User Guide
xTGFF4x4x-100

10 Gigabit Ethernet fiber-to-fiber Media Converter

- **Two-port XFP to XFP**
- **Two-port SFP+ to SFP+**

CTGFF4x4x-100

STGFF4x4x-100

Introduction

Transition Networks' 10 Gigabit Ethernet fiber-to-fiber media converter is a two-port 10G pluggable media converter, supporting a variety of XFP and SFP+ modules, which allows network designers to utilize the module to meet their network requirements. The media converter can use Transition Networks' or third party MSA compatible 10G XFP or SFP+ modules.

Copper-to-fiber conversion is also supported with the use of a 10GBase-CX4 XFP module in one of the ports. The converter provides 3R (reamplify, reshape, and retime) optical signal regeneration.

Contents

Models

Transition Networks' (TN) SFP+ and XFP modules fully comply with Multi-Sourcing Agreement (MSA).

| Part Number*	Port One - Fiber Optic	Port Two - Fiber Optic
STGFF4747-100	(2) Port 10GBase-xx open XFP	Open XFP
STGFF4848-100	(2) Port 10GBase-xx open SFP+	Open SFP+
CTGFF4747-100	(2) Port 10GBase-xx open XFP	Open XFP
CTGFF4848-100	(2) Port 10GBase-xx open SFP+	Open SFP+

* For models and technical data see www.transition.com/TransitionNetworks/Landing/SFP-XFP/SFP-XFP.aspx.

Features

- Supports 3R (reamplify, reshape, and retime) regeneration, which relays or regenerates optical signals in three domains: power, shape and time.
- Supports DMI MSA SFF-8472.
- Supports these interface standards:
  - 10GBased-LRM (Long Reach Multimode)
  - 10GBased-SR
  - 10GBased-LR
  - 10GBased-ER
 - 10GBased-ZR

Link-Pass Through

The Link Pass-Through feature allows the media converter to monitor the fiber and copper RX (receive) ports for loss of signal. If the RX signal drops (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.
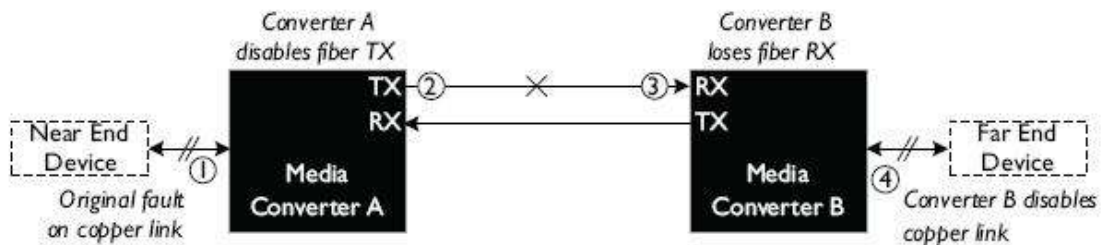
Automatic Link Restore

After a link failure condition has been corrected, Transition Networks' converters will automatically re-establish the link in all network conditions.

There is no need to reset devices; these TN converters will automatically reestablish the link when connected to switches if link was broken.
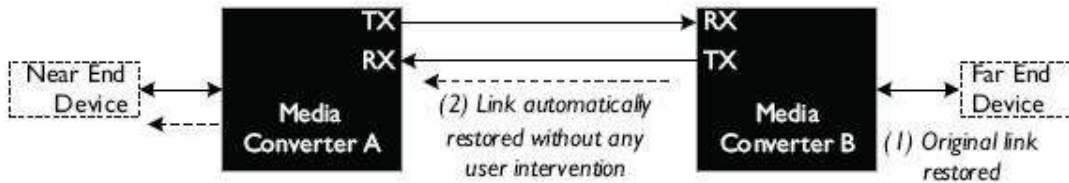
Loopback

Troubleshooting: There are two loopback scenarios pertaining to whether the switch is in Software or Hardware mode determined by the jumper on header J19.
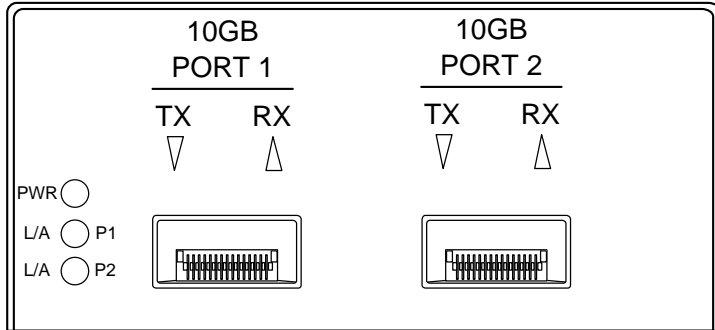
- In Software mode with DIP SW4 is ignored, you can select either port to start the loopback via a GUI interface.
- In Hardware mode with DIP SW4 DOWN, puts both ports into loopback. See Illustration below.
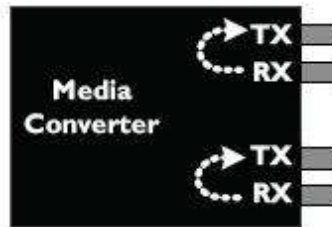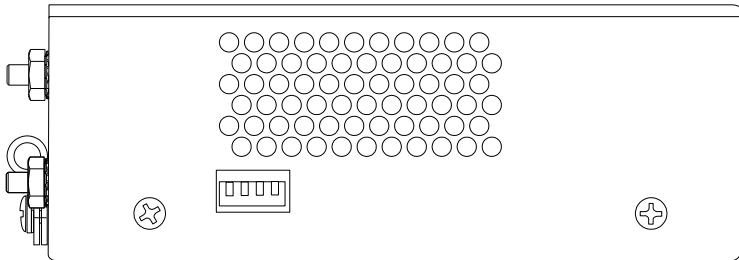

Loopback RX to TX:
DIP SW4 DOWN; in Hardware
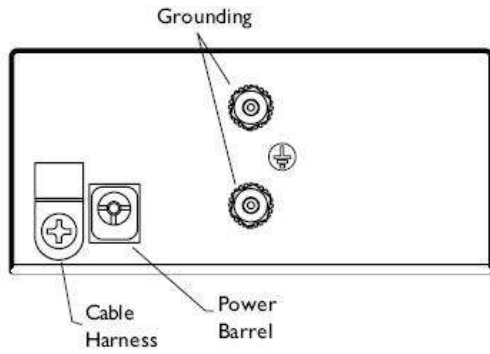Mode (Port 1 + Port 2)

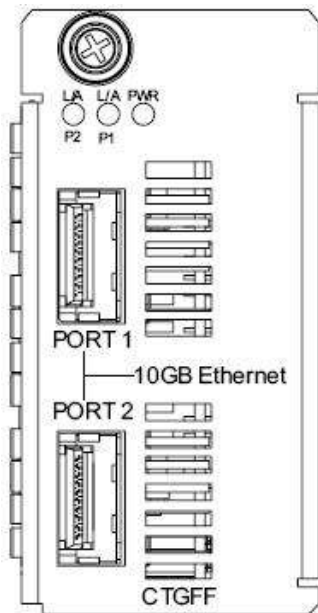# Hardware Description
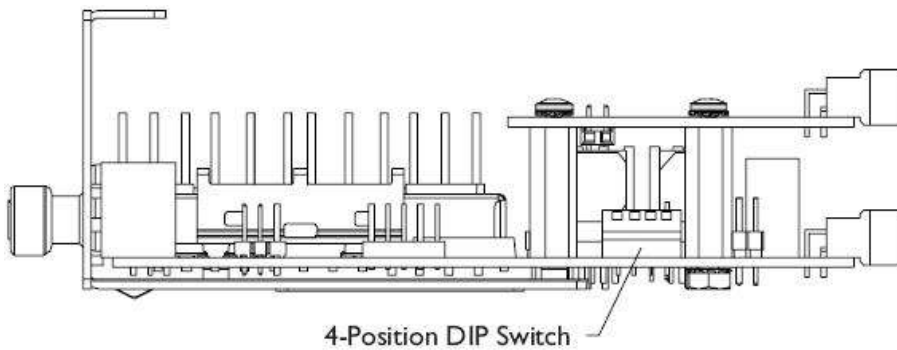
Standalone Front panel

Standalone Side view

Standalone Rear view

Slide-in module front


Slide-in module side

Installation

Install slide-in module

CAUTION: Slots in the PointSystem™ chassis without a slide-in module <u>MUST</u> have a protective plate covering the empty module slot for FCC Class B compliance.

The media converter slide-in module may be installed in any slot of the chassis, and in any order.

To install the slide-in module:
1. Remove two slot covers from the chassis where you want to install the module.
2. Carefully slide the module into the slot, aligning the module's circuit board with the slot guides.
3. Ensure that the module is firmly seated in the chassis slot.
4. Secure the module by pushing its fastener in and turning it clockwise.
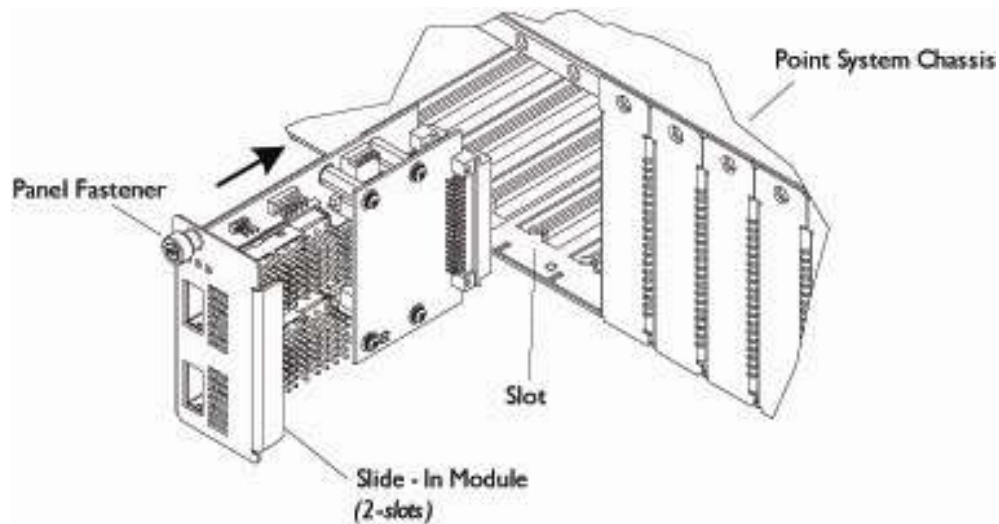
Management

The CTGFF4x4x-100 is powered by the Point System chassis. After power up, the module can be SNMP managed. Through the backplane, the management module communicates with each module in the chassis and sends requests for status and configuration. Each module has a set of predefined features that are known to the management module so that the user can receive current statuses and can 'enable' or 'disable' all configurable features. The information about these manageable features is included in the MIB document so the management application software can access this document and ask for a particular feature to be changed accordingly. The user communicates with the management module over the Ethernet cloud or directly through the serial port.

Grounding the standalone module

The STGFF4x4x-100 standalone modules come equipped with grounding lugs. See Figure below.
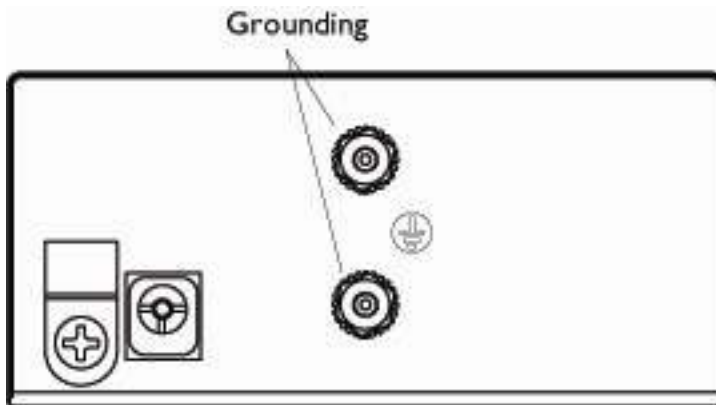
**Important**: The installer must consult local/national electrical codes and regulations or facility grounding requirements to determine required grounding of the module. They require a grounding conductor wire terminated with a two-hole, compression-type grounding connector.

The 2-hole grounding connector and grounding wire (*copper only*) is NOT included and must be provided by the customer/installer. See Figure below.
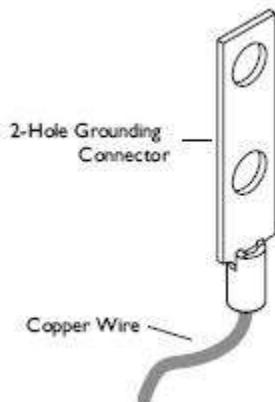
Grounding wire size

The wire size of the Protective Earthing (*ground*) conductor should be greater than or equal to the wire size of the power source conductors (*wires*). The power-source conductor wire size is installation dependent and sized to accommodate acceptable IR losses between the power source and the device terminal block. The device terminal block accommodates #6 wire lugs. A #6 wire lug typically terminates #16 - #20 wire, with #18 being the most common size.

Installing standalone module

To install the standalone module, do the following:

1. Locate and attach the four rubber feet to the bottom of the standalone module chassis.
2. Place the standalone module:
   - Away from direct sunlight
   - Away from direct exposure to water
   - Near an AC outlet

Installing power

1. Plug the power supply's cord into an AC power outlet.
2. Plug the power supply's barrel connector into the standalone module See Illustration below.
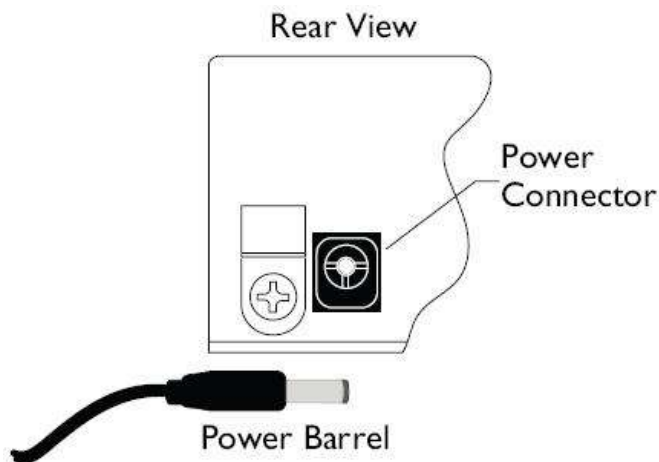
Note: On power up, the **P** (Power) LED turns ON green and the fan becomes operational.

Operation

Status LEDs

Use the LEDs to monitor the status of the media converter. See Figure and Table below for LED descriptions.

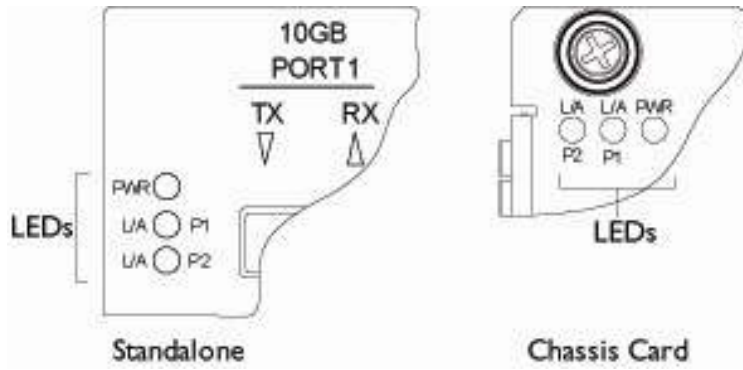| LED	Description
Power (PWR)	ON Green - Power
Link/Activity (L/A)/P1	ON Green - Link; Blink - Activity
Link/Activity(L/A)/ P2	ON Green - Link; Blink - Activity

DIP switches

The DIP switches can be used to configure device operation. In most cases, the factory default settings provide optimal configuration. DIP Switch may require different settings for operating mode changes or for troubleshooting purposes. See Figure below.
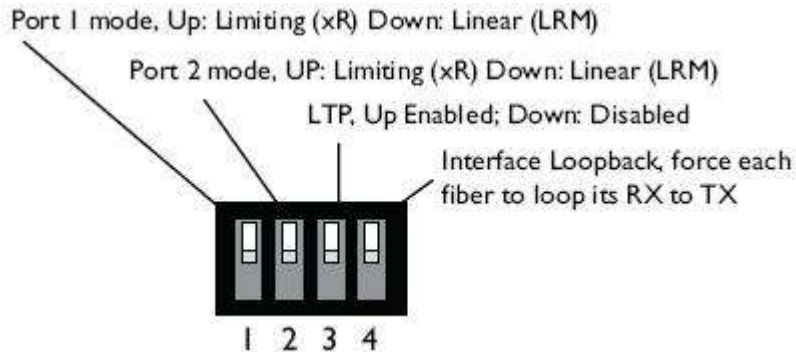
Switch settings

SW1:   Port 1 mode, UP = Limiting (xR); DOWN = Linear, only if LRM SFP+.

SW2:   Port 2 mode, UP = Limiting (xR); DOWN = Linear, only if LRM SFP+.

SW3:   Link Pass Through (LPT) UP = Enabled; DOWN = Disabled.

SW4:   Interface loop back forces each fiber to loop its signal (RX to TX).

Note: SW1 and SW2 are only used when the interface is an LRM SFP+ module. When an XFP module is used these switches are ignored.

Slide-In Module Only: Jumper J19 - Hardware / Software settings

Note: This applies to the CTGFF4x4x-100, Slide-In Module ONLY.

The 3-pin header J19 is located on the circuit board. Use a small needle-nose pliers to position the jumper. (shorting plug)
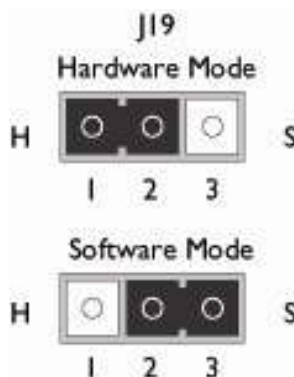
Diagnostic Monitoring Interface (DMI)

The following DMI port screen and explanation table provide brief definitions of the DMI support offered on the XFP and SFP+ Transceiver Modules. For further information, please see the help option on the CPSMM-xxx, SNMP agent or Focal Point Transition Networks' GUI.

Variable Name	Description
DMI Rx Power	Measured receive optical power in microwatts and in decibels relative to 1mW.
DMI Rx Power Alarm	Alarm status of measured receive optical power.
DMI Temp	Internally measured temperature of transceiver in degrees C and degrees F.
DMI Temp Alarm	Alarm status for internally measured temperature of the transceiver.
DMI Bias Current	Measured transmit bias current in microamperes (uA).
DMI Bias Alarm	Alarm status for measured transmit bias current for the interface.
DMI Tx Power	Measured transmit power in microwatts and in decibels relative to 1mW.
DMI Tx Power Alarm	Alarm status of measured transmit power.
Rx Power Intrusion Threshold	Instructs the converter to stop passing traffic when the receive power drops below the new threshold. This feature is sometimes referred to as 'Intrusion Detection,' since tapping into a fiber to intercept traffic leads to a reduction in receive power. This value can be entered in microwatts or in decibels relative to 1mW. **Note**: This feature is not available on all devices.

Installing transceiver modules

To install the transceiver module, do the following:

1. Position the transceiver at the installation slot.
2. Carefully insert the transceiver fully into the slot (L/A LED will turn ON green).

Fiber cable physical characteristics

The fiber cable physical characteristics must meet or exceed IEEE 802.3ae specifications:

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

WARNING: Visible and invisible laser radiation when open. DO NOT stare into laser beam or view directly with optical instruments. Failure to observe this warning could result in damage to your eyes or blindness.

Connecting fiber cables

To install the fiber cable, do the following:

1. Locate the appropriate fiber cable.
2. Install the cable (RX to TX) as shown below.
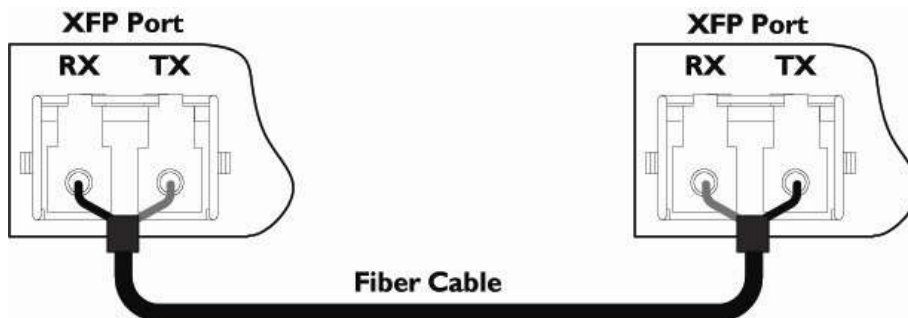
Application Examples

A substantial set of technical documents, white papers, case studies, etc. are available on the Transition Networks web site at www.transition.com.

Technical Specifications

Applies to Transition Networks Model xTGFF4x4x-100 or equivalent.

Standards	Multisource Agreement (MAS) XFP and SFP plus
Dimensions	
Slide-in module	1.72"W x 5.0"D x 3.4"H (*44 mm x 127mm x 86mm*)
Standalone module	3.6"W x 5.0"D x 1.75"H (*91.44 mm x 127mm x 44mm*)
Data Rate	10 Gbps
Shipping Weight	2 lbs (*91 g*) (*approximate*)
MTBF	Chassis converter cards:
	Greater than 250,000 MIL-HDBK-217F Hours
	Greater than 687,500 Bellcore Hours
	Standalone cards bundled with a typical 50,000 hour power supply:
	Greater than 41,660 MIL-HDBK-217F Hours
	Greater than 114,500 Bellcore Hours
Power Consumption	7.0 watts (*typical*)
Environment	Tmra*: 0°C to 40°C (*32°F to 104°F*)
	Storage Temp: -40°C to 85°C (*-40°F to 185°F*)
	Humidity: 10 to 90%, non-condensing
	Altitude: 0 to 10,000 feet
Warranty	Lifetime

Note: The CTGFF4x4x-100 media converters are for use in Transition Networks' model Point System chassis only. See the Point System chassis manuals at www.transition.com for information.

Note: For the most up-to-date information on the xTGFF4x4x-100 media converter, view the on-line user's guide at www.transition.com.

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

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 fault by determining the answers to the following questions and then taking the indicated action:

1. Is the P (power) LED on the media converter illuminated?

> **NO**

> **Standalone only**:

- Is the power adapter properly installed in the media and in the AC outlet?
- Is the power adapter the correct type?
- Is the fan operational (moving air)?

> **Slide-in module only**:

- Is the media converter inserted properly into the chassis?
- Is the power cord properly installed in the chassis and at the external power source?
- Does the external power source provide power?
- Contact Technical Support: US/Canada: 1-800-260-1312, International: 00-1-952-941-7600.

> **YES**

- Proceed to step 2.

2. Is the L/A LED illuminated?

> **NO**

- Is there and XFP/SFP+ module installed in the media converter?
- Is the L/A LED ON green (or blinking when transmitting data)?
- 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 Technical Support: US/Canada: 1-800-260-1312, International: 00-1-952-941-7600.

> **YES**

- Proceed to step 3.

3. Is the L/A LED blinking?

> **NO**

- Remove and reinsert the slide-in module to restart the initialization process for the module.

> **Standalone only**:

- Remove and reinsert the barrel connector of the power adapter to restart the initialization process for the standalone device.
- Contact Technical Support: US/Canada: 1-800-260-1312, International: 00-1-952-941-7600.

> **YES**

- Contact Technical Support: US/Canada: 1-800-260-1312, International: 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 at 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: xTGFF4x4x-100 Series Media Converters

Part Number(s): xTGFF4747-100, xTGFF4848-100

Purpose: To declare that the xTGFF4x4x-100 to which this declaration refers is in conformity with the following standards.

EMC Directive 2004/108/EC; EN 55022:2006+A1:2007 Class A; EN55024:1998+A1:2001+A2:2003; EN61000-3-2; EN61000-3-3; 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 equipment specified above conforms to the above Directive(s) and Standard(s).

Stephen Anderson, Vice-President of Engineering

March, 2011

Date

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

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 EGMitgliedstaaten verstösst gegen die jewelligen 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	Notes
A	5/18/11	Initial release.
B	8/15/13	Add application example note, update MTBF information, and change format.

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