle the module by its edges.

Installing a Module

This installation procedure takes only a few minutes to complete. A small flat-blade screwdriver may be required for module installation.

CAUTION: *When handling modules, 3Com recommends that you always use a wrist strap connected to a proper ground. This helps prevent the module from being damaged by ESD. Additionally, when not in use, store the module in an antistatic bag.*

To install a module in the CoreBuilder system, follow these steps:

1. Put on the ESD wrist strap.
2. Discharge yourself of static electricity by touching a mounting screw located on the system's mounting bracket.

   If your system is mounted on a table, touch the back panel of the system.
3. Choose the slot where you want to insert the module.

Slots 1 and 2 are for FDDI, Fast Ethernet, or ATM modules. Slots 3 and 4 are for Ethernet modules. Slots do not have to be used consecutively.

4 Loosen the two captive screws on the faceplate covering the selected slot. Use a small flat-blade screwdriver if necessary.

5 Pull the faceplate away from the system. See Figure 3-1. Save the faceplate for future use.

CAUTION: *Cover the empty slot with a blank faceplate to protect the system from dust or other foreign substances and to ensure proper system cooling.*

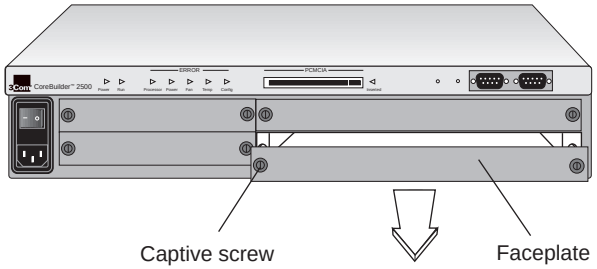


Figure 3-1 Removing Faceplates

6 Remove the module from its antistatic bag.

7 Place the module between the guides of the selected slot and slide the module into the chassis.

8 To seat the module, firmly push the module forward to engage the backplane connectors. You will feel a slight resistance as the connectors engage.

CAUTION: *If the resistance is too great, the module and backplane connectors may not be aligned. Forcing the module forward can damage the module or backplane connectors. If necessary, remove and reinsert the module, ensuring that the connectors are properly aligned. You should not have to seat the module by tightening the captive screws.*

Figure 3-2 shows a module being installed into a CoreBuilder system.

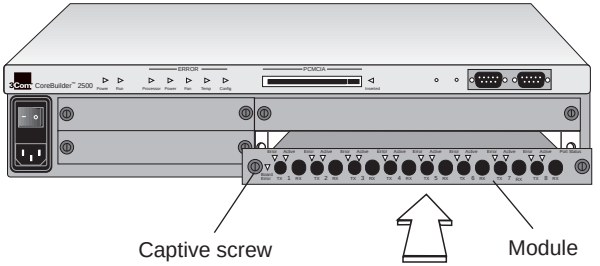


Figure 3-2 Installing a Module

9 Tighten the module's captive screws to secure the module in the chassis.

10 Repeat steps 1 through 9 to install the remaining modules.

The module is now ready to be cabled. See Chapter 4: *Cabling*.

4 CABLING

This chapter describes how to cable your CoreBuilder™ 2500 system for connection to your network. It describes how to cable:

- Ethernet modules
- Fast Ethernet modules
- FDDI modules
- ATM modules
- The optical bypass switch
- The system processor serial ports

The sections on Ethernet, Fast Ethernet, FDDI, and ATM media options include sample network configurations and instructions for connecting each type of media option to the network.

When all your Ethernet, Fast Ethernet, FDDI, and ATM system network connections are complete, see Chapter 5: *System Power Up*.

If you are staging the system, you do not need to connect it to the network at this point. However, to view possible error messages while the system is running power-up diagnostics, you must connect a terminal, workstation, or a PC with terminal emulation to the system's terminal serial port.

Ethernet Modules

Your Ethernet segments connect to 3Com's CoreBuilder 2500 system through Ethernet modules, which have various media interface options. Depending on your system configuration, your system may support up to 16 Ethernet ports.

This section describes the Ethernet modules and possible configurations and gives instructions for making network connections. Available Ethernet modules include:

- 10BASE-T (RJ-21)
- 10BASE-T (RJ-45)
- 10BASE-5 (AUI)
- 10BASE-FL
- 10BASE-2 (BNC)
- Unterminated 10BASE-2 (BNC)

For pinout information for each module, see Appendix B: *Module and System Pinouts* or the appropriate module installation guide.

To configure the system for management access through the Ethernet ports, see Chapter 6: *Quick Setup for Management Access*.

10BASE-T (RJ-21) Module

This section contains information on common 10BASE-T (RJ-21) configurations, how to cable the 10BASE-T (RJ-21) media option, and how to connect the modules to the network using harmonica panels and punch-down blocks.

Follow these guidelines when cabling 10BASE-T:

- Use only copper, unshielded twisted-pair (UTP) wire. Do not use flat, multiconductor cable (for example, silver satin), which is often identified by solid colors such as red, green, yellow, or black.
- Use two twisted pairs for each link.
- Use twisted-pair wire that is 22-26 AWG (0.5 millimeter) in diameter.
- Use twisted-pair wire with an impedance between 85 and 115 ohms.
- Ensure that the twisted-pair link length from the system to any potential workstation location is 100 meters (328 feet) or less.

10BASE-T (RJ-21) Configuration

A sample 10BASE-T (RJ-21) network configuration is illustrated in Figure 4-1. Your configuration may have different quantities and types of devices than pictured in this example.

In Figure 4-1, an Ethernet module with one RJ-21 (10BASE-T) connector is connected to a harmonica panel with a cable using a 50-pin Telco connector. Attached to the harmonica panel's RJ-45 connectors are eight unshielded twisted-pair (UTP) cables (a maximum of eight ports can be connected for each 50-pin cable). These UTP links can be attached to various devices. Figure 4-1 includes the following connected devices:

- A server with an IEEE 802.3 Attachment Unit Interface (AUI) and an IEEE 802.3 compatible Ethernet transceiver attaching the UTP to the AUI. The UTP connections on the transceiver use RJ-45 connectors.
- A workstation that conforms to IEEE 802.3, Type 10BASE-T specification, attached directly to the UTP link. The UTP connections on these devices typically use RJ-45 connectors.
- A non-10BASE-T, proprietary UTP hub. Here, a transceiver couples the standard AUI interface of the hub to the UTP cable.
- A NETBuilder II® router
- A SuperStack® II stackable hub
- A coaxial cabling segment attached to the UTP link by an IEEE 802.3 compatible repeater. Network segments that use thinnet must conform to the IEEE 802.3 Type 10BASE-2 specification.

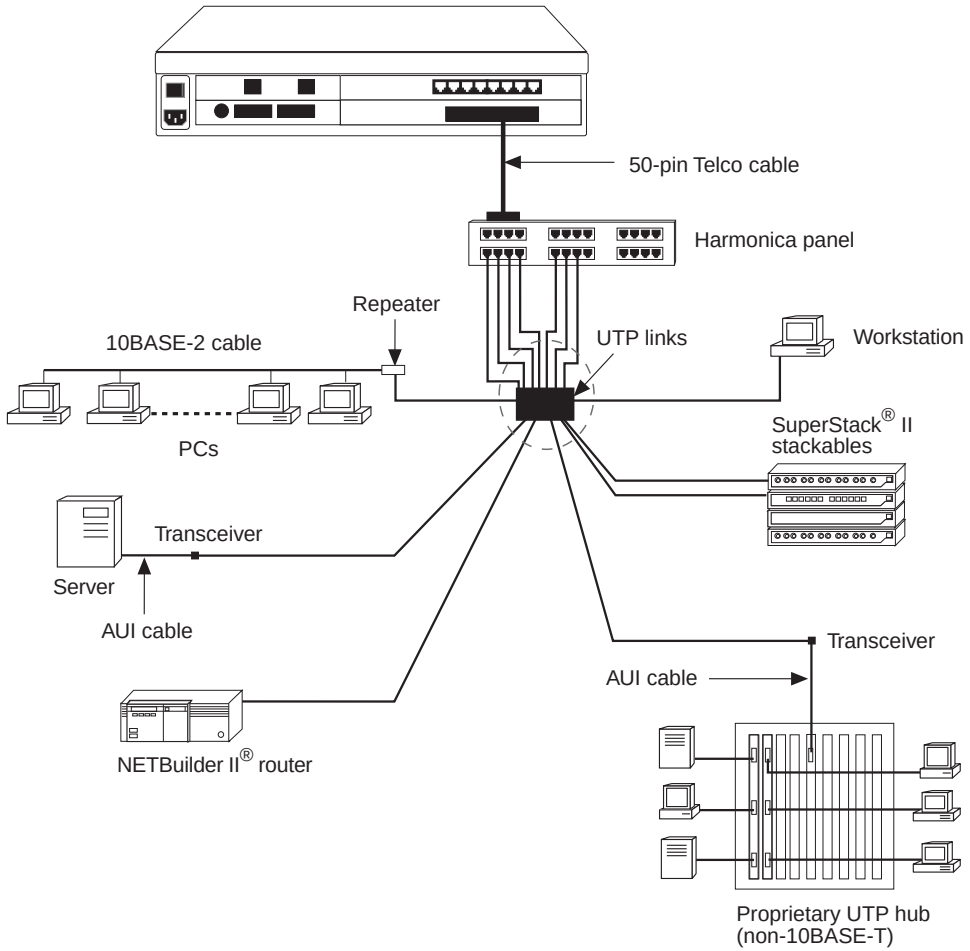


Figure 4-1 Sample Ethernet Configuration Using the 10BASE-T (RJ-21) Module

Cabling the 10BASE-T (RJ-21) Module

The 10BASE-T (RJ-21) module provides eight 10BASE-T connections with one Telco connector. The connections are implemented as MDI-X (media dependent interface crossover) connections, meaning that a workstation or other DTE can be directly connected to the port with a straight-through cable.

To cable the 10BASE-T (RJ-21) module:

1. Insert the mounting post and washer into the threaded hole of the cable end of the male Telco connector.
2. Connect the male Telco connector on the 10BASE-T cable to the female Telco connector on the module. Ensure that the slide latch is to the right.
3. Slide the latch to the left and ensure it grips the mounting posts.
4. Tighten the connector securing screws.
5. Attach the other end of the 10BASE-T cable in one of these ways:
   - Attach it to a harmonica panel with RJ-45 ports, as described in the next section.
   - Punch the individual wires into a Type 66 or Type 110 punch-down block, as described on page 4-5 in "Connecting 10BASE-T (RJ-21) to a Punch-down Block."

Figure 4-2 shows the cabling of the 10BASE-T (RJ-21) module using 10BASE-T cable.

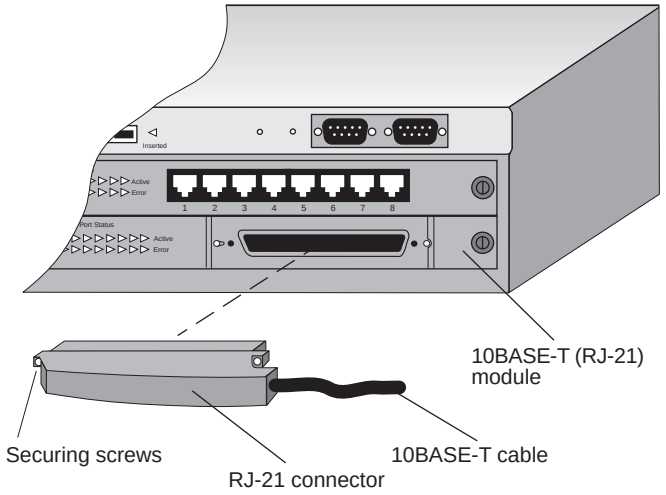


Figure 4-2 Cabling the 10BASE-T (RJ-21) Module

Connecting 10BASE-T (RJ-21) to a Harmonica Panel

Up to three modules with RJ-21 connectors can connect to a single harmonica panel, each through a 50-pin connector. Each harmonica panel provides 24 RJ-45 connections for various network devices. Figure 4-3 shows the RJ-45 connections on the front of the harmonica panel. Figure 4-4 shows the back of the panel, including the connections for the 50-pin connectors. Harmonica panels are available from 3Com.

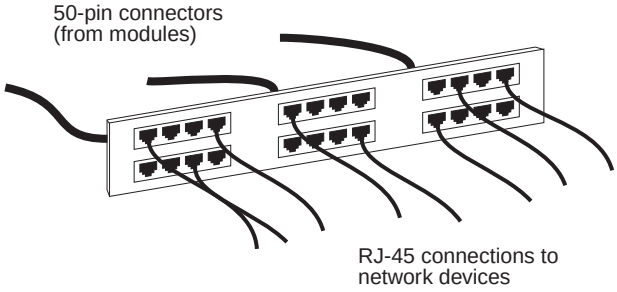


Figure 4-3 Harmonica Panel (Front View)

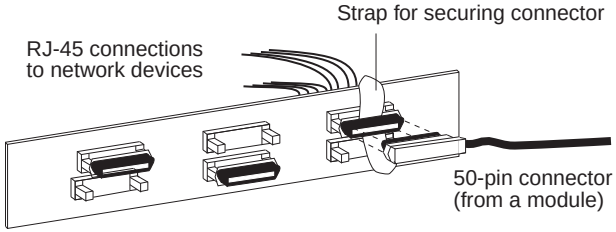


Figure 4-4 Harmonica Panel (Rear View)

Connecting 10BASE-T (RJ-21) to a Punch-down Block

You can use two types of punch-down blocks to connect modules with RJ-21 connectors to the network. 3Com recommends Type 110 (Figure 4-5), the type commonly used for data connections, and Type 66 (Figure 4-6), typically used for voice connections.

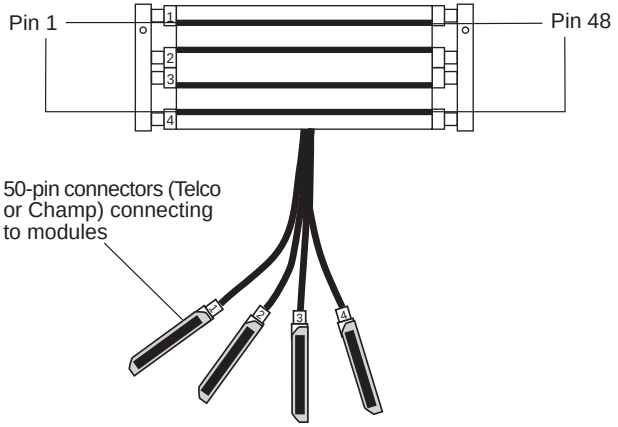


Figure 4-5 Type 110 Punch-down Block

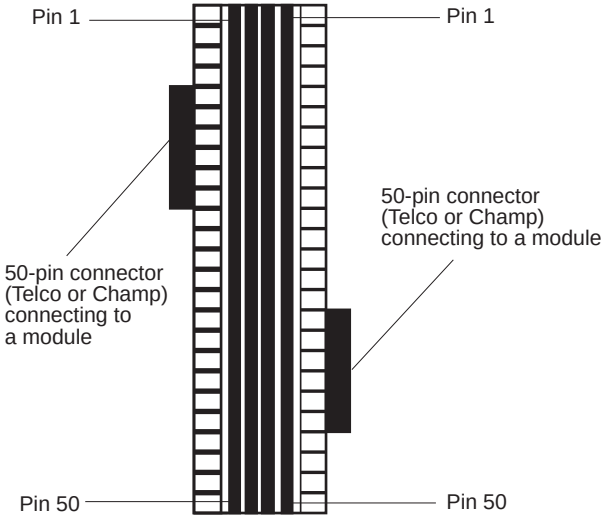


Figure 4-6 Type 66 Punch-down Block

10BASE-T (RJ-45) Module

This section contains information on common 10BASE-T (RJ-45) configurations and how to cable the 10BASE-T (RJ-45) media option.

Follow these guidelines when cabling 10BASE-T:

- Use only copper, unshielded twisted-pair (UTP) wire. Do not use flat, multiconductor cable (for example, silver satin), which is often identified by solid colors such as red, green, yellow, or black.
- Use two twisted pairs for each link.
- Use twisted-pair wire that is 22-26 AWG (0.5 millimeter) in diameter.
- Use twisted-pair wire with an impedance between 85 and 115 ohms.
- Ensure that the twisted-pair link length from the system to any potential workstation location is 100 meters (328 feet) or less.

10BASE-T (RJ-45) Configuration

A sample 10BASE-T (RJ-45) configuration is illustrated in Figure 4-7. Your configuration may have different quantities or types of devices than pictured in this example.

Figure 4-7 shows an Ethernet module with 10BASE-T (RJ-45) connectors attached to a PC with a 10BASE-T Network Interface Card (NIC) through UTP wire. A server is attached to unshielded twisted pair through a transceiver.

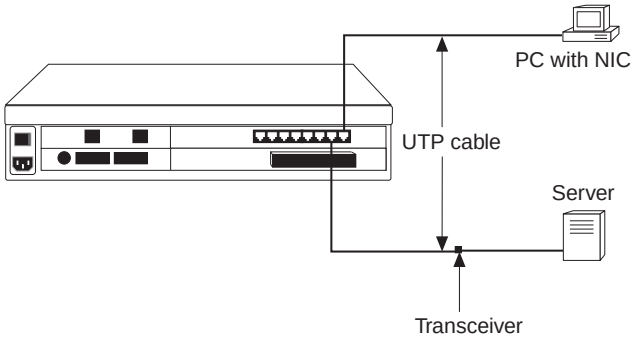


Figure 4-7 Sample Ethernet Configuration Using the 10BASE-T (RJ-45) Module

Cabling the 10BASE-T (RJ-45) Module

The 10BASE-T (RJ-45) module contains eight 10BASE-T ports using RJ-45 connectors. The ports are implemented as MDI-X (media dependent interface crossover) connections, meaning that a workstation can be directly connected to the port with a straight-through cable.

To cable the 10BASE-T (RJ-45) module:

1. Plug the male RJ-45 connector on the 10BASE-T cable into the selected port on the module until it clicks into place.
2. Attach the other end of the 10BASE-T cable to an MDI port on a workstation or on a repeater/concentrator.
3. Repeat steps 1 and 2 for the remaining ports on the module.

Figure 4-8 shows the cabling of the 10BASE-T (RJ-45) module using 10BASE-T cabling.

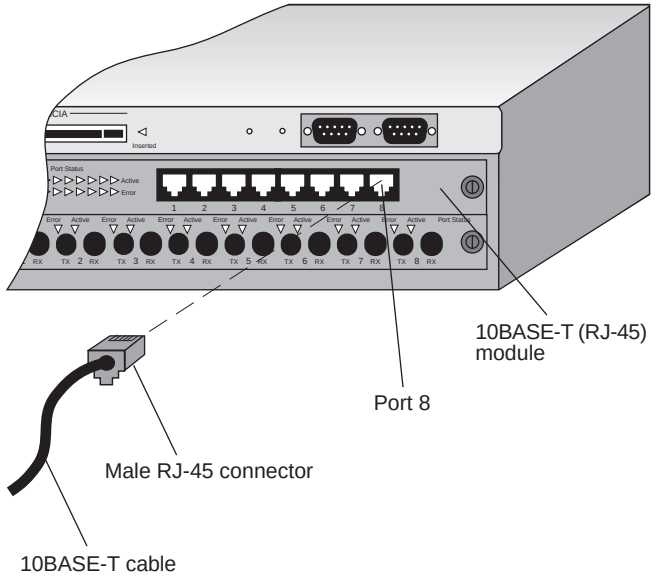


Figure 4-8 Cabling the 10BASE-T (RJ-45) Module

10BASE-5 (AUI) Module

This section contains information on common 10BASE-5 (AUI) configurations and how to cable the 10BASE-5 (AUI) media option.

10BASE-5 (AUI) Configuration

A sample 10BASE-5 (AUI) configuration is illustrated in Figure 4-9. Your configuration may have different quantities or types of devices than pictured in this example.

Figure 4-9 shows an Ethernet module with 10BASE-5 (AUI) connectors attached to a coaxial cabling segment. In this example, network segments are using cable that conforms to the IEEE 802.3 Type 10BASE-5 specification.

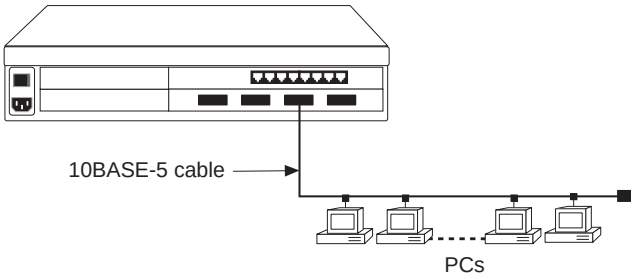


Figure 4-9 Sample Ethernet Configuration Using the 10BASE-5 (AUI) Module

You can also attach the module to other types of Ethernet/IEEE 802.3 wiring and cabling using different transceivers.

Each of the four AUI ports may connect to a different type of Ethernet cabling segment.

Cabling the 10BASE-5 (AUI) Module

The 10BASE-5 (AUI) module contains four 10BASE-5 ports that use four female 15-pin, D subminiature, Attachment Unit Interface (AUI) connectors.

The AUI is a DTE interface that must be attached to a transceiver through a standard AUI cable. This configuration allows a standard 10BASE-5 segment to be attached to one of the Ethernet ports of the module. The AUI interface is designed to attach the CoreBuilder system to an Ethernet segment, not to an individual station.

To cable the 10BASE-5 (AUI) module:

1. Ensure the slide latch on the AUI port connector is open.
2. Attach the DB-15 male connector on the AUI cable to the selected port on the module.
3. Lock the slide latch on the connector.
4. Attach the other end of the 10BASE-5 cable to a transceiver on the segment.
5. Repeat steps 1 through 4 for the remaining ports on the module.

Figure 4-10 shows the cabling of the 10BASE-5 (AUI) module using 10BASE-5 cabling.

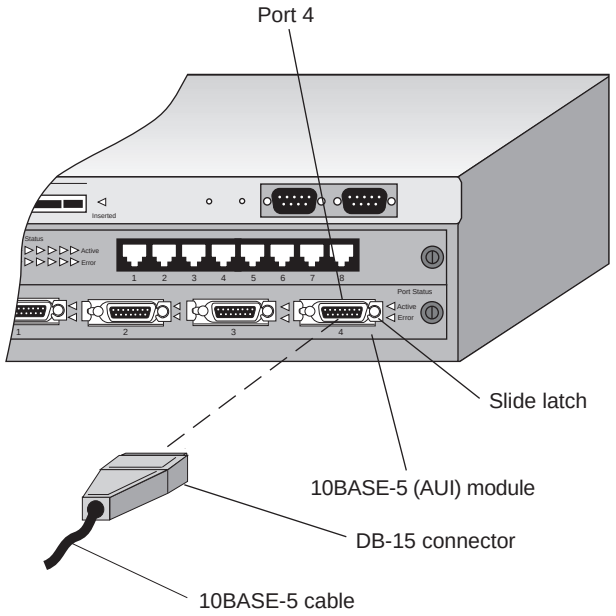


Figure 4-10 Cabling the 10BASE-5 (AUI) Module

10BASE-FL Module

This section contains information on common 10BASE-FL configurations and how to cable the 10BASE-FL media option.

10BASE-FL Configuration

A sample 10BASE-FL configuration is illustrated in Figure 4-11. Your configuration may have a different number and different types of devices than pictured in this example.

In Figure 4-11, one 10BASE-FL module with 10BASE-FL connectors is attached to various devices through duplex fiber. These devices include:

- A PC with a 10BASE-FL Network Interface Card (NIC)
- A NETBuilder II router
- A SuperStack® II stackable hub
- A workstation with an AUI connector. The duplex fiber is attached to the AUI through a transceiver.
- A workgroup concentrator

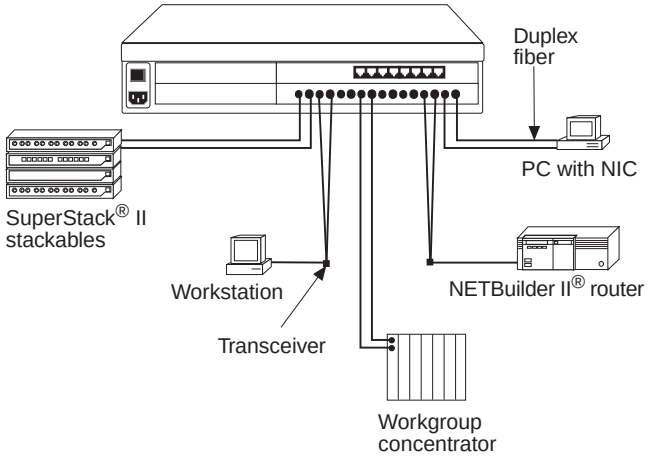


Figure 4-11 Sample Ethernet Configuration Using the 10BASE-FL Module

Cabling the 10BASE-FL Module

The 10BASE-FL module contains eight 10BASE-FL ports that use ST connectors to provide Ethernet connections over fiber. To each port, you can attach an Ethernet/IEEE 802.3 segment that is up to 2Km long. As a result, Ethernet segments dispersed throughout a building or campus can be centrally connected to one CoreBuilder system.

Each pair of ST connectors comprises a fiber optic transmitter and a receiver attached to a duplex fiber cable. The transmitter for port one (1) is adjacent to the receiver for port one (1), and so on. You can attach to the transmitter and receiver of the individual ports either 50/125 μm or 62.5/125 μm fiber optic cable, terminated with ST connectors. If you terminate the cable with any other connectors, use an adapter cable between the module's port and the cable plant termination.

The 10BASE-FL standard is backward-compatible with the earlier Fiber Optic Inter-Repeater Link (FOIRL) method for transmitting Ethernet over fiber.

Any transceiver that attaches to a port through the fiber also has a fiber transmitter and fiber receiver. When cabling a transceiver:

- Insert the module port's transmitter into the fiber that is connected to the receiver of the corresponding transceiver.
- Attach the module port's receiver to the fiber into which the transmitter of the transceiver is inserted.

Because the 10BASE-FL standard is backward-compatible with the earlier Fiber Optic Inter-Repeater Link (FOIRL) method for transmitting Ethernet over fiber, you may attach a transceiver that is FOIRL-compatible to the 10BASE-FL port and it will function the same as a transceiver that is compatible with 10BASE-FL.

When attaching fiber to a transceiver that is far away from the CoreBuilder system, you can identify which fiber is connected to the transmitter of the module's port by holding the end of the cable against a sheet of white paper. When the CoreBuilder system is on, the fiber connected to the module's port transmitter emits a red light.

To cable the 10BASE-FL module:

1. Remove the protective plastic covers from the module's fiber optic ports and from the ends of the connectors on each fiber strand.
2. Locate the fiber attached to the *receiver* of the remote 10BASE-FL transceiver/system and connect it to the selected *transmitter* port on the module.
3. Locate the fiber attached to the *transmitter* of the remote 10BASE-FL receiver/system and connect it to the selected *receiver* port on the module.
4. Repeat steps 1 through 3 for the remaining ports.

Figure 4-12 shows the cabling of the 10BASE-FL module using 10BASE-FL cabling.

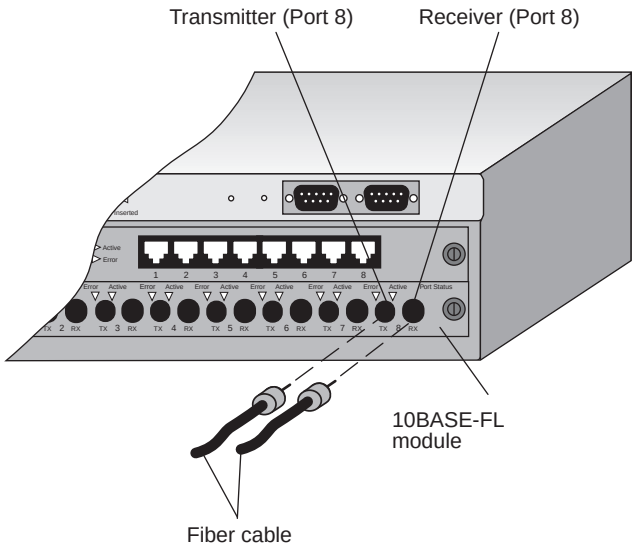


Figure 4-12 Cabling the 10BASE-FL Module

10BASE-2 (BNC) Module

This section contains information on the common 10BASE- 2 (BNC) configuration and how to cable the 10BASE- 2 (BNC) media option.

10BASE-2 (BNC) Configuration

Figure 4-13 illustrates a sample 10BASE-2 (BNC) configuration. Your configuration may have different quantities and types of devices than pictured in this example.

Figure 4-13 shows an Ethernet module with 10BASE-2 (BNC) connectors attached to a coaxial cabling segment. In this example, network segments are using cable that conforms to the IEEE 802.3 Type 10BASE-2 specification.

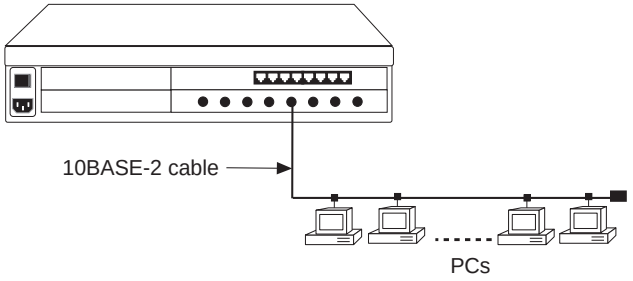


Figure 4-13 Sample Ethernet Configuration with the 10BASE-2 (BNC) Module

Cabling the 10BASE-2 (BNC) Module

The 10BASE-2 (BNC) module contains eight 10BASE-2 ports that use BNC connectors. Because each port is internally terminated, you do not need to use external terminators when cabling the module.

To cable the 10BASE-2 (BNC) module:

1. Attach the male end of the 10BASE-2 (BNC) segment to the female BNC connector on the module.

Each segment on the module is internally terminated. When you connect a 10BASE-2 (BNC) module to your network, the CoreBuilder 2500 system must be an end connection.

2. Ensure that the opposite end of the 10BASE-2 segment is also terminated.
3. Repeat steps 1 and 2 for the remaining module ports.

Figure 4-14 shows the cabling of the 10BASE-2 (BNC) module using 10BASE-2 cabling.

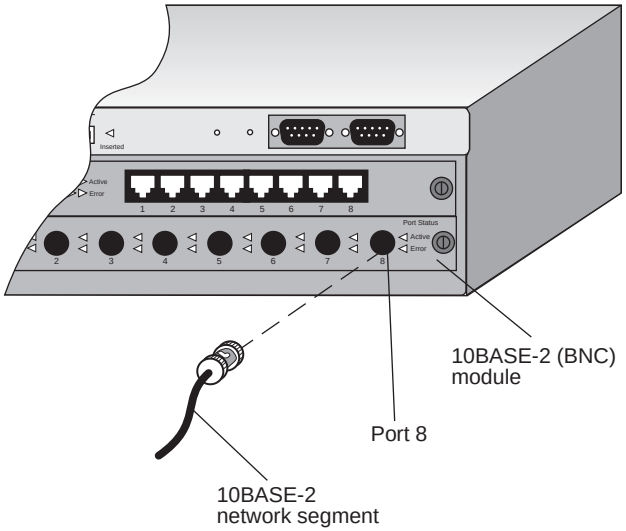


Figure 4-14 Cabling the 10BASE-2 (BNC) Module

Unterminated 10BASE-2 (BNC)

This section contains information on common unterminated 10BASE-2 (BNC) configurations and how to cable the unterminated 10BASE-2 (BNC) media option.

Unterminated 10BASE-2 (BNC) Configuration

The sample configuration in Figure 4-13 on page 4-12 using the terminated 10BASE-2 (BNC) module can also be applied to the unterminated 10BASE-2 (BNC) module.

Cabling the Unterminated 10BASE-2 (BNC) Module

The unterminated 10BASE-2 (BNC) module offers eight unterminated Ethernet 10BASE-2 ports that use BNC connectors and provides a 10 Mbps connection over multimode fiber.

To cable the unterminated 10BASE-2 (BNC) module, attach the male end of the 10BASE-2 (BNC) segment to the female BNC connector on the module.

Repeat the process for the remaining ports.

If a port is at the end of a 10BASE-2 (BNC) segment, you must provide an external 50 Ohm terminator. Because using a T connector with a terminating plug may interfere with adjacent ports, 3Com recommends that you terminate ports with the ITT Pomona Y connector, Model 4896, with a terminating plug on the end, or the ITT Pomona Feed-Thru Terminator, Model 4119-50. Figure 4-15 and Figure 4-16 illustrate both types of terminator interfaces.

A Y connector also may be necessary when the port is in the middle of a segment.

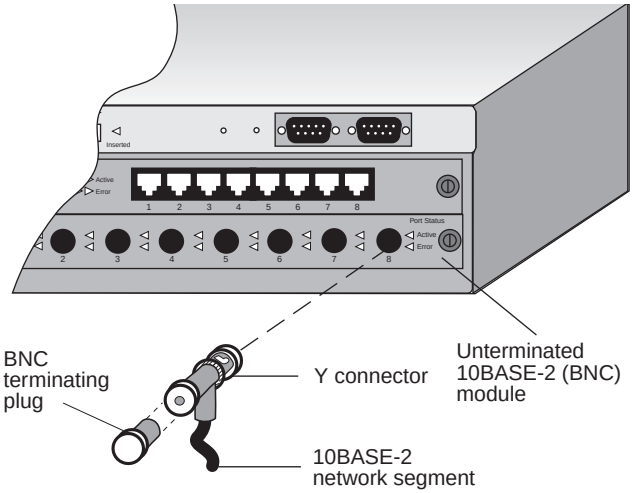


Figure 4-15 Terminating BNC Ports with a Y Connector

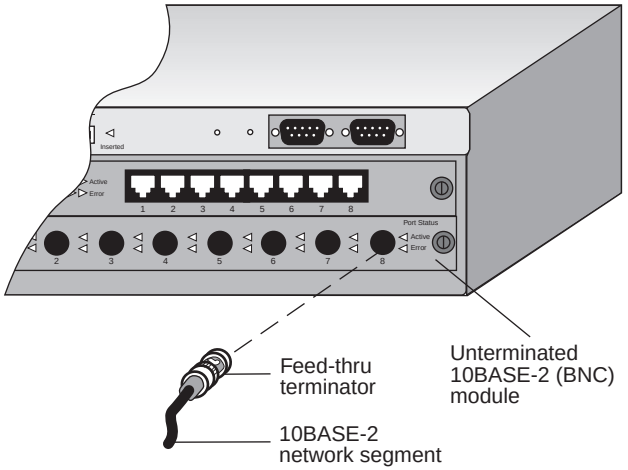


Figure 4-16 Terminating BNC Ports with a Feed-thru Terminator

Fast Ethernet Modules

Your Fast Ethernet segments connect to 3Com's CoreBuilder 2500 system through Fast Ethernet modules, which come with a copper or fiber connector. This section describes the Fast Ethernet modules, configurations possible for each module, and how to connect the following modules to the network:

- 100BASE-TX
- 100BASE-FX

Depending on your system configuration, your system may support up to two Fast Ethernet ports.

100BASE-TX Module

This section contains a sample 100BASE-TX configuration and information on configuring the module.

100BASE-TX Configuration

Figure 4-17 illustrates a sample 100BASE-TX configuration. Your configuration may have different quantities and types of devices than pictured in this example.

Figure 4-17 shows a Fast Ethernet module attached to 3Com's SuperStack® II Hub 100 switch. This configuration could be either 100BASE-TX (copper) or 100BASE-FX (fiber).

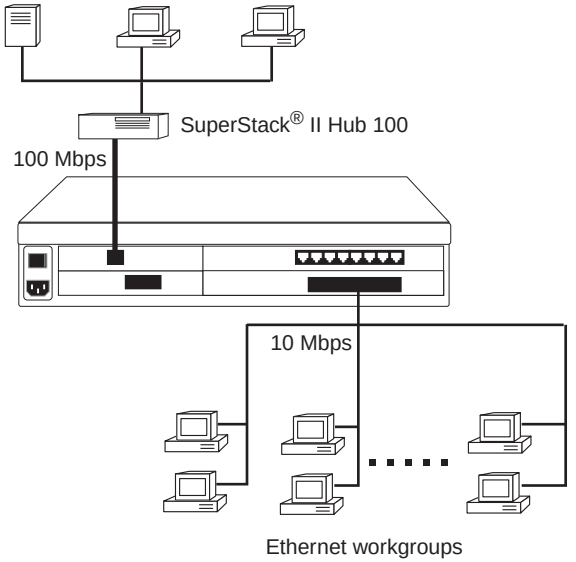


Figure 4-17 Sample 100BASE-TX Configuration

Cabling the 100BASE-TX Module

The 100BASE-TX module offers one Fast Ethernet port that uses an RJ-45 connector and provides a 100 Mbps Fast Ethernet connection over UTP-Category 5 copper wire.

To cable the 100BASE-TX module:

1. Plug the male RJ-45 connector on the 100BASE-T cable into the port on the Fast Ethernet module until it clicks into place.
2. Attach the other end of the cable to the network device you wish to connect.

Figure 4-18 shows the cabling of the 100BASE-TX module with 100BASE-T cabling.

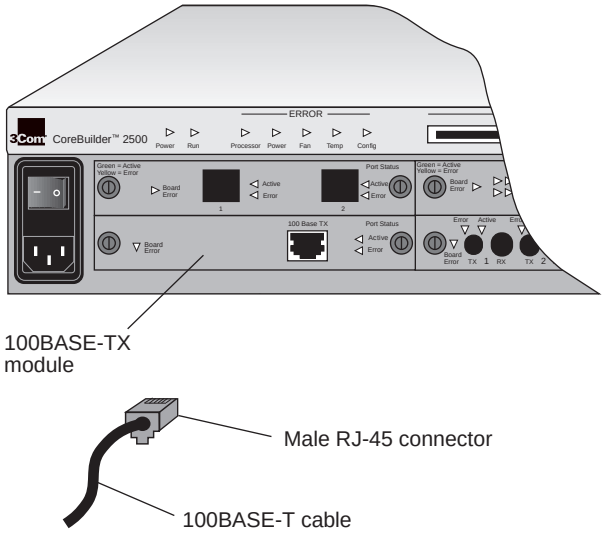


Figure 4-18 Cabling the 100BASE-TX Module

100BASE-FX Module

This section contains a sample 100BASE-FX configuration and information on configuring the module.

100BASE-FX Configuration

The sample 100BASE-TX configuration shown in Figure 4-17 is the same for the 100BASE-FX configuration. The only difference is the connection type: fiber for the 100BASE-FX and copper for the 100BASE-TX.

Cabling the 100BASE-FX Module

The 100BASE-FX module comes with one Fast Ethernet port that uses an SC connector and provides a 100 Mbps Fast Ethernet connection over fiber.

To cable the 100BASE-FX Module:

1. Plug the male SC connector on the fiber cable into the port on the Fast Ethernet module until it clicks into place.
2. Attach the other end of the fiber cable to the network device you wish to connect.

Figure 4-19 shows the cabling of the 100BASE-FX module with fiber.

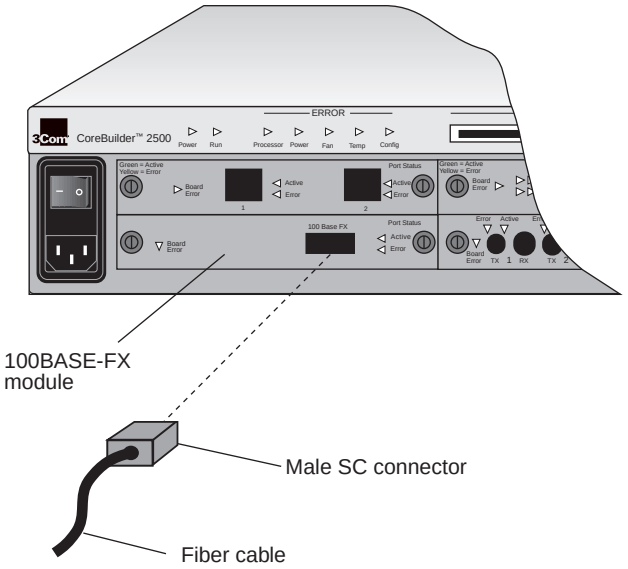


Figure 4-19 Cabling the 100BASE-FX Module

FDDI Modules

Your FDDI segments connect to 3Com's CoreBuilder 2500 through FDDI modules, which are available in various media options. This section describes sample FDDI configurations as well as how to cable the following FDDI DAS (Dual Attachment Station) modules to the network:

- MIC (Media Interface Connector)
- TP (Twisted Pair)

To configure the system for management access through the FDDI ports, see Chapter 6: *Quick Setup for Management Access*.

When planning your installation, inspect your present cabling to determine if it meets the specifications in the cabling system or standards used at your site. In addition, the cable must conform to national standards. See Appendix D: FDDI Standards for further information.

FDDI Configurations

You can install your system into many FDDI configurations. Figures in this section present logical diagrams that illustrate the flexibility of the two FDDI modules available for the CoreBuilder 2500 system. Only the most common configurations are presented. Your configuration may have many more devices than shown in the following examples.

Three node types are used to describe FDDI station configurations and topologies. These node types and their abbreviations are given in Table 4-1. Table 4-2 provides the abbreviations for the port types used in the FDDI illustrations. See your *CoreBuilder 2500 Operation Guide* for more information about FDDI station configurations.

Table 4-1 Node Types and Abbreviations

Node Type	Abbreviation
Single MAC-Dual Attachment Station	SM-DAS
Dual MAC-Dual Attachment Station	DM-DAS
Single Attachment Station	SAS

Table 4-2 Port Types and Abbreviations

Port Type	Abbreviation
A port	A
B port	B
Master port	M
Slave port	S

CoreBuilder 2500 System Connection to an FDDI Dual Ring

Figure 4-20 shows CoreBuilder 2500 systems attached to the FDDI dual ring. The connection to the dual ring is made by the A and B ports on the FDDI module. FDDI DAS modules, excluding concentrators, may be attached to the dual ring, as shown. Each CoreBuilder 2500 system shown has a second FDDI module installed to enable additional FDDI connections to servers and other CoreBuilder systems.

3Com recommends that you connect equipment that can be powered on and off, such as workstations, only through concentrators. For intermediate systems that are seldom powered off, such as bridges and routers, connect them to the FDDI dual ring only if they are equipped with an optical bypass switch. These precautions protect the integrity of the dual ring.

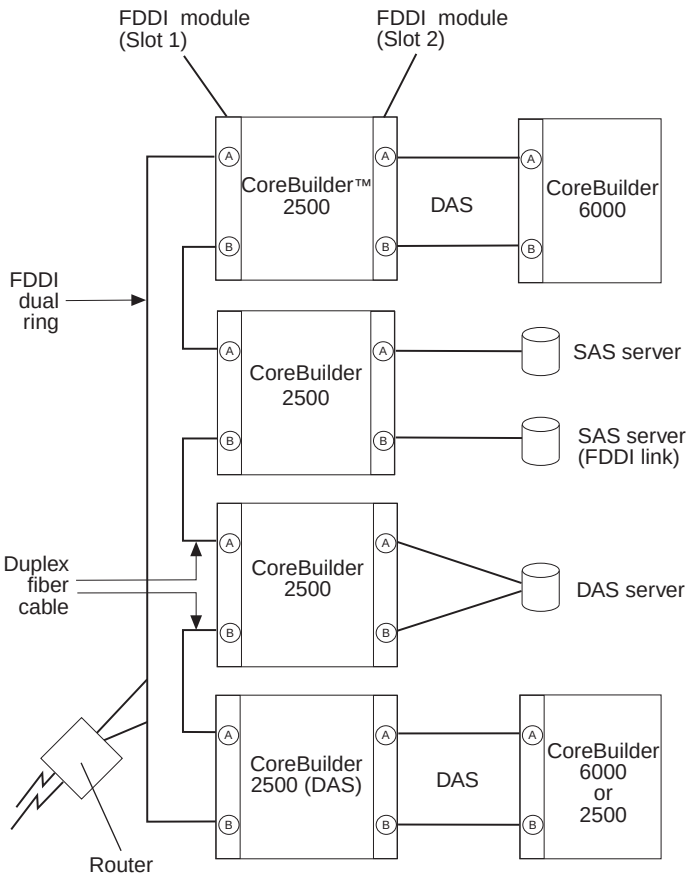


Figure 4-20 Connecting CoreBuilder™ Systems to FDDI Dual Ring (Logical Diagram)

Configuring a DAS for Dual Homing

Because a DAS has two attachments to the FDDI dual ring, A-to-M and B-to-M, it is possible to use one of them as a "standby" link if the active link fails. This configuration is called *dual homing* and is commonly used for mission-critical devices.

Using dual homing, only one of the two attachments is active at any given time. In this sense, a DAS acts as if it is a SAS by using its A port as a hot standby port. Through SMT, a DAS can be dual homed to the same concentrator or, more commonly, to two different concentrators. This provides a more stable trunk ring of concentrators. If one concentrator fails, the DAS automatically enables the standby link to another concentrator to become the active link. By using dual homing, your network is more reliable and you can maintain it more easily. See Figure 4-21.

If the station is a dual path or dual path/dual MAC station, then the dual-homed station can be configured in one of two ways:

- With both links active
- With one link active and one connection withheld as a backup, only becoming active if one link fails

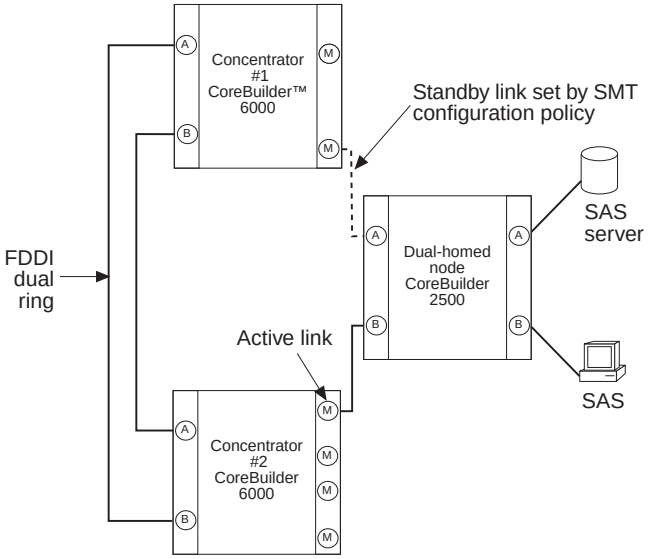


Figure 4-21 Dual Homing a CoreBuilder™ 2500 System

As shown in Figure 4-21, the dual-homed device has two connections to the primary ring: A-to-M and B-to-M. When a device has connections using both the A and B ports, the B precedence rule takes effect. This rule states that if a connection exists from both the A and B ports to the M ports, the B port always takes precedence and becomes the active link. If the connection using the B port fails, the A port is automatically triggered to become the active link.

Using an Optical Bypass Switch with the CoreBuilder 2500 System

Figure 4-22 shows an optical bypass switch configuration. Here, the fiber optic cables installed on the optical bypass switch are connected to the A and B ports of the CoreBuilder system. The power/control cable is then connected to the optical bypass interface on the FDDI module. The FDDI dual ring is attached to the MIC receptacles on the optical bypass switch.

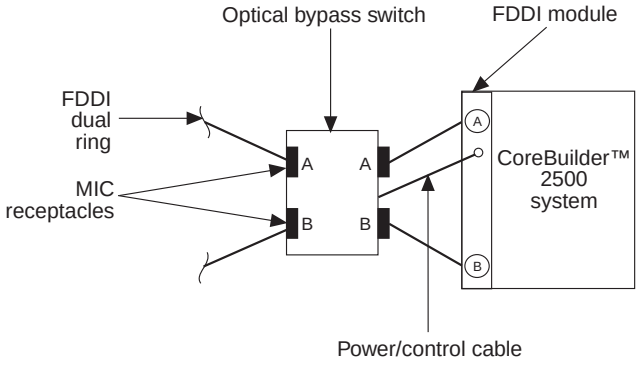


Figure 4-22 Optical Bypass Switch Configuration

The optional optical bypass switch, available from 3Com, provides A and B MIC connectors and a power connector.

Cabling the FDDI DAS MIC Module

The FDDI DAS MIC module contains two media interface connector ports, A and B. The FDDI DAS MIC module also comes with an optical bypass switch power connector. See the section "Cabling the Optical Bypass Switch" on page 4-26 for information on connecting an optical bypass switch.

To cable the FDDI DAS MIC module:

1. Remove the plastic protectors from the transceiver connectors on the module by squeezing the spring clips together and sliding the protectors out.
2. Connect one FDDI cable with a MIC connector to the A port on the module.
3. Ensure that the opposite end of the FDDI cable is attached to an M, B, or S port.
4. Connect the other FDDI cable with a MIC connector to the B port on the module.
5. Ensure that the opposite end of the FDDI cable is attached to an M, A, or S port.

The A and B ports may also be connected to any two Master ports on an FDDI LAN concentrator.

Figure 4-23 shows the cabling of the FDDI DAS MIC module.

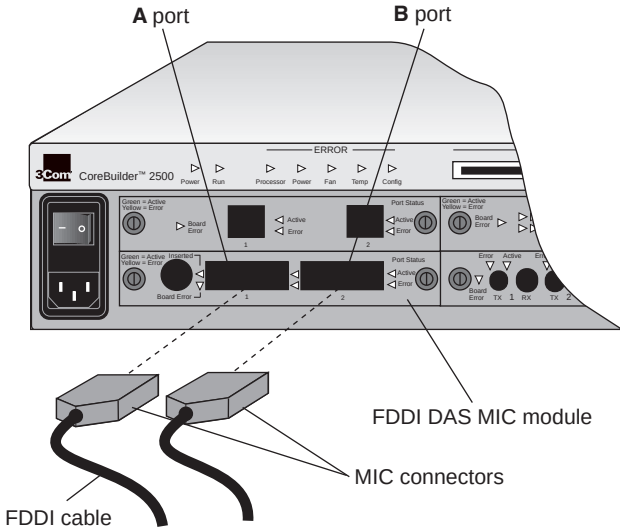


Figure 4-23 Cabling the FDDI DAS MIC Module

Cabling the FDDI DAS TP Module

The FDDI DAS TP module contains two RJ-45 ports, A and B.

To cable the FDDI DAS TP module:

1. Remove the plastic protectors from the transceiver connectors on the module by squeezing the spring clips together and sliding the protector out.
2. Connect one FDDI cable with an RJ-45 connector to the A port on the module by inserting the connector into the port until it clicks into place.
3. Ensure that the opposite end of the twisted pair cable is attached to an M, B, or S port.
4. Connect the other FDDI cable with an RJ-45 connector to the B port on the module by inserting the connector into the port until it clicks into place.
5. Ensure that the opposite end of the twisted pair cable is attached to an M, A, or S port.

The A and B ports may also be connected to any two Master ports on an FDDI LAN concentrator.

Figure 4-24 shows the cabling of the FDDI DAS TP module.

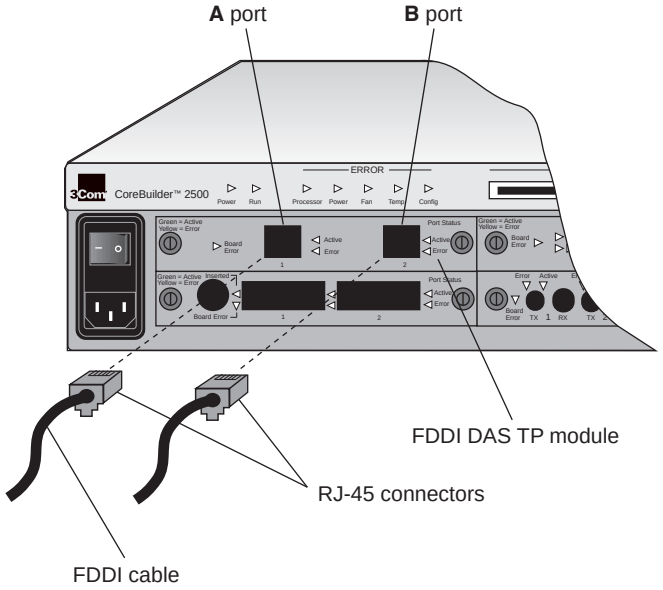


Figure 4-24 Cabling the FDDI DAS TP Module

ATM Module

With 3Com's CoreBuilder 2500 system, you can connect to important network resources over an ATM segment by installing an ATM module.

ATM Configuration

A sample ATM configuration is illustrated in Figure 4-25. Your configuration may have different quantities and types of devices than pictured in this example.

Figure 4-25 shows an ATM module connected to a 3Com CoreBuilder™ 7000 ATM switch, which in turn is connected to several servers. The figure also shows a local server connected to a Fast Ethernet module and Ethernet workstations connected to a 10BASE-T (RJ-21) Ethernet module.

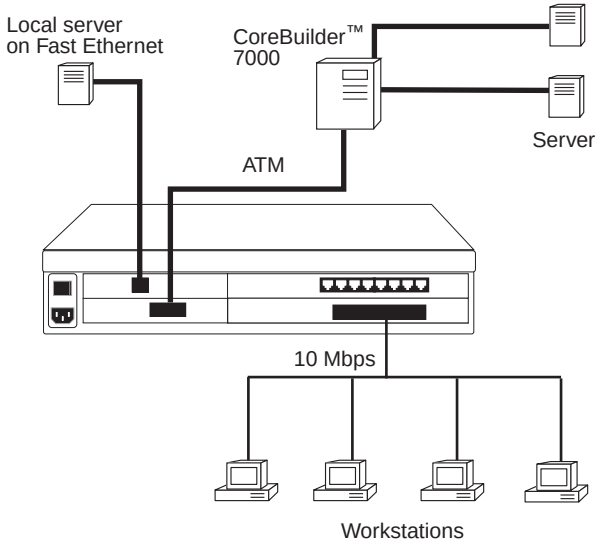


Figure 4-25 Sample ATM Module Configuration

Cabling the ATM Module

The ATM module offers a single OC-3 interface, providing a 155 Mbps connection over multimode fiber.

To cable the ATM Module:

1. Plug the male SC connectors on the multimode fiber cable into the port on the ATM module until they click into place.
2. Attach the other end of the cable to the network device you wish to connect.

Figure 4-26 shows the cabling of the ATM module with multimode fiber.

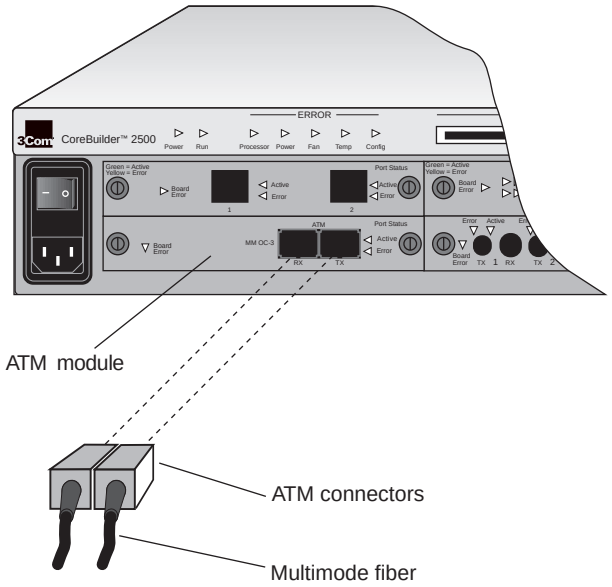


Figure 4-26 Cabling the ATM Module

Cabling the Optical Bypass Switch

You can install an optical bypass switch between the CoreBuilder 2500 and the FDDI cable connecting to the network. Refer to Figure 4-27 as needed when following the directions below.

1. Power down your CoreBuilder system.
2. Plug the A and B MIC connectors from the FDDI network cable that would normally connect to the FDDI module into the A and B receptacles on the optical bypass switch. (Place the A connector in the A receptacle and the B connector in the B receptacle.)
3. Plug the optical bypass switch's A and B MIC connectors into the A and B ports on the FDDI module (A to A, B to B).
4. Plug the optical bypass switch's power connector into the optical bypass interface on the FDDI module.
5. Power up your CoreBuilder system.

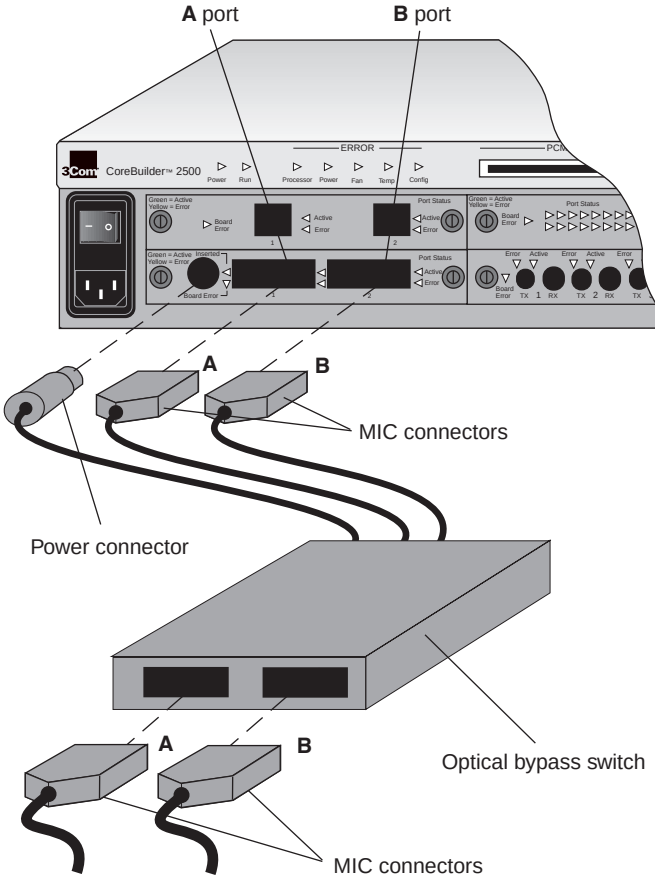


Figure 4-27 Connecting the Optical Bypass Switch

Cabling the System Processor Serial Ports

The system processor serial ports provide the following connectivity options:

- One serial (RS-232C) *modem* port for an external modem connection
- One serial (RS-232C) *terminal* port for a terminal connection

Pinouts for the serial ports are shown in Table 4-3 and Table 4-4.

To connect to either the modem port or the terminal port:

1. Attach the female DB-9 connector to the selected modem or terminal port.
2. Secure the connector to the port using the connector screws.
3. Attach the other end of the serial cable to your modem or terminal.

Figure 4-28 shows the cabling of the system processor.

You can also access the system processor through any Ethernet port using telnet or rlogin.

To configure your system for management access through the serial ports, see Chapter 6: *Quick Setup for Management Access*.

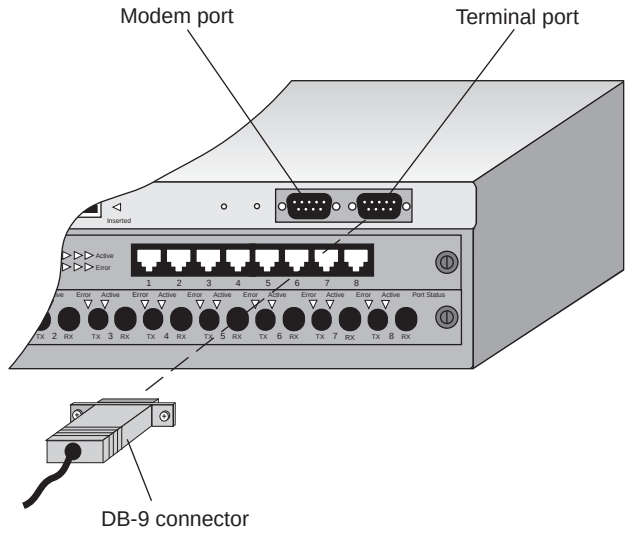


Figure 4-28 Cabling the System Processor Serial Ports

Serial Port Pin Assignments

The following tables show the pin assignments for the two serial ports. See Table 4-3 for the modem port and Table 4-4 for the terminal port pin assignments.

Table 4-3 Modem Port Pin Assignments

Pin No.	Signal	Description
1	DCD	Data carrier detect
2	RxD	Received data
3	TxD	Transmitted data
4	DTR	Data terminal ready
5		Signal ground
6		Not used
7	RTS	Request to send
8	CTS	Clear to send
9		Not used

Table 4-4 Terminal Port Pin Assignments

Pin No.	Signal	Description
1		Not used
2	RxD	Received data
3	TxD	Transmitted data
4		Not used
5		Signal ground
6		Not used
7		Not used
8		Not used
9		Not used

5 System Power Up

This chapter contains:

- Instructions for powering up the CoreBuilder™ system
- A description of power-up diagnostics
- A list of items to check after system power up

If you have any problems powering up your CoreBuilder system, see Chapter 7: *Troubleshooting the System*.

Power Up

To get your CoreBuilder system powered up and ready to operate, follow the steps in this section.

To view possible error messages while the system is running power-up diagnostics, connect a terminal, workstation, or PC with terminal emulation software to the system's terminal serial port.

See Chapter 4: *Cabling* and Chapter 6: *Quick Setup for Management Access* for information about cabling and configuring the terminal serial port.

1 To protect the system from dust and foreign objects and to ensure proper system cooling, verify that each unused slot in the chassis is covered with a blank faceplate.

2 Be sure that the system's power switch is off, and then plug the power cord into the system. See Figure 5-1 for the location of the power switch and power receptacle on the back panel.

CAUTION: *To prevent a possible fire hazard, be sure that the power cord is fully seated.*

3 Plug the other end of the power cable into a power outlet.

4 Turn on the system by setting the power switch to the On ("|") position.

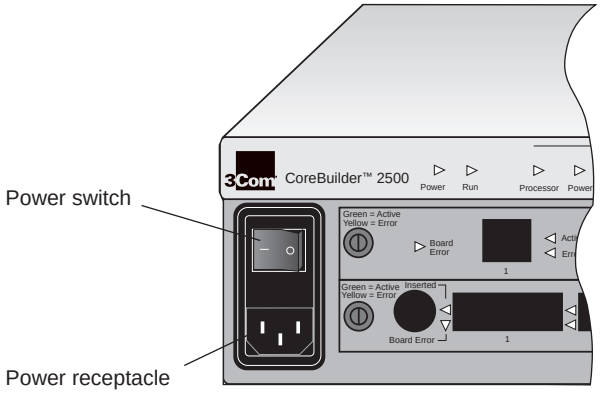


Figure 5-1 CoreBuilder™ System Power Switch Assembly

Power-up Diagnostics

The CoreBuilder system automatically runs diagnostic software at power up. This software verifies that every component in the system is operating correctly.

If any component fails during power-up diagnostics, the system either fails to power up or it keeps faulty modules offline. When the system comes up, check to see which modules, if any, have failed diagnostics by looking at the system configuration in the CoreBuilder Administration Console.

During power up, the system processor LEDs provide information on components in your CoreBuilder system. See the illustration on page 5-3 in the section "System Processor LEDs."

System Diagnostics — LED Activity

When you first power up the system, the system processor **Power** LED and **Run** LED are green, indicating that the system is running diagnostics. When the system diagnostics are successfully completed, the **Run** LED blinks, indicating that the system is operating. If the **Processor** LED is yellow, the system processor has failed at power up. See Table 5-1.

You can view messages displayed during power-up diagnostics if you connect a terminal, workstation, or PC with terminal emulation to the system processor's terminal serial port.

Table 5-1 System Diagnostics – LED Activity

LED Name	Color	Indicates...
Power	Steady green	Running diagnostics
Run	Steady green	Running diagnostics
Run	Blinking green	System operational
Processor	Steady yellow	Processor failure

Module Diagnostics — LED Activity

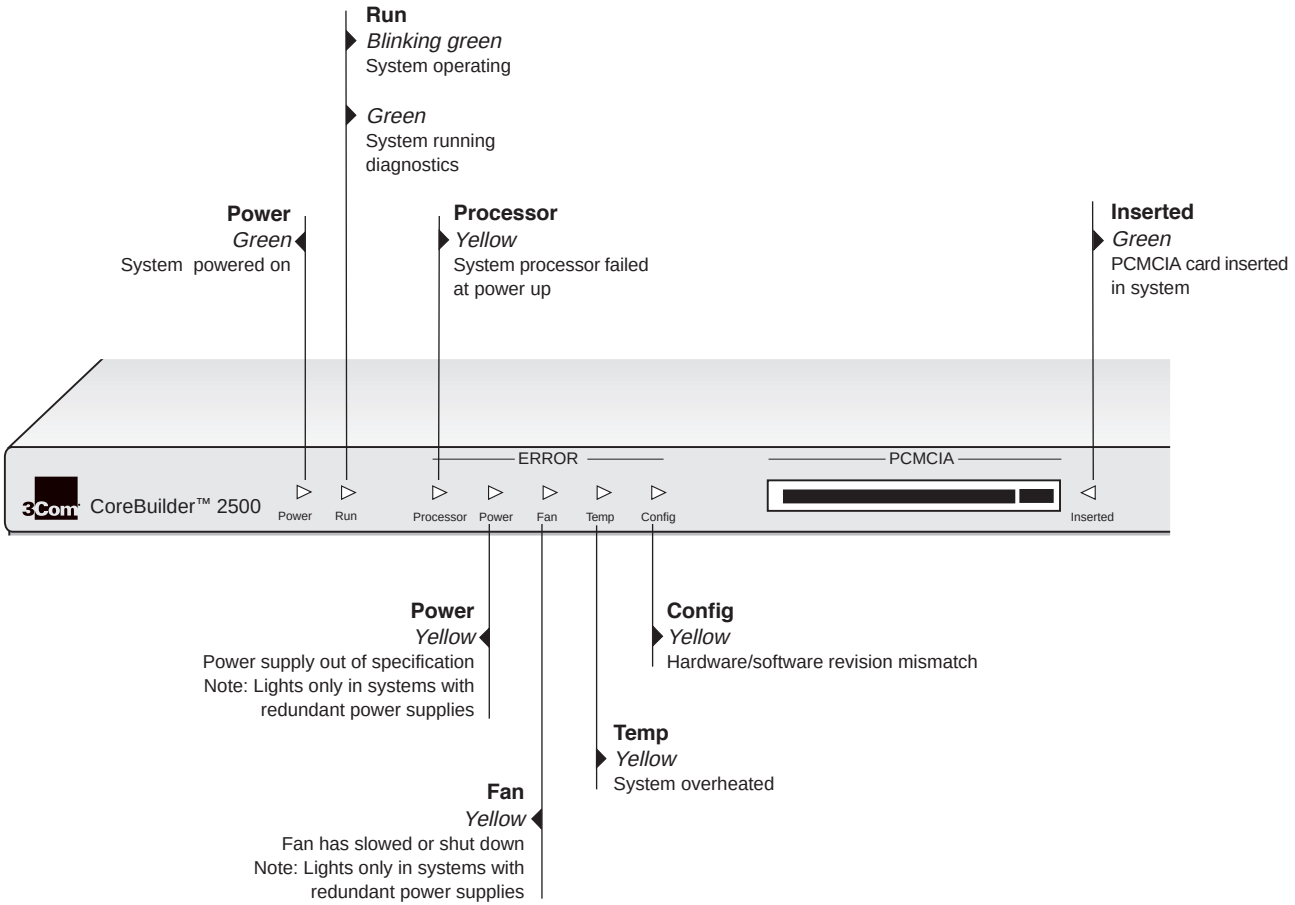
When diagnostics are running on a module, its port status **Error** LEDs are yellow. When the diagnostics are successfully completed, the port status **Active** LEDs for connected ports turn green. See Table 5-2.

If any port status **Error** LEDs remain yellow, the port is not operational. If the module's **Board Error** LED is yellow, the module has failed a diagnostic test.

Table 5-2 Module Diagnostics – LED Activity

LED Name	Color	Indicates...
Error	Steady yellow	Running diagnostics
Error	Steady yellow	Port not operational
Active	Steady green	Diagnostics successful
Board Error	Steady yellow	Diagnostics failure

System Processor LEDs



System Checks

After the system has successfully completed the power-up diagnostics, check the items in Table 5-3 to verify that the system is operating correctly. If you discover any abnormal conditions, see Chapter 7: *Troubleshooting the System*.

Table 5-3 System Power-up Checklist

Check	Why?
Power-up error messages	If there is a problem during power up, the messages are displayed in the Administration Console connection through the terminal serial port.
Normal LED activity	When the power-up diagnostics are running, the LEDs light in a certain pattern as described on page 5-2 in the section "Power-up Diagnostics." After the system successfully completes the power-up diagnostics, you should observe the following normal LED activity: **Power** LED (system) = green **Run** LED (system) = blinking green **Error** LEDs (system) = off **Board Error** LED (module) = off Port status **Error** LEDs (module) = off Port status **Active** LEDs (module) = green

The Next Step: Software Configuration

Your CoreBuilder system is shipped from the factory with IEEE 802.1 bridging enabled, allowing the system to run on your network as soon as it is installed.

To configure your system for your particular networking environment (including customized filtering, SNMP set up, and routing), you must first establish management access. See the procedures in Chapter 6: *Quick Setup for Management Access*.

6 Quick Setup for Management Access

This chapter provides easy instructions for configuring the CoreBuilder™ 2500 system for management access. When you decide how you want to manage your system, follow the configuration instructions for your preferred type of management access.

About CoreBuilder 2500 System Management

You can use several applications to configure and manage your CoreBuilder system:

- The CoreBuilder Administration Console software
- Transcend Enterprise Manager software
- Other SNMP-based network management applications

The CoreBuilder Administration Console is a character-oriented, menu-driven user interface for performing system administration. You can access the Administration Console using the serial ports or IP. For more information, see the *CoreBuilder 2500 Administration Console User Guide*.

For more complete network management, use an external SNMP-based application such as Transcend Enterprise Manager or other network management applications. You can access the system with an external management application using IP.

For more detailed descriptions of these applications, see the *CoreBuilder 2500 Operation Guide*, Part I: *Administration and Management*.

How Do You Want to Manage the System?

You can manage your system locally through a terminal connection or remotely using an IP or modem connection. Table 6-1 describes the access mechanisms.

Table 6-1 Management Access Mechanisms

Access Mechanism	Allows you to...	Using...
Terminal	Connect directly to the Administration Console and stay attached across system reboots	Terminal serial port
Modem	Access the Administration Console from remote sites	Modem serial port
IP	Access the Administration Console using the rlogin or telnet commands. Or use an external SNMP management application to communicate with the CoreBuilder™ SNMP agent	FDDI or Ethernet port assigned to an IP interface

The management access mechanisms are described more completely in the next sections.

Terminal Port

Direct access through the terminal port allows you to remain on the system during system boots. A Macintosh or PC attachment can use any terminal emulation program for connecting to the terminal serial port. A workstation attachment under UNIX can use the emulator TIP.

Modem Port

You can access the Administration Console from a remote terminal using an external modem attached to the modem serial port.

IP Interface

An IP interface is the connection between the CoreBuilder system and a subnet. It allows you to manage the system through an Ethernet or FDDI port.

With an IP interface, you can use the rlogin or telnet commands to access the Administration Console using TCP/IP from a host computer. You can also use an IP interface to manage the system with an external management application.

Initial Management Access

Initially, you must access the system through the terminal serial port. Use these default settings for this port:

- 9600 baud
- 8 bits, no parity
- 1 stop bit

When you access the Administration Console using the terminal serial port, you receive this prompt:

```
Select access level (read, write, administer):
```

1. At the prompt, enter:

   `administer`

2. At the password prompt, press [Return].

   The Administration Console top-level menu appears as shown here. Use this menu to change the terminal serial port baud rate or configure your system for another management access mechanism.

```
Menu options:
-----------------------------------------------
system    - Administer system-level functions
ethernet  - Administer Ethernet ports
fddi      - Administer FDDI resources
atm       - Administer ATM
bridge    - Administer bridging
ip        - Administer IP
snmp      - Administer SNMP
analyzer  - Administer Roving Analysis
script    - Run a script of console commands
logout    - Logout of the Administration Console

Type ? for help.
-----------------------------------------------
Select a menu option:
```

Setting the Terminal Port Baud Rate

To set the baud rate of the terminal port from the Administration Console:

1. From the top level of the Administration Console at the `Select a menu option` prompt, enter:

   `system`

2. At the System menu, enter:

   `serialPort`

3. At the SerialPort menu, enter:

   `terminalSpeed`

4. At the prompt, enter the baud rate for the terminal port. The system supports these baud rates: 19200, 9600, 4800, 2400, 1200, and 300.

   After changing the baud rate, you see this message:

   ```
   Changing the baud rate may cause a loss of
   communication since you are currently connected
   via the serial port.

   Are you sure you want to change the baud rate?
   (y/n):
   ```

5. Enter **`y`** (for yes) or **`n`** (for no) at the prompt.

   If you enter **`y`**, the baud rate is changed immediately. At this time, you lose the ability to communicate on the serial port unless you adjust the baud rate of your terminal or terminal emulator (Sun *tip*) appropriately. If you enter **`n`**, the baud rate does not change and you return to the previous menu.

Modem Setup

You can set up your system for modem access through an external modem attached to the system processor's modem port. To do this, you must first set the baud rate of the modem port (if necessary), and then attach and configure your external modem.

Setting the Modem Port Baud Rate

Your CoreBuilder system is shipped with the following modem serial port parameters set as defaults: 9600 baud, 8 bits, no parity, 1 stop bit.

To change the baud rate of the modem port from the Administration Console:

1. From the top level of the Administration Console at the `Select a menu option` prompt, enter:

   `system`

2. At the System menu, enter:

   `serialPort`

3. At the SerialPort menu, enter:

   `modemSpeed`

4. At the prompt, enter the baud rate for the modem port. The system supports these baud rates: 19200, 9600, 4800, 2400, 1200, and 300.

Connecting to an External Modem

To connect to and configure the external modem port:

1. From the top level of the Administration Console at the `Select a menu option` prompt, enter:

   `system`

2. At the System menu, enter:

   `serialPort`

3. At the SerialPort menu, enter:

   `connectModem`

   You can now issue the commands to the attached modem that support whatever communication parameters are appropriate to your installation. All characters you enter in the Console are transmitted to the modem port.

4. To break the connection, enter the escape sequence **`~]`** with no intervening characters.

   When you enter the escape sequence, the connection to the modem port is broken and you are returned to the previous menu.

IP Interface Configuration

These instructions include information on defining an IP interface through which you can manage your CoreBuilder system. An IP interface contains the following parameters:

- **IP address**

  This address, which is specific to your network, is used for managing the system. The IP address defines both the number of the network to which the interface is attached and its host number on that network.

- **Subnet mask**

  A subnet mask, a 32-bit number, uses the same format and representation as IP addresses. The subnet mask determines which bits in the IP address are interpreted as the network number, the subnet number, and the host number. Each IP address corresponding to a **1** in the subnet mask is in the network and subnet part of the address. Each IP address bit corresponding to a **0** is in the host part of the IP address.

- **Advertisement address**

  The CoreBuilder 2500 system uses this IP address to advertise packets to other stations on the same subnet. In particular, this address is used for sending RIP updates. By default, the CoreBuilder system uses a directed broadcast (all **1**s in the host field).

- **Cost**

  Each interface has an associated cost. This value, between 1 and 15, is used when calculating route metrics.

The next three parameters apply only to CoreBuilder 2500 systems running Extended Switching software.

- **Type**

  The type of IP interface is one of the following:

  - *VLAN* supports routing between two VLANs.
  - *System* supports out-of-band management.
  - *LIS* supports ATM CLIP.

- **State**

  This parameter is the status of the IP interface, which indicates whether the interface is available for communications.

- **VLAN Index**

  This parameter is the number of the IP VLAN associated with the IP interface. The VLAN index indicates which bridge ports are associated with the IP interface. When the menu prompts you for this option, it displays a list of available VLAN indexes and the ports associated with them.

To set the interface parameters:

1 From the top level of the Administration Console at the `Select a menu option` prompt, enter:

```
ip interface define
```

2 Enter the IP address of the interface.

3 Enter the subnet mask of the subnet to which the interface is to be assigned.

4 Enter the cost value of the interface.

5 Enter the type of IP interface, either VLAN or LIS.

6 Enter one or more advertisement addresses to be used on the interface.

7 Enter either VLAN or LIS information.

   a For a VLAN interface, enter the index of the IP VLAN associated with the interface.

   b For a LIS interface, enter the ATM ARP server address, the maximum SVC count, the inactivity timer, the minimum holding time, and the ATM port and PVCs associated with the interface.

7 TROUBLESHOOTING THE SYSTEM

This chapter explains how to troubleshoot certain problems within the CoreBuilder™ system. It covers how to:

- Identify and correct system problems
- Perform related maintenance tasks, such as replacing fuses or cleaning fiber optic ports and connectors

If you experience system problems that are not addressed in this chapter, contact 3Com Technical Support or your service representative. Before you call, gather the following information and have it available:

- Chassis type and serial number
- Maintenance agreement or purchase date/warranty information
- Software revision number
- Brief description of the problem

For additional information, see Appendix E: *Technical Support*.

Diagnosing Problems

By observing system diagnostics, you can identify and correct problems that might occur at system power up.

Power Failures

If the system does not respond during power up, see the troubleshooting suggestions in Table 7-1.

Abnormal LED Activity

The system processor contains several status LEDs that indicate system problems. Also, each module has status LEDs that alert you to problems with a module or port. See Table 7-2 or Table 7-3 for troubleshooting suggestions in the event of abnormal LED activity on the system processor or a module.

CAUTION: *When handling a module, always use a wrist strap that is connected to a proper ground. This precaution prevents the module from being damaged by electrostatic discharge.*

Table 7-1 Troubleshooting Power Failures

Symptom	Possible Sources of the Problem	Try this...
System does not power up	■ System is not receiving power ■ Power supply malfunction ■ Broken fuse	**1** Verify that the building's power outlet has power. **2** Check that the power cord is firmly plugged into the system and into the building's power outlet. **3** Verify that the power switch is toggled to ON (I). **4** Check whether the fuse is broken. (See the section "Checking the CoreBuilder System Fuses" on page 7-5) and replace any broken fuses. **5** Restart the system by toggling the power switch OFF (O) and then ON (I). **6** If the system still does not operate, contact 3Com Technical Support or your service representative.

Table 7-2 Troubleshooting Abnormal System Processor Status LED Activity

LED Status	Possible Sources of the Problem	Try this...
Run LED does not illuminate	Diagnostic software is not running	Call 3Com Technical Support or your service representative.
Processor LED lights yellow	System processor failure	**1** Shut down the CoreBuilder™ system. **2** Call 3Com Technical Support or your service representative.
Power LED lights yellow (Only appears in systems with redundant power supplies)	Power supply is out of specification	Call 3Com Technical Support or your service representative.
Fan LED lights yellow (Only appears in systems with redundant power supplies)	Fan has slowed or shut down	**1** Shut down the CoreBuilder™ system. If the system is not over temperature (that is, if the **Temp** LED is not lit), you may continue to run the system until service is scheduled. However, the system should be serviced. **2** Call 3Com Technical Support or your service representative.
Temp LED lights yellow	■ System temperature is too high ■ Wiring closet is too hot ■ System vents are blocked ■ System fans are not operating ■ System processor has failed ■ Thermal sensor is faulty ■ Backplane is faulty	**1** Shut down the CoreBuilder™ system. **2** Verify that the room temperature meets the system's specifications. See Appendix A: *System Specifications*. **3** If the temperature is too high, lower the room's thermostat and wait until the room temperature meets the specifications. **4** Verify that nothing blocks the airflow from the system's vents. **5** Restart the system. If the **Temp** LED still lights, the room temperature is still too high or the system processor is faulty. **6** Shut down the CoreBuilder™ system and contact 3Com Technical Support or your service representative.
Config LED lights yellow	Hardware and Software revision mismatch	**1** If you have added a new module, remove it. **2** If you have just updated software, reload the old version of software. **3** Call 3Com Technical Support or your service representative for hardware and software compatibility information.

Table 7-3 Troubleshooting Abnormal Module Status LED Activity

LED Status	Possible Sources of the Problem	Try this...
Board Error LED lights yellow	Module failure	Replace the module with a new one.
Error LED (Port Status) lights yellow	■ System does not recognize a connection to the port ■ Cabling not fully attached to the port ■ Cabling to the port is dirty (on FDDI modules) ■ Cable to the port is faulty	**1** Verify that all cables are firmly plugged into both the system's affected port and the attached device. **2** Verify that the cables are clean. See the section "Cleaning Dirty Fiber Optic Ports and Connectors" on page 7-7 for more information. **3** Test for faulty cables. When the problem is corrected, the **Active** LED (port status) lights green. **4** Contact 3Com Technical Support or your service representative if the port status **Error** LED remains yellow.

Related Maintenance Procedures

During system troubleshooting, you might have to perform the minor maintenance procedures described in this section. For other assistance, contact 3Com Technical Support as discussed in Appendix E: *Technical Support*.

Checking the CoreBuilder System Fuses

If your CoreBuilder system does not power up, check the fuses.

Two fuses are located inside the AC power switch assembly on the back panel of the chassis. The fuses are mounted in removable cartridges.

WARNING: *Before beginning this procedure, power down and unplug the system to prevent electric shock or system damage, or both.*

You need a small, flat-blade screwdriver to complete this procedure.

Removing the Fuse

To remove the fuse, take these steps:

1 Insert the small flat-blade screwdriver into the slot at the top of the power switch assembly and flip down the hinged panel covering the fuse cartridges. See Figure 7-1.

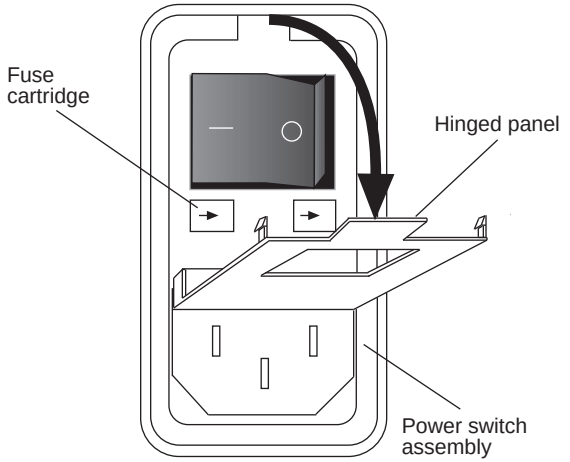


Figure 7-1 Accessing the AC Power Fuses

2 Release one of the fuse cartridges by gently pushing on the cartridge in the direction of the arrow until the fuse cartridge is released.

3 Remove the fuse cartridge from the fuseholder. See Figure 7-2.

4 Pull the fuse out of the cartridge and inspect the wire. If the wire is broken, install a new fuse. See Figure 7-2.

5 Repeat steps 2 through 4 with the other cartridge.

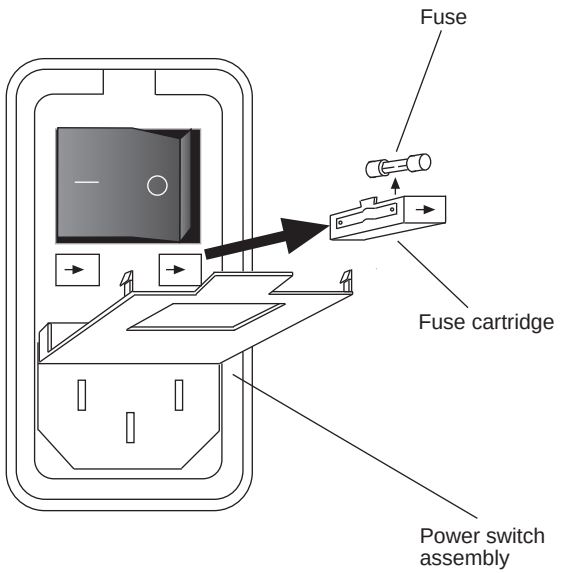


Figure 7-2 Removing and Replacing the AC Power Fuses

Installing a New Fuse

To install a new fuse, take these steps:

1 Insert a new 4-amp fuse into the cartridge. See Figure 7-2.

CAUTION: *For continued protection against fire hazard, replace CoreBuilder system fuses with fuses of the same type and rating.*

2 Insert the fuseholder cartridge into the power switch assembly.

3 Close the panel covering the fuseholder cartridge.

4 Be sure that the power switch is in the OFF (O) position. Plug the appropriate end of the power cord into the power supply receptacle and the other end into the building's power outlet or your power source.

5 Power up the system.

Cleaning Dirty Fiber Optic Ports and Connectors

Fiber optic transceivers are sensitive optical devices that you must handle carefully. If dirt collects on the fiber optic lens, you might notice that the LED for an FDDI port either does not light or lights yellow. You might also notice degradation in port performance, indicated by an increase in the Link Error Rate (LER) count for that port.

To prevent dust from collecting on the fiber optic lens, keep the dust covers on any ports at all times when not in use. To clean a fiber optic lens, take these steps:

1 Remove any accumulated dust or debris from the port or connector by blowing across all surfaces with a canned air duster.

Compressed gas is recommended, such as Chemtronics' Ultrajet or the Triangle Tool Group's Liqui-Tool Dust-A-Way. Do not use commercial compressed air or "house air" because of the risk of oil contamination.

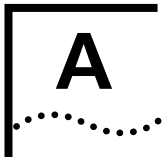
2 Reconnect the cable to the port to check whether the dusting corrected the problem.

If the LED still does not light, or if it lights yellow, continue with steps 3 and 4.

3 Gently wipe the ports with a lint-free, nonabrasive, nonadhesive swab. Microswabs by Texwipe are recommended.

4 Gently wipe the connectors with a lint-free, nonabrasive wipe or pad. Texwipe pads are recommended.

Avoid touching any surfaces after cleaning the connectors. Keep all unused ports covered.



SYSTEM SPECIFICATIONS

Physical Dimensions	3.0 inches (H) x 19.0 inches (W) x 14.0 inches (D) [7.6 cm (H) x 48.3 cm (W) x 35.4 cm (D)]
	Weight (fully loaded): 20 lb (9.0 kg)
Environmental Requirements	
Operating temperature	32˚ to 104˚ F (0˚ to 40˚ C)
Operating humidity	10% to 90% relative humidity, noncondensing
Storage temperature	–22˚ to 149˚ F (–30˚ to 65˚ C)
Storage humidity	90% maximum relative humidity, noncondensing
Safety	
Agency certifications	UL 1950, CSA 22.2 No. 950, TUV, IEC 950
Designed to comply with	VDE
AC protection	4-amp fuse
Over temperature protection	Automatic warning at 140˚ F (60˚ C)
Electromagnetic Emissions (Agency Certification)	Meets FCC part 15, Subparagraph J, Class A limits, and CISPR Class A limits
Heat Dissipation	242 watts maximum (826 BTU/hour maximum)
Power Supply	
AC line frequency	47 to 63 Hz
Input voltage options	120 VAC to 220 VAC; 90 VAC to 264 VAC
Current rating	120 VAC at 1.2 amps (maximum)/220 VAC at 0.65 amps (maximum)
Redundancy (optional)	Dual power supplies

(continued)

(continued)

Standards Supported	**SNMP** ■ SNMP protocol (RFC 1157) ■ MIB-II (RFC 1213) ■ FDDI SMT 7.3 MIB (RFC 1512) ■ Ethernet MIB (RFC 1398) ■ Bridge MIB (RFC 1493) ■ CoreBuilder™ System MIB version 1.2.0 ■ CoreBuilder™ Optional FDDI MIB version 1.2.0 based on SMT 7.3 **FDDI** ANSI X3T9.5 FDDI, including revision 7.3 SMT **Software Installation** FTP (RFC 959)	**Terminal Emulation Protocols** ■ telnet (RFC 854) ■ rlogin (RFC 1282) **Protocols Used for Administration** ■ UDP (RFC 768) ■ IP (RFC 791) ■ ICMP (RFC 792) ■ TCP (RFC 793) ■ ARP (RFC 826)
CoreBuilder™ System LEDs	**System Status LEDs** ■ **Power** (Green): System is powered on ■ **Run** (Green): System is running diagnostics ■ **Run** (Blinking Green): System is operating ■ **Processor** (Yellow): Processor failed at power up ■ **Power** (Yellow): Power supply is out of specification (Only lit in systems with redundant power supplies) ■ **Fan** (Yellow): Fan has slowed or shut down (Only lit in systems with redundant power supplies) ■ **Temp** (Yellow): System has overheated ■ **Config** (Yellow): Hardware and software revision mismatch ■ **Inserted** (Green): PCMCIA card inserted in system	**Module Status LEDs** ■ **Board Error** (Yellow): Module has failed a diagnostic procedure ■ **Active** (Green): Associated port is active ■ **Error** (Yellow): Error has occurred with the associated port ■ **Inserted** (Green): Optical bypass switch inserted into the system

B Module and System Pinouts

This appendix contains the pin assignments for the CoreBuilder™ 2500 modules, serial port connectors, and the optical bypass switch.

Ethernet Module Pin Assignments

Figure B-1 shows the pin assignments for the 10BASE-FL Ethernet module. Table B-1 shows the pin assignments for the 10BASE-5 (AUI) module. Table B-2 and Table B-3 show the pin assignments for the 10BASE-T (RJ-21 and RJ-45) Ethernet modules.

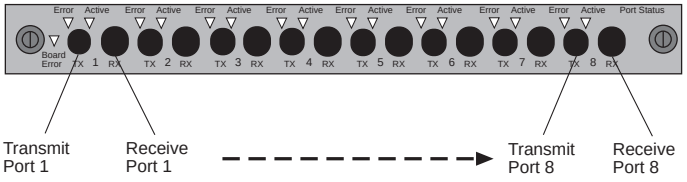


Figure B-1 10BASE-FL Pin Assignments

Table B-1 10BASE-5 (AUI) Pin Assignments

Pin No.	Description
1	Collision shield
2	Collision +
3	Transmit +
4	Receive shield
5	Receive +
6	Power return
7	Not used
8	Not used
9	Collision –
10	Transmit –
11	Transmit shield
12	Receive –
13	+12 volts
14	Voltage shield
15	Not used

Table B-2 10BASE-T (RJ-21) Pin Assignments

Pin/Port	Color Code	Signal	Pin/Port	Color Code	Signal	Pin/Port	Color Code	Signal
1/8	blue_white	Receive –	18	green_yellow	unused	35/4	red_gray	Receive +
2/8	orange_white	Transmit –	19	brown_yellow	unused	36/3	black_blue	Receive +
3/7	green_white	Receive –	20	gray_yellow	unused	37/3	black_orange	Receive +
4/7	brown_white	Transmit –	21	blue_violet	unused	38/2	black_green	Receive +
5/6	gray_white	Receive –	22	orange_violet	unused	39/2	black_brown	Receive +
6/6	blue_red	Transmit –	23	green_violet	unused	40/1	black_gray	Receive +
7/5	orange_red	Receive –	24	brown_violet	unused	41/1	yellow_blue	Receive +
8/5	green_red	Transmit –	25	gray_violet	unused	42	yellow_org	unused
9/4	brown_red	Receive –	26/8	white_blue	Receive +	43	yellow_green	unused
10/4	gray_red	Transmit –	27/8	white_orange	Transmit +	44	yellow_brown	unused
11/3	blue_black	Receive –	28/7	white_green	Receive +	45	yellow_gray	unused
12/3	orange_black	Transmit –	29/7	white_brown	Transmit +	46	violet_blue	unused
13/2	green_black	Receive –	30/6	white_gray	Receive +	47	violet_orange	unused
14/2	brown_black	Transmit –	31/6	red_blue	Transmit +	48	violet_green	unused
15/1	gray_black	Receive –	32/5	red_orange	Receive +	49	violet_brown	unused
16/1	blue_yellow	Transmit –	33/5	red_green	Transmit +	50	violet_gray	unused
17	org_yellow	unused	34/4	red_brown	Receive +			

Table B-3 10BASE-T (RJ-45) Pin Assignments

Pin No.	Signal	Description
1	TX +	Transmit +
2	TX –	Transmit –
3	RX +	Receive +
4	Not Used	
5	Not Used	
6	RX –	Receive –
7	Not used	
8	Not used	

Optical Bypass Connector Pin Assignments

Table B-4 provides the pin assignments for the optical bypass switch connector on the FDDI DAS MIC module.

Table B-4 Optical Bypass Switch Connector Pin Assignments

Pin No.	Signal	Description
1	+5 Volts	
2	+5 Volts	
3	Control signal	**Multimode Fiber** High: Bypass mode Low: Insert mode
4	Control signal	**Multimode Fiber** High: Bypass mode Low: Insert mode
5		Signal ground
6		Signal ground

Serial Port Pin Assignments

The following tables show the pin assignments for the system processor serial ports.

Table B-5 Modem Port Pin Assignments

Pin No.	Signal	Description
1	DCD	Data carrier detect
2	RxD	Received data
3	TxD	Transmitted data
4	DTR	Data terminal ready
5		Signal ground
6		Not used
7	RTS	Request to send
8	CTS	Clear to send
9		Not used

Table B-6 Terminal Port Pin Assignments

Pin No.	Signal	Description
1		Not used
2	RxD	Received data
3	TxD	Transmitted data
4		Not used
5		Signal ground
6		Not used
7		Not used
8		Not used
9		Not used

C Site Requirements and Safety Codes

You took careful steps to plan and prepare your site for new or additional CoreBuilder™ 2500 systems. For your reference, this appendix summarizes the criteria your site should meet for the CoreBuilder 2500 system to operate safely and effectively.

The topics covered in this appendix include:

- General safety requirements
- Wiring closet recommendations
- Distribution rack requirements, if applicable
- Sources for building and electrical codes

General Safety Requirements

For safe operation, your site must meet these general safety requirements:

- All environmental requirements listed in Appendix A and in the next section. Pay special attention to temperature and humidity.
- All building and electrical codes for your city and country, as described on page C-4 in "Building and Electrical Codes."
- All grounding requirements listed in the next two sections.

Wiring Closet Recommendations

The cabling system plan used at your facility probably covers most wiring closet concerns. 3Com also recommends that you check these items:

- Verify that your wiring closet meets all requirements mentioned in your *facility cabling plan*.
- Verify that your wiring closet and your facility *meet all state, local, and country building and wiring codes.*
- Be sure that your system is *easily accessible* for installation and service.
- Provide *adequate overhead lighting* for easy maintenance.
- Be sure that all wiring closet doors have locks to *prevent unauthorized access.*
- Assign *wiring closet identification numbers* using architectural location codes or some type of floor-grid matrix.
- Select a *vinyl floor covering* for your wiring closet. Concrete floors accumulate dust; carpets can cause static electricity.

- Be sure that the wiring closet *floor is flat and level*. If you are using distribution racks and the floor is not level, bolt the racks to the floor to prevent them from tipping over.
- Be sure that each wiring closet has a *suitable ground*. Ground all metal racks, enclosures, boxes, and raceways in the closet.
- Use AC power, 15-amp service receptacles, type N5/15 or NEMA 5-15R for 120 VAC and the other *system specifications shown in Appendix A*.
- Be especially sure to meet all *system environmental requirements* in Appendix A, such as ambient temperature and humidity.
- Be sure that the *ventilation* in the wiring closet is adequate to maintain a temperature below 104˚ F (40˚ C).
- Install a *reliable air conditioning and ventilation system* if you plan to have two or more CoreBuilder 2500 systems in a single wiring closet.
- During nonbusiness hours, *guard against the ventilation being shut down* while a CoreBuilder 2500 system remains powered up; otherwise, the equipment might overheat.

Distribution Rack Requirements

If you plan to mount your CoreBuilder 2500 systems in a distribution rack, your rack should meet the basic mechanical and space requirements described in this section.

Protective Grounding for the Rack

Proper distribution rack grounding ensures that voltages induced into wiring by lightning or other disturbances are directed to ground. Normally, you use a distribution rack grounding kit and a ground conductor that is carried back to earth or to another suitable building ground. To order the grounding kit, contact your sales representative.

Space Requirements for the Rack

Provide enough space in front of and behind the system so that you can service it easily. Allow a minimum of 30 inches (76 centimeters) between the rack and any wall behind or in front of it. Extra room on each side is optional. See Figure C-1.

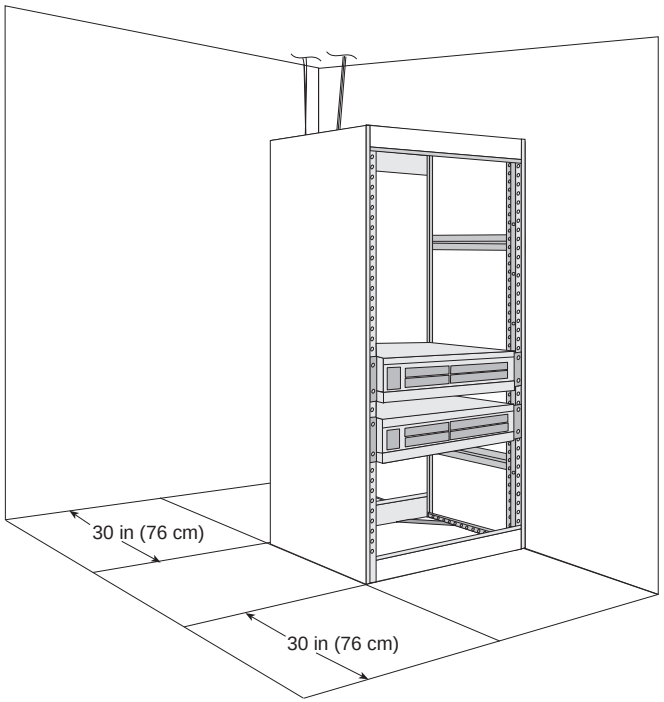


Figure C-1 Recommended Service Access

Mechanical Requirements for the Rack

Racks should comply with the standards and requirements mentioned in your cabling system plan and should also conform to certain conventional standards:

- In the United States, use EIA Standard RS-310C: *Racks, Panels, and Associated Equipment*.
- In countries other than the United States, use IEC Standard 297: *Dimensions of Panels and Racks*.

In addition, 3Com recommends that your distribution rack meet these requirements:

- Use an open style, 19-inch rack. The rack styles shown in Figure C-2 facilitate easy maintenance and provide excellent ventilation.
- Use a rack that has the universal mounting rail hole pattern identified in IEC Standard 297. See page 2-3 for the description of the universal mounting hole pattern.
- Use a rack that is made of steel.
- Install equipment in the lower half of the distribution rack to avoid making the rack top-heavy.

- Use a rack that supports approximately 600 lb (272 kg).
- Use a rack that has adequate electrical grounding, for instance, with a distribution rack grounding kit.
- Verify that the floor under the rack is level within $^{3}/_{16}$ inch (5 millimeters). Use a floor-leveling cement compound if necessary or bolt the racks to the floor.
- Attach the rack to the wiring closet floor with $^{3}/_{8}$ inch (9.5 millimeters) lag screws or equivalent hardware.
- Brace open distribution racks if the channel thickness is less than $^{1}/_{4}$ inch (6.4 millimeters).

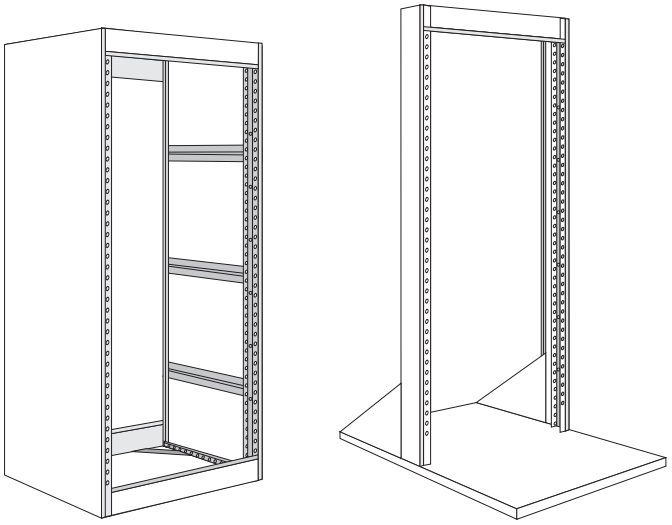


Figure C-2 Recommended Rack Styles

Building and Electrical Codes

Follow all appropriate building codes and authorities on electrical codes when planning your site and installing your cable for the CoreBuilder 2500 system.

Specific building and electrical codes vary depending on your location. The following lists are provided as resources to help you find additional information.

Building Codes

Major building codes:

- Uniform Building Code

  International Conference of Building Officials (ICBO)
  5360 South Workman Mill Road
  Whittier CA 90601

- BOCA Basic Building Code

  Building Officials and Code Administrators (BOCA) International, Inc.
  4051 West Flossmoor Road
  Country Club Hills IL 60478

- Standard Building Code (SBC)

  Southern Building Code Congress International, Inc.
  900 Montclair Road
  Birmingham AL 35213

Electrical Codes

Authorities on electrical codes:

- National Electrical Code (NEC) Classification (USA only) — a recognized authority on safe electrical wiring. Federal, state, and local governments use NEC standards to establish their own laws, ordinances, and codes on wiring specifications.

  The NEC classification is published by:

  National Fire Protection Association (NFPA)
  1 Batterymarch Park
  Quincy MA 02269

- Underwriters' Laboratory (UL) Listing (USA only) — an independent research and testing laboratory. UL evaluates the performance and capability of electrical wiring and equipment to determine whether they meet certain safety standards when properly used. Acceptance is usually indicated by the words "UL Approved" or "UL Listed."

  UL
  333 Pfingsten Road
  Northbrook IL 60062-2096

- National Electrical Manufacturing Association (NEMA) (USA only) — an organization of electrical product manufacturers. Members develop consensus standards for cables, wiring, and electrical components.

  NEMA
  1300 North 17th Street, Suite 1847
  Rosslyn VA 22209

- Electronic Industries Association (EIA) (USA only) — a trade association that develops technical standards, disseminates marketing data, and maintains contact with government agencies in matters relating to electronics and related industries.

  EIA
  2500 Wilson Boulevard
  Arlington VA 22201

D FDDI STANDARDS

This appendix describes multimode and single mode FDDI fiber standards. When planning your installation, thoroughly inspect your present cabling to determine if it meets the specifications in the cabling system plan and standards used at your site.

In addition to adhering to your local standards, all cable must conform to the American National Standard FDDI Physical Layer Medium Dependent (PMD) standard, ISO.166-1990, American National Standards Institute, which defines the Physical Medium Dependent (PMD) layer of the FDDI network. Currently, there are two approved PMD standards:

- Multimode Fiber (MMF-PMD), which is defined in ANSI standard X.3-166-1992
- Single Mode Fiber (SMF-PMD), which is defined in ANSI standard X.3-184-198x

For the CoreBuilder™ 2500 system, 3Com supports multimode fiber (MMF-PMD) 62.5/125 μm and Category one (1) single mode fiber (SMF-PMD).

When deciding whether to use multimode or single mode fiber, determine the maximum interstation distance (the distance from the CoreBuilder system to any potential workstation):

- If the maximum interstation distance is less than or equal to 2 kilometers (1.25 miles), use multimode fiber (MMF-PMD).
- If the maximum interstation distance is greater than 2 kilometers (1.25 miles) and less than or equal to 14.4 kilometers (8.6 miles), use single mode fiber (SMF-PMD).

Standards for multimode and single mode fiber are described in the rest of this appendix.

Multimode Fiber Standards

The MMF-PMD standards define the requirements for an FDDI cable plant to support an interstation distance of up to 2 kilometers (1.25 miles) of multi-mode fiber. The cable plant includes all fiber optic components between any two communicating FDDI stations and their associated "station-to-network" connectors at each end.

To determine whether your cable plant complies with the MMF-PMD standard, take these steps:

- Compare the specifications of the fiber you are using to standard specifications, as described in the next section.

- If unlike fibers are mated in the cable plant, calculate insertion losses to see whether they exceed the maximum attenuation value allowed for a link, as described on page D-3.
- Verify that the fiber's modal bandwidth is within an acceptable range for the length of the link, as described on page D-4.

The following sections describe each of these steps and give examples.

Comparing Fiber to Specifications

Compare the specifications of the fiber you are using to those in the following tables. If the fiber does not meet the specifications, use a different fiber or contact 3Com's Technical Support.

The fiber you use must meet the specifications listed in Table D-1, which describes 62.5/125 cable, commonly sold as "FDDI Spec." It meets all the requirements of the MMF-PMD standard.

Table D-1 Standard Multimode Fiber Specifications

Specification	Description
Core	62.5 μm diameter
Cladding	125 μm diameter nominal
	122 μm minimum
	128 μm maximum
Numerical aperture	0.275
Maximum attenuation	11 dB* (1 dB allowed for reflection and dispersion penalties)
Modal bandwidth	500 MHz • km
Maximum distance between nodes	2 km
Output power (from transmitter)	–20 dB minimum
	–14 dB maximum
Receive power	–32 dB minimum sensitivity
	–14 dB maximum sensitivity

*Maximum attenuation includes cable attenuation and the loss induced by other components such as connectors, splices, and the mating of unlike fiber types. Although some 2 km cable plants have a total attenuation of less than 11.0 dB, the 2 km interstation distance must be maintained to comply with modal bandwidth requirements.

The maximum attenuation value is based on a cable diameter of 62.5, 80, or 100 μm. If you are using fiber with a diameter of 50 μm, the maximum attenuation is 8 dB for links connecting two CoreBuilder™ 2500 systems and 6 dB for links connecting a CoreBuilder™ 2500 system with equipment from another vendor.

Table D-2 Alternate Multimode Fiber Types

Core (μm)	Cladding (μm)	Numerical Aperture
50	125	0.20
50	125	0.22
85	125	0.28
100	140	0.29

If you are using fiber with a diameter of 50 μm and have 3Com equipment at both ends of the link, substitute 8 dB for the maximum attenuation in Table D-1. If 3Com equipment is only at one end, substitute 6 dB for the maximum attenuation value.

If you are using equipment at the end of a link from a vendor other than 3Com, you must perform a separate loss budget analysis. Contact the vendor(s) of your other equipment for values to use in your analysis.

Calculating Insertion Losses for Unlike Fibers

If unlike fibers are mated in the cable plant, calculate insertion losses to be certain that the cable plant does not exceed the maximum attenuation value. To calculate the insertion loss, consider the types of fiber in the cable plant and the connectors or splices used to join them. Compare the result to the maximum attenuation value listed in Table D-1. If the result is greater than the value in the table, use only like fibers in your cable plant.

Refer to Table D-3 for the insertion losses of the fibers themselves. Use Table D-4, which lists the losses for connectors, cables, and splices, if the specifications for these components are not available.

Use Table D-3 for fiber-to-fiber connections only, not for power launched from a transmitter.

Table D-3 Insertion Losses for Mating Unlike Fiber Types

		Transmitting Fiber Size				
		50 μm	**50 μm**	**62.5 μm**	**85 μm**	**100 μm**
Receiving Fiber Size	Numerical Aperture	0.20	0.22	0.275	0.26	0.29
50 μm	0.20	0.0	0.4	2.2	3.8	5.7
50 μm	0.22	0.0	0.0	1.6	3.2	4.9
62.5 μm	0.275	0.0	0.0	0.0	1.0	2.3
85 μm	0.26	0.0	0.0	0.1	0.0	0.8
100 μm	0.29	0.0	0.0	0.0	0.0	0.0

Table D-4 Typical Losses for Connectors, Cables, and Splices*

Type of Insertion	Loss
MIC connector	.6 dB
ST connector (ceramic)	.6 dB
ST connector (plastic)	1.0 dB
ST connector (stainless steel)	.7 dB
62.5/125 cable	1.0 to 3.0 dB maximum per km, depending on cable quality (nominal 2.0 dB)
8/125 cable	.5 dB/km (AT&T Lightguide)
Bypass switch	2.5 dB maximum
Fusion splice	.1 to .3 dB depending on type used (use .3 dB)

*A MIC-to-ST adapter connection and an ST-to-ST connection are each considered 1 connector loss.

Example

Suppose that a link consisting of one km of 62.5/125 fiber with a maximum attenuation rating of 1.75 dB/km is transmitting into one km of 50/125 fiber with a maximum attenuation rating of 3 dB/km. The fibers are joined using a fusion splice rated at 0.3 dB and the link contains one in-line ST connector rated at 0.6 dB. The calculation in Table D-5 would arrive at the link loss attenuation value for this linked fiber.

Table D-5 Calculation Example for Link Loss Attenuation Value

Type of Loss	Value
Cable loss (62.5 μm)	1 km (1.75 dB/km)
Cable loss(50 μm)	1 km (3 dB/km)
Splice loss	0.3 dB
ST connector loss	0.6 dB
Insertion loss for mating unlike fiber types	2.2 dB
Total link attenuation	7.85 dB

Because the resulting value, 7.85, does not exceed the maximum attenuation value listed in Table D-1, no adjustments are needed in the types of fibers joined or how they are connected. The link meets all of the specifications of the MMF-PMD standard.

Verifying Modal Bandwidth

Bandwidth for multimode fiber is referred to as modal bandwidth because it varies based on the modal field (or core diameter) of the fiber. The bandwidth of an optical fiber is defined as the lowest frequency at which the magnitude of the baseband frequency response has decreased by 3 dB compared to the magnitude at zero frequency. Modal bandwidth is specified in units of MHz • km, which indicates the amount of bandwidth supported by the fiber for a one km distance.

The modal bandwidth specified in Table D-1 on page D-2 is 500 MHz • km, which allows the cable plant to support end-to-end bandwidth of 250 MHz at the maximum 2 km distance. As a check, use the following formula to verify that the bandwidth of your fiber is within an acceptable range:

n MHz • km/x km = y MHz

In this formula, **n** is the amount of bandwidth available according to the fiber specification. Divide this number by the total length of the fiber (**x**) in kilometers. The result is the modal bandwidth (**y**), measured in MHz.

If the result is lower than 250 MHz, the link may increase bit errors. To reduce the likelihood of bit errors, shorten the length of the fiber or use different fiber until the result of the calculation reaches 250 MHz.

Example

Cable with a modal bandwidth of 500 MHz • km will have 250 MHz of bandwidth at 2 km:

(500 MHz • km)/2 km = 250 MHz

The same cable would have 500 MHz of bandwidth at 1 km. A fiber cable with a bandwidth specifications of 200 MHz • km would have only 100 MHz of bandwidth at 2 km, which would not support FDDI. In this case, another type of fiber would be required.

Single Mode Fiber Standards

The SMF-PMD standard defines the requirements for an FDDI cable plant to support an interstation distance of up to 14.4 kilometers (8.6 miles) of single mode fiber. The cable plant includes all fiber optic components between any two communicating FDDI stations and their associated "station-to-network" connectors at each end.

To determine whether your cable plant complies with the SMF-PMD standard, do the following:

- Compare the specifications of the fiber you are using to standard specifications, as described in Table D-6.
- If you mix equipment supporting Category 1 and Category 2, verify the maximum attenuation between the equipment, as described in Table D-6.
- If your cables are not keyed for single mode FDDI transceivers, modify the transceiver and connector housing so that they fit together, as described on page D-7 in "Using Unkeyed Single Mode Cables."

The following sections describe each of these steps and give examples.

Comparing Fiber to Specifications

Compare the specifications of the fiber you are using to those in Table D-6. If the fiber does not meet the specifications, use a different fiber or contact 3Com Technical Support.

The single mode PMD specification (SMF-PMD) defines two optical power categories: Category 1 and Category 2. These categories refer to the optical power that must be launched into the fiber by the transmitter or detected by the receiver. 3Com supports only Category 1 single mode fiber.

The specifications for the standard single mode fiber are listed in Table D-6. Refer to the Category 1 specifications in this table for fiber connecting 3Com equipment. For fiber used with Category 2 equipment from another vendor, refer to the Category 2 specifications.

The cable plant for a Category 2 implementation must have a minimum loss of 15 dB. In a Category 2 implementation, minimum cable plant losses are required to avoid saturating (blinding) the receiver.

Table D-6 Single Mode Fiber Specifications

Category	Specifications	Description
Both Categories	Core	8 to 10 μm
	Cladding	125 μm (± 2 μm)
Category 1	Output power (from transmitter)	–20 dB minimum
		–14 dB maximum
	Receive power	–31 dB minimum
		–14 dB maximum
	Maximum distance* between nodes	14.4 km
	Maximum attenuation†	10 dB (1 dB allowed for reflections and dispersion penalties)
Category 2	Output power (from transmitter)	–4 dB minimum
		0 dB maximum
	Receive power	–37 dB minimum
		–15 dB maximum
	Maximum distance* between nodes	58.6 km
	Maximum attenuation†	32 dB (1 dB allowed for reflections and dispersion penalties)

*Maximum distances assume cable with one splice every 2.2 km with 0.3 dB loss each, and with no patch panels or mechanical splices.

†Maximum attenuation includes cable attenuation and the loss induced by other components such as connectors, splices, and the mating of unlike fiber types.

Verifying Maximum Attenuation for Mixed Fibers

If you mix Category 1 and Category 2 receivers and transmitters, use Table D-7 to verify the maximum attenuation for each possible combination.

Table D-7 Acceptable Cable Plants for Combinations of Category 1 and Category 2

Output Category	Input Category	Minimum Loss	Maximum Attenuation
1	1	0.0	10.0
1*	2*	1.0	16.0
2	1	14.0	26.0
2	2	15.0	32.0

*This combination is dispersion-limited rather than loss-limited. The expected maximum length is approximately 35 km.

Example

If a Category 2 transmitter is outputting to a Category 1 receiver, the maximum attenuation is 26.0.

Using Unkeyed Single Mode Cables

The SMF-PMD standard specifies that keyed single mode connectors must be used with single mode cables. Figure D-1 shows a cross-section of a keyed single mode connector.

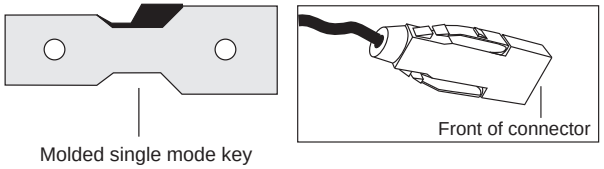


Figure D-1 Keyed Single Mode Connector

Because of the limited availability of these keyed connectors, however, you must be able to get only those cables with unkeyed connectors. Figure D-2 shows a cross-section of an unkeyed single mode connector.

Figure D-2 Unkeyed Single Mode Connector

If you are using unkeyed single mode cables, you can modify the transceiver and connector housing so that they fit together. Follow these instructions.

The following procedure reverses the transmit and receive fiber bundles. Be sure to make a corresponding reversal at the opposite end of the cable.

To install the cables into a single mode keyed transceiver:

1 Remove the A, B, or S key from the connector housing. See Figure D-3.

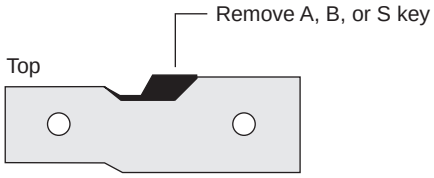


Figure D-3 Single Mode Connector Housing

Before completing the next step, check to see whether the transceiver is keyed. If you have received a special unkeyed transceiver from 3Com, go to step 3.

2 Remove the A, B, or M key from the keyed transceiver. See Figure D-4. You may have to remove the front panel on the module.

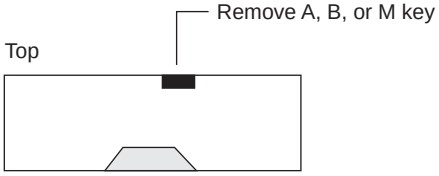


Figure D-4 Single Mode Keyed Transceiver (front view)

3 Plug the connector into the transceiver by turning the connector upside down so that the slot that normally accepts the A, B, or M key now accepts the transceiver's key. See Figure D-5.

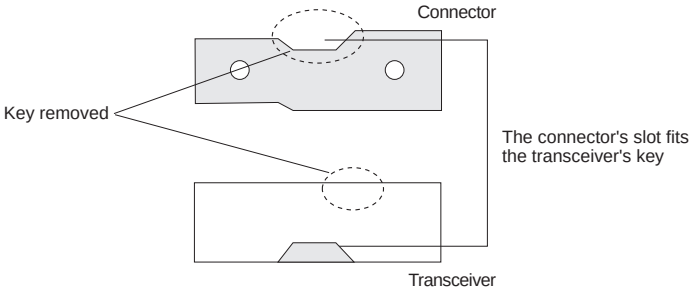


Figure D-5 Installing the Connector into the Transceiver

TECHNICAL SUPPORT

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

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

Online Technical Services

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

- World Wide Web site
- 3Com Bulletin Board Service (3ComBBS)
- 3ComFacts℠ automated fax service
- 3ComForum on CompuServe® online service

World Wide Web Site

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

http://www.3Com.com/

This service features the latest information about 3Com solutions and technologies, customer service and support, news about the company, *NetAge*® Magazine, technical documentation, and more.

3Com Bulletin Board Service

3ComBBS contains patches, software, and drivers for all 3Com products, as well as technical articles. This service is available through analog modem or digital modem (ISDN) 24 hours a day, 7 days a week.

Access by Analog Modem

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

Country	Data Rate	Telephone Number
Australia	up to 14400 bps	61 2 9955 2073
Brazil	up to 14400 bps	55 11 547 9666
France	up to 14400 bps	33 1 6986 6954
Germany	up to 28800 bps	4989 62732 188
Hong Kong	up to 14400 bps	852 2537 5608
Italy (fee required)	up to 14400 bps	39 2 27300680
Japan	up to 14400 bps	81 3 3345 7266
Mexico	up to 28800 bps	52 5 520 7853
P.R. of China	up to 14400 bps	86 10 684 92351

(continued)

Country	Data Rate	Telephone Number
Singapore	up to 14400 bps	65 534 5693
Taiwan, R.O.C.	up to 14400 bps	886 2 377 5840
U.K.	up to 28800 bps	44 1442 438278
U.S.A.	up to 28800 bps	1 408 980 8204

Access by Digital Modem

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

408 654 2703

3ComFacts Automated Fax Service

3Com Corporation's interactive fax service, 3ComFacts, provides data sheets, technical articles, diagrams, and troubleshooting instructions on 3Com products 24 hours a day, 7 days a week.

Call 3ComFacts using your Touch-Tone telephone using one of these international access numbers:

Country	Telephone Number
Hong Kong	852 2537 5610
U.K.	44 1442 438279
U.S.A.	1 408 727 7021

Local access numbers are available within the following countries:

Country	Telephone Number
Australia	1800 678 515
Belgium	0800 71279
Denmark	800 17319
Finland	98 001 4444
France	05 90 81 58
Germany	0130 81 80 63
Hong Kong	800 933 486
Italy	1678 99085
Malaysia	1800 801 777
Netherlands	06 0228049
New Zealand	0800 446 398
Norway	800 11062
Portugal	0505 442 607
Russia (Moscow only)	956 0815
Singapore	800 6161 463
Spain	900 964 445
Sweden	020 792954
U.K.	0800 626403

3ComForum on CompuServe Online Service

3ComForum contains patches, software, drivers, and technical articles about all 3Com products, as well as a messaging section for peer support. To use 3ComForum, you need a CompuServe account.

To use 3ComForum:

1. Log on to your CompuServe account.
2. Type **`go threecom`**
3. Press [Return] to see the 3ComForum main menu.

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:

- A list of system hardware and software, including revision levels
- Diagnostic error messages
- Details about recent configuration changes, if applicable

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

Support from 3Com

If you are unable to receive support from your network supplier, technical support contracts are available from 3Com.

Contact your local 3Com sales office to find your authorized service provider using one of these numbers:

Regional Sales Office	Telephone Number
3Com Corporation	
P.O. Box 58145 5400 Bayfront Plaza Santa Clara, California 95052-8145 U.S.A.	800 NET 3Com *or* 1 408 764 5000 408 764 5001 (fax)
3Com Asia Limited	
Australia	61 2 9937 5000 (Sydney) 61 3 9866 8022 (Melbourne)
P.R. of China	8610 68492568 (Beijing) 86 21 63740220 Ext 6115 (Shanghai)
Hong Kong	852 2501 1111
India	91 11 644 3974
Indonesia	6221 572 2088
Japan	81 6 536 3303 (Osaka) 81 3 3345 7251 (Tokyo)
Korea	822 2 319 4711
Malaysia	60 3 732 7910
New Zealand	64 9 366 9138
Phillippines	632 892 4476
Singapore	65 538 9368
Taiwan, R.O.C.	886 2 377 5850
Thailand	662 231 8151 4
3Com Benelux B.V.	
Belgium	32 2 725 0202
Netherlands	31 30 6029700

(continued)

Regional Sales Office	Telephone Number
3Com Canada	
Calgary	403 265 3266
Montreal	514 683 3266
Ottawa	613 566 7055
Toronto	416 498 3266
Vancouver	604 434 3266
3Com European HQ	49 89 627320
3Com France	33 1 69 86 68 00
3Com GmbH	
Austria	43 1 513 4323
Czech Republic/Slovak Republic	420 2 21845 800
Germany	49 30 34 98790 (Berlin)
(Central European HQ)	49 89 627320 (Munich)
Hungary	36 1 250 83 41
Poland	48 22 6451351
Switzerland	41 31 996 14 14
3Com Ireland	353 1 820 7077
3Com Latin America	
U.S. Headquarters	408 326 2093
Northern Latin America	305 261 3266 (Miami, Florida)
Argentina	541 312 3266
Brazil	55 11 546 0869
Chile	562 633 9242
Colombia	571 629 4110
Mexico	52 5 520 7841/7847
Peru	51 1 221 5399
Venezuela	58 2 953 8122
3Com Mediterraneo	
Italy	39 2 253011 (Milan) 39 6 5279941 (Rome)
Spain	34 1 383 17 00
3Com Middle East	971 4 349049

(continued)

Regional Sales Office	Telephone Number
3Com Nordic AB	
Denmark	45 39 27 85 00
Finland	358 0 435 420 67
Norway	47 22 18 40 03
Sweden	46 8 632 56 00
3Com Russia	007 095 258 09 40
3Com Southern Africa	27 11 807 4397
3Com UK Ltd.	44 131 220 8228 (Edinburgh) 44 161 873 7717 (Manchester) 44 162 889 7000 (Marlow)

Returning Products for Repair

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

To obtain an RMA number, call or fax:

Country	Telephone Number	Fax Number
U.S.A. and Canada	1 800 876 3266, option 2	408 764 7120
Latin America	1 408 326 2927	408 764 7120
Europe, South Africa, and Middle East	44 1442 438125	44 1442 435822
Elsewhere	1 408 326 2926	1 408 764 7120

GLOSSARY

A port

Each DAS contains two ports, one designated A and one designated B. Port A is intended to be connected to the primary ring on the incoming fiber and the secondary ring on the outgoing fiber. A properly formed trunk ring is composed of a set of stations with the A port of one station connected to the B port of the neighboring station. *See B port*.

ambient air temperature

The temperature of air or liquid surrounding any electrical part or device. Usually refers to the effect of such temperature in aiding or slowing down removal of heat by radiation and convection from the part or device in question.

attenuation

Power, measured in decibels (dB) that is lost as a signal moves from transmitter to receiver.

ATM

Asynchronous Transfer Mode. A transmission protocol that segments user traffic into small, fixed cells. Cells are transmitted to their destination where they are reassembled. During transmission, cells from different users are intermixed asynchronously to maximize utilization of network resources.

AUI

Attachment Unit Interface. The cable, connectors, and transmission circuitry used to interconnect the physical signaling and the MAU. *See MAU*.

B port

Each DAS contains two ports, one designated A and one designated B. Port B is intended to be connected to the incoming fiber of the secondary ring and the outgoing fiber of the primary ring. A properly formed trunk ring is composed of a set of stations with the A port of one station connected to the B port of the neighboring station. *See A port*.

B to M link

One of several detailed connection rules for a specific port relative to other ports. The B to M (master) port rule is a tree connection with redundancy. With this link, a station must not go to THRU state in Configuration Management (CFM). Port B on one station has precedence for connecting to an M port on a different station (single MAC station).

backbone

The main segment of a building or campus LAN, to which are attached department networks.

bandwidth

Data, measured in bits per second, that a channel can transmit. The bandwidth of an Ethernet segment is 10 Mbps and the bandwidth for a Fast Ethernet and FDDI segment is 100 Mbps.

bridges

Equipment that connects different LANs, allowing communication between devices on separate LAN segments. Bridges are protocol independent but hardware specific, with communication limited to the data link layer (1) and physical layer (2) of the OSI reference model.

Bridges connect LANs with different hardware and different protocols. An example would be a device that connects an Ethernet network to an FDDI network. This bridge would allow the two networks to communicate.

The CoreBuilder 2500 system can operate as a translation/transparent 802.1d bridge.

bus topology

An architecture distinguished by having all of its nodes connected to a single cable.

campus network

A Local Area Network (LAN) consisting of several smaller LANs within and between buildings.

client

A single-user computer that requests application or network services from a server.

client-server

An architectural model of computing that distributes computing power out to the desktop, where users ("clients") access resources from servers.

coaxial cable

A type of cable that typically has higher performance specifications than twisted-pair wiring. It is the conductor of choice for use in higher-speed networks like Ethernet because of its high bandwidth and low sensitivity to electrical interference. Coaxial cable can be used in computer networks at speeds of 16 million bits per second or more.

concentrator

An FDDI station having additional PHY/PMD entities beyond those required for its own attachment to an FDDI network. These additional PHY/PMD entities, called M (master) ports, are for the attachment of other FDDI stations (including other concentrators) in a tree topology.

DAC

Dual Attachment Concentrator. A concentrator that offers two attachments to the FDDI network that are capable of accommodating a dual, counter-rotating ring. A DAC contains an A-B port pair and at least one M port.

DAS

Dual Attachment Station. A station directly attached to FDDI's dual token rings. A DAS has four fiber attachments, one *receive* and one *transmit* fiber for each ring. Rather than an individual user workstation, a DAS is most likely to be the device controlling LAN operation, such as an FDDI concentrator, bridge, router, server, minicomputer, or mainframe. A DAS can be either single-MAC or dual-MAC and contains one A-B port pair.

dual-MAC

A DAS that has one MAC inserted in each of the dual rings. *See DAS and MAC*.

duplex fiber cable

A cable composed of two insulated optical fibers.

Ethernet

A CSMA/CD, 10 Mbps, local area data network technology, developed by Digital Equipment Corporation, Intel, and Xerox Corporation. It is one of the most popular baseband LAN technologies in use.

Fast Ethernet

A 100 Mbps, local area data network technology.

FDDI

Fiber Distributed Data Interface. A high-performance, fiber-optic, token ring LAN technology that operates at 100 Mbps over distances up to 100 kilometers with up to 500 connected stations. FDDI can go up to 200 kilometers with up to 1000 connected stations when wrapped.

FDDI dual ring

The pair of counter-rotating, logical rings (primary and secondary) common to the FDDI network. This architecture provides a high degree of reliability. In normal operation, only the primary ring carries data. The second or backup ring is used for automatic recovery in case of failure. If a network fault occurs, only the stations on either side of the fault are affected. They detect the fault and automatically bypass the fault to maintain continuous transmission of data.

FDDI paths

The segments of an FDDI ring that pass through a station. Every FDDI station must contain a primary path. The primary path represents, to the best of the station's knowledge, the segment(s) of the primary ring that pass through the station.

In addition, a station may optionally contain a secondary path representing the segment(s) of the secondary ring that pass through the station. A station may contain additional paths representing segments of rings other than the primary and secondary. Such paths are called local paths.

FDDI standard

A standard written by the X3T9.5 Committee of the American National Standards Institute (ANSI), that addressed the need for greater speed and reliability than what was available in other standard LAN technologies at the time. It is a major factor contributing to the expected acceptance and widespread use of optical fiber as a LAN transmission medium. The standard comprises four parts. *See PMD standard, PHY standard, and SMT.*

fiber optic cable

A data transmission medium consisting of glass or plastic fibers. Light-emitting diodes send light through the fiber to a detector, which then converts the light back into electrical signals. Fiber optic LANs offer a high degree of protection from eavesdropping, electromagnetic interference, and radioactivity. It is the cable most frequently used with FDDI.

ground

See protective grounding.

hostname

A meaningful, easy to remember name or title assigned to a machine on the Internet that is associated with the IP address. *See IP address*.

IEEE 802.3

A physical layer standard that specifies a LAN with a CSMA/CD access method on a bus topology. Ethernet follows this standard. *See 10BASE-T, 10BASE-FL, 10BASE-2, and 10BASE-5*.

in-band management channel

Network management performed using the same network normally used for data transmission.

internal paths

See primary ring, secondary ring.

interoperability

The ability of computer equipment from one vendor to communicate and exchange information with equipment from other vendors.

IP (Internet Protocol) address

A unique identifier for a machine attached to a network made up of two or more interconnected local area or wide area networks. An IP address is a 32-bit address composed of the identifier for the network on which the host is located and the identifier for the host. The network part of the address is based on the class assigned to a company. The host part is identified by the network administrator.

LAN

Local Area Network. A data communications network spanning a limited geographical area, such as a single building or campus. It provides communication between computers and peripherals. LANs are distinguished by their small geographical size, high data rate, and low error rate.

local management

Management of a station by using software running on the station. The CoreBuilder Administration Console provides a means to locally manage the CoreBuilder 2500 system.

M port

Master port. Each PHY/PMD pair, designated as a port, belongs to one of four types: A, B, M, or S. Concentrator stations (DAS, SAC, and NAC) contain one or more M ports to provide connection within the concentrator tree.

MAC

Media Access Control. A station resource that specifies the lower sublayer of the data-link layer for FDDI. As such, it presents the specifications and services provided for conforming FDDI attachment devices. MAC specifies the access to the medium, including addressing, data checking, and data framing.

MAU

Medium Attachment Unit. An IEEE 802.3 compatible Ethernet transceiver that is used to couple unshielded twisted pair to AUI cable. It is a computer's hardware mechanism through which network transmissions are sent and received. *See IEEE 802.3, AUI, and twisted pair.*

MIB

Management Information Base. Stores a device's managed characteristics and parameters. MIBs are used by the Simple Network Management Protocol (SNMP) and the Common Management Information Protocol (CMIP) to contain attributes of their managed systems.

MIC

Media Interface Connector. A mated pair connector that attaches an FDDI station to a fiber optic cable plant. It consists of two parts: a plug and a receptacle. There are four types of MIC: MIC A, MIC B, MIC S, and MIC M.

modem

Modulator/demodulator. The device that converts serial digital data from a transmitting terminal to a signal suitable for transmission over a telephone (analog) channel. At the other end another modem reconverts the analog signal to digital data for use by the computers. A modem port provides the interface for remote management of CoreBuilder systems. An external modem can be connected to the serial port of the system processor.

multimode fiber

A fiber optic cable that transmits signals by using light-emitting diodes (LEDs). Multimode fiber is used widely to transmit data.

operating system

A program that manages and provides access to system resources.

PHY (Physical Layer) standard

A portion of the ANSI FDDI standard (X3T9.5) that specifies the data encoding mechanism and the clock recovery and data framing parameters for FDDI.

PMD (Physical Layer Medium Dependent) standard

A portion of the ANSI FDDI standard (X3T9.5) that specifies the lower sublayer of the physical layer for FDDI, including the power levels and characteristics of the optical transmitter and receiver, interface optical signal requirements including jitter, the connector receptacle footprint, the requirements of conforming FDDI optical fiber cable plants, and the permissible bit error rates.

primary ring

One of two counter-rotating, fiber optic rings that serve as the root of an FDDI network. The primary ring normally enters each station on the trunk ring through the A port and exits through the B port. *See secondary ring*.

protective grounding

Connection to the ground, or to a conductor that is grounded, to ensure safety from electric shock and prevent equipment damage.

punch-down block

A central wiring connection device typically located in the wiring center of a voice or data network. 3Com recommends Type 110 or Type 66 punch-down blocks.

remote management

Usually refers to the management of workstations at distant locations linked to the main LAN by a network modem. Remote management can be done in the CoreBuilder system through a serial port connected to an external modem. *See modem*.

repeater

An FDDI node that serves as a two-way relay of the optical signals in an FDDI network. A repeater does not have any MAC or concentrator functionality.

ring

A series of stations across which information is passed sequentially, each station in turn examining or copying the information, finally returning it to the originating station. The ring has a predictable response time determined by the number of stations. *See primary ring, secondary ring, FDDI dual ring.*

RS-232 serial port

The ports on the system processor accepting a terminal or modem connector. They change the parallel arrangement of data within computers to the serial (one after the other) form used on data transmissions links. This port can be used for dedicated local management access, as well as for remote access.

S port

Slave port. Each PHY/PMD pair, designated as a port, belongs to one of four types: A, B, M, or S. A single attachment station (SAS or SAC) has an S port that is intended to be attached to an M port within a concentrator tree. *See M port*.

SAC

Single Attachment Concentrator. A concentrator that offers one attachment to the FDDI network. A SAC has an S port that is intended to be attached to an M port within a concentrator tree.

SAS

Single Attachment Station. A station that offers one attachment to the FDDI network. An SAS has an S port that is intended to be attached to an M port within a concentrator tree.

secondary ring

One of two counter-rotating, fiber optic rings that serve as the root of an FDDI network. The secondary ring normally enters each station on the trunk ring through the B port and exits through the A port. *See primary ring*.

server

A computer that provides clients with application and network services. Servers are shared by multiple users.

SMT

Station Management. A component of the ANSI FDDI standard (X3T9.5) that specifies the control required for proper operation of a station in an FDDI ring.

SNMP

Simple Network Management Protocol. A protocol originally designed to be used in managing TCP/IP internets. SNMP is presently implemented on a wide variety of computers and networking equipment and may be used to manage many aspects of network and end-station operation.

station

An addressable logical and physical attachment in a ring that is capable of transmitting, receiving, and repeating information. An FDDI station has one or more PHY entities, one or more MAC entities, and only one SMT entity.

station ID

The unique identifier for an FDDI station or concentrator.

topology

The physical or logical placement of stations on a network in relation to one another, such as ring, mesh, star, or bus.

transceiver

See MAU.

twisted pair

Two insulated wires wrapped around each other for protection against interference. Each wire is insulated, and the pair is usually covered by an overall casing. This type of wiring is generally used for connecting 10BASE-T, 100BASE-T and CDDI systems.

UTP

Unshielded Twisted Pair. Common, phone-grade, twisted-pair wiring that is not provided with a protective shielding against outside interference.

VLAN

Virtual LAN. A network configuration in which users communicate using LAN protocols as if they were on the same physical LAN, but where they are in fact on physically separate LANs.

wiring closet

A central area used for wiring networking systems and telephone communication systems.

10BASE-2

Refers to the IEEE Standard 802.3 that provides industry specifications for 10 Mbps multi-segment baseband networks that use thin coaxial wiring as a medium. Also called Thin Ethernet or thinnet.

10BASE-5

Refers to the IEEE Standard 802.3 that provides industry specifications for 10 Mbps multi-segment baseband networks that use thick coaxial wiring as a medium. Also called Thick Ethernet or thicknet.

10BASE-T

Refers to the IEEE Standard 802.3i that provides industry specifications for 10 Mbps multi-segment baseband networks that use twisted-pair wiring as a medium.

10BASE-FL

Refers to the IEEE Standard 802.3j that provides industry specifications for Type 10BASE-FL. The 10BASE-FL standard is backward compatible with the earlier FOIRL standard.

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3Com Corporation LIMITED WARRANTY

The duration of the warranty for the CoreBuilder™ 2500 System is 1 year.

HARDWARE

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

Network adapters	Lifetime
Other hardware products (unless otherwise specified above)	1 year
Spare parts and spares kits	90 days

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

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

SOFTWARE

3Com warrants that the software programs licensed from it will perform in substantial conformance to the program specifications therefor for a period of ninety (90) days from the date of purchase from 3Com or its Authorized Reseller. 3Com warrants the media containing software against failure during the warranty period. No updates are provided. 3Com's sole obligation with respect to this express warranty shall be (at 3Com's discretion) to refund the purchase price paid by Customer for any defective software products, or to replace any defective media with software which substantially conforms to 3Com's applicable published specifications. Customer assumes responsibility for the selection of the appropriate applications program and associated reference materials. 3Com makes no warranty or representation that its software products will 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 noncompatibility 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 of the defective product by 3Com.

WARRANTIES EXCLUSIVE

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

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, NEGLECT, IMPROPER INSTALLATION OR TESTING, UNAUTHORIZED ATTEMPTS TO REPAIR OR MODIFY, OR ANY OTHER CAUSE BEYOND THE RANGE OF THE INTENDED USE, OR BY ACCIDENT, FIRE, LIGHTNING, OR OTHER HAZARD.

LIMITATION OF LIABILITY

TO THE FULL EXTENT ALLOWED BY LAW, 3COM ALSO EXCLUDES FOR ITSELF AND ITS SUPPLIERS ANY LIABILITY, WHETHER BASED IN CONTRACT OR TORT (INCLUDING NEGLIGENCE), FOR INCIDENTAL, CONSEQUENTIAL, INDIRECT, SPECIAL, OR PUNITIVE DAMAGES OF ANY KIND, OR FOR LOSS OF REVENUE OR PROFITS, LOSS OF BUSINESS, LOSS OF INFORMATION OR DATA, 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, AND LIMITS ITS LIABILITY TO REPAIR, REPLACEMENT, OR REFUND OF THE PURCHASE PRICE PAID, AT 3COM'S OPTION. THIS DISCLAIMER OF LIABILITY FOR DAMAGES WILL NOT BE AFFECTED IF ANY REMEDY PROVIDED HEREIN SHALL FAIL OF ITS ESSENTIAL PURPOSE.

(continued)

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GOVERNING LAW

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