TRANSITION NETWORKS®

User's Guide

CSDTF10xx-12x

Slide-in Card (SIC)

- **T1/E1/J1with Remote Management**
- **Copper to Fiber**

Transition Networks CSDTF10xx-12x series SIC Devices encode and decode T1, E1, and J1 twisted-pair copper signals over fiber optic cable to extend the distance and reliable transmission of high-speed T1, E1, or J1 data traffic. The Device is frame independent *(as ESF vs. D4)* and supports all common line codes *(e.g., AMI, B8ZS, HDB3)*.

The CSDTF1029-12x series SIC Devices are single fiber, designed for installation in pairs. For example, install one CSDTF1029-12x as the "local" Device and another CSDTF1029-12x as the "remote" Device.

Part Number	Port One - Copper	Port Two - Duplex Fiber-Optic
CSDTF1011-120	RJ-45 1.5 km *(5,000 feet)**	ST, 850 nm multimode 2 km *(1.2 miles)**
CSDTF1012-120	RJ-45 1.5 km *(5,000 feet)**	ST, 1310 nm single mode 8 km *(4.8 miles)**
CSDTF1013-120	RJ-45 1.5 km *(5,000 feet)**	SC, 850 nm multimode 2 km *(1.2 miles)**
CSDTF1014-120	RJ-45 1.5 km *(5,000 feet)**	SC, 1310 nm single mode 20 km *(12.4 miles)**
CSDTF1015-120	RJ-45 1.5 km *(5,000 feet)**	SC, 1310 nm single mode 40 km *(24.8 miles)**
CSDTF1016-120	RJ-45 1.5 km *(5,000 feet)**	SC, 1310 nm single mode 60 km *(37.3 miles)**
CSDTF1017-120	RJ-45 1.5 km *(5,000 feet)**	SC, 1550 nm single mode 80 km *(49.7 miles)**

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

Note: The CSDTF10xx-12x requires a CSU *(Channel Service Unit)* between the Device and the Public Telephone Network.

Part Number	Port One - Copper	Port Two - Duplex Fiber-Optic
CSDTF1022-120	RJ-45 1.5 km *(5,000 feet)**	ST, 1310 nm single mode 15 km *(9.3 miles)**
CSDTF1027-120	RJ-45 1.5 km *(5,000 feet)**	ST, 1300 nm multimode 5 km *(3.1 miles)**

Part Number	Port One - Copper	Port Two - Single Fiber-Optic
CSDTF1029-120**	RJ-45 1.5 km *(5,000 feet)**	SC, 1310nm *(TX)*/1550 nm (RX) single mode, 20 km *(12.4 miles)**
CSDTF1029-121**	RJ-45 1.5 km *(5,000 feet)**	SC, 1550nm (TX)/1310 nm (RX) single mode, 20 km *(12.4 miles)**
CSDTF1029-122**	RJ-45 1.5 km *(5,000 feet)**	SC, 1310nm (TX)/1550 nm (RX) single mode, 40 km *(24.8 miles)**
CSDTF1029-123**	RJ-45 1.5 km *(5,000 feet)**	SC, 1550nm (TX)/1310 nm (RX) single mode, 40 km *(24.8 miles)**

(TX) = transmit (RX) = receive

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

** CSDTF1029-120 and -121; -122 and -123 are intended to be installed in the same network where one is the local Device and the other is the remote Device.

Note: The SSDTF10xx-12x model is the stand-alone version of the Device. For more information, see the SSDTF10xx-12x user's guide 33449 on-line at: www.transition.com.

Installation

CAUTION: Wear a grounding device and observe electrostatic discharge precautions when setting the jumper and switches. Failure to observe this caution could result in damage or failure of the Device.

Set the Hardware/Software Jumper

- The hardware/software 3-pin header (J9) is located on the circuit board labeled "H" and "S." Jumper on Pins 1&2 = hardware mode; Pins 2&3 = software mode.

- Use a small needle-nose pliers or similar tool to move the jumper to the desired position.

Hardware	The Device mode is determined by the switch setting.
Software	The Device mode is determined by the most-recently saved, on-board microprocessor setting.
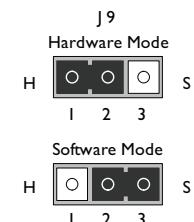
Set the MDI/MDI-X switch *(hardware mode only)*

The MDI/MDI-X switch is located on the side of the Device. This switch allows the network administrator to use a straight-through cable in installations where a crossover configuration cable is required. Use a small, flat-blade screwdriver or a similar tool to set the recessed switch.
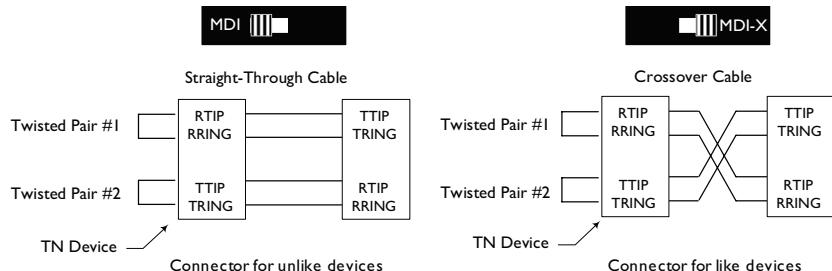
Set the switch to MDI if using a straight-through copper cable to connect two unlike devices.

Set the switch to MDI-X if using a crossover copper cable to connect two like devices.

Installation — Continued

Set the loop-back switch

Hardware mode:

The loop-back switch is located on the front panel of the SIC. The switch is used for installation and network debugging procedures.

To set the switch, use a small flat-blade screwdriver or a similar tool *(see the drawing to the right)*.

|		
CL	*(Copper loop-back)*	Enable loop-back on the local copper interface.
--	*(Center position)*	Normal operation.
FL	*(Fiber loop-back)*	Enable loop-back on the local fiber interface.

Software Mode:

If both Devices are under software control, the network administrator can initiate the loop-back test on the copper interface *(local/remote)* or on the fiber interface *(local/remote)*. These four loop-back test scenarios are described in detail in the Troubleshooting section.

Set the configuration switches

The configuration switches are located on the side of the SIC. The DIP switches are used to configure the SIC for various network conditions.

There are two sets *("left" is SW 4, and "right" is SW 3)* each with four switches labeled "1" through "4" as shown below.

Use a small, flat-blade screwdriver or a similar tool to set the recessed switches.
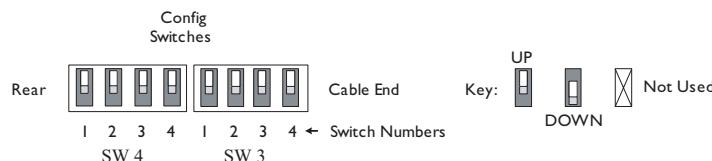
Transmit all ones *(positions 1 & 2, left set)*

The transmit all ones function allows the insertion of an "all ones" pattern on the copper and/or fiber interface when the signal detect is lost, creating an alarm condition at the device connected to the interface.

Switch 1: Copper – transmit all ones

UP - Disables the transmit all ones function on the copper interface.

DOWN - Transmits an "all ones" pattern on the copper interface when the signal detection on the fiber interface is lost.

Coax - Transmit All Ones - Disabled

Coax - Transmit All Ones - Enabled
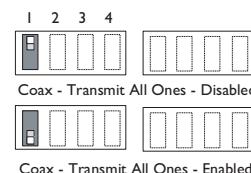
Installation — Continued

Switch 2: Fiber – transmit all ones

UP - Disables the transmit all ones function on the fiber interface.

DOWN - Transmits an "all ones" pattern on the fiber interface when the signal detect on the copper interface is lost.

Fiber - Transmit All Ones - Disabled

Fiber - Transmit All Ones - Enabled
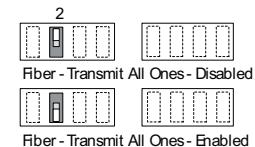
Select T1 configuration *(switches 3 & 4, left set)*

Use switches 3 and 4 to configure the Device for T1 configuration.

Switch 3: long haul/short haul *(T1 only)*

UP - Short haul.

DOWN - Long haul.

Short Haul (T1 only)

Long Haul (T1 only)
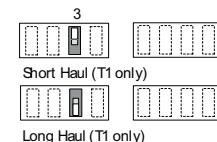
Switch 4: T1 / E1

UP - T1 configuration.

Set switches 1, 2, 3, and 4 on the right set for the required network cable settings. *(See "Cable settings for T1 configuration" section.)*
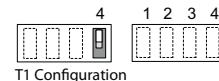
T1 Configuration

Select E1 configuration *(switch 4, left set)*

Use switch 4 to configure the Device for E1 configuration.

Switch 4: T1 / E1

DOWN - E1 configuration.

The default network cable setting is 3.0 V, 120 ohm.

Switch 3 on the left set, and switches 1, 2, 3, and 4 on the right set are disabled.

E1 — 3.0V 120 Ohm Cable
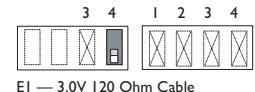
Installation — Continued

Cable settings for T1 configuration *(right switch set)*

T1/long-haul signal

Use switches 3 and 4 on the left switch set to select T1/long-haul signal. See the drawings below.

Use switches 1 and 2 on the right switch set to select the proper network cable settings. The drawings below show the four options.

(T1/Long-Haul)   -22.5 db 100 ohm cable

-15.0 db 100 ohm cable

-7.5 db 100 ohm cable

0.0 db 100 ohm cable
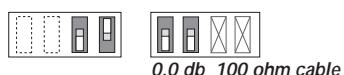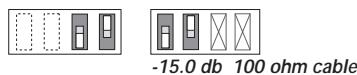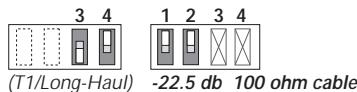
(Switches 3 and 4 on the right switch set are not used for configuring T1 / long-haul signals.)

T1/short-haul signal

Use switches 3 and 4 on the left switch set to select T1/short-haul signal *(see the drawing below)*.

Use switches 1, 2 and 3 on the right switch set to select the proper network cable settings. The following drawings list the options.

(T1/Short Haul)   DSX-1   162.5 - 200 m
(533 - 655') 100 ohm cable

DSX-1   121.6 - 162.5 m
(399 - 533') 100 ohm cable

Installation — Continued

DSX-1   81 - 121.6 m
(266 - 399') 100 ohm cable

DSX-1   40.5 - 81 m
(133 - 266') 100 ohm cable

DSX-1   0 - 40.5 m
(0 - 133') ANSI T1.403
100 ohm cable

or

DSX-1   0 - 40.5 m
(0 - 133') 100 ohm cable

DSX-1   6.0 V
100 ohm cable

Disable
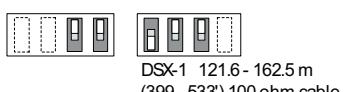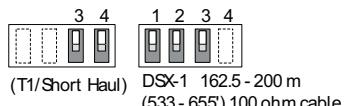
Enable
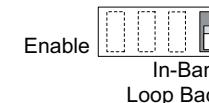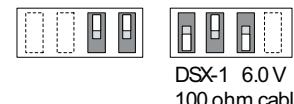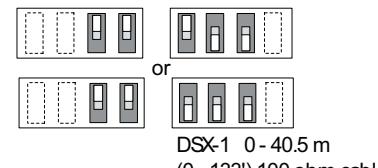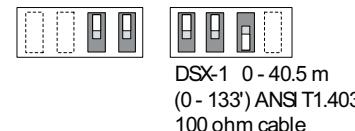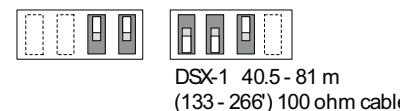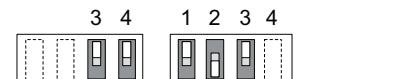
In-Band
Loop Back

Note: T1/short-haul modes. Any other settings not illustrated above will default to DSX-1 0-133' 100 ohm cable mode. J1 is a newly supported mode.

Installation — Continued

In-band loop back code detection

Enables detection and loop back of the fiber interface based on NIU Facility 2 (FAC2) loop back codes. Certain testers, e.g., T-BERD 2310 can send in-band loop back codes into the local TP interface, which are transmitted to the remote Device through the fiber. The remote Device can detect and react to this activate and de-activate the loop back codes. For detection, these codes must be sent for 5 seconds minimum. Bit 5 loop codes are as follows:

- Loop UP code: 5-bit '11000'
- Loop DOWN code: 5-bit '11100'

Data paths after the remote Device receives the loop activate code *(5-bit 11000)* for 5 seconds with SW 8 in the DOWN position is as shown below.

Install the SIC

CAUTION: Wear a grounding device and observe electrostatic discharge precautions when installing the CSDTF10xx-12x SIC. Failure to observe this caution could result in damage or failure of the Device.

1. Carefully slide the Device into the installation slot, aligning the module with the slot guides.
2. Ensure that the module is firmly seated to the backplane of the chassis.
3. Push in and rotate the attached panel fastener screw clockwise to secure the module to the chassis.
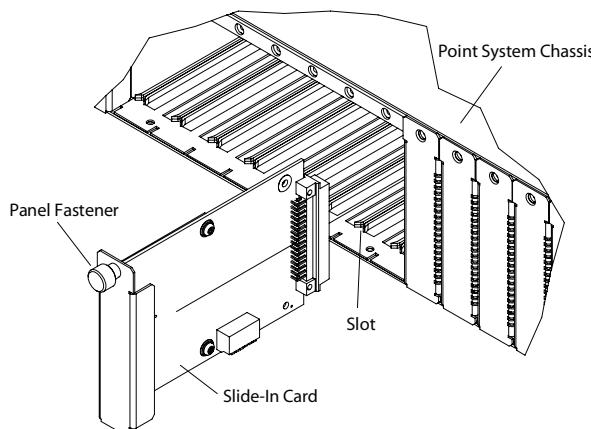
Installation — Continued

Install the copper cable

1. Locate a twisted-pair copper cables with an RJ-45 connector at both ends.
2. Ensure that the MDI/MDI-X switch is set according to the network conditions.
3. Connect the RJ-45 connector at one end of cable to the RJ-45 port on the Device.
4. Connect the RJ-45 connector at the other end of the cable to the RJ-45 port on the other device *(switch, workstation, etc.)*.
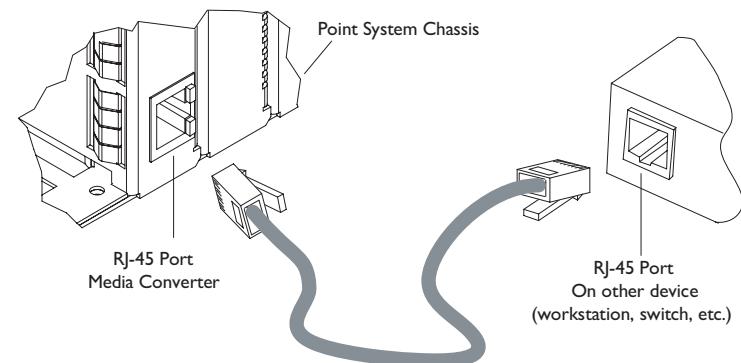
Install the fiber cable

1. Locate a cable with male, two-stranded TX to RX connectors installed at both ends.
2. Connect the fiber cables to the local CSDTF10xx-12x Device 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 CSDTF10xx-12x Device as described:
   - Connect the male TX cable connector to the female RX port.
   - Connect the male RX cable connector to the female TX port.
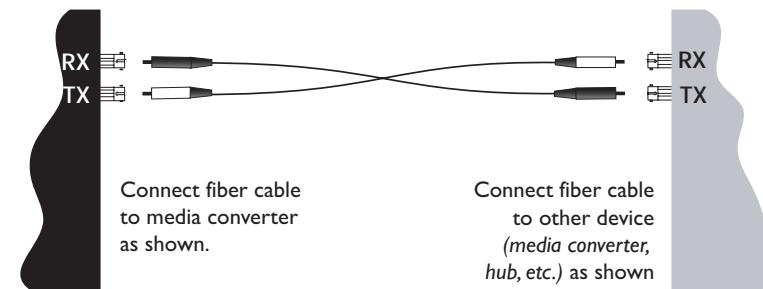
Operation

After installation, the Device should function without operator intervention. Use the LEDs to monitor the Device operation in the network.

SDC *(Signal Detect/Copper)* LED	ON = the twisted-pair copper link is up. Blinking = port is in loop back mode enabled by front panel switch.
SDF *(Signal Detect/Fiber)* LED	ON = the fiber link is up. Blinking = port is in loop back mode enabled by front panel switch. Blinking = in-band loop back codes on the fiber port—DIP SW 8 Down.
PWR *(Power)* LED	ON = the Device is connected to external power.
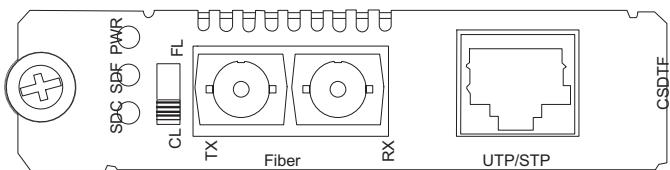
Dry-contact relay

The RJ-45 copper port has a dry-contact relay that closes if the power signal detect/copper, or signal detect/fiber is lost. The operational rating on pins 3 and 6 is 0-30VDC, 100mA *(max)*.
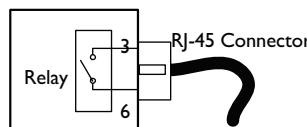
Remote management function

A remote stand-alone Device *(revision SSDTF10xx-120 or higher)* can be managed when connected to a local CSDTF10xx-120 Device. Please note that in a managed network, both the local and remote Devices must be set to "software" mode.

Operation — Continued

SNMP

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

- Device power and hardware switch settings
- Copper link and fiber link status *(local/remote)*
- AIS detected on copper link and fiber link *(local/remote)*

Also, use SNMP to enter network commands that:

- Bootload the firmware *(local only)*
- Enable/disable loop-back on the copper link *(local/remote)*
- Enable/disable loop-back on the fiber link *(local/remote)*
- Enable/disable Transmit All Ones on the fiber link when the copper link is down *(local/remote)*
- Enable/disable Transmit All Ones on the copper link when the fiber link is down *(local/remote)*
- Power-down the Device

See the on-line documentation that comes with Transition Networks FocalPoint™ software for commands and usage at www.transition.com.

Cable Specifications

Fiber Cable

Single mode fiber *(recommended)*:	9 μm
Multimode fiber *(recommended)*:	62.5/125 μm
Multimode fiber *(optional)*:	100/140, 85/140, 50/125 μm

CSDTF1011-120   850 nm multimode
Fiber Optic Transmitter Power:	min: -19.0 dBm	max: -14.0 dBm
Fiber Optic Receiver Sensitivity:	min: -32.5 dBm	max: -14.0 dBm
Link Budget:	13.5 dB	

CSDTF1012-120   1310 nm single mode
Fiber-optic Transmitter Power:	min: -27.0 dBm	max: -10.0 dBm
Fiber-optic Receiver Sensitivity:	min: -34.0 dBm	max: -14.0 dBm
Link Budget:	7.0 dB	

CSDTF1013-120   850 nm multimode
Fiber Optic Transmitter Power:	min: -19.0 dBm	max: -14.0 dBm
Fiber Optic Receiver Sensitivity:	min: -32.5 dBm	max: -14.0 dBm
Link Budget:	13.5 dB	

CSDTF1014-120   1310 nm single mode
Fiber-optic Transmitter Power:	min: -19.0 dBm	max: -14.0 dBm
Fiber-optic Receiver Sensitivity:	min: -34.0 dBm	max: -3.0 dBm
Link Budget:	15.0 dB	

CSDTF1015-120   1310 nm single mode
Fiber Optic Transmitter Power:	min: -8.0 dBm	max: -2.0 dBm
Fiber Optic Receiver Sensitivity:	min: -38.0 dBm	max: -8.0 dBm
Link Budget:	30.0 dB	

CSDTF1016-120   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 dB	

CSDTF1017-120   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	

CSDTF1022-120   1310 nm single mode
Fiber Optic Transmitter Power:	min: -15.0 dBm	max: -5.0 dBm
Fiber Optic Receiver Sensitivity:	min: -25.0 dBm	max: -14.0 dBm
Link Budget:	10.0 dB	

CSDTF1027-120   1300 nm multimode
Fiber Optic Transmitter Power:	min: -19.0 dBm	max: -15.0 dBm
Fiber Optic Receiver Sensitivity:	min: -32.5 dBm	max: -14.0 dBm
Link Budget:	13.5 dB	

# *Cable Specifications — Continued*

Fiber cable

CSDTF1029-120   1310 nm (TX) / 1550 nm (RX) simplex
CSDTF1029-121   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	

CSDTF1029-122   1310 nm (TX) / 1550 nm (RX) simplex
CSDTF1029-123   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 meet Class I Laser safety requirements per IEC-825/CDRH standards and comply with 21 CFR1040.10 and 21CFR1040.11.

Copper cable

Connector:	RJ-45
Elec. network connection:	Single 4-wire *(Tip/Ring - Tip1/Ring1)*
Mechanical arrangement:	8-position miniature modular jack
Usage:	1.544 Mb/s or 2.0478 Mb/s access lines
Interface codes:	04DU9 *(any applicable)*

Cable type
Long Haul T1:	0db, -7.5dp, -15db, -22db
E1 *(120 ohm)*:	E1 3.0V, 120
J1 *(110 ohm)*:	0-655', 110
DSX-1 *(100 ohm)*:	0-133', 133-266', 266-399', 399-533', 533-655'
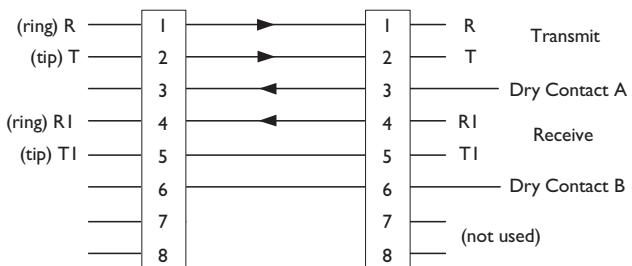
Technical Specifications

For use with Transition Networks Model CSDTF10xx-12x or equivalent.

Dimensions:	3.4" x 5" x 0.87" *(86 mm x 182 mm x 22 mm)*
Shipping Weight:	1 lb *(454 g)* approximately
Power Consumption:	3.7 Watts
MTBF:	Greater than 41,660 MIL-HDBK-217F hours
	Greater than 114,580 Bellcore7 V5.0 hours
Environment:	0°C to 60°C *(32°F to 140° F)*
Storage Temp:	-15°C to 65°C *(5°F to 149°F)*
Humidity:	10% to 90%, non condensing
Warranty:	Lifetime

The information in this user's guide is subject to change. For the most up-to-date information on the CSDTF10xx-12x Device, view 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 the 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.

NOTICE: 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.

Troubleshooting

If the Device fails, isolate and correct the failure by determining the answers to the following questions and then taking the indicated action:

1. Is the PWR *(Power)* LED illuminated?
   NO
   - Is the Device properly installed in the chassis?
   - Is the power cord properly installed in the chassis and at the external power source?
   - Is the external power source active?
   - Contact Tech Support: 1-800-260-1312, Int'l: 00-1-952-941-7600.
   YES
   - Proceed to step 2.

2. Is the SDC *(Signal Detect / Copper)* LED illuminated?
   NO
   - Check the twisted-pair copper cable for the proper connection.
   - Check the MDI/MDI-X switch for the correct twisted-pair copper cable configuration.
   - Contact Tech Support: 1-800-260-1312, Int'l: 00-1-952-941-7600.
   YES
   - Proceed to step 3.

3. Is the SDF *(Signal Detect / Fiber)* LED illuminated?
   NO
   - Check the fiber cables for proper connection.
   - Verify that the TX and RX cables on the local Device are connected to the RX and TX ports respectively on the remote Device.
   - Contact Tech Support: 1-800-260-1312, Int'l: 00-1-952-941-7600.
   YES
   - Proceed to step 4.

4. Is data transfer failing?

    YES

    - Verify the local copper connection by starting a local copper loop-back test *(hardware mode: set the loop-back switch on the local Device to "CL", software mode: enter the local copper loop-back command)* and then use a bit error test unit to run a bit error test.
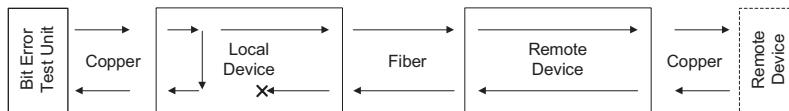

    - Verify the local fiber connection by starting a remote fiber loop-back test *(hardware mode: set the loop-back switch on the remote Device to "FL", software mode: enter the remote fiber loop-back command)* and then use a bit error test unit to run a bit error test.
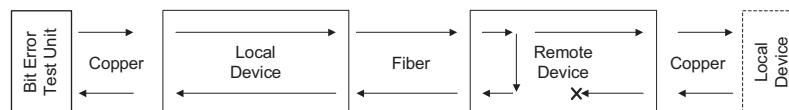
    - Verify the remote copper connection by starting a remote copper loop-back test *(hardware mode: set the loop-back switch on the remote Device to "CL", software mode: enter the remote copper loop-back command)* and then use a bit error test unit to run a bit error test.
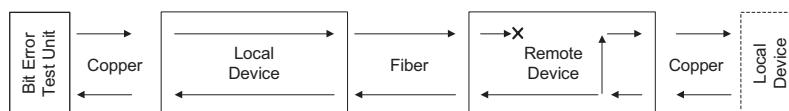
    - Verify the remote fiber connection by starting a local copper loop-back test *(hardware mode: set the loop-back switch on the local Device to "FL", software mode: enter the local fiber loop-back command)* and then use a bit error test unit to run a bit error test.
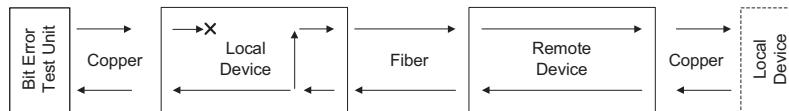

    - Contact Tech Support: 1-800-260-1312, Int'l: 00-1-952-941-7600.

    NO
    - Contact Tech Support: 1-800-260-1312, Int'l: 00-1-952-941-7600.

Declaration of Conformity

TRANSITION NETWORKS®   **Declaration of Conformity**

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

Model number(s):   CSDTF1011-120, CSDTF1012-120, CSDTF1013-120, CSDTF1014-120, CSDTF1015-120, CSDTF1016-120, CSDTF1017-120, CSDTF1022-120, CSDTF1027-120, CSDTF1029-120, CSDTF1029-121, CSDTF1029-122, CSDTF1029-123

Purpose: To declare that the CSDTF10xx-12x 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; IEC 60950-1:2005; 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   April 2012
Stephen Anderson, Vice-President of Engineering   Date

Contact Us

Technical support

Technical support is available 24 hours a day.
U.S.A. 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.
http://www.transition.com/TransitionNetworks/TechSupport/Contact.aspx

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

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 Fäll ist der Benutzer für Gegenmaßnahmen verantwortlich.

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.

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.

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.