3Com® Corporation

PathBuilder™ S24x, 26x, and 27x Switch Installation Manual

Notice

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Overview

Introduction

This manual describes features, hardware, specifications, and applications for the 3Com PathBuilder S24x, 26x and 27x switch.

Audience

This manual is intended for operators of the 3Com PathBuilder S24x, 26x and 27x switch.

How to Use This Manual

The following table describes the contents of this manual.

This Chapter...	*Describes:*
Chapter 1	PathBuilder S24x, 26x and 27x switch hardware and software features, and FCC and Telephone Company procedures and requirements.
Chapter 2	Setting up a PathBuilder S24x, 26x and 27x switch, including site preparation, how to unpack the unit, and installation procedures.
Chapter 3	Installing the hardware on the PathBuilder S24x, 26x and 27x switch, powerup and verification, and installation of software options.
Chapter 4	Maintaining the PathBuilder S24x, 26x and 27x switch including replacement of cards and motherboard.
Chapter 5	Channelized Data option for the PathBuilder S24x, 26x and 27x switch.
Appendix A	Cable pinouts for Ethernet.
Appendix B	Product specifications.
Appendix C	Error Codes
Appendix D	Technical Support

Special Notices

The following notices emphasize certain information in the manual. Each serves a special purpose and is displayed in the format shown:

⚠ Caution

Caution provides you with information that, if not followed, can result in damage to software, hardware, or data.

⚠ Mise en Garde

Une mise en garde vous fournit des informations qui, si elles ne sont pas observées, peuvent se traduire par des dommages pour le logiciel, le matériel ou les données.

About This Manual (continued)

Vorsicht

Ein Vorsichtshinweis macht Sie darauf aufmerksam, daß Nichtbefolgung zu Software-, Hardware- oder Datenschäden führen kann.

Warning

Warning is the most serious notice, indicating that you can be physically hurt.

Avertissement

Un avertissement constitue le message le plus sérieux, indiquant que vous pouvez subir des blessures corporelles.

Warnung

Eine Warnung ist der ernsthafteste Hinweis auf Körperverletzungsgefahr.

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Chapter 1
About the PathBuilder S24x, 26x, and 27x switch

Overview

What is the PathBuilder S24x, 26x, and 27x switch?

The PathBuilder S24x, 26x, and 27x switch is a multi-protocol LAN/WAN PathBuilder S200 series switch featuring a high-speed processor and coprocessor coupled with 12 Mbytes of on-board memory (standard). Designed to address the needs of large branch offices with higher throughput needs and regional concentration sites, the PathBuilder S24x, 26x, and 27x switch is available in rack-mount configurations.

The PathBuilder S24x, 26x, and 27x switch's high performance capabilities are uniquely matched to branch applications with high traffic requirements.

As a regional concentrator, the PathBuilder S24x, 26x, and 27x switch accepts traffic from many branch locations into a single site and transfers the traffic to other devices at the regional or central site.

The PathBuilder S24x, 26x, and 27x switch supports both Frame Relay and X.25.

Meshed Cluster Application Support

A unique feature of the PathBuilder S24x, 26x, and 27x switch is its ability to support full meshed cluster applications. This functionality provides host site resiliency, port count extension, and multiple LAN connectivity.

Examples of how the features of the PathBuilder S24x, 26x, and 27x switch function in specific applications can be found the "Applications" section on page 1-3.

Figure 1-1 shows a PathBuilder S24x, 26x, and 27x switch.
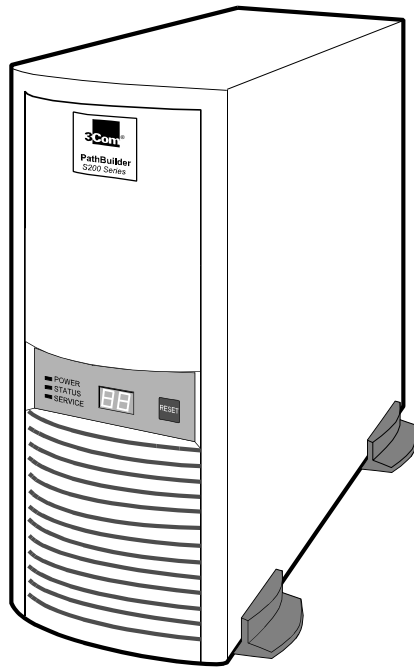
Figure 1-1. PathBuilder S24x, 26x, and 27x Switch

Applications

Introduction

This section briefly describes several application examples for the PathBuilder S24x, 26x, and 27x switch.

Performance Branch Nodes

Because of its high performance capabilities, the PathBuilder S24x, 26x, and 27x switch can be employed in a variety of branch node applications. For example, the PathBuilder S24x, 26x, and 27x switch can support a mix of voice and data types, traditional legacy (SDLC, X.25, Bisync, Async, etc.), and LAN. Because of its high throughput, the PathBuilder S24x, 26x, and 27x switch can be used in situations where large file transfers, fast response time, and high numbers of users are the norm. Figure 1-2 is an example of a typical branch node application.

Furthermore, the PathBuilder S24x, 26x, and 27x switch is designed to meet the needs of an expanding network. With its large RAM capacity and high-speed processor, the PathBuilder S24x, 26x, and 27x switch can easily adapt to a growing network with little or no additional hardware.
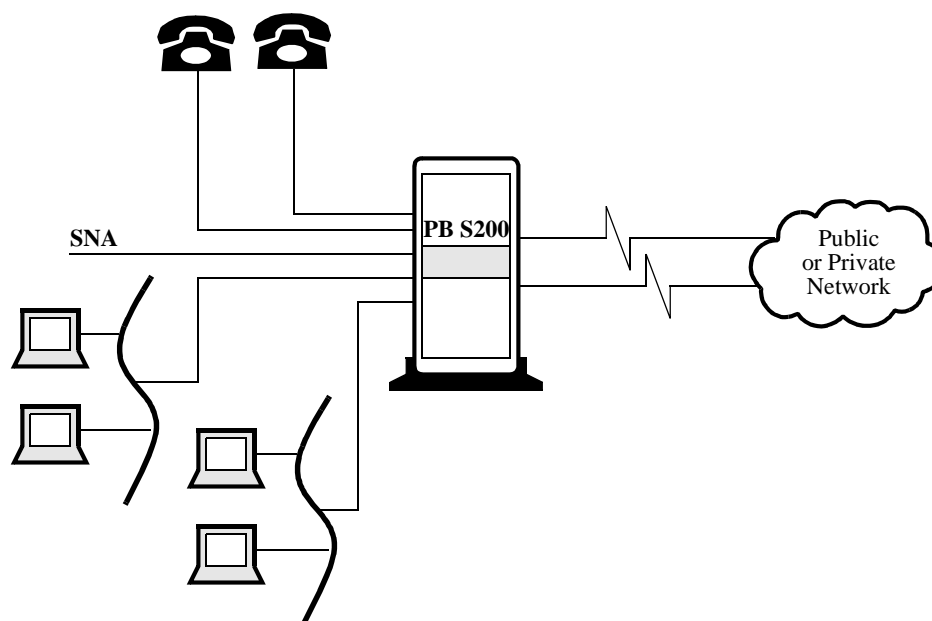
Figure 1-2. Performance Branch Node Example

Regional Concentrator	In Figure 1-3, the public network (Frame Relay/X.25) is performing the branch concentration function with the PathBuilder S24x, 26x, and 27x switch routing the traffic to the appropriate end point. In Figure 1-4, the PathBuilder S24x, 26x, and 27x switch acts as the regional concentrators, receiving traffic from dozens and even thousands of remote sites, and concentrating the traffic before forwarding it to the correct location. In this case, the PathBuilder S24x, 26x, and 27x switch is the regional site.

In both examples, the PathBuilder S24x, 26x, and 27x switch could be either a single node or a group of nodes networked together as a cluster. The PathBuilder S24x, 26x, and 27x switch's cluster feature is described below.
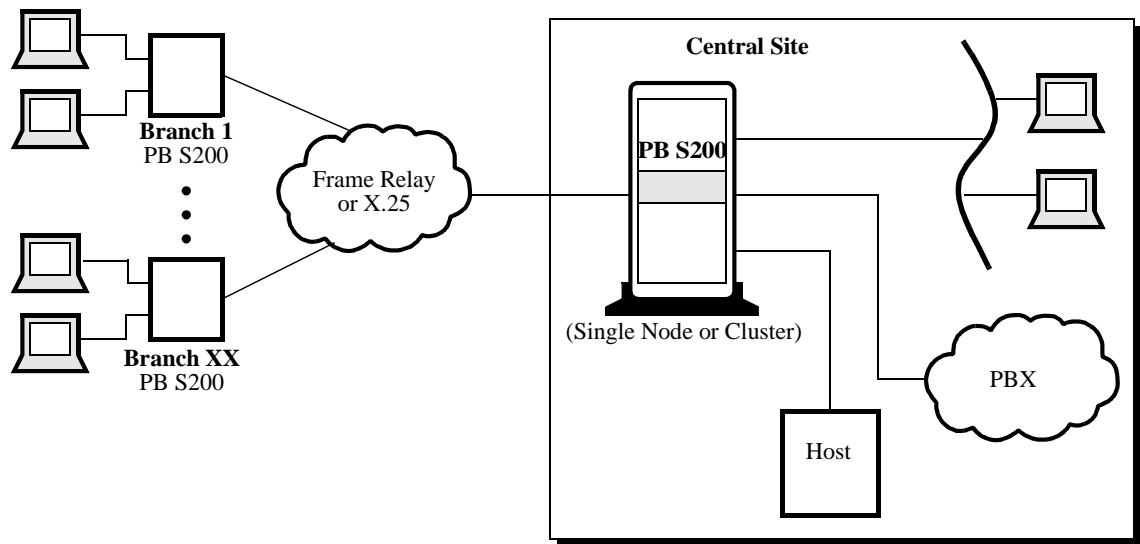
Figure 1-3. Regional Concentrator With Public Network Example
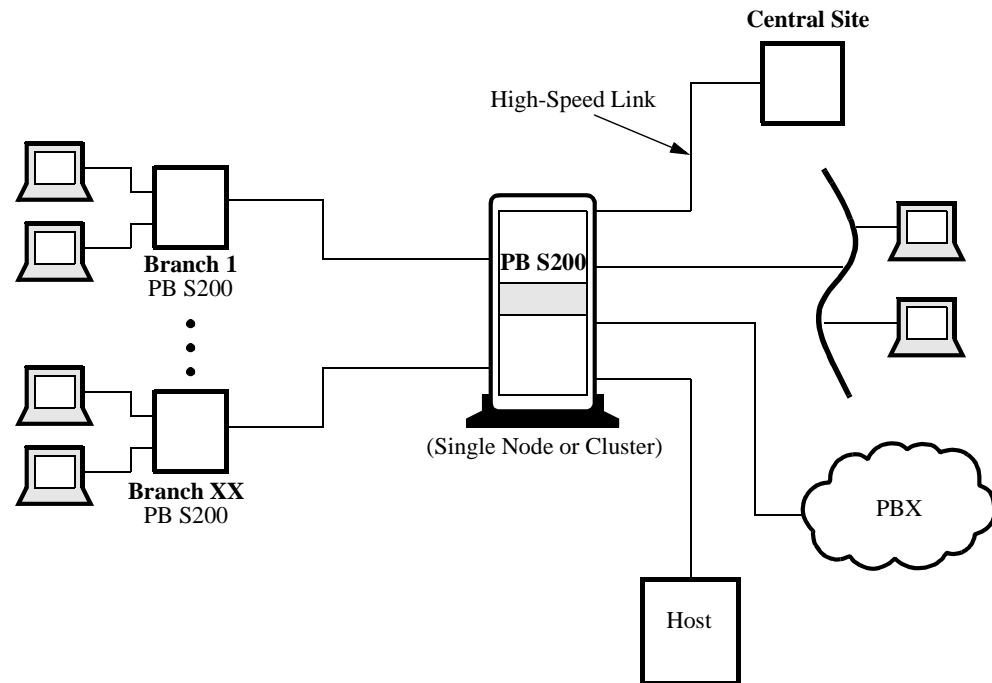
Figure 1-4. Regional Concentrator Example

Cluster Application An important new feature available with the PathBuilder S24x, 26x, and 27x switch is its use in a cluster. This allows as many as four PathBuilder S24x, 26x, and 27x switches to act a single unit for the purposes of connectivity. Though configured and managed as individual nodes, when the PathBuilder S24x, 26x, and 27x switches are clustered together, devices attached to access ports on one node can have calls routed out the network port of one of the other nodes.

The three high-speed ports on the PathBuilder S24x, 26x, and 27x switch motherboard provide networking channels between the nodes to pass traffic from network ports to access ports. The PathBuilder S24x, 26x, and 27x switch cluster allows for high port count and throughput primarily in support of the regional concentrator applications.

The example in Figure 1-5 is a full mesh cluster which means that any access link can reach any host connection. If a PathBuilder S24x, 26x, and 27x switch node within the cluster fails, only those links and host connections directly connected to that node go down. Placement of host equipment, and use of redundant host equipment can minimize the impact of any individual node failure. Furthermore, Link Back Up features in the remotes can limit the degree of remote isolation if part of the PathBuilder S24x, 26x, and 27x switch cluster fails.

16 Access Ports   16 Access Ports   16 Access Ports   16 Access Ports

PB S200   **PB S200**   **PB S200**   **PB S200**

**High-Speed Network Links to other Sites
or Backbone LAN Connectors**
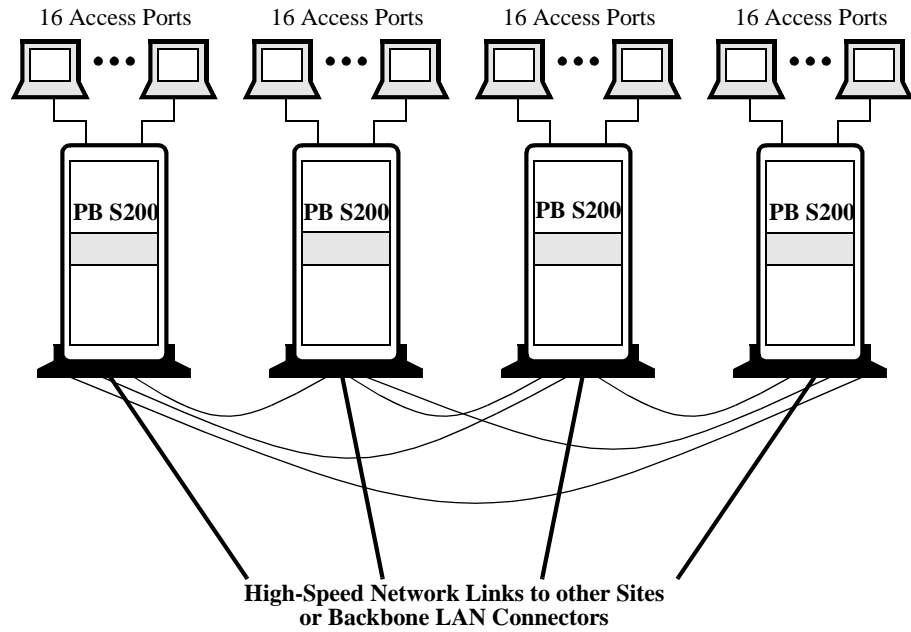
Figure 1-5. PathBuilder S24x, 26x, and 27x Switch Cluster Example

Features and Protocols

Description   For a complete listing of the features and protocols supported by your PathBuilder S24x, 26x, and 27x switch, refer to the Software Release Notice that came with the operating software.

Hardware Components

PathBuilder S24x, 26x, and 27x Switch Hardware Configuration

The PathBuilder S24x, 26x, and 27x switch comes in a rack-mountable configuration.

The switch contains a motherboard/CPU board, a built-in power supply, and an ISA bus for up to eight additional interface cards. The PathBuilder S24x, 26x, and 27x switch has three available serial ports, an Ethernet port, and a CTP port, FLASH memory, and battery-powered configuration backup. It is easily expanded by adding option cards to the industry standard ISA bus.

Figure 1-6 shows a rack-mountable PathBuilder S24x, 26x, and 27x switch.
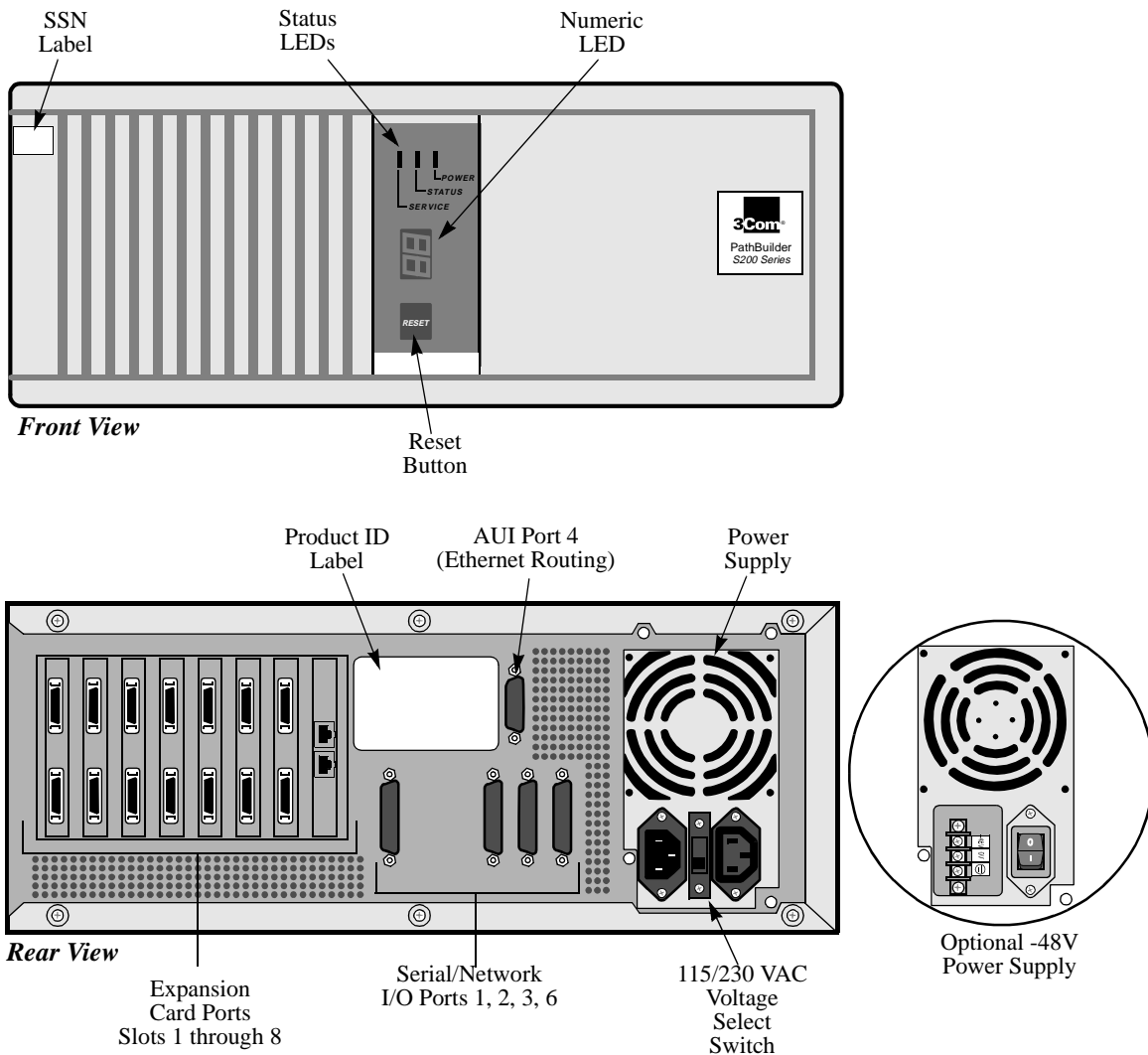
Figure 1-6. PathBuilder S24x, 26x, and 27x Switch

Hardware Components

This table lists and briefly describes the hardware components that make up the PathBuilder S24x, 26x, and 27x switch. More detailed descriptions of these components follow.

Component	*Description*
Enclosure	A rack-mount unit that contains all the PathBuilder S24x, 26x, and 27x switch processor cards.
Back Panel	Contains power outlets, power switch, communication ports, and slots for I/O cards.
Motherboard	Contains five data ports: • Ports 1 and 2 are DIM ports • Port 3 is a high-speed/V.36 DTE port • Port 4 is the Ethernet AUI port (see below for limitations) • Port 6 is reserved for the control terminal port Contains eight full-size expansion slots.
Integral DSU DIM (Optional)	An option used in installations requiring connection to a DDS interface conforming to AT&T 62310 or ANSI T1E1.4/91-006, and running at 56 kbps.
10Base2 Transceiver for AUI ports (optional)	Lets you accommodate different network configurations through the user-selectable Signal Quality Error (SQE) function.
T1 Dual Port Digital PBX Interface Card PathBuilder S24x, 26x, and 27x	The T1 dual port digital PBX interface card supports digital voice communications, providing integrated network access. The T1 digital interfaces are used for both voice and data traffic.
E1 Dual Port Digital PBX Interface Card	The E1 dual port digital PBX interface card supports digital voice communications, providing integrated network access (see Figure 1-12). The E1 interface card is used to support both voice and data traffic.
DSPM/SM	The DSPM/SM card, used at nodes with digital PBX interfaces, compresses four digital voice channels. It has no external I/O capabilities.
DSPM with FXS Analog Interface	The analog DSPM/FXS card allows the PathBuilder S24x switch to support up to two voice/fax channels per card. Each DSPM/FXS card occupies one ISA slot in the PathBuilder S24x switch.
DSPM with FXO Analog Interface	The analog FXO daughtercard (when mounted on the DSPM/HC) allows the PathBuilder S244 and S254 switch to support one voice/fax channel per card. Each DSPM/HX with FXO daughtercard combination occupies one ISA slot in the PathBuilder S244 and S254 switch.

Component	*Description* (continued)
DSPM with E&M Interface	The PathBuilder S26x switch Analog DSPM/E&M card allows the PathBuilder S26x switch to support up to two (2) voice/fax channels per card. Each E&M card occupies one ISA slot in the PathBuilder S26x switch. The PathBuilder S26x switch E&M card supports both two- and four-wire interfaces.

Ethernet Port 4 Limitations

Consider these limitations when using the Ethernet Port 4:

- The port does not support Bridging (refer to the *Bridging Option*, Part No. T0008-16). When configuring this port, you are not prompted for the bridge link number.
- The port does not support SLAC.
- When configuring the Ethernet Port 4, you are not prompted for the connector type. Ethernet Port 4 only supports AUI.

About the PathBuilder S24x, 26x, and 27x switch

Enclosure

Introduction

This section provides detailed information about the parts of the PathBuilder S24x, 26x, and 27x switch enclosure.

Front Panel

The PathBuilder S24x, 26x, and 27x switch front panel (see Figure 1-6) has:

- Three status LEDs
- A 2-character numeric LED display
- A RESET switch

Status LEDs

The three status LEDs are:

- Power (green) — When on, indicates that power is on and all DC voltages are within specifications.
- Status (green) — When on, indicates that the PathBuilder S24x, 26x, and 27x switch node is executing either a power-up diagnostic or a software download. This LED is normally off.
- Service (yellow) — When on, indicates a hardware failure. This LED is normally off.

Numeric LED Display

The 2-character numeric LED display provides system diagnostic codes. When the Service LED is on, a 2-digit code on the numeric LED display corresponds to a certain event.

Reset Switch

The RESET switch resets the node. Pressing the RESET switch is the equivalent of a power-up operation which clears all existing calls and brings down all links.

Power Supply

The power supply is mounted at the top rear of the chassis. The AC switchable power supply can operate at a nominal 110 or a nominal 230 Volts. For information about maintaining and replacing the power supply, refer to Chapter 4, Maintenance.

■**Note**

For this unit, the -48VDC Power Option is also available.

Motherboard

Parts of the Motherboard

This section describes some of the components that make up the PathBuilder S24x, 26x, and 27x switch motherboard. In addition, this section describes some of the daughtercards that can be found on the motherboard, shown in Figure 1-7.
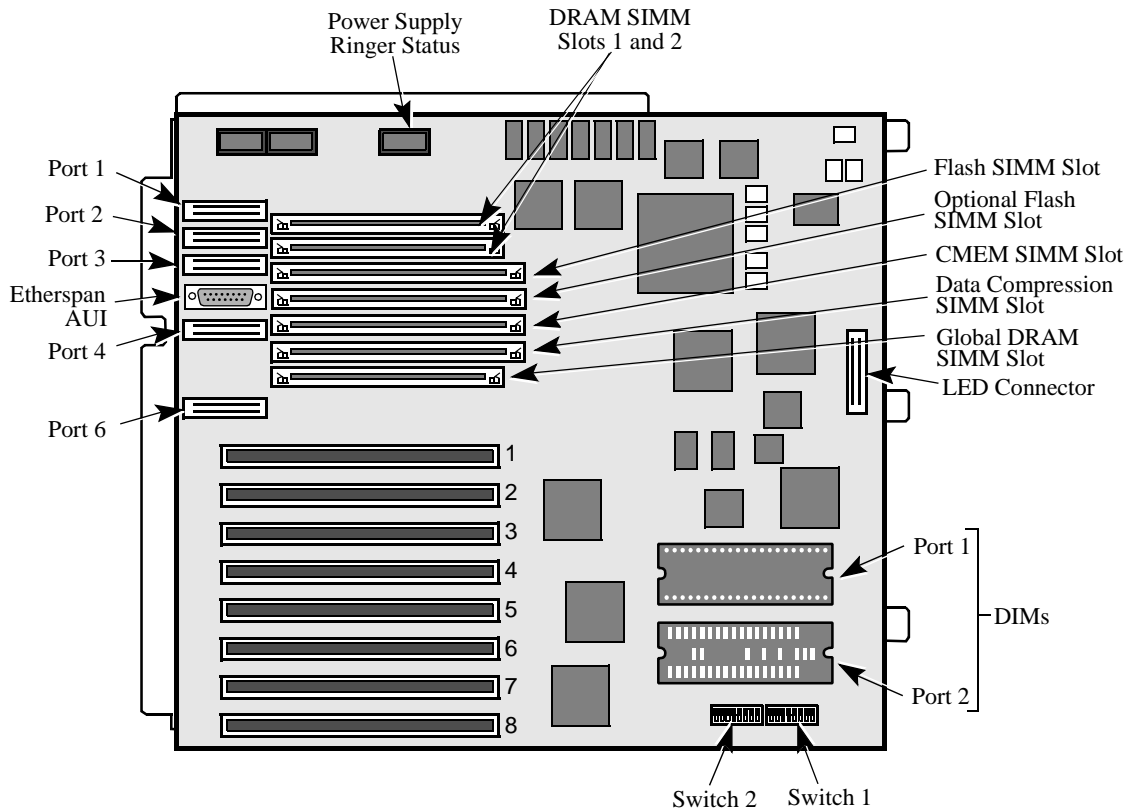
Figure 1-7. Motherboard

RAM

The PathBuilder S24x, 26x, and 27x switch comes standard with 16 Mbytes of local DRAM for image execution and 8 Mbytes of global memory for buffer storage.

Ports

There are four serial data port DB-25 connectors for network or access functions (2.048 Mbps):

- Ports 1 and 2 (DB 25) are Data Interface Module (DIM) ports
- Port 3 (DB 25) is a V.36 DTE port
- Port 4 (DB 15) is an Ethernet AUI port
- Port 6 (DB25) is the Control Terminal Port (EIA232)

FLASH SIMM

The FLASH Single In-line Memory Module (SIMM) holds a compressed image of the operating software. This module is electrically erasable and reprogrammable. An optional FLASH SIMM can be installed for backup. These modules are installed in one of the SIMM slots (1 or 2). Figure 1-8 shows the SIMM.
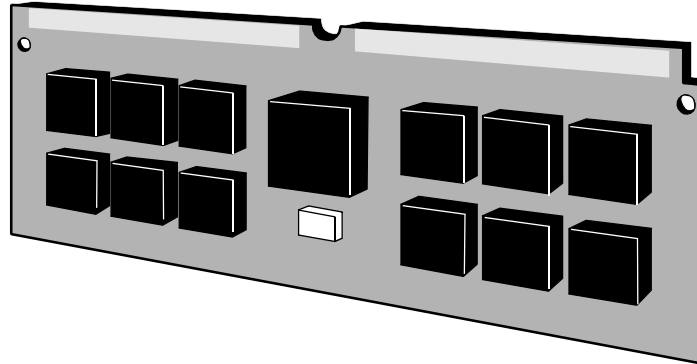
Figure 1-8. FLASH SIMM

■**Note**

The chips on your SIMM may vary from the one shown inFigure 1-8.

CMEM SIMM

The Configuration Memory Module (CMEM) SIMM has 512 Kbytes of memory and provides the real time clock function. The CMEM is backed up by a lithium battery in case of a power disruption.

Each PathBuilder S24x, 26x, and 27x switch has a Software Serial Number (SSN) burned into a PROM located on the CMEM card. This SSN is used to verify the software options that are enabled for that node. It is on the CMEM SIMM card for easy removal and replacement in case of a motherboard failure.

The CMEM is installed in the SIMM slot (see Figure 1-7 for slot location). Figure 1-9 shows the CMEM.

Warning

Only qualified service personnel should perform the procedure described in this section. If the battery is installed incorrectly, it could explode after the PathBuilder S200 series switch product is powered up, damaging the unit.

Avertissement

Seules des personnes qualifiées peuvent mettre en pratique les procédures décrites dans cette section. Si la batterie n'est pas correctement installée, elle risque d'exploser après la mise en marche du produit PathBuilder S200 series switch et d'endommager l'unité.

Warnung

Die in diesem Abschnitt aufgeführten Vorgänge sollten ausschließlich von qualifiziertem Servicepersonal durchgeführt werden. Wenn die Batterie unsachgemäß installiert wird, kann sie nach dem Einschalten des PathBuilder S200 series switch-Produkts explodieren

About the PathBuilder S24x, 26x, and 27x switch 1-13

Lithium Battery
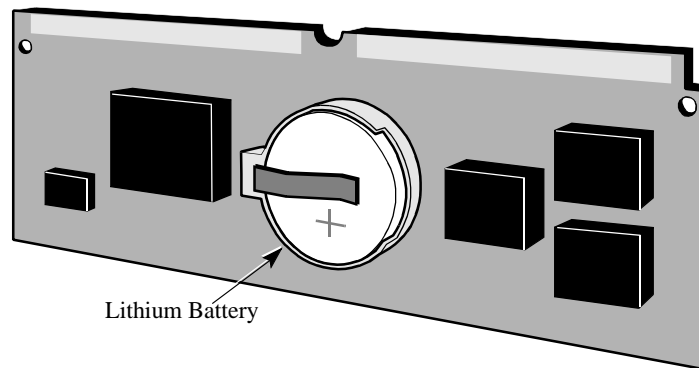
Figure 1-9. CMEM SIMM

Expansion Port I/O Slots

The PathBuilder S24x, 26x, and 27x switch motherboard has eight full-size expansion card slots (see Figure 1-6). Expansion I/O cards have I/O connectors that extend through the rear panel.

Port numbers for the ports on the I/O cards have a fixed relationship to the chassis expansion slot number. Six port numbers are reserved for each slot. If a slot contains an I/O card that does not support the full port count reserved for that slot, or the slot is empty, the extra port numbers remain unused.

Slot Number and Port Numbers

This table shows the port numbers associated with each card type.

Slot Number	*Port Number*	*Associated Card*
Motherboard I/O	1-6	Motherboard
1	7-12	Voice cards (E & M, FXS, Server Module, T1, E1). The T1/E1 is restricted to Slot 8.
2	13-18	
3	19-24	
4	25-30	
5	31-36	
6	37-42	
7	43-48	
8	49-54	

Description of Serial/Network Ports

Ports 1 through 3 are connected to the motherboard with ribbon cables. Ports 1 and 2 are DIM ports and are functional only if a DIM is present. Port 3 is a dedicated V.36 DTE port.

Ports 1, 2, 3, and 6 on the rear panel of the chassis are DB-25 female connectors. Port 4, (the Ethernet AUI port) uses a DB-15 connector. Ports 1 and 2 may require adapters, depending on the DIM used. An adapter cable is available for Port 3.

How Ports Are Used

The following table describes how the ports are used.

Port Number	Use
1, 2, and 3	Recommended for network port connection or cluster connectivity. Ports 1 and 2 have variable interfaces, depending on the DIMs.
4	Ethernet AUI port for routing applications.
6	Control Terminal Port (CTP). When operating as an asynchronous interface, it can support data rates up to 115.2 kbps. Default CTP configuration parameters are 9600 baud, 8-bit characters, 1 stop bit, no parity. This is an EIA 232-D DCE port using a DB-25 connector.

DIMs without a Cable Adapter

Ports 1 and 2 support a DSU DIM without the use of cable adapters.

DIMs with a Cable Adapter

If cable adapters are used, Ports 1 and 2 can support the following DIMs:

- High Speed (V.36)
- V.35
- V.11/ISO-4903

Each DIM port can be configured independently of the other port. For example, you can install: two V.35 DIMs; one V.35 DIM and one V.11 DIM; or two V.11 DIMs.

The cable adapter pinouts are described in Appendix A, Cables.

Back Panel

Back Panel Components

The components of the back panel are:

- **Serial/Network I/O Ports**. Ports 1, 2, 3, and 6 are DB-25 connectors. Port 4 is a DB 15 connector.
- **AC Power Supply**. The rear of the Power Supply has two (male and female) power source connectors (one is for connection to an AC source and the other is an AC outlet) along with a selectable 115 VAC or 230 VAC switch. For most international usage, the switch must be set for 230 VAC.
- **DC Power Supply.** The unit can be shipped with the -48VDC Power Option. The terminal block of the -48VDC has 5 screws. The two outermost screws are for attachment. The negative wire terminal is second from the left; the positive wire terminal is in the middle; the ground is second from the right.
- **Expansion Card Ports**. The expansion card ports differ depending on what card is installed in that slot.

Figure 1-10 shows the PathBuilder S24x, 26x, and 27x switch back panel.
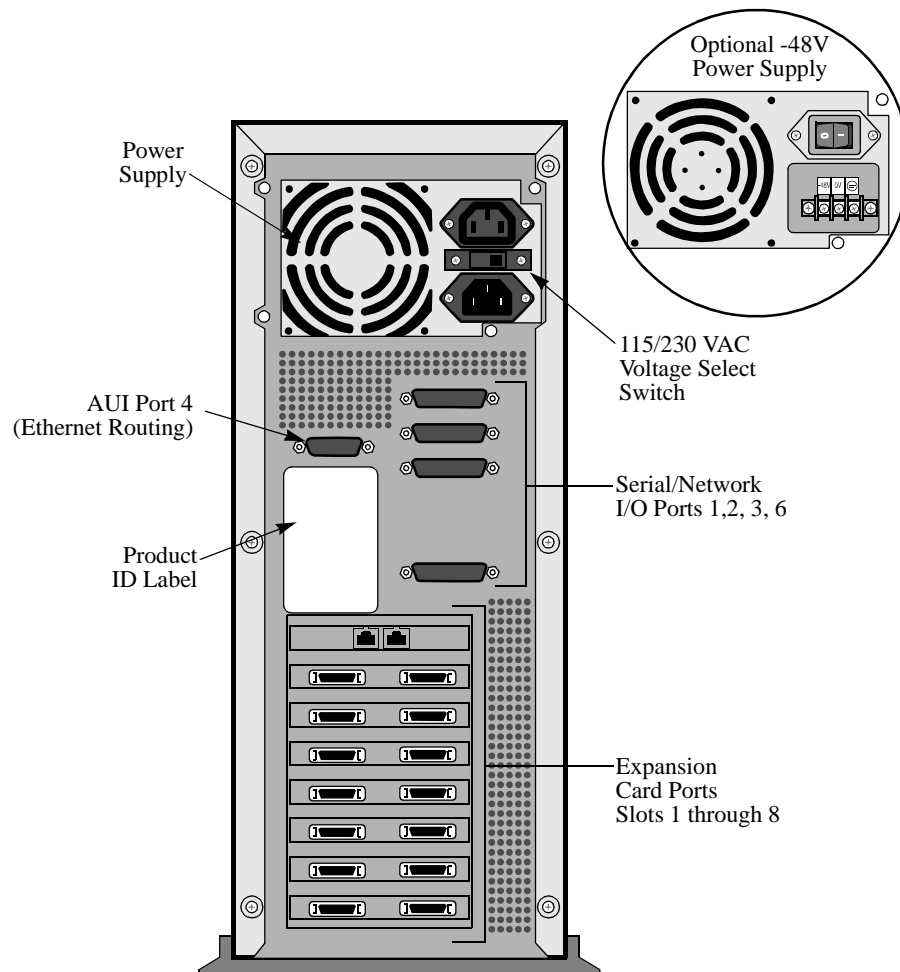
Figure 1-10. PathBuilder S24x, 26x, and 27x Switch Back Panel

About the PathBuilder S24x, 26x, and 27x switch

TI Dual Port Digital PBX Interface Card

Introduction
The T1 dual port digital PBX interface card supports digital voice communications, providing integrated network access. The T1 interface card is installed primarily in North America and Japan. A 2-megabyte T1 card is required for passing data and voice traffic.

Figure 1-11. T1 Dual Port Digital PBX Interface Card

Description
Each T1 dual port digital PBX interface card uses an Industry Standard Architecture (ISA) bus interface and a Multi-Vendor Integration Protocol (MVIP) bus interface. The MVIP bus interface provides multiplexed digital access within the PathBuilder S24x, 26x, and 27x switch chassis.

Function
T1 dual port digital PBX interface cards provide the digital interfaces for connections to a PBX. The T1 dual port digital PBX interface cards bring PCM voice and channel signaling into the node. The PCM voice data and voice signaling is routed to a DSPM/SM card over the MVIP bus for compression and transmission to the remote end.

Slot Restriction	The T1 dual port digital PBX interface card occupies slot 8 in the PathBuilder S24x, 26x, and 27x switch chassis.
DIP Switch Location	The T1 dual port digital PBX interface card contains a single DIP switch bank (SW1) used to assign the card's I/O base address.
DIP Switch Settings	Set the DIP switches on the T1 dual port digital PBX interface card as shown in Figure 1-11.
T1/CSU Daughter Card	The T1/CSU Daughtercard provides a 1.544 MHz point-to-point interface for North American service that conforms to AT&T 62411/62421 standard. The card is FCC Part 68 Registered and uses eternal clocking derived from the telephone network.
	One or two T1/CSU Daughter Cards can be installed onto the T1 Dual Port card. The top card supports port 49 and the bottom supports port 50.
	For instructions for installing the T1/CSU card, refer to "Installing the T1/CSU Daughter Card" section in Chapter 3.
Required Cables	These cables ship with the T1 dual port digital PBX interface card and are required to cable the T1 dual port digital PBX interface card to the DSPM/SM cards in the node.

Cable Description	*Function*
One 4-position 40-pin MVIP ribbon cable	Connects up to 3 DSPM/SM cards to interconnect digital voice traffic between individual cards in the same PathBuilder S24x, 26x, and 27x switch node.
One 8-position 40-pin MVIP ribbon cable	Connects 4 or more DSPM/SM cards to interconnect digital voice traffic between individual cards in the same PathBuilder S24x, 26x, and 27x switch node.
Two 8-pin modular to DB15 cables	3-ft adapter converter cables used to convert the 8-pin modular connector on the front of the T1/E1 card to a DB15 connector (Product Code 17269).

LED Status Indicators

The T1 dual port digital PBX interface card contains four LEDs that can be viewed through the rear bracket.

LED	Color	LED is...	...Indicating
Port 49		OFF	Normal operation
	Yellow	ON	Carrier failure on Port 49span
Port 50		OFF	Normal operation
	Yellow	ON	Carrier failure on Port 50 span
RUN		OFF	Card failure
	Green	ON	Card Active
SYSFAIL		OFF	Normal operation
	Yellow	ON	Card failure

E1 Dual Port Digital PBX Interface Card

Introduction
The E1 dual port digital PBX interface card supports digital voice communications, providing integrated network access (see Figure 1-12). The E1 interface card is installed primarily in Europe and South America. A 2-megabyte E1 card is required for passing data traffic and voice traffic.
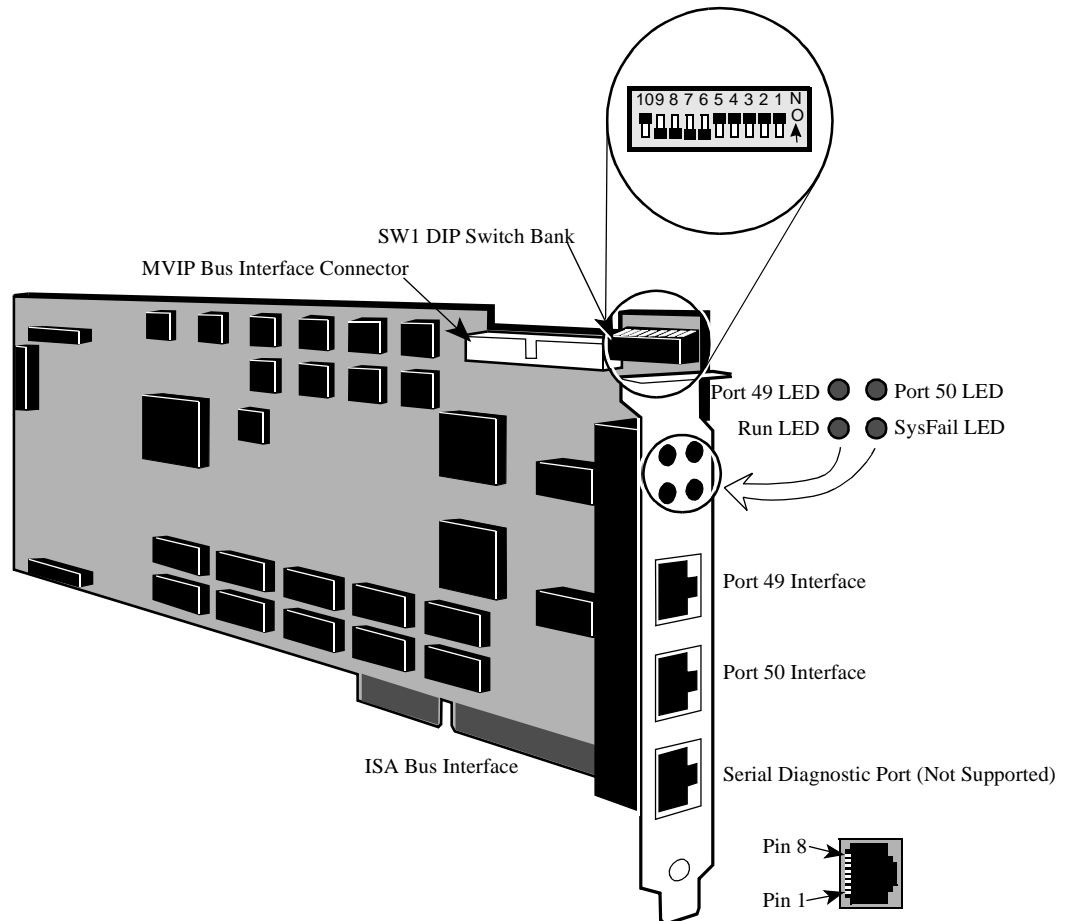
Description
Each E1 dual port digital PBX interface card uses an Industry Standard Architecture (ISA) bus interface and a Multi-Vendor Integration Protocol (MVIP) bus interface. The MVIP bus interface provides a multiplexed digital access within the PathBuilder S24x, 26x, and 27x switch chassis.

The E1 dual port digital PBX interface card has two E1 ports (CAS signaling only), handles E1 lines with or without CRC4, and supports 120Ω and 75Ω (with the addition of an optional cable). The interface type is 8-pin modular.

Function
E1 dual port digital PBX interface cards provide the digital interfaces for connections to a PBX. The dual port digital PBX interface cards bring PCM voice and channel signaling into the node. The PCM voice data and voice signaling is routed to a DSPM/SM card over the MVIP bus for compression and transmission to the motherboard.

Slot Restriction
The E1 dual port digital PBX interface card can only occupy slot 8 in the PathBuilder S24x, 26x, and 27x switch chassis.

E1 Dual Port Digital PBX Interface Card Illustration

Figure 1-12 shows an example of the E1 dual port digital PBX interface card.
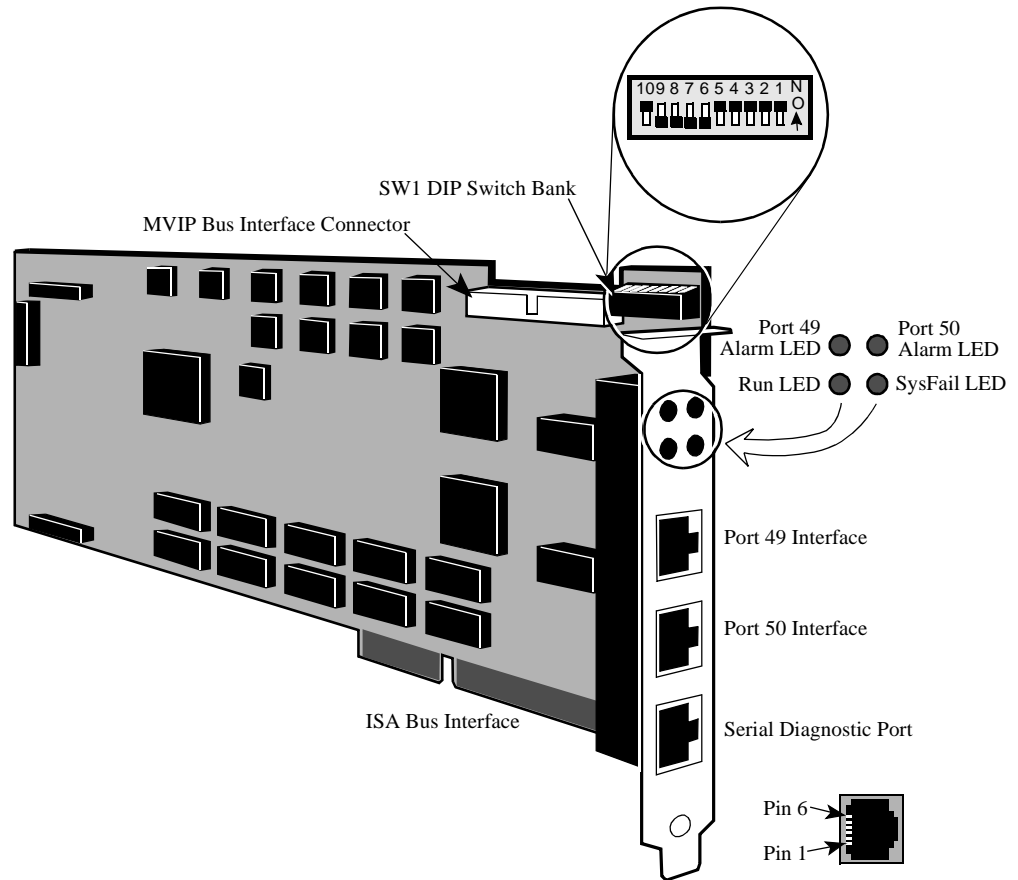
Figure 1-12. E1 Digital PBX Interface Card

DIP Switch Location

The E1 dual port digital PBX interface card contains a single DIP switch bank (SW1) used to assign the card's I/O base address.

DIP Switch Settings

Set the switches as shown in Figure 1-12.

Required cables   The following cables, including two pigtail cables, ship with the E1 dual port digital PBX interface card and are required to cable the E1 card to the DSPM/SM cards in the PathBuilder S24x, 26x, and 27x switch node.

Cable Description	Function
One 4-position 40-pin MVIP ribbon cable	Connects up to three DSPM/SM cards to interconnect digital voice traffic between individual cards in the same PathBuilder S24x, 26x, and 27x switch node.
One 8-position, 40-pin MVIP ribbon cable	Connects four or more DSPM/SM cards to interconnect digital voice traffic between individual cards in the same PathBuilder S24x, 26x, and 27x switch node.
Two 8-pin modular to DB15 cables	For 120Ω connection.
Two 8-pin modular to BNC cables	For 75Ω connection.

LED Status Indicators   The E1 dual port digital PBX interface card contains four LEDs that can be viewed through the rear bracket:

LED	Color	LED is...	...Indicating
Port 49	Yellow	OFF	Normal operation
		ON	Carrier failure on Port 49 span
Port 50	Yellow	OFF	Normal operation
		ON	Carrier failure on Port 50 span
RUN	Green	OFF	Card failure
		ON	Microprocessor Activity
SYSFAIL	Yellow	OFF	Normal operation
		ON	Card failure

DSPM/SM Card

Introduction   The Digital Signal Processing Module/Server Module (DSPM/SM) supports T1 or E1 dual port digital PBX interface cards.

Description   The DSPM/SM card, used at nodes with digital PBX interfaces, compresses four digital voice channels. It has no external I/O capabilities.

Function   PCM voice and voice signaling, brought into the PathBuilder S24x, 26x, and 27x switch node by the T1/E1 cards, is routed to a DSPM/SM card over the MVIP bus for compression and transmission to the remote end.

When You Receive the Card   When you receive a DSPM/SM card, do the following:.

Step	*Action*
1	Remove the card from the packing material.
2	Inventory the contents of the shipping container. ■ **Note** No cables are shipped with the DSPM/SM card. The appropriate Multi-Vendor Integration Protocol 40-pin ribbon cable and other cables ship with the T1 or E1 dual port digital interface cards.
3	Power off the PathBuilder S24x, 26x, and 27x switch node.
4	Install the card into the PathBuilder S24x, 26x, and 27x switch node.
5	Cable the card to the T1 or E1 dual port digital interface cards as required.

DSPM/ SM Card Illustration	Figure 1-13 shows an example of the DSPM/SM card.

MVIP Bus Interface Connector

Installed

MVIP Clock Termination Jumpers

Not Installed

DPSM SM
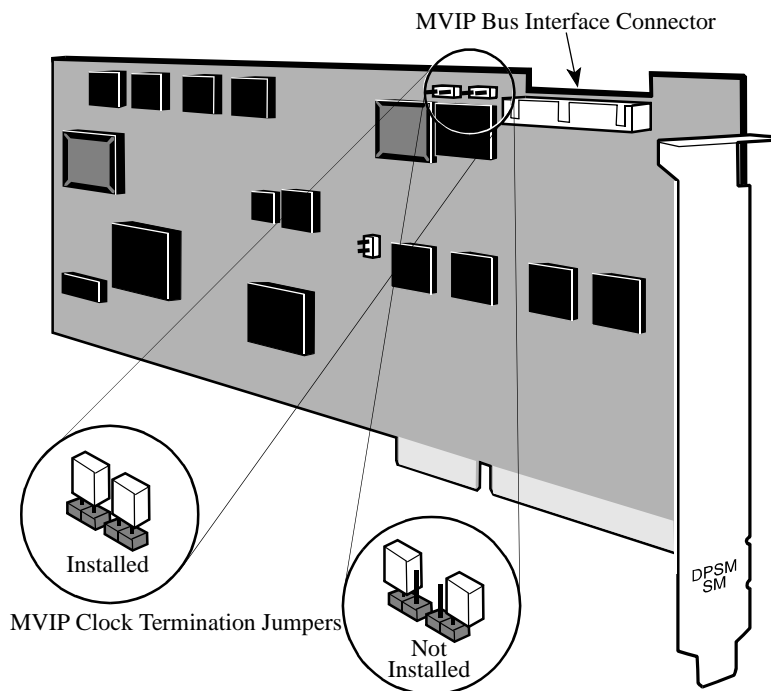
Figure 1-13. DSPM/SM Card

Jumper Locations	Figure 1-13 shows the location of jumpers on the DSPM/SM card that terminate the Multi-Vendor Integration Protocol clock.

Installing Jumpers	Figure 1-13 shows how to install the jumpers on the DSPM/SM card to terminate the Multi-Vendor Integration Protocol clock.

The DSPM/SM card with the jumpers set to the installed position must be located furthest from the T1 or E1 card as shown in Figure 1-14 (the T1/E1 card is always located in slot 8). All other DSPM/SM cards must have their jumpers in the "not installed" position.

Cables Required   No cables ship with the DSPM/SM card; however, the DSPM/SM card must be cabled to the T1 or E1 dual port digital interface using a Multi-Vendor Integration Protocol 40-pin ribbon cable, as Figure 1-14 shows.

To support 12 voice channels, for instance, you need three DSPM/Server Module cards.

Note: The DSPM/SM card with the jumpers set to the installed position must be located furthest away from the E1 or T1 card, the top card, as shown in this figure.

MVIP 4-Position Cable

DSPM/SM

T1 or E1
Restricted to Slot 8
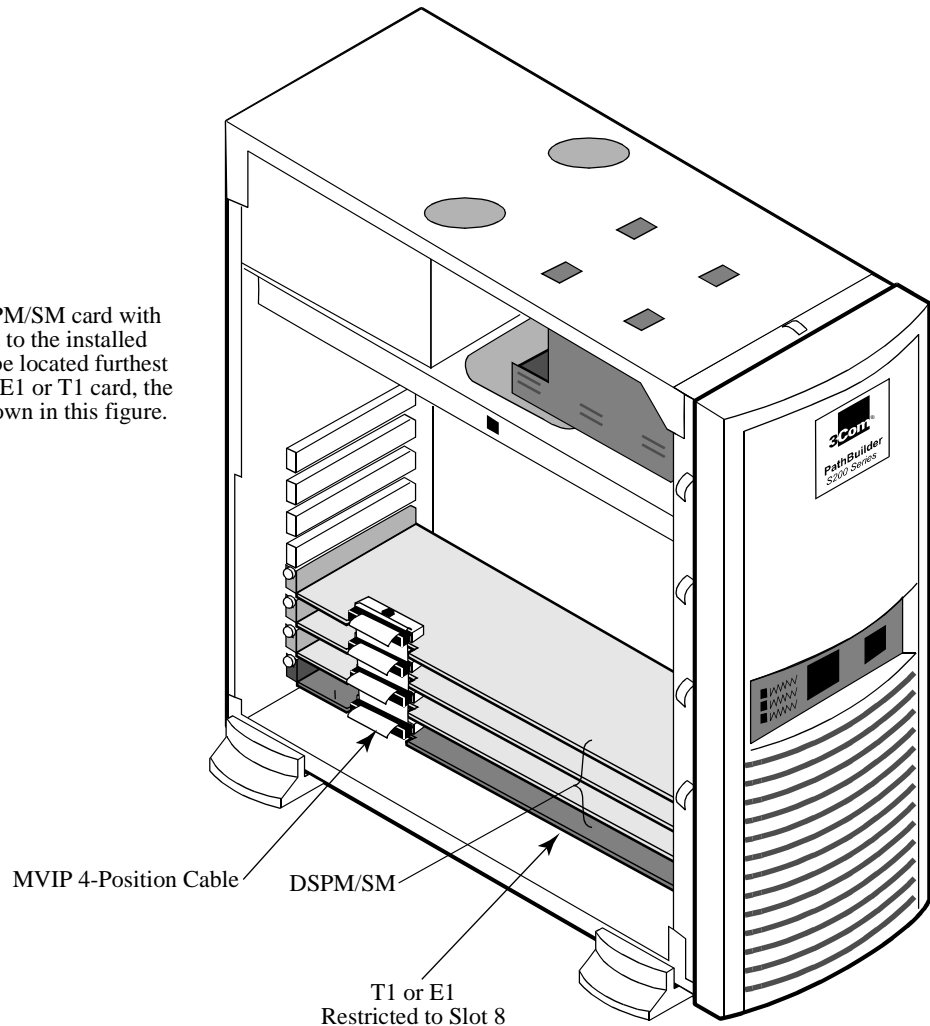
Figure 1-14. Cabling T1/E1 Card to DSPM/SM Cards

DSPM Card with Analog E&M Interface

Introduction
The DSPM/E&M card supports two analog E&M interface voice channels.

Description
The Analog DSPM/E&M card allows the PathBuilder S24x, 26x, and 27x switch to support up to two (2) voice/fax channels per card. Each E&M card occupies one ISA slot in the PathBuilder S24x, 26x, and 27x switch. The PathBuilder S24x, 26x, and 27x switch E&M card supports both two- and four-wire interfaces.

Function
The DSPM/E&M card allows a PBX to attach to one of its two connectors.

-48V Ringer/ Power Supply Card Required
The DSPM/E&M card requires installation of a -48V ringer/power supply card and enclosure into the PathBuilder S24x, 26x, and 27x switch node to support interface types II, III, and V.

Interface type I does not require a -48V ringer/power supply.

Cables Required
The DSPM/E&M interface card requires a -48V ringer/power supply cable to support interface types II, III, and V.

The -48V ringer/power supply cable connects up to six DSPM cards to the power supply. The cable ships with the -48V ringer/power supply.

For details on how to cable the DSPM card to the -48V ringer/power supply, refer to the "-48V Ringer/Power Supply Card and Enclosure" section on page 1-53.

When You Receive the Card
When you receive a DSPM/E&M card, do the following:

Step	Action
1	Remove it from the packing material.
2	Inventory the contents of the shipping container. ■ **Note** No cables are shipped with the DSPM/E&M card. The appropriate 6-position power cable and status cable ship with the -48V ringer/power supply card that must be used in conjunction with the DSPM/E&M card.
3	Set jumpers as required.
4	Power off the node.
5	Install the card into the PathBuilder S24x, 26x, and 27x switch node.
6	Cable the card to the -48V ringer/power supply as required.

DSPM/E&M Card Illustration

Figure 1-15 shows an example of the DSPM card with an analog E&M interface.

MVIP Clock Termination Jumpers (Not Used)

-48V Power Supply Connector

Port 1

2-or 4-wire Jumpers

Port 2

Complex Impedance Jumpers

DSPM/EM

Port 1 RM (Remote Busy)

Port 1 LC (Local Busy)

Port 2 RM (Remote Busy)

Port 2 LC (Local Busy)

Pin 8

Pin 1
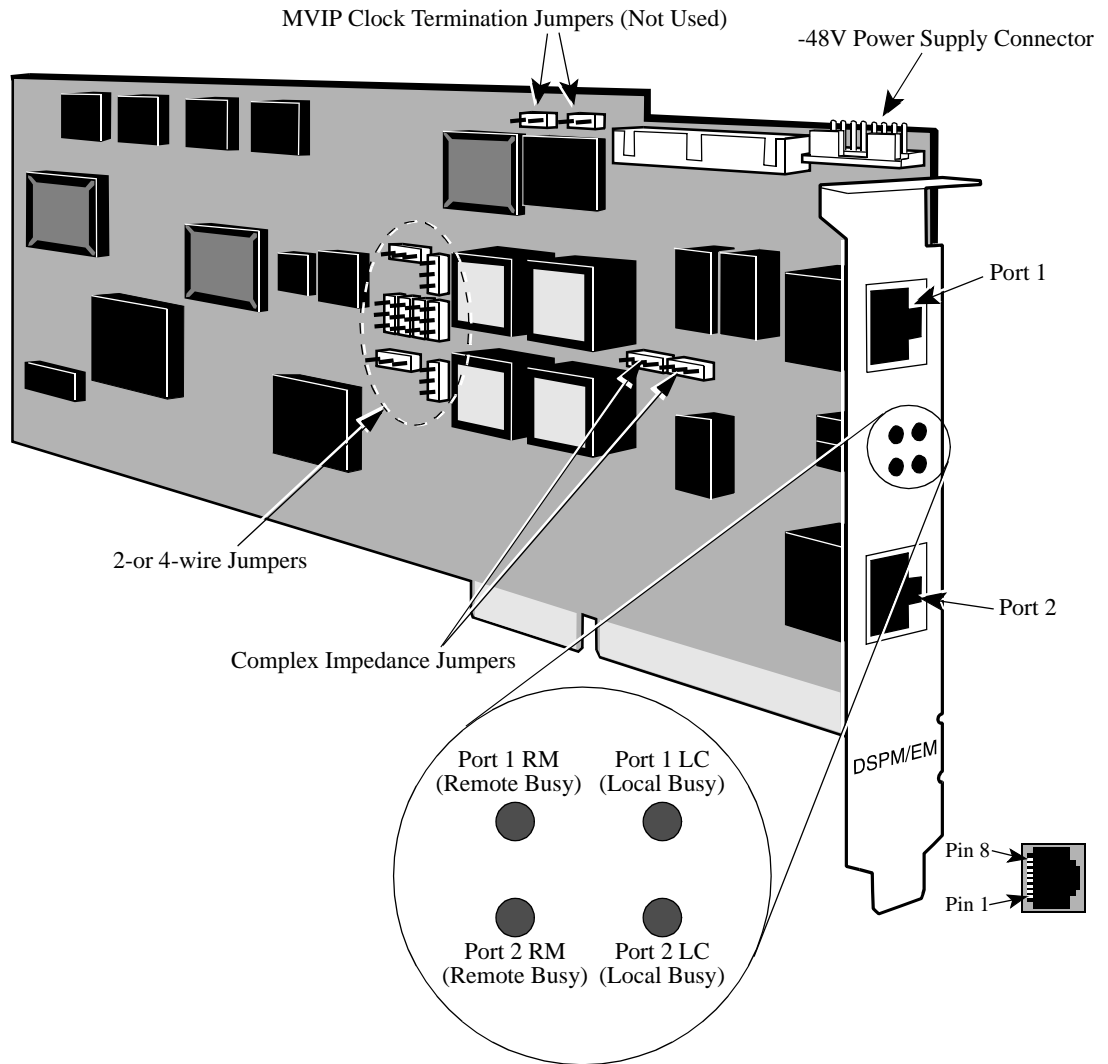
Figure 1-15. DSPM/E&M Card

LEDs

The card contains four LEDs that can be viewed through the rear bracket.

LED	*Color*	*LED is...*	*...Indicating*
Port 1 Local Busy	Green	On Off	local physical connection is active (offhook) local physical connection is idle (onhook)
Port 1 Remote Busy	Green	On Off	remote end is active (offhook) remote end is idle (onhook)
Port 2 Local Busy	Green	On Off	local physical connection is active (offhook) local physical connection is idle (onhook)
Port 2 Remote Busy	Green	On Off	remote end is active (offhook) remote end is idle (onhook)

Setting Jumpers for DSPM Card with Analog E&M Interface

Introduction The DSPM/EM card has a total of 12 jumpers that you can set for various applications if required:

- Ten jumpers for two- or four-wire operation
- Two jumpers for MVIP clock termination (not used at present)

Default Jumper Settings The DSPM/EM card ships from the factory with the ten jumpers for two- or four-wire operation set to four-wire.

Jumper Definitions Jumpers J11 through J15 are associated with Port 1.

Jumper Number	4-Wire/600	2-Wire/600	2-Wire/UK Complex	2-Wire/ Germany Complex
J11	600	600	COM	COM
J12	4W	2W	2W	2W
J13	Don't Care (Default Germany)	Don't Care (Default Germany)	UK	Germany
J14	600	600	COM	COM
J15	4W (removed)	2W (installed)	2W (installed)	2W (installed)

Jumpers J21 through J25 are associated with Port 2.

Jumper Number	4-Wire/600	2-Wire/600	2-Wire/UK Complex	2-Wire/ Germany Complex
J21	600	600	COM	COM
J22	4W	2W	2W	2W
J23	Don't Care (Default Germany)	Don't Care (Default Germany)	UK	Germany
J24	600	600	COM	COM
J25	4W (removed)	2W (installed)	2W (installed)	2W (installed)

Complex Impedance for UK and Germany

Setting jumpers for two-wire UK complex and two-wire Germany complex impedance as noted in the "Jumper Definitions" section above, matches the impedance required in each country, respectively. Refer to Figure 1-15 and Figure 1-17.

Figure 1-16. UK Complex Impedance

Figure 1-17. Germany Complex Impedance

Jumper Locations   Set the jumpers to the positions as shown in Figure 1-18.
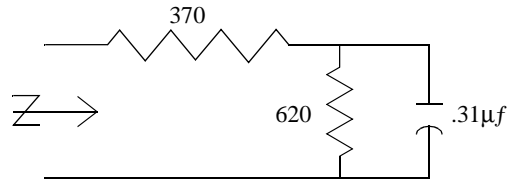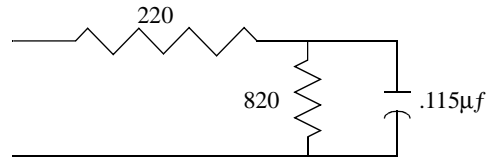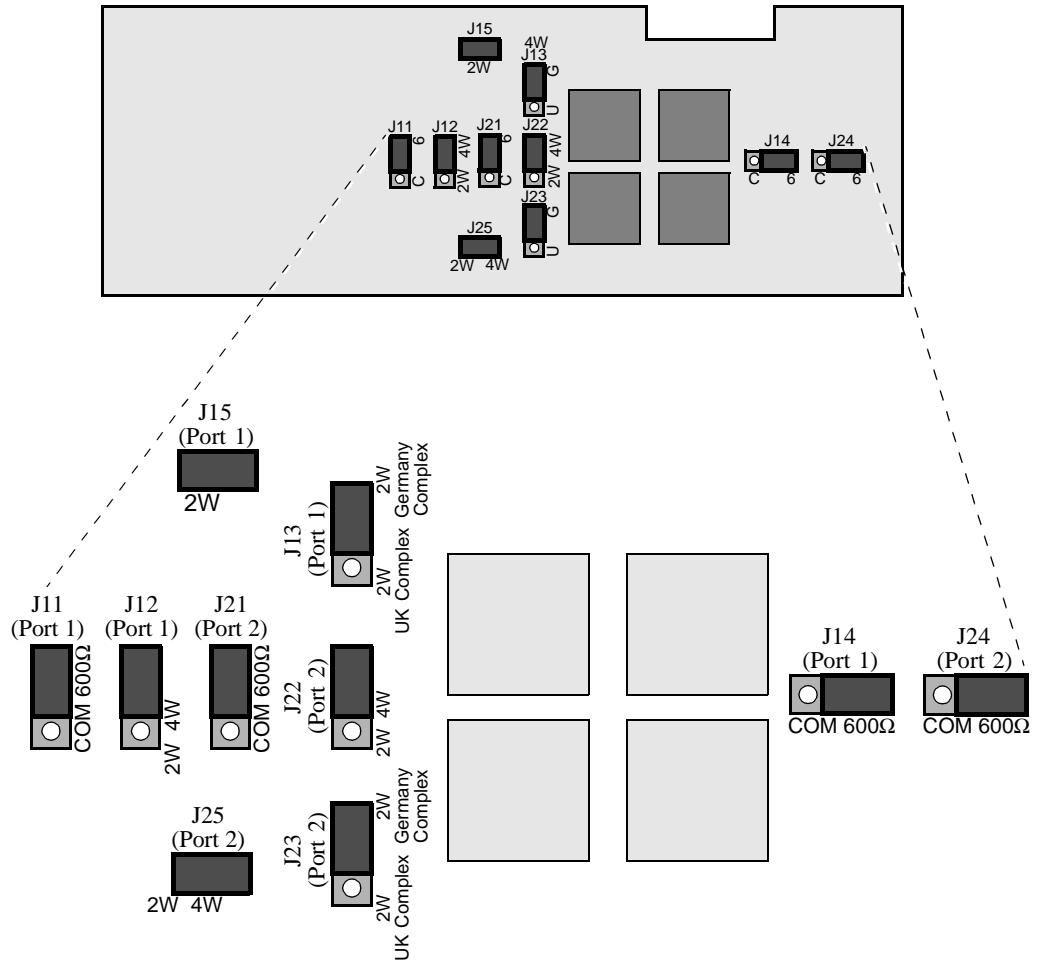

Figure 1-18. Jumper Locations for DSPM E&M Card

Installing Jumpers   Figure 1-19 illustrates how to install two- or four-wire jumpers into proper position.
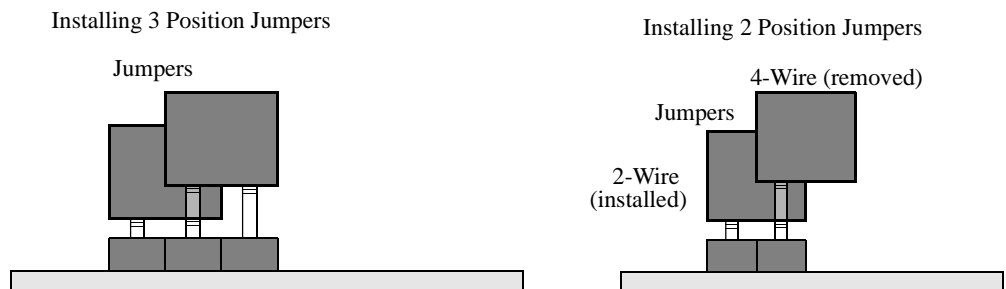
Figure 1-19. Installing Jumpers

DSPM Card with FXS Analog Interface

Introduction   The Analog DSPM/FXS (Foreign Exchange Station) card supports two analog FXS interfaces.

Description   The analog DSPM/FXS card allows the PathBuilder S24x, 26x, and 27x switch to support up to two voice/fax channels per card. Each DSPM/FXS card occupies one ISA slot in the PathBuilder S24x, 26x, and 27x switch.

Function   The FXS interface provides a ringing voltage which alerts a station of an incoming call's -48V to power the phone/fax, and its -48V loop current detector to detect when the station goes off hook. As a result, an analog DSPM card with an FXS interface allows a telephone set, fax machine, or telephone key set to attach to one of its two connectors.

When You Receive the Card   When you receive a DSPM/FXS card, do the following:.

Step	Action
1	Remove the card from the packing material.
2	Inventory the contents of the shipping container. ■ **Note** No cables are shipped with the DSPM/FXS card. The appropriate 6-position power cable and status cable ship with the -48V ringer/power supply card that must be used in conjunction with the DSPM/FXS card.
3	Power off the PathBuilder S24x, 26x, and 27x switch node.
4	Install the card into the PathBuilder S24x, 26x, and 27x switch node.
5	Cable the card to the -48V ringer/power supply as required.

-48V Ringer/Power Supply Required   The DSPM/FXS card requires installation of a -48V ringer/power supply card and enclosure into the PathBuilder S24x, 26x, and 27x switch node. Refer to the "-48V Ringer/Power Supply Card and Enclosure" section on page 1-38.

Cables Required   The DSPM/FXS interface card requires a -48V ringer/power supply cable, which can attach up to two DSPM/FXS cards to the power supply. The cable ships with the -48V ringer/power supply card and enclosure.

For details concerning how to install and cable the DSPM card to the -48V ringer/power supply card and enclosure, refer to the "-48V Ringer/Power Supply Card and Enclosure" section on page 1-38.

DSPM/FXS Card Illustration

Figure 1-20 shows an example of the DSPM card with an analog FXS interface.

MVIP Clock Termination
Jumpers (Not Used)

-48V Power Supply
Connector

Port 1

Port 2

DSPM/FXS

Port 1 RM
(Remote Busy)

Port 1 LC
(Local Busy)

Port 2 RM
(Remote Busy)

Port 2 LC
(Local Busy)

Pin 6

Pin 1
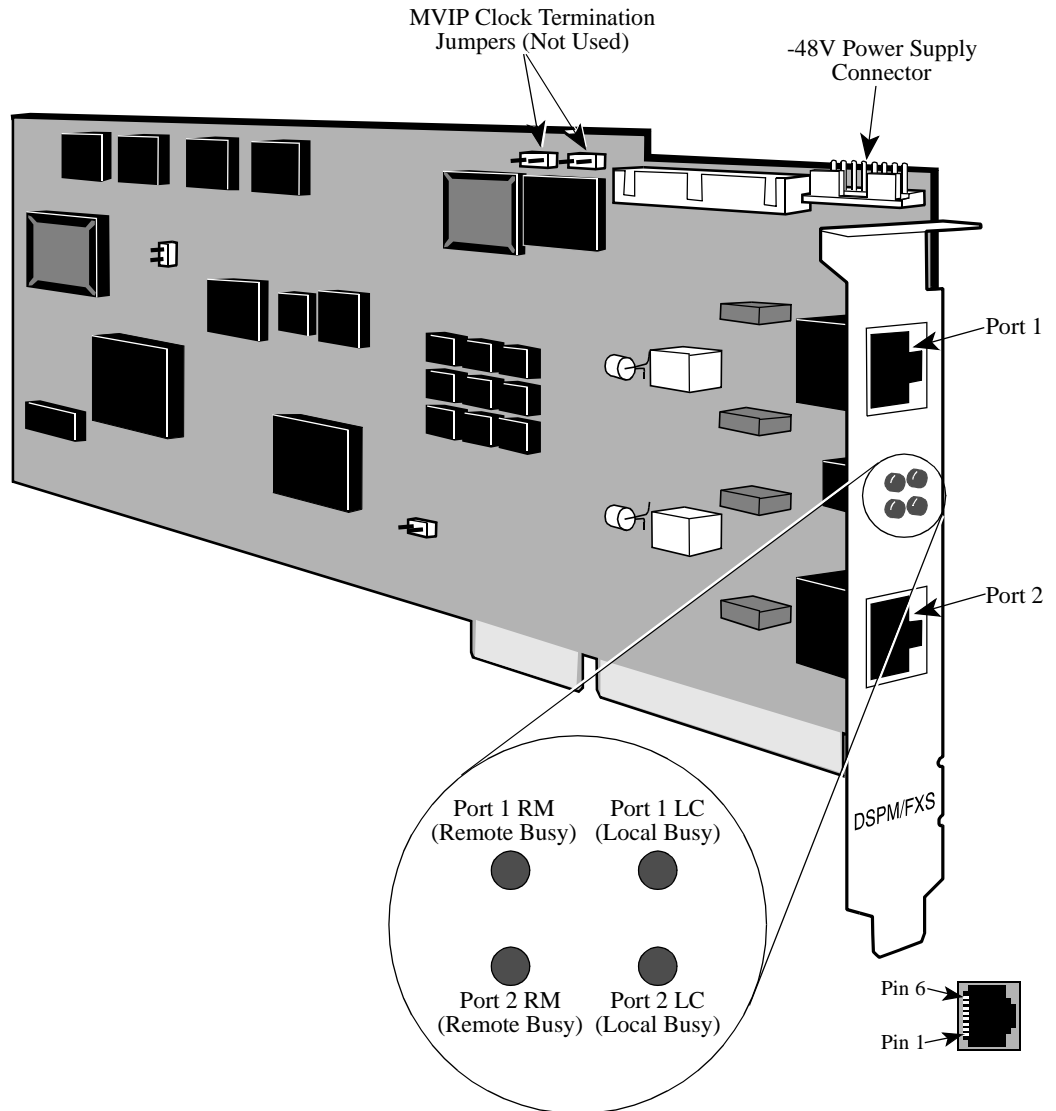
Figure 1-20. DSPM Card with Analog FXS Interface

LEDs	The card contains four LEDs that can be viewed through the rear bracket.

LED	*Color*	*LED is...*	*...Indicating*
Port 1 Local Busy	Green	On Off	local physical connection is active (offhook) local physical connection is idle (onhook)
Port 1 Remote Busy	Green	On Off	remote end is active (offhook) remote end is idle (onhook)
Port 2 Local Busy	Green	On Off	local physical connection is active (offhook) local physical connection is idle (onhook)
Port 2 Remote Busy	Green	On Off	remote end is active (offhook) remote end is idle (onhook)

Jumper Locations	The DSPM/FXS interface card has no jumpers that must be set.

For Australian Users	Only 3Com approved engineering staff can install and program this card. The QDU rating for the voice compression algorithm used by this equipment is:

     * 8k 4.5 QDU
     * 16k 2.63 QDU

The total number of QDU in any application must *be* managed according to the guidelines in the *Private Network Design Guide* published by Standards Australia.

Failure to adhere to these guidelines is a breach of Australian Communications Authority regulations.

DSPM Host Card with FXO Analog Interface

Introduction   The Analog DSPM/HC (host card) supports one analog FXO (Foreign Exchange Office) interface. The FXO is a daughtercard that is mounted onto the DSPM/HC.

Description   The analog FXO daughtercard (when mounted on the DSPM/HC) allows the PathBuilder S24x, 26x, and 27x switch to support one voice/fax channel per card. Each DSPM/HX with FXO daughtercard combination occupies one ISA slot in the PathBuilder S24x, 26x, and 27x switch.

Function   The FXO interface provides a method for connecting to the PBX, simulating a phone. The FXO interface:

- has a ring voltage detector for detecting an incoming call
- can generate a loop closure for acknowledging an incoming call request
- can generate a call request to a PBX

When You Receive the Card   When you receive a DSPM/HC with FXO daughtercard, do the following:.

Step	*Action*
1	Remove the card from the packing material.
2	Inventory the contents of the shipping container. ■ **Note** No cables are shipped with the DSPM/HC with FXO interface.
3	Power off the PathBuilder S24x, 26x, and 27x switch node.
4	Install the card into the PathBuilder S24x, 26x, and 27x switch node.

DSPM/HC with FXO Card Illustration Figure 1-21 shows an example of the DSPM/HC with an analog FXO daughtercard.

FXO Daughtercard

Port 1 (Remote Busy) Port 1 (Local Busy)

Port 2 (Remote Busy) Port 2 (Local Busy)

DSPM HC

Pin 6

Pin 1
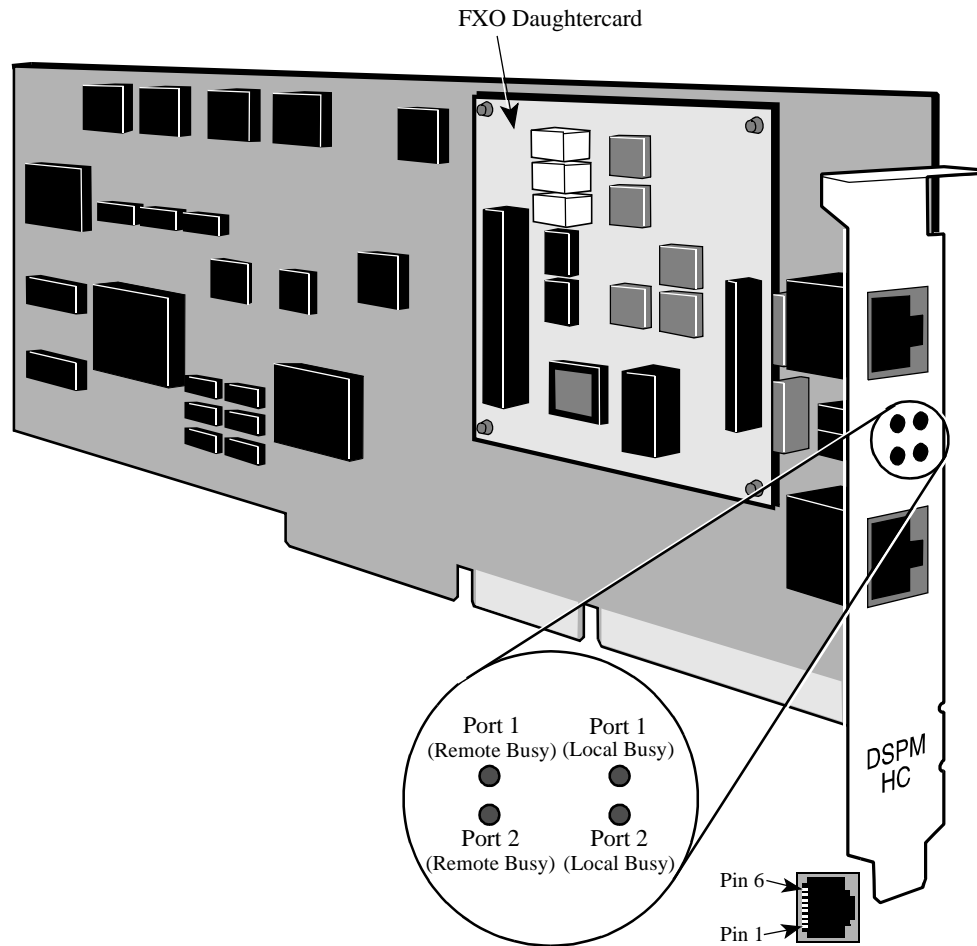
Figure 1-21. DSPM/HC Card with Analog FXO Daughtercard

LEDs The card contains four LEDs that can be viewed through the rear bracket.

LED	*Color*	*LED is...*	*...Indicating*
Port 1 Local Busy	Green	On	local physical connection is active (offhook)
		Off	local physical connection is idle (onhook)
Port 1 Remote Busy	Green	On	remote end is active (offhook)
		Off	remote end is idle (onhook)
Port 2 Local Busy	Green	On	local physical connection is active (offhook)
		Off	local physical connection is idle (onhook)
Port 2 Remote Busy	Green	On	remote end is active (offhook)
		Off	remote end is idle (onhook)

About the PathBuilder S24x, 26x, and 27x switch

Jumper Locations   The DSPM/HC with FXO daughtercard has no jumpers that must be set.

-48V Ringer/Power Supply Card and Enclosure

Introduction
One -48V ringer/power supply card and enclosure is required per PathBuilder S24x, 26x, and 27x switch node for

- Analog DSPM/FXS cards
- DSPM/E&M cards using interface signaling types II, III, and V.

DSPM/E&M card with an interface signaling of type I does not require a -48V ringer/power supply card and enclosure.

Description
The -48V ringer/power supply card comes in an enclosure, which you must install in the PathBuilder S24x, 26x, and 27x switch if you are field upgrading to support the Voice option.

New PathBuilder S24x, 26x, and 27x switch nodes ordered with the voice option ship with the -48V ringer/power supply factory installed.

The -48V ringer/power supply card supports the following:

- 12 E&M ports, or 6 DSPM/E&M cards
- 4 FXS ports, or 2 DSPM/FXS cards

Function
The -48V ringer/power supply card rings up to four phones at a time.

-48V Ring/Power Supply Types
There are two versions of the -48V ringer/power supply: Standard and Enhanced.

- The Standard -48V ringer/power supply (see Figure 1-22) can support two FXS cards.
- The Enhanced -48V ringer/power supply (see Figure 1-23) can support six FXS cards. (Available in the Fall of 1998.)

Jumper Definitions
The -48V ringer/power supply card has two sets of jumpers for various requirements.

- One set of jumpers to enable or disable the -48V ringer supply output (should not be changed from its default setting of enabled.)
- One set of jumpers to control the frequency of the ring supplied to the DSPM/FXS card: 25 Hz (US) or 50 Hz (Europe).

For more information see Figure 1-22 and Figure 1-23.

Jumper Locations
The jumpers for 25 or 50 Hz ring frequency are located on the -48V ringer/power supply card as shown in Figure 1-22 and Figure 1-23.

Installing Jumpers
Figure 1-22 and Figure 1-23 show jumper positions on the -48V ringer/power supply card for 25 or 50 Hz ring frequency and how to install the jumpers for 25 or 50 Hz ring frequency.

Cables Required   The -48V ringer/power supply card is shipped with one cable with six connectors.
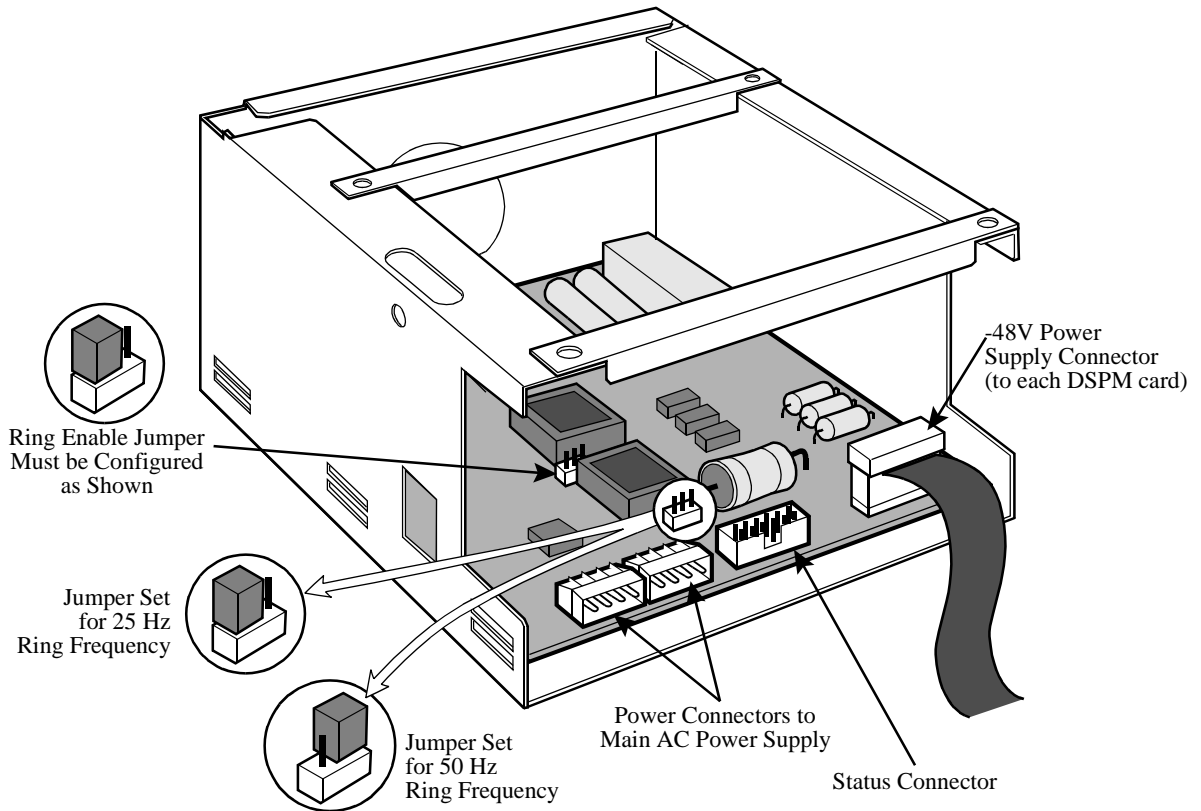
Figure 1-22. Standard -48V RInger/Power Supply Card and Enclosure

Ring Enable Jumper
Must be Configured
as Shown ⟶ ▢ J12

J11 Jumper Set for 25 Hz
Ring Frequency ⟶ J11

J11 Jumper Set for 25 Hz
Ring Frequency ⟶

Jumper Locations

Output Connectors

Power Connectors to
Main AC Power Supply

Status Connector
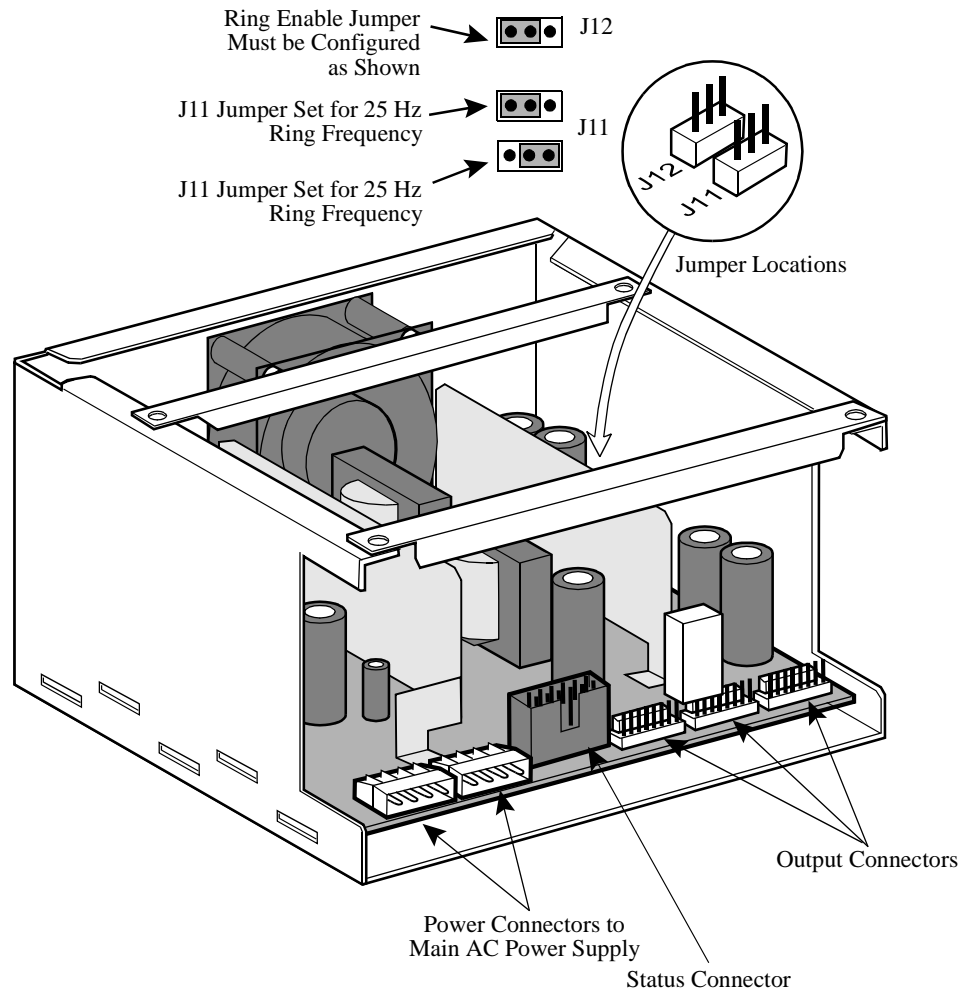
Figure 1-23. Enhanced -48V RInger/Power Supply Card and Enclosure

10BaseT Transceiver

Description   This transceiver is designed to provide Ethernet 10baseT support for the PathBuilder S24x, 26x, and 27x switch. It can accommodate different 10BaseT configurations through the user-selectable Signal Quality Error (SQE) function. See Figure 1-24. Some network devices do not recognize this signal. If the attached network device does not recognize this SQE signal, set the switch to Off.

RJ45 Connector

SQUE Switch

15-Pin D-Type Connector
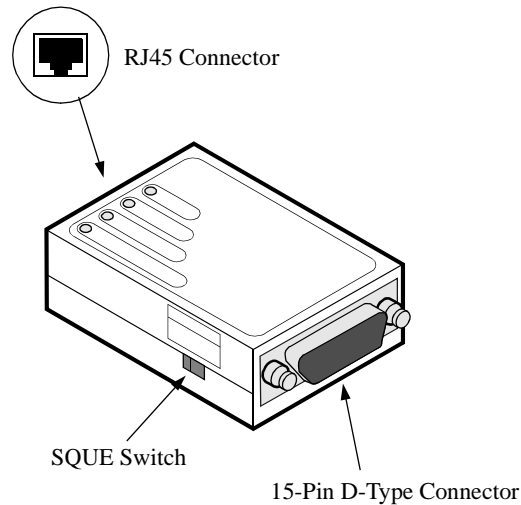
Figure 1-24. 10BaseT Transceiver

The 10BaseTransceiver can be connected to the Ethernet LAN (ELAN) card or the PathBuilder S24x, 26x, and 27x switch's Port 4.

Radio Frequency Interference Regulations

Introduction

This section explains the radio frequency interference regulations.

FCC

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules, CISPR Publication 22:85 and EN 55022:87. These limits are designed to provide reasonable protection against interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and, if not installed and used in accordance with the instruction manual, may cause interference to radio communications.

Changes or modifications not expressly approved by 3Com could void the user's authority to operate the equipment.

Canadian DOC

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the radio interference regulations of the Canadian Department of Communications.

Operation of this equipment in a residential area is likely to cause interference, in which case the user will be required to take adequate measures to correct the interference at his/her own expense.

General

This product was verified under test conditions that include some use of shielded DTE cable(s). Use of different cables will invalidate verification and increase the risk of causing interference to radio and TV reception.

You can obtain the proper cables from 3Com.

Telecommunications Regulations

In the United States, FCC rules Part 68 require that the following user instructions are provided:

The telephone company has the right to ask you for registration information about your equipment that is connected to the telephone line. When requested, you should provide your equipment's FCC registration number and ringer equivalence number (REN), if applicable.

The user instructions shall include the FCC registration number and a detailed list of all ports that connect to the network. The information provided must also include USOC connector jacks, the facility interface codes (FOC), service order codes, (SOCs), and REN, as applicable.

REN is used to determine the number of devices that can be connected to an analog telephone line, but is generally not applicable to digital service equipment. Excessive RENs on the line may result in the devices' not ringing in response to an incoming call. Contact the telephone company to determine the maximum REN sum for the calling area; in general, it should not exceed five.

The telephone company may change its equipment, operations, or procedures. If these changes affect your equipment or service, the telephone company will provide written notice so you may make the necessary changes with uninterrupted service.

FCC regulations and telephone company procedures prohibit connection of customer-provided equipment to telephone company-provided coin service (central office-implemented systems). Connection to party lines is subject to state tariffs.

Contact your telephone company if you have any questions about your telephone line.

In Canada, the following equipment attachment limitations and information must be provided in the user instructions:

The Canadian Department of Communications label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective operational and safety requirements. The Department does not guarantee the equipment will operate to the user's satisfaction.

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

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

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

Caution

Users should not attempt to make such connection themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

Mise en Garde

Les utilisateurs ne doivent pas établir de telles connexions eux-mêmes. Ils doivent contacter une personne compétente ou un électricien.

Warnung

Benutzer sollten nicht versuchen, diese Verbindung selbst herzustellen, sondern dazu die zuständige Aufsichtsbehörde für Elektroinstallationen bzw. einen Elektroinstallateur kontaktieren.

■Note

The Load Number (LN) assigned to each terminal device denotes the total load percentage to be connected to a telephone loop used by the device to prevent overloading. The loop termination can consist of any combination of devices as long as their total LNs do not exceed 100.

FCC and Telephone Company Procedures and Requirements

Introduction

The following tables provide the information that is needed for ordering telephone company network connections for the 3Com PathBuilder S24x, 26x, and 27x switch V.22 bis modem.

How to Order Connections in the U.S.A.

Service Description	*USOC Jack Connector*	*REN*	*Facility Interface Code*
PSTN-permissive	RJ11C	0.8B	02LS2

How to Order Connections in Canada

Service Description	*Connection Arrangement*	*LN*	*Network Interface*
PSTN- permissive	CA11A	15	LS

Ordering Connections for the T1/CSU

To order the proper connections for a PathBuilder S24x, 26x, and 27x switch with a T1 Dual Port Interface card with T1/CSU daughtercards, provide the telephone company with the following information:

- Interface type
- Required USOC jack connector number
- Service code
- Facility interface codes

Interface Type	*USOC Jack Connector*	*Service Code*	*Facility Interface Code*
56-kbps digital interface	RJ48	6.0P	04DU9-BN
56-kbps digital interface	RJ48	6.0P	04DU9-1ZN
56-kbps digital interface	RJ48	6.0P	04DU9-1KN
56-kbps digital interface	RJ48	6.0P	04DU9-1SN

If Problems Arise

If any of your telephone equipment is not operating correctly, immediately remove it from the telephone line before it harms your network. If the telephone company notes the problem, they will notify you in advance, if possible, and may temporarily disconnect your service. When you are notified, you will be given the chance to correct the problem and be informed of your right to file a complaint with the FCC.

FCC Information

Customer-Provided Telephone Equipment

FCC regulations and telephone company procedures prohibit connection of customer-provided equipment to telephone company-provided coin service (central office-implemented systems). Connection to party lines is subject to state tariffs.

Occasionally, the telephone company may make changes in their equipment, operations, or procedures. If these changes affect your equipment or service, the telephone company will provide written notice so you can make the necessary changes to maintain uninterrupted service.

Contact your telephone company if you have any questions about your telephone line.

In some circumstances, the telephone company may ask you for information about your equipment that is connected to the telephone line. Within the United States (at the request of the telephone company), you should provide your equipment's FCC registration number. This number is AT9USA-21085-DD-N and is located on the unit's label.

FCC and Telephone Company Procedures and Requirements

Before you connect the PathBuilder S24x, 26x, and 27x switch DSU option to the network, you must provide the telephone company with the information shown below.

Type of Interface	*USOC Jack Connector*	*REN/Service Code*	*Facility Interface Code*
56-kbps digital interface	RJ48S	6.0F	04DU5-56

Regulations Concerning Electromagnetic Radiation

The Federal Communications Commission (FCC) of the United States of America and the Industry and Science Canada (ISC) have published regulations that govern the allowable limits of emanation of radio frequency energy of computing devices and associated peripherals. These regulations are concerned with interference to radio communications, such as radio and television. The regulations require equipment for use in the United States or Canada to be labeled and to be accompanied by the following notice:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against interference when equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause interference to radio communications.

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the radio interference regulations of the ISC.

Operation of this equipment in a residential area is likely to cause interference in which case the user will be required to take adequate measures to correct the interference.

This product was verified under test conditions that include use of shielded DTE cable(s). Leased line cables with 1.5 turns through a ferrite cylinder were also used. Use of different cables will invalidate verification and increase the risk of causing interference to radio and TV reception.

You can obtain the proper cables from 3Com.

Correcting Interference

If this equipment causes interference to radio or television reception, which can be determined by turning the equipment off and on, you are encouraged to try to correct the interference by one or more of the following measures:

- Reorienting the receiving antenna
- Relocating the equipment with respect to the receiver
- Moving the equipment away from the receiver
- Plugging the equipment into a different outlet so that the equipment and receiver are on different circuits

If necessary, you should consult the dealer or an experienced radio/television technician for additional circuits.

Additional Information

You may find the following booklet prepared by the FCC helpful: *How to Identify and Resolve Radio-TV Interference Problems.* This booklet is available from the U.S. Government Printing Office, Washington, D.C. 20402, Stock No. 004-000-00345-4.

About the PathBuilder S24x, 26x, and 27x switch

Overview

Introduction

This chapter summarizes information you need and activities you must complete before installing your PathBuilder S24x, 26x, and 27x switch system.

It describes how to select an operating environment and how to unpack the enclosure.

Before Installing Your PathBuilder S24x, 26x, and 27x Switch

Introduction

Before installing your PathBuilder S24x, 26x, and 27x switch, be sure to complete the following steps:

- Verify that the configuration worksheets are accurate and complete. Be sure that they are prepared beforehand according to your network requirements.
- Be sure you have all the required information from your service provider.
- Configure, connect, and test the network termination unit (for example, a CSU) through which the PathBuilder S24x, 26x, and 27x switch connects to the network.

Selecting an Operating Environment

Choose a site for your PathBuilder S24x, 26x, and 27x switch that is within 6 feet (1.8m) of an appropriate power source. Depending on your application and the country in which the PathBuilder S24x, 26x, and 27x switch will operate, this may be a grounded 115 or 230 VAC outlet.

⚠️ Caution

The voltage select switch on the back of the power supply must be set for 230 VAC for use where applicable.

The area selected should be free of accumulated dust and environmental extremes. The acceptable temperature range for operating the unit is 32× to 122×F (0× to 50×C) at sea level. Relative humidity should not exceed 90% (noncondensing).

Allow at least 12 inches (30.5 cm) in back of the unit for cable clearance and air circulation.

⚠️ Mise en Garde

Le commutateur de sélection de tension à l'arrière du bloc d'alimentation doit être sur la position 230 VAC (tension courant alternatif) pour une utilisation appropriée.

Choisissez un emplacement propre et sûr, dont la température se situe entre 0 et 50 degrés Celsius (32 et 122 degrés Fahrenheit) au niveau de la mer. L'humidité ne doit pas excéder 90% (sans condensation).

Laissez un espace d'au moins 30,5 cm (12 pouces) derrière l'unité pour les câbles et la circulation de l'air.

⚠️ Vorsicht

Der Spannungsumschalter auf der Rückseite des Netzteils muß für die entsprechenden Länder auf 230 VAC eingestellt sein.

Der Betriebsort sollte staubfrei und keinen extremen Umwelteinflüssen ausgesetzt sein. Der akzeptable Temperaturbereich für den Betrieb des Gerätes liegt zwischen 0 und 50 Grad Celcius auf Meereshöhe. Die relative Luftfeuchtigkeit sollte 90% (nicht kondensierend) nicht übersteigen.

Halten Sie einen Wandabstand von mindestens 30,5 cm auf der Geräterückseite zur ungehinderten Verlegung der Kabel und Entlüftung ein.

⚠ Caution

To avoid overheating the unit's circuitry, you should never place anything on top of the unit, within one inch (2.5 cm) of the ventilation slots on the front panel, or within 12 inches (30.5 cm) of the back of the unit.

⚠ Mise en Garde

Afin d'éviter toute surchauffe des circuits de l'unité, ne placez aucun objet sur l'unité à moins de 2,5 cm (1 pouce) des conduits de ventilation du panneau avant et à moins de 30,5 cm (12 pouces) de l'arrière de l'unité.

⚠ Vorsicht

Zur Vermeidung einer Überhitzung der Geräteschaltkreise sollten Sie keine Gegenstände auf dem Gerät plazieren. Zu den Entlüftungsöffnungen der Vorderabdeckung sollte ein Abstand von 2,5 cm und zur Rückseite des Gerätes von 30,5 cm eingehalten werden.

Unpacking

Introduction The PathBuilder S24x, 26x, and 27x switch's printed circuit cards and other internal components are installed in the enclosure before the unit is shipped from the factory. In addition to the enclosure and its components, you may find within the shipping carton a sleeve containing the power cord (if appropriate for your installation).

Checking the Equipment Thoroughly check the cartons and their contents for damage in shipment. If damage has occurred, contact the shipping agent.

Next, lift the unit from the shipping carton and remove the foam packing material.

Direct any questions about missing parts to your 3Com representative.

The PathBuilder S24x, 26x, and 27x Switch Rackmount Kit

Introduction   You can install the PathBuilder S24x, 26x, and 27x switch in a standard Electronics Industry Association (EIA) 19-inch equipment rack.

EIA Rackmount Kit   The PathBuilder S24x, 26x, and 27x switch EIA Rackmount kit contains the following components:

- One Mounting Shelf
- Two adjustable Rear Mounting brackets for rear rail attachment
- Four Phillips-head 10-32 x .38 long screws with integral lock washers
- Eight Phillips-head 12-24 x.50 long screws for front and rear rail attachment
- Three longer #6 screws

When Checking the EIA Rackmount Kit   Be aware of the following issues when checking the components of your rackmount kit:

- The Mounting Shelf and adjustable Rear Mounting brackets ship fastened together at the Mounting bracket's front-most adjustment hole. This prevents damage during shipping. Disassemble these components prior to installation.
- The four Phillips-head 10-32 x .38 long screws ship in holes securing the Mounting Shelf to the Rear Mounting brackets. Remove them to separate the shelf and brackets.
- The eight Phillips-head 12-24 x .50 long screws ship in a small plastic bag.

Rackmount Kit Parts

Figure 2-1 shows the components of the rackmount kit.

10-32 x .38
Screws with External
Lock Washers (4)

Mounting Shelf

Adjustable
Rear Mounting
Bracket (2)
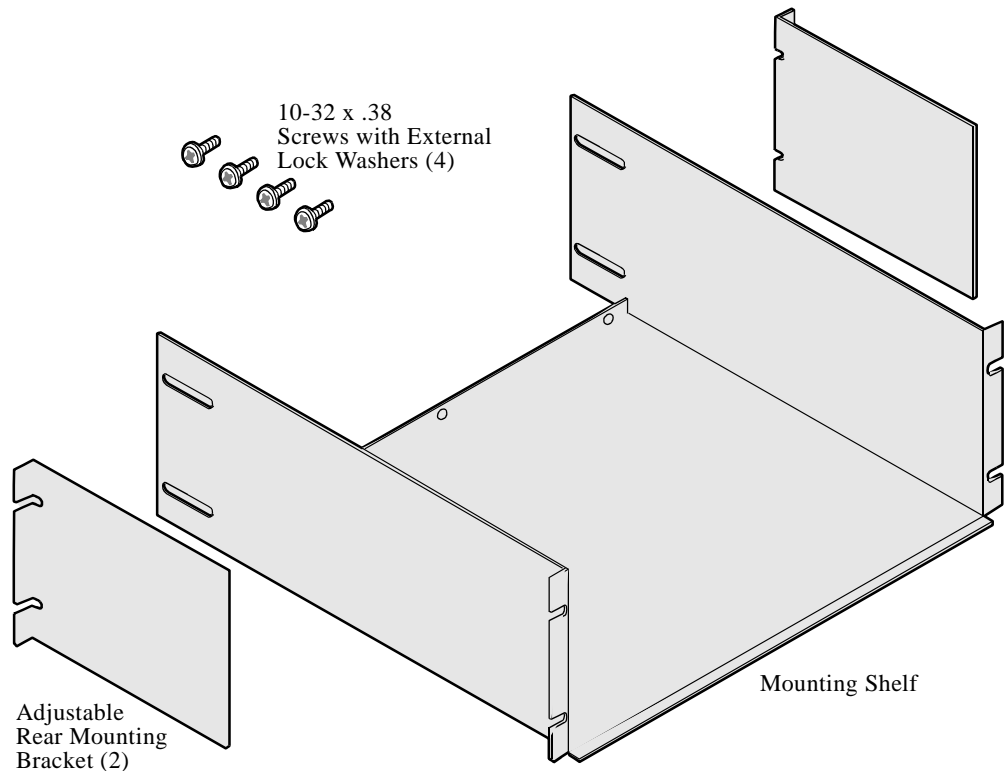
Figure 2-1. The PathBuilder S24x, 26x, and 27x Switch Rackmount Kit

Placement Considerations

Consider the following issues when installing your PathBuilder S24x, 26x, and 27x switch in an equipment rack:

Space

A PathBuilder S24x, 26x, and 27x switch and EIA rackmount assembly occupies 7.0 inches, or 4 U NEMA rack space increments.

Power

Allow enough room behind the EIA equipment rack to connect the power cord and devices. Refer to this manual for maximum power load, when connecting to a 15 amp internal convenience power outlet strip.

Thermal

For proper ventilation, do not cover air vents at the rear of the unit. Where a front door is present on a rackmount cabinet, installation of the PathBuilder S24x, 26x, and 27x switch must allow a 2-inch clearance between the door and the PathBuilder S24x, 26x, and 27x switch air inlet to provide sufficient air flow.

Stability

When installing the PathBuilder S24x, 26x, and 27x switch in a non-3Com cabinet or with other vendors' equipment, the PathBuilder S24x, 26x, and 27x switch should be positioned so that the resulting system rack remains stable during installation on a 10-degree ramp or when 56 pounds of force is applied to the top of the cabinet.

Installing the PathBuilder S24x, 26x, and 27x Switch in an Equipment Rack

How to...

Follow these steps to install the PathBuilder S24x, 26x, and 27x switch in an equipment rack:

Step	*Action*	*Description*
1	Remove the plastic pedestal base that is attached to the PathBuilder S24x, 26x, and 27x switch.	The base is attached by four Phillips-head screws coming up from the bottom, as shown in Figure 2-2.
2	Insert the Mounting Shelf to the desired location in the equipment rack and secure it to the front using four 12-24 x .50 long screws.	See Figure 2-3, A.
3	Fasten the adjustable Rear Mounting brackets at each side of the rear of the equipment rack. Use the remaining four 12-24 x.50 long screws.	See Figure 2-3, B. When installed correctly, the Rear Mounting brackets are on the outside of the mounting shelf.
4	Bolt the Mounting Shelf to the Rear Mounting brackets using the four 10-32 x .38 long screws, two to each side. To do this, insert the screws from inside the equipment rack, through the Mounting Shelf slot, and through the appropriate adjustment hole in the Rear Mounting bracket.	See Figure 2-3, C.
5	Facing the front panel, carefully tip the PathBuilder S24x, 26x, and 27x switch horizontally to your right. Insert the PathBuilder S24x, 26x, and 27x switch into the equipment rack, leaving enough room at the rear to remove the three case-fastening screws along the new "bottom" of the unit.	See Figure 2-4.

Step	Action	Description
6	Remove the long (#6) screws. Then, slide the PathBuilder S24x, 26x, and 27x switch flush against the rear flange of the Mounting Shelf and reinsert the screws through the flange and into the unit's case.	The PathBuilder S24x, 26x, and 27x switch is now securely attached to the equipment rack and ready for connection to devices and power. ■ **Note** The unit is now accessible mainly from the front and will require complete removal from the rack to perform maintenance routines.

Removing the Pedestal Base

Figure 2-2 shows how to remove the pedestal base from the PathBuilder S24x, 26x, and 27x switch.

Remove the pedestal base by removing the four Phillips-head screws from the bottom.
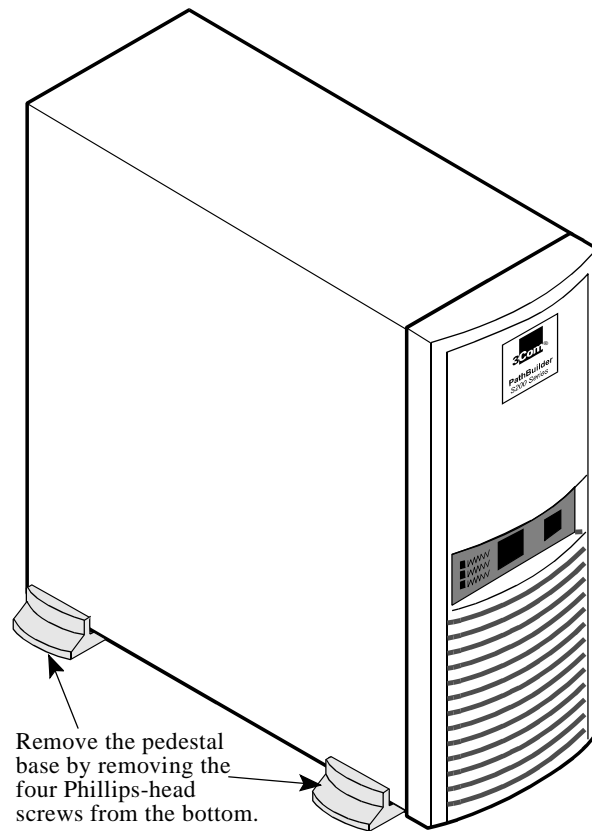
Figure 2-2. Pedestal Base Removal of the PathBuilder S24x, 26x, and 27x Switch

Steps for Rackmount Assembly

Figure 2-3 shows the steps for rackmount assembly.

Equipment Rack Rail

Adjustable Rear Mounting bracket

Ⓒ Bolt the Mounting Shelf to the Rear Mounting Brackets using the four 10-32 x .38 screws supplied with the kit. Do this by inserting the screws from inside the rack, through the Mounting Shelf slot, and through the appropriate hole in the Rear Mounting bracket.

10-32 x .38 Screws

Ⓑ Fasten the adjustable Rear Mounting brackets to each side of the equipment rack using four 12-24 x .50 screws.

Mounting Shelf

Ⓐ Insert the Mounting Shelf in the desired location and secure it to the front rail using four 12-24 x .50 screws supplied with your equipment rack.

Figure 2-3. PathBuilder S24x, 26x, and 27x Switch Rackmount Assembly

Installing the PathBuilder S24x, 26x, and 27x Switch

Figure 2-4 shows the installation of the PathBuilder S24x, 26x, and 27x switch in the rackmount assembly.

PathBuilder S24x, 26x, and 27x switch
(Rear View)

Mounting Shelf

Ⓐ Remove the three case-fastening screws off the left rear (new bottom) of PathBuilder S24x, 26x, and 27x switch.
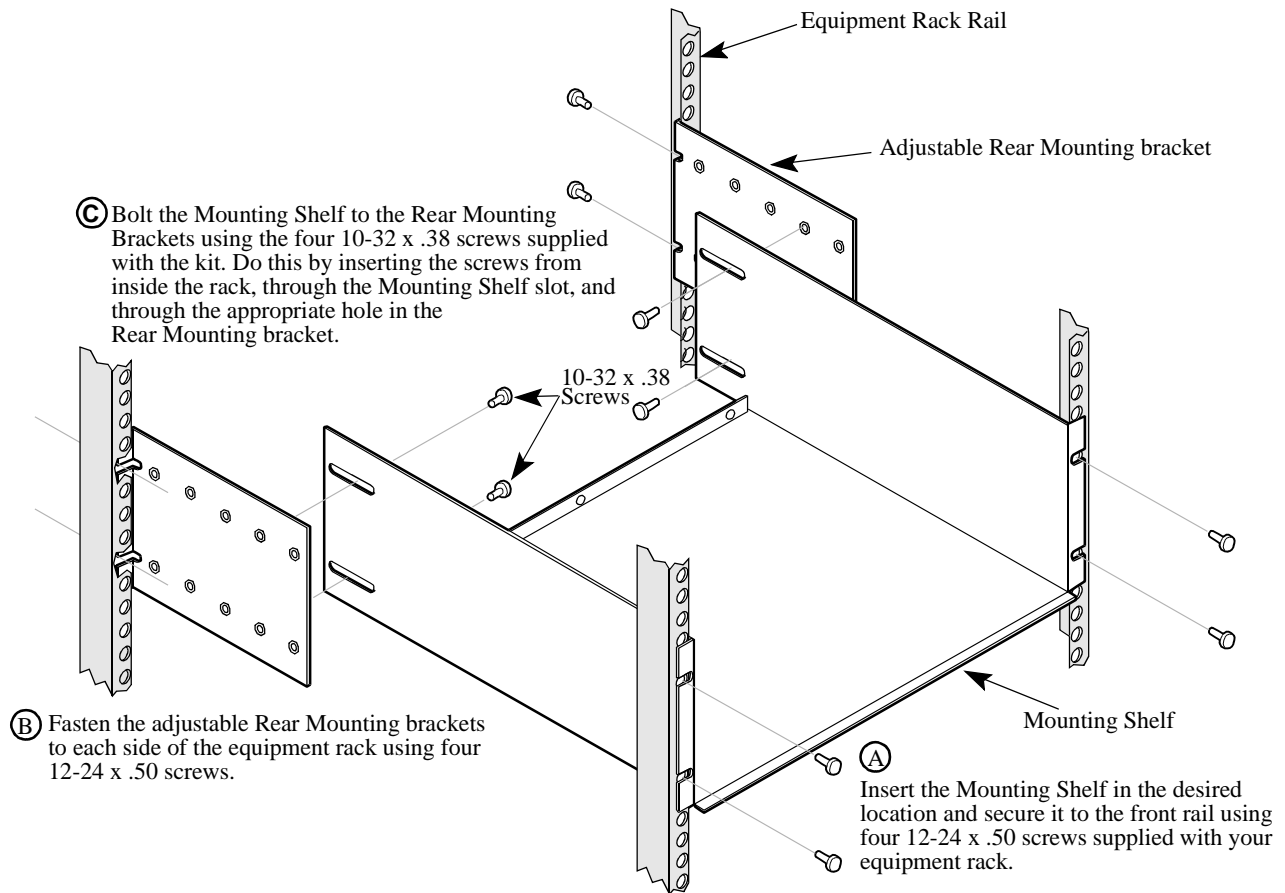
Ⓑ Slide the PathBuilder S24x, 26x, and 27x switch flush against rear mounting rail and reinsert long screws through rail and into machine's case.

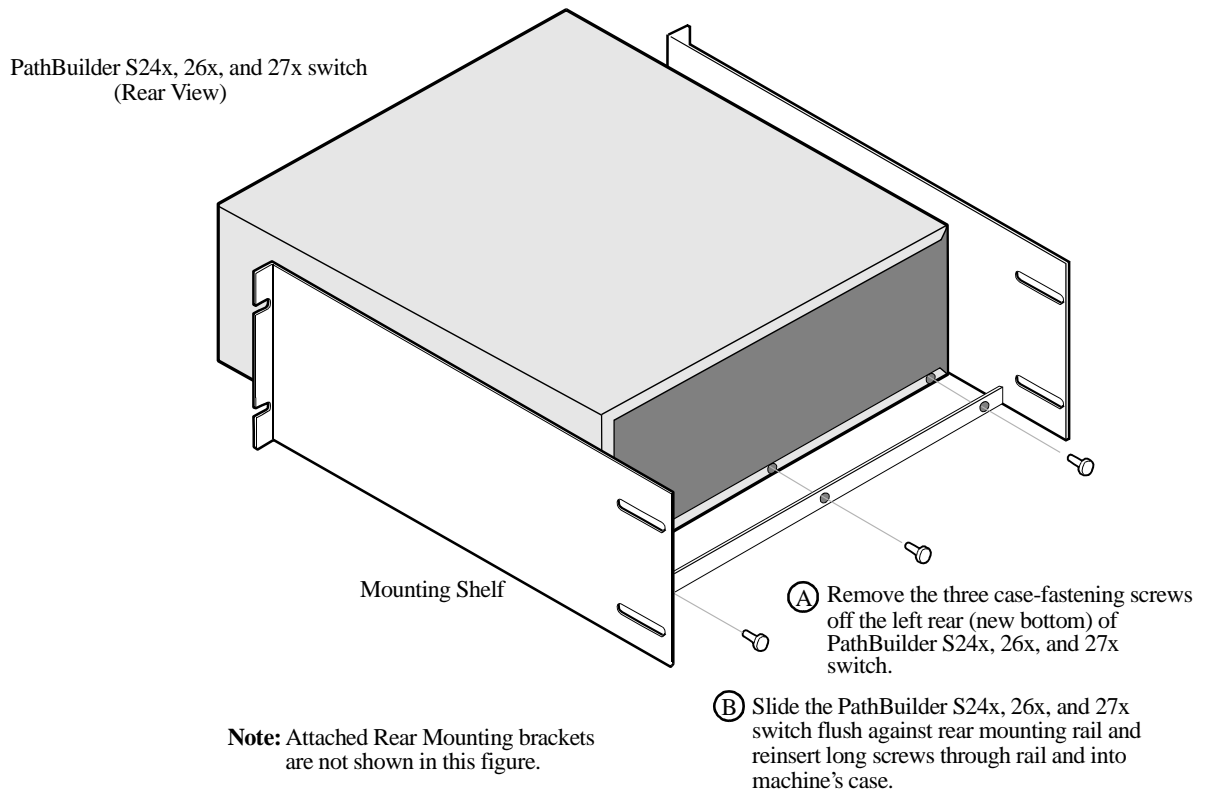**Note:** Attached Rear Mounting brackets are not shown in this figure.

Figure 2-4. Installing the PathBuilder S24x, 26x, and 27x Switch in Rackmount Assembly

Chapter 3
PathBuilder S24x, 26x, and 27x Switch Hardware Installation

Overview

Introduction   This chapter contains procedures for installing PathBuilder S24x, 26x, and 27x switch hardware components.

The following warnings and cautions apply to all procedures described in this chapter:

⚠ Caution

Ports that are capable of connecting to other apparatus are defined as Safe Extra Load Voltage (SELV). To ensure conformity with EN60950, ensure that these ports are only connected to ports of the same type of apparatus.

⚠ Mise en Garde

Les ports qui sont susceptibles d'être connectés à des équipements sont désignés comme TBTS. Pour garantir la conformité à la norme EN 60950, n'interconnecte ces ports qu'avec des ports du même type sur des autres matériels.

⚠ Vorsicht

Anschlusse, die mit anderen Geräten verbindet werden können, sind als SELV beschrieben. Um Konformität mit EN 60950 zu versichern, sichern Sie es, daB diese Anschlusse nur mit den des selben Type auf anderen Geräten verbindet werden.

⚠ Caution

The socket-outlet shall be installed near the equipment and shall be easily accessible.

⚠ Mise en Garde

Pour mettre hors tension l'appareil debrancher la prise électrique. La prise électrique doit être située a proximité de l'équipement et elle doit être d'accès facile.

⚠ Vorsicht

Die Steckdose soll nahliegend der Einrichtung installiert werden und leicht erreichbar sein.

✋ Warning

Only qualified service personnel should perform the procedure described in this section. Use of this procedure by unqualified personnel could result in personal injury or equipment damage, and could jeopardize your warranty and maintenance agreement.

Avertissement

Seules des personnes qualifiées peuvent mettre en pratique les procédures décrites dans cette section. Dans le cas contraire, des risques de blessures ou d'endommagement du matériel sont possibles, ce qui pourrait annuler votre garantie et votre contrat de maintenance.

Warnung

Die in diesem Abschnit aufgeführten Vorgänge sollten ausschließlich von geschultem und qualifiziertem Servicepersonal durchgeführt werden. Wenn diese Vorgänge von unqualifiziertem Personal durchgeführt werden, kann dies zu Personenschäden oder einer Beschädigung des Gerätes führen und darüber hinaus Ihren Anspruch auf Garantieleistung und Kundendienst gefährden.

Caution

Some components used in the PathBuilder S24x, 26x, and 27x switch are sensitive to static electric discharges; static electric discharges can cause damage to internal components. Use proper handling and grounding precautions whenever handling cards and components.

Mise en Garde

Certains composants du PathBuilder S24x, 26x, and 27x switch sont sensibles aux décharges électrostatiques qui peuvent les endommager. Prenez les dispositions et précautions de mise à la terre nécessaires lors de la manipulation de cartes et de composants.

Vorsicht

Einige im PathBuilder S24x, 26x, and 27x switch verwendeten Komponenten sollten keinen elektrostatischen Entladungen ausgesetzt werden, durch die interne Bauteile beschädigt werden können. Wenden Sie die entsprechenden Maßnahmen zur Erdung und zum Schutz vor statischen Ladungen bei der Handhabung von Karten und Komponenten an.

Setting DIP Switches

Introduction   This section explains how to set the DIP switches for the motherboard and the Serial Data Board (SDB) card.

Motherboard Components   Figure 3-1 is an illustration of the PathBuilder S24x, 26x, and 27x switch motherboard showing the location of the switches.
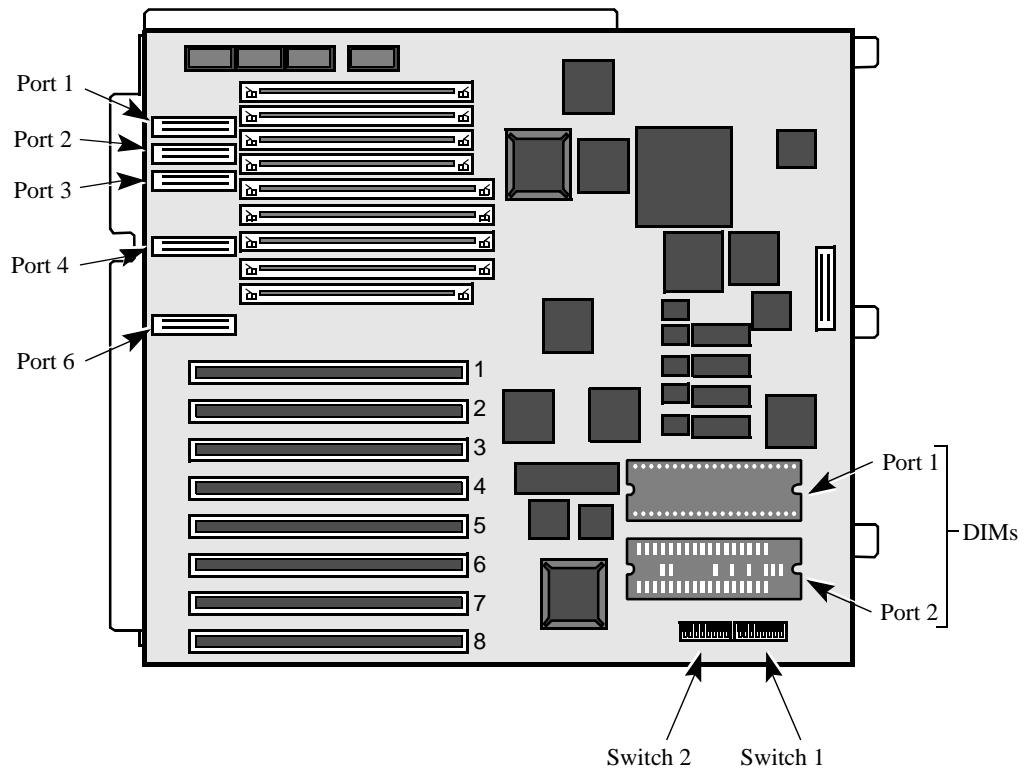

Figure 3-1. Switch Blocks on Motherboard

Motherboard Switches 1 and 2   These are the settings for motherboard switch 1 (port 1) and switch 2 (port 2). Refer to Figure 3-1.

Switch Settings for Motherboard Switches 1 and 2

Set Switch...	To...	For...
1–5	ON	EIA 232-D DIM
6–8	OFF	
1–5	OFF	V.11 and V.35 DIMs
6–8	ON	
9	ON	Ring Indicator (DCE)
10	ON	Make Busy (DTE)

Installing the DSU DIM

Introduction   You can install up to two DSUs for each PathBuilder S24x, 26x, and 27x switch
platform using both Ports 1 and 2.

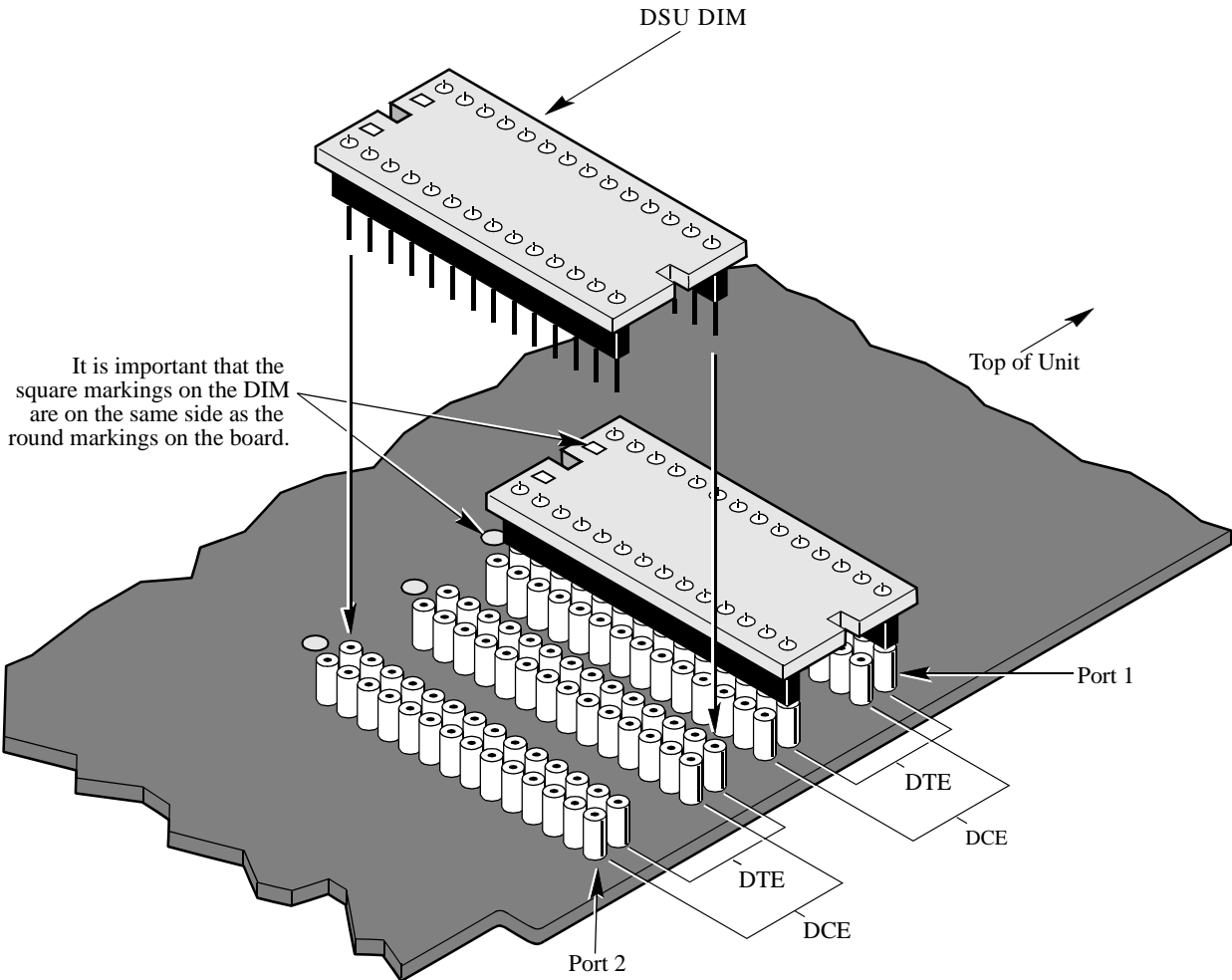**DSU DIM Example**   Figure 3-2 shows how to install the DSU DIM.

DSU DIM

It is important that the
square markings on the DIM
are on the same side as the
round markings on the board.

Top of Unit

Port 1

DTE

DCE

DTE

DCE

Port 2

Figure 3-2. DSU DIM Installation

Install the DSU DIM Perform these steps to install the DSU DIM:

Step	Action	Result/Description
1	Install the DSU DIM in the DTE position only (see Figure 3-2).	The DSU option does not operate if the DIM is installed in the DCE position.
2	Set the switches properly. Refer to "Switch Settings for Motherboard Switches 1 and 2."	
3	Plug the EIM into the backplane connector corresponding to the DIM port containing the DSU DIM (Port 1 or 2). Verify that the EIM is only connected to a port that has a DSU DIM installed.	
4	Tighten the connector mounting screws to provide proper grounding and to ensure signal integrity.	

⚠ Caution

Be sure that the telephone company plug is disconnected before you disconnect the EIM from the PathBuilder S24x, 26x, and 27x switch. Also, do not connect the telephone company plug to the EIM until you have connected the EIM to the PathBuilder S24x, 26x, and 27x switch.

⚠ Mise en Garde

Assurez-vous que la prise de téléphone est débranchée avant de déconnecter le module d'interface externe (EIM) du PathBuilder S24x, 26x, and 27x switch. Ne la rebranchez pas au EIM avant d'avoir reconnecté le module au PathBuilder S24x, 26x, and 27x switch.

⚠ Vorsicht

Das Telefonkabel muß ausgesteckt sein, bevor Sie die Verbindung zwischen dem EIM und dem PathBuilder S24x, 26x, and 27x switch trennen. Schließen Sie das Telefonkabel erst dann wieder in das EIM an, wenn Sie die Verbindung zwischen EIM und PathBuilder S24x, 26x, and 27x switch wiederhergestellt haben.

Switch Blocks 1 and 2

The PathBuilder S24x, 26x, and 27x switch Integral DSU option requires that you set the same switches in the switch blocks as you do for the V.35, V.36, and X.21 interfaces.

These are the switch settings for the motherboard switches 1 and 2.

Switch Settings

Set Switch...	To....	For...
1-5 6-8	OFF ON	V.11, V.35, V.36 DIMs, and the PathBuilder S24x, 26x, and 27x switch Integral DSU option

■**Note**

There is no indication when the motherboard switches do not match the type of DIM being used. When replacing DIMs, be sure that the motherboard switches are set correctly for the particular DIM being installed.

Configuring the PathBuilder S24x, 26x, and 27x Switch for DSU Operation

Configuration Procedure

Perform these steps from the CTP to configure the PathBuilder S24x, 26x, and 27x switch for DSU operation:

Step	Action	
1	Refer to the *PathBuilder S200 Series Basic Protocols.* However, you do not need to complete these configuration parameters: • Clock Speed • Connection Type • Port Control	
2	Configure the clock source parameter under port configuration as follows:	
	INT	Use this parameter when providing clock to the network.
	EXT	Use this parameter when using the network-provided clock (usual mode for DSU operation).

DSU Input and Output Signaling

Introduction　　Input and output signaling information is useful as a debugging tool and replaces the EIA summary information associated with other DIM types.

Input Signals　　This table describes the input signals.

NIS	Not In Service
	This signal is normally low (L). If no signal is received, or the DSU option is in DSU Loopback mode, or if idle codes are received, NIS is listed as high (H). This signal is used to determine if the other end of the connection is available.
BPV	Bipolar Violation
	This signal is "H" during normal operation. When the signal is "L," it indicates that some type of bipolar violation was received by the DSU option. The signal toggles during a DSU loopback condition.
DL	DSU Loopback
	This signal is normally "H." An "L" indicates that a DSU loopback mode is entered.
C+	Positive Sealing Current*
	This signal is "H" if the DC current on the telephone company interface is not in the positive direction.
C-	Negative Sealing Current*
	This signal is "H" if the DC current on the telephone company interface is not in the negative direction. An "L" indicates that the DSU option has detected a negative "sealing" current and is therefore performing a CSU loopback.

■**Note**
When both C+ and C- are "H", it indicates that no sealing current exists. This is often the case when connected to other DSU type hardware. Normally, the signal for C+ is "L" when connected to central office equipment (OCU hardware).

Output Signals　　Although you cannot directly access the output signals, they are manipulated by the DSU option software and may be useful for informational purposes. The following table describes the output signals.

Signal	*Description*
RS	Reset
	This output resets the DSU option hardware. Its normal operating state is "H".
LL	**Local Loopback**
	When this signal is "L", the DSU hardware is locally looping data back to the PathBuilder S24x, 26x, and 27x switch hardware by way of the EIM.

Signal	*Description* (continued)
CL	CSU Loopback When this signal is "L", the DSU hardware is looping the remote connection's receive to transmit.
IDL	Idle An "H" on this signal tells the DSU hardware to send idle bipolar violations to the remote system.
CLK	Clock Mode The signal "H" denotes the use of the network clock. The DSU option provides the clock when this signal is "L".

You can view these signals using the control terminal Monitor menu item on the Main menu.

Other Reporting Differences

Other differences in control terminal output are:

- Detailed Port Statistics— show DSU input and output signaling as well as note the installed DSU DIM
- Detailed Node Statistics— show DSU DIM position

Example of Diagnostics Menu

Figure 3-3 shows the Diagnostics menu. Use this menu to access the loopback options described in the next section.
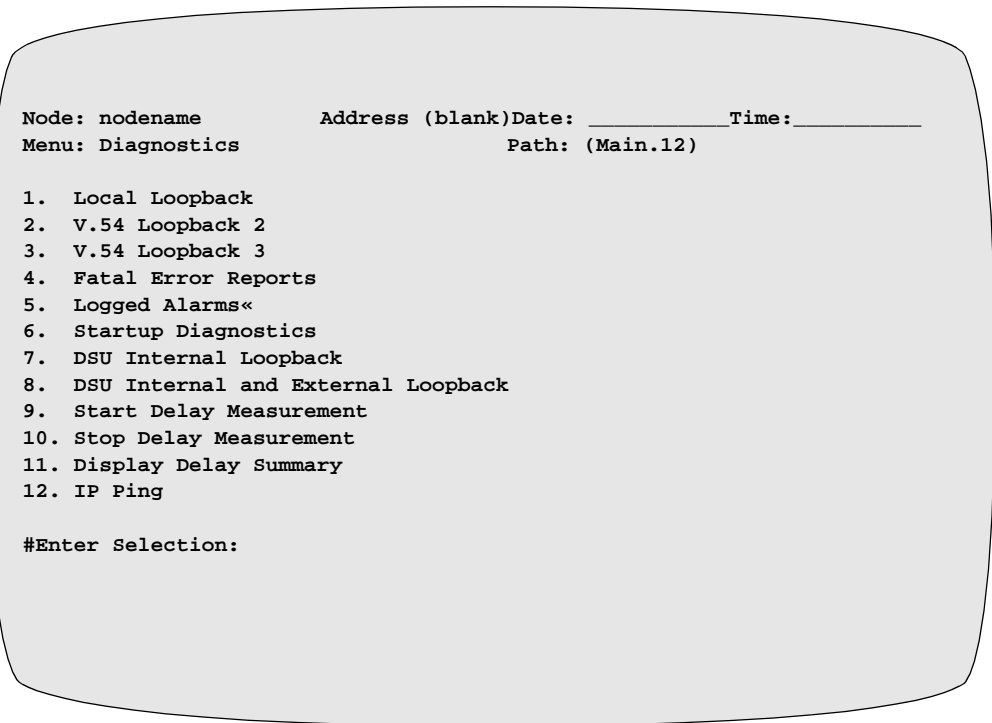
```
Node: nodename          Address (blank)Date: _____Time:_____
Menu: Diagnostics                      Path: (Main.12)

1.  Local Loopback
2.  V.54 Loopback 2
3.  V.54 Loopback 3
4.  Fatal Error Reports
5.  Logged Alarms«
6.  Startup Diagnostics
7.  DSU Internal Loopback
8.  DSU Internal and External Loopback
9.  Start Delay Measurement
10. Stop Delay Measurement
11. Display Delay Summary
12. IP Ping


#Enter Selection:
```

Figure 3-3. Diagnostics Menu

Control Terminal Loopback Options

These are the control terminal loopback options.

DSU Internal Loopback	This loopback mode does not affect the external interface but it does loop the local transmit data back to the receive data within the EIM. This test is useful for verifying that the EIM is connected and is working properly from a digital integrity perspective.
DSU Internal and External loopback	This loopback mode performs the internal loopback mentioned above along with looping the external transmit to the external receive to allow manual testing of the remote interface.

Troubleshooting DSU Installation

Introduction

Some potential DSU installation problems are:

- Improper port connection of the EIM.
- Improper telephone company interface connection.
- The DSU DIM is not connected in DTE configuration.
- The motherboard switches are not in the proper positions.
- The DSU option Software is not operational.
- The DSU port clock source option is not correct.
- No signal from the telephone company interface.

CTP Troubleshooting

The following information, available from the control terminal, can help you troubleshoot.

Node Statistics	Used to verify that the software version contains the DSU option modifications. It also indicates if the DSU DIM is recognized by the software.
Port Statistics	Used to verify that data is sent without error. Error counts may denote an error in clocking mode configuration. Port statistics also indicate if the software recognizes the DSU DIM.
Monitor	Input and output signals determine if the DSU option is in a loopback mode requested by the remote end. This would explain the inability to send data. Continuous bipolar violations also indicate that the remote system is out of service.
DSU Internal Loopback	Failure of this loopback mode indicates that the EIM module is not connected.

If Problems Arise Installing the DSU

If any of your equipment is operating incorrectly, immediately remove it from the telephone line before it harms your network. If the telephone company notes the problem, they may temporarily disconnect your service. They will notify you in advance of the disconnection, when possible. If advance notification is not feasible, you will be notified as soon as possible. When you are notified, you will be given the chance to correct the problem and be informed of your right to file a complaint with the FCC.

If the PathBuilder S24x, 26x, and 27x switch Integral DSU needs repair, 3Com or an authorized representative of 3Com can repair it. For information, contact 3Com Technical Support at 1 800 NET 3Com (1 800 638 3266).

Installing DIMs

Introduction   There are two Data Interface Modules (DIMs) on both the PathBuilder S24x, 26x, and 27x switch motherboard. Each DIM is a 64-pin, dual in-line module that can be repositioned so that Ports 1 or 2 act as either DCE or DTE ports. One DIM corresponds to Port 1 and the other to Port 2.

The DIMs on the motherboard are factory set in the DTE position.

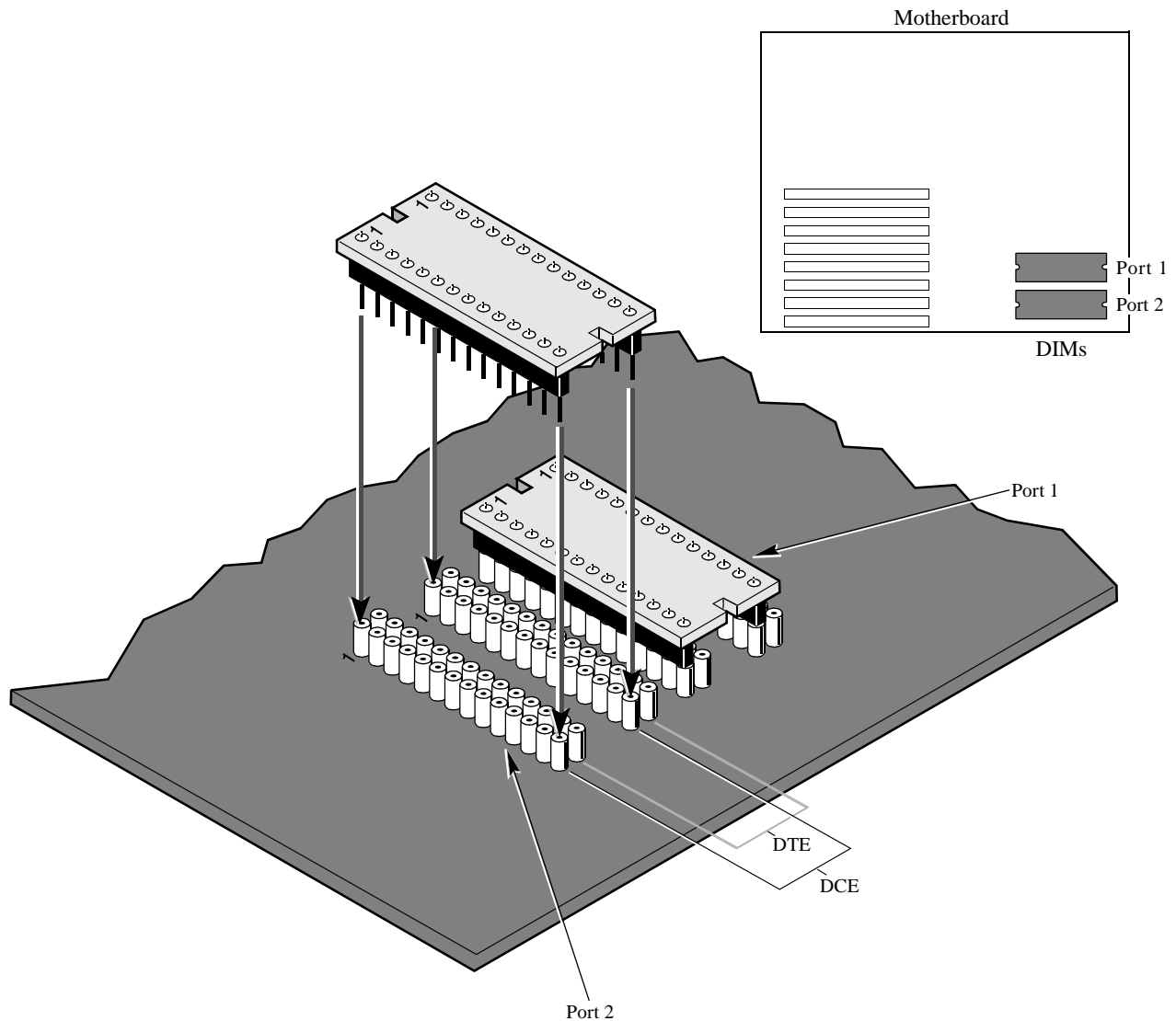**Example**   Figure 3-4 shows an example of installing a DIM.

Figure 3-4. Installing a DIM

Installing a DIM   To install the DIM, insert it into the desired DTE or DCE location. Be sure the pins are seated firmly in the sockets and are not bent.

⚠️ **Caution**

Some components used in the PathBuilder S24x, 26x, and 27x switch are sensitive to static electric discharges; static electric discharges can cause damage to internal components. Use proper handling and grounding precautions whenever handling cards and components.

⚠️ **Mise en Garde**

Certains composants du PathBuilder S24x, 26x, and 27x switch sont sensibles aux décharges électrostatiques qui peuvent les endommager. Prenez les dispositions et précautions de mise à la terre nécessaires lors de la manipulation de cartes et de composants.

⚠️ **Vorsicht**

Einige im PathBuilder S24x, 26x, and 27x switch verwendeten Komponenten sollten keinen elektrostatischen Entladungen ausgesetzt werden, durch die interne Bauteile beschädigt werden können. Wenden Sie die entsprechenden Maßnahmen zur Erdung und zum Schutz vor statischen Ladungen bei der Handhabung von Karten und Komponenten an.

Removing a DIM   To remove a DIM, lift it from its socket as shown in Figure 3-4. Be sure that you do not bend the pins during removal.

Installing SIMMs

Introduction

This section explains how to install different types of SIMMs on the motherboard.

- DRAM: There are two types of DRAM:
  - Global DRAM: This is memory that is accessible by all the boards in the PathBuilder S24x, 26x, and 27x switch.
  - Processor DRAM: This is memory dedicated to the PathBuilder S24x, 26x, and 27x switch's processor.

The PathBuilder S24x, 26x, and 27x switch motherboard comes with 8 Mbytes of Processor DRAM and 4 Mbytes of Global DRAM. You can add additional DRAM for a total of 8 Mbytes of Global and 16 Mbytes of Processor DRAM.

- FLASH: This is nonvolatile read/write memory.
- CMEM: This is nonvolatile (battery backed-up) configuration memory. This is where the real time clock is located.
- Data Compression: This is optional SIMM that is used for data compression functions.

Caution

Some components used in the PathBuilder S24x, 26x, and 27x switch are sensitive to static electric discharges; static electric discharges can cause damage to internal components. Use proper handling and grounding precautions whenever handling cards and components.

Mise en Garde

Certains composants du PathBuilder S24x, 26x, and 27x switch sont sensibles aux décharges électrostatiques qui peuvent les endommager. Prenez les dispositions et précautions de mise à la terre nécessaires lors de la manipulation de cartes et de composants.

Vorsicht

Einige im PathBuilder S24x, 26x, and 27x switch verwendeten Komponenten sollten keinen elektrostatischen Entladungen ausgesetzt werden, durch die interne Bauteile beschädigt werden können. Wenden Sie die entsprechenden Maßnahmen zur Erdung und zum Schutz vor statischen Ladungen bei der Handhabung von Karten und Komponenten an.

SIMM Location   Figure 3-5 shows the location of the Single In-line Memory Module (SIMM) slots on the PathBuilder S24x, 26x, and 27x switch motherboard.
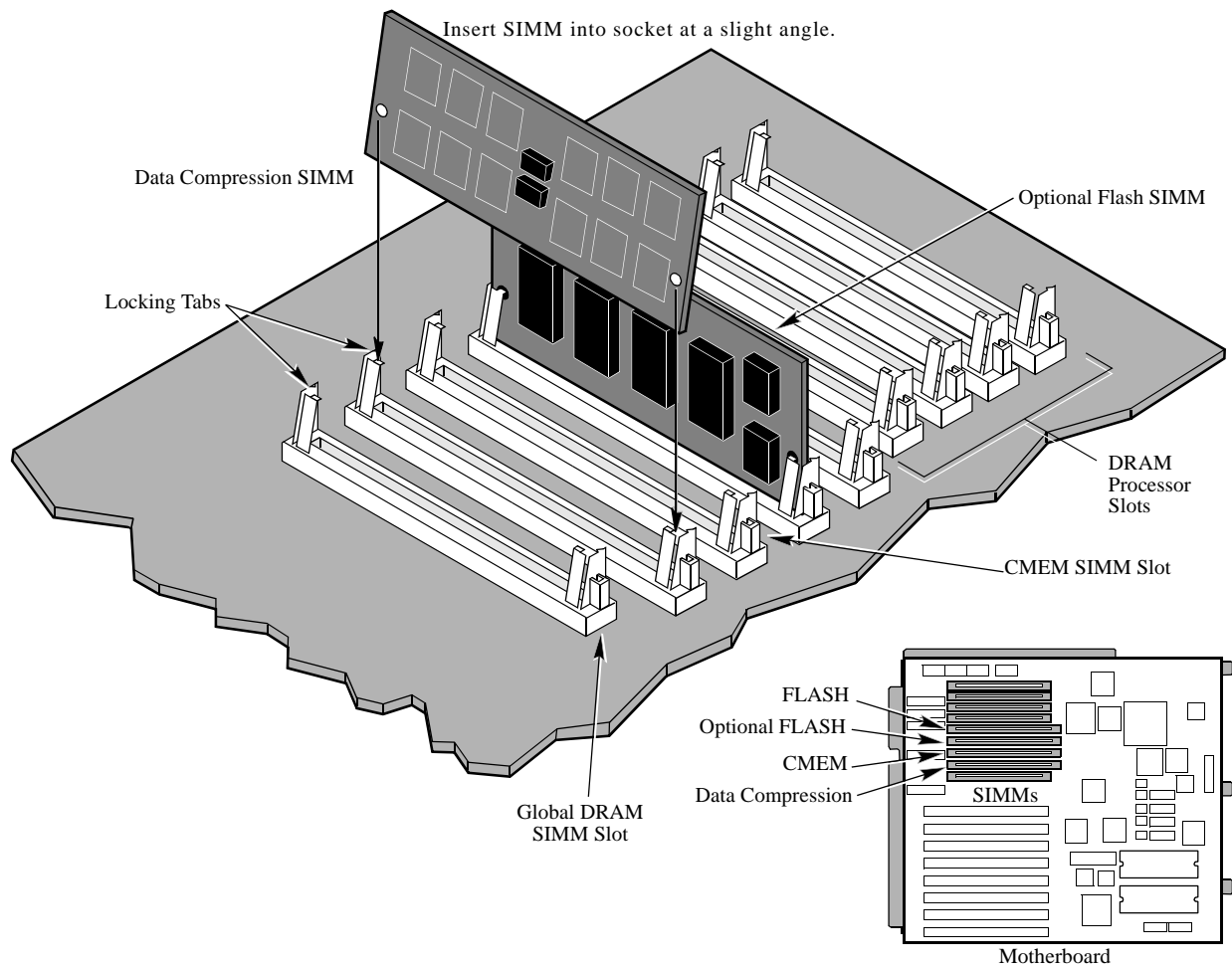

Figure 3-5. Installing SIMMs

Installing a SIMM   Perform these steps to install the SIMM:

Step	Action
1	Insert the SIMM at a slight angle as shown in Figure 3-5.
2	Snap the SIMM into the vertical position.
3	Be sure it locks in place with the locking tabs in a vertical position.

Removing a SIMM   When removing a SIMM, gently disengage locking tabs and lift out the SIMM.

Installing I/O Cards

Introduction
These PathBuilder S24x, 26x, and 27x switch I/O cards are installed into slots 1 through 8:

- Serial Data Board (SDB)
- BRI
- Hub

The Modem card can only be installed into slot 1.

Installing an I/O Card
Perform these steps to install any of the I/O cards:

Step	Action
1	Align the card and the appropriate slot.
2	Insert the card, making the proper connection on the motherboard.
3	Fasten each card with a single holding screw to the rear of the PathBuilder S24x, 26x, and 27x switch chassis.

Installing a T1 or E1 Dual Port Digital PBX Interface Card

Introduction
This section provides installation instructions for the T1 or E1 dual port digital PBX interface card for the PathBuilder S24x, 26x, and 27x switch. It also provides a section on installing a T1/CSU Daughter card onto the T1 Dual Port Card.

Slot Restriction
One T1 or E1 dual port digital PBX interface card may only be installed in expansion slot 8 in the PathBuilder S24x, 26x, and 27x switch.

Installation Procedure
Follow these steps to install a T1 or E1 dual port digital PBX interface card.

⚠ Caution

Observe antistatic precautions whenever handling interface cards to avoid damaging sensitive components. Wear a ground strap connected to a grounded equipment frame whenever handling the interface card; always transport the card in an antistatic bag.

⚠ Mise en Garde

Prenez des précautions antistatiques lors de la manipulation des cartes d'interface afin de ne pas endommager les composants sensibles. Portez une bande de mise à la masse raccordée à un équipement mis à la terre lors de la manipulation d'une carte d'interface, transportez-la toujours dans un sac antistatique.

Bitte beachten Sie bei der Handhabung der Schnittstellenkarten die Vorsichtsmaßnahmen zur Antistatik, um anfällige Bauteile vor Beschädigungen zu schützen. Tragen Sie einen Schutzerdungsleiter, der mit einem geerdeten Gerätegehäuse verbunden ist, wenn Sie die Schnittstellenkarte berühren. Transportieren Sie die Karte immer in einer antistatischen Hülle.

✋ Warning

Do not attempt to install the interface card while the PathBuilder S24x, 26x, and 27x switch is running.

✋ Avertissement

Ne tentez pas d'installer une carte d'interface lorsque le PathBuilder S24x, 26x, and 27x switch fonctionne.

✋ Warnung

Versuchen Sie nicht, die Schnittstellenkarte während des Betriebs des PathBuilder S24x, 26x, and 27x switch zu installieren.

Step	Action
1	Place the interface card on an antistatic mat.
2	Set the I/O base address for the card using the DIP switches at SW1.
3	Power down the PathBuilder S200 series switch by unplugging the AC power plug.
4	Remove the cover from the PathBuilder S24x, 26x, and 27x switch as shown in Figure 4-1 on page 4-4.
5	Use expansion slot 8. If necessary, unfasten the bracket screw and remove the bracket that covers the chassis opening for slot 8.
6	Holding the interface card by the rear bracket and board edges, gently insert the card into expansion slot 8, aligning the card with the card guides and making proper connection on the motherboard. Ensure that the card is seated securely in the expansion slot.
7	Secure the card to the chassis using the bracket screw.
8	Connect the 40-pin MVIP ribbon cable to the Multi-Vendor Integration Protocol interface on the top edge of the digital PBX interface card by snapping it so that the tabs match.
9	Connect the other end of the 40-pin MVIP ribbon cable to the appropriate DSPM/SM cards' MVIP connector by snapping it so that the tabs match.
10	Replace the PathBuilder S24x, 26x, and 27x switch cover.
11	Connect the spans to the connectors on the digital PBX interface card rear bracket.
12	Plug the AC power cord in. <u>Result:</u> The LEDs on the rear bracket remain off until the card is reset and the software is downloaded. after the download is complete, the green RUN LED remains on.

Installing the T1/CSU Daughter Card

Introduction
This section explains how to install a T1/CSU Daughter Card onto a T1 Dual Port Card.

When installing the T1/CSU card be certain that the T1 Dual Port card is not next to an FXO, FXS, or E&M card. Because these cards have components on both sides, they might come in contact with the T1/CSU card, damaging both cards.

⚠ Caution

Observe antistatic precautions whenever handling interface cards to avoid damaging sensitive components. Wear a ground strap connected to a grounded equipment frame whenever handling the interface card; always transport the card in an antistatic bag.

⚠ Mise en Garde

Prenez des précautions antistatiques lors de la manipulation des cartes d'interface afin de ne pas endommager les composants sensibles. Portez une bande de mise à la masse raccordée à un équipement mis à la terre lors de la manipulation d'une carte d'interface, transportez-la toujours dans un sac antistatique.

⚠ Vorsicht

Bitte beachten Sie bei der Handhabung der Schnittstellenkarten die Vorsichtsmaßnahmen zur Antistatik, um anfällige Bauteile vor Beschädigungen zu schützen. Tragen Sie einen Schutzerdungsleiter, der mit einem geerdeten Gerätegehäuse verbunden ist, wenn Sie die Schnittstellenkarte berühren. Transportieren Sie die Karte immer in einer antistatischen Hülle.

✋ Warning

Do not attempt to install the interface card while the PathBuilder S24x, 26x, and 27x switch is running.

✋ Avertissement

Ne tentez pas d'installer une carte d'interface lorsque le PathBuilder S24x, 26x, and 27x switch fonctionne.

✋ Warnung

Versuchen Sie nicht, die Schnittstellenkarte während des Betriebs des PathBuilder S24x, 26x, and 27x switch zu installieren.

| **Installation Procedure** | Follow these steps to install the T1/CSU Daughter card. |

Step	*Action*
1	Power down the PathBuilder S200 series switch by unplugging the AC power plug.
2	Remove the cables from the rear of the T1 Dual Port Interface card.
3	Remove the cover from the PathBuilder S24x, 26x, and 27x switch as shown in Figure 4-1 on page 4-4.
4	Use a screw driver to loosen the bracket screw and remove the T1 Dual Interface card.
5	Place the card on an antistatic mat.
6	Locate the pin connectors on the T1 Dual Port Card. See Figure 3-6. The upper connectors support Port 49 and the lower connectors support Port 50.
7	Using a pair of long-nose pliers or a small screw driver, remove the small jumpers from the connectors.
8	Carefully insert the T1/CSU Daughter Card(s) into the pin connectors. Ensure that the card is seated securely.
9	Insert the T1 Dual Port card into expansion slot 8, aligning the card with the card guides and making proper connection on the motherboard. Ensure that the card is seated securely.
10	Secure the card to the chassis using the bracket screw.
11	Replace the PathBuilder S24x, 26x, and 27x switch cover.
12	Reconnect the cables to the T1 Dual Port card.
13	Plug in the AC power cord.

2 Carefully install Daughtercard Pins into T1 Dual Port Interface Connector.

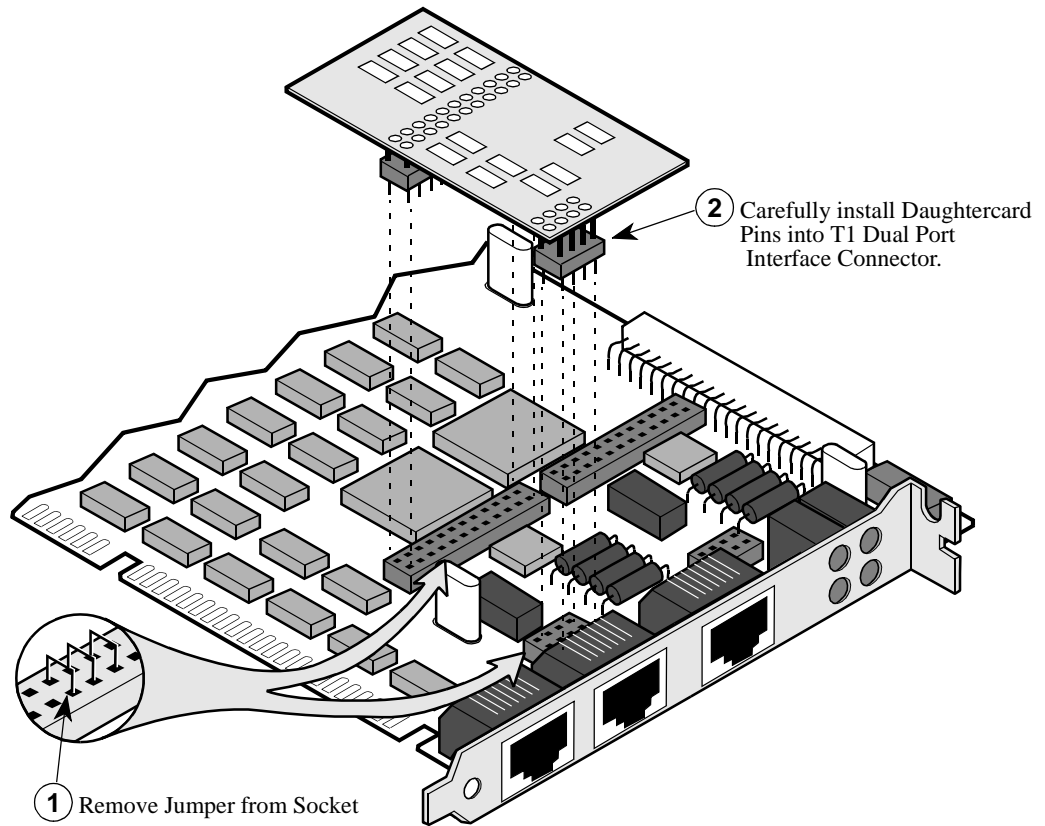1 Remove Jumper from Socket

Figure 3-6. Installing T1/CSU Daughter Cards

Cabling the PathBuilder S24x, 26x, and 27x Switch

Introduction   This section describes the connections for:

- Control Terminal Port (CTP)
- I/O Interface cards
- Network Manager
- LAN
- An external power source

CTP Connection   The CTP is set as Port 6 on the rear of the PathBuilder S24x, 26x, and 27x switch. It is a fixed EIA 232-D DCE interface terminating on a DB-25 connector. No special cabling is required. Typically, a straight-through DB-25 male to DB-25 male cable is required for connection to a terminal device.

I/O Interface Port Connection   Three of the I/O ports on the backplane of the PathBuilder S24x, 26x, and 27x switch chassis are DB-25 female connectors. One of the I/O ports is a DB-15 female connector. You do not need additional cables if the DIM-based ports (Ports 1 and 2) have EIA 232-D DIMs installed.

Network Manager Connection   The PathBuilder S24x, 26x, and 27x switch supports direct manager connection using the CTP. There is a serial interface connection for the SNMP manager. You can attach the control terminal to any asynchronous PAD port.

LAN Connection   You can connect a PathBuilder S24x, 26x, and 27x switch to a LAN with a router. The router can be either an external router connected to a PathBuilder S24x, 26x, and 27x switch using a Frame Relay connection or a PathBuilder S200 series switch internal router. For more LAN connection information, refer to Appendix A, Appendix.

Procedure   Follow these steps to connect to an external power source:

Step	Action	Result/Description
1	Verify that the 115/230 VAC Switch on the rear panel is set for the specific country's requirements.	Be sure that the AC power cord meets requirements for the country of use.
2	If you are using an AC power supply, connect the power cord to the back of the PathBuilder S24x, 26x, and 27x switch enclosure and then to the appropriate power source. If you are using a -48VDC input power supply, verify correct polarity with a Volt meter.	The PathBuilder S24x, 26x, and 27x switch unit automatically powers on and runs self-diagnostics.

Installing the Transceiver

Introduction

The transceiver mounts to the DB-15 AUI connector of the Ethernet LAN card or to the DB-15 AUI connector on the back panel. The Thin-Net BNC connector provides subsequent interface to the coaxial network.

The SQE can be turned ON and OFF by setting a switch on the side of the housing.

■**Note**

The transceiver is shipped with the SQE set to the OFF position.
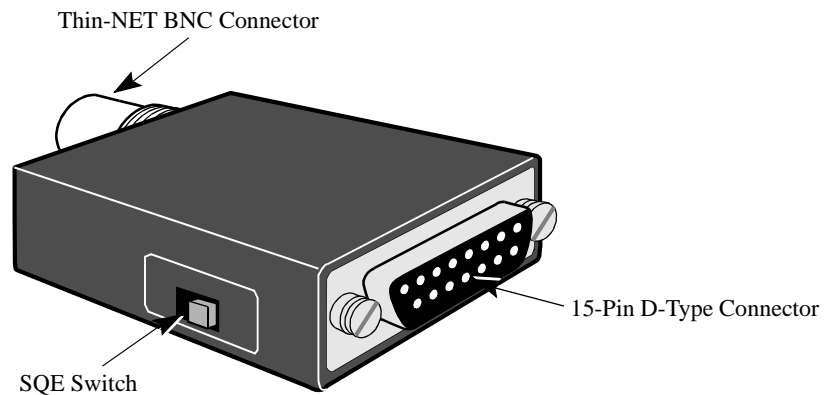
Transceiver Illustration

Figure 3-7 shows a transceiver.

Figure 3-7. Transceiver

Power-Up Diagnostics/Verification

Introduction

Diagnostics run when a node is powered up. Basic tests are run from PROM and more extensive diagnostics are run during startup.

If the node detects a lack of software, it sends a message to the CTP. The yellow LED lights and a 2-digit code is displayed. You must initiate a software coldload if needed.

Power Up Sequence

This is the power-up sequence.

Function	*Description*
ROM-based diagnostics	Local core self-tests. Boots PROM checksum, MPU test, Program RAM test.
FLASH verification	Checksum FLASH image.
Loads RAM diagnostics	Uncompresses FLASH diagnostics image to RAM and executes.
RAM-based diagnostics	Tests I/O cards and everything else on card.
Loads RAM operational software	Uncompresses FLASH operational software image to RAM and executes.
Verifies Config database	Verifies resident CMEM database.

Node Restarts

The three types of restarts are:

- Coldstart
- Warmstart
- Default Node

Node Coldstart

A node coldstart is similar to a power-up. It follows the power-up sequence except that it is initiated when the operator presses the RESET button on the front panel or when certain software faults occur. All calls are cleared along with Event queues. A Node coldstart loads only configuration memory.

Node Warmstart

A node warmstart can be initiated by a software fault or an operator command. It is identical to a coldstart except for the following:

- No diagnostic testing is performed.
- Code downloads are not performed unless necessary.
- Event logs are not erased.

Default Node Command

A default node command is the same as a warmstart, except it is only initiated by the operator. The Current configuration bank in nonvolatile CMEM memory is erased and replaced by the system default configuration.

Setting Node to Default Configuration

You can set a node to the default configuration by choosing the Default Node selection from the CTP Main menu.

Installing Software Options

Introduction   The PathBuilder S24x, 26x, and 27x switch contains all the software options available for the current release of the product. In some cases, the options have already been enabled. However, in other cases, the option you want to use needs to be enabled. Refer to the latest Software Release Notice for more information.

Full Mesh Cluster Cabling

Introduction   This section explains some of the important points to keep in mind when using your PathBuilder S24x, 26x, and 27x switches in a full mesh cluster configuration.

Usage   A full mesh application uses standard networking ports on the PathBuilder S24x, 26x, and 27x switch (ports 1, 2, and 3) and standard networking protocols appropriate for your application (X.25, Voice Relay, etc.). All networking services are available to the circuits between the clustered nodes.

Configuring   When configuring a full mesh application, remember that each node must be configured individually. Ports 1, 2, and 3 on each PathBuilder S24x, 26x, and 27x switch will appear normally on the Port Record. The parameter Clock Speed and the appropriate clock mode (Int, Ext, etc.) should be set depending on the DIM position and speed. Clock speeds up to 2.048 Mbps are supported.

Cables   When cabling PathBuilder S200 series switch in a mesh application, use DB25 male to DB25 male straight-through cables.

Ports   To use your PathBuilder S24x, 26x, and 27x switch in a full mesh cluster, note that:

- Ports 1, 2, and 3 on all four nodes are for the mesh connections.
- Port 3 is always a DTE port (V.36 electrical).
- Ports 1 and 2 can be either DCE or DTE ports. This is determined by the way you set the V.36 DIMs on the motherboard. Refer to the "Installing DIMs" section earlier in this chapter.

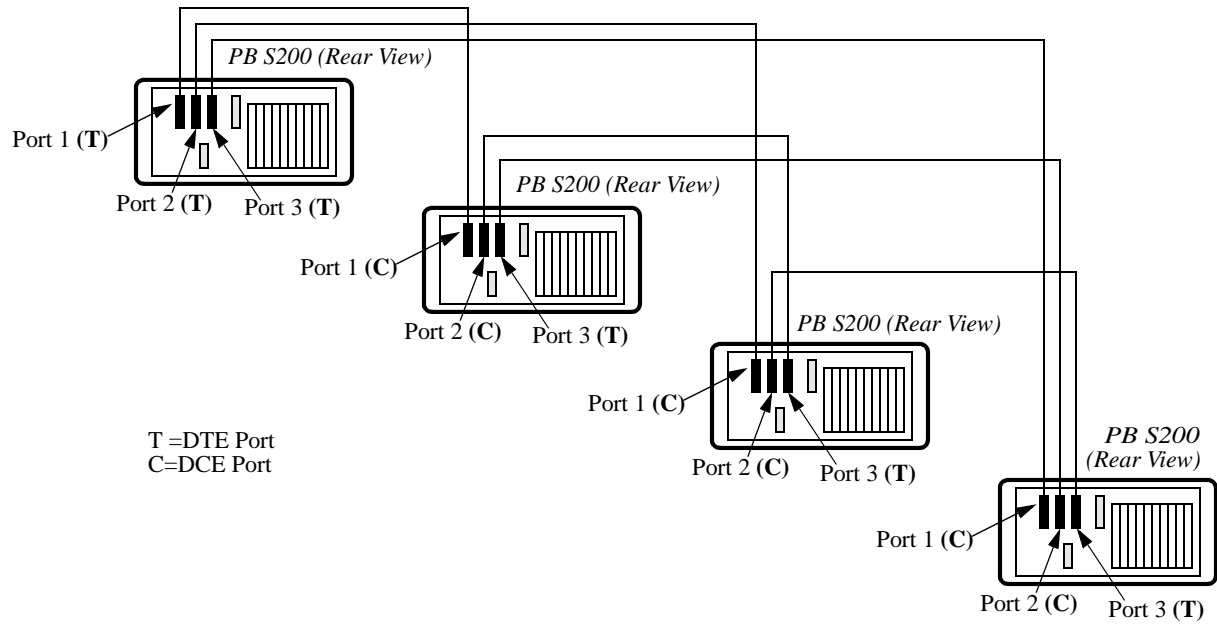**Mesh Diagram**   Figure 3-8 shows how a full mesh application is cabled.

Figure 3-8. Mesh Diagram

Overview

Introduction   This chapter contains procedures to remove/replace the PathBuilder S24x, 26x, and 27x switch components.

⚠ Warning

Only trained, qualified technicians should perform procedures outlined in this manual. 3Com PathBuilder S200 series switch daughtercards and DIMs are sensitive to static discharge, which can damage components. Trained, qualified technicians will use proper handling and grounding precautions when handling a 3Com PathBuilder S200 series switch daughtercard or DIM.

⚠ Avertissement

Seuls des techniciens qualifiés doivent mettre en pratique les procédures décrites dans ce manuel. Les cartes fille 3Com PathBuilder S200 series switch et les DIM sont sensibles aux décharges statiques qui peuvent endommager les composants. Les techniciens formés et qualifiés prendront les dispositions et précautions de mise à la terre nécessaires lors de la manipulation de cartes fille 3Com PathBuilder S200 series switch et de DIM.

⚠ Warnung

Die in diesem Handbuch aufgeführten Vorgänge sollten ausschließlich von geschulten und qualifizierten Technikern durchgeführt werden. Da PathBuilder S200 series switch-Zusatzkarten und DIMs von 3Com keinen statischen Entladungen ausgesetzt werden sollten, da Komponenten beschädigt werden können, werden sie von dem qualifizierten technischen Personal mit den entsprechenden Maßnahmen zur Erdung und zum Schutz vor statischen Ladungen gehandhabt.

⚠ Caution

Some components used in the PathBuilder S24x, 26x, and 27x switch are sensitive to static electric discharges; static electric discharges can cause damage to internal components. Use proper handling and grounding precautions whenever handling cards and components.

⚠ Mise en Garde

Certains composants du PathBuilder S24x, 26x, and 27x switch sont sensibles aux décharges électrostatiques qui peuvent les endommager. Prenez les dispositions et précautions de mise à la terre nécessaires lors de la manipulation de cartes et de composants.

⚠ Vorsicht

Einige im PathBuilder S24x, 26x, and 27x switch verwendeten Komponenten sollten keinen elektrostatischen Entladungen ausgesetzt werden, durch die interne Bauteile beschädigt werden können. Wenden Sie die entsprechenden Maßnahmen zur Erdung und zum Schutz vor statischen Ladungen bei der Handhabung von Karten und Komponenten an.

Removing/Replacing Top Cover

Introduction
You must remove the top cover to access the motherboard and all I/O cards, the power supply, and the fan.

Removing the Cover
Perform these steps to remove the top cover of the PathBuilder S24x, 26x, and 27x switch:

Step	*Action*
1	Verify that the power is OFF.
2	Remove the six screws from the back of the chassis (Figure 4-1).
3	Pull the cover toward the rear of the unit (approximately 1/4 inch).
4	Lift up to release from the sliding clips. ■ **Note** Be sure not to damage spring clips on chassis.

Example   Figure 4-1 shows an example of removing the top cover of the PathBuilder S24x, 26x, and 27x switch.

Pull cover
1/4-in.
toward rear.

Lift cover.

Remove six screws.
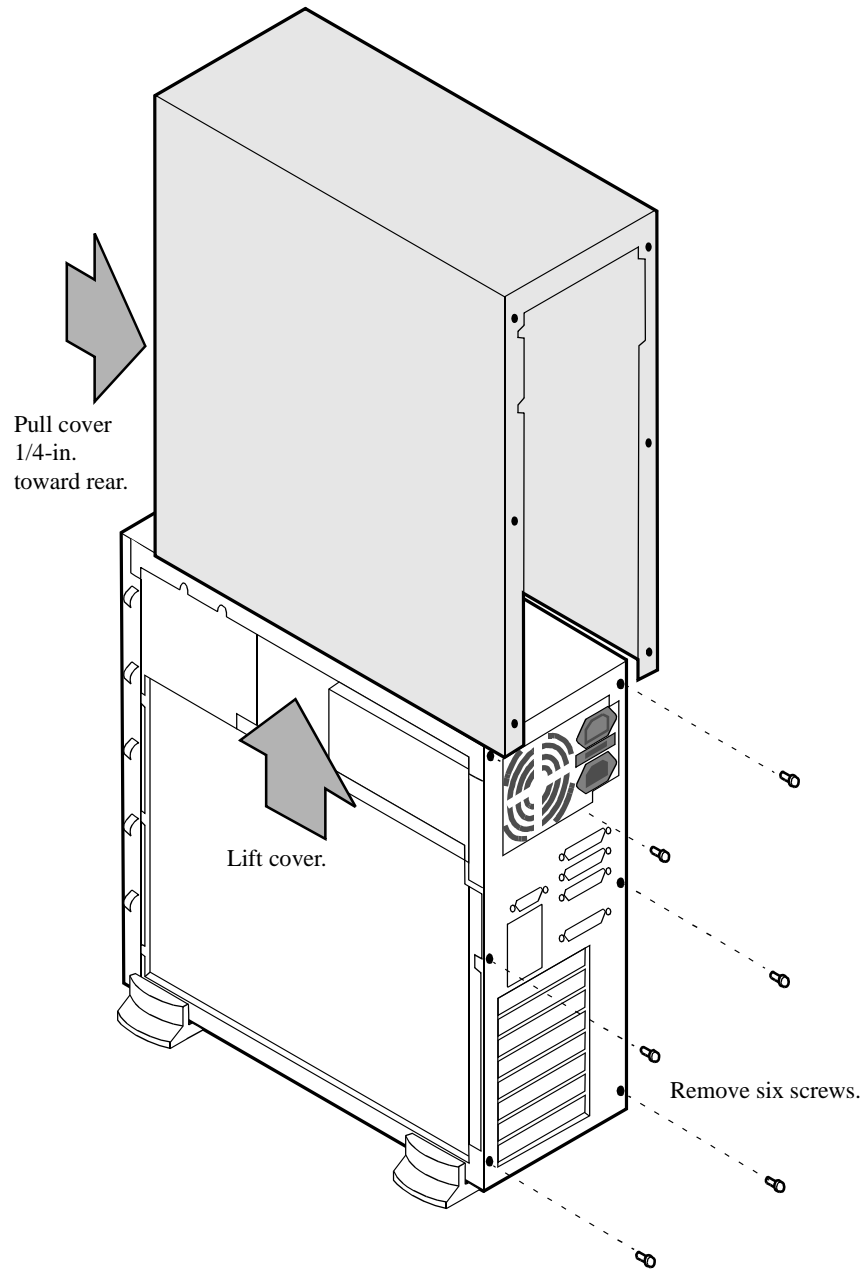
Figure 4-1. Removing the Top Cover

Replace the Cover   To replace the top cover, reverse the steps just detailed in "Removing the Cover."

Removing/Replacing Front Panel Cover

Introduction   This section describes how to remove the front panel cover. The auxiliary fan is attached to the front panel cover.

Remove the Front Panel Cover   Perform these steps to remove the front panel cover:

Step	*Action*
1	Verify that the power is OFF.
2	Remove the top cover as shown in Figure 4-1.
3	Remove the ribbon cable connecting the LED display card to the motherboard. The ends of the cable are keyed, simplifying cable replacement (Figure 4-2).
4	While holding onto the front panel cover: • Loosen the thumbscrew by turning counter-clockwise (Figure 4-2). • Pull the top of the front panel cover away from the front of the unit. • Lift up to disengage from bottom tabs.

Example	Figure 4-2 shows an example of disconnecting the front panel cover.
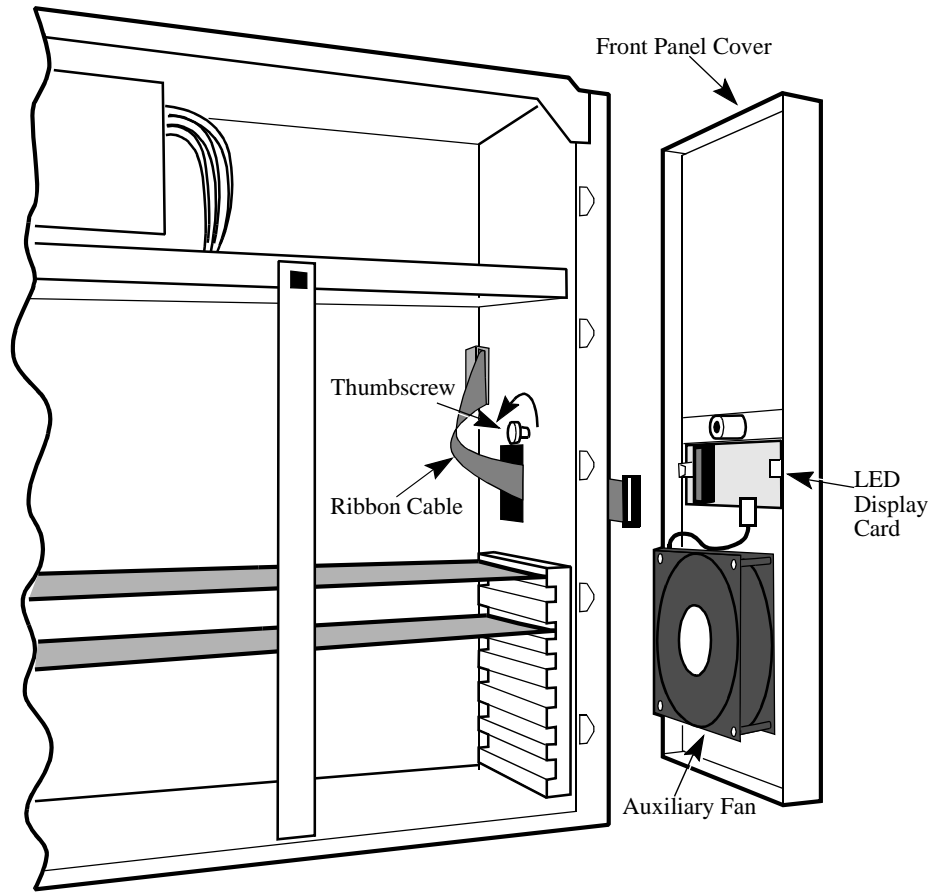
Figure 4-2. Removing the Front Panel Cover

Removing/Replacing Power Supply

Introduction

This section describes how to remove the power supply.

Remove the Power Supply

Perform these steps to remove the power supply:

Step	*Action*
1	Verify that the power is OFF by disconnecting the power cord.
2	Remove the top cover (refer to Figure 4-1).
3	At the rear of the unit, remove the four screws attaching the power supply to the back of the chassis (Figure 4-3).
4	Disconnect the power supply cables (P1 and P2) from the motherboard.
5	• Remove the two internal screws on the fan assembly. • Slide the power supply to the front to clear the lip of the chassis. • Slide it out and away from the unit.

Replace the Power Supply

To replace the power supply, reverse the steps just detailed in "Remove the Power Supply." Cables are keyed to aid in reassembly.

To replace the DC power supply, reverse the steps detailed "Removing/Replacing Power Supply" section on page 4-7 to Step 2. Instead of performing Step 1, verify that incoming power is disconnected with a volt meter then connect the appropriate terminal block locations.

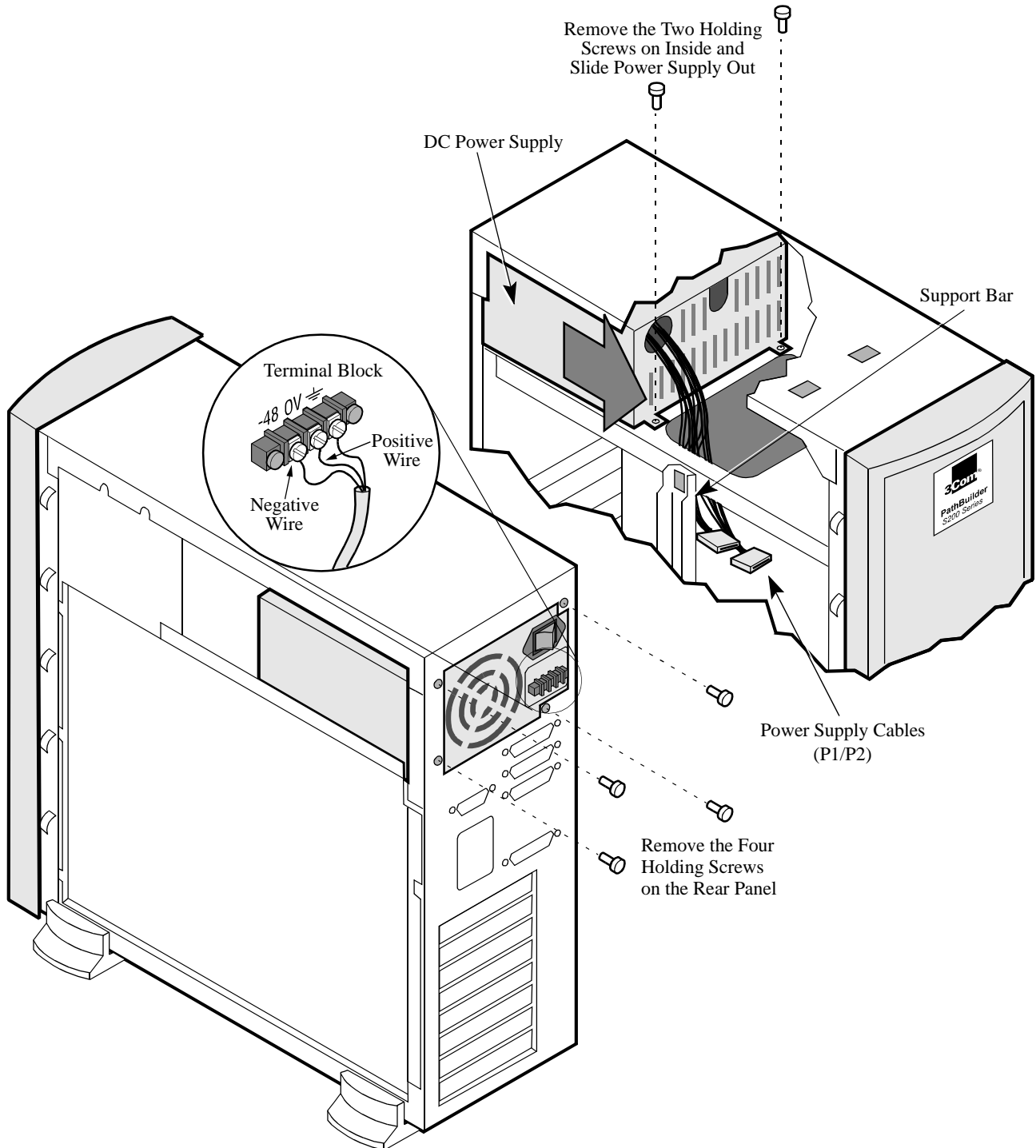**Example**   Figure 4-3 shows an example of removing the power supply.

Remove the Two Holding
Screws on Inside and
Slide Power Supply Out

DC Power Supply

Support Bar

Terminal Block

-48 0V

Positive
Wire

Negative
Wire

3Com

PathBuilder
S200 Series

Power Supply Cables
(P1/P2)

Remove the Four
Holding Screws
on the Rear Panel

Figure 4-3. Removing the Power Supply

Removing/Replacing PathBuilder S24x, 26x, and 27x Switch Cards

Introduction

This section describes how to remove the PathBuilder S24x, 26x, and 27x switch cards. The I/O cards are located in seven full-size and one half-size slots on the motherboard.

Removing an Expansion Card

Follow these steps to remove an expansion card:

Step	Action
1	Verify that the power is OFF by removing the power cord.
2	Remove the top cover (refer to Figure 4-1).
3	Unlock the latch at the top of the support bar by turning the latch counterclockwise 1/4 turn (Figure 4-4).
4	Pull the support bar out from the chassis.
5	To remove an expansion card: • Remove the holding screw that is to the left of the card to be removed (Figure 4-5). • Disconnect any external cables attached to the card being removed. • Gently pull the card away from its connectors and slide the card out.

Example   Figure 4-4 shows an example of removing the support bar.

Turn latch
1/4 turn.

Support Latch Bar
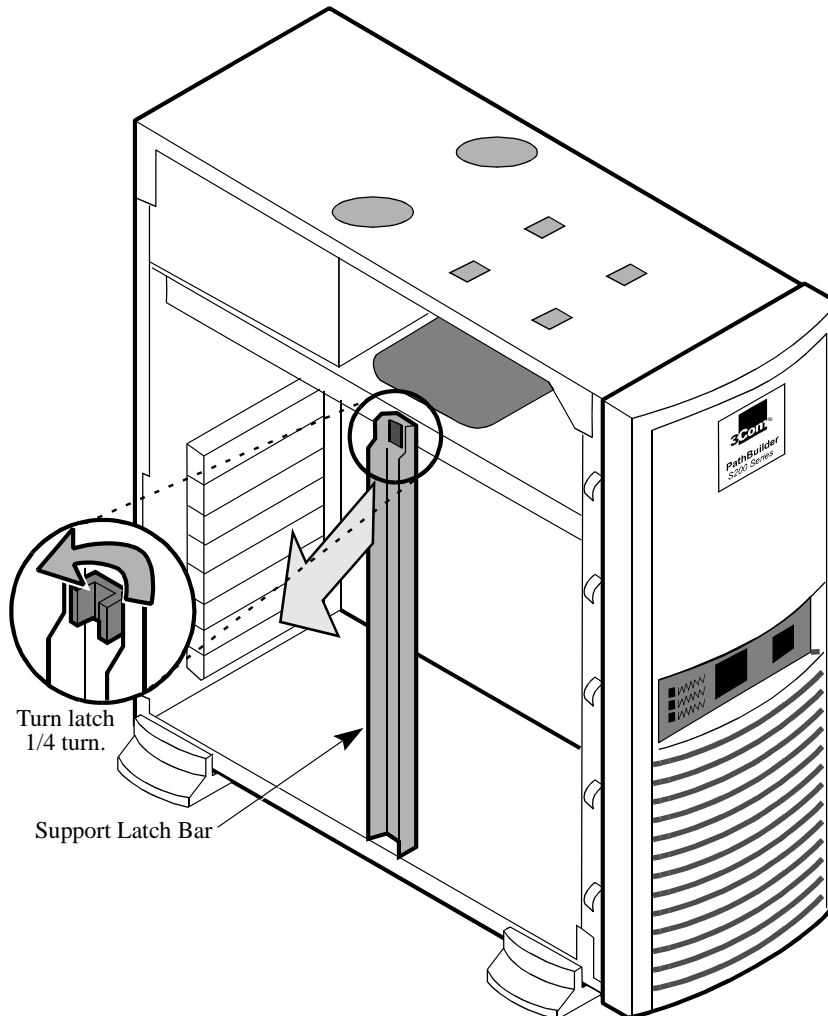
Figure 4-4. Removing the Support Bar

Maintenance

Example   Figure 4-5 shows an example of removing an expansion card.

Holding Screws

Gently pull card from
connectors and slide it out.
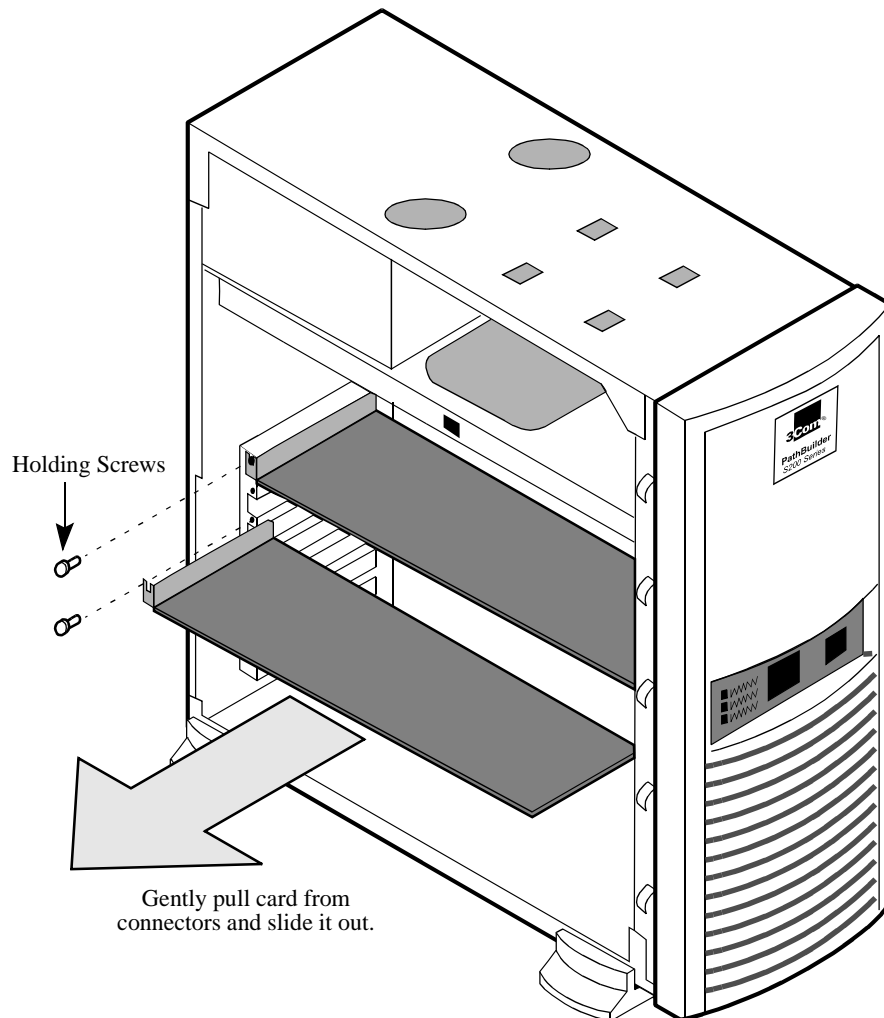
Figure 4-5. Removing an Expansion Card

Replacing a Card   To replace an expansion card, reverse the steps just detailed in "Removing an Expan-
sion Card." When replacing cards, be sure that the full-size cards are engaged in the
card guides in the front end of the unit

Replacing PathBuilder S24x, 26x, and 27x Switch Motherboard

Introduction   You must first remove all the expansion cards in order to gain access to the motherboard.

Removing the Motherboard   Perform these steps to remove the motherboard:

Step	Action
1	Verify that the power is OFF by removing the power cord.
2	Remove the unit's top cover (refer to Figure 4-1).
3	Remove the support bar from the chassis.
4	Remove all cables connected to expansion cards and remove all expansion cards.
5	Disconnect the ribbon cable connecting the LED display card to the motherboard at the motherboard end.
6	Disconnect all cables connecting ports 1, 2, 3, 4, and 6 to the motherboard. ■ **Note** All cable connectors are keyed to ensure proper connection.
7	Disconnect the two power supply cables.
8	On the right side of the unit (toward the backplane): • Remove the three retaining screws (Figure 4-6). • Swing the motherboard out and away from the chassis. • Lift the assembly up and away from its hinges.

Example   Figure 4-6 shows an example of removing the motherboard.

Swing motherboard out
and lift from enclosure.

Remove screws.
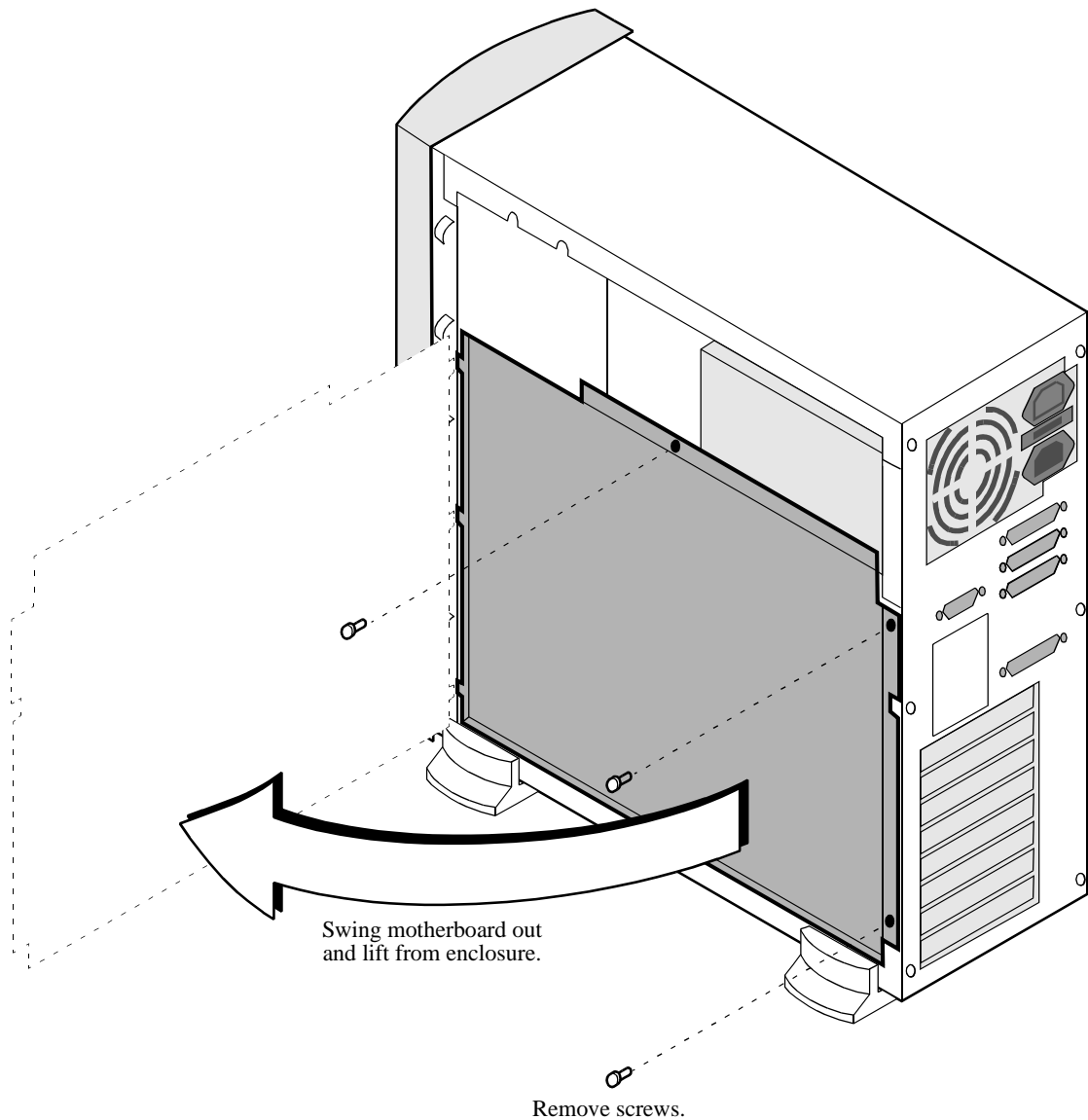
Figure 4-6. Removing the Motherboard

Install the   To replace the motherboard, reverse the steps just detailed in "Removing the
Motherboard   Motherboard."

Removing/Replacing the Lithium Battery

Introduction The 3-volt lithium battery on the CMEM card maintains the node's configuration memory in the event of a power failure.

⚠ Warning

Only qualified service personnel should perform the procedure described in this section. Use of this procedure by unqualified personnel could result in personal injury or equipment damage, and could jeopardize your warranty and maintenance agreement. The danger of explosion exists if the lithium battery is incorrectly replaced. Replace the battery only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

⚠ Avertissement

Il y a danger d'explosion s'il y a remplacement incorrect de la batterie. Remplacer uniquement avec une batterie du même type ou d'un type équivalent recommandé par le constructeur. Mettre au rebut les batteries usagées conformément aux instructions du fabricant.

⚠ Warnung

Explosionsgefahr bei unsachgemäßem Austausch der Batterie. Ersatz nur durch denselben oder einen vom Hersteller empfohlenen ähnlichen Typ. Entsorgung gebrauchter Batterien nach Angaben des Herstellers.

Replacing the Battery Follow these steps to replace the battery:

Step	Action
1	Power down the PathBuilder S24x, 26x, and 27x switch node.
2	Remove the CMEM card (refer to Figure 3-2 in Chapter 3).
3	Slip the battery out from under the spring clip in the upper left-hand portion of the card, as shown in Figure 4-7 .
4	Insert a fresh battery under the spring clip, making sure that the positive (+) terminal is face up. **IMPORTANT:** *This procedure will erase the CMEM*.
5	Reinsert the CMEM card.

Example
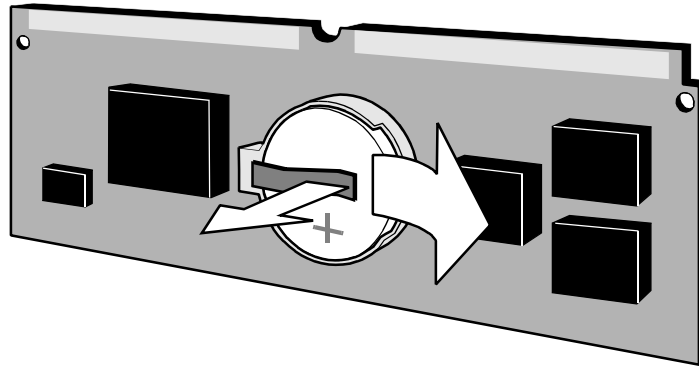
Figure 4-7 shows an example of removing the lithium battery.

Figure 4-7. Removing the Lithium Battery

Overview

What Is It?

The Channelized Data option provides an alternative to using Serial Data Boards (SDB) to concentrate data traffic from remote nodes attached to the PathBuilder S24x, 26x, and 27x switch through a multiplexer.

Using one T1 or E1 card installed in a PathBuilder S24x, 26x, and 27x switch, Channelized Data supports a greater number of port connections between the PathBuilder S24x, 26x, and 27x switch and remote nodes than allowed is by SDBs.

For example, eight SDB cards installed in the PathBuilder S24x, 26x, and 27x switch plus three motherboard ports allow a maximum of 19 connections per node, or two ports per SDB card. With Channelized Data you can make up to 30 connections using a T1 card or E1 card.

■**Note**

Each E1 or T1 card contains two ports. However, the Channelized Data option only supports up to 30 configured virtual ports for data traffic. The remaining virtual ports available on the PathBuilder S24x, 26x, and 27x switch are reserved for uncompressed voice traffic.

The Channelized Data option is configurable from the Control Terminal Port. See the "Configuring Channelized Data" section on page 5-3 for details on how to configure a PathBuilder S200 series switch for channelized data operation.

Statistics and Alarms

The Channelized Data option uses the standard X.25 and Frame Relay statistics available for the PathBuilder S200 series switch products family. Refer to the *X.25 Configuration Basics Guide* for information on statistics.

For details on alarms and reports, refer to the *Alarms and Reports* manual.

Software Authorization Key

No Software Authorization Key is required to enable Channelized Data on a PathBuilder S24x, 26x, and 27x switch.

Application Example

Overview

Figure 5-1 shows a typical Channelized Data application where multiple remote LAN sites feed into a cluster of PathBuilder S24x, 26x, and 27x switch Regional Concentrators. The PathBuilder S24x, 26x, and 27x switch cluster concentrates the traffic and passes it on to multiple hosts.
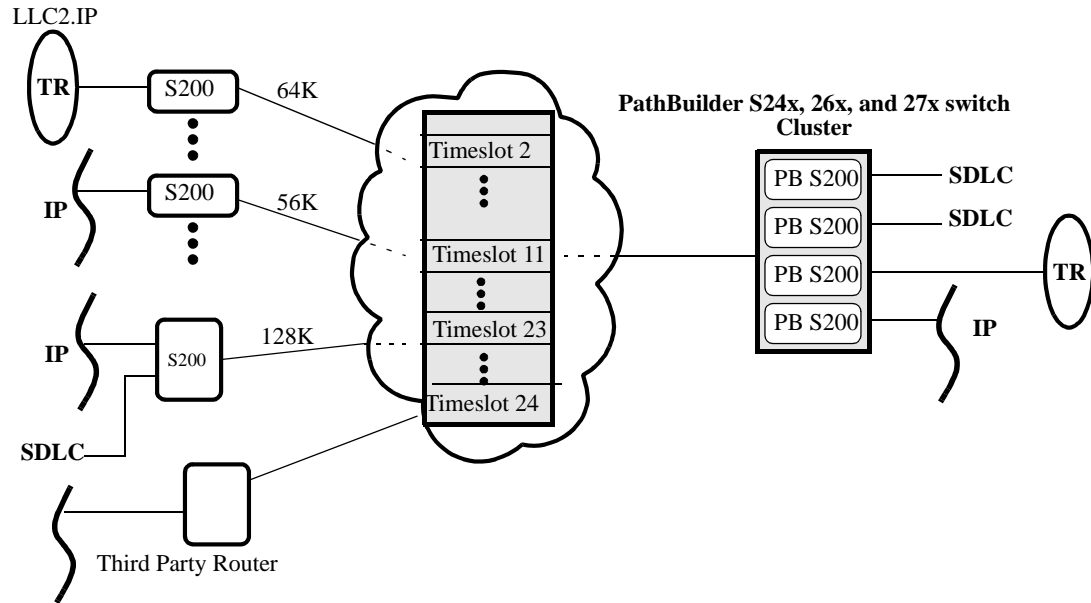

Figure 5-1. Application Example

In a Frame Relay application, each timeslot shown in Figure 5-1 would represent a port. You would also need to configure a station for each port if you wanted to run the maximum DS0 for a timeslot.

Configuring Channelized Data

Overview
Before you can use the Channelized Data option on your PathBuilder S24x, 26x, and 27x switch, you must configure the node for Channelized Data operation. This section describes how to set up your PathBuilder S24x, 26x, and 27x switch for Channelized Data operation.

Before You Begin
Refer to the following list to make sure you have everything you need before you begin to configure the Channelized Data option:

- Install a T1/E1 card in slot 8 on your PathBuilder S24x, 26x, and 27x switch.
- If you want to pass both voice and data traffic, or just data traffic, make sure a 2 Mbps T1/E1 card is installed properly in slot 8 on your PathBuilder S24x, 26x, and 27x switch. If you want to pass voice traffic only, you can use a 512 kbps T1/E1 card.
- Obtain the timeslot information from your network service provider. The timeslot information is needed to configure virtual ports for all your remote connections.
- Install the software release containing the Channelized Data option in your PathBuilder S24x, 26x, and 27x switch.
- Make a CTP connection to the CTP port on your PathBuilder S24x, 26x, and 27x switch and begin to configure the Channelized Data option.

Frame Relay Applications
For Frame Relay applications, you must configure a port and a station for every timeslot with a unique destination.

What You Have to Configure
You need to configure the following records and tables in your PathBuilder S24x, 26x, and 27x switch to perform Channelized Data operation:

Configure this Record/Table	*To do this...*
Port record	This sets up the physical T1/E1 ports on the PathBuilder S24x, 26x, and 27x switch performing Channelized Data. See the "Configuring T1 and E1 Physical Ports" section on page 5-5.
Virtual Port Record (for each remote connection)	This sets up a Virtual Port Record entry for each connection between the PathBuilder S24x, 26x, and 27x switch and a remote node. See the "Configuring Virtual Ports on the PathBuilder S24x, 26x, and 27x Switch" section on page 5-18.
Virtual Port Mapping Table	This sets up a timeslot for each connection between the PathBuilder S24x, 26x, and 27x switch and the remote nodes. Refer to the "Configuring Virtual Port Mapping Table" section on page 5-20.

Configuring T1 and E1 Physical Ports

Introduction

You have to configure the physical ports for the T1/E1 connections between the remote nodes and the PathBuilder S24x, 26x, and 27x switch.

T1/E1 physical ports are configured as ports 49 and 50 on the PathBuilder S24x, 26x, and 27x switch. You can configure up to two T1 or E1 ports per node.

There is an overall limitation of 30 Channelized Data ports for a T1 or E1 card installed in a node. The remaining ports can be used for voice traffic.

Configuration Procedure

Follow these steps to configure the physical ports on the PathBuilder S24x, 26x, and 27x switch.

Step	Action	Result
1	From the CTP Main menu, select **Configure -> Ports**.	The Port Number parameter appears.
2	Enter the port number. This value is **49** or **50.**	The Port Type parameter appears.
3	Enter **T1** for a **T1** connection or **E1** for an **E1** connection.	The port parameters for E1 or T1 appear in sequence. See the "Configuring T1 and E1 Physical Ports" section on page 5-5 for details.
4	Fill in the remaining port parameters, and type **a semicolon <;>**. Press Return at the last parameter.	This saves your changes.
5	Perform a Node boot.	This implements your changes to the Port record. ■ **Note** You can perform a Node boot after configuring all the records and tables for Channelized Data operation to implement all your changes at one time if you prefer.

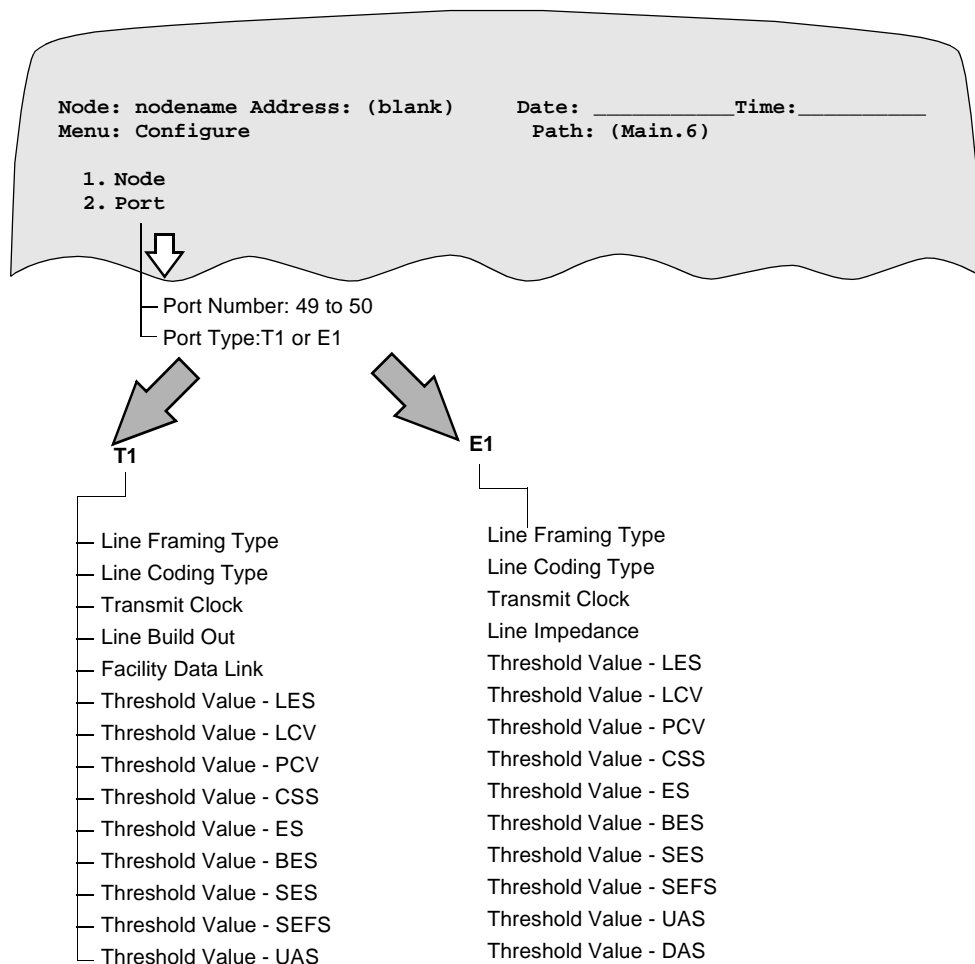**Port Record**   Figure 5-2 shows the navigational path to the T1 and E1 configuration parameters.

```
Node: nodename Address: (blank)      Date: _____Time:_____
Menu: Configure                       Path: (Main.6)

  1. Node
  2. Port
```

— Port Number: 49 to 50
— Port Type:T1 or E1

T1

— Line Framing Type
— Line Coding Type
— Transmit Clock
— Line Build Out
— Facility Data Link
— Threshold Value - LES
— Threshold Value - LCV
— Threshold Value - PCV
— Threshold Value - CSS
— Threshold Value - ES
— Threshold Value - BES
— Threshold Value - SES
— Threshold Value - SEFS
— Threshold Value - UAS

E1

Line Framing Type
Line Coding Type
Transmit Clock
Line Impedance
Threshold Value - LES
Threshold Value - LCV
Threshold Value - PCV
Threshold Value - CSS
Threshold Value - ES
Threshold Value - BES
Threshold Value - SES
Threshold Value - SEFS
Threshold Value - UAS
Threshold Value - DAS

Figure 5-2. Example of the Port Record for the Physical Port for T1 and E1 Connections

T1 Port Parameters

Overview

This section describes the T1 port parameters in detail.

Configuration Guidelines

Configure a T1 Port before configuring a Virtual Port Mapping Record, which maps a logical timeslot channel (a virtual port) to that port.

Port Record Parameters

The following parameters are available from the T1 port record.

Port Number

Range:	49, 50
Default:	NA
Description:	Specifies the number of the port you are configuring and serves as the entry number for the port you are about to configure.

Port Type

Range:	Voice, T1, E1
Default:	Null
Description:	Specifies the type of port you are configuring; the parameter value you input for port type determines the subsequent parameters that appear next.
Boot Type:	Changes to this parameter require a Node boot to take effect.

Line Framing Type

Range:	ESF, SF
Default:	ESF
Description:	Indicates type of framing the DS1 circuit uses. • ESF: Extended SuperFrame • SF: SuperFrame

Line Coding Type

Range:	B8ZS, B7ZS, AMI
Default:	B8ZS

Line Coding Type *(continued)*

Description:	Selects type of zero suppression used on the T1 link.
	   • B8ZS: Consecutive 8 zero suppression (clear channel)
	   • B7ZS: Stuffing: (56k x N)
	   • AMI: Alternate mark inversion (user equipment must maintain density)

Transmit Clock

Range:	INT, REC
Default:	INT

Description:	Selects the source of transmit clock.
	   • INT: Internal Oscillator
	   • REC: Received Timing
	■ **Note**
	Only one T1 port on the card can be selected for REC timing.

Line Build Out

Range:	0 to 4
Default:	0

Description:	Select the Line Build Out to match the physical interface. For a DSX interface, select the number based on the cable length:
	   • 0: 0 to 133 ft
	   • 1: 134 to 266 ft
	   • 2: 267 to 399 ft
	   • 3: 400 to 533 ft
	   • 4: 534 to 655 ft
	For a DS1 interface, select the number based on the signal level:
	   • 0: 0 dB
	   • 1: -7 dB
	   • 2: -15 dB
	   • 3: -22 dB
	   • 4: Invalid for DS1 interfaces

Facility Data Link

Range:	None, ANSI, ATT
Default:	None
Description:	Describes the use of the facility data link channel. Appears only if ESF is selected as Line Framing Type.

Threshold Value LES

Range:	1 to 255
Default:	10
Description:	Specifies the number of errors that must occur within a fixed 15- minute window before an alarm is declared. This is based on the threshold value for Line Error Seconds, which are seconds in which one or more line code violation error events are detected.

Threshold Value-LCV

Range:	1 to 255
Default:	10
Description:	Specifies the number of errors that must occur within a fixed 15- minute window before an alarm is declared. This is based on the threshold value for Line Code Violations, which are the occurrences of either a bipolar violation or excessive zeroes error events.

Threshold Value-PCV

Range:	1 to 255
Default:	10
Description:	Specifies the number of errors that must occur within a fixed 15- minute window before an alarm is declared. This is based on the threshold value for Path Coding Violations, which are frame synchronization bit errors in the D4 and E1-noCRC formats, or CRC errors in the ESF and E1-CRC formats.

Threshold Value-CSS

Range:	1 to 255
Default:	10
Description:	Specifies the number of errors that must occur within a fixed 15- minute window before an alarm is declared. This is based on the threshold value for Controlled Slip Seconds, which are one-second intervals containing one or more controlled slips.

Threshold Value-ES

Range:	1 to 255
Default:	10
Description:	Specifies the number of errors that must occur within a fixed 15- minute window before an alarm is declared. This is based on the threshold value for Error Seconds, which have: • one or more path code violations • one or more out-of-frame defects • one or more controlled slip events • a detected alarm indication signal defect For D4 and E1-CRC links, the presence of bipolar violations also triggers an errored second.

Threshold Value-BES

Range:	1 to 255
Default:	10
Description:	Specifies the number of errors that must occur within a fixed 15- minute window before an alarm is declared. This is based on the threshold value for Bursty Errored Seconds, which have: • fewer than 320 and more than 1 path coding violation error events • no severely errored frame defects • no detected incoming alarm indication signal defects Controlled slips are not included; BES is not incremented during an unavailable second.

Threshold Value-SES

Range:	1 to 255
Default:	10
Description:	Specifies the number of errors that must occur within a fixed 15- minute window before an alarm is declared. This is based on the threshold value for Severely Error Seconds.

Severely Errored Seconds for ESF signals have:

- 320 or more path code violation error events
- one or more out-of-frame defects
- a detected alarm indication signal defect

Severely Errored Seconds for E1-CRC signals have:

- 832 or more path code violation error events
- one or more out-of-frame defects

Severely Errored Seconds for E1-noCRC signals have:

- 2048 line coding violations or more

Severely Errored Seconds for D4 signals have:

- a count of one-second intervals with framing error events
- an out-of-frame defect
- 1544 line coding violations or more

Controlled slips are not included; BES is not incremented during an unavailable second.

Threshold Value SEFS

Range:	1 to 255
Default:	1
Description:	Specifies the number of errors that must occur within a fixed 15- minute window before an alarm is declared. This is based on the threshold value for Severely Error Framing Seconds, which have:

- one or more out-of-frame defects
- a detected alarm indication signal defect

Threshold Value UAS

Range:	1 to 255
Default:	1

Description:	Specifies the number of errors that must occur within a fixed 15- minute window before an alarm is declared. This is based on the threshold value for Unavailable Seconds. The DS1 interface is unavailable from the onset of 10 contiguous SESs or any condition leading to a failure;
	
	• once unavailable and if no failure is present, the DS1 interface becomes available at the onset of 10 contiguous seconds with no SESs
	
	• once unavailable and if a failure is present, the DS1 interface becomes available at the onset of 10 contiguous seconds with no SESs if the failure clearing time is less than or equal to 10 seconds
	
	• once unavailable and if a failure is present, the DS1 interface becomes available at
	
	  – the onset of 10 contiguous seconds with no SESs if the failure clearing time is more than 10 seconds
	
	  – or the onset period leading to the successful clearing condition, whichever occurs later

E1 Port Parameters

Introduction

This section describes the E1 port parameters in detail. The E1 Port Record contains parameter values that you use to define operating characteristics for an E1 dual port digital interface card.

Configuration Guidelines

Configure an E1 port before configuring a Virtual Port Mapping Record, which maps a logical timeslot channel (a virtual port) to that port.

E1 Port Record Parameters

The following parameters are available from the E1 port record.

Port Type

Range:	Voice, T1, E1
Default:	Null
Description:	Specifies the type of port that you are configuring; the parameter value you input for port type determines the parameters that appear next.
Boot Type:	Changes to this parameter require a Node boot to take effect.

Line Framing Type

Range:	E1_CAS, E1_CAS_CRC, E1_CAS_FEBE
Default:	E1_CAS
Description:	Indicates type of framing the E1circuit uses. • E1_CAS: Channel Associated Signaling (CAS) • E1_CAS_CRC: Channel Associated Signaling with CRC • E1_CAS_FEBE: Channel Associated Signaling with Si = Far End Bit Error functionality that sends an indication in TS0 that signifies receipt of a SuperFrame with a bad CRC

Line Coding

Range:	AMI, HDB3
Default:	HDB3
Description:	Selects zero suppression technique used on this E1 link. • AMI: Alternate Mark Inversion (for testing only) • HDB3: High Density Bipolar 3

Line Impedance

Range:	75, 120 Ω
Default:	120 Ω
Description:	Defines the line impedance as 75 Ω or 120 Ω

Transmit Clock

Range:	INT, REC
Default:	INT
Description:	Selects the source of transmit clock. • INT: From Internal Oscillator • REC: Transmit Clock is derived from Receive Clock ■ **Note** Only one E1 port on the card can be selected for REC timing.

Threshold Value-LCV

Range:	1 to 255
Default:	10
Description:	Specifies the number of errors that must occur within a fixed 15- minute window before an alarm is declared. This is based on the threshold value for Line Code Violations, which are the occurrences of either a bipolar violation or excessive zeroes error events.

Threshold Value-PCV

Range:	1 to 255
Default:	10
Description:	Specifies the number of errors that must occur within a fixed 15- minute window before an alarm is declared. This is based on the threshold value for Path Coding Violations, which are frame synchronization bit errors in the D4 and E1-noCRC formats, or CRC errors in the ESF and E1-CRC formats.

Threshold Value-CSS

Range:	1 to 255
Default:	10
Description:	Specifies the number of errors that must occur within a fixed 15- minute window before an alarm is declared. This is based on the threshold value for Controlled Slip Seconds, which are one-second intervals containing one or more controlled slips.

Threshold Value-ES

Range:	1 to 255
Default:	10
Description:	Specifies the number of errors that must occur within a fixed 15- minute window before an alarm is declared. This is based on the threshold value for Error Seconds, which have: • one or more path code violations • one or more out-of-frame defects • one or more controlled slip events • a detected alarm indication signal defect For D4 and E1-CRC links, the presence of bipolar violations also triggers an errored second.

Threshold Value-BES

Range:	1 to 255
Default:	10
Description:	Specifies the number of errors that must occur within a fixed 15- minute window before an alarm is declared. This is based on the threshold value for Bursty Errored Seconds, which have: • fewer than 320 and more than 1 path coding violation error events • no severely errored frame defects • no detected incoming alarm indication signal defects Controlled slips are not included; BES is not incremented during an unavailable second.

Threshold Value-SES

Range:	1 to 255
Default:	10
Description:	Specifies the number of errors that must occur within a fixed 15- minute window before an alarm is declared. This is based on the threshold value for Severely Error Seconds. Severely Errored Seconds for ESF signals have: • 320 or more path code violation error events • one or more out-of-frame defects • a detected alarm indication signal defect Severely Errored Seconds for E1-CRC signals have: • 832 or more path code violation error events • one or more out-of-frame defects Severely Errored Seconds for E1-noCRC signals have: • 2048 line coding violations or more Severely Errored Seconds for D4 signals have: • a count of one-second intervals with framing error events • an out-of-frame defect • 1544 line coding violations or more Controlled slips are not included; BES is not incremented during an unavailable second.

Threshold Value SEFS

Range:	1 to 255
Default:	1
Description:	Specifies the number of errors that must occur within a fixed 15- minute window before an alarm is declared. This is based on the threshold value for Severely Error Framing Seconds, which have: • one or more out-of-frame defects • a detected alarm indication signal defect

Threshold Value UAS

Range:	1 to 255
Default:	1
Description:	Specifies the number of errors that must occur within a fixed 15- minute window before an alarm is declared. This is based on the threshold value for Unavailable Seconds. The DS1 interface is unavailable from the onset of 10 contiguous SESs or any condition leading to a failure; • once unavailable and if no failure is present, the DS1 interface becomes available at the onset of 10 contiguous seconds with no SESs • once unavailable and if a failure is present, the DS1 interface becomes available at the onset of 10 contiguous seconds with no SESs if the failure clearing time is less than or equal to 10 seconds • once unavailable and if a failure is present, the DS1 interface becomes available at – the onset of 10 contiguous seconds with no SESs if the failure clearing time is more than 10 seconds – or the onset period leading to the successful clearing condition, whichever occurs later

Configuring Virtual Ports on the PathBuilder S24x, 26x, and 27x Switch

Introduction   You have to configure a virtual port for each connection between the remote nodes and the PathBuilder S24x, 26x, and 27x switch.

How to...   Follow these steps to configure virtual ports between the remote nodes and the PathBuilder S24x, 26x, and 27x switch.

Step	*Action*	*Result*
1	From the CTP Main menu, select **Configure -> Ports**.	The Ports menu appears, as shown in Figure 5-3 on page 5-19.
2	Enter the Port Number. This value should be 100 or above to configure a virtual port.	The Port Type: parameter appears.
3	Enter **X25** for an X.25 connection or **FR** for a Frame Relay connection.	The standard port parameters for X.25 or Frame Relay appear in sequence. Refer to the appropriate manuals for details.
4	Fill in the remaining parameters, and enter a semicolon <**;**>. Press Return when you are finished.	This saves the record in CMEM.
5	Perform a Node boot.	This implements the configuration changes you made.

Booting Virtual Ports   Boot a virtual port by entering the virtual port number and issuing a port boot command. Booting a virtual port brings down SVCs associated with that virtual port, but does not affect the operation of the T1 or E1 port, or of any other virtual ports.

Enabling/Disabling Virtual Ports   Enabling or disabling a virtual port has no effect on a T1 or E1 port or other virtual ports. However, disabling a T1 or E1 port makes all associated virtual ports unusable. Enabling a T1 or E1 port makes all associated virtual ports usable; their SVCs can be established. Virtual ports previously disabled via the disable port command remain disabled.

Port Speed   Port speed for virtual ports is set from the DS0 Rate parameter in the Virtual Ports Mapping Table. You can set the rate of speed for traffic at 56k or 64k. See the "Configuring Virtual Port Mapping Table" section on page 5-20 for more details.

Virtual Port Record Figure 5-3 shows how to navigate the CTP hierarchy to the Port record. The Port Number and Port Type parameters are always the first two parameters that appear in the Port record.

```
Node: nodename Address: (blank) Date: _____Time:_____
Menu: Configure                        Path: (Main.6)

  1. Node
  2. Port
```

Port Number: 100 - 254
Port Type: X25 or FR
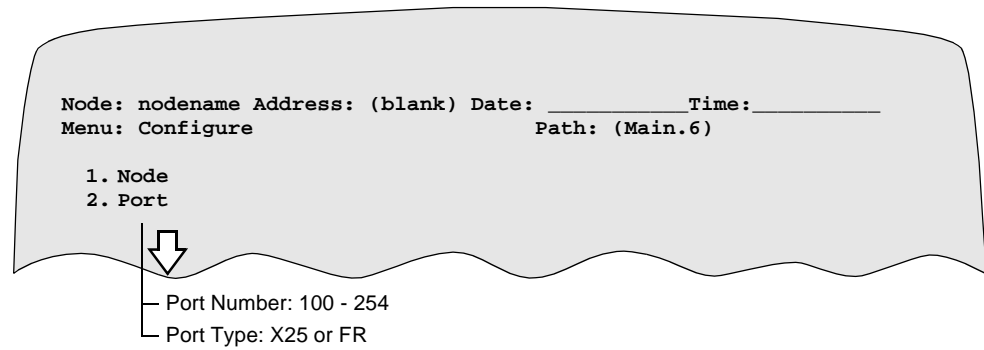
Figure 5-3. Port Configuration for Channelized Data Option

Configuring Virtual Port Mapping Table

Introduction

A T1 or E1 digital port comprises multiple logical data channels. These channels, known as virtual ports, are not associated with any physical slot number and have no physical I/O of their own.

Before You Begin

Obtain the timeslot assignments for all the remote nodes connecting to the PathBuilder S24x, 26x, and 27x switch from your network services provider. You need this information to complete the virtual ports configuration.

Function

By configuring the Virtual Port Mapping Table, a timeslot channel on a specific T1 or E1 line is mapped to a virtual port. Virtual ports are numbered from 100 to 254, whereas ports with actual physical connections are numbered from 1 to 54.

Configuration Guidelines

The Virtual Port Mapping Table must be configured in conjunction with other records as follows.

- Configure the physical port record as either T1 or E1 and all virtual ports before you configure the Virtual Port Mapping Table.
- Configure a Virtual Port Mapping Record to assign a timeslot number per T1/E1 channel for the application.

What You See

Figure 5-4 shows the Virtual Port Mapping Table.

```
Node: nodename Address: (blank) Date: _____Time:_____
Menu: Configure          Path: (Main.6)

   1.   Node
          •
          •
          •
  20.   Virtual Port Mapping Table
```

— Virtual Port Number
— Port Type
— T1/E1 Port Number
— Timeslot Number
— DS0Rate
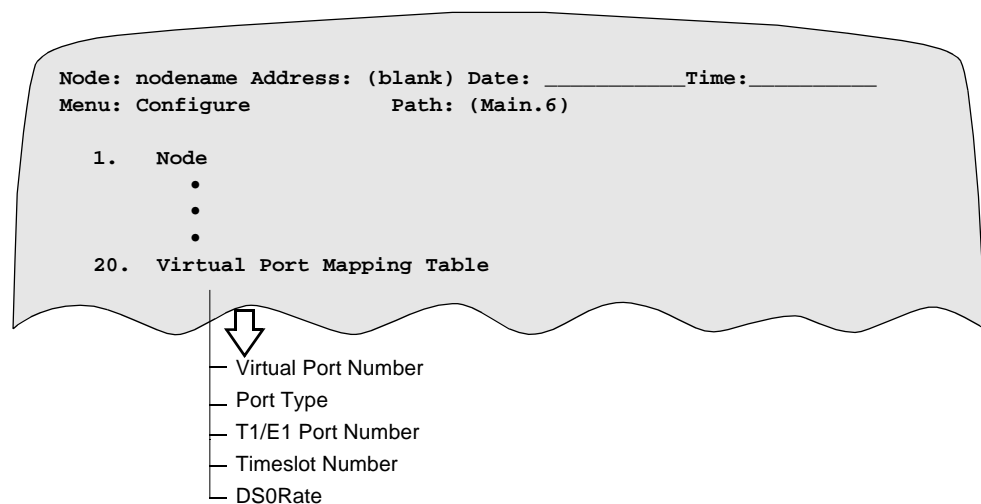
Figure 5-4. Virtual Port Mapping Table

Configuring the Virtual Mapping Table

Perform this procedure to configure the Virtual Port Mapping Table.

Step	*Action*	*Result*
1	From the CTP Main menu, select **Configure**.	The Configure menu appears.
2	Select **Virtual Port Mapping Table** from the Configure menu.	The first parameter appears—**Virtual Port Number**—as shown in Figure 5-4.
3	Enter a value for each parameter.	The next parameter appears.
4	Enter a semicolon <**;>** once you have entered values for all parameters.	The record is saved.

Virtual Port Mapping Table Parameters

This section describes parameters for the Virtual Port Mapping Table.

Virtual Port Number

Range:	100 to 254
Default:	(blank)
Description:	The timeslot logical channel (a virtual port number) to which a specific T1 or E1 card's port number is mapped.

Port Type

Range:	Voice, Data
Default:	Voice
Description:	Specify the type of traffic you are passing.
Boot Type:	Changes to this parameter require a Node boot to take effect.

Physical T1/E1 Port Number

Range:	49 or 50
Default:	(blank)
Description:	T1 or E1 port number associated with this logical timeslot channel (a virtual port number).
Boot:	Changes to this parameter require a Node boot to take effect.

Time Slots

Range:	1 to 31
Default:	1
Description:	Each time slot provides a 64k channel to pass traffic. Specify the time slot assignment for the logical channel: • 1 to 24 for T1 port type • 1 to 31 for E1 port type; 16 is not allowed
Boot Type:	Changes to this parameter require a Node boot to take effect.

DS0 Rate

Range:	56k, 64k
Default:	56k
Description:	Specify the DS0 Rate. This sets the rate of speed for each time slot.
Boot Type:	Changes to this parameter require a Node boot to take effect.

Overview

Introduction The tables in this appendix describe the pinouts for ports on the PathBuilder S24x, 26x, and 27x switch. Cable pinouts for Ethernet and LAN cables are also provided.

The following table shows EIA 232-D signals with V.24 DIMs on the motherboard and SDB cards.

EIA 232-D Signals (Motherboard and SDB)

Pin	DCE Position	Function/Signal Name	Pin	DTE Position	Function/Signal Name
1	---------------	Shield/Frame Ground	1	---------------	Shield/Frame Ground
2	<-------------	TXD	2	------------->	TXD
3	------------->	RXD	3	<-------------	RXD
4	<-------------	RTS	4	------------->	RTS
5	------------->	CTS	5	<-------------	CTS
6	------------->	DSR	6	<-------------	DSR
7	---------------	Signal Ground	7	---------------	Signal Ground
8	------------->	DCD	8	<-------------	DCD
14	<-------------	DATA RESTRAINT	14	------------->	DATA RESTRAINT
15	------------->	TRANSMIT CLOCK or V.54 Loop 3 *	15	<-------------	TRANSMIT CLOCK
16	------------->	STANDBY INDICATOR	16	<-------------	STANDBY INDICATOR
17	------------->	RECEIVE CLOCK	17	<-------------	RECEIVE CLOCK
18	<---------------	EXTERNAL RECEIVE CLOCK	18	------------->	EXTERNAL RECEIVE CLOCK or V.54 Loop 3 *
20	<-------------	DTR	20	------------->	DTR
21	<-------------	V.54 Loop 2	21	------------->	V.54 Loop 2
22	<------------>	RI/TM *	22	<------------	RI
24	<-------------	EXTERNAL TRANSMIT CLOCK	24	------------->	EXTERNAL TRANSMIT CLOCK
25	<----------	MAKE BUSY	25	------------->	TEST MODE
* Pin assigned double function as follows:					
Outputs RI when switch is on. Otherwise, it acts as a TM input signal.					

The following table shows V.35/V.36 signals with V.35/V.36 DIMs on the motherboard.

V.35/V.36 (Motherboard)

Pin	DCE Position	Function/ Signal Name	Pin	DTE Position	Function/ Signal Name
1	---------------	SHIELD/FRAME GROUND	1	---------------	SHIELD/FRAME GROUND
2	<--------------	TRANSMITTED DATA A	2	-------------->	TRANSMITTED DATA A
3	-------------->	RECEIVED DATA A	3	<--------------	RECEIVED DATA A
4	<--------------	REQUEST TO SEND	4	-------------->	REQUEST TO SEND
5	-------------->	CLEAR TO SEND	5	<--------------	CLEAR TO SEND
6	-------------->	DATA SET READY	6	<--------------	DATA SET READY
7	--------------	SIGNAL GROUND	7	---------------	SIGNAL GROUND
8	-------------->	DATA CARRIER DETECT	8	<--------------	DATA CARRIER DETECT
14	<--------------	TRANSMIT DATA B	14	-------------->	TRANSMIT DATA B
15	-------------->	TRANSMIT CLOCK A	15	<--------------	TRANSMIT CLOCK A
16	-------------->	RECEIVED DATA B	16	<--------------	RECEIVED DATA B
17	-------------->	RECEIVE CLOCK A	17	<--------------	RECEIVE CLOCK A
18	-------------->	RECEIVE CLOCK B	18	<--------------	RECEIVE CLOCK B
20	<--------------	DATA TERMINAL READY	20	-------------->	DATA TERMINAL READY
21	-------------->	TRANSMIT CLOCK B	21	<--------------	TRANSMIT CLOCK B
22	<--------------	EXTERNAL TRANSMIT CLOCK B	22	-------------->	EXTERNAL TRANSMIT CLOCK B
24	<--------------	EXTERNAL TRANSMIT CLOCK A	24	-------------->	EXTERNAL TRANSMIT CLOCK A

The following table shows V.35/V.36 signals with V.35/V.36 DIMs on the SDB card.

V.35/V.36 (SDB)

Pin	DCE Position	Function/ Signal Name	Pin	DTE Position	Function/Signal Name
1	---------------	SHIELD/FRAME GROUND	1	---------------	SHIELD/FRAME GROUND
2	<--------------	TRANSMITTED DATA A	2	-------------->	TRANSMITTED DATA A
3	-------------->	RECEIVED DATA A	3	<--------------	RECEIVED DATA A
4	<--------------	REQUEST TO SEND	4	-------------->	REQUEST TO SEND
5	-------------->	CLEAR TO SEND	5	<--------------	CLEAR TO SEND
6	-------------->	DATA SET READY	6	<--------------	DATA SET READY
7	--------------	SIGNAL GROUND	7	---------------	SIGNAL GROUND
8	-------------->	DATA CARRIER DETECT	8	<--------------	DATA CARRIER DETECT
13		TRANSMIT CLOCK (B)	13	-------------->	TRANSMIT CLOCK (B)
14	<--------------	TRANSMIT DATA B	14	-------------->	TRANSMIT DATA B
15	-------------->	TRANSMIT CLOCK A	15	<--------------	TRANSMIT CLOCK A
16	-------------->	RECEIVED DATA B	16	<--------------	RECEIVED DATA B
17	-------------->	RECEIVE CLOCK A	17	<--------------	RECEIVE CLOCK A
18	--------------	N/A	18	<--------------	LOOP 3 (V.36 only)
19	<--------------	RECEIVE CLOCK B	19	-------------->	RECEIVE CLOCK B
20	<--------------	DATA TERMINAL READY	20	-------------->	DATA TERMINAL READY
21	--------------	N/A	21	<--------------	LOOP 3 (V.36 only)
23	<--------------	EXTERNAL TRANSMIT CLOCK B	23	------------->	EXTERNAL TRANSMIT CLOCK B
24	<--------------	EXTERNAL TRANSMIT CLOCK A	24	-------------->	EXTERNAL TRANSMIT CLOCK A
25	--------------	TEST MODE	25	--------------	TEST MODE

The following table shows V.11 signals with V.11 DIMs on the motherboard.

V11 Signals (Motherboard)

Pin	DCE Position	V.11	Function/ Signal Name	Pin	DTE Position	Function/ Signal Name
1	---------------		SHIELD/ FRAME GROUND	1	---------------	SHIELD/ FRAME GROUND
2	<--------------	T (A)	TRANSMIT DATA A	2	------------->	TRANSMIT DATA A
3	------------->	R (A)	RECEIVE DATA A	3	<--------------	RECEIVE DATA A
4	<--------------	C (A)	CONTROL A	4	--------------- >	CONTROL A
6	------------->	I (B)	INDICATION B	6	<--------------	INDICATION B
7	---------------		SIGNAL GROUND	7	---------------	SIGNAL GROUND
8	------------->	I (A)	INDICATION A	8	<--------------	INDICATION A
14	<--------------	T (B)	TRANSMIT DATA B	14	-------------->	TRANSMIT DATA B
15	------------->	S (A)	SIGNAL TIMING (A)	15	<--------------	SIGNAL TIMING (A)
16	------------->	R (B)	RECEIVE DATA B	16	<--------------	RECEIVE DATA B
20	<--------------	C (B)	CONTROL B	20	-------------->	CONTROL B
21	------------->	S (B)	SIGNAL TIMING (B)	21	<--------------	SIGNAL TIMING (B)
22	<--------------	X (B)	EXTERNAL CLOCK B	22	-------------->	EXTERNAL CLOCK B
24	<--------------	X (A)	EXTERNAL CLOCK A	24	-------------->	EXTERNAL CLOCK A

The following table shows V.11 signals with V.11 DIMs on the SDB card.

V11 Signals (SDB)

Pin	DCE Position	V.11	Function/ Signal Name	Pin	DTE Position	Function/ Signal Name
1	---------------		SHIELD/ FRAME GROUND	1	---------------	SHIELD/ FRAME GROUND
2	<--------------	T (A)	TRANSMIT DATA A	2	-------------->	TRANSMIT DATA A
3	-------------->	R (A)	RECEIVE DATA A	3	<--------------	RECEIVE DATA A
4	<--------------	C (A)	CONTROL A	4	--------------- >	CONTROL A
6	-------------->	I (B)	INDICATION B	6	<--------------	INDICATION B
7	---------------		SIGNAL GROUND	7	---------------	SIGNAL GROUND
8	-------------->	I (A)	INDICATION A	8	<--------------	INDICATION A
13			SIGNAL TIMING B	13		SIGNAL TIMING B
14	<--------------	T (B)	TRANSMIT DATA B	14	-------------->	TRANSMIT DATA B
15	-------------->	S (A)	SIGNAL TIMING (A)	15	<--------------	SIGNAL TIMING (A)
16	-------------->	R (B)	RECEIVE DATA B	16	<--------------	RECEIVE DATA B
20	<--------------	C (B)	CONTROL B	20	-------------->	CONTROL B
23	<--------------	X (B)	EXTERNAL CLOCK B	23	-------------->	EXTERNAL CLOCK B
24	<--------------	X (A)	EXTERNAL CLOCK A	24	-------------->	EXTERNAL CLOCK A

Ethernet Cable Pinouts

Introduction

This cable may have a maximum length of up to 100m and must conform to the 802.3 10BaseT specification, with a nominal impedance of 100 ohms. Category 3, 4, or 5 cable may be used. Category 4 or 5 is preferred.

Additional Information

Refer to ANSI/TIA/EIA 568A and the following references:

- CSMA/CD Access Method and Physical Layer Specifications, IEEE standard 802.3-1992.
- Draft supplement to IEEE standard 802.3, System Considerations for Multi Segment 10B/S Baseband Networks (Chapter 13) and Medium Attachment Unit and Baseband Medium Specification, Type 10BaseT (Chapter 14), p802.3i-1990.

Ethernet RJ-45S Connector Signals

The following table shows the Ethernet RJ-45S connector signals.

Pin	Signal
1	Transmit +
2	Transmit -
3	Receive +
6	Receive -

Ethernet DB-15 Connector Signals

The AIU cable uses male DB-15 to female DB-15 connectors with slide latches in a straight-through connection.

The twisted pair combinations are 1/2, 3/6, and 4/5, and may be used for Ethernet.

This cable may have a maximum length of up to 50m and must conform to the 802.3 10BASE5 specification.

The following table shows the Ethernet DB-15 connector signals.

Pin	Signal
1	Shield
2	Collision+
3	Transmit+
4	Shield
5	Receive+
6	Ground
8	Shield
9	Collision-
10	Transmit-
11	Shield

Pin	Signal
12	Receive-
13	+12V
14	Shield

Appendix B
PathBuilder S24x, 26x, and 27x Switch Specifications

Overview

The following sections list the physical, electrical, and environmental specifications for the PathBuilder S24x, 26x, and 27x switch.

Physical Specifications

Height: 17.8 in. (45.3 cm)

Width: 10.0 in. (25.5 cm)

Depth: 16.8 in. (42.8 cm)

Weight: (fully configured) 27.5 lb (12.5 kg)

Power Requirements

Power Output:

200 W max

AC Input:

The standard AC Input power supply module features an external voltage select switch, IEC line input jack, internal 3 1/8 in. fan, and internal fusing.

- 90 VAC to 132 VAC, 6 Amps RMS max, 50-60 Hz
- 180 VAC to 264 VAC, 3 Amps RMS max, 50-60 Hz

DC Input:

The optional DC Input power supply module features a covered input terminal block, an internal 3 1/8 in. fan and internal fusing.

- -36V to -72V, 10 Amps RMS max.

Environmental Limits

PathBuilder S24x, 26x, and 27x Switch System: 0° C to 50° C (32° F to 122° F)

Storage Temperature: –40° C to 70° C (–40° F to 158° F)

Relative Humidity: 5% to 95% (noncondensing)

Overview

Numeric LED Display

The 2-character numeric LED display provides system diagnostic codes to assist in troubleshooting. When the Service LED is ON, a 2-digit code on the numeric LED display corresponds to a certain event or failure.

Status Display Error Codes

The following table lists the codes that may appear.

Numeric Display	Status LED	Service LED	Description/Comments
00	Flicker	OFF	FBIST motherboard test
01-08	Flicker	OFF	FBIST I/O card test
00-08	OFF	ON	Slot # of highest priority card diagnostic failure
20	OFF	ON	Modem card failure
30	OFF	ON	PBIST—FLASH failure
31	OFF	ON	PBIST—CMEM failure
33	OFF	ON	Lab strap installed
34	OFF	ON	CMEM battery bad
40	OFF	ON	PBIST—Invalid FLASH checksum
41	OFF	ON	Alternate FLASH loaded
42	OFF	ON	Default CMEM loaded—incompatible CMEM image detected
43	OFF	ON	Alternate configuration loaded
44	OFF	ON	FLASH being erased; this takes a few minutes
45	OFF	ON	Waiting for flash file; Port 6 configured at 9600 bps
45.	OFF	ON	Waiting for flash file; Port 6 configured at 19200 bps
4.5.	OFF	ON	Waiting for flash file; Port 6 configured at 115200 bps
46	Blinking	ON	Status OK—loading
46	No Blink	ON	Load problem— reset node and restart cold load procedure.
47	OFF	ON	Copying from RAM to FLASH; this takes a few minutes

Numeric Display *(continued)*	Status LED	Service LED	Description/Comments
48	OFF	ON	FLASH write failure
49	OFF	ON	Read error on Port 6
60	OFF	ON	Local DRAM exhausted
8.8.	ON	OFF	PBIST (~3 seconds)
(Blank)	OFF	OFF	PBIST lamp-off test (~.5 seconds)
L0	OFF	OFF	Load Phase 0—PROM IPL loads the FLASH IPL image, (~ 1 second)
L1	OFF	OFF	Load Phase 1—FLASH IPL decompresses and loads the FBIST image (~ 1 second)
(Rotating segments)	ON	OFF	FBIST lamp test (~ 2 seconds)
L2	OFF	OFF	Load Phase 2—FLASH IPL decompresses and loads the ONS image (several seconds)
L3	OFF	OFF	Load Phase 3—STARTUP inventories the modules in ONS image (~ 3 seconds)
L4	OFF	OFF	Load Phase 4—SYSINIT inits memory mgmt. and all ONS modules (~10 seconds)
CR	OFF	ON	PathBuilder S24x, 26x, and 27x switch has crashed
(Blank with flashing dashes)	OFF	OFF	Normal system operation

■ **Note**

During a warm start, display sequencing starts with the "L2" code.

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

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

Online Technical Services

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

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

World Wide Web Site

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

http://www.3com.com/

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

3Com FTP Site

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

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

- Hostname: **ftp.3com.com (or 192.156.136.12)**
- Username: **anonymous**
- Password: **<your Internet e-mail address>**

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

3Com Bulletin Board Service

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

Access by Analog Modem

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

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

Access by Digital Modem

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

1 408 654 2703

3ComFacts Automated Fax Service

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

Call 3ComFacts using your Touch-Tone telephone:

1 408 727 7021

Support from Your Network Supplier

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

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

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

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

Support from 3Com

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

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

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

Below is a list of worldwide technical telephone support numbers:

Country	Telephone Number	Country	Telephone Number
Asia Pacific Rim			
Australia	1 800 678 515	P.R. of China	10800 61 00137 or
Hong Kong	800 933 486		021 6350 1590
India	61 2 9937 5085	Singapore	800 6161 463
Indonesia	001 800 61 009	S. Korea	
Japan	0031 61 6439	From anywhere in S. Korea:	82 2 3455 6455
Malaysia	1800 801 777	From Seoul:	00798 611 2230
New Zealand	0800 446 398	Taiwan, R.O.C.	0080 611 261
Pakistan	61 2 9937 5085	Thailand	001 800 611 2000
Philippines	1235 61 266 2602		
Europe			
From anywhere in Europe, call:	+31 (0)30 6029900 phone +31 (0)30 6029999 fax		

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

Country	Telephone Number	Country	Telephone Number
Austria	06 607468	Netherlands	0800 0227788
Belgium	0800 71429	Norway	800 11376
Denmark	800 17309	Poland	0800 3111206
Finland	0800 113153	Portugal	05 05313416
France	0800 917959	South Africa	0800 995014
Germany	0130 821502	Spain	900 983125
Hungary	00800 12813	Sweden	020 795482
Ireland	1 800 553117	Switzerland	0800 55 3072
Israel	177 3103794	U.K.	0800 966197
Italy	1678 79489		
Latin America			
Argentina	541 312 3266	Colombia	571 629 4847
Brazil	55 11 523 2725, ext. 422	Mexico	01 800 849 2273
North America	1 800 NET 3Com (1 800 638 3266)		

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

To obtain an RMA number, call or fax:

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

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

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

Latin America	1 408 326 2927	1 408 764 6883
U.S.A. and Canada	1 800 876 3266, option 2	1 408 764 7120

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