

User's Guide

C4TEF10xx-10x

Slide-in-Module Media Converter

- **RS-232 to Fiber**
- **(4) T1/E1 to Fiber**

The C4TEF10xx-10x media converter is designed to be installed into a Transition Networks *PointSystem™* chassis and can extend signals from an RS-232 data port and up to four (4) T1/E1 network ports over fiber. The RS-232 and T1/E1 interfaces are independent of each other and the signals from these ports can be sent over the fiber interface simultaneously.

The C4TEF10xx-10x is designed to be installed in pairs. For example, install one C4TEF1011-100 as the local media converter and another C4TEF1011-100 as the remote media converter.

All C4TEF10xx-10x models have the following copper connectors:

Connector Type	Number	Description
RS-232	one (1)	6-pin, DIN serial, 3.2 m (10 ft.)*
T1	four (4)	RJ-48

The various fiber connectors are available on separate models. Both duplex and single mode fiber optic converters are available:

Part Number	Duplex Fiber-Optic - 100Base-FX
C4TEF1011-100	ST, 1300 nm multimode, 2 km (1.2 miles)*
C4TEF1013-100	SC, 1300 nm multimode, 2 km (1.2 miles)*
C4TEF1014-100	SC, 1310 nm single mode, 20 km (12.4 miles)*
C4TEF1015-100	SC, 1310 nm single mode, 40 km (24.8 miles)*
C4TEF1016-100	SC, 1310 nm single mode, 60 km (37.2 miles)*
C4TEF1017-100	SC, 1550 nm single mode, 80 km (49.7 miles)*
C4TEF1018-100	MT-RJ, 1300 nm multimode, 2 km (1.2 miles)*
C4TEF1029-10x	(single mode, single-fiber models are listed on page 2)

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

The **stand-alone** version of the media converter is **S4TEF10xx-10x**. For more information, see the user's guide on-line at: www.transition.com.

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C4TEF10xx-10x

Part Number	Fiber-Optic - single fiber, single mode, 100Base-FX
C4TEF1029-100	SC, 1310 nm (TX)/1550 nm (RX), 20 km (12.4 miles)*
C4TEF1029-101	SC, 1550 nm (TX)/1310 nm (RX), 20 km (12.4 miles)*
<i>C4TEF1029-100 and C4TEF1029-101 are intended to be installed in the same link where one is the local converter and the other is the remote converter.</i>	
C4TEF1029-102	SC, 1310 nm (TX)/1550 nm (RX), 40 km (24.8 miles)*
C4TEF1029-103	SC, 1550 nm (TX)/1310 nm (RX), 40 km (24.8 miles)*
<i>C4TEF1029-102 and C4TEF1029-103 are intended to be installed in the same link where one is the local converter and the other is the remote converter.</i>	

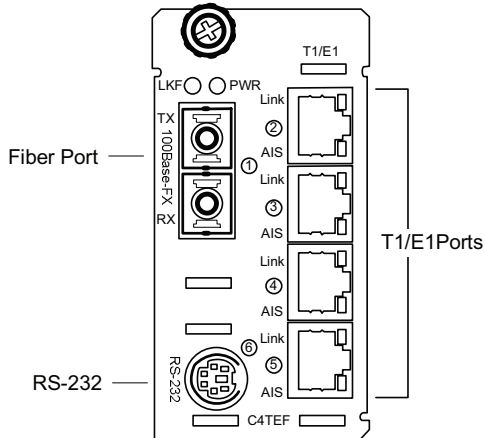
* Typical maximum cable distance. Actual distance is dependent upon the physical characteristics of the network. (TX) = transmit, (RX) = receive

Installation

NOTE: Due to proprietary communication over fiber, the C4TEF10xx-10x is required to be installed in pairs, where one is the local converter and the other is the remote converter.

Copper and Fiber Ports

The figure below illustrates the locations of the fiber port, the RS-232 port, and the four (4) T1/E1 ports.



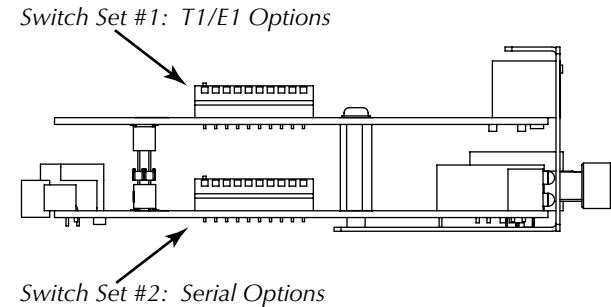
NOTE: An RS-232 cable with a 6-pin DIN connector and a DB-9 connector is included with the C4TEF10xx-10x media converter.

Installation -- Continued

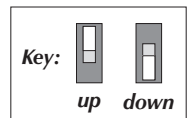
Configuration Switches

The C4TEF10xx-10x media converter has two (2) sets of configuration switches.

- Set #1 is on the upper circuit board and sets the **T1/E1 options**.
- Set #2 is on the lower circuit board and sets the **serial options**.



Use a flat blade screwdriver to set the switches as shown:



Switch Set #1 - T1/E1 Options

1, 2, 3, 4 - Line Settings

Switches 1, 2, 3, and 4 are used to setup the line settings for the T1/E1 ports. The selected setting applies to all four (4) T1/E1 channels.

1 2 3 4 DSX-1, 100 ohm, 0-133 ft. (0-40.5 m)	1 2 3 4 DS1, 100 ohm, 0 dB LBO
1 2 3 4 DSX-1, 100 ohm, 133-266 ft. (40.5-81 m)	1 2 3 4 DS1, 100 ohm, -7.5 dB LBO
1 2 3 4 DSX-1, 100 ohm, 266-399 ft. (81-122 m)	1 2 3 4 DS1, 100 ohm, -15 dB LBO
1 2 3 4 DSX-1, 100 ohm, 399-533 ft. (122-162 m)	1 2 3 4 DS1, 100 ohm, -22.5 dB LBO
1 2 3 4 DSX-1, 100 ohm, 533-655 ft. (162-200 m)	1 2 3 4 E1, 120 ohm
1 2 3 4 J1, 110 ohm, 0-655 ft. (0-200 m)	

Installation -- Continued

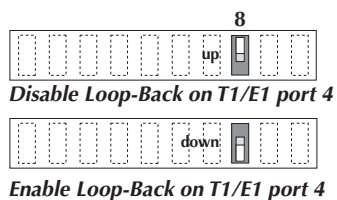
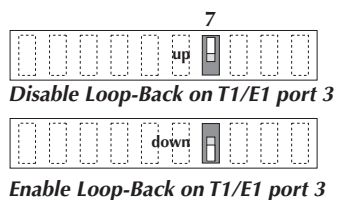
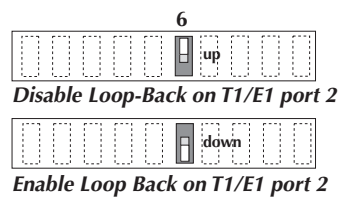
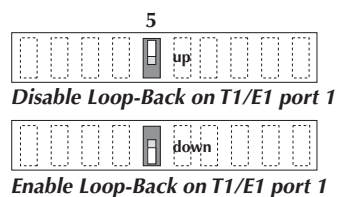
Switch Set #1 - T1/E1 Options

5, 6, 7, 8 - Loop-Back Settings

The loop-back setting is used for installation and network debugging procedures. Each of the T1/E1 ports can be individually set for loop-back mode:

- Switch 5 controls T1/E1 port 1
- Switch 6 controls T1/E1 port 2
- Switch 7 controls T1/E1 port 3
- Switch 8 controls T1/E1 port 4

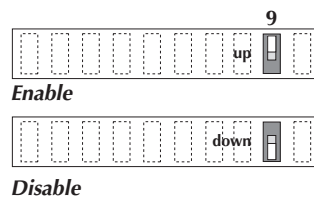
When the loop-back switch for a particular T1/E1 port is enabled, the port loops the signal from the receive port back to the transmit port. The loop-back test scenarios are described in detail on page 18.



9 - Transmit AIS

up - Enables the transmit AIS (Alarm Indication Signal) on loss of the carrier signal. This function is un-framed and applies to ALL channels, both copper and fiber.

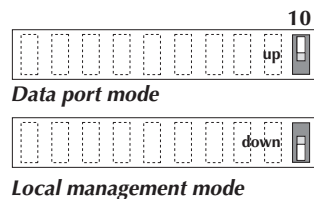
down - Disables the transmit AIS function.



10 - RS-232 Port Mode

up - Data port mode (normal operation). Transmits data to a desk top computer or other data collection device

down - Local (auxiliary) management mode. See the SNMP section (page 11) for the commands that are supported via the RS-232 connector.

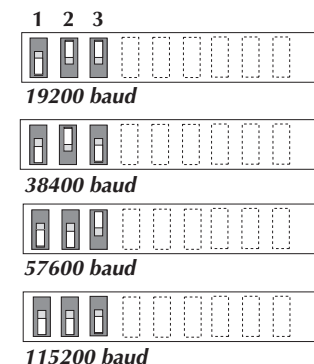
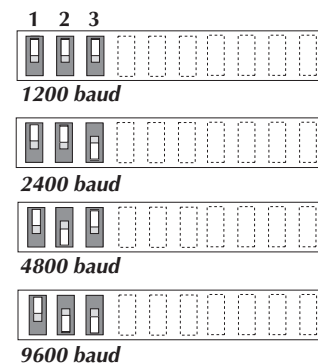


Installation -- Continued

Switch Set #2 - Serial Options

1, 2, 3 - Serial Connection Speed Line Settings

Switches 1, 2, and 3 on switch set #2 are used to set the serial connection speed.

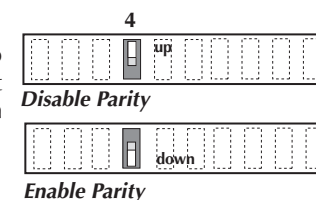


4. Enable / Disable Parity

When parity is enabled, an additional bit is added to an 8-bit signal to identify whether the signal is sent successfully. Use **switch 5** to send **odd** or **even** signal parity.

up - Disable parity.

down - Enable parity.

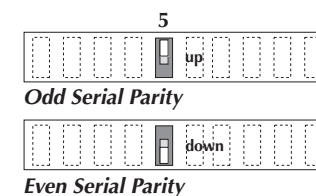


5. Parity Select

up - Select odd serial parity.

down - Select even serial parity.

This switch is inactive if **switch 4** is (up).



Installation -- Continued

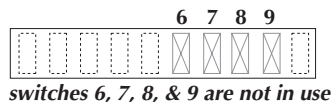
Switch Set #2 - Serial Options

6 - not in use

7 - not in use

8 - not in use

9 - not in use

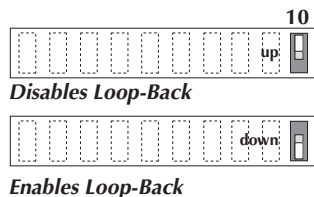


10 - Fiber Loop-Back

up - Disabled fiber loop-back.

down - Enabled fiber loop-back.

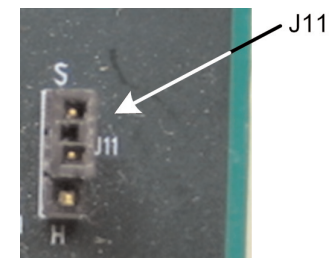
The loop-back setting is used for installation and network debugging procedures. When the fiber loop-back function is enabled, the fiber port loops all T1/E1 signals from the receive ports back to the transmit ports. The loop-back test scenarios are described in detail on page 17.



Installation -- Continued

Hardware/Software Jumper

- The hardware/software header J11 is located on the circuit board.
- Use a small needle-nose pliers to change the jumper position—currently in the software position.



Hardware The media converter mode is determined by the switch settings (see pages 3 - 6).



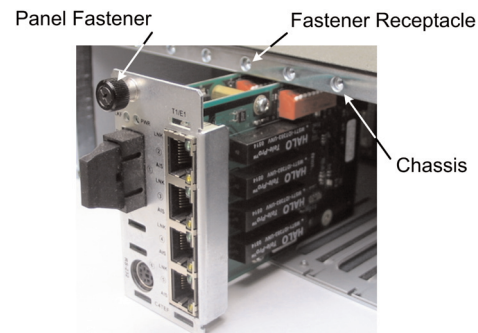
Software The media converter mode is determined by the most-recently saved, on-board microprocessor settings.



Install the Slide-in-Module

CAUTION: Wear a grounding device and observe electrostatic discharge precautions when installing the C4TEF10xx-10x slide-in-module media converter. **Failure to observe this caution could result in damage to, and subsequent failure of, the slide-in-module.**

- Carefully slide the slide-in-module into two adjacent installation slots, aligning the module with the installation guides.
- Ensure that the module is firmly seated inside the chassis.
- Push in and rotate the panel fastener screw clockwise to secure the module to the chassis front.



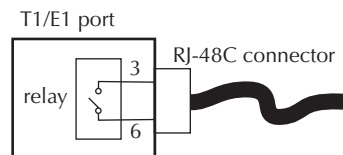
Installation -- Continued

Install the T1/E1 Cable

1. Locate or build ITU compliant copper cable with straight-through RJ-48 connectors installed at both ends. (See page 14 for the proper cable specifications for your network application.)
2. Connect the RJ-48 connector at one end of the cable to one of the T1/E1 ports on the C4TEF10xx-10x media converter.
3. Connect the RJ-48 connector at the other end of the cable to the T1/E1 port on the other device.

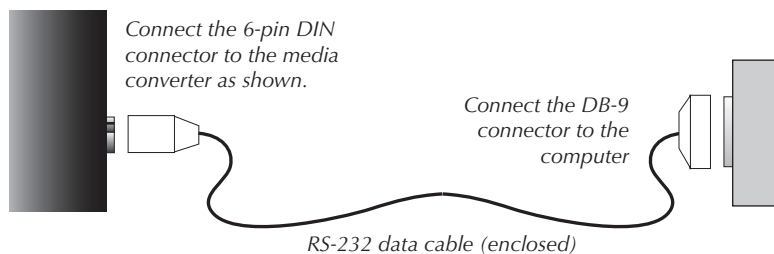
Dry-Contact Relay

All four T1/E1 ports are equipped with an RJ-48 dry-contact relay. The relay closes if the **power** is lost or if any of the individual **T1/E1 links** are lost. The operational rating on pins 3 and 6 are 0-30 VDC, 100 mAmp (maximum).



Install the RS-232 Data Cable

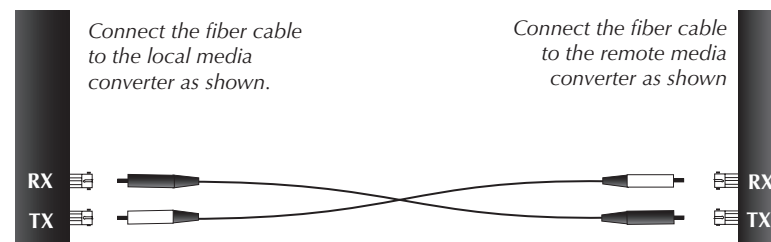
1. Use the enclosed RS-232 data cable with a male, DIN 6-pin connector on one end and a DB-9 connector installed on the other end.
2. Connect the DIN 6-pin connector to the RS-232 port on the C4TEF10xx-10x media converter.
3. Connect the DB-9 connector at the other end of the cable to the RS-232 port on a computer or other device that is used to collect and display data.



Installation -- Continued

Install the Fiber Cable

1. Locate or build ITU compliant fiber cable with male, two-stranded TX to RX connectors installed at both ends.
2. Connect the fiber cables to the local C4TEF10xx-10x 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 remote C4TEF10xx-10x media converter as described:
 - Connect the male **TX** cable connector to the female **RX** port.
 - Connect the male **RX** cable connector to the female **TX** port.



Operation

Fiber Network LEDs

Use the status LEDs next to the fiber port to monitor the media converter and the fiber network connections.

LKF (fiber link)

On = Fiber link connection.

PWR (power)

On = Connection to external AC or DC power.

T1/E1 LEDs

Each T1/E1 link has a pair of LEDs embedded in the RJ-48 connector that monitor the status of the link.

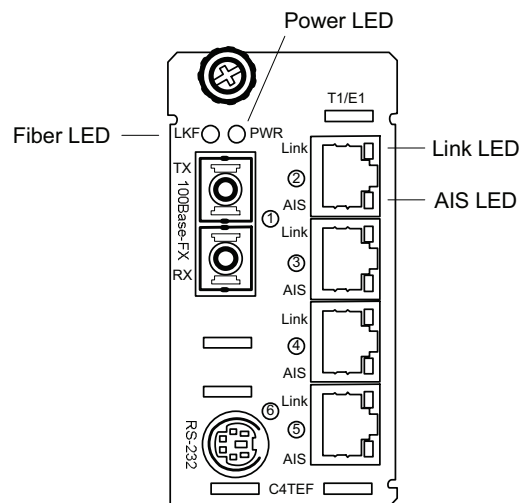
LNK LED (green)

On = T1/E1 link detected.

Off = T1/E1 signal lost or no signal.

AIS LED (amber)

On = AIS (Alarm Indication Signal) detected. Failure of the device connected to the T1/E1 port.



Operation -- Continued

Remote Management Function

The stand-alone version of this media converter, the S4TEF10xx-10x, can be remotely managed when connected via fiber cable to a local C4TEF10xx-10x slide-in-module media converter that is installed in a managed Transition Networks PointSystem™ chassis. (See the list of SNMP commands below.)

SNMP

See the on-line documentation that comes with Transition Networks FocalPoint™ software for applicable commands and usage.

Use SNMP at an attached terminal or at a remote location to monitor the media converter by monitoring:

- Media converter power
- Fiber link status
- Copper link status for each T1/E1 (AIS, link)
- RS-232 status (speed, bits, parity, stop)
- All hardware switch settings
- AIS detected copper link
- Model #, serial #, PIC revision, HW revision, group string, connectors

Also, use SNMP to enter network commands that:

- Local and remote fiber loop-back.
- Local and remote T1/E1 loop-back on each channel
- T1/E1 line options (DS1, DSX-1, J1, D1, AIS)
- RS-232 settings (speed, bits, parity, stop)
- T1/E1 monitor modes and loop-back modes
- Boot-load firmware (local unit only)

The local (auxiliary) factory maintenance interface via the RS-232 connector supports the following:

- Switch selection for the RS-232 interface
- Access to all local and remote status information
- Perform all local and remote commands
- Operate at selected baud rates

Cable Specifications

The physical characteristics must meet or exceed ITU 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
C4TEF1011-100	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 dB
C4TEF1013-100	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 dB
C4TEF1014-100	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 dB
C4TEF1015-100 (long haul)	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 dB
C4TEF1016-100 (extra long haul)	1310 nm single mode
C4TEF1017-100 (long wave length)	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 dB
C4TEF1018-100	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 dB
C4TEF1029-100	1310 nm (TX)/1550 nm (RX) simplex
C4TEF1029-101	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
C4TEF1029-102	1310 nm (TX)/1550 nm (RX) simplex
C4TEF1029-103	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

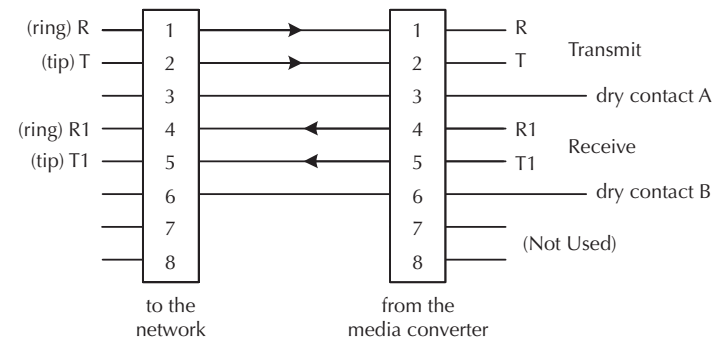
The fiber optic transmitters on this device meets Class I Laser safety requirements per IEC-825/CDRH standards and complies with 21 CFR1040.10 and 21CFR1040.11.

Cable Specifications -- Continued

T1/E1 Cable

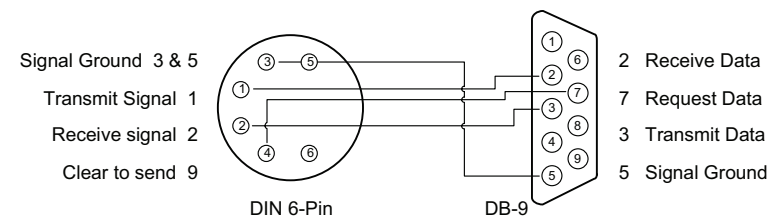
Category 3: (minimum requirement)

Connector:	RJ-48C
Electrical network connection:	Single 4-wire (Tip/Ring - Tip1/Ring1)
Mechanical arrangement:	8-position miniature modular jack
Usage:	1.544 Mb/s access lines
Interface codes:	04DU9 (any applicable)
Cable type:	
Long Haul T1:	0db, -7.5db, -15db, -22db
E1:	E1 3.0V, 120 ohm
J1:	0-655', 110 ohm
DSX-1:	0-133', 133-266', 266-399', 399-533', 533-655', 100 ohm



RS-232 Cable (included)

Connectors:	6-pin DIN and DB-9
Gauge:	24 to 22 AWG
Attenuation:	20 dB/1000 ft. @ 10 MHz
Differential characteristic impedance:	100 ohm +/- 10% @ 10 MHz
Maximum cable distance:	<10 ft (3.2 m) @ 56 kb/s or higher



Technical Specifications

For use with Transition Networks Model C4TEF10xx-10x or equivalent.

Standards	G.703, AMI/B8ZS/HDB3	
Data Rate	Fiber: 100 Mb/s	
Dimensions	3.4" x 5.0" x 1.75" (86 mm x 182 mm x 43 mm)	
Weight	6 oz. (181 g) (approximate)	
Power Consumption	6.0 watts	
Environment	Tmra*:	0 to 50°C (32 to 122°F)
	Storage Temperature:	-40 to 85°C (-40 to 185°F)
	Humidity:	5 to 95%, non condensing
	Altitude:	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 Transition Networks PointSystem™ chassis in which this slide-in-module will be installed.

The information contained in this user's guide is subject to change. For the most up-to-date information on the C4TEF10xx-10x media converter, see the user's guide on-line at: www.transition.com.

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 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.

Troubleshooting

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 illuminated?

NO

- Is the slide-in-module installed properly in the chassis?
- Is the power cord properly installed in the chassis?
- Does the external power source provide power?
- Contact Tech Support: 1-800-260-1312, Int'l: 00-1-952-941-7600.

YES

- Proceed to step 2.

2. Is the "LKF" LED illuminated?

NO

- Check the fiber cables for proper connection.
- Verify that the TX and RX cables on the local media converter are connected to the RX and TX ports, respectively, on the remote media converter.
- Contact Tech Support: 1-800-260-1312, Int'l: 00-1-952-941-7600.

YES

- Proceed to step 3.

3. Is the "LNK" LED on a T1port (with a copper cable installed) illuminated?

NO

- Check the copper cable connected to that T1/E1 port for proper connection.
- Contact Tech Support: 1-800-260-1312, Int'l: 00-1-952-941-7600.

YES

- Proceed to step 4.

4. Is the "AIS" LED on a T1/E1 port (with a copper cable installed) illuminated?

YES

- The device connected to the T1/E1 port has failed. Correct the device failure.
- Contact Tech Support: 1-800-260-1312, Int'l: 00-1-952-941-7600.

NO

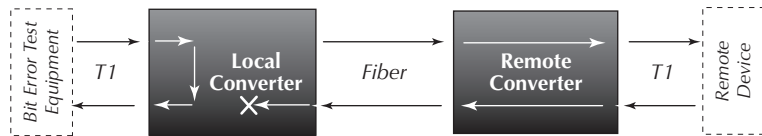
- Proceed to step 5.

Troubleshooting -- Continued

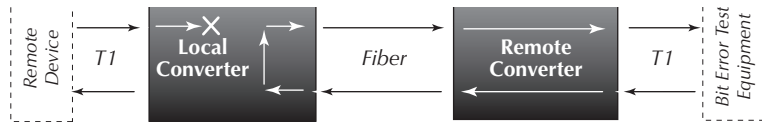
5. Is data transfer failing on one of the T1/E1 ports?

YES

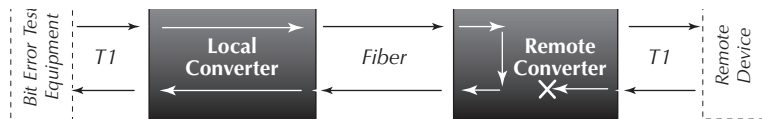
- Verify the **local T1/E1 connection at the local converter** by starting a local loop-back at the local converter:
 - HW mode: set the local converter to T1/E1 loop-back (see page 4).
 - SW mode: enter the **local** T1/E1 loop-back command at the **local** converter.
- Use a bit error test unit to run a bit error test.



- Verify the **remote T1/E1 connection at the local converter** by starting a remote loop-back at the local converter:
 - SW mode: enter the **remote** T1/E1 loop-back command at the **local** converter. (HW mode is not available.)
- Use a bit error test unit to run a bit error test.



- Verify the **remote T1/E1 connection at the remote converter** by starting a remote loop-back at the remote converter:
 - SW mode: enter the **remote** T1/E1 loop-back command at the **remote** converter. (HW mode is not available.)
- Use a bit error test unit to run a bit error test.



- Verify the **local T1/E1 connection at the remote converter** by starting a local loop-back at the remote converter:
 - HW mode: set the remote converter to T1/E1 loop-back (see page 4).
 - SW mode: enter the **local** T1/E1 loop-back command at the **remote** converter.
- Use a bit error test unit to run a bit error test.

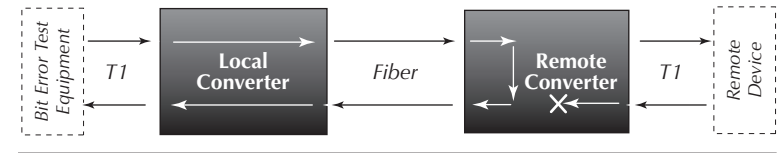


Troubleshooting -- Continued

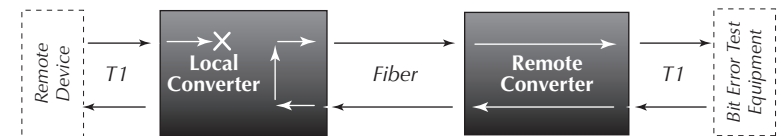
6. Is data transfer failing on the fiber port?

YES

- Verify the local fiber connection by starting a remote fiber loop-back:
 - HW mode: set the remote converter to fiber loop-back (see page 7).
 - SW mode: enter the remote fiber loop-back command.
- Use a bit error test unit to run a bit error test.



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

NO

- 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


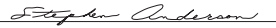
6475 City West Parkway

Minneapolis, MN 55344, U.S.A.

telephone: 952-941-7600

toll free: 800-526-9267

fax: 952-941-2322

		Declaration of Conformity	
Name of Mfg:	Transition Networks	6475 City West Parkway, Minneapolis MN 55344 U.S.A.	
Model:	C4TEF10xx-10x Series Media Converters		
Part Number(s):	C4TEF1011-100, C4TEF1013-100, C4TEF1014-100, C4TEF1015-100, C4TEF1016-100, C4TEF1017-100, C4TEF1018-100, C4TEF1029-100, C4TEF1029-101, C4TEF1029-102, C4TEF1029-103		
Regulation:	EMC Directive 89/336/EEC		
Purpose:	To declare that the C4TEF10xx-10x to which this declaration refers is in conformity with the following standards.		
	EN 55022:1994 Class A; EN 55024:1998+A1+A13564:2002; FCC Part 15 Subpart B; 21 CFR subpart J; EN 61000-3-2:2001; EN 61000-4-2, 4-3, 4-4, and 4-6		
	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, 2007 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 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.

VCCI Class 1 Compliance

This equipment is in the 1st Class category (information equipment to be used in commercial and/or industrial areas) and conforms to the standards set by the Voluntary Control Council For Interference by Data Processing Equipment and Electronic Office Machines aimed at preventing radio interference in commercial and/or industrial areas. When used in a residential area or in an adjacent area thereto, interference may be caused to radio and TV receivers, etc. Read the instructions for correct handling.

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従って、住宅地域またはその隣接した地域で使用すると、ラジオ、テレビジョン受信機等に受信障害を与えることがあります。

取扱説明書に従って正しい取り扱いをして下さい。

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