TRANSITION
NETWORKS®

User's Guide
E-TBT-FRL-N-02 & E-TBT-FRL-NLP-02
PCI Media Converter
- **Ethernet**
- **Copper to Fiber**
- **10Base-T to 10Base-FL**

Transition Networks E-TBT-FRL-N-02 and E-TBT-FRL-NLP-02 series media converters are 10Base-T/10Base-FL devices that connect 10Base-T copper to 10Base-FL fiber. The E-TBT-FRL-N-02 is PCI *(Peripheral Component Interconnect)* powered; designed to install directly in a PC workstation or file server, and insert into any slot on a standard PCI. No additional power supply is needed since each PCI slot has power.

| Part Number	Port One - Copper 10Base-T	Port Two - Fiber-Optic 10Base-FL
E-TBT-FRL-N-02	RJ-45 100 m *(328 ft)**	ST, 850 nm multimode 2 km *(1.2 miles)**
E-TBT-FRL-N-02 (SC)	RJ-45 100 m *(328 ft)**	SC, 850 nm multimode 2 km (1.2 *miles)**
E-TBT-FRL-NLP-02	RJ-45 100 m *(328 ft)**	ST, 850 nm multimode 2 km *(1.2 miles)**
E-TBT-FRL-NLP-02 (SC)	RJ-45 100 m *(328 ft)**	SC, 850 nm multimode 2 km (1.2 *miles)**

* Typical maximum cable distance. Actual distance is dependent upon the physical characteristics of the network installation.
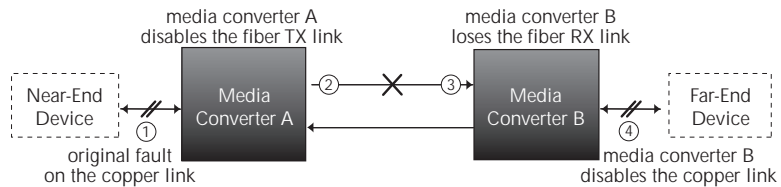
Installation

Set the LinkAlert™ switch

The LinkAlert switch is located on the edge of the printed circuit board and can be easily switched to ENABLE or DISABLE without the use of tools.
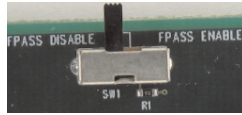
The LinkAlert feature allows the media converter to monitor the fiber and copper RX *(receive)* ports for signal losses. In the event of a loss of an RX signal, the media converter will automatically disable the TX *(transmit)* signal, thus "passing through" the link loss. The far-end device is automatically notified of the link loss, which prevents the loss of valuable data unknowingly transmitted over an invalid link.

Note: If all network devices attached to the media converter(s) are capable of auto-negotiation, enable the LinkAlert feature on the media converter(s). Otherwise, disable the LinkAlert feature.

## Install the slide-in-module media converter(s)

To install the E-TBT-FRL-N-02 or the E-TBT-FRL-NLP-02 series media converter:

1. Locate an empty slot on the PC workstation or file server.
2. Remove the screws holding the cover to the slot. Retain the screws.
3. Carefully slide the media converter into the slot, aligning it with the installation guides.
4. Ensure that the converter is firmly seated in the slot.
5. Using the screws from Step 2, secure the converter to the workstation or file server housing .

Installation -- Continued

Install the copper cable

1. Use the enclosed 10Base-T 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 E-TBT-FRL-N-02 media converter.
3. Connect the RJ-45 connector at the other end of the cable to the RJ-45 port on the other device *(network interface card (NIC), terminal device, transceiver, switch, workstation, etc.)*.
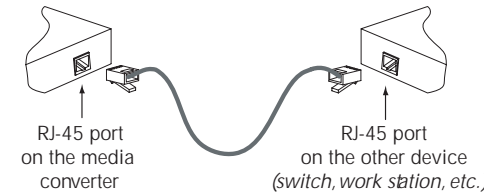
Install the copper cable

1. Locate or build 10Base-FL compliant fiber cable with male, two-stranded TX to RX connectors installed at both ends.
2. Connect the fiber cables to the E-TBT-FRL-N-02 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.
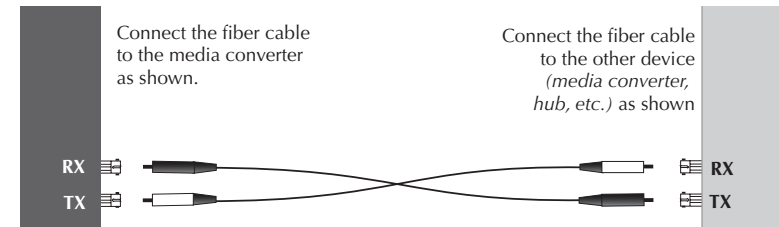
Power the media converter

The E-TBT-FRL-N-02 media converter is powered by the PCI *(Peripheral Component Interconnect)* edge connector on the circuit board.

Operation

LED indicators

After installation the E-TBT-FRL-N-02 or E-TBT-FRL-NLP-02 series media converter it should function without operator intervention. Use the status LEDs to monitor media-converter operation in the network.

FLink *(Fiber)* ON = A 10Base-FL link and normal operation.
OFF = A lack of power or a downed 10Base-FL link.

Link *(TBT)* ON = A 10Base-T link and normal operation.
OFF = A lack of power or a downed 10Base-T link
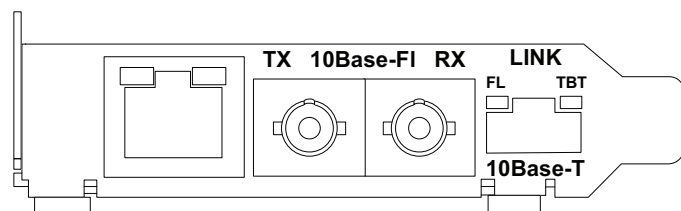
AutoCross™

The AutoCross feature detects and configures the twisted-pair copper port on the media converter to the correct straight-through (MDI) or crossover (MDI-X) configuration. This feature allows either MDI or MDI-X cable to connect the media converter to devices such as hubs, transceivers, or network interface cards (NICs).

Cable Specifications

Fiber cable

Bit Error Rate:	<10-9
Multimode fiber *(recommended)*:	62.5/125 μm

E-TBT-FRL-N-02(ST)
E-TBT-FRL-N-02(SC)
E-TBT-FRL-NLP-02(ST)

|		
E-TBT-FRL-NLP-02(SC)	850 nm multimode	
Fiber-optic Transmitter Power:	min: -20.0 dBm	max: -10.0 dBm
Fiber-optic Receiver Sensitivity:	min: -32.5 dBm	max: -7.2 dBm
Link Budget	12.5 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.

Cable Specifications -- Continued

Copper cable

Category 3:	*(minimum requirement)*
Gauge	24 to 22 AWG
Attenuation	11.5 dB/100m @ 5-10 MHz
Category 5:	*(recommended)*
Gauge	24 to 22 AWG
Attenuation	22.0 dB/100m @ 100 MHz

• Straight-through twisted-pair cable must 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.
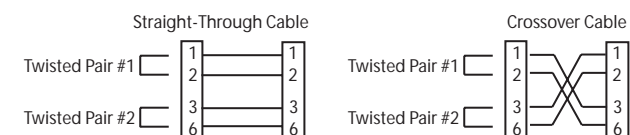
Technical Specifications

For use with Transition Networks Model E-TBT-FRL-N-02 or equivalent

Standards:	IEEE 802.3™
Data Rate:	10 Mb/s
Dimensions:	4.762" x 5.208" x 0.932" *(121mm x 134mm x 24mm)*
Weight:	3 oz. *(91g approximately)*
Power Consumption:	<450 mA

Environment:

Operating temp Tmra*:	0°C to 50°C (*32°F to 122°F*)
Storage temp:	-25°C to 85°C (*-13 to 185°F*)
Humidity:	10% to 90%, non-condensing
Altitude:	0 to 10,000 feet
Warranty:	Lifetime

*Manufacturer's rated ambient temperature: Tmra range for this slide-in-module depends on the physical characteristics and the installation configuration of the file server or PC workstation in which this slide-in-module will be installed.

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

CAUTION: Visible and Invisible Laser Radiation When Open. DO NOT STARE into laser Beam or view it directly with optical Instruments. Failure to observe this caution could result in loss of vision.

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

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 PWR *(power)* LED illuminated?
    NO
    - Confirm that the media converter is properly inserted into the PC workstation or the file server.
    - Confirm that the PC workstation or the file server is properly connected to the power source and is turned on.
    - Contact Tech Support: 1-800-260-1312, Int'l: 00-1-952-941-7600.
    YES
    - Proceed to step 2.

2. Is the RJ-45 LINK LED illuminated?
    NO
    - Check the twisted-pair cables for proper connection.
    - Contact Tech Support: 1-800-260-1312, Int'l: 00-1-952-941-7600.
    YES
    - Proceed to step 3.

3. Is the fiber LINK LED illuminated?
    NO
    - Check the fiber cables for proper connection.
    - Verify that the TX and RX cables on the media converter are connected to RX and TX ports, respectively, on the other device.
    - Contact Tech Support: 1-800-260-1312, Int'l: 00-1-952-941-7600.
    YES
    - Proceed to step 4.

4. Is the RJ-45 RX LED illuminated?
    NO
    - Disconnect and reconnect the 10Base-T cable to restart the initialization process.
    - Restart the attached device to restart the initialization process.
    - Contact Tech Support: 1-800-260-1312, Int'l: 00-1-952-941-7600.
    YES
    - Proceed to step 5.

5. Is the fiber RX LED illuminated?
    NO
    - Disconnect and reconnect the 10Base-FL cable to restart the initialization process.
    - Restart the attached device to restart the initialization process.
    - Contact Tech Support: 1-800-260-1312, Int'l: 00-1-952-941-7600.
    YES
    - Contact Tech Support: 1-800-260-1312, 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
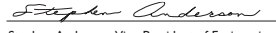
Address
Transition Networks
10900 Red Circle Drive
Minneatonka, MN 55343, U.S.A.
Telephone: 952-941-7600
Toll free: 800-526-9267
Fax: 952-941-2322

TRANSITION
NETWORKS®   **Declaration of Conformity**

Name of Mfg: Transition Networks
                      10900 Red Circle Drive, Minnetonka MN 55343 U.S.A.
Model: E-TBT-FRL-N-02 & E-TBT-FRL-NLP-02 Series Media Converter
Part Number: E-TBT-FRL-N-02(ST), E-TBT-FRL-N-02(SC), E-TBT-FRL-NLP-02(ST), E-TBT-FRL-NLP-02(SC),
Regulation: EMC Directive 89/336/EEC
Purpose: To declare that the E-TBT-FRL-N-02 & E-TBT-FRL-NLP-02 to which this declaration refers is in conformity with the following standards.
EN 55022:1998+A1:2000 Class A; EN 55024:1998; FCC Part 15 Subpart B

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

Stephen Anderson   July 2009
Stephen Anderson, Vice-President of Engineering   Date

Compliance Information

CISPR22/EN55022 Class A + EN55024
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 environement 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.

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