TRANSITION NETWORKS®

User's Guide

E-100BTX-FX-05(10x)

Stand-Alone Media Converter

- ***Fast Ethernet***
- ***Copper to Single Fiber***
- ***100Base-TX to 100Base-FX***

Transition Networks E-100BTX-FX-05(10x) Fast Ethernet media converter connects 100Base-TX shielded or unshielded twisted-pair copper cable to single connector 100Base-FX fiber-optic cable.

Part Number	Port 1- Copper	Port 2 - Simplex Fiber-Optic
E-100BTX-FX-05(100)	RJ-45 100 m *(328 ft)**	SC, 1310 mn (TX)/1550 nm (RX) single mode, 20 km *(12.4 miles)***
E-100BTX-FX-05(101)	RJ-45 100 m *(328 ft)**	SC, 1550 mn (TX)/1310 nm (RX) single mode, 20 km *(12.4 miles)***
E-100BTX-FX-05(102)	RJ-45 100 m *(328 ft)**	SC, 1310 mn (TX)/1550 nm (RX) single mode, 40 km *(24.8 miles)***
E-100BTX-FX-05(103)	RJ-45 100 m *(328 ft)**	SC, 1550 mn (TX)/1310 nm (RX) single mode, 40 km *(24.8 miles)***
E-100BTX-FX-05(104)	RJ-45 100 m *(328 ft)**	SC, 1310 mn (TX)/1550 nm (RX) single mode, 60 km *(37.3 miles)***
E-100BTX-FX-05(105)	RJ-45 100 m *(328 ft)**	SC, 1550 mn (TX)/1310 nm (RX) single mode, 60 km *(37.3 miles)***

Part Number	Port 1 Copper	Port 2 - Simplex Fiber-Optic
E-100BTX-FX-05(106)	RJ-45 100 m *(328 ft)**	SC, 1310 mn (TX)/1550 nm (RX) single mode, 80 km *(49.7 miles)***
E-100BTX-FX-05(107)	RJ-45 100 m *(328 ft)**	SC, 1550 mn (TX)/1310 nm (RX) single mode, 80 km *(49.7 miles)***

*Typical maximum cable distance. Actual distance is dependent upon the physical characteristics of the network. (TX) = transmit, (RX) = receive

**E-100BTX-FX-05(10x) models install on the network as a local and remote pair *(100/101, 102/103, etc.)*

The E-100BTX-FX-05(xx) models are the duplex fiber-optic version of the media converter. For more information, see the E-100BTX-FX-05(xx) user's guide 33210 on-line at: www.transition.com, and then click on Products/Product Finder.

Optional Accessories *(sold separately)*

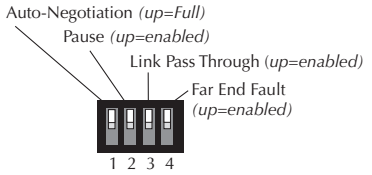
Part Number	Description
SPS-1872-SA	Optional External Power Supply; 18-72VDC Stand-Alone Output: 12.6VDC, 1.0 A
SPS-1872-CC	Optional External Power Supply; 18-72VDC Piggy-back; Output: 12.6VDC, 1.0 A
E-MCR-05	12-Slot Media Converter Rack *(includes universal internal power supply)* 17 x 15 x 5 in. *(432 x 381 x 127 mm)*
WMBL	Optional Wall Mount Brackets Length: 4.0 in. *(102 mm)*, Fits converter length: 4.7in. (*119mm*
WMBV	Optional Vertical Mount Bracket; Length: 5.0 in. *(127 mm)*
WMBD	Optional DIN Rail Mount Bracket; Length: 5.0 in. *(127 mm)*
WMBD-FS	Optional DIN Rail Mount Bracket *(flat-small)*; 3.1in. *(79 mm)*

Installation

CAUTION: Wear a grounding device and observe electrostatic discharge precautions when setting the 4-position switch and jumper. Failure to observe this caution could result in damage to the media converter.

4-Position Switch

The 4-position switch is located on the side of the media converter. Use a small flat-blade screwdriver or a similar tool to set the switches *(see the drawing to the right).*



1. Auto-Negotiation
up = Advertises 100Mb/s full-duplex and half-duplex.
down = Disables auto-negotiation. The media converter operates at 100 Mb/s in duplex mode *(full or half)* of the attached device. *(This setting is primarily used when connecting to a hub).*

2. Pause Control Frame
(Applies only if switch 1 is up and the media converter is connected to auto-negotiation device(s) capable of Pause Control Frame.)
up = Enabled
down = Disabled

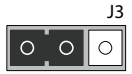
3. Link Pass-Through
up = Enabled
down = Disabled

4. Far-End Fault
up = Enabled
down = Disabled

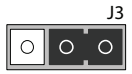
AutoCross™ jumper

The AutoCross feature allows either straight-through (MDI) or crossover (MDI-X) cables to be used when connecting to devices such as hubs, transceivers, or network interface cards (NICs). AutoCross determines the characteristics of the cable connection and automatically configures the media converter to link up, regardless of the cable configuration.

The J3, 3-pin header is located on the circuit board behind the DIP switch. To set the jumper:



1. Using a small screwdriver, remove the four (4) screws securing the device cover, then remove it.
2. Locate the jumper on header J3. Use a small needle-nosed pliers to move the jumper to the desired position *(see the drawing to the right).*

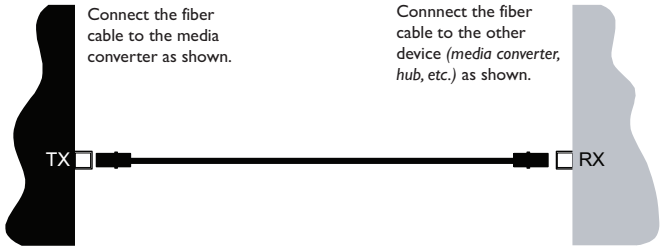


3. Carefully replace the cover; then replace the four (4) screws to secure the cover to the media converter.

Installation — continued

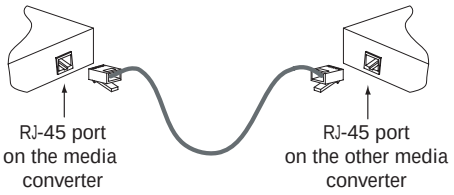
Connect the fiber cable

1. Locate a 100Base-FX compliant fiber cable with male, single-stranded simplex connectors installed at both ends.
2. Connect the simplex connector at one end of the cable to the single-strand fiber port on the first E-100BTX-FX-05(10x) media converter.
3. Connect the simplex connector at the other end of the cable to the single-strand fiber port on the second E-100BTX-FX-05(10x) media converter.



Connect the twisted-pair copper cable

1. Locate a100Base-TX compliant cable with male RJ-45 connectors installed at both ends.
2. Connect the RJ-45 connector at one end of the cable to the RJ-45 port on the E-100BTX-FX-05(10x) media converter.
3. Connect the RJ-45 connector at the other end of the cable to the RJ-45 port on the other E-100BTX-FX-05(10x) media converter.



Installation — continued

Powering the media converter

AC

1. Install the power cord barrel connector into the back of the media converter.
2. Connect the power adapter plug into wall jack AC power.
3. Verify that the media converter is powered by observing the illuminated LED power indicator light, which should be ON green.

DC

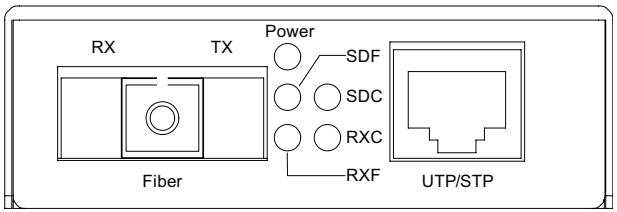
Consult user guide 33266 for information on the SPS-1872-xx DC external power supply.

Operation

Status LEDs

The E-100BTX-FX-05(10x) media converter is designed to operate without user intervention. Use the status LEDs to monitor media-converter operation on the network.

Power	On	Connection to external AC power.
SDF	On	*(Signal Detect/Fiber)* a link has been established for the fiber connection.
SDC	On	*(Signal Detect/Copper)* a link has been established for the copper connection.
RXC	Flashing	*(Copper Receive)* the copper connection is receiving data.
RXF	Flashing	*(Receive Fiber)* the fiber connection is receiving data.



Operation — continued

Product features

Auto-Negotiation

The Auto-Negotiation feature allows the media converter to perform automatic configuration to achieve the best possible mode of operation over a link. The media converter will broadcast its speed *(10 Mb/s, 100 Mb/s, etc.)* and duplex *(full/half)* capabilities to the other devices and negotiate the best mode of operation.

NOTE: The E-100BTX-FX-05(10x) series media converter does NOT support rate conversion between 10Mb/s, 100Mb/s, and 1000Mb/s network devices.

Pause Control Frame

The Pause Control Frame feature can improve network performance by allowing one end of the link to signal the other to discontinue frame transmission for a set period of time to relieve buffer congestion.

NOTE: If the Pause Control feature is present on ALL network devices attached to the media converter(s), enable the Pause Control feature on the media converter(s). Otherwise, disable Pause Control.

Full Duplex Network

In a full-duplex network, maximum cable lengths are determined by the type of cables used. See the front cover for the cable specifications for the different E-100BTX-FX-05(10x) 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.

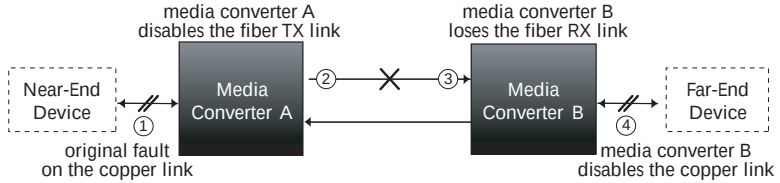
For more information on the 512-Bit Rule, see the white paper titled “Collision Domains” on the Transition Networks website at: www.transition.com and then click on Learning Center/White Papers.

Operation — continued

Product Features — continued

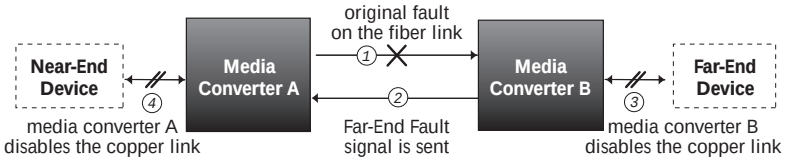
Link Pass-Through

The Link Pass-Through feature allows the media converter to monitor both the fiber and copper RX *(receive)* ports for loss of signal. In the event of a loss of an RX signal, the media converter will automatically disable the TX *(transmit)* signal, thus, “passing through” the link loss. The far-end device is notified automatically of the link loss, which prevents the loss of valuable data unknowingly transmitted over an invalid link.



Far-End Fault

When a fault occurs on an incoming fiber link (1), the media converter transmits a Far-End Fault signal on the outgoing fiber link (2). In addition, the Far-End Fault signal also activates Link Pass-Through, which in turn disables the link on the copper portion of the network (3) and (4).



Cable Specifications

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

Fiber cable

Bit Error Rate:	<10-9	
Single mode fiber *(recommended)*:	9 µm	
Multimode fiber *(recommended)*:	62.5/125 µm	
Multimode fiber *(optional)*:	100/140, 85/140, 50/125 µm	
E-100BTX-FX-05(100)	1310 nm (TX) /1550 nm (RX) simplex	
Fiber-optic Transmitter Power:	min: -13.0 dBm	max: -6.0 dBm
Fiber-optic Receiver Sensitivity:	min: -32.0 dBm	max: -3.0 dBm
Link Budget:	19.0 dB	
E-100BTX-FX-05(101)	1550 nm (TX) /1310 nm (RX) simplex	
Fiber-optic Transmitter Power:	min: -13.0 dBm	max: -6.0 dBm
Fiber-optic Receiver Sensitivity:	min: -32.0 dBm	max: -3.0 dBm
Link Budget:	19.0 dB	
E-100BTX-FX-05(102)	1310 nm (TX) / 1550 nm (RX) simplex	
Fiber-optic Transmitter Power:	min: -8.0 dBm	max: -3.0 dBm
Fiber-optic Receiver Sensitivity:	min: -33.0 dBm	max: -3.0 dBm
Link Budget:	25.0 dB	
E-100BTX-FX-05(103)	1550 nm (TX) / 1310 nm (RX) simplex	
Fiber-optic Transmitter Power:	min: -8.0 dBm	max: -3.0 dBm
Fiber-optic Receiver Sensitivity:	min: -33.0 dBm	max: -3.0 dBm
Link Budget:	25.0 dB	
E-100BTX-FX-05(104)	1310 nm (TX) / 1550 nm (RX) simplex	
Fiber-optic Transmitter Power:	min: -5.0 dBm	max: -0.0 dBm
Fiber-optic Receiver Sensitivity:	min: -34.0 dBm	max: -3.0 dBm
Link Budget:	29.0 dB	
E-100BTX-FX-05(105)	1550 nm (TX) / 1310 nm (RX) simplex	
Fiber-optic Transmitter Power:	min: -5.0 dBm	max: -0.0 dBm
Fiber-optic Receiver Sensitivity:	min: -34.0 dBm	max: -3.0 dBm
Link Budget:	29.0 dB	

Cable Specifications — continued

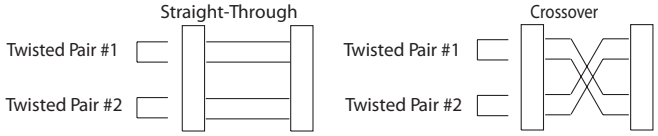
E-100BTX-FX-05(106)	1310 nm (TX) / 1550 nm (RX) simplex	
Fiber-optic Transmitter Power:	min: -2.0 dBm	max: 3.0 dBm
Fiber-optic Receiver Sensitivity:	min: -35.0 dBm	max: -3.0 dBm
Link Budget:	33.0 dB	
E-100BTX-FX-05(107)	1550 nm (TX) / 1310 nm (RX) simplex	
Fiber-optic Transmitter Power:	min: -3.0 dBm	max: 2.0 dBm
Fiber-optic Receiver Sensitivity:	min: -35.0 dBm	max: -3.0 dBm
Link Budget:	32.0 dB	

The fiber optic transmitters on this device meet Class I Laser safety requirements per IEC-825/CDRH standards and comply with 21 CFR1040.10 and 21CFR1040.11.

Copper cable

Category 5:	Minimum requirement
Gauge:	24 to 22 AWG
Attenuation:	22.0 dB /100m @ 100 MHz
Maximum Cable Distance:	100 meters

- Straight-through or crossover cable may be used.
- Shielded twisted-pair (STP) or unshielded twisted-pair (UTP) may be used
- Pins 1&2 and 3&6 are the two active pairs in an Ethernet network .
- RJ-45 Pin-out: Pin 1 = TD+, Pin 2 = TD-, Pin 3 = RD+, Pin 6 = RD-
- Use only dedicated wire pairs for the active pins:
  (e.g., blue/white & white/blue, orange/white & white/orange, etc.)
- Do not use flat or silver satin wire.



Technical Specifications

For use with Transition Networks Model E-100BTX-FX-05(10x) or equivalent.

Data Rate:	100 Mb/s	
Dimensions:	4.7" x 3.0" x 1.0" *(119mm x 76mm x 25mm)*	
Weight:	6 oz. *(181 g)* approximate	
MTBF	41,660 *(MIL-HDBK-217F hours)* 114,580 *(Bellcore hours)*	
Power Consumption:	2.8 Watts, 200 mA	
Power Supply: DC Output	12 VDC, 0.5 A *(minimum)* minimum output regulation: 5% Connector: 2.1mm barrel, center pin positive	
Environment:	Tmra*: Storage Temperature: Humidity:	0 to 50°C *(32 to 122°F)* -20 to 85°C *(-4 to 185°F)* 5 to 95%, non condensing
Warranty:	Lifetime	

*Manufacturer's rated ambient temperature.

For the most up-to-date information on the E-100BTX-FX-05(10x) media converter, view the user's guide on-line at: www.transition.com.

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.

CAUTION: Copper based media ports, e.g., Twisted Pair (TP) Ethernet, USB, RS232, RS422, RS485, DS1, DS3, Video Coax, etc., are intended to be connected to intra-building (inside plant) link segments that are not subject to lightening transients or power faults. Copper based media ports, e.g., Twisted Pair (TP) Ethernet, USB, RS232, RS422, RS485, DS1, DS3, Video Coax, etc., are NOT to be connected to inter-building (outside plant) link segments that are subject to lightening transients or power faults. Failure to observe this caution could result in damage to equipment.

Troubleshooting

If the media converter fails, isolate and correct the fault by determining the answers to the following questions and then taking the indicated action.

1. Is the Power LED on the media converter illuminated?

   NO
   - Is the power adapter the correct model *(check I/O voltage and Hz)*?
   - Verify the voltage and frequency of the AC outlet?
   - Is the power adapter properly installed in the media converter and in the outlet?
   - Contact Tech Support: 800-260-1312, Int'l: 00-1-952-941-7600.

   YES
   - Proceed to step 2.

2. Is the SDC LED on the media converter illuminated?

   NO
   - Check the twisted-pair copper cables for proper connection.
   - Contact Tech Support: 800-260-1312, Int'l: 00-1-952-941-7600.

   YES
   - Proceed to step 3.

3. Is the SDF LED on the media converter illuminated?

   NO
   - Check the fiber cables for proper connection.
   - Contact Tech Support: 800-260-1312, Int'l: 00-1-952-941-7600.

   YES
   - Proceed to step 4.

4. Is the RXC LED on the media converter flashing?

   NO
   - If there is no activity on the copper port, proceed to step 5.
   - If there is activity on the copper port, disconnect and reconnect the twisted-pair cable to restart the initialization process.
   - Restart the workstation to restart the initialization process.
   - Contact Tech Support: 800-260-1312, Int'l: 00-1-952-941-7600.

   YES
   - Proceed to step 5.

5. Is the RXF LED on the media converter flashing?

   NO
   - If there is no activity on the fiber port, contact Tech Support.
   - If there is activity on the fiber port, disconnect and reconnect the fiber cable to restart the initialization process.
   - Restart the workstation to restart the initialization process.
   - Contact Tech Support: 800-260-1312, Int'l: 00-1-952-941-7600.

   YES
   - Contact Tech Support: 800-260-1312, Int'l: 00-1-952-941-7600.

Contact Us

Technical Support

Technical support is available 24 hours a day.
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 Tech Support/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
10900 Red Circle Drive
Minneatonka, MN 55343, U.S.A.
telephone: 952-941-7600
toll free: 800-526-9267
fax: 952-941-2322

Declaration of Conformity

TRANSITION NETWORKS

Declaration of Conformity

Name of Mfg: Transition Networks
10900 Red Circle Drive, Minnetonka MN 55343 U.S.A.

ModelNumber(s): E-100BTX-FX-05(100), E-100BTX-FX-05(101), E-100BTX-FX-05(102), E-100BTX-FX-05(103) E-100BTX-FX-05(104), E-100BTX-FX-05(105), E-100BTX-FX-05(106), E-100BTX-FX-05(107)

Regulation: EMC Directive 89/336/EEC

Purpose: To declare that the E-100BTX-FX-05(10x) to which this declaration refers is in conformity with the following directive(s) and standard(s).

EMC Directive 2004/108/EC; EN 55022:2006+A1:2007 Class A; EN55024:1998+A1:2001+A2:2003; EN61000-3-2; EN61000-3-3; CFR Title 47 Part 15 Subpart B Class A; Low Voltage Directive: 2006/95/EC; CFR Title 21 Section 1040.10 Class I

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

August, 2011
Date

Compliance Information

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.

In accordance with European Union Directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003, Transition Networks will accept post usage returns of this product for proper disposal. The contact information for this activity can be found in the 'Contact Us' portion of this document.

CAUTION: RJ connectors are NOT INTENDED FOR CONNECTION TO THE PUBLIC TELEPHONE NETWORK. Failure to observe this caution could result in damage to the public telephone network.

Der Anschluss dieses Gerätes an ein öffentlickes Telekommunikationsnetz in den EG-Mitgliedstaaten verstösst gegen die jeweligen einzelstaatlichen Gesetze zur Anwendung der Richtlinie 91/263/EWG zur Angleichung der Rechtsvorschriften der Mitgliedstaaten über Telekommunikationsendeinrichtungen einschliesslich der gegenseitigen Anerkennung ihrer Konformität.

Compliance Information — continued

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 diesem Fäll ist der Benutzer für Gegenmaßnahmen werantwortlich.

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.

In accordance with European Union Directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003, Transition Networks will accept post usage returns of this product for proper disposal. The contact information for this activity can be found in the 'Contact Us' portion of this document.
CAUTION: RJ connectors are NOT INTENDED FOR CONNECTION TO THE PUBLIC TELEPHONE NETWORK. Failure to observe this caution could result in damage to the public telephone network.

Der Anschluss dieses Gerätes an ein öffentlickes Telekommunikationsnetz in den EG-Mitgliedstaaten verstösst gegen die jeweligen einzelstaatlichen Gesetze zur Anwendung der Richtlinie 91/263/EWG zur Angleichung der Rechtsvorschriften der Mitgliedstaaten über Telekommunikationsendeinrichtungen einschliesslich der gegenseitigen Anerkennung ihrer Konformität.

Printed in the U.S.A. 33243.G