B-STDX 8000/9000
Hardware Installation Guide

Ascend Communications, Inc.

Product Code: 80005
Revision 04
September 1998

ASCEND COMMUNICATIONS, INC. LIMITED WARRANTY ON HARDWARE

Ascend Communications, Inc. warrants the *B-STDX 8000* and *B-STDX 9000* against defects in materials and workmanship for a period of one year from the date of shipment. During the warranty period, Ascend will, at its option, repair, replace, or refund the purchase price of any defective product at no additional cost, provided you return it during the warranty period, transportation charges prepaid, to Ascend. You must attach your name, address and telephone number, a description of the problem(s), and a dated proof-of-purchase bearing the serial number of each product returned for warranty service.

This warranty is limited to the original purchaser of the product and is not transferable unless otherwise agreed by Ascend in writing. This warranty does not apply if the product: has been damaged by accident, abuse, misuse or misapplication; has been modified without written permission by Ascend; or if any Ascend serial number has been removed or defaced.

UNDER NO CIRCUMSTANCES SHALL ASCEND'S LIABILITY ARISING OUT OF OR IN CONNECTION WITH THE PRODUCT OR THE USE OF, OR INABILITY TO USE, THE PRODUCT IN TORT (INCLUDING NEGLIGENCE), OR OTHERWISE, EXCEED THE PURCHASE PRICE OF THE PRODUCT. CASCADE MAKES NO WARRANTY OR REPRESENTATIONS, EITHER EXPRESSED OR IMPLIED, WITH RESPECT TO THE PRODUCT, ITS QUALITY, PERFORMANCE, MERCHANTABILITY, OR FITNESS IN A PARTICULAR PURPOSE.

ANY IMPLIED WARRANTIES ARE LIMITED IN DURATION TO ONE YEAR FROM THE DATE OF ORIGINAL PURCHASE OF THE PRODUCT.

THIS WARRANTY AND REMEDIES SET FORTH ABOVE ARE EXCLUSIVE AND IN LIEU OF ALL OTHERS, ORAL OR WRITTEN, EXPRESSED OR IMPLIED. No Ascend dealer, agent, or employee is authorized to make any modification, extension, or addition to this warranty.

ASCEND IS NOT RESPONSIBLE FOR SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES RESULTING FROM ANY BREACH OF WARRANTY, OR UNDER ANY LEGAL THEORY, INCLUDING LOST PROFITS, DOWNTIME, GOODWILL, DAMAGE TO OR REPLACEMENT OF EQUIPMENT AND PROPERTY, AND ANY COST OF RECOVERING, REPROGRAMMING, OR REPRODUCING ANY PROGRAM OR DATA STORED IN OR USED WITH ASCEND'S PRODUCTS.

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

ASCEND COMMUNICATIONS INC. LIMITED WARRANTY ON MEDIA AND DOCUMENTATION

Ascend Communications Inc. also warrants that the media on which the Software is distributed and the Documentation are free from defects in materials and workmanship. Ascend will replace defective media or documentation, provided you return the item with dated proof of purchase to Ascend within 90 days of the date of delivery.

FEDERAL COMMUNICATIONS COMMISSION WARNING

This device complies with Part 15 of the FCC Rules and Regulations. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must withstand any interference received, including interference that may cause undesired operation.

The *B-STDX 8000* and *B-STDX 9000* have been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules and Regulations. These limits are designed to provide reasonable protection against harmful interference when this 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 harmful interference to radio and television communications. Operation of this equipment in a residential area is likely to cause interference in which case the user will be required to correct the interference at his or her own expense.

Shielded cables must be used with this unit to ensure compliance with the FCC Class A limits.

Do not attempt to repair or modify this equipment. Any repairs to the unit must be performed by Ascend Communications Inc. or an Ascend-authorized representative.

Maintenance Agreements

Ascend offers a comprehensive program to provide hardware support, a 24-hour emergency hotline, overnight parts replacement, and an escalation procedure. Non-contract maintenance services are provided at current time-and-materials rates. For more information, contact Ascend Technical Assistance Center at 1-800-DIAL-WAN (in the U.S.) or 1-978-952-7299 (outside the U.S.).

Ascend has adopted a maintenance strategy based on customer-initiated requests to the Ascend Technical Assistance Center. The Ascend Technical Assistance Center coordinates all customer services, including hardware and software technical support, on-site service requirements, and module exchange and repair.

If the Product Is Damaged

If any portion of the switch is damaged, forward an immediate request to the delivering carrier to perform an inspection of the product and to prepare a damage report. Save the container and all packing materials until the contents are verified.

Concurrently, report the nature and extent of the damage to the Ascend Technical Assistance Center so that action can be initiated, either to repair or replace the damaged items.

Do not return any items to Ascend until you obtain instructions from an Ascend Technical Assistance Center representative. Report the problem or deficiency to the Ascend Technical Assistance Center representative, along with the model, type, and serial number. Upon receipt of this information, the Ascend Technical Assistance Center will provide you with service instructions, or a Return Authorization Number and shipping information. All items returned under warranty must be shipped to the manufacturer with the charges prepaid.

If Problems Arise

If any of your telephone equipment is not operating properly, you should immediately remove it from your telephone line, as it may cause harm to the telephone network. If the telephone company notes a problem, they may temporarily discontinue service. When practical, they notify you in advance of this disconnection. If advance notice is not feasible, you will be notified as soon as possible. When you are notified, you will

be given the opportunity to correct the problem and informed of your right to file a complaint with the FCC.

In the event that repairs are ever needed on this equipment, they should be performed by Ascend Communications Corporation or an authorized Ascend representative. For information, contact the Ascend Technical Assistance Center 24 hours a day, 7 days a week at:

1-800-DIAL-WAN (in the U.S.)

0-800-96-2229 (U.K.)

1-978-952-7299 (all other areas)

Contents

About This Guide

What You Need To Know xxi
Customer Comments xxi
Documentation Reading Path xxii
How to Use This Guide xxiii
What's New in This Guide? xxiv
Related Documents xxiv
Conventions xxv

1 Overview

B-STDX Product Description 1-2
- CP Modules 1-2
- IOP Modules 1-4
- Features 1-8

About B-STDX Redundancy 1-9
- Status Indicators 1-10
- About the Redundancy Manager 1-10
  - Keep-Alive Monitoring 1-11
  - TFTP Support 1-12
  - Checksum/Version Number Exchange 1-13
  - NMS Support 1-13

2 Specifications and Safety Warnings

Electronic/Electrical Specifications 2-2
Physical Specifications 2-3
Environmental Specifications and Safety Warnings 2-4

DC Power Supply Warnings 2-5
Safety Warnings 2-6
Signes Précurseurs de Sécurité 2-7
Achtung: Zusätzliche Sicherheitshinweise 2-7
Power Cord Requirements 2-9

3 Preparing for the Installation

Selecting the Installation Site 3-2
Unpacking the Switch 3-2
Unpacking the Accessory Kit 3-4
Gathering the Installation Items 3-5
Check the Configuration 3-6
Check the CP and IOPs 3-6
Check the CP Adapter and I/O Adapter Modules 3-8
Redundant Configurations 3-9
What's Next 3-9

4 Installing the B-STDX Switch

Setting Up the Switch 4-2
As a Free-Standing Switch 4-3
As a Rack-Mounted Switch 4-3
Installing the Mid-Mount Brackets 4-4
Installing the Switch Into the Cabinet 4-5
Connecting Cables to the Switch 4-6
Connecting the Console 4-7
Setting Up the Network Management Station 4-8
Choose a Connection Method 4-8
Using an Ethernet Connection 4-10
Direct Ethernet Method 4-10
Indirect Ethernet Method 4-11
Using a SLIP Connection 4-12
Direct SLIP method 4-12
Using a Management DLCI Connection 4-14

5 Determining the Operating Status

Powering Up the Switch 5-2
Switches with AC Power Supplies 5-2
Switches with DC Power Supplies 5-3

Displaying the Diagnostic Results 5-7
Determining the Switch Operating Status 5-8
Determining Module Operating Status 5-9
Determining Redundancy Status 5-10
What's Next 5-10

6 Installing or Replacing Modules

Installation and Replacement Considerations 6-2
Replacing Control Processors 6-2
Installing a Redundant Control Processor 6-5
Replacing the CP Adapter Module 6-6
Installing or Replacing IOP Modules 6-8
    Installing a New Module 6-8
        Installing the IOA Module 6-8
        Installing the IOP Module 6-9
    Removing and Replacing an Installed Module 6-10
        Removing and Replacing an IOP Module 6-10
        Removing and Replacing an IOA Module 6-13
Installing or Replacing Power Supplies 6-16
Replacing the Cooling Fan Module 6-21
Replacing and Servicing Air Filters 6-23

7 Troubleshooting

Switch Status 7-2
IOP Module Status 7-2
Power Supply Module Status 7-5
Contacting the Technical Assistance Center 7-6
    Calling by Phone 7-6
    Sending Electronic Messages or Faxes 7-6

A IOP Modules

8-Port Universal IOP Module A-3
    Specifications A-3
        Physical Dimensions A-3
        Power Requirements A-3
        Agency Approvals A-4
        Temperature Range A-4
        Interface Standards A-4

Physical Interfaces A-4
Status Indicators A-4
V.35 UIO Maximum Cable Lengths A-5
UIO Panels A-5
4-Port T1 IOP Module A-7
Specifications A-7
Physical Dimensions A-7
Power Requirements A-7
Agency Approvals A-8
Temperature Range A-8
Physical Interfaces A-8
Interface Standards A-8
Signal Levels A-9
Loopbacks A-9
Integral T1 CSU/DSU A-9
Status Indicators A-10
Channelized T1 Panels A-10
4-Port E1 IOP Module A-12
Specifications A-12
Physical Dimensions A-12
Power Requirements A-12
Agency Approvals A-12
Temperature Range A-13
Physical Interfaces A-13
Interface Standards A-13
Signal Levels A-13
Loopbacks A-13
Integral E1 CSU/DSU A-14
Status Indicators A-14
Channelized E1 Panels A-14
12-Port E1 IOP Module A-16
Specifications A-16
Physical Dimensions A-16
Power Requirements A-16
Agency Approvals A-17
Temperature Range A-17
Physical Interfaces A-17
Physical Connectors A-17

Line Coding A-17
Framing A-17
Diagnostics A-17
Statistics A-17
Loopbacks A-18
Status Indicators A-18
12-Port E1 IOP Module Panels A-19
2-Port HSSI IOP Module A-21
Specifications A-21
Physical Dimensions A-21
Power Requirements A-21
Agency Approvals A-22
Temperature Range A-22
Physical Interfaces A-22
Interface Standards A-22
Signal Levels A-22
Loopbacks A-22
Status Indicators A-23
HSSI Panels A-23
10-Port DSX-1 IOP Module A-25
Specifications A-25
Physical Dimensions A-25
Power Requirements A-25
Agency Approvals A-26
Temperature Range A-26
Physical Interfaces A-26
Interface Standards A-26
Signal Levels A-26
Loopbacks A-26
Status Indicators A-27
DSX-1 Panels A-27
1-Port ATM UNI IOP Module A-29
Specifications A-29
Physical Dimensions A-29
Power Requirements A-29
Agency Approvals A-29
Temperature Range A-29
Physical Interfaces A-29

Interface Standards A-30
Signal Levels A-30
Loopbacks A-30
Status Indicators A-31
ATM UNI Panels A-31
ATM UNI CS E3 IOP Module A-33
Specifications A-33
Physical Dimensions A-33
Power Requirements A-33
Agency Approvals A-33
Temperature Range A-33
Physical Interfaces A-33
Cell Mapping A-34
Framing A-34
Cell Payload Scramble A-34
Diagnostics A-34
Statistics A-34
Loopbacks A-34
Status Indicators A-35
ATM CS E3 Panels A-35
4-Port T1 ISDN PRI IOP Module A-37
Specifications A-37
Physical Dimensions A-37
Power Requirements A-37
Agency Approvals A-37
Temperature Range A-38
Physical Interfaces A-38
Interface Standards A-38
Signal Levels A-38
Loopbacks A-38
Status Indicators A-39
ISDN PRI Panels A-39
4-Port E1 ISDN PRI IOP Module A-41
Specifications A-42
Physical Dimensions A-42
Power Requirements A-42
Agency Approvals A-42
Temperature Range A-42

Physical Interfaces A-42
Interface Standards A-43
Signal Levels A-43
Loopbacks A-43
Integral E1 NTU A-43
Status Indicators A-44
ISDN PRI Panels A-44
1-Port Channelized DS3 IOP Module A-46
Typical Application A-47
Specifications A-47
Physical Dimensions A-47
Power Requirements A-47
Agency Approvals A-47
Temperature Range A-48
Physical Interfaces A-48
Physical Connectors A-48
Interface Standards A-48
Line Coding A-49
Framing A-49
Application Mode A-49
Diagnostics A-49
Statistics A-50
Loopbacks A-50
Status Indicators A-51
Channelized DS3 Panels A-51
Channelized DS3-1-0 IOP Module A-53
Specifications A-53
Physical Dimensions A-53
Power Requirements A-53
Agency Approvals A-54
Temperature Range A-54
Physical Interfaces A-54
Physical Connectors A-54
Interface Standards A-54
Diagnostics A-55
Line Coding A-55
Framing A-55
Application Mode A-55

Signal Levels A-56
Statistics A-56
Loopbacks A-56
Status Indicators A-57
Channelized DS3-1-0 Panels A-58
1-Port ATM CS DS3/E3 IOP Module A-59
Direct Cell Trunking A-59
Frame Relay to ATM Network Interworking A-60
Service Interworking Application A-60
Specifications A-60
Physical Dimensions A-60
Power Requirements A-60
Agency Approvals A-61
Temperature Range: A-61
Physical Interfaces A-61
Physical Connections A-61
Network Clock Support A-61
Interface Standards A-61
DS3 Options A-62
E3 Options A-62
DS3 Standards A-62
E3 Standards A-63
Loopback A-63
Status Indicators A-63
Redundancy A-64
Channelized DS3 Panels A-64
1-Port ATM IWU OC3c/STM-1 IOP Module A-66
Direct Cell Trunking A-66
Frame Relay to ATM Network Interworking A-67
Service Interworking Application A-67
Specifications A-67
Physical Dimensions A-67
Power Requirements A-67
Agency Approvals A-68
Temperature Range: A-68
Physical Interfaces A-68
Physical Connections A-68
Network Clock Support A-68

Signal Distance/Levels A-68
Interface Standards A-69
OC3c Standards A-69
STM-1 Standards A-70
Status Indicators A-70
Redundancy A-71
ATM IWU Panels A-71
2-Port Ethernet 10/100 Base-T IOP Module A-73
Specifications A-73
Physical Dimensions A-73
Power Requirements A-73
Agency Approvals A-74
Temperature Range A-74
Physical Interfaces A-74
Interface Standards A-74
Status Indicators A-75
2-Port Ethernet 10/100Base-T IOP Panels A-75
Ordering Information A-77

B Cables and Pinout Assignments

RS-232 Shielded Crossover Console Cable B-3
RS-232 Shielded Null Modem Cable B-4
DB-25 Connector Pinouts B-5
RS-232 Shielded Straight-through Modem Cable B-6
RS-232 DB-9 to DB-25 Shielded Crossover Cable B-7
V.35 Straight-through Cable B-9
V.35 Crossover Cable B-11
X.21 Straight-through Cable B-13
X.21 Crossover Cable B-15
T1/E1 Straight-through Cable - DB15 ..... B-17
T1/E1 Crossover Cable - DB15 ..... B-18
T1 Straight-through USOC-RJ-48C Connector B-19
T1 Crossover USOC-RJ-48C Connector B-20
HSSI Straight-through Cable B-21
HSSI Crossover Cable B-25
Media Independent Interface (MII) B-29
V.35 Loopback Connector (Male) B-30
X.21 Loopback Connector (Male) B-32

T1 Loopback Connector (Male) B-33
RJ-48 Loopback Connector (Male) B-33
HSSI Loopback Connector (Male) B-34

C DS3 Conversion Procedure

Converting a DSX IOP to Channelized DS3 IOP C-2
Installing the Conversion Procedure C-2
Running the Conversion Procedure C-4
Converting a Channelized DS3 Card to a DSX Card C-5

D Regulatory Information

Product Attachment Information D-2
Environmental Standards Compliance D-4
Canadian IC CS-03 Requirements D-5
Avis D'Industrie Canada D-6
FCC Part 68 General Information D-7
FCC and Telephone Company Procedures and Requirements D-8
Radio Frequency Interference D-9
If Problems Arise D-10
Example Affidavit D-11

Index

List of Figures

Figure 3-1. B-STDX Switch Attached to Delivery Pallet 3-3
Figure 3-2. Front View of the B-STDX 9000..... 3-6
Figure 3-3. Back View of the B-STDX 9000 3-8
Figure 4-1. B-STDX Switch Connected to NMS and Terminal Console..... 4-2
Figure 4-2. Installing Mid-Mount Brackets..... 4-4
Figure 4-3. Console Connection to B-STDX Switch 4-7
Figure 4-4. Direct Ethernet Method..... 4-9
Figure 4-5. Indirect Ethernet Method 4-9
Figure 4-6. Serial Line Over Internet Protocol (SLIP) Method..... 4-9
Figure 4-7. Management Data Link Connection Identifier (DLCI) Link Method..... 4-9
Figure 4-8. Direct Ethernet Connection from B-STDX Switch to NMS 4-10
Figure 4-9. Indirect Ethernet Connection from B-STDX Switch to NMS..... 4-11
Figure 4-10. Sample Direct SLIP Connection from B-STDX Switch to NMS. 4-13
Figure 4-11. Dial SLIP Connection from B-STDX Switch to NMS..... 4-14
Figure 4-12. Management DLCI Connection from B-STDX Switch to NMS.. 4-15
Figure 5-1. Connecting the -48 VDC Power Supply..... 5-4
Figure 5-2. Redundancy Status LEDs 5-10
Figure 6-1. Removing a Control Processor Module..... 6-3
Figure 6-2. Removing the CPA Module..... 6-6
Figure 6-3. Removing IOP Modules 6-11
Figure 6-4. Removing IOA Modules..... 6-13
Figure 6-5. AC Power Supply Module Back View 6-16
Figure 6-6. -48 VDC Power Supply Module Back View..... 6-17
Figure 6-7. Removing the Power Supply Module..... 6-18
Figure 6-8. Connecting the -48 VDC Power Supply..... 6-20
Figure 6-9. Removing the Cooling Fan Access Cover..... 6-21
Figure 6-10. Removing the Cooling Fan Module..... 6-22
Figure 6-11. Removing Air Intake switch and Top Filter 6-23
Figure 6-12. Removing Side Filter Retaining Bracket and Side Filters..... 6-24
Figure A-1. 8-Port UIO Module, V.35 Panel, and X.21 Panel..... A-6
Figure A-2. Channelized T1 IOP and IOA..... A-11
Figure A-3. Unchannelized E1 IOP and IOA..... A-15
Figure A-4. 12-port E1 IOP and IOA A-20
Figure A-5. HSSI Module IOP and IOA A-24

Figure A-6. 10-Port DSX-1 Module IOP and IOA A-28
Figure A-7. ATM UNI IOP and IOA A-32
Figure A-8. ATM CS E3 IOP and IOA A-36
Figure A-9. T1 ISDN PRI Module IOP and IOA A-40
Figure A-10. E1 ISDN PRI Module IOP and IOA A-45
Figure A-11. Channelized DS3 Module IOP and IOA A-52
Figure A-12. Channlized DS3-1-0 Module IOP and IOA A-58
Figure A-13. ATM UNI CS DS3/E3 IOP and IOA A-65
Figure A-14. ATM IWU OC-3c/STM-1 IOP and IOA A-72
Figure A-15. Ethernet 10/100Base-T IOP and IOA A-76
Figure B-1. Shielded Crossover Console Cable Diagram B-3
Figure B-2. RS-232 Shielded Null Modem Cable Diagram B-4
Figure B-3. RS-232 Shielded Straight-through Modem Cable Diagram B-6
Figure B-4. RS-232 DB-9 to DB-25 Shielded Crossover Cable Diagram B-8
Figure B-5. V.35 Straight-through Cable Diagram B-10
Figure B-6. V.35 Crossover Cable Diagram B-12
Figure B-7. X.21 Straight-through Cable Diagram B-14
Figure B-8. X.21 Crossover Cable Diagram B-16
Figure B-9. T1/E1 Straight-through Cable Diagram B-17
Figure B-10. T1/E1 Crossover Cable Diagram B-18
Figure B-11. T1 Straight-through USOC-RJ-48C Connector Diagram B-19
Figure B-12. T1 Crossover USOC-RJ-48C Connector Diagram B-20
Figure B-13. HSSI Straight-through Cable Diagram B-24
Figure B-14. HSSI Crossover Cable Diagram B-28
Figure B-15. V.35 Loopback Connector Connection Summary B-31
Figure B-16. X.21 Loopback Connector Connection Summary B-32
Figure B-17. T1 Loopback Connector Connection Summary B-33
Figure B-18. RJ-48 Loopback Connector Connection Summary B-33
Figure B-19. HSSI Loopback Connector Connection Summary B-34

List of Tables

Table 1-1. B-STDX IOP Modules 1-6
Table 1-2. B-STDX IOP Module Service Support 1-7
Table 2-1. B-STDX 8000 and 9000 Electronic/Electrical Specifications 2-2
Table 2-2. B-STDX 8000 and 9000 Physical Specifications 2-3
Table 2-3. B-STDX 8000 and 9000 Environmental Specifications 2-4
Table 2-4. Power Cord Requirements 2-9
Table 5-2. Module Status LEDs 5-9
Table 7-1. Switch Status 7-2
Table 7-2. IOP Module Status 7-3
Table 7-3. Power Supply Module Status 7-5
Table A-1. Multimode (LED) Optics A-68
Table A-2. Single-Mode (Laser) Optics A-69
Table B-1. Pinouts for RS-232 Shielded Crossover Console Cable B-3
Table B-2. Pinouts for RS-232 Shielded Null Modem Cable B-4
Table B-3. Pinouts for DB-25 Connector B-5
Table B-4. Pinouts for RS-232 Shielded Straight-through Modem Cable B-6
Table B-5. Pinouts for RS-232 DB-25 Shielded Crossover Cable B-7
Table B-6. Pinouts for RS-232 DB-25 to DB-9 Shielded Crossover Cable B-7
Table B-7. Pinouts for V.35 Straight-through Cable B-9
Table B-8. Pinouts for V.35 Crossover Cable B-11
Table B-9. Pinouts for X.21 Straight-through Cable B-13
Table B-10. Pinouts for X.21 Crossover Cable B-15
Table B-11. Pinouts for T1/E1 Straight-through Cable, DB-15 ..... B-17
Table B-12. Pinouts for T1/E1 Crossover Cable, DB-15 ..... B-18
Table B-13. Pinouts for T1 Straight-through USOC-RJ-48C Connector B-19
Table B-14. Pinouts for T1 Crossover USOC-RJ-48C Connector B-20
Table B-15. Pinouts for HSSI Straight-through Cable B-21
Table B-16. Pinouts for HSSI Crossover Cable B-25
Table B-17. Pinouts for Media Independent Interface (MII) Connector B-29
Table B-18. Pinouts for V.35 Loopback Connector (Male) B-30
Table B-19. Pinouts for X.21 Loopback Connector (Male) B-32
Table B-20. Pinouts for T1 Loopback Connector (Male) B-33
Table B-21. Pinouts for RJ-48 Loopback Connector (Male) B-33
Table B-22. Pinouts for HSSI Loopback Connector (Male) B-34
Table D-1. Cable Specifications D-3

Table D-2. B-STDX FCC Information D-7

About This Guide

The *Ascend B-STDX 8000/9000 Hardware Installation Guide* contains all of the procedures you need to set up, install, and test the B-STDX 8000 and B-STDX 9000 hardware configurations. This guide also provides basic troubleshooting solutions for resolving potential problems. The *B-STDX 8000/9000 Hardware Installation Guide* is intended for systems integrators and other implementation personnel who are responsible for the installation of the B-STDX 8000 and 9000 switches.

What You Need To Know

The procedures in this guide dictate that you understand and follow the safety practices at your site, as well as those identified in this guide.

Before you can configure the switch using the NavisCore NMS software, you have to complete all of the hardware installation procedures outlined in this guide. After you complete the hardware installation, refer to the *Networking Services Technology Overview* if you need information on Ascend's networking services and the technologies employed by these services.

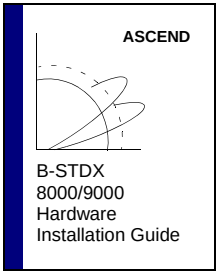
You should work closely with the NMS operator and other systems integration personnel to assure a functional installation.

Customer Comments

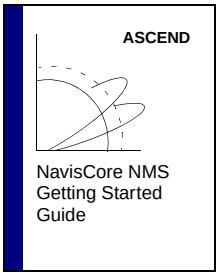
Customer comments are welcome. Please fill out the Customer Comment form located in the back of this guide and return it to us.

Documentation Reading Path

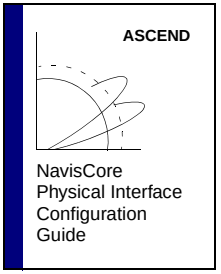
Use the following guides to install and manage the B-STDX 8000/9000 switch:



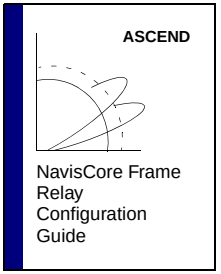
Describes how to install, test, and troubleshoot the B-STDX 8000 and 9000 switch hardware, including replacing hardware modules and interpreting LED status indicators.



Provides an overview of basic NavisCore features. Use this guide to learn how to create network maps. This guide includes a step-by-step example that enables you to create a network map containing two switch objects connected by a direct line trunk.



Explains how to configure processor modules, I/O cards, and physical ports for STDX, B-STDX, CBX 500, and GX 550 switches.



Describes how to configure Frame Relay services on your switch network.

How to Use This Guide

The following table summarizes the information contained in this guide.

Read	To Learn About
Chapter 1	Introduces the B-STDX 8000 and B-STDX 9000 switches, and describes the interface, features, and typical applications for these switches. It also explains how redundant modules operate in a B-STDX switch, and describes the considerations and procedures needed to install or replace a redundant configuration.
Chapter 2	Lists the product specifications for the B-STDX hardware, including environmental and electrical considerations. This chapter also lists the Safety Warnings related to the use of the B-STDX hardware.
Chapter 3	Describes the prerequisites for installing the hardware, such as unpacking the unit, taking an inventory, and gathering the necessary installation items.
Chapter 4	Explains, in a step-by-step format, how to set up and install the B-STDX hardware.
Chapter 5	Describes how to complete the installation of the B-STDX hardware and determine its operating status and the results of the power-up diagnostics by viewing the LEDs on the front panel of the Control Processor and IOP modules.
Chapter 6	Explains the steps involved in installing new modules or replacing existing modules in B-STDX switches, including the Control Processor, IOP modules, power supply, and cooling fan modules.
Chapter 7	Explains how to determine the operational status of the hardware and, where appropriate, provides general troubleshooting solutions. This chapter also provides information about how to contact the Ascend Technical Assistance Center for assistance.
Appendix A	Contains a description of each of the hardware IOP modules that are available for B-STDX switches.
Appendix B	Illustrates the various types of B-STDX cables and details the pinout assignments for each type of cable.

Read	To Learn About
Appendix C	Provides instructions on how to convert a DSX IOP to a channelized DS3 IOP, and how to convert a channelized DS3 IOP to a DSX IOP.
Appendix D	Contains country-specific regulatory information, including recommended and mandatory requirements of certification authorities. It also contains information on environmental standards compliance for the B-STDX switches, as well as an example of the affidavit that has to be filed with the Telco.

What's New in This Guide?

This following table lists the enhancements and changes made to this guide.

Changes/Enhancements to this Guide	Described in
New module descriptions and specifications	Chapter 1 and Appendix A

Related Documents

- *Networking Services Technology Overview*, Product Code: 80001
- *Network Management Station Installation Guide*, Product Code: 80014
- *NavisCore Frame Relay Configuration Guide*, Product Code: 80071
- *Naviscore Diagnostic and Troubleshooting Guide*, Product Code: 80074
- *NavisCore Console Command Reference*, Product Code: 80075

To obtain a current product code/price list manual, contact your Ascend Account Manager.

Conventions

This guide uses the following conventions to emphasize certain information, such as user input, screen prompts and output, and menu selections. For example:

Convention	Indicates	Example
`Courier Bold`	User input on a separate line.	**`eject cdrom`**
`Courier`	Screen or system output	`Please wait ...`
Black boxes surrounding text	Notes and warnings.	See examples below.
Italics	Used for file names, path names, directories, book titles, new terms, and emphasized text.	*Network Management Station Installation Guide*

Provides helpful suggestions or reference to materials not contained in this manual.

Cautions notify the reader to proceed carefully to avoid possible equipment damage or data loss.

Warns the reader to proceed carefully in order to avoid personal harm or injury.

This guide uses many acronyms to describe various networking terms. Use the following list to quickly identify the meaning of the acronyms contained in this guide:

Acronym	Meaning
ATM	Asynchronous Transfer Mode
CP	control processor
CSU	channel service unit
DCE	data communications equipment
DLCI	data link connection identifier
DSU	data service unit
DTE	data terminal equipment
DXI	data exchange interface
HDLC	High-Level Data Link Control
IOA	input/output adapter
IOP	input/output processor
ISDN	Integrated Services Digital Network
Kbps	Kilobits per Second
LAP	Link Access Protocol
Mbps	Megabits per Second
MIB	Management Information Base
NMS	Network Management System
NNI	Network-to-Network Interface
OSI	Open Systems Interconnection
OSPF	Open Shortest Path First

Acronym	Meaning
PAD	packet assembler/disassembler
PP	Packet Processor
PPP	Point-to-Point Protocol
PRAM	Parameter Random Access Memory
PRI	Primary Rate Interface
PVC	permanent virtual circuit
RFC	request for comments
SLIP	Serial Line over Internet Protocol
SMDS	Switched Multimegabit Data Service
SNMP	Simple Network Management Protocol
SVC	switched virtual circuit
UIO	universal input/output
UNI	user-to-network interface

1

Overview

This chapter describes the overall architecture of the Ascend B-STDX 8000 and B-STDX 9000 multiservice WAN switches. It also describes the interfaces, features, and typical applications of these switches in Frame Relay, IP SMDS, ISDN, and ATM network environments. In addition, this chapter explains how redundant modules operate in a B-STDX switch, and describes the considerations and procedures needed to install or replace a redundant configuration.

B-STDX Product Description

The B-STDX 8000 (8-slot) and the B-STDX 9000 (16-slot) are fully redundant, multiservice WAN switches that provide a standards-based foundation suited for both public carrier and private networks.

The B-STDX CP and corresponding IOP modules are optionally available in fully redundant pairs for high reliability networking requirements. In the event of CP or IOP failure, the redundant partner automatically becomes the active processor, thereby avoiding any unnecessary service disruption on the network.

CP Modules

B-STDX switches consist of a Control Processor (CP) that interacts with multiple Input/Output Processors (IOPs) to accommodate numerous interface specifications, speeds, and protocols. The new CP models (CP 30, 40, and 50) provide a disk-based processor, which allows for smoother upgrades, as well as more memory configuration and storage capabilities. The new disk-based processors also support dual software images, allowing for fast and safe fallback during network upgrades.

CP Basic — Provides background management and static networking functions in support of the real time networking functionality provided by multiple IOPs. CP Basic modules consist of a connector panel and a CP Basic card.

CP Plus — CP Plus modules also provide background management and static networking functions in support of the real time networking functionality provided by multiple IOPs. However, CP Plus modules contain more memory than the CP Basic module, to support SMDS ICI and billing functions. If you need support for SMDS ICI and/or billing functions, you must have a CP Plus module installed in the B-STDX switch. A CP Plus module consists of a connector panel and a CP Plus card.

On B-STDX switches running switch code releases prior to release 4.2, you must use CP Basic or CP Plus modules. CP Models 30, 40, and 50 are not supported by switch code releases prior to Release 4.2. CP Basic and CP Plus modules are not supported with Release 6.0 and above.

CP Model 30 — This module provides support for all existing and future functions. This module requires B-STDX switch code release 4.2 or greater, and NavisCore Release 2.3 or greater.

CP Model 40 — In addition to supporting Frame Relay functions, this module also provides support for next-generation features such as IP Switching and Accounting. It provides 64 MB of IP DRAM to support IP switching networks with up to 200K IP routes. It also provides SRAM battery backup for storage of accounting data. This module requires B-STDX switch code release 4.2 or greater, and NavisCore Release 2.3 or greater.

CP Model 50 — This module provides 128 MB of IP DRAM to support large IP switching networks (up to 512K IP routes), and is designed to be expandable to 256 MB of IP DRAM for future expansion. This module requires B-STDX switch code release 4.2 or greater, and NavisCore Release 2.3 or greater.

CP Models 30, 40, and 50 use either a 260 or 520 MB internal disk.

Existing CP connector panels support the new CP models. However, in order to support remote identification of network inventory, you have to install the new CP Model 30/40/50 Redundant Connector panel (product code 59107).

Use the following table to visually identify the different types of CP cards.

CP Type	DIP Switch Color on Front Panel	Board Part Number
CP Classic	Black	710-00001-00
CP Basic	Black	710-00069-00
CP Plus	Red	710-0034-01

Unless there is a specific reason to differentiate between the different CP modules, all CP module types are generically referred to as CP modules throughout this guide.

IOP Modules

The B-STDX 8000/9000 now supports 16-MB (IOP-16) and 64-MB (IOP-64) versions of its IOP modules (however, only high-speed core modules are available in the 64-MB version). All module types are available in the 16-MB version, with the exception of the 4-port unchannelized T1 and 4-port T1/E1 ISDN modules which are only available with 8-MB (IOP-8) of memory.

IOP Plus — IOP Plus (IOP-8) modules manage the lowest level of a node's trunk or user interfaces. These modules perform physical data and multiplexing operations on external trunks and user links. IOP Plus modules are not supported with switch code releases prior to 4.0. If, however, you are using switch code release 4.0 or greater, and you need support for SMDS, ATM, or multiservice connections, you must use an IOP Plus module. These modules are configured with 8 MB of IRAM.

The IOP-8 modules will not be available after the end of calendar year 1998.

IOP-16 — These modules are 16-MB versions of the IOP Plus modules. They provide 16 MB of IRAM (and on high-speed HSSI and channelized DS3 cards, an HD processor) to support future IP Navigator functionality, large IP switching route tables, and higher PVC scalability. Although the increased memory will not be supported until release 5.0 of the switch code, these modules are available now with release 4.2 of the switch code. This provides flexibility in migrating to the new hardware before IP switching services are available on the B-STDX switch. By upgrading your IOP hardware now, you can deploy future software features with only a software upgrade.

IOP-64 — The IOP-64 cards are available on all existing high-speed modules and other new modules on the B-STDX switch. They support additional IPN functionality, large IP switching route tables, increased availability, and provide increased memory capabilities which will be required to support future enhancements on the B-STDX. The high-speed HSSI, channelized DS3, ATM CS DS3, and ATM OC3/STM1 cards will be supported with Release 4.2; however, the increased memory will not be used until a future release. These changes provide flexibility in migrating to the new hardware before IP switching services are available on the B-STDX switch. By upgrading your IOP hardware now, you can deploy future software features with only a software upgrade.

Use the following table to visually identify the different types of IOP cards.

IOP Type	DIP Switch Color on Front Panel
IOP	Black
IOP Plus	Red

Unless there is a specific reason to differentiate between the different IOP modules, all IOP module types are generically referred to as IOP modules throughout this guide. For a complete list of the supported IOP modules, refer to Table 1-1.

IOA — Connects the various IOP Plus, IOP-16, and IOP-64 modules to the network. IOA configurations vary according to the specific IOP module they support.

Table 1-1 lists the supported IOP modules for B-STDX switches. This table also identifies the port speed, port capacity, and interfaces for each module type.

Table 1-1. B-STDX IOP Modules

IOP Module	Port Speeds	Port Capacity
12-Port Unchannelized E1 I/O	2.048 Mbps	12 E1
12-Port T1/E1 ATM	1.544Mbps (T1) or 2.048 Mbps (E1)	12 T1 or 12 E1
ATM CS DS3/E3	44.736 Mbps (DS3) or 34.368 Mbps (E3)	1 DS3/E3
ATM IWU OC3c/STM-1	155.52 Mbps	1 OC3c or 1 STM-1
Channelized DS3/1	44.736 Mbps per port/module	1 28-bundle T1
Channelized DS3/1	44.736 Mbps per port/module	1 28-bundle T1with support for 24 DS0 per T1
Channelized T1/E1	1.544/2.048 Mbps	4 24-bundle T1, or 4 31-bundle E1
Channelized T1/E1 ISDN PRI	T1: 23 D channels and 1 B channel E1: 30 D channels and 1 B channel	4 24-bundle ISDN PRI or 4 31-bundle ISDN PRI
DSX-1	1.54 Mbps	10 DSX-1
HSSI	45 Mbps	2 HSSI
Unchannelized T1/E1	1.544/2.048 Mbps	4 T1 or 4 E1
Universal IO (V.35, X.21)	8 Mbps	8 V.35 or 8 X.21
10/100 Base-T[a]	10/100 Mbps Ethernet	2 ports

[a] Contact your Ascend sales representative for information regarding availability.

Table 1-2 lists the WAN services that are supported by each B-STDX IOP module.

Table 1-2. B-STDX IOP Module Service Support

IOP Module	FR	SMDS	ATM	IP	ISDN	Accounting
ATM IWU OC3c/STM-1[a]	no	no	yes	yes	no	yes
ATM UNI CS DS3/E3	no	no	yes	yes	no	yes
Channelized DS3/1	yes	yes	yes	yes	no	yes
Channelized DS3/1/0[e]	yes	yes	yes	yes	no	yes
Channelized T1/E1	yes	yes	yes (DXI)	yes	no	yes
Channelized T1/E1 ISDN PRI	yes	yes	yes (DXI)	no	yes	no
DSX-1	yes	yes	yes (DXI)	yes	no	yes[b]
HSSI	yes	yes	yes	yes	no	yes[b]
ATM UNI T1/E1	no	no	yes	no	no	yes
12-Port T1/E1 ATM[e]	no	no	yes	yes	no	yes
Unchannelized T1/E1[c]	yes	yes	yes (DXI)[d]	yes[b]	no	yes[b]
12-Port Unchannelized E1	yes	yes	yes	yes[b]	no	yes[b]
Universal IO (V.35, X.21)	yes	yes[d]	yes[d]	yes[b]	no	yes[b]
Ethernet 10/100Base-T[e]	no	no	no	yes	no	no

[a] This module is only available in a 16-MB (IOP-16) version.
[b] IP, SNA/SDLC, and accounting support require the IOP-16 version of this module, as well as B-STDX software release 4.2 or greater.
[c] This module is only available in an 8-MB (IOP or IOP Plus) version.
[d] For ATM, SMDS, or multiservice connection support with B-STDX software release 4.0 or greater, use the IOP Plus version of this module. For release 4.2 or greater, the IOP-16 version is recommended.

[e] This module is only available in a 64-MB (IOP-64) version. Contact your Ascend sales representative for further information regarding availability.

Features

The B-STDX 8000 and B-STDX 9000 broadband packet multiservice WAN switches provide the following features:

- Support for broadband technologies on a single platform
- Support for a wide spectrum of line speeds ranging from Sub-DS0 to OC-3c/STM-1
- An infrastructure for either public carrier or privately managed broadband packet networks based on industry standards for networking and network management
- Frame Relay permanent virtual circuit (PVC) and switched virtual circuit (SVC) services
- ATM virtual channel connection (VCC) and Internetworking Services
- Integrated Services Digital Network (ISDN) primary rate interface (PRI) access service
- Packet rate monitoring for network accounting and design
- Congestion management, based on Open Shortest Path First (OSPF) packet routing for large network support
- Protocol translation features, such as the PPP to RFC 1490 Translation FRAD (Point-to-Point Protocol to Request for Comments 1490 Translation Frame Relay Assembler/Disassembler)
- Optional redundant CP, IOPs, and power supply modules for high-reliability networking
- Simple Network Management Protocol (SNMP) based network management
- Supports IP Switching, which requires IOP-16/64 modules
- Supports Accounting usage data collection, which requires IOP-16/64 modules

About B-STDX Redundancy

The B-STDX's CP and IOP modules are optionally available in fully redundant pairs for high-reliability networking requirements. Redundancy support is achieved by installing two identically configured CPs or IOP modules into neighboring slots in the front of the chassis while installing a single IOA module interface into the back of the chassis. Redundant IOA modules occupy the space of the two neighboring slots in the back of the chassis to support the redundant configuration in the front of the chassis, presenting a single interface to the network.

When redundancy modules are installed in a switch and configured in NavisCore, the redundant partner continually polls the active module for status. If the redundant module detects a failure in the active module, the redundant module automatically takes over operation, thereby avoiding any unnecessary service disruptions.

B-STDX redundancy and recovery comprises both hardware and software mechanisms that enable the switch to continue operation after certain types of failure. Each switch consists of multiple power supplies and cooling fans. Optionally, any CP or IOP module can be backed up with one redundant card of the same type. Some or all cards in the unit can be configured for redundancy. The only restriction is the number of available slots.

In the B-STDX, redundancy support is distributed such that CPs and IOP modules can be independently redundant. The changeover to a standby CP and/or IOP module is independent from other cards in the system.

Redundant IOP modules can be in any two adjacent slots. The redundant IOP module slots are configured on the NMS and sent to each IOP module. Also, hardware provides a status indicating whether an IOP module is connected to the special redundancy I/O panel and, if so, if it is located on the right or left side. During initialization of the IOP module, the hardware status is verified against PRAM to ensure its correctness.

If one module of a redundant pair is an IOP Plus module, the second module must also be an IOP Plus module. If one module of a redundant pair is an IOP module, the second module must also be an IOP module. If one module of a redundant pair is an IOP-16 module, the second module must also be an IOP-16 module.

Status Indicators

Redundancy LEDs are located on the front of each CP or IOP module to indicate which card in a redundant configuration is the active card and which card is the standby card. Although there are two LEDs on each card, only one LED is lit (the LED closest to the active or standby card).

For example, in a redundant IOP configuration, the active card is indicated by a solid green Redundancy Status LED closest to the standby card. The green Redundant Status LED on the standby card closest to the active card will blink. For additional information on redundancy status, see "Determining Redundancy Status" on page 5-10.

About the Redundancy Manager

The Redundancy Manager is a background task that runs on each CP and IOP module installed in the switch. It performs the following functions:

- Establishes an active and standby module for each pair of redundant modules.
- Monitors the integrity of active modules. Monitoring occurs using keep-alive messages over the cell bus. (For more information, see "Keep-Alive Monitoring" on page 1-12.)
- Detects failures in active modules. If a failure is detected, the standby module disables the active module and performs a warm boot to take over control.
- Monitors the PRAM in standby cards to ensure identical configurations are maintained between the active and standby card. If a mismatch is detected, the active card automatically updates PRAM on the standby card.

If you install a redundant CP module that contains no boot Flash or application code, the main CP automatically downloads boot Flash and application code to the standby CP card. The main CP then monitors PRAM in the standby CP, and automatically downloads PRAM to the standby CP if a mismatch is detected.

The Redundancy Manager is distributed and runs on each card in the system. Redundant cards monitor each other using a keep-alive mechanism. If an active card fails, the standby reboots the active card by ‘shooting’ it and taking over as the new active card. The changeover does not have any direct effect on other cards in the system. However, other cards may be indirectly affected by not being able to access information on the resetting card.

The redundancy scheme is not meant to provide a fault-tolerant system. The effect of a redundant changeover varies for CPs and IOP modules. If a CP fails, the changeover causes no loss of data, since data transfer is strictly handled by the IOP cards. In addition, during this time new PVCs/SVCs can be established and rerouting of existing PVCs/SVCs can occur. However, no IP routing can occur through this node (i.e., no NMS traffic). If an IOP card fails, all PVCs/SVCs running through the IOP module are terminated, resulting in possible data loss.

Keep-Alive Monitoring

Redundant modules monitor each other's integrity through the use of a keep-alive protocol. Keep-alive messages are exchanged by the Redundancy Manager in each card (CP or IOP) over the cell bus. The redundant card initiates the poll.

The following list describes the Keep-alive Timers and Counters used to determine the status of an active card. These values are hard-coded on to each card; they cannot be configured from by the user.

Keep-Alive Poll Timer — Triggers the transmission of keep-alive messages from the standby card to the active card. This value is set for expiration every 0.5 seconds.

Keep-Alive Poll Counter — Dictates the number of consecutive active card keep-alive responses that the standby card can miss before it shoots the active card. This value is set to 3.

Keep-Alive Poll Verification Timer — Verifies the active card’s receipt of keep-alive messages from the standby card. This value is set for 1 second and is reset each time a keep-alive is received by the active card.

Keep-Alive Poll Verification Counter — Verifies the number of consecutive Keep Alive Poll Timer time-outs received before shooting the standby card and reporting a problem. This value is set to 3.

Keep-alive monitoring of the active card in a redundant configuration occurs as follows:

- The standby card initiates a hello message to the active card, as set by the expiration of the Keep-Alive Poll Timer.
- For each keep-alive poll the active card receives, the active card sends a response back to the standby.
- If the standby card does not receive responses according to the value set in the Keep Alive Poll Counter, it assumes the active card has failed and shoots the active card using special redundancy hardware. (The act of shooting reboots the active card and enables the standby card.)
- The standby card performs a warm boot and takes over operation as the active card.
- The new active card keeps the “shoot” active until the old active card boots up. When the old active card finishes booting, it then acts as the standby card and begins to send keep-alive polls to the new active card.
- If the exchange of keep-alives with the new active card is successful, the new active card releases the shoot and the old active card becomes the standby card.

The PRAM checksum of the sender is also contained in the keep-alive message. This number is used to guarantee that PRAM remains identical between the two cards. (For more information, refer to “Checksum/Version Number Exchange” on page 1-14.)

TFTP Support

All PRAM images downloaded to the switch have to go to both the appropriate active card and its redundant standby card. After an active card receives a new PRAM image, the active card is responsible for downloading the PRAM image to its standby card.

Checksum/Version Number Exchange

The SNMP and TFTP mechanisms are intended to keep the PRAM of redundant cards synchronized. To ensure identical images on both cards, the PRAM checksum version number is included in the keep-alive message. If the standby detects a difference in images, it automatically initiates a download of the PRAM from the active card.

NMS Support

Users are required to specify which cards in the unit are redundant and which slots they reside in. For redundant CPs, the NMS depicts the back panel with a graphical representation of a redundant CP Adapter module occupying the space of the first two slots in the unit. To initially bring up the switch, the NMS requires you to have a CP configured in Slot 1; however, the CP can physically reside in Slot 1 or Slot 2.

For redundant IOPs, the NMS depicts the back panel with an I/O panel covering each pair of redundant slots. When the NMS builds the PRAM configuration for each IOP, it includes the Slot ID of each card in the new IOP Management Information Base (MIB) group. When the switch is powered up, active and standby cards are enabled according to their Slot ID, as configured in the NMS.

The NMS also enables a user to manually switch operation from an active card (CP or IOP) to its standby card. The reset procedure is the same as if the backup detected a failure with the active card.

2

Specifications and Safety Warnings

This chapter provides product-specific information about the B-STDX 8000 and B-STDX 9000 switches, as well as safety warnings relating to the use of this equipment. The specifications in this chapter include:

- Electronic/Electrical
- Physical
- Environmental (including Safety Warnings)
- Power Cord

Electronic/Electrical Specifications

The B-STDX power supply is auto-ranging. The B-STDX power cord is connected via a three-prong plug that grounds the B-STDX and polarizes the connection. The ground connector must be properly grounded.

Table 2-1 describes the B-STDX 8000 and B-STDX 9000 electronic/electrical specifications.

Table 2-1. B-STDX 8000 and 9000 Electronic/Electrical Specifications

Feature	Specification
100-120 VAC applications	90-132 VAC, 12 amps max, 1300 watts max, 50-60 Hz, single phase
200-240 VAC applications	180-264 VAC, 7.5 amps max, 1300 watts max, 50-60 Hz, single phase
-48/-60 VDC applications	-39 to -76 VDC, 20 amps max[a], 1000 watts max

[a] If voltage is close to the -39 VDC boundary, the current will exceed 20 amps when the system is fully loaded.

Physical Specifications

The B-STDX 8000 and 9000 basic configuration consists of:

- Chassis
- Power Supply
- Fan Module

The CP module is not included, but is required to operate the switch. Optional redundant power supplies and IOP modules can be selected separately. Table 2-2 describes the B-STDX specifications.

A CP module must be installed in the chassis (with the reset latch up) before applying power to the chassis or inserting IOP modules into a powered chassis; otherwise any installed IOPs will be subject to damage.

Table 2-2. B-STDX 8000 and 9000 Physical Specifications

Specification	Description
Frame Relay Standards ATM Standards SMDS Standards	Frame Relay Forum UNI, ATM Forum UNI, SMDS Access Server, TA-001239, TA-001240.
WAN Interfaces	V.35, T1, E1, T3, E3, HSSI, X.21, RS-232, DS3, OC3, STM-1.
Management Interfaces	Ethernet, RS-232.
Physical Characteristics	Basic system includes one power supply module and one cooling fan module. The B-STDX 8000 has the capacity for 2 CP and 6 IOP modules. The B-STDX 9000 has the capacity for 2 CP and 14 IOP modules. Both models also have the capacity for a second power supply.
Size[a]	19.0 in. wide x 31.5 in. high x 15 in. deep.

Table 2-2. B-STDX 8000 and 9000 Physical Specifications (Continued)

Specification	Description
Weight	160 lbs. maximum.
Thermal Dissipation	1,300 watts maximum, 4433 BTU/hr. AC. 1,000 watts maximum, 3410 BTU/hr. DC.

[a] Depth size does not include cables.

Environmental Specifications and Safety Warnings

Table 2-3 describes the environmental requirements for selecting an installation site for the B-STDX hardware.

Table 2-3. B-STDX 8000 and 9000 Environmental Specifications

Characteristic	Requirement
Ambient Operating Temperature	0°C to +55°C
Relative Humidity	10% to 95% (non-condensing)
Operating Altitude	to 10,000 feet
Ambient Storage Temperature	-40°C to +65°C, 95% Relative Humidity
Storage Altitude	-1,000 to +30,000 feet

The B-STDX hardware should also be installed in an area that allows the following clearances for the chassis:

- A minimum of 6 in. (15 cm) at the back panel (for cable routing)
- A minimum of 20 in. (54 cm) at the front panel
- A minimum air flow space of 3 in. (8 cm) on both sides of the chassis
- A minimum of 3.5 in. (9 cm) at the top

DC Power Supply Warnings

The DC power supply must be installed only in restricted access areas (dedicated equipment rooms, equipment closets, or the like) in accordance with Articles 110-16, 110-17, and 110-18 of the National Electric Code, ANSI/NFPA 70. Connect to a 48V DC source which is electrically isolated from the AC source and which is reliably connected to earth.

This equipment is designed to permit the connection of the grounded conductor of the DC supply circuit to the grounding conductor at the equipment. If this connection is made, all of the following conditions must be met:

- This equipment shall be connected directly to the DC supply system grounding electrode conductor or bonding jumper from a grounding terminal bar or bus to which the DC supply system grounding electrode conductor is connected.
- This equipment shall be located in the same immediate area (such as adjacent cabinets) as any other equipment that has a connection between the grounded conductor of the same DC supply circuit and the grounding conductor, and also the point of grounding of the DC system. The DC system shall not be grounded elsewhere.
- The DC supply source is to be located within the same premises as the equipment.

- There shall be no switching or disconnecting devices in the grounded circuit conductor between the DC source and the point of connection of the grounding electrode conductor.

A readily accessible disconnect device must be provided in the fixed wiring for a DC power supply. It must be suitable for the rated voltage and current specified.

Safe operation of this unit requires connection to a grounded outlet. To prevent possible injury from voltages on the telecommunications network, disconnect all telecommunications network lines before disconnecting the unit from the grounded outlet.

Safety Warnings

1. There are mechanical and electrical shock hazards present throughout the system if one or more of the modules is removed. There are no operator serviceable components. Only qualified personnel are allowed to service the unit.
2. This equipment must be connected to a protective ground in accordance with the instructions provided in this guide. Improper grounding may result in an electrical shock.
3. This equipment does not provide safety isolation between any port that is connected to a digital network termination point and any other port to which terminal equipment may be connected.
4. The icons “|” and “⏻” next to the switch on the power supply represent “On” and “Standby” respectively. In the “|” (On) mode, the power supply is fully operational, delivering power to the system. In “⏻” (Standby) mode, the power supply is operational, but is not delivering power to the system. The only way to completely disconnect the supply is to remove the appropriate power cord from the back of the unit.

This unit has more than one power supply cord. To avoid electrical shock, disconnect the appropriate power supply cord prior to servicing.

Signes Précurseurs de Sécurité

1. Il y a danger de hasards mécaniques et de shocks électriques parmi le système si un ou plusieurs modules sont enlevés. Il n'y a pas de parties constituantes qui peuvent être entretenu. Seulement les techniciens qualifiés peuvent faire l'entretien de ce système.
2. Il faut connecter cet équipement à une prise de terre protegée conformément aux instructions fournis dans ce guide. Une prise de terre incorrecte résultera en commotion électrique.
3. Cet équipement ne fournit pas sureté d'isolement entre un port qui est connecté a un point reseau digital et tout autre port auquel l'équipement terminal peut être connecté.
4. Les icones “|” et “⏻” à côté du commutateur sur la prise de courant représentent “en march” (On) et “se tenir prêt” (Standby) respectivement. Dans le mode “|” (On) la prise de courant est complètement opérationnel, délivrant le courant au système. Dans le mode “⏻” (Standby) la prise de courant est opérationnel, mais ne délivre aucun courant au système. La seule façon de couper complètement le courant est d'enlever le cordon d'alimentation approprié à l'arrière de pl'appareil.

Cet appareil comporte plus d'un cordon d'alimentation. Afin de prévenir les chocs électriques débrancher le cordon d'alimentation approprié avant le dépannage.

Achtung: Zusätzliche Sicherheitshinweise

- Wenn ein oder mehrere Module entfernt werden, besteht die Gefahr eines elektrischen Stromschlages oder Verletzung durch mechanische Elemente. Es gibt keine vom Bediener zu wartenden Komponenten. Die Wartung darf nur vom qualifizierten Fachpersonal vorgenommen werden.

- Die Symbole “|” and “⏻” in der Nähe des Schalters am Netzteil bezeichnen “EIN” und “Bereitschaft” (Standby). In der Stellung “|” (EIN) ist das Netzteil in Funktion und liefert Strom in das System. In der Stellung “⏻” (Bereitschaft, Standby) ist das Netzteil in Funktion, liefert aber keinen Strom in das System. Die einzige Möglichkeit das Netzteil ganz abzuschalten ist die entsprechende Zuleitung an der Rückseite des Gehäuses herauszuziehen.

Achtung: Dieses Gerät hat mehr als eine Zuleitung. Um einen elektrischen Strom-schlag zu vermeiden muß die entsprechende Strom-Zuleitung vor der Wartung vom Netz getrennt werden.

Power Cord Requirements

Table 2-4 outlines the requirements, by country, for the plug type and ratings for power AC cords. Note that the other end of the AC power cord must be terminated with an IEC 320 receptacle.

Table 2-4. Power Cord Requirements

Country	Power Cord Type
USA and Canada	NEMA 5-15 15A/125 VAC
U.K.	BS 1363 10A/240 VAC
Australia	AS 3112 10A/240 VAC
Japan	JIS 8303 15A/125 VAC
Switzerland	SEV 1011 10A/220-240 VAC
Germany	CEE7 VII 16A/250 VAC

The 75Ω G.703 (E1) interface cannot be connected to cabling which would be required by BS6701: Part 1: 1986 to be equipped with over voltage protection. Bit integrity is maintained across the apparatus with 0 dB gain/loss through switch.

3

Preparing for the Installation

This chapter describes the components in the B-STDX 8000 and B-STDX 9000 hardware package and corresponding Accessory Kit. It also describes the preparations and prerequisites for installing the unit.

Selecting the Installation Site

Before you choose a setup location for the B-STDX switch, be sure to read and follow the environmental and electrical requirements defined in Chapter 2, "Specifications and Safety Warnings."

Select the site for your switch installation carefully, keeping in mind that the unit requires proper ventilation. Also, be sure to consider current and future cabling requirements when selecting your installation site.

The B-STDX switch can be rack mounted in a standard 19- or 23-inch wide equipment cabinet or placed on a flat surface as a free-standing unit, as described in "Setting Up the Switch" on page 4-2.

Unpacking the Switch

The B-STDX switch is delivered to you in a protective shipping carton. The unit is attached to a wooden pallet, using screws and L brackets, as shown in Figure 3-1.

Before you remove the Ascend B-STDX switch from the shipping carton and delivery pallet, examine it for damage. If you see damage, follow the instructions in "If the Product Is Damaged."

Due to the large size and weight of a fully configured switch, Ascend recommends moving the unit to the installation site before unpacking it from the shipping carton.

A fully configured unit weighs approximately 160 pounds. To avoid potential injury, a hand lift is recommended for moving or rack-mounting the unit.

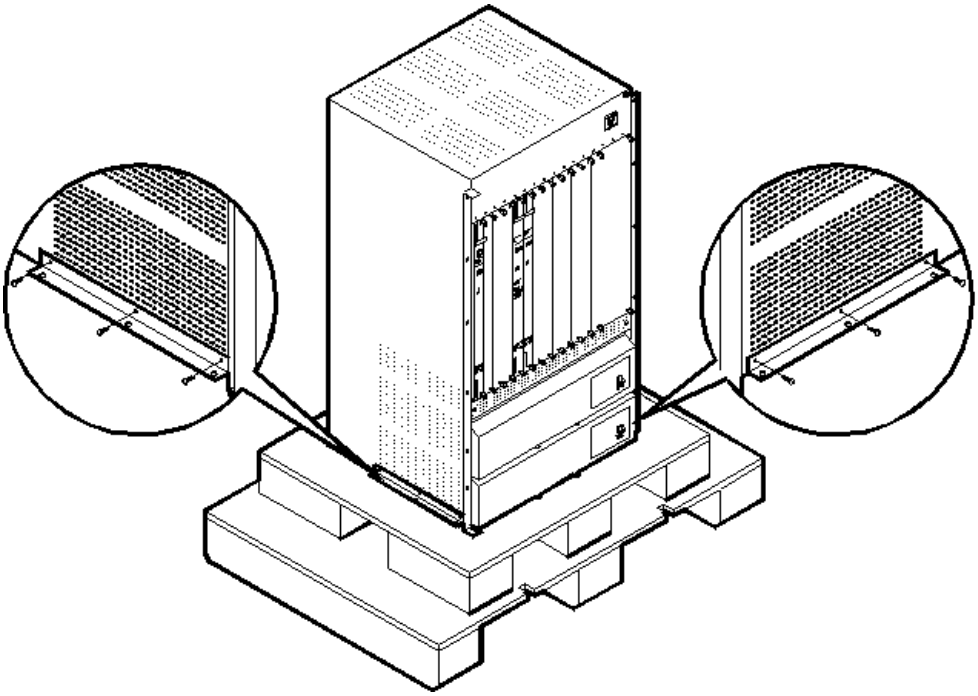


Figure 3-1. B-STDX Switch Attached to Delivery Pallet

To unpack the switch:

1. Open the carton and remove all enclosed packing materials. Save the packing materials in case you need to repack the switch for relocation at a later date.
2. Check the contents of the carton against the items listed on the packing slip.
3. Using a *#2* Phillips screwdriver, remove the screws from the L-brackets on the delivery pallet.
4. Carefully dismount the switch from the pallet.

Unpacking the Accessory Kit

The contents of the Accessory Kit vary with each order. Check them against the packing slip. The following *required* items are shipped with each B-STDX order:

- RS-232 Shielded Straight-through Modem cable, M-F, 15 ft.
- RS-232 Null Modem cable, M-F, 15 ft.
- RS-232 DB-9 to DB-25 cable, F-F
- DB-9 to DB-25 adapter for connecting the switch to a PC or console terminal
- Anti-static wrist strap
- Power supply removal tool
- Packet of installation hardware
- *B-STDX 8000/9000 Hardware Installation Guide*, Revision 04 (Product Code: 80005)
- *Ascend Networking Services Technology Overview* (Product Code: 80001)

The following *optional* accessory items are shipped as ordered:

- NavisCore Network Management software
- IOA module-specific cables
- Ethernet Adapter card (if you have a CP model 30, 40, or 50, the Ethernet Adapter is included with the CP and does not need to be ordered separately)

Gathering the Installation Items

First, decide which of the following methods you intend to use to download the software configuration install script to the switch:

From the Network Management Station (NMS) — Requires you to connect either a direct or asynchronous dial-up link between the NMS serial port and the B-STDX Network Management Port on the CP module. With this method, the configuration script is generated within NavisCore, then downloaded from the NMS to the B-STDX switch.

From a Terminal Emulator — Requires you to connect an ASCII/VT100 console terminal, or equivalent terminal emulator, to the B-STDX Network Management Port on the CP module. You can make this connection either directly or remotely through an asynchronous dial-up link. The ASCII/VT100 terminal console can then be used to invoke the install script from the B-STDX switch, prompting you for all information needed to enable the switch to communicate with the NMS.

To install the B-STDX hardware configuration, you need the following items:

- An ASCII/VT100 console terminal or equivalent that runs at 19,200 bps and has the ability to download software using either PROCOMM Plus for Windows or Windows Terminal.exe (for DOS platforms), or using TIP (for UNIX platforms). This terminal is used for downloading the install script.

- RS-232 DB-9 to DB-25 cable (included in the Accessory Kit) for connecting a PC to the switch via a 9-pin serial port, *or*

  RS-232 Null Modem cable (included in the Accessory Kit) for connecting a SPARCstation to the switch.

- RS-232 Straight-through Modem cable (included in the Accessory Kit) for connecting a modem dial-up link to the switch.

- (Optional) Ethernet transceiver or LAN connection for connecting the switch to the NMS, provided the switch is to be used as the gateway to the NMS.

- Anti-static wrist strap (included in the Accessory Kit).
- Screwdrivers: a #2 Phillips, and 1/8-in. and a 3/16-in. flathead.
- Hand lift (recommended).

Check the Configuration

The B-STDX switch is a mid-plane design that enables the CP and IOP modules to occupy the front slots of the chassis, and the CPAs and IOAs to occupy the corresponding slots in the back of the chassis.

Before installing the switch, check the modules in the unit to verify the unit is configured as ordered.

Check the CP and IOPs

Figure 3-2 shows the front slots of the B-STDX 9000 chassis, as well as an example configuration that includes a redundant CP module. The B-STDX 8000 chassis is the same, with the exception that Slots 9-16 are sealed off and cannot be used.

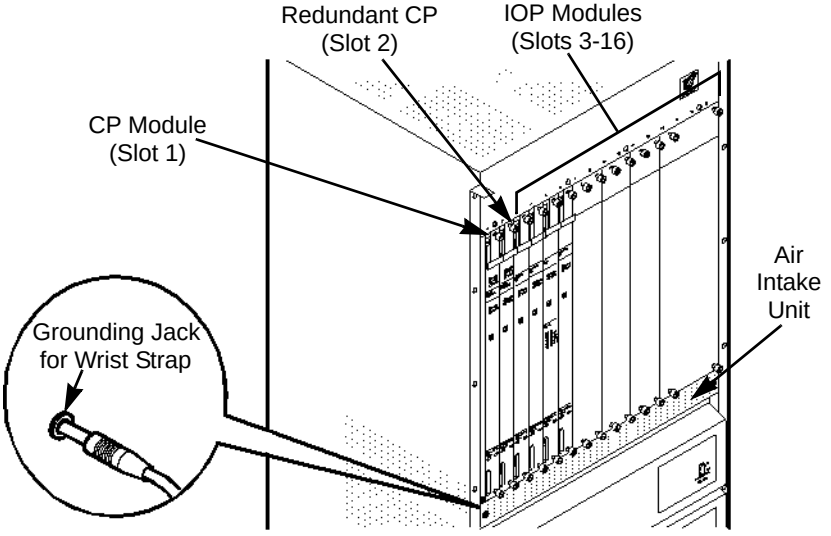


Figure 3-2. Front View of the B-STDX 9000

To verify that the unit is configured as ordered, check the installed modules against your order.

Use the following tables to visually identify the different types of CP and IOP cards.

CP Type	DIP Switch Color on Front Panel	Board Part Number
CP Classic	Black	710-00001-00
CP Basic	Black	710-00069-00
CP Plus	Red	710-0034-01

IOP Type	DIP Switch Color on Front Panel
IOP	Black
IOP Plus	Red

The main CP module always resides in Slot 1 of the chassis. An additional CP module may optionally be installed in Slot 2 for redundancy. Slots 1 and 2 are reserved for the CP and redundant CP modules; they cannot be used for IOP modules. (For information about redundancy, see "About B-STDX Redundancy" on page 1-10.)

A CP module must be installed in the chassis (with the reset latch up) before applying power to the chassis or inserting IOP modules into a powered chassis; otherwise any installed IOPs will be subject to damage.

If you have a B-STDX 9000, Slots 3 through 16 contain the IOP modules that you ordered; if you have a B-STDX 8000, Slots 3 through 8 contain the IOP modules that you ordered. Because all slots require occupation for proper air flow; any unused slots contain blank filler modules. (For a list of the supported IOP modules, see Table 1-1 on page 1-6.)

Check the CP Adapter and I/O Adapter Modules

Figure 3-3 shows the back view of the B-STDX 9000 chassis. The B-STDX 8000 is the same, with the exception that Slots 9-16 are sealed off and cannot be used.

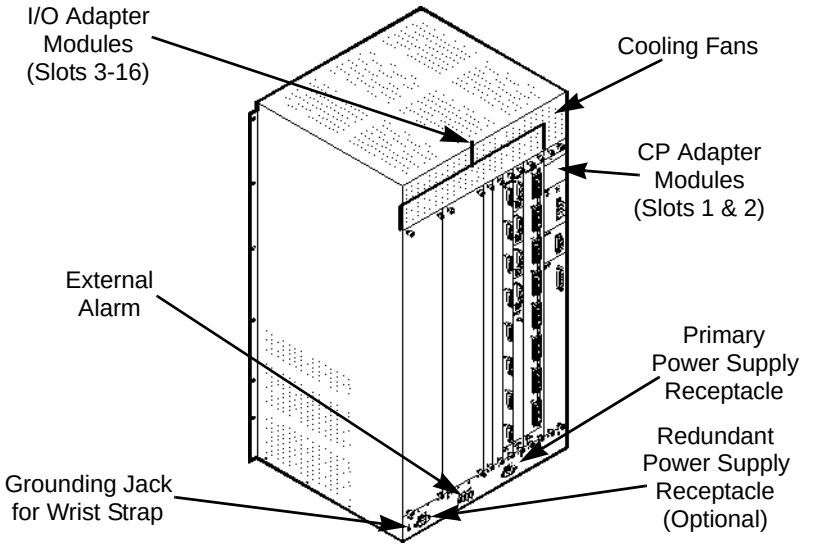


Figure 3-3. Back View of the B-STDX 9000

> The CP Adapter module contains the Network Management and Ethernet connector ports. Although the CP Adapter contains the Ethernet connector, you must check the actual CP module to verify that the Ethernet daughter board is resident.

The CP Adapter and input/output adapter (IOA) modules are installed in the back of the chassis. The CP Adapter always occupies two slots (Slots 1 and 2), even if only one CP module is installed in the front of the chassis. For each IOP module installed in the front of the chassis, there must be a supporting IOA module installed in the corresponding slot at the back of the chassis.

Redundant Configurations

In the case where a redundant configuration is installed, two identically configured IOP modules reside in neighboring slots in the front of the chassis with a single redundant (double-wide) IOA module installed in the back of the chassis. The redundant IOA module occupies the space of the two slots affected by the redundant IOP module configuration, but presents only a single interface to the network.

The cable connectors and power supply inlets are also located at the back of the chassis. An ESD grounding jack (banana jack) is located at the bottom left corner for installing the anti-static wrist strap.

What's Next

When you finish unpacking and taking an inventory of the B-STDX hardware package and corresponding Accessory Kit, and have checked the hardware configuration of the switch, you are ready to install the unit. Proceed to Chapter 4, "Installing the B-STDX Switch," for detailed instructions.

4

Installing the B-STDX Switch

This chapter provides step-by-step instructions for setting up and installing the switch, either as a free-standing switch or as a rack-mounted switch. It also describes how to:

- Connect the switch to a PC or SPARCstation to serve as the gateway to the Network Management Station (NMS).
- Connect an ASCII/VT100 terminal to the switch to download the install script.

Before performing the instructions in this chapter, verify that the following tasks are complete:

- ☑ Select the installation site
- ☑ Unpack the switch
- ☑ Unpack the Accessory Kit
- ☑ Gather the setup items
- ☑ Check the hardware configuration

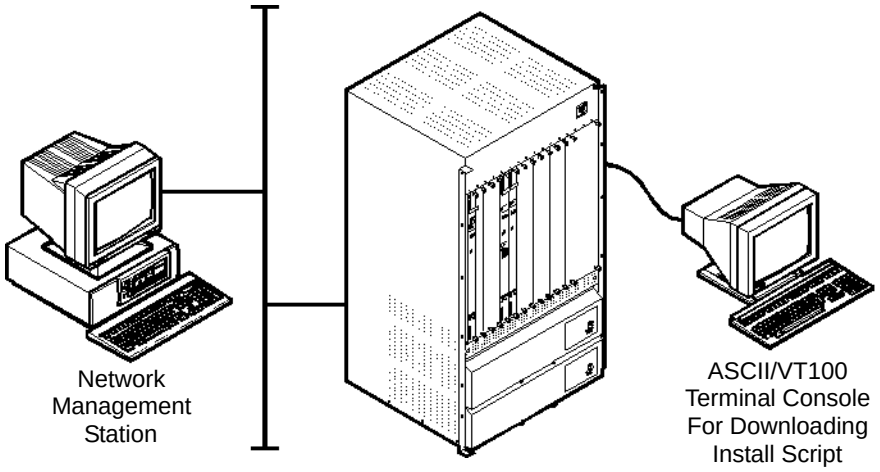


Figure 4-1. B-STDX Switch Connected to NMS andTerminal Console

To install the OS and the network management software for use in configuring, monitoring, and controlling the Ascend network, see the *Network Management Station Installation Guide*.

Setting Up the Switch

After you verify the hardware configuration, you are ready to install the switch. Position the switch for installation, keeping in mind that all cables connect to the back of the switch. The switch can be placed on a flat surface as a free-standing switch, or rack-mounted in a standard 19- or 23-inch wide equipment cabinet. The following sections describe the steps involved for each method of installation.

The 23-in. cabinet installation requires the use of adapter brackets (Product Code 90010).

As a Free-Standing Switch

If you choose to place the switch on a flat surface as a free-standing switch, you must first install rubber feet onto the bottom of the switch. (Rubber feet are included in the packet of installation hardware in the Accessory Kit.)

To install the rubber feet and set up the switch on a flat surface:

1. Carefully place the switch onto one side so that the bottom of the switch is easily accessible.
2. Install the rubber feet into each corner of the switch bottom, using the *6-32 x .375* pan head screws supplied in the Accessory Kit.

Failure to use the proper screws may damage the switch.

3. Use a *#2* Phillips screwdriver to tighten each of the screws and secure the rubber feet to the bottom of the switch.
4. Carefully return the switch to its upright position.
5. Position the switch in the location that you selected for operation. Remember that all cables connect to the back of the switch and the switch requires proper ventilation. (See "Environmental Specifications and Safety Warnings" on page 2-4 for ventilation requirements.)

As a Rack-Mounted Switch

If you choose to rack-mount the switch, decide whether you want the switch to be flush-mounted or mid-mounted in the cabinet.

The rack-mount spacing meets IEC 297-2 and ANSI/EIA-RS-310-C standards.

The switch is delivered with flush-mount brackets already installed on the front of the switch. If, however, you want to mid-mount the switch into the cabinet, you must install mid-mount brackets onto the switch. Mid-mount brackets can be ordered from Ascend.

Installing the Mid-Mount Brackets

Figure 4-2 shows how to properly position the mid-mount brackets for installation onto the switch.

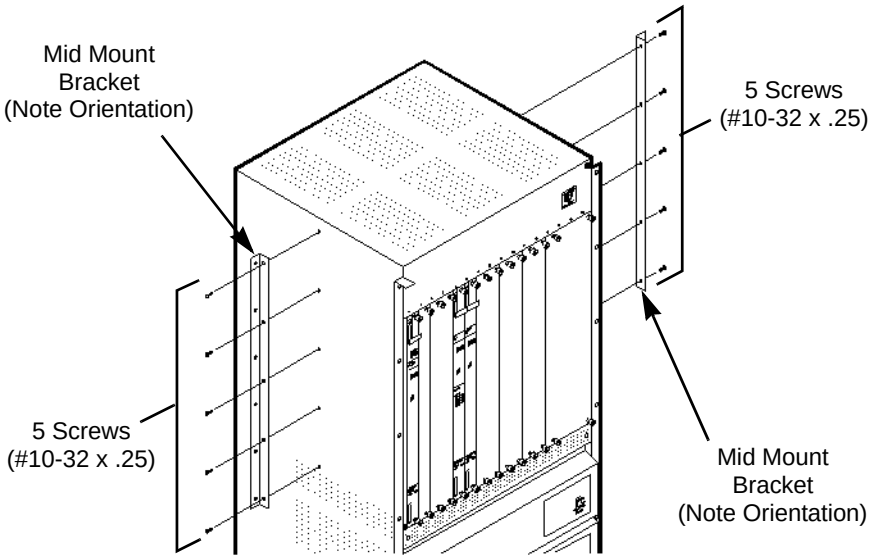


Figure 4-2. Installing Mid-Mount Brackets

To install mid-mount brackets onto the switch:

1. Position a mid-mount bracket onto one side of the switch, lining up the five screw holes on the bracket with the five screw holes on the side of the switch. Note the proper orientation for installing the mid-mount bracket in Figure 4-2.
2. Using a *#2* Phillips screwdriver, install the five *#10-32 x .25* truss head screws (included with the brackets) through the mid-mount bracket holes into the switch.

3. Repeat Step 1 and Step 2 to install the second mid-mount bracket onto the other side of the switch.

Failure to use the proper screws may damage the switch.

Installing the Switch Into the Cabinet

The procedure for rack-mounting the switch requires more than one installer. Because a fully configured switch weighs 160 pounds, the use of a hand lift is recommended for raising the switch into the cabinet.

To rack-mount the switch into the equipment cabinet:

1. If your switch has a front door, remove the door.
   a. Open the front door of the chassis and locate the release lever (in the top right corner of the door, between the two upper door screws).
   b. While holding the door with your left hand, depress the release lever with your right hand to release the door from the switch.
2. Using the recommended hand lift (or a minimum of three installers), raise the switch to the appropriate installation height.
3. Line up the six screw holes on the mounting bracket with the screw holes on the equipment cabinet.
4. Using a *#2* Phillips screwdriver, install truss head screws of the appropriate size through the mount bracket on the switch into the mount bracket on the equipment cabinet.

Connecting Cables to the Switch

The switch is connected to the network by attaching the appropriate cables to the IOA modules in the back of the switch. Typical IOA connections include: routers, CSU/DSUs, and an Ascend switch-to-switch trunk. The B-STDX adapter cables and pin-out assignments are detailed in Appendix B, "Cables and Pinout Assignments."

The CPA module located in the back of the switch contains the ports needed to make connections to the NMS or a console terminal emulator as follows:

Ethernet — A standard DB-15 Ethernet port for making a direct or indirect Ethernet connection from the switch to the NMS (the Ethernet daughter card must be installed on the CPA module in order to make this connection).

Network Management — A standard DB-25 port for making a direct or dial SLIP connection to the NMS, or for attaching a console terminal emulator to the switch.

The CPA module also contains a Relay Alarm that is triggered by certain hardware failures.

The following section, "Connecting the Console," describes how to connect a terminal console to the B-STDX switch.

Connecting the Console

Figure 4-3 illustrates a connection from the switch to the terminal console.

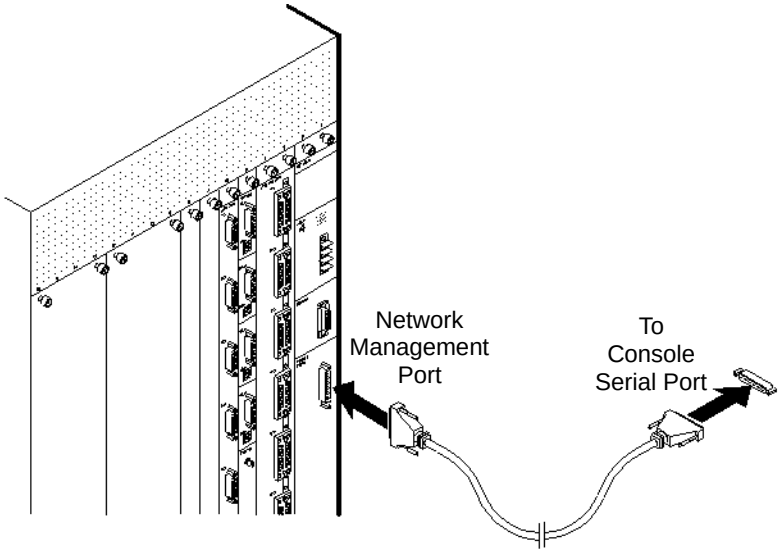


Figure 4-3. Console Connection to B-STDX Switch

To connect the console terminal to the switch:

If the console is a PC — Connect the DB-25 end of the RS-232 DB-9 to DB-25 Shielded Crossover cable, shown in Figure B-4, to the Network Management Port on the CPA. Then connect the DB-9 end of the RS-232 DB-9 to DB-25 Shielded Crossover cable to the serial port on the PC.

If the console is a SPARCstation — Connect the male connector of the RS-232 Shielded Null Modem cable, shown in Figure B-2, to the Network Management Port on the CPA. Then connect the female connector of the RS-232 Shielded Null Modem cable to the serial port on the SPARCstation.

For a remote dial-up connection from the console to the switch, use the RS-232 Shielded Straight-through cable shown in Figure B-3.

Setting Up the Network Management Station

If the switch you are installing is a gateway to the NMS, read and follow the instructions in this section, starting with "Choose a Connection Method"; otherwise, refer to the *NavisCore Frame Relay Configuration Guid*e for instructions on downloading the install script.

The workstation(s) you are using for network management should be solely dedicated for that purpose. Using the NMS hardware for other tasks may hinder the performance of the network management functions.

Prior to connecting the NMS to the gateway switch, refer to the *Network Management Station Installation Guide* for NMS hardware and software requirements.

Choose a Connection Method

There are four different connection methods available for connecting the NMS:

- Direct Ethernet
- Indirect Ethernet
- Serial Line Over Internet Protocol (SLIP)
- Management Data Link Connection Identifier (DLCI) Link

Direct or indirect Ethernet is recommended as the primary connection method from the NMS to the switch. Should the primary connection method fail, SLIP configuration is a useful backup for network management.

Ascend recommends that you provision dial-up or some other access to each switch in the Ascend network as a backup.

Figure 4-4 through Figure 4-7 show the basic structure of the four available connection methods. For instructions about how to make the actual connections, refer to the appropriate section that follows.

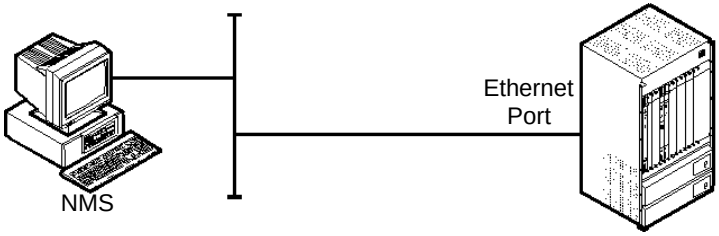


Figure 4-4. Direct Ethernet Method

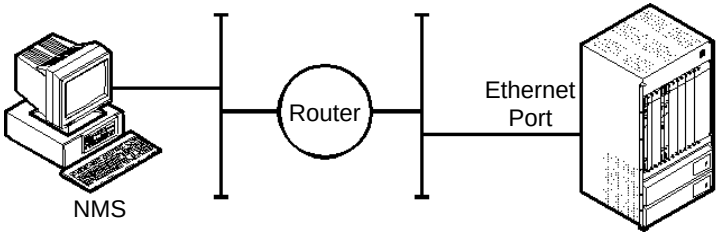


Figure 4-5. Indirect Ethernet Method

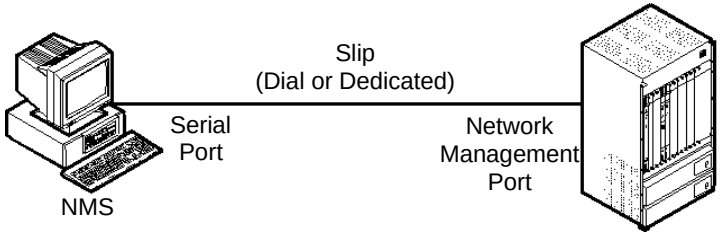


Figure 4-6. Serial Line Over Internet Protocol (SLIP) Method

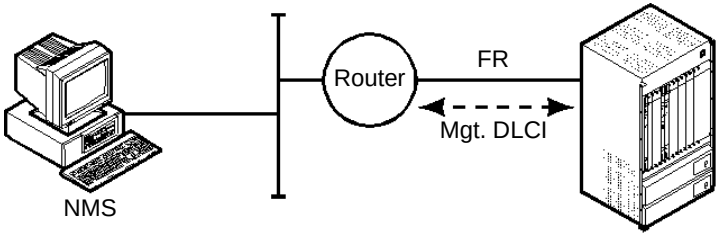


Figure 4-7. Management Data Link Connection Identifier (DLCI) Link Method

Using an Ethernet Connection

Choose one of the following two methods for making an Ethernet connection from the switch to the NMS:

Direct Ethernet — Connects the switch and the NMS to the same LAN. This setup provides the greatest interface speed and ease of use.

Indirect Ethernet — Connects the switch and the NMS to separate LANs using a router connection.

Direct Ethernet Method

Figure 4-8 shows how to make a direct Ethernet connection from the switch to the NMS.

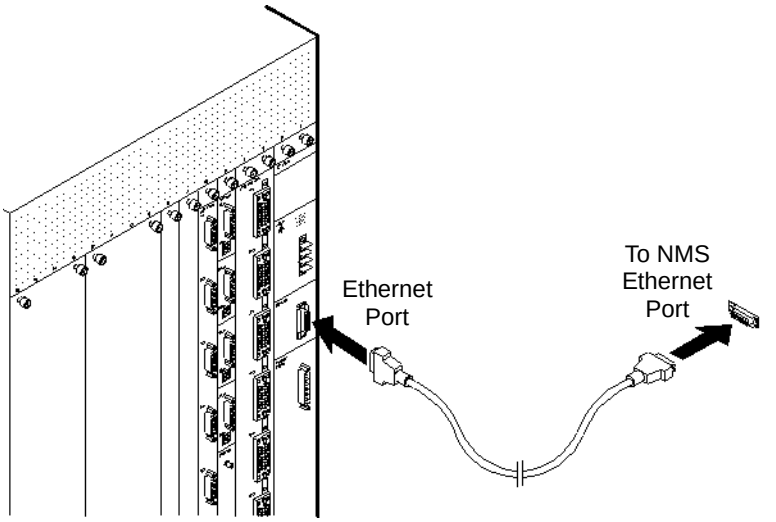


Figure 4-8. Direct Ethernet Connection from B-STDX Switch to NMS

To connect the NMS to the switch using a direct Ethernet connection:

1. Connect the Ethernet to the 15-pin Ethernet port located on the CPA module.
2. Connect the NMS Ethernet cable to the same LAN as the switch.
3. Ensure the Ethernet transceivers are properly connected to the network.

Indirect Ethernet Method

Figure 4-9 illustrates an indirect Ethernet connection from the switch to the NMS.

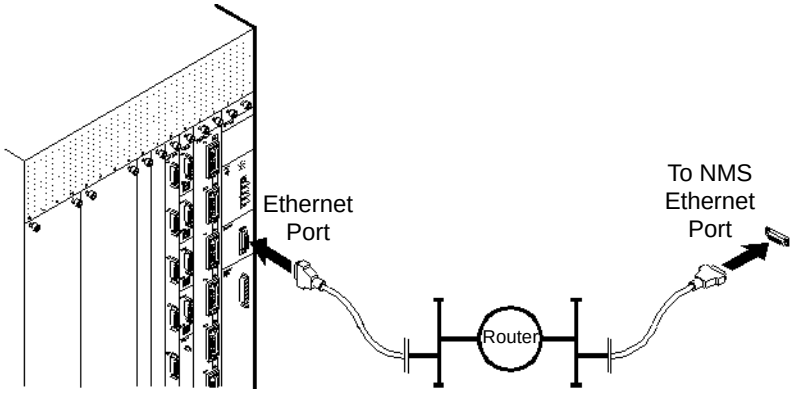


Figure 4-9. Indirect Ethernet Connection from B-STDX Switch to NMS

To connect the NMS to the switch using an indirect Ethernet connection:

1. Connect the NMS Ethernet cable to the local LAN.
2. Using a router, connect the B-STDX Ethernet to a remote LAN that has connectivity to the LAN on which the NMS resides.
3. Ensure the Ethernet transceivers are properly connected to the network.

Using a SLIP Connection

The SLIP connection method enables the NMS to monitor the network either directly via a serial line to a switch or indirectly from a modem link or asynchronous PAD connection.

Choose one of the following two methods for making a SLIP connection from the switch to the NMS:

Direct SLIP (PC) — Uses an RS-232 DB-9F to DB-25F Shielded Crossover cable connection from the switch to the NMS.

Direct SLIP (SPARCstation) — Uses an RS-232 DB-25M to DB-25F Shielded Null Modem cable connection from the switch to the NMS.

Dial-up SLIP — Uses an RS-232 DB-25M to DB-25F Shielded Straight-through cable connection from the modem to the switch.

Direct SLIP method

Figure 4-10 illustrates a direct SLIP connection from the switch to the NMS.

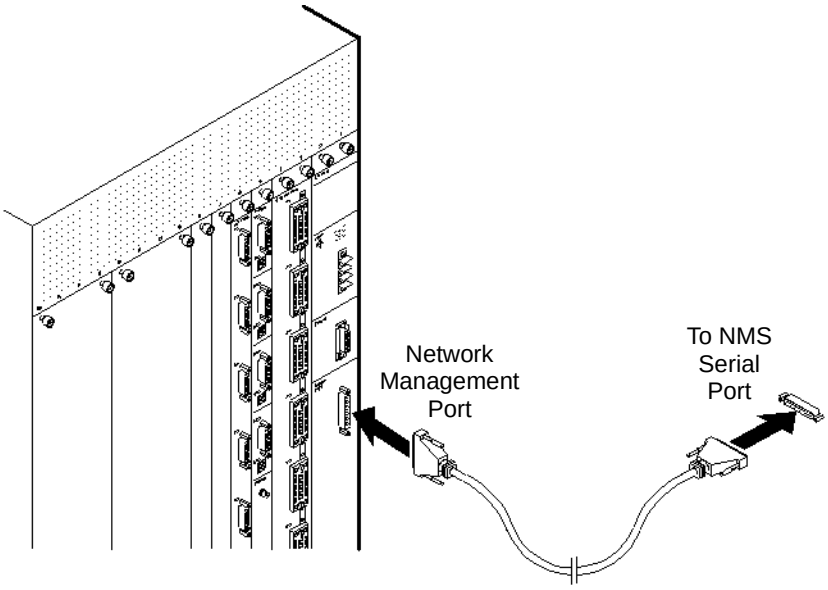


Figure 4-10. Sample Direct SLIP Connection from B-STDX Switch to NMS

To connect the NMS to the switch using a Direct SLIP connection:

If the NMS is a PC — Connect the DB-25 end of the RS-232 DB-9 to DB-25 cable shown in Figure B-4, to the Network Management Port on the CPA. Then connect the DB-9 end to the serial port on the NMS.

If the NMS is a SPARCstation — Connect the male connector of the RS-232 Shielded Null Modem cable, shown in Figure B-2, to the Network Management Port on the CPA. Then connect the female connector to the serial port on the SPARCstation.

Dial SLIP method

If you use a dial-up SLIP connection, the modem has to be configured as follows:

- 19,200 baud
- 8 bits

- No parity
- Use Hayes Q1 command
- RTS-CTS hardware flow control

Do not send responses to DTE or use Xon/Xoff flow control.

Figure 4-11 illustrates a dial-up SLIP connection from the switch to the NMS.

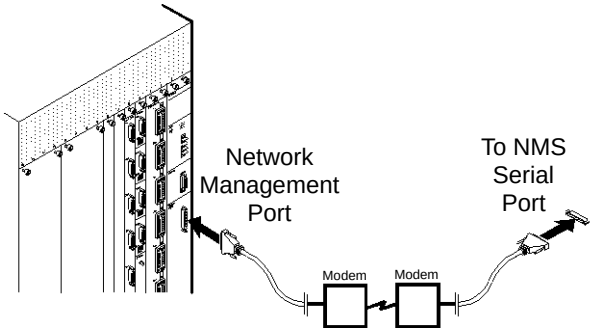


Figure 4-11. Dial SLIP Connection from B-STDX Switch to NMS

To connect the NMS to the switch using a dial-up SLIP connection:

1. Connect one end of the RS-232 Shielded Straight-through cable (shown in Figure B-3) to the modem on the switch side.
2. Connect the other end of the RS-232 Shielded Straight-through cable to the Network Management Port on the CPA.

Using a Management DLCI Connection

A Management DLCI connection provides a way for the NMS to manage the network through a permanent virtual circuit (PVC) on a router having connectivity to the switch using a Frame Relay UNI-DCE connection.

Figure 4-12 illustrates a Management DLCI connection from the switch to the NMS.

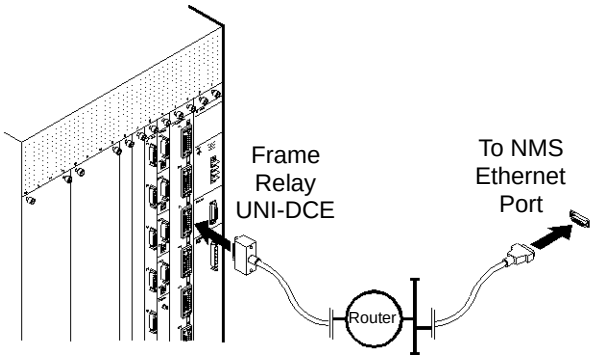


Figure 4-12. Management DLCI Connection from B-STDX Switch to NMS

To connect the NMS to the switch using a Management DLCI connection:

1. Connect the NMS to the LAN that has a router connection to the switch via a Frame Relay UNI connection.
2. Configure the NMS to use a DLCI connection. Refer to the *NavisCore Frame Relay Configuration Guide*.
3. Configure the switch to route management traffic through the designated DLCI.
4. Configure the router with a “static route” to the Ascend network.

5

Determining the Operating Status

This chapter describes how to power up the B-STDX switch and determine its operating status. Before you perform the instructions in this chapter, verify that the following tasks are complete:

- ☑ Set up the switch hardware (either as a free-standing or rack-mounted switch)
- ☑ Connect cables to the switch
- ☑ Set up the Network Management Station (NMS)
- ☑ Connect the NMS to the switch
- ☑ Connect the console terminal to the switch

Powering Up the Switch

B-STDX switches are powered by either an AC or a DC power supply. This section describes how to connect both AC and DC power supplies.

Switches with AC Power Supplies

To connect the switch's AC power supply to a power source:

1. Verify that the correct power source is available for the B-STDX 8000/9000 power supply. (Refer to Chapter 2 for power specifications.)

Before connecting the power cord, see "Electronic/Electrical Specifications" on page 2-2. Also see Appendix D, "Regulatory Information" for circuit regulatory information.

2. Attach the main power cord to the switch by plugging the AC power cord into the Power 1 - IEC 320 inlet on the back panel. For a redundant power supply, plug the cord into the Power 2 - IEC 320 inlet.
3. Insert the main power cord into one or more of the cable strain-relief clamps, and ensure that there is some slack in the power cords between the clamp and the IEC 320 inlet.
4. Verify that the power switch on each power supply is in the OFF position.
5. Plug the main power cord into a 3-wire grounding receptacle. To ensure continuous power in the event of an electrical circuit outage, plug the power cord for the redundant power supply into a separate grounding receptacle on another circuit.

Switches with DC Power Supplies

To connect the switch's DC power supply to a power source:

1. Verify that the correct power source is available for the B-STDX power supplies. (See Chapter 2, "Specifications and Safety Warnings," for power specifications.)

Before connecting the power cord, see "Electronic/Electrical Specifications" on page 2-2. Also see Appendix D, "Regulatory Information" for circuit regulatory information.

The DC power cord wires should terminate in Listed *#10* ring lugs using the tools specified by the manufacturer. Also, the wire gauge you use depends on the distance from the connection point. The lugs can accept up to a 6 AWG wire.

Verify that the power is off or disconnected at the source before beginning this procedure.

2. Connect the power cord for each power supply as follows:
   a. Verify that the power switch on the power supply is set to the OFF position.
   b. Locate the *#10* studs on the back of the unit.

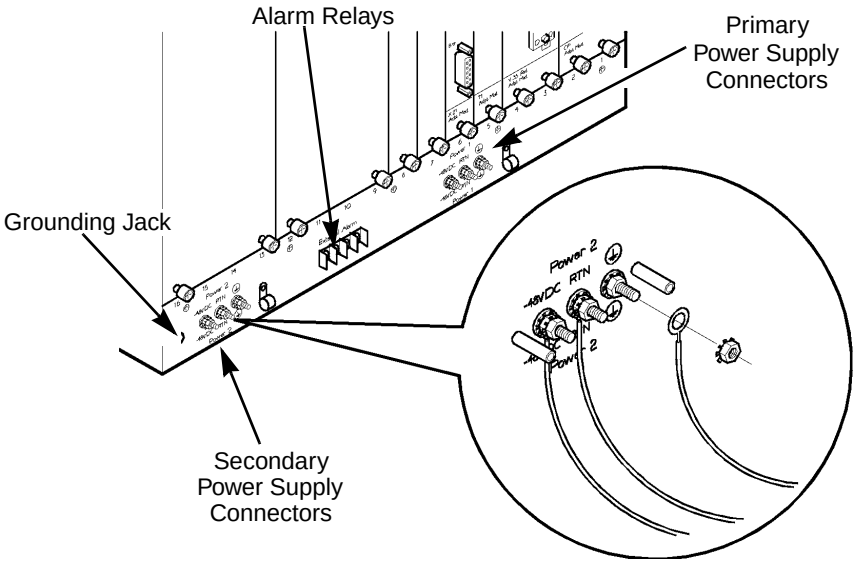


Figure 5-1. Connecting the -48 VDC Power Supply

c. Using a *#2* Phillips screwdriver, remove the two screws that secure the protective cover over the studs. Then remove the protective cover.

d. Using a *3/8-in.* wrench or socket, remove the top nut and washer from each of the three studs (labelled -48V, RTN, and ⏚). Do not remove the bottom nut and washer.

e. Install the three ring lugs onto the appropriate posts.

f. Reinstall the washer and nut onto each post, then use a *3/8-in.* wrench or socket to tighten the nut.

g. Reinstall the protective cover with the two screws.

3. Insert the power cords into one or more of the cable strain relief clamps, and ensure that there is some slack in the power cords between the clamp and the terminal posts.

4. Plug the other end of the main power cords into the DC power source for the switch. To ensure continuous power in the event of an electrical circuit outage, plug the power cord for the redundant power supply into a separate DC power source, if possible.

Cable clamps are supplied in the Accessory Kit to relieve strain on the power cord.

5. Ensure that both positions on the two-position DIP switch, located on the front of the CP module, are in the On position (pointing right).

A CP module must be installed in the chassis (with the reset latch up) before applying power to the chassis or inserting IOP modules into a powered chassis; otherwise any installed IOPs will be subject to damage.

6. Power on each power supply.

When you turn on the main power supply switch, the switch initializes and runs through a series of self checks. During the initialization and self checks, you should observe the following blinking sequence on the CP module's Good LED (not the switch LED located at the top of the CP card):

- Begins to slowly blink green to indicate that the CP card is initializing.
- Goes through a quick blink session, followed by a slower steady blink session, followed by a very rapid blinking session.
- Following this, the CP module's Good LED goes out temporarily. At this point, all LEDs on the switch are out. You should then hear a faint clicking sound indicating the Ethernet Adapter card is being loaded.
- The CP module's Good LED then comes on solid green, indicating that the CP card is operational.

At this point, the state of the LEDs on the switch depends on whether or not the switch is already configured.

If PRAM has not been downloaded to the switch — The switch's Marginal LED located at the top of the CP module comes on solid yellow, indicating that no configuration is present on the switch. Also, the Good LED on each IOP module blinks. To configure the switch, refer to the instructions provided in the *NavisCore Frame Relay Configuration Guide*.

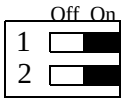
If PRAM has already been downloaded to the switch — The CP module's Good LED remains solid green, as does the switch's Good LED located at the top of the CP module. Also, the Good LED on each *configured* IOP module comes on solid green. (The Good LED on any *unconfigured* IOP module blinks slowly).

Displaying the Diagnostic Results

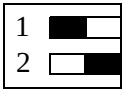
To view the status of power up diagnostics, a console terminal must be connected to the switch's Network Management Port. See "Connecting the Console" on page 4-7.

Depending on the position of the two DIP switches located on the front of each module, one of the following four scenarios occurs when the switch is powered up:

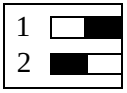
Solid black indicates the switch position.



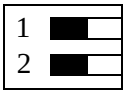
#1 On, #2 On — If both positions on the two-position DIP switch are in the normal On position (pointing right), power up diagnostics begin, but the results do not display on the console terminal.



#1 Off, #2 On — If the top position is Off (pointing left) and the bottom position is On (pointing right), power up diagnostics begin and the results display on the console terminal before the system software is executed.



#1 On, #2 Off — If the top position on the two-position DIP switch is On (pointing right) and the bottom position is Off (pointing left), extended diagnostics begin and the results display on the console terminal. If an error is detected, the switch goes into a diagnostic loop.



#1 Off, #2 Off — If both positions on the two-position DIP switch are in the Off position (pointing left), power up diagnostics are bypassed and the system debugger is enabled.

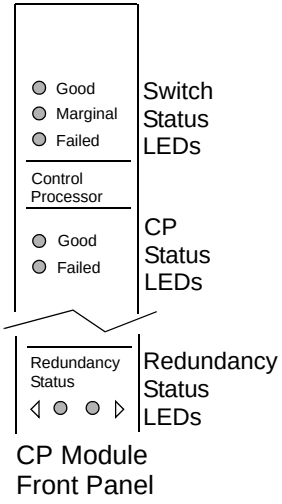
The CP polls the slots on the switch to verify operation of all modules. If the CP polling mechanism suspects a failure in an IOP module slot, it shoots the slot to reboot the card. If either position on the CP module DIP switch is in the Off (left) position, the CP is disabled from shooting the cards.

Determining the Switch Operating Status

The overall status of the switch is indicated by Good, Marginal, and Failed LED status lights that appear on the CP module. The following three LEDs are located at the top of the CP module. These LEDs indicate the status of the switch.

Table 5-1. Switch Status LEDs on CPU Module

Switch Status LEDs	Description
Good (Green) on	The switch is fully operational, no errors detected.
Marginal (Yellow) on	The switch hardware is operational but the software configuration has not been downloaded, or a nonfatal error condition exists on the switch.
Failed (Red) on	The switch detected an operational error condition. See Chapter 7, “Troubleshooting.”



Determining Module Operating Status

Each module in the switch, including the CP module, has its own Good and Failed LED status lights to indicate the operation or failure of the individual module. In addition, some modules have Port Alarm LEDs to indicate the status of individual ports on the module. HSSI IOP modules have online LEDs to indicate whether or not each port is online.

Table 5-2. Module Status LEDs

Module Status LEDs	Description
Good (Green) on	The module is fully operational, no errors detected.
Failed (Red) on	The module detected an operational error condition. See Chapter 7, “Troubleshooting.”
Good and Failed blinking simultaneously	The OS software image is currently being downloaded to the module from the active CP. This is not an error condition.
Yellow Alarm on	A carrier or synchronization error has been detected at a remote site on the circuit for the indicated port.
Red Alarm on	A carrier or synchronization loss has been detected on the indicated port on the module.
On-line on (HSSI only)	The indicated port is currently online.
On-line off (HSSI only)	The indicated port is currently offline.

Determining Redundancy Status

All IOP modules have Redundancy LEDs on the bottom of the module to indicate the redundancy status of the module. These lights are on/blinking only if the modules are part of a redundant pair, as shown in Figure 5-2.

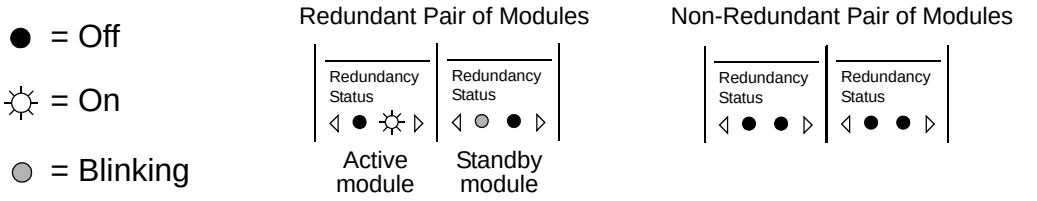


Figure 5-2. Redundancy Status LEDs

What's Next

Once the hardware installation is complete and the switch is powered up, you are ready to download the software configuration to the switch. Choose one of the following two methods for downloading the initial software configuration install script to the switch:

From the Network Management System (NMS) — This method requires you to connect either a direct or asynchronous dial-up link between the NMS serial port and the B-STDX Network Management Port. With this method, the configuration script is generated within NavisCore and then downloaded from the NMS to the switch.

From a Terminal Emulator — This method requires you to connect an ASCII/VT100 console terminal or equivalent terminal emulator to the B-STDX Network Management Port on the CP module. You can make this connection either directly or remotely through an asynchronous dial-up link. The terminal console can then be used to invoke the install script from the switch, prompting you for all information needed to enable the switch to communicate with the NMS.

Depending on the software configuration download method you choose, Ascend recommends that either PROCOMM for Windows (supplied by Ascend) or the Windows Terminal program be installed on the PC or console. For UNIX environments, TIP (from Solaris) must be installed on the console. For software installation and configuration instructions, refer to the *Network Management Station Installation Guide*.

6

Installing or Replacing Modules

This chapter describes the considerations and steps involved in inserting additional modules or replacing existing or defective modules in the switch. These modules include:

- CP and CPA modules
- IOP and IOA modules
- Power supplies
- Cooling fans

For redundant module considerations, see “About B-STDX Redundancy” on page 1-10.

Installation and Replacement Considerations

The B-STDX switch design enables installation and replacement of most modules without the need to power down the switch. However, you may choose to power down the switch as a precautionary measure if the switch is not currently in an operational state.

Never attempt to remove or install modules without using appropriate static guard measures. Ascend includes a grounded wrist strap in the accessory kit.

Also, never attempt to repair parts or modules yourself. Return all defective modules to Ascend for repair. Only Ascend-trained service representatives are authorized to service parts.

Replacing Control Processors

If the switch contains a redundant CP configuration, and only one of the CP modules is being replaced, verify that the module being replaced is not the active card. If it is the active card, perform a "switch to redundant card" operation via the NMS before continuing (refer to the *NavisCore Frame Relay Configuration Guide*). Hot swap replacement of the active CP module is not allowed.

You cannot hot swap the main CP module on an operational switch unless a redundant CP module is installed and active at the time of replacement.

Figure 6-1 shows the procedure for removing the CP or redundant CP from the front of the switch. Step-by-step instructions follow the illustration.

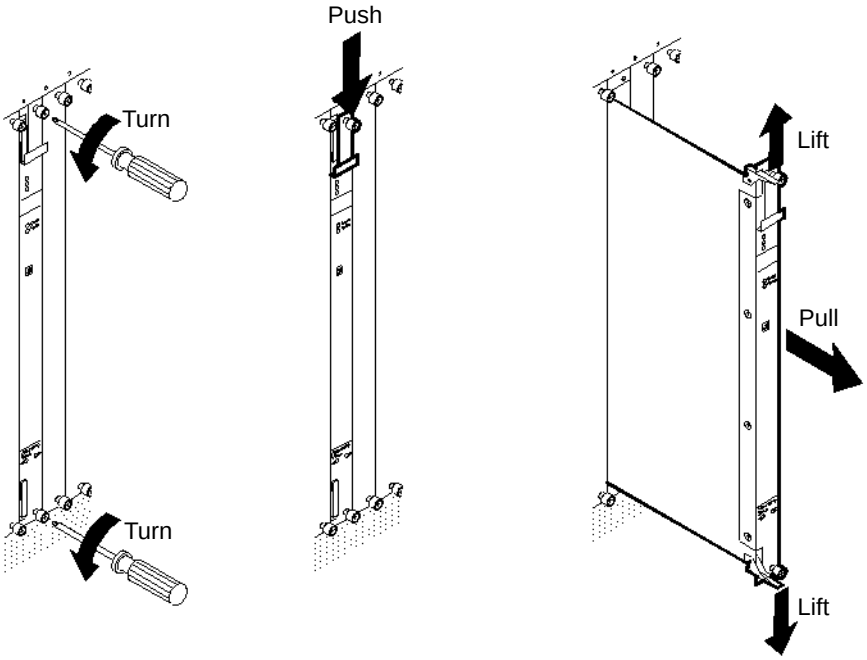


Figure 6-1. Removing a Control Processor Module

To remove an existing CP module and replace it with a new CP module:

1. Put on the anti-static wrist strap, supplied by Ascend in the Accessory Kit, and plug it into the ESD Grounding Jack on the switch.
2. If the switch does not contain a redundant CP, or if both the main CP and the redundant CP module are being replaced simultaneously, notify all users of the impending service disruption. Then, power down the switch.
3. Using a *#2* Phillips screwdriver, loosen the thumb screws located on the top and bottom of the CP module. Failure to use a *#2* Phillips screwdriver may cause damage to the screw heads.
4. Slide the ejector lock at the top of the CP module down to disable the card from the network.

5. Simultaneously lift the top and bottom card ejectors to remove the module from the switch. Both ejectors should be lifted simultaneously to avoid damage.
6. Carefully slide the CP module out of the chassis and place it into an anti-static container.
7. Align the replacement CP with the card guide in the switch and carefully slide the replacement CP module into the switch.
8. Align the screw holes at the top and bottom of the CP and gently slide the module into the back enclosure.
9. Simultaneously depress the card ejectors to install the module into the CPA and back plane.
10. Slide the card ejector lock up.
11. Using a *#2* Phillips screwdriver, secure the module into the chassis by tightening the two thumb screws.

The CP module must be properly installed in the chassis (with the reset latch up) before applying power to the chassis; otherwise any installed IOPs will be subject to damage.

12. If necessary, restore power to the switch.
13. Check the LEDs on the CP to verify the operational status of the card. The green Good LED should remain solid.
14. *(Optional)* Load a new OS and configuration. Note that the Good and Failed LEDs on the newly installed CP will blink simultaneously while the OS software image is being downloaded; this is *not* an error condition.

The OS is loaded at the factory prior to shipment. You should perform the next step only if the original OS is lost or damaged. For instructions, refer to the *NavisCore Frame Relay Configuration Guide*.

Installing a Redundant Control Processor

The main CP is always installed in Slot 1. To install a redundant CP module in Slot 2:

1. Put on the anti-static wrist strap, supplied by Ascend in the Accessory Kit, and plug it into the ESD Grounding Jack on the switch.
2. Use a *#2* Phillips screwdriver to loosen the thumb screws, then remove the filler module from Slot 2 in the front of the switch.
3. Push down the ejector lock on the CP module being installed.
4. From the front of the switch, align the redundant CP module with the card guide in Slot 2 and carefully slide the card into the switch.
5. Align the screw holes at the top and bottom of the module and gently slide the module into the back enclosure.
6. Simultaneously depress the card ejectors to install the module into the backplane.
7. Slide the card ejector lock up on the redundant CP module that you just installed.
8. Using a *#2* Phillips screwdriver, tighten the two thumb screws.
9. Check the LEDs on the redundant CP to verify the operational status of the card. The green Good LED should remain solid on the card. Also, the Redundancy Status LED on the bottom left of the card should be blinking green, indicating the card is in standby mode.
10. Configure the switch for a redundant CP configuration via the NMS software. For instructions, see the *NavisCore Frame Relay Configuration Guide*.
11. *(Optional)* Load a new OS on the card (only necessary if the OS is lost or has become corrupt). Note that the Good and Failed LEDs on the newly installed CP will blink simultaneously while the OS software image is being downloaded; this is *not* an error condition.

The OS is loaded at the factory prior to shipment. For instructions, see the *NavisCore Diagnostic and Troubleshooting Guide*.

Replacing the CP Adapter Module

The CPA always occupies Slots 1 and 2 in the back of the switch to allow for a redundant CP configuration to be installed in the front of the switch.

> The CP modules have to be disengaged from the CPA before the CPA module can be removed from the switch.

Figure 6-2 illustrates the procedure for removing the CPA module from the back of the switch. Step-by-step instructions follow the illustration.

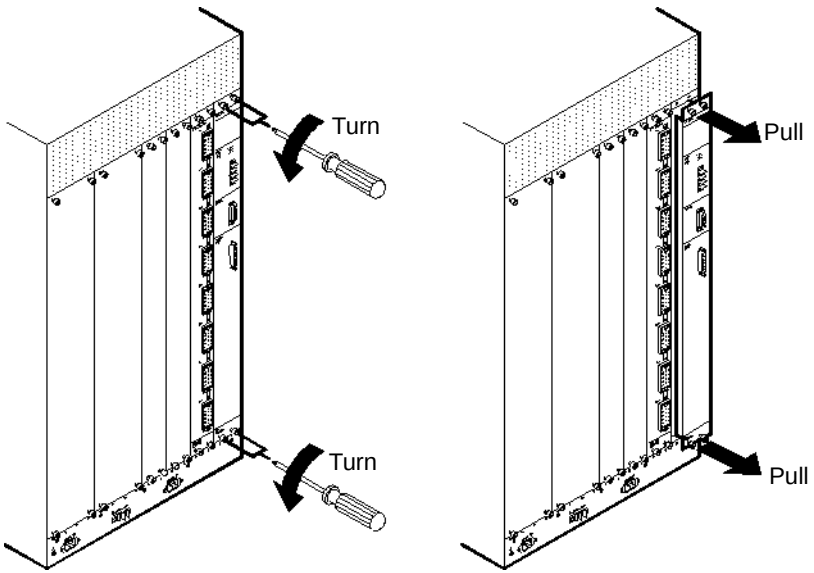


Figure 6-2. Removing the CPA Module

To replace the CPA:

1. Put on the anti-static wrist strap (provided in the Accessory Kit) and plug it into the ESD grounding jack on the switch.
2. Notify all users of the impending service disruption, then power down the switch.

3. From the front of the switch, disengage the CP module (and redundant CP module, if one is installed) as follows:
   a. Using a *#2* Phillips screwdriver, loosen the thumb screws located on the top and bottom of the CP module. Other tools can damage the screw heads.
   b. Locate the ejector lock at the top of the CP module, then slide the ejector lock down to disable the card from the network.
   c. Simultaneously lift the top and bottom card ejectors to disengage the module from the switch. The ejectors are lifted simultaneously to avoid damage.
   d. Slide the CP module approximately one-third of the way out.
4. From the back of the switch, disconnect any cable connections from the existing CPA. Tag the cable(s) for identification and reconnection.
5. Using a *#2* Phillips screwdriver, loosen the two thumb screws on the top of the CPA and the two thumb screws at the bottom of the CPA.
6. Holding on to the thumb screws for leverage, carefully slide the CPA module out from the back of the chassis and place it into an anti-static container.
7. Insert the replacement CPA module by lining it up with the card guide.
8. Gently slide the module approximately two-thirds of the way in. Then reconnect the cables and remove the tags you placed on the cables in Step 4.
9. Gently slide the module the rest of the way into the card guide, and align the screw holes at the top and bottom of the CPA.
10. Slightly tighten the CPA thumb screws into the back of the switch, leaving some flexibility of movement.
11. Reinstall the CP, and optional redundant CP, into the front of the switch. (If necessary, see "Replacing Control Processors" on page 6-2 for instructions.)
12. Return to the back of the switch and secure the CPA module by tightening the thumb screws at the top and bottom of the module.
13. Restore power to the switch.
14. Check the LEDs to verify the operational status of the cards. The green Good LED should remain solid.

Installing or Replacing IOP Modules

You can install additional IOP modules (or replace existing IOP modules) in any of the available slots. IOP modules do not have to be added sequentially, with the exception of Slots 1 and 2, which are reserved for the CP and redundant CP modules.

If you are installing a new module into an empty slot, refer to the next section for detailed instructions. If you are removing or replacing a module, see "Removing and Replacing an Installed Module" on page 6-10.

Installing a New Module

This section describes how to install an IOP module into an empty slot. You can install the module in any of the available slots in the front of the chassis. Before installing the IOP module, you must first install the IOA module, as described in the next section.

Installing the IOA Module

This section describes how to install a new IOA module. You install IOA modules into the back of the unit to support the IOPs that are installed in the front of the unit. You must install the IOA module before you install its corresponding IOP module.

To install an IOA module:

1. Put on the anti-static wrist strap provided in the Accessory Kit, and plug it into the ESD Grounding Jack on the switch.
2. Using a *#2* Phillips screwdriver, remove the blank filler module covering the selected slot(s).
3. Insert the new IOA module into the back of the switch, lining it up with the card guides.
4. Gently slide the module into the card guides approximately two-thirds of the way. Then connect the cables to the IOA module.
5. Gently slide the module the rest of the way in, and align the screw holes at the top and bottom of the IOA.
6. Slightly tighten the IOA thumb screws into the back of the switch. Do not tighten the screws all the way until you have installed the IOP module(s) for this IOA.

7. Install the IOP and optional redundant IOP into the front of the switch, as described in the next section.

Installing the IOP Module

When you receive a new IOP module from the factory, the card contains boot code, but it does not contain application code. The new IOP module receives its application code from the CP card once the IOP module is properly installed and set in the switch.

IOP modules do not have to be added sequentially. They can be installed into any empty slot, with the exception of Slots 1 and 2, which are reserved for the CP module.

To install an IOP module:

1. Make sure the IOA module for this IOP has been installed in the back of the switch (see "Installing the IOA Module" on page 6-8 for instructions).
2. Put on the anti-static wrist strap provided in the Accessory Kit, and plug it into the ESD Grounding Jack on the switch.
3. Using a *#2* Phillips screwdriver, remove the blank filler module covering the selected slot(s).
4. Align the IOP module with the card guide, and carefully slide the module into the back of the switch. (If you are installing a redundant IOP module, make sure you attach it to the same IOA to which its partner IOP is attached.)
5. Align the screw holes at the top and bottom of the IOP and gently slide the module into the back enclosure.
6. Depress the card ejectors simultaneously to install the module into the IOA.
7. Slide the card ejector lock up.

8. Using a *#2* Phillips screwdriver, secure the module into the chassis by tightening the thumb screws on both the IOP and IOA modules.

If the CP detects a mismatch of boot Flash between the CP and the IOP module, the CP automatically downloads its current version of the boot Flash to the IOP card before downloading the application code.

Before continuing to Step 9, wait until the Good LED on the front of the IOP module is flashing slowly. The IOP card may reboot several times before the download process completes. Please be patient; this may take several minutes.

9. From the NMS, synchronize the IOP card. For instructions, see the *NavisCore Frame Relay Configuration Guide*.
10. Check the LEDs to verify the operational status of the cards you installed.

Removing and Replacing an Installed Module

This section describes how to remove an existing module and install a replacement module.

Removing and Replacing an IOP Module

Replacing an active IOP module stops circuit traffic on that module during replacement; possible data loss could also occur on those circuits. Before replacing the module, Ascend recommends setting the Admin Status of a non-redundant card to Down via the NMS. For redundant IOP modules, it is recommended that, whenever possible, you replace only the standby IOP module to avoid termination of circuits.

When you receive an IOP module from the factory, the card contains boot code, but it does not contain application code. The new IOP module receives its application code from the CP card once the IOP module is properly installed and set in the switch.

Figure 6-3 shows how to remove an IOP module from the switch.

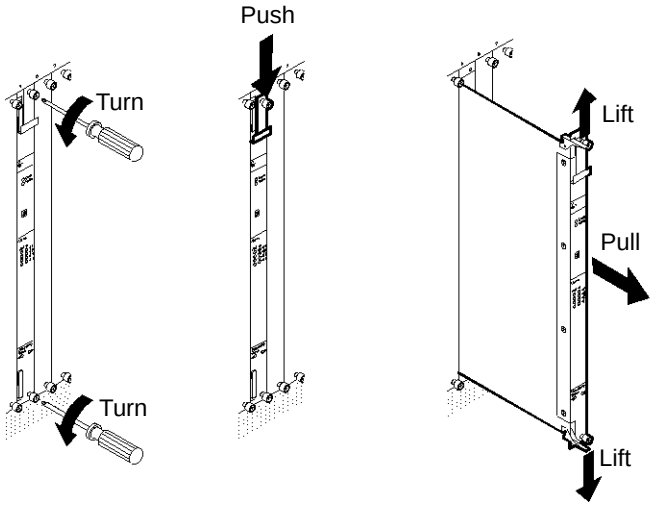


Figure 6-3. Removing IOP Modules

To remove and replace an IOP module:

1. Put on the anti-static wrist strap (provided in the Accessory Kit) and plug it into the ESD Grounding Jack on the switch.
2. From the back of the switch, use a *#2* Phillips screwdriver to loosen, but not remove, the corresponding IOA module. Failure to use a *#2* Phillips screwdriver may damage the screw heads.
3. From the front of the switch, slide the card ejector lock located at the top of the IOP module down to disable the card from the network.
4. Simultaneously lift the top and bottom card ejectors to remove the module from the switch. Both ejectors should be lifted simultaneously to avoid damage.
5. Carefully slide out the IOP module and place it into an anti-static container.
6. Align the replacement IOP module with the card guide, and carefully slide the module into the back of the switch.
7. Align the screw holes at the top and bottom of the IOP and gently slide the module into the back enclosure.
8. Depress the card ejectors simultaneously to install the module into the IOA.

9. Slide the card ejector lock up.
10. Using a *#2* Phillips screwdriver, secure the module into the chassis by tightening the thumb screws on both the IOP and IOA modules.

If the CP detects a mismatch of boot Flash between the CP and the IOP module, the CP automatically downloads its current version of the boot Flash to the IOP card before downloading the application code.

Before continuing to Step 11, wait until the Good LED on the front of the IOP module is flashing slowly. The IOP card may reboot several times before the download process completes. Please be patient; this may take several minutes.

11. From the NMS, synchronize the IOP card. For instructions, see the *NavisCore Frame Relay Configuration Guide*.
12. Check the LEDs to verify the operational status of the cards you installed.

Removing and Replacing an IOA Module

This section describes how to remove and replace an installed IOA module.

Figure 6-4 illustrates the procedure for removing IOA modules from the back of the switch. Step-by-step instructions follow the illustration.

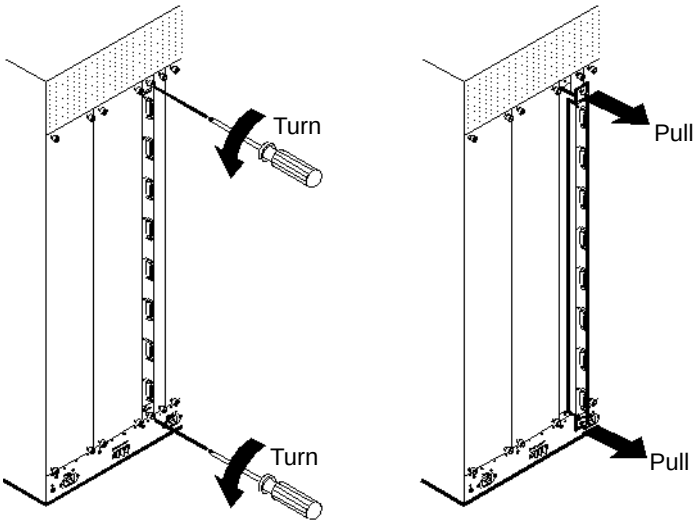


Figure 6-4. Removing IOA Modules

To remove and replace an IOA module:

1. Put on the anti-static wrist strap provided in the Accessory Kit, and plug it into the ESD Grounding Jack on the switch.
2. Disengage the IOP module (and optional redundant IOP module) that it supports from the front of the switch as follows:
   a. Using a *#2* Phillips screwdriver, loosen the thumb screws located on the top and bottom of the IOP module. Failure to use a *#2* Phillips screwdriver may damage the screw heads.
   b. Locate the ejector lock at the top of the IOP module, then slide the ejector lock down to disable the card from the network.

c. Simultaneously lift the top and bottom card ejectors to disengage the module from the switch. Both ejectors should be lifted simultaneously to avoid damage.

d. Carefully slide the IOP module, and optional redundant IOP module, approximately one-third of the way out of the chassis.

Any circuits running through the IOP module will be terminated when the module is removed, which may result in possible data loss. Before removing the module from the switch, Ascend recommends setting the IOP module's Administrative Status to Down via the NMS. For instructions, see the *NavisCore Frame Relay Configuration Guide*.

3. From the back of the switch, disconnect any cables from the existing IOA module. Tag the cable(s) for identification and reconnection.

4. Using a *#2* Phillips screwdriver, loosen the thumb screws at the top and bottom of the IOA.

5. Grasp the thumb screws for leverage, then carefully slide the IOA module out from the back of the chassis and place it into an anti-static container.

6. Insert the replacement IOA module into the back of the switch, lining it up with the card guides.

7. Gently slide the module into the card guides approximately two-thirds of the way. Then connect the cables to the IOA module.

8. Gently slide the module the rest of the way in, and align the screw holes at the top and bottom of the IOA.

9. Slightly tighten the IOA thumb screws into the back of the switch. Do not tighten the screws all the way until you have installed the IOP module(s) for this IOA.

10. Reinstall the IOP and optional redundant IOP into the front of the switch.

11. Return to the back of the switch and secure the IOA module by tightening the thumb screws at the top and bottom of the module.

12. If necessary, reconnect any cables and power up the switch.

Before continuing to Step 13, wait until the Good LED on the active IOP module is either solid green or flashing slowly. This may take several minutes.

13. If necessary, synchronize the IOP card from the NMS. For instructions, see the *NavisCore Frame Relay Configuration Guide*.

14. Check the LEDs to verify the operational status of the cards.

Installing or Replacing Power Supplies

If a redundant power supply is installed and active at the time of replacement, you do not have to power down the B-STDX switch to replace the power supply. You also do not have to power down the switch if you are upgrading from a single power supply to a redundant power supply configuration.

Before replacing the power supply, see "Power Cord Requirements" on page 2-8.

Make sure you power down the power supply you are replacing before you remove it from the switch.

B-STDX switches support both AC and -48 VDC power supplies. Figure 6-5 shows the back view of an AC power supply module and Figure 6-6 shows the back view of a -48 VDC power supply module.

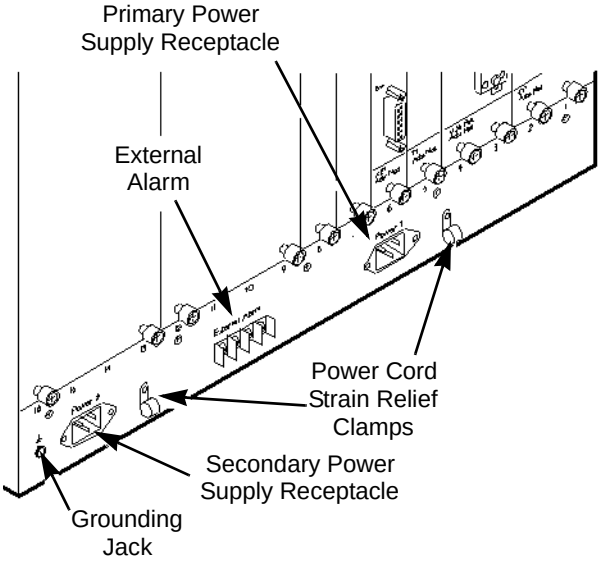


Figure 6-5. AC Power Supply Module Back View

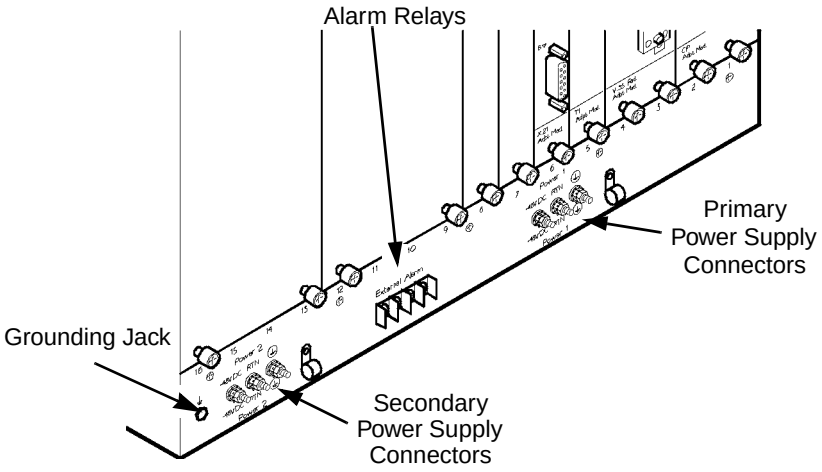


Figure 6-6. -48 VDC Power Supply Module Back View

Although the AC and -48 VDC power supply modules look different, the removal and replacement procedures are identical. Power supply modules are removed from the front of the switch. Figure 6-7 illustrates the power supply removal procedure; step-by-step instructions follow.

To replace or install the power supply module:

1. If you are installing a redundant power supply for the first time, remove the power supply cover plate from the front of the switch and proceed to Step 7; otherwise, go to Step 2.
2. If the switch does not contain an active redundant power supply module, power down the switch. Otherwise, shut off the power switch for the power supply that you are replacing. Then unplug the power cord from the wall outlet.

The safety of this unit requires connection to a grounded outlet. To prevent possible injury from voltages on the telecommunications network, disconnect all telecommunications network lines before disconnecting the unit from the grounded outlet.

3. Using a *#2* Phillips screwdriver, remove the three screws located at the top of the power supply module, as shown in Figure 6-7.

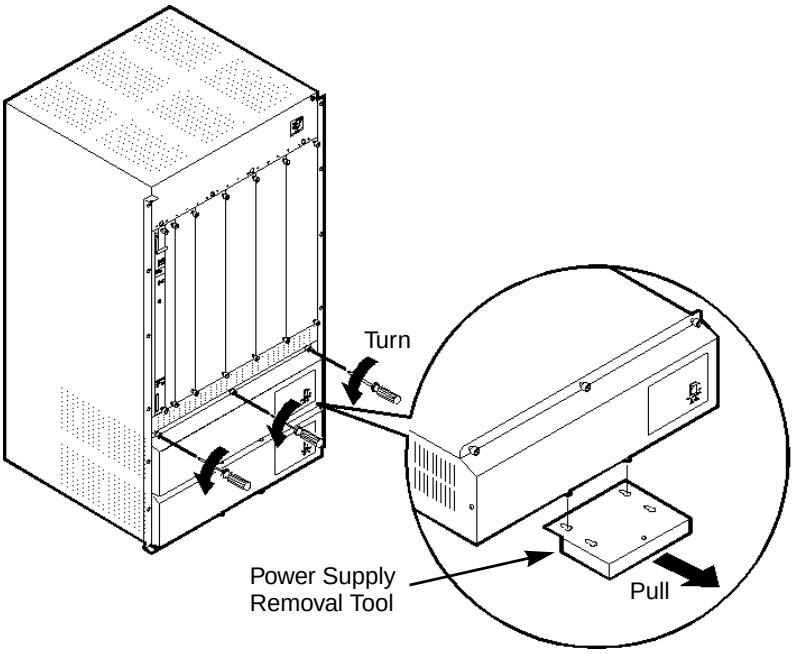


Figure 6-7. Removing the Power Supply Module

4. Attach the power supply removal tool (provided in the Accessory Kit) to the two screws located on the underside of the power supply.
5. Holding on to the power supply removal tool, carefully pull out the power supply.
6. Carefully slide the module out of the chassis.
7. Insert the new or replacement power supply by aligning it with the power supply rails inside the chassis.
8. Gently push the module into the back plane and align the three screw holes.
9. Secure the module into the chassis by tightening the three screws with a *#2* Phillips screwdriver.

10. If necessary, reinstall the power cords, turn on the power switch for the new or replacement module and power the switch back up.

To attach the power cord:

AC power supply — Attach the main power cord to the switch by plugging the AC power cord into the Power 1 - IEC 320 inlet on the back panel. For a redundant power supply, plug the cord into the Power 2 - IEC 320 inlet.

-48 VDC power supply — Attach the power cord as follows (see Figure 6-8):

Before connecting the power cord, refer to "Electronic/Electrical Specifications" on page 2-2. Also, see Appendix D, "Regulatory Information," for circuit regulatory information.

The DC power cord wires should terminate in Listed *#10* ring lugs using the tools specified by the manufacturer. Also, the wire gauge you use depends on the distance from the connection point. The lugs can accept up to a 6 AWG wire.

Verify that the power is off or disconnected at the source before beginning this procedure.

a. Verify that the power switch on the power supply is set to the OFF position.

b. Locate the *#10* studs on the back of the unit.

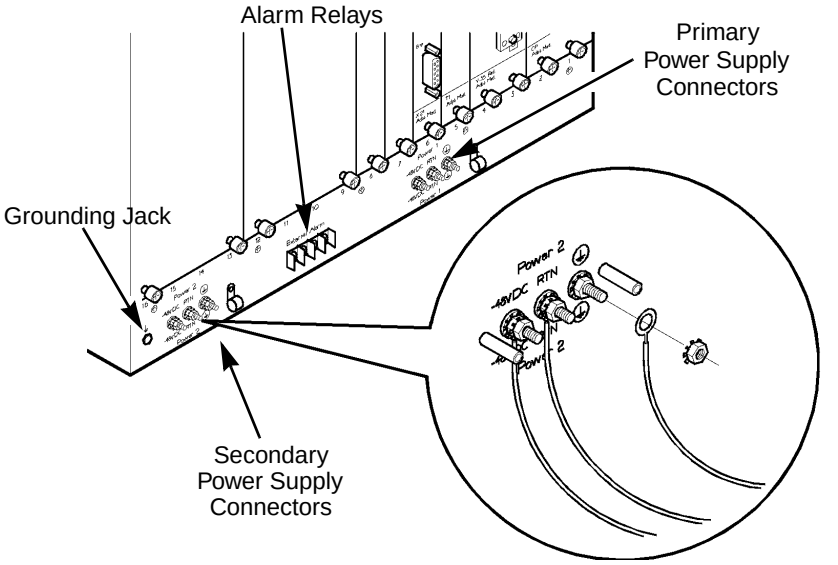


Figure 6-8. Connecting the -48 VDC Power Supply

c. Using a *#2* Phillips screwdriver, remove the two screws that secure the protective cover over the studs. Then remove the protective cover.

d. Using a *3/8-in.* wrench or socket, remove the top nut and washer from each of the three studs (labelled -48V, RTN, and ⏚). Do not remove the bottom nut and washer.

e. Install the three ring lugs onto the appropriate posts.

f. Reinstall the washer and nut onto each post, then use a *3/8-in.* wrench or socket to tighten the nut.

g. Reinstall the protective cover with the two screws.

11. Insert the power cords into one or more of the cable strain relief clamps, and ensure that there is some slack in the power cords between the clamp and the terminal posts.

12. Plug the other end of the main power cords into the DC power source for the switch. To ensure continuous power in the event of a power source failure, connect each DC power cord to separate DC power sources, if possible.

Replacing the Cooling Fan Module

You do not have to power down the switch to replace the cooling fan module. The switch is capable of running without the cooling fans for a short period of time, and can tolerate the temperatures shown in "Environmental Specifications and Safety Warnings" on page 2-4.

Do not place your fingers anywhere near the fans when removing the fan module from the switch. The fans may still be running.

Before you can remove the Cooling Fan Module from the switch, you first have to remove the front panel access cover, as shown in Figure 6-9.

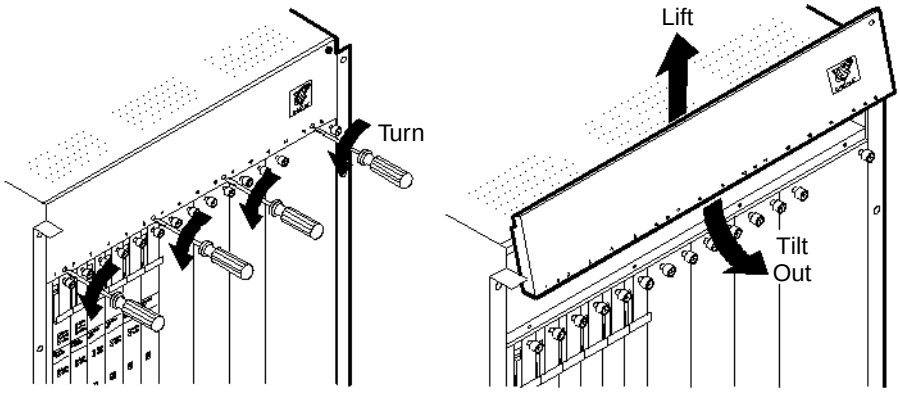


Figure 6-9. Removing the Cooling Fan Access Cover

To remove the access cover and cooling fan module:

1. Open the front door of the switch to locate the cooling fan access cover.
2. Remove the four screws located along the bottom of the fan access cover using a *1/4-in.* flathead screwdriver.
3. To remove the cover from the switch, apply pressure to the bottom of the access cover and lift up.
4. Set the access cover aside.

5. Carefully slide the fan tray out of the switch along the card guides in the switch as shown in Figure 6-10.

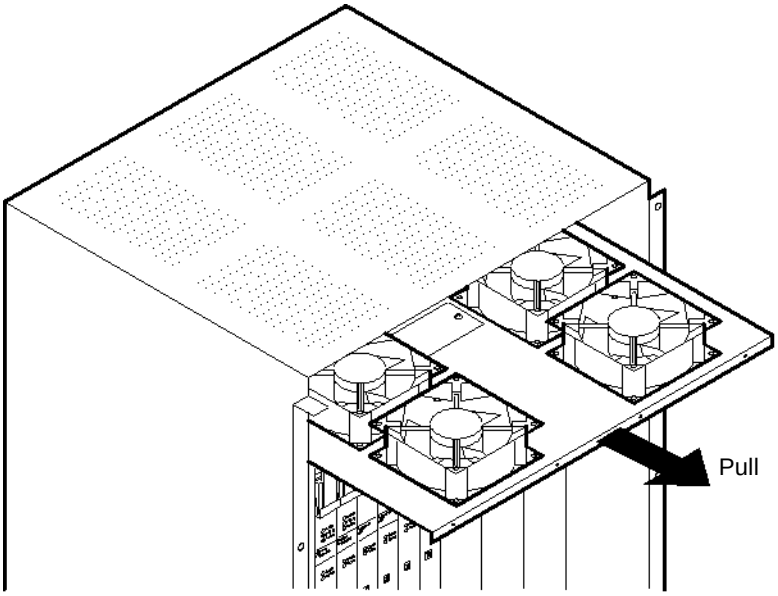


Figure 6-10. Removing the Cooling Fan Module

6. Slide the replacement cooling fan module into the front of the chassis by lining it up with the card guides.
7. Reinstall the access cover by lining up the five tabs in the chassis with the slots in the access cover and tilting the cover back into place.
8. Reinstall the four screws using a *1/4-in.* flathead screwdriver.

Replacing and Servicing Air Filters

The B-STDX switch has three optional built-in air filters for use in conjunction with the cooling fan system. Ascend recommends that you remove and clean these filters on a monthly basis to ensure quality air flow through the switch.

To remove and service the air filters:

1. Using a *1/4-in*. flathead screwdriver, remove the two screws from the air intake switch, as shown in Figure 6-11.

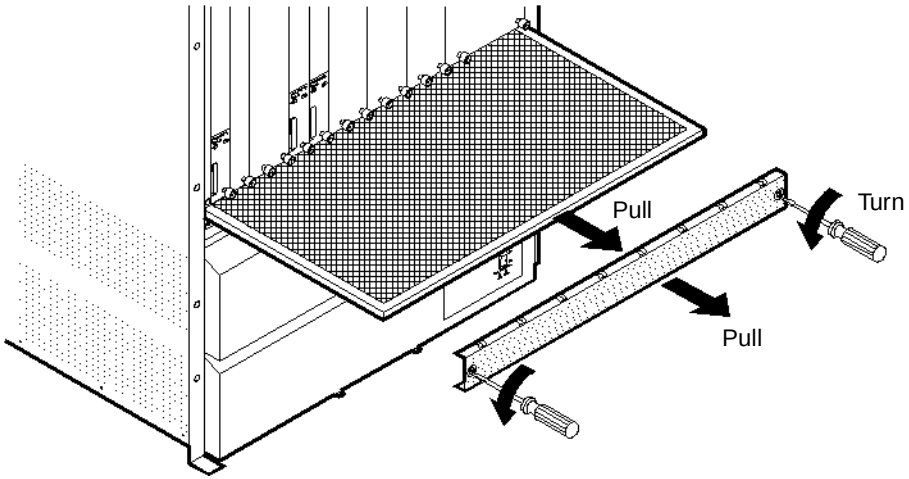


Figure 6-11. Removing Air Intake switch and Top Filter

2. Remove the air intake switch and slide the top air filter out from its retaining slot. Set the filter aside for servicing.
3. Tilt out and remove the side filter retaining bracket, as shown in Figure 6-12.

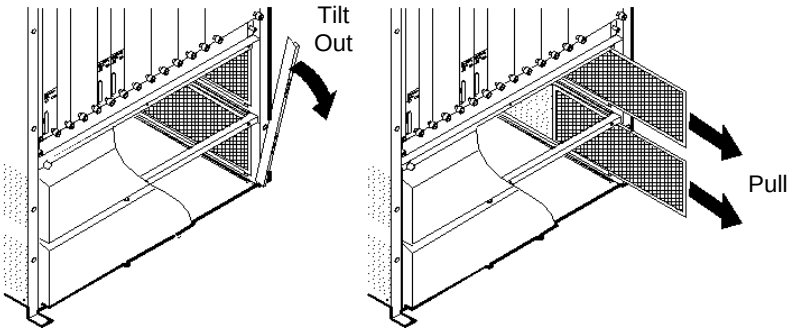


Figure 6-12. Removing Side Filter Retaining Bracket and Side Filters

4. Use needle-nose pliers to grasp the edge of the filter, then pull the upper and lower side air filters out of their retaining slots.
5. To service each of the three air filters, use either low-pressure compressed air or a vacuum cleaner to gently remove any dust from the filters.
6. To replace the cleaned air filters:
   a. Slide each filter back into its respective retaining slot.
   b. Place the bottom of the side filter retaining bracket into the holder and tilt it back into position to secure the side air filters.
   c. Replace the air intake switch and tighten its two retaining screws.

7

Troubleshooting

This chapter provides general troubleshooting solutions for the B-STDX hardware. Unless otherwise noted, only hardware problems and their solutions are listed in this guide. If you suspect software problems, consult the troubleshooting information in the *NavisCore Diagnostic and Troubleshooting Guide.*

In most cases, the overall status of the B-STDX switch is indicated by switch status LEDs on the active CP module. The overall status of individual IOPs and IOP ports is indicated by LEDs on the module. For more information on LEDs, see Chapter 5, “Determining the Operating Status.”

When experiencing hardware problems, check the status lights and compare them to the following tables to determine the problem and appropriate resolution.

Switch Status

Table 7-1 lists common problems associated with B-STDX switches, their causes, and possible solutions.

Table 7-1. Switch Status

Problem	Cause	Solution
Marginal LED remains solid at the top of the CP module.	A marginal error condition exists on the switch. May indicate the failure of a redundant power supply, fan module, or IOP. May also indicate that no configuration is present.	Check the power supply, fan modules, and IOP modules for status. If a failure is detected, replace the failed module. If no configuration is present, download the configuration as described in the *NavisCore Frame Relay Configuration Guide*.
Failed LED remains solid at the top of the CP module.	Power up diagnostics have failed.	Check the switch for a failed CP card or a corrupt Flash Operating System.
Switch continually reboots.	Bad or corrupt Flash Operating System, or one or more IOP ejector locks are in reset mode.	Ensure all IOP ejector locks are all the way in the up position. If the OS is bad or corrupted, put a jumper on and reload the Flash software. For instructions, see the *NavisCore Diagnostic and Troubleshooting Guide*.

IOP Module Status

Table 7-2 lists common problems associated with IOP modules, their causes, and possible solutions.

Table 7-2. IOP Module Status

Problem	Cause	Solution
No LEDs are lit on the module.	The DIP switch on the module may be in debug mode (that is, both positions are pointing left).	Check the position of the DIP switch on the module. If both positions are Off (pointing left), change the position so that both positions are pointing right. (See "Displaying the Diagnostic Results" on page 5-7).
All LEDs on the module remain solid.	One of the following conditions exist. Either: • The card is in reset mode. • The card failed its internal CPU diagnostics. • The 960 boot PROM, 8031 boot PROM, or processor either failed, is loose, or is missing.	Check the ejector lock slide located at the top of the module, and ensure it is all the way up. Contact the Ascend Technical Assistance Center (see page 7-6). The affected module has to be replaced.
Failed LED on the module is blinking red.	Power up diagnostics detected a fatal error on the card.	Contact the Ascend Technical Assistance Center (see page 7-6). The affected module has to be replaced.
Failed LED remains solid.	A fatal error exists on the card.	Contact the Ascend Technical Assistance Center (see page 7-6).
Redundancy LED was solid, is now blinking.	An error condition may exist on the card.	Check the Traps Alarm log on the NMS.
Experiencing difficulty installing a new IOP module.	The module may not be properly aligned with the card rail, or the related IOA module has not been loosened enough for the IOP installation.	Check that the card is properly aligned with the card rail. Slightly loosen the IOA to ease insertion of the card. After the IOP module is installed, tighten the IOA.

Table 7-2. IOP Module Status (Continued)

Problem	Cause	Solution
The IOP module has no boot Flash or application code resident on the card.	Unknown. Boot Flash is installed on each IOP card at the factory.	• Install the IOP module into the unit (see "Installing or Replacing IOP Modules" on page 6-8). • Download boot Flash from the active CP to the IOP module. LED activity on the IOP during the download process: • During initialization, the left Redundancy Status LED begins to blink while the right LED remains solid. • All LEDs on the module go off briefly. • The module's Good and Failed LEDs both begin to blink continuously until the boot Flash download completes. • When the download completes, the Good LED should remain solid on the module.

Power Supply Module Status

Table 7-3 lists common problems associated with power supply modules, their causes, and possible corrective solution.

Table 7-3. Power Supply Module Status

Problem	Cause	Solution
No LEDs are lit on the unit's power supply.	The switch is not receiving power. The power cord may not be properly attached to the unit or to the wall outlet receptacle.	Check the power cord in the primary receptacle on the switch (and secondary redundant receptacle) to ensure proper seating at the wall outlet and in the unit.
Solid red LED appears on the power supply.	One of the following conditions exists: • A local power supply failure has been detected, including a power supply fan failure, voltage out of range, temperature out of range. • The power supply microprocessor failed to load.	Replace the power supply module.
Red LED blinks on power supply.	This indicates a serious, but non fatal, power supply fault.	Replace the power supply as soon as possible.
Experiencing difficulty installing a new power supply module.	The power supply module may not be correctly aligned with the guide bars in the unit.	Ensure the guide bars are intact and the power supply is properly aligned before sliding the module into the unit.

Contacting the Technical Assistance Center

Ascend provides a full range of support services to ensure that the maximum network uptime is achieved with low equipment cost. The staff at the Ascend Technical Assistance Center is also available to assist you with any problems that you may encounter when using the NMS software. The Ascend Technical Assistance Center can be contacted by phone, electronic mail, or fax.

Calling by Phone

Ascend offers support 24 hours a day, 7 days a week. To contact the Ascend Technical Assistance Center by phone, call:

1-800-DIAL-WAN (in the USA and Canada)

0-800-96-2229 (in the United Kingdom)

1-978-952-7299 (outside the USA, Canada, and United Kingdom)

Sending Electronic Messages or Faxes

To contact the Ascend Technical Assistance Center by electronic mail, address your requests to:

cs@casc.com

To contact the Ascend Technical Assistance Center by fax, call:

1-978-392-9768

Include the following information when requesting service by electronic mail or a fax message:

- Your name and telephone number
- Name of contact person and telephone number (if different from above)
- Brief description of the problem

- List of identifiable symptoms
- Any information that you gathered as a result of reviewing the Technical Support Checklist in the *NavisCore Diagnostic and Troubleshooting Guide*

A

IOP Modules

This appendix contains technical information about each of the hardware IOP modules that are currently available from Ascend Communications for the B-STDX switches. The following modules are described:

- 8-Port Universal IOP
- 4-Port T1 IOP
- 4-Port E1 IOP
- 12-Port Unchannelized E1 IOP
- 2-Port HSSI IOP
- 10-Port DSX-1 IOP
- 1-Port ATM UNI IOP
- ATM UNI CS E3 IOP
- 4-Port T1 ISDN PRI IOP
- 4-Port E1 ISDN PRI IOP

- 1-Port Channelized DS3 IOP
- Channelized DS3-1-0 IOP
- 1-Port ATM SC DS3/E3 IOP
- 1-Port ATM IWU OC3c/STM-1 IOP
- 2-Port Ethernet 10/100 Base-T IOP

8-Port Universal IOP Module

The 8-port Universal IOP module for the B-STDX supports connections to a variety of popular synchronous interface connections, including modem international serial interfaces. The B-STDX symmetrical architecture gives any port on the Universal IOP module the flexibility to act as either network (DCE), user port (DTE), inter-switch trunks, or inter-network link (NNI). As a trunk connection, this module supports the ATM DXI, SMDS DXI, and Ascend OPTimum interfaces. For user devices, the connections can be frame relay UNI or SMDS DTE. This module also supports connections from X.25, HDLC, or TCP/IP PPP connections, and will assemble the data links into the appropriate format for switching in a frame relay, SMDS, or ATM network.

The 8-port Universal IOP module offers high network availability through a redundancy option. The redundancy option switches the line interface over to an optional redundant IOP module, operating in the same B-STDX switch.

Specifications

Physical Dimensions

Height:	15 in. (38.1 cm)
Width:	1 in. (2.54 cm)
Depth:	10 in. (25.4 cm)
Weight:	3 lbs. (1.35 kg)

Power Requirements

40 Watts

Agency Approvals

Electromagnetic Emissions Certifications: FCC Part 15 Class A, EN55022 (CISPR Class A), VCCI Class 1

NEBS GR-63-CORE, GR-1089-CORE

Temperature Range

0° to 50°C (32° to 122° F)

Interface Standards

- CCITT V.10
- CCITT V.11
- Network interfaces: V.35, X.21

Physical Interfaces

- CCITT V.35 34-pin ISO 2593
- X.21, 15-pin D-sub

Status Indicators

Module status LEDs: Good, Failed, Redundant

LED State	Status
Good LED lit	Normal operation
Failed LED lit	Module failure
Redundant LED lit	Redundant module online
Good and Failed LEDs blinking simultaneously	OS software image currently being downloaded from active CP

V.35 UIO Maximum Cable Lengths

The 8-port V.35 UIO IOP module is designed to meet the cable lengths recommended in the V.11 specification. The V.35 specification is obsolete, and has been replaced by the V.10/V.11 specification. This applies to all modes of operation (DCE, DTE, DCE Loop, and Direct Trunk). However, as indicated in the *Network Configuration Guide for B-STDX/STDX*, at higher data rates and/or longer cable lengths, the DCE Loop mode should be used instead of the DCE mode. This applies mostly to data rates over 2Mbps.

The following approximate cable lengths were taken from the V.11 specification:

Data Rate (Kbps)	Maximum Cable Length (Meters)
64	1000
256	300
512	175
768	125
1500	60

UIO Panels

Figure A-1 shows the UIO front panel, as well as the non-redundant V.35 and X.21 connector panels. The redundant connector panels are double-wide versions of the non-redundant panels.

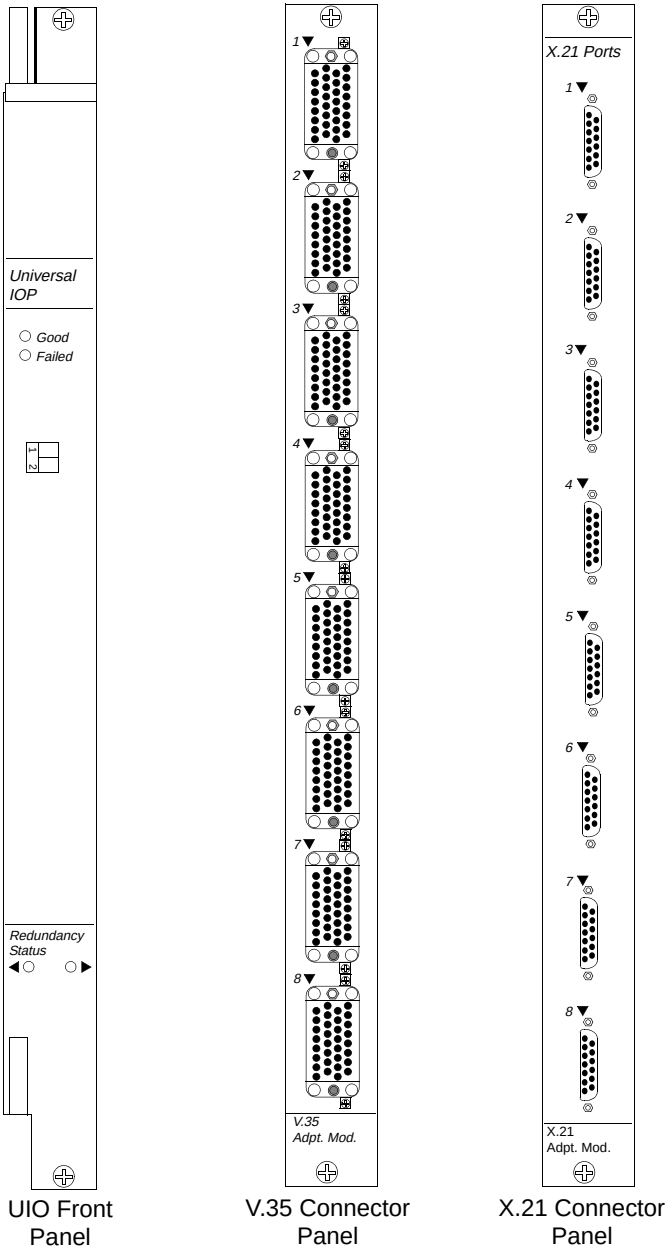


Figure A-1. 8-Port UIO Module, V.35 Panel, and X.21 Panel

4-Port T1 IOP Module

The Ascend 4-port 24-bundle T1 IOP module contains four integral T1 CSU/DSUs, and provides a D4 or ESF channel format T1 interface. This makes it economical and easy to interface to multiple sites over a single T1 connection, eliminating the need for numerous cables in “groom and fill” operations. Users can leave traffic in its original D4 or ESF channel format, eliminating expensive equipment for extra data handling and improving reliability by reducing the introduction of errors. The B-STDX symmetrical architecture allows any n x DS0 data link channel on the 4-port 24-bundle T1 IOP module the flexibility to function as a network, a user port, or as inter-switch trunks.

Users can map the DS0 channels on each of the T1 ports to a maximum of 24 HDLC data links. Contiguous or non-contiguous n x DS0 channels compose each HDLC data link. Users can configure each of the n x DS0 data link channels on the 24-bundle T1 IOP module as DCE or DTE to provide a variety of logical port functions.

Specifications

Physical Dimensions

Height:	15 in. (38.1 cm)
Width:	1 in. (2.54 cm)
Depth:	10 in. (25.4 cm)
Weight:	3 lbs. (1.35 kg)

Power Requirements

40 Watts

Agency Approvals

Electromagnetic Emissions Certifications: FCC Part 15 Class A, EN55022 (CISPR Class A), VCCI Class 1

NEBS GR-63-CORE, GR-1089-CORE

Temperature Range

0° to 50°C (32° to 122°F)

Physical Interfaces

- Four T1 ports
- 15-pin Sub-D male connector, RJ-48 8-pin modular connector; both connector types supplied
- Input clock source: BNC

Interface Standards

- AT&T Publication 62411
- AT&T Publication 54016
- Bellcore TR-NPR-000054
- Bellcore TR-TSY-000194
- CCITT G.703
- CCITT G.704
- ANSI T1.403
- FCC Part 68
- Line coding: AMI, B8ZS

- Framing: D4, ESF
- Network interface: DS1

Signal Levels

Receive: 0dB to -30dB
Transmit: 0dB, -7.5dB, -15dB

Jitter meets or exceeds template defined in AT&T Publication 62411

Provides internal Stratum 4 network clock

Loopbacks

Line, Payload, DS0 (latching and non-latching), and programmable loop-up/loop-down online coding

Integral T1 CSU/DSU

T1 linecoding options	Zero encoding
Options	Jammed bit, B8ZS
Timing options	Loop timing, interval timing

Status Indicators

Module status LEDs: Good, Failed, Redundant

LED State	Status
Good LED lit	Normal operation
Failed LED lit	Module failure
Redundant LED lit	Redundant module online
Good and Failed LEDs blinking simultaneously	OS software image currently being downloaded from active CP

Channelized T1 Panels

Figure A-2 shows the channelized T1 IOP and IOA panels. The redundant module is identical, except that it is double-wide.

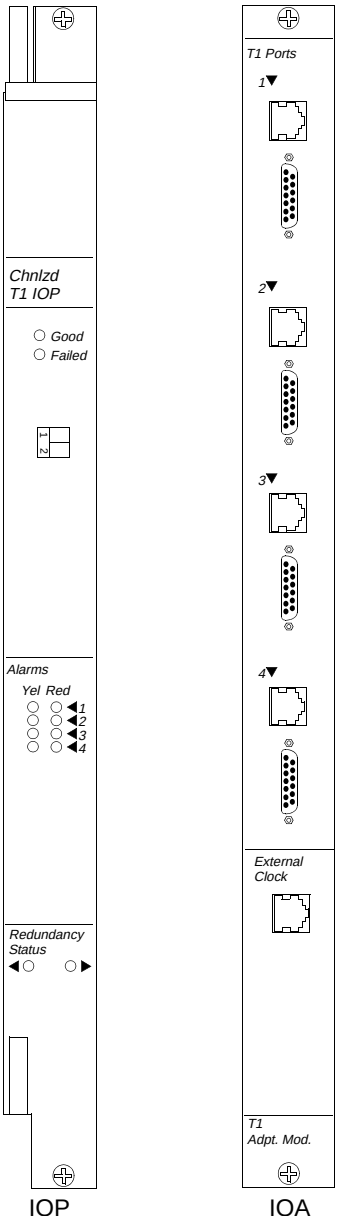


Figure A-2. Channelized T1 IOP and IOA

4-Port E1 IOP Module

The 4-port E1 IOP module contains four integral E1 CSU/DSUs, and provides a CRC4 channel format E1 interface. This makes it easy and economical to interface to multiple sites over a single E1 connection, eliminating the need for numerous chassis cables in groom-and-fill operations. Users can leave traffic in its original CRC4 channel format, eliminating expensive equipment for extra data handling and improving reliability by reducing the introduction of errors. The B-STDX symmetrical architecture allows any n x 64 Kbps data link channels on the 4-port 31-bundle E1 module the flexibility to function as a network, a user port, or as inter-switch trunks.

Users can map the 64 Kbps channels on the E1 interface to a maximum of 30 HDLC data links. Contiguous or non-contiguous n x 64 Kbps channels compose each HDLC data link. Users can configure each of the n x 64 Kbps data link channels on the 4-port 31-bundle E1 module as DCE or DTE to provide a variety of logical port functions.

Specifications

Physical Dimensions

Height:15 in. (38.1 cm)

Width:1 in. (2.54 cm)

Depth:10 in. (25.4 cm)

Weight:3 lbs. (1.35 kg)

Power Requirements

40 Watts

Agency Approvals

Electromagnetic Emissions Certifications: FCC Part 15 Class A, EN55022 (CISPR Class A), VCCI Class 1

NEBS GR-63-CORE, GR-1089-CORE

Temperature Range

0° to 50°C (32° to 122°F)

Physical Interfaces

- Four E1 ports, G.703 coaxial pair 75 ohm unbalanced, and G.703 symmetrical pair 120 ohm balanced; both connector types supplied
- 15-pin Sub-D male connector
- BNC connector
- Input clock source: BNC

Interface Standards

- CCITT G.703 and G.704
- Line coding: HDB3
- Framing: CRC4
- Network interfaces: E1

Signal Levels

Receive: 0dB to -30dB

Jitter meets or exceeds template defined in G.703

Provides internal Stratum 4 network clock

Loopbacks

Line, payload, channel (latching and non-latching), and programmable loop-up/loop-down online coding

Integral E1 CSU/DSU

E1 linecoding options: Zero encoding

Status Indicators

Module status LEDs: Good, Failed, Redundant

LED State	Status
Good LED lit	Normal operation
Failed LED lit	Module failure
Redundant LED lit	Redundant module online
Good and Failed LEDs blinking simultaneously	OS software image currently being downloaded from active CP

Channelized E1 Panels

Figure A-3 shows the unchannelized E1 IOP and IOA panels. Both the 75-ohm and 120-ohm are shown. The redundant modules are the same, except that they are double-wide.

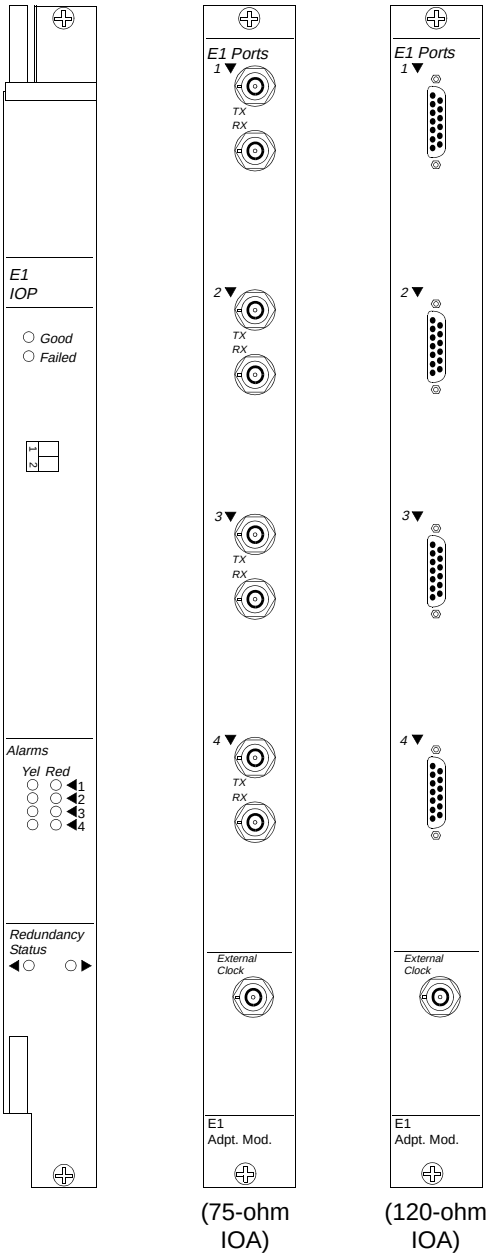


Figure A-3. Unchannelized E1 IOP and IOA

12-Port E1 IOP Module

The 12-port unchannelized E1 IOP module (12-port E1 IOP module) is a high-speed core IOPB card that enables B-STDX switches to provide up to 31 TS0 connections per port at a variable data rate (for example, 64 Kbps through 2.048 Mbps). The module supports an unchannelized E1 interface with up to 12 individual E1 connections for frame-based traffic. It supports TS0 and E1 line loopback, diagnostic loopback, and Bit Error Rate Test (BERT) capabilities. It also provides link monitoring for accumulating statistics and generating reports. You can individually configure each of the Lports as DCE or DTE to provide any Frame Relay logical port function

The 12-port E1 IOP module supports Frame Relay only. Multiservice will be supported in a future release.

The 12 independent HDLC controllers on the 12-port E1 IOP module provide high density and use approximately 35 watts per card. You can configure up to 14 E1 IOP modules in a B-STDX switch to support 168 E1 connections. This feature provides the highest density Frame Relay solution in the industry, at the lowest E1 cost per port.

Specifications

Physical Dimensions

Height:15 in. (38.1 cm)

Width:1 in. (2.54 cm)

Depth:10 in. (25.4 cm)

Weight:3 lbs. (1.35 kg)

Power Requirements

35 Watts per card

Agency Approvals

Electromagnetic Emissions Certifications: FCC Part 15 Class A, EN55022 (CISPR Class A)

Temperature Range

0° to 50°C (32° to 122°F)

Physical Interfaces

The module has 12 E1 ports, which provide up to 32 independent TS0 channels.

Physical Connectors

Twelve 75 ohm BNC connectors (external clock)

Twelve 120 ohm balanced DB15 connectors (external clock)

Line Coding

HDB3

Framing

CRC Multiframe, CAS, Unstructured

Diagnostics

Background

Foreground: I/O card, physical port, channel

Statistics

Link performance and monitoring

Loopbacks

The following types of loopback tests are available on the 12-port E1 IOP module.

Test Level	Test Type
E1 - physical port	Internal, External Near-end line loopback Near-end diag loopback
TS0 - channel	Near End Loopback (payload, line, or diagnostic) Bit Error Rate Test (BERT)

Status Indicators

Module status LEDs: Good, Failed, Redundant
Physical Port Alarm LEDs: Red, Yel (Yellow)

LED State	Status
E1 I/O Module	
Good LED lit	Normal operation
Failed LED lit	Module failure
Redundant LED lit	Redundant module online
Physical Port	
Red LED lit	Loss of frame or signal
Red LED blinking	Downstream equipment failure resulting in an Alarm Indication Signal (AIS)
Yellow LED lit	Downstream equipment sees loss of signal resulting in a Remote Alarm Indication (RAI)
Both LEDs off	Normal operation

12-Port E1 IOP Module Panels

Figure A-4 shows the IOP and IOA panels for the 12-port E1 IOP module.

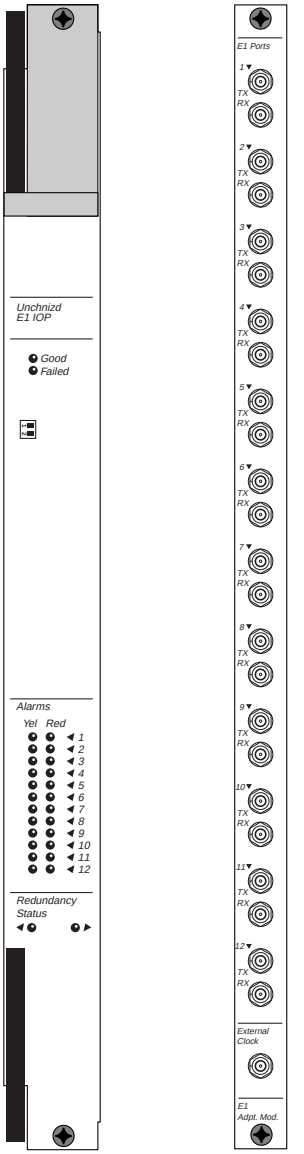


Figure A-4. 12-port E1 IOP and IOA

2-Port HSSI IOP Module

The 2-port HSSI IOP module enables B-STDX switches to provide connections at data rates up to 45 Mbps. The HSSI IOP module's two physical ports can each be configured at speeds that increment from 1.54 Mbps to 45 Mbps to support DTE connections in excess of 8 Mbps, as well as Ascend trunking over fully saturated T3/E3 circuits. The total throughput of the IOP module is 45 Mbps.

Users can individually configure each of the two physical ports as DCE or DTE to provide any frame relay logical port functions, as well as ATM DXI and SMDS DXI.

The HSSI IOP module enables the B-STDX to connect routers to the network at LAN speeds. It also enables the B-STDX to function as a high-speed trunk between Ascend switches or as a feeder link into a backbone central office class switch. This flexibility makes the HSSI IOP module a cost-effective solution for supporting the high-speed connection requirements of both public and private networks.

Specifications

Physical Dimensions

Height:15 in. (38.1 cm)

Width:1 in. (2.54 cm)

Depth:10 in. (25.4 cm)

Weight:3 lbs. (1.35 kg)

Power Requirements

45 Watts

Agency Approvals

Electromagnetic Emissions Certifications: FCC Part 15 Class A, EN55022 (CISPR Class A), VCCI Class 1

NEBS GR-63-CORE, GR-1089-CORE

Temperature Range

0° to 50°C (32° to 122°F)

Physical Interfaces

- Two HSSI ports
- Amplimite 50-pin receptacle

Interface Standards

- HSSI design specification Rev. 2.11
- Line coding: NR2
- Framing: HDLC
- Network interfaces: Data rate — 1.58 Mbps to 44.21 Mbps
- Programmable as DCE or DTE

Signal Levels

Receive: ECL
Transmit: ECL

Loopbacks

DCE: Provides loopback based on LA, LB signals
DTE: Requests loopback using LA, LB signals

Status Indicators

Module status LEDs: Good, Failed, Redundant
Physical Port status LEDs: Online

LED State	Status
HSSI IOP Module	
Good LED lit	Normal operation
Failed LED lit	Module failure
Good and Failed LEDs blinking simultaneously	OS software image currently being downloaded from active CP
Redundant LED lit	Redundant module online
Physical Port	
Online LED lit	Port module online

HSSI Panels

Figure A-5 shows the HSSI module IOP and IOA panels. The redundant module is the same, except that it is double-wide.

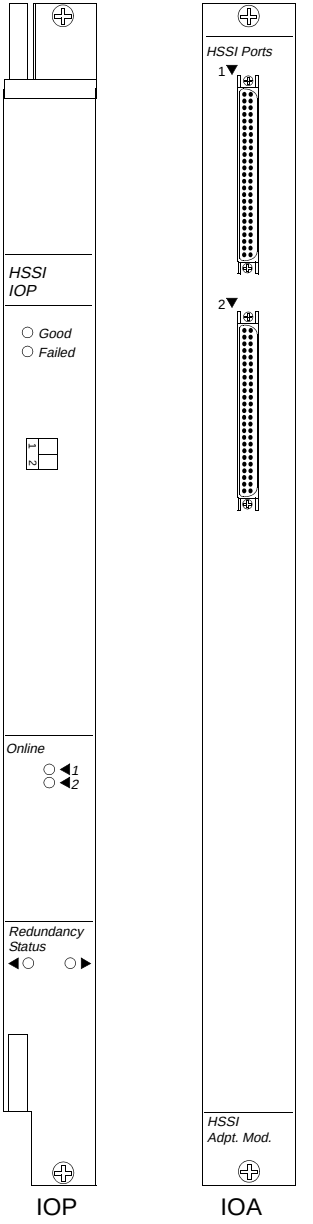


Figure A-5. HSSI Module IOP and IOA

10-Port DSX-1 IOP Module

The 10-port DSX-1 IOP module enables B-STDX switches to provide a Fractional T1 connection at a variable data rate (for example, 56 Kbps, 64 Kbps, 128 Kbps, …, 1.54 Mbps) that is directly wired into central office equipment without use of CSU/DSUs. Users can individually configure each of the 10 DSX-1 ports as DCE or DTE to provide any Frame Relay logical port function, as well as ATM DXI and SMDS DXI.

The DSX-1 IOP module is intended for a B-STDX switch located in a central office. The support for unchannelized T1 connections reduces unnecessary expense that network providers incur when using channelized T1 equipment to carry unchannelized data. The 10-port density of the unchannelized T1 connections makes the DSX-1 IOP module extremely cost effective for concentrating multiple circuits.

A typical configuration for a B-STDX switch equipped with DSX-1 would be in a central office in a major metropolitan area that concentrates multiple T1 connections (possibly connecting to remote STDX switches in suburban/rural areas with a V.35 connection). The central office B-STDX in turn connects to another major metropolitan area via a HSSI-derived or ATM UNI 45 Mbps connection. Although the DSX-1 IOP module is primarily intended for public networks, it is also applicable to large private networks that have leased floor space for equipment within central offices.

Specifications

Physical Dimensions

Height:15 in. (38.1 cm)

Width:1 in. (2.54 cm)

Depth:10 in. (25.4 cm)

Weight:3 lbs. (1.35 kg)

Power Requirements

40 Watts

Agency Approvals

Electromagnetic Emissions Certifications: FCC Part 15 Class A, EN55022 (CISPR Class A), VCCI Class 1

NEBS GR-63-CORE, GR-1089-CORE

Temperature Range

0° to 50°C (32° to 122°F)

Physical Interfaces

- Ten DSX-1 ports and external clock connection, RJ-48 8-pin modular connector
- Physical connectors: RJ-48

Interface Standards

- AT&T Publication 62411
- ANSI T1.403
- Line coding: AMI (jammed bit), B8ZS
  Framing: D4, ESF
  Network interfaces: DSX-1

Signal Levels

Receive: 0dB to -10dB
Transmit: Compliant to DSX-1 distance specifications

Jitter meets or exceeds template defined in AT&T Publication 62411

Loopbacks

Line and payload loopback

Status Indicators

Module LEDs: Good, Failed, Redundant
Physical Port Alarm LEDs: Red, Yel (Yellow)

LED State	Status
DSX-1 IOP Module	
Good LED lit	Normal operation
Failed LED lit	Module failure
Redundant LED lit	Redundant module online
Physical Port	
Red LED lit	Loss of signal
Red LED blinking	Downstream equipment failure resulting in an Alarm Indication Signal (AIS)
Yellow LED lit	Downstream equipment sees loss of signal resulting in a Remote Alarm Indication (RAI)
Both LEDs off	Normal operation

DSX-1 Panels

Figure A-6 shows the DSX-1 IOP and IOA. The redundant module is the same, except that it is double-wide.

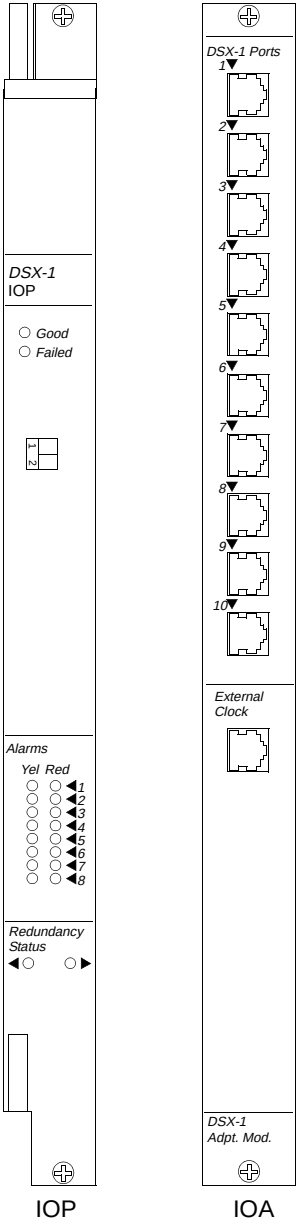


Figure A-6. 10-Port DSX-1 Module IOP and IOA

1-Port ATM UNI IOP Module

The most common configuration for a B-STDX switch equipped with an ATM UNI IOP module is as a user-to-network interface (UNI) between two switches. It provides high-performance trunk access to an ATM backbone network at T3 rates.

Specifications

Physical Dimensions

Height:15 in. (38.1 cm)

Width:1 in. (2.54 cm)

Depth:10 in. (25.4 cm)

Weight:3 lbs. (1.35 kg)

Power Requirements

40 Watts

Agency Approvals

Electromagnetic Emissions Certifications: FCC Part 15 Class A, EN55022 (CISPR Class A)

Safety: UL 1950, CSA 222.2, EN 60950

Temperature Range

5° to 45°C (41° to 113°F)

Physical Interfaces

- One ATM-UNI port and external clock connection, COAX connector
- Physical connectors: Coaxial cable

Interface Standards

- ANSI T1.102
- TR-TSY-000499
- CCITT G.703

Signal Levels

Receive: 0dB to -30dB
Transmit: 0-225 feet (68.625 meters), 225-450 feet (137.25 meters)

Loopbacks

Line

Payload

Far-end

Status Indicators

Module LEDs: Good, Failed, Redundant
Physical Port Alarm LEDs: Red, Yel (Yellow)

LED State	Status
ATM UNI IOP Module	
Good LED lit	Normal operation
Failed LED lit	Module failure
Redundant LED lit	Redundant module online
Physical Port	
Red LED lit	Loss of signal - receiving unframed signal
Red LED blinking	Downstream equipment failure resulting in an Alarm Indication Signal (AIS)
Yellow LED lit	Downstream equipment sees loss of signal - receiving yellow alarm from downstream equipment, resulting in a Remote Alarm Indication (RAI)
Both LEDs off	Normal operation

ATM UNI Panels

Figure A-7 shows the ATM UNI IOP and IOA panels.

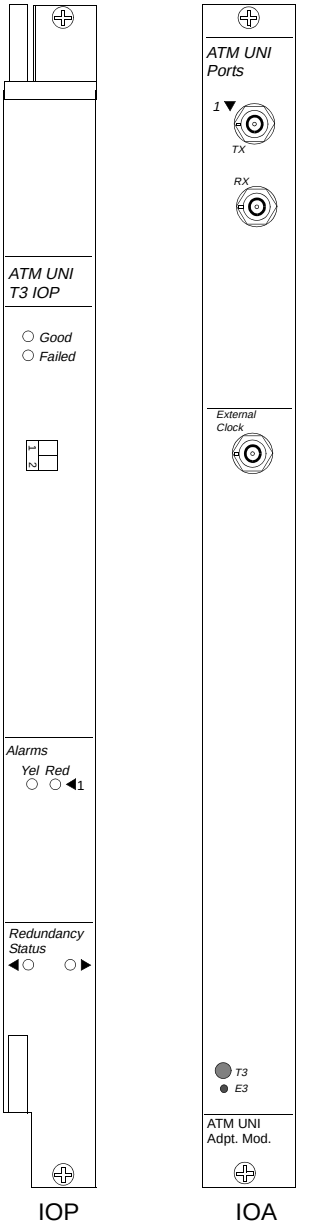


Figure A-7. ATM UNI IOP and IOA

ATM UNI CS E3 IOP Module

The ATM UNI Cell Switching (CS) E3 IOP module (ATM CS E3 IOP module) is a one-port E3 module that supports ATM services on the B-STDX switch. The CS module can saturate the E3 line when exclusively performing cell switching, regardless of packet size. The module supports E3 line loopback and payload loopback. It also provides link monitoring for accumulating statistics and generating reports.

Specifications

Physical Dimensions

Height:15 in. (38.1 cm)

Width:1 in. (2.54 cm)

Depth:10 in. (25.4 cm)

Weight:3 lbs. (1.35 kg)

Power Requirements

40 Watts

Agency Approvals

Electromagnetic Emissions Certifications: FCC Part 15 Class A

Temperature Range

0° to 50°C (32° to 144°F)

Physical Interfaces

- One ATM-UNI 3.0/3.1 E3 port
- One ANSI E1 external clock port

User configurable: enabled or disabled

- Wire wrap and RJ48 (8-pin modular) for E1 external clock

Cell Mapping

- E3 PLCP
- HEC Delineation (direct mapping)

Framing

M13

Cell Payload Scramble

User configurable: enabled or disabled

Diagnostics

- Background
- Foreground: IOP card, physical port, channel

Statistics

Link performance and monitoring

Loopbacks

You can perform the following types of E3 physical port loopback tests on the ATM CS E3 IOP module:

- Internal
- External
- Payload
- Near End Line

For more information about loopback testing, see the *NavisCore Diagnostic and Troubleshooting Guide*.

Status Indicators

Module LEDs: Good, Failed, Redundant
Physical Port Alarm LEDs: Red, Yel (Yellow)

LED State	Status
ATM CS E3 IOP Module	
Good LED lit	Normal operation
Failed LED lit	Module failure
Redundant LED lit	Redundant module online
Physical Port	
Red LED lit	Loss of signal - receiving unframed signal
Red LED blinking	Downstream equipment failure resulting in an Alarm Indication Signal (AIS)
Yellow LED lit	Downstream equipment sees loss of signal - receiving yellow alarm from downstream equipment, resulting in a Remote Alarm Indication (RAI)
Both LEDs off	Normal operation

ATM CS E3 Panels

Figure A-8 shows the panels for the ATM CS E3 IOP module.

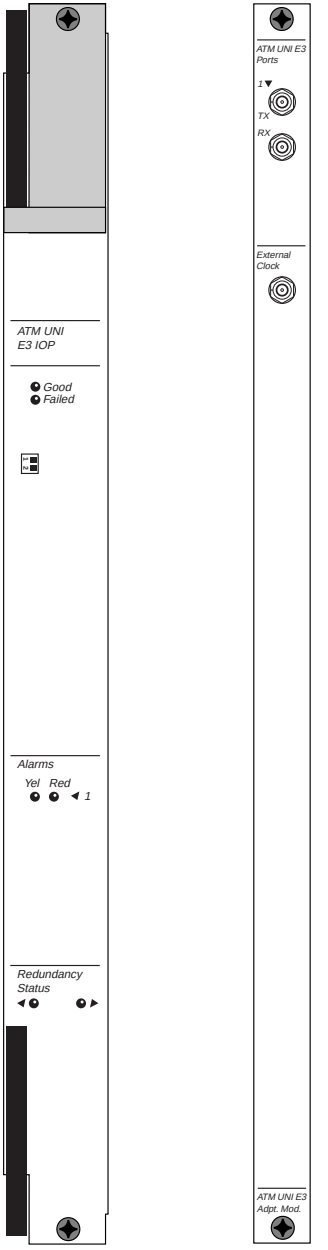


Figure A-8. ATM CS E3 IOP and IOA

4-Port T1 ISDN PRI IOP Module

The 4-port 24 channel T1 ISDN PRI IOP supports the Primary Rate Interface (PRI). This interface is specified as 23D. That means the module has 23 B channels of data and one additional channel, the “D” channel, assigned as a management channel.

ISDN is a low-cost alternative to leased lines as a means of accessing the STDX switch. A typical application is for user devices to access the ISDN via a Basic Rate Interface (BRI) and, using the D channel for signalling, establish a connection between one of the user device B channels and a B channel on the STDX PRI. Once the connection is established, the user device communicates with remote users using standard Frame Relay protocol over the B channel.

Specifications

Physical Dimensions

Height:15 in. (38.1 cm)

Width:1 in. (2.54 cm)

Depth:10 in. (25.4 cm)

Weight:3 lbs. (1.35 kg)

Power Requirements

40 Watts

Agency Approvals

Electromagnetic Emissions Certifications: FCC Part 15 Class A, EN55022 (CISPR Class A)

NEBS GR-63-CORE, GR-1089-CORE

Temperature Range

0° to 50°C (32° to 122°F)

Physical Interfaces

- Four ISDN (T1) ports and external clock connection, RJ-48 8-pin modular connector
- Physical connectors:
  RJ-48 (clock input)
  15-pin Sub D male connector or RJ-48 8-pin modular connector (port connectors)

Interface Standards

- AT&T Publication 62411
- AT&T Publication 54016
- Bellcore TR-NPR-000054
- Bellcore TR-TSY-000194
- ANSI T1.403
- FCC Part 68
- Line coding: AMI (jammed bit), B8ZS
  Framing: D4, ESF
  Network interfaces: DS1

Signal Levels

Receive: 0dB to -30dB
Transmit: 0dB, -7.5dB, -15dB

Loopbacks

Line and payload loopback

Status Indicators

Module LEDs: Good, Failed, Redundant
Physical Port Alarm LEDs: Red, Yel (Yellow)

LED State	Status
T1 ISDN PRI IOP Module	
Good LED lit	Normal operation
Failed LED lit	Module failure
Redundant LED lit	Redundant module online
Physical Port	
Red LED lit	Loss of signal - receiving unframed signal
Red LED blinking	Downstream equipment failure resulting in an Alarm Indication Signal (AIS)
Yellow LED lit	Downstream equipment sees loss of signal - receiving yellow alarm from downstream equipment, resulting in a Remote Alarm Indication (RAI)
Both LEDs off	Normal operation

ISDN PRI Panels

Figure A-9 shows the 4-port ISDN PRI IOP and IOA panels.

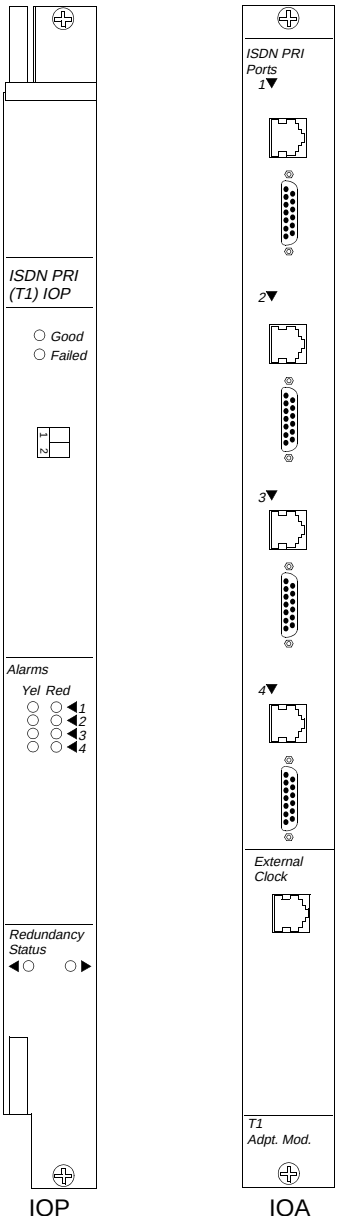


Figure A-9. T1 ISDN PRI Module IOP and IOA

4-Port E1 ISDN PRI IOP Module

The 4-port 31-bundle E1 ISDN PRI module provides E1 (2.048 Mbps) and ISDN (30 B-channel and one D-channel) interface support for B-STDX switches. The ISDN module and associated remote access software make the B-STDX the only platform to fully integrate ISDN remote access with Frame Relay, SMDS, and ATM WAN switching, enabling the delivery of public remote access services. Each port can be configured individually to support channelized E1 or primary rate ISDN. Each port can support either 30 ISDN B-channels and one ISDN D-channel, or up to 31 x 64 Kbps E1 time slots. Each IOP module uses a RISC processor for high performance, and Flash memory for easy field installation of new capabilities.

The E1 ISDN module contains four integral E1 Network Terminating Units (NTUs). It provides a CRC4 channel format E1 interface, which makes it easy and economical to interface to multiple sites over a single E1 connection. This saves space, cost, and cabling of an external NTU, while increasing performance. Traffic can remain in its original CRC4 channel format from an NTU, eliminating expensive equipment for extra data handling and improving reliability by reducing the introduction of errors.

When operating as an E1 interface, the 64 Kbps channels can be mapped to a maximum of 31 HDLC data links. Contiguous or non-contiguous n x 64 Kbps channels compose each HDLC data link. Each of the n x 64-Kbps data link channels can be configured as DCE or DTE, providing a variety of logical port functions.

When configured for ISDN, each module offers four primary rate ISDN ports. A fully loaded B-STDX 9000 offers the highest-density remote access solution supporting 1,440 ISDN B-channels.

Specifications

Physical Dimensions

Height:15 in. (38.1 cm)

Width:1 in. (2.54 cm)

Depth:10 in. (25.4 cm)

Weight:3 lbs. (1.35 kg)

Power Requirements

40 Watts

Agency Approvals

Electromagnetic Emissions Certifications: FCC Part 15 Class A, CISPR Class A (EN55022)

Temperature Range

0° to 50°C (32° to 122° F)

Physical Interfaces

- Four E1 ports, G.703 coaxial pair 75-ohm
- Unbalanced and G.703 symmetrical pair 120-ohm balanced
- Physical connectors:
  BNC (clock input)

Interface Standards

- ITU-TS G.703
- ITU-TS G.704
- Line coding: HDB3
  Framing: CRC4
  Network interfaces: E1

Signal Levels

Receive: 0dB to -10dB
Jitter meets or exceeds template defined in G.703
Internal stratum 4 network clock

Loopbacks

Line and payload loopback

Integral E1 NTU

E1 line coding options: Zero encoding
Timing options: loop timing, internal and external timing

Status Indicators

Module LEDs: Good, Failed, Redundant
Physical Port Alarm LEDs: Red, Yel (Yellow)

LED State	Status
E1 ISDN PRI IOP Module	
Good LED lit	Normal operation
Failed LED lit	Module failure
Redundant LED lit	Redundant module online
Physical Port	
Red LED lit	Loss of signal - receiving unframed signal
Red LED blinking	Downstream equipment failure resulting in an Alarm Indication Signal (AIS)
Yellow LED lit	Downstream equipment sees loss of signal - receiving yellow alarm from downstream equipment, resulting in a Remote Alarm Indication (RAI)
Both LEDs off	Normal operation

ISDN PRI Panels

Figure A-10 shows the 4-port E1 ISDN PRI IOP and IOA panels.

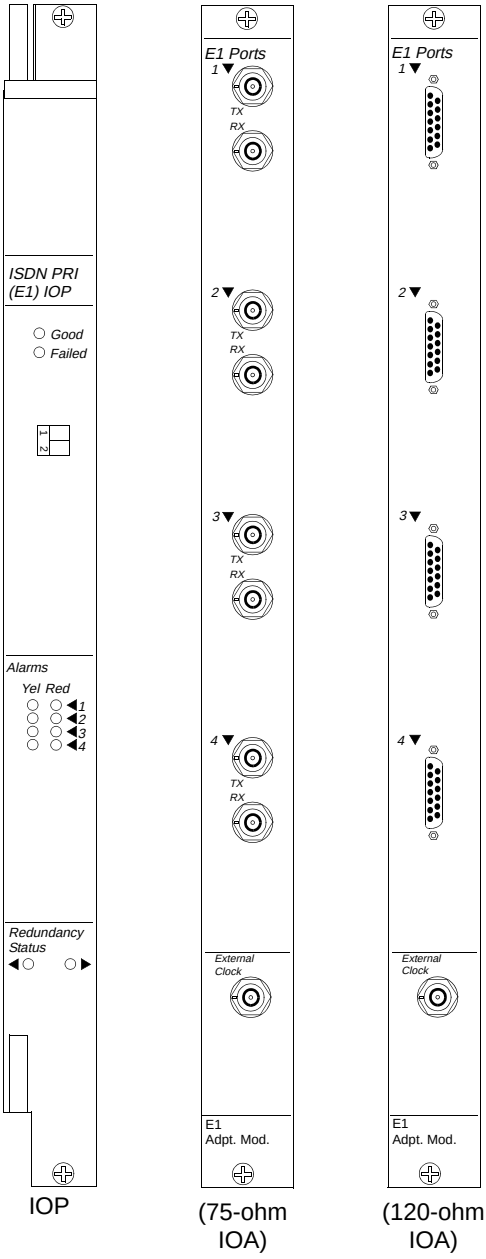


Figure A-10. E1 ISDN PRI Module IOP and IOA

1-Port Channelized DS3 IOP Module

The 1-port channelized DS3 I/O module (channelized DS3 module) is a high-speed core IOP card that enables B-STDX switches to provide 28 T1 connections at a variable data rate (for example, 56 Kbps through 1.54 Mbps). The channelized DS3 module carries 28 independent DS1 channels on a single DS3 port. The module supports a channelized T3 interface with up to 28 individual T1 connections for frame-based traffic. It supports DS1 and DS3 line loopback, diagnostic loopback, and Bit Error Rate Test (BERT) capabilities. It also provides link monitoring for accumulating statistics and generating reports. You can individually configure each of the DS1 channels as DCE or DTE to provide any Frame Relay logical port function.

Multiservice is supported as of release 4.2 of the switch firmware.

The 28 independent HDLC controllers on the channelized DS3 module provide high density and use low power consumption. You can configure up to 14 channelized DS3 modules in a B-STDX switch to support 392 T1 connections. This feature provides the highest density Frame Relay solution in the industry, at the lowest T1 cost per port.

The channelized DS3 module uses the Module Identification Memory (MIM) device. This device allows Ascend to remotely access your card by issuing a console command to determine card type, hardware revision, serial number, manufacturing part number, and product code. For more information on MIM, contact the Ascend Technical Assistance Center (see “Contacting the Technical Assistance Center” on page 7-6).

Typical Application

The channelized DS3 module is intended for installation in a B-STDX 8000/9000 switch located in a central office in a major metropolitan area. In this configuration, the switch concentrates multiple T1 connections (possibly connecting to remote B-STDX switches in suburban/rural areas with a V.35 connection). The central office B-STDX in turn connects to another major metropolitan area via a HSSI-derived or ATM UNI 45-Mbps connection. Although the channelized DS3 module is primarily intended for public networks, it also accommodates large private networks with leased floor space for equipment within a central office.

Specifications

Physical Dimensions

Height:15 in. (38.1 cm)

Width:1 in. (2.54 cm)

Depth:10 in. (25.4 cm)

Weight:3 lbs. (1.35 kg)

Power Requirements

35 Watts

Agency Approvals

Electromagnetic Emissions Certifications:

FCC Part 15 Class A

EN55022 (CISPR Class A)

NEBS GR-63-CORE, GR-1089-CORE

UL 1950, EN 60950

Temperature Range

0° to 50°C (32° to 122°F)

Physical Interfaces

The module has one DS3 port, which provides up to 28 independent DS1 channels.

Physical Connectors

Two 75 ohm BNC connectors (transmit/receive)

One RJ-48 8-pin modular connector (external clock)

One wire-wrap connector (external clock)

Interface Standards

AT&T Publication 62415

ANSI T1.102

The following table lists the supported DS3 and DS1 standards.

Level	Standards
DS3	ANSI T1.103 ANSI T1.107 ANSI T1.107a ANSI T1.231 ANSI T1M1.3/91-003R3 Bellcore TR-NWT-000499 AT&T TR54016 RFC 1407
DS1	AT&T Publication 62411 Bellcore TR-TSY-000312 Bellcore TR-NWT-000499 ANSI T1.403 ANSI T1.107 RFC 1406

Line Coding

B3ZS

Framing

D4, ESF (CCITT)

Application Mode

C-bit Parity, M13

Diagnostics

Background

Foreground: I/O card, physical port, channel

Statistics

Link performance and monitoring

Loopbacks

The following table lists the types of loopback tests available on the channelized DS3 module.

Test Level	Test Type
DS3 - physical port	• Internal • External • Near-end line loopback • Far-end loopback • Near-end diag loopback
DS1 - channel	• Near End Loopback – payload – line – diagnostic • Far End Loopback • Bit Error Rate Test (BERT)

Status Indicators

Module LEDs: Good, Failed, Redundant
Physical Port Alarm LEDs: Red, Yel (Yellow)

LED State	Status
DS# IOP Module	
Good LED lit	Normal operation
Failed LED lit	Module failure
Redundant LED lit	Redundant module online
Physical Port	
Red LED lit	Loss of frame or signal
Red LED blinking	Downstream equipment failure resulting in an Alarm Indication Signal (AIS)
Yellow LED lit	Downstream equipment sees loss of signal - receiving yellow alarm from downstream equipment, resulting in a Remote Alarm Indication (RAI)
Both LEDs off	Normal operation

Channelized DS3 Panels

Figure A-11 shows the DS3 module IOP and IOA.

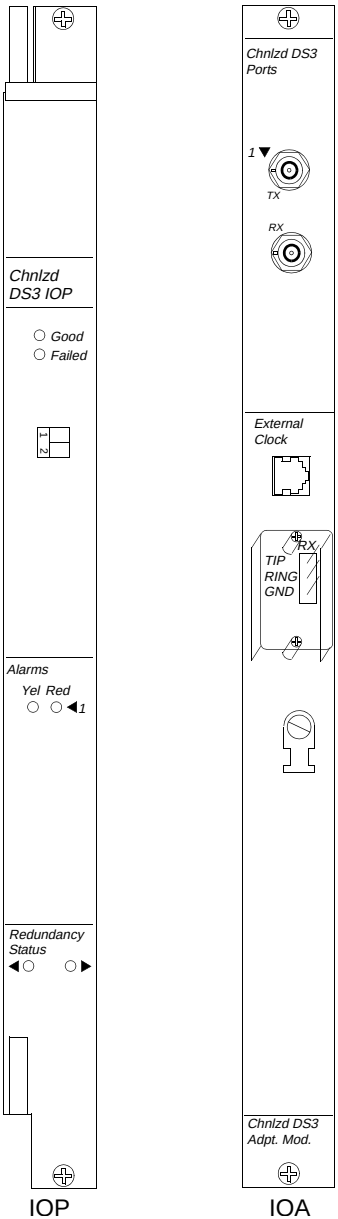


Figure A-11. Channelized DS3 Module IOP and IOA

Channelized DS3-1-0 IOP Module

The channelized DS3-1-0 IOP module is a high-speed core IOPB card that enables B-STDX switches to provide 28 T1 connections at a variable data rate (for example, 56 Kbps through 1.54 Mbps). The module supports a channelized T3 interface with up to 28 individual T1 and 24 DS0 connections per T1 for frame-based traffic. It supports DS0, DS1, and DS3 line loopback, diagnostic loopback, and Bit Error Rate Test (BERT) capabilities. It also provides link monitoring for accumulating statistics and generating reports. You can individually configure each of the DS0 or DS1 channels to provide any Frame Relay logical port function.

The 28 independent HDLC controllers on the DS3-1-0 module provide high density and use low power consumption. You can configure up to 14 DS3-1-0 modules in a B-STDX switch. Each module supports up 128 DS0 connections. This feature provides the highest density Frame Relay solution in the industry, at the lowest T1 cost per port.

The DS3-1-0 module is intended for installation in a B-STDX 8000/9000 switch and enables remote provisioning of central office Digital Access and Cross-Connect (DAC) and multiplexer equipment. The DS3-1-0 uses the Module Identification Memory (MIM) device, which allows Ascend to determine the card type, hardware revision, serial number, manufacturing part number, and product code.

Specifications

Physical Dimensions

Height:15 in. (38.1 cm)

Width:1 in. (2.54 cm)

Depth:10 in. (25.4 cm)

Weight:3 lbs. (1.35 kg)

Power Requirements

35 Watts

Agency Approvals

Electromagnetic Emissions Certifications:

FCC Part 15 Class A

EN55022 (CISPR Class A)

NEBS GR-63-CORE, GR-1089-CORE

UL 1950 (CUL), EN 60950, EN 61000

Temperature Range

0° to 50°C (32° to 122°F)

Physical Interfaces

The module has one channelized DS3 (44.736 Mbps) port, which provides up to 28 independent DS1 channels and 128 DS0 channels.

Physical Connectors

Two 75 ohm BNC connectors (transmit/receive)

One RJ-48 8-pin modular connector (external clock)

One wire-wrap connector (external clock)

Interface Standards

AT&T Publication 62415

ANSI T1.102

The following table lists the supported DS3 and DS1 standards.

Level	Standards
DS3	ANSI T1.103 ANSI T1.107 ANSI T1.107a ANSI T1.231 ANSI T1M1.3/91-003R3 Bellcore TR-NWT-000499 AT&T TR54016 RFC 1406, 1407
DS1	AT&T Publication 62411 Bellcore TR-NWT-000499 ANSI T1.403 ANSI T1.107 RFC 1406

Diagnostics

Background

Foreground: I/O card, physical port, channel

Line Coding

B3ZS

Framing

D4, ESF (CCITT)

Application Mode

C-bit Parity, M13

Signal Levels

- Receive: Peak pulse amplitude from 0.2 to 0.85 volts
- Transmit: Conform to ANSI T1.102 pulse template and amplitude (0.36 volts to 0.85 volts) for cable up to 450 feet

Statistics

Performance monitoring (PM) and Summary statistics

Loopbacks

The following table lists the types of loopback tests available on the channelized DS3 module.

Test Level	Test Type
DS3 - physical port	• Internal • External • Near-end line loopback • Far-end loopback • Near-end diag loopback
DS1 - channel	• Near End Loopback – payload – line – diagnostic • Far End Loopback • Bit Error Rate Test (BERT)
DS0 - logical port	• DS0 Near End Loopback • Bit Error Rate Test (BERT)

Status Indicators

Module LEDs: Good, Failed, Redundant
Physical Port Alarm LEDs: Red, Yel (Yellow)

LED State	Status
DS# IOP Module	
Good LED lit	Normal operation
Failed LED lit	Module failure
Redundant LED lit	Redundant module online
Physical Port	
Red LED lit	Loss of frame or signal
Red LED blinking	Downstream equipment failure resulting in an Alarm Indication Signal (AIS)
Yellow LED lit	Downstream equipment sees loss of signal - receiving yellow alarm from downstream equipment, resulting in a Remote Alarm Indication (RAI)
Both LEDs off	Normal operation

Channelized DS3-1-0 Panels

Figure A-4 shows the IOP and IOA panels for the Channelized DS3-1-0 IOP module.

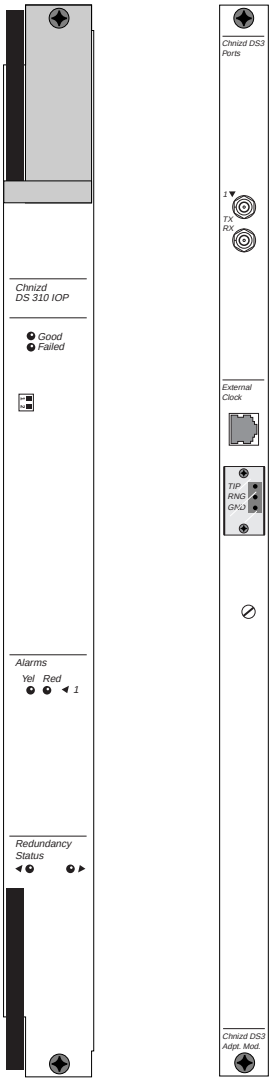


Figure A-12. Channlized DS3-1-0 Module IOP and IOA

1-Port ATM CS DS3/E3 IOP Module

The 1-port ATM CS (cell-switching) DS3/E3 IOP module is a one-port DS3/E3 module that supports ATM services on the B-STDX platform. The CS represents Ascend's next generation of B-STDX ATM technology. It extends the bounds of the B-STDX by adding native cell-switching capability.

Direct Cell Trunking

Cell trunking may be used when optimum performance between two B-STDX switches, or between a B-STDX and CBX 500 switch, is desired.

By using a cell trunk, you can achieve seamless integration between a B-STDX and the CBX 500 in a single network. Ascend's Virtual Network Navigator (VNN) sees this integrated network as a single routing domain, under which all Ascend switches function as peers. This eliminates the need for ATM OPTimum trunking, and permits rapid network scaling, faster provisioning, and ease of maintenance.

Direct cell trunking supports the establishment of virtual circuits between two B-STDX access ports across a CBX 500 core, as well as circuits that originate on a B-STDX and terminate on a CBX 500.

Although ATM cell trunks are supported between B-STDX switches, the CBX 500 is more appropriate for ATM backbone switching. You should not attempt to build a large-scale ATM switching infrastructure using only B-STDX switches. The CBX 500 provides a superior QoS feature set to guarantee quality of service across all classes of ATM traffic.

Frame Relay to ATM Network Interworking

Frame Relay to ATM Network Interworking allows Frame Relay users to take advantage of ATM as a high-bandwidth backbone, and lets the end user or networking devices communicate with each other via the ATM network.

The Frame Relay devices communicate as they usually do, as if they are using Frame Relay for the entire session. ATM allows the Frame Relay network to scale in size by providing higher bandwidth and trunking for a large number of locations and end-user devices. The ATM network is completely transparent to the Frame Relay devices. An ATM backbone connecting multiple Frame Relay networks can provide scalability and high-speed support for a large number of locations and end-user devices, without calling for any changes to those devices.

Service Interworking Application

The Frame Relay-to-ATM Service Interworking standard (FRF.8) enables a Frame Relay user device to connect to an ATM user device over a common WAN backbone. Frame Relay-to-ATM Service Interworking provides a seamless communication between ATM and Frame Relay network or end-user devices.

Specifications

Physical Dimensions

Height:15 in. (38.1 cm)

Width:1 in. (2.54 cm)

Depth:10 in. (25.4 cm)

Weight:3 lbs. (1.35 kg)

Power Requirements

40 Watts

Agency Approvals

FCC Part 15 Class A

Temperature Range:

0° to 50° C (32° to 122° F)

Physical Interfaces

- Either 1 ATM UNI 3.0/3.1 DS3 port (44.738 Mbps) or 1 ATM UNI 3.0/3.1 E3 port (34.368 Mbps)
- One ANSI T1 external clock port (1.544 Mbps)

Physical Connections

- Two BNC connectors (TX and RX)
- Wire wrap and RJ48 (8-pin modular) for T1 external clock

Network Clock Support

The onboard clock is Stratum 4E compliant with holdover capability. Transmit clock can be derived from the network, generated internally, or provided via the external clock port (ANSI T1).

Interface Standards

- ANSI T1.102
- AT&T Publication 62415

DS3 Options

- Framing
  - C-bit parity
  - M13
- Cell mapping
  - DS3 PLCP
  - HEC Delineation (direct mapping)
- Cell payload scrambling
  - User configurable: enabled or disabled

E3 Options

Framing/Cell mapping

- G.751 with E3 PLCP
- G832 with HEC Delineation

DS3 Standards

- ATM Forum UNI 3.0/3.1
- ANSI T1.103
- ANSI T1.107
- ANSI T1.107a
- ANSI T1M1.3/91-003R3
- Bellcore TR-NWT-000499
- AT&T TR54016
- RFC 1407

E3 Standards

- ATM Forum UNI 3.0/3.1
- ITU G.432
- ITU G.703
- ITU G.751
- ITU G.804
- ITU G.832

Loopback

Line loopback

Status Indicators

Physical Port Alarm LEDs: Red, Yel (Yellow

LED State	Status
ATM CS DS3/E3 IOP Module	
Master LED (Green)	Lit indicates that this unit is the chassis clock master
Port	
Red LED lit	Loss of signal
Red LED blinking	Downstream equipment failure resulting in an Alarm Indication Signal (AIS)
Yellow LED lit	Downstream equipment sees loss of signal - receiving yellow alarm from downstream equipment, resulting in a Remote Alarm Indication (RAI)
Both LEDs off	Normal operation

Redundancy

There is 2-slot, 1-for-1 redundancy of the IOPs

Channelized DS3 Panels

Figure A-13 shows the ATM UNI CS DS3/E3 IOP and IOA.

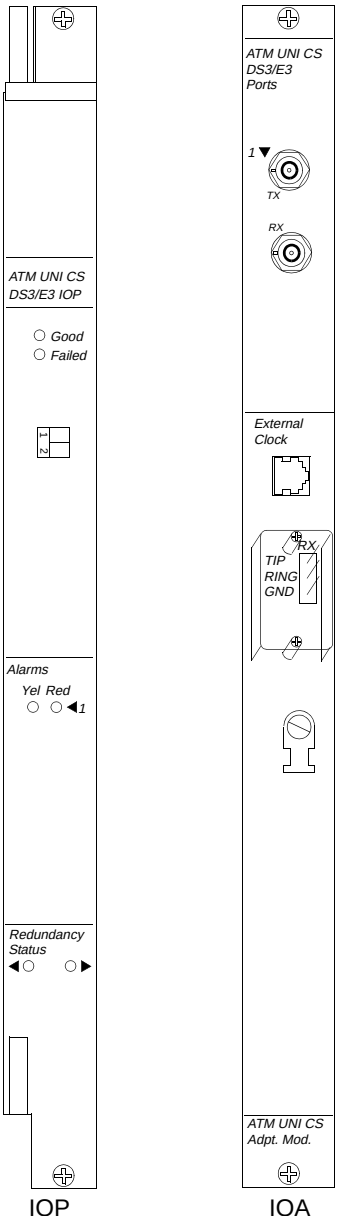


Figure A-13. ATM UNI CS DS3/E3 IOP and IOA

1-Port ATM IWU OC3c/STM-1 IOP Module

The 1-port ATM IWU (interworking unit) OC3c/STM-1 IOP module supports ATM services on the B-STDX platform. The IWU module represents a major extension in trunking and Frame Relay – ATM internetworking capacity for the B-STDX platform. Customer operations and service provisioning are simplified through the support of a native cell trunking interface to the CBX 500, providing full integration and state-of-the-art virtual circuit routing with Virtual Network Navigator (VNN).

Direct Cell Trunking

The IWU IOP module supports direct cell trunking for full integration with the CBX 500. Cell trunking may be used when optimum performance between two B-STDX switches, or between a B-STDX and CBX switch, is desired.

By using a cell trunk, you can achieve seamless integration between a B-STDX and CBX switch in a single network. Ascend's Virtual Network Navigator (VNN) sees this integrated network as a single routing domain, under which all Ascend switches function as peers. This eliminates the need for ATM OPTimum trunking, and permits rapid network scaling, faster provisioning, and ease of maintenance.

Direct cell trunking fully supports the establishment of virtual circuits between two B-STDX access ports across a CBX 500 core, as well as circuits that originate on a B-STDX and terminate on a CBX 500.

Although ATM cell trunks are supported between B-STDX switches, the CBX 500 is more appropriate for ATM backbone switching. You should not attempt to build a large-scale ATM switching infrastructure using only B-STDX switches. The CBX 500 provides a superior QoS feature set to guarantee quality of service across all classes of ATM traffic.

Frame Relay to ATM Network Interworking

Frame Relay to ATM Network Interworking allows Frame Relay users to take advantage of ATM as a high-bandwidth backbone, and lets the end user or networking devices communicate with each other via the ATM network.

The Frame Relay devices communicate as they usually do, as if they are using Frame Relay for the entire session. ATM allows the Frame Relay network to scale in size by providing higher bandwidth and trunking for a large number of locations and end-user devices. The ATM network is completely transparent to the Frame Relay devices. An ATM backbone connecting multiple Frame Relay networks can provide scalability and high-speed support for a large number of locations and end-user devices, without calling for any changes to those devices.

Service Interworking Application

The Frame Relay-to-ATM Service Interworking standard (FRF.8) enables a Frame Relay user device to connect to an ATM user device over a common WAN backbone. Frame Relay-to-ATM Service Interworking provides a seamless communication between ATM and Frame Relay network or end-user devices.

Specifications

Physical Dimensions

Height:15 in. (38.1 cm)

Width:1 in. (2.54 cm)

Depth:10 in. (25.4 cm)

Weight:3 lbs. (1.35 kg)

Power Requirements

40 Watts

Agency Approvals

FCC Part 15 Class A

Temperature Range:

0° to 50° C (32° to 122° F)

Physical Interfaces

- 1 ATM UNI 3.0/3.1 OC3c/STM-1 port (155.52 Mbps)
- 1 G.703 section 10 clock interface (2.048 Mbps)

Physical Connections

- Subscriber Connector (SC) for the OC3c/STM-1 port
- RJ-45 (8-pin modular) for the G.703 synchronization port

Network Clock Support

The onboard clock is Stratum 4E compliant with holdover capability. Transmit clock can be derived from the network, generated internally, or provided via the external clock port (G.703 section 10).

Signal Distance/Levels

Table A-1. Multimode (LED) Optics[a]

	Non-Redundant		Redundant	
	Minimum	**Maximum**	**Minimum**	**Maximum**
TX Power	-20dBm	-14dBm	-21dBm	-14dBm
RX Sensitivity	-29dBm	-14dBm	-25dBm	-14dBm
Loss Budget	9dB		4dB	

[a] For applications less than 1.2 miles (2 kilometers)

Table A-2. Single-Mode (Laser) Optics[a]

	Non-Redundant		Redundant	
	Minimum	**Maximum**	**Minimum**	**Maximum**
TX Power	-15dBm	-8dBm	-26dBm	-8dBm
RX Sensitivity	-28dBm	-8dBm	-24dBm	-8dBm
Loss Budget	9dB		4dB	

[a] For applications up to 9 miles (15 kilometers)

The redundant assembly uses optical coupler/splitters. This results in ~4dB attenuation for RX signals, and ~1dB attenuation for TX signals.

Interface Standards

- ANSI T1.105
- ANSI T1.106

OC3c Standards

- ATM Forum UNI 3.0/3.1
- ANSI T1M1.3/92-005R1
- Bellcore TR-NWT-001112
- Bellcore GR-253-CORE
- RFC SONET 1595

STM-1 Standards

- ATM Forum UNI 3.0/3.1
- ANSI T1M1.3/92-005R1
- ITU G.707
- ITU G.708
- ITU G.709
- ITU G.783
- RFC SONET 1595

Status Indicators

Physical Port Alarm LEDs: Red, Yel (Yellow)

LED State	Status
Module	
Master LED (Green)	Lit indicates that this unit is the chassis clock master
Port	
Red LED lit	Loss of signal
Red LED blinking	Downstream equipment failure resulting in an Alarm Indication Signal (AIS)
Yellow LED lit	Downstream equipment sees loss of signal - receiving yellow alarm from downstream equipment, resulting in a Remote Alarm Indication (RAI)
Both LEDs off	Normal operation

Redundancy

- 2-slot, 1-for-1 redundancy of the IOPs
- 1-for-1 redundancy of fiber optic transceivers via modular design
- Offline fiber optic transceiver can be replaced without service interruption

ATM IWU Panels

Figure A-14 shows the IOP and IOA panels for the ATM IWU IOP module.

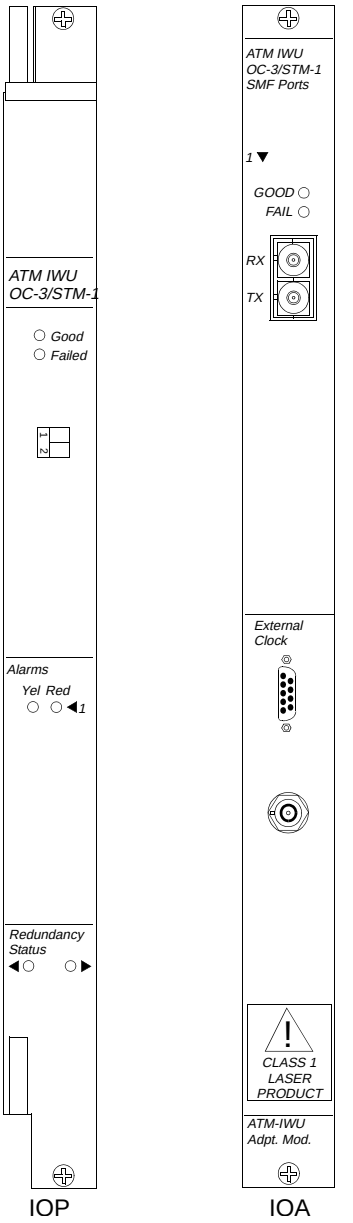


Figure A-14. ATM IWU OC-3c/STM-1 IOP and IOA

2-Port Ethernet 10/100 Base-T IOP Module

The 2-Port Ethernet 10/100 Base-T IOP module provides high-speed 100Mbps connections to help reduce bottlenecks to dial access equipment and improve network performance. When using IP Navigator while operating as a standard IP routing interface, the 10/100 Processor provides users with a high-speed interface to Ascend's IP Switch (GRF) and MAX TNT products, in addition to high-speed links to local Internet/Intranet hosting servers.

The 10/100 Ethernet IOP module enables service providers to easily offer both Internet hosting services and value-added IP routing services that are inherent in IP Navigator. IP traffic received from the Ethernet module is fowarded over a Multipoint-to-Point Tunnel (MPT) built by IP Navigator, or over a regular Permanent Virtual Circuit (PVC). In a similar manner, traffic received from the network is forwarded from the MPT or circuit to the appropirate Ethernet segment and address.

Contact your Ascend sales representative for information regarding the availability of the 2-Port Ethernet IOP Module.

Specifications

Physical Dimensions

Height:16 in. (40.6 cm)

Width:1 in. (2.54 cm)

Depth:11 in. (27.9 cm)

Weight:2 lbs. (.91 kg)

Power Requirements

60 Watts

Agency Approvals

Electromagnetic Emissions Certifications:

FCC Part 15 Class A

EN55022 (CISPR Class A)

EN50082

NEBS GR-63-CORE, GR-1089-CORE

Temperature Range

0° to 50°C (32° to 122°F)

Physical Interfaces

Four RJ45-8 connectors (two-pair, category 5 UTP)

Four Media Independent Interface (MII) Connectors

Interface Standards

802.3-compliant 100 Base TX (10 or 100 Mbps operation)

Full- or half-duplex

Auto-negotiation for 10 or 100 Mbps rate (full- or half-duplex)

Internal and external loopback

Status Indicators

Module LEDs: Good, Failed, Redundant
Port Status LEDs: Five per port to indicate port status and traffic)

LED State	Status
Good LED lit	Normal operation
Failed LED lit	Module failure
Redundant LED lit	Module online - redundant module installed and offline
Redundant LED off	Module online - no redundant module installed
Redundant LED blinking	Module offline - redundant module installed and offline
Port Status	
On/Off	TX activity
On/Off	RX activity
On/Off	Link established
On/Off	Full duplex
On/Off	Collision

2-Port Ethernet 10/100Base-T IOP Panels

Figure A-15 shows the IOP and IOA panels for the Ethernet 10/100Base-T IOP module.

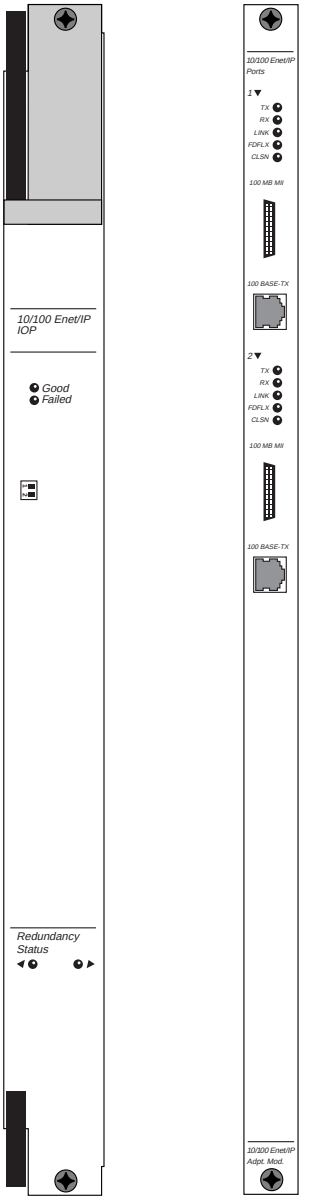


Figure A-15. Ethernet 10/100Base-T IOP and IOA

Ordering Information

To obtain a current product code/price list manual, contact your Ascend Account Manager.

B

Cables and Pinout Assignments

This appendix provides cable diagrams and pinout assignments for the following B-STDX cables:

- RS-232 Shielded Crossover Console Cable
- RS-232 Shielded Null Modem Cable
- RS-232 Shielded Straight-through Modem Cable
- RS-232 DB-9 to DB-25 Shielded Crossover Cable
- V.35 Straight-through Cable
- V.35 Crossover Cable
- X.21 Straight-through Cable
- X.21 Crossover Cable
- T1/E1 Straight-through Cable - DB15
- T1/E1 Crossover Cable - DB15
- T1 Straight-through USOC-RJ-48C Connector
- T1 Crossover USOC-RJ-48C Connector
- HSSI Straight-through Cable

- HSSI Crossover Cable
- Media Independent Interface (MII)

Any of the above-listed cables can be purchased from Ascend Communications. Be sure to use the appropriate product code for ordering. To obtain a current product code/price list manual, contact your Ascend Account Manager.

In addition to the above-listed cables, the following loopback connectors are also described in this appendix. Note that these connectors *cannot* be ordered from Ascend Communications.

- V.35 Loopback Connector (Male)
- X.21 Loopback Connector (Male)
- T1 Loopback Connector (Male)
- RJ-48 Loopback Connector (Male)
- HSSI Loopback Connector (Male)

RS-232 Shielded Crossover Console Cable

Table B-1. Pinouts for RS-232 Shielded Crossover Console Cable

RS-232 Female Connector #1		RS-232 Female Connector #2	
Pin	**Signal**	**Pin**	**Signal**
2	Transmit Data	3	Receive Data
3	Receive Data	2	Transmit Data
7	Signal Ground	7	Signal Ground
1	Frame Ground	1	Frame Ground
4	Request To Send	5	Clear To Send
5	Clear To Send	4	Request To Send
6	Data Set Ready	20	Data Terminal Ready
8	Data Carrier Detect	8	Data Carrier Detect
20	Data Terminal Ready	6	Data Set Ready

Product Code:40024Y

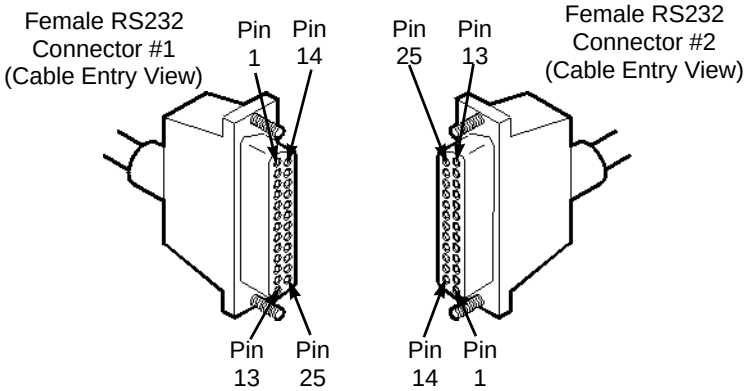


Figure B-1. Shielded Crossover Console Cable Diagram

RS-232 Shielded Null Modem Cable

Table B-2. Pinouts for RS-232 Shielded Null Modem Cable

RS-232 Male Connector #1		RS-232 Female Connector #2	
Pin	**Signal**	**Pin**	**Signal**
7	Signal Ground	7	Signal Ground
3	Receive Data	2	Transmit Data
2	Transmit Data	3	Receive Data

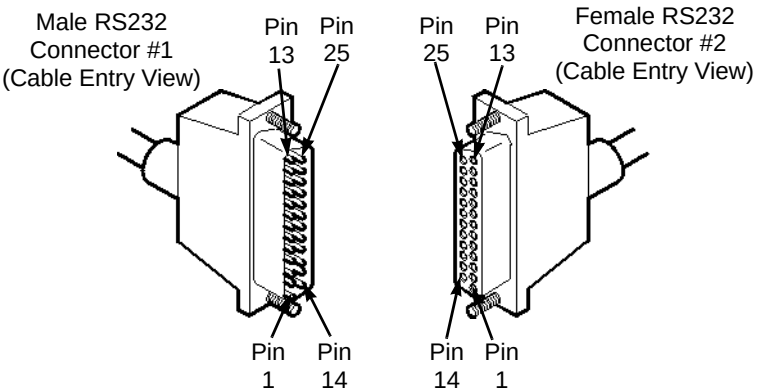


Figure B-2. RS-232 Shielded Null Modem Cable Diagram

DB-25 Connector Pinouts

Table B-3. Pinouts for DB-25 Connector

DB-25 Male Connector #1		DB-25 Male Connector #1	
Pin	**Signal**	**Pin**	**Signal**
20	Data Terminal Ready	8	Data Carrier Detect
8	Data Carrier Detect	6	Data Set Ready
5	Clear To Send	4	Request To Send

DB-25 Female Connector #2		DB-25 Female Connector #2	
Pin	**Signal**	**Pin**	**Signal**
20	Data Terminal Ready	8	Data Carrier Detect
8	Data Carrier Detect	6	Data Set Ready
5	Clear To Send	4	Request To Send

Product Code: 40034Y

RS-232 Shielded Straight-through Modem Cable

Table B-4. Pinouts for RS-232 Shielded Straight-through Modem Cable

Pin	Male Connector #1 Signal	Pin	Female Connector #2 Signal
2	Transmit	2	Transmit
3	Receive Data	3	Receive Data
7	Signal Ground	7	Signal Ground
1	Frame Ground	1	Frame Ground
4	Request To Send	4	Request To Send
5	Clear To Send	5	Clear To Send
6	Data Set Ready	6	Data Set Ready
8	Data Carrier Detect	8	Data Carrier Detect
20	Data Terminal Ready	20	Data Terminal Ready

Product Code: 40021Y

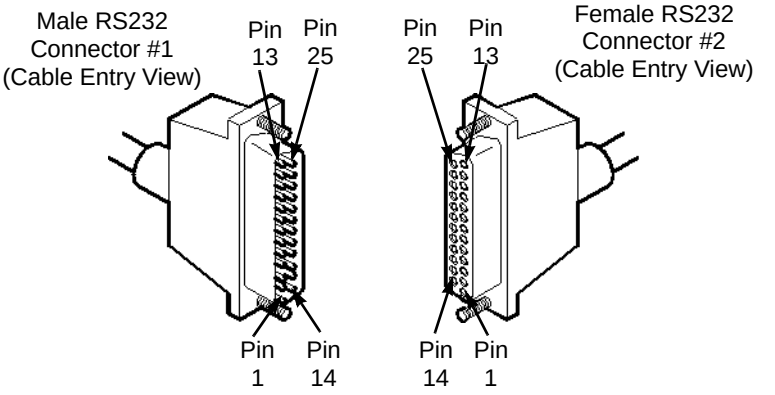


Figure B-3. RS-232 Shielded Straight-through Modem Cable Diagram

RS-232 DB-9 to DB-25 Shielded Crossover Cable

Table B-5. Pinouts for RS-232 DB-25 Shielded Crossover Cable

DB-9 Female Connector #1		DB-25 Female Connector #2	
Pin	**Signal**	**Pin**	**Signal**
2	RX (Receiving Data)	2	TX (Transmit Data)
3	TX (Transmit Data)	3	RX (Receiving Data)
5	GND (Signal Ground)	7	GND (Signal Ground)

Table B-6. Pinouts for RS-232 DB-25 to DB-9 Shielded Crossover Cable

DB-9 Female Connector #1		DB-9 Female Connector #1	
Pin	**Signal**	**Pin**	**Signal**
1	DCD (Data Carrier Detect)	4	DTR (Data Terminal Ready)
4	DTR (Data Terminal Ready)	6	DSR (Data Set Ready)
7	RTS (Request To Send)	8	CTS (Clear To Send)

DB-25 Female Connector #2		DB-25 Female Connector #2	
Pin	**Signal**	**Pin**	**Signal**
4	RTS (Request To Send)	5	CTS (Clear To Send))
6	DSR (Data Set Ready)	8	DCD (Data Carrier Detect)
8	DCD (Data Carrier Detect)	20	DTR (Data Terminal Ready)

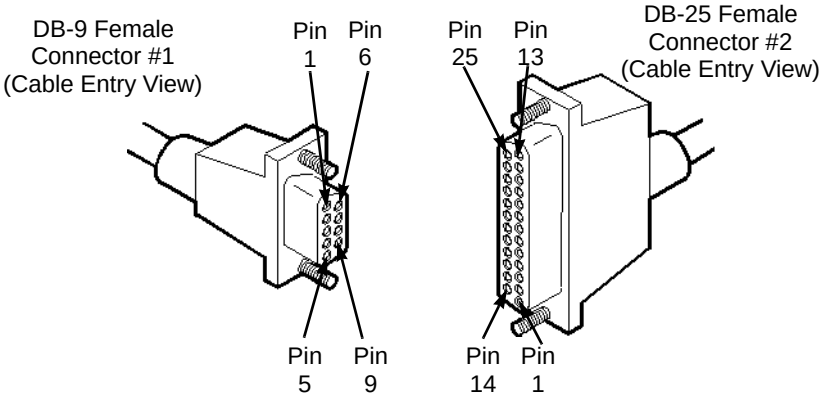


Figure B-4. RS-232 DB-9 to DB-25 Shielded Crossover Cable Diagram

V.35 Straight-through Cable

Table B-7. Pinouts for V.35 Straight-through Cable

Pin	V.35 Connector #1 Signal	Pin	V.35 Connector #2 Signal
A	Earth Ground	A	Earth Ground
B	Signal Ground	B	Signal Ground
C	Request To Send	C	Request To Send
D	Clear To Send	D	Clear To Send
E	Data Set Ready	E	Data Set Ready
F	Data Carrier Detect	F	Data Carrier Detect
H	Data Terminal Ready	H	Data Terminal Ready
L	Local Loopback	L	Local Loopback
N	Remote Loopback	N	Remote Loopback
P	Transmit Data (Signal P)	P	Transmit Data (Signal P)
R	Receive Data (Signal P)	R	Receive Data (Signal P)
S	Transmit Data (Signal N)	S	Transmit Data (Signal N)
T	Receive Data (Signal N)	T	Receive Data (Signal N)
U	External Transmit Clock (Signal P)	U	External Transmit Clock (Signal P)
V	Receive Clock (Signal P)	V	Receive Clock (Signal P)
W	External Transmit Clock (Sig. N)	W	External Transmit Clock (Sig. N)
X	Receive Clock (Signal N)	X	Receive Clock (Signal N)
Y	Transmit Clock (Signal P)	Y	Transmit Clock (Signal P)
Z	External Receive Clock (Signal P)	Z	External Receive Clock (Signal P)
AA	Transmit Clock (Signal N)	AA	Transmit Clock (Signal N)
BB	External Receive Clock (Signal N)	BB	External Receive Clock (Signal N)
NN	Test Indicator	NN	Test Indicator

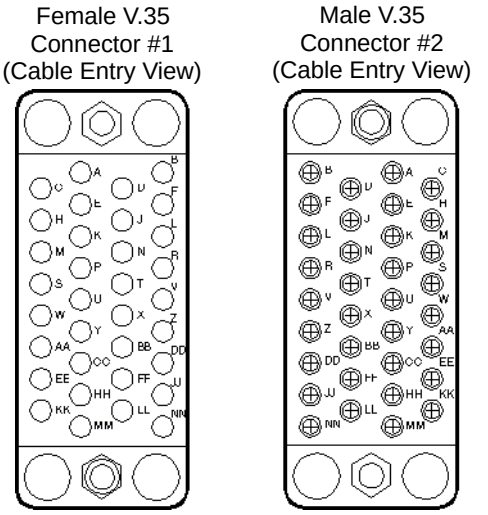


Figure B-5. V.35 Straight-through Cable Diagram

Required Twisted Pairs

P & SV & X

R & TY & AA

U & WZ & BB

Product Code:

40011X (M-F, 5 ft.)
40011Y (M-F, 15 ft.)
40011Z (M-F, 30 ft.)
40012X (F-F, 5 ft.)
40012Y (F-F, 15 ft.)
40012Z (F-F, 30 ft.)
40013X (M-M, 5 ft.)
40013Y (M-M, 15 ft.)
40013Z (M-M, 30 ft.)

V.35 Crossover Cable

Table B-8. Pinouts for V.35 Crossover Cable

Pin	V.35 Connector #1 Signal	Pin	V.35 Connector #2 Signal
A	Earth Ground	A	Earth Ground
B	Signal Ground	B	Signal Ground
C	Request To Send	F	Data Carrier Detect
D	Clear To Send	L	Local Loopback
E	Data Set Ready	H	Data Terminal Ready
F	Data Carrier Detect	C	Request To Send
H	Data Terminal Ready	E	Data Set Ready
L	Local Loopback	D	Clear To Send
N	Remote Loopback	NN	Test Indicator
P	Transmit Data (Signal P)	R	Receive Data (Signal P)
R	Receive Data (Signal P)	P	Transmit Data (Signal P)
S	Transmit Data (Signal N)	T	Receive Data (Signal N)
T	Receive Data (Signal N)	S	Transmit Data (Signal N)
U	External Transmit Clock (Signal P)	V	Receive Clock (Signal P)
V	Receive Clock (Signal P)	U	External Transmit Clock (Signal P)
W	External Transmit Clock (Sig. N)	X	Receive Clock (Signal N)
X	Receive Clock (Signal N)	W	External Transmit Clock (Sig. N)
Y	Transmit Clock (Signal P)	Z	External Receive Clock (Signal P)
Z	External Receive Clock (Signal P)	Y	Transmit Clock (Signal P)
AA	Transmit Clock (Signal N)	BB	External Receive Clock (Signal N)
BB	External Receive Clock (Signal N)	AA	Transmit Clock (Signal N)
NN	Test Indicator	N	Remote Loopback

Required Twisted Pairs

P & SV & X

R & TY & AA

U & WZ & BB

Product Code:

40010X (5 ft.)
40010Y (10 ft.)
40010Z (15 ft.)

Pins Z and BB are Ascend-specific. When making DTE connections to an Ascend switch using custom cables, make sure you map the Transmit Clock to the External Receive Clock.

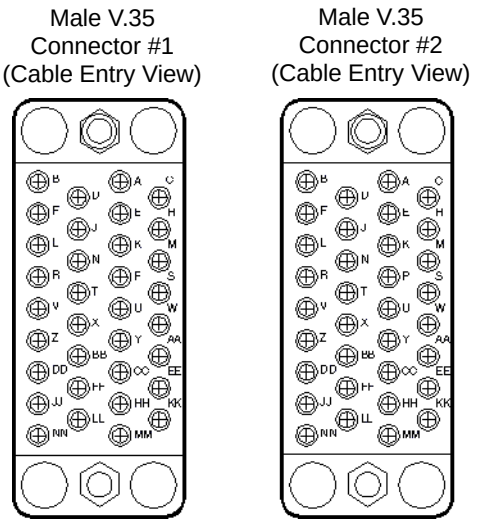


Figure B-6. V.35 Crossover Cable Diagram

X.21 Straight-through Cable

Table B-9. Pinouts for X.21 Straight-through Cable

Pin	Connector #1 Signal	Pin	Connector #2 Signal
2	Transmit Data (P)	2	Transmit Data (P)
3	Request To Send (P)	3	Request To Send (P)
4	Receive Data (P)	4	Receive Data (P)
5	Data Carrier Detect (P)	5	Data Carrier Detect (P)
6	Receive Clock (P)	6	Receive Clock (P)
7	External Transmit Clock (P)	7	External Transmit Clock (P)
8	Ground	8	Ground
9	Transmit Data (N)	9	Transmit Data (N)
10	Request To Send (N)	10	Request To Send (N)
11	Receive Data (N)	11	Receive Data (N)
12	Data Carrier Detect (N)	12	Data Carrier Detect (N)
13	Receive Clock (N)	13	Receive Clock (N)
14	External Transmit Clock (N)	14	External Transmit Clock (N)
	Required Twisted Pairs		
	2 & 95 & 12		
	3 & 106 & 13		
	4 & 117 & 14		

Product Codes:

40008X (5 ft.)
40008Y (15 ft.)
40008Z (30 ft.)

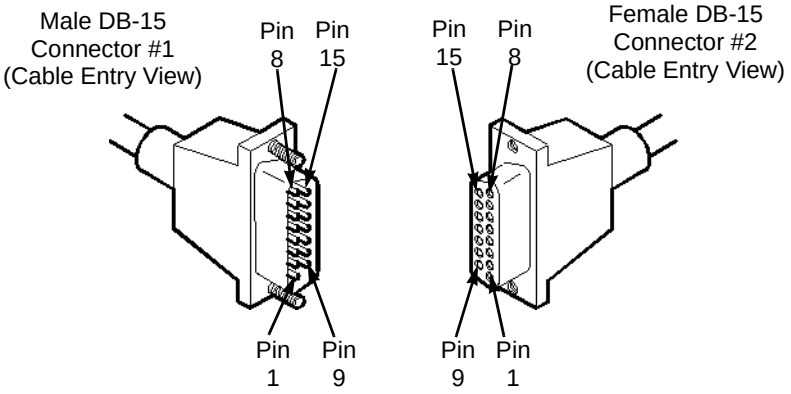


Figure B-7. X.21 Straight-through Cable Diagram

X.21 Crossover Cable

Table B-10. Pinouts for X.21 Crossover Cable

Pin	Connector #1 Signal	Pin	Connector #2 Signal
2	Transmit Data (P)	4	Receive Data (P)
3	Request To Send (P)	5	Data Carrier Detect (P)
4	Receive Data (P)	2	Transmit Data (P)
5	Data Carrier Detect (P)	3	Request To Send (P)
6	Receive Clock (P)	7	External Transmit Clock (P)
7	External Transmit Clock (P)	6	Receive Clock (P)
8	Ground	8	Ground
9	Transmit Data (N)	11	Receive Data (N)
10	Request To Send (N)	12	Data Carrier Detect (N)
11	Receive Data (N)	9	Transmit Data (N)
12	Data Carrier Detect (N)	10	Request To Send (N)
13	Receive Clock (N)	14	External Transmit Clock (N)
14	External Transmit Clock (N)	13	Receive Clock (N)
	Required Twisted Pairs		
	2 & 95 & 12		
	3 & 106 & 13		
	4 & 117 & 14		

Product Codes:

40009X (5 ft.)
40009Y (15 ft.)
40009Z (30 ft.)

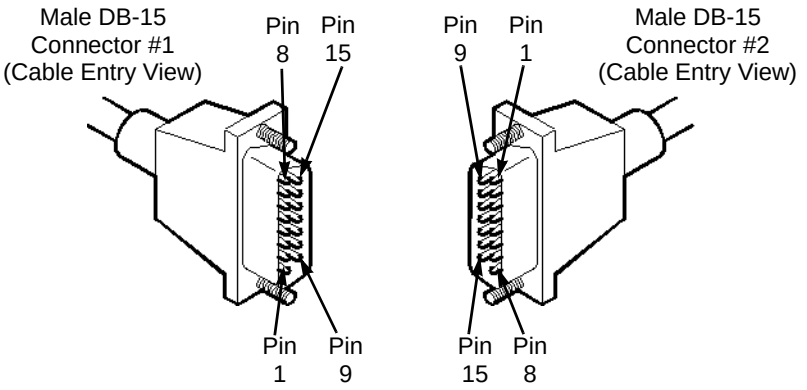


Figure B-8. X.21 Crossover Cable Diagram

T1/E1 Straight-through Cable - DB15

Table B-11. Pinouts for T1/E1 Straight-through Cable, DB-15

Pin	Male Connector #1 Signal	Pin	Male Connector #2 Signal
1	Transmit Tip	1	Transmit Tip
3	Receive Tip	3	Receive Tip
9	Transmit Ring	9	Transmit Ring
11	Receive Ring	11	Receive Ring
	Required Twisted Pairs		
	1 & 9		
	3 & 11		

Product Code:

40004

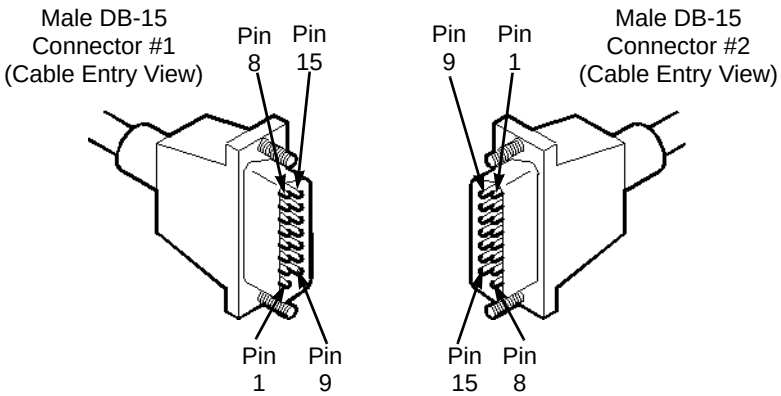


Figure B-9. T1/E1 Straight-through Cable Diagram

T1/E1 Crossover Cable - DB15

Table B-12. Pinouts for T1/E1 Crossover Cable, DB-15

Pin	Male Connector #1 Signal	Pin	Male Connector #2 Signal
1	Transmit Tip	3	Receive Tip
3	Receive Tip	1	Transmit Tip
9	Transmit Ring	11	Receive Ring
11	Receive Ring	9	Transmit Ring
	Required Twisted Pairs		
	1 & 9		
	3 & 11		

Product Code:

40020

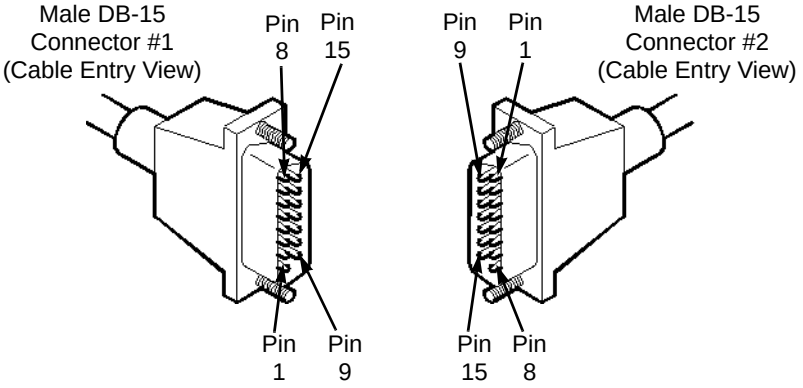


Figure B-10. T1/E1 Crossover Cable Diagram

T1 Straight-through USOC-RJ-48C Connector

Table B-13. Pinouts for T1 Straight-through USOC-RJ-48C Connector

Pin	Signal	Pin	Signal
1	Receive Ring	1	Receive Ring
2	Receive Tip	2	Receive Tip
4	Transmit Ring	4	Transmit Ring
5	Transmit Tip	5	Transmit Tip

Product Code:

40022X (5 ft.)
40022Y (15 ft.)
40022Z (30 ft.)

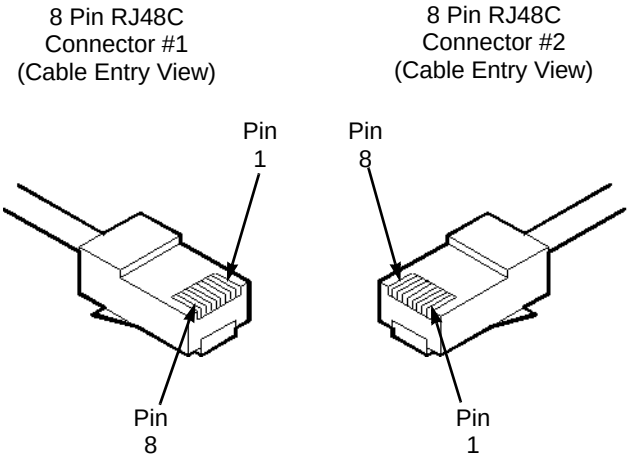


Figure B-11. T1 Straight-through USOC-RJ-48C Connector Diagram

T1 Crossover USOC-RJ-48C Connector

Table B-14. Pinouts for T1 Crossover USOC-RJ-48C Connector

Pin	Signal	Pin	Signal
1	Receive Ring	4	Transmit Ring
2	Receive Tip	5	Transmit Tip
4	Transmit Ring	1	Receive Ring
5	Transmit Tip	2	Receive Tip

Product Code:

40023X (5 ft.)
40023Y (15 ft.)
40023Z (30 ft.)

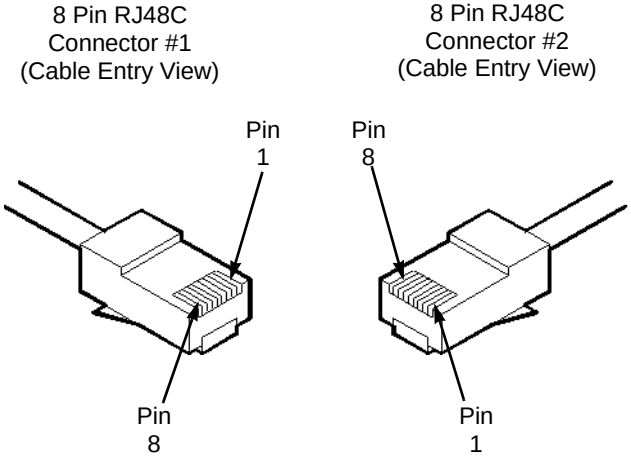


Figure B-12. T1 Crossover USOC-RJ-48C Connector Diagram

HSSI Straight-through Cable

Table B-15. Pinouts for HSSI Straight-through Cable

Pin	Male Connector #1	Pin	Male Connector #2
1	Signal Ground	1	Signal Ground
2	Receive Timing (Signal P)	2	Receive Timing (Signal P)
3	DCE Available (Signal P)	3	DCE Available (Signal P)
4	Receive Data (Signal P)	4	Receive Data (Signal P)
5	Reserved	5	Reserved
6	Send Timing (Signal P)	6	Send Timing (Signal P)
7	Signal Ground	7	Signal Ground
8	DTE Available (Signal P)	8	DTE Available (Signal P)
9	Terminal Timing (Signal P)	9	Terminal Timing (Signal P)
10	Loopback Circuit A (Signal P)	10	Loopback Circuit A (Signal P)
11	Send Data (Signal P)	11	Send Data (Signal P)
12	Loopback Circuit B (Signal P)	12	Loopback Circuit B (Signal P)
13	Signal Ground	13	Signal Ground
14	Reserved	14	Reserved
15	Reserved	15	Reserved
16	Reserved	16	Reserved
17	Reserved	17	Reserved
18	Reserved	18	Reserved
19	Signal Ground	19	Signal Ground
20	Reserved	20	Reserved
21	Reserved	21	Reserved

Table B-15. Pinouts for HSSI Straight-through Cable (Continued)

Pin	Male Connector #1	Pin	Male Connector #2
22	Reserved	22	Reserved
23	Reserved	23	Reserved
24	Reserved	24	Reserved
25	Signal Ground	25	Signal Ground
26	Signal Ground	26	Signal Ground
27	Receive Timing (Signal N)	27	Receive Timing (Signal N)
28	DCE Available (Signal N)	28	DCE Available (Signal N)
29	Receive Data (Signal N)	29	Receive Data (Signal N)
30	Reserved	30	Reserved
31	Send Timing (Signal N)	31	Send Timing (Signal N)
32	Signal Ground	32	Signal Ground
33	DTE Available (Signal N)	33	DTE Available (Signal N)
34	Terminal Timing (Signal N)	34	Terminal Timing (Signal N)
35	Loopback Circuit A (Signal N)	35	Loopback Circuit A (Signal N)
36	Send Data (Signal N)	36	Send Data (Signal N)
37	Loopback Circuit B (Signal N)	37	Loopback Circuit B (Signal N)
38	Signal Ground	38	Signal Ground
39	Reserved	39	Reserved
40	Reserved	40	Reserved
41	Reserved	41	Reserved
42	Reserved	42	Reserved
43	Reserved	43	Reserved
44	Signal Ground	44	Signal Ground

Table B-15. Pinouts for HSSI Straight-through Cable (Continued)

Pin	Male Connector #1	Pin	Male Connector #2
45	Reserved	45	Reserved
46	Reserved	46	Reserved
47	Reserved	47	Reserved
48	Reserved	48	Reserved
49	Reserved	49	Reserved
50	Signal Ground	50	Signal Ground

Required Twisted Pairs

1 & 26	6 & 31	10 & 35	14 & 39	18 & 43	22 & 47
2 & 27	7 & 32	11 & 36	15 & 40	19 & 44	23 & 48
3 & 28	8 & 33	12 & 37	16 & 41	20 & 45	24 & 49
4 & 29	9 & 34	13 & 38	17 & 42	21 & 46	25 & 50
5 & 30					

Product Codes:

40027X (5 ft.)
40027Y (15 ft.)
40027Z (30 ft.)

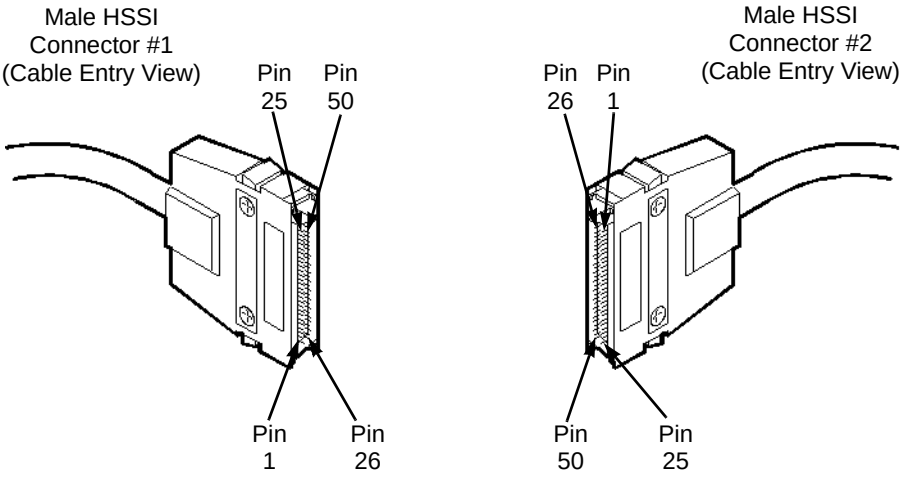


Figure B-13. HSSI Straight-through Cable Diagram

HSSI Crossover Cable

Table B-16. Pinouts for HSSI Crossover Cable

Pin	Male Connector #1	Pin	Male Connector #2
1	Signal Ground	1	Signal Ground
2	Receive Timing (Signal P)	9	Terminal Timing (Signal P)
3	DCE Available (Signal P)	8	DTE Available (Signal P)
4	Receive Data (Signal P)	11	Send Data (Signal P)
5	Reserved	5	Reserved
6	Send Timing (Signal P)	6	Send Timing (Signal P)
7	Signal Ground	7	Signal Ground
8	DTE Available (Signal P)	3	DCE Available (Signal P)
9	Terminal Timing (Signal P)	2	Receive Timing (Signal P)
10	Loopback Circuit A (Signal P)	10	Loopback Circuit A (Signal P)
11	Send Data (Signal P)	4	Receive Data (Signal P)
12	Loopback Circuit B (Signal P)	12	Loopback Circuit B (Signal P)
13	Signal Ground	13	Signal Ground
14	Reserved	14	Reserved
15	Reserved	15	Reserved
16	Reserved	16	Reserved
17	Reserved	17	Reserved
18	Reserved	18	Reserved
19	Signal Ground	19	Signal Ground
20	Reserved	20	Reserved
21	Reserved	21	Reserved

Table B-16. Pinouts for HSSI Crossover Cable (Continued)

Pin	Male Connector #1	Pin	Male Connector #2
22	Reserved	22	Reserved
23	Reserved	23	Reserved
24	Reserved	24	Reserved
25	Signal Ground	25	Signal Ground
26	Signal Ground	26	Signal Ground
27	Receive Timing (Signal N)	34	Terminal Timing (Signal N)
28	DCE Available (Signal N)	33	DTE Available (Signal N)
29	Receive Data (Signal N)	36	Send Data (Signal N)
30	Reserved	30	Reserved
31	Send Timing (Signal N)	31	Send Timing (Signal N)
32	Signal Ground	32	Signal Ground
33	DTE Available (Signal N)	28	DCE Available (Signal N)
34	Terminal Timing (Signal N)	27	Receive Timing (Signal N)
35	Loopback Circuit A (Signal N)	35	Loopback Circuit A (Signal N)
36	Send Data (Signal N)	29	Receive Data (Signal N)
37	Loopback Circuit B (Signal N)	37	Loopback Circuit B (Signal N)
38	Signal Ground	38	Signal Ground
39	Reserved	39	Reserved
40	Reserved	40	Reserved
41	Reserved	41	Reserved
42	Reserved	42	Reserved
43	Reserved	43	Reserved
44	Signal Ground	44	Signal Ground

Table B-16. Pinouts for HSSI Crossover Cable (Continued)

Pin	Male Connector #1	Pin	Male Connector #2
45	Reserved	45	Reserved
46	Reserved	46	Reserved
47	Reserved	47	Reserved
48	Reserved	48	Reserved
49	Reserved	49	Reserved
50	Signal Ground	50	Signal Ground

Required Twisted Pairs

1 & 26	6 & 31	10 & 35	14 & 39	18 & 43	22 & 47
2 & 27	7 & 32	11 & 36	15 & 40	19 & 44	23 & 48
3 & 28	8 & 33	12 & 37	16 & 41	20 & 45	24 & 49
4 & 29	9 & 34	13 & 38	17 & 42	21 & 46	25 & 50
5 & 30					

Product Codes:

40028X (5 ft.)
40028Y (15 ft.)
40028Z (30 ft.)

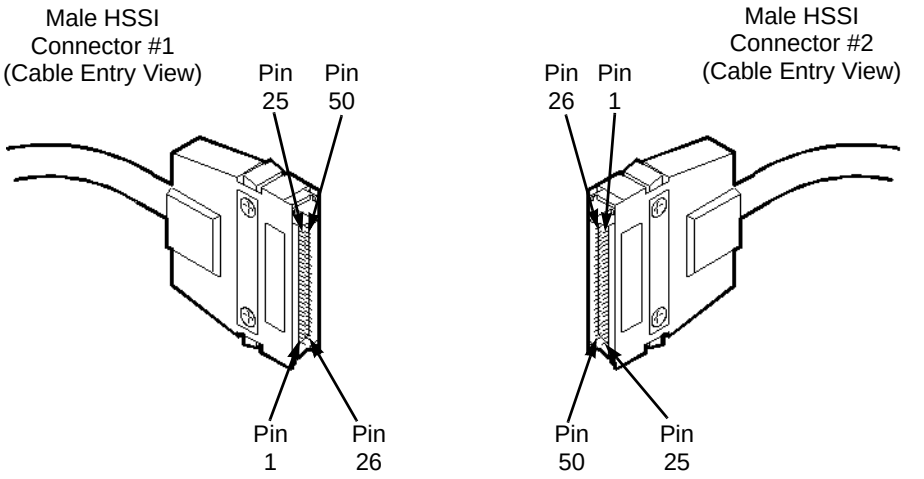


Figure B-14. HSSI Crossover Cable Diagram

Media Independent Interface (MII)

Table B-17. Pinouts for Media Independent Interface (MII) Connector

Pin	Signal	Pin	Signal
1	+5V	21	+5V
2	MDIO	22	common
3	MDC	23	common
4	RXD<3>	24	common
5	RXD<2>	25	common
6	RXD<1>	26	common
7	RXD<0>	27	common
8	RX_DV	28	common
9	RX_CLK	29	common
10	RX_ER	30	common
11	TX_ER	31	common
12	TX_CLK	32	common
13	TX_EN	33	common
14	TXD<0>	34	common
15	TXD<1>	35	common
16	TXD<2>	36	common
17	TXD<3>	37	common
18	COL	38	common
19	CRS	39	common

Table B-17. Pinouts for Media Independent Interface (MII) Connector (Continued)

Pin	Signal	Pin	Signal
20	+5V	40	+5V
Connector Panel Product Code:59114			

V.35 Loopback Connector (Male)

Table B-18. Pinouts for V.35 Loopback Connector (Male)

Pin	Signal		Pin	Signal
C	Request To Send	⇒	F	Data Carrier Detect
D	Clear To Send	⇒	L	Local Loopback
E	Data Set Ready	⇒	H	Data Terminal Ready
N	Remote Loopback	⇒	NN	Test Indicator
P	Transmit Data (Signal P)	⇒	R	Receive Data (Signal P)
S	Transmit Data (Signal N)	⇒	T	Receive Data (Signal N)
U	External Transmit Clock (Sig P)	⇒	V	Receive Clock (Signal P)
W	External Transmit Clock (Sig N)	⇒	X	Receive Clock (Signal N)
Y	Transmit Clock (Signal P)	⇒	Z	External Receive Clock (Sig P)
AA	Transmit Clock (Signal N)	⇒	BB	External Receive Clock (Sig N)

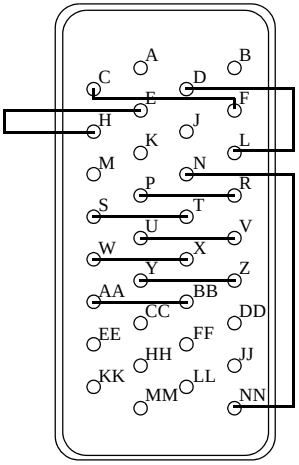


Figure B-15. V.35 Loopback Connector Connection Summary

X.21 Loopback Connector (Male)

Table B-19. Pinouts for X.21 Loopback Connector (Male)

Pin	Signal		Pin	Signal
2	Transmit Data (Signal P)	⇒	4	Receive Data (Signal P)
3	Request To Send (Signal P)	⇒	5	Data Carrier Detect (Signal P)
6	Receive Clock (Signal P)	⇒	7	External Transmit Clock (Signal P)
9	Transmit Data (Signal P)	⇒	11	Receive Data (Signal P)
10	Request To Send (Signal N)	⇒	12	Data Carrier Detect (Signal N)
13	Receive Clock (Signal N)	⇒	14	External Transmit Clock (Signal N)

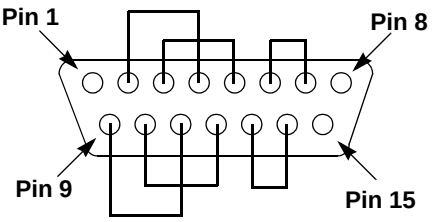


Figure B-16. X.21 Loopback Connector Connection Summary

T1 Loopback Connector (Male)

Table B-20. Pinouts for T1 Loopback Connector (Male)

Pin	Signal		Pin	Signal
1	Transmit Tip	⇒	3	Receive Tip
9	Transmit Ring	⇒	11	Receive Ring

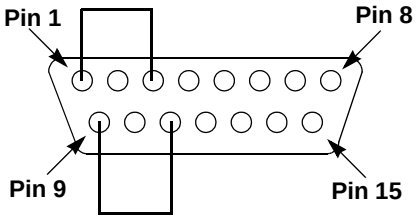


Figure B-17. T1 Loopback Connector Connection Summary

RJ-48 Loopback Connector (Male)

Table B-21. Pinouts for RJ-48 Loopback Connector (Male)

Pin	Signal		Pin	Signal
1	Receive Ring	⇒	4	Transmit Ring
2	Receive Tip	⇒	5	Transmit Tip

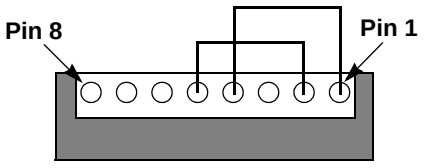


Figure B-18. RJ-48 Loopback Connector Connection Summary

HSSI Loopback Connector (Male)

Table B-22. Pinouts for HSSI Loopback Connector (Male)

Pin	Signal		Pin	Signal
10	Loopback Circuit A (Signal P)	⇒	12	Loopback Circuit B (Signal P)
4	Receive Data (Signal P)	⇒	11	Send Data (Signal P)
3	DCE Available (Signal P)	⇒	8	DTE Available (Signal P)
2	Receive Timing (Signal P)	⇒	9	Terminal Timing (Signal P)
35	Loopback Circuit A (Signal N)	⇒	37	Loopback Circuit B (Signal N)
29	Receive Data (Signal N)	⇒	36	Send Data (Signal N)
28	DCE Available (Signal N)	⇒	33	DTE Available (Signal N)
27	Receive Timing (Signal N)	⇒	34	Terminal Timing (Signal N)

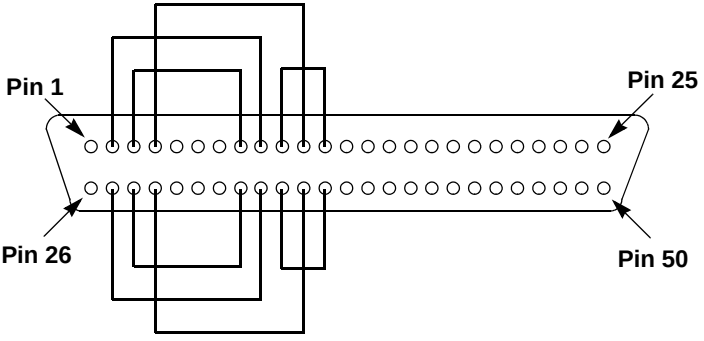


Figure B-19. HSSI Loopback Connector Connection Summary

C

DS3 Conversion Procedure

This appendix describes how to convert a DSX IOP module to a channelized DS3 IOP module. It also describes how to convert a channelized DS3 IOP module to a DSX IOP module.

You must run the conversion procedure if you replaced a DSX card with a channelized DS3 card, or if you are converting a channelized DS3 card back to a DSX card. See one of the following sections depending on your conversion situation:

- "Converting a DSX IOP to Channelized DS3 IOP" on page C-2
- "Converting a Channelized DS3 Card to a DSX Card" on page C-5

Converting a DSX IOP to Channelized DS3 IOP

When you convert a 10-port DSX IOP to a channelized DS3 IOP, the first 10 logical ports on the DSX card are converted into the first 10 channels on the channelized DS3 IOP. Channels 11-28 cannot be configured.

Converting a 10-port DSX IOP to a channelized DS3 IOP is a two-step process in which you must:

1. Install the conversion procedure by running the INSTALL script.
2. Run the conversion procedure.

You must be running switch code 4.1.5x.x before you can convert a DSX IOP to a channelized DS3 IOP. If you are not running 4.1.5x.x, you must first upgrade the switch.

Installing the Conversion Procedure

The INSTALL script creates the cv_ds3_2_dsx and cv_dsx_2_ds3 files. These files convert a DSX IOP to a channelized DS3 IOP, and a channelized DS3 IOP to a DSX IOP in the database.

To install the conversion procedure:

1. Verify that you are the root user. You should see a # prompt.
2. Type the following command and press Return to start the INSTALL script:

   ```
   ./INSTALL_cv_dsx_2_ds3
   ```

   The following message appears:

   ```
   Installing conversion procedures.
   ```

3. Answer the following conversion questions:
   a. Do you want to Install the conversion procedures [y/n]. Type y and press Return.
   b. Enter the Sybase database server name (default: "CASCADE"). Press Return to accept the default.

c. Enter the Sybase system administrator user name (default: "sa"). Press Return to accept the default.

d. Enter the Sybase system administrator password (default: ""). Type your sa password.

e. Enter the NavisCore database name (default: "cascview"). Press Return to accept the default.

f. Enter the NavisCore database USER name (default: "cascview"). Press Return to accept the default.

The following messages appear:

```
Installing cv_dsx2chds3 into Database ...
Installing cv_chds32dsx into Database ...
Done.
```

Running the Conversion Procedure

The cv_dsx_2_ds3 file converts the DSX IOP to a channelized DS3 IOP in the database.

To run the conversion procedure:

1. Verify that you are logged in as the root user. You should see a # prompt.
2. Type the following command and press Return.

   ```
   cv_dsx_2_ds3 [CV DB username] [CV DB password] SwitchName Slot#
   ```

   for example:

   ```
   ./cv_dsx_2_ds3 cascview cascview Switch1 12
   ```

   This converts the 10-port DSX IOP in Switch 1, Slot 12 to a channelized DS3 IOP.
3. Replace the 10-port DSX IOP with the channelized DS3 IOP installed inside the switch. For instructions on replacing modules, see "Installing or Replacing IOP Modules" on page 6-8.
4. Perform a PRAM synch on the CP card and the channelized DS3 card you just converted. For instructions, see the *NavisCore Frame Relay Configuration Guide*.

Converting a Channelized DS3 Card to a DSX Card

When you convert back to a 10-port DSX card, you can move Lports from the channelized DS3 card that are defined from 1 to 10 only. Channels 11-28 must not be configured. The conversion back to the 10-port DSX card should only be used as a fall back plan. The cv_ds3_2_dsx file converts the channelized DS3 card to a 10-port DSX card in the database.

To convert a channelized DS3 card to a 10-port DSX card:

1. Verify you have installed the conversion procedure as described in "Installing the Conversion Procedure" on page C-2.
2. Verify that you are logged in as the root user. You should see a # prompt.
3. Type the follow command and press Return.

   `cv_ds3_2_dsx [`*`CV DB username`*`] [`*`CV DB password`*`] SwitchName Slot#`

   for example:

   `./cv_ds3_2_dsx cascview cascview Switch1 12`

   This converts the channelized DS3 card in switch 1, slot 12 to a 10-port DSX card.
4. Replace the channelized DS3 card with a 10-port DSX card installed inside the switch. (For instructions on replacing modules, see the *Channelized DS3 I/O Module User's Guide*.)
5. Perform a PRAM synch on the CP card and the 10-port DSX card you just converted.

If you convert back to a DS3 card, Multiple Service Values will be grayed out in NavisCore since only FR is recognized. The Application Mode value, DSX Line Length, and DS3 Line Buildout values are lost.

D

Regulatory Information

This appendix lists the regulatory agencies that have approved Ascend B-STDX switches. This appendix also includes a sample affidavit that you need to file with your local telephone company concerning connecting customer premise equipment (CPE) WAN services.

Product Attachment Information

This section describes the regulatory requirements of the United Kingdom.

According to the requirements of TIS 6328/8.2, the default configuration of the 75Ω G.703 (E1) Interface with regards to the grounding of the outer conductor of the BNC connectors is as follows:

- Transmit port (XMTR) - connected to earth ground.
- Receive port (RCVR) - insulated from earth ground.

To connect the receive port to earth ground:

1. Remove the BNC retaining nut and metal washers on the RCVR port BNC connector.
2. Remove and discard the insulating grommet from the BNC connector.
3. Reinstall the retaining nut and metal washers on the BNC connector. The outer shell of the RCVR port is then positively connected to earth ground.

The 75W G.703 interface has not been tested in a BS6701 configuration and should not be connected to BS6701 approved cabling.

The recommended cable specifications for interface to Ascend B-STDX series equipment are summarized in Table D-1.

Table D-1. Cable Specifications

Interface Type	Number Twisted Pairs	DC Res. Ω/km	Nom. Imp Ω	Nom. Capacitance pf/m	% Shield	Max. Length
V.35	12	78	100	15.5/27.5	90%	50m
X.21	7	78	100	15.5/27.5	90%	50m
G.703 - 75 Ω	N/A	49.2	75	66.7	95%	50m

V.35 and X.21 Nominal Capacitance is specified as cond. to cond./cond. to earth.

To comply with the EN55022 EMI specification, Ascend also recommends that the V.35 cables use the following:

ISO2593 Hood Assembly — CDM, Nickel Plated, Part #783.734-90 (Ascend's V.35 cable assembly uses these hoods)

Environmental Standards Compliance

Ascend's B-STDX switches are approved by the following regulatory agencies to be fully compliant with their environmental standards:

- Network Equipment Building System (NEBS) GR-63-CORE Issue 1 and GR-1089-CORE Issue 1
- British Approval Board for Telecommunications (BABT) — Factory Compliance
- TUV — EMC, Safety, and EN60950
- Canadian Standards Association (CSA) — Safety CSA 22.2, no. 950
- Underwriter's Laboratory (UL) — Safety UL 1950
- Federal Communications Commission (FCC) — EMC compliance (Class A and Telecom, Part 68)
- Industry Canada, CS-03

In addition, Ascend's B-STDX switches meet the following Country Standards:

- Australia
- New Zealand
- Europe — (ENN55022 Class A, EW 50082-1, 1992 (plus applicable Telecom standards)

Canadian IC CS-03 Requirements

The Industry Canada label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational, and safety requirements as prescribed in the appropriate Terminal Equipment Technical Requirements documents. 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 connection method. 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 coordinated by a supplier-designated representative. Any user-performed repairs or alterations to this equipment, or any equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

For protection, users should ensure 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.

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

See "If Problems Arise" on page D-10 for information on contacting an authorized Ascend representative in Canada.

Avis D'Industrie Canada

L'étiquette d'Industrie Canada identifie le matériel homologué. Cette étiquette certifie que le matériel est conforme aux normes de protection, d'exploitation et de sécurite des réseaux de télécommunications, comme le prescrivent les documents concernant les exigences techniques relatives au matériel terminal. Le Ministère n'assure toutefois pas que le matériel fonctionnera à la satisfaction de l'utilisateur.

Avant d'installer ce matériel, l'utilisateur doit s'assurer qu'il est permis de le raccorder aux installations de l'entreprise locale de télécommunication. Le matériel doit également étre installé en suivant une méthode acceptée de raccordement. L'abonné ne doit pas oublier qu'il est possible que la comformité aux conditions énoncées ci-dessus n'empêche pas la dégradation du service dans certaines situations.

Les réparations de matériel homologué doivent être coordonnées par un représentant désigné par le fournisseur. L'entreprise de télécommunications peut demander a l'utilisateur de débrancher un appareil a la suite de réparations ou de modifications effectuées par l'utilisateur ou à cause de mauvais fonctionnement.

Pour sa propre protection, l'utilisateur doit s'assurer que tous les fils de mise a la terre de la source d'énergie électrique, des lignes téléphoniques et des canalisations d'eau métalliques, s'il y en a, sont raccordés ensemble. Cette précaution est particulièrement importante dans les régions rurales. Avertissement: L'utilisateur ne doit pas tenter de faire ces raccordements lui-méme; il doit avoir recours a un service d'inspection des installations électriques, ou à un électricien, selon le cas.

AVIS: L'indice d' équivalence de la sonnerie (IES) assigné à chaque dispositif terminal indique le nombre maximal de terminaux qui peuvent étre raccordés a une interface. La terminaison d' une interface téléphonique peut consister en une combinaison de quelques dispositifs, a la seule condition que la somme d'indices d'équivalence de la sonnerie de tous les dispositifs n'excède pas 5.

FCC Part 68 General Information

Read the following FCC Part 68 information before you connect the B-STDX 8000 or B-STDX 9000 switch to the public telecommunications network.

- This equipment complies with Part 68 of the FCC rules. On the back of this equipment is a label that contains (among other information) the FCC registration number and ringer equivalence number (REN) for this equipment. If requested, this information must be provided to the telephone company.

- This equipment uses the USOC jacks defined in Table D-2.

Table D-2. B-STDX FCC Information

Type of Interface	USOC Jack Connector	Service Code	Facility Code
1.544 Mbps Superframe format (SF) without line power	RJ-48C	6.0N	04DU9-BN
1.544 Mbp Superframe format (SF) and B8ZF without line power	RJ-48C	6.0N	04DU9-DN
1.544 Mbp ANSI ESF without line power	RJ-48C	6.0N	04DU9-1KN
1.544 Mbp ANSI ESF and B8ZF without line power	RJ-48C	6.0N	04DU9-1SN

- An FCC-compliant telephone cord and modular plug is provided with this equipment. This equipment is designed to be connected to the telephone network or premises wiring using a compatible modular jack which is Part 68 compliant.

- This equipment cannot be used on telephone company-provided coin service. Connection to Party Line Service is subject to state tariffs.

- If this equipment causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. If advance notice is not practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

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

- If you experience trouble with this equipment, please contact the Ascend Technical Assistance Center for repair and warranty information (see "If Problems Arise" on page D-10**)**. If the trouble is causing harm to the telephone network, the telephone company may request you remove the equipment from the network until the problem is resolved.

- It is recommended that the customer install an AC surge protecter in the AC outlet to which this device is connected. This is to avoid damage to the equipment caused by local lightning strikes and other electrical surges.

FCC and Telephone Company Procedures and Requirements

In order to connect this system to the network, you must provide the local operating company with the registration number of this equipment, and you must order the proper connections.

To order the proper service, provide the telephone company with the following information:

- Quantities and USOC numbers of the required jacks

- Sequence in which the trunks are to be connected

- Facility interface codes, by position

- Ringer equivalence number or service code, as applicable, by position

Radio Frequency Interference

The B-STDX switch is designed for Class A use only. Do not attempt to use this equipment in a domestic environment, which requires Class B distinction. These switches cause interference with domestic products.

In accordance with FCC Part 15 Subpart B requirements, changes or modifications made to this equipment not expressly approved by Ascend Communications Corporation could void user's authority to operate this equipment.

This equipment produces electromagnetic energy at radio frequencies and, if not installed and operated in accordance with the manufacturer's instructions as contained in this document, could cause interference to radio communications and/or interfere with the operation of other RF devices. The equipment has been tested and found to comply with the limits for a Class A Computing Device pursuant to Subpart B of Part 15 of the FCC Rules, which are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of the equipment in a residential area may cause interference. Should this occur, the user may be required to discontinue operation of the equipment, or take other such measures as may be adequate to rectify the condition at the user's expense.

If Problems Arise

If any of your telephone equipment is not operating properly, you should immediately remove it from your telephone line, as it may cause harm to the telephone network. The telephone operating company must be notified before removal of equipment that is connected to 1.544 Mbps digital services. If the telephone company notes a problem, it may temporarily discontinue service. When practical, the telephone company will notify you in advance of this disconnection. If advance notice is not feasible, you will be notified as soon as possible. When you are notified, you will be given the opportunity to correct the problem and informed of your right to file a complaint with the FCC.

In the event repairs are needed on this equipment, they should be performed by Ascend Communications or an authorized representative of Ascend Communications. You can contact the Technical Assistance Center 24 hours a day, 7 days a week at:

1-800-DIAL-WAN (in the USA and Canada)

0-800-96-2229 (in the United Kingdom)

1-978-952-7299 (outside the USA, Canada, and United Kingdom)

Example Affidavit

This is an example of the affidavit that needs to be filed with the Telco concerning connection of customer premise equipment (CPE) to 1.544 Mbps services:

For the work to be performed in the certified territory of _____ (name of Telco), State of _____, County of, _____, I, _____ (Name), of _____ (Business Address), _____(phone number) being duly sworn, state the following:

I have responsibility for the operation and maintenance of the terminal equipment to be connected to 1.544 Mbps digital services. The terminal equipment to be connected complies with Part 68 of the FCC rules except for the encoded analog content and billing protection specifications. With respect to the encoded analog content and billing protection:

( ) I attest that all operations associated with the establishment, maintenance of the terminal equipment to be connected to 1.544 Mbps digital services complies with Part 68 of the FCC Rules and Regulations.

( ) The digital CPE does not transmit digital signals containing encoded analog content or billing information which is intended to be decoded within the telecommunications network.

( ) The encoded analog content and billing protection is factory set and is not under control of the customer.

I attest that the operator(s)/maintainer(s) of the digital CPE responsible for the establishment, maintenance and adjustment of the encoded analog content and billing information has (have) been trained to perform these functions by successfully having completed one of the following:

( ) A training course provided by the manufacturer/grantee of the equipment used to encode analog signals; or

( ) A training course provided by the customer or authorized representative, using training materials and instructions provided by the manufacturer/grantee of the equipment used to encode analog signals; or

( ) An independent training course (e.g. trade school or technical institution) recognized by the manufacturer/grantee of the equipment used to encode analog signals; or

( ) In lieu of the proceeding training requirements, the operator(s)/maintainer(s) is (are) under control of a supervisor trained in accordance with _____ (circle one) above.

I agree to provide _____ (name of Telco) with proper documentation to demonstrate compliance with the information as provided in the preceding paragraph, if so requested.

_____ (Signature)

_____ (Title)_____(Date)

Subscribe and sworn to before me, this _____ day of _____, 19__.

_____ Notary Public, my commission expires _____.

Index

A

Accessory Kit
  items included, 3-4
  unpacking, 3-4
Acronyms, xxvi to xxvii
Air filters
  replacing, 6-23 to 6-24
  servicing, 6-23 to 6-24
Ascend Technical Assistance Center, v
Asynchronous Transfer Mode (ATM)
  standards, 2-3
  UNI IOP Module, A-29, A-33
ATM
  CS DS3/E3 IOP module technical information, A-59 to A-65
  IWU OC3c/STM-1 IOP module technical information, A-66 to A-72
  UNI CS E3 IOP module technical information, A-33 to A-36
  UNI IOP module technical information, A-29 to A-32
ATM, *see* Asynchronous Transfer Mode 2-3

B

B-STDX switch
  and radio frequency interference, D-9
  as gateway to NMS, 4-8
  determining status of, 7-2
  features, 1-8
  installing as free-standing unit, 4-3
  installing mid-mount brackets, 4-4
  operating status, 7-2
  preparing for installation, 3-2 to 3-6
  rack-mounting, 4-3 to 4-5
  Redundancy Manager, 1-10
  troubleshooting, 7-1 to 7-6
  unpacking, 3-2 to 3-3
Bypassing power-up diagnostics, 5-7

C

Cable
  specifications, D-3
Cables
  connecting to switch, 4-6
  descriptions of, B-1 to B-34

pinouts, B-1 to B-34
Canadian requirements, D-5
Channelized DS3 IOP module
technical information, A-46 to A-52
typical application, A-47
Channelized DS3-1-0 IOP module
technical information, A-53 to A-58
Checking the switch configuration, 3-6 to 3-9
Configuration
checking, 3-6 to 3-9
Configuring
CP modules for redundancy, 1-9
IOA and IOP modules for redundancy, 1-9
Connecting
cables to IOA modules, 4-6
cables to switch, 4-6
console terminal, 4-7
NMS Ethernet
connection methods, 4-10 to 4-11
NMS using Management DLCI, 4-14
NMS, 4-8 to 4-15
power cord, 5-2
to the NMS using SLIP, 4-12
Console terminal
connecting, 4-7
Contacting the Technical Assistance Center, 7-6
Control processor (CP) module
configuring for redundancy, 1-9
description of, 1-2
DIP switch, 5-5
Ethernet daughter board, 3-8
hot swapping, 6-2
replacing, 6-3 to 6-4
status lights, 7-2
Control processor adapter (CPA) module
Relay Alarm, 4-6
replacing, 6-6 to 6-7
Cooling fan module
replacing in B-STDX, 6-21 to 6-22
Country standards, D-4
Customer service, *see* Ascend Technical Assistance Center

D

Damaged product
instructions for resolving, v
Debugger
enabling, 5-7
Determining
B-STDX switch operating status, 7-2
IOP module status, 7-5
DIP switch
CP module, 5-5
DIP switch settings
IOP modules, 5-7
Displaying power-up diagnostic results, 5-7
Door removal, 4-5
Downloading the software configuration, 5-10
DSX-1 IOP module
technical information, A-25 to A-28

E

E1 IOP module
technical information, A-12 to A-15
E1 ISDN PRI IOP module

technical information, A-41 to A-45
Electronic specifications, 2-2
Enabling system debugger, 5-7
Environmental
specifications, 2-4
standards compliance, D-4
Ethernet
connection to NMS, 4-10 to 4-11
daughter board, 3-8
Ethernet 10/100 Base-T IOP module
technical information, A-73 to A-76

F

FCC
information, D-7
Part 68
general information, D-7
USOC jack connector types, D-7
procedures and requirements, D-8
radio interference, D-9
Features of B-STDX 8000/9000 switches, 1-8
Filler modules, 3-7
Frame Relay standards, 2-3
Free-standing unit
installing a B-STDX switch as, 4-3
Front door removal, 4-5

H

Hardware specifications, 2-1 to 2-5
Hot swapping CP modules, 6-2
HSSI IOP module
technical information, A-21 to A-24

I

IC CS-03 requirements, D-5
Initialization and self-check sequence, 5-5
Input/output adapter (IOA) module
configuring for redundancy, 1-9
connecting cables to, 4-6
description of, 1-5
installing, 6-13 to 6-15
replacing, 6-13 to 6-15
Input/output processor (IOP) module
configuring for redundancy, 1-9
definition of, 1-4
determining operating status of, 5-8
determining status of, 7-5
DIP switch settings, 5-7
installing, 6-8 to 6-15
list of different types, 1-4
replacing, 6-8 to 6-15
status lights, 7-5
Install script, 5-10
Installation
of B-STDX switch, 4-1 to 5-11
preparing for, 3-2 to 3-6
Installation site selection, 3-2
Installing
B-STDX power supplies, 5-2 to 5-4, 6-16 to 6-20
B-STDX switch as free-standing unit, 4-3
IOA module, 6-13 to 6-15
IOP module, 6-8 to 6-15
mid-mount brackets, 4-4
modules, 6-1 to 6-24

Interface standards, A-17, A-48, A-54, A-74
Interference from radio frequency, D-9
IOA, *see* Input/output adapter (IOA) module
ISDN PRI IOP module, A-33

K

Keep-alive
  mechanism, 1-11 to 1-12
  poll
    counter, 1-11
    timer, 1-11
    verification counter, 1-11
    verification finder, 1-11

L

LEDs
  IOP module status, 5-8
  Redundancy, 1-10

M

Maintenance agreement, v
Management DLCI
  connecting NMS to switch, 4-14
Mid-mount brackets
  installing, 4-4
MIM, *see* Module Identification Memory
Module Identification Memory (MIM) A-46, A-53

N

Network Management Station (NMS)
  B-STDX gateway, 4-8
  connecting, 4-8 to 4-15
  dial SLIP connection, 4-13
  direct Ethernet connection, 4-10
  direct SLIP connection, 4-12
  Ethernet connection, 4-10 to 4-11
  indirect Ethernet connection 4-11
  Management DLCI connection, 4-14
  redundancy support, 1-13
  setting up console terminal, 4-7
  SLIP connection to, 4-12
NMS, *see* Network Management Station

O

Operating status
  determining, 5-8
  of IOP module, 5-8

P

Physical specifications, 2-3
Power cord
  connecting, 5-2
  requirements, 2-9
Power supplies
  installing in B-STDX, 5-2 to 5-4, 6-16 to 6-20
  replacing in B-STDX, 5-2 to 5-4, 6-16 to 6-20
Powering up the switch, 5-2

Power-up diagnostics
bypassing, 5-7
displaying results of, 5-7
Preparing for B-STDX switch installation, 3-2 to 3-6
Problems with phone equipment, v
Procedures and requirements
FCC and Telephone Company, D-8
Product
attachment information, D-2
information, 2-1 to 2-8
warnings, 2-1 to 2-8

R

Rack-mounting the B-STDX switch, 4-3 to 4-5
Radio interference, D-9
Redundancy
configuring
CP modules for, 1-9
IOA modules for, 1-9
IOP modules for, 1-9
failure of active module, 1-9
keep-alive mechanism, 1-11 to 1-12
LEDs, 1-10
manager, 1-10
NMS, 1-13
overview of, 1-9
switch changeover, 1-11
Redundancy, 1-2, 1-9 to 1-13
Regulatory information, D-2 to D-9
Relay Alarm
CPA module, 4-6
Removing front door, 4-5
Replacing
air filters, 6-23 to 6-24
B-STDX cooling fan module, 6-21 to 6-22
B-STDX power supplies, 5-2 to 5-4, 6-16 to 6-20
CP module, 6-3 to 6-4
CPA module, 6-6 to 6-7
IOA module, 6-13 to 6-15
IOP module, 6-8 to 6-15
modules, 6-1 to 6-24

S

Safety warnings, 2-6 to 2-8
Selecting an installation site, 3-2
Serial Line over Internet Protocol (SLIP)
connection to NMS, 4-12
Servicing air filters, 6-23 to 6-24
Setting up NMS console terminal, 4-7
SMDS, *see* Switched Multimegabit Data Service
Software configuration
downloading, 5-10
Specifications
electronic, 2-2
environmental, 2-4
hardware, 2-1 to 2-5
physical, 2-3
Standards
country, D-4
environmental, D-4
Status lights
CP module, 7-2
IOP modules, 7-5
Switch

initial power-up, 5-2
Switched Multimegabit Data Service (SMDS) standards, 2-3
System debugger
enabling, 5-7

T

T1 IOP module
technical information, A-7 to A-11
T1 ISDN PRI IOP module
technical information, A-37 to A-40
TAC, *see* Technical Assistance Center
Technical Assistance Center
contacting, 7-6
Telephone
procedures and requirements, D-8
Telephone equipment
problem resolution, D-10
problems with, v
Testing the hardware, 5-7
TFTP support, 1-12
Troubleshooting the B-STDX switch, 7-1 to 7-6

U

Unchannelized E1 IOP module
technical information, A-16 to A-20
Universal IOP module
technical information, A-3 to A-6
Unpacking
Accessory Kit, 3-4
B-STDX switch, 3-2 to 3-3
Unused slots, 3-7

W

WAN interfaces supported, 2-3
Warnings
safety, 2-6 to 2-8