T R A N S I T I O N
n e t w o r k s

User's Guide

CGETF10xx-10x

Slide-in-Module Media Converter

- *Gigabit Ethernet*
- *Copper to Fiber*
- *1000Base-T to 1000Base-SX/LX*

Transition Networks CGETF10xx-10x Gigabit Ethernet media converter connects 1000Base-T shielded or unshielded twisted-pair copper cable to 1000Base-SX or 1000Base-LX, fiber-optic cable. The CGETF10xx-10x is also designed to be installed in the Transition Networks *PointSystem™* chassis.

Part Number	Port One - Copper	Port Two - Duplex Fiber-Optic
CGETF1013-105	RJ-45 1000Base-T 100 m *(328 ft)**	SC, 1000Base-SX, 850 nm multimode 300 m *(984 ft)** *(62.5/125 µm cable)* 500 m *(1,640 ft)** *(50/125 µm cable)*
CGETF1014-105	RJ-45 1000Base-T 100 m *(328 ft)**	SC, 1000Base-LX, 1310 nm single mode 10 km *(6.2 miles)**
CGETF1015-105	RJ-45 1000Base-T 100 m *(328 ft)**	SC, 1000Base-LX, 1310 nm single mode 25 km (15.5 miles)*
CGETF1017-105	RJ-45 1000Base-T 100 m *(328 ft)**	SC, 1000Base-LX, 1550 nm single mode 65 km *(40.4 miles)**
CGETF1018-105	RJ-45 1000Base-T 100 m *(328 ft)**	MT-RJ, 1000Base-SX, 850 nm multimode 300 m *(984 ft)** *(62.5/125 µm cable)* 500 m *(1,640 ft)** *(50/125 µm cable)*
CGETF1024-105	RJ-45 1000Base-T 100 m *(328 ft)**	SC, 1000Base-SX, 1300 nm extended multimode, 2 km *(1.2 miles)** **Note:** 62.5/125 µm *(fiber only)*
CGETF1035-105	RJ-45 1000Base-T 100 m *(328 ft)**	SC, 1000Base-LX, 1550 nm single mode 125 km *(77.5 miles)**
CGETF1039-105	RJ-45 1000Base-T 100 m *(328 ft)**	LC, 1000Base-SX, 850 nm multimode 300 m *(984 ft)** *(62.5/125 µm cable)* 500 m *(1,640 ft)** *(50/125 µm cable)*

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

NOTE: The stand-alone version of the media converter is SGETF10xx-10x. For more information, see the SGETF10xx-10x user's guide on-line at: www.transition.com.

Part Number	Port One - Copper	Port Two - Single Fiber-Optic
CGETF1029-105	RJ-45 1000Base-T 100 m *(328 ft)**	SC, 1000Base-LX, 1310 TX/1550 RX single mode, 20 km *(12.4 miles)**
CGETF1029-106	RJ-45 1000Base-T 100 m *(328 ft)**	SC, 1000Base-LX, 1550 TX/1310 RX single mode, 20 km *(12.4 miles)**
	The CGETF1029-105 and the CGETF1029-106 are to be installed in the same network, where one is the local converter and the other is the remote converter.	
CGETF1029-107	RJ-45 1000Base-T 100 m *(328 ft)**	SC, 1000Base-LX, 1310 TX/1550 RX single mode, 40 km *(24.8 miles)**
CGETF1029-108	RJ-45 1000Base-T 100 m *(328 ft)**	SC, 1000Base-LX, 1550 TX/1310 RX single mode, 40 km *(24.8 miles)**
	The CGETF1029-107 and the CGETF1029-108 are to be installed in the same network, where one is the local converter and the other is the remote converter.	

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

Installation

CAUTION: Wear a grounding device and observe electrostatic discharge precautions when setting the jumper and the 4-position switch and when installing the CGETF10xx-10x media converter into the *PointSystem™* chassis. Failure to observe this caution could result in damage to, and subsequent failure of, the media converter.
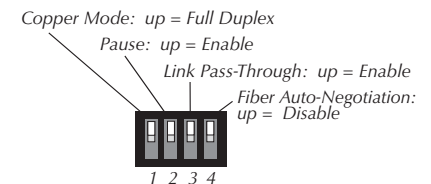
Set the 3-position jumper

- The jumper is located on the media converter circuit board.
- Use small needle-nosed pliers or a similar device to set the jumper.
- Refer to the drawing below for the jumper positions.

Hardware	The media converter mode is determined by the 4-position switch settings *(as described on page 3)*.	H ◯ ◯ ● S *Hardware Mode*
Software	The media converter mode is determined by the most-recently saved, on-board microprocessor settings.	H ● ◯ ◯ S *Software Mode*

Installation -- Continued

Set the 4-position switch

- The 4-position switch is located on the side of the media converter.
- Use a small flat blade screwdriver to set the recessed switches.

Copper Mode: up = Full Duplex
Pause: up = Enable
Link Pass-Through: up = Enable
Fiber Auto-Negotiation: up = Disable

1 2 3 4

1. Twisted-Pair Full/Half Duplex Mode
    up   = Full-Duplex on the copper link *(see page 6)*.
    down = Half-Duplex on the copper link *(see page 6)*.

2. Pause
    up   = Enable Pause *(see page 7)*.
    down = Disable Pause.

3. Link Pass-Through
    up   = Enable Link Pass-Through *(see page 6)*.
    down = Disable Link Pass-Through.

4. Fiber Auto-Negotiation
    up   = Disable Auto-Negotiation for the fiber link *(default setting)*.
    down = Enable Auto-Negotiation for the fiber link.

If the CGETF10xx-10x is connected via fiber to another CGETF10xx-10x, both media converters must have the fiber Auto-Negotiation setting disabled *(switch 4 = up)*. Otherwise, the fiber-linked media converters will not link up.

When Fiber Auto-Negotiation is disabled *(default setting)*:
Switches 1, 2 and 3 will function only if Fiber Auto-Negotiation is disabled. The settings for Twisted-Pair Full/Half Duplex, Pause, and Link Pass-Through can be set as needed using switches 1, 2 and 3.

When Fiber Auto-Negotiation is enabled:
Switches 1, 2, and 3 will not function and the media converter adopts the settings for Twisted-Pair Full/Half Duplex, Pause, and Link Pass-Through from the media converter at the other end of the fiber cable.

Fiber Auto-Negotiation allows the fiber interface to detect and subsequently advertise the support abilities from the remote device. It is supported only when the fiber is connected to a device with a negotiating port. The process is as follows:
1. The fiber interface detects the support abilities from the remote partner.
2. These abilities are passed to the twisted-pair interface and advertised.
3. Once the twisted-pair interface has a link at the highest common ability, it passes the result to the fiber interface.
4. The fiber interfaces then start advertising these abilities. At this point, the link between the fiber and the negotiating port is complete.

Installation -- Continued

Install the slide-in-module

CAUTION: Slots in the PointSystem™ chassis without a slide-in-module installed MUST have a protective plate covering the empty slot for Class A compliance.

To install the CGETF10xx-10x media converter slide-in-module:

1. Locate an empty installation slot on the *PointSystem™* chassis.

2. Carefully slide the slide-in-module into the installation slot, aligning the module with the installation guides.

3. Ensure that the slide-in-module is firmly seated inside the chassis.

4. Push in and rotate the panel fastener screw *(attached to the slide-in-module)* clockwise to secure the slide-in-module to the chassis front.

The slide-in-module is powered through the Transition Networks PointSystem™ chassis.

Panel Fastener Screw
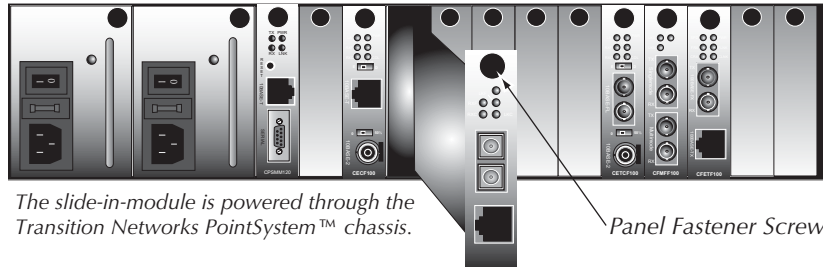
Install the Fiber Cable

1. Locate or build 1000Base-SX/LX compliant fiber cable with male, two-stranded TX to RX connectors installed at both ends.

2. Connect the fiber cables to the CGETF10xx-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 other device (another media converter, hub, etc.) as described:
   • Connect the male TX cable connector to the female RX port.
   • Connect the male RX cable connector to the female TX port.

Connect the fiber cable to the media converter as shown.

Connect the fiber cable to the other device (media converter, hub, etc.) as shown

RX
TX

RX
TX
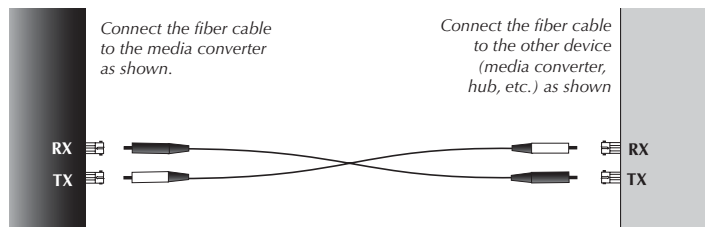
Installation -- Continued

Install the copper cable

1. Locate or build 1000Base-T compliant copper cables with male, RJ-45 connectors installed at both ends.

2. Connect the RJ-45 connector at one end of the cable to the RJ-45 port on the CGETF10xx-10x media converter.

3. Connect the RJ-45 connector at the other end of the cable to the RJ-45 port on the other device *(switch, workstation, etc.)*.
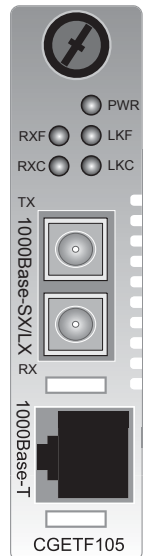
RJ-45 port on the media converter

RJ-45 port on the other device (switch, work station, etc.)

Operation

Status LEDs

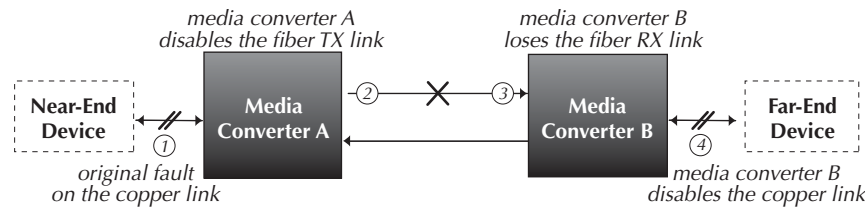Use the status LEDs to monitor the CGETF10xx-10x media converter operation in the network.

PWR	*(Power)*	ON =	Connection to external AC power.
LKF	*(Fiber link)*	ON =	Fiber link connection.
LKC	*(Copper link)*	ON =	Copper link connection.
RXF	*(Fiber receive)*	Flashing =	Reception of data on the fiber link.
RXC	*(Copper receive)*	Flashing =	Reception of data on the copper link.

PWR
RXF   LKF
RXC   LKC

TX
1000Base-SX/LX
RX
1000Base-T

CGETF105

Operation - Continued

Link Pass-Through

The Link Pass-Through feature allows the media converter to monitor both the fiber and copper RX (receive) ports for loss of signal. In the event of a loss of an RX signal (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.

media converter A
disables the fiber TX link

media converter B
loses the fiber RX link

Near-End Device — Media Converter A — ② ✕ ③ — Media Converter B — Far-End Device

original fault on the copper link

media converter B disables the copper link

Full-Duplex network

In a full-duplex network, maximum cable lengths are determined by the type of cables that are used. See pages 1 and 2 for the cable specifications for the different CGETF10xx-10x models.

The 512-Bit Rule does not apply in a full-duplex network.

Half-Duplex network *(512-Bit Rule)*

In a half-duplex network, the maximum cable lengths are determined by the round trip delay limitations of each Fast Ethernet collision domain. *(A collision domain is the longest path between any two terminal devices, e.g. a terminal, switch or router.)*

The 512-Bit Rule determines the maximum length of cable permitted by calculating the round-trip delay in bit-times (BT) of a particular collision domain. If the result is less than or equal to 512 BT, the path is good.

For more information on the 512-Bit Rule, see the white paper titled "Collision Domains" on the Transition Networks website at: www.transition.com

Operation

Pause

The pause feature can improve network performance by allowing one end of the link to signal the other to discontinue frame transmission for a set period of time to relieve buffer congestion.

In Hardware mode, the pause feature can be set to
- Disable *(i.e., no pause)*
- Enable *(i.e., symmetrical pause)*

In Software mode, the pause feature can be set to one of four settings:
- Disable *(i.e., no pause)*
- Symmetrical pause
- Asymmetric TX *(transmit)* pause
- Asymmetric RX *(receive)* pause

Enable the pause feature if it is present on ALL network devices attached to the media converter(s). Otherwise, disable the pause feature.

SNMP

Use SNMP at an attached terminal or at a remote location to monitor the media converter by monitoring:
- Copper and fiber link/receive status
- Hardware switch settings
- Receive error count

Also, use SNMP to enter network commands that:
- Enable/disable full-duplex and half-duplex advertisement
- Enable/disable Link Pass-Through
- Enable/disable Auto-Negotiation
- Symmetric pause
- Asymmetric TX *(transmit)* pause
- Asymmetric RX *(receive)* pause
- Disable pause

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

Cable Specifications

The physical characteristics must meet or exceed IEEE 802.3™ 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

CGETF1013-105   850 nm multimode
Fiber Optic Transmitter Power: min: -10.0 dBm   max: -4.0 dBm
Fiber Optic Receiver Sensitivity: min: -17.0 dBm   max: 0.0 dBm
Link Budget: 7.0 dB

CGETF1014-105   1310 nm single mode
Fiber-optic Transmitter Power: min: -13.0 dBm   max: -3.0 dBm
Fiber-optic Receiver Sensitivity: min: -20.0 dBm   max: -3.0 dBm
Link Budget: 7.0 dB

CGETF1015-105   1310 nm single mode
Fiber-optic Transmitter Power: min: -5.0 dBm   max: -0.0 dBm
Fiber-optic Receiver Sensitivity: min: -20.0 dBm   max: -3.0 dBm
Link Budget: 15.0 dB

CGETF1017-105   1550 nm single mode
Fiber-optic Transmitter Power: min: -3.0 dBm   max: +2.0 dBm
Fiber-optic Receiver Sensitivity: min: -23.0 dBm   max: -3.0 dBm
Link Budget: 20.0 dB

CGETF1018-105   850 nm multimode
Fiber Optic Transmitter Power: min: -10.0 dBm   max: -4.0 dBm
Fiber Optic Receiver Sensitivity: min: -17.0 dBm   max: 0.0 dBm
Link Budget: 7.0 dB

CGETF1024-105   1300 nm extended multimode
Fiber-optic Transmitter Power: min: -10.0 dBm   max: -3.0 dBm
Fiber-optic Receiver Sensitivity: min: -17.0 dBm   max: -3.0 dBm
Link Budget: 7.0 dB

CGETF1029-105   1310nm TX / 1550nm RX single mode
CGETF1029-106   1550nm TX / 1310nm RX single mode
Fiber-optic Transmitter Power: min: -8.0 dBm   max: -3.0 dBm
Fiber-optic Receiver Sensitivity: min: -21.0 dBm   max: -3.0 dBm
Link Budget: 13.0 dB

CGETF1029-107   1310nm TX / 1550nm RX single mode
CGETF1029-108   1550nm TX / 1310nm RX single mode
Fiber-optic Transmitter Power: min: -3.0 dBm   max: +2.0 dBm
Fiber-optic Receiver Sensitivity: min: -23.0 dBm   max: -8.0 dBm
Link Budget: 20.0 dB

CGETF1035-105   1550 nm single mode
Fiber-optic Transmitter Power: min: 0.0 dBm   max: +5.0 dBm
Fiber-optic Receiver Sensitivity: min: -27.0 dBm   max: -3.0 dBm
Link Budget: 27.0 dB

Cable Specifications -- Continued

Fiber Cable - Continued

CGETF1039-105   850 nm multimode
Fiber Optic Transmitter Power: min: -9.0 dBm   max: -4.0 dBm
Fiber Optic Receiver Sensitivity: min: -17.0 dBm   max: -17.0 dBm
Link Budget: 8.0 dB

Copper Cable (Category 5 -- minimum requirement)

- Gauge = 24 to 22 AWG; Attenuation = 22.0 dB /100m @ 100 MHz
- Straight-through OR crossover cable may be used.
- Shielded twisted-pair (STP) OR unshielded twisted-pair (UTP) may be used
- All pin pairs (1&2, 3&6, 4&5, 7&8) are active in a gigabit network.
- Use only dedicated wire pairs for the active pins; e.g., blue/white & white/blue, orange/white & white/orange, etc.
- Do not use flat or silver satin wire.

Technical Specifications

For Transition Networks' Model CGETF10xx-10x or equivalent

Standards:	IEEE 802.3ab™, IEEE 802.3 2000
Data Rate / Delay:	1000 Mbs/300 nsec
Dimensions:	3.4" x 0.87" x 4.8" *(86mm x 22mm x 122mm)*
Weight:	3 oz. *(91 g)* approximate
Power Consumption:	5.4W, 450mA @ 12VDC
Packet Size:	10 Kbytes *(maximum)*
MTBF	381,000 hours *(MIL217F2 V5.0) (MIL-HDBK-217F)* 1,344,000 hours *(Bellcore7 V5.0)*
Operating Temp:	Tmar* 0°C to 50°C *(32°F to 122°F)**
Storage Temp:	-15°C to 65°C *(5°F to 149°F)*
Humidity:	10% to 90%, non condensing
Altitude:	0 to 10,000 feet
Warranty:	Lifetime

*Manufacturer's rated ambient temperature. "Tmra" range for this slide-in-module depends on the physical characteristics and the installation configuration of the 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 CGETF10xx-10x media converter, view the user's guide on-line at: www.transition.com.

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.

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.

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 Fäll is 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.

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