TRANSITION networks

USER'S GUIDE

F-SM-MM-04

Stand-Alone Media Converter

- ***Gigabit Ethernet™***
- ***Singlemode to Multimode***
- ***1000Base-SX to 1000Base-LX***

Transition Networks F-SM-MM-04 Gigabit Ethernet™ Media Converter connects singlemode to multimode fiber-optic cable. The F-SM-MM-04 Media Converters function in either full-duplex or half-duplex mode.

Part Number	**Port One -** *Fiber-Optic 1000Base-SX*	**Port Two -** *Fiber-Optic 1000Base-LX*
F-SM-MM-04	*SC, 850 nm multimode 220 m (721 ft)**	*SC, 1300 nm singlemode 10 km (6.2 miles)**
F-SM-MM-04(LH)	*SC, 850 nm multimode 220 m (721 ft)**	*SC ,1310 nm singlemode 25 km (15.5 miles)**
F-SM-MM-04(LW)	*SC, 850 nm multimode 220 m (721 ft)**	*SC, 1550 nm singlemode 65 km (40.4 miles)**

* Typical maximum cable distance. (Actual distance is dependent upon the physical characteristics of the network installation.) See the Cable Specifications on page 4 for more information on the cable length.

Optional Accessories *(sold separately)*

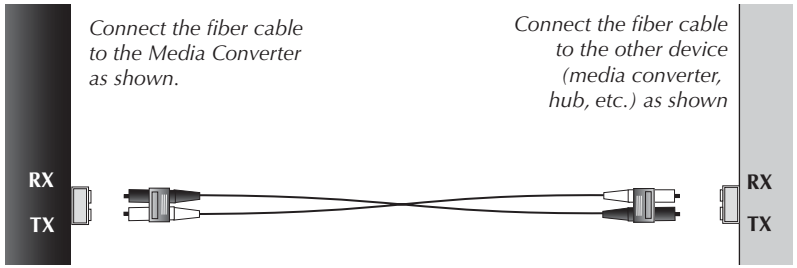
Part Number	**Description**
E-MCR-03	*12-Slot Media Converter Rack (includes universal internal power supply) 17 x 15 x 5 in. (432 x 381 x 127 mm)*
WMBL	*Optional Wall Mount Brackets Length: 4.0 in. (102 mm), Fits converter length: 4.7 in. (109 mm)*
SPS-1872-SA	*Optional External Power Supply; 18-72VDC Stand-Alone Wide-Input; Output: 12.6VDC, 1.0 A*
SPS-1872-CC	*Optional External Power Supply; 18-72VDC Wide-Input; Output: 12.6VDC, 1.0 A*

INSTALLATION

Installing the Cable

FIBER

1. Locate or build fiber cable with male, two-stranded TX to RX connectors installed at both ends.
2. Connect the fiber cables to F-SM-MM-04 Media Converter as described:
   - Connect the male **TX** cable connector the female **TX** port.
   - Connect the male **RX** cable connector to the female **RX** port.
3. Connect the fiber cables to the other device (another media converter, hub, etc.) as described:
   - Connect the male **TX** cable connector the female **RX** port.
   - Connect the male **RX** cable connector to the female **TX** port.



Power the Media Converter

AC

1. Install the power adapter cord to the back of the Media Converter.
2. Connect the power adapter plug to AC power.
3. Verify that the Media Converter is powered by observing the illuminated LED power indicator light.

DC

Consult the User's Guide for the Transition Networks SPS1872-xx DC External Power Suppy for powering the Media Converter.

OPERATION

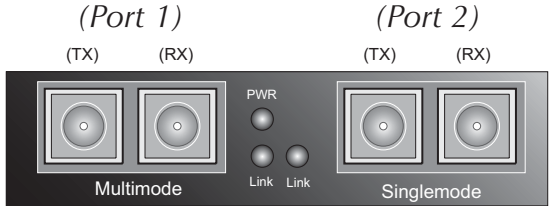
Using Status LEDs

Use the status LEDs to monitor the Media Converter operation in the network.

Pwr Steady LED indicates connection to external AC power.

Link *(left)* Steady LED indicates multimode fiber link connection.

Link *(right)* Steady LED indicates singlemode link connection.



Full-Duplex Network

In a full-duplex network, maximum cable lengths are determined by ***the type of cables*** that are used. See page 4 for the cable specifications for the different F-SM-MM-04 models. (The 512-Bit Rule ***does not apply*** in a full-duplex network.)

Half-Duplex Network (512-Bit Rule)

In a half-duplex network, the maximum cable lengths are determined by the round trip delay limitations of each Fast Ethernet™ **collision domain**. (A collision domain is the longest path between any two terminal devices, e.g. a **terminal**, **switch**, or **router**.)

The 512-Bit Rule determines the maximum length of cable permitted by calculating the round-trip delay in **bit-times (BT)** of a particular collision domain. If the result is less than or equal to 512 BT, the path is good.

For more information on the 512-Bit Rule, see the white paper titled "*Collision Domains*" on the Transition Networks website at:

http://www.transition.com/learning/whitepapers/colldom_wp.htm

CABLE SPECIFICATIONS

The physical characteristics must meet or exceed IEEE 802.3™ specifications.

Bit Error Rate:	$<10^{-12}$	
Multimode - 1000Base-SX	850 nm	
Multimode fiber (recommended):	62.5/125 µm	
Multimode fiber (optional):	50/125 µm	
Fiber Optic Transmitter Power:	min: -10.0 dBm	max: -4.0 dBm
Fiber Optic Receiver Sensitivity:	min: -17.0 dBm	max: 0.0 dBm
Link Budget:	7.0 dB	
Minimum cable distance*	2 meters (6.6 ft)	
Typical maximum cable distance*	220 meters for 160/500 MHz•Km 270 meters for 200/500 MHz•Km	
Singlemode - 1000Base-LX		
Singlemode fiber (recommended):	9 µm	
F-SM-MM-04	1300 nm	
Fiber Optic Transmitter Power:	min: -13.0 dBm	max: -3.0 dBm
Fiber Optic Receiver Sensitivity:	min: -20.0 dBm	max: -3.0 dBm
Link Budget:	7.0 dB	
Minimum cable distance*	2 meters (6.6 ft)	
Typical maximum cable distance*	10 km (6.2 miles)	
F-SM-MM-04(LH)	1310 nm	
Fiber Optic Transmitter Power:	min: -5.0 dBm	max: 0.0 dBm
Fiber Optic Receiver Sensitivity:	min: -20.0 dBm	max: -3.0 dBm
Link Budget:	15.0 dB	
Spectral Width:	5.9 nm FWHM	
Minimum Attenuation	3.0 dB	
Typical maximum cable distance*	25 km (15.5 miles)	
F-SM-MM-04(LW)	1550 nm	
Fiber-optic Transmitter Power:	min: -3.0 dBm	max: +2.0 dBm
Fiber-optic Receiver Sensitivity:	min: -23.0 dBm	max: -3.0 dBm
Link Budget:	20.0 dB	
Spectral Width:	2.3 nm FWHM	
Minimum Attenuation	5.0 dB	
Typical maximum cable distance*	65 km (40.4 miles)	

* Actual distance is dependent upon the physical characteristics of the network installation.

TECHNICAL SPECIFICATIONS

For use with Transition Networks Model F-SM-MM-04 or equivalent

Product is certified by the manufacturer to comply with DHHS Rule 21/CFR, Subchapter J applicable at the date of manufacture.

Standards:	IEEE 802.3™	
Data Rate:	1000 Mb/s	
Case Dimensions:	4.7" x 3.0" x 1.0" (119 mm x 76 mm x 25 mm)	
Weight:	1 pounds (0.45 kilograms) (approximate)	
Power Consumption:	3.3 W	
Power Supply DC Output:	12VDC, 500 mA (minimum) minimum output regulation: 5% Connector: 2.1mm barrel, center pin positive	
MTBF	51,185 hours *(MIL217F2 V5.0) (MIL-HDBK-217F)* 124,339 hours *(Bellcore7 V5.0)*	
Environment:	Tmra*: Storage Temp: Humidity: Altitude:	0 to 50°C (32 to 12°F) -20 to 85°C (-4 to 185°F) 10-90%, non condensing 0-10,000 feet
Warranty:	Lifetime	

*Manufacturer's rated ambient temperature.

CAUTION: Visible and Invisible Laser Radiation When Open. Do Not Stare Into Beam Or View Directly With Optical Instruments.

CAUTION: Use of controls, adjustments or the performance of procedures other than those specified herein may result in hazardous radiation exposure.

FAULT ISOLATION and CORRECTION

If the Media Converter fails, isolate and correct the failure by determining the answers to the following questions and then taking the indicated action:

1. Is the *PWR* LED on the Media Converter illuminated?

NO

- Is the power adapter the proper type of voltage and cycle frequency for the AC outlet?
- Is the power adapter properly installed in the Media Converter and in the outlet?
- Contact Technical Support: US/Canada: 1-800-260-1312, International: 00-1-952-941-7600.

YES

- Proceed to step 2.

2. Is the multimode *Link* LED (on the left) illuminated?

NO

- Check the fiber cables for proper connection.
- Verify that the TX and RX cables on the Media Converter are connected to the RX and TX ports, respectively, on the other device.
- Contact Technical Support: US/Canada: 1-800-260-1312, International: 00-1-952-941-7600.**YES**
- Proceed to step 3.

3. Is the singlemode *Link* LED (on the right) illuminated?

NO

- Check the fiber cables for proper connection.
- Verify that the TX and RX cables on the Media Converter are connected to the RX and TX ports, respectively, on the other device.
- Contact Technical Support: US/Canada: 1-800-260-1312, International: 00-1-952-941-7600.

YES

- Contact Technical Support: US/Canada: 1-800-260-1312, International: 00-1-952-941-7600.

CONTACT US

Technical Support

Technical support is avialable 7:00 AM - 6:00 PM CST (GMT -6:00)
US and Canada: **1-800-260-1312**
International: **00-1-952-941-7600**

Transition NOW

Chat live via the Web with Transition Networks Technical Support.
Log onto **www.transition.com** and click the **Transition Now** link.

Web-Based Seminars

Transition Networks provides seminars via live web-based training.
Log onto **www.transition.com** and click the **Learning Center** link.

E-Mail

Ask a question anytime by sending an e-mail to our technical support staff.
techsupport@transition.com

Address

Transition Networks
6475 City West Parkway
Minneapolis, MN 55344, USA
telephone: 952-941-7600
toll free: 800-526-9267
fax: 952-941-2322

TRANSITION networks

DECLARATION OF CONFORMITY

Name of Mfg:	**Transition Networks** 6475 City West Parkway, Minneapolis MN 55344 USA
Model:	**F-SM-MM-04 Series Media Converters**
Part Number(s):	**F-SM-MM-04, F-SM-MM-04(LH), F-SM-MM-04(LW)**
Regulation:	**EMC Directive 89/336/EEC**

Purpose: To declare that the ***F-SM-MM-04*** to which this declaration refers is in conformity with the following standards.

EMC-CISPR 22: 1985 Class A; EN 55022: 1988 Class A; EN 50082-1:1992; EN 60950 A4:1997; IEC 801.2, 801.3, 801.4; IEC 950; 21 CFR subpart J

I, the undersigned, hereby declare that the equipment specified above conforms to the above Directive(s) and Standard(s).

Stephen Anderson, Vice-President of Engineering

September 1, 2000
Date

COMPLIANCE INFORMATION

UL Listed
C-UL Listed (Canada)
CISPR22/EN55022 Class A
CE Mark

FCC Regulations
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 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 case the user will be required to correct the interference at the user's own expense.

Canadian Regulations
This digital apparatus does not exceed the Class A limits for radio noise for digital apparatus set out on 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.

European Regulations
Warning
This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Achtung !
Dieses ist ein Gerät der Funkstörgrenzwertklasse A. In Wohnbereichen können bei Betrieb dieses Gerätes Rundfunkstörungen auftreten, in weichen Fällen der Benutzer für entsprechende Gegenmaßnahmen werantwortlich ist.

Attention !
Ceci est un produit de Classe A. Dans un environment domestique, ce produit risque de créer des interférences radioélectriques, il appartiendra alors à l'utilsateur de prende les measures spécifiques appropriées.

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