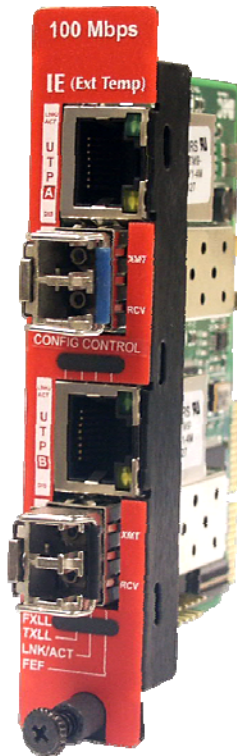# IE-iMcV-2xLIM, TX/SFP

Operation Manual

FCC Radio Frequency Interference Statement

This equipment has been tested and found to comply with the limits for a Class B computing 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 generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which the user will be required to correct the interference at his own expense.

Any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

The use of non-shielded I/O cables may not guarantee compliance with FCC RFI limits. This digital apparatus does not exceed the Class B limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of the Canadian Department of Communications.

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

Warranty

IMC Networks warrants to the original end-user purchaser that this product, EXCLUSIVE OF SOFTWARE, shall be free from defects in materials and workmanship under normal and proper use in accordance with IMC Networks' instructions and directions for a period of six (6) years after the original date of purchase. This warranty is subject to the limitations set forth below.

At its option, IMC Networks will repair or replace at no charge the product which proves to be defective within such warranty period. This limited warranty shall not apply if the IMC Networks product has been damaged by unreasonable use, accident, negligence, service or modification by anyone other than an authorized IMC Networks Service Technician or by any other causes unrelated to defective materials or workmanship. Any replaced or repaired products or parts carry a ninety (90) day warranty or the remainder of the initial warranty period, whichever is longer.

To receive in-warranty service, the defective product must be received at IMC Networks no later than the end of the warranty period. The product must be accompanied by proof of purchase, satisfactory to IMC Networks, denoting product serial number and purchase date, a written description of the defect and a Return Merchandise Authorization (RMA) number issued by IMC Networks. No products will be accepted by IMC Networks which do not have an RMA number. For an RMA number, contact IMC Networks at PHONE: (800) 624-1070 (in the U.S and Canada) or (949) 465-3000 or FAX: (949) 465-3020. The end-user shall return the defective product to IMC Networks, freight, customs and handling charges prepaid. End-user agrees to accept all liability for loss of or damages to the returned product during shipment. IMC Networks shall repair or replace the returned product, at its option, and return the repaired or new product to the end-user, freight prepaid, via method to be determined by IMC Networks. IMC Networks shall not be liable for any costs of procurement of substitute goods, loss of profits, or any incidental, consequential, and/or special damages of any kind resulting from a breach of any applicable express or implied warranty, breach of any obligation arising from breach of warranty, or otherwise with respect to the manufacture and sale of any IMC Networks product, whether or not IMC Networks has been advised of the possibility of such loss or damage.

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Table of Contents

About the IE-iMcV-2xLIM, TX/SFP

The IE-iMcV-2xLIM, TX/SFP is a Fast Ethernet module which provides two conversions of 100Base-TX twisted pair to 100Base-FX/SX single-mode or multi-mode fiber. There are two sets of ports, each providing an RJ-45 (copper) to SFP (fiber) an SFP, available in SC or LC connectors, 155 Mbps, can be installed in the SFP port. Models with Configuration Control are identified by a label on the faceplate of the module.

Also available in a single-strand fiber version, IE-iMcV-2xLIM, TX/SFP and IE-iMcV-2xLIM, TX/SFP with Configuration Control allow two wavelengths to share one fiber strand — Full-Duplex data travels on different wavelengths, for example (1310 nm and 1550 nm) — doubling the capacity of fiber.

The IE-iMcV-2xLIM, TX/SFP is SNMP-manageable and can be installed into the modular, SNMP-manageable iMediaChassis, the MediaChassis series, or the MediaChassis series which are unmanaged.

A single DIP Switch bay offers configuration for each RJ-45 to fiber interface set: DSW 1-5 for port 1 and DSW 6-10 for port 2.

Configuration Instructions

The IE-iMcV-2xLIM, TX/SFP has user-configurable maintenance features (e.g., TX LinkLoss (TXLL), FX LinkLoss (FXLL), Link Fault Pass-Through (LFPT) and Far End Fault (FEF)). Refer to the iMcV-Module DIP Switch configuration table for information on available features. Instructions for configuring both managed (via an SNMP-compatible management application like iView[2]) and unmanaged modules follow.

Installing an iMcV-Modules

The iMcV-Modules install in IMC Networks' SNMP manageable iMediaChassis series or in any MediaChassis.

NOTE
All modules are hot-swappable.

To install an iMcV-Module:

1. Remove the blank bracket covering the slot where the module is to be installed by removing the screws on the outside edges of the bracket.
2. Slide the iMcV-Modules into the chassis, via the cardguides, until the module is seated securely in the connector.
3. Secure the module to the chassis by tightening the captive screw.
4. Save any "blanks" removed during installation for future use if the configuration requirements change.

Managed Modules

To manage one or more IE-iMcV-2xLIM, TX/SFP(s), an SNMP agent must be present in the chassis. To configure Managed Modules, install the module first, and then configure using the management software.

Configuration Control and SNMP Management

Some iMcV-Modules offer Configuration Control; labels on the front faceplate will identify if the iMcV-module has Configuration Control. Configuration Control has been implemented to assist the end user for the following:

- Any module, iMcV-module or SNMP Management Module, can be changed under power with out losing any configuration.

- The Management Module can be added to a chassis without losing any configuration the modules have been set to.

- The Management Module will not be subjected to a "Mission Critical" condition. If the Management module is removed or fails, the iMcV-modules will not experience an interruption in service.

Configuration Control was created to solve the following issues:

- When non-Configuration Control iMcV-modules are placed in a managed chassis, the iMcV-module's DIP Switches are ignored and the

iMcV-module is configured by the chassis' Management Module. If the SNMP Management Module is removed or fails, then the iMcV-modules will revert back to the DIP Switch settings. When an iMcV-module configuration changes from the Management Module's settings to DIP Switch settings, the traffic across the iMcV-module will be interrupted for a very short period of time.

- When introducing a Management Module to a chassis full of working non-Configuration Control iMcV-modules, the iMcV-modules will stop using the DIP Switch settings and start using the Management module's settings. When an iMcV-module changes from DIP Switch settings to the Management module's settings, the traffic across the iMcV-modules will be interrupted for a very short period of time

- When removing an existing iMcV-module and replacing it with a different model iMcV-module, the configuration of the former iMcV-module remains.

Unmanaged Modules

Before installing, configure the IE-iMcV-2xLIM, TX/SFP modules for desired features. The table below indicates the available features and settings for the IE-iMcV-2xLIM, TX/SFP modules.

After configuring the DIP Switches for the desired settings, install the module and connect the appropriate cables (refer to Installing an IE-iMcV-2xLIM, TX/SFP section for more information).
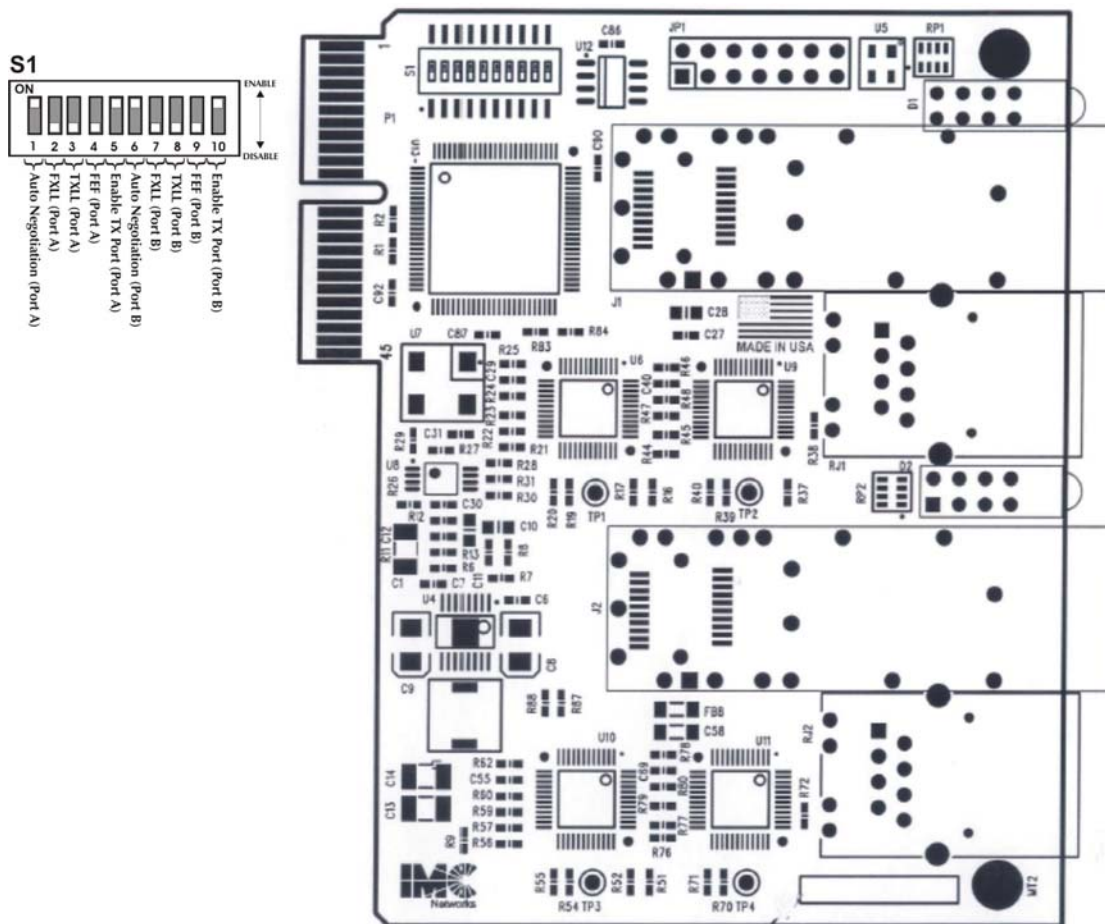
IE-iMcV-2xLIM, TX/SFP and Configuration Control

DIP Switch on S1	Feature	Default Setting
1	Auto Negotiation (AN) (Port A)	ON
2	FX LinkLoss (FXLL) (Port A)	OFF
3	TX LinkLoss (TXLL) (Port A)	OFF
4	Far End Fault (FEF) (Port A)	OFF
5	Enable TX Port (Port A)	ON
6	Auto Negotiation (AN) (Port B)	ON
7	FX LinkLoss (FXLL) (Port B)	OFF
8	TX LinkLoss (TXLL) (Port B)	OFF
9	Far End Fault (FEF) (Port B)	OFF
10	Enable TX Port (Port B)	ON

BEST PRACTICES
When possible, it is always a good idea to configure DIP Switches to match software settings.

FX LinkLoss, TX LinkLoss, Link Fault Pass-Through, Far End Fault

IE-iMcV-2xLIM, TX/SFP modules include the troubleshooting features, TXLL, FXLL, FEF and LFPT that help locate *silent failures* on a network. Before attempting to install the module(s), understand how these features work and react to a specific network configuration.

Link Integrity

During normal operation, link integrity pulses are transmitted by all point-to-point Ethernet devices. When an IMC Networks media converter receives valid link pulses, it knows that the device to which it is connected is up and sending pulses, and that the copper or fiber cable coming from that device is intact. The appropriate "LNK" (link) LED is lit to indicate this.

The IMC Networks media converter also sends out link pulses from its copper and fiber transmitters, but normally has no way of knowing whether the cable to the other device is intact and the link pulses are reaching the other end. The combination of FEF and LinkLoss allows this information to be obtained, even when physical access to a remote device (and its link integrity LED) is not available.

FX LinkLoss (FXLL)

FX LinkLoss is a troubleshooting feature. When enabled, if a fault occurs on the fiber segment of a conversation, FX LinkLoss detects the fault and passes this information to the twisted pair segment. If a media converter is not receiving a fiber link, FX LinkLoss disables the transmitter on the media converter's twisted pair port. This results in a loss of link on the device connected to the twisted pair port, and the TXLL LED will blink.

TX LinkLoss (TXLL)

TX LinkLoss is a troubleshooting feature. When enabled, if a fault occurs on the twisted pair segment of a conversion, TX LinkLoss detects the fault and passes this information to the fiber segment. If a media converter is not receiving a twisted pair link, TX LinkLoss disables the transmitter on the media converter's fiber port. This results in a loss of the link on the device connected to the fiber port, and the FXLL LED will blink.

Link Fault Pass-Through (LFPT)

Link Fault Pass-Through (LFPT) is a troubleshooting feature that combines TX and FX LinkLoss from both the local and remote IE-iMcV-2xLIM, TX/SFP modules. LFPT is enabled by turning on both FX and TX LinkLoss on both modules. This feature allows

either end of the conversion to detect a link fault occurring at the other end of the media conversion chain.
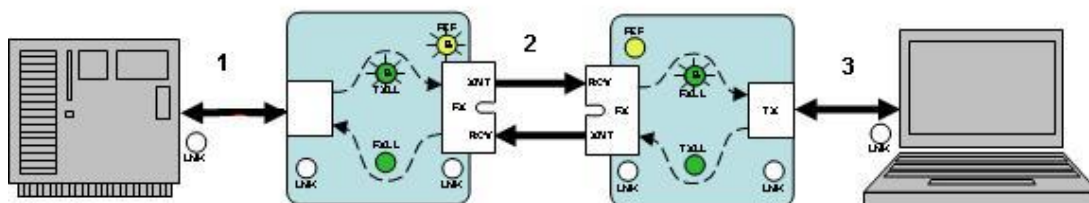
Regardless if there is a break in segment 1, 2 or 3, the link will drop on the switches at both ends. The link fault is passed through the media conversion and is observed at each end. It acts just like it would if the devices were directly connected.

Far End Fault (FEF)

By default, FEF is disabled. When enabled, and a fault occurs on the fiber line, affecting data in one direction, an FEF signal will be sent in the opposite direction, indicating the fault. When enabling LFPT, FXLL will act on this signal propagating the loss of link to the copper port when FXLL is enabled.

For more information on LinkLoss, visit the IMC Networks Web site at http://www.imcnetworks.com/support/ If unsure of how to implement these features in a specific configuration, contact IMC Networks Technical Support at (800) 624-1070 (U.S./Canada), +32-16-550880 (Europe) or via e-mail at: techsupport@imcnetworks.com.

Auto Negotiation on IE-iMcV-2xLIM, TX/SFP

IE-iMcV-2xLIM, TX/SFP modules include the feature Auto Negotiation. When Auto Negotiation is enabled, the module negotiates as a 100 Mbps full-duplex device. If the connected device can operate at 100 Mbps full-duplex and support Auto Negotiation, a link is established. Auto Negotiation (DIP Switch #1) is enabled by default.

If the twisted pair port on the other device does not have the ability to Auto Negotiate or if the 100 Mbps half-duplex connection is desired, then Auto Negotiation must be disabled. Half- and full-duplex settings must be set manually to match the connected devices.

The following diagram shows a typical application and with three possible configurations.

```
HDX ——————————— OK (Manual Setting Only) ——————————— HDX
FDX ——————————— OK (Auto/Manual Setting) ——————————— FDX
HDX ——————————————— WRONG ——————————————— FDX
```

Switch — MediaConverter —/— MediaConverter — Switch

End-to-End Connection	Switch	TX/FX
Half-Duplex	Configure HDX manually	Auto Negotiation is OFF
Full-Duplex	Configure FDX manually	Auto Negotiation is OFF
Full-Duplex	Auto Negotiation is ON	Auto Negotiation is ON

Configure Auto Negotiation on an IE-iMcV-2xLIM, TX/SFP by adjusting the DIP Switch setting (for unmanaged modules) or via the management software. Refer to the DIP Switch table for switch location and settings.

AutoCross Feature for Twisted Pair Connection

All twisted pair ports on the IE-iMcV-2xLIM, TX/SFP includes AutoCross, a feature that automatically selects between a crossover workstation and a straight-through connection depending on the connected device.

Disable TX Port (DIS-TX)

The TX DISABLE (DIS) LED is OFF by default. To disable the port and stop transmission of data, this can be set through iView[2] management or by setting DIP Switch #5 or #10 OFF (dependent on whether the selection is for Port A or Port B).

LED Operation

Each IE-iMcV-2xLIM, TX/SFP module features diagnostic LEDs that provide information on features and ports.

FXLL   Glows green when FX LinkLoss is enabled on the port.

Blinks when a fault occurs on the fiber port and actively disables the copper port.

TXLL   Glows green when TX LinkLoss is enabled on the port.

Blinks when a fault occurs on the copper port and actively disables the fiber port.

LNK/ACT   Glows green when the fiber or copper link is established.

Blinks green when activity is detected.

FEF   Glows green when the FEF function is enabled on the fiber port and will blink if it is receiving the FEF signal.

DIS   The TX DISABLE (DIS) LED is OFF by default. To disable the port and stop transmission of data, this can be set through iView[2] management or by setting DIP Switch #5 or #10 OFF (dependent on whether the selection is for Port A or Port B).
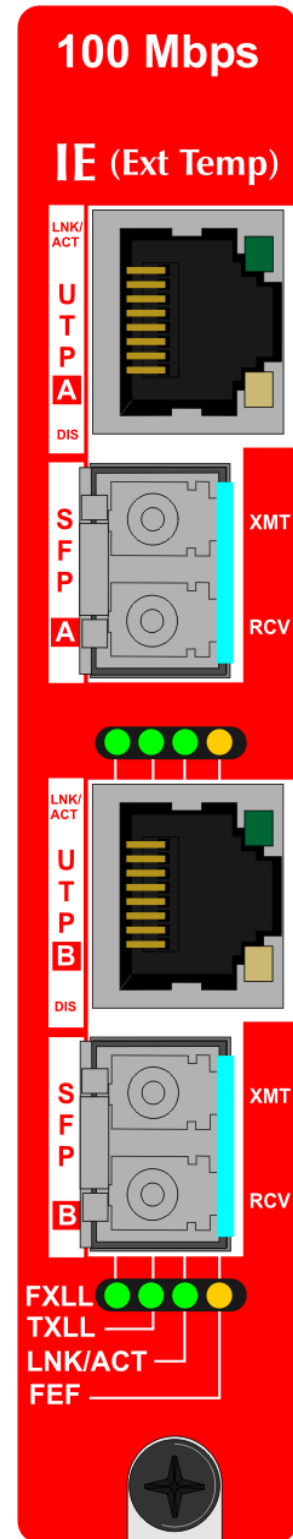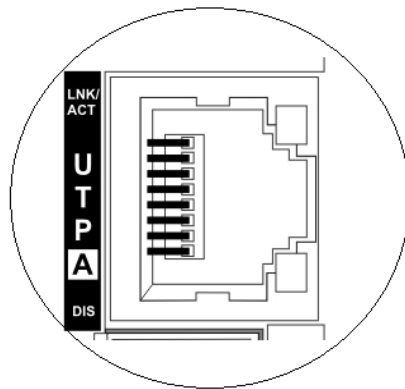
- During installation, first test the fiber and twisted pair connections with all troubleshooting features disabled, then enable these features, if desired, just before final installation. This will reduce the features' interference with testing.

- To test a IE-iMcV-2xLIM, TX/SFP by itself, first, have an appropriate fiber patch cable, then follow these steps to test:

  1. Connect the IE-iMcV-2xLIM, TX/SFP to the twisted pair device with a twisted pair cable.

  2. Loop a single strand of fiber from the transmit port to the receive port of the IE-iMcV-2xLIM, TX/SFP.

  3. Verify that both the twisted pair and the fiber link are lit (see LEDs, below) on the IE-iMcV-2xLIM, TX/SFP.

Specifications

Environmental

Operating Temperature
-40°F to +176°F (-40°C to +80°C)

Storage Temperature
-40°F to +176°F (-40°C to +80°C)

Humidity
5 - 95% (non-condensing)

DC Input
IE-iMcV-2xLIM, TX/SFP w/LFPT: 0.80 Amp @ 5V

Fiber Optic Specifications

For fiber optic specifications, please visit:
http://www.imcnetworks.com/adocs/fcs.asp

IMC Networks Technical Support

Tel: (949) 465-3000 or (800) 624-1070 (in the U.S. and Canada);

+32-16-550880 (Europe)

Fax: (949) 465-3020

E-Mail: techsupport@imcnetworks.com

Web: www.imcnetworks.com

Fiber Optic Cleaning Guidelines

Fiber Optic transmitters and receivers are extremely susceptible to contamination by particles of dirt or dust, which can obstruct the optic path and cause performance degradation. Good system performance requires clean optics and connector ferrules.

1. Use fiber patch cords (or connectors, if you terminate your own fiber) only from a reputable supplier; low-quality components can cause many hard-to-diagnose problems in an installation.

2. Dust caps are installed at IMC Networks to ensure factory-clean optical devices. These protective caps should not be removed until the moment of connecting the fiber cable to the device. Should it be necessary to disconnect the fiber device, reinstall the protective dust caps.

3. Store spare caps in a dust-free environment such as a sealed plastic bag or box so that when reinstalled they do not introduce any contamination to the optics.

4. If you suspect that the optics have been contaminated, alternate between blasting with clean, dry, compressed air and flushing with methanol to remove particles of dirt.

Electrostatic Discharge Precautions

Electrostatic discharge (ESD) can cause damage to any product, add-in modules or stand alone units, containing electronic components. Always observe the following precautions when installing or handling these kinds of products

1. Do not remove unit from its protective packaging until ready to install.

2. Wear an ESD wrist grounding strap before handling any module or component. If the wrist strap is not available, maintain grounded contact with the system unit throughout any procedure requiring ESD protection.

3. Hold the units by the edges; do not touch the electronic components or gold connectors.

4. After removal, always place the boards on a grounded, static-free surface, ESD pad or in a proper ESD bag. Do not slide the modules or stand alone units over any surface.

WARNING! Integrated circuits and fiber optic components are extremely susceptible to electrostatic discharge damage. Do not handle these components directly unless you are a qualified service technician and use tools and techniques that conform to accepted industry practices.

Certifications

CE: The products described herein comply with the Council Directive on Electromagnetic Compatibility (2004/108/EC).

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**Class 1 Laser product, Luokan 1 Laserlaite,
Laser Klasse 1. Appareil A'Laser de Classe 1**

European Directive 2002/96/EC (WEEE) requires that any equipment that bears this symbol on product or packaging must not be disposed of with unsorted municipal waste. This symbol indicates that the equipment should be disposed of separately from regular household waste. It is the consumer's responsibility to dispose of this and all equipment so marked through designated collection facilities appointed by government or local authorities. Following these steps through proper disposal and recycling will help prevent potential negative consequences to the environment and human health. For more detailed information about proper disposal, please contact local authorities, waste disposal services, or the point of purchase for this equipment.
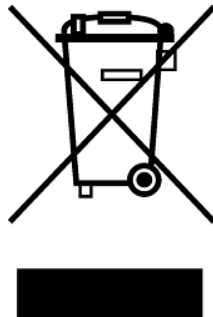
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