10/100/1000 Media Converter Module

perle.com/products/10-100-1000-managed-media-converter-module.shtml

Managed

- 10/100/1000Base-T to 1000Base-X Fiber Media Converters
- Connect 10/100 devices to Gigabit backbone
- Extend network distances up to 160km
- Advanced features - Smart Link Pass-Through, Fiber Fault Alert, Auto-MDIX and Loopback
- High density applications with Perle Media Converter Chassis
- Manage via SNMP, CLI - Telnet/SSH, Internet browser, or PerleVIEW Centralized Management Package with an MCR-MGT Media Converter Management Module

Installed in a high density Perle Media Converter Chassis, Perle's line of feature rich **Managed 10/100/1000 Rate Converting Media Converters** transparently connect copper to fiber. Our 10/100/1000 Ethernet to Fiber Converters provide an economical path to extend the distance of an existing network, the life of non-fiber based equipment, or the distance between two devices.

Network Administrators can "see-everything" with Perle's advanced features such as Auto-Negotiation, Auto-MDIX, Link Pass-Through, Fiber Fault Alert, and Loopback. Along with a Media Converter Management Module in the chassis, configuration and monitoring of the copper and fiber ports can be performed. These cost and time saving features, along with a lifetime warranty and free worldwide technical support, make Perle's **Managed 10/100/1000 Media Converter Modules** the smart choice for IT professionals.

For those environments requiring a medium to large-scale deployment of media converters, a centralized platform that simplifies the configuration, administration, monitoring, and troubleshooting of this gear is recommended. PerleVIEW Device Management software is a multi-user, Windows server-based application that delivers this level of Enterprise-grade solution.

CM-1110 Managed Media Converter Features

QOS (Quality of Service)	• Bandwidth Allocation via rate limiting • IEEE 802.1P tagged frame priority control • IEEE 802.1P priority tag remapping • IP TOS (Type of Service) priority for IPV4 Diffserv or IPV6 traffic class frames • Congestion Service Policy through WQF (Weighted Fair Queuing) or Strict Priority Queuing (default)
VLAN Tagging	• Default – Transparent to VLAN frames • Enable discarding of tagged frames • Enable discarding of untagged frames • Untag – Removes any existing tag • Insert Tag – Insert (if original frame is untagged) or replace (if original frame is tagged) the VLAN ID and priority with the configured default VLAN ID and priority tag. • Insert Double tag (Q in Q) – Append an additional tag using the configured default VLAN ID and priority.
Unknown	When enabled, Multicast frames with an unknown destination address are not allowed to egress the port

Multicast Frame filtering	
Unknown Unicast Frame filtering	When enabled, Unicast frames with an unknown destination address are not allowed to egress the port
Unidirectional Ethernet	When enabled, provides the ability to restrict port to one-way traffic flow. Used in applications such as unidirectional video broadcasting as well as providing security for ethernet connections in accessible public areas
Configuration Mode selection	Select whether the module is to use the on-board DIP switches or enable the management module in the chassis to manage
Auto-MDIX	Can manually set Auto or MDIX on the copper port via on-board strap or via the management card. Auto-MDIX (automatic medium-dependant interface crossover) detects the signaling on the copper ethernet interface to determine the type of cable connected (straight-through or crossover) and automatically configures the connection when enabled. The media converter can also correct for wires swapped within a pair. The media converter will adjust for up to 120ns of delay skew between the 1000Base-T pairs.
Module Information	• Chassis slot number that the module is in • Media converter model and serial number • User configurable media converter module name • User configurable fiber port name • User configurable copper port name • Copper Downshift status • Hardware revision number • Firmware version number
Module DIP switch settings	View hardware DIP switch settings
Selectable Max Packet Size	Set max packet size to 1522 / 2048 or 10,240 (default)
10BaseT Extended Distance	Normal/extended – default Normal. By configuring as “extended”, the 10baseT receiver sensitivity is increased providing the possibility of an 10BaseT connection greater than 100m.
Auto Copper downshift	automatically detects a 2-pair cable environment and downshifts operation of the link to 100 Mb/s. Configure the number of times (0-8) that the PHY will attempt to establish a successful Gigabit link before attempting to “downshift” as an auto-negotiating 10/100 device. Setting # of attempts to 0 (default) disables the feature.
Virtual Cable Test	A test that enables the detection of potential copper cabling issues such as pair polarity pair swaps and excessive pair skew as well as any opens, shorts or any impedance mismatch. Will report the distance in the cable to the open or short.
Port Control	Enable or disable individual fiber or copper port on the module
Copper Port Status	• Port Enabled (Yes/No) • Link Status (Up/Down) • Auto Negotiation Settings (Disabled, Complete or In Progress) • Resolved as crossover MDI or MDIX type
Fiber Port Status	• Port Enabled (Yes/No)

	• Connector type (SC, LC, ST) • Link Status (Up/Down) • Far End Fault (OK, Failed) • Fiber Loopback mode (On/Off)
Module Control	• Reset card • Reset to factory default • Reset Statistical counters • Phy specific commands such write/read config, read dip switches • Update firmware • Fiber Loopback mode. (On/Off) • Virtual Cable Test. (On/Off) • Upload/download configuration
Backup and Restore	Provides fast and easy module replacement. Management module will always save a copy of the media converter configuration and will restore this configuration automatically to the media module when it is detected in the slot
Detailed port statistics	To assist in troubleshooting copper and fiber links, an extensive list of ingress and egress counters for both copper and fiber ports are available. These statistics can be viewed locally via the management module or from a central SNMP NMS on the network
Auto-Negotiation (802.3u)	The media converter supports auto negotiation. The 1000Base-X fiber interface negotiates according to 802.3 clause 37. The 10/100/1000Base-T negotiates according to 802.3 clause 28 and 40. The 1000Base-X will link up with its partner after the highest common denominator (HCD) is reached and the copper has linked up with its partner. The 1000Base-X will continue to cycle through negotiation transmitting a remote fault of offline (provided this is enabled through the switch setting) until the copper is linked up and the HCDs match. The media converter supports auto-negotiation of full duplex, half duplex, remote fault, full duplex pause, asymmetric pause and Auto MDI-X.
Smart Link Pass-Through	When the Link Mode switch is placed into Smart Link Pass-Through mode, the copper ethernet port will reflect the state of the 1000Base-X media converter port. This feature can be used whether fiber auto-negotiation is enabled or disabled.
Fiber Fault Alert	With Fiber Fault Alert the state of the 1000Base-X receiver is passed to the 1000Base-X transmitter. This provides fault notification to the partner device attached to the 1000Base-X interface of the media converter. If the 1000Base-X transmitter is off as a result of this fault it will be turned on periodically to allow the condition to clear should the partner device on the 1000Base-X be using a similar technique. This eliminates the possibility of lockouts that occur with some media converters. Applies only when fiber auto-negotiation is disabled.
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. The media converter supports pause negotiation on the 10/100/1000Base-T connection and 1000Base-X fiber connection.
Duplex	Full and half duplex operation supported.
Jumbo Packets	Transparent to jumbo packets up to 10KB.
Remote Loopback	Capable of performing a loopback on the 1000Base-X fiber interface.

Indicators

Power / TST	This green LED is turned on when power is applied to the media converter. Otherwise it is off. The LED will blink when in Loopback test mode.
Fiber link on / Receive activity	This green LED is operational only when power is applied. The LED is on when the 1000Base-X link is on and flashes with a 50% duty cycle when data is received.

(LKF)	
Copper link on / Receive activity (LKC)	This green LED is operational only when power is applied. The LED is on when the 10/100/1000Base-T link is on and flashes with a 50% duty cycle when data is received.
Fiber Duplex (FDF)	This green LED is operational only when power is applied. The LED is on when the 10/100/1000Base-X link is operatinal in full duplex mode. The LED is off when in half duplex.
Copper Duplex (FDC)	This green LED is operational only when power is applied. The LED is on when the 10/100/1000Base-T link is operatinal in full duplex mode. The LED is off when in half duplex.
10/100/1000 Speed	This multi-color LED is operational only when power is applied. The LED is green when the speed of the copper ethernet port is running at 1000 Mbps. The LED is orange when the speed of the copper Ethernet port is running at 100 Mbps. The LED is off when in 10 Mbps.
Switches: On-Board (If Auto/Switch strap is set to Switch)	
Auto-Negotiation (802.3u)	*Enabled (Default)* - The media converter uses 802.3u Auto-negotiation on the 10/100/1000Base-T interface. It is set to advertise full duplex, half duplex, pause and remote fault capabilities. *Disabled* - The media converter sets the port according to the position of the speed and duplex switches.
Link Mode	Link Mode provides a transparency to the state of the copper link allowing for simplified trouble shooting from the devices connected to the media converter. *Normal (Default – Up)* With Fiber Auto Negotiation enabled when the copper link goes down the 1000Base-X link is brought down. The 1000Base-X link will advertise Remote Fault (Link Fault). With Fiber Auto Negotiation disabled the state of the copper link has no effect on the 1000Base-X link. *Smart Link Pass Through (Down)* With Fiber Auto Negotiation enabled the behavior is as follows. When the copper link goes down the 1000Base-X link is brought down. The 1000Base-X link will advertise Remote Fault (Link Fault). When Remote Fault (Link Fault) is received on the 1000Base-X interface the copper transmitter will be turned off. When the copper receiver is off the 1000Base-X transmitter will be turned off. When the 1000Base-X receiver goes off the copper transmitter will be turned off. With Fiber Auto-Negotiation disabled the behavior is as follows. When the copper receiver is off the 1000Base-X transmitter will be turned off. When the 1000Base-X receiver goes off the copper transmitter will be turned off.
Fiber Fault Alert	The Fiber Fault Alert switch has meaning when Auto-Negotiation is disabled *Enabled (Default - Up)* When the 1000Base-X receiver is off the 1000Base-X transmitter is turned off. Periodically the 1000Base-X receiver will be turned on for a short period to allow the condition to clear if the 1000Base-X link partner is using a similar feature. *Disabled (Down)*
Remote Loopback	The media converter can perform a loopback on the 1000Base-X fiber interface. *Disabled (Default - Up)* *Enabled* - The 1000Base-X receiver is looped to the 1000Base-X transmitter. The copper transmitter is taken off the interface.
Auto-MDIX (Strap)	If Auto-Negotiation (802.3u) is enabled, the media converter determines the current cable pinout to use on the copper interface. If Auto-Negotiation (802.3u) is disabled the Media converter will use the RX Energy method on the copper interface to set the port MDI or MDIX whichever is appropriate. *Enabled (Default)* - Either a straight-through or crossover type cable can be used to connect the media converter to the device on the other end of the cable. *Disabled* - If the partner device on the other end of the cable does not have the Auto-MDIX feature a specific cable, either a straight-through or crossover will be required to ensure that the media converter's transmitter and the partner devices transmitter are connected to the others receiver. The Media converter's 100Base-TX port is configured as MDI-X with this switch setting.

Speed Copper	100 (Default) 10
Duplex Copper	Full (Default) Half
Duplex Fiber	Full (Default) Half
Connectors	
10/100/1000Base-T	RJ45 connector 2 pair CAT5, EIA/TIA 568A/B or better cable for 10/100. 4 pair CAT5 UTP cable for Gigabit.
Magnetic Isolation	1.5kv
Filtering	
Filtering	1024 MAC Addresses
Frame Specifications	
Buffer	1000 Kbits frame buffer memory
Size	Maximum frame size of 10,240 bytes -- Gigabit Maximum frame size of 2048 bytes -- Fast Ethernet
Environmental Specifications	
Operating Temperature	0 C to 50 C (32 F to 122 F)
Storage Temperature	minimum range of -25 C to 70 C (-13 F to 158 F)
Operating Humidity	5% to 90% non-condensing
Storage Humidity	5% to 95% non-condensing
Operating Altitude	Up to 3,048 meters (10,000 feet)
Heat Output (BTU/HR)	7.2
Maximum Power Consumption (Watts)	2.1
MTBF (Hours)*	598,000
Mechanical - Hot Swapping Card	
Edge Connecter	32 pin DIN 41612 / IEC 60603-2 Type B/2 Male. First make, last break for ground and power
Card insertion and removal	Captive thumb screws enable fast insertion and removal. Can be further tighten with a screwdriver.
Product Weight	
Weight	0.15 kg, 0.33 lbs

Packaging

Shipping Weight	0.33 kg, .73 lbs
Shipping Dimensions	203 x 38 x 152 mm, 8 x 1.5 x 6 inches

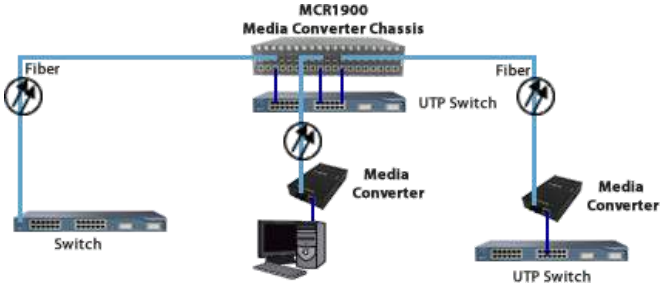
Regulatory Approvals

Emissions	FCC Part 15 Class A, EN55022 Class A
	CISPR 22 Class A
	EN61000-3-2
Immunity	EN55024
Electrical Safety	UL 60950-1
	EN60950
	CE
Laser Safety	EN 60825-1:2007
	Fiber optic transmitters on this device meet Class 1 Laser safety requirements per IEC-60825 FDA/CDRH standards and comply with 21CFR1040.10 and 21CFR1040.11.
Environmental	Reach, RoHS and WEEE Compliant
Other	ECCN: 5A991
	HTSUS Number: 8517.62.0050
	Perle Limited Lifetime Warranty

*Calculation model based on MIL-HDBK-217-FN2 @ 30 °C

High Density Fiber Distribution from UTP Switch Equipment at Corporate Headquarters

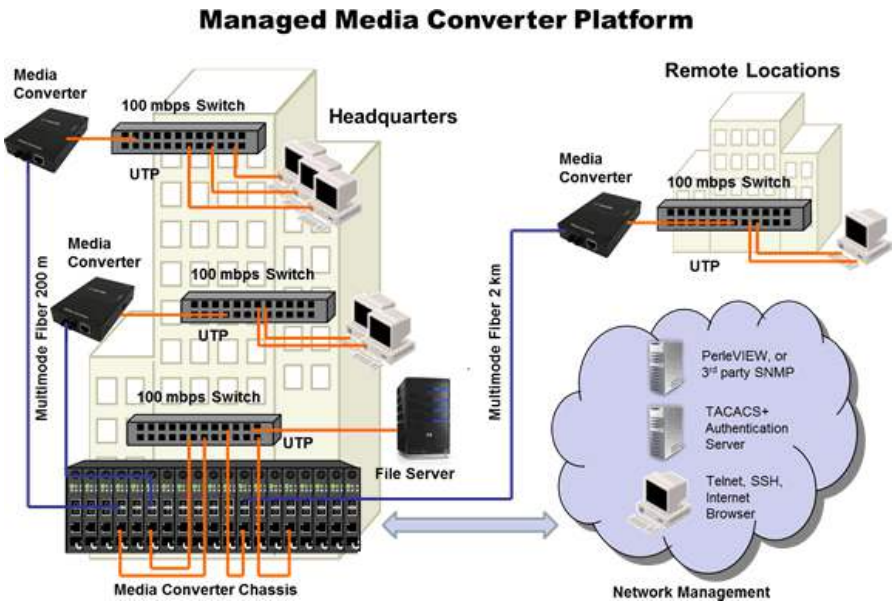
In this enterprise campus application, up to 18 Perle CM-1110 10/100/1000 Media Converters are installed in the MCR1900 Media Converter Chassis. The 19th slot in the chassis is filled the MCR-MGT Management Module. All media converts in the chassis are managed by SNMP, Telnet or an internet browser interface. A remote fiber enabled Ethernet switch is connected directly to the central MCR1900 Chassis. A standalone S-110 Media Converter converts the fiber to Ethernet in a fiber-to-desktop application. Another S-1110 Fiber Media Converter is connected to a remote office Ethernet switch. In all cases, multimode or single-mode fiber can be used. Fiber links can be extended up to 120km using single-mode fiber.



Ethernet to Fiber in a Campus Network

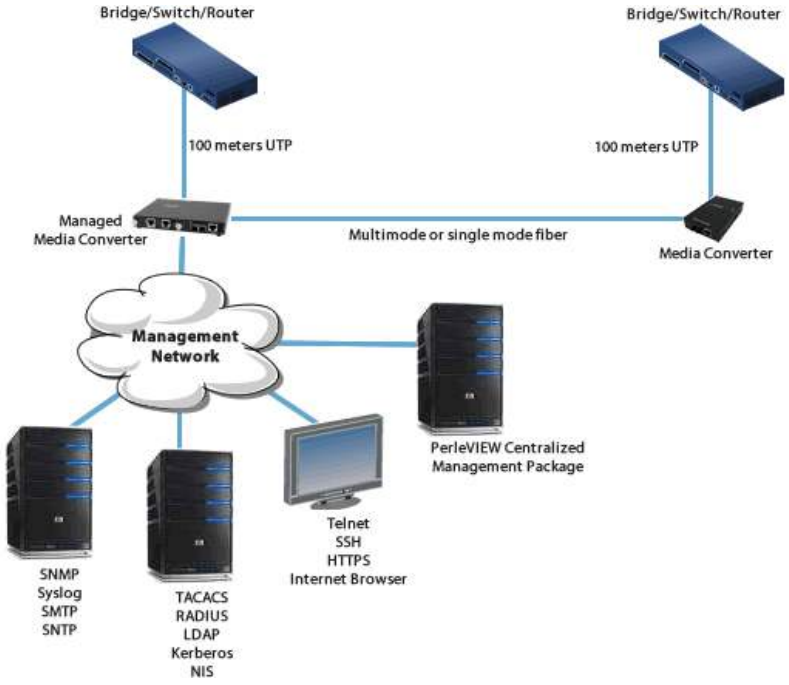
The use of chassis-based media converters is a cost effective means in providing fiber connectivity in a campus network. By consolidating Ethernet to fiber conversion in a rack mount media converter chassis, various types of fiber links can be brought into a single wiring closet platform. This simplifies deployment and

maintenance and also provides a scalable means to grow your network as needed.



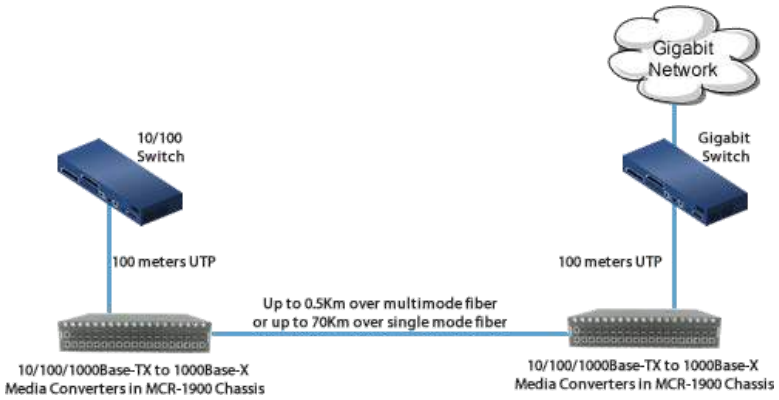
Managed Ethernet over Fiber Links

Manage your **copper to fiber** link with an MCR200 chassis housing a media converter and management module. Ideal for use in managed networks with low density fiber applications, this Managed Media Converter is connected across a fiber link to a remote media converter. The copper or fiber link on the managed standalone unit can provide vital information and status to network management tools such as SNMP.



Bridge 10/100 Devices to gigabit Backbone

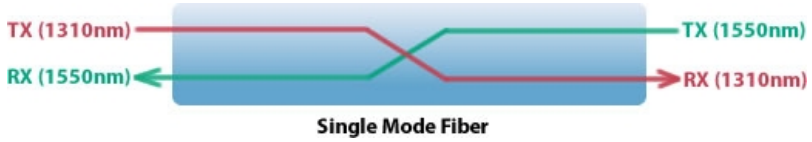
Connect 10/100 devices to Gigabit Backbone
Devices on a 10/100 ethernet switch can be connected to a Gigabit backbone through the use of rate converting 10/100/1000 Media Converters.



Single Mode / Single Fiber

Connect copper ports over a single fiber strand (also referred to as "Bi-Directional" BiDi)
When Single Strand fiber is used, a pair of Single Fiber Media Converters is needed for the copper to fiber conversion. Perle Single Fiber Media Converters are also referred to as "Up/Down" models. For example the CM-1110-S1SC10**U** ("Up") and CM-1110-S1SC10**D** ("Down"), shown below, must be used in pairs. An "**U**p" must be matched with a "**D**own" peer to deal with transmit and receive frequencies separately.

CM-1110-S1SC10UCM-1110-S1SC10D



The majority of installations for single mode fiber media converters are of the "dual connector" or "dual fiber" type where one fiber connection is used for transmit, the other for receive. These are physically "crossed" to match up the Transmit/Receive links.

However, to reduce costs, or where there are limits on available fiber, WDM technology may be utilized. WDM uses separate transmit and receive frequencies to communicate on a single fiber strand. WDM technology relies on the fact that optical fibers can carry many wavelengths of light simultaneously without interaction between each wavelength. Thus, a single fiber can carry many separate wavelength signals or channels simultaneously.

So remember, if Single Strand fiber is used, you will need an "**Up**" Media Converter on one side and a "**Down**" Media Converter on the other for copper to fiber conversion.

Perle offers a wide variety of Single Fiber ("**U**p/**D**own") Media Converters to connect 10BaseT, Fast Ethernet and Gigabit to single fiber. Whether you need Managed or Unmanaged, Standalone or Modular Chassis Based, 20km or 120km, Perle has the right model to meet your fiber conversion requirement.

Select a Model to obtain a Part Number - Managed Media Converter Chassis Modules - 10/100/1000 to Fiber

Model	Connector	Type	Transmit (dBm)		Receive (dBm)		Power Budget (dBm)	Wavelength (nm)	Fiber Type	Core Size (um)	Modal Bandwidth (MHz* Km)	Operating Distance
			Min	Max	Min	Max						
CM-1110-M2SC05	Dual SC	1000Base-SX	-9.5	-4.0	-17.0	-3.0	7.5	850	MMF	62.5	160	220 m (722 ft)
										62.5	200	275 m (902 ft)
										50	400	500 m (1,640 ft)
										50	500	550 m (1,804 ft)
										50	2000	1000 m (3281 ft)

CM-1110-M2LC05	Dual LC	1000Base-SX	-9.5	-4.0	-17.0	-3.0	7.5	850	MMF	62.5	160	220 m (722 ft)
										62.5	200	275 m (902 ft)
										50	400	500 m (1,640 ft)
										50	500	550 m (1,804 ft)
										50	2000	1000 m (3281 ft)
CM-1110-M2ST05	Dual ST	1000Base-SX	-9.5	-4.0	-17.0	-3.0	7.5	850	MMF	62.5	160	220 m (722 ft)
										62.5	200	275 m (902 ft)
										50	400	500 m (1,640 ft)
										50	500	550 m (1,804 ft)
										50	2000	1000 m (3281 ft)
CM-1110-M2SC2	Dual SC	1000Base-LX	-6.0	0.0	-17.0	-0.0	11	1310	MMF	62.5	160	2 km (1.2 mi)
										50	500	1000m (3280ft)
CM-1110-M2ST2	Dual ST	1000Base-LX	-6.0	0.0	-17.0	-0.0	11	1310	MMF	62.5	160	2 km (1.2 mi)
										50	500	1000m (3280ft)
CM-1110-M2LC2	Dual LC	1000Base-LX	-9.0	-1.0	-19.0	-1.0	10	1310	MMF	62.5	160	2 km (1.2 mi)
										50	500	1000m (3280ft)
CM-1110-S2SC10	Dual SC	1000Base-LX/LH	-9.5	-3.0	-20.0	-3.0	10.5	1310	MMF*	62.5	500	550 m (1,804 ft)
										50	400	550 m (1,804 ft)
										50	400	550 m (1,804 ft)
									SMF	**	-	10 km (6.2 mi)
CM-1110-S2LC10	Dual LC	1000Base-LX/LH	-9.5	-3.0	-20.0	-3.0	10.5	1310	MMF*	62.5	500	550 m (1,804 ft)

										50	400	550 m (1,804 ft)
										50	400	550 m (1,804 ft)
									SMF	**	-	10 km (6.2 mi)
CM-1110-S2ST10	Dual ST	1000Base-LX/LH	-9.5	-3.0	-20.0	-3.0	10.5	1310	MMF*	62.5	500	550 m (1,804 ft)
										50	400	550 m (1,804 ft)
										50	400	550 m (1,804 ft)
									SMF	**	-	10 km (6.2 mi)
CM-1110-S2SC40	Dual SC	1000Base-EX	-2.0	2.0	-23.0	-3.0	21.0	1310	SMF	**	-	40 km (25 mi)
CM-1110-S2LC40	Dual LC	1000Base-EX	-3.0	2.0	-23.0	-3.0	20.0	1310	SMF	**	-	40 km (25 mi)
CM-1110-S2ST40	Dual ST	1000Base-EX	-2.0	2.0	-23.0	-3.0	21.0	1310	SMF	**	-	40 km (25 mi)
CM-1110-S2SC70	Dual SC	1000Base-ZX	-2.0	5.0	-23.0	-3.0	21.0	1550	SMF	-	-	70 km (43 mi)
CM-1110-S2LC70	Dual LC	1000Base-ZX	0.0	5.0	-23.0	-3.0	23.0	1550	SMF	-	-	70 km (43 mi)
CM-1110-S2ST70	Dual ST	1000Base-ZX	-2.0	5.0	-23.0	-3.0	21.0	1550	SMF	-	-	70 km (43 mi)
CM-1110-S2SC120	Dual SC	1000Base-ZX	0.0	5.0	-32.0	-9.0	32	1550	SMF	-	-	120 km (75 mi)
CM-1110-S2LC120	Dual LC	1000Base-ZX	0.0	5.0	-32.0	-9.0	32	1550	SMF	-	-	120 km (75 mi)
CM-1110-S2ST120	Dual ST	1000Base-ZX	0.0	5.0	-32.0	-9.0	32	1550	SMF	-	-	120 km (75 mi)
CM-1110-S2SC160	Dual SC	1000Base-ZX	2.0	5.0	-34.0	-9.0	36.0	1550	SMF	-	-	160 km (100 mi)
CM-1110-S2LC160	Dual LC	1000Base-ZX	2.0	5.0	-34.0	-9.0	36.0	1550	SMF	-	-	160 km (100 mi)
CM-1110-S2ST160	Dual ST	1000Base-ZX	2.0	5.0	-34.0	-9.0	36.0	1550	SMF	-	-	160 km (100 mi)

Single Fiber Models (Recommended use in pairs)

Model	Connector	Type	Transmit (dBm)		Receive (dBm)		Power Budget (dBm)	Wavelength (nm)	Fiber Type	Core Size (um)	Modal Bandwidth (MHz* Km)	Operating Distance
			Min	Max	Min	Max						

CM-1110-M1SC05U	Single SC	1000Base-BX-U	-10.0	-4.0	-17.0	-3.0	7.0	1310 / 1550	MMF	62.5	500	500 m (1,640 ft)
										50	500	500 m (1,640 ft)
CM-1110-M1SC05D	Single SC	1000Base-BX-D	-10.0	-4.0	-17.0	-3.0	7.0	1550 / 1310	MMF	62.5	500	500 m (1,640 ft)
										50	500	500 m (1,640 ft)
CM-1110-S1SC10U	Single SC	1000Base-BX-U	-9.0	-3.0	-20.0	-3.0	11.0	1310 / 1490	SMF	**	-	10 km (6.2 mi)
CM-1110-S1SC10D	Single SC	1000Base-BX-D	-9.0	-3.0	-20.0	-3.0	11.0	1490 / 1310	SMF	**	-	10 km (6.2 mi)
CM-1110-S1SC20U	Single SC	1000Base-BX-U	-8.0	-3.0	-22.0	-3.0	14.0	1310 / 1490	SMF	**	-	20 km (12.4 mi)
CM-1110-S1SC20D	Single SC	1000Base-BX-D	-8.0	-3.0	-22.0	-3.0	14.0	1490 / 1310	SMF	**	-	20 km (12.4 mi)
CM-1110-S1SC40U	Single SC	1000Base-BX-U	-3.0	2.0	-23.0	-3.0	20.0	1310 / 1490	SMF	**	-	40 km (25 mi)
CM-1110-S1SC40D	Single SC	1000Base-BX-D	-3.0	2.0	-23.0	-3.0	20.0	1490 / 1310	SMF	**	-	40 km (25 mi)
CM-1110-S1SC80U	Single SC	1000Base-BX-U	-2.0	3.0	-26.0	-3.0	24.0	1510 / 1590	SMF	-	-	80 km (50 mi)
CM-1110-S1SC80D	Single SC	1000Base-BX-D	-2.0	3.0	-26.0	-3.0	24.0	1590 / 1510	SMF	-	-	80 km (50 mi)
CM-1110-S1SC120U	Single SC	1000Base-BX-U	-3.0	2.0	-34.0	-9.0	31	1510 / 1590	SMF	-	-	120 km (75 mi)
CM-1110-S1SC120D	Single SC	1000Base-BX-D	-3.0	2.0	-34.0	-9.0	31	1590 / 1510	SMF	-	-	120 km (75 mi)

The minimum fiber cable distance for all converters listed is 2 meters.

*A mode-conditioning adapter as specified by the IEEE standard, is required regardless of the span length. Note how the mode conditioning adapter for 62.5-um fibers has a different specification from the mode-conditioning adapter for 50-um fibers.

**ITU-T G.652 SMF as specified by the IEEE 802.3z standard.