

MMAC-Plus™ 9F206-02
FDDI Repeater MicroLAN™ Module
User's Guide

CABLETRON
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The Complete Networking Solution™

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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.

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 uses, generates, and can radiate radio frequency energy and if not installed in accordance with the operator's manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause interference in which case the user will be required to correct the interference at his own expense.

WARNING: Changes or modifications made to this device which are not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

DOC Notice

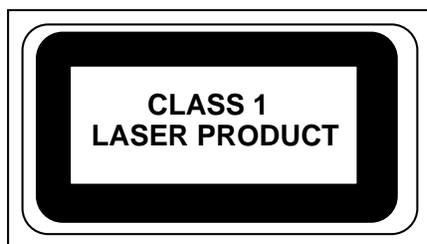
This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la class A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

Safety Information

CLASS 1 LASER TRANSCEIVERS

The FPIM-05 and FPIM-07 are Class 1 Laser Products



The FPIM-05 and FPIM-07 use Class 1 Laser transceivers. Read the following safety information before installing or operating these adapters.

The Class 1 laser transceivers use an optical feedback loop to maintain Class 1 operation limits. This control loop eliminates the need for maintenance checks or adjustments. The output is factory set, and does not allow any user adjustment. Class 1 Laser transceivers comply with the following safety standards:

- 21 CFR 1040.10 and 1040.11 U.S. Department of Health and Human Services (FDA).
- IEC Publication 825 (International Electrotechnical Commission).
- CENELEC EN 60825 (European Committee for Electrotechnical Standardization).

When operating within their performance limitations, laser transceiver output meets the Class 1 accessible emission limit of all three standards. Class 1 levels of laser radiation are not considered hazardous.

Safety Information

CLASS 1 LASER TRANSCEIVERS

Laser Radiation and Connectors

When the connector is in place, all laser radiation remains within the fiber. The maximum amount of radiant power exiting the fiber (under normal conditions) is -12.6 dBm or 55×10^{-6} watts.

Removing the optical connector from the transceiver allows laser radiation to emit directly from the optical port. The maximum radiance from the optical port (under worst case conditions) is 0.8 W cm^{-2} or $8 \times 10^3 \text{ W m}^{-2} \text{ sr}^{-1}$.

Do not use optical instruments to view the laser output. The use of optical instruments to view laser output increases eye hazard. When viewing the output optical port, power must be removed from the network adapter.

Chapter 1 Introduction

Features.....	1-1
Related Manuals.....	1-4
Getting Help	1-4

Chapter 2 Installing the MicroLAN Module

Unpacking the Module.....	2-1
Installing an FPIM.....	2-1
User-Accessible Components.....	2-3
Setting the Module Card DIP Switch	2-4
Installing the Module into the MMAC-Plus Chassis.....	2-6
The Reset Switch	2-8

Chapter 3 Operation

Flexible Network Bus (FNB).....	3-1
System Management Bus.....	3-2
System Diagnostic Controller.....	3-2
DC/DC Converter	3-2
FNB Interface	3-2
CPU	3-3

Chapter 4 LANVIEW LEDs

Chapter 5 General Specifications

Safety.....	5-1
Service.....	5-1
Physical.....	5-2
Dimensions:	5-2
Weight:.....	5-2

Appendix A FPIM Specifications

FPIM-00 and FPIM-01.....	A-1
FPIM-02 and FPIM-04.....	A-2
FPIM-05 and FPIM-07.....	A-3

Introduction

The 9F206-02 (as shown in Figure 1-1) is an FDDI repeater module for the MMAC-Plus that provides external access to the Flexible Network Bus (FNB) backplane via two sets of FDDI-compliant A/B ports. This allows the FNB to traverse multiple MMAC-Plus systems, or connect to any ASNI FDDI-compliant device in an FDDI network. The 9F206-02 module attaches to both FDDI networks on the FNB backplane, FNB-1 and FNB-2, but can be controlled separately with DIP switches or local management tools. The 9F206-02 can also be used to Dual-Home an MMAC-Plus chassis to multiple points in the network. Using standard FDDI chip-set technology, the 9F206-02 module completely re-times and regenerates data signals for error free transmission and guaranteed interoperability.

Features

System Management

The 9F206-02 requires minimal management. It can be completely managed and controlled through the SMB-1. The management features include the following:

- Front Panel Port Status
- Insertion/bypass Control (FDDI-1 and FDDI-2) and Status
- FPIM Identification (Front Panel)

Connectivity

The 9F206-02 uses FDDI Port Interface Modules (FPIMs) to provide several media options for the front panel (FNB-1 and FNB-2) interfaces. These FPIMs are available in various media types including the following:

- Multimode Fiber Optic (FDDI MIC)
- Single Mode Fiber Optic (FDDI MIC)
- Unshielded Twisted Pair (RJ-45)
- Shielded Twisted Pair (RJ-45)
- Multimode Fiber Optic (SC)
- Singlemode Fiber Optic (SC)

LANVIEW LEDs

The 9F206-02 uses LANVIEW: the Cabletron Systems built-in visual diagnostic and status monitoring system for at-a-glance diagnosis of the network. With LANVIEW LEDs, you can quickly identify the device, port, and physical layer status.

Hot Swapping

The 9F206-02 can be installed or removed from the chassis while the MMAC-Plus is powered up without affecting the operation of the rest of the system.

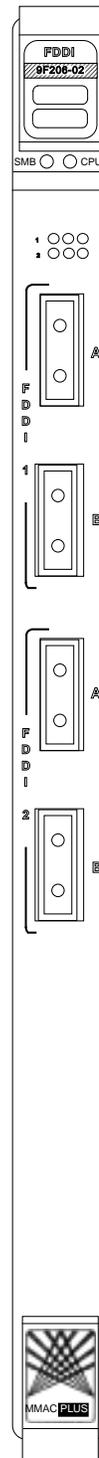


Figure 1-1. The 9F206-02 Module

Related Manuals

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

MMAC-Plus Installation Guide

MMAC-Plus Operations Guide

MMAC-Plus 9C300-1 Environmental Module User's Guide

MMAC-Plus 9C214-AC Power Supply User's Guide

MMAC-Plus Module Local Management User's Guide

Getting Help

If you need additional support with the MMAC-Plus, or if you have any questions, comments or suggestions concerning this manual, feel free to contact Cabletron Systems Technical Support:

By phone: (603) 332-9400

By CompuServe®: GO CTRON from any ! prompt

By Internet mail: support@ctron.com

By mail: Cabletron Systems, Inc.
P.O. Box 5005
Rochester, NH 03867-0505

Installing the MicroLAN Module

This module uses FPIMs for the front panel connections. They are not shipped with the module and must be purchased separately. For more information on FPIMs see **Appendix A**.

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.

Installing an FPIM

FPIMs are required for the 9F206-02 and are ordered and shipped separately. To install an FPIM, follow the procedure below:

1. Remove the module if it is installed in the MMAC-Plus chassis.
2. Remove the blank front cover over the FPIM slot.
3. Install the FPIM as shown in Figure 2-1. Ensure that the rear connector is seated firmly before tightening the two mounting screws.

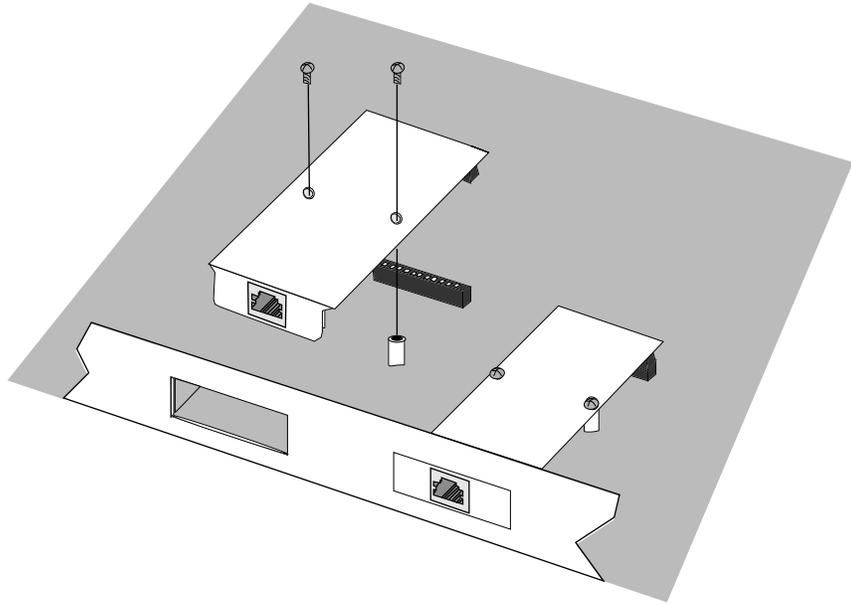


Figure 2-1. Installing an FPIM

User-Accessible Components

Figure 2-2 shows the various components that are accessible to the user. These consist of an eight position dip switch (explained in the next section) and sockets for replaceable PROMs. These will be used for future upgrades. Instructions for installing the components will be supplied with the upgrade kit.

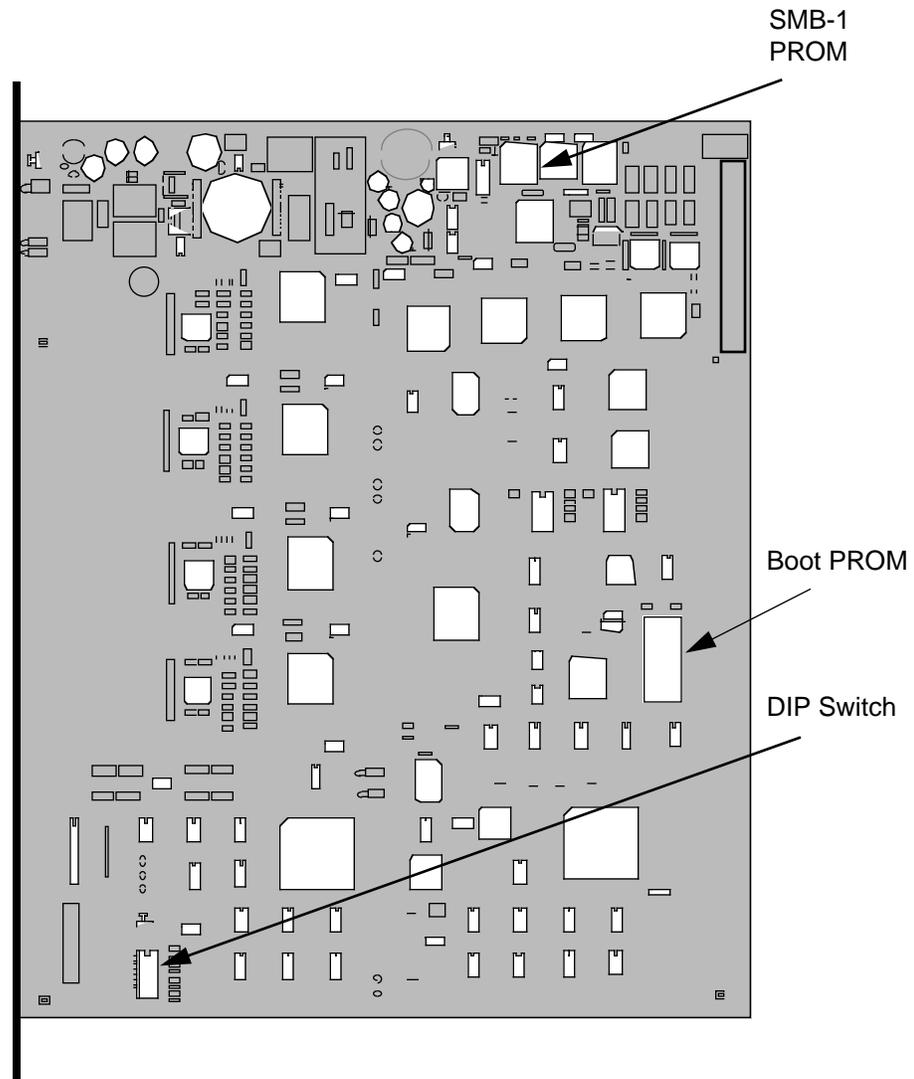


Figure 2-2. User-Accessible Components

Setting the Module Card DIP Switch

An eight switch DIP switch is located on the module card as shown in Figure 2-2 and Figure 2-3. The functions of the switches are listed in Table 2-1.

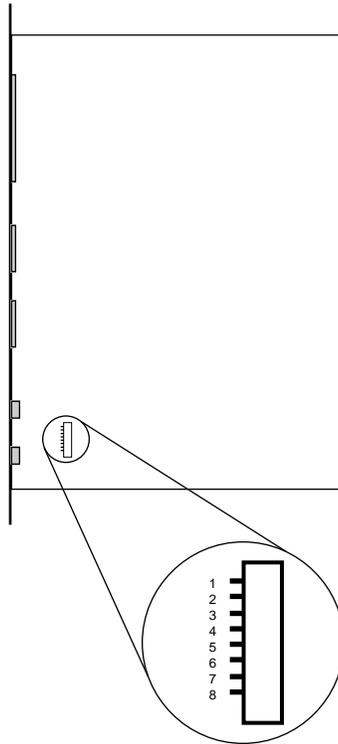


Figure 2-3. Location of Module DIP Switch

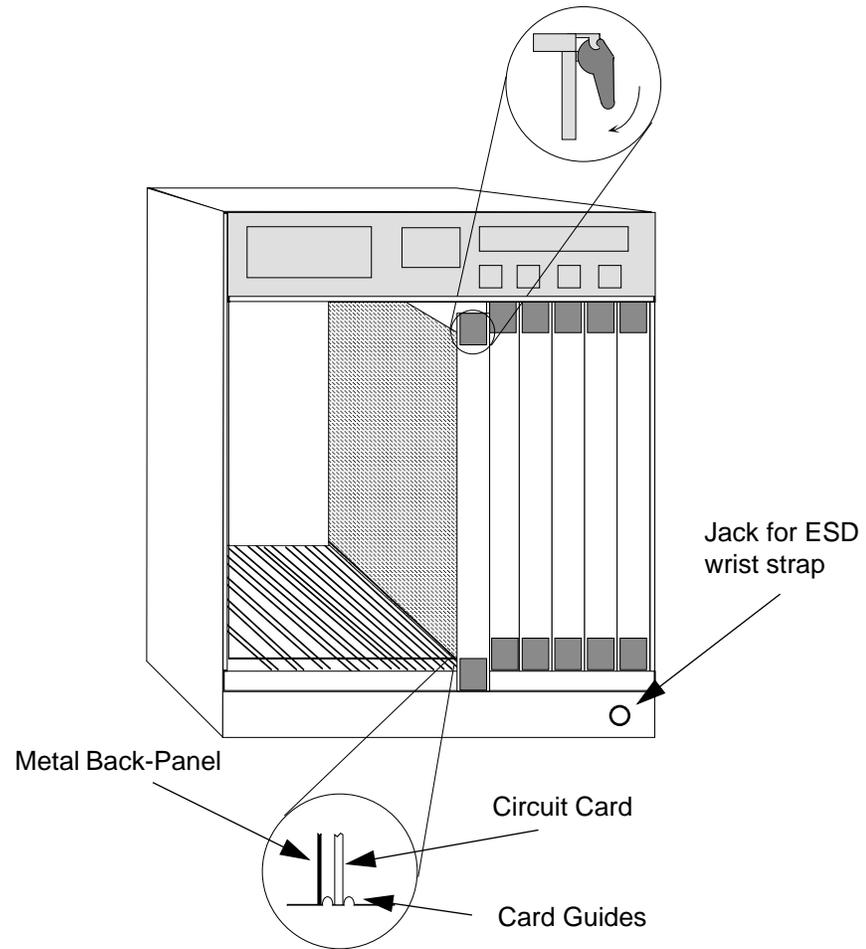
Table 2-1. Function of DIP Switch

Switch	Function	Description	On	Off	Factory Default
1	None	Not Used.	N/A	N/A	N/A
2	None	Not Used.	N/A	N/A	N/A
3	FNB-1 External Ring	Specifies which ring is externalized for FNB-1.	Primary	Secondary	Primary
4	FNB-2 External Ring	Specifies which ring is externalized for FNB-2.	Primary	Secondary	Primary
5	FNB-1 Status	The status of the FNB-1.	Inserted	Bypassed	Inserted
6	FNB-2 Status	The status of the FNB-2.	Inserted	Bypassed	Inserted
7	Restore Defaults	Restores module to the original factory settings.	Toggle	N/A	N/A
8	Control	This switch determines whether the module is controlled by the DIP switches or Local Management.	Local Management	DIP Switches	Local Management

Installing the Module into the MMAC-Plus Chassis

MMAC-Plus MicroLAN Modules can be installed in any of the 14 slots that are available. To install, follow the steps below:

1. Switch off the power supplies and remove all power from the MMAC-Plus chassis.
2. Remove the blank panels, covering the slots that the module is being mounted in. All other slots must be covered, if modules are not being installed, to ensure proper airflow and cooling.
3. Attach one end of the ESD wrist strap packaged with the MMAC-Plus chassis to your wrist. Plug the other end into the ESD Wrist Strap Grounding receptacle in the lower right corner of the MMAC-Plus Chassis shown in Figure 2-4.
4. The module is installed into the chassis by sliding it into slots and locking down both the top and bottom plastic tabs, as shown in Figure 2-4. Take care that the module slides in straight and engages the backplane connectors properly. When installing the module, ensure that both circuit cards are between the card guides, as shown in Figure 2-4. Check both the upper and lower tracks of both cards.



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 2-4. Installing the MicroLAN Module

The Reset Switch

The Reset switch is located on the front panel, under the top plastic tab as shown in Figure 2-5. It serves two functions:

- Pressing the Reset switch twice within three seconds causes the main CPU to reset.
- Pressing and holding the switch on for three or more seconds causes the module to shutdown. Pressing and holding again for three seconds restarts the module.

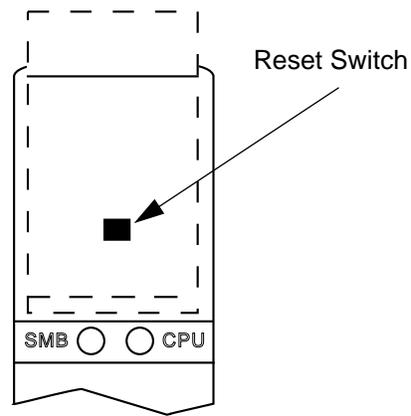


Figure 2-5. The Reset Switch

Operation

The 9F206-02 module, as shown in Figure 3-1, provides two repeater ports that extend the FNB bus outside the MMAC-Plus chassis. No bridging or routing is done in this module. Each port connects to both rings (Primary and Secondary) on each FNB (FNB-1 and FNB-2).

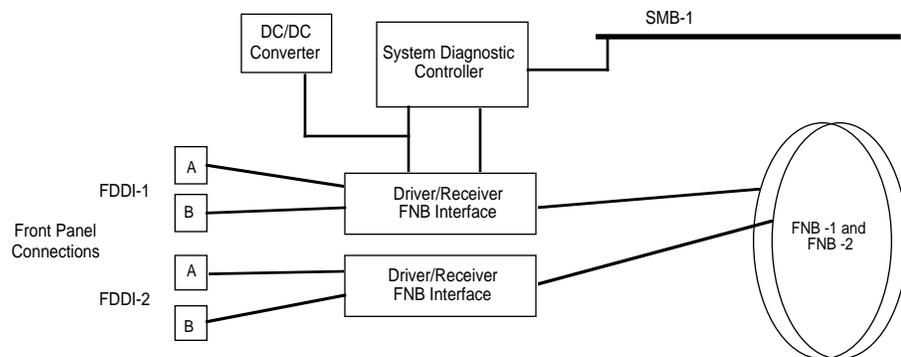


Figure 3-1. 9F206-02 Block Diagram

Flexible Network Bus (FNB)

The FNB consists of two dual FDDI networks, FNB-1 and FNB-2, providing up to 400 Mbps of data bandwidth. These FDDI networks are 100% ANSI FDDI-compliant supporting SMT (version 7.3), MAC, PHY, and PMD standards. This allows the FNB to traverse multiple MMAC-Plus hubs, or connect to any ANSI FDDI-compliant device, through standard A/B port connections.

System Management Bus

There are two management channels within the MMAC-Plus system: the SMB-1 and the SMB-10. These buses provide out-of-band management and inter-module management communication. The 9F206-02 uses only the SMB-1 bus.

The SMB-1 is a 1 Mbps management bus located within the MMAC-Plus. 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.

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 9F206-02 input and output parameters, as well as monitor the temperature, and control the SMB LANVIEW LED. The diagnostic controller on the 9F206-02 is also responsible for reporting the FNB and front panel connectivity status to network management. The information gathered by the diagnostic controller is available to the network manager via local/remote management and the LCD located on the Environmental Module. The 9F206-02 has been designed so that in the event of a diagnostic controller fault, the 9F206-02 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 controls the operation of the DC/DC converter.

FNB Interface

MMAC-Plus modules are designed with one of two attachment policies. One allows a module to dual attach to either FNB-1 or FNB-2; the second allows dual attachment to both FNB-1 and FNB-2. The 9F206-02 has dual attachment to the FNB backplane, connecting to both FNB-1 and FNB-2. These flexible configuration options make the MMAC-Plus ideal for networks designed to Bridge/Route multiple lower speed LANs to FDDI and/or networks designed using an FDDI collapsed backbone.

CPU

The CPU handles all low level SMT functions as well as module configuration requests. The CPU is also responsible for all environmental, power and system level communication between modules in the MMAC-Plus chassis.

LANVIEW LEDs

The front panel LANVIEW LEDs indicate the status of the module and may be used as an aid in troubleshooting. Shown in Figure 4-1 are the LANVIEW LEDs of the 9F206-02 module.

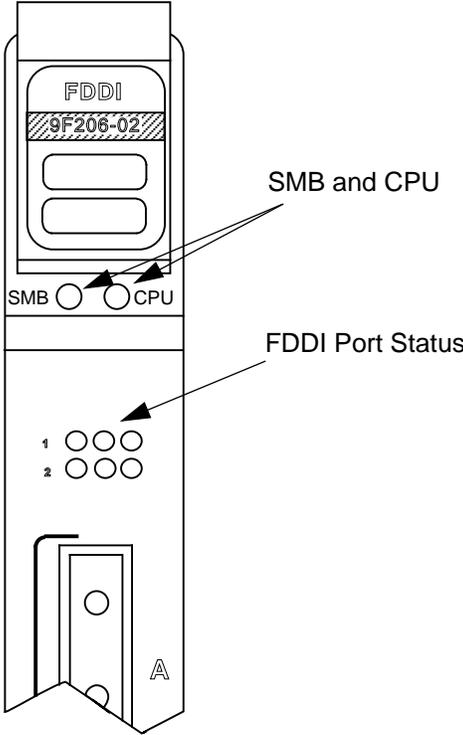


Figure 4-1. 9F206-02 LANVIEW LEDs

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

Table 4-1. SMB and CPU LEDs

LED Color	State	Description
Green	Functional	Fully operational.
Yellow (Flashing)	Crippled	Not fully operational (i.e., one bad port).
Yellow /Green	Booting	Blinks yellow and green while booting.
Red	Reset	Normal power-up reset.
Red (Flashing)	Failed	Fatal error has occurred.
Off	Power off	Module powered off.

There is one row of FDDI Port Status LEDs for each FDDI ring, FNB-1 and FNB-2. The functions of the FDDI LEDs are shown in Figure 4-2 and Table 4-2.

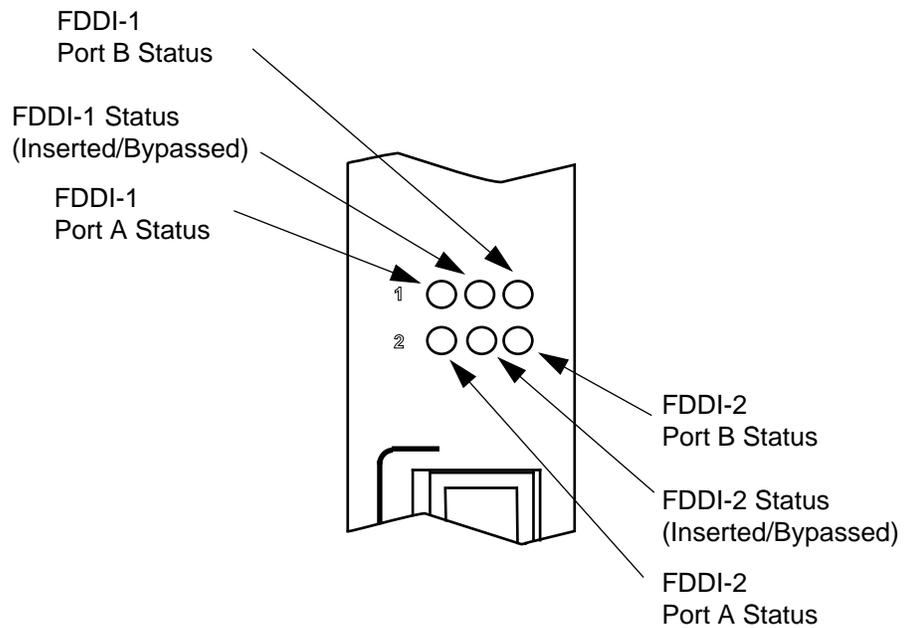


Figure 4-2. FDDI LEDs

The functions of the FDDI Port Status LEDs are listed in Table 4-2.

Table 4-2. FDDI Port Status LEDs

LED Color	STATE
Green	Link, Active, Port Enabled
Yellow	Link, Not Active, Port Enabled
Red	Not Link, Port Disabled
Red (Flashing)	Link, Port Disabled
Off	No Link, Not Active, Port Enabled

The functions of the FDDI Status LEDs are listed in Table 4-3.

Table 4-3. FDDI Status LEDs

LED Color	State
Green	Inserted
Red	Isolated
Yellow	Wrapped
Off	Bypassed

General Specifications

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 following safety requirements:

- UL 1950
- CSA C22.2 No. 950
- EN 60950
- IEC 950
- EMI Requirements of FCC Part 15 Class A
- EN 55022 Class A
- VCCI Class I
- EMC requirements of the following:
 - 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 3.0 W centimeters
(13.8 D x 17.4 H x 1.2 W inches)

Weight:

Unit:	1.36 kg. (3 lb)
Shipping:	1.81 kg. (4 lb)

FPIM Specifications

This MMAC-Plus module uses Fiber Port Interface Modules (FPIM) to provide front panel cable connections. The FPIMs are user-installable. See the section titled **Installing an FPIM** on page 2-1.

FPIM-00 and FPIM-01

The FPIM-00 and FPIM-01 provide a multimode fiber connection. The FPIM-00 uses a MIC style connector and the FPIM-01 uses an SC type connector. The specifications for both devices are listed in Table A-1.

Table A-1. FPIM-00 and FPIM-01 Specifications

Parameter	Typical Value	Worst Case	Worst Case Budget	Typical Budget
Receive Sensitivity	-30.5 dBm	-28.0 dBm	—	—
Peak Input Power	-7.6 dBm	-8.2 dBm	—	—

Transmitter power parameters are listed in Table A-2.

Table A-2. Transmitter Power Parameters

Parameter	Typical Value	Worst Case	Worst Case Budget	Typical Budget
50/125 μm fiber	-13.0 dBm	-15.0 dBm	13.0 dB	17.5 dB
62.5/125 μm fiber	-10.0 dBm	-12.0 dBm	16.0 dB	20.5 dB
100/140 μm fiber	-7.0 dBm	-9.0 dBm	19.0 dB	23.5 dB
Error Rate	Better than 10^{-10}			

The link distance is up to 2 kilometers on the multimode fiber-optic cable as specified by ANSI MMF-PMD.

FPIM-02 and FPIM-04

The FPIM-02 has an RJ-45 connector supporting an Unshielded Twisted Pair (UTP) connection. The FPIM-04 has an RJ-45 connector supporting a Shielded Twisted Pair (STP) connection. The pinouts for both are listed in Table A-3.

Table A-3. FPIM-04 Pinouts

Pin Number	Represents	Pin Number	Represents
1	Transmit+	5	NA
2	Transmit-	6	NA
3	NA	7	Receive+
4	NA	8	Receive-

The link distance is up to 100 meters on unshielded twisted pair cable as specified by ANSI TP-PMD.

FPIM-05 and FPIM-07

The FPIM-05 and FPIM-07 provide a Single-mode fiber connection. The FPIM-05 uses a MIC style connector and the FPIM-07 uses an SC type connector. The specifications for both devices are listed in Table A-4.

Table A-4. FPIM-05 and FPIM-07 Specifications

Parameter	Typical	Minimum	Maximum
Transmitter Peak Wave Length	1300 nm	1270 nm	1330 nm
Spectral Width	60 nm	-	100 nm
Rise Time	3.0 nsec	2.7 nsec	5.0 nsec
Fall Time	2.5 nsec	2.2 nsec	5.0 nsec
Duty Cycle	50.1%	49.6%	50.7%
Bit Error Rate	Better than 10^{-10}		

The link distance is up to 40 kilometers (max) and 25 kilometers (typical) on single mode fiber-optic cable as specified by ANSI SMF-PMD.