

MMAC-Plus™ 9F106-01  
Two Port FDDI Router  
User's Guide

**CABLETRON**  
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The Complete Networking Solution™

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

Read the instructions for correct handling.

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# Introduction

The 9F106-01 module, shown in Figure 1-1, is a two port FDDI router. One front panel network connection can be made to this module and routed to any other MMAC-Plus module via the FNB bus.

## Features

### **Processor**

The 9F106-01 is equipped with an advanced IDT R4600 Fourth Generation 64 bit RISC microprocessor. This microprocessor provides a platform for all management functions within a scalable RISC-based architecture.

### **System Management**

The 9F106-01 provides an interface to the System Management Bus (SMB-1) for intermodule management.

### **Connectivity**

The 9F106-01 provides one dual attached FDDI interface using two standard Cabletron FPIMs.

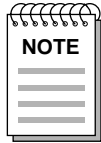
### **Routing**

The 9F106-01 provides Routing between the front panel interface and/or to any other module in the chassis via FNB -1 or FNB -2 of the FNB bus. IEEE 802.1d Spanning Tree Protocol is supported in all bridging functions.

### **Management Information Base (MIB) Support**

The 9F106-01 module provides MIB support including the following:

- IETF FDDI MIB
- IETF MIB II



*For a complete list of supported MIBs, refer to the release notes provided in the module package.*

### **LANVIEW LEDs**

The 9F106-01 uses LANVIEW: the 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.

### **Hot Swapping**

The 9F106-01 can be installed or removed from the chassis while the MMAC-Plus is powered up without affecting the operation of the remaining modules in the chassis.



Figure 1-1. The 9F106-01 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 9C214-1 AC Power Supply User's Guide**

**Cisco Systems R4500 manuals - CRM-DOC or CRM-CDROM**

## 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

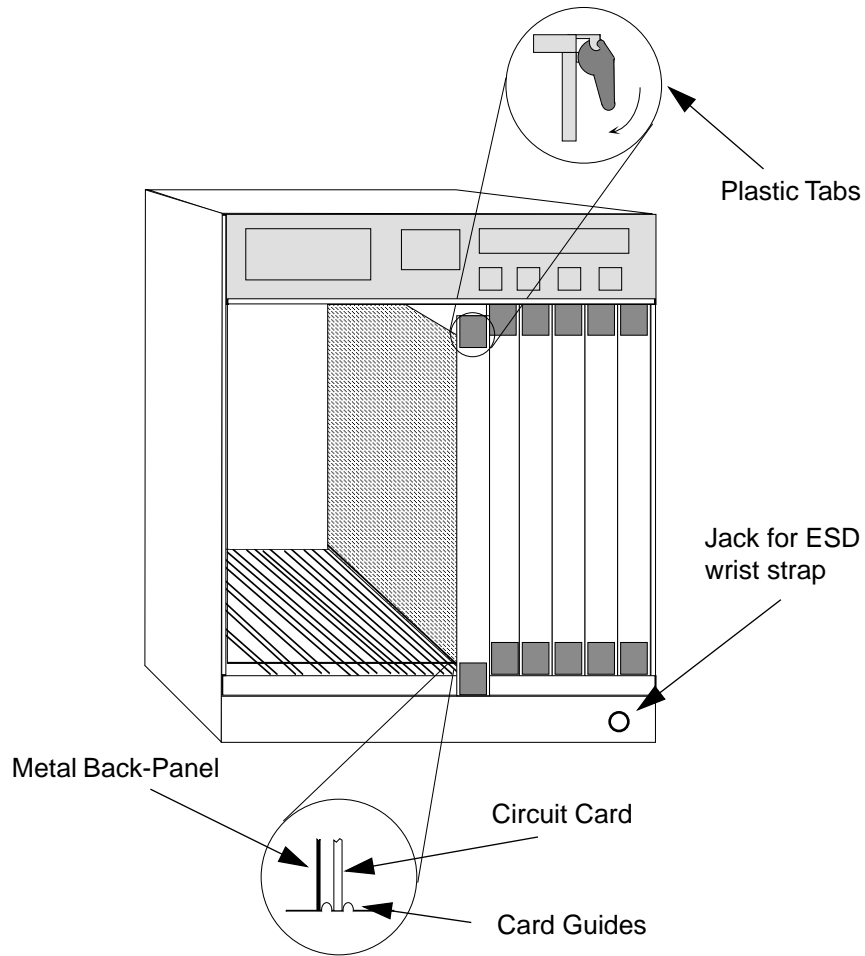
By Internet mail: support@ctron.com

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

# Installing the MMAC-Plus Module

The MMAC-Plus module may be installed into any of the 14 slots that are available. To install, follow the steps below:

1. Remove the blank panel, covering the slot 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.
2. Carefully remove the module from the shipping box. (Save the box and packing materials in the event the module must be reshipped.)
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 1.
4. Remove the module from the plastic bag. Observe all precautions to prevent damage from Electrostatic Discharge (ESD).
5. Carefully examine the module, checking for damage. If any damage exists, DO NOT install the module. Contact Cabletron Systems Technical Support immediately.
6. Before installing the MMAC-Plus cards into the chassis, ensure that the bottom and top plastic tabs are unlocked. Slide the card into an available slot and ensure that the circuit card is between the card guides, as shown in Figure 1. Check both the upper and lower tracks. Take care that the module slides in straight and engages the backplane connectors properly. Lock down the top and bottom plastic tabs at the same time, applying even pressure.



**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 2-1. Installing the MMAC-Plus Module

## The Reset Switch

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

- Pressing the Reset switch twice within three seconds causes the processor 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.

SNMP management may be used to disable this switch to enhance module security.

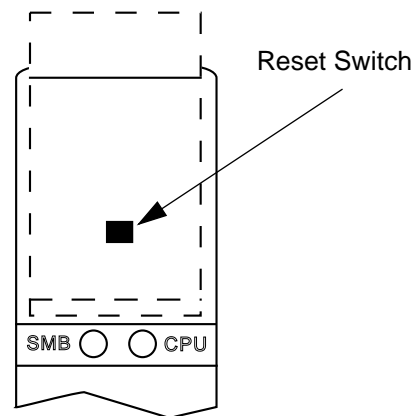


Figure 2-2. The Reset Switch

## Local Management Console

Local Management is accessed by attaching a management console at the RJ-45 CON port of the 9F106-01. The console connection supports a Digital Equipment Corporation VT 320™ terminal or PC emulation of one of these terminals.

Table 2-1 lists the setup requirements for the local management console. If your terminal is a Digital Equipment Corporation VT 320™ terminal, press **F3** to access the Setup Directory. If you have a terminal emulation of the Digital Equipment terminals, refer to your equipment user manual for setup procedures.

Table 2-1. Terminal Setup Requirements

<b>Menu</b>	<b>Function</b>	<b>Selection</b>
<b>Display Setup:</b>	<b>Columns</b>	<b>80 Columns</b>
	<b>Controls</b>	<b>Interpret Controls</b>
	<b>Auto Wrap</b>	<b>No Auto Wrap</b>
	<b>Text Cursor</b>	<b>Cursor</b>
<b>General Setup:</b>	<b>Mode</b>	<b>7 Bit Control</b>
	<b>Cursor Keys</b>	<b>Normal Cursor Keys</b>
<b>Communications Setup:</b>	<b>Transmit</b>	<b>Transmit = 9600</b>
	<b>Receive</b>	<b>Receive = Transmit</b>
	<b>XOFF</b>	<b>any option</b>
	<b>Bits, Parity</b>	<b>8 Bits, No Parity</b>
	<b>Stop Bit</b>	<b>1 Stop Bit</b>
	<b>Local Echo</b>	<b>No Local Echo</b>
	<b>Port</b>	<b>EIA Port, Data Leads Only DEC-423, Data Leads only</b>
	<b>Transmit Auto Answerback</b>	<b>any option No Auto Answerback</b>
<b>Keyboard Setup:</b>	<b>Auto Repeat</b>	<b>any option</b>
	<b>Keyclick</b>	<b>any option</b>
	<b>Margin Bell</b>	<b>Margin Bell</b>
	<b>Warning Bell</b>	<b>Warning Bell</b>
	<b>Auto Answerback</b>	<b>No Auto Answerback</b>

An RJ-45 connector provides a CON interface to the management terminal. Figure 2-3 shows the pinouts.

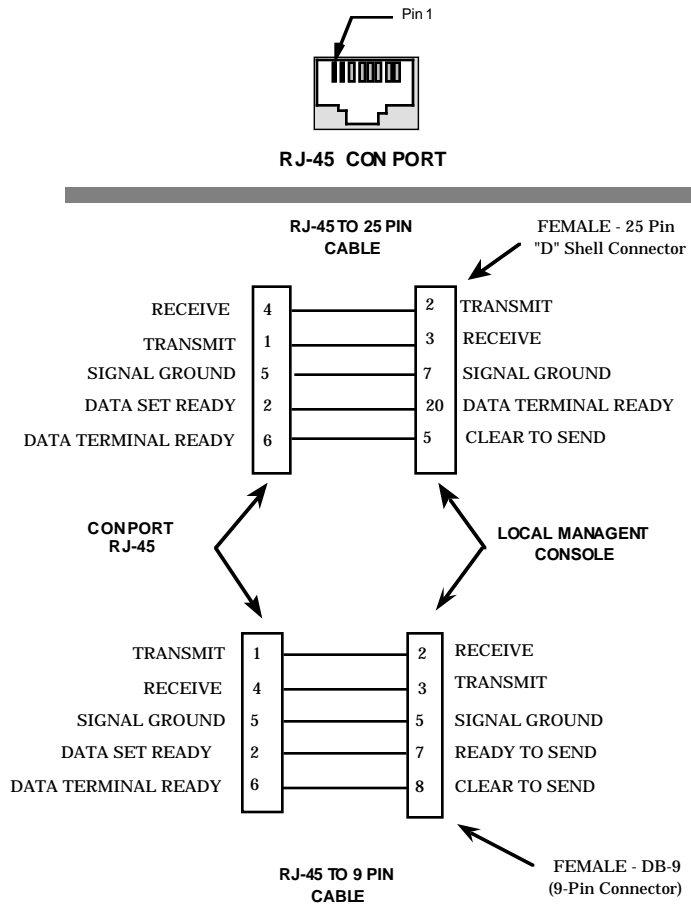


Figure 2-3. Console Cable Pinouts

Connect the console to the module as follows:

1. Attach the male RJ-45 connector to the CON port of the 9F106-01.
2. Attach the female end (25-pin or 9-pin, as applicable) to the terminal.

Refer to the Cisco Systems documentation for information on configuring this module.

## Installing an FPIM

The 9F106-01 module is shipped without FPIMs. 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 2-4. Ensure that the rear connector is seated firmly before tightening the two mounting screws.

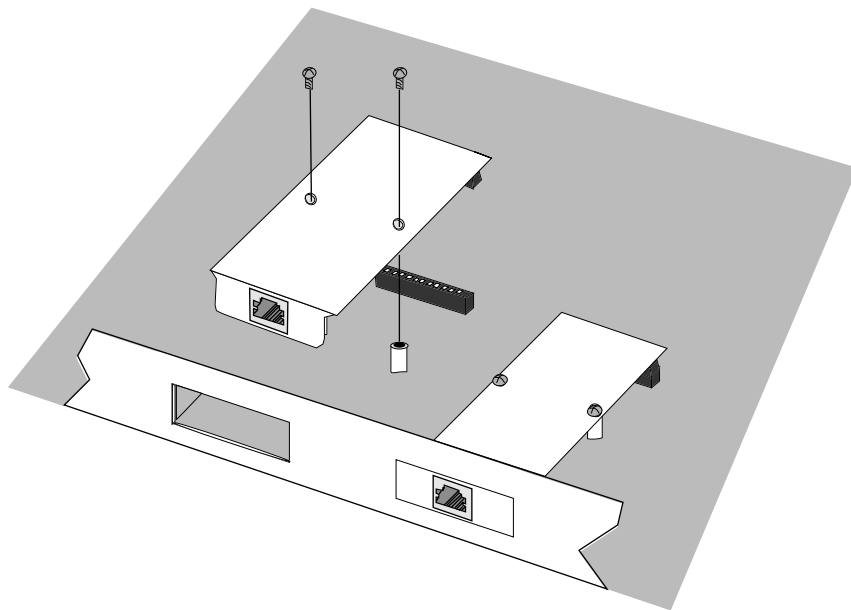


Figure 2-4. Installing an FPIM

# Operation

The 9F106-01 FDDI module is a two port router for the MMAC-Plus. One front panel network connection can be made to this module and routed to any other MMAC-Plus module via the FNB bus.

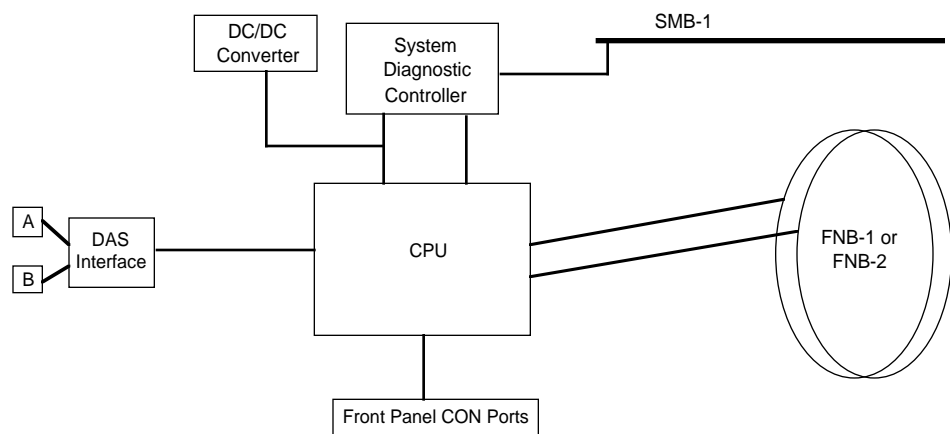


Figure 3-1. 9F106-01 Block Diagram



## Flexible Network Bus (FNB)

The FNB consists of two dual FDDI networks, the 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 Buses

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. These include 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 that share this bus to ensure the validity of SMB-1.

## 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 9F106-01 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. 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 9F106-01 have been designed so that in the event of a diagnostic controller fault, the modules 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 dual attachment of a module to either FNB-1 or FNB-2; the second allows dual attachment to both FNB-1 and FNB-2. The 9F106-01 has one dual attachment to the FNB backplane, connecting to either FNB-1 or FNB-2. The module can insert into the FNB or bypass it. 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 provides all forwarding/filtering decisions, the SNMP protocol stacks, as well as support for industry standard MIBs.

# LANVIEW LEDs

The front panel LANVIEW LEDs, shown in Figure 4-1, indicate the status of the module and may be used as an aid in troubleshooting.

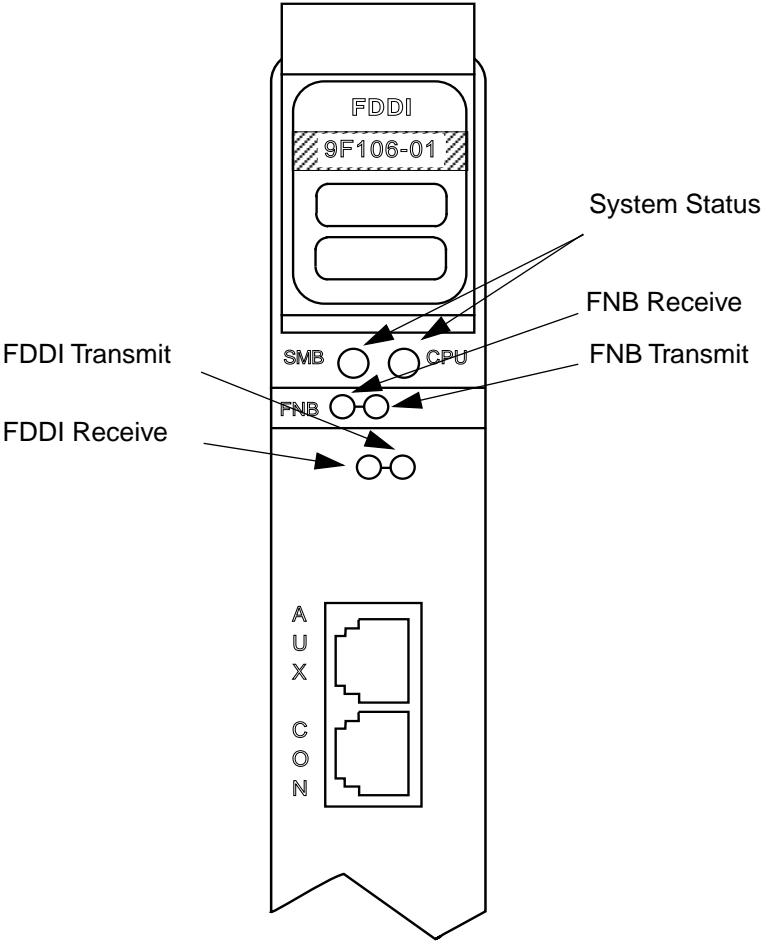


Figure 4-1. LANVIEW LEDs

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	Conditional FDDI fault *.
Yellow	Booting	Booting.
Red	Reset	Normal power-up reset.
Red (Flashing)	Failed	FDDI Fault (FNB is down).
Off	Power off	Module powered off.

\* Front Panel FDDI down.

The function of the FNB Receive LED is listed in Table 4-2.

Table 4-2. FNB Receive LED

LED Color	State
Yellow (Flashing)	Activity (Flashing rate indicates rate of activity).
Off	No activity

The function of the FNB Transmit LED is listed in Table 4-3.

Table 4-3. FNB Transmit LED

LED Color	State
Green (Flashing)	Activity (Flashing rate indicates rate of activity).
Off	No activity

The function of the FDDI Receive LED is listed in Table 4-4.

Table 4-4. FDDI Receive LED

LED Color	State
Yellow (Flashing)	Activity (Flashing rate indicates rate of activity).
Off	No activity

The Function of the FDDI Transmit LED is listed in Table 4-5.

Table 4-5. FDDI Transmit LED

LED Color	State
Green (Flashing)	Activity (Flashing rate indicates rate of activity).
Off	No activity

# 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 the following requirements:

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)

### Environment

Operating Temperature	5 to 40° C
Storage Temperature	-30 to 90° C
Relative Humidity	5% to 95% non-condensing

# 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 2-6.

## FPIM-00

The FPIM-00 has a MIC style connector supporting a multimode fiber connection. The specifications are listed in Table A-1.

Table A-1. FPIM-00 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 <sup>-10</sup>			

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

The FPIM-05 has a MIC style connector supporting a Single-mode fiber connection. The specifications are listed in Table A-4.

Table A-4. FPIM-05 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.

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