Perle Gigabit

Fiber to Fiber

Media Converters

Installation Guide

S-1000MM-XXXXXX

P/N 5500314-11

Overview

This document contains instructions necessary for the installation and operation of the Perle Gigabit Standalone Fiber to Fiber Media Converters (S-1000MM). These products allow dissimilar 1000Base-X fiber interfaces to connect to one another.

These are the fiber to fiber conversion models:

- Multimode to Multimode (MM)
- Multimode to Single Mode (SM)
- Multimode to Single Mode Single Strand (SM)

The first fiber connection will be multimode (MM) and the second fiber port can be either single mode (SM) or multimode (MM) depending on the model selected. They can operate over different wavelengths and distances. (see tables below).

Fiber port 1 – MM1

Model	Connector	Mode	Distance	Wavelength (TX/RX)
All models	SC/ST/LC	MM.	550 m/1804 ft.	850 nm

Fiber port 2 – MM2/SM2

Model	Connector	Mode	Distance	Wavelength (TX/RX)
S-1000MM-M2xx05	SC/ST/LC	MM	550 m/1804 ft.	850 nm
S-1000MM-M2xx2	SC/ST/LC	MM	2 km/1.2mi.	1310 nm
S-1000MM-S2xx10	SC/ST/LC	SM	10 km/6.2 mi	1310 nm
S-1000MM-S2xx40	SC/ST/LC	SM	40 km/24.9 mi	1310 nm
S-1000MM-S2xx70	SC/ST/LC	SM	70 km/43.5 mi	1550 nm
S-1000MM-S2xx120	SC/ST/LC	SM	120 km/74.6mi	1550 nm
S-1000MM-S2xx160	SC/ST/LC	SM	160 km/100	1550 nm
S-1000MM-S1SC10U	SC	SM	10 km/6.2 mi.	1310/1490 nm
S-1000MM-S1SC10D	SC	SM	10 km/6.2 mi.	1490/1310 nm
S-1000MM-S1SC20U	SC	SM	20 km/12.4 mi.	1310/1490 nm
S-1000MM-S1SC20D	SC	SM	20 km/12.4 mi.	1490/1310 nm
S-1000MM-S1SC40U	SC	SM	40 km/25 mi.	1310/1490 nm
S-1000MM-S1SC40D	SC	SM	40 km/25 mi.	1490/1310 nm
S-1000MM-S1SC80U	SC	SM	80 km/50 mi.	1510/1590 nm
S-1000MM-S1SC80D	SC	SM	80 km/50 mi.	1590/1510 nm

Fiber port 2 – MM2/SM2

Model	Connector	Mode	Distance	Wavelength (TX/RX)
S-1000MM-S1SC120U	SC	SM	120 km/74.6 mi.	1510/1590 nm
S-1000MM-S1SC120D	SC	SM	120 km/74.6 mi.	1590/1510 nm

Visit Perle's web site for the most up to date Installation guides, models and specifications:

http://www.perle.com/

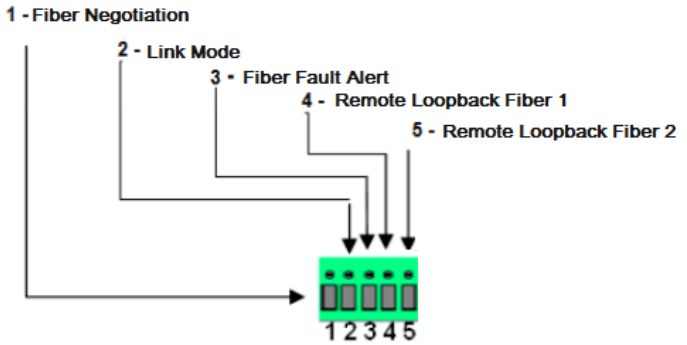
Installation

The default switch setting (all switches in the UP position) will work for most installations. These are the steps required to configure the Perle Gigabit Fiber to Fiber media converter:

1. Set the DIP switch settings.(optional)
2. Install and connect fiber cable to MM1 port.
3. Install and connect fiber cable to MM2/SM2 port.
4. Power up the media converter.

DIP Switch Settings

The DIP switches are accessible through the opening in the side of the enclosure**.**



Note: Switch changes made when the product is powered up take effect immediately and will result in a link reset on both ports.

Fiber Negotiation (Switch 1)

Switch Position	Mode
Up (default)	Auto
Down	Off

Auto: In this mode of operation the media converter will negotiate fiber parameters on both MM1 and MM2/SM2 (fiber ports). This will ensure the most optimal connection parameters will be in effect. If connecting to another Perle Media Converter, this parameter should be set to Auto.

Off: Fiber negotiation on both fiber ports will be disabled. Fiber Negotiation should only be turned off, if the fiber link partner does not support fiber link negotiations.

Link Mode (Switch 2)

Switch Position	Mode
Up (default)	Smart Link Pass-Through Mode
Down	Standard Mode

Smart Link Pass-Through: In this mode, the link state on one connection is directly reflected through the media converter to the other connection. If fiber link is lost on one of the connections, then the other fiber link will be brought down by the media converter.

Standard Mode: In this mode, the links can be brought up and down independently of each other. A loss of link on either fiber connection can occur without affecting the other fiber connection

Fiber Fault Alert (Switch 3)

Switch Position	Mode
Up (default)	Enabled
Down	Disabled

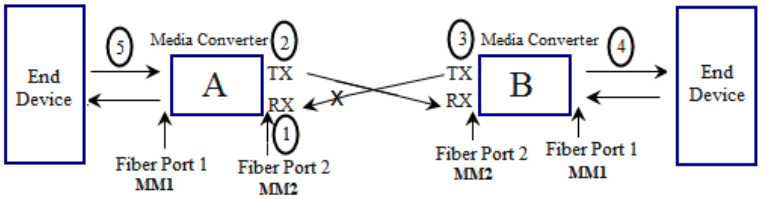
Enabled: If the media converter detects a loss of fiber signal on the fiber receiver, it will immediately disable its fiber transmitter signal on this port. This, in effect, notifies the fiber link partner that an error condition exists on the fiber connection.

If the remote media converter is set up for Fiber Fault Alert(FFA) Enabled and the local media converter is set up with Smart Link Pass-Through, a loss of fiber link on either the transmit or receive line will be passed through to the other fiber connection.

Disabled: The media converter will not monitor for fiber fault.

Note: This feature is not required; if Fiber negotiation has been enabled since link negotiation accomplishes the same thing. When Fiber Negotiation is enabled this switch is ignored.

Illustration of the FFA feature



Media Converter A Configuration

Link Mode–Standard Mode

Fiber Fault Alert

Media Converter B Configuration

Link Mode–Smart Link Pass Through Mode

Fiber Fault Alert

Sequence of Events

1. Media Converter **A** loses fiber connection (RX) on MM2/SM2.
2. Media Converter **A** disables the transmitter (TX) MM2/SM2.
3. Media Converter **B** detects loss of fiber link on receiver RX – MM2/SM2.
4. Media Converter **B** turns off transmitter (TX) on MM1.
5. Media Converter **A** MM1 is not affected

Remote Loopback Fiber 1 (Switch 4)

Switch Position	Mode
Up (default)	Disabled
Down	Enabled

Disabled: The loopback feature is disabled. This is the normal position for regular operation. The switch must be set to this position in order for data to pass through the media converter.

Enabled: This is a test mode. All data received on the receive (RX) fiber connection on port MM1 is looped back to the transmit (TX) fiber connection.

Note: Only one fiber interface can be in loopback at a time.

Remote Loopback Fiber 2 (Switch 5)

Switch Position	Mode
Up (default)	Disabled
Down	Enabled

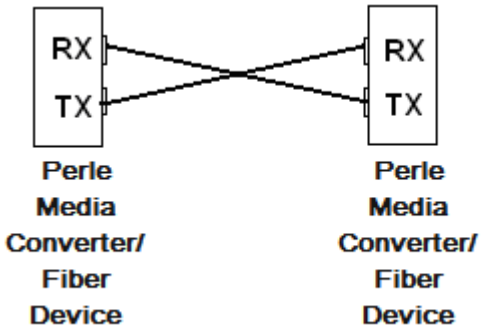
Disabled: The loopback feature is disabled. This is the normal position for regular operation. The switch must be set to this position in order for data to pass through the media converter.

Enabled: This is a test mode. All data received on the receive (RX) fiber connection on port MM/SM2 is looped back to the transmit (TX) fiber connection.

Note: Only one fiber interface can be in loopback at a time.

Installing the Duplex Fiber Cable

1. Locate a 1000Base-X compliant duplex (2 strands) fiber cable with male connections.
2. Connect the fiber cables from one media converter to the other media converter/switch/fiber device ensuring that the RX and TX are reversed at the opposite end.



Installing the Simplex Fiber Cable

1. Locate a 1000Base-X compliant simplex (1 strand) fiber cable with male connections.
2. Connect the fiber cable from one media converter to the other media converter/switch/fiber device.

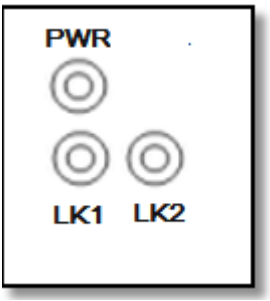
Powering up the Perle Media Converter

1. Connect the Perle supplied power adapter to the media converter.
2. Turn on the power at source.
3. Check that the PWR LED light is lit.

Operation

Status LED

The Perle Gigabit Fiber to Fiber Media converters have three single colored status LEDs located on the front panel of the unit.



PWR - Power/Test

- **On**: Power is on and the unit is in normal operation mode.
- **Blinking** *slowly*: the unit is in loopback mode.
- **Blinking** *quickly*: the unit has a hardware error.

LK1 – MM1 (Fiber Link) Activity

- **On**: Fiber link present.
- **Blinking** *slowly*: The fiber link has been taken down as a result of Smart Link Pass-Through.
- **Blinking** *quickly*: Fiber link present and receiving data.
- **Off**: No fiber link present.

LK2 – MM2/SM2 (Fiber Link 2) Activity

- **On***:* Fiber link is present*.*
- **Blinking** *slowly:* The fiber link has been taken down as a result of Smart Link Pass-Through.
- **Blinking** *quickly*: Fiber link present and receiving data.
- **Off***:* No fiber link present.

Troubleshooting

General

- Ensure power is supplied to the media converter – use of the Perle supplied power adapter is highly recommended.
- Ensure both devices on either end of the fiber are compatible. If using a single fiber connection, ensure that you have both an Upstream (U) and Downstream (D) media converter.
- Ensure all cabling is of the correct type and is in good operating condition.
- For dual-stranded fiber connections, ensure the RX and TX has been reversed between the 2 media converters.

No connectivity

If unable to get full connectivity with all DIP switches in the UP position, this procedure is recommended for troubleshooting.

Method 1

1. Turn off Fiber Negotiation (SW1 Down) on both media converters. Set Link Mode to Standard. Leave all other switches in the UP position.
2. Connect the near end device to port MM1, the LK1 LED on each media converter should be lit to indicate good fiber connections. If the LK1 LED is not lit, then check the fiber cable and the attached device.
3. Repeat step 2 for port MM2/SM2.
4. Return units to desired configuration.

Method 2

Each fiber connection can also be verified by configuring the remote media converter for loopback mode. The link LEDs between the local and remote media converter should be lit. Data should pass through the local converter then over the fiber connection to the remote media converter.

Technical Specifications

The following applies to all S-1000MM media converters:

Power Input/Consumption	12V DC /2.5 W
Operating Temperature:	0℃ - 50℃ (32℉ - 122℉)
Storage Temperature:	-25℃ - 70℃ (-13℉ - 158℉)
Operating Humidity:	5% to 90% non-condensing
Storage Humidity:	5% to 95% non-condensing
Operating Altitude:	Up to 3,048 m (10,000 ft)
Weight:	0.3 kg (0.66 lbs)
MTBF:	432,138 hours
(with power supply)	274,804 hours

Fiber Optic Specifications

Fiber port 1 – MM1

Model	Mode	Wavelength (nm)	TX Power (dB)	RX Power (dB)	Budget (dB)
All models	MM	TX: 850 RX: 850	Min: -9.5 Max: -4	Min: -17 Max: -3	7.5

Fiber port 2 – MM2/SM2

Model	Mode	Wavelength (nm)	TX Power (dB)	RX Power (dB)	Budget (dB)
S-1000MM-M2xx05	MM	TX: 850 RX: 850	Min: -9.5 Max: -4	Min: -17 Max: -3	7.5
S-1000MM-M2xx2	MM	TX: 1310 RX: 1310	Min: -6 Max: -0	Min: -17 Max: -0	11
S-1000MM-S2xx10	SM	TX: 1310 RX:1310	Min: -9.5 Max: -3	Min: -20 Max: -3	10.5
S-1000MM-S2xx40	SM	TX: 1310 RX:1310	Min: -3 Max: 5	Min: -23 Max: -3	20
S-1000MM-S2xx70	SM	TX: 1550 RX:1550	Min: -2 Max: 5	Min: -23 Max: -3	21
S-1000MM-S2xx120	SM	TX: 1550 RX: 1550	Min: 0 Max: 5	Min: -32 Max: -9	32
S-1000MM-S2xx160	SM	TX: 1550 RX: 1550	Min: 2 Max: 5	Min: -34 Max: -9	32

Model	Mode	Wavelength (nm)	TX Power (dB)	RX Power (dB)	Budget (dB)
S-1000MM-S1SC10U	SM	TX: 1310 RX:1490	Min: -9 Max: -3	Min: -20 Max: -3	11
S-1000MM-S1SC10D	SM	TX:1490 RX:1310	Min: -9 Max: -3	Min: -20 Max: -3	11
S-1000MM-S1SC20U	SM	TX: 1310 RX:1490	Min: -8 Max: -3	Min: -22 Max: -3	14
S-1000MM-S1SC20D	SM	TX:1490 RX:1310	Min: -8 Max: -3	Min: -22 Max: -3	14
S-1000MM-S1SC40U	SM	TX: 1310 RX:1490	Min: -3 Max: 2	Min: -23 Max: -3	20
S-1000MM-S1SC40D	SM	TX:1490 RX:1310	Min: -3 Max: 2	Min: -23 Max: -3	20
S-1000MM-S1SC80U	SM	TX: 1510 RX:1590	Min: -2 Max: 3	Min: -26 Max: -3	24
S-1000MM-S1SC80D	SM	TX:1590 RX:1510	Min: -2 Max: 3	Min: -26 Max: -3	24
S-1000MM-S1SC120U	SM	TX: 1510 RX:1590	Min: -3 Max: 2	Min: -34 Max: -9	31
S-1000MM-S1SC120D	SM	TX:1590 RX:1510	Min: -3 Max: 2	Min: -34 Max: -9	31

Fiber Cabling Requirements

MM: 50/125 microns
62.5/125 microns

SM: 9/125 microns

Note: Please refer the product page on the Perle website for the most up to date specifications.

http://www.perle.com/

Warranty / Registration

Perle's standard Lifetime Warranty provides customers with return to factory repairs for Perle products that fail under the conditions of the warranty coverage. Details can be found at:

http://www.perle.com/support_services/warranty.shtml

Compliance Information

FCC

This product has been found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions in this Guide, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his/her own expense.

EN 55022 Class A

WARNING This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

EN 55024 Class A

Laser Safety – IEC 60825-1:2007

This product meets Class I Laser safety requirements per IEC-60825-1:2007 standard and complies with FDA/CDRH 21 CFR1040.10 and 21 CFR1040.11.
WARNING: Visible and invisible laser radiation may be present when cables are not connected. Do not stare into the beam or view the beam directly with optical instruments. Failure to observe this warning could result in an eye injury or blindness.
WARNING: Use of controls, adjustments or the performance of procedures other than those specified herein may result in hazardous radiation exposure.

Contacting Technical Support

Contact information for the Perle Technical Assistance Center (PTAC) can be found at the link below. A Technical Support Query may be made via this web page.

www.perle.com/support_services/support_request.shtml