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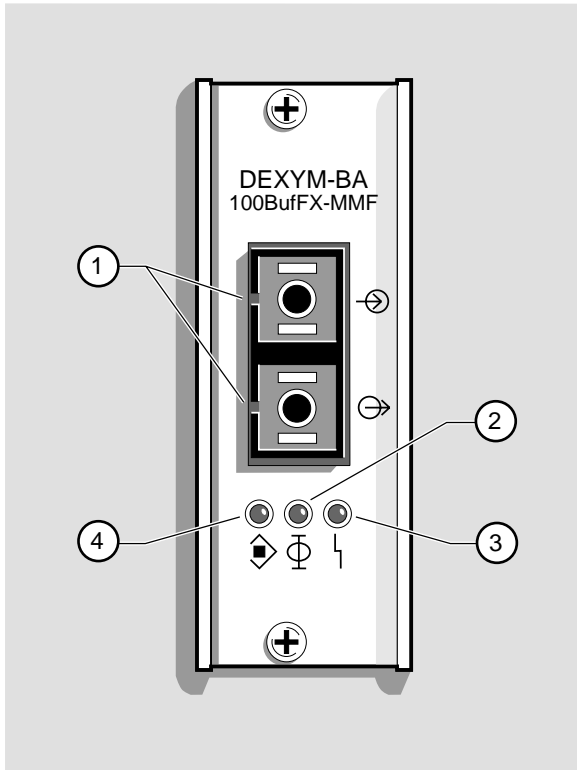# Installing the 100 Mb/s Fast Ethernet Buffered Link Modular Media Interface Card

Introduction

The 100BufFX Fast Ethernet Modular Media Interface (MM-100) is part of the Modular Media Interface (MMI) family of front-insertable, hot-swappable, single-slot option cards that are customer installable and field-replaceable. The 100BufFX Fast Ethernet card allows FX buffered support for Fast Ethernet Hubs and extends the cabling distance to 2 kilometers. The host module provides the power, initialization, and control for the card.

The installation instructions contained here are applicable to the cards described in *100 Mb/s Fast Ethernet Modular Media Interface Cards Installation* manual. Depending on the type of physical media interface used in the card, there are differences in the attachment and removal of connectors. For more media connection information, refer to the *100 Mb/s Fast Ethernet Modular Media Interface Cards Installation* manual. For network configuration information, refer to the *DIGITAL MultiSwitch Hub 612TX* manual.

Components of the 100BufFX Card

The 100BufFX card components are as follows:

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Item	Description
1	SC-transmit and receive connectors
2	PHY Status LED
3	FRU Status LED
4	Buffer Status LED

Where to Use These Cards

This section illustrates recommended network topologies. You should use these topologies when configuring your network with 100BaseFX, 100BaseTX, or 100BufFX Fast Ethernet cards. These 100Mb/s Fast Ethernet Modular Media Interface (MMI) cards are used in the DIGITAL Class II MultiSwitch 600 Fast Ethernet Hubs. The 100BufFX Fast Ethernet card allows FX buffered support for Fast Ethernet Hubs, extending the cabling distance to 2 kilometers.
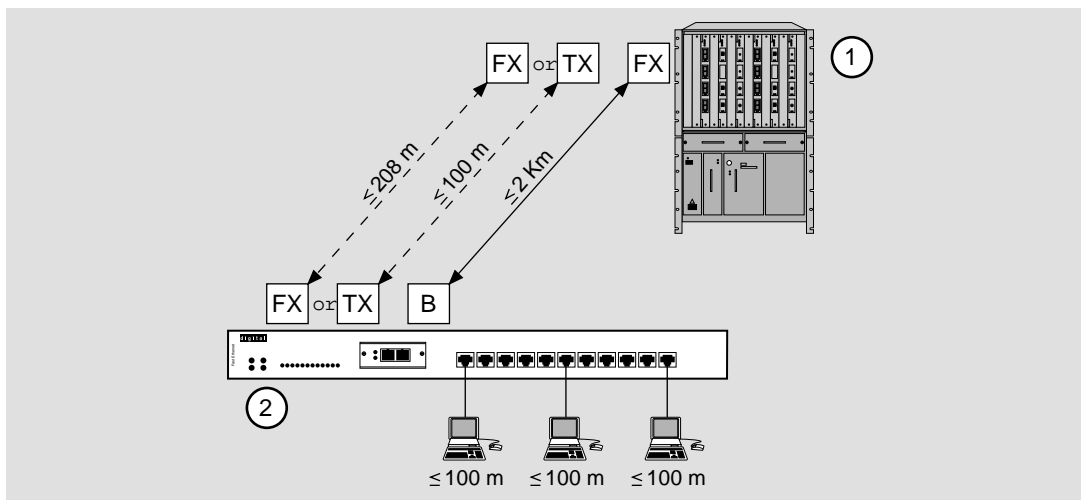
The following illustration shows a single Class II hub configuration with a switch (**1**) connected to a DIGITAL MultiSwitch Hub 612TX module (**2**). This connection is made using 100Mb/s Fast Ethernet Modular Media Cards. The combinations for connecting these cards are as follows:

100BaseFX	Connects to another 100BaseFX card at a distance of up to 208 meters in half-duplex mode
100BaseTX	Connects to another 100BaseTX card at a distance of up to 100 meters in half-duplex mode.
100BufFX	Connects to 100BaseFX card at a distance of up to 2 kilometers in full-duplex mode

NOTE

While a hub to hub configuration using two 100BufFX cards at a distance of up to 2 km will work, we do *not* recommend it.

**Single Class II Hub Configuration**

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The following illustration shows a primary and redundant Class II hub configuration with a switch (**1**) connected to two DIGITAL MultiSwitch Hub 612TX modules (**2**) and (**3**). In this configuration, the 100BaseFX to 100BaseFX connection is at a distance of up to 111 meters. The 100BaseTX to 100BaseTX is 100 meters. The 100BufFX to 100BufFX connection is up to 2 kilometers.

This figure also shows the two hub modules (**2**) and (**3**) connected via two 100BaseTX fixed ports using a 5 meter Inter-Repeater Link (IRL) in half-duplex mode.

Two Class II Hub Configuration
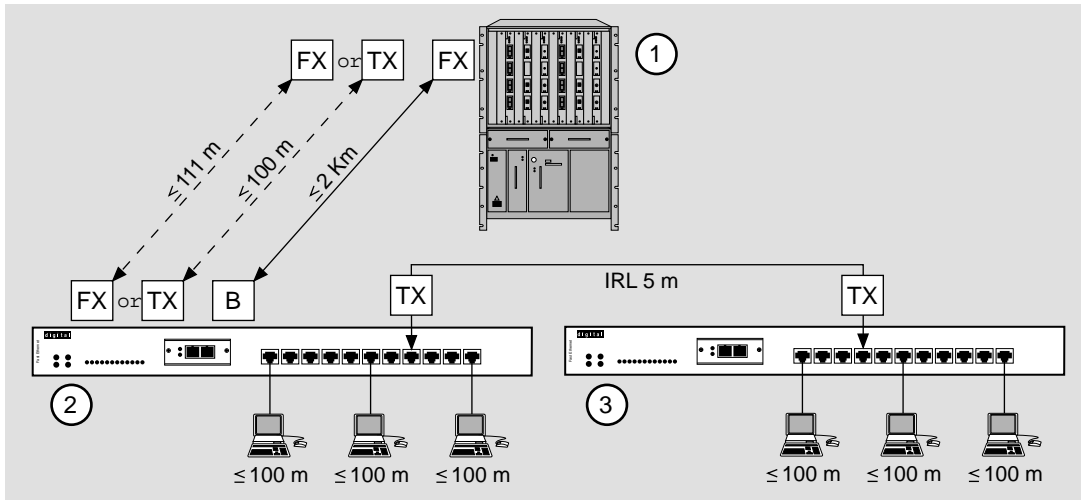

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Auto-Negotiation

The 100BufFX has a full duplex 100BaseFX interface and as such, does not auto-negotiate. You must manually configure the switch port to full duplex 100Base FX operation.

User Support

The following illustration shows user support for two configurations using primary link **(1)** and redundant link controlled by a switch that is configured appropriately **(2)** configurations. The configurations use DIGITAL MultiSwitch Hub 612TX (3) modules. The following table describes the number of users supported with each configuration.

Various Class II Hub Configurations
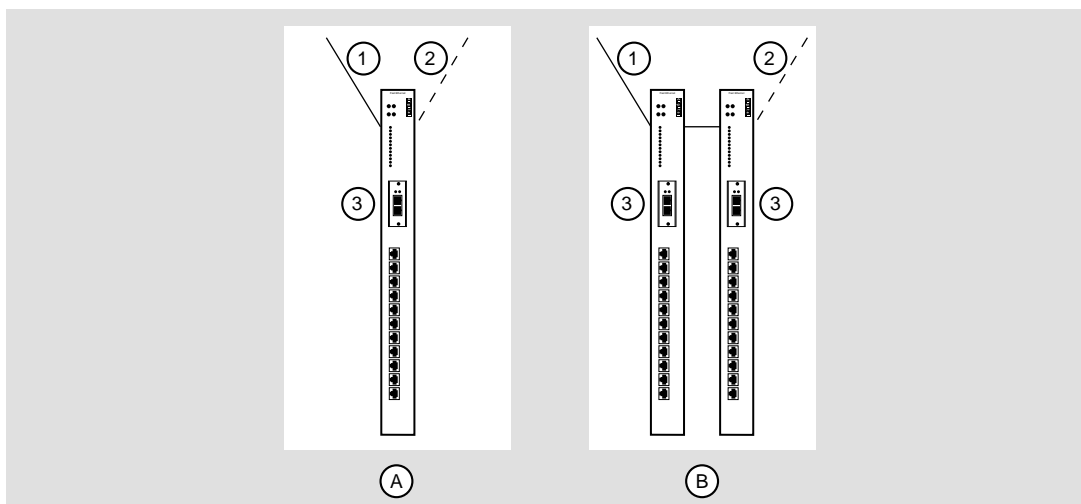
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User Support for Various Class II Hub Configurations

Configuration	Module(s)	Maximum Users	Uplink(s)
A	One DIGITAL MultiSwitch Hub 612TX	11	1
B	Two DIGITAL MultiSwitch Hub 612TX	20-21	1-2

Installation Preparation

Required Tools

DIGITAL recommends the use of, but does not supply, the following tools to install the cards:

- Phillips-head screwdriver
- Antistatic grounding strap and grounded work surface.

Before installing the card into the host module, complete the following steps:

Step	Action
1	Remove the contents from the box and be sure to keep all original packing materials. The card comes packed in protective antistatic material. Do not remove the card from the material until you are ready to install the card.
2	Check the shipment for damage and missing parts. In case of damaged or missing parts, contact your delivery agent or your DIGITAL sales representative.

Installation Procedure

To install the card into a host module, complete the steps, as shown in the following illustration:

Step	Action
1	Use a Phillips-head screwdriver to remove the two screws that hold the slot cover in place, and remove the cover. Save the slot cover and screws for future use.
2	Attach one end of an antistatic wrist strap to your wrist and the other end to a chassis ground. **CAUTION** Static electricity can damage modules and electronic components. DIGITAL recommends using a grounded antistatic wrist strap and a grounded work surface when handling any modules.
3	Remove the dust caps from the card, if necessary.
4	Hold the card by the edges of the bezel so that it is parallel with the slot opening.
5	Insert the card into the slot opening and slide the card along the card guides until the bezel is flush with the module (as shown in the following illustration). Note: To prevent the screws from interfering with the card insertion, make sure that the captive screws on the bezel are partially threaded into the bezel threads.
6	Firmly fasten the card to the module with the two captive screws.
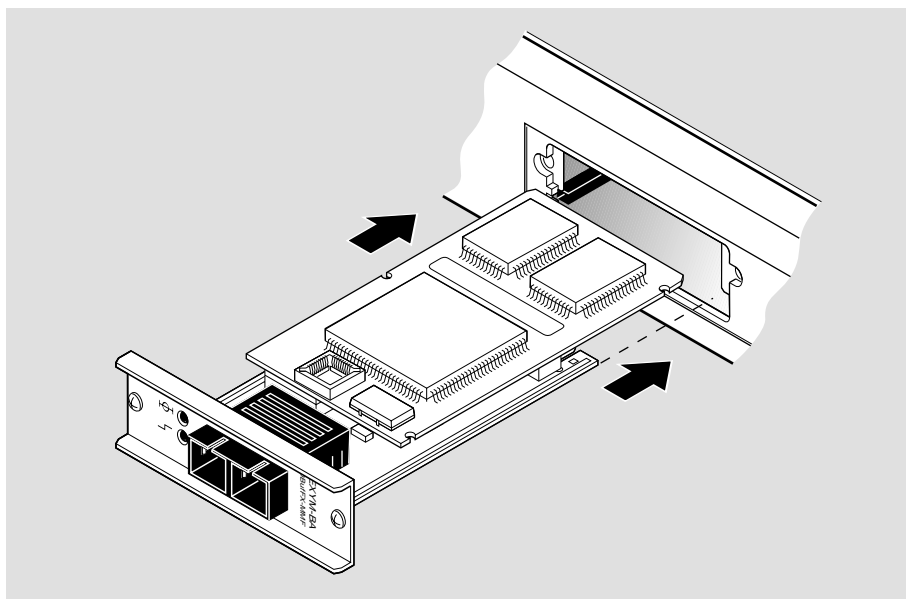
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Initializing the Card

This card supports the hot-swap feature and automatically initializes when inserted into a powered module. If you install the card into a powered-down module, once power is applied to the module, the initialization procedure is performed automatically. At initialization, LED indications that occur are:

If...	Then...
The PHY LED blinks three or more times after the card is inserted	The module has powered on and is initializing the card.
None of the LEDs light within 10 seconds after the card is inserted	The module or power to the module may be faulty.
	Refer to your host module's documentation for troubleshooting information.
	Contact your DIGITAL representative.

After initialization, the three LEDs on the card provide the following information about its operation.

Type of LED	Symbol	Indicates...
Physical layer (PHY) LED	⊢⊖⊣	The state of the physical layer interface
Field-replaceable unit status (FRU) LED	⌐	The port's fault or diagnostic status
Buffer status (BUF) LED	◈	The occupancy status of the buffer

The following table describes LED conditions and their meaning.

LED Descriptions

LED Condition	Symbol	Meaning
BUF LED is green.	◈	Buffer is less than half full.
BUF LED is yellow.		Buffer is more than half full.
BUF LED is alternately yellow and no light.		Buffer has overflowed and lost packets during the last second.
BUF LED is alternating yellow/green.		Buffer is crossing over midpoint.
FRU LED is off.	⌐	The card's diagnostic status is unknown. The card could not be tested because of some other port failure.
FRU LED is green.		The card has passed diagnostics.
FRU LED is yellow.		The diagnostics have detected a fault.
PHY LED is green.	⊢⊖⊣	The card is working properly and a link is established.
PHY LED is blinking yellow.		Unsupported connection on the port.
PHY LED is off.		No link connection is established due to a cable fault or no cable attached.

Verifying Operability

Once you plug in the cables connecting this card to another system, verify that the connection is active by checking the LEDs.

If...	Then...
The system is working	Both the FRU LED and the PHY LED are green.
The FRU LED is yellow or off	Troubleshoot the MMI module.

Connector Information

The following multimode fiber-optic cables are available from DIGITAL:

Cable Description	Order Number
ST-SC, MM, dual fiber-optic cables	BN34A-*xx*[1]
SC-SC, MM, dual fiber-optic cables	BN34B-*xx*[1]

[1] The symbol *xx* represents the cable length. The available cable lengths are described in the *OPEN DECconnect Applications Guide*.

Multimode Fiber-Optic Cable Specifications

The multimode fiber-optic cables should adhere to these specifications:

- EIA/TIA 492-AAAA

- 62.5/125 µm

- SC connector

- 0 through 2 km

- 0 through 9 dB loss at 1300 nm

To connect the cables, complete these steps (as shown in the following illustration):

Step	Action
1	Remove the dust caps from the ports.
2	Line up the receive cable connector (**1**) with the receive port and the transmit cable connector (**2**) with the transmit port.
3	Insert the cables.
4	Connect the other end of cable to your network device.
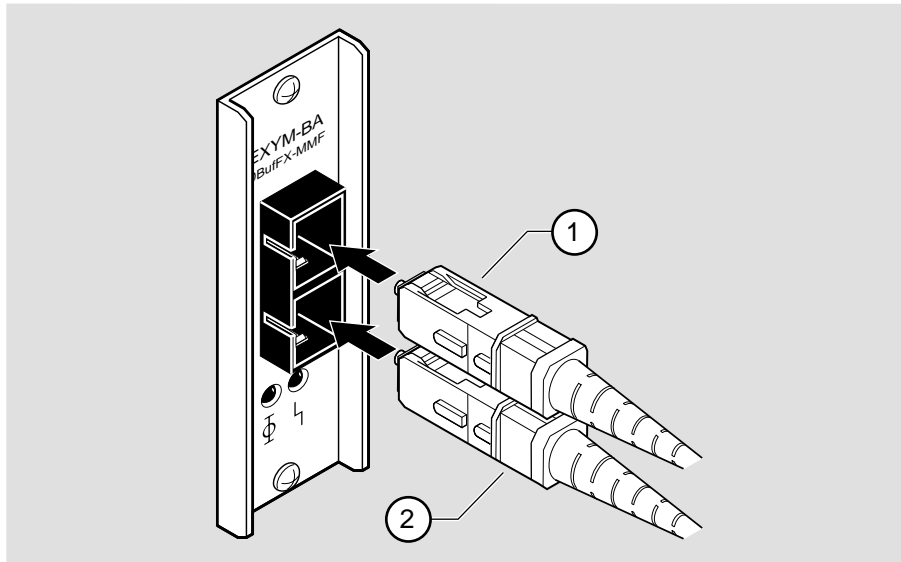
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Product Specifications

The following table lists the product specifications for the 100 BufFX card when used in a DIGITAL MultiSwitch Hub 612TX:

Parameter	Specification
Environment	
Operating Temperature[1]	5° C to 50° C (41 ° F to 122 ° F)
Relative Humidity	10% to 95% noncondensing
Altitude	
• Operating	Sea level to 4,267 m (14,000 ft)
• Nonoperating	Sea level to 12,192 m (40,000 ft)
Power	3.8 W, total power
	0.76 A, 5Vdc
Physical	
Height	2.54 cm (1.00 in)
Width	6.477 cm (2.55 in)
Length	13.335 cm (5.25 in)
Weight	0.07 kg (0.15 lb)
Functional	
Receive buffer size	1 K packets
Error filtering	Does not filter all error packets propagated
Shock (Class A/B for products weighing under 100 lbs)	10 G / 10 ms half sine pulse in three orthogonal axes
Vibration (Class C)	5 to 200 Hz sine sweep @ 0.25 G limited by 0.02" (0.5mm) displacement DA* 200 to 500 Hz sine sweep @ 0.10 G
Certification	CE, CSA, FCC, TÜV, UL, VCCI, C-TICK

[1] For sites above 2400 m (8,000 ft), decrease the operating temperature specification by 1.8° C for each 1000 m or 3.2°F for each 3200 ft.