# 10/100/1000 802.3ah Bridging
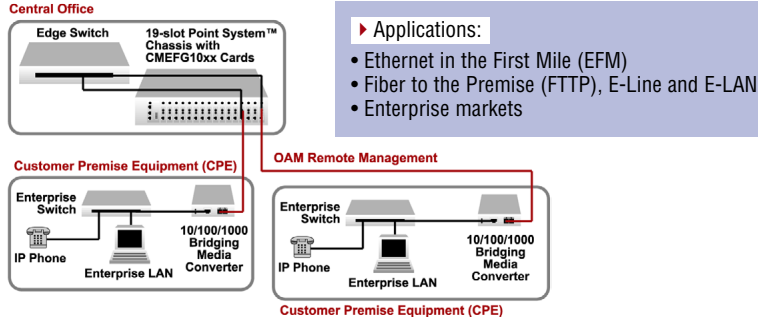## 10/100/1000BASE-TX to 1000BASE-BX/SX/LX

### Point System™ Slide-In-Module Media Converters

### CMEFG10xx-1xx

NEW

Convert 10/100/1000BASE-TX to 1000BASE-BX/SX/LX

## ▶ Remotely Manage 10/100/1000 Converters

**Central Office**

Edge Switch | 19-slot Point System™ Chassis with CMEFG10xx Cards

**Customer Premise Equipment (CPE)**

Enterprise Switch — 10/100/1000 Bridging Media Converter
IP Phone — Enterprise LAN

**OAM Remote Management**

Enterprise Switch — 10/100/1000 Bridging Media Converter
IP Phone — Enterprise LAN

**Customer Premise Equipment (CPE)**

▶ Applications:
- Ethernet in the First Mile (EFM)
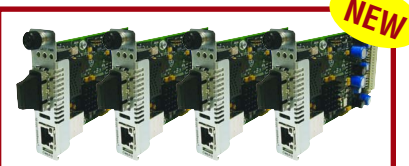- Fiber to the Premise (FTTP), E-Line and E-LAN
- Enterprise markets

### Features

▶ IEEE 802.3ah™ compliant

▶ In-band OAM management (Operation, Administration & Maintenance)

▶ 10/100/1000Mbs Auto-Negotiation or forced mode operation on the TP interface *(see next pages)*

▶ Fiber Auto-Negotiation enable/disable to support legacy devices *(see next pages)*

▶ AutoCross™ *(see next pages)*

▶ QoS Management for traffic separation

▶ 802.1Q VLAN Tagging

▶ Static VLANs

*Note: CMEFG cards cannot be used in the 1-Slot Point System™ Chassis*

▶ Remote Link Loss detection & notification

▶ RMON Statistics

▶ Automatic Link Restoration *(next pages)*

▶ Symmetric and Asymmetric Pause *(see next pages)*

▶ Remote Loopback assists in diagnosing network problems (per 802.3ah) *(next pages)*

▶ Bandwidth allocation Upstream and downstream in 64KB increments *(next pages)*

▶ Remote Firmware Upgrade *(next pages)*

▶ DMI management interface for optical monitoring of temperatures and power on -110 models.

### Ordering Info

| Product Number | Product Number (Models with Optical DMI management) | Port One | Port Two |
|---|---|---|---|
| CMEFG1013-100 | CMEFG1013-110 | 10/100/1000BASE-T (RJ-45) [100 m/328 ft.] | 1000BASE-SX 850nm multimode (SC) [62.5/125 µm: 220 m / 722 ft.] [50/125 µm: 550 m / 1804 ft.] |
| CMEFG1039-100 | CMEFG1039-110 | 10/100/1000BASE-T (RJ-45) [100 m/328 ft.] | 1000BASE-SX SFP Bundle: 850nm multimode (LC) [62.5/125 µm: 220 m / 722 ft.] [50/125 µm: 550 m / 1804 ft.] |
| CMEFG1019-100 | CMEFG1019-110 | 10/100/1000BASE-T (RJ-45) [100 m/328 ft.] | 1000BASE-LX SFP Bundle: 1310nm single mode (LC) [10 km / 6.2 miles] |
| CMEFG1014-100 | CMEFG1014-110 | 10/100/1000BASE-T (RJ-45) [100 m/328 ft.] | 1000BASE-LX-10 1310nm single mode (SC) [10 km/6.2 miles] |
| CMEFG1015-100 | CMEFG1015-110 | 10/100/1000BASE-T (RJ-45) [100 m/328 ft.] | 1000BASE-LX 1310nm single mode (SC) [30 km / 18.6 miles] |
| CMEFG1017-100 | n/a | 10/100/1000BASE-T (RJ-45) [100 m/328 ft.] | 1000BASE-LX 1550nm single mode (SC) [65 km / 40.4 miles] |
| CMEFG1035-100 | n/a | 10/100/1000BASE-T (RJ-45) [100 m/328 ft.] | 1000BASE-LX 1550nm single mode (SC) [120 km / 74.6 miles] |
| CMEFG1040-100 | n/a | 10/100/1000BASE-T (RJ-45) [100 m/328 ft.] | 1000BASE-X SFP Slot (empty) |
| **Single Fiber Products** *Note: Recommended use in pairs (see next pages)* | | | |
| CMEFG1029-100 | CMEFG1029-110 | 10/100/1000BASE-T (RJ-45) [100 m/328 ft.] | 1000BASE-BX-U 1310nm TX / 1490nm RX single fiber single mode (SC) [20 km / 12.4 miles] |
| CMEFG1029-101 | CMEFG1029-111 | 10/100/1000BASE-T (RJ-45) [100 m/328 ft.] | 1000BASE-BX-D 1490nm TX / 1310nm RX single fiber single mode (SC) [20 km / 12.4 miles] |
| CMEFG1029-102 | n/a | 10/100/1000BASE-T (RJ-45) [100 m/328 ft.] | 1000BASE-BX-U 1310nm TX / 1490nm RX single fiber single mode (SC) [40 km / 24.9 miles] |
| CMEFG1029-103 | n/a | 10/100/1000BASE-T (RJ-45) [100 m/328 ft.] | 1000BASE-BX-D 1490nm TX / 1310nm RX single fiber single mode (SC) [40 km / 24.9 miles] |

### Specifications

| | |
|---|---|
| Standards | IEEE Std. 802.3™ IEEE Std. 802.3ah™ IEEE Std. 802.1P IEEE Std. 802.1Q |
| Data Rate | Copper: 10/100/1000 Mbps Fiber: 1000 Mbps |
| Filtering Addresses | 4K MAC Addresses |
| RAM Buffers | 256K (2 Mbps) |
| **Fiber Optic Connector Specs** | |
| CMEFG1013-1x0 | Min TX PWR: -10.0 dBm Max TX PWR: -4.0 dBm RX Sensitivity: -17.0 dBm Max In PWR: 0.0 dBm Link Budget: 7.0 dB |
| CMEFG1039-1x0 | Min TX PWR: -9.5 dBm Max TX PWR: -4.0 dBm RX Sensitivity: -17.0 dBm Max In PWR: -3.0 dBm Link Budget: 7.5 dB |
| CMEFG1019-1x0 | Min TX PWR: -9.5 dBm Max TX PWR: -3.0 dBm RX Sensitivity: -21.0 dBm Max In PWR: -3.0 dBm Link Budget: 11.5 dB |
| CMEFG1014-1x0 | Min TX PWR: -9.0 dBm Max TX PWR: -3.0 dBm RX Sensitivity: -21.0 dBm Max In PWR: -3.0 dBm Link Budget: 12.0 dB |
| CMEFG1015-1x0 | Min TX PWR: -5.0 dBm Max TX PWR: 0.0 dBm RX Sensitivity: -24.0 dBm Max In PWR: -3.0 dBm Link Budget: 19.0 dB |
| CMEFG1017-100 | Min TX PWR: -3.0 dBm Max TX PWR: +2.0 dBm RX Sensitivity: -24.0 dBm Max In PWR: -3.0 dBm Link Budget: 21.0 dB |
| CMEFG1035-100 | Min TX PWR: 0.0 dBm Max TX PWR: 5.0 dBm RX Sensitivity: -32.0 dBm Max In PWR: -9.0 dBm Link Budget: 32.0 dB |
| **Single Fiber Products** | |
| CMEFG1029-1x0 & CMEFG1029-1x1 | Min TX PWR: -8.0 dBm Max TX PWR: -3.0 dBm RX Sensitivity: -22.0 dBm Max In PWR: -3.0 dBm Link Budget: 14.0 dB |
| CMEFG1029-102 & CMEFG1029-103 | Min TX PWR: -3.0 dBm Max TX PWR: +2.0 dBm RX Sensitivity: -23.0 dBm Max In PWR: -3.0 dBm Link Budget: 20.0 dB |
| Status LEDs | TP (Duplex/Link/Activity): Yellow: ON = Half-duplex Link; BLINK = Activity Green: ON = Full-duplex Link; BLINK = Activity TP (10Mbs/100Mbs/1000Mbs): Off = 10Mbs; Yellow = 100Mbs; Green = 1000Mbs DPX (Fiber Duplex): Green: ON = Full; OFF = Half LACT (Fiber Link/Activity): Green: ON = Link; BLINK = Activity PWR (Power): Green: ON = Power applied to board |
| Dimensions | Width: 0.86" [22 mm] Depth: 5.0" [127 mm] Height: 3.4" [86 mm] |
| Power Consumption: 5.1 watts | |
| Environment | See chassis specifications |
| Shipping Weight | 1 lb. [0.45 kg] |
| Regulatory Compliance | CISPR/EN55022 Class A, EN55024, EN61000, FCC Class A, CE Mark |
| Warranty | Lifetime |

*Full 18-channel CWDM modules available. Please contact Transition Networks for details.*

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## ▸ Auto-Negotiation (802.3u)

Auto-Negotiation allows devices to perform automatic configuration to achieve the best possible mode of operation over a link. Devices with this feature will broadcast their speed (10Mbps, 100Mbps, etc.) and duplex (half/full) capabilities to other devices and negotiate the best mode of operation between the two devices.

- ▸ No user intervention required to determine best mode of operation
- ▸ Optimal link established automatically
- ▸ Quick and easy installation

While the inclusion of this feature is beneficial, the ability to disable it is equally beneficial. In the event of a non-negotiating end device trying to connect to a negotiating device, the mode of operation will drop to the least common denominator between the two devices (i.e. 100Mbps, half-duplex). Disabling this feature gives the user the ability to force the connection to the best mode of operation when trying to link with a non-negotiating device. Most Transition converters with Auto-Negotiation will allow you to disable this feature.

## ▸ AutoCross™

Automatically detects and configures the twisted pair port on the converter to the correct MDI or MDI-X configuration.

- ▸ Eliminates an entire category of troubleshooting
- ▸ No need to identify cable type—straight-through or crossover
- ▸ No user intervention required to determine correct button / switch settings

## ▸ Automatic Link Restoration

Transition Networks's converters will automatically re-establish link in all network conditions.

▸ No need to reset devices

Transition Networks's converters will automatically re-establish link when connected to switches if link was lost. With other manufacturers' converters the user must reset the converter to re-establish the link.

▸ Auto-Negotiation Enabled

Automatic Link Restoration allows the users to continue using Auto-Negotiation with Link Loss Notification features. With other manufacturers' converters the user must disable Auto-Negotiation and hard set the link.

▸ Link Pass Through Activated in both directions

Automatic Link Restoration on Transition Networks's products allows users to continue using Link Loss Notification feature activated in both directions. Many competitive solutions allow for Link Loss Notification activation only in one direction. If Link Loss feature is activated in both directions, competitive products are put in a "deadly embrace" and they cannot restore the link without resetting the converters.
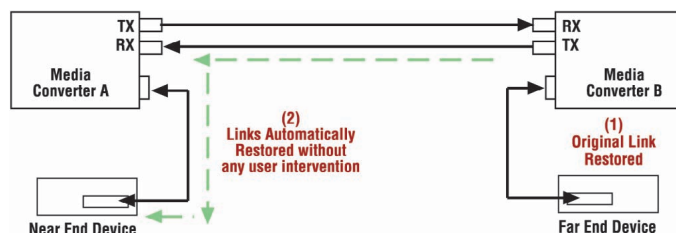
If someone tells you media conversion is a commodity product that anyone can bring to market, they probably haven't looked at the extensive product suite offered by Transition Networks. With the industry's most comprehensive offering of full-featured products, Transition's media converters stand out as "the choice" among industry IT professionals.

Generally, media converters are low-level OSI model devices with no IP or MAC addresses and therefore are transparent to the network. This "transparency" makes them very inexpensive and easy to use, but also can make troubleshooting the network very difficult. In an effort to overcome this difficulty and to make media converters "visible" to network managers, Transition has designed their full-featured products to include the most advanced features on the market today.

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**The Conversion Technology Experts**

# ADVANCED PRODUCT FEATURES

## ▸ Loopback

Select Transition Networks products are equipped with Loopback. This feature puts a converter in a special mode that enables the device to loop back the signal from the RX port to the TX port on either media for testing and troubleshooting purposes. Test signals from a tester (Firebird, etc.) can then be inserted into the link and looped back as received by a device to test a particular segment of the link (i.e. copper or fiber). Loopback can be either local or remote depending on the location of the converter in the link.

▸ Allows network diagnostics from local or remote location

▸ Quickly pinpoints problem areas of end to end link by testing a particular segment
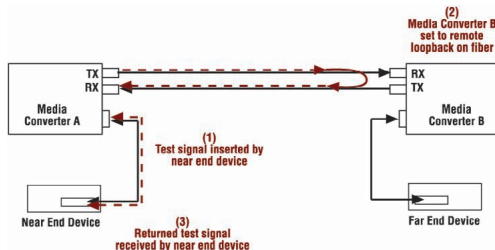


Some converters have separate copper and fiber loopback functions that can be enabled separately, while others will loopback both copper and fiber at the same time when enabled. Please refer to the specific product page for details.

## ▸ Bandwidth Allocation

Bandwidth allocation is an important feature found on select converters which allows network administrators to set the bandwidth of the converter in 64KB increments via SNMP management. The bandwidth can be allocated in any multiple of 64KB from 0Kb up to the full bandwidth capability of the media converter and can be entered in either KB or Mb values.

▸ Effectively manage bandwidth usage in the network to support critical processes or activities

▸ Provide only the contracted amount of bandwidth to paying customers

▸ Provide only the bandwidth necessary to end users

## ▸ Remote Firmware Upgrade

New product features are continuously being added to Transition Networks's products. These improvements are also available for many products already installed in the field. Management modules and many media converters can be updated remotely via firmware upgrade. The remote upgrade feature eliminates the need to ship the products back to the manufacturer. The firmware upgrades can be performed by a user either locally via a Console port or remotely via TFTP.

The upgrades do not require the reconfiguration of the SNMP management or converter feature settings.

## ▸ Pause (IEEE 802.3xy)

PAUSE signaling is an IEEE feature that temporarily suspends data transmission between two devices in the event that one of the devices becomes overwhelmed. In the event that a device needs some time to clear network congestion, it will send out a PAUSE signal to the other end device, which will then wait a pre-determined amount of time before re-transmitting the data. Transition's converters will pass PAUSE signaling unhindered; ensuring that the message is delivered to the end device.

▸ PAUSE enabled devices allowed to work properly

▸ Prevents loss of valuable data transmission

▸ Reduces bottlenecks and allows for efficient use of network devices

PAUSE signaling is not standardized over fiber media. Transition's media converters will communicate this signaling over fiber between the converters to pass this signaling on to the other end device.

## ▸ Single Fiber

**Single fiber technology offers a 50% savings** in fiber utilization. It is an attractive solution to maximize the usage of a limited number of fiber runs.

In a traditional optical link, a fiber pair consists of two uni-directional strands. The single fiber technology multiplexes two optical wavelengths of 1310nm and 1550nm into a single strand fiber. In a single fiber media converter each wavelength is responsible for either the transmit or receive function. Consequently, the bi-directional transmission is achieved by using a single strand. The converters in a single fiber scenario "match" each other's wavelengths. Converter A transmits at the wavelength of 1310nm and receives at 1550nm while the other converter transmits at 1550nm and receives at 1310nm. Therefore, converters are usually used in pairs.

### Single Fiber
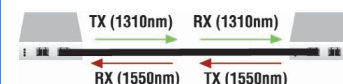


Single fiber technology is available on all Transition Networks Media Converters in maximum distance ranges from 20 to 80km.

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