1000 Bridging 100BASE-X to 1000BASE-X

OAM/IP-Based Remotely Managed Media Converter

AUTO CROSS · AUTO NEG · PAUSE · TRANSPARENT LINK PASS THROUGH · FAR END FAULT · LOOP BACK · BANDWIDTH ALLOCATION · REMOTE FIRMWARE UPGRADE · SINGLE FIBER

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

SFBRM13xx-1xx

NEW

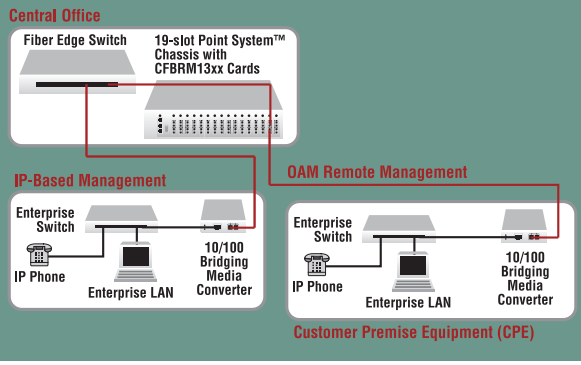
CARRIER ETHERNET MEF Certified Compliant™

Features

- MEF 9 & MEF 14 Carrier Ethernet Certification
- Two selectable remote management modes:
  - IP-Based remote management
  - In-Band OAM 802.3ah (remote device managed by local peer)
- SNMP v1, v2*
- AutoCross™
- Auto-Negotiation
- Pause
- Transparent Link Pass Through
- Far-End-Fault
- Remote Loopback
- IEEE 802.1p™ QOS packet classification with four egress queues
- Ipv4 IP TOS and DiffServ QOS classification, IPv6 Traffic class
- IEEE 802.1q™ VLAN, 4096 entries
- Static MAC, 64 entries
- Double VLAN tagging (QinQ)
- IEEE 802.1x™ Port based security
- RADIUS client
- RMON counters for each port
- Bandwidth allocation per port
- DMI Optical Management
- USB port for basic setup
- Cable diagnostic function for TP ports
- 8K MAC addresses
- Remote Firmware Upgrade

**Future firmware upgrade; Please contact Transition Networks for upgrade availability.*

Remotely Manage 1000BASE Converters



Specifications

Standards	IEEE Std. 802.3™, IEEE Std. 802.3ah, IEEE Std. 802.1P, IEEE Std. 802.1Q, IEEE Std. 802.1X
Data Rate	**Fiber:** 1000BASE-X **Fiber 2:** 1000BASE-X
Filtering Addresses	8K MAC Addresses
RAM Buffers	256K (2 Mbps)
Max Frame Size	802.3ac tagged: 1628 bytes untagged: 1632 bytes
Dimensions	**Width:** 3.25" [82 mm] **Depth:** 4.8" [122 mm] **Height:** 1.0" [25 mm]
Environment	0 – 50°C; 5% – 95% humidity non-condensing; 0 – 10,000 ft. altitude
Shipping Weight	2 lbs. [0.90 kg]
Regulatory Compliance	CISPR/EN55022 Class B, EN55024, EN61000, FCC Class B, CE Mark
Warranty	Lifetime

Ordering Info

SFBRM1313-100
SFBRM1313-110 (DMI Options)
100BASE-FX 1300nm MM (SC)
[2 km / 1.2 mi.] Link Budget: 11.0 dB
to 1000BASE-SX 850nm Ext. MM (SC)
[62.5/125µm fiber: 300 m/984 ft.] or [50/125µm fiber: 550 m/1804 ft.] Link Budget: 7.0 dB

SFBRM1314-100
SFBRM1314-110 (DMI Options)
100BASE-FX 1300nm MM (SC)
[2 km / 1.2 mi.] Link Budget: 11.0 dB
to 1000BASE-LX10 1310nm SM (SC)
[10 km/6.2 mi.] Link Budget: 12.0 dB

SFBRM1315-100
SFBRM1315-110 (DMI Options)
100BASE-FX 1300nm MM (SC)
[2 km / 1.2 mi.] Link Budget: 11.0 dB
to 1000BASE-LX 1310nm SM (SC)
[25 km/15.5 mi.] Link Budget: 19.0 dB

SFBRM1317-100
SFBRM1317-110 (DMI Options)
100BASE-FX 1300nm MM (SC)
[2 km / 1.2 mi.] Link Budget: 11.0 dB
to 1000BASE-LX 1550nm SM (SC)
[65 km/40.4 mi.] Link Budget: 22.0 dB

SFBRM1335-100
SFBRM1335-110 (DMI Options)
100BASE-FX 1300nm MM (SC)
[2 km / 1.2 mi.] Link Budget: 11.0 dB
to 1000BASE-LX 1550nm SM (SC)
[125 km/77.7 mi.] Link Budget: 27.0 dB

Single Fiber Products
Recommended use in pairs

SFBRM1329-100
SFBRM1329-110 (DMI Options)
100BASE-FX 1300nm MM (SC)
[2 km / 1.2 mi.] Link Budget: 11.0 dB
to 1000BASE-BX-U 1310nm TX / 1490nm RX single fiber SM (SC)
[20 km/12.4 mi.] Link Budget: 14.0 dB

SFBRM1329-101
SFBRM1329-111 (DMI Options)
100BASE-FX 1300nm MM (SC)
[2 km / 1.2 mi.] Link Budget: 11.0 dB
to 1000BASE-BX-D 1490nm TX / 1310nm RX single fiber SM (SC)
[20 km/12.4 mi.] Link Budget: 14.0 dB

SFBRM1329-102
SFBRM1329-112 (DMI Options)
100BASE-FX 1300nm MM (SC)
[2 km / 1.2 mi.] Link Budget: 11.0 dB
to 1000BASE-BX-U 1310nm TX / 1490nm RX SM (SC)
[40 km/24.9 mi.] Link Budget: 20.0 dB

SFBRM1329-103
SFBRM1329-113 (DMI Options)
100BASE-FX 1300nm MM (SC)
[2 km / 1.2 mi.] Link Budget: 11.0 dB
to 1000BASE-BX-D 1490nm TX / 1310nm RX SM (SC)
[40 km/24.9 mi.] Link Budget: 20.0 dB

TRANSITION NETWORKS®

Transition Networks, Inc.
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SFBRM13xx-1xx Advanced Features

SFBRM13xx-1xx Fiber Optic Connector Specs

Product SKU	Min TX PWR (dBm)	Max TX PWR (dBm)	RX Sensitivity (dBm)	Max In PWR (dBm)	Link Budget (dB)
SFBRM1313-100 MM	-19.0	-14.0	-30.0	-14.0	11.0
SFBRM1313-100 SM	-10.0	-4.0	-17.0	0.0	7.0
SFBRM1314-100 MM	-19.0	-14.0	-30.0	-14.0	11.0
SFBRM1314-100 SM	-9.0	-3.0	-21.0	-3.0	12.0
SFBRM1315-100 MM	-19.0	-14.0	-30.0	-14.0	11.0
SFBRM1315-100 SM	-5.0	0.0	-24.0	-3.0	19.0
SFBRM1317-100 MM	-19.0	-14.0	-30.0	-14.0	11.0
SFBRM1317-100 SM	-2.0	+3.0	-24.0	-3.0	22.0
SFBRM1329-100 MM	-19.0	-14.0	-30.0	-14.0	11.0
SFBRM1329-100 SM	-8.0	-3.0	-22.0	-3.0	14.0
SFBRM1329-101 MM	-19.0	-14.0	-30.0	-14.0	11.0
SFBRM1329-101 SM	-8.0	-3.0	-22.0	-3.0	14.0
SFBRM1329-102 MM	-19.0	-14.0	-30.0	-14.0	11.0
SFBRM1329-102 SM	-3.0	+2.0	-23.0	-3.0	20.0
SFBRM1329-103 MM	-19.0	-14.0	-30.0	-14.0	11.0
SFBRM1329-103 SM	-3.0	+2.0	-23.0	-3.0	20.0
SFBRM1335-100 MM	-19.0	-14.0	-30.0	-14.0	11.0
SFBRM1335-100 SM	0.0	+5.0	-27.0	-3.0	27.0

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

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.

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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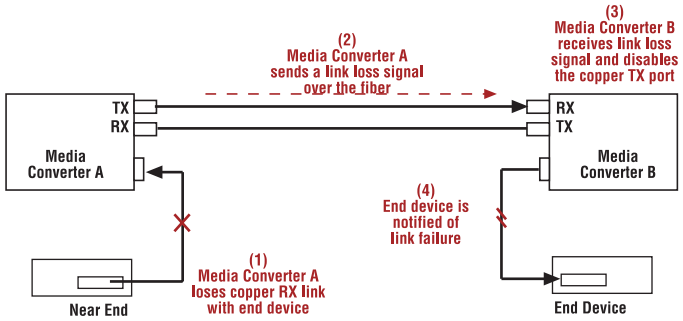
SFBRM13xx-1xx Advanced Features

Transparent Link Pass Through

Transparent Link Pass Through will notify an end device of a link failure just like Link Pass Through, however it uses a different method for "passing through" this information. Transparent Link Pass Through sends a link-loss signal over the fiber, instructing the remote converter to shut down the copper port thus notifying the end device, while maintaining the fiber link between the two converters (see diagram below).

- End device automatically notified of link loss
- Fiber link remains up as it carries a link-loss signal



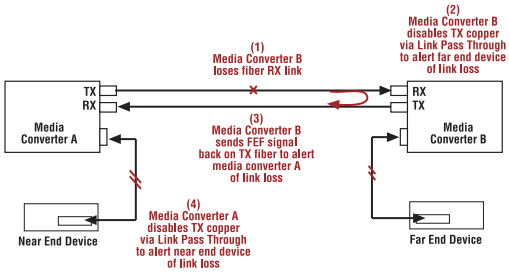
AN, Pause, TLPT, FEF, LB, BA, RFU

Far End Fault (802.3u)

Far End Fault (FEF) is a troubleshooting feature that is generally used in conjunction with Link Pass Through to notify both end devices of a loss of link. In the event of a loss of the fiber RX signal on the far end converter the converter will automatically generate a Far End Fault signal and send it on its TX fiber port to notify the near end converter of a fiber link loss. Link Pass Through will then disable the copper links on both ends; alerting both end devices of network trouble (see diagram below).

- Both end devices automatically notified of link loss
- Prevents loss of valuable data unknowingly transmitted over invalid link
- Allows for quick diagnosis and resolution of network problems

Transition Networks's media converters that include the FEF feature do not need to be used as pictured above as they will work with other network devices that support Far End Fault per IEEE standards.



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.

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.

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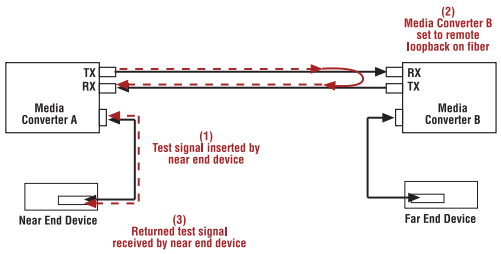
SFBRM13xx-1xx Advanced Features

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.

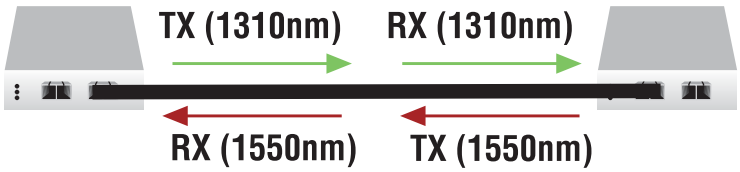
- Effectively manage bandwidth usage in the network to support critical processes or activities
- Provide only the contracted amount of bandwidth to paying customers
- Provide only the bandwidth necessary to end users

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



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