SMI-10G Managed Media Converters

10 Gigabit Fiber to Fiber, Copper to Fiber and Copper to Copper conversion

- Uses a variety of 10G transceivers supplied by Perle, Cisco or other MSA compliant SFP+ and XFPs

- Advanced features –Smart Link Pass-Through, Fiber Fault Alert, Built-in Link Test Generator and Loopback

- Support for Power Level 1,2,3 as well as high-power Level 4 XFPs

- Optical signal regeneration: 3R (re-amplify, reshape, and retime)

- Manage via SNMP, CLI - Telnet/SSH, Internet browser, or PerleVIEW Centralized Management Package

Perle **SMI-10G Managed Media Converters** transparently connect 10 Gigabit Ethernet links over multimode or single mode fiber in **environments where network security is critical**. Each 10GbE Media Converter comes with two pluggable transceiver ports that support fiber to fiber, copper to fiber or copper to copper media conversion.

SMI-10G Managed Media Converters support all authentication, authorization and accounting (AAA) security services used in corporate networks, including TACACS+, RADIUS, LDAP, Kerberos, NIS and RSA. To further protect ID's and passwords from someone 'snooping' on the network, Perle Managed Media Converters provide secure management sessions by supporting **SSH, SNMPv3, Telnet and HTTPS**. These types of features are used when managing your corporate firewalls, switches and routers. This is why Perle makes them available in the **SMI-10G Managed Media Converter**. 10G Media Converters are also available for unmanaged applications.

Fiber to Fiber and **Copper to Fiber** conversion is achieved by inserting XFP or SFP+ fiber transceivers that support multimode and single-mode fiber, including CWDM/DWDM wavelengths. **Copper to copper** is achieved by inserting SFP+ Direct Attach Cable (DAC), also known as twinax, or XFP 10Gbase-CX4 transceivers.

The empty transceiver ports on the **SMI-10G Media Converters** allow for flexible network configurations to meet any requirement using a variety of 10G transceivers supplied by Perle, Cisco or other manufacturers of MSA compliant SFP+ and XFPs. You can use these products to convert:

- SFP+ to SFP+

- XFP to XFP

- XFP to SFP+

- SFP to SFP (1000Base-x to 1000Base-x)

- SFP+ to CX4

Perle 10 Gigabit Ethernet to Fiber Converters provide an economical path to extend the distance of an existing 10GbE link. Network Administrators can "see-everything" with Perle's advanced features such as Smart Link Pass-Through, Fiber Fault Alert, a built-in Link Test capability and Loopback. This allows for more efficient

troubleshooting and less on-site maintenance. These cost and time saving features, along with a **lifetime warranty and free worldwide technical support**, make Perle **SMI-10G Media Converters** the smart choice for IT professionals.

SMI-10G Managed Media Converter Features

Smart Link Pass-Through	When the Smart Link Pass-Through switch is enabled (default), each port will reflect the state of its port peer. In this mode, if a link loss is detected on one port, the transmit signal on the other port is disabled "passing through" the state of the failed link. This enables managed switches and other devices to report link failures to their network NMS. When the switch is in the down position, Smart Link Pass-Through is disabled. If a link loss is detected on one port, the transmit signal remains enabled on the other port.
Fiber Fault Alert	With Fiber Fault Alert the state of the 10 Gigabit Ethernet receiver is passed to the transmitter. This provides fault notification to the partner device attached to the 10G Ethernet interface of the media converter.
3R – Optical Signal Regeneration	Optical signal regeneration: 3R (Re-amplify, Reshape, and Retime the signal) ensures that there is a quality link at 10 Gigabit speeds.
Built-in Link Test	When enabled, the built-in packet generator transmits Ethernet test frames to its 10 Gigabit Ethernet peer. The remote media converter will auto-detect the test frames and loopback the test frames. Any frames received in error, will cause the Power, LK1 and LK2 LEDs to illuminate in a specific combination to identify the error. During the test different bit test patterns will be utilized every 5 seconds ensuring a thorough link test.
Test Mode Auto-detect	When enabled through the management interface, the remote media converter will enter test mode automatically when requested by its central site peer. This virtually eliminates unnecessary truck rolls to a remote site when diagnosing a link failure.
EDC Mode Control	Electronic Dispersion Compensation (EDC) is an algorithmic method used to compensate for optical dispersion that occurs on high speed 10 Gigabit links. EDC mode settings are automatically configured by the media converter based on the information retrieved from the SFP+ or XFP module. This will enable proper operation for extended multimode 10GBase-LRM as well as active or passive copper cabling.
Module Temperature Protection	Protects your DOM/DMI capable SFP+ or XFP module by monitoring its internal temperature and will automatically shut down the XFP or SFP if the module is operating above its maximum temperature threshold.
High Power Level 4 XFPs	High powered Level 4 XFPs are supported in XTSH and XTXH models.
Gigabit SFP support	The 10 Gigabit media converter model with dual SFP+ slots can also support Gigabit (1000Base-X) SFPs. This allows users to use Gigabit SFPs today and migrate to 10G SFP+ in the future. Both slots must be populated with Gigabit SFPs.

Jumbo Packets	Transparent to jumbo packets.
VLAN	Transparent to VLAN tagged packets.
Remote Loopback	Capable of performing a loopback on each 10 Gigabit interface. In this mode, all frames received on the port in loopback mode will be transmitted back. This provides users with the capability of utilizing their own in-house test generators for testing the link.
Configuration Mode selection	Select whether to use the on-board DIP switches or the management software for mode selection.
Converter Information	- Media converter model and serial - User configurable name - User configurable fiber port name - Hardware revision number - Firmware version number
Module DIP switch settings	View hardware DIP switch settings.
Port Control	Enable or disable individual fiber ports on the module.
Fiber Port Status	- Port Enabled (Yes/No) - Connector - Link Status (Up/Down) - Fiber Fault Alert (OK, Failed) - Fiber Loopback mode (On/Off)
Control	- Reset - Reset to factory default - Ability to specific read/write phy registers - Update firmware - Fiber Loopback mode (Yes/No) - Upload/download configuration
Manage Tune-able	Select transceiver ITU 50GHz center wavelengths and channel numbering on tune-able XFP transceivers.

DWDM XFP
modules

SMI-10G 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 Authorization and Accounting with primary and secondary server support	
	• TACACS+
	• RADIUS
	• LDAP
	• Active Directory via LDAP
	• RSA Secure ID-agent or via RADIUS authentication
	• Kerberos
	• NIS
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.

Power	Dual SFP	Dual XFP	XFP to SFP

Input Supply Voltage	12 vDC Nominal		
Maximum Current Amps @ 12v DC	0.8	XTX: 1.25	XTS: 1.0
		XTXH: 1.6	XTSH: 1.6
Maximum Power * Requirements (watts)	9.7 *	XTX: 15.0 *	XTS: 12.0 *
		XTXH: 19.3 *	XTSH: 19.3 *
Power Connector	5.5mm x 9.5mm x 2.1mm barrel socket		

Power Adapter

Universal AC/DC Adapter	100-240v AC, regulated AC/12v DC adapter included
	STS and XTS : 12 watt adapter
	XTX, XTXH and XTSH : 24 watt adapter

Indicators

Power / TST	- On: Power indication and in normal operation - Blinking slowly: the unit is in loopback or test mode (either port) - Blinking quickly: the unit has a hardware error (Err LED will also be on)
LK1, LK2	- On: Fiber link present - Blinking quickly: Fiber link present and receiving data.(including test data) - Blinking slowly: Fiber link disabled because the other fiber link went down. - Blinking 1 sec on 3 sec off – invalid SFP+ or XFP inserted - Blinking twice then 3 sec off – module shut down due to high temperature. - LK1, LK2 alternating on and off – 1 sec on 1 sec off incompatible Speeds (Err LED will also be on) - Off: No fiber link present or no module inserted
ERR LED	When in test mode – this indicates test mode errors – will clear when the link has recovered - If Power LED is blinking, this indicates a hardware error - If LNK LEDS blink, this indicates that there is a module compatibility error

Switches - accessible through a side opening in the chassis

Smart Link Pass-Through	When the Smart Link Pass-Through switch is enabled (default), each port will reflect the state of its port peer. In this mode, if a link loss is detected on one port, the transmit signal on the other port is disabled "passing through" the state of the failed link. This enables managed switches and other devices to report link failures to their network NMS. When the switch is in the down position, Smart Link Pass-Through is disabled. If a link loss is detected on one port, the transmit signal remains enabled on the other port.
Fiber Fault Alert	*Enabled (Default - Up)* With Fiber Fault Alert the state of the 10 Gigabit ethernet receiver is passed to the transmitter. This provides fault notification to the partner device attached to the 10G ethernet interface of the media converter *Disabled (Down)*
EDC Mode	Electronic Dispersion Compensation is an algorithmic method used to compensate for optical dispersion that occurs on high speed 10 Gigabit links. EDC mode settings are automatically configured by the media converter based on the information retrieved from the SFP+ or XFP module. This will enable proper operation for extended multimode 10GBase-LRM as well as active or passive copper cabling. In the default UP switch position the media converter will automatically set the 10G transceiver to match the EDC type declared by the SFP+ / XFP module to either to "linear" or "limiting". In the event that there is a mismatch, setting the switch to the Down position on the media converter will flip the setting to that declared by the module.
Loopback	Capable of performing a loopback on each 10 Gigabit interface. In this mode, all frames received on the port in loopback mode will be transmitted back. This provides users with the capability of utilizing their own in-house test generators for testing the link.

Connectors	Dual SFP	Dual XFP	XFP to SFP
Pluggable 10G Fiber Transceiver slots (Hot insertion and removable)	Two 10 Gigabit SFP+ Slots • Power level 1, 2	Two 10 Gigabit XFP Slots • Power level 1,2,3 • Power Level 4 (XTSH model)	One 10 Gigabit SFP+ • Power Level 1, 2 One 10 Gigabit XFP • Power level 1,2,3 • Power Level 4 (XTSH model)

Voltages supplied to XFP slots	-	1.8V, 3.3V, 5V and -5.2V	1.8V, 3.3V, 5V and -5.2V
Supported 10 Gigabit Fiber pluggable transceivers	IEEE 802.3ae compliant: • 10GBase-SR • 10GBase-LRM • 10GBase-LR • 10GBase-ER • 10GBase-ZR CWDM/DWDM	IEEE 802.3ae compliant: • 10GBase-SR • 10GBase-LRM • 10GBase-LR • 10GBase-ER • 10GBase-ZR CWDM/DWDM	IEEE 802.3ae compliant: • 10GBase-SR • 10GBase-LRM • 10GBase-LR • 10GBase-ER • 10GBase-ZR CWDM/DWDM
Supported 10 Gigabit Copper pluggable transceivers	SFP+ Direct Attach Cable (DAC). Also known as: • Twinax • 10GBase-CU • 10GSFP+Cu • 10GBase-CX1 • 10GBase-CR1 Note: Passive and Active cable types supported	IEEE 802.3ak compliant: • XFP 10GBase-CX4 copper	SFP+ Direct Attach Cable (DAC). Also known as: • Twinax • 10GBase-CU • 10GSFP+Cu • 10GBase-CX1 • 10GBase-CR1 Note: Passive and Active cable types supported IEEE 802.3ak compliant: • XFP 10GBase-CX4 copper
Supported Gigabit Fiber SFPs	1000Base-SX 1000Base-LX/LH 1000Base-EX 1000Base-ZX 1000Base-BX CWDM/DWDM Note: In this mode both SFP modules must operate 1000Base-X	N/A	N/A

Environmental Specifications	Dual SFP	Dual XFP	XFP to SFP
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)	13.1 *	XTX: 51.2 * XTXH: 65.9 *	XTS: 40.9 * XTSH: 65.9 *
MTBF (Hours)**	Without power adaptor: 194,615 With power adaptor: 138,338	Without power adaptor: 184,350 With power adaptor: 139,590	Without power adaptor: 184,350 With power adaptor: 133,071
Chassis	Metal with an IP20 ingress protection rating		
Mounting			
Din Rail Kit	Optional		
Wall / Rack Mount Kit	Optional		
Product Weight and Dimensions			
Weight	0.93 Kg, 2.1 lbs		
Dimensions	175 x 145 x 46mm, 6.9 x 5.7 x 1.8 inches		
Packaging			
Shipping Weight	STS and XTS : 1.2 Kg, 2.6 lbs XTX, XTXH and XTSH : 1.5 Kg, 3.3 lbs		

Shipping Dimensions	300 x 200 x 70 mm, 11.8 x 7.9 x 2.8 inches

Regulatory Approvals

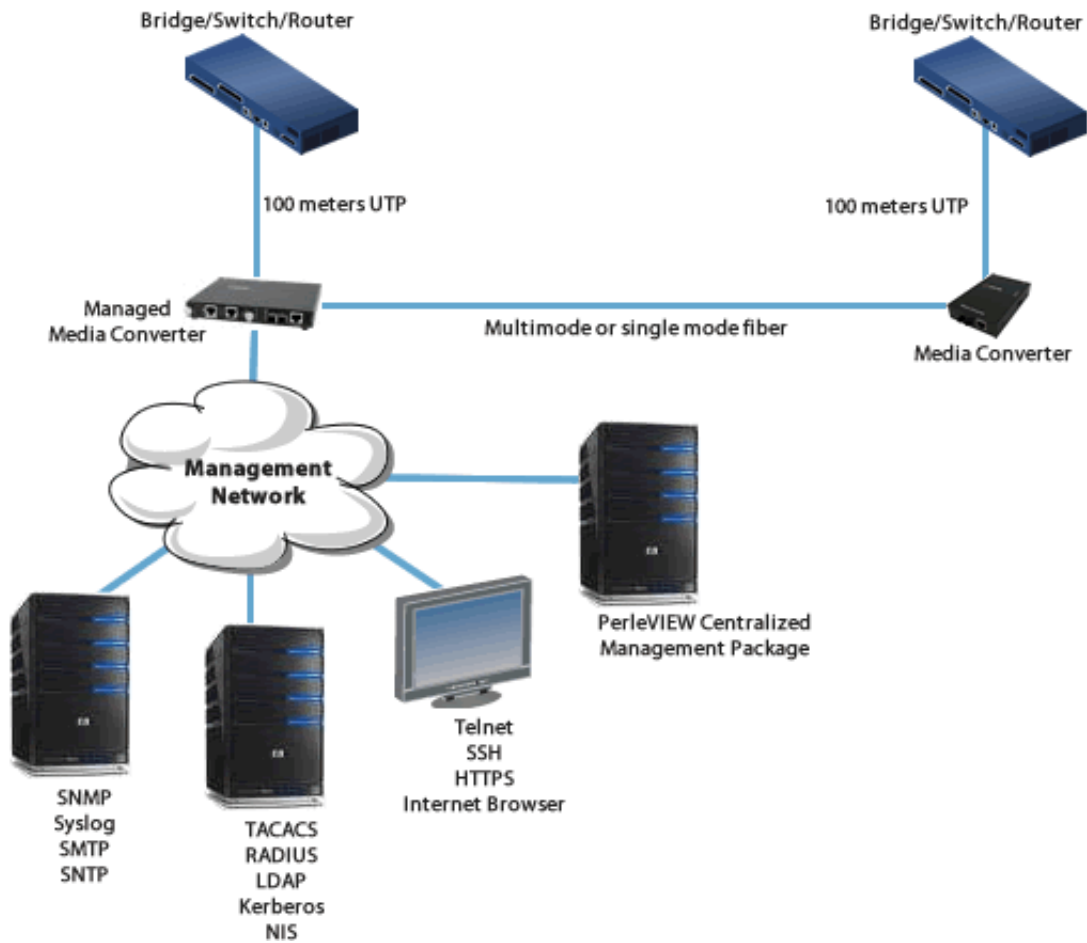|	
Emissions	FCC Part 15 Class A, EN55022 Class A
	CISPR 22 Class A CISPR 32:2015/EN 55032:2015 (Class A) CISPR 24:2010/EN 55024:2010
	EN61000-3-2
Immunity	EN55024
Electrical Safety	UL 60950-1
	IEC 60950-1(ed 2); am1, am2 EN 60950-1:2006+A11:2009+A1:2010+A12:2011+A2:2013
	CE
Environmental	Reach, RoHS and WEEE Compliant
Other	ECCN: 5A992
	HTSUS Number: 8517.62.0050
	CCATS: G134373
	Perle Limited Lifetime Warranty

*Maximum rating for both media converter and modules inserted. Actual rating is dependent on the power consumption of the SFP+/XFP modules inserted.

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

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.

Bridge/Switch/Router

Bridge/Switch/Router

100 meters UTP

100 meters UTP

Managed
Media Converter

Multimode or single mode fiber

Media Converter

Management
Network

PerleVIEW Centralized
Management Package

Telnet
SSH
HTTPS
Internet Browser

SNMP
Syslog
SMTP
SNTP

TACACS
RADIUS
LDAP
Kerberos
NIS

10 Gigabit Ethernet Fiber Repeater

Extend the network distance of 10 Gigabit Fiber Links

Create a 10 Gigabit Ethernet fiber link that can extend up to 160km.

Switch with 10G Fiber

Switch with 10G Fiber

160 Km

Single Mode
80 Km Fiber

Single Mode
80 Km Fiber

10G Media Converter

10 Gigabit Ethernet Fiber Extender

## Extend the network distance between two 10 Gigabit Fiber Switches

Two 10 Gigabit Mode Media Converters can extend the distance between 10 Gigabit Multimode Switches across a fiber link up to 80km in length.

10 Gigabit Copper to Fiber Media Conversion

Convert one 10G Ethernet media to another

Convert your 10G SFP+ Direct Attach (Twinax) or XFP CX4 copper to multimode or single mode fiber. Ideal for large data centers and Co-Location applications where the distance required to connect top of rack switches exceeds the 100 meter limitation of 10G copper.
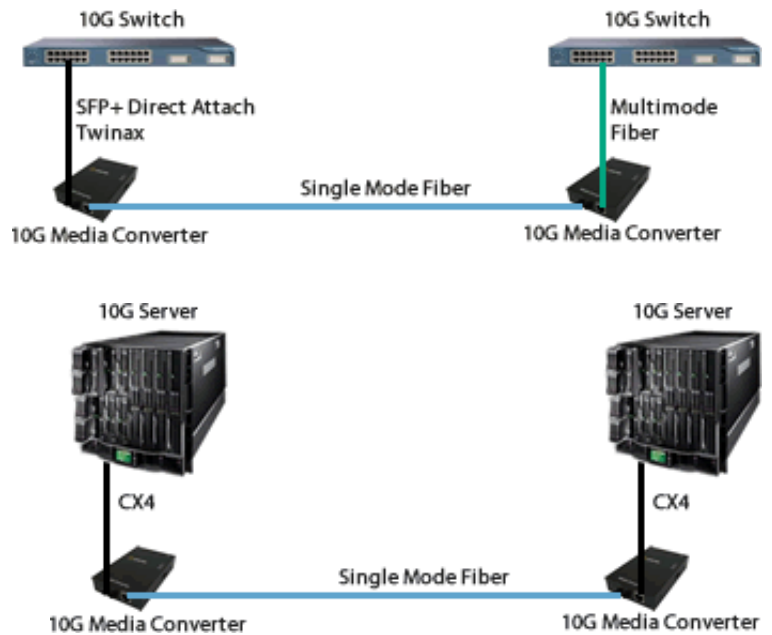
Model	Port	Slot	SFP+ Power Levels	XFP Power Levels	Maximum Total Transceiver Power Supported
SMI-10G-STS	Port 1	SFP+	Level 1 (up to 1.0 watts)	-	3.0 watts
			Level 2 (up to 1.5 watts)	-	
	Port 2	SFP+	Level 1 (up to 1.0 watts)	-	

				Level 2 (up to 1.5 watts)	-
SMI-10G-XTS	Port 1	XFP	-	Level 1 (up to 1.0 watts)	5.0 watts
			-	Level 2 (1.5 to 2.5 watts)	
			-	Level 3 (2.5 to 3.5 watts)	
	Port 2	SFP+	Level 1 (up to 1.0 watts)	-	
			Level 2 (up to 1.5 watts)	-	
SMI-10G-XTSH	Port 1	XFP	-	Level 1 (up to 1.0 watts)	7.0 watts
			-	Level 2 (1.5 to 2.5 watts)	
			-	Level 3 (2.5 to 3.5 watts)	
			-	Level 4 (3.5 to 5.5 watts)	
	Port 2	SFP+	Level 1 (up to 1.0 watts)	-	
			Level 2 (up to 1.5 watts)	-	
SMI-10G-XTX	Port 1	XFP	-	Level 1 (up to 1.0 watts)	7.0 watts
			-	Level 2 (1.5 to 2.5 watts)	
			-	Level 3 (2.5 to 3.5 watts)	
	Port 2	XFP	-	Level 1 (up to 1.0 watts)	
			-	Level 2 (1.5 to 2.5 watts)	
			-	Level 3 (2.5 to 3.5 watts)	
SMI-10G-	Port	XFP	-	Level 1 (up to 1.0 watts)	11.0 watts

XTXH	1			
			-	Level 2 (1.5 to 2.5 watts)
			-	Level 3 (2.5 to 3.5 watts)
			-	Level 4 (3.5 to 5.5 watts)
	Port 2	XFP	-	Level 1 (up to 1.0 watts)
			-	Level 2 (1.5 to 2.5 watts)
			-	Level 3 (2.5 to 3.5 watts)
			-	Level 4 (3.5 to 5.5 watts)