![IMC Networks logo]

IE–ModeConverter

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. IMC Networks warrants to the original end-user purchaser that all SFPs 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 one (1) year 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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About IE–ModeConverter

The IE–ModeConverter is a pure mode converter that converts any fiber optics type to any other fiber optics type. This product is a Protocol independent converter and is not intended for applications that require retiming or any Layer 2 functions. The IE–ModeConverter supports extended temperature operation.

The IE–ModeConverter requires two small form-factor (SFP) modules (sold separately), which provide greater fiber flexibility in the network environment. The hot-swappable nature of the SFPs and the numerous fiber modes and types available in SFPs allow for easy configuration and future upgrading as network demands evolve. The SFP modules must be MSA compliant and support the same speed range.

The IE–ModeConverter operates as a mode converter only and not as a rate converter.

The IE–ModeConverter does not provide support for copper (TX) SFPs.

Features

The IE–ModeConverter provides the ability to change optical transport characteristics using easy-to-install SFP devices. This mix-and-match functionality is only limited by the available IMC Networks' SFP units. For more information about SFPs, visit
https://www.imcnetworks.com/Products/Small_Form_Factor_Pluggable.cfm

The key features of the IE–ModeConverter are
- Uses Miniature Media Converter Form Factor
- Supports a 7 VDC to 50 VDC terminal block option with cascading power
- Supports an external 5 VDC power option (not extended temperature)
- Allows extended temperature range from -13°C to +185°F (-25°C to +85°C)
- Uses all standard MSA-complaint SFP devices (excluding copper SFPs)
- Provides extensive diagnostic LED functions
- Supports DIN Rail mounting

Applications

The standard application is the conversion of a short-range, multi-mode fiber interface to a long-range single-mode fiber line. In addition, CWDM, DWDM, or single-strand fiber can be supported with the appropriate SFP. This allows you to purchase low cost multi-mode fiber blade cards for your network equipment and support long-distance single-mode fiber links.

Installing the IE–ModeConverter

The IE–ModeConverter installs anywhere as a standalone, table-top device or on a DIN rail.

As a standalone device, install it in locations with limited space.

If multiple connections are required, use an IE-PowerTray/18 enclosure, (sold separately). The tray allows for 18 conversions in a 1.5 rack unit of space. The units can also be powered by daisy-chaining DC power (refer to *Cascading DC Power*).

SFP Port Requirements

The IE–ModeConverter requires two SFP Modules of the same speed, either two fast Ethernet (100Mbps) modules or two Gigabit Ethernet (1000Mbps) modules.

NOTE
Both SFPs must operate at the same speed.

DIN Rail Mounting

The IE–ModeConverter can be mounted with two DIN Rail clips, a hardware option available through IMC Networks. The DIN Rail clips include screws, to allow the installation onto a DIN Rail. Install the screws into DIN Rail clips, which should be mounted perpendicular to the DIN Rail. Snap the converter onto the clips. To remove the converter from the DIN Rail, use a flat-head screwdriver into the slot to gently pry the converter from the rail.

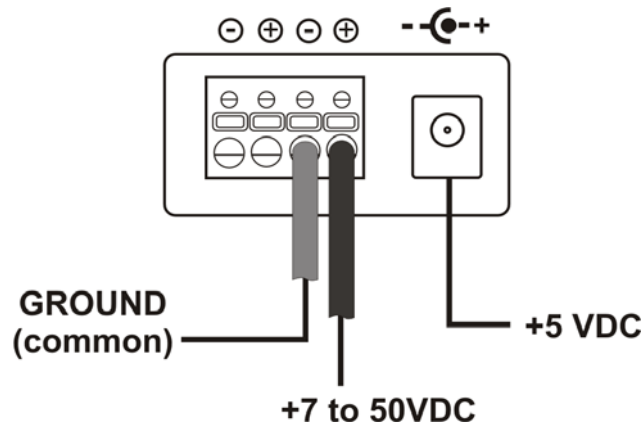| NOTE |
|------|
| *The DIN clips are designed for use on a DIN-35 rail.* |

Powering the IE–ModeConverter

The IE–ModeConverter requires an external DC power source and has three powering options:

- Universal AC power adapter with country specific clip (not included with module only version).
- User supplied LPS DC power via a four-position DC power block.
- Power from an IE- PowerTray/18.
- An optional IMC Network Double-USB Power Cable (available only from IMC Network)
- An optional IE-Power/5V DIN Rail mount power supply, extended temperature

For extended temperature operation the DC terminal block must be used because the supplied AC to DC converter is not rated for extended temperature operation. The power source used with the DC terminal block should be a Limited Power Source (LPS).

DC Terminal Block Option

The IE–ModeConverter DC power option includes a 7 VDC to 50 VDC terminal block and a standard +5 VDC mini-jack. The DC terminal block has multiple DC inputs intended for cascading DC power to an adjacent unit.

Connect the power source to any one positive and one negative terminal on the IE–ModeConverter.

NOTE
When using stranded wire, the leads must be tinned. The chassis is not protected against mis-wiring; if mis-wired the chassis will not function. The chassis is internally connected to the negative power terminal.

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Cascading DC Power

If installing multiple IE–ModeConverters on a DIN rail, you can use one DC input source and then cascade from one DC terminal block to the next, until reaching the maximum electrical current available.

LED Operation
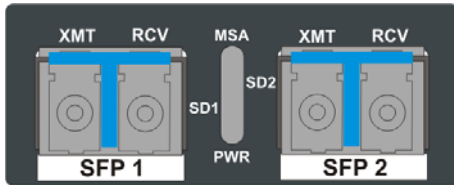
The IE–ModeConverter contains four status LED indicators. Each LED is dual color and has three states: off, red, or green. A loss of signal on one SFP causes the TX of the other SFP to turn off. This action does not activate the red TX Fault LED.

LED	Color or State		
	Red	**OFF**	**Green**
PWR	Card does not pass the self-test.	Unit does not have power.	Power is applied to the card. All internal self-test functions must pass before the PWR LED is green.
SD I SD 2	LED transmitter has an active fault.	No active fault on transmitter. LOS indication on receiver.	Valid signal is detected by the SFP and LED transmitter is not in fault.
MSA LEDs	One or both SFPs are not installed or not detected. The TX inhibit must not be active if a SFP is missing.* Or, both SFPs are installed, but their speed settings are different. This condition disables both SFPs.	N/A	Indicates that both SFPs with the same speed are securely installed.

* To help in troubleshooting, the **Link Loss** (LL) feature is always ON. That is, if a LOS is detected on an incoming SFP port, the Optical transmitter on the other SFP port is turned OFF. This provides a Link Loss carry forward function to alert the device downstream of the existing problem. This function is "ON" in both directions at the same time. The LL function is inhibited if either SFP is not installed.

DC Power Supply Precautions

The following precautions must be observed when installing the chassis model with an internal DC power supply.

1. Check nameplate ratings to ensure there is no overloading of supply circuits that could effect overcurrent protection and supply wiring.

2. In addition, the following must be observed:

    a. Connect the equipment to a 35 to 50 VDC power source that is electrically isolated from the alternating current source. The 35 to 50 VDC power source is connected to a SELV DC source.

    b. Route input wiring to terminal block and secure in such a manner that it is protected from damage and stress. Do not route wiring past sharp edges or moving parts.

    c. Incorporate a readily accessible disconnect device, with a 3mm minimum contact gap in the fixed wiring.

3. Reliable Earthing of this equipment must be maintained. Particular attention should be given to supply connections when connecting to power strips, rather than direct connections to the branch circuit.

IMC Networks Technical Support

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Web: www.imcnetworks.com

Specifications

Input Specifications

AC Wall Adapter	100 to 240 ±10% VAC input, 5 VDC output, 2A max.
DC terminal	+7 VDC to +50 VDC @ 2.5 watts. Actual current consumption may vary depending on the type of SFP modules installed. When not using the supplied AC/DC converter the externally supplied DC power must be provided from a LPS source
DC jack	5 VDC
Double-USB Power Cable	Spec 500mA
	Please note that the laptop or PC USB ports must be 2.0 or greater to provide sufficient power to the unit.
Power Tray 18-Slot AC for Miniature Converters	125W, 20A@ 5V

Operating Temperature:

-13°F to +185°F (-25°C to +85°C) DC configuration
-4°F to +158°F (-20°C to +70°C) DIN Railmount power supply
+14°F to +122°F (-10°C to +50°C) with AC wall adapter

Storage Temperature:
-49°F to +185°F (-45°C to +85°C)

Shipping Weight:
0.25 lbs (0.11 kg)

Dimensions:
0.83″ H x 1.80″ W x 3.35″ D (2.11 x 4.57 x 8.51 cm)

Standards/Compliance

SFP-MSA SFP standard (September 14, 2000)
SFF-8472 DDMI standard (Revision 1.0)

All SFPs used in this product should be certified to IEC 60825-1.

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.

Safety Certifications

UL/CUL: Listed to Safety of Information Technology Equipment, including Electrical Business Equipment.

CE: The products described herein comply with the Council Directive on Electromagnetic Compatibility (2004/108/EC) and the Council Directive on Electrical Equipment Designed for use within Certain Voltage Limits (2006/95/EC). Certified to Safety of Information Technology Equipment, Including Electrical Business Equipment. For further details, contact IMC Networks.

> **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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