8260/8285 ATM WAN / WAN 2 Modules
E1/T1, E3, DS3, OC3, and STM1 I/O Cards

Installation Guide

SA33-0437-00

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Note!

Before using this information and the product it supports, be sure to read the general information under “Notices” on the back cover.

First Edition (March 1997)

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Electronic Emission Notices

For statements of compliance with electronic emission standards, see the section on Electronic Emission Notices in the *IBM ATM WAN Module: Installation and User's Guide*, SA33-0396, and *IBM ATM A-8WAN Module: Installation and User's Guide*, SA33-0436.

Safety

These products comply with International and IBM safety standards.

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

Chapter 1. Overview

This manual describes the procedures for installing the following I/O cards on both the WAN (A2-WAN) Module and the WAN 2 (A8-WAN) Module:

- E1/T1 I/O Card (A8-WAN only)
- E3 I/O Card
- DS3 I/O Card
- OC3 I/O Card
- STM1 I/O Card

The IBM WAN and WAN 2 modules function as part of the IBM 8260 Nways Multiprotocol Switching Hub or IBM 8285 Nways ATM Workgroup Switch Expansion Unit.

All I/O card interfaces conform to the relevant ATM Forum Specifications.

Throughout this manual, the term *WAN Module User's Guide* will be used, depending on the type of WAN module, for:

- *IBM ATM WAN Module: Installation and User's Guide*, SA33-0396.
- *IBM ATM A-8WAN Module: Installation and User's Guide*, SA33-0436.

Chapter 2. Technical Information

E1/T1 I/O Card

The E1/T1 I/O Card conforms with ANSI recommendations T1.102-1993 and T1.107-1995 for the line interface at 1.544 Mbps, and recommendations T1.646-1995 for the transportation mode.

The E1/T1 I/O Card conforms with ITU G.703/G.704/G.706 recommendations for E1 at 2.048 Mbps.

Cabling Information

Table 1 details the accepted cable types for the E1/T1 ATM ports.

Table 1. E1/T1 Cabling

Connection Type	Cable Type	Impedance	Attenuation
E1 (twisted-pair)	STP	120 ohm	6dB @ 1.024 MHz
T1 (twisted-pair)	STP	100 ohm	15dB @ 772 KHz
E1 (coaxial)	RG59	75 ohm	6dB @ 1.024 MHz

Note: The values given assume that the attenuation 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 2 are approximate.

Table 2. ATM Device Cabling Distances

Configuration Type	Cable Type	Maximum Recommended Distance
E1 (twisted-pair)	STP	230 meters
T1 (twisted-pair)	STP	*Short-haul:* 200 meters *Long-haul:* 750 meters
E1 (coaxial)	RG59 coax	300 meters

E3/DS3 I/O Cards

The E3 I/O Card conforms with CCITT recommendation G.703 for the line interface at 34368 Kbps, and recommendation G.832 for the transportation mode.

The DS3 I/O Card conforms with ANSI recommendation T1.102-1993 for the line interface at 44736 Kbps, and recommendations T1.107-1988/T1.107a-1990 for the transportation mode.

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

Cabling Information

Table 3 details the accepted coaxial cables for the ATM ports.

Table 3. 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 4 are approximate.

Table 4. 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 *WAN Module User's Guide*, SA33-0396.

OC3/STM1 I/O Cards - Single-Mode

To use the technical information presented in this section to validate your link, see the chapter on setting up a connection using fiber in the *WAN Module User's Guide*.

Optical Power Budget

Table 5. 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 6. 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 7. 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 8. 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 9. 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 10. 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 11. 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 12. 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 I/O Cards - Multimode

To use the technical information presented in this section to validate your link, see the chapter on setting up a connection using fiber in the *WAN Module User's Guide*.

Optical Power Budget

Table 13. 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 14. 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 15. 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 16. 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 17. 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 18. 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 19. 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 20. 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 21. 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}.

Chapter 3. Unpacking and Checking the Shipping Group

This chapter describes the I/O card shipping groups and how to unpack the I/O cards.

Shipping Group Contents

E1/T1 I/O Card

When you receive your I/O card, the shipping group for each card contains:

- 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
- Two screwlock kits, one for each port
- One faceplate
- One cable for connecting ports

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

When you receive your I/O card, the shipping group for each card contains:

- 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.
- Five screws: three for attaching the I/O card to the motherboard, and two for securing the I/O card to the front panel of the module.
- One motherboard faceplate bracket (for use on ATM 8-Port 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 I/O Card

Take the following precautions before unpacking the I/O card:

- 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 component.
- When possible, handle the component by its 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 component.

Unpacking the Module or I/O Cards

When unpacking the I/O card, follow these steps:

__ **1** Verify that the I/O card is the correct model by comparing the Feature Code listed on the side of the shipping carton to the Feature Code you ordered.

__ **2** Remove the I/O card from its shipping cartons.

__ **3** Remove the I/O card from its anti-static bag and inspect it for damage. Always handle it by the faceplate being careful not to touch the internal components.

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

If the 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 I/O card was delivered in case you later want to repackage it for storage or shipment.

IBM also suggests that you record the serial number of the I/O card, 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. Installing the E1/T1 I/O Card on the WAN 2 (A8-WAN) Module

This chapter describes the steps required to install an E1/T1 I/O card on the A8-WAN module

Procedure

__ **1** Adjust the port jumpers on the I/O card to correspond to the type of connection you will be using (E1 Coaxial, E1 Twisted-Pair, T1 Twisted-Pair) by following the instructions in “Setting the Connection Jumpers” on page 17.

__ **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 by following the instructions in “Setting the Grounding Jumpers” on page 18.

__ **3** Mount the I/O card on the A8-WAN module by following the instructions in “Mounting the E1/T1 I/O Card on the A8-WAN Motherboard” on page 19.

__ **4** Configure the I/O card as described in the *WAN Module User's Guide*.

Note: If you replace an I/O card after configuring the module, the new card is automatically configured with the settings of the previous card when you re-insert the module.

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

Figure 1 shows the location of the ports, configuration jumpers and grounding jumpers on the E1/T1 I/O card.

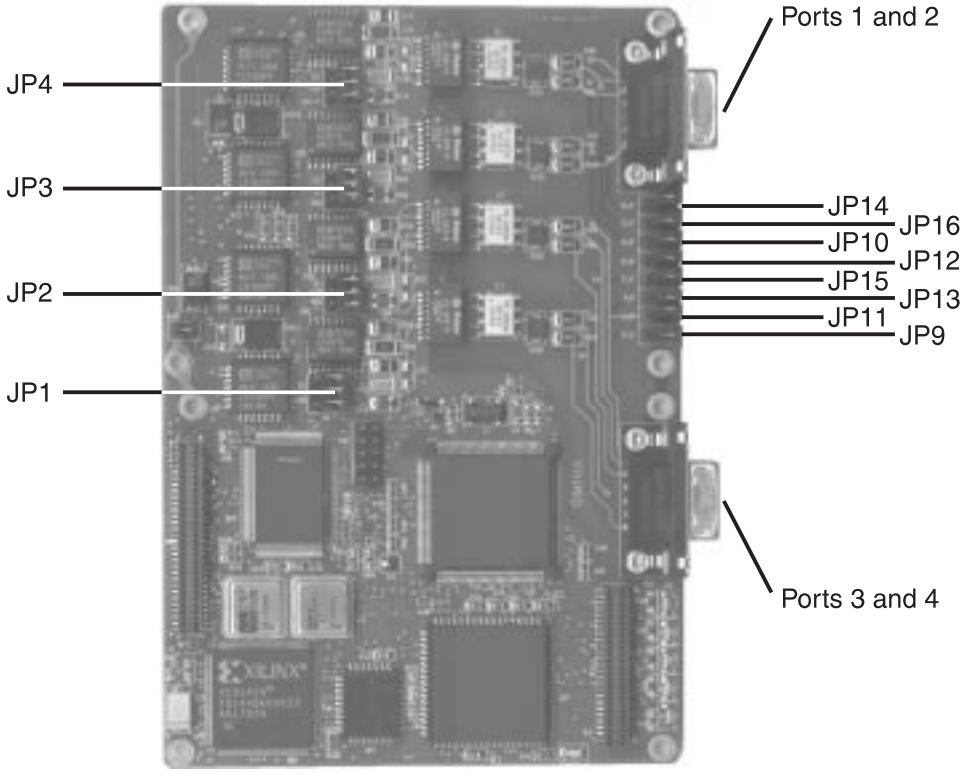

Figure 1. Port and Jumper Locations on the E1/T1 I/O Card

Setting the Connection Jumpers

Each E1/T1 I/O card has four Port Connection jumpers (JP1-JP4 in Figure 1 on page 16), which determine the types of connection you can attach to each of the ports:

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

Note: All ports on the same I/O card 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 I/O card, `NOT SUPPORTED PORT` will be displayed.

Figure 2 shows the correct position of the jumper for each connection type.

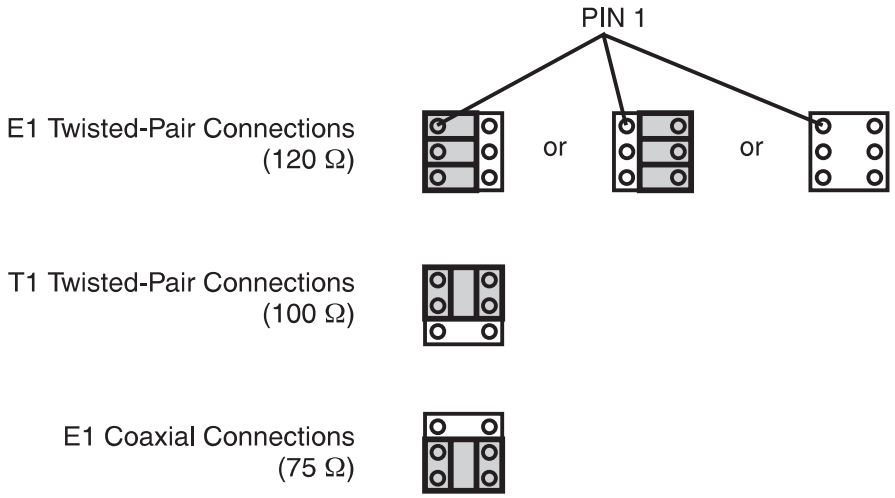

Figure 2. Port Connection Jumper Settings

Table 22. Port Connection Jumpers

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

Setting the Grounding Jumpers

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

Regulations governing the grounding of outer conductors on E1 coaxial pairs vary from country to country. To conform to these country-specific regulations, 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 1 on page 16).

- 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 depends on individual country regulations. Check to see whether your country also requires the receive port to be grounded.

Table 23. 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.

Mounting the E1/T1 I/O Card on the A8-WAN Motherboard

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 3) that hold the motherboard to the module. Save the screws in order to reattach the motherboard.

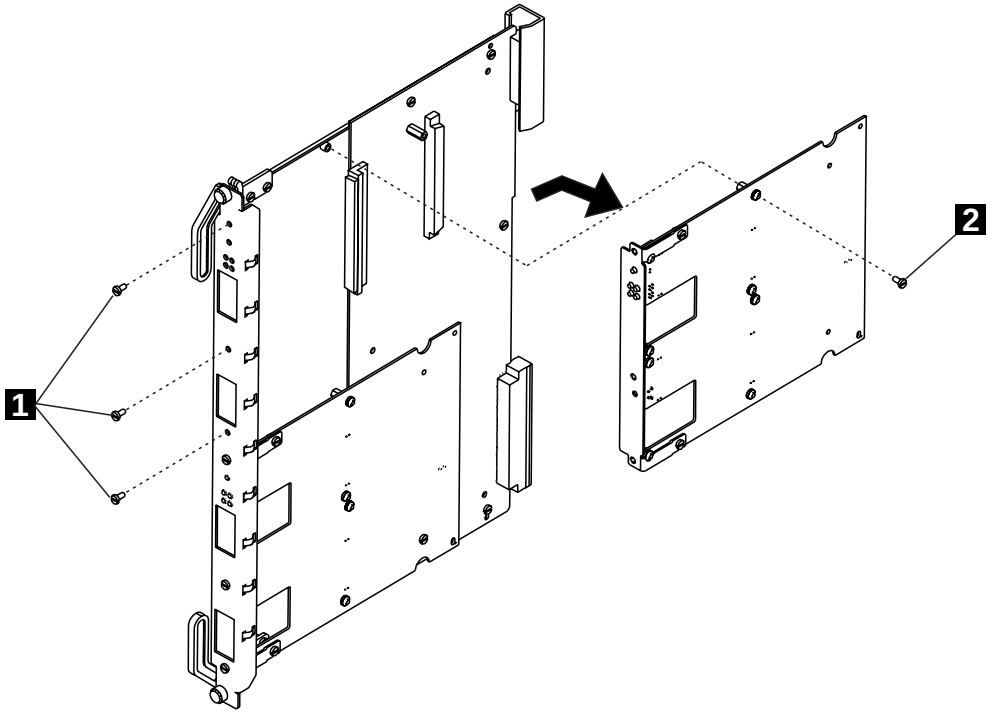

Figure 3. Removing the Motherboard

__ **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 4 on page 20), saving the screws for the new bracket. Save the dummy bracket in a safe place for future reuse.

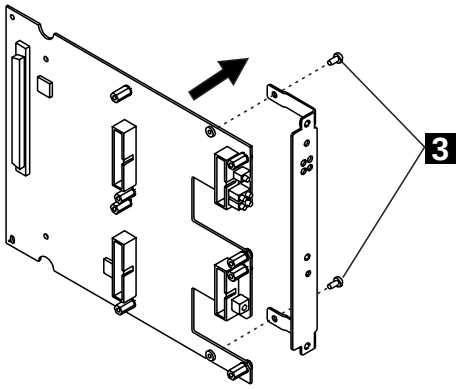

Figure 4. Removing the Dummy Faceplate Bracket

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

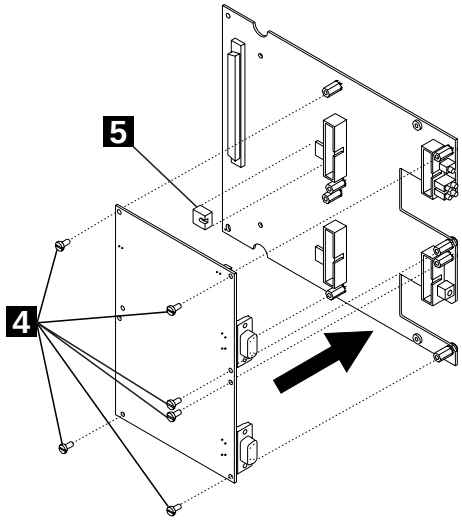

Figure 5. Attaching the I/O Card

__ **6** Install the VPD PROM chip (**5** new artwork to come) 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 6 on page 21) from the old dummy bracket.

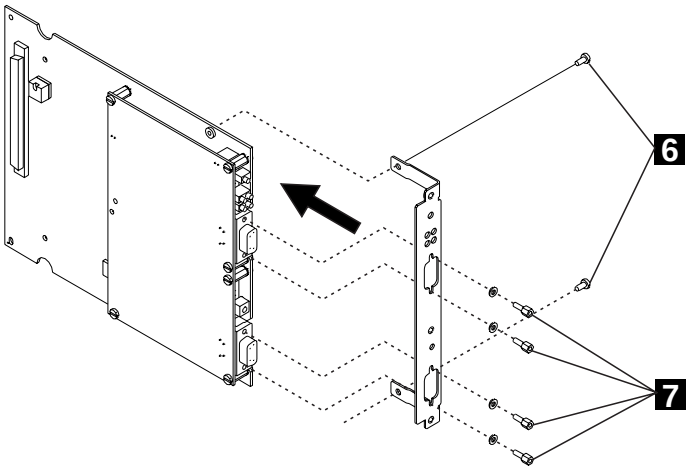

Figure 6. Attaching the Faceplate Bracket

__ **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.

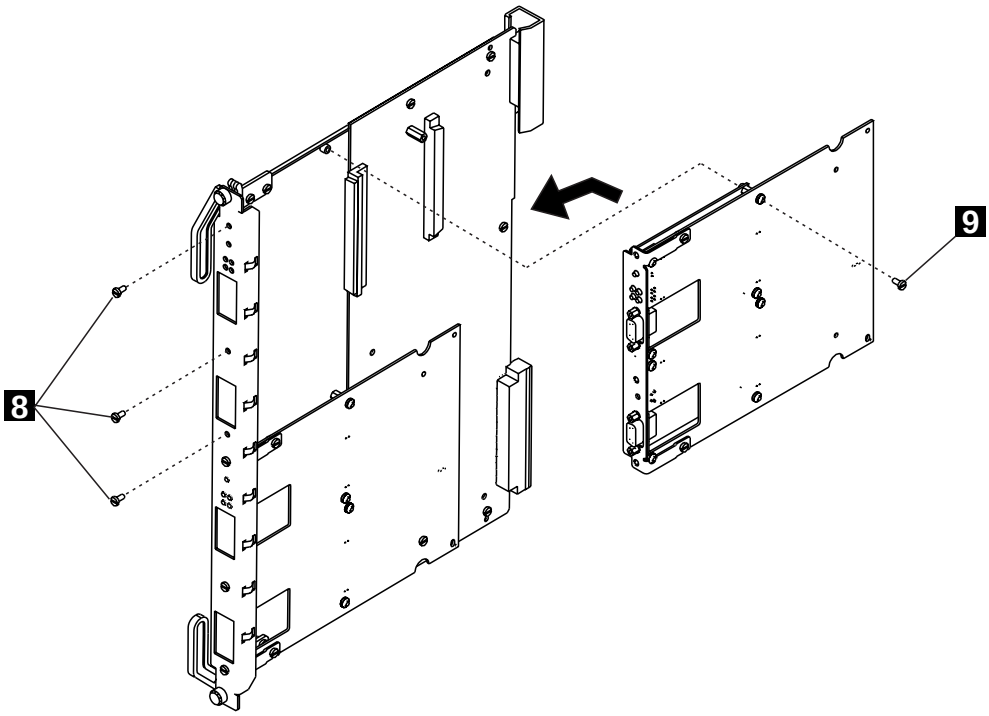

Figure 7. Reattaching the Motherboard

__ **10** Reattach the motherboard to the module using the four screws (**8** and **9** in Figure 7) that you removed in Step 2 on page 19.

Chapter 5. Installing an I/O Card on the WAN (A2-WAN) Module

This chapter describes the steps required to install an E3, DS3, OC3, or STM1 I/O card on the A2-WAN module

Note: The E1/T1 I/O Card cannot be installed on the A2-WAN module.

Procedure

__ **1** **(E3/DS3 I/O cards only)** Ensure that the configuration of the grounding jumpers on the I/O card conforms to the specific grounding regulations in your country by following the instructions in “Setting the Grounding Jumpers for E3/DS3 I/O Cards” on page 24.

__ **2** Mount the I/O card on the A2-WAN module by following the instructions in “Mounting the I/O Card on the A2-WAN Motherboard” on page 26.

__ **3** Configure the I/O card as described in the *WAN Module User's Guide*.

Note: If you replace an I/O card after configuring the module, the new card is automatically configured with the settings of the previous card when you re-insert the module.

Setting the Grounding Jumpers for 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 E3/DS3 I/O cards. If the jumpers are not used, the outer connector is grounded through a 10 nF capacitor. Figure 8 shows the location of the four jumpers.

Normally, only the outer connector of the transmit port is to be grounded, and not the receive port. This depends on individual country regulations. Check to see whether your country also requires the receive port to be grounded.

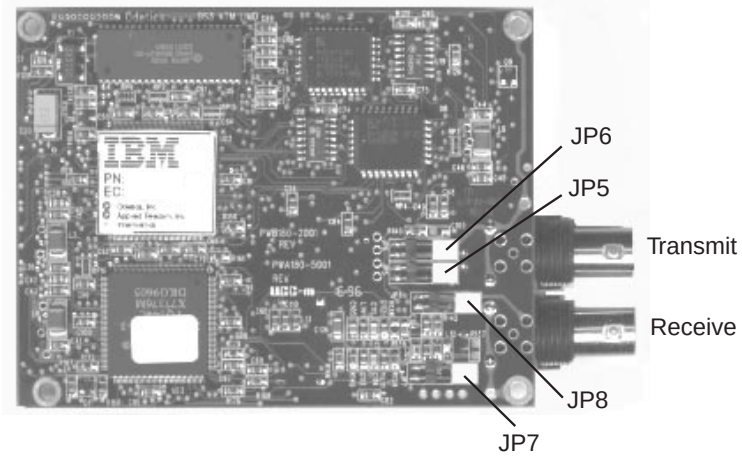

Figure 8. Grounding Jumper Locations

Refer to Table 24 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.

CAUTION:
Some of the jumpers MUST be removed before the I/O card is installed.

Table 24. Grounding Jumper Requirements 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)		√	√		

Note: Standard G.703 recommends that the outer conductor of the coaxial pair is 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 not apply.

Mounting the I/O Card on the A2-WAN Motherboard

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 A2-WAN module, The steps are identical for the OC3/STM1 I/O card.

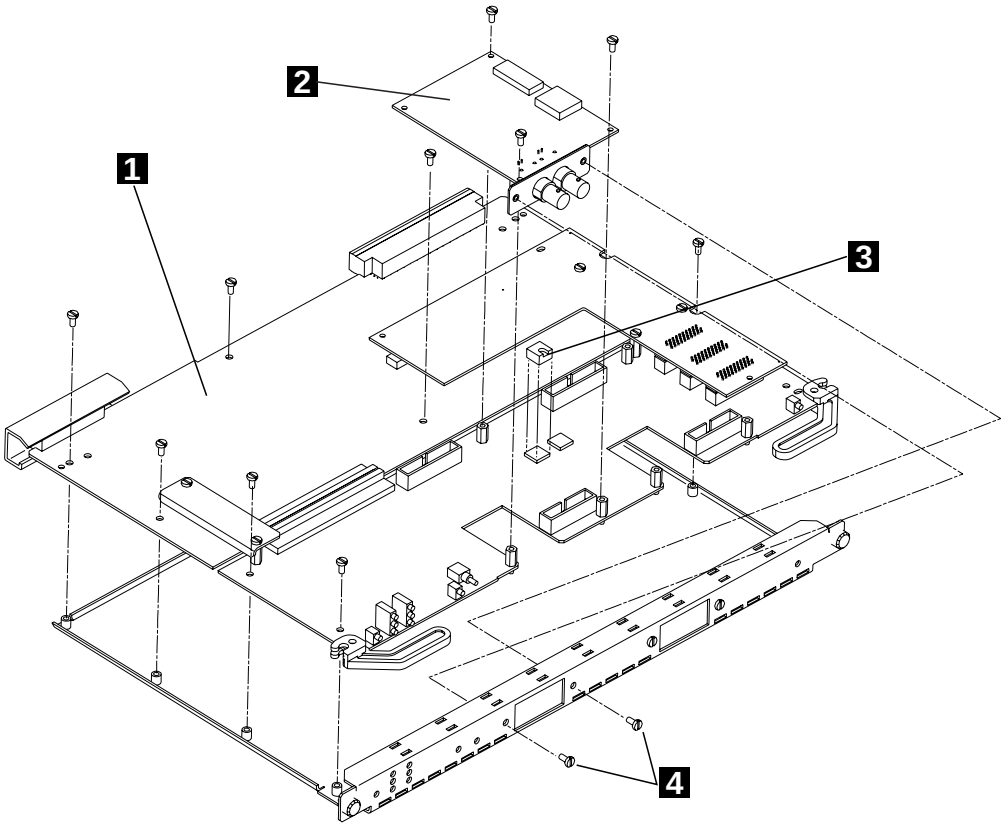

Figure 9. Installing an I/O Card on the A2-WAN Module

To install the E3 I/O card on the A2-WAN module motherboard, follow these steps, referring to Figure 9 on page 26:

__ **1** Before installing the I/O card on the A2-WAN module, you must isolate and then remove the A2-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 using the following steps:

a. If any I/O cards are already installed, remove the two screws that secure each I/O card to the front panel.

b. Remove the ten screws that secure the motherboard to its frame (see **1** on Figure 9 on page 26).

c. Slide the motherboard from its frame.

__ **3** If necessary, remove the two screws and faceplate that cover the A2-WAN port(s) on the front panel of the motherboard. This is required only when you use the lower port for the first time. Keep the screws and faceplate in a safe place.

__ **4** Remove any grounding jumpers that are not required. See “Setting the Grounding Jumpers for E3/DS3 I/O Cards” on page 24.

__ **5** Install the faceplate on the I/O card, over the two BNC connectors.

__ **6** Hold the I/O card so that its connectors and screw holes are aligned over the connectors and small metal posts on the motherboard. Then gently push the card downwards until you hear it click into the motherboard connectors.

If you are installing two I/O cards, Repeat this step with the second I/O card.

__ **7** Place three of the screws that came with the I/O card into the metal posts and tighten them with a screwdriver (see **2** on Figure 9 on page 26).

If you are installing two I/O cards, Repeat this step with the second I/O card.

__ **8** Install the VPD PROM chip on the motherboard, making sure that the notch is aligned with the front of the module (see **3** on Figure 9 on page 26).

__ **9** Slide the motherboard back into its frame.

__ **10** Re-insert the ten screws that secure the motherboard to its frame, and tighten them with a screwdriver.

__ **11** Insert the remaining two screws that came with the I/O card into the front panel to secure the I/O card, and tighten them with a screwdriver (see **4** on Figure 9 on page 26).

If you are installing two I/O cards, Repeat this step with the second I/O card.

Chapter 6. Installing an I/O Card on the WAN 2 (A8-WAN) Module

This chapter describes the steps required to install an E3, DS3, OC3, or STM1 I/O card on the A8-WAN module.

Note: The instructions in this chapter do not apply to the E1/T1 I/O Card. To install an E1/T1 I/O Card, see Chapter 4, “Installing the E1/T1 I/O Card on the WAN 2 (A8-WAN) Module” on page 15.

Procedure

__ **1** Mount the I/O card on the A8-WAN module by following the instructions in “Mounting the I/O Card on the A8-WAN Motherboard” on page 30.

__ **2** Configure the I/O card as described in the *WAN Module User's Guide*.

Note: If you replace an I/O card after configuring the module, the new card is automatically configured with the settings of the previous card when you re-insert the module.

Mounting the I/O Card on the A8-WAN Motherboard

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/STM1 I/O card.

To install the E3 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 10) that hold the motherboard to the module. Save the screws in order to reattach the motherboard.

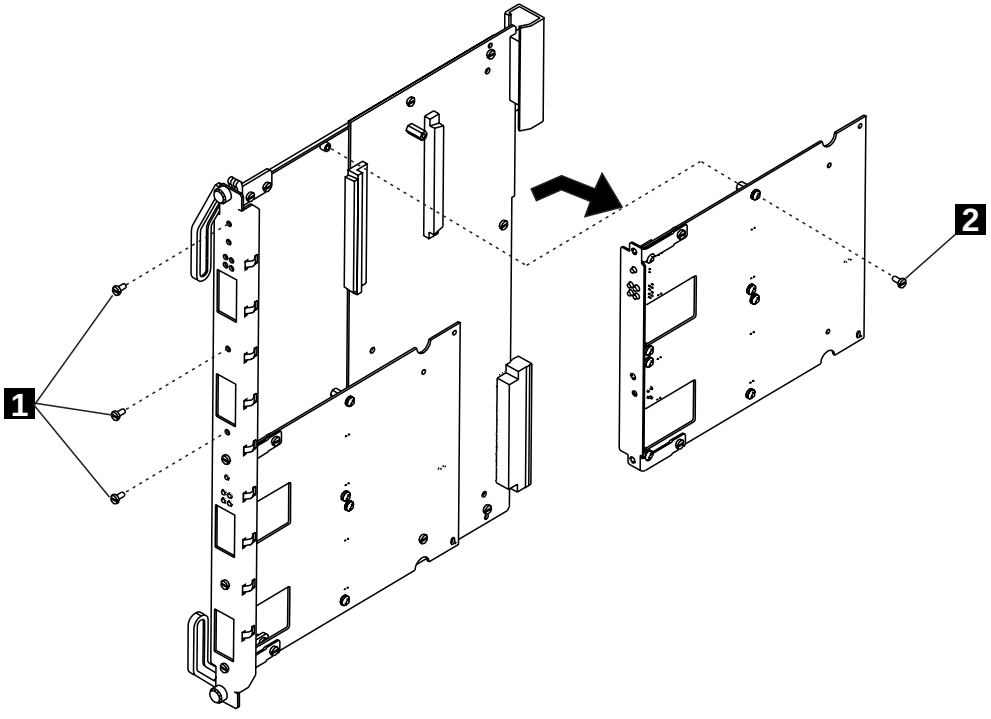

Figure 10. Removing the Motherboard

__ **2** Disconnect the motherboard connectors and remove the motherboard from the module.

__ **3** Remove the dummy faceplate bracket from the motherboard (**3** in Figure 11), saving the screws for the new bracket. Save the dummy bracket in a safe place for future reuse.

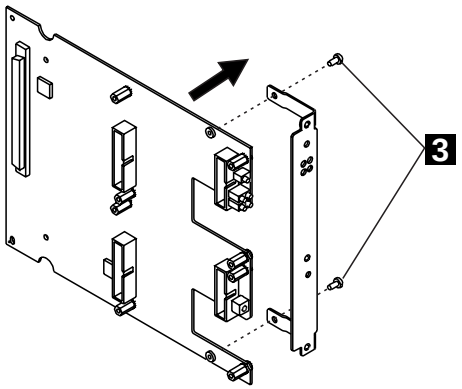

Figure 11. Removing the Dummy Faceplate Bracket

__ **4** Attach the I/O card to the motherboard using the four screws provided (**4** in Figure 12).

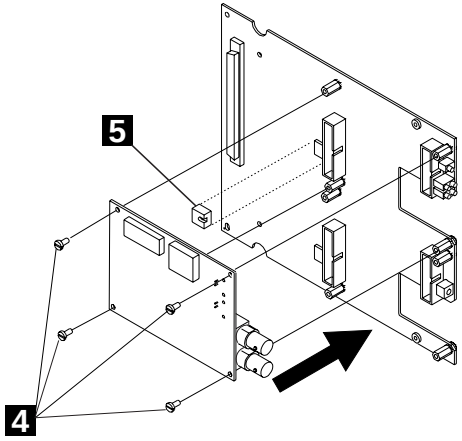

Figure 12. Attaching the I/O Card

__ **5** Install the VPD PROM chip (**5** new artwork to come) 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 13) from the old dummy bracket.

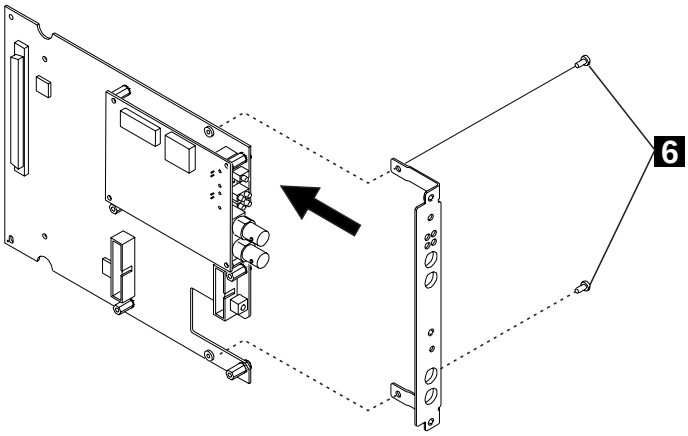

Figure 13. Attaching the Faceplate Bracket

__ **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.

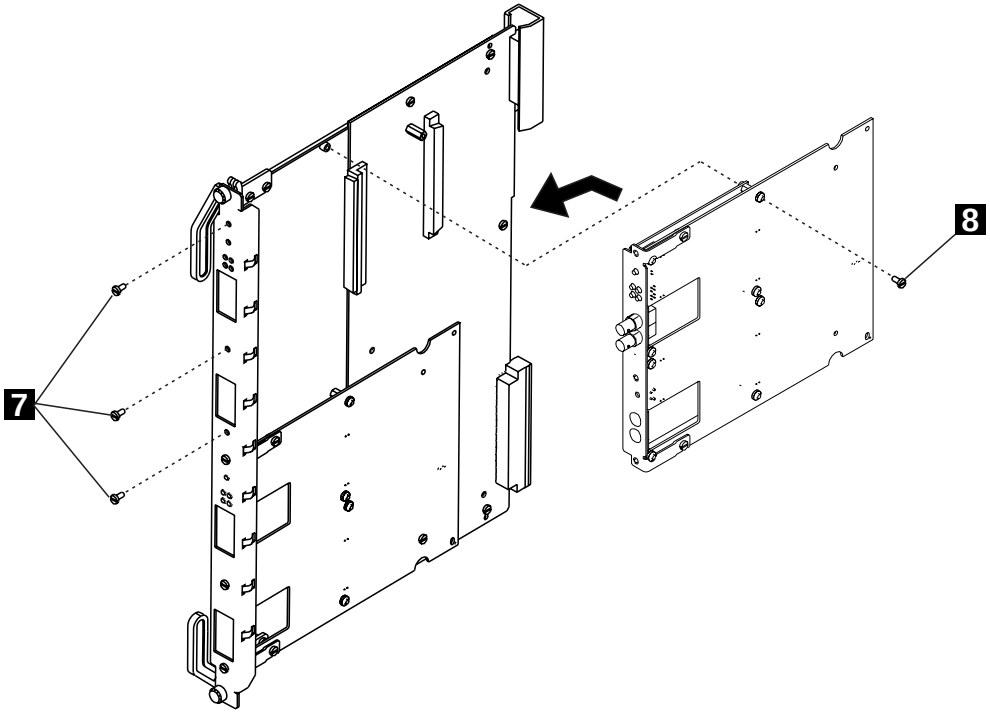

Figure 14. Reattaching the Motherboard

__ **8** Reattach the motherboard to the module using the four screws (**7** and **8** in Figure 14) that you removed in Step 1 on page 30.

__ **9** If you are installing only one I/O card on the motherboard, cover the unused port opening with the dummy port cover (**9** in Figure 15).

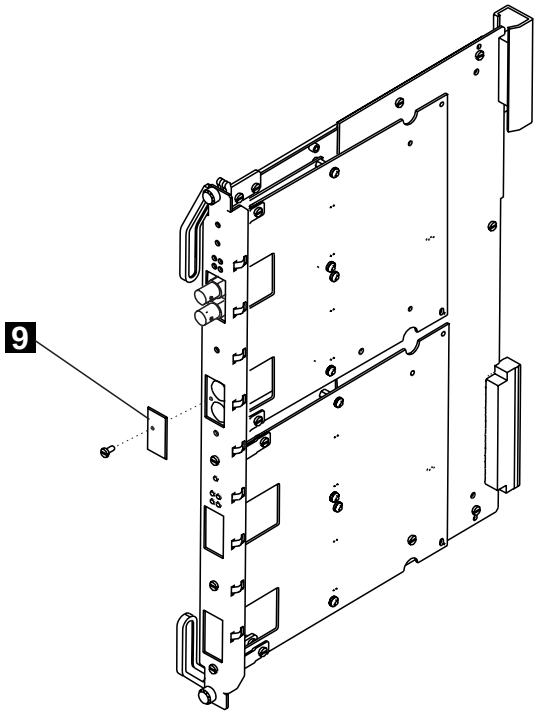

Figure 15. Attaching the Dummy Port Cover

Readers' Comments — We'd Like to Hear from You

8260/8285 ATM WAN / WAN 2 Modules
E1/T1, E3, DS3, OC3, and STM1 I/O Cards
Installation Guide

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