

# COMPLIANCE INFORMATION

UL Listed  
C-UL Listed (Canada)  
CISPR/EN55022 Class A

## 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 classe 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 welchen Fällen der Benutzer für entsprechende Gegenmaßnahmen verantwortlich ist.

### 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.



**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 EG-Mitgliedstaaten 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.

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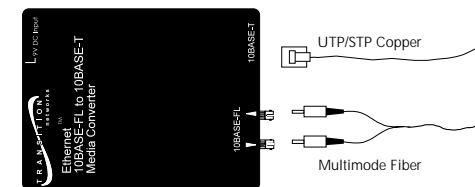
# 10BASE-T/10BASE-FL

## Media Converters

E-TBT-FRL-03, E-TBT-FRL-03(SC), E-TBT-FRL-03(SM),  
E-TBT-FRL-03(L), E-TBT-FRL-03(MT), E-TBT-FRL-03(XC)

## USER'S GUIDE

The TRANSITION Networks E-TBT-FRL-03 10BASE-T/10BASE-FL media converters connect either half-duplex or full-duplex, unshielded or shielded 10BASE-T twisted-pair copper to either half-duplex or full-duplex 10BASE-FL multimode fiber.



### E-TBT-FRL-03

Provides an RJ-45 unshielded twisted pair 10BASE-T connector and a set of RX (receive) and TX (transmit) ST 10BASE-FL 850nm multimode fiber connectors.

### E-TBT-FRL-03 (SC)

Provides an RJ-45 unshielded twisted pair 10BASE-T connector and a set of RX (receive) and TX (transmit) SC 10BASE-FL 850nm multimode fiber connectors.

### E-TBT-FRL-03(SM)

Provides an RJ-45 unshielded twisted pair 10BASE-T connector and an RX (receive) and TX (transmit) ST 10BASE-FL 1300nm singlemode fiber connector.

### E-TBT-FRL-03(L)

Provides an RJ-45 unshielded twisted pair 10BASE-T connector and a set of RX (receive) and TX (transmit) ST 10BASE-FL 1300nm multimode fiber connectors.

### E-TBT-FRL-03(MT)

Provides an RJ-45 unshielded twisted pair 10BASE-T connector and an RX (receive) and TX (transmit) MT-RJ 10BASE-FL 850nm multimode fiber connector.

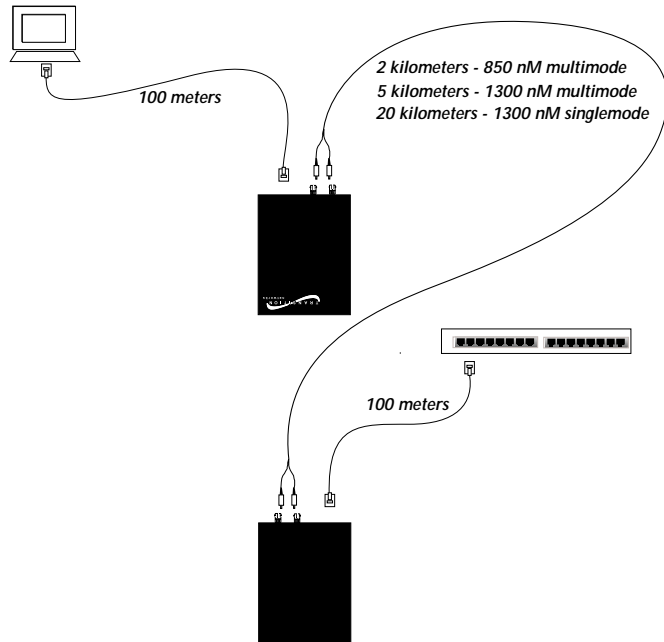
### E-TBT-FRL-03(XC)

Provides an RJ-45 unshielded twisted pair 10BASE-T connector and an RX (receive) and TX (transmit) SC 10BASE-FL 1300nm singlemode fiber connector.

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## E-TBT-FRL-03 IN THE NETWORK

Use the E-TBT-FRL-03 media converter (or two E-TBT-FRL-03 media converters in pairs) to connect a workstation to a remote hub or to connect two hubs.



NOTE: Maximum cable distances apply ONLY to full duplex installations.

## TECHNICAL SPECIFICATIONS

<b>Standards</b>	IEEE 802.3	
<b>Case Dimensions</b>	3.8" x 2.4" x 1.0" (97mm x 61mm x 25mm)	
<b>Environment</b>	Temperature:	0-50°C (32° to 122° F)
	Humidity	5-95%, non condensing
	Altitude	0-10,000 feet

**Power Supply Requirements** Replace power supply with only the equivalent input rating (see below) and output rating (regulated 9VDC at 500 mA).

TN PN	Requirement	Location
3517	240 volts, 50 hertz	United Kingdom
3516	230 volts, 50 hertz	Europe
3518	120 volts, 60 hertz	USA/Canada/Mexico
3514	100 volts, 50-60 hertz	Japan
3515	240 volts, 50 hertz	Australia

**Warranty** Lifetime

TRANSITION  
NETWORKS

### DECLARATION OF CONFORMITY

Name of Mfg: **Transition Networks**  
6475 City West Parkway, Minneapolis MN 55344 USA

Model: **E-TBT-FRL-03 Series Copper-to-Fiber Media Converter**


Part Number: **E-TBT-FRL-03, E-TBT-FRL-03(SC), E-TBT-FRL-03(SM),  
E-TBT-FRL-03(L), E-TBT-FRL-03(MT), E-TBT-FRL-03(XC)**

Regulation: **EMC Directive 89/336/EEC**

Purpose: To declare that the **E-TBT-FRL-03** 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, IEC 801.3, and IEC 801.4; IEC 950

**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

July 7, 1999  
Date

## CABLE SPECIFICATIONS

The physical characteristics of the media cable must meet or exceed IEEE 802.3 specifications.

### Fiber Cable

#### 850NM MULTIMODE

Fiber Optic Cable Recommended:	62.5 / 125 $\mu$ m multimode fiber
Fiber Optic Transmitter Power:	Minimum: -15 dBm
Fiber Optic Receiver Sensitivity:	Minimum : -33 dBm
Bit error rate:	$\leq 10^{-10}$
Maximum Cable Distance:	2 kilometers (6,600 feet)

#### 1300NM MULTIMODE

Fiber Optic Cable Recommended:	62.5 / 125 $\mu$ m multimode fiber
Fiber Optic Transmitter Power:	Minimum: -17 dBm
Fiber Optic Receiver Sensitivity:	Minimum: -35 dBm
Bit error rate:	$\leq 10^{-9}$
Maximum Cable Distance:	5 kilometers (16,500 feet)

#### 1300NM SINGLEMODE (ST)

Fiber Optic Cable Recommended:	9/125 micron single mode fiber
Fiber Optic Transmitter Power:	Minimum: -27 dBm
Fiber Optic Receiver Sensitivity:	Minimum: -36 dBm
Bit error rate:	$\leq 10^{-10}$
Maximum Cable Distance:	20 kilometers (66,000 feet)

#### 1300NM SINGLEMODE (SC)

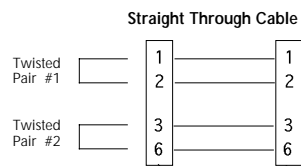
Fiber Optic Cable Recommended:	62.5 / 125 $\mu$ m multimode fiber
Fiber Optic Transmitter Power:	Minimum: -15.5 dBm
Fiber Optic Receiver Sensitivity:	Minimum : -36.9 dBm
Bit error rate:	$\leq 10^{-10}$
Maximum Cable Distance:	20 kilometers (66,000 feet)

### Copper Cable and Connector

Category 3 or better twisted-pair copper wire is required. Either shielded twisted-pair (STP) or unshielded twisted-pair (UTP) can be used. DO NOT USE FLAT OR SILVER SATIN WIRE.

#### CATEGORY 3:

Gauge	24 to 22 AWG
Attenuation	$\leq 11.5$ dB/100m @ 5-10 MHz
Maximum Number of Nodes	2 nodes
Maximum Cable Distance	100 meters (200 meters with better cable)
RJ-45 Pin-outs	Pin 1=TD+, Pin 2=TD-, Pin 3=RTD+, Pin 4=RD-



Twisted pair connection requires two active pairs configured as straight through. The two active pairs in an Ethernet™ network are pins 1 & 2 and pins 3 & 6. Use only dedicated wire pairs (such as blue/white & white/blue, orange/white & white/orange) for the active pairs.

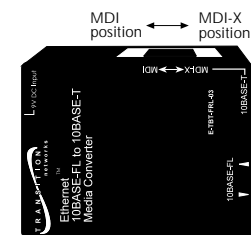
## INSTALLATION

### Set MDI/MDI-X Switch

NOTE: Straight-through/crossover 10BASE-T requirements are satisfied using the MDI/MDI-X switch with straight-through cable. See page 6 for cable configurations.

Using small flatblade screwdriver or similar tool and referring to label at front of media converter, set MDI/MDI-X switch position for site installation.

**10BASE-T cable connections between a hub and the media converter require the MDI/MDI-X switch to be set to MDI.**  
**10BASE-T cable connections between the media converter and a terminal, transceiver or NIC require the switch to be set to MDI-X**



### Install Cable

NOTE: See page 6 for cable specifications.

### COPPER

NOTE: KEEP TWISTED PAIR RUNS AS SHORT AS POSSIBLE.

- Locate or build 10BASE-T-compliant cables with straight-through or crossover configuration and with male RJ-45 plug connectors at both ends.
- Connect male RJ-45 plug connector at one end of cable to media converter RJ-45 jack connector.
- Connect male RJ-45 plug connector at other end of cable to 10BASE-T terminal device RJ-45 jack connector (using straight-through cable configuration) or to 10BASE-T hub RJ-45 jack connector (using crossover cable configuration).

### FIBER

- Locate or build 10BASE-FL-compliant fiber cable with male two-stranded TX to RX connectors at both ends.
- Connect male TX and RX cable connectors at one end of cable to TX and RX female connectors, respectively, on media converter.
- Connect male TX and RX cable connectors at other end of cable to RX and TX connectors of 802.3 compliant fiber device.

### Connect to Power

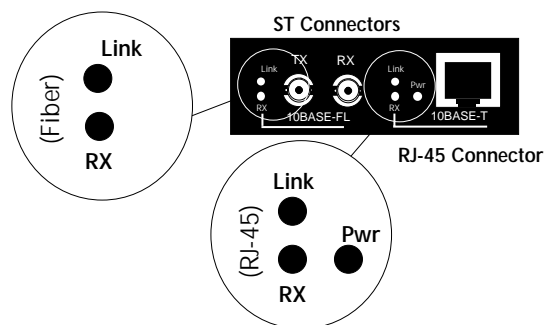
- Install power adapter cord at back of media converter.
- Connect power adapter plug to AC power.
- Verify that media converter is powered by observing illuminated LED(s).

## OPERATION

After installation, the media converter should function without operator intervention.

### Status LEDs

Use the status LEDs to monitor media converter operation in the network.



<b>Link</b>	<b>(near 10BASE-FL connector)</b> Steady green LED indicates good 10BASE-FL link and normal operation. Dark LED indicates lack of power OR downed 10BASE-FL link.
<b>RX</b>	<b>(Receive - near 10BASE-FL connector)</b> Flashing green LED indicates data reception on 10BASE-FL link.
<b>Link</b>	<b>(near 10BASE-T connector)</b> Steady green LED indicates good 10BASE-T link and normal operation. Dark LED indicates lack of power OR downed 10BASE-T link.
<b>RX</b>	<b>(Receive - near 10BASE-T connector)</b> Flashing green LED indicates data reception on 10BASE-T link.
<b>P(o)w(e)r</b>	Steady green LED indicates connection to external AC power.

## FAULT ISOLATION and CORRECTION

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 *P(ower)* LED on the media converter illuminated?**  
**NO**
  - Is the power adapter the proper voltage and frequency for AC outlet? NOTE: Refer to "Power Supply Requirements" on page 7.
  - Is the power adapter properly installed in the media converter and in the outlet?
  - Contact Technical Support: (800) 260-1312/(800) LAN-WANS.**YES**
  - Proceed to step 2.
- 2. Is the green 10BASE-T *Link* LED illuminated?**  
**NO**
  - Check twisted pair cables for proper connection.
  - Contact Technical Support: (800) 260-1312/(800) LAN-WANS.**YES**
  - Proceed to step 3.
- 3. Is the green 10BASE-FL *Link* LED illuminated?**  
**NO**
  - Check fiber cables for proper connection.
  - Verify that TX and RX cables on media converter are connected to RX and TX ports, respectively, on other device.
  - Contact Technical Support: (800) 260-1312/(800) LAN-WANS.**YES**
  - Proceed to step 4.
- 4. Is the amber 10BASE-T *RX* LED illuminated?**  
**NO**
  - Restart the workstation to restart the initialization process.
  - Contact Technical Support: (800) 260-1312/(800) LAN-WANS.**YES**
  - Proceed to step 5.
- 5. Is the amber 10BASE-FL *RX* LED illuminated?**  
**NO**
  - Restart the workstation to restart the initialization process.
  - Contact Technical Support: (800) 260-1312/(800) LAN-WANS.**YES**
  - Contact Technical Support: (800) 260-1312/(800) LAN-WANS.