



# Perle Fast Fiber to Fiber Media Converters

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## Installation Guide

S-100MM-XXXXX



# Overview

This document contains instructions necessary for the installation and operation of the Perle Fast Fiber to Fiber Standalone Media Converters (S-100MM). These products allow dissimilar 100Base-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 port will be 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.	2 km/1.2 mi	1310 nm

Fiber port 2 – MM2/SM2

Model	Connector	Mode	Distance	Wavelength (TX/RX)
S-100MM-M2xx2	SC/ST/LC	MM	2 km/1.2 mi.	1310 nm
S-100MM-S2xx20	SC/ST/LC	SM.	20 km/12.4 mi.	1310 nm
S-100MM-S2xx40	SC/ST/LC	SM	40 km/24.9 mi.	1310 nm
S-100MM-S2xx80	SC/ST/LC	SM	80 km/49.7 mi.	1550 nm
S-100MM-S2xx120	SC/ST/LC	SM	120 km/74.6 mi	1550 nm
S-100MM-S1xx20U	SC/ST	SM	20 km/12.4 mi.	1310/1550 nm
S-100MM-S1xx20D	SC/ST	SM	20 km/12.4 mi.	1550/1310 nm
S-100MM-S1SC40U	SC	SM	40 km/24.9 mi.	1310/1550 nm
S-100MM-S1SC40D	SC	SM	40 km/24.9 mi.	1550/1310 nm

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

<http://www.perle.com/>

# Installation

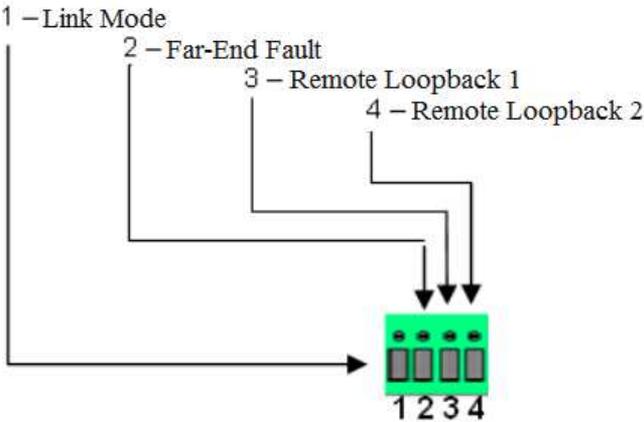
The default switch settings (all switches in the UP position) will work for most installations.

These are the steps required to configure the Perle Fast Fiber to Fiber media converter:

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

## DIP Switches

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



**Note:** All switch changes take effect immediately and will result in a link reset on both fiber ports.

# DIP Switch Settings

## Link Mode (Switch 1)

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

**Link Pass-Through:** In this mode, the link state on one fiber connection is directly reflected through the media converter to the other fiber connection.

For example, if a Far End Fault (FEF) indication is received on port MM1, the media converter in turn sends a signal to turn off the transmitter on port MM2/SM2. When the Far-End Fault indication is cleared the transmitter is then turned back on.

**Standard Mode:** In this mode, the links on the fiber side 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.

## Far End Fault (Switch 2)

Switch Position	Mode
Up (default)	Enabled
Down	Disabled

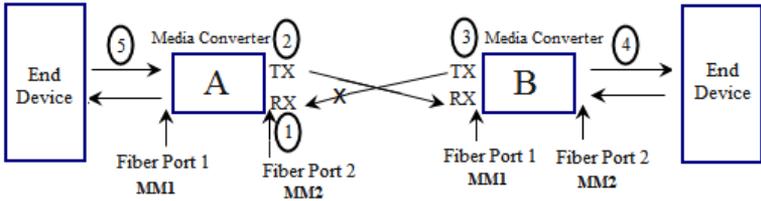
**Enabled:** If the media converter detects a loss of fiber signal on the fiber receiver, the media converter will immediately send a FEF on the fiber link. This, in effect, notifies the fiber link partner that an error condition exists on the fiber connection.

If the remote media converter is set up for Far End Fault (FEF) and the local media converter is set up with Link Pass-Through, a loss of fiber link on either the transmit or receive link will be passed through to the end fiber connection.

**Disabled:** Far End Fault indications are not transmitted regardless of the condition of the receive signal on the 100BASE-FX fiber connection.

**Note:** This switch needs to be set to either generate or detect the FEF signal.

## ***Illustration of the FEF feature***



### **Media Converter A Configuration**

**Link Mode–Standard Mode**

**Far-End Fault–Enabled**

### **Media Converter B Configuration**

**Link Mode–Link Pass Through Mode**

**Far-End Fault–Enabled**

### **Sequence of Events**

1. Media Converter **A** loses fiber connection (RX) on MM2/SM2.
2. Media Converter **A** sends FEF on 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/SM1.
5. Media Converter **A** MM1 is not affected

## ***Remote Loopback Fiber 1 (Switch 3)***

<b>Switch Position</b>	<b>Mode</b>
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 4)***

<b>Switch Position</b>	<b>Mode</b>
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.

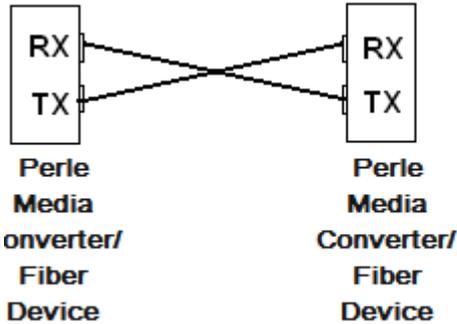
**Enabled:** This is a test mode. All data received on the receive (RX) fiber connection on port MM2/SM21 is looped back to the transmit (TX) fiber connection.

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

## ***Installing the Duplex Fiber Cable***

Locate a 100Base-X compliant duplex (2 strands) fiber cable with appropriate connectors.

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***

Locate a 100Base-X compliant simplex (1 strand) fiber cable with appropriate connectors.

Connect the fiber cable from one Media Converter Module to another Media Converter/switch/fiber device.

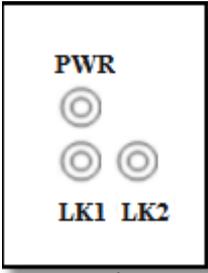
## ***Powering up the Media Converter***

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 and on solid.

# Operation

## Status LED

The Perle Fast 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 in normal operation.
- **Blinking *slowly*:** the unit is in loopback mode.
- **Blinking *quickly*:** the unit has a hardware error.

### LK1 – MM1 (Fiber Link 1) Activity

- **On:** Fiber link present.
- **Blinking *quickly*:** Fiber link present and receiving data.
- **OFF:** No fiber link present.

### LK2 – MM2/SM2 (Fiber Link 2) Activity

- **On:** Fiber link present.
- **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 supplied power adapters is highly recommended.
- Ensure both devices on either end of the fiber are compatible. If using a simplex 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 working condition.
- For duplex fiber connections, ensure the RX and TX has been reversed between the two 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) Set the Link mode to Standard (SW1 – Down) on both media converters. Leave all other switches in the Up position.
- 2) Connect the near end device to port MM1, the LK1 LED should be lit to indicate a good fiber connection. 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:**

The fiber connection can also be verified by configuring the remote media converter for loopback mode. The link LEDs on both media converters should be lit. Data should pass through the local converter, over the fiber connection to the remote media converter. At the remote media converter, the data will be looped back and passed back through the fiber.

# Technical Specifications

The following applies to all S-100MM media converters:

<b>Power Input/Consumption</b>	<b>12V DC /3.5 W</b>
<b>Operating Temperature:</b>	<b>0°C to 50°C (32°F to 122°F)</b>
<b>Storage Temperature:</b>	<b>-25°C to 70°C (-13°F to 158°F)</b>
<b>Operating Humidity:</b>	<b>5% to 90% non-condensing</b>
<b>Storage Humidity:</b>	<b>5% to 95% non-condensing</b>
<b>Operating Altitude:</b>	<b>Up to 3,048 m (10,000 ft)</b>
<b>MTBF:</b>	<b>432,138 hours</b>
<b>MTBF (with power supply):</b>	<b>274,804 hours</b>
<b>Weight:</b>	<b>0.3 kg (0.66 lbs)</b>
<b>Dimensions:</b>	<b>80 mm x 120 mm x 26 mm</b>

## Fiber Optic Specifications:

### Fiber port 1 – MM1

Model	Mode	Wavelength (nm)	TX Power (dB)	RX Power (dB)	Budget (dB)
All models	MM	TX: 1310 RX: 1310	Min: -20 Max: -12	Min: -31 Max: -14	11

### Fiber port 2 – MM2/SM2

Model	Mode	Wavelength (nm)	TX Power (dB)	RX Power (dB)	Budget (dB)
S-100MM-M2SC2	MM	TX: 1310 RX: 1310	Min: -20 Max: -12	Min: -31 Max: -14	11
S-100MM-M2ST2	MM	TX: 1310 RX: 1310	Min: -20 Max: -12	Min: -31 Max: -14	11
S-100MM-M2LC2	MM	TX: 1310 RX: 1310	Min: -20 Max: -12	Min: -30 Max: -14	10
S-100MM-S2SC20	SM	TX: 1310 RX: 1310	Min: -18 Max: -7	Min: -32 Max: -3	14
S-100MM-S2ST20	SM	TX: 1310 RX: 1310	Min: -15 Max: -8	Min: -32 Max: -3	17
S-100MM-S2LC20	SM	TX: 1310 RX: 1310	Min: -15 Max: 0	Min: -34 Max: -5	19
S-100MM-S2SC40	SM	TX: 1310 RX: 1310	Min: -5 Max: 0	Min: -34 Max: -3	29
S-100MM-S2ST40	SM	TX: 1310 RX: 1310	Min: -5 Max: 0	Min: -34 Max: -3	29

Model	Mode	Wavelength (nm)	TX Power (dB)	RX Power (dB)	Budget (dB)
S-100MM-S2LC40	SM	TX: 1310 RX: 1310	Min: -5 Max: 0	Min: -34 Max: -3	29
S-100MM-S2SC80	SM	TX: 1550 RX: 1550	Min: -5 Max: 0	Min: -34 Max: -3	29
S-100MM-S2ST80	SM	TX: 1550 RX: 1550	Min: -5 Max: 5	Min: -34 Max: -3	29
S-100MM-S2LC80	SM	TX: 1550 RX: 1550	Min: -5 Max: 0	Min: -34 Max: -3	29
S-100MM-S2SC120	SM	TX: 1550 RX: 1550	Min: 0 Max: 5	Min: -35 Max: -3	35
S-100MM-S2ST120	SM	TX: 1550 RX: 1550	Min: 0 Max: 5	Min: -35 Max: 0	35
S-100MM-S2LC120	SM	TX: 1550 RX: 1550	Min: 0 Max: 5	Min: -35 Max: -3	35
S-100MM-S1SC20U	SM	TX: 1310 RX: 1550	Min: -14 Max: -8	Min: -32 Max: -3	18
S-100MM-S1SC20D	SM	TX: 1550 RX: 1310	Min: -14 Max: -8	Min: -32 Max: -3	18
S-100MM-S1ST20U	SM	TX: 1310 RX: 1550	Min: -15 Max: -3	Min: -3 Max: -34	12
S-100MM-S1ST20D	SM	TX: 1550 RX: 1310	Min: -15 Max: -3	Min: -3 Max: -34	12
S-100MM-S1SC40U	SM	TX: 1310 RX: 1550	Min: -8 Max: -3	Min: -33 Max: -3	25
S-100MM-S1SC40D	SM	TX: 1550 RX: 1310	Min: -8 Max: -3	Min: -33 Max: -3	25

## 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/>

# 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 B

## EN 55024 Class A

**Note:** When used with a power adapter providing low conducted emissions, the S-100 will comply with Class B requirements.

## 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.

## 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](http://www.perle.com/support_services/warranty.shtml)

## 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](http://www.perle.com/support_services/support_request.shtml)

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