SMI-110 10/100 Rate Converting Media Converters

perle.com/products/10-100-managed-media-converters.shtml

Standalone, Managed

- 10/100Base-TX to 100Base-X Fiber Media Converters
- Extend network distances up to 120km
- SC, LC and ST Media Converters
- Advanced Features: Link Pass-Through, Far-End Fault, Auto-MDIX
- Manage via SNMP, CLI - Telnet/SSH, Internet Browser, or PerleVIEW Centralized Management Package

Perle's advanced line of **Managed 10/100 Ethernet Media Converters**, transparently connect UTP ethernet copper to multimode or single mode fiber. While providing an economical means of extending your existing copper based network connection, these media converters are SNMP manageable to enable complete control and status viewing of your fiber links.

Perle 10/100 Managed Media Converters come standard with extensive cost and time saving features. In addition, a lifetime warranty and free worldwide technical support make Perle's Managed 10/100 Ethernet Converters the smart choice for IT professionals.

SMI-110 Managed Fast Ethernet 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 Multicast Frame filtering	When enabled, Multicast frames with an unknown destination address are not allowed to egress the port

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 to use the on-board DIP switches or the management software for mode selection
Auto-MDIX	Can manually set Auto or MDIX on the copper port via on-board strap or via the management software. Auto-MDIX (automatic medium-dependant interface crossover) detects the signaling on the UTP interface to determine the type of cable connected (straight-through or crossover) and automatically configures the connection when enabled. With Auto-MDIX enabled, 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.
Converter Information	• User configurable media converter name • User configurable fiber port name • User configurable copper port name • Hardware revision number • Firmware version number
DIP switch settings	View hardware DIP switch settings
Selectable Max Packet Size	Set max packet size to 1522, 1518 or 2048 (default)
10BaseT Extended Distance	Normal/extended – default Normal. By configuring as “extended”, the 10baseT receiver sensitivity is increased providing the possibility of a 10BaseT connection greater than 100m.
Port Control	Enable or disable individual fiber or copper port on the converter
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)
Control	• Reset • Reset to factory default • Reset Statistical counters • Phy specific commands such write/read config, read dip switches • Update firmware • Fiber Loopback mode. (On/Off) • Upload/download configuration
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 on the 10/100Base-TX interface.
Link Pass-Through	With Link Pass-Through the state of the UTP receiver is passed to the fiber transmitter to make the media converter appear transparent to the end devices that are connected. In addition if Far-End Fault is enabled the media converter can turn off the 10/100Base-TX transmitter when a FAR-End Fault is received. Using Link Pass-Through with Far-End Fault minimizes data loss when a fault occurs. Should a fault occur, the end devices have the indication of a failure available to them making trouble shooting easier.
Far-End Fault (FEF)	The media converter implements the 802.3 standard for Far-End Fault for the indication and detection of remote fault conditions on the 100Base-X fiber connection. With Far-End Fault enabled the media converter transmits the Far-End Fault Indication over the 100Base-X fiber connection whenever a receive failure is detected on the 100Base-X fiber connection. The media converter continuously monitors the100Base-X fiber connection for a valid signal. The action the media converter takes on receiving a Far-End Fault Indication is dependent on the Link Pass-Through switch setting.
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 10/100Base-TX copper connection.
Remote Loopback	The media converter is capable of performing a loopback on the fiber port.

SMI-110 Advanced Management Features

Enterprise and carrier-grade security is available through the support of strong authentication systems such as TACACS+, RADIUS and LDAP. Secure in-band access is assured via SNMPv3, SSH CLI and secure HTTPS Internet browser.

SNMP

	• Full read/write capabilities via central SNMP servers and PerleVIEW • Send SNMP traps (up to 4 servers) • SNMPv3, V2C and V1 • SNMPv3 – encryption and authentication for both management and trap support • RFC1213 MIB II • Proprietary MIB provided
Telnet / SSH CLI access	In-band command line access via Telnet or SSH application
Internet Browser access	• Fast and intuitive graphical web interface for use with common internet browsers such Internet Explorer, Mozilla Firefox and Safari • HTTP or secure HTTPS • PerleVIEW Centralized Management Package
Console port CLI access	Out-of-band command line access via Cisco compatible RJ45 serial console port using common “rolled” CAT5 cable. Console port can be enabled (default) or disabled
Concurrent management sessions	Run multiple management sessions simultaneously for multiple users
Inactivity timeout	Protect secure management sessions by setting an inactivity timeout value
Alert event reporting	Alert level events are stored in the local event log and sent as: • SNMP traps to up to 4 servers • SYSLOG messages to a SYSLOG server • Email to user defined email address
Advanced IP feature set	• IPV4 and IPV6 address support • DHCP • DNS • Dynamic DNS • NTP • TFTP • Telnet • SSH V2 and V1 • HTTP • HTTPS
Advanced Management User Authentication with primary and secondary server support	• TACACS+ • RADIUS

	• LDAP • Active Directory via LDAP • RSA Secure ID-agent or via RADIUS authentification • Kerberos • NIS
Advanced Management User Authorization and Accounting	• TACACS+ • RADIUS
Encryption	• AES (256/192/128), 3DES, DES, Blowfish, CAST128, ARCFOUR(RC4), ARCTWO(RC2) • Hashing Algorithms: MD5, SHA-1, RIPEMD160, SHA1-96, and MD5-96 • Key exchange: RSA, EDH-RSA, EDH-DSS, ADH • X.509 Certificate verification: RSA, DSA
Access Control List	An access control list can be created which can filter out only those workstations that are authorized to access the management resources. Filter on IP and/or Ethernet MAC addresses
Network Services Filter	Enable only those network services on the management module that are allowed on your network (Telnet, SSH, HTTP, HTTPS, SNMP)
Firmware download	Update the latest level firmware for management and media converter modules via TFTP or PerleVIEW

Media Converter Module 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 (LKF)	This green LED is operational only when power is applied. The LED is on when the 100Base-FX link is on and flashes with a 50% duty cycle when data is received.
Copper link on / Receive activity (LKC)	This green LED is operational only when power is applied. The LED is on when the 100Base-TX 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 100Base-FX 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 10/100Base-TX link is operatinal in full duplex mode. The LED is off when in half duplex.
10/100 Speed	This green LED is operational only when power is applied. The LED is on when the speed of the copper

	Ethernet port is running at 100 MBPS. The LED is off when in 10 MBPS
Management Module Indicators / reset	
Power	Blinking green during startup cycle Steady green: module has power and is ready Red : error
ALM	Red alarm indicator activated when an alert event occurs
LKC	Green indicator indicating an active Ethernet link. Blinking indicates RX and TX of data
100/1000	Green - 1000 Mbps link Yellow - 100 Mbps link Off - 10 Mbps or no Link
Reset button	Recessed pinhole button resets module
Connectors	
100Base-TX	RJ45 connector, 2 pair CAT 5, EIA/TIA 568A/B or better cable Magnetic Isolation - 1.5kv
Fiber Optic Cable	Multimode: 62.5 / 125, 50/125, 85/125, 100/140 micron Single Mode: 9/125 micron (ITU-T 625)
Management ethernet port	10/100/1000Base-T - RJ45 Auto- MDI/MDIX
Management console port	RS232 Serial RJ45 - Cisco pinout for use with standard CAT5 "rolled cable" (crossover) 9600 to 115k bps 7/8 bits Odd,even, no parity 1/2 stop bits Hardware/software flow control DCD/DSR monitoring
Filtering	
Filtering	1024 MAC Addresses
Frame Specifications	
Buffer	512 Kbits frame buffer memory
Size	Maximum frame size of 2048 bytes
Switches - accessible through a side opening in the chassis	
Auto-Negotiation (802.3u)	*Enabled (Default)* - The media converter uses 802.3u Auto-negotiation on the 100Base-TX interface. It is set to advertise full duplex. *Disabled* - The media converter sets the port according to the position of the speed and duplex switches.
Link Pass Through	*Enabled (Default)* - When the state of the receiver is changed on the 100Base-TX interface it is reflected on the 100Base-FX fiber transmitter. When the state of the receiver on the 100Base-FX interface is changed it is reflected on the 100Base-TX transmitter.

	When a Far-End Fault Indication is received on the fiber interface the 100Base-TX transmitter is turned off. When the Far-End Fault Indication is cleared the transmitter is turned back on. *Disabled* - The 100Base-TX and the 100Base-FX fiber interface operate independently. Far-End Fault indication on the 100Base-FX fiber interface has no effect on the 100Base-TX interface.
Far-End Fault (FEF)	*Enabled (Default)* - The media converter transmits the Far-End Fault Indication over the 100Base-X fiber connection whenever a receive failure is detected on the 100Base-X fiber connection. The media converter continuously monitors the100Base-X fiber connection and clears the Far-End Fault Indication condition when a valid signal is received. *Disabled* - Far-End Fault Indications are not transmitted regardless of the condition of the receive signal on the 100Base-FX fiber connection.
Remote Loopback	The media converter can perform a loopback on the 100Base-X fiber interface. *Disabled (Default - Up)* *Enabled* - The 100Base-X receiver is looped to the 100Base-X transmitter. The 100Base-TX transmitter is taken off the interface.
Auto-MDIX (Strap)	If Auto-Negotiation (802.3u) is enabled, the media converter uses the HP Auto-MDIX method for the 100Base-TX interface. If Auto-Negotiation (802.3u) is disabled the Media converter will use the RX Energy method on the 100Base-TX 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
	Power
Input Supply Voltage	(12 vDC Nominal)
Current	0.34amps at 12vdc
Power Consumption	4.1watts

Power Connector	5.5mm x 9.5mm x 2.1mm barrel socket
Power Adapter	
Universal AC/DC adapter	100-240v AC, regulated DC adapter included
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)	14
MTBF (Hours)*	246,403 without power adaptor 168,829 with power adaptor
Chassis	Metal with an IP20 ingress protection rating
Mounting	
Din Rail Kit	Optional
Rack Mount Kit	Optional
Product Weight and Dimensions	
Weight	0.722 kg
Dimensions	175 x 145 x 23 mm
Packaging	
Shipping Weight	1.2 kg
Shipping	300 x 200 x 70 mm

Dimensions	

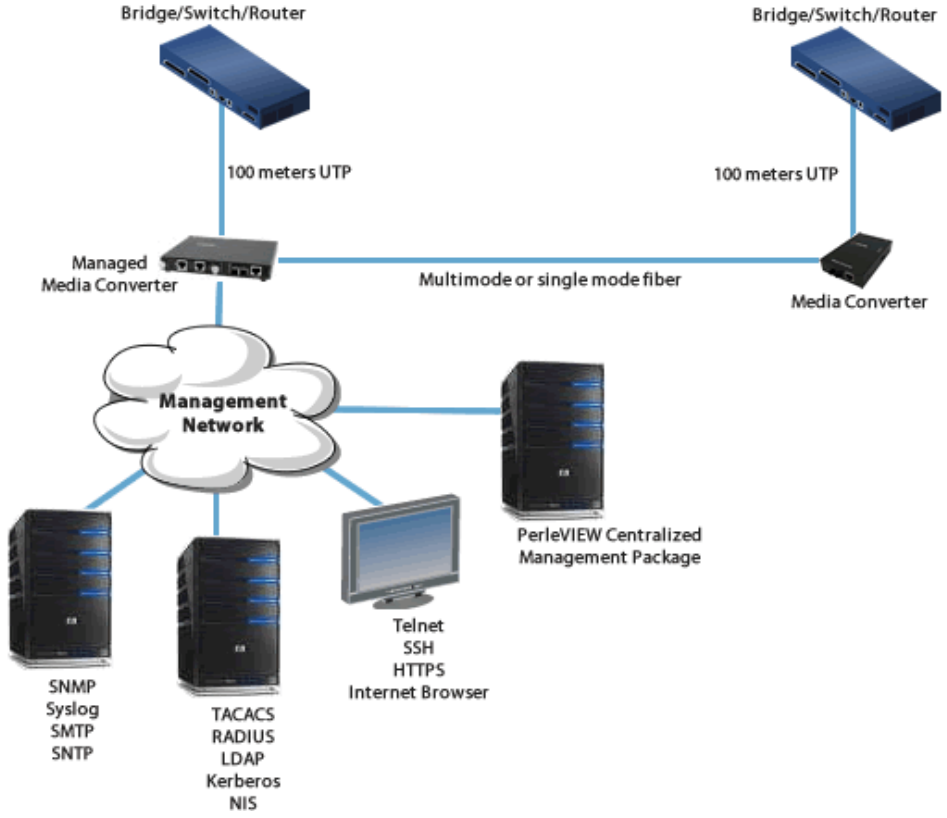
Regulatory Approvals

Emissions	FCC Part 15 Class B**, EN55022 Class B**
	CISPR 22 Class B**
	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: 5A992
	HTSUS Number: 8517.62.0050
	Perle Limited Lifetime Warranty

*Calculation model based on MIL-HDBK-217-FN2 @ 30 °C
** When used with a Class B rated AC power adapter.

Managed Ethernet to Fiber Links

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



10/100 – Extend Network between Ethernet Hubs

Extend the network distance between two Ethernet Hubs
A pair of 10/100 media converters can extend the distance between hubs across a fiber link up to 120km in length.

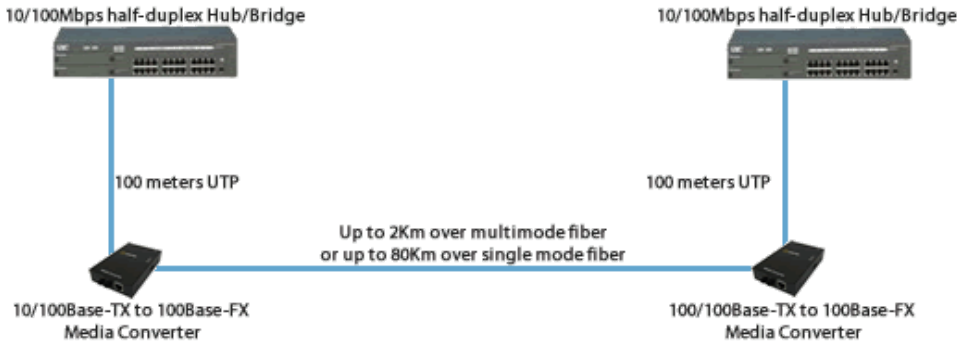
10/100 – Extend Network between 10Mbps and Fast Ethernet

Extend the network distance between legacy 10Mbps copper Ethernet to Fast Ethernet infrastructure
A pair of 10/100 media converters can extend the distance between a legacy 10Mbps device to a Fast Ethernet switch across a fiber link up to 120km in length.

10/100 – Extend Network between Half-Duplex Hubs

Extend the network distance between two Ethernet half-duplex hubs

A pair of 10/100 media converters can extend the distance between hubs across a fiber link up to 120km in length. They also isolate the collision domains, associated with half-duplex, from crossing the fiber link.



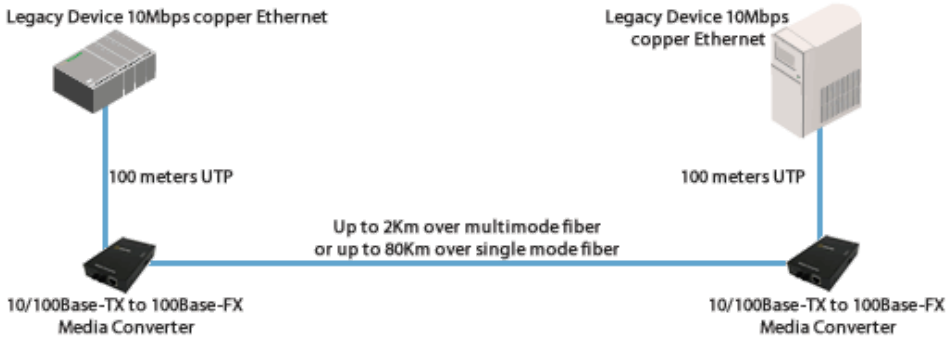
10/100 – Extend Network between Half-Duplex Hub and Switch

Extend the network distance between an Ethernet half-duplex hub and a full-duplex switch

A pair of 10/100 media converters can extend the distance between a half-duplex hub and a full-duplex switch across a fiber link up to 120km in length. They also isolate the collision domains, associated with half-duplex, from crossing the fiber link. In this scenario, the media converter connected to the switch must be forced to half-duplex.

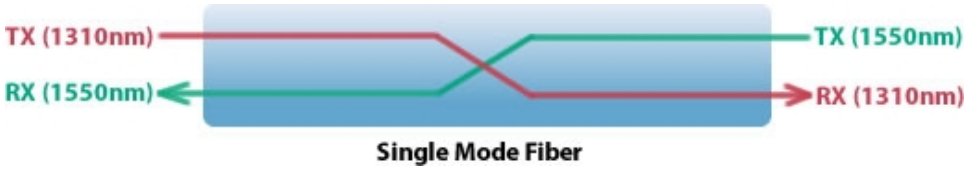
10/100 – Extend Network between two legacy 10Mbps Devices

Extend the network distance between legacy 10Mbps copper Ethernet devices
A pair of 10/100 media converters can extend the distance between two legacy 10Mbps devices across a fiber link up to 120km in length.



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 SMI-110-S1SC20**U** ("Up") and SMI-110-S1SC20**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.



SMI-110-S1SC20USMI-110-S1SC20D

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 Stand-alone Media Converters - Fast Ethernet to Fiber

	Transmit (dBm)	Receive (dBm)	Power Budget	Wavelength	Fiber	Operating

Model	Connector	Type	Min	Max	Min	Max	(dBm)	(nm)	Type	Distance
SMI-110-M2ST2	Dual ST	100Base-FX	-20.0	-12.0	-31.0	-14.0	11.0*	1310	MMF	2 km (1.2 mi)
SMI-110-M2SC2	Dual SC	100Base-FX	-20.0	-12.0	-31.0	-14.0	11.0*	1310	MMF	2 km (1.2 mi)
SMI-110-M2LC2	Dual LC	100Base-FX	-20.0	-12.0	-30.0	-14.0	10.0*	1310	MMF	2 km (1.2 mi)
SMI-110-S2ST20	Dual ST	100Base-LX	-18.0	-7.0	-32.0	-3.0	14.0	1310	SMF	20 km (12.4 mi)
SMI-110-S2SC20	Dual SC	100Base-LX	-18.0	-7.0	-32.0	-3.0	14.0	1310	SMF	20 km (12.4 mi)
SMI-110-S2LC20	Dual LC	100Base-LX	-15.0	0.0	-34.0	-5.0	19.0	1310	SMF	20 km (12.4 mi)
SMI-110-S2ST40	Dual ST	100Base-EX	-5.0	0.0	-34.0	-3.0	29.0	1310	SMF	40 km (25 mi)
SMI-110-S2SC40	Dual SC	100Base-EX	-5.0	0.0	-34.0	-3.0	29.0	1310	SMF	40 km (25 mi)
SMI-110-S2LC40	Dual LC	100Base-EX	-5.0	0.0	-34.0	-3.0	29.0	1310	SMF	40 km (25 mi)
SMI-110-S2ST80	Dual ST	100Base-ZX	-5.0	0.0	-34.0	-3.0	29.0	1550	SMF	80 km (50 mi)
SMI-110-S2SC80	Dual SC	100Base-ZX	-5.0	0.0	-34.0	-3.0	29.0	1550	SMF	80 km (50 mi)
SMI-110-S2LC80	Dual LC	100Base-ZX	-5.0	0.0	-34.0	-3.0	29.0	1550	SMF	80 km (50 mi)
SMI-110-S2ST120	Dual ST	100Base-ZX	0.0	5.0	-35.0	-3.0	35.0	1550	SMF	120 km (75 mi)
SMI-110-S2SC120	Dual SC	100Base-ZX	0.0	5.0	-35.0	-3.0	35.0	1550	SMF	120 km (75 mi)
SMI-110-S2LC120	Dual LC	100Base-ZX	0.0	5.0	-34.0	-3.0	34.0	1550	SMF	120 km (75 mi)

Single Fiber Models (Recommended use in pairs)

	Transmit (dBm)		Receive (dBm)		Power Budget	Wavelength	Fiber	Operating

Model	Connector	Type	Min	Max	Min	Max	(dBm)	(nm)	Type	Distance
SMI-110-M1ST2U	Single ST	100Base-BX-U	-15.0	0.0	-28.0	-8.0	13.0	1310 / 1550	MMF	2 km (1.2 mi)
SMI-110-M1ST2D	Single ST	100Base-BX-D	-15.0	0.0	-28.0	-8.0	13.0	1550 / 1310	MMF	2 km (1.2 mi)
SMI-110-M1SC2U	Single SC	100Base-BX-U	-15.0	0.0	-28.0	-8.0	13.0	1310 / 1550	MMF	2 km (1.2 mi)
SMI-110-M1SC2D	Single SC	100Base-BX-D	-15.0	0.0	-28.0	-8.0	13.0	1550 / 1310	MMF	2 km (1.2 mi)
SMI-110-S1ST20U	Single ST	100Base-BX-U	-14.0	-8.0	-32.0	-3.0	18.0	1310 / 1550	SMF	20 km (12.4 mi)
SMI-110-S1ST20D	Single ST	100Base-BX-D	-14.0	-8.0	-32.0	-3.0	18.0	1550 / 1310	SMF	20 km (12.4 mi)
SMI-110-S1SC20U	Single SC	100Base-BX-U	-14.0	-8.0	-32.0	-3.0	18.0	1310 / 1550	SMF	20 km (12.4 mi)
SMI-110-S1SC20D	Single SC	100Base-BX-D	-14.0	-8.0	-32.0	-3.0	18.0	1550 / 1310	SMF	20 km (12.4 mi)
SMI-110-S1SC40U	Single SC	100Base-BX-U	-8.0	-3.0	-33.0	-3.0	25.0	1310 / 1550	SMF	40 km (25 mi)
SMI-110-S1SC40D	Single SC	100Base-BX-D	-8.0	-3.0	-33.0	-3.0	25.0	1550 / 1310	SMF	40 km (25 mi)

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

*Based on use with 62.5/125 micron multimode fiber.

Media Converter Accessories

4 DIN Rail Mount Bkt	DIN Rail Mounting Kit
MCSM	Standalone media converter wall mount bracket