

SmartSwitch 9000
9A426-02
User's Guide

9031918-03

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Application of Council Directive(s): **89/336/EEC
73/23/EEC**

Manufacturer's Name: **Cabletron Systems, Inc.**

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Conformance to Directive(s)/Product Standards: **EC Directive 89/336/EEC
EC Directive 73/23/EEC
EN 55022
EN 50082-1
EN 60950**

Equipment Type/Environment: **Networking Equipment, for use in a
Commercial or Light
Industrial Environment.**

We the undersigned, hereby declare, under our sole responsibility, that the equipment packaged with this notice conforms to the above directives.

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Introduction

The 9A426-02 ATM Module is a hardware-based switching module that supports multiple interfaces simultaneously. The module's interconnecting interfaces include:

- Up to two front panel ATM interfaces via user-installed ATM Port Interface Modules (APIMs)
- A fixed interface to the SmartSwitch 9000's Internal Network Bus (INB)
- A user-configurable interface to the SmartSwitch 9000's Flexible Network Bus (FNB-1 or FNB-2)

Each data packet, regardless of the interface in which the packet enters the module (ATM, FNB, or INB), is initially converted into a common format known as a canonical frame. Each canonical frame's header section contains source and destination information. All canonical frames are forwarded to the module's group of SmartSwitch Application Specific Integrated Circuits (ASICs) collectively known as the SmartSwitch Core.

The SmartSwitch Core can process data in two modes: as a traditional switch or as a Secure Fast Switch (SFS). When operating as a traditional switch, the Fast Packet Switch makes filtering/forwarding decisions based on Destination Address, with standard IEEE 802.1d learning. When operating in SFS mode, all filtering/forwarding decisions are based on a Destination Address-Source Address pair, and the associated receive/transmit port.

Canonical frames that enter the 9A426-02 Module via the backplane interface (FNB or INB) and are destined for the module's front panel interface(s), are converted by the module's ATM Network Interface Block (ANIB) into 53 byte ATM cells. The ANIB uses a separate set of ASICs to perform hardware-based packet to cell conversions. This conversion process is an integral part of the module's ability to provide high-performance interconnections between legacy LANs and ATM attached networks.

Conversely, canonical frames destined for the FNB bus on the SmartSwitch 9000 backplane are converted into FDDI packets via the 9A426-02 Module's FDDI Network Interface Block (FNIB), and then forwarded onto the FNB.

Canonical frames destined for the INB bus on the SmartSwitch 9000 backplane are converted into fixed length data packets via the 9A426-02 Module's INB Network Interface Block (INB NIB), and then forwarded onto the INB.

Features

Processor

The 9A426-02 Module is equipped with an advanced Intel i960 microprocessor. This microprocessor provides a platform for all management functions within a scalable RISC-based architecture.

SmartSwitch Core

The 9A426-02 Module incorporates the SmartSwitch Core, a collection of custom Application Specific Integrated Circuits (ASICs) designed specifically for high speed switching. The SmartSwitch ASIC bus is 64 bits wide with a bandwidth of 640 Mbps. Since all frame translation, address lookups, and forwarding decisions are performed in hardware, the 9A426-02 Module can obtain a throughput performance of greater than 750K pps.

Management

The 9A426-02 Module has one full implementation of SMT (Version 7.3) and SNMP for local and remote management. Local management is provided through the RS-232 Com ports on the SmartSwitch 9000 Environmental Module using a standard VT-220™ terminal or emulator, or via telnet. Remote management is achieved through Cabletron's SPECTRUM or any SNMP compliant management tool. Switching statistics of the selected FNB interface include frames filtered, frames forwarded, and all Spanning Tree Protocol parameters.

Connectivity

The 9A426-02 Module has two front panel ATM interfaces. An ATM Port Interface Module (APIM) can be installed in one (or both) interface(s). The 9A426-02 Module also has one interface to the INB-2 backplane, and one user-configurable interface to the SmartSwitch 9000 FNB backplane (either FNB-1 or FNB-2, or neither).

Management Information Base (MIB) Support

The 9A426-02 Module provides MIB support including:

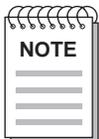
- IETF AToM MIB
- IETF FDDI MIB
- IETF Bridge MIB
- A host of Cabletron Enterprise MIBs

LANVIEW LEDs

The 9A426-02 Module uses LANVIEW – Cabletron Systems built-in visual diagnostic and status monitoring system. With LANVIEW LEDs, you can quickly identify the device, port, and physical layer status at a glance.



Figure 1-1. The 9A426-02 Module



For a complete list of supported MIBs, refer to the release notes provided in the 9A426-02 Module package.

Related Manuals

The manuals listed below should be used to supplement the procedures and technical data contained in this manual.

SmartSwitch 9000 Installation Guide

SmartSwitch 9000 9C300-1 Environmental Module User's Guide

SmartSwitch 9000 9C214-1 AC Power Supply User's Guide

INB Terminator Modules Installation Guide

SmartSwitch 9000 Local Management User's Guide

SmartSwitch 9000 9A426-01/9A426-02 Module-Specific Local Management Appendix

Getting Help

For additional support related to this device or document, contact the Cabletron Systems Global Call Center:

| | |
|--|---|
| Phone | (603) 332-9400 |
| Internet mail | support@ctron.com |
| FTP | ctron.com (134.141.197.25) |
| Login | <i>anonymous</i> |
| Password | <i>your email address</i> |
| BBS | (603) 335-3358 |
| Modem setting | 8N1: 8 data bits, No parity, 1 stop bit |
| For additional information about Cabletron Systems or its products, visit the World Wide Web site: http://www.cabletron.com/ For technical support, select Service and Support . | |
| To send comments or suggestions concerning this document, contact the Cabletron Systems Technical Writing Department via the following email address: TechWriting@ctron.com <i>Make sure to include the document Part Number in the email message.</i> | |

Before calling the Cabletron Systems Global Call Center, have the following information ready:

- Your Cabletron Systems service contract number
- A description of the failure
- A description of any action(s) already taken to resolve the problem (e.g., changing mode switches, rebooting the unit, etc.)
- The serial and revision numbers of all involved Cabletron Systems products in the network
- A description of your network environment (layout, cable type, etc.)
- Network load and frame size at the time of trouble (if known)
- The device history (i.e., have you returned the device before, is this a recurring problem, etc.)
- Any previous Return Material Authorization (RMA) numbers

Preparing and Installing the 9A426-02 Module

This chapter describes the physical layout of the 9A426-02 Module and explains how to prepare and install the module in a SmartSwitch 9000 chassis.



Never expose the module's components to Electrostatic Discharge. Make sure you have attached the module's disposable grounding strap to your wrist and always place the module on a non-conductive surface.

Unpacking the Module

1. Carefully remove the module from the shipping box. (Save the box and packing materials in the event the module must be reshipped.)
2. Remove the module from the plastic bag. Observe all precautions to prevent damage from Electrostatic Discharge (ESD).
3. Carefully examine the module, checking for damage. If any damage exists, DO NOT install the module. Contact Cabletron Systems Technical Support immediately.

The Module's Physical Layout

The 9A426-02 Module has two major circuit boards on which components are attached (see Figure 2-1). The module's base-level circuit board is known as the motherboard. The module's second-level circuit board is known as the daughterboard. The removable daughterboard attaches to the motherboard's connectors and standoffs. Both the motherboard and the daughterboard contain components that are accessible to the user.

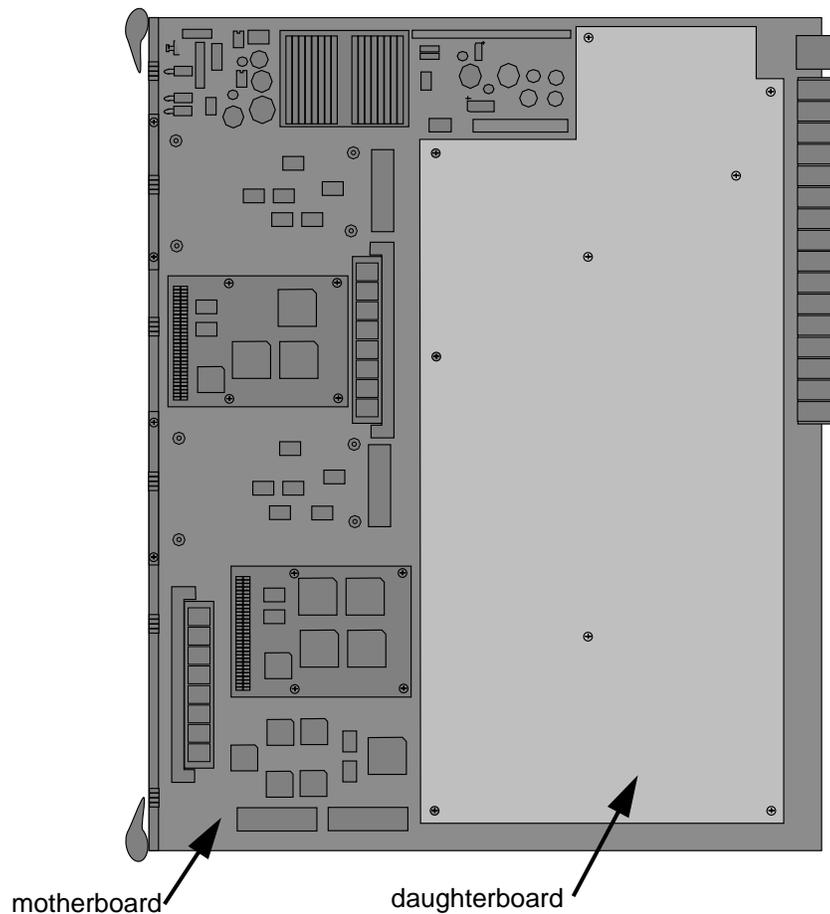


Figure 2-1. The 9A426-02 Module's two major circuit boards

User-Accessible Components on the Module's Motherboard

The user accessible components on the module's motherboard include two Look-Up Engines, up to two user-installed ATM Memory Upgrade SRAM SIMMs, and up to two user-installed ATM Port Interface Modules (APIMs). See Figure 2-2.



The User Accessible Components on the motherboard of a 9A426-02 Module are positioned in close proximity to one another. Therefore, to attain easier access for removing a desired component, you may opt to remove an additional component. For example, you may remove an SRAM SIMM to gain better access for removing a Look-Up Engine.

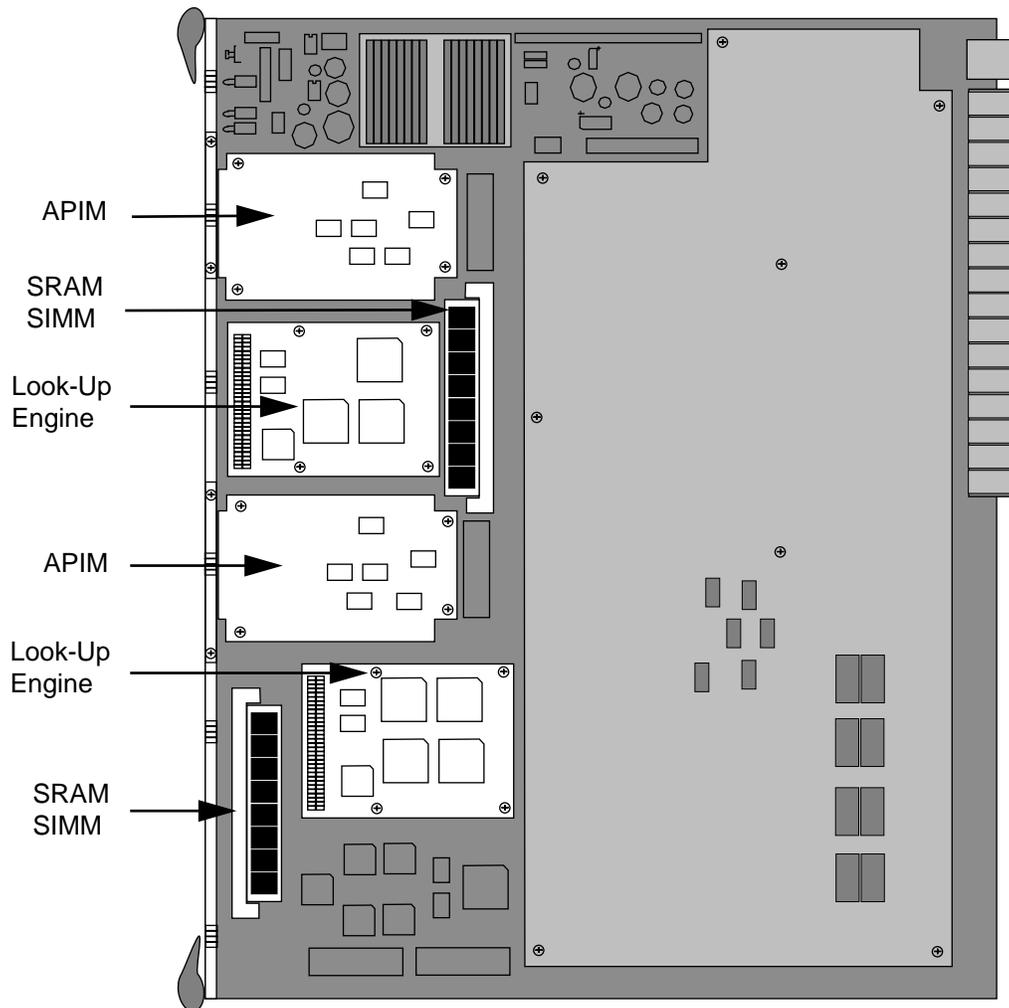


Figure 2-2. User Accessible Components on the 9A426-02 Module's motherboard

Look-Up Engines

The 9A426-02 Module is shipped with two look-up engines (one for each front panel port). These components are located at the front section of the module as shown in Figure 2-2. Each Look-Up Engine stores MAC Address/Virtual Channel Pairings.

To increase the capacity of a front panel port's Look-Up Engine, install the Look-Up Engine Upgrade Kit (LUE-UGK). To increase the capacity of the module's second front panel port, install an additional upgrade kit. Installation instructions are included in each upgrade kit.

SRAM SIMMs

Each front panel port on the 9A426-02 Module is equipped with two megabytes of Static Random Access Memory (SRAM).

To increase the SRAM of a front panel port, install the SRAM SIMM from the ATM Memory Upgrade Kit (ATM-MEM-UGK) in the port's corresponding SIMM socket. To increase the SRAM of the module's second front panel port, install an additional SRAM SIMM in the port's corresponding SIMM socket.

The SRAM SIMMs fit into the SIMM sockets located at the front section of the module as shown in Figure 2-2. Installation instructions are included in the upgrade kit.

APIMs

The preparation of the 9A426-02 Module includes the installation of at least one ATM Port Interface Module (APIM) in one of the module's front panel ports (if desired, you can install two APIMs). The module is shipped with no installed APIMs. You customize the module to your particular need by selecting from a variety of APIMs, and then installing the selected APIM(s) in the module. Figure 2-2 shows two APIMs installed in a 9A426-02 Module. Installation instructions are provided in the following section.

Installing an APIM in the 9A426-02 Module

To install an APIM in the 9A426-02 Module, you must:

- Unpack the APIM
- Remove the 9A426-02 Module's ATM-Port Retaining Plate
- Insert the APIM in the 9A426-02 Module
- Attach the 9A426-02 Module's ATM-Port Retaining Plate

Throughout each of these procedures you must never expose the module's components to Electrostatic Discharge. Make sure you have attached the module's disposable grounding strap to your wrist and always place the module on a non-conductive surface.

Unpacking an APIM

1. Remove the APIM from the shipping box. (Save the box and packing materials in the event the APIM must be reshipped.)
2. Remove the APIM from the non-conductive bag.
3. Examine the APIM and check for damage. If damage exists, DO NOT proceed; contact Cabletron Systems Technical Support. Otherwise, place the APIM back into the non-conductive bag, set the APIM aside, and proceed.

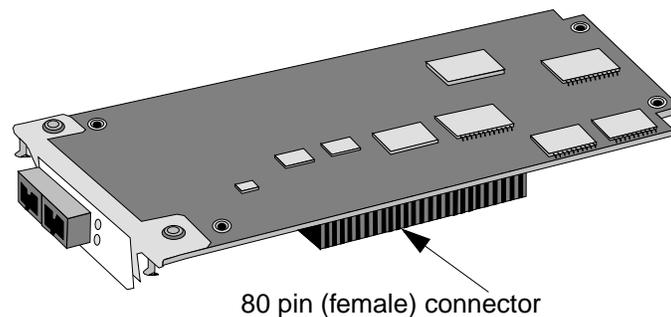


Figure 2-3. An APIM-21

Removing the 9A426-02 Module's ATM-Port Retaining Plate



To install an APIM properly in the 9A426-02 Module, you MUST remove the module's ATM-Port Retaining Plate. Failure to do so can damage the module and the APIM.

1. Place the module (component side up) on a non-conductive, flat surface. Position the module so that the module's front (faceplate) is to the left and the module's back (backplane connectors) is to the right. See Figure 2-4.
2. Locate the module's ATM-Port Retaining Plates. Each plate is secured by two screws and is located on the right side panel of the module's faceplate. See Figure 2-4.

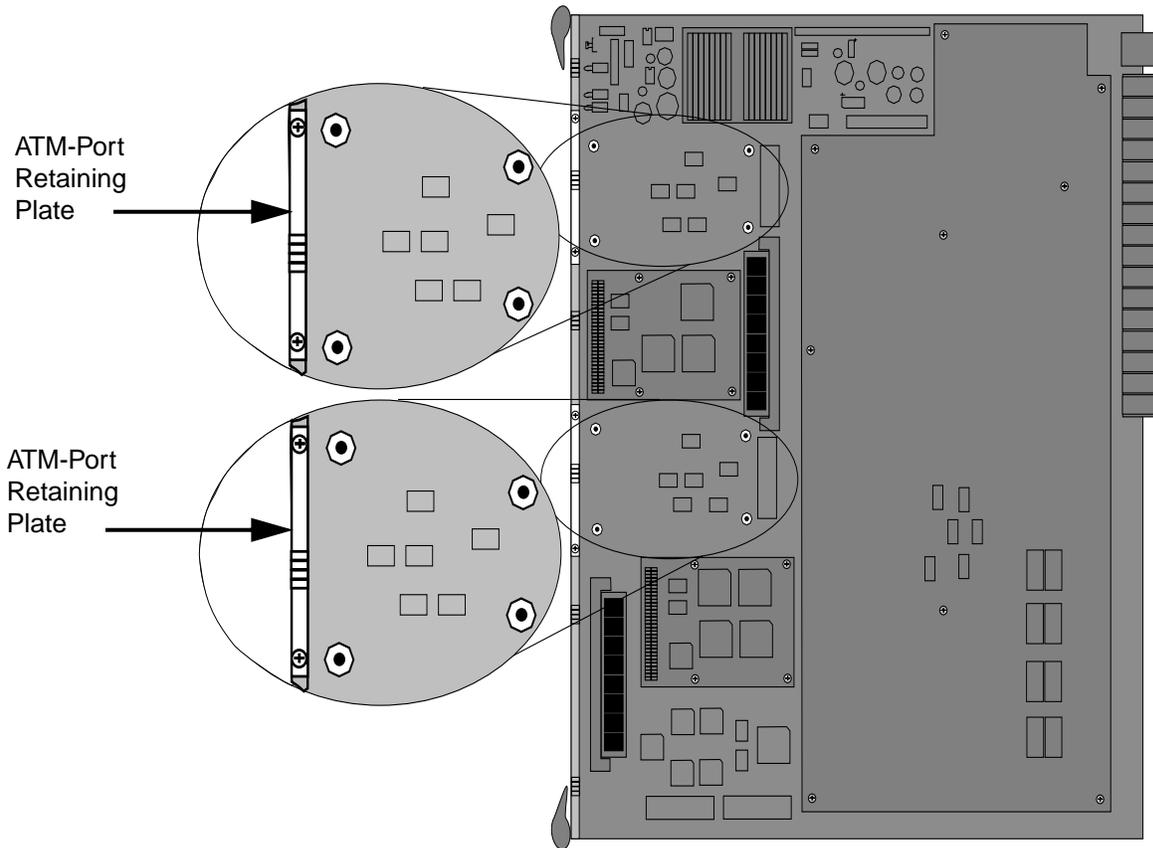


Figure 2-4. The 9A426-02 Module (APIM installation area in insert)

3. Use a Phillips-head screwdriver to remove the two flathead securing screws (see Figure 2-5). Set the screws aside.
4. Remove the ATM-Port Retaining Plate. Set the plate aside.

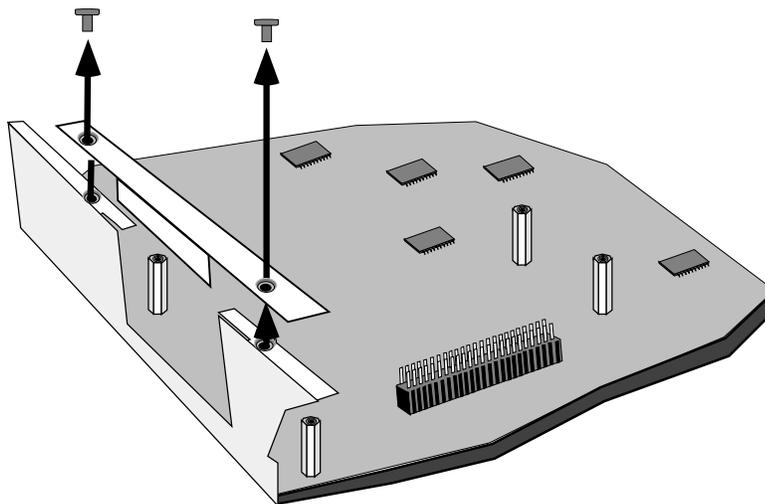


Figure 2-5. Removing the ATM-Port Retaining Plate

Inserting an APIM into the 9A426-02 Module

1. Remove the module's ATM-Port Retaining Plate.
2. Locate the area on the module where APIMs can be installed (shown in Figure 2-4). This area contains eight standoffs (short metal posts). There are four standoffs (arranged in an irregular rectangle) for each APIM (see insert in Figure 2-4). There is a round-head screw at each end of these four standoffs.
3. Use a phillips head screwdriver to remove the four round-head screws from the four standoffs. Set the screws aside.
4. Remove the APIM from its non-conductive bag.
5. Locate the APIM's 80-pin (female) connector (see Figure 2-3).
6. Align the APIM's female connector with the 80-pin male connector in the APIM area of the 9A426-02 Module. Also align the APIM's mounting holes with the four standoffs in the APIM area of the module (see Figure 2-6).

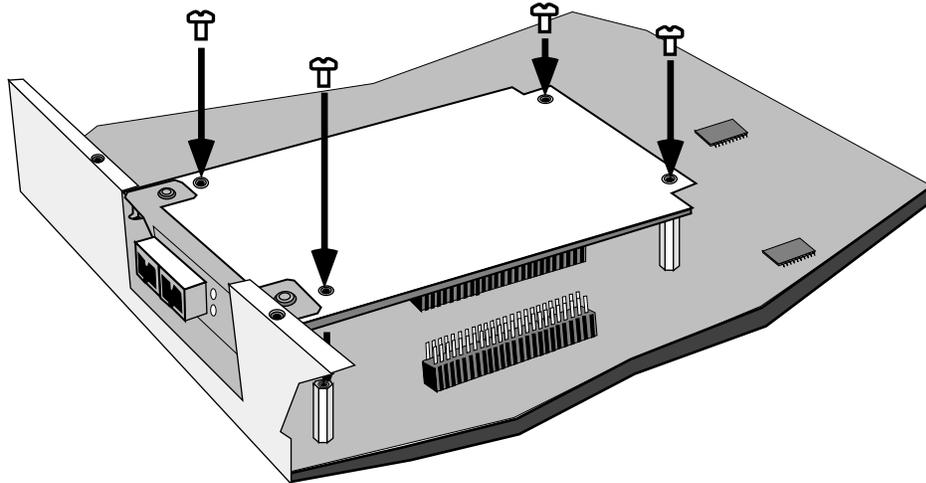
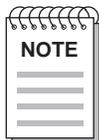


Figure 2-6. Attaching an APIM to a 9A426-02 Module

7. Press down gently on the APIM to lock its female connector into the 9A426-02 Module's male connector.
8. Secure the APIM to the module: Use a Phillips-head screwdriver to attach four round-head screws to the four standoffs on the 9A426-02 Module.
9. Attach the 9A426-02 Module's ATM-Port Retaining Plate (see next page).



Steps 1 through 9 explain how to insert one APIM in the 9A426-02 Module. To insert a second APIM, repeat the same steps.

Attaching the 9A426-02 Module's ATM-Port Retaining Plate

1. Place the module (component side up) on a non-conductive, flat surface. Position the module so that the module's front (faceplate) is facing you.
2. Locate the area where the ATM-Port Retaining Plate attaches to the faceplate.
3. Place the ATM-Port Retaining Plate on the module (align the retaining plate's securing holes with the module's securing holes). Make sure the Retaining Plate's faceplate (its smaller side) is flush with the module's faceplate (see Figure 2-7).
4. Secure the retaining plate to the module: Use a Phillips-head screwdriver to attach two flathead mounting screws to the module.

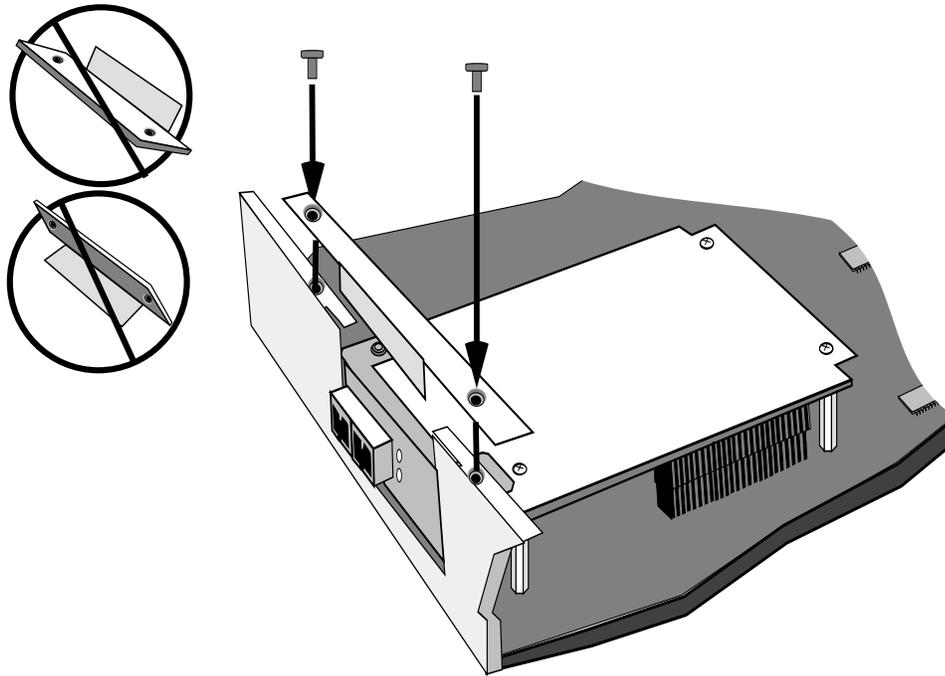


Figure 2-7. Attaching the ATM-Port Retaining Plate to the 9A426-02 Module

User-Accessible Components on the Module's Daughterboard

The user accessible components on the module's daughterboard are located on the underside of the daughterboard. These components include an eight position DIP switch, a replaceable SMB-1 PROM, a replaceable BOOT PROM, and sockets for DRAM and FLASH memory. **You can access the DIP switch without removing the daughterboard.** However, to access the other user-accessible components on the daughterboard, you must remove the daughterboard from the motherboard.

DIP Switch

An eight-position DIP switch is located on the module's daughterboard as shown in Figure 2-8. The functions of the switches are listed in Table 2-1.

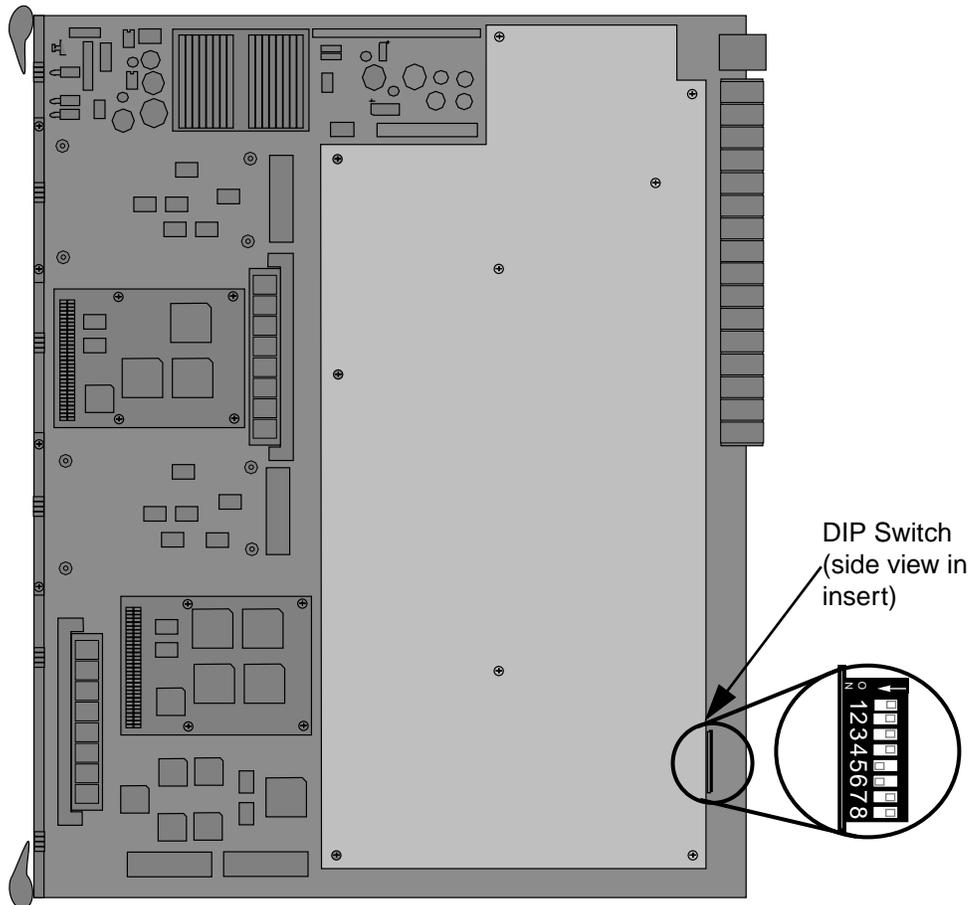


Figure 2-8. Location of DIP Switch on the 9A426-02 Module's Daughterboard

Table 2-1. Function of DIP Switch

| Switch | Function | Description |
|--------|-----------------------------|--|
| 8 | Clear Password ¹ | When toggled, this switch clears user-entered passwords stored in NVRAM, and restores the default passwords. Once the passwords are reset, you can use the defaults or enter new passwords. |
| 7 | Clear NVRAM ² | The module uses NVRAM to store user entered parameters such as IP addresses, device name, etc. To reset these parameters to the factory defaults, toggle this switch. Once reset you can use the defaults or enter new parameters which are stored in NVRAM when the module is powered down, and remain there until the switch is toggled again. |
| 6 | Force BootP Download | Toggling this switch after pulling the board out of the SmartSwitch 9000, clears download information from NVRAM and forces image files to be downloaded from the station connected to the EPIM on the Environmental Module configured to act as that module's BOOTP server. |
| 5 | Reserved | For Factory Use Only |
| 4 | Reserved | For Factory Use Only |
| 3 | Reserved | For Factory Use Only |
| 2 | Reserved | For Factory Use Only |
| 1 | Reserved | For Factory Use Only |



¹Do not toggle Switch 8 unless you intend to reset the user configured passwords to their factory default settings.

²Do not toggle Switch 7 unless you intend to reset the user parameters to the factory default settings.

Removing the Daughterboard from the Motherboard



Never expose the module's components to Electrostatic Discharge. Make sure you have attached the module's disposable grounding strap to your wrist and always place the module on a non-conductive surface.

To remove the module's daughterboard from the motherboard:

1. Place the module (component side up) on a non-conductive, flat surface. Position the module so that the module's front (faceplate) is to the left and the module's back (backplane connectors) is to the right. The daughterboard abuts the backplane connectors (see Figure 2-1).
2. Locate the daughterboard's nine securing screws (see Figure 2-9).
3. Use a phillips head screwdriver to remove the securing screws. Set the screws aside.
4. Grasp the daughterboard and lift up.
5. Turn the daughterboard over to reveal its user accessible components (see Figure 2-10).

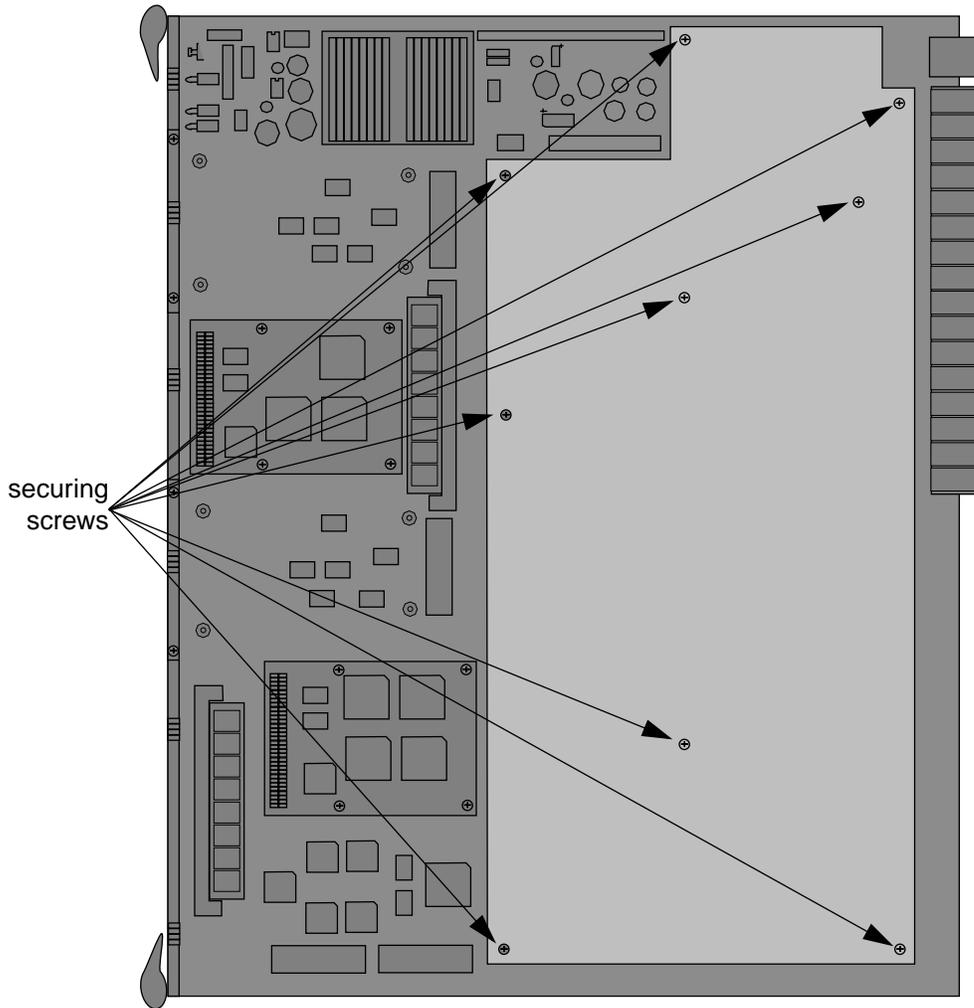


Figure 2-9. Daughterboard Attached to the 9A426-02 Module

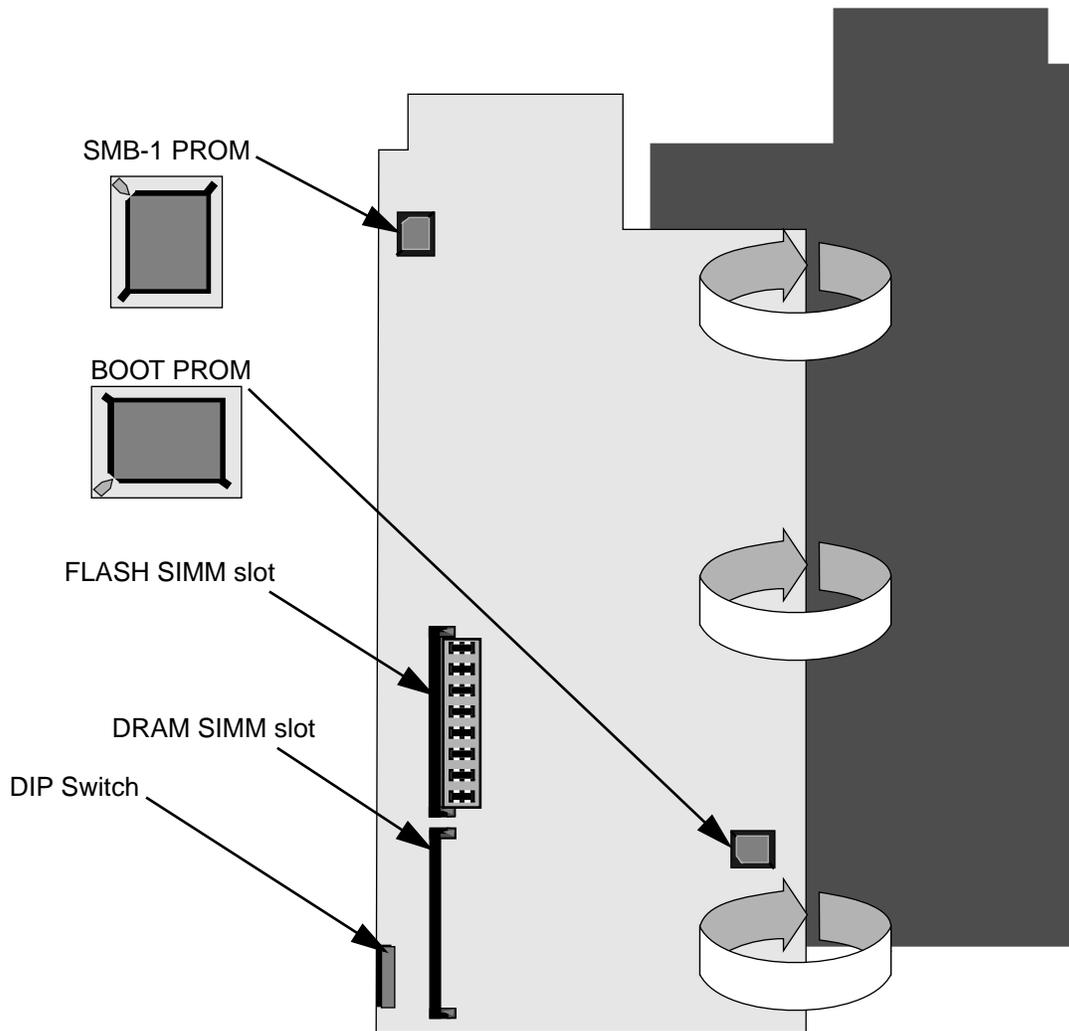


Figure 2-10. User-Accessible Components on Underside of Daughterboard

SMB-1 PROM

The 9A426-02 Module is shipped with an SMB-1 Firmware PROM. The SMB-1 Firmware PROM is located on the underside of the module's daughterboard as shown in Figure 2-10.

To upgrade the SMB-1 PROM, install the SMB-1 PROM Upgrade Kit. Installation instructions are included in the upgrade kit.

BOOT PROM

The 9A426-02 Module is shipped with a BOOT PROM. The BOOT PROM is located on the underside of the module's daughterboard as shown in Figure 2-10.

To upgrade the BOOT PROM, install the BOOT PROM Upgrade Kit. Installation instructions are included in the upgrade kit.

FLASH SIMM

The 9A426-02 Module is shipped with a 4Mb FLASH SIMM. The FLASH SIMM's socket is located on the underside of the module's daughterboard as shown in Figure 2-10.

To upgrade the FLASH SIMM, refer to the installation instructions included in the FLASH SIMM Upgrade Kit.

DRAM SIMM

The 9A426-02 Module is shipped with 16 Mb of DRAM (on the module's motherboard). However if additional DRAM is desired, you can install a DRAM SIMM in the socket on the underside of the module's daughterboard as shown in Figure 2-10.

To install a DRAM SIMM, refer to the installation instructions included in the DRAM SIMM Upgrade Kit.

Installing the Module into the SmartSwitch 9000 Chassis

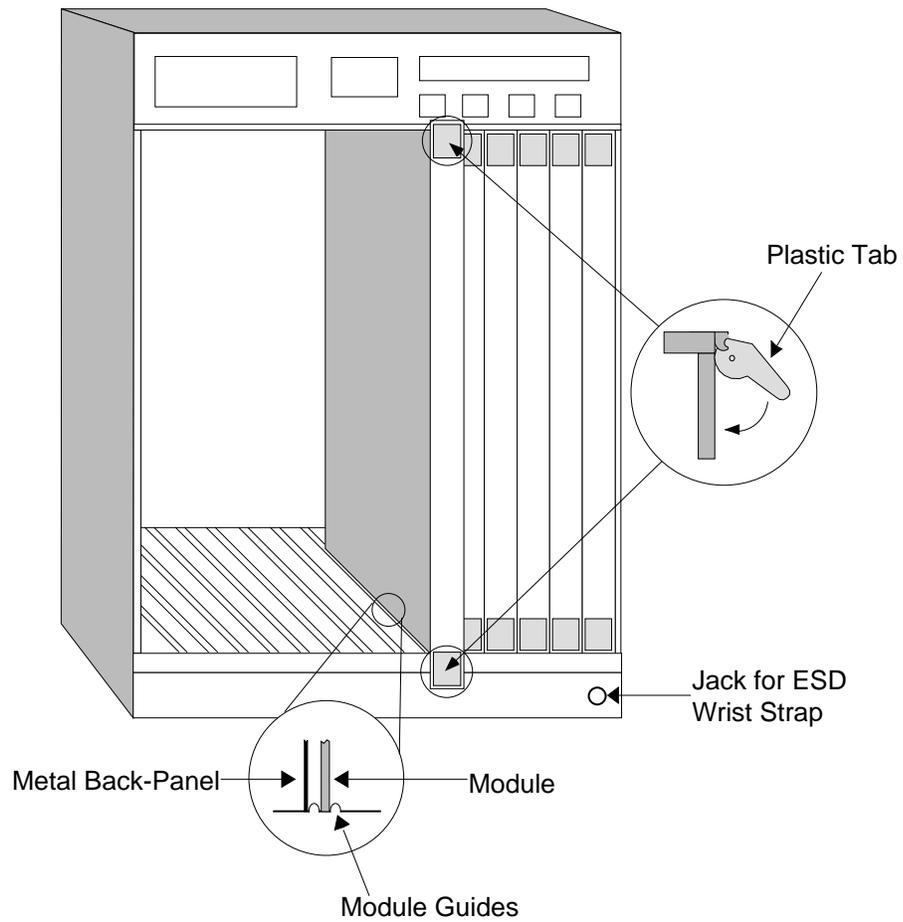
To install the 9A426-02 Module into the SmartSwitch 9000 Chassis, follow the steps below:



*To insure proper data transmission from the 9A426-02 Module to the INB on the SmartSwitch 9000 backplane, two INB Terminator Modules must be installed on the rear of the SmartSwitch 9000 chassis. Refer to the **INB Terminator Module Installation Guide** for information and installation procedure.*

1. Remove the blank panel covering the slot in which the module is being installed. If you are only installing one module, make sure the chassis' other module slots are covered. This action ensures proper airflow and cooling.

2. Attach one end of the ESD wrist strap packaged with the SmartSwitch 9000 chassis to your wrist. Plug the other end into the ESD Wrist Strap Grounding receptacle in the lower right corner of the SmartSwitch 9000 Chassis shown in Figure 2-11.
3. Grasp the module and slide it into the slot. Make sure that the module's circuit card is between the card guides, as shown in Figure 2-11. Check both the upper and lower tracks of the card. Take care that the module slides in straight and engages the backplane connectors properly.
4. Lock down the top and bottom plastic tabs, as shown in Figure 2-11.



Warning:

Ensure that the circuit card is between the card guides.
Lock down the top and bottom plastic tabs
at the same time, applying even pressure.

Figure 2-11. Installing the 9A426-02 Module

The Reset Switch

The Reset switch is located under the top plastic tab as shown in Figure 2-12. Use the reset switch to reset the module's processor, shutdown (power down) the module, and/or restart the module.

- To reset the module's i960 processor, press the reset switch twice within three seconds.
- To shutdown the module, press and hold the reset switch for three or more seconds.
- To restart the module, press the reset switch momentarily.

To enhance module security, use SNMP management to disable the reset switch.

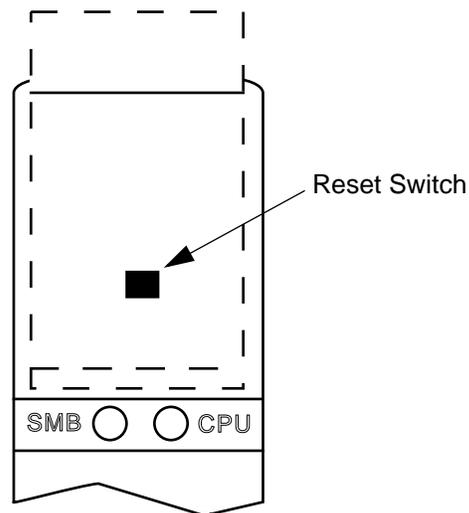


Figure 2-12. The Reset Switch

Operation

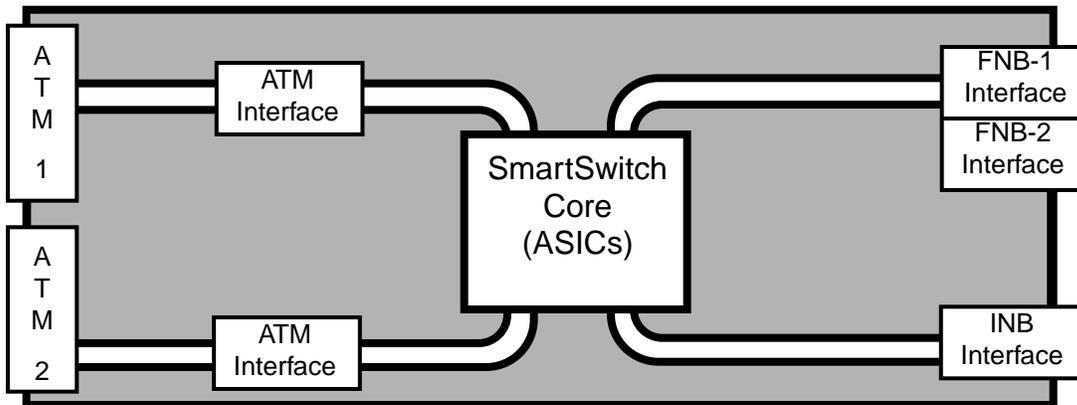
The 9A426-02 Module has three fixed network interface connections: the module's two front panel ATM ports, and the module's INB interface each connect to the module's SmartSwitch ASIC core.

In addition to fixed interface connections, the module offers a user-configurable FNB interface. Through Local Management or SNMP, you can connect the module's SmartSwitch ASIC core to one (or none) of the two FNB interfaces (FNB-1 or FNB-2). Keep in mind that connecting the module's SmartSwitch ASIC core to an FNB interface also connects the selected FNB to the module's three fixed interface connections (the two front panel ATM ports and the INB interface).

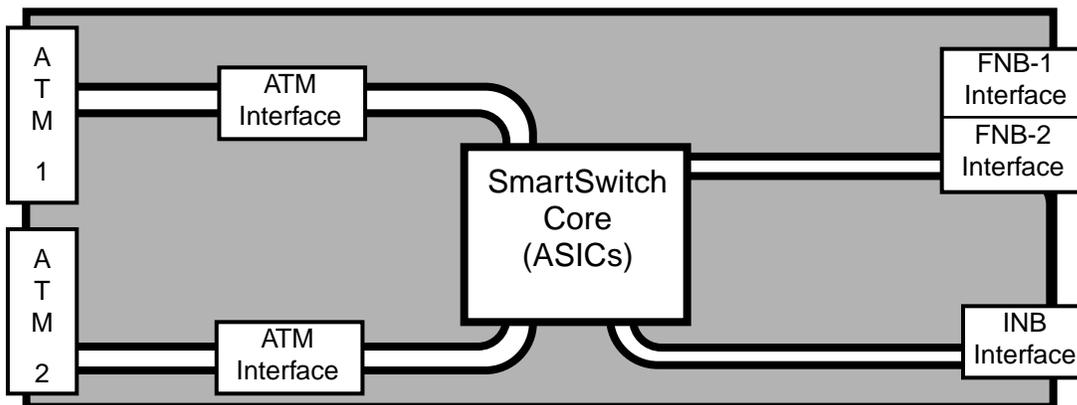
As shown in Figure 3-1, packets can be received simultaneously at the front panel ATM ports, the INB interface and, if configured by the user, one of the FNB interfaces (FNB-1 or FNB-2). All packets that enter the module are converted into a common format known as a canonical frame. The SmartSwitch ASIC core's circuitry determines the ports to which the frames are forwarded.

Front Panel

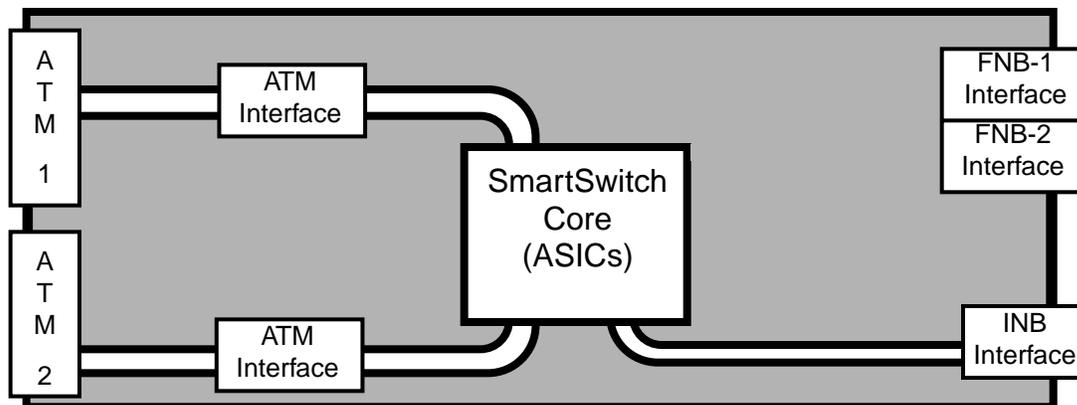
Backplane



ATM/FNB-1 Configuration



ATM/FNB-2 Configuration



ATM/No FNB Configuration

Figure 3-1. Configuration Options

LAN Emulation

The 9A426-02 Module interconnects LANs over an ATM network through a method known as LAN Emulation. LAN Emulation, or LANE, is a method that makes a connection-orientated ATM network look and behave like a shared connectionless Ethernet or Token Ring LAN Segment. Unlike other methods of interconnecting LANs over ATM, LANE can handle routable protocols such as TCP/IP, IPX and DECnet, as well as non-routable protocols such as NetBIOS and SNA.

LANE is an ATM Forum standard that is implemented by a variety of vendors and ensures the interoperability between vendors to allow connectivity from legacy LANs over an ATM backbone.

While LANE allows users to utilize ATM as a backbone between legacy LANs, it also allows legacy LAN users to communicate with native ATM devices such as file servers.

LANE allows you to retain equipment that is currently installed on your desktop, while providing the capability of a high-speed uplink to an ATM network. As such, it enhances your current equipment, as well as the equipment's operating system software. LANE provides high-speed ATM performance, without a wholesale swap of hardware.

System Management Buses

There are two management channels within the SmartSwitch 9000 system: the SMB-1 and the SMB-10. These buses provide out-of-band management and intermodule management communication.

SMB-1 Bus

The SMB-1 is a 1Mbs management bus located within the SmartSwitch 9000. This bus is utilized by all diagnostic controllers in the system including connectivity modules, power supply modules and the environmental module. The SMB-1 transports inter-chassis information between system components, such as power and environmental information, as well as diagnostic messages. Periodic loop-back tests are performed by all modules which share this bus to ensure the validity of SMB-1. In the event a failure is detected on SMB-1, the SMB-10 may be used as an alternate communication channel.

SMB-10 Bus

The SMB-10 is a 10Mbps management bus located within the SmartSwitch 9000 which is also used for inter-chassis communication of modules as well as serving as an out-of-band management channel into the SmartSwitch 9000. The SMB-10 is externalized from the chassis via an optional Ethernet Port Interface Module (EPIM) located on the front of the Environmental Module. Through an EPIM connection, full SNMP management of the SmartSwitch 9000 is available out-of-band from user data. Modules which share the SMB-10 bus periodically send out loop-back packets to ensure the validity of SMB-10. In the event a fault is detected on the SMB-10, the SMB-1 can be used as an alternate communication channel by the modules.

System Diagnostic Controller

This diagnostic controller is composed of a Z-80 microprocessor and its supporting logic. The diagnostic controller is designed to control the power-up sequencing of modules, monitor the 9A426-02 Module input and output power parameters, keep watch over the main host processor, as well as monitor the temperature and control the SMB LANVIEW diagnostic LED. Although the diagnostic controller and the main host processor can operate independent of each other if needed, they exchange information about each other's status and overall module condition. The information gathered by the diagnostic controller is available to the network manager via local/remote management and the LCD located on the environment module. The 9A426-02 Module has been designed so that in the event of a diagnostic controller fault, the 9A426-02 Module will continue to function.

DC/DC Converter

The DC/DC converter converts the 48 VDC on the system power bus to the necessary operating voltages for its host network services module. The diagnostic controller monitors and controls the operation of the DC/DC converter.

INB Network Interface Block

The 9A426-02 Module's INB interface includes a Network Interface Block (INB NIB). Canonical frames processed by the module's SmartSwitch ASIC core that are destined for the INB on the SmartSwitch 9000's backplane are converted by the INB NIB into fixed length data blocks and then transmitted on the INB. Conversely, data blocks received by the module from the INB are converted by the INB NIB into canonical frames and forwarded to the SmartSwitch ASIC core for processing.

FDDI Network Interface Block

The 9A426-02 Module's FNB Interface includes an FDDI Network Interface Block (FNIB). Canonical frames processed by the module's SmartSwitch ASIC core that are destined for one of the two FNBs on the SmartSwitch 9000's backplane are first converted by the FNIB into FDDI packets and then transmitted onto the selected FNB. Conversely, FDDI packets received by the module from an FNB are converted by the FNIB into canonical frames and forwarded to the SmartSwitch ASIC core for processing.

ATM Network Interface Block

The 9A426-02 Module's ATM Interface includes an ATM Network Interface Block (ANIB). ATM cells that enter the module's front panel port(s) are converted by the module's ANIB into canonical frames. The ANIB uses hardware (ASICs) to perform its conversions. The canonical frames are then forwarded to the SmartSwitch ASIC core (a separate set of ASICs on the module) for processing. Conversely, canonical frames processed by the module's SmartSwitch ASIC core that are destined for front panel ATM ports are converted via ASICs in the ANIB into fixed length (53 byte) ATM cells and then transmitted to the ports. The ANIB uses encapsulation techniques in accordance with the ATM Forum LAN Emulation Specification. These techniques include the capability to encapsulate ATM data in either Ethernet or Token Ring frame formats.

SecureFast Virtual Networking

Secure Fast Virtual Networking combines the best elements of bridging and routing technologies with connection-oriented switching. Essential to Cabletron's SecureFast architecture is the ability to embed layer-three virtual routing services directly into its high-performance switches. Through a simple firmware upgrade, customers can add "intranet management" software to a broad line of Cabletron switches, including an installed base of over one million ports.

With Cabletron's "connection-oriented" architecture, users avoid latency and performance problems and can build intranetworks that more closely mirror the organizational structure of their business.

Since SecureFast Virtual Networking implements the same connection-oriented concepts as ATM, customers are guaranteed a smooth migration from packet-based LANs to cell-based technologies. SecureFast Switching allows customers to receive many of the benefits of ATM such as security and accountability within LAN infrastructures.

An equally important SecureFast Virtual Networking feature is a broadcast interception service which resolves issues such as security, broadcasts, multi-casts and network flooding. Broadcast interception allows customers to cost-effectively control broadcast traffic in a switched network without requiring a router.

i960 Core

The i960 core provides the SNMP protocol stacks, to support industry standard MIBs. Additionally, Cabletron enterprise extension MIBs are supported for each media type. Advanced management services, such as the Distributed LAN Monitor, telnet and network address to MAC address mapping, are also provided by the i960 core.

The host engine sends and receives packets via the CPU SmartSwitch ASIC Interface. This method allows the traditional switch to perform spanning tree protocol and other traditional switching functions. The SMB Interfaces provide communication to the Host Engine for management functions and communication with other modules in the chassis.

LANVIEW LEDs

The front panel LANVIEW LEDs indicate the status of the module and aid in troubleshooting the module. The LANVIEW LEDs of the 9A426-02 Module are shown in Figure 4-1.

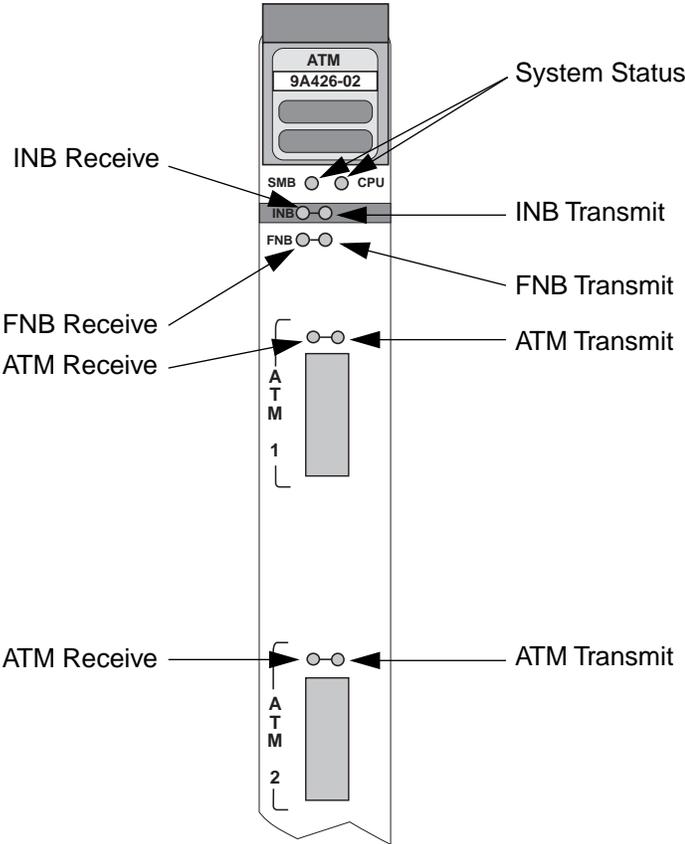


Figure 4-1. The LANVIEW LEDs of the 9A426-02 Module

The functions of the System Status (SMB and CPU) LEDs are listed in Table 4-1.

Table 4-1. System Status (SMB and CPU) LEDs

| LED Color | State | Description |
|-------------------|------------|--|
| Green | Functional | Fully operational |
| Yellow/Green | Booting | Blinks yellow and green while booting |
| Yellow | Testing | Performing power-up testing |
| Yellow (Flashing) | Crippled | Not fully operational (i.e., one bad port) |
| Red | Reset | Normal power-up reset |
| Red (Flashing) | Failed | Fatal error has occurred |
| Off | No Power | No power is being supplied to the module |

The status of the INB Receive LED is listed in Table 4-2.

Table 4-2. INB Receive LED

| LED Color | State |
|-------------------|---|
| Green | Link exists, no activity, port is enabled |
| Yellow (Flashing) | Link exists, activity, port is enabled |
| Red | No link, port is disabled |
| Red (Flashing) | Link exists, port is disabled |
| Off | No link, no activity, port is enabled |

The status of the INB Transmit LED is listed in Table 4-3.

Table 4-3. INB Transmit LED

| LED Color | State |
|-------------------|------------------------------|
| Green (Flashing) | Activity, port is enabled |
| Yellow (Flashing) | Port is in standby mode |
| Red | Port is disabled |
| Red (Flashing) | Fault or error exists |
| Off | No activity, port is enabled |

The status of the FNB Receive LED is listed in Table 4-4.

Table 4-4. FNB Receive LED

| LED Color | State |
|-------------------|---|
| Green | Link exists, no activity, port is enabled |
| Yellow (Flashing) | Link exists, activity, port is enabled |
| Red | No link, port is disabled |
| Red (Flashing) | Link exists, port is disabled |
| Off | No link, no activity, port is enabled |

The status of the FNB Transmit LED is listed in Table 4-5.

Table 4-5. FNB Transmit LED

| LED Color | State |
|-------------------|------------------------------|
| Green (Flashing) | Activity, port is enabled |
| Yellow (Flashing) | Port is in standby mode |
| Red | Port is disabled |
| Red (Flashing) | Fault or error exists |
| Off | No activity, port is enabled |

The status of the ATM Receive LED is listed in Table 4-6.

Table 4-6. ATM Receive LEDs

| LED Color | State |
|-------------------|--------------|
| Yellow (Flashing) | Activity |
| Red | Failure |
| Off | No Activity |

The status of the ATM Transmit LED is listed in Table 4-7.

Table 4-7. ATM Transmit LEDs

| LED Color | State |
|------------------|-------------|
| Green (Flashing) | Activity |
| Red | Failure |
| Off | No Activity |

The following section lists the conditions of the APIM status (STS) and link (LNK) LANVIEW LED's.

An example showing the location of LANVIEW LEDs on an APIM is presented in Figure 4-2. For further information about a particular APIM, refer to that specific APIM's documentation.

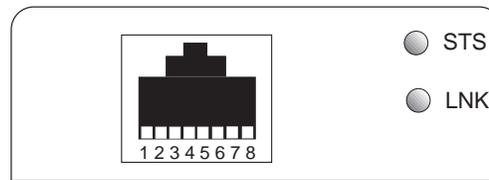


Figure 4-2. The LANVIEW LEDs of an APIM-22

The status of the APIM Status (STS) LED is listed in Table 4-8.

Table 4-8. APIM Status (STS) LED

| LED Color | State |
|-----------|---------|
| Green | Active |
| Amber | Reset |
| Red | Failure |

The status of the APIM Link (LNK) LED is listed in Table 4-9.

Table 4-9. APIM Link (LNK) LED

| LED Color | State |
|------------------|---------------------|
| Green | Link is established |
| Amber | Off, no link |
| Red | Off, no link |

Specifications

Technical Specifications

CPU

Intel i960 RISC-based microprocessor

Memory

| | |
|---------------|-----------------------------|
| Main Memory: | 16 Mb standard (expandable) |
| Flash Memory: | 4 Mb standard (expandable) |

Address Table Size

16,000 entries (expandable)

Power

100 - 125 VAC or 200 - 250 VAC @ 50 - 60 Hz

Network Interfaces

APIM Connectors

Standards

ATM Forum UNI v3.0/3.1
ITU I.361 ATM Layer
Q.2931
LAN Emulation v1.0

Safety



It is the responsibility of the person who sells the system to which the module will be a part to ensure that the total system meets allowed limits of conducted and radiated emissions.

This equipment meets the safety requirements of:

UL 1950
CSA C22.2 No. 950
EN 60950
IEC 950

The EMI Requirements of:

- FCC Part 15 Class A
- EN 55022 Class A
- VCCI Class I

The EMC requirements of:

- EN 50082-1
- IEC 801-2 ESD
- IEC 801-3 Radiated susceptibility
- IEC 801-4 EFT

Service

| | |
|------------------|---------------|
| MTBF (MHBK-217E) | >200,000 hrs. |
| MTTR | <0.5 hr. |

Physical

Dimensions

35.0 D x 44.0 H x 6.0 W centimeters
(13.8 D x 17.4 H x 1.2 W inches)

Weight

| | |
|-----------|-----------------------|
| Unit: | 4.525 kgs. (10 lbs.) |
| Shipping: | <6.787 kgs. (15 lbs.) |

Environment

| | |
|------------------------|-------------------------------|
| Operating Temperature: | +5° to 40° C (41° to 104° F) |
| Storage Temperature: | -30 to 90° C (-22° to 164° F) |
| Relative Humidity: | 5% to 95% non-condensing |

