8260/8285 ATM WAN 2 Module

Installation and User's Guide

SA33-0436-01

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Note!

Before using this information and the product it supports, be sure to read the general information in Appendix A, “Notices” on page 87.

Second Edition (April 1997)

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How to Use This Guide

This guide presents information on how to install and configure the IBM 8260 Nways* 8-Port ATM WAN Module (A8-WAN module) in the IBM 8260 Nways Multiprotocol Switching Hub or IBM 8285 Nways ATM Workgroup Switch expansion unit. It describes how to:

- Install I/O cards on the A8-WAN module
- Install the A8-WAN module in an 8260 hub or 8285 workgroup switch expansion unit
- Configure the module and its ports
- Diagnose and solve problems associated with the operation of the A8-WAN module.

Who Should Use This Guide

This guide is intended for the following people at your site:

- ATM network administrator
- ATM network operator
- Hardware installer.

Contents of This Guide

This guide consists of the following chapters and appendixes:

Chapter 1, "Overview" on page 1 gives an overview of the main functions of the A8-WAN module, the I/O cards used with the module, and the ATM interfaces used by A8-WAN module ports to interconnect user devices in an ATM campus network.

Chapter 2, "Installation Procedures" on page 11 lists the procedures to follow to install the A8-WAN module in an 8260 hub or 8285 workgroup switch expansion unit.

Chapter 3, "Unpacking and Checking the Shipping Group" on page 13 describes how to unpack and handle the A8-WAN module and the I/O cards.

Chapter 4, "Mounting the E1/T1 I/O Card on the A8-WAN Module" on page 17 describes how to mount E1/T1 I/O cards on the A8-WAN module.

Chapter 5, "Mounting an E3/DS3 or OC3/STM1 I/O Card on the A8-WAN Module" on page 25 describes how to mount E3/DS3 I/O cards on the A8-WAN module.

Chapter 6, "Mounting the A8-WAN Module" on page 33 describes how to mount the A8-WAN module on an 8260 hub or 8285 workgroup switch expansion unit.

Chapter 7, "Cabling and Connecting" on page 39 describes how to connect the A8-WAN module to other devices.

Chapter 8, "Configuration" on page 43 describes how to configure the A8-WAN module and its ports.

Chapter 9, “Troubleshooting” on page 65 describes how to diagnose and solve problems associated with the operation of the A8-WAN module.

Appendix A, “Notices” on page 87 contains the emissions, legal, and safety notices for this product.

Appendix B, “Technical Specifications” on page 95 describes the specifications for the A8-WAN module, including the optical specifications for A8-WAN SC transmitters and receivers.

Appendix C, “Changing E1/T1 Default Settings” on page 97 describes the default configuration parameters for E1/T1 I/O cards and how to change them.

Appendix D, “Changing E3/DS3 Default Settings” on page 105 describes the default configuration parameters for E3/DS3 I/O cards and how to change them.

Appendix E, “Changing OC3/STM1 Default Settings” on page 115 describes the default configuration parameters for OC3/STM-1 I/O cards and how to change them.

Appendix F, “Cables and Connectors” on page 121 describes the types of cables used with E1/T1 I/O cards.

“Glossary” on page 139 describes the terms and abbreviations used in this manual.

“Index” on page 149 lists the concepts, terms, and tasks described in this manual and the page numbers on which you can find the information.

Terms Used in This Book

The term *ATM Control Point* used in this book refers to the ATM Control Point located in the IBM 8260 Nways Multiprotocol Switching Hub or IBM 8285 Nways ATM Workgroup Switch Base Unit.

The term *Command Reference Guide* used in this book refers to the IBM 8260 Nways Multiprotocol Switching Hub, IBM 8285 Nways ATM Workgroup Switch, ATM Command Reference Guide, SA33-0385.

Related Information

To understand the information presented in this guide, refer to:

- *IBM 8260 Multiprotocol Intelligent Switching Hub Product Description* (GA33-0315) for more information on features and characteristics of the IBM 8260 Nways Multiprotocol Switching Hub
- *IBM 8285 Nways ATM Workgroup Switch Installation and User's Guide* (SA33-0381) for more information on features and characteristics of the IBM 8285 Nways ATM Workgroup Switch.
- *IBM 8250 Multiprotocol Hub, IBM 8260 Multiprotocol Intelligent Switching Hub, IBM 8285 Nways ATM Workgroup Switch, Planning and Site Preparation Guide* (GA33-0285) for more information regarding cabling and connectors.
- *IBM 8260 Nways Multiprotocol Switching Hub, IBM 8285 Nways ATM Workgroup Switch, ATM Command Reference Guide* (SA33-0385) for more information regarding ATM commands.

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`http://www.networking.ibm.com`

`http://www.networking.ibm.com/826/826fix.html (for microcode upgrades)`

Conventions Used in This Guide

The following text conventions are used in this guide:

Text Convention	Meaning	Example
Bold	Text emphasis	**Selective backpressure** temporarily stops one virtual connection. **Global backpressure** temporarily stops an ATM link.
Italics	Special term	This is known as a *hot swap*.
	Document titles	Refer to the *ATM User-Network Interface Specification - Version 3.0* for more information.
`Monospace`	Command syntax (parameters and variables)	`SET PORT slot.port ENABLE`
	User input (including carriage return)	To display detailed information, enter the following command: `show port 4.2 verbose [ENTER]`

	System messages and screen displays	`Port display for 8260 ATM WAN Module:`
		`Port Type Mode Status`
		`----------`
		`4.02 IISP enabled UP-OKAY`

I/O Card Availability

This document is the generic user's guide for the A8-WAN module. You must ensure that support for the different individual I/O cards (E1, T1, E3, DS3, OC3, and STM1) is available in your country.

Chapter 1. Overview

This chapter presents an overview of the 8260 Nways 8-Port ATM WAN module (A8-WAN module). It describes the main functions of the module, the I/O cards used with the module, and how the module operates as part of the ATM subsystem when installed in the IBM 8260 Nways Multiprotocol Switching Hub or IBM 8285 Nways ATM Workgroup Switch Expansion Unit.

A8-WAN Module in the 8260 Hub or 8285 ATM Workgroup Switch

The A8-WAN module is a single-slot, eight-port 1.5/2 Mbps ATM module that functions as part of the IBM 8260 Nways Multiprotocol Switching Hub or 8285 ATM Workgroup Switch, and provides all standard ATM functions as well as access to 8260 or 8285 management services. Up to two E1/T1 standard I/O cards, can be installed on the motherboard. (In the future, the A8-WAN will support up to four standard E3/DS3 I/O cards.) You can "mix and match" different types of I/O cards according to your ATM networking needs.

A8-WAN modules can be used in any of the following ways:

- To send and receive data from an ATM subsystem via a public network or Wide Area Network (WAN).
- To send to and receive data from an ATM subsystem in another ATM 8260 hub or workgroup switch
- To attach high capacity workstations and servers that function in ATM mode.

8260 Nways 8-Port ATM WAN modules interface to the 8260 hub or 8285 workgroup switch by means of the ATM Control Point, located in either the ATM Control Point and Switch (A-CPSW) module of the 8260 Hub or 8285 Base Unit. A8-WAN modules process ATM cells of data by:

- Checking their validity
- Accessing the switching tables to locate the destination module
- Preparing the internal ATM format required by the ATM Control Point
- Sending the cells to the ATM Control Point.

A8-WAN modules can be installed in any vacant slot in the 8285 workgroup switch expansion unit or any vacant slot in the 8260 hub, except for slots 9, 10, and (for 17-slot models) 11. These slots are reserved for A-CPSW modules. In 17-slot models, although slot 12 is also reserved, you can insert an A8-WAN module provided an A-CPSW module is not installed in slot 11.

Like other ATM media modules, such as the A2-WAN module, the A8-WAN module can be inserted while the hub or workgroup switch is operating without disturbing data traffic on other modules. Before removing the module, however, you must first isolate it by using the SET MODULE command.

For more information on how to install and change modules, see the *IBM 8260 Multiprotocol Switching Hub Installation Guide*, SA33-0251 or *IBM 8285 Nways ATM Workgroup Switch Installation and User's Guide*, SA33-0381 as appropriate.

Module Functions

The A8-WAN module has the following characteristics:

- Eight ports, each operating at 1.5 Mbps (T1) or 2 Mbps (E1), to connect to stations, servers, and other hubs or workgroup switches. (In the future, the A8-WAN module will also support four ports operating at 34 Mbps (E3) or 45 Mbps (DS3).) Each port may connect to:
  - A plug provided by a public network or Wide Area Network (WAN)
  - An ATM or multimedia workstation that requires a high bit rate (UNI connection)
  - A UNI or IISP device using a supported interface.
- UTOPIA interface connecting the I/O cards and the motherboard.

  All ATM data cells are transferred via the UTOPIA interface.

  The IBM implementation of UTOPIA-2 is an 8-bit interface with no parity management and a cell-level handshake. UTOPIA-2 supports multiple PHY-layers.
- Clocking may be provided either by the network or internally by the A8-WAN module.
- Motherboard and up to four I/O cards for A8-WAN port-to-port and port-to-device connections.
- Physical interfaces:
  - Twisted-pair cable for E1 and T1 I/O cards
  - Coaxial cable for E1 I/O cards
  - Coaxial cable for E3 and DS3 I/O cards
  - Single mode or multimode optical fiber cable for OC3 and STM1 I/O cards
- A8-WAN connections: port-to-port, hub-to-server, and hub-to-workstation.
- Up to three A8-WAN modules can be used in the 8285 workgroup switch expansion unit, providing a maximum of 24 ATM ports.
- Up to fourteen A8-WAN modules can be used in the 17-slot 8260 hub at the same time (8 in the 10-slot 8260 hub).
- Connectors. The A8-WAN module has four standard connectors:
  - Two backplane connectors, for communication with the 8260 hub or 8285 workgroup switch:
    - The ATM backplane connector, which provides the path for ATM transfer and management functions
    - The Trichannel backplane connector, which provides power and other control signals
  - Four I/O card interface connectors, for communication with the I/O cards.

Supported Interfaces

The A8-WAN module supports the following interfaces:

- User-to-network (UNI)
- Interim-Inter-Switch-Protocol (IISP).

The UNI and IISP interfaces supported by the A8-WAN module are defined in the following documents:

- ATM Forum UNI Specification V3.0 and V3.1
- ITU (ex-CCITT) SG13 as defined in the following standards:
  - I.413 (B_ISDN User-Network Interface)
  - I.432, I.610, G.703, G804 (Physical Layer)
  - G.832 for E3
  - Q.2931 (Signaling).

All ATM data cells are transmitted via the UTOPIA interface.

The UTOPIA Interface: The ATM Forum has developed and approved a standardized data path interface between the physical layer (PHY) and the ATM layer in an ATM network. This interface was named UTOPIA (Universal Test & Operations PHY Interface for ATM).

UTOPIA allows a common interface between ATM and a wide variety of PHY-layer (physical-layer) protocols, speeds and media types.

By using the UTOPIA interface in the A8-WAN Module, PHY-specific functions are separated from the standard ATM functions that are common to all ATM applications:

- Standard ATM functions are located in the A8-WAN Module
- All PHY-specific functions are concentrated on daughter cards that are mounted on the A8-WAN Module motherboard.
- The daughter cards access all necessary ATM functions via the UTOPIA interface.

ATM Line Attachments

T1, E1, and J1

Table 1 summarizes the characteristics according to the type of line.

Table 1. T1, E1, and J1 Line Attachment Physical Characteristics and Supported Standards

Characteristics	T1	E1	J1
Fractional Support	No	No	No
Line Speed	1544 Kbps	2048 Kbps	1544 Kbps
Payload	Clear channel: 1536 Kbps	Clear channel: 1920 or 1984 Kbps	Clear channel: 1536 Kbps
Clock Extraction	Yes	Yes	No
Connector Type	RJ48C/CA48C DB15/CA31A	**E1 Coaxial** 75Ω line impedance, BNC type connector **E1 Twisted-Pair** Open wires 120Ω line impedance	ISO IS8877
Number of Line Attachments	Up to 4 line attachments per I/O card	Up to 4 line attachments per I/O card	Up to 4 line attachments per I/O card
Physical Interface	Interface type: • DS1 • DSX1 (Maximum length of cable to DSU-end is 110 ft). Standards: • AT&T 62411 • ANSI T1.403 • EIA IA.547.	ITU-T G.703	Interface type: • NTT interface • DS1 • DSX1 (maximum length of cable to DSU-end is 110 ft). Standards: • JT-I411a • JT-I431a • ANSI T1.403 • NTT HSDLCS.
Code	• B8ZS • AMI	• HDB3	• B8ZS • AMI
Frame Format	D4 (SF), D5 (ESF) for: • T1.403 • T1.407 • AT&T 62411.	ITU-T G.703 unstructured ITU-T G.704 with or without CRC ITU-T G.706 support for frame alignment / CRC procedure.	NTT-I interface format
Alarm	• T1.M1 • AT&T 62411.	ITU-T G.732	ITU-T G.732

J1 Equivalent

The E1/T1 I/O Card supports J1 connections. J1 is fully equivalent to T1.

E3 and DS3

Table 2 summarizes the characteristics according to the type of line.

Table 2. DS3 and E3 Line Attachment Physical Characteristics and Supported Standards

Characteristics	DS3	E3
Fractional Support	No fractional DS3	No fractional E3
Line Speed	44.736 Mbps	34.368 Kbps
Payload	1 × 42.209 Kbps	1 × 33.920 Kbps
Clock Role	DTE or DCE	DTE or DCE
Connector Type	75Ω line impedance, BNC type connector	75Ω unbalanced line impedance, BNC type connector
Number of Line Attachments	1 line attachment per I/O card	1 line attachment per I/O card
Physical Interfaces	DS3	ITU-T G.703
Code	B8ZS	HDB3
Frame Format	C-bit parity multiplex	ITU-T G.832
Transmission Convergence Layer	• PLCP • HEC	Not applicable
Cell Payload Scrambling	• PLCP: No • HEC: Yes	Not applicable
Cell Discard Policy	ANSI, ANSI unassigned ATM Forum, ATM Forum unassigned CCITT, CCITT unassigned	
Idle Cell Character	Not supported	

J3 Equivalent

The E3/DS3 I/O Card supports J3 connections. J3 is fully equivalent to DS3.

OC3 and STM1

Table 3 summarizes the characteristics according to the type of line.

Table 3. OC3 and STM1 Line Attachments

	Optical Single-Mode Fiber	**Optical Multimode Fiber**
Distance Range	Range up to 10 or 20km (8μ fiber)	Range up to 2km (8μ fiber)
Line Speed	155.520Mbps	
Payload	149.760Mbps	
Clock Extraction	Yes	
Connector Type	SC	SC
Number of Line Attachments	1 line attachment per I/O card	
Physical Interfaces	OC3/STM1	OC3/STM1
Laser	1310 nm, class 1 (ITU-T G.957)	1310 nm, diode
Minimum Transmitted Power	–15 dB	–21 dB
Maximum Receiver Sensitivity	–29 dB	–30 dB
Optical Power Budget	14 dB	9 dB
Frame Format	SONET STS-3c (T1-105) SDH STM-1 (ITU-T G.708/G.709) ATM cells in VC-4	
Cell Delineation	I.432	
Rate decoupling	I.432, I.361, and ATM Forum 3.0/3.1	
Idle Cell Character	Not supported	
Cell Discard Policy	ANSI, ANSI unassigned ATM Forum, ATM Forum unassigned CCITT, CCITT unassigned	

I/O Cards

The A8-WAN module allows you to use different I/O cards to mix and match different media types in an 8260 hub or 8285 workgroup switch-based ATM subnetwork. By taking advantage of this flexibility, you can create customized mixed-media solutions for your individual network needs.

The following I/O cards are supported:

- E1 (1.5 Mbps)
- T1 (2 Mbps)
- E3 (G.832) (34.368 Mbps) (*future release*)
- DS3 (44.736 Mbps) (*future release*)
- OC3 (155.520 Mbps)
- STM-1 (155.520 Mbps).

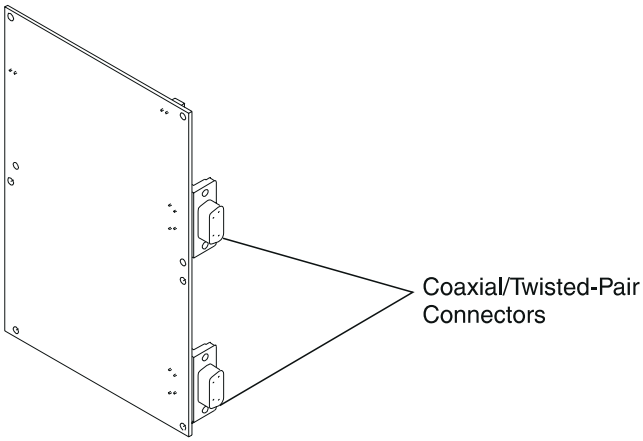

Figure 1. E1 and T1 I/O Cards

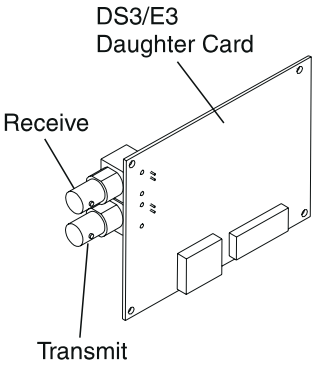

Figure 2. E3 and DS3 I/O Cards

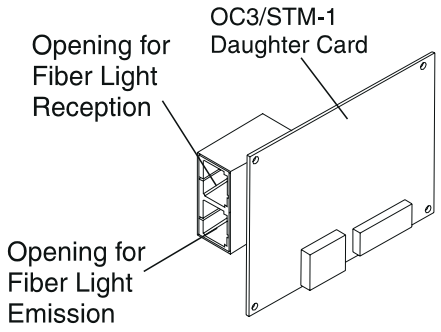

Figure 3. OC3 and STM1 I/O Cards

ATM Traffic Management Using Reserved Bandwidth

The A8-WAN module provides Reserved Bandwidth (RB) service (specified QOS class 1 in the ATM Forum UNI Specification V3.0).

The traffic of the RB service is controlled at call setup by the Connection Admission Control (CAC) mechanism. Resource allocation is performed according to the Peak Cell Rate (PCR) negotiated in the traffic contract between the user and the network. PCR allocation provides a class A circuit emulation service.

For RB traffic, resource allocation is performed according to the PCR. The maximum bandwidth that can be reserved is eighty-five per cent of the total throughput capacity.

RB cells are immediately transmitted as long as the total aggregate throughput from the 8260 A-CPSW module or 8285 workgroup switch to a given A8-WAN module port does not exceed 85% of the maximum.

Connecting ATM Campus Networks via a WAN

The A8-WAN module can be used to link ATM campus networks via a Wide Area Network (WAN).

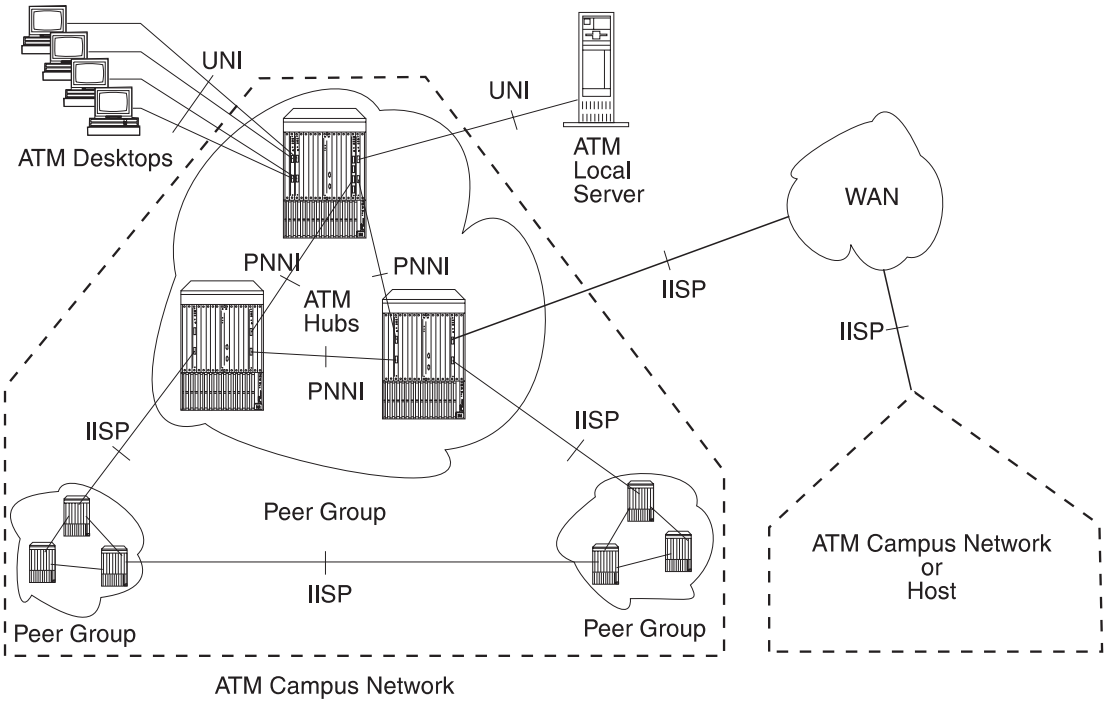

Figure 4. ATM Campus Network

Chapter 2. Installation Procedures

This chapter describes how to install the A8-WAN module with E1/T1 or E3/DS3 I/O cards. Complete details for each step are contained in the following chapters.

Installation Summary

__ **1** Unpack and check the components in your shipping group by following the steps in Chapter 3, “Unpacking and Checking the Shipping Group” on page 13.

__ **2** **For each E1/T1 I/O card:** Check the configuration of the ground jumpers and port jumpers, and mount the I/O card on the A8-WAN module by following the steps in Chapter 4, “Mounting the E1/T1 I/O Card on the A8-WAN Module” on page 17.

__ **3** **For each E3/DS3, OC3, or STM1 I/O card:** Check the configuration of the ground jumpers and mount the I/O card on the A8-WAN module by following the steps in Chapter 5, “Mounting an E3/DS3 or OC3/STM1 I/O Card on the A8-WAN Module” on page 25.

__ **4** To mount the A8-WAN module on the:

8260 Follow the steps in “Installing the A8-WAN Module in an 8260 Hub” on page 33.

8285 Follow the steps in “Installing the A8-WAN Module in the 8285 Expansion Unit” on page 36.

__ **5** Set up connections between the A8-WAN ports by following the steps in Chapter 7, “Cabling and Connecting” on page 39.

__ **6** Configure the ports and connect them to the ATM network by following the steps in Chapter 8, “Configuration” on page 43.

Chapter 3. Unpacking and Checking the Shipping Group

This chapter describes the A8-WAN module shipping group and how to unpack the module and I/O cards.

Shipping Group Contents

When you receive the A8-WAN module, the shipping group consists of:

- One motherboard
- Possibly one or two I/O cards.

  For each E1/T1 I/O card:

  – One I/O card, to be installed on the A8-WAN motherboard

  – One Vital Product Data (VPD) Programmable Read Only Memory (PROM) chip, to be installed on the motherboard

  – Six screws to secure the I/O card to the motherboard

  – One faceplate

  – Two cables for connecting ports

  For each E3, DS3, OC3, or STM1 I/O card:

  – One I/O card, to be installed on the A8-WAN or A2-WAN motherboard

  – One Vital Product Data (VPD) Programmable Read Only Memory (PROM) chip, to be installed on the motherboard.

  – Four screws for attaching the I/O card to the motherboard.

  – One motherboard faceplate bracket (for use on A8-WAN modules only).

  – One motherboard faceplate bracket (for use on A2-WAN modules only).

  – One dummy port cover with screw, for use when only one I/O card is installed on an A8-WAN motherboard.

Before Unpacking the Components

Take the following precautions before unpacking the A8-WAN module or any I/O cards:

- Do not remove the component from its anti-static shielding bag until you are ready to use it. This avoids the possibility of having electrostatic discharge damage static-sensitive devices on the components.
- When possible, handle the components by their faceplates.
- Always use a foot strap and grounded mat or wear a grounded static discharge wrist strap whenever you inspect or handle a component. Or else, be sure to touch a grounded rack or another source of ground **before** handling it.
- Ensure that you have a clean surface available on which to place the components.

Unpacking the Module or I/O Cards

To unpack the A8-WAN motherboard and I/O cards, follow these steps:

__ **1** Verify that the A8-WAN motherboard and I/O cards are the correct models by matching the model number listed on the side of their shipping cartons to the model numbers you ordered.

__ **2** Remove the motherboard and I/O cards from their shipping cartons.

__ **3** Remove the motherboard and I/O cards from their anti-static bags and inspect them for damage. Always handle them by the faceplate being careful not to touch the internal components.

Be sure to keep the screws that come with each I/O card card as you will need them to install the cards on the motherboard.

If either the motherboard or I/O card appears to be damaged, put it back in the anti-static bag, and put the bag back into the shipping carton. Then contact your local IBM dealer.

IBM suggests that you keep the shipping carton and the anti-static shielding bags in which the A8-WAN motherboard and I/O cards were delivered in case you later want to repackage them for storage or shipment.

IBM also suggests that you record the serial numbers of the A8-WAN motherboard and daughter cards, and other information about the modules in your 8260 hub in the Slot Usage chart in the binder of the *IBM 8260 Multiprotocol Intelligent Switching Hub Reference Library* (Part Number 59G0022) that is shipped with the 8260 hub.

Chapter 4. Mounting the E1/T1 I/O Card on the A8-WAN Module

This chapter describes:

- How to configure the port jumpers on an E1/T1 I/O card
- How to configure the grounding jumpers on an E1/T1 I/O card
- How to mount the E1/T1 I/O card on an A8-WAN module.

Summary of Steps

__ **1** Adjust the port jumpers on the I/O card correspond to the type of connection you will be using (E1 Coaxial, E1 Twisted-Pair, T1 Twisted-Pair) by following the instructions in “Configuring the Connection Type” on page 19.

__ **2** Ensure that the configuration of the grounding jumpers on the E1/T1 I/O card conforms to the type of port connection and to the specific grounding regulations in your country as described in “Grounding Considerations” on page 20.

__ **3** Mount the I/O card on the A8-WAN module by following the instructions in “Installing the E1/T1 I/O Card” on page 21.

Jumpers and Ports on the E1/T1 I/O Card

Figure 5 shows the location of the ports, configuration jumpers and grounding jumpers on the E1/T1 I/O card.

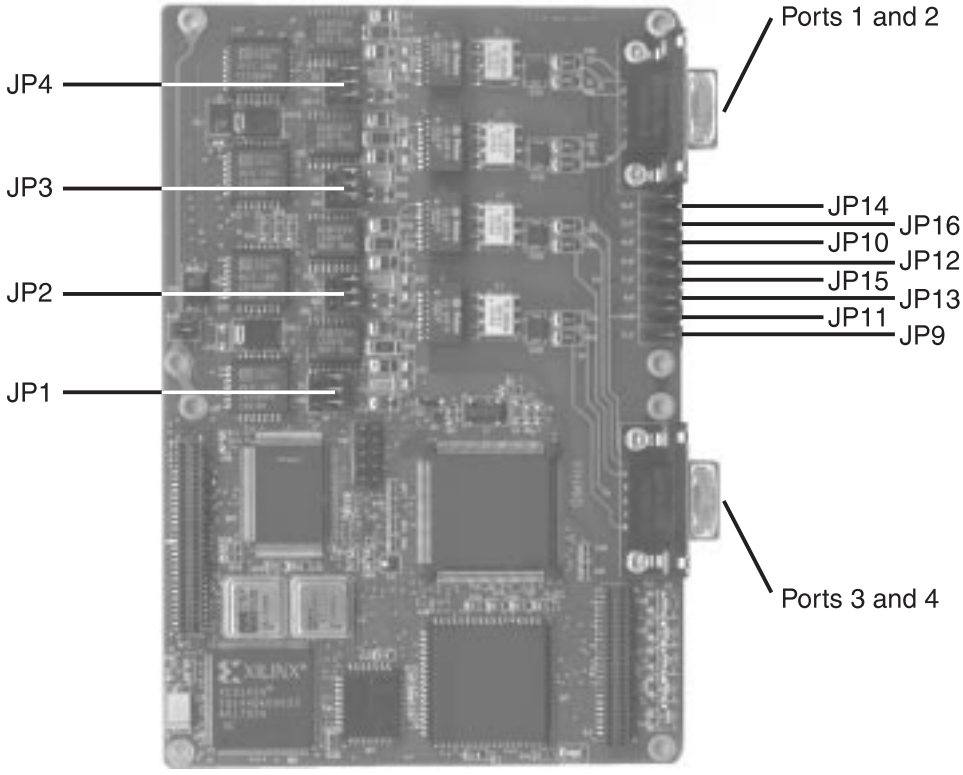

Figure 5. Port and Jumper Locations on the E1/T1 I/O Card

Configuring the Connection Type

Each E1/T1 I/O card has four Port Connection jumpers (JP1-JP4 in Figure 5 on page 18), which determine the types of connection you can set up on the ports:

- E1 Coaxial Connection
- E1 Twisted-Pair Connection
- T1 Twisted-Pair Connection

Note: All ports on the A8-WAN module must be set up either:

- All as T1 connections (twisted-pair), or
- All as E1 connections (any combination of coaxial or twisted-pair)

If E1 and T1 connections are mixed on the same module, a module error will be generated.

Figure 6 shows the correct position of the jumper for each connection type.

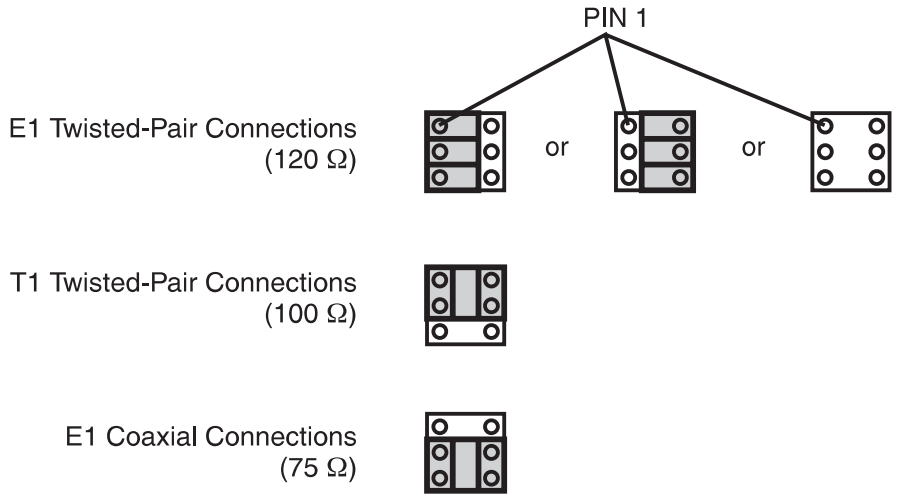

Figure 6. Port Connection Jumper Settings

Table 4. Port Connection Jumpers

Port Number:	Jumper Number:	Port Number:	Jumper Number:
Port 1	JP4	Port 3	JP2
Port 2	JP3	Port 4	JP1

Grounding Considerations

E1 and T1 Twisted-Pair Connections

Twisted-pair connections should not be grounded. You must remove the grounding jumpers from both the Transmit and the Receive jumper pins for each port that has a twisted-pair connection.

E1 Coaxial Connections

The shielding on the Connector Cables provided with the E1 Coaxial I/O Card (see Figure 35 on page 127) are connected directly to ground at the connector level, making the use of the grounding jumpers (JP9-JP14) unnecessary.

Users with specific grounding requirements may procure their own cable and set the ground on a per-port basis. Eight jumpers (one for Transmit and one for Receive on each port) are provided on the rear of the E1/T1 I/O card (see Figure 5 on page 18) to control the grounding of port cables.

If a jumper is inserted over a pair of jumper pins, the outer connector of the corresponding port is grounded to the Frame Ground.

Table 5. Ground Jumper Settings for E1 Coaxial Connections

To Ground Outer of:	Place Jumper On:	To Ground Outer of:	Place Jumper On:
Port 1 Receive	JP9	Port 3 Receive	JP13
Port 1 Transmit	JP10	Port 3 Transmit	JP14
Port 2 Receive	JP11	Port 4 Receive	JP15
Port 2 Transmit	JP12	Port 4 Transmit	JP16

Note: Standard G.703 recommends that the outer conductor of the coaxial pair be connected to ground on the transmit port, and that the same provision be available for the receive port. Some countries however, have different rules, so the setting may be not apply.

Installing the E1/T1 I/O Card

CAUTION:
When installing an I/O card on the motherboard, be careful not to touch its components. Always hold the card by its edges.

To install the E1/T1 I/O card on the A8-WAN module motherboard, follow these steps:

__ **1** Before installing the I/O card on the A8-WAN module, you must isolate and then remove the A8-WAN module from the 8260 hub or 8285 workgroup switch. To isolate the module, enter the following command from the ATM console:

```
SET MODULE slot ISOLATED
```

where `slot` specifies the number of the slot to be used.

__ **2** Detach the motherboard on which you want to install the I/O card by removing the four screws (**1** and **2** in Figure 7) that hold the motherboard to the module. Retain the screws for reattaching the motherboard.

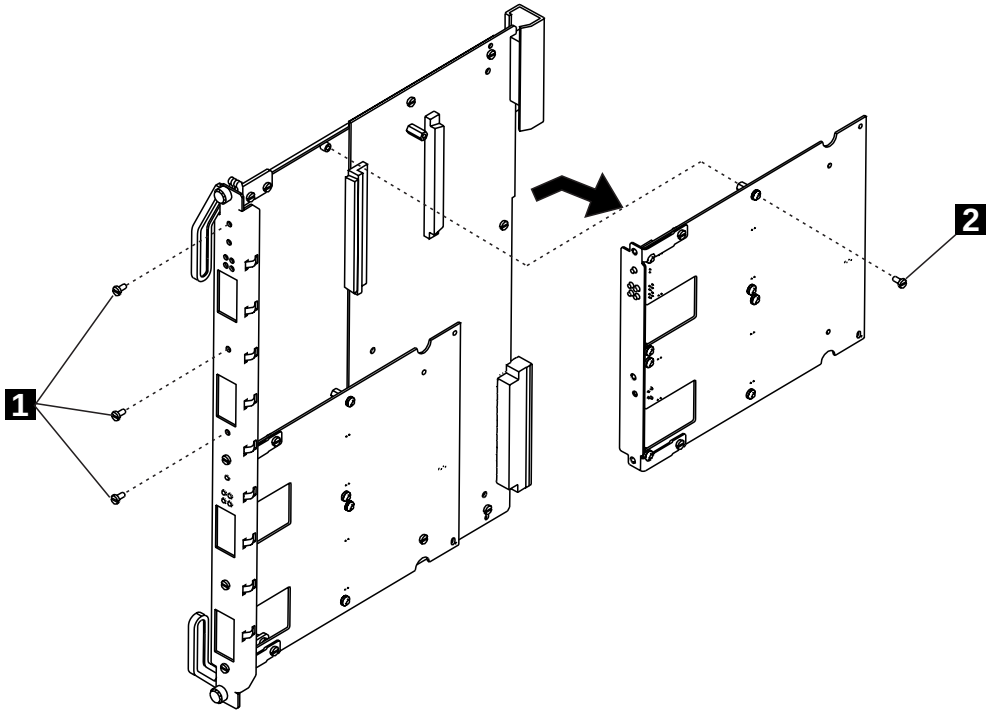

Figure 7. Removing the Motherboard

__ **3** Disconnect the motherboard connectors and lift the motherboard out of the module.

__ **4** Remove the dummy faceplate bracket from the motherboard (**3** in Figure 8 on page 22), retaining the screws for the new bracket. Save the dummy bracket in a safe place for future reuse.

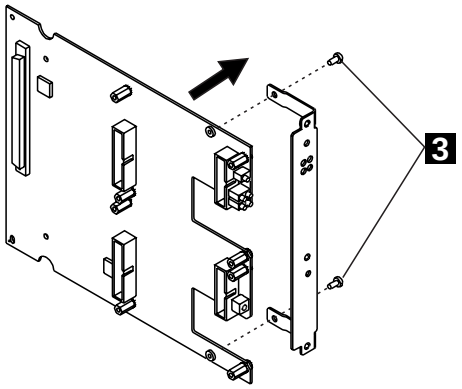

Figure 8. Removing the Dummy Faceplate Bracket

__ **5** Attach the I/O card to the motherboard using the six screws provided (**4** in Figure 9).

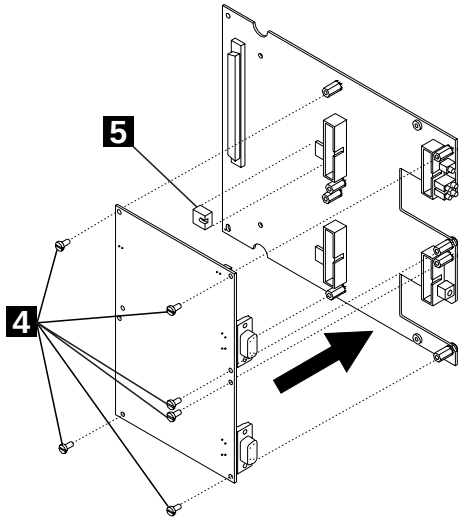

Figure 9. Attaching the I/O Card

__ **6** Install the VPD PROM chip (**5**) on the motherboard, making sure that the notch is aligned with the front of the module.

__ **7** Attach the faceplate bracket to the motherboard using the two screws (**6** in Figure 10 on page 23) from the old dummy bracket.

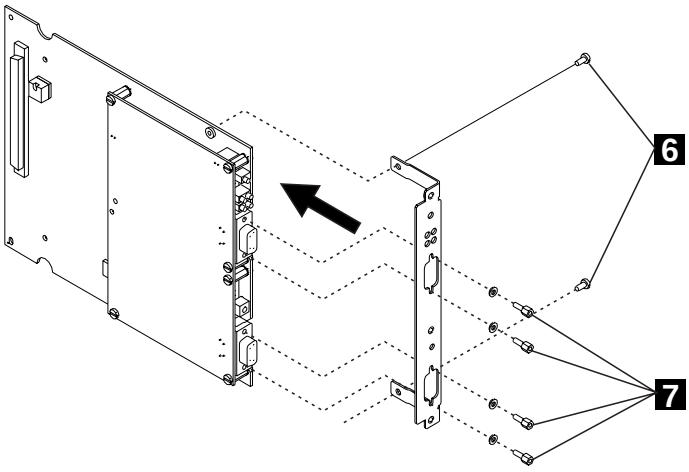

Figure 10. Attaching the Faceplate Bracket

__ **8** Using a screwdriver, attach one post (**7**) onto each side of each of the two ports on the I/O card.

__ **9** Hold the motherboard so that the connectors and screw holes are aligned correctly on the module. Then gently push the card downwards until you hear it click into the motherboard connectors.

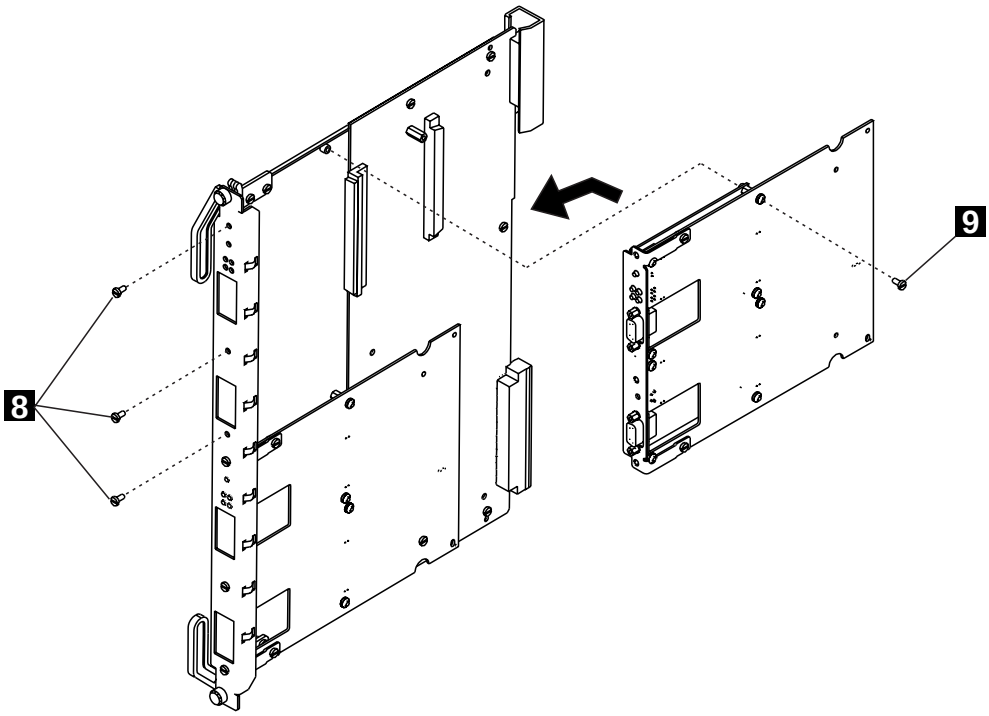

Figure 11. Reattaching the Motherboard

__ **10** Reattach the motherboard to the module using the four screws (**8** and **9** in Figure 11) that originally held the motherboard.

Chapter 5. Mounting an E3/DS3 or OC3/STM1 I/O Card on the A8-WAN Module

This chapter describes:

- How to configure the grounding jumpers on an E3/DS3 I/O card
- How to mount an E3/DS3 I/O card on the A8-WAN module.

Procedure

__ **1** **(E3/D3 I/O cards only)** Ensure that the configuration of the grounding jumpers on the I/O card conforms to the type of port connection and to the specific grounding regulations in your country by following the instructions in “Setting the Grounding on E3/DS3 I/O Cards” on page 27.

__ **2** Mount the I/O card on the A8-WAN module by following the instructions in “Installing the I/O Card” on page 28.

Jumpers and Ports on the I/O Card

Figure 12 shows the location of the ports, configuration jumpers and grounding jumpers on the I/O card.

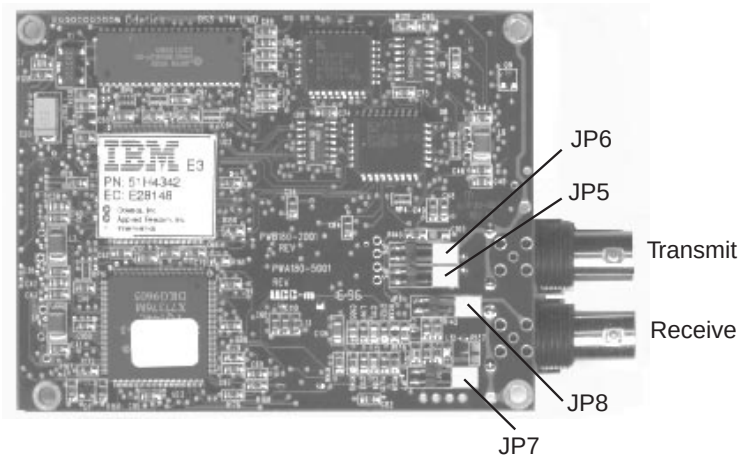

Figure 12. Port and Jumper Locations on the E3/DS3 I/O Card

Setting the Grounding on E3/DS3 I/O Cards

To adhere to country specific regulations regarding the grounding of outer conductors on coaxial pairs (both receive and transmit ports), four jumpers are provided on the rear of the I/O cards. If the jumpers are not used, the outer connector is grounded through a 10 nF capacitor. Figure 12 on page 26 shows the location of the four jumpers.

- If a jumper is inserted over a pair of jumper pins, the outer connector of the corresponding port is grounded to the Frame Ground.
- If no jumper is inserted, the outer connector of that port is grounded through a 10 nF capacitor.

Normally, only the outer connector of the transmit port is to be grounded, and not the receive port. This is dependent on individual country rulings.

Refer to Table 6 to determine which jumpers you require to meet your country's requirements. Remove any jumpers that are not required, by sliding them gently in the direction of the ports.

Attention: Some of the jumpers MUST be removed from E3 I/O cards.

Table 6. Jumper Settings for E3/DS3 I/O Cards

Outer of:	Connected to:	JP5	JP6	JP7	JP8
Transmit	Ground		√		
Transmit	0 volt	√			
Receive	Ground				√
Receive	0 volt			√	
E3 (according to G.703)		√	√		
DS3 (recommended setting)		√	√	√	√

Note: Standard G.703 recommends that the outer conductor of the coaxial pair be connected to ground on the transmit port, and that the same provision be available for the receive port. Some countries however, have different rules, so the setting may be not apply.

Installing the I/O Card

Before installing the I/O card on the A8-WAN module, you must isolate and then remove the A8-WAN module from the 8260 hub or 8285 workgroup switch. To isolate the module, enter the following command from the ATM console:

```
SET MODULE slot ISOLATED
```

where `slot` specifies the number of the slot to be used.

CAUTION:
When installing an I/O card on the motherboard, be careful not to touch its components. Always hold the card by its edges.

Note: Although the illustrations in this chapter show an E3/DS3 I/O card being installed on the A8-WAN module, the steps are identical for the OC3/STM-1 I/O card.

To install the I/O card on the A8-WAN module motherboard, follow these steps:

__ **1** Detach the motherboard on which you want to install the I/O card by removing the four screws (**1** and **2** in Figure 13) that hold the motherboard to the module. Retain the screws for reattaching the motherboard.

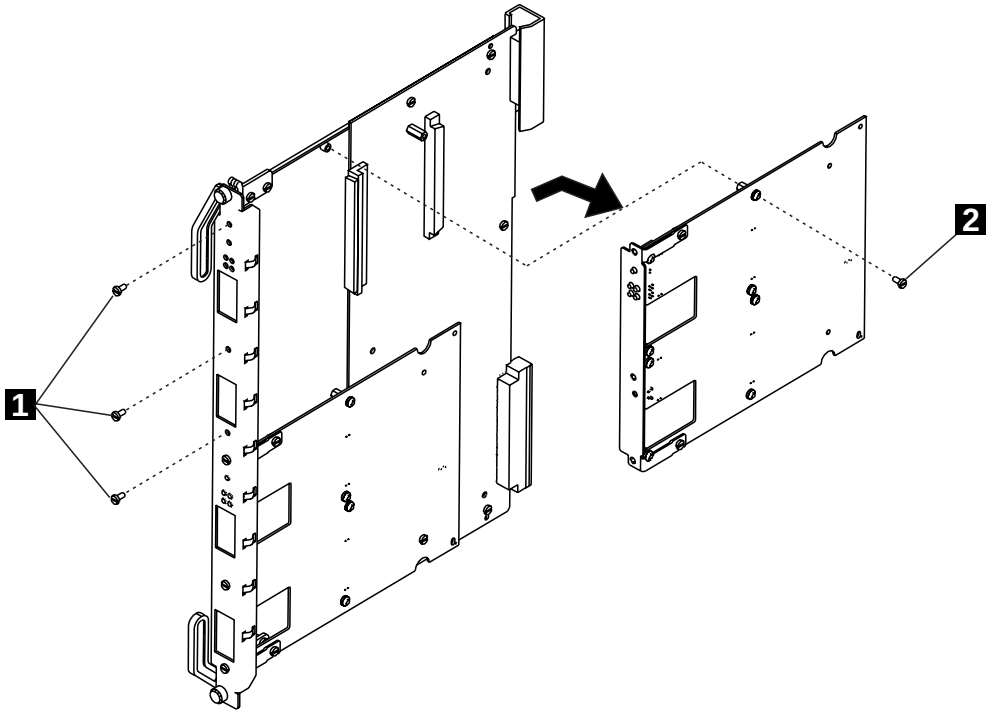

Figure 13. Removing the Motherboard

__ **2** Disconnect the motherboard connectors and lift the motherboard out of the module.

__ **3** Remove the dummy faceplate bracket from the motherboard (**3** in Figure 14), retaining the screws for the new bracket. Save the dummy bracket in a safe place for future reuse.

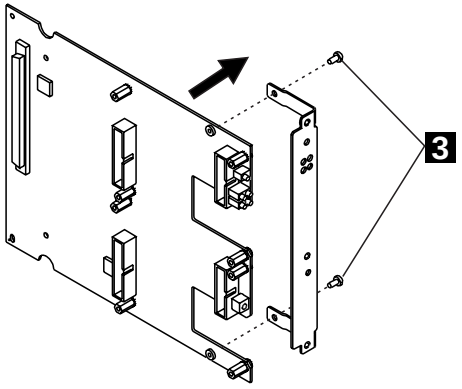

Figure 14. Removing the Dummy Faceplate Bracket

__ **4** Attach the I/O card to the motherboard using the four screws provided (**4** in Figure 15).

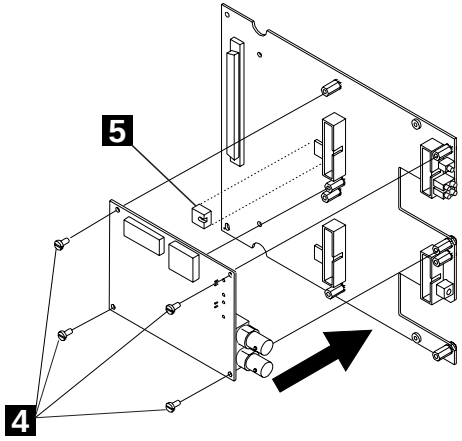

Figure 15. Attaching the I/O Card

__ **5** Install the VPD PROM chip (**5**) on the motherboard, making sure that the notch is aligned with the front of the module.

__ **6** Attach the faceplate bracket to the motherboard using the two screws (**6** in Figure 16) from the old dummy bracket.

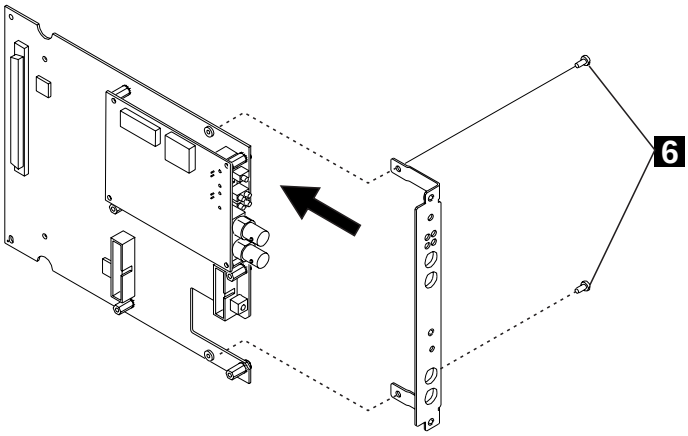

Figure 16. Attaching the Faceplate Bracket

__ **7** Hold the motherboard so that the connectors and screw holes are aligned correctly on the module. Then gently push the card downwards until you hear it click into the motherboard connectors.

__ **8** Reattach the motherboard to the module using the four screws (**7** and **8** in Figure 17) that originally held the motherboard.

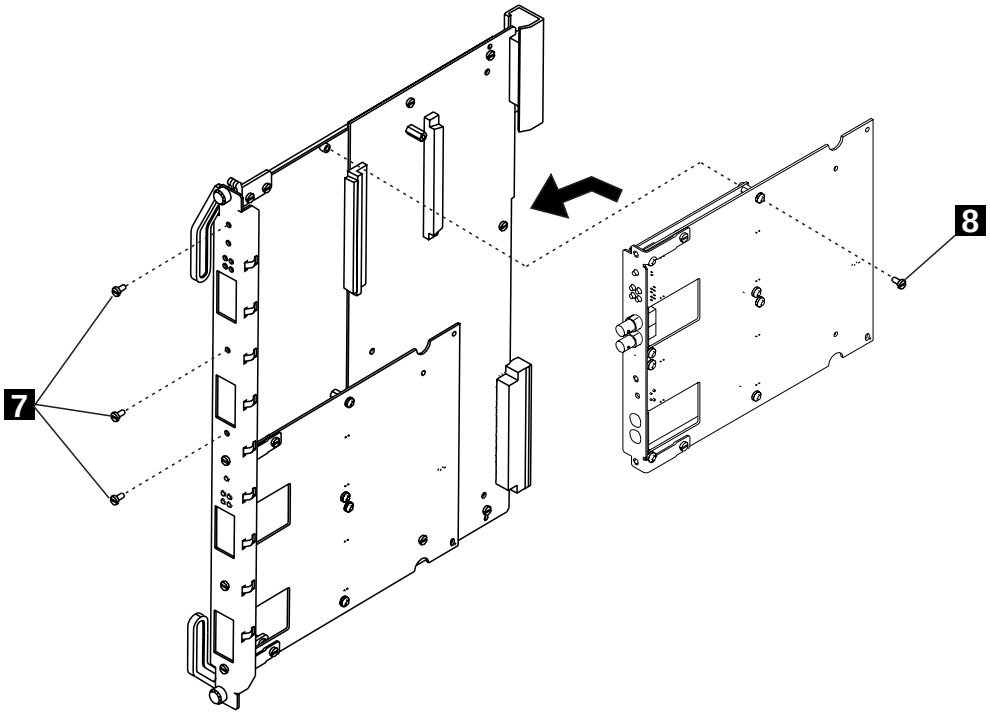

Figure 17. Reattaching the Motherboard

Chapter 6. Mounting the A8-WAN Module

This chapter describes how to unpack and install the A8-WAN module and connect ATM devices.

Installing the A8-WAN Module in an 8260 Hub

Notes:

1. You can install the A8-WAN module in an 8260 hub either when the hub is running or turned OFF.
2. Before installing an A8-WAN module in an 8260, make sure that an A-CPSW module is installed in slots 9-10 (or 11 in A17 models), and that an A-CPSW console has already been configured. If no A-CPSW module is installed in the hub, the Reset LED on the A8-WAN module will start blinking when you insert the module.

To install an A8-WAN module in an 8260 hub, follow these steps:

__ **1** Locate a blank slot in positions 1 to 8 (or 12 to 17 in 17 slot models). If necessary, remove a panel on the hub to expose a blank slot.

__ **2** Make sure that the slot to be used is in Isolated mode by entering the following command from the A-CPSW console:

```
SET MODULE slot ISOLATED
```

where `slot` specifies the number of the slot to be used. For more information, see the *IBM 8260 Multiprotocol Switching Hub Installation Guide*, SA33-0251.

__ **3** Insert the A8-WAN module into the slot as shown in Figure 18, matching the top and bottom board guides as you slide the module cleanly into place (by pressing evenly on the top and bottom of the faceplate). Do not attempt to push the module all the way into the hub until you have verified that the top and bottom module ejectors are OPEN (see Figure 19 on page 35.)

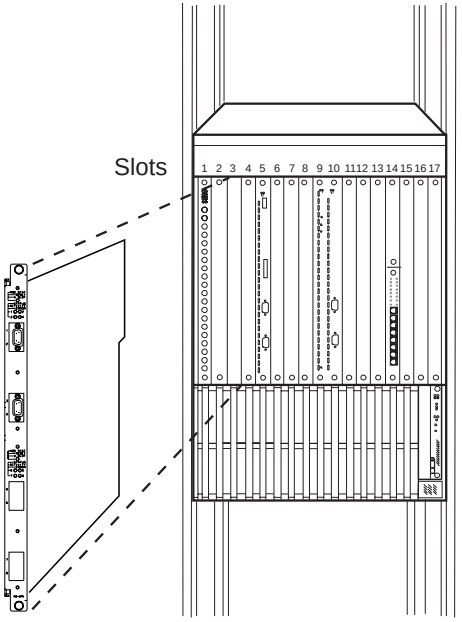

Figure 18. Inserting the Module in an 8260 Hub

__ **4** Close the top and bottom ejectors simultaneously. This secures the module.

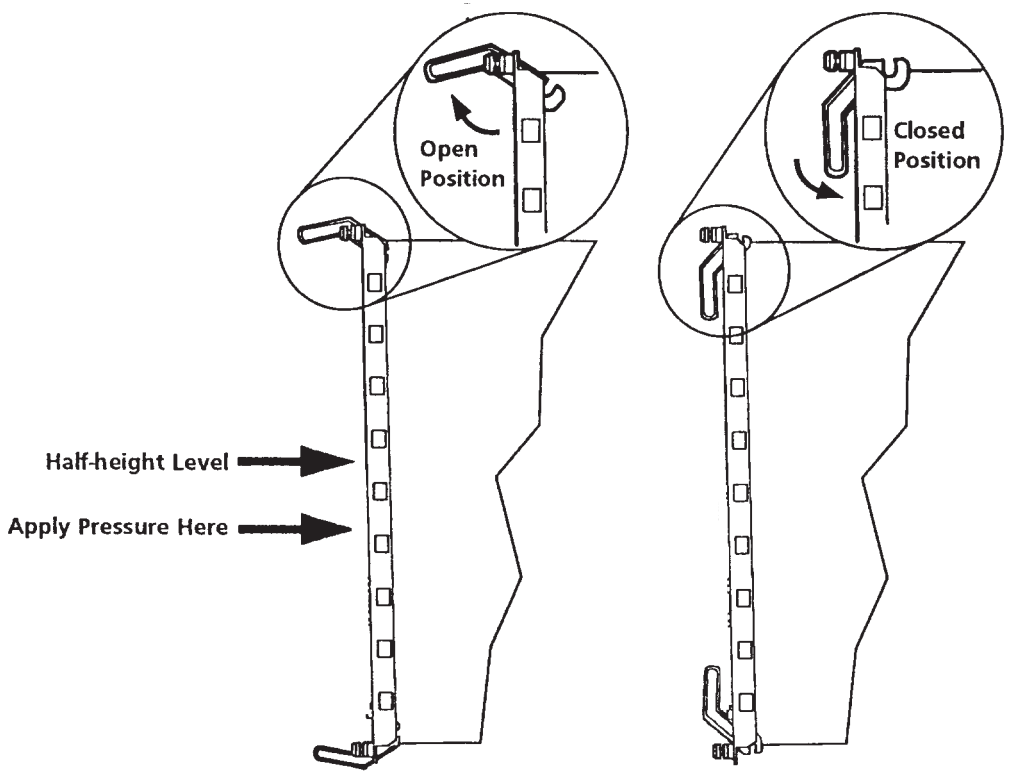

Figure 19. 8260 Module Ejectors

__ **5** The Multifunction Module Status LED should light YELLOW (Reset) briefly, and then turn OFF. After a few seconds, other LEDs may also light ON if the slot was previously configured for an A8-WAN module.

__ **6** Fasten the spring-loaded screws on the front panel of the module to the hub, using your fingers. Do not overtighten.

Installing the A8-WAN Module in the 8285 Expansion Unit

To install an A8-WAN module in an 8285 expansion unit, follow these steps:

1. Locate a vacant slot in the expansion unit. If the slot is filled with a dummy module, loosen the knurled screws on both sides of the cover and remove it from the front panel of the expansion unit.

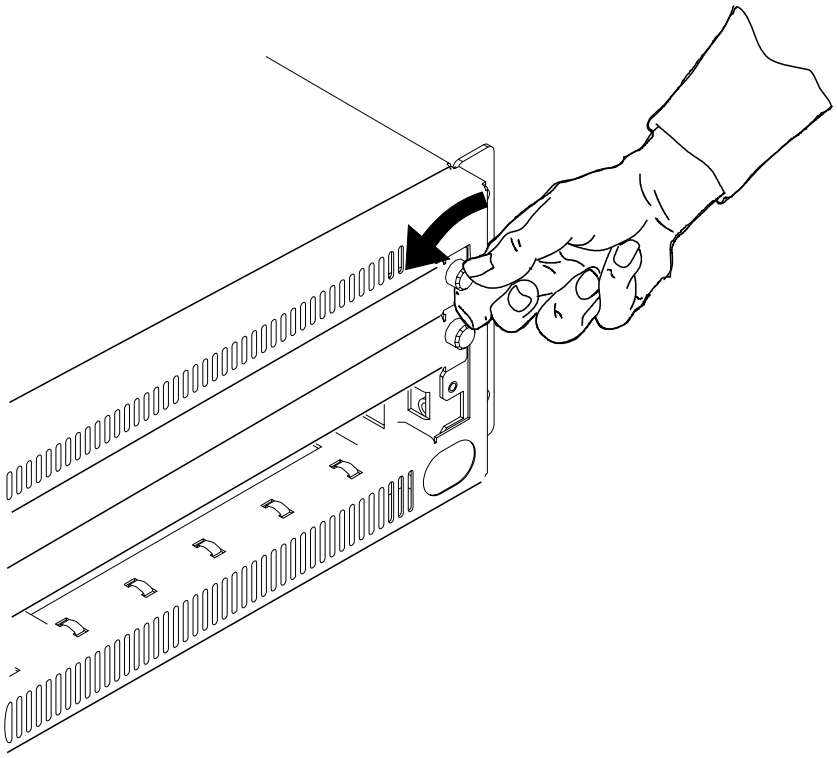

Figure 20. Removing a Dummy Module

   Store the dummy module in a safe place in case the ATM media module needs to be removed in the future.

2. Make sure that the slot to be used is in Isolated mode by entering the following command from the ATM console:

   ```
   SET MODULE slot ISOLATED
   ```

   where `slot` specifies the number of the slot to be used. For more information, see the *IBM 8285 Nways ATM Workgroup Switch Installation and User's Guide*, SA33-0381.

3. Insert the A8-WAN module into the slot in the expansion unit as shown in Figure 21, matching the left and right board guides as you slide the module cleanly into place (by pressing evenly on the top and bottom of the faceplate). Do not attempt to push the module all the way in until you have verified that the left and right module ejectors are OPEN (see Figure 22 on page 38.)

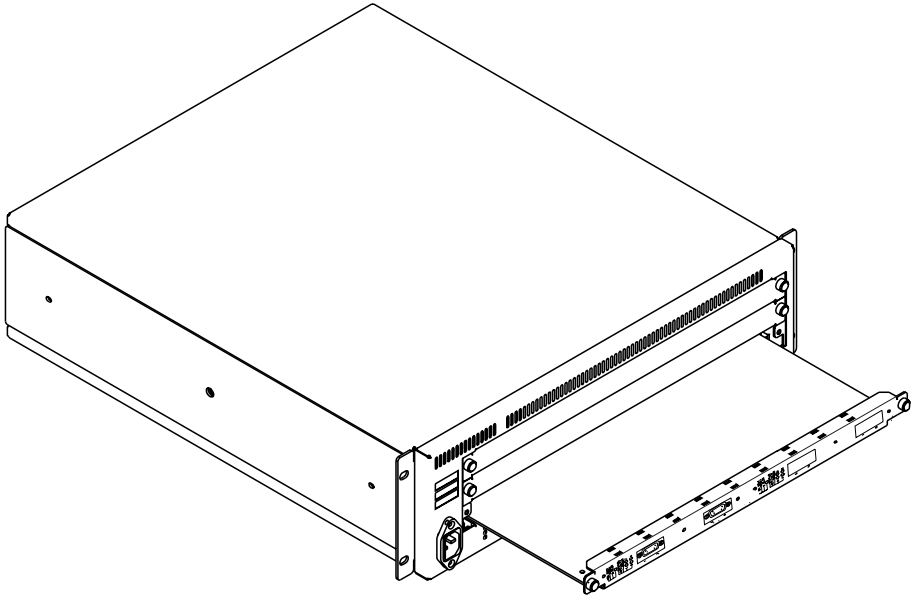

Figure 21. Inserting the Module in an 8285 Expansion Unit

4. Close the left and right ejectors simultaneously. This secures the module.

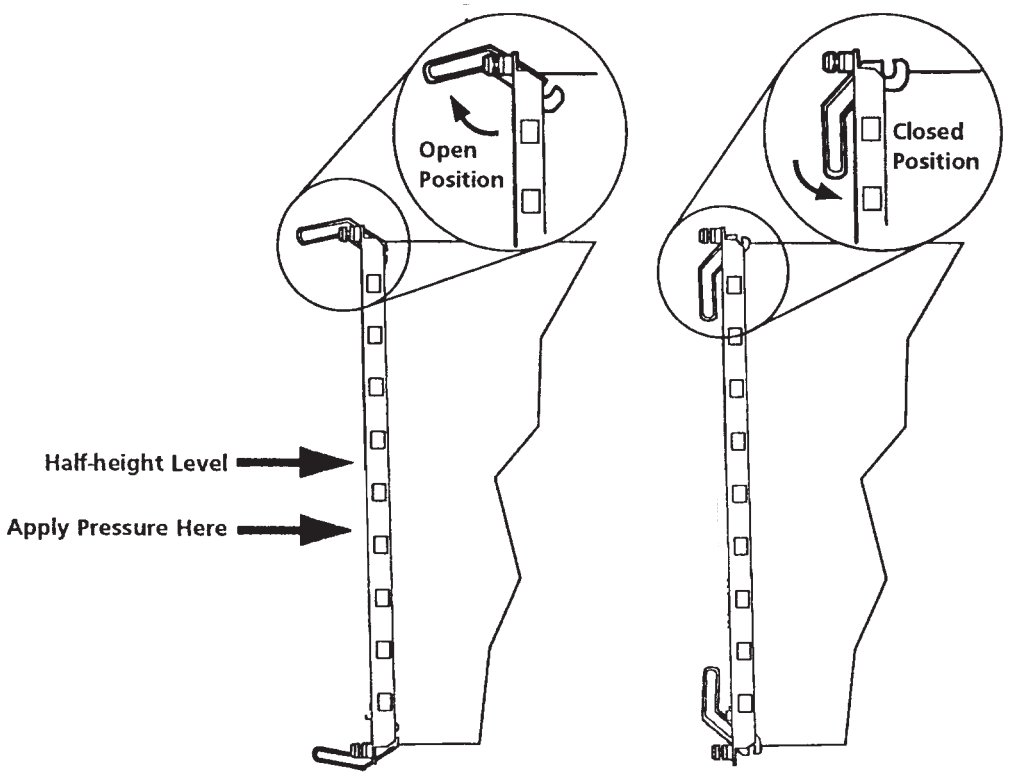

Figure 22. 8285 Module Ejectors

5. The Multifunction Module Status LED should light YELLOW (Reset) briefly, and then turn OFF. After a few seconds, other LEDs may also light ON if the slot was previously configured for an A8-WAN module.
6. Fasten the spring-loaded screws on the front panel of the module to the expansion unit, using your fingers. Do not overtighten.

Chapter 7. Cabling and Connecting

This chapter describes how to unpack and install the A8-WAN module and connect ATM devices.

To record configuration information on your complete ATM network, use the ATM cabling charts in Appendix A of the *IBM 8250 Multiprotocol Intelligent Hub, IBM 8260 Multiprotocol Intelligent Switching Hub, IBM 8285 Nways ATM Workgroup Switch, Planning and Site Preparation Guide*, (GA33-0285).

Cabling Up

The following sections provide instructions and guidelines for connecting ATM devices (such as switches, servers, personal computers, and workstations). Remember these tips when connecting cables:

- Avoid stretching and bending the cables too much.
- Avoid routing the cables near potential sources of electromagnetic interference, such as motorized devices and fluorescent lights.
- Avoid trip hazards by routing the cables away from aisles and other areas where people walk. If such routes cannot be avoided, use floor cable covers or similar material to secure and protect the cables.

Cable and Connector Types

Connection Type	Cable
E1 Twisted Pair	120-ohm STP (shielded twisted pair)
T1 Twisted Pair	100-ohm STP (shielded twisted pair)
E1 Coaxial / E3 / DS3	RG59 75-ohm coax cable
OC3 / STM1 Single Mode	9/125 micron SC duplex
OC3 / STM1 Multimode	62.5/125 micron SC duplex

For a full description of cables, connectors and wrap plugs for the A8-WAN module, see Appendix F, “Cables and Connectors” on page 121.

Connecting Devices to the ATM Ports

You can connect devices to the ATM ports on an A8-WAN module either through building wiring or by a direct connection.

Via Building Wiring: To connect an ATM device to the A8-WAN via building wiring, follow the steps listed below.

__ **1** Look at the cabling chart, which your network planner provided, to determine how the A8-WAN should be connected to the network.

__ **2** In the work area, connect one end of a straight-through cable (with ATM-Forum-compliant pin assignments) to the ATM connector on the device and the other end to the ATM connector on the faceplate where the building wiring terminates.

__ **3** Label the faceplate if it does not already have a cable label. Follow your enterprise's procedures for cable labeling. If there is more than one wiring closet on a floor, record the wiring closet identifier or location and the cable identifier on the same line.

__ **4** In the wiring closet, connect the cable that originated at the ATM device to the appropriate connector on the patch panel or on other equipment where building wiring terminates. Connect the other end of the cable to an ATM port on the A8-WAN.

__ **5** Label the connector on the patch panel (or other equipment used to terminate the building wiring).

Direct Cabling: To cable an ATM device directly to the A8-WAN:

__ **1** Look at the cabling chart, which your network planner provided, to determine how the A8-WAN should be connected to the network.

__ **2** Connect the cables between the A8-WAN and other devices, as indicated by the connections in the cabling chart.

__ **3** Label the cables, following your enterprise's procedures for cable labeling.

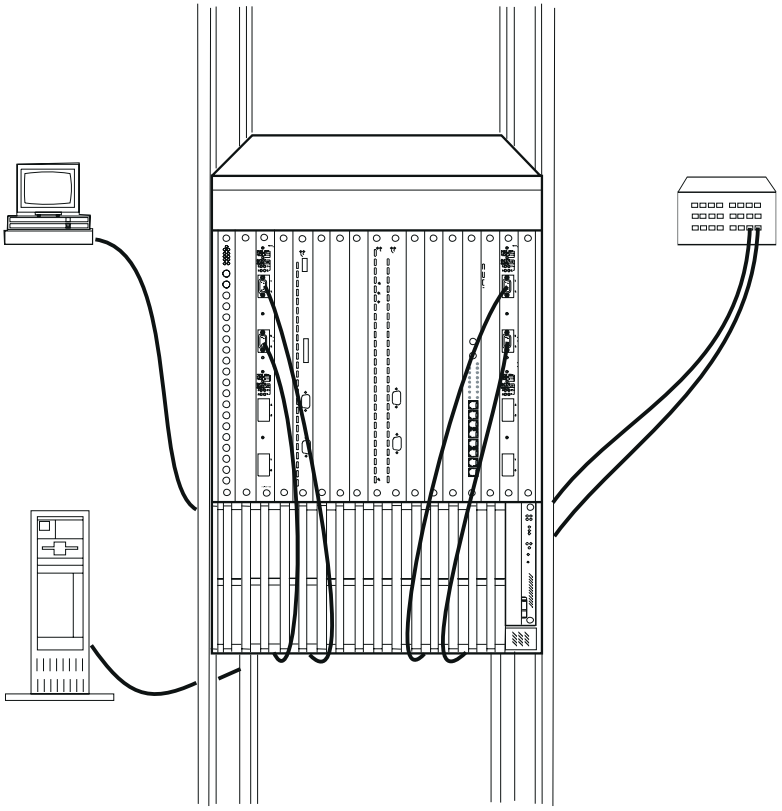

Figure 23. Attaching ATM Devices

Chapter 8. Configuration

This chapter describes the how to:

- Configure E1/T1, E3 and DS3 ports on the A8-WAN module, and display their settings on the configuration console
- Connect the A8-WAN module to the network, and verify that the module is operating correctly
- Reset ports on the A8-WAN module
- Upgrade the microcode on A8-WAN module I/O cards.

Configuration Procedure

To configure the ports on the A8-WAN module, perform the following steps:

__ **1** Configure the ports on the A8-WAN module using the SET PORT Standard Parameters, as described in the Command Reference Guide.

__ **2** If any of the ports on the A8-WAN module will be connected to switches in another Peer Group, configure the VPC, using the SET VPC_LINK command, as described in the Command Reference Guide.

__ **3** If the default settings for any of the A8-WAN ports are not suitable for your network, modify them using the SET PORT Port-Specific Parameters, as described in Appendix C, “Changing E1/T1 Default Settings” on page 97.

__ **4** Save your A8-WAN module configuration settings, using the SAVE MODULE_PORT command.

To verify that the configuration settings are correct, use the SHOW MODULE command, as described in “Displaying Configuration Settings” on page 44.

__ **5** Connect the A8-WAN module to the network using the SET MODULE command, as described in “Connecting the Module to the Network” on page 58.

__ **6** Verify that the module is functioning correctly, as described in “Verifying Module Operation” on page 59.

Displaying Configuration Settings

The following section describes how to display information about the module, its port configurations, and any VPCs that you have defined. By displaying this information, you can check that the A8-WAN is properly configured before connecting it to the network.

Module Settings

To display status information about an A8-WAN module, use the SHOW MODULE command.

For example, to display configuration information about the A8-WAN module in slot 2, you would enter the following command:

```
ATMPROMPT> show module 2 verbose     [ENTER]

Slot Install Connect Operation General Information
-------------------------------------------------------------------
 2      Y       Y        Y     8260 ATM WAN Module with T1 + E1 Ports

status: connected / hardware okay
        enable  / Normal
P/N:51H3635 EC level:E28056 Manufacturer:VIME
Operational FPGA version : EC13
     Backup FPGA version : EC13

     Type  Mode      Status                              Daughter Card Description
-------------------------------------------------------------------------------
 2.01:UNI   enabled  UP                                     T1 Port
 2.02:UNI   enabled  UP                                     T1 Port
 2.03:UNI   enabled  UP                                     T1 Port
 2.04:UNI   enabled  UP                                     T1 Port
 2.05:UNI   enabled  UP                                     E1 Port
 2.06:UNI   enabled  UP                                     E1 Port
 2.07:UNI   enabled  UP                                     E1 Port
 2.08:UNI   enabled  UP                                     E1 Port

ATMPROMPT>
```

If the value for `status` indicates that an ATM WAN module port is inoperational or not functioning properly (for example, `NOT IN SERVICE` or `NO ACTIVITY`), refer to the chapter called "Troubleshooting", in the *IBM 8260 Nways Multiprotocol Switching Hub, ATM Control Point and Switch Module Installation and User's Guide*, SA33-0326 or *IBM 8285 Nways ATM Workgroup Switch Installation and User's Guide*, SA33-0381, as appropriate.

For more information on the SHOW MODULE command, see the Command Reference Guide.

Port Settings

To display status information about the ports of an A8-WAN module, use the SHOW PORT command. The following example shows how to display detailed information about port 2 of the A8-WAN module in slot 1:

```
SHOW PORT 1.2 VERBOSE        [ENTER]
```

The resulting display depends on the type of I/O card used, as illustrated in the sections that follow.

The DIAGNOSTICS fields are described in “On Demand Diagnostics” on page 82.

If the EQUIPMENT TEST RESULT is not OK, additional fields are displayed (refer to “Power On Diagnostics” on page 78).

The FAILURE STATUS fields are described in “Failure Status” on page 84.

For further information on parameters, see Appendix C, “Changing E1/T1 Default Settings” on page 97.

For more information on the SHOW PORT command, see the Command Reference Guide.

E1 I/O Card

```
ATMPROMPT> show port 2.1 verbose

     Type  Mode     Status                            Daughter Card Description
-------------------------------------------------------------------------------
 2.01:UNI  disabled no activity                        E1 Port

Signalling Version   : Auto
ILMI status          : DOWN:Not in service
ILMI vci             : 0.16
RB Bandwidth         : unlimited
Signalling vci       : 0.5
Administrative weight: 5040
VPI.VCI range        : 3.1023 (2.10 bits)
Connector            : DB9
Media                : coaxial cable
Port speed           : 2048 Kbps
Remote device is inactive


DAUGHTER CARD INFORMATION:
--------------------------
 Type                              : E1
 Software Version                  : 0.1.5.68

CONFIGURATION CONTROL:
----------------------
 Common for the card:
 ====================
   Failure Integration Time        : 2500 ms
   Failure Decay Time              : 10 s

 Specific for this port:
 =======================
   Timing Source                   : PARM_FACILITY_TMG
   Descramble Received Cells       : Yes
   Discard Idle Cells              : Yes
   Scramble Transmitted Cells      : Yes
   Discard Errored Cells           : Yes
   Correct Received Errors         : Yes

DIAGNOSTICS CONTROL:
--------------------
 Common for the card:
 ====================
   Diagnostic Pattern              : 00 00 00 00 00 00 00 00

 Specific for this port:
 =======================
   Internal Wrap                   : Disable
   Reply Mode Wrap                 : Disable
   Payload Wrap                    : Disable
```

```
EQUIPMENT TEST RESULT:
----------------------
 Tests Results                     : OK

FAILURE STATUS:
---------------
 Equipment Failure                 : Inactive
 Loss of Signal                    : Inactive
 E1 Alarm Indication Signal (AIS)  : Inactive
 Loss of Frame                     : Inactive
 E1 Red CFA Failure                : Inactive
 E1 Remote Alarm Indication (RAI)  : Inactive
 Loss of Cell Delineation          : Inactive
 Loss of Synchronization           : Inactive

FAILURE SUMMARY STATUS:
-----------------------
                   No Failure
```

T1 I/O Card

```
ATMPROMPT> show port 2.5 verbose

      Type  Mode     Status                            Daughter Card Description
-------------------------------------------------------------------------------
  2.05:UNI  disabled no activity                        T1 Port

Signalling Version   : Auto
ILMI status          : DOWN:Not in service
ILMI vci             : 0.16
RB Bandwidth         : unlimited
Signalling vci       : 0.5
Administrative weight: 5040
VPI.VCI range        : 3.1023 (2.10 bits)
Connector            : DB9
Media                : copper utp
Port speed           : 1544 Kbps
Remote device is inactive


DAUGHTER CARD INFORMATION:
--------------------------
 Type                              : T1
 Software Version                  : 0.1.5.68

CONFIGURATION CONTROL:
----------------------
 Common for the card:
  ====================
   Failure Integration Time         : 2500 ms
   Failure Decay Time               : 10 s

 Specific for this port:
 =======================
   Timing Source                    : PARM_FACILITY_TMG
   Descramble Received Cells        : Yes
   Discard Idle Cells               : Yes
   Scramble Transmitted Cells       : Yes
   Discard Errored Cells            : Yes
   Correct Received Errors          : Yes
   T1 Format                        : ESF
   T1 LBO                           : 0 dB of attenuation

DIAGNOSTICS CONTROL:
--------------------
 Common for the card:
 ====================
   Diagnostic Pattern               : 00 00 00 00 00 00 00 00

 Specific for this port:
 =======================
   Internal Wrap                    : Disable
   Reply Mode Wrap                  : Disable
   Payload Wrap                     : Disable
   Far End Line Wrap                : Disable
   Far End Payload Wrap             : Disable
```

```
EQUIPMENT TEST RESULT:
----------------------
 Tests Results                     : OK

FAILURE STATUS:
---------------
 Equipment Failure                 : Inactive
 Loss of Signal                    : Inactive
 Loss of Frame                     : Inactive
 T1 Red CFA Failure                : Inactive
 T1 Yellow CFA Failure             : Inactive
 T1 Alarm Indication Signal (AIS)  : Inactive
 Loss of Cell Delineation          : Inactive
 T1 Loss of Synchronization        : Inactive

FAILURE SUMMARY STATUS:
-----------------------
                  No Failure
```

E3 I/O Card

```
ATMPROMPT> show port 6.1 verbose

     Type  Mode     Status                            Daughter Card Description
-------------------------------------------------------------------------------
 6.01:UNI  disabled no activity                        E3 Port

Signalling Version   : Auto
ILMI status          : DOWN:Not in service
ILMI vci             : 0.16
RB Bandwidth         : unlimited
Signalling vci       : 0.5
Administrative weight: 5040
VPI.VCI range        : 15.1023 (4.10 bits)
Connector            : BNC
Media                : coaxial cable
Port speed           : 34368 Kbps
Remote device is inactive


DAUGHTER CARD INFORMATION:
--------------------------
 Type                              : E3 (G.832)
 Software Version                  : 0.3.2.72


CONFIGURATION CONTROL:
----------------------
 Failure Integration Time          : 2500 ms
 Failure Decay Time                : 10 s
 Timing Source                     : PARM_FACILITY_TMG
 Descramble Received Cells         : Yes
 Discard Idle Cells                : Yes
 Scramble Transmitted Cells        : Yes

DIAGNOSTICS CONTROL:
--------------------
 Diagnostic Pattern                : 00 00 00 00 00 00 00 00
 Internal Wrap                     : Disable
 Reply Mode Wrap                   : Disable

EQUIPMENT TEST RESULT:
----------------------
 Tests Results                     : OK
```

```
FAILURE STATUS:
---------------
 Loss of Signal                     : Inactive
 Loss of Frame                      : Inactive
 Equipment Failure                  : Inactive
 Loss of Synchronization            : Inactive
 Loss of Cell Delineation           : Inactive
 E3 Remote Failure Indication (RFI) : Inactive
 E3 Alarm Indication Signal (AIS)   : Inactive
 Payload Type Mismatch              : Inactive
 Trail Trace Mismatch               : Inactive

FAILURE SUMMARY STATUS:
-----------------------
                    No Failure
```

DS3 I/O Card

```
ATMPROMPT> show port 6.1 verbose

     Type  Mode     Status                            Daughter Card Description
-------------------------------------------------------------------------------
 6.01:UNI  disabled no activity                        DS3 Port

Signalling Version   : Auto
ILMI status          : DOWN:Not in service
ILMI vci             : 0.16
RB Bandwidth         : unlimited
Signalling vci       : 0.5
Administrative weight: 5040
VPI.VCI range        : 15.1023 (4.10 bits)
Connector            : BNC
Media                : coaxial cable
Port speed           : 44736 Kbps
Remote device is inactive


DAUGHTER CARD INFORMATION:
--------------------------
 Type                              : DS3
 Software Version                  : 0.3.2.72

CONFIGURATION CONTROL:
----------------------
 Failure Integration Time          : 2500 ms
 Failure Decay Time                : 10 s
 Timing Source                     : PARM_FACILITY_TMG
 Descramble Received Cells         : Yes
 Discard Idle Cells                : Yes
 Scramble Transmitted Cells        : Yes
 DS3 Format                        : M23
 PLCP Framing                      : Yes

DIAGNOSTICS CONTROL:
--------------------
 Diagnostic Pattern                : 00 00 00 00 00 00 00 00
 Internal Wrap                     : Disable
 Reply Mode Wrap                   : Disable
 Far End Mode Wrap                 : Disable

EQUIPMENT TEST RESULT:
----------------------
 Tests Results                     : OK
```

```
FAILURE STATUS:
---------------
 Loss of Signal                     : Inactive
 Loss of Frame                      : Inactive
 Equipment Failure                  : Inactive
 Loss of Synchronization            : Inactive
 Loss of Cell Delineation           : Inactive
 DS3 Alarm Indication Signal (AIS)  : Inactive
 DS3 Remote Alarm Indication (RAI)  : Inactive
 PLCP Loss of Frame                 : Inactive
 PLCP Remote Alarm Indication (RAI) : Inactive
 Idle Signal                        : Inactive

FAILURE SUMMARY STATUS:
-----------------------
                    No Failure
```

OC3 I/O Card

```
ATMPROMPT> show port 6.1 verbose

     Type  Mode     Status                            Daughter Card Description
-------------------------------------------------------------------------------
 6.01:UNI  disabled no activity                        OC3 Port


Signalling Version   : Auto
ILMI status          : DOWN:Not in service
ILMI vci             : 0.16
RB Bandwidth         : unlimited
Signalling vci       : 0.5
Administrative weight: 5040
VPI.VCI range        : 15.1023 (4.10 bits)
Connector            : BNC
Media                : coaxial cable
Port speed           : 155000 Kbps
Remote device is inactive


DAUGHTER CARD INFORMATION:
--------------------------
 Type                              : OC3
 Software Version                  : 0.3.1.71

CONFIGURATION CONTROL:
----------------------
 Failure Integration Time          : 0 s
 Failure Decay Time                : 0 s
 Timing Source                     : PARM_FACILITY_TMG
 Descramble Received Cells         : Yes
 Discard Idle Cells                : Yes
 Scramble Transmitted Cells        : Yes

DIAGNOSTICS CONTROL:
--------------------
 Diagnostic Pattern                : 00 00 00 00 00 00 00 00
 Internal Wrap                     : Disable
 Reply Mode Wrap                   : Disable

EQUIPMENT TEST RESULT:
----------------------
   Tests Results                     : OK
```

```
FAILURE STATUS:
---------------
 Loss of Signal                     : Inactive
 Loss of Frame                      : Inactive
 STS Path Loss of Pointer           : Inactive
 Equipment Failure                  : Inactive
 Loss of Synchronization            : Inactive
 Signal Label Mismatch              : Inactive
 Path Trace Mismatch                : Inactive
 Loss of Cell Delineation           : Inactive
 Line Alarm Indication Signal (AIS) : Inactive
 STS Path Alarm Indication Signal   : Inactive
 Line Remote Failure Indication     : Inactive
 STS Path Remote Failure Indication : Inactive

FAILURE SUMMARY STATUS:
-----------------------
                    No Failure
```

STM1 I/O Card

```
ATMPROMPT> show port 6.1 verbose

     Type  Mode     Status                            Daughter Card Description
-------------------------------------------------------------------------------
 6.01:UNI  disabled no activity                        STM1 Port


Signalling Version   : Auto
ILMI status          : DOWN:Not in service
ILMI vci             : 0.16
RB Bandwidth         : unlimited
Signalling vci       : 0.5
Administrative weight: 5040
VPI.VCI range        : 15.1023 (4.10 bits)
Connector            : BNC
Media                : coaxial cable
Port speed           : 155000 Kbps
Remote device is inactive


DAUGHTER CARD INFORMATION:
--------------------------
 Type                              : STM1
 Software Version                  : 0.3.2.72

CONFIGURATION CONTROL:
----------------------
 Failure Integration Time          : 2500 ms
 Failure Decay Time                : 10 s
 Timing Source                     : PARM_FACILITY_TMG
 Descramble Received Cells         : Yes
 Discard Idle Cells                : Yes
 Scramble Transmitted Cells        : Yes

DIAGNOSTICS CONTROL:
--------------------
 Diagnostic Pattern                : 00 00 00 00 00 00 00 00
 Internal Wrap                     : Disable
 Reply Mode Wrap                   : Disable

EQUIPMENT TEST RESULT:
----------------------
 Tests Results                     : OK
```

```
FAILURE STATUS:
---------------
 Loss of Signal                     : Inactive
 Loss of Frame                      : Inactive
 STS Path Loss of Pointer           : Inactive
 Equipment Failure                  : Inactive
 Loss of Synchronization            : Inactive
 Signal Label Mismatch              : Inactive
 Path Trace Mismatch                : Inactive
 Loss of Cell Delineation           : Inactive
 MS Alarm Indication Signal (AIS)   : Inactive
 AU4 Path Alarm Indication Signal   : Inactive
 MS Remote Failure Indication (RFI) : Inactive
 VC4 Path Remote Failure Indication : Inactive

FAILURE SUMMARY STATUS:
-----------------------
                   No Failure
```

Connecting the Module to the Network

When you install an A8-WAN module, it is by default set to Isolated mode and all of its ports are disabled. When an A8-WAN module is isolated, no network activity takes place on it and it cannot be accessed by the network. This is a security measure that protects your ATM network from unauthorized access and module disfunction.

To establish the A8-WAN module's connection to the network, enter the following command at the ATM console prompt:

```
SET MODULE slot CONNECTED
```

where `slot` specifies the slot number of the A8-WAN module. The Module Status LED should light ON.

The module's ports will not be enabled. This allows you to configure the individual ports before enabling them. If you wish to enable all ports on the module (????) using the current values (either the default values if the module has not been used, or the previous values entered), enter the following command:

```
SET MODULE slot CONNECTED ENABLE
```

Verifying Module Operation

After configuring and saving ATM WAN module port and module settings, you can verify that the module is operating correctly by viewing the LEDs on the front panel:

- The Module Status LED should be ON.
- The Port Status LED should be ON.
- The Port Activity LED should be ON when traffic is present.

Table 7 on page 60 provides a full description of all the front panel LEDs.

A8-WAN Module Front Panel

ATM connections are made through the A8-WAN module by means of the ports on its front panel and its backplane interfaces. The A8-WAN module front panel is shown in Figure 24 on page 61. The meaning of each ATM WAN module LED is shown in Table 7.

Multifunction LEDs

Table 7. Meaning of the A8-WAN Module Multifunction LEDs

LED Name	Color	State	Meaning
Module Status	Green	MOD STAT	Normal operation (connected).
	Yellow	RESET	Module is being reset; data traffic is interrupted.
	Red	W. SLOT	A8-WAN module is installed in an incorrect slot and no power is reaching the module.
Port Status	Green	STATUS	*Continuous:* Port is enabled and signal is detected. *Blinking:* No signal is detected.
	Yellow	ACTIVITY	ATM cells are being transmitted.
	Red	ERROR	An error condition is detected on the port.

If you find any of the following operating conditions, see Chapter 9, “Troubleshooting” on page 65:

- The Module Status LED is not ON.
- A Port Status LED is not ON.
- A Port Activity LED is not ON during traffic.
- A Port Error LED is ON.
- The Reset LED is ON or is blinking.
- The Wrong Slot LED is ON.

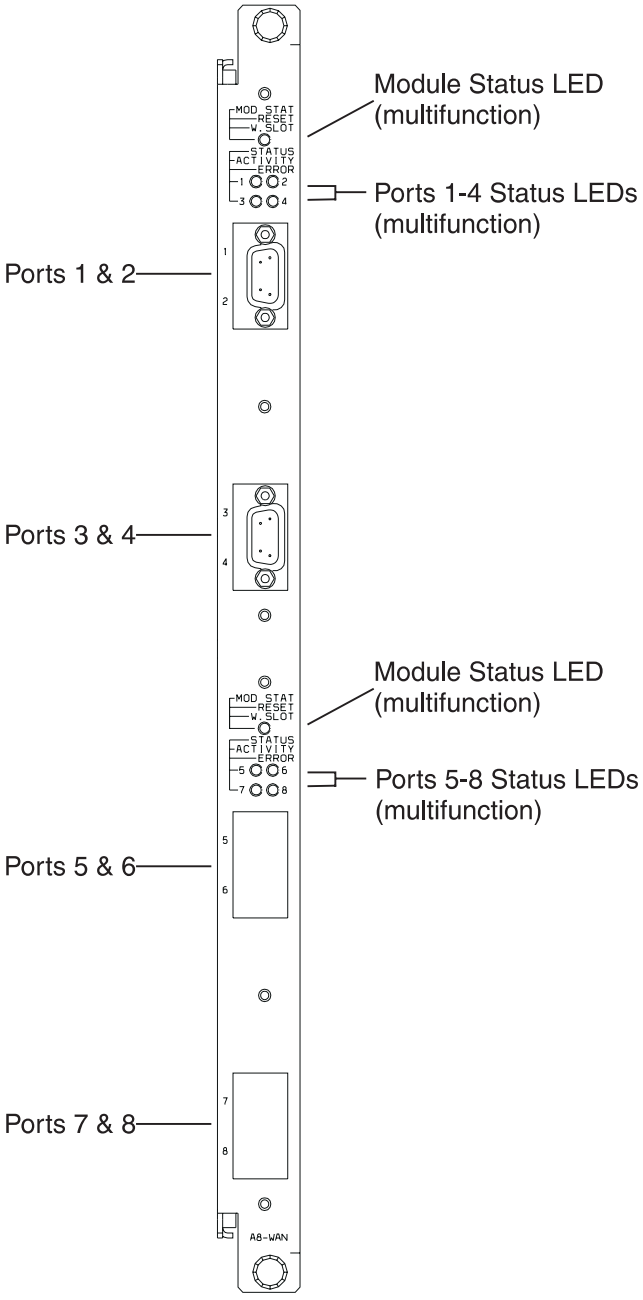

Figure 24. Front Panel

Resetting an I/O Card

Individual I/O cards can be reset via the configuration console. When a reset is performed, the on-board microprocessor will be reset, the on-board FPGA devices reprogrammed, and power on diagnostics will be run (unless they have been deactivated). Resetting the port interrupts the transmission/reception of ATM cells.

To reset an I/O card on the A8-WAN module, enter the following command:

```
SET PORT slot.port PARM CARD_SOFT_RESET        [ENTER]
```

slot Slot number of the A8-WAN module.

port The ATM port number of one I/O card.

Example:

```
ATMPROMPT> set port 4.2 parm card_soft_reset        [ENTER]

ATMPROMPT>
```

Upgrading Port Microcode

Microcode updates for the A8-WAN module I/O cards may be downloaded via the Internet or the IBM Bulletin Board System:

Internet

You may access updated versions of the software through FTP or the World Wide Web.

- FTP: lansupport.raleigh.ibm.com
- WWW: http://www.raleigh.ibm.com/ - This is the IBM Networking home page. From here, you can access product announcements, publications information, and information regarding hardware and software updates.

IBM Bulletin Board System

Using a modem you can access the IBM BBS to obtain latest versions of software. Set your modem and communications software to 8 data bits, no parity, and 1 stop bit. Dial one of the following numbers:

- United States: (919) 517-0001
- Toronto: (905) 316-4255
- Toronto: (416) 956-7877
- Vancouver: (604) 664-6464
- Montreal: (514) 938-3022
- Halifax: (902) 420-0300

Upgrading the Microcode

To upgrade ATM port microcode, ATM network administrators, using the ATM console, perform inband operations from a server connected to an 8260 hub or workgroup switch.

After locating the directory where the microcode updates are stored, log on using the administrator password, and enter the following ATM commands:

1. SET TFTP SERVER_IP_ADDRESS (to define the server where the microcode is stored)
2. SET TFTP FILE_NAME (to define the pathname of the file on the server)
3. SET TFTP FILE_TYPE PORT
4. SET TFTP TARGET_PORT slot.port (where slot identifies the location of the module, and port identifies the port to be updated)
5. DOWNLOAD (to load the microcode).

Chapter 9. Troubleshooting

This chapter describes how to diagnose and solve problems that may arise with the operation of an A8-WAN module. These problems are signaled by the following conditions:

- The Module Status LED is not ON.
- The Port Status LED is not ON.
- The Port Activity LED is not ON during data transmission.
- A Port Error LED is ON.
- The Module Reset LED is either ON or blinking.
- The Wrong Slot LED is ON.

Before you start troubleshooting, be sure to carry out the procedure described in "Verifying LED Operation."

When instructed to replace an A8-WAN module, proceed as described in "Replacing Modules" on page 76.

USA and Canada: If the problem is not resolved after following the troubleshooting procedures outlined in this chapter, call toll-free 800-IBM-SERV for IBM support.

Verifying LED Operation

Before troubleshooting an A8-WAN module, verify that all LEDs on the module are functioning properly:

8260 Press the LED Test button on the Fault-Tolerant Controller module in the 8260 hub.

8285 Press the RESET button on the base unit. Note that this action will interrupt all traffic and reset the 8285.

All LEDs should light ON with each of the three colors in sequence. If not, replace the module (see page "Replacing Modules" on page 76).

Module Status LED Is Not ON

During normal operation, the Module Status LED of an A8-WAN module should be ON. If not, the module is inoperable. Refer to Table 8 to diagnose and solve the problem.

Table 8. Problem Determination Using Module Status LED

Module Status LED	Module Status	Possible Cause	Corrective Action
OFF	Disabled or Isolated	Module is not receiving power.	1) Enter the `SET MODULE slot CONNECTED` command at the ATM console. 2) Check the Power Supply LEDs by following the instructions in "Verifying LED Operation" on page 65. 3) **(8260 only)** Check the power budget by entering the `SHOW POWER` command from the A-CPSW console, or Distributed Management Module (DMM) console if a DMM module is installed. For more information, refer to the Command Reference Guide. 4) Re-insert the A8-WAN module.
		Power budget has been exceeded. **(8260 only)**	Add a power supply block.
		Status LED is burned out.	1) Check the Status LED by following the instructions in "Verifying LED Operation" on page 65. 2) If necessary, replace the module.
		Module is faulty.	Replace the module.

Port Status LED Is Not ON

When the Status LED of an ATM WAN module port is not ON, the port has detected a possible problem. Refer to Table 9 to diagnose and solve the problem.

Table 9. Problem Determination Using Port Status LED

Status LED	Port Status	Possible Cause	Corrective Action
OFF	Disabled	Port is disabled.	Enable port.
		Module is not receiving power.	1) Check the Module Status LED by following the instructions in “Verifying LED Operation” on page 65. 2) Re-insert the A8-WAN module.
		Status LED is burned out.	1) Check the Port Status LED by following the instructions in “Verifying LED Operation” on page 65. 2) If necessary, replace the module.
		Module is faulty.	Perform the wrap tests described in “Determining the Failing Component Using a Wrap Test” on page 71.
Blinking	Enabled	Cable attached to the module port is faulty.	Change the cable.
		The remote equipment is faulty.	Call the remote operator.

Port Activity LED Is Not ON During Traffic

If during continuous traffic the Activity LED of an ATM WAN module port is not ON, refer to Table 10 to diagnose and solve the problem.

Table 10. Problem Determination Using Port Activity LED

Activity LED	Possible Cause	Corrective Action
OFF	Port is disabled.	Enter the `SHOW PORT` command at the ATM console to see if port is enabled.
	Module is not receiving power.	1) Check the Module Status and Power Supply LEDs by following the instructions in “Verifying LED Operation” on page 65. 2) Re-insert the A8-WAN module.
	Activity LED is burned out.	1) Check the Activity LED by following the instructions in “Verifying LED Operation” on page 65. 2) If necessary, replace the module.
	Port is faulty.	Perform the wrap tests described in “Determining the Failing Component Using a Wrap Test” on page 71.
	There is a bad connection on the ATM backplane.	1) Remove the A8-WAN module and re-insert it in the same slot. 2) If the problem persists, insert the module in another slot.
	UNI port is enabled but not in service.	From the ATM host, make sure that the station attached to the port has been assigned an ATM address and that the address is unique within the network.

Port Error LED Is ON

When an Error LED of an ATM WAN module port is ON, the port has entered into an error condition. Table 11 describes the possible problems that may occur and the corrective action to take for each problem.

Table 11. Problem Determination Using the Port Error LED

Error LED	Meaning	Possible Cause	Corrective Action
ON	Error condition on the port	Module is faulty.	Perform the wrap tests described in "Determining the Failing Component Using a Wrap Test" on page 71.
		Cable attached to the A8-WAN port is faulty.	1) Change the cable. 2) Perform the wrap tests to determine the failing component. 3) Check the cable type.

Reset LED Is ON or Starts Blinking

When the Reset LED of an A8-WAN module is ON or starts blinking, the module has entered into an error condition. Table 12 describes the possible problems that may occur and the corrective action to take for each problem.

Table 12. Problem Determination Using the Module Reset LED

Reset LED	Meaning	Possible Cause	Corrective Action
ON	Error condition	Module is faulty.	Perform the wrap tests described in "Determining the Failing Component Using a Wrap Test" on page 71.
		There is a bad connection on the ATM backplane.	1) Remove the A8-WAN module and re-insert it in the same slot. 2) If the problem persists, insert the module in another slot.
Blinking **(8260 only)**	Error condition	Internal clock failure.	Replace the module.
		Module is either faulty or not securely plugged into the ATM backplane.	1) Remove the A8-WAN module and re-insert it. 2) If the problem persists, replace the module.
		There is a bad connection on the ATM backplane.	1) Remove the A8-WAN module and re-insert it in the same slot. 2) If the problem persists, insert the module in another slot.

Wrong Slot LED Is ON (8260 only)

When the Wrong Slot LED of an A8-WAN module is ON, the module is not installed in the correct slot. Remove the module from the hub and re-insert it into any blank slot in positions 1 to 8 (or 12 to 17 in A17 models). (Slots 9-10, and 11 in A17 models are reserved for the A-CPSW module). Slot 12 in 17-slot models cannot be used if an A-CPSW module is installed in slot 11.

Determining the Failing Component Using a Wrap Test

In the troubleshooting procedures in this chapter, you are sometimes instructed to perform a wrap test in order to determine the failing component (for example, I/O card or motherboard) that caused the problem in an ATM WAN module connection.

There are four types of wrap tests:

Internal The ATM cell interface on the I/O card is looped back onto itself internally.

External The ATM cell interface on the I/O card is looped back onto itself via an external cable.

Payload-mode A wrap is set up on the port of a local 8260 hub or workgroup switch, and a loop is established from the port on the remote hub or workgroup switch.

Far-end-payload-mode
(T1 only) The local 8260 hub or workgroup switch establishes a loop from the local port to a port connected to a remote 8260 hub or workgroup switch. The reply-mode request is sent via the channel 1 FEAC. The far-end wrap test is a two step process:

1. The far-end mode is enabled, and the loop established.
2. The far-end test is executed, and the loop is released.

   Note: If the connection is broken before the test has completed, the loop can be released manually.

Note: Before running a wrap test, the module must be connected and the port disabled.

1. Enter the SHOW MODULE command to display the status of the module and its ports.
2. If the module is `isolated`, enter the SET MODULE slot CONNECTED command, where slot indicates the location of the module. Then press Enter.
3. If the port is enabled, enter the `SET PORT slot.port DISABLE` command, where `slot` is the slot number of the A8-WAN module to be tested, and `port` is the number of the port (1 or 2). Then press Enter.

Internal Wrap Test

To perform an internal wrap test:

1. Enter the `WRAP slot.port INTERNAL` command, where `slot` is the slot number of the A8-WAN module and `port` is the number of the port. Then press Enter.
2. If you receive the message `Test Failed`, the motherboard is faulty and should be replaced.

External Wrap Test

To perform an external wrap test:

1. Insert a wrap plug in the port.
2. Enter the `WRAP slot.port EXTERNAL` command, where `slot` is the slot number of the module and `port` is the number of the port. Then press Enter.

If you receive a return code of `Test Failed`, the I/O card is faulty and should be replaced.

If you receive a return code of `Test Successful`, and if another 8260 hub or workgroup switch is attached to the port, perform a Reply-mode wrap test or far_end_mode wrap test (T1 only).

If you receive a return code of `Test Successful` and if another device besides an 8260 hub or workgroup switch (for example, a workstation adapter over a UNI connection) is attached to the port, return to the troubleshooting procedure and follow the next step.

Payload-mode Wrap Test

To perform a reply-mode wrap test:

1. Enable the wrap procedure on the remote ATM WAN module port by entering the `WRAP slot.port REPLY_MODE ENABLE` command. Then press Enter.
2. From the console attached to the local hub, enter `WRAP slot.port EXTERNAL`. This command sends a signal across the connection to the remote (wrapped) port on the attached 8260 hub or workgroup switch. The test result appears on the console of the local hub or workgroup switch.

   If you receive a return code of `Test Failed`, either the cable is faulty and should be replaced, or the fault lies with the transceiver of the remote 8260 hub or workgroup switch. If you receive a return code of `Test Successful`, the cause of the problem is on the remote 8260 hub or workgroup switch.
3. Disable the wrap procedure on the remote ATM WAN module port by entering `WRAP slot.port REPLY_MODE DISABLE` from the console attached to the remote hub or workgroup switch. Then press Enter.
4. Perform an internal and external wrap test on the ATM WAN module port on the remote 8260 hub or workgroup switch in order to determine the failing component.

Far-end-payload-mode Wrap Test

To perform an far-end-mode wrap test:

1. Enter the `WRAP slot.port far_end_mode enable` command. Then press Enter.
2. Enter the `WRAP slot.port far_end_test` command. Then press Enter.

If the connection is broken before the test has completed, the loop will not be automatically released. To release the loop, enter the `WRAP slot.port far_end_mode disable` command.

Replacing E1/T1 I/O Cards

After running a wrap test, you may find that an E1/T1 I/O card is faulty and you need to replace it. Or, while troubleshooting a problem from the condition of the ATM WAN module LEDs, you may be instructed to replace an I/O card.

CAUTION:
When removing an I/O card from the motherboard, be careful not to touch its components. Always hold the card by its edges.

To replace an E1/T1 I/O card follow these steps:

__ **1** Enter `SET MODULE slot ISOLATED` where `slot` is the slot number of the 8260 Nways 8-Port ATM WAN module containing the I/O card. Then press Enter.

__ **2** Remove the module from the hub or workgroup switch expansion unit.

__ **3** Unscrew and remove the four screws that attach the motherboard to the module (**8** and **9** in Figure 11 on page 24). Gently pull the motherboard away from the module until the motherboard connectors are detached.

__ **4** Unscrew and remove the post from each side of each port (**7** in Figure 10 on page 23).

__ **5** Unscrew and remove the two screws that attach the faceplate bracket to the motherboard (**6** in Figure 10 on page 23) and remove the bracket.

__ **6** Unscrew and remove the four screws that attach the I/O card to the motherboard (**4** in Figure 9 on page 22) and remove the I/O card.

__ **7** Remove the VPD PROM chip for the I/O card being replaced. (**5** in Figure 9 on page 22).

__ **8** Install a new I/O card and VPD PROM chip on the motherboard as described in Chapter 4, “Mounting the E1/T1 I/O Card on the A8-WAN Module” on page 17.

__ **9** Re-insert the module into the hub or workgroup switch expansion unit.

__ **10** Enter `SET MODULE slot CONNECTED` where `slot` is the slot number of the module. Then press Enter.

Replacing E3/DS3 and OC3/STM1 I/O Cards

After running a wrap test, you may find that the I/O card is faulty and you need to replace it. Or, while troubleshooting a problem from the condition of the ATM WAN module LEDs, you may be instructed to replace an I/O card.

CAUTION:
When removing an I/O card from the motherboard, be careful not to touch its components. Always hold the card by its edges.

To replace an I/O card follow these steps:

__ **1** Enter `SET MODULE slot ISOLATED` where `slot` is the slot number of the 8260 Nways 8-Port ATM WAN module containing the I/O card. Then press Enter.

__ **2** Remove the module from the hub or workgroup switch expansion unit.

__ **3** Unscrew and remove the four screws that attach the motherboard to the module (**7** and **8** in Figure 17 on page 32). Gently pull the motherboard away from the module until the motherboard connectors are detached.

__ **4** Unscrew and remove the two screws that attach the faceplate bracket to the motherboard (**6** in Figure 16 on page 31) and remove the bracket.

__ **5** Unscrew and remove the four screws that attach the I/O card to the motherboard (**4** in Figure 15 on page 30) and remove the I/O card.

__ **6** Remove the VPD PROM chip for the I/O card being replaced. (**5** in Figure 15 on page 30).

__ **7** Install the new I/O card and VPD PROM chip on the motherboard as described in Chapter 5, “Mounting an E3/DS3 or OC3/STM1 I/O Card on the A8-WAN Module” on page 25.

__ **8** Re-insert the module into the hub or workgroup switch expansion unit.

__ **9** Enter `SET MODULE slot CONNECTED` where `slot` is the slot number of the module. Then press Enter.

Replacing Modules

The troubleshooting procedures in this chapter sometimes instruct you to replace a failing A8-WAN module. To do so, follow these steps:

1. Enter `SET MODULE slot ISOLATED` where `slot` is the slot number of the failed module. Then press Enter.
2. Remove the failed module and insert another A8-WAN module in its slot.
3. Enter `SET MODULE slot CONNECTED` where `slot` is the slot number of the failed module. Then press Enter.

The new A8-WAN module is automatically configured with the last settings configured for the slot number you entered.

Running Diagnostics

There are three types of diagnostics:

Power On Diagnostics: Run automatically after the module is reset

Audit Diagnostics Run continuously when the module is operational

On Demand Diagnostics Run on request, by entering the command
`SET PORT slot.port PARM ADDRESS 70 value`

Power On Diagnostics

The diagnostics are run each time the module is initialized, unless deactivated by the SET PORT command (`SET PORT slot.port parm address 100 1`).

To enable power on diagnostics, if they are disabled, enter the `SET PORT slot.port parm address 100 0` command.

The diagnostics test memory access, register access, data path continuity, and basic device functionality on the ports.

The results of the power on diagnostics are displayed in the EQUIPMENT_TEST_RESULT field displayed after entering the following command from the ATM console:

```
SHOW PORT slot.port VERBOSE        [ENTER]
```

slot.port Slot number where the A8-WAN module is installed and port for which results are to be displayed.

Example: The following examples shows the Equipment Test Results fields displayed from the `SHOW MODULE slot.port VERBOSE` command.

```
ATMPROMPT> show port 2.2 verbose       [ENTER]

  ⋮
EQUIPMENT TEST RESULT:
----------------------
 Tests Results                      : OK

ATMPROMPT>
```

The following table describes the fields displayed:

Table 13. Power On Diagnostics

Field	Description
Test results	This field shows whether the diagnostics have completed successfully, failed, or are currently active.
Test number	Number of the failed test (1-200)
Test address	Address where test failed (412 = most significant, 415 = least significant)
Expected data	Data pattern expected by the test when the diagnostics failed.
Received data	Data pattern received by the test
Suspected part	This field indicates the part suspected of causing the diagnostics to fail: • Processor • Flash memory • Static RAM • Dual port RAM • S/UNI device • One FPGA • FPGA 1 • FPGA 2 • Write address FIFO
Interface error	This field indicates whether an interface error has caused the diagnostics to fail.

Audit Diagnostics

Audit diagnostics run continuously and verify that telecom devices are accessible and properly configured. If an error is found, the error information is stored at address offset 420-421.

To display the Audit Diagnostics results, enter the SHOW PORT command as follows:

```
SHOW PORT slot.port ADDRESS 420        [ENTER]
```

16 consecutive addresses from 420 are displayed. The results of the Audit diagnostics are shown in the first two bytes. Table 14 shows the possible values of the first two bytes and their meanings.

Table 14. Audit Diagnostics

First two bytes (HEX)	Description
00 00	No error
00 01	Integration time failure
00 02	Decay time failure
00 03	Timing source failure
00 04	Unscramble received cell failure
00 05	Receive errors failure
00 06	Discard error cells failure
00 07	Discard idle cells failure
00 08	Scramble transmit cells failure
00 09	Generate transmit HEC failure
00 0A	Monitor signal label failure
00 0B	Monitor path trace failure
00 0C	Transmit path trace failure
00 0D	Expected receive path trace failure
00 0E	Coset polynomial failure
10 01	Terminal loopback
10 02	Facility loopback

Example: The following example shows the value 00 01 in the first two bytes, indicating that the Audit diagnostics detected an integration time failure.

```
ATMPROMPT> show port 2.2 parm address 420       [ENTER]
Actual value : 00 01 00 00 00 00 00 00 00 00 00 00 00 00 00 00

ATMPROMPT>
```

On Demand Diagnostics

On Demand diagnostics can be run from terminal dialog. The diagnostic selections are not stored in flash memory, so, if the module is reset, the diagnostics settings will revert to the defaults.

A pattern of 8 bytes can be set to test the control interface between the ATM control point and the A8-WAN ATM port. ATM control point software can read the diagnostic pattern and write it back again in order to test the data path without affecting the operation of the port. The pattern is stored at address offset 070 through 07F.

Displaying the Diagnostics Pattern: To display the current diagnostics pattern, enter the following command:

```
SHOW PORT slot.port VERBOSE        [ENTER]
```

slot Slot number of the A8-WAN module.

port ATM port number.

verbose Required keyword.

The diagnostics pattern is displayed under the heading 'Diagnostics Control' in the output from the command (see “E1 I/O Card” on page 46 for an example).

Setting a Diagnostics Pattern: A value of 00 to 0F can be set for each of the 8 bytes (set to 00 for each byte by default).

To set a pattern, enter the following command:

```
SET PORT slot.port PARM ADDRESS xxx value        [ENTER]
```

slot Slot number of the A8-WAN module.

port ATM port number.

PARM Required keyword.

ADDRESS Required keyword.

xxx Address of the byte to be set (070 through 07F). Only one byte may be set at a time. Repeat the command, changing the address to complete a pattern.

value The value to be applied to the setting. If no value is entered, the setting is displayed and may be altered if required.

Example

```
ATMPROMPT> set port 2.2 parm address 070       [ENTER]
Actual value : 01
Enter required value: 22        [ENTER]

ATMPROMPT>
```

Clearing Diagnostic Results: To clear the results of the diagnostics, address 081 must be set to a value of 1. To do this, enter the following command:

```
SET PORT slot.port PARM ADDRESS 081 1        [ENTER]
```

Failure Status: The A8-WAN module software continually monitors the ports for failure.

The Failure Status for individual ports can be displayed via the SHOW PORT command (SHOW PORT slot.port VERBOSE, where slot.port indicates the slot where the A8-WAN module is installed and the port to be displayed).

T1 Ports: Table 15 lists the possible failures displayed.

Table 15. Failure Status Fields

Field	Description
Equipment_failure	A value of 1 in this field indicates that an equipment failure was detected.
Loss_of_signal	A value of 1 in this field indicates that a Loss of Signal defect was detected.
Loss_of_frame	A value of 1 in this field indicates that a Loss of Frame defect was detected, and a Loss of Signal failure is not present.
T1_red	A value of 1 in this field indicates that a T1 Red CFA defect was detected.
T1_yellow	A value of 1 in this field indicates that a T1 Yellow CFA defect was detected.
T1_ais	A value of 1 in this field indicates that a T1 Alarm Indication Signal was detected.
Loss_of_cell_delin	A value of 1 in this field indicates that a loss of cell delineation was detected.
Loss_of_synch	A value of 1 in this field indicates that a synchronization error was detected.

E1 Ports: The following table lists the possible failures displayed.

Table 16. Failure Status Fields

Field	Description
Equipment_failure	A value of 1 in this field indicates that an equipment failure was detected.
Loss_of_signal	A value of 1 in this field indicates that a Loss of Signal defect was detected.
E1_ais	A value of 1 in this field indicates that an E1 Alarm Indication Signal was detected.
Loss_of_frame	A value of 1 in this field indicates that a Loss of Frame defect was detected, and a Loss of Signal failure is not present.
E1_red	A value of 1 in this field indicates that an E1 Remote Alarm Indication Signal was detected.
E1_rai	A value of 1 in this field indicates that an E1 Yellow CFA defect was detected.
Loss_of_cell_delin	A value of 1 in this field indicates that a loss of cell delineation was detected.
Loss_of_synch	A value of 1 in this field indicates that a synchronization error was detected.

Appendix A. Notices

References in this publication to IBM products, programs, or services do not imply that IBM intends to make these available in all countries in which IBM operates.

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Industry Standards Reflected in This Product

The 8260 Nways 8-Port ATM WAN (A8-WAN) module complies with the ATM User-Network Interface (UNI) Specification V3.0 and V3.1, ATM Forum.

The A8-WAN module is designed according to the specifications of the following industry standards as understood and interpreted by IBM as of September 1994:

- RFC854 - TELNET protocol
- RFC1350 - Trivial File Transfer Protocol (TFTP)
- RFC1577 - Classical IP and ARP (Address Resolution Protocol) over ATM
- SNMP:
  - RFC1155 - Structure and Identification of Management Information (SMI) for TCP/IP based Internet.
  - RFC1156 - Management Information Base (MIB) for network management of TCP/IP based Internets (MIB-I)
  - RFC1157 - Simple Network Management Protocol (SNMP)
  - RFC1212 - Concise MIB definitions
  - RFC1213 - Management Information Base (MIB) for network management of TCP/IP based Internets (MIB-II)
  - RFC1215 - Convention for defining traps for use with SNMP

For more information, see the *IBM Telecommunication Products Safety Handbook*, GA33-0126.

European Union (EU) Statement

This product is in conformity with the protection requirements of EU Council Directive 89/336/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility. IBM can not accept responsibility for any failure to satisfy the protection requirements resulting from a non-recommended modification of the product, including the fitting of non-IBM option cards.

Electronic Emission Notices

Federal Communications Commission (FCC) Statement

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

IBM is not responsible for any radio or television interference caused by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Industry Canada Compliance Statement

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

Avis de conformité aux normes d'Industrie Canada

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Japanese Voluntary Control Council For Interference (VCCI) Statement

This equipment is in the 1st Class category (information equipment to be used in commercial and/or industrial areas) and conforms to the standards set by the Voluntary Control Council for Interference by Information Technology Equipment aimed at preventing radio interference in commercial and industrial areas.

Consequently, when used in a residential area or in an adjacent area thereto, radio interference may be caused to radios and TV receivers, and so on.

Read the instructions for correct handling.

Korean Communications Statement

Please note that this device has been approved for business purpose with regard to electromagnetic interference. If you find this is not suitable for your use, you may exchange it for a non-business one.

New Zealand Radiocommunications (Radio) Regulations

Attention: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

FCC Warning FCC Part 68

This equipment complies with Part 15 and 68 of the Federal Communications Commission (FCC) rules for the United States. It also complies with regulations RSS210 and CS-03 of Industry Canada and Science Canada. Operation is subject to the following two conditions (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

A label is located on the underside of the base unit containing the FCC registration.

Provide your telephone company with the following information:

Facility Interface Code: 04DU9-1SN; Service Order Code: 6.0N; USOC Jack Type: RJ48X.

This equipment is compatible with inductively coupled hearing aids.

Should you experience trouble with this telephone equipment, please contact:

IBM U.S. Maintenance Services
400 Parsons Pond Drive
Franklin Lakes, New Jersey
09417 U.S.A.

1-800-IBMSERV

If trouble is experienced with the **ATM Line Interface Module**, for repair or warranty information, please contact *IBM U.S. Maintenance Services* in the USA **1-800-IBMSERV**. If the equipment is causing harm to the telephone network, the telephone company may request that you disconnect the equipment until the problem is resolved.

For repair/warranty information. The telephone company may ask you to disconnect this equipment from the line network until the problem has been corrected.

Notice to Users of Machines Installed in Canada

The Industry Canada label identifies certified equipment. This certification means that the equipment meets telecommunications network protective, operational and safety requirements as prescribed in the appropriate Terminal Equipment Technical Requirements document(s). The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. 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 representative designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

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

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

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 sécurité 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 la raccorder aux installations de l'entreprise locale de télécommunication. Le matériel doit égalment être 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 à 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-même; il doit avoir recours à un service d'inspection des installations électriques, ou à un électricien, selon le cas.

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IBM Nways

Safety

This product complies with international and IBM* safety standards.

For more information, see the *IBM Telecommunication Products Safety Handbook*, GA33-0126.

Appendix B. Technical Specifications

General

	Feature Codes	Faceplate Marking	Features per Module	Max. Ports per Module	Connectors
A8-WAN Module	5602	A8-WAN			
E1/T1 I/O Card	8507	E1/T1	2	8	DB9
E3 I/O Card	8501	E3	4	4	BNC
DS3 I/O Card	8502	DS3	4	4	BNC
OC3 SONET Single Mode Fiber	8503	O-SF	2	2	SC fiber
OC3 SONET Multimode Fiber	8504	O-MF	2	2	SC fiber
STM1 SDH Single Mode Fiber	8505	S-SF	2	2	SC fiber
STM1 SDH Multimode Fiber	8506	S-MF	2	2	SC fiber

Electrical

Power Requirement 34.2 Watts for +5.25V
(18.4 Watts for the motherboard plus 7.9 Watts for each I/O card)

Power Consumption 6.5 Amps for +5.25V

Fuses 7 Amps for +5.25V

Environmental

Operating Temperature 10°C to 50°C (50°F to 122°F)

Storage Temperature –10°C to +60°C (14°F to 140°F)

Humidity 0 to 95 % RH

Mechanical

Dimensions 2.5 cm. (1.0 in) Width
10.27 cm. (10.7 in) Length
38.5 cm. (15.2 in) Height

Weight 2 kg (4.4 lbs)

Appendix C. Changing E1/T1 Default Settings

The E1/T1 I/O cards for the A8-WAN module are supplied with default settings for the ATM ports. These settings can be changed with the SET PORT command from the ATM Control Point console. This appendix describes the default settings, the possible alternate settings, and how to change them.

- Parameters common to both E1 and T1 I/O cards are detailed in “Common WAN Port Parameters (E1/T1)” on page 99.
- Additional parameters specific to E1 I/O cards are detailed in “E1 Port Parameters” on page 103.
- Additional parameters specific to T1 I/O cards are detailed in “T1 Port Parameters” on page 104.

Displaying Current Settings

The current setting of a parameter is displayed via the `SHOW PORT` command. Frequently used parameters are displayed when the `SHOW PORT slot.port VERBOSE` command is issued, and all other settings are displayed individually when the `SET PORT` command is issued along with the address of the parameter to be displayed. 16 bytes are displayed, starting from the address specified.

Table 17 summarizes which method should be used.

Table 17. Displaying Parameters

To Display:	Use the Command:
Failure_integration_time Failure_decay_time Timing_source Descramble_rcv_cells Discard_idle_cells Scramble_xmt_cells Correct_rcv_errors T1_lbo (T1 only) T1_format (T1 only)	`SHOW PORT slot.port VERBOSE`
All other parameters	`SHOW PORT slot.port ADDRESS address`

Examples: For an example of how to display parameters using the `SHOW PORT VERBOSE` command, see “Port Settings” on page 45.

This example shows how to display the setting of the power on diagnostics.

```
ATMPROMPT> show port 4.2 address 100        [ENTER]

Actual value: 01 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
ATMPROMPT>
```

Note that 16 bytes are displayed, starting with address 100. The value **01** in the first byte (address 100), shows that the diagnostics are enabled (see Power On Diagnostics on page 100).

Changing Current Settings

The current setting of a parameter is changed via the `SET PORT` command. Frequently used parameters can be changed when the `SET PORT slot.port PARM name` command is issued, where `name` defines the name of the parameter to be changed, and `value` signifies the new value to be applied. All other settings are changed when the `SET PORT slot.port PARM ADDRESS address value` command is issued, `address` specifying the address of the parameter to be changed, `value` specifying the new value (in hex). If no value is entered, the current setting is displayed, and you are given the option of entering a new setting.

Table 18 summarizes which method should be used.

Table 18. Changing Parameters

To Change:	Use the Command:
Failure_integration_time Failure_decay_time Timing_source Descramble_rcv_cells Discard_idle_cells Scramble_xmt_cells Discard_errored_cells Correct_rev_cells Set_card_default_config Set_port_default_config T1_lbo (T1 only) T1_format (T1 only) Card_soft_reset	`SET PORT slot.port PARM name value`
All other parameters	`SET PORT slot.port PARM ADDRESS address value`

Examples: This example shows how to set the timing source to external timing:

```
ATMPROMPT> set port 4.2 parm timing_source 1        [ENTER]

ATMPROMPT>
```

This example shows how to disable power on diagnostics:

```
ATMPROMPT> set port 4.2 parm address 100 0      [ENTER]

ATMPROMPT>
```

Common WAN Port Parameters (E1/T1)

The following parameters are used to configure all types of WAN module ports:

slot, port, apply_defaults, enable, disable, uni, iisp, pnni, void, public_uni
These Standard SET PORT parameters are described in the *IBM 8285/8260: ATM Command Reference Guide*, SA33-0385.

PARM failure_int_time *xx*
The amount of time, in half-second increments, that a defect must be continually present before being deemed a failure is set by default to 2.5 seconds. See the table below for possible values of *xx*.

Table 19. Failure Integration Time Parameter Values

Value	Sec	Value	Sec	Value	Sec	Value	Sec	Value	Sec
00	0.0	**05**	2.5	**10**	5.0	**15**	7.5	**20**	10.0
01	0.5	**06**	3.0	**11**	5.5	**16**	8.0		
02	1.0	**07**	3.5	**12**	6.0	**17**	8.5		
03	1.5	**08**	4.0	**13**	6.5	**18**	9.0		
04	2.0	**09**	4.5	**14**	7.0	**19**	9.5		

PARM failure_decay_time *xx*
The amount of time, in five-second increments, that a defect must be continually absent before the failure is cleared is set by default to 10.0 seconds. See the table below for possible values of *xx*.

Table 20. Failure Decay Time Parameter Values

Value	Sec	Value	Sec	Value	Sec	Value	Sec	Value	Sec
00	0.0	**05**	5.0	**10**	10.0	**15**	15.0	**20**	20.0

PARM timing_source *x*
The timing source used for transmission signal timing can be set to be derived from the receive signal (Facility timing), the external interface (External timing), or the I/O card (Internal timing). Possible values of *x* are:

0 Facility timing (default)
1 External timing
2 Internal timing
3 Receive line clock timing

PARM descramble_rcv_cells *x*

The ATM cells received by the port are unscrambled by default. Possible values of *x* are:

0 Unscrambling disabled
1 Unscrambling enabled (default)

PARM discard_idle_cells *x*

Idle ATM cells (cells with VPI and VCI fields of zeroes) received by the port are discarded by default. Possible values of *x* are:

0 Discard disabled
1 Discard enabled (default)

PARM scramble_xmt_cells *x*

The scrambling of ATM cells transmitted by the port is performed by default. Possible values of *x* are:

0 Scrambling disabled
1 Scrambling enabled (default)

PARM correct_rcv_errors *x*

The correction of single bit errors in the header of ATM cells received is performed by default. Possible values of *x* are:

0 Disabled
1 Enabled (default)

PARM discard_errored_cells *x*

The discarding of idle ATM cells received is performed by default. Possible values of *x* are:

0 Disabled
1 Enabled (default)

PARM ADDRESS 100 *x* [Power On Diagnostics]

Power On diagnostics test memory access, register access, data path continuity and basic device functionality on the port, after each reset of the port. These diagnostics are enabled by default. Disabling the diagnostics will minimize the time required for the port to be initialized. Possible values of *x* are:

0 Disabled
1 Enabled (default)

PARM ADDRESS *address x* [Generate Header Error Control (HEC) Field]

The generation of the HEC field in ATM cells that are to be transmitted over the ATM port is performed by default. The port generates the HEC field and inserts it into the transmitted cells. Applications that require the ATM Control Point to generate the field should disable this function.

Values for *address* may be:

116 Port 1
126 Port 2
136 Port 3
146 Port 4

Possible values of *x* are:

0 Generation disabled
1 Generation enabled (default)

PARM ADDRESS *address x* [Addition of Coset Polynomial in ATM Cell Headers]

The addition of the coset polynomial to the HEC byte in ATM cell headers is performed by default.

Values for *address* may be:

117 Port 1
127 Port 2
137 Port 3
147 Port 4

Possible values of *x* are:

0 Coset polynomial not added
1 Coset polynomial added (default)

Example: The following command sets the timing source to external timing on port 2 of slot 4.

```
ATMPROMPT> set port 4.2 parm timing_source 0             [ENTER]

ATMPROMPT> Port set.
ATMPROMPT> show port 4.2 verbose                         [ENTER]

  ⋮
CONFIGURATION CONTROL:
----------------------
 Common for the card:
 ====================
   Failure Integration Time         : 2500 ms
   Failure Decay Time               : 10 s

 Specific for this port:
 =======================
   Timing Source                    : PARM_FACILITY_TMG
   Descramble Received Cells        : Yes
   Discard Idle Cells               : Yes
  ⋮

ATMPROMPT>
```

Example: The following command disables the generation of the HEC field in cells transmitted over port 1 of slot 3.

```
ATMPROMPT> set port 3.1 parm address 116 0               [ENTER]

ATMPROMPT> Port set.
ATMPROMPT> show port 3.1 address 116                     [ENTER]

Actual value: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
```

E1 Port Parameters

In addition to the common WAN port parameters, the following parameters are used to configure E1 ports:

PARM ADDRESS *addr x* [Set SA4 - SA8 Bits in Transmit E1]

(E1 only) Sets the value of the SA4 to SA8 Bits in the transmit E1.

Possible values of *x* are **0** and **1**.

Values for *addr* may be:

Table 21. Values for SA4 to SA8 bits in Transmit E1

Bit	Port 1	Port 2	Port 3	Port 4
SA4	118	128	138	148
SA5	119	129	139	149
SA6	11A	12A	13A	14A
SA7	11B	12B	13B	14B
SA8	11C	12C	13C	14C

T1 Port Parameters

In addition to the common WAN port parameters, the following parameters are used to configure T1 ports:

PARM ADDRESS *address x*

The T1 termination location is set to a customer-side location by default.

Values for *address* may be:

11B Port 1 or Port 5
12B Port 2 or Port 6
13B Port 3 or Port 7
14B Port 4 or Port 8

Possible values of *x* are:

0 T1 termination on Network side
1 T1 termination on Customer side (default)

PARM t1_format *x*

The framing format of the transmit T1 is set to ESF by default. Possible values of *x* are:

0 SF format
1 ESF format (default)

PARM t1_lbo *x*

The transmit output amplitude and shape are set to 0 dB by default. Possible values of *x* are:

0 0-133 Ft.
1 133-266 Ft.
2 266-399 Ft.
3 399-533 Ft.
4 533-655 Ft.
5 0 dB (default)
6 7.5 dB
7 15 dB
8 22.5 dB

Appendix D. Changing E3/DS3 Default Settings

The E3/DS3 I/O cards for the A8-WAN module are supplied with default settings for the ATM ports. These settings can be changed with the SET PORT command from the ATM Control Point console. This appendix describes the default settings, the possible alternate settings, and how to change them.

- Parameters common to both E3 and DS3 I/O cards are detailed in “Common WAN Port Parameters (E3/DS3)” on page 107.
- Additional parameters specific to E3 I/O cards are detailed in “E3 Port Parameters” on page 110.
- Additional parameters specific to DS3 I/O cards are detailed in “DS3 Port Parameters” on page 112.

Displaying Current Settings

The current setting of a parameter is displayed via the `SHOW PORT` command. Frequently used parameters are displayed when the `SHOW PORT slot.port VERBOSE` command is issued, and all other settings are displayed individually when the `SET PORT` command is issued along with the address of the parameter to be displayed. 16 bytes are displayed, starting from the address specified.

Table 22 summarizes which method should be used.

Table 22. Displaying Parameters

Parameter	To Display:
Failure_integration_time Failure_decay_time Timing_source Descramble_rcv_cells Discard_idle_cells Scramble_xmt_cells	`SHOW PORT slot.port VERBOSE`
All other parameters	`SHOW PORT slot.port ADDRESS address`

Examples: For an example of how to display parameters using the `SHOW PORT VERBOSE` command, see “Port Settings” on page 45.

This example shows how to display the setting of the power on diagnostics.

```
ATMPROMPT> show port 4.2 address 100        [ENTER]

Actual value: 01 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
ATMPROMPT>
```

Note that 16 bytes are displayed, starting with address 100. The value **01** in the first byte (address 100), shows that the diagnostics are enabled (see Power On Diagnostics on page 108).

Changing Current Settings

The current setting of a parameter is changed via the `SET PORT` command. Frequently used parameters can be changed when the `SET PORT slot.port PARM name` command is issued, where `name` defines the name of the parameter to be changed, and `value` signifies the new value to be applied. All other settings are changed when the `SET PORT slot.port PARM ADDRESS address value` command is issued, `address` specifying the address of the parameter to be changed, `value` specifying the new value (in hex). If no value is entered, the current setting is displayed, and you are given the option of entering a new setting.

Table 23 summarizes which method should be used.

Table 23. Changing Parameters

Parameter	To Change:
Failure_integration_time Failure_decay_time Timing_source Descramble_rcv_cells Discard_idle_cells Scramble_xmt_cells	`SET PORT slot.port PARM name value`
All other parameters	`SET PORT slot.port PARM ADDRESS address value`

Examples: This example shows how to change the timing source to external timing:

```
ATMPROMPT> set port 4.2 parm timing_source 1        [ENTER]

ATMPROMPT>
```

This example shows how to change the setting of the power on diagnostics to disabled:

```
ATMPROMPT> set port 4.2 parm address 100 0      [ENTER]

ATMPROMPT>
```

Common WAN Port Parameters (E3/DS3)

The following parameters are used to configure all types of WAN module ports:

slot, port, apply_defaults, enable, disable, uni, iisp, pnni, void, public_uni
These Standard SET PORT parameters are described in the *IBM 8285/8260: ATM Command Reference Guide*, SA33-0385.

PARM failure_int_time *xx*
The amount of time, in half-second increments, that a defect must be continually present before being deemed a failure is set by default to 2.5 seconds. See the table below for possible values of *xx*.

Table 24. Failure Integration Time Parameter Values

Value	Sec	Value	Sec	Value	Sec	Value	Sec	Value	Sec
00	0.0	**05**	2.5	**10**	5.0	**15**	7.5	**20**	10.0
01	0.5	**06**	3.0	**11**	5.5	**16**	8.0		
02	1.0	**07**	3.5	**12**	6.0	**17**	8.5		
03	1.5	**08**	4.0	**13**	6.5	**18**	9.0		
04	2.0	**09**	4.5	**14**	7.0	**19**	9.5		

PARM failure_decay_time *xx*
The amount of time, in five-second increments, that a defect must be continually absent before the failure is cleared is set by default to 10.0 seconds. See the table below for possible values of *xx*.

Table 25. Failure Decay Time Parameter Values

Value	Sec	Value	Sec	Value	Sec	Value	Sec	Value	Sec
00	0.0	**05**	5.0	**10**	10.0	**15**	15.0	**20**	20.0

PARM timing_source *x*
The timing source used for transmission signal timing can be set to be derived from the receive signal (Facility timing), the external interface (External timing), or the I/O card (Internal timing). Possible values of *x* are:

0 Facility timing (default)
1 External timing
2 Internal timing

PARM descramble_rcv_cells *x*
The ATM cells received by the port are unscrambled by default. Possible values of *x* are:

0 Unscrambling disabled
1 Unscrambling enabled (default)

PARM discard_idle_cells *x*

Idle ATM cells (cells with VPI and VCI fields of zeroes) received by the port are discarded by default. Possible values of *x* are:

0 Discard disabled
1 Discard enabled (default)

PARM scramble_xmt_cells *x*

The scrambling of ATM cells transmitted by the port is performed by default. Possible values of *x* are:

0 Scrambling disabled
1 Scrambling enabled (default)

PARM ADDRESS 100 *x* [Power On Diagnostics]

Power On diagnostics test memory access, register access, data path continuity and basic device functionality on the port, after each reset of the port. These diagnostics are enabled by default. Disabling the diagnostics will minimize the time required for the port to be initialized. Possible values of *x* are:

0 Disabled
1 Enabled (default)

PARM ADDRESS 105 *x* [Correct Header Errors]

The correction of single bit errors in the header of ATM cells received by the port is enabled by default. Possible values of *x* are:

0 Error correction disabled
1 Error correction enabled (default)

PARM ADDRESS 106 *x* [Discard ATM Cells with Uncorrectable Headers]

ATM cells with uncorrectable header errors received by the port are discarded by default. They are not passed to the ATM Control Point. Possible values of *x* are:

0 Discard disabled
1 Discard enabled (default)

PARM ADDRESS 109 *x* [Generate Header Error Control (HEC) Field]

The generation of the HEC field in ATM cells that are to be transmitted over the ATM port is performed by default. The port generates the HEC field and inserts it into the transmitted cells. Applications that require the ATM Control Point to generate the field should disable this function. Possible values of *x* are:

0 Generation disabled
1 Generation enabled (default)

Example: The following command sets the timing source to external timing on port 2 of slot 4.

```
ATMPROMPT> set port 4.2 parm timing_source 1              [ENTER]

ATMPROMPT> Port set.
ATMPROMPT> show port 4.2 verbose                          [ENTER]

  ⋮
CONFIGURATION CONTROL:
----------------------
 Common for the card:
 ====================
   Failure Integration Time         : 2500 ms
   Failure Decay Time               : 10 s

 Specific for this port:
 =======================
   Timing Source                    : PARM_FACILITY_TMG
   Descramble Received Cells        : Yes
   Discard Idle Cells               : Yes
   Scramble Transmitted Cells       : Yes
   Discard Errored Cells            : Yes
   Correct Received Errors          : Yes
  ⋮

ATMPROMPT>
```

Example: The following command enables the discard of ATM cells with uncorrectable headers port 1 of slot 3.

```
ATMPROMPT> set port 3.1 parm address 106 1                [ENTER]

ATMPROMPT> Port set.
ATMPROMPT> show port 3.1 address 106                      [ENTER]

Actual value: 01 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
```

E3 Port Parameters

In addition to the common WAN port parameters, the following parameters are used to configure E3 ports:

PARM ADDRESS 10A *x* [Addition of Coset Polynomial in ATM Cell Headers]

The addition of the coset polynomial to the HEC byte in ATM cell headers is performed by default. Possible values of *x* are:

0 Coset polynomial not added
1 Coset polynomial added (default)

PARM ADDRESS 10B *x* [E3 Framing Format]

The E3 transmit framing format is by default set to G.832. When other framing formats are supported in future releases, the format may be changed. Possible values of *x* are:

0 G.832 format used for transmit

PARM ADDRESS 10C *x* [E3 Transmit Timing Marker]

When external timing is used (see PARM timing_source on page 107), transmit timing can be deemed traceable to a primary reference clock. Possible values of *x* are:

0 External clock is a primary reference clock
1 External clock is not a primary reference clock (default)

PARM ADDRESS 10D *x* [Monitoring of Payload Type]

The monitoring of payload type mismatch failures can be enabled or disabled. When enabled, failures are declared when the payload field of the E3 overhead does not contain the proper value. Possible values of *x* are:

0 Monitoring disabled
1 Monitoring enabled (default)

PARM ADDRESS 10E *x* [Monitoring of Trail Mismatch Failures]

The monitoring of trail mismatch failures (see Expected Trail Trace on page 111), can be enabled or disabled. When enabled, failures are declared when the 16-byte trail trace received does not match the expected receive trail trace (see Expected Trail Trace on page 111), Possible values of *x* are:

0 Monitoring disabled (default)
1 Monitoring enabled

PARM ADDRESS 10F *x* [Trail Trace Format]

The trail trace format applies to both the transmit and receive trail traces. The 16-byte trail trace format can be specified to include a CRC7 in the first byte. Possible values of *x* are:

0 16-byte format
1 16-byte format with CRC7 in first byte (default)

PARM ADDRESS 110 - 11F *x* [Transmit Trail Trace]

A trail access point identifier (16 bytes in length) is usually transmitted so that the trail receiving terminator can verify that it is connected to the correct transmitter. If the trail trace format is set to include a CRC7 in the first byte, only bytes 1-15 of the 16 byte field are significant. Possible values of *x* are:

00 to **FF** for each byte. Default is 89 for the first byte, all remaining bytes 00.

PARM ADDRESS 120 - 12F *x* [Expected Trail Trace]

The trail trace that is expected to be received can be specified so that when the monitoring of trace mismatch failures is active (see Monitoring Trail Mismatch Failures on page 110), a failure can be signalled if the received trail trace differs. If the trail trace format is set to include a CRC7 in the first byte, only bytes 1-15 of the 16 byte field are significant. Possible values of *x* are:

00 to **FF** for each byte. Default is 89 for the first byte, all remaining bytes 00.

PARM ADDRESS 130 *x* [Generation of RDI Signal]

An E3 RDI signal can be generated when of loss of cell delineation occurs. Possible values of *x* are:

0 Transmission of RDI signal disabled
1 Transmission of RDI signal enabled (default)

Example: The following command enables the monitoring for improper payload values on port 2 of slot 1.

```
ATMPROMPT> set port 1.2 parm address 10d 1              [ENTER]

ATMPROMPT> Port set.
ATMPROMPT> show port 1.2 address 10d                    [ENTER]

Actual value: 01 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
```

DS3 Port Parameters

In addition to the common WAN port parameters, the following parameters are used to configure DS3 ports:

PARM ADDRESS 10A *x* [Addition of Coset Polynomial in ATM Cell Headers]

The addition of the coset polynomial to the HEC byte in the ATM cell headers is performed by default. Possible values of *x* are:

0 Coset polynomial not added
1 Coset polynomial added (default)

PARM ADDRESS 10B *x* [DS3 Framing Format]

The DS3 transmit framing format can be set to either C-bit parity or M23 format. Enforced C-bit parity is set by default. The format can also be set so that C-bit parity automatically reverts to M23 format if the received DS3 signal is in M23 format. Possible values of *x* are:

0 M23 format forced
1 C-bit parity format preferred
2 C-bit parity format forced (default)

PARM ADDRESS 10C *x* [DS3 Line Buildout]

The transmit DS3 line buildout is determined by the length of the cable connected to the ATM port. If the cable is between 0 and 225 feet (0 and 68.5 m), the default setting should be used. If the length of cable is between 225 and 450 feet (68.5 and 137.1 m), the setting should be changed to **1**. Possible values of *x* are:

0 0 to 225 feet (default)
1 225 to 450 feet

PARM ADDRESS 10D *x* [PLCP Framing]

A PLCP (Physical Layer Convergence Protocol) can be used in the transmit and receive DS3 signals. When used (default), 41.1 Mbps of bandwidth is allocated to ATM cell traffic, while direct mapping of ATM cells provides up to 44.21 Mbps of bandwidth for ATM traffic. If not used, ATM cells are mapped directly into the DS3 payload and cell delineation is based on the HEC field. Possible values of *x* are:

0 PLCP disabled
1 PLCP enabled (default)

PARM ADDRESS 10E *x* [PLCP Timing Source]

The timing source for the transmit PLCP can be independent of transmit DS3 timing. By default, the timing is derived from the receive PLCP signal, and may be changed to derive timing from the transmit DS3 signal or from the external interface. Possible values of *x* are:

1 External 8kHz timing
3 Receive PLCP (default)
4 Transmit DS3

PARM ADDRESS 10F *x* [Transmitting Z Bytes]

Transmit Z bytes can either be derived from an external source or be filled with zeroes (default). When an external source is used, the bytes are derived from the XPOHDATA (Transmit PLCP Overhead Data) signal. Possible values of *x* are:

0 All zeroes (default)
1 External source

Example: The following command enables PLCP framing on port 3 of slot 4.

```
ATMPROMPT> set port 4.3 parm address 10d 1              [ENTER]

ATMPROMPT> Port set.
ATMPROMPT> show port 4.3 address 10d                    [ENTER]

Actual value: 01 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
```

Appendix E. Changing OC3/STM1 Default Settings

The OC3/STM1 I/O cards for the A8-WAN module are supplied with default settings for the ATM ports. These settings can be changed with the SET PORT command from the ATM Control Point console. This appendix describes the default settings, the possible alternate settings, and how to change them.

- Parameters common to both OC3 and STM1 I/O cards are detailed in “Common WAN Port Parameters (OC3/STM1)” on page 117.

Displaying Current Settings

The current setting of a parameter is displayed via the `SHOW PORT` command. Frequently used parameters are displayed when the `SHOW PORT slot.port VERBOSE` command is issued, and all other settings are displayed individually when the `SET PORT` command is issued along with the address of the parameter to be displayed. 16 bytes are displayed, starting from the address specified.

Table 26 summarizes which method should be used.

Table 26. Displaying Parameters

Parameter	To Display:
Failure_integration_time Failure_decay_time Timing_source Descramble_rcv_cells Discard_idle_cells Scramble_xmt_cells	`SHOW PORT slot.port VERBOSE`
All other parameters	`SHOW PORT slot.port ADDRESS address`

Examples: For an example of how to display parameters using the `SHOW PORT VERBOSE` command, see “Port Settings” on page 45.

This example shows how to display the setting of the power on diagnostics.

```
ATMPROMPT> show port 4.2 address 100        [ENTER]

Actual value: 01 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
ATMPROMPT>
```

Note that 16 bytes are displayed, starting with address 100. The value **01** in the first byte (address 100), shows that the diagnostics are enabled (see Power On Diagnostics on page 118).

Changing Current Settings

The current setting of a parameter is changed via the `SET PORT` command. Frequently used parameters can be changed when the `SET PORT slot.port PARM name` command is issued, where `name` defines the name of the parameter to be changed, and `value` signifies the new value to be applied. All other settings are changed when the `SET PORT slot.port PARM ADDRESS address value` command is issued, `address` specifying the address of the parameter to be changed, `value` specifying the new value (in hex). If no value is entered, the current setting is displayed, and you are given the option of entering a new setting.

Table 27 summarizes which method should be used.

Table 27. Changing Parameters

Parameter	To Change:
Failure_integration_time Failure_decay_time Timing_source Descramble_rcv_cells Discard_idle_cells Scramble_xmt_cells	`SET PORT slot.port PARM name value`
All other parameters	`SET PORT slot.port PARM ADDRESS address value`

Examples: This example shows how to change the timing source to external timing:

```
ATMPROMPT> set port 4.2 parm timing_source 1        [ENTER]

ATMPROMPT>
```

This example shows how to change the setting of the power on diagnostics to disabled:

```
ATMPROMPT> set port 4.2 parm address 100 0      [ENTER]

ATMPROMPT>
```

Common WAN Port Parameters (OC3/STM1)

The following parameters are used to configure all types of WAN module ports:

slot, port, apply_defaults, enable, disable, uni, iisp, pnni, void, public_uni
These Standard SET PORT parameters are described in the *IBM 8285/8260: ATM Command Reference Guide*, SA33-0385.

PARM failure_int_time *xx*
The amount of time, in half-second increments, that a defect must be continually present before being deemed a failure is set by default to 2.5 seconds. See the table below for possible values of *xx*.

Table 28. Failure Integration Time Parameter Values

Value	Sec	Value	Sec	Value	Sec	Value	Sec	Value	Sec
00	0.0	**05**	2.5	**10**	5.0	**15**	7.5	**20**	10.0
01	0.5	**06**	3.0	**11**	5.5	**16**	8.0		
02	1.0	**07**	3.5	**12**	6.0	**17**	8.5		
03	1.5	**08**	4.0	**13**	6.5	**18**	9.0		
04	2.0	**09**	4.5	**14**	7.0	**19**	9.5		

PARM failure_decay_time *xx*
The amount of time, in five-second increments, that a defect must be continually absent before the failure is cleared is set by default to 10.0 seconds. See the table below for possible values of *xx*.

Table 29. Failure Decay Time Parameter Values

Value	Sec	Value	Sec	Value	Sec	Value	Sec	Value	Sec
00	0.0	**05**	5.0	**10**	10.0	**15**	15.0	**20**	20.0

PARM timing_source *x*
The timing source used for transmission signal timing can be set to be derived from the receive signal (Facility timing), the external interface (External timing), or the I/O card (Internal timing). Possible values of *x* are:

0 Facility timing (default)
1 External timing
2 Internal timing

PARM descramble_rcv_cells *x*
The ATM cells received by the port are unscrambled by default. Possible values of *x* are:

0 unscrambling disabled
1 unscrambling enabled (default)

PARM discard_idle_cells *x*

Idle ATM cells (cells with VPI and VCI fields of zeroes) received by the port are discarded by default. Possible values of *x* are:

0 discard disabled
1 discard enabled (default)

PARM scramble_xmt_cells *x*

The scrambling of ATM cells transmitted by the port is performed by default. Possible values of *x* are:

0 scrambling disabled
1 scrambling enabled (default)

PARM ADDRESS 100 *x* [Power On Diagnostics]

Power On diagnostics test memory access, register access, data path continuity and basic device functionality on the port, after each reset of the port. These diagnostics are enabled by default. Disabling the diagnostics will minimize the time required for the port to be initialized. Possible values of *x* are:

0 disabled
1 enabled (default)

PARM ADDRESS 105 *x* [Correct Header Errors]

The correction of single bit errors in the header of ATM cells received by the port is enabled by default. Possible values of *x* are:

0 error correction disabled
1 error correction enabled (default)

PARM ADDRESS 106 *x* [Discard ATM Cells with Uncorrectable Headers]

ATM cells with uncorrectable header errors received by the port are discarded by default. They are not passed to the ATM Control Point. Possible values of *x* are:

0 discard disabled
1 discard enabled (default)

PARM ADDRESS 109 *x* [Generate Header Error Control (HEC) Field]

The generation of the HEC field in ATM cells that are to be transmitted over the ATM port is performed by default. The port generates the HEC field and inserts it into the transmitted cells. Applications that require the ATM Control Point to generate the field should disable this function. Possible values of *x* are:

0 generation disabled
1 generation enabled (default)

PARM ADDRESS 10A *x* [Monitoring of Signal Label Mismatch Failures]

Signal label mismatch failures are monitored by the port by default. The port indicates label mismatch failures when the C2 byte in the SDH path overhead received does not contain the proper value. The use of this monitoring is optional. Possible values of *x* are:

0 monitoring disabled
1 monitoring enabled (default)

PARM ADDRESS 18D *x* [Path Trace Format (STM1 only)]

The path trace format applies to both receive and transmit path traces. By default, it is set to a repeating 64-byte message. The trace can also be set to a repeating 16-byte message, with the first byte optionally containing a CRC7 calculated over the message. Possible values of *x* are:

00 to **FF** for each byte (max. 64 bytes)
00 for each byte (default)

PARM ADDRESS 10B *x* [Monitoring of Path Trace Mismatch Failures]

Path trace mismatch failures are not monitored by default. When enabled, the ATM port indicates path trace mismatch failures when the 64-byte path trace received in the J1 byte in the SDH path overhead received does not match the expected received path trace. The expected path trace should be configured before monitoring is activated. Possible values of *x* are:

0 monitoring disabled (default)
1 monitoring enabled

PARM ADDRESS 10C *x* [Transmitted Path Trace]

The path trace transmitted by the ATM port in the J1 byte of the SDH overhead, typically a string describing the location of the transmitter, is sent in the path trace field so that the far end VC4 path terminator can verify that is connected to the correct transmitter. If the path trace format has been set at 16 bytes, (see Path Trace Format on page 119), only the first 16 bytes (all set to 0 by default) of this field are significant. If the path trace format contains a CRC7, only bytes 1-15 are significant (a CRC7 is generated for byte 0). Possible values of *x* are:

00 to **FF** for each byte (max. 64 bytes)
00 for each byte (default)

PARM ADDRESS 14C - 18B *x* [Expected Received Path Trace]

If the monitoring of path trace mismatches is enabled, the value assigned to the expected path trace is compared with the received path trace to determine if a mismatch is present. If the path trace format contains a CRC7, only bytes 1-15 are significant (a CRC7 is generated for byte 0). By default, the expected received path trace has all bytes set to zeroes. Possible values of *x* are:

00 to **FF** for each byte (max. 64 bytes)
00 for each byte (default)

PARM ADDRESS 18C *x* [Addition of Coset Polynomial in ATM Cell Headers (STM1 only)]

The addition of the coset polynomial to the HEC byte in the ATM cell headers is performed by default. Possible values of *x* are:

0 coset polynomial not added
1 coset polynomial added (default)

Example: The following command sets the timing source to external timing on port 2 of slot 4.

```
ATMPROMPT> set port 4.2 parm timing_source 1             [ENTER]

ATMPROMPT> Port set.
ATMPROMPT> show port 4.2 verbose                         [ENTER]


CONFIGURATION CONTROL:
----------------------
 Failure Integration Time           : 0 s
 Failure Decay Time                 : 0 s
 Timing Source                      : PARM_FACILITY_TMG
 Descramble Received Cells          : Yes
 Discard Idle Cells                 : Yes
 Scramble Transmitted Cells         : Yes
  ⋮

ATMPROMPT>
```

Example: The following command enables the correction of single bit errors in ATM cell headers received on port 1 of slot 3.

```
ATMPROMPT> set port 3.1 parm address 10D 1               [ENTER]

ATMPROMPT> Port set.
ATMPROMPT> show port 3.1 address 10D                     [ENTER]

Actual value: 01 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
```

Appendix F. Cables and Connectors

E1 Twisted-Pair Connection

E1 Twisted-Pair Interface	Description
Number	4
Characteristics	E1 (120 Ohms)
Speed	2.048 Mbps
Feature Code	8505

Wrap Plug

The part number of the wrap plug is 57G8097.

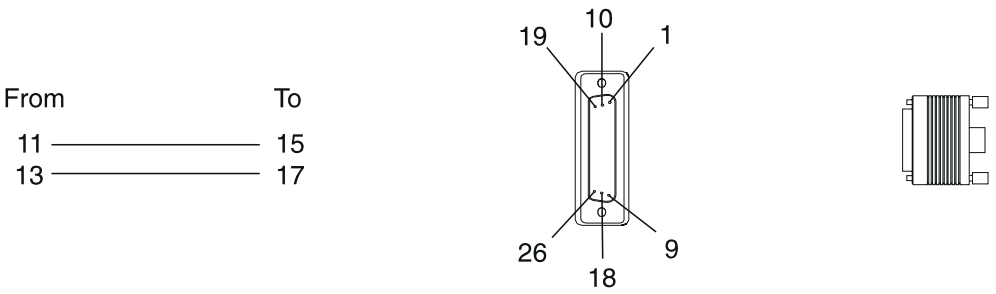

Figure 25. E1 Twisted-Pair Wrap Plug Pin Assignment

Cable and Connectors

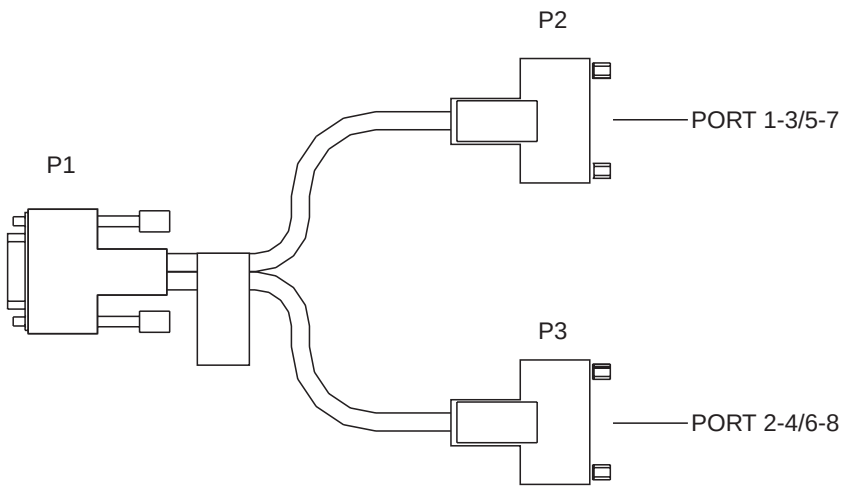

Figure 26. E1 Twisted-Pair Connector Cable

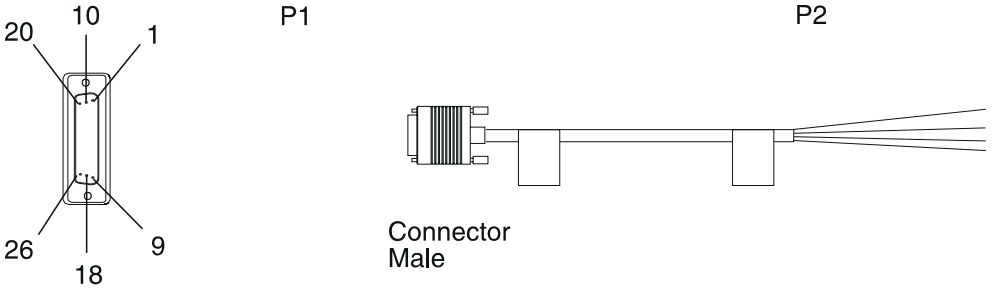

Figure 27. E1 Twisted-Pair Cable

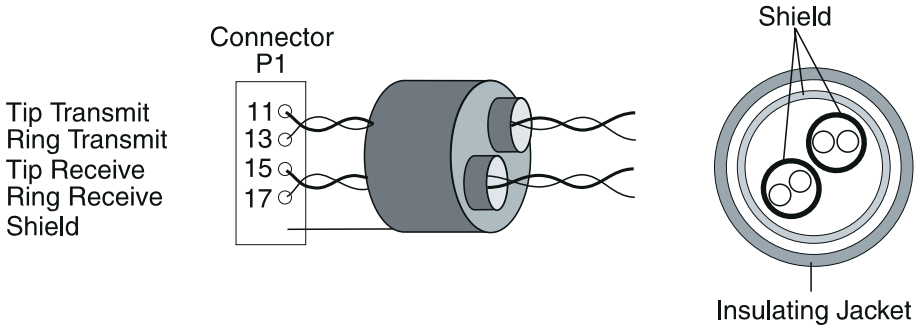

Figure 28. E1 Twisted-Pair Cable Pin Assignment

Connector Kit

Table 30. E1 Twisted-Pair Connector Kit

	Feature Code	Part Number
Connector Kit	5701	57G8075

Bulk Cable Specifications

- Two twisted pairs, AWG 24, 120 ohms (see Figure 27).
- Shielding on each twisted pair plus overall shielding.
- Maximum length 122 m.

Connector P2

- Not predefined. It depends on the customer equipment.
- ETSI 300-11 standard.

Note: If a cable not supplied by IBM is used, IBM does not guarantee electromagnetic compatibility (EMC) compliance for the 8260/8285 machine.

Cable List

Table 31. E1 Twisted-Pair Cables				
Cable Type	**Length m (ft)**	**Feature Code**	**Part Number**	
			World Wide Except Germany	**World Wide**
E1	15 (50)	5260	57G8029	80G3983
E1	30 (100)	5261	57G8030	80G3984
E1	70 (230)	5262	57G8031	80G3985
E1	100 (328)	5263	57G8032	80G3986
E1	122 (400)	5264	57G8033	80G3987

Homologation and Notes

E1 Twisted-Pair complies with the following EU directives:

EMC 89/336/EEC

LVD 73/23/EEC

Telecommunications 91/263/EEC

If the PTT require an ISO/IEC 10173 plug to connect the E1/T1 I/O card, then the IBM Service Engineer installs this plug on the flyleads of the supplied cable.

T1 Twisted-Pair Connection

T1 Twisted-Pair Interface	Description
Number	4
Characteristics	T1 or J1
Speed	Up to 1.536 Mbps
Feature Code	8507

Wrap Plug

The wrap plug part number is 57G8097.

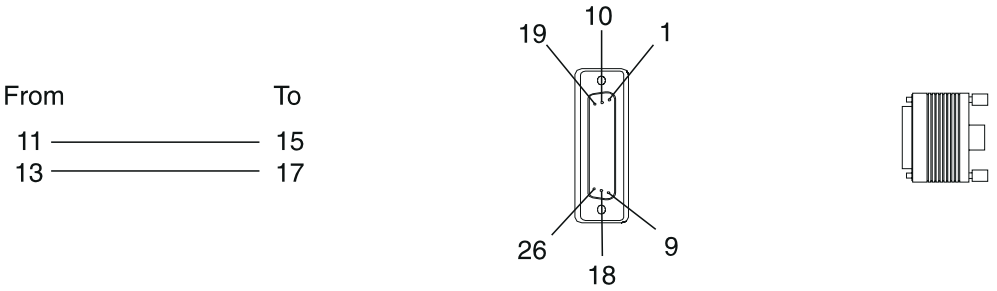

Figure 29. T1 Twisted-Pair Wrap Plug Pin Assignments

Cable and Connectors

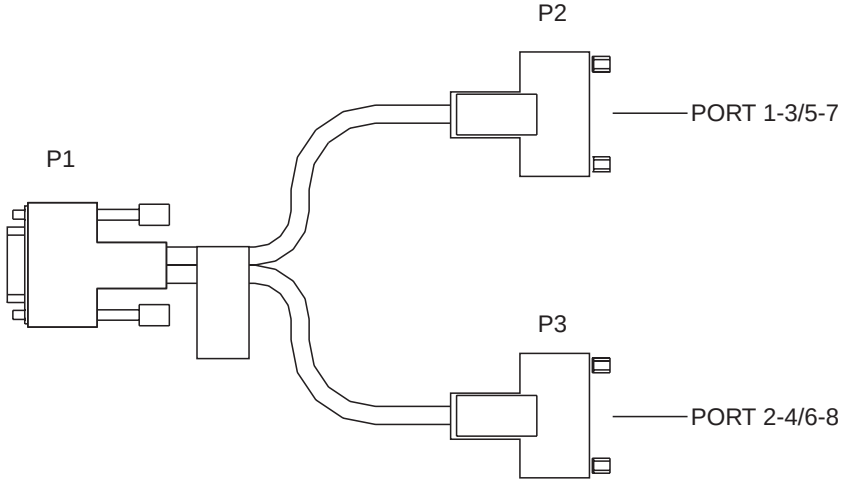

Figure 30. T1 Twisted-Pair Connector Cable

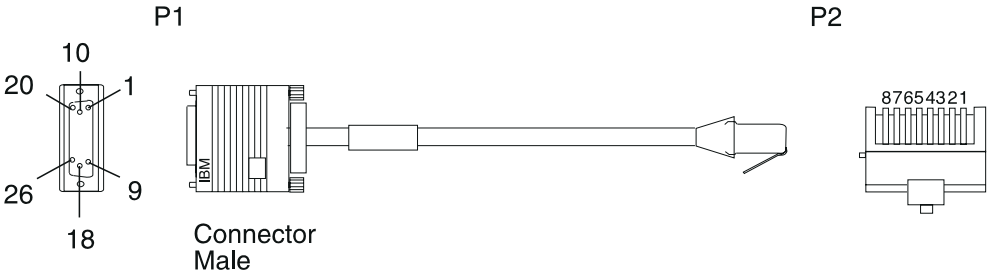

Figure 31. RJ-48 Twisted-Pair T1 and J1 Cable

Interchange Circuit for RJ-48 T1 Cable

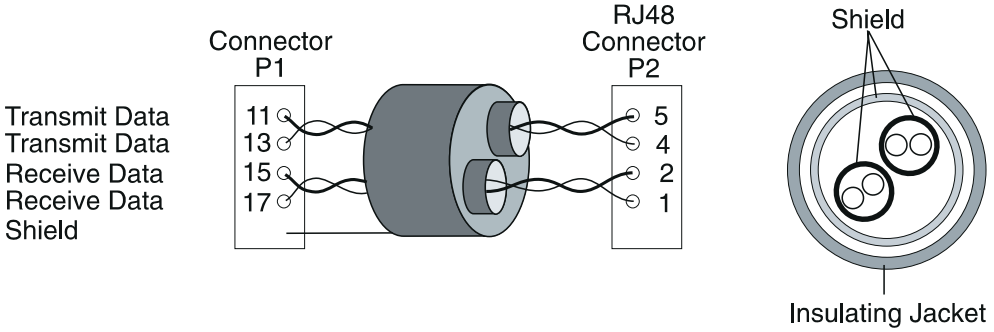

Figure 32. RJ-48 Twisted-Pair T1 Cable

Interchange Circuit for RJ-48 J1 Cable (Japan only)

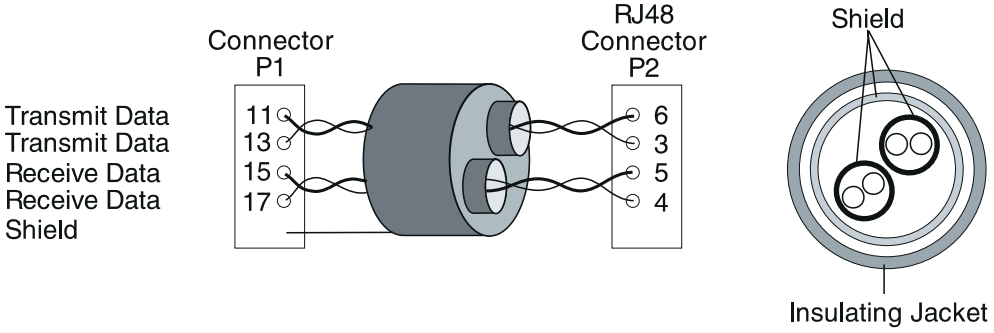

Figure 33. RJ-48 Twisted-Pair J1 Cable

Connector Kit

Table 32. T1 Twisted-Pair Connector Kit		
	Feature Code	**Part Number**
Connector Kit	5701	57G8075

Bulk Cable Specifications

- Two twisted pairs, AWG 24, 100 ohms (see Figure 32 on page 125 or Figure 33 on page 125).
- Shielding on each twisted pair plus overall shielding.
- 1500V overvoltage minimum between signal wires and shielding.
- Shielding connected on connector shell of P1 but is left flying (not connected) at P2.
- Maximum length 30 m.

Connector P2

The RJ-48 connector must conform to the ISO 8877, ANSI 408, and EIA/TIA 547 standards.

Note: If a cable not supplied by IBM is used, IBM does not guarantee electromagnetic compatibility (EMC) compliance for the 8260/8285 machine.

Cable List

Table 33. T1 Twisted-Pair Standard Cables			
Cable Type	**Length m (ft)**	**Feature Code**	**Part Number**
RJ-48 T1	15 (50)	5241	57G8020
RJ-48 T1	30 (100)	5242	57G8021
RJ-48 J1 (See Note)	15 (50)	5241	57G8042
RJ-48 J1 (See Note)	30 (100)	5242	57G8043

Table 34. T1 Twisted-Pair Plenum Cables (U.S. Only)			
Cable Type	**Length m (ft)**	**Feature Code**	**Part Number**
RJ-48	15 (50)	6890	80G0700
RJ-48	30 (100)	6891	80G0701
Note: The plenum cables comply with U.S.A. safety regulations.			

Note: Japan only, shipment triggered by Japan country code

E1 Coaxial Connection

E1 Coaxial Interface	Description
Number	4 (using two BNC cables for each interface.)
Characteristics	E1 (75 ohms)
Speed	Up to 2.048 Mbps
Feature Code	8505

Wrap Plug

The wrap plug part number is 57G8093

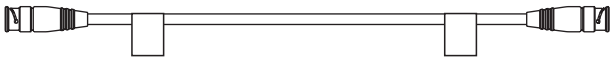

Figure 34. E1 Coaxial Wrap Plug (75 ohms)

Cable and Connectors

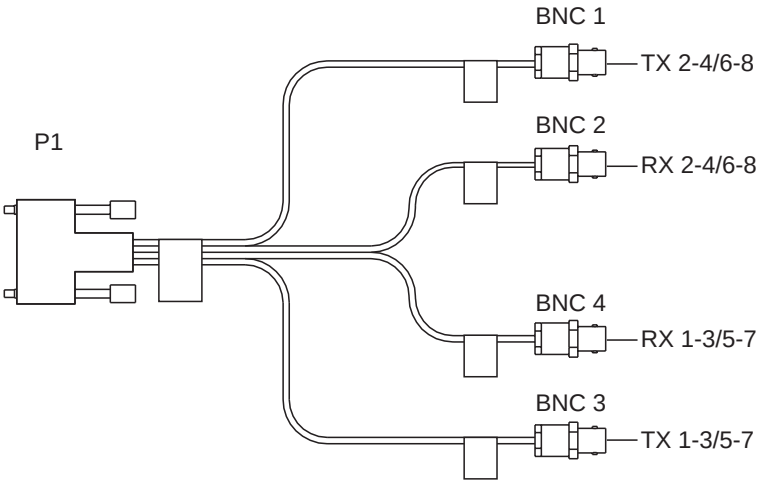

Figure 35. E1 Coaxial Connector Cable

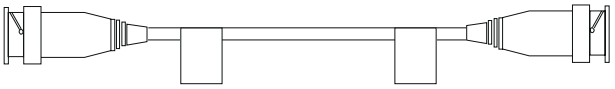

Figure 36. E1 Coaxial Cable (75 ohms)

Note: If a cable not supplied by IBM is used, IBM does not guarantee electromagnetic compatibility (EMC) compliance for the 8260/8285 machine.

Cable List

Table 35. E1 Coaxial Cables

Cable Type	Length m (ft)	Feature Code	Part Number
BNC (75 ohms)	15 (50)	5250	80G0714
BNC (75 ohms)	30 (100)	5251	80G0715
BNC (75 ohms)	70 (230)	5252	80G0716
BNC (75 ohms)	100 (328)	5253	80G0717
BNC (75 ohms)	122 (400)	5254	80G0718

The maximum attenuation of the associated cables shall not exceed 6dB when measured at 1024 Khz for the 2Mb adapter. The frequency/attenuation characteristics shall follow the root F law.

IBM E1 coaxial cables meet these characteristics.

Customer Cables

Be very careful when selecting cables:

- Only 75 ohms coaxial cables must be used (93 ohms or 50 ohms coaxial cables are not acceptable).
- Shielding must have an aluminum foil shield, plus a braid shield (minimum 90 % coverage).
- BNC connectors must be connected to cable with a 360 degree shield continuity.

E3/DS3 Connection

The media for both E3 and DS3 I/O card types is a 75 ohm impedance coaxial pair with BNC connectors for each direction of transmission.

Cabling Information

Table 36 details the accepted coaxial cables for the ATM ports.

Table 36. Cabling Details

I/O Card Type	Cable Type	Impedance	Attenuation @ 400 MHz
E3	RG59	75 ohm	25dB MAX / 100m
DS3	RG59	75 ohm	25dB MAX / 100m

Note: The 25 dB attenuation @ 400 MHz corresponds to an attenuation of 12 dB @ 17 MHz, assuming that follows approximately a $\sqrt{f}$ law.

For more information, refer to the *IBM 8250 Multiprotocol Switching Hub, IBM 8260 Multiprotocol Intelligent Switching Hub, IBM 8285 Nways ATM Workgroup Switch, Planning and Site Preparation Guide*, GA33-0285.

Cabling Distances

Because the maximum recommended distance depends on the quality of cable used, the values given in Table 37 are approximate.

Table 37. ATM Device Cabling Distances

I/O Card Type:	Cable Type	Maximum Recommended Distance
E3	RG59 coax	100 meters (330 ft) based on a power budget of 12 dB @ 17 MHz.
DS3	RG59 coax	68 meters (225 ft) default 135 meters (450 ft) If cable distance exceeds 68 meters (225 ft), the default configuration setting for the port must be changed. See the &wmug., SA33-0396.

OC3/STM1 Connection - Single Mode

Optical Power Budget

Table 38. Optical Power Budget for Port-to-Port Connections: Single-Mode Fiber

Fiber Cable: Type and Size	Minimum Transmitted Power	Maximum Received Power	Optical Power Budget	Maximum Link Distance
Single Mode 9/125 micron	–15 dB	–29 dB	14 dB	20 km (12.4 miles)

Optical Power Loss Through Connectors

Table 39. Optical Power Loss per Connector: Single-Mode Fiber

Connector Type	Cable Size (microns)	Average Loss (dB)
Physical contact	9 to 9	0.35

Optical Power Loss Through Splicing

Table 40. Optical Power Loss per Splice: Single-Mode Fiber

Splice Type	Cable Size (microns)	Maximum Loss (dB)	Average Loss (dB)
Fusion	9 to 9	—	0.15
Mechanical	9 to 9	1.0	0.4

Optical Power Loss by Fiber Cable Type

Table 41. Optical Power Loss by Cable Type: Single-Mode Fiber

Type of Fiber Cable	Power Loss (dB/km)	Typical Loss (dB/km)
9/125 micron @ 1300 nm	—	0.5

Optical Power Loss Through Patch Panels

Table 42. Optical Power Loss per Patch Panel: Single-Mode Fiber

Type of Patch Panel	Power Loss	Typical Loss
SC to MIC	0.1 to 1.0 dB	0.6 dB
ST to SC	0.1 to 1.0 dB	0.6 dB
SC to SC	0.1 to 1.0 dB	0.6 dB

Optical Power Loss Through Jumper Cables

Table 43. Optical Power Loss per IBM Jumper Cable: Single-Mode Fiber

Cable Type	Total Loss	By Component
Single Mode	0.75 dB	0.7 (0.35 × 2 connectors) + 0.05 (cable loss for 100 meters)

SC Single Mode Transmitters

Power coupled into fiber cable includes SC connector loss.

Table 44. Optical Specifications for SC Transmitters: Single-Mode Fiber

Parameter	Minimum Value	Typical Value	Maximum Value	Unit
Optical Power Output (P_O): 9/125 micron cable [1]	–15	—	–8	dBm avg
Center Wavelength (λ_c)	1261	1300	1360	nm
Modulation Frequency	—	155.52	—	MHz

Notes:

1. These optical power values are measured with the following conditions:
   - At the Beginning Of Life (BOL).
   - Over the specified operating voltage and temperature ranges.
   - With HALT Line State (12.5 MHz square-wave) input signal.
   - At the end of one meter of noted optical fiber with cladding modes removed.

   The average power value can be converted to a peak power value by adding 3 dB.

SC Single Mode Receivers

Table 45. Optical Specifications for SC Receivers: Single-Mode Fiber

Parameter	Minimum Value	Typical Value	Maximum Value	Unit
Optical Power Input: Minimum at Window Edge[1] ($P_{IN\ Min}$ W)	—	—	–29	dBm avg
Maximum ($P_{IN\ Max}$)	–8	—	—	dBm avg
Operating Wavelength (λ)	1261	—	1360	nm

Notes:

1. This specification is intended to indicate the performance of the receiver section of the transceiver when Input Optical Power signal characteristics are present per the following definitions. The Input Optical Power dynamic range from the minimum level (with a window time-width) to the maximum level is the range over which the receiver is guaranteed to provide output data with a Bit Error Ratio (BER) better than or equal to 2.5×10^{-10}.

OC3/STM1 Connection - Multimode

Optical Power Budget

Table 46. Optical Power Budget for Port-to-Device Connections: Multimode Fiber (ATM Forum V3.0)

Fiber Cable: Type and Size	Minimum Transmitted Power	Maximum Received Power	Optical Power Budget	Maximum Link Distance
Multimode 50/125 micron NA 0.20	–21 dB	–30 dB	9 dB	2 km (1.24 miles)
Multimode 62.5/125 micron NA 0.275	–20 dB	–29 dB	9 dB	2 km (1.24 miles)

Table 47. Optical Power Budget for Port-to-Port Connections: Multimode Fiber

Fiber Cable: Type and Size	Minimum Transmitted Power	Maximum Received Power	Optical Power Budget	Maximum Link Distance
Multimode 50/125 micron NA 0.20	–22.5 dB	–30 dB	7.5 dB	2 km (1.24 miles)
Multimode 62.5/125 micron NA 0.275	–19 dB	–30 dB	11 dB	2.2 km (1.36 miles)

Optical Power Loss Through Connectors

Table 48. Optical Power Loss per Connector: Multimode Fiber

Connector Type	Cable Size (microns)	Average Loss (dB)
Physical contact	62.5 to 62.5	0.4
	50 to 50	0.4
	100 to 100	0.4
	62.5 to 50	4.8
	50 to 62.5	0.0
	62.5 to 100	0.0
	100 to 62.5	4.72
	9 to 9	0.35
Non-physical contact	62.5 to 62.5	0.7
	50 to 50	0.7
	100 to 100	0.7
	62.5 to 50	5.0
	50 to 62.5	0.3
	62.5 to 100	0.3
	100 to 62.5	4.9

Optical Power Loss Through Splicing

Table 49. Optical Power Loss per Splice: Multimode Fiber

Splice Type	Cable Size (microns)	Maximum Loss (dB)	Average Loss (dB)
Fusion	62.5 to 62.5	—	0.15
	50 to 50	—	0.15
	100 to 100	—	0.15
	9 to 9	—	0.15
Mechanical	62.5 to 62.5	1.0	0.4
	50 to 50	1.0	0.4
	100 to 100	1.0	0.4
	9 to 9	1.0	0.4

Optical Power Loss by Fiber Cable Type

Table 50. Optical Power Loss by Cable Type: Multimode Fiber

Type of Fiber Cable	Power Loss (dB/km)	Typical Loss (dB/km)
50/125 micron @ 1300 nM	0.5 to 2.5	1.5
62.5/125 micron @ 1300 nM	0.5 to 2	1.5
85/125 micron @ 1300 nM	3 to 6	4.0
100/140 micron @ 1300 nM	3 to 6	5.0
9/125 micron @ 1300 nM	—	0.5

Optical Power Loss Through Patch Panels

Table 51. Optical Power Loss per Patch Panel: Multimode Fiber

Type of Patch Panel	Power Loss	Typical Loss
SC to MIC	0.1 to 1.0 dB	0.6 dB
ST to SC	0.1 to 1.0 dB	0.6 dB
SC to SC	0.1 to 1.0 dB	0.6 dB

Optical Power Loss Through Jumper Cables

Table 52. Optical Power Loss per IBM Jumper Cable: Multimode Fiber

Cable Type	Total Loss	By Component
Multimode	1.5 dB	1.4 (0.7 × 2 connectors) + 0.1 (cable loss for 100 meters)

SC Multimode Transmitters

Table 53. Optical Specifications for SC Transmitters: Multimode Fiber

Parameter	Minimum Value	Typical Value	Maximum Value	Unit
Optical Power Output (P_O):				
50/125 micron cable[1,2] NA 0.20 fiber	–22.5	–18	–14	dBm avg
62.5/125 micron cable[1] NA 0.275 fiber	–19	–16	–14	dBm avg
Center Wavelength[3] (λ_c)	1270	1300	1380	nm
Modulation Frequency	—	155.52	—	MHz

Notes:

1. These optical power values are measured with the following conditions:
   - At the Beginning Of Life (BOL).
   - Over the specified operating voltage and temperature ranges.
   - With HALT Line State (12.5 MHz square-wave) input signal.
   - At the end of one meter of noted optical fiber with cladding modes removed.

   The average power value can be converted to a peak power value by adding 3 dB.
2. This transmitter is available on special request with coupled optical power guaranteed into 50/125 micron fiber cables. The value will depend on the specific NA of the 50/125 micron fiber used.
3. This parameter complies with the FDDI PMD requirements for the tradeoffs between center wavelength, spectral width, and rise/fall times. The temperature coefficient of the center wavelength is typically +0.37 nm/°C.

SC Multimode Receivers

Table 54. Optical Specifications for SC Receivers: Multimode Fiber

Parameter	Minimum Value	Typical Value	Maximum Value	Unit
Optical Power Input: Minimum at Window Edge[1] ($P_{IN\ Min}$ W)	—	–34	–30	dBm avg
Maximum ($P_{IN\ Max}$)	–14	–13	—	dBm avg
Operating Wavelength (λ)	1270	—	1380	nm
Modulation Frequency	—	155.52	—	MHz

Notes:

1. This specification is intended to indicate the performance of the receiver section of the transceiver when Input Optical Power signal characteristics are present per the following definitions. The Input Optical Power dynamic range from the minimum level (with a window time-width) to the maximum level is the range over which the receiver is guaranteed to provide output data with a Bit Error Ratio (BER) better than or equal to 2.5×10^{-10}.

Glossary

This glossary defines terms and abbreviations used in this manual. It includes terms and definitions from the *IBM Dictionary of Computing* (New York; McGraw-Hill, Inc., 1994).

(A) Identifies definitions from the *American National Standard Dictionary for Information Systems*, ANSI X3.172-1990, copyright 1990 by the American National Standards Institute (ANSI). Copies can be purchased from the American National Standards Institute, 1430 Broadway, New York, New York 10018.

(E) Identifies definitions from the *ANSI/EIA Standard - 440A: Fiber Optic Terminology*, copyright 1989 by the Electronics Industries Association (EIA). Copies can be purchased from the Electronic Industries Association, 2001 Pennsylvania Avenue N.W., Washington, DC 20006.

(I) Identifies definitions from the *Information Technology Vocabulary*, developed by Subcommittee 1, Joint Technical Committee 1, of the International Organization for Standardization and the International Electrotechnical Commission (ISO/IEC JTC1/SC1).

(T) Identifies definitions from draft international standards, committee drafts, and working papers being developed by ISO/IEC JTC1/SC1.

The following cross-references are used in this glossary:

Contrast with
This refers to a term that has an opposed or substantively different meaning.

See
This refers the reader to multiple-word terms in which this term appears.

See also
This refers the reader to terms that have a related, but not synonymous, meaning.

Synonym for
This indicates that the term has the same meaning as a preferred term, which is defined in the glossary.

If you do not find the term you are looking for, refer to the index or to the *IBM Dictionary of Computing*.

A

A. Ampere.

AAL. ATM Adaptation Layer

ac. Alternating current.

active. (1) Able to communicate on the network. A token-ring network adapter is active if it is able to transmit and receive on the network. (2) Operational. (3) Pertaining to a node or device that is connected or is available for connection to another node or device. (4) Currently transmitting or receiving.

adapter. In a LAN, within a communicating device, a circuit card that, with its associated software and/or microcode, enables the device to communicate over the network.

address. (1) In data communication, the IEEE-assigned unique code or the unique locally administered code assigned to each device or workstation connected to a network. (2) To refer to a device or an item of data by its address (A).

American National Standard Code for Information Interchange (ASCII). The standard code, using a coded character set consisting of 7-bit coded characters (8 bits including parity check), used for information interchange among data processing systems, data communication systems, and associated equipment. The ASCII set consists of control characters and graphics characters. (A)

ASCII. American National Standard Code for Information Interchange.

Asynchronous Transfer Mode (ATM). A transfer mode in which the information is organized into cells. It is asynchronous in the sense that the recurrence of cells containing information from an individual user is not necessarily periodic.

ATM. Asynchronous Transfer Mode.

ATM campus network. A union of privately-owned ATM subnetworks interconnected by network node interfaces (NNIs). See also *network node interface (NNI).*

ATM device. An end system that encapsulates data into ATM cells and forwards them to the ATM subsystem in the 8260 hub across a UNI interface.

ATM subnetwork. A set of ATM subsystems interconnected by ATM interfaces (UNI, SSI, NNI).

ATM subsystem. The ATM components in an ATM hub or switch.

attach. To logically make a device a part of a network. Contrast with *connect*, which implies physically connecting a device to a network.

attenuation. Level of optical power loss expressed in units of dB.

B

bandwidth. The bandwidth of an optical link designates the information-carrying capacity of the link and is related to the maximum bit rate that a fiber link can support.

baud. The rate at which signal conditions are transmitted per second. Contrast with *bits per second (bps)*.

BER. Bit error rate.

bit error rate (BER). The ratio of the number of bits experiencing error on a telecommunications link divided by the number of bits sent over the link.

bits per second (bps). The rate at which bits are transmitted per second. Contrast with *baud*.

bridge. (1) An attaching device that connects two LAN segments to allow the transfer of information from one LAN segment to another. A bridge may attach the LAN segments directly by network adapters and software in a single device, or may connect network adapters in two separate devices through software and use of a telecommunications link between the two adapters. (2) A functional unit that connects two LANs that use the same logical link control (LLC) procedures but may use the same or different medium access control (MAC) procedures. (T) Contrast with *gateway* and *router*.

broadband. A frequency band divisible into several narrower bands so that different kinds of transmissions such as voice, video, and data transmission can occur at the same time. Synonymous with *wideband*.

buffer. (1) A portion of storage used to hold input or output data temporarily. (2) A routine or storage used to compensate for differences in data rate or time of occurrence of events, when transferring data from one device to another. (A)

bus. (1) In a processor, a physical facility on which data is transferred to all destinations, but from which only addressed destinations may read in accordance with appropriate conventions. (I) (2) A network configuration in which nodes are interconnected through a bidirectional transmission medium. (3) One or more conductors used for transmitting signals or power. (A)

byte. (1) A string that consists of a number of bits, treated as a unit, and representing a character. (T) (2) A binary character operated upon as a unit and usually shorter than a computer word. (A) (3) A string that consists of a particular number of bits, usually 8, that is treated as a unit, and that represents a character. (4) A group of 8 adjacent binary digits that represent one extended binary-coded decimal interchange code (EBCDIC) character.

C

C. Celsius.

CBR. Constant bit rate.

CCITT. Comité Consultatif International Télégraphique et Téléphonique. The International Telegraph and Telephone Consultative Committee.

CLP. Cell loss priority.

configuration. (1) The arrangement of a computer system or network as defined by the nature, number, and chief characteristics of its functional units. More specifically, the term may refer to a hardware configuration or a software configuration. (I) (A) (2) The devices and programs that make up a system, subsystem, or network.

connect. In a LAN, to physically join a cable from a station to an access unit or network connection point. Contrast with *attach*.

connection. (1) In data communication, an association established between functional units for conveying information. (I) (A) (2) In Open Systems Interconnection architecture, an association established by a given layer between two or more entities of the next higher layer for the purpose of data transfer. (T) (3) In TCP/IP, the path

between two protocol applications that provides reliable data stream delivery service. In Internet, a connection that extends from a TCP application on one system to a TCP application on another system. (4) The path between two protocol functions, usually located in different machines, that provides reliable data delivery service. (5) A logical association between a call participant (party) and a switch. A party's connection represents that party's participation in a telephone call.

D

data communication. (1) Transfer of information between functional units by means of data transmission according to a protocol. (T) (2) The transmission, reception, and validation of data. (A)

data transfer rate. The average number of bits, characters, or blocks per unit of time passing between equipment in a data-transmission system. (I) The rate is expressed in bits, characters, or blocks per second, minute, or hour.

data transmission. The conveying of data from one place to another for reception by telecommunication means. (I)

dB. Decibel.

dBm. Decibels based on 1 milliwatt.

dc. Direct current.

decibel (dB). (1) One tenth of a bel. (2) A unit that expresses the ratio of two power levels on a logarithmic scale. (3) A unit for measuring relative power. The number of decibels is 10 times the logarithm (base 10) of the ratio of the measured power levels. If the measured levels are voltages (across the same or equal resistance), the number of decibels is 20 times the log of the ratio.

decibels based on 1 milliwatt (dBm). A unit of absolute power measurement that is scaled such that 0 dBm equals 1 milliwatt.

default. Pertaining to an attribute, condition, value, or option that is assumed when none is explicitly specified. (I)

destination. Any point or location, such as a node, station, or particular terminal, to which information is to be sent.

device. (1) A mechanical, electrical, or electronic contrivance with a specific purpose. (2) An input/output unit such as a terminal, display, or printer.

diagnostics. Modules or tests used by computer users and service personnel to diagnose hardware problems.

dump. (1) To record, at a particular instant, the contents of all or part of one storage device in another storage device. Dumping is usually for the purpose of debugging. (T) (2) Data that has been dumped. (T) (3) To copy data in a readable format from main or auxiliary storage onto an external medium such as tape, diskette, or printer. (4) To copy the contents of all or part of virtual storage for the purpose of collecting error information.

E

EIA. Electronic Industries Association.

EEPROM. Electrically erasable programmable read-only memory.

electrically erasable programmable read-only memory (EEPROM). A PROM that can be erased by a special process and reused. (T)

Electronic Industries Association (EIA). An organization of electronics manufacturers that advances the technological growth of the industry, represents the views of its members, and develops industry standards.

equipment rack. Synonym for *rack*.

F

F. Fahrenheit.

FCC. Federal Communications Commission (USA).

field. On a data medium or a storage medium, a specified area used for a particular category of data; for example, a group of character positions used to enter or display wage rates on a panel. (T)

file. A named set of records stored or processed as a unit. (T)

File Transfer Protocol (FTP). (1) In TCP/IP, an application protocol used for transferring files to and from host computers. FTP requires a user ID and possibly a password to allow access to files on a remote

host system. FTP assumes that the Transmission Control Protocol is the underlying protocol. (2) In the Internet suite of protocols, an application layer protocol that uses TCP and Telnet services to transfer bulk-data files between machines or hosts. See also *TFTP*.

FTP. (1) File Transfer Protocol. (2) Foiled twisted pair.

G

gateway. A device and its associated software that interconnect networks or systems of different architectures. The connection is usually made above the reference model network layer. Contrast with *bridge* and *router*.

GFC. Generic Flow Control.

H

hardware. Physical equipment as opposed to programs, procedures, rules, and associated documentation. (I) (A)

header. The portion of a message that contains control information for the message such as one or more destination fields, name of the originating station, input sequence number, character string indicating the type of message, and priority level for the message.

HEC. Header Error Control.

host computer. (1) The primary or controlling computer in a multi-computer installation or network. (2) In a network, a processing unit in which resides a network access method. Synonymous with *host processor*.

Hz. Hertz; frequence in cycles/second.

I

I/O. Input/output.

ILMI. Interim Local Management Interface.

InARP. Inverse Address Resolution Protocol.

input/output (I/O). (1) Pertaining to input, output, or both (A). (2) Pertaining to a device, process, or channel involved in data input, data output, or both.

interface. (1) A shared boundary between two functional units, defined by functional characteristics, signal characteristics, or other characteristics, as appropriate. The concept includes the specification of the connection of two devices having different functions. (T) (2) Hardware, software, or both, that links systems, programs, or devices.

International Organization for Standardization (ISO). An organization of national standards bodies from various countries established to promote development of standards to facilitate international exchange of goods and services, and develop cooperation in intellectual, scientific, technological, and economic activity.

internet. A collection of networks interconnected by a set of routers that allow them to function as a single, large network. See also *Internet*

Internet. The internet administered by the Internet Architecture Board (IAB), consisting of large national backbone networks and many regional and campus networks all over the world. The Internet uses the Internet suite of protocols.

Internet address. See *IP address*.

Internet Protocol (IP). (1) A protocol that routes data through a network or interconnected networks. IP acts as an interface between the higher logical layers and the physical network. This protocol, however, does not provide error recovery, flow control, or guarantee the reliability of the physical network. IP is a connectionless protocol. (2) A protocol used to route data from its source to its destination in an Internet environment.

IP. Internet Protocol.

IP address. The 32-bit address defined by the Internet Protocol, standard 5, Request for Comment (RFC) 791. It is usually represented in dotted decimal notation.

ISO. International Organization for Standardization.

ITU. International Telecommunication Union.

K

Kbps. Kilobits per second.

kilobit (Kb). (1) For processor storage, real and virtual storage, and channel volume, 2^{10} or 1024 bits. (2) For disk storage capacity and communications volume, 1000 bits.

kilobyte (KB). (1) For processor storage, real and virtual storage, and channel volume, 2^{10} or 1024 bytes. (2) For disk storage capacity and communications volume, 1000 bytes.

L

LAN. Local area network.

local. (1) Pertaining to a device accessed directly without use of a telecommunication line. (2) Contrast with *remote*.

local area network (LAN). (1) A computer network located on a user's premises within a limited geographical area. Communication within a local area network is not subject to external regulations; however, communication across the LAN boundary may be subject to some form of regulation. (T) (2) A network in which a set of devices are connected to one another for communication and that can be connected to a larger network. (3) See also *Ethernet* and *token ring*. (4) Contrast with *metropolitan area network (MAN)* and *wide area network (WAN)*.

M

m. Meter, meters.

MAN. Metropolitan area network.

Management Information Base (MIB). A tree-like data structure for the definition and use of information.

Mb. Megabit; 1048576 bits.

Mbps. One million bits per second.

MB. Megabyte; 1048576 bytes.

megabyte. (1) For processor storage and real and virtual memory, 2^{20} or 1048576 bytes. (2) For disk storage capacity and transmission rates, 1000000 bytes.

MIB. Management Information Base.

mm. Millimeter, millimeters.

N

network. (1) A configuration of data processing devices and software connected for information interchange. (2) An arrangement of nodes and connecting branches. Connections are made between data stations. (T)

network administrator. A person who manages the use and maintenance of a network.

network node interface (NNI). The interface between two network nodes.

NNI. Network node interface.

node. A generic term applying to an active element in an ATM network (station or concentrator).

O

output device. A device in a data processing system by which data can be received from the system. (I) (A) Synonymous with *output unit*.

output unit. Synonym for *output device*.

P

parameter. (1) A variable that is given a constant value for a specified application and that may denote the application. (I) (A) (2) An item in a menu or for which the user specifies a value or for which the system provides a value when the menu is interpreted. (3) Data passed between programs or procedures.

parity. (1) A transmission error-checking scheme in which an extra bit is added to some unit of data, usually a byte, in order to make the total number of one bits even or odd. No-parity means that no parity bit is sent or expected. Mark and space mean that the parity position is always set to one or zero, respectively, and that received parity is not checked. (2) The state of being either even-numbered or odd-numbered.

parity (even). A condition when the sum of all of the digits in an array of binary digits is even.

parity (odd). A condition when the sum of all of the digits in an array of binary digits is odd.

path. (1) In a network, any route between any two nodes. (T) (2) The route traversed by the information exchanged between two attaching devices in a network.

PLCP. Physical Layer Convergence Protocol.

port. (1) An access point for data entry or exit. (2) A connector on a device to which cables for other devices such as display stations and printers are attached. Synonymous with *socket*. (3) A PHY entity and a PMD entity in a node, together creating a PHY/PMD pair, that may connect to the fiber media and provide one end of a physical connection with another node.

POST. Power-on self-test.

power-on self-test (POST). A series of diagnostic tests that are run automatically by a device when the power is switched on.

protocol. (1) A set of semantic and syntactic rules that determines the behavior of functional units in achieving communication. (I) (2) In SNA, the meanings of and the sequencing rules for requests and responses used for managing the network, transferring data, and synchronizing the states of network components. (3) A specification for the format and relative timing of information exchanged between communicating parties.

Q

QOS. Quality of service

quality of service (QOS). A set of communication characteristics required by an application. Each QOS defines a specific transmission priority, level of route reliability, and security level. Each QOS also defines whether the sessions are interactive.

R

RAM. Random access memory.

random access memory (RAM). A computer's or adapter's volatile storage area into which data may be entered and retrieved in a nonsequential manner.

remote. (1) Pertaining to a system, program, or device that is accessed through a telecommunication line. (2) Contrast with *local*.

router. An attaching device that connects two LAN segments, which use similar or different architectures, at the reference model network layer. Contrast with *bridge* and *gateway*.

routing. (1) The assignment of the path by which a message will reach its destination. (2) In SNA, the forwarding of a message unit along a particular path through a network, as determined by the parameters carried in the message unit, such as the destination network address in a transmission header.

RX. Receive.

S

server. (1) A device, program, or code module on a network dedicated to providing a specific service to a network. (2) On a LAN, a data station that provides facilities to other data stations. Examples are a file server, print server, and mail server.

session. (1) In network architecture, for the purpose of data communication between functional units, all the activities which take place during the establishment, maintenance, and release of the connection. (T) (2) The period of time during which a user of a terminal can communicate with an interactive system, usually, elapsed time between logon and logoff.

signaling. Establishment of an ATM connection from a call set up by an end device.

station. (1) A communication device attached to a network. The term most often used in LANs is an *attaching device* or *workstation*. (2) An input or output point of a system that uses telecommunication facilities. (3) An addressable node on an FDDI network capable of transmitting, repeating, and receiving information. A station has exactly one SMT, at least one MAC, at least one PHY, and at least one PMD.

subnet. (1) In TCP/IP, a part of a network that is identified by a portion of the IP address. (2) Synonym for *subnetwork*.

subnet address. In Internet communications, an extension of the basic IP addressing scheme where a portion of the host address is interpreted as the local network address.

subnet mask. Synonym for *address mask*.

subnetwork. (1) A group of nodes that have a set of common characteristics, such as the same network ID. (2) Synonymous with *subnet*.

T

TCP/IP. Transmission Control Protocol/Internet Protocol.

Telnet. In TCP/IP, an application protocol that allows a user at one site to access a remote system as if the user's display station were locally attached. Telnet uses the Transmission Control Protocol as the underlying protocol.

TFTP. Trivial File Transfer Protocol.

token ring. A network with a ring topology that passes tokens from one attaching device (node) to another. A node that is ready to send can capture a token and insert data for transmission.

topology. The physical or logical arrangement of nodes in a computer network. Examples include ring topology and bus topology.

trace. (1) A record of the execution of a computer program. It exhibits the sequences in which the instructions were executed. (A) (2) A record of the frames and bytes transmitted on a network.

transceiver. Any terminal that can transmit and receive data.

Transmission Control Protocol (TCP). A communications protocol used in the Internet. TCP provides a reliable host-to-host protocol between hosts in packet-switched communications networks and in interconnected systems of such networks. It uses the Internet Protocol (IP) as the underlying protocol.

Transmission Control Protocol/Internet Protocol (TCP/IP). A set of communications protocols that support peer-to-peer connectivity functions for both local and wide area networks.

transmission medium. (1) A physical carrier of electrical energy or electromagnetic radiation. (2) The physical medium that conveys data between data stations; for example, twisted-pair wire, optical fiber, coaxial cable. (T)

transmit. (1) The action of a station in generating a token, frame, or other symbol sequence and placing it on the outgoing medium. (2) The action of a station that consists of generating a frame, token, or control sequence, and placing it on the medium to the next station.

trap. Trajectory analysis program.

TRS. Topology Routing Service.

TX. Transmit.

U

UNI. User-network interface.

unshielded twisted pair (UTP). One or more twisted pairs of copper wire in the unshielded voice-grade cable commonly used to connect a telephone to its wall jack. Synonym for *telephone twisted pair*.

user-network interface (UNI). Physical and logical definition of the interface between an ATM user device and the ATM network.

UTP. Unshielded twisted pair.

V

V. Volt.

V ac. Volts alternating current.

variable. (1) In computer programming, a character or group of characters that refers to a value and, in the execution of a computer program, corresponds to an address. (2) A quantity that can assume any of a given set of values. (A)

VBR. Variable bit rate.

X

XPOHDATA. Transmit PLCP overhead data.

W

WAN. Wide area network.

wide area network (WAN). (1) A network that provides communication services to a geographic area larger than that served by a local area network or a metropolitan area network, and that may use or provide public communication facilities. (T) (2) A data communications network designed to serve an area of hundreds or thousands of miles; for example, public and private packet-switching networks and national telephone

networks. (3) Contrast with *local area network (LAN)* and *metropolitan area network (MAN)*.

wiring closet. A room that contains one or more distribution panels and equipment racks that are used to interconnect cables. Sometimes called a *network wiring closet* to distinguish it from a telephone wiring closet.

workstation. (1) A functional unit at which a user works. A workstation often has some processing capability. (T) (2) One or more programmable or nonprogrammable devices that allow a user to do work. (3) A terminal or microcomputer, usually one that is connected to a mainframe or to a network, at which a user can perform applications.

Bibliography

For supplementary information on the functions and technology in the 8260 Nways 8-Port ATM WAN Module, please refer to the following documents:

IBM 8260 Nways Multiprotocol Switching Hub ATM Control Point and Switch Module, Installation and User's Guide, SA33-0326.

IBM 8260 Multiprotocol Intelligent Switching Hub Installation Guide, SA33-0251.

IBM 8250 Multiprotocol Switching Hub, IBM 8260 Multiprotocol Intelligent Switching Hub, IBM 8285 Nways ATM Workgroup Switch, Planning and Site Preparation Guide, GA33-0285.

IBM 8285 Nways ATM Workgroup Switch Installation and User's Guide, SA33-0381.

IBM 8260 Nways Multiprotocol Switching Hub, IBM 8285 Nways ATM Workgroup Switch, ATM Command Reference Guide, SA33-0385.

IBM 8260 Multiprotocol Intelligent Switching Hub, Distributed Management Module User's Guide, SA33-0259.

IBM 8260 Multiprotocol Intelligent Switching Hub, Distributed Management Module Commands Guide, SA33-0275.

Case, J., Fedor, M., Scoffstall, M., and Davin, J., *The Simple Network Managemnet Protocol*, University of Tennessee at Knoxville, Performance Systems International and the MIT Laboratory for Computer Science, May 1990.

De Prycker, M., *Asynchronous Transfer Mode – Solution for Broadband ISDN*, Ellis Horwood, 1991.

Handel, R. and Huber, M.N., *Integrated Broadband Networks – An Introduction to ATM-Based Networks*, Addison-Wesley, 1991.

The ATM Forum, *ATM User-Network Interface Specification – Version 3.0 & V3.1*.

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