

E-100BTX-FX-05

User Guide

Stand-Alone Media Converter

- Fast Ethernet
- Copper to Fiber
- 100Base-TX to 100Base-FX
- Extended Temperature



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Introduction

Transition Networks E-100BTX-FX-05 Fast Ethernet media converters connect 100Base-TX shielded or unshielded twisted-pair copper cable to 100Base-FX fiber-optic cable. The E-100BTX-FX-05 series media converters include both Standard temperature models and Extended temperature models.

Standard Temperature Models: media converters that can be used in a standard temperature environment from 0°C to 50°C (32°F to 122°F)

Extended Temperature Models: media converters with the “HT” extension in the part number can be used in an extended temperature environment from -25°C to 65°C (-13°F to 149°F).

Standard Temperature Models

Part Number	Port One - Copper 100Base-TX	Port Two - Duplex Fiber- 100Base-FX
E-100BTX-FX-05	RJ-45 100 m (328 ft)*	ST, 1300 nm multimode 2 km (1.2 miles)*
E-100BTX-FX-05(SC)	RJ-45 100 m (328 ft)*	SC, 1300 nm multimode 2 km (1.2 miles)*
E-100BTX-FX-05(LC)	RJ-45 100 m (328 ft)*	LC, 1300 nm multimode 2 km (1.2 miles)*
E-100BTX-FX-05(MT)	RJ-45 100 m (328 ft)*	MT-RJ, 1300 nm multimode 2 km (1.2 miles)*
E-100BTX-FX-05(SM)	RJ-45 100 m (328 ft)*	SC, 1310 nm single mode 20 km (12.4 miles)*
E-100BTX-FX-05(SMLC)	RJ-45 100 m (328 ft)*	LC, 1310 nm single mode 20 km (12.4 miles)*
E-100BTX-FX-05(LH)	RJ-45 100 m (328 ft)*	SC, 1310 nm single mode 40 km (24.9 miles)*
E-100BTX-FX-05(XL)	RJ-45 100 m (328 ft)*	SC, 1310 nm single mode 60 km (37.3 miles)*
E-100BTX-FX-05(LW)	RJ-45 100 m (328 ft)*	SC, 1550 nm single mode 80 km (49.7 miles)*
E-100BTX-FX-05(XLW)	RJ-45 100 m (328 ft)*	SC, 1550 nm single mode 120 km (74.56 miles)*

* Typical maximum cable distance. Actual distance depends on the physical characteristics of the network installation. For more information, see www.transition.com.

Extended Temperature Models

The media converters with the "HT" extension in the part number can be used in an extended temperature environment from -25°C to 65°C (-13°F to 149°F).

Part Number	Port One - Copper 100Base-TX	Port Two - Duplex Fiber- 100Base-FX
E-100BTX-FX-05(HT)	RJ-45 100 m (328 ft)*	ST, 1300 nm multimode 2 km (1.2 miles)*
E-100BTX-FX-05(SCHT)	RJ-45 100 m (328 ft)*	SC, 1300 nm multimode 2 km (1.2 miles)*
E-100BTX-FX-05(SMHT)	RJ-45 100 m (328 ft)*	SC, 1310 nm single mode 20 km (12.4 miles)*
E-100BTX-FX-05(LHHT)	RJ-45 100 m (328 ft)*	SC, 1310 nm single mode 40 km (24.9 miles)*
E-100BTX-FX-05(XLHT)	RJ-45 100 m (328 ft)*	SC, 1310 nm single mode 60 km (37.3 miles)*
E-100BTX-FX-05(LWHT)	RJ-45 100 m (328 ft)*	SC, 1550 nm single mode 80 km (49.7 miles)*
E-100BTX-FX-05(100HT)**	RJ-45 100 m (328 ft)*	SC, 1310Tx/1550Rx nm single mode 20 km (12.4 miles)*
E-100BTX-FX-05(101HT)**	RJ-45 100 m (328 ft)*	SC, 1550Tx/1310Rx nm single mode 20 km (12.4 miles)*

**E-100BTX-FX-05(100/101HT) are installed in pairs.

Accessories

Accessories are sold separately.

Part Number	Description
SPS-2460-SA	Optional External Power Supply; 24-60 VDC and 24-42 VRMS Stand-Alone Wide-Input; Output: 12.25 VDC, 1.0 A
SPS-2460-CC	Optional External Power Supply; 24-60 VDC and 24-42 VRMS Piggy-Back Wide-Input; Output: 12.25 VDC, 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; 4.0 in. (102 mm)
WMBV	Optional Vertical Mount Bracket; 5.0 in. (127 mm)
WMBD	Optional DIN Rail Mount Bracket; 5.0 in. (127 mm)
WMBD-FS	Optional DIN Rail Mount Bracket (flat, small); 3.1 in. (79 mm)

Installation

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

4-Position DIP Switch

The 4-position DIP switch is located on the side of the media converter. Use a small flat-blade screwdriver or a similar tool to set the recessed switches.

1. Auto-Negotiation

up Enables Auto-Negotiation for the copper connection.

down Disables Auto-Negotiation for the copper connection.

2. Pause Control

up Enabled

down Disabled

3. Link Pass-Through

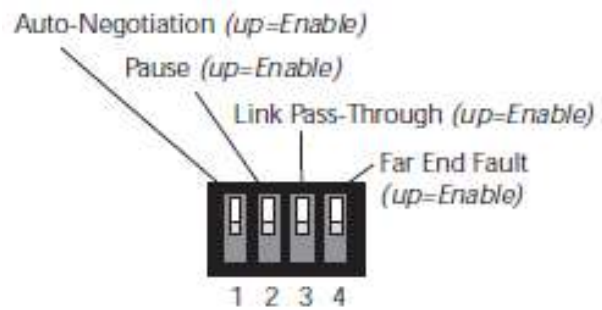
up Enabled

down Disabled

4. Far-End Fault

up Enabled

down Disabled

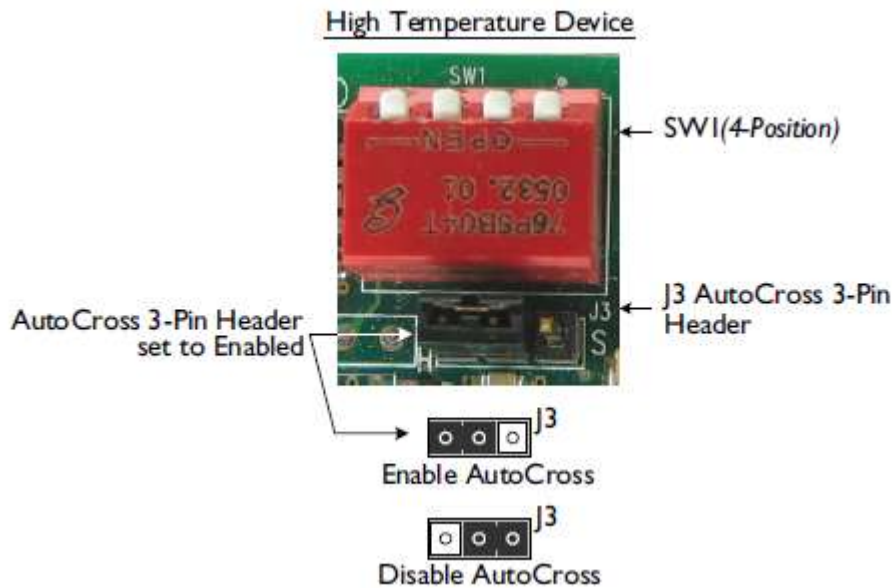


AutoCross Jumpers

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 unit to link up, regardless of the cable configuration.

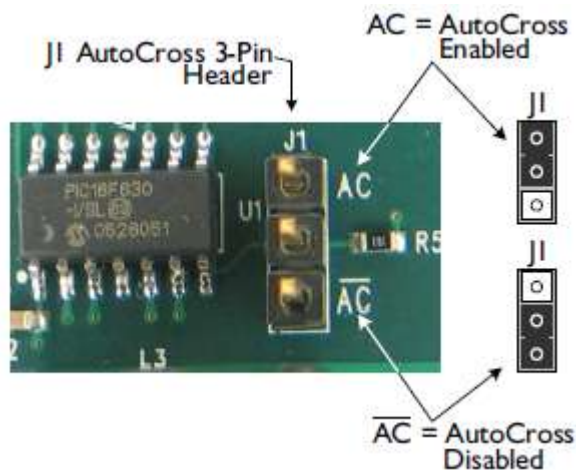
High Temperature Board, J3, 3-Pin Header Settings

1. Orient the board as shown below.
2. Position the jumper as shown below.



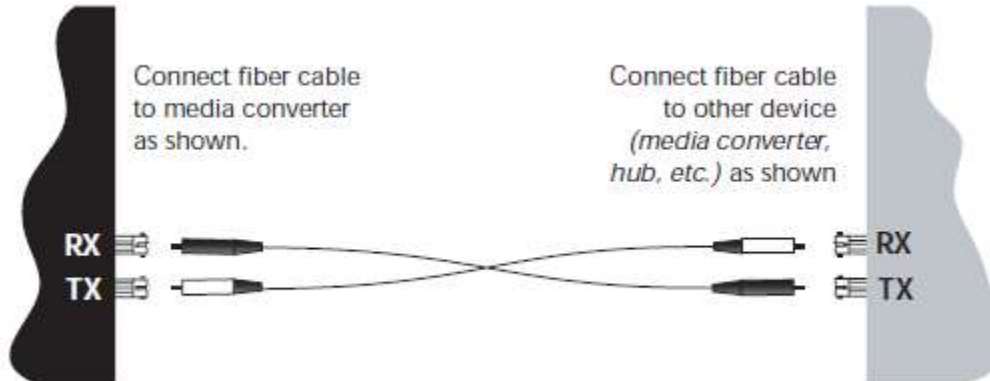
Standard Temperature Board, J1, 3-Pin Header Settings

1. Orient the board as shown below.
2. Position the jumper as shown below.



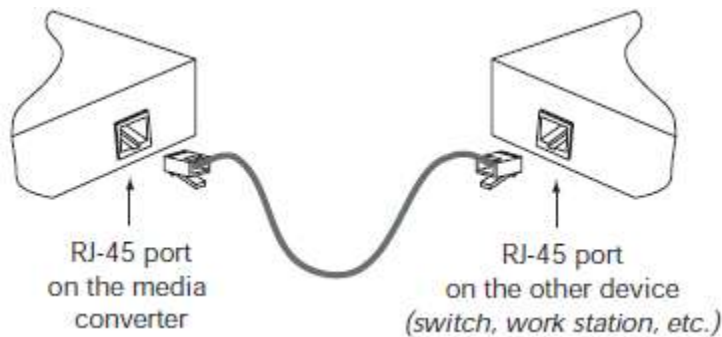
Installing the Fiber Cable

1. Locate a 100Base-FX compliant fiber cable with male, two-stranded TX to RX connectors installed at both ends.
2. Connect the fiber cables to the media converter as described:
 - Connect the male TX cable connector to 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 to the female RX port.
 - Connect the male RX cable connector to the female TX port.



Installing the Copper Cable

1. Locate a 100Base-TX compliant copper 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 media converter.
3. Connect the RJ-45 connector at the other end of the cable to the RJ-45 port on the other device (*switch, workstation, etc.*).



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 AC power.
3. Verify that the media converter is powered up by observing the illuminated power indicator LED.

DC

Consult user guide 33455 for information on the SPS-2460-xx DC external power supply.

Operation

Status LEDs

Use the status LEDs to monitor the E-100BTX-FX-05 media converter operation in the network:

Power	(Power)	On = Connected to external AC power.
SDF	(Signal Detect/Fiber)	On = Fiber link is detected.
SDC	(Signal Detect/Copper)	On = Copper link is detected.
RXC	(Receive/Copper)	Flashing = A signal is being received on the copper link.
RXF	(Receive/Fiber)	Flashing = A signal is being received on the fiber link.

Auto-Negotiation

When the Auto-Negotiation feature is activated, the media converter configures itself to achieve the best possible mode of operation over a link, automatically. The media converter broadcasts its speed (100 Mb/s) and duplex capabilities (*either full or half-duplex*) and negotiates the best mode of operation between the two devices.

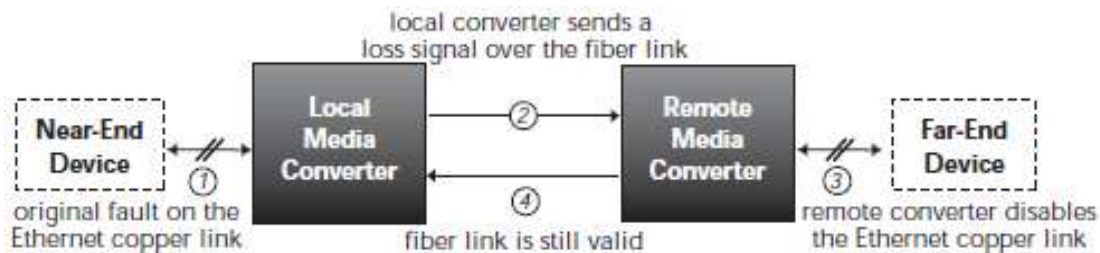
Pause Control

The Pause 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 feature is available on ALL network devices attached to the media converter(s), enable the Pause feature on the media converter(s); otherwise, disable the Pause feature.

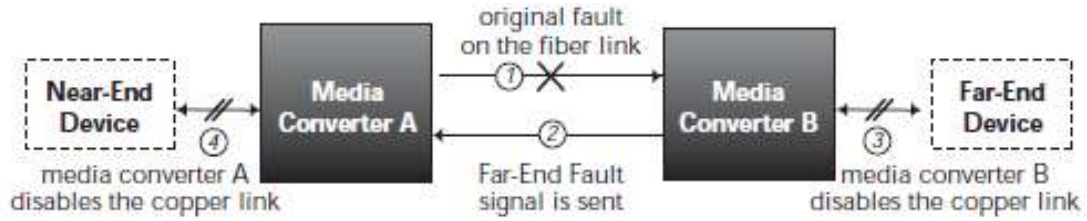
Link Pass-Through

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 (1), the media converter will automatically disable the TX (transmit) signal (2), thus, “passing through” the link loss (3). The far-end device is automatically notified of the link loss (4), 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 the Link Pass-Through, which in turn disables the link on the copper portion of the network (3) and (4).



Optic and Cable Specifications

The fiber optic cable physical characteristics must meet or exceed IEEE 802.3ae specification.

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

Extended Temperature Models

E-100BTX-FX-05(HT)	1300 nm multimode		
Fiber Optic Transmitter Power:	min: -19.0 dBm		max: -14.0 dBm
Fiber Optic Receiver Sensitivity:	min: -30.0 dBm		max: -14.0 dBm
Link Budget:	11.0 dbm		
E-100BTX-FX-05(SCHT)	1300 nm multimode		
Fiber Optic Transmitter Power:	min: -19.0 dBm		max: -14.0 dBm
Fiber Optic Receiver Sensitivity:	min: -30.0 dBm		max: -14.0 dBm
Link Budget:	11.0 dbm		
E-100BTX-FX-05(SMHT)	1310 nm single mode		
Fiber-optic Transmitter Power:	min: -15.0 dBm		max: -8.0 dBm
Fiber-optic Receiver Sensitivity:	min: -31.0 dBm		max: -8.0 dBm
Link Budget:	16.0 dbm		
E-100BTX-FX-05(LHHT)	1310 nm single mode		
Fiber-optic Transmitter Power:	min: -8.0 dBm		max: -2.0 dBm
Fiber-optic Receiver Sensitivity:	min: -34.0 dBm		max: -7.0 dBm
Link Budget:	26.0 dbm		
E-100BTX-FX-05(XLHT)	1310 nm single mode		
Fiber-optic Transmitter Power:	min: -5.0 dBm		max: 0.0 dBm
Fiber-optic Receiver Sensitivity:	min: -38.0 dBm		max: -8.0 dBm
Link Budget:	33.0 dbm		
E-100BTX-FX-05(LWHT)	1550 nm single mode		
Fiber-optic Transmitter Power:	min: -5.0 dBm		max: 0.0 dBm
Fiber-optic Receiver Sensitivity:	min: -34.0 dBm		max: -7.0 dBm
Link Budget:	29.0 dbm		
E-100BTX-FX-05(100HT)	1310Tx/1550Rx nm single mode		
E-100BTX-FX-05(101HT)	1550Tx/1310Rx nm single mode		
Fiber-optic Transmitter Power:	min: -14.0 dBm		max:-8.0 dBm
Fiber-optic Receiver Sensitivity:	min: -33.0 dBm		max: -3.0 dBm
Link Budget:	19.0 dbm		

Standard models

E-100BTX-FX-05	1300 nm multimode		
Fiber Optic Transmitter Power:	min: -19.0 dBm	max: -14.0 dBm	
Fiber Optic Receiver Sensitivity:	min: -30.0 dBm	max: -14.0 dBm	
Link Budget:	11.0 dbm		
E-100BTX-FX-05(SC) & (LC)	1300 nm multimode		
Fiber Optic Transmitter Power:	min: -19.0 dBm	max: -14.0 dBm	
Fiber Optic Receiver Sensitivity:	min: -30.0 dBm	max: -14.0 dBm	
Link Budget:	11.0 dbm		
E-100BTX-FX-05(MT)	1300 nm multimode		
Fiber Optic Transmitter Power:	min: -19.0 dBm	max: -14.0 dBm	
Fiber Optic Receiver Sensitivity:	min: -33.5 dBm	max: -14.0 dBm	
Link Budget:	14.5 dbm		
E-100BTX-FX-05(SM)	1310 nm single mode		
Fiber-optic Transmitter Power:	min: -15.0 dBm	max: -8.0 dBm	
Fiber-optic Receiver Sensitivity:	min: -31.0 dBm	max: -8.0 dBm	
Link Budget:	16.0 dbm		
E-100BTX-FX-05(SMLC)	1310 nm single mode		
Fiber-optic Transmitter Power:	min: -15.2 dBm	max: -8.0 dBm	
Fiber-optic Receiver Sensitivity:	min: -32.5 dBm	max: -3.0 dBm	
Link Budget: 17.3 dbm			
E-100BTX-FX-05(LH)	1310 nm single mode		
Fiber-optic Transmitter Power:	min: -8.0 dBm	max: -2.0 dBm	
Fiber-optic Receiver Sensitivity:	min: -34.0 dBm	max: -7.0 dBm	
Link Budget:	26.0 dbm		
E-100BTX-FX-05(XL)	1310 nm single mode		
E-100BTX-FX-05(LW)	1550 nm single mode		
Fiber-optic Transmitter Power:	min: -5.0 dBm	max: 0.0 dBm	
Fiber-optic Receiver Sensitivity:	min: -34.0 dBm	max: -7.0 dBm	
Link Budget:	29.0 dbm		
E-100BTX-FX-05(XLW)	1550 nm single mode		
Fiber-optic Transmitter Power:	min: 0.0 dBm	max: 5.0 dBm	
Fiber-optic Receiver Sensitivity:	min: -36.0 dBm	max: -3.0 dBm	
Link Budget:	36.0 dbm		

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

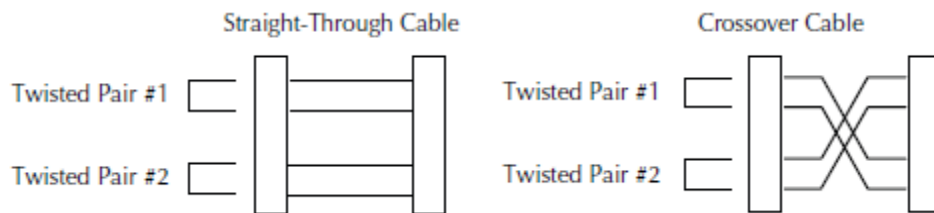
Category 5: (minimum requirement)

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(xxxx) or equivalent

Data rate:	100 Mb/s	
Dimensions:	4.75" x 3.0" x 1.0" (119mm x 76mm x 25mm)	
Weight:	6 oz. (181 g) approximately	
MTBF:	Greater than 46,768 hours (MIL-HDBK-217F) Greater than 123,861 hours (Bellcore7 V5.0)	
Power supply	(standard temperature)	12 VDC, 0.5 A (minimum)
DC output:	(extended temperature)	9 VDC, 1.0 A (minimum)
	minimum output regulation:	5%
Environment:	Tmra* (standard temp):	0°C to 50°C (32 to 122°F)
	Storage Temperature:	-15°C to 65°C (5 to 149°F)
	Tmra* (extended temp):	-25°C to 65°C (-13 to 149°F)
	Storage Temperature:	-25°C to 65°C (5 to 149°F)
	Humidity:	10% – 90%, non-condensing
	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.

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 intrabuilding (inside plant) link segments that are not subject to lightning 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 lightning 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.

Note: DIP switch positions 3 and 4 must be DOWN before starting the troubleshooting process.

1. Is the Power LED lit?

NO

- Is the power adapter the correct model (check I/O voltage and Hz)?
- Verify the voltage and frequency of the AC outlet?
- Are the power barrel connector and wall plug of the power adapter properly inserted in the media converter and plugged into a live AC wall outlet?
- Contact Tech Support: 800-260-1312, Int'l: 00-1-952-941-7600.

YES

- Proceed to step 2.

2. Is the SDC (signal detect/copper) LED lit?

NO

- Check the twisted-pair 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 (signal detect/fiber) 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 Tech Support: 800-260-1312, Int'l: 00-1-952-941-7600.

YES

- Proceed to step 4.

4. Is the RXC (receive/copper) LED flashing?

NO

- If there is no activity on the UTP/STP port, proceed to step 5.
- If there is activity on the UTP/STP port, disconnect and reconnect the twisted-pair cable 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 (receive/fiber) LED flashing?

NO

- If there is no activity on the fiber port, contact Tech Support.
- If there is activity on the fiber port, disconnect / reconnect the fiber cable to restart 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 **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

Minnetonka, MN 55343, U.S.A.



telephone: 952-941-7600

toll free: 800-526-9267

fax: 952-941-2322

Compliance Information

Declaration of Conformity

		Declaration of Conformity
Name of Mfg:	Transition Networks 10900 Red Circle Drive, Minnetonka MN 55343, U.S.A.	
Model Number(s):	E-100BTX-FX-05, E-100BTX-FX-05(SC), E-100BTX-FX-05(LC), E-100BTX-FX-05(MT), E-100BTX-FX-05(SM), E-100BTX-FX-05(SMLC), E-100BTX-FX-05(LH), E-100BTX-FX-05(XL), E-100BTX-FX-05(LW), E-100BTX-FX-05(XLW) E-100BTX-FX-05(SMHT), E-100BTX-FX-05(HT), E-100BTX-FX-05(LHHT), E-100BTX-FX-05(XLHT), E-100BTX-FX-05(LWHT), E-100BTX-FX-05(SCHT) E-100BTX-FX-05(100HT), E-100BTX-FX-05(101HT)	
Purpose: To declare that the E-100BTX-FX-05(xxxx) to which this declaration refers is in compliance 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; EN6100-2-3; EN6100-3-3; 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 model number(s) listed in this declaration of conformity are in compliance with the directive(s) and standard(s) herein.		
 Stephen Anderson, Vice-President of Engineering		August 2011 Date

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 diesem Fall ist der Benutzer für Gegenmaßnahmen verantwortlich.

Attention !

Ceci est un produit de Classe A. Dans un environnement domestique, ce produit risque de créer des interférences radioélectriques, il appartiendra alors à l'utilisateur de prendre les mesures 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 öffentliches Telekommunikationsnetz in den EGMitgliedstaaten verstösst gegen die jeweiligen einzelstaatlichen Gesetze zur Anwendung der Richtlinie 91/263/EWG zur Angleichung der Rechtsvorschriften der Mitgliedstaaten über Telekommunikationsendeinrichtungen einschliesslich der gegenseitigen Anerkennung ihrer Konformität.

Record of Revisions

Rev	Date	Note
N	7/30/08	Added AutoCross text and graphic.
P	2/05/10	Modified the information in the Declaration of Conformity.
Q	8/10/11	Removed UL and CE.
R	10/23/13	Corrected MTBF and Accessories information and updated format.

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