



# Perle Type 4 High-Power PoE

## 10/100/1000 Ethernet

### Media Converters

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#### Installation Guide

***S-1110HP***

***S-1110HP-SFP***

***S-1110DHP***

***S-1110DHP-SFP***

***S-1110HP-DSFP***

***S-1110DHP-DSFP***

***S-1110HP-XT***

***S-1110HP-SFP-XT***

***S-1110DHP-XT***

***S-1110DHP-SFP-XT***

***S-1110HP-DSFP-XT***

***S-1110DHP-DSFP-XT***



# Preface

## Audience

This guide is for the network or computer technician responsible for installing the Perle High-Power Media Converter. Familiarity with the concepts and terminology of Ethernet and local area networks is required.

**Note:** *any references to the S-1110HP covers all models in this product line unless noted.*

## Purpose

This document describes the hardware and physical characteristics of the Perle S-1110HP media converter. It covers hardware features as well as installation and operation of the product.

## Package Contents

- S-1110HP Media Converter
- Extended Temperature models have a terminal block adapter and do not come with a power adapter or cable
- Non Extended Temperature models come with a power adapter and cable. (S-1110HP – 120 watts) (S-1110DHP – 200 watts)
- Rubber feet
- Power cord strain relief clip
- Installation Guide (this guide)

## Document Conventions

**Note:** *Means reader take note:* notes contain helpful suggestions.

**Caution:** Means reader be careful. In this situation, you might perform an action that could result in equipment damage or loss of data.

### **Warning: IMPORTANT SAFETY INSTRUCTIONS**

Means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Only qualified personnel should connect power to this unit.



Warning - more information is contained within this guide



Warning - equipment rated above 40C. Equipment may be very hot.

## Conventions de documents

**Note:** *Moyens prendre note: les notes contiennent des suggestions utiles*

**Caution:** *Moyens faire attention au lecteur Dans ce cas, vous pouvez effectuer une action susceptible d'endommager le matériel ou de perdre des données.*

### **Warning: CONSIGNES DE SÉCURITÉ IMPORTANTES**

*Signifie danger. Vous êtes dans une situation susceptible de causer des blessures corporelles. Avant de travailler sur un équipement, soyez conscient des dangers liés aux circuits électriques et familiarisez-vous avec les pratiques standard de prévention des accidents. Seul le personnel qualifié doit connecter l'alimentation à cet appareil.*



Warning - more information is contained within this guide  
Attention - plus d'informations sont contenues dans ce guide



Warning - equipment rated above 40C. Equipment may be very hot.  
Attention - équipement évalué au-dessus de 40C. L'équipement peut être très chaud.

## Cautions and Warnings

**Warning:** Power sources must be off prior to beginning the power connection steps. Read the installation instructions before you connect the unit to its power source.

**Warning:** Power supply of the equipment must be rated appropriately (See the Technical Specification section for specification with limited power). Limited power means complying with one of the following:

- Class 2 circuit according to Canadian Electrical Code, Part 1, C22.1
- Class 2 circuit according to National Electrical Code, NFPA-70
- Power Source Class 2 according to IEC 62368-1
- Limited-energy circuit according to EN/IEC 61010-1

**Warning:** If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

**Warning:** In case of malfunction or damage, no attempts at repair should be made by the user. All repairs need to be made by a qualified Perle representative. Do not dismantle this product.

**Warning:** Transient protection shall be provided that is set at a level not exceeding 140% of the peak rated voltage value at the supply terminals to the equipment.

**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.

## **Précautions et avertissements**

**Attention:** *Les sources d'alimentation doivent être éteintes avant de commencer les étapes de connexion d'alimentation. Lisez les instructions d'installation avant de connecter l'appareil à sa source d'alimentation.*

**Attention:** *L'alimentation électrique de l'équipement doit être évaluée de manière appropriée (voir l'annexe pour les spécifications avec une puissance limitée). Une puissance limitée signifie se conformer à l'un des critères suivants:*

- *Circuit de classe 2 selon le Code canadien de l'électricité, Partie 1, C22.1*
- *Circuit de classe 2 selon le Code national de l'électricité, NFPA-70*
- *Source d'Alimentation classe 2 selon IEC 62368-1*
- *Circuit à énergie limitée selon EN / IEC 61010-1*

**Attention:** *Si cet équipement est utilisé d'une manière non spécifiée par le fabricant, la protection fournie par l'équipement peut être altérée.*

**Attention:** *En cas de dysfonctionnement ou de dommage, aucune tentative de réparation ne doit être effectuée par l'utilisateur. Toutes les réparations doivent être effectuées par un représentant qualifié de Perle. Ne démontez pas ce produit.*

**Attention:** *Une protection contre les transitoires doit être fournie à un niveau ne dépassant pas 140% de la valeur de tension nominale maximale aux bornes d'alimentation de l'équipement.*

**Attention:** les Visibles et les invisibles rayonnement laser peut être présent lorsque les câbles ne sont pas connectés. Ne pas regarder fixement le faisceau ou de visualiser le faisceau directement avec des instruments optiques. Le nonrespect de cet avertissement pourrait entraîner une blessure à l'œil ou à la cécité.

**Attention:** l'Utilisation de commandes, de réglages ou l'exécution de procédures autres que celles spécifiées dans ce guide peut entraîner une exposition dangereuse aux radiations.

# Overview

This document contains instructions necessary for the installation and operation of the Perle Standalone High-Power (HP) PoE 10/100/1000 rate converting Media Converters (S-1110HP). Perle's feature rich Gigabit rate converting High-Power PoE Media Converters transparently connect copper to fiber while providing Power over Ethernet (PoE) to standards-based PoE, PoE+ and High-Power PoE compliant devices such as TVs, IP cameras, VoIP phones, computers and high-power wireless APs. Perle media converters function as PoE switches and support a variety of port configurations, including single or dual UTP and fiber ports. As Power Sourcing Equipment (PSE), they can power either one or two Powered Devices (PDs) using standard UTP cables that carry Ethernet data. The S-1110HP models are compatible with Powered Devices that comply with the IEEE 802.3af standard, 802.3at-2009 standard and the IEEE 802.3bt standard for High-Power PoE devices. The fiber connection can be either single mode (SM) or multimode (MM) and can operate over different wavelengths and distances, depending on the model selected (see table below). Visit Perle's website for the most up to date Installation guides models and specifications. <http://www.perle.com/>

## 2 Port Models

Single copper HP Single fiber port	Connector (xx)	Mode Distance	Wavelength (TX/RX) nm
S-1110HP-SC05 S-1110HP-ST05	SC/ST	MM 550 m/1804 ft.	850
S-1110HP-SC05U S-1110HP-SC05D	SC	MM 550 m/1804 ft.	1310/1550 1550/1310
S-1110HP-SC2 S-1110HP-ST2	SC/ST	MM 2 km/1.2 mi.	1310
S-1110HP-SC10 S-1110HP-ST10	SC/ST	SM 10 km/6.2 mi.	1310
S-1110HP-SC10U S-1110HP-SC10D	SC	SM 10 km/6.2 mi.	1310/1490 1490/1310
S-1110HP-SC20U S-1110HP-SC20D	SC	SM 20 km/12.4 mi.	1310/1490 1490/1310
S-1110HP-SC40 S-1110HP-ST40	SC/ST	SM 40 km/24.9 mi.	1310
S-1110HP-SC40U S-1110HP-SC40D	SC	SM 40 km/24.9 mi.	1310/1490 1490/1310

Single copper HP Single fiber port	Connector (xx)	Mode Distance	Wavelength (TX/RX) nm
S-1110HP-SC70 S-1110HP-ST70	SC/ST	SM 70 km/43.5 mi.	1550
S-1110HP-SC80U S-1110HP-SC80D	SC	SM 80 km/50 mi.	1510/1590 1590/1510
S-1110HP-SC120 S-1110HP-ST120	SC/ST	SM 120 km/75 mi.	1550
S-1110HP-SC120U S-1110HP-SC120D	SC	SM 120 km/75 mi.	1510/1590 1590/1510
S-1110HP-SC160 S-1110HP-ST160	SC/ST	SM 160 km/100 mi.	1550
S-1110HP-SFP	SFP	<b>Note 1</b>	

**Note 1:** Fiber characteristics will depend on the SFP fiber module selected.

### 3 Port Models

Dual copper HP Single fiber port	Connector (xx)	Mode Distance	Wavelength (TX/RX) nm
S-1110DHP-SC05 S-1110DHP-ST05	SC/ST	MM 550 m/1804 ft.	850
S-1110DHP-SC05U S-1110DHP-SC05D	SC	MM 500 m/1804 ft.	1310/1550 1550/1310
S-1110DHP-SC2 S-1110DHP-ST2	SC/ST	MM 2 km/1.2 mi.	1310
S-1110DHP-SC10 S-1110DHP-ST10	SC/ST	SM 10 km/6.2 mi.	1310
S-1110DHP-SC10U SC1110DHP-SC10D	SC	SM 10 km/6.2 mi.	1310/1490 1490/1310
S-1110DHP-SC20U S-1110DHP-SC20D	SC	SM 20 km/12.4 mi.	1310/1490 1490/1310
S-1110DHP-SC40 S-1110DHP-ST40	SC/ST	SM 40 km/24.9 mi.	1310
S-1110DHP-SC40U S-1110DHP-SC40D	SC	SM 40 km/24.9 mi.	1310/1490 1490/1310
S-1110DHP-SC70 S-1110DHP-ST70	SC/ST	SM 70 km/43.5 mi.	1550
S-1110DHP-SC80U S-1110DHP-SC80D	SC	SM 80 km/50 mi.	1510/1590 1590/1510
S-1110DHP-SC120 S-1110DHP-ST120	SC/ST	SM 120 km/75 mi.	1550
S-1110DHP-SC120U S-1110DHP-SC120D	SC	SM 120 km/75 mi.	1510/1590 1590/1510
S-1110DHP-SC160 S-1110DHP-ST-160	SC/ST	SM 160 km/100 mi.	1550

Dual copper HP Single fiber port	Connector (xx)	Mode Distance	Wavelength (TX/RX) nm
S-1110DHP-SFP	SFP		<b>Note 1</b>

**Note 1:** Fiber characteristics will depend on the SFP fiber module selected.

## 4 Port Models - SFP

Dual copper HP Dual SFP	Connector (xx)	Mode Distance	Wavelength (TX/RX) nm
S-1110DHP-DSFP	SFP	<b>Note 1.</b>	

**Note 1:** Fiber characteristics will depend on the SFP fiber module selected.

## Extended Temperature 2 port models

Single copper HP Single fiber port	Connector (xx)	Mode Distance	Wavelength (TX/RX) nm
S-1110HP-SC05-XT S-1110HP-ST05-XT	SC/ST	MM 550 m/1804 ft.	850
S-1110HP-SC10 XT S-1110HP-ST10-XT	SC/ST	SM 10 km/6.2 mi.	1310
S-1110HP-SC10U-XT S-1110HP-SC10D-XT	SC	SM 10 km/6.2 mi.	1310/1490 1490/1310
S-1110HP-SFP-XT	SFP	<b>Note 1.</b>	

**Note 1:** Fiber characteristics will depend on the SFP fiber module selected.

## Extended Temperature 3 port models

Dual copper HP Single fiber port	Connector (xx)	Mode Distance	Wavelength (TX/RX) nm
S-1110DHP-SC05-XT	SC	MM 550 m/1804 ft.	850
S-1110DHP-ST05-XT	ST	MM 550 m/1804 ft.	850
S-1110DHP-SC10-XT	SC	SM 10 km/6.2 mi	1310
S-1110DHP-ST10-XT	ST	SM 10 km/6.2 mi	1310
S-1110DHP-SC10U-XT S-1110DHP-SC10D-XT	SC	SM 10 km/6.2 mi.	1310/1490
S-1110HP-DSFP-XT	SFP	<b>Note 1</b>	
S-1110DHP-SFP-XT	SFP	<b>Note 1</b>	

**Note 1:** Fiber characteristics will depend on the SFP fiber module selected.



## Extended Temperature 4 port models

Dual copper HP Dual fiber ports	Connector (xx)	Mode Distance	Wavelength (TX/RX) nm
S-1110DHP-DSFP-XT	SFP	Note 1.	

**Note 1:** Fiber characteristics will depend on the SFP fiber module selected.

## Installation

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

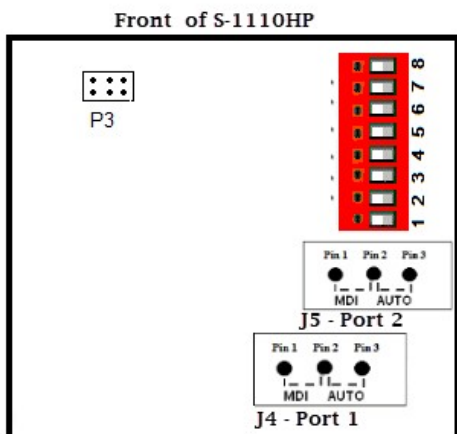
These are the steps required to configure the Perle S-1110HP Ethernet media converter:

1. Insert SFP Module (SFP Model only).
2. Set the Auto-MDIX jumper setting(s) (optional).
3. Set the SGMII jumper(s) (if required).
4. Set the DIP switch settings (if required).
5. Install and connect the fiber cable(s).
6. Install and connect the copper cable(s).
7. Power up the media converter.

## *Auto-MDIX Jumper Settings*

**Note:** The factory settings for Auto-MDIX will work for most installations, but in the rare case that you need to modify the settings, the procedure is below.

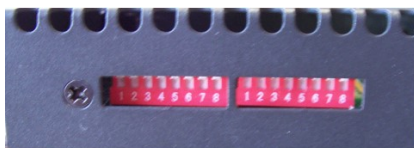
For dual copper media converters, each copper interface has an Auto-MDIX jumper bank. To access the Auto-MDIX jumper settings, unscrew the six side screws on the case and remove the cover plate. Locate the MDIX AUTO jumper set (J4 for port 1 and J5 for port 2). By covering or strapping pins 1 and 2, the S-1110HP will operate as an MDIX device. By covering or strapping pins 2 and 3, the S-1110HP will automatically detect the Ethernet cable's polarity. Removing the strapping is the same as AUTO.



**Note:** The default jumper setting is AUTO

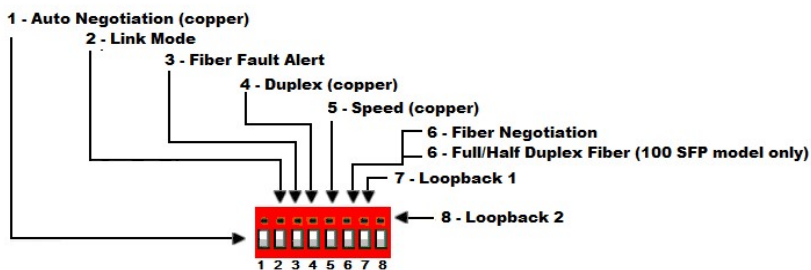
## DIP Switches

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

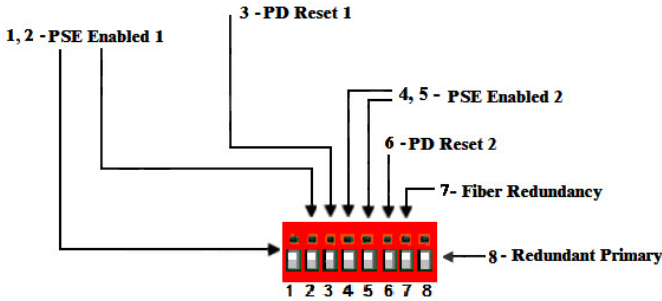


Bank 1      Bank 2

### Bank 1



## Bank 2



**Note:** All switch changes take effect immediately. Switch changes will cycle power to the PD only if the PD Reset switch is set to On or you make changes to the PSE Power switches.

## DIP Switch Settings

### Bank 1

#### Auto Negotiation copper (Switch 1)

Switch Position	Copper 1	Copper 2
Up (default)	Auto	Auto
Down	Off	Auto

**Note:** Auto negotiation should only be turned off, if the copper link partner does not support Auto Negotiation and fixed settings are required by the copper link partner. Copper port 2 only supports Auto negotiation.

**Auto:** The media converter will negotiate with its link partner to determine the most optimal parameters for this connection. The S-1110HP will advertise capabilities of 10,100 and 1000 Mbps, full and half duplex as well as pause, and remote fault capabilities to the link partner.

If the copper link partner does not support Auto negotiation, the S-1110HP will parallel detect to 10 or 100 Mbps and force Half Duplex mode as per IEEE specifications.

**Off:** Copper negotiations should only be turned off, if the copper link partner does not support copper link negotiations.

When the Auto Negotiation switch is set to the OFF position, the media converter will not negotiate the Ethernet parameters with the copper link partner. The parameters used by the media converter will be determined by the Duplex (switch 4) and Speed (switch 5) DIP switch settings.

**Note:** This switch affects the behaviour of copper port 1 only; copper port 2 is always set to Auto.

### Link Mode (Switch 2)

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

**Standard Mode(default):** The link on the fiber and copper sides can be brought up and down independently of each other. A loss of link on either the fiber or copper port can occur without affecting the other connection.

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

If the media converter has 2 copper or 2 fiber connections, then both must go down in order to affect the other connection(s).

If the installation has a media converter on both ends of the fiber link and both are set-up for Smart Link Pass-Through, then a loss of copper link on the far end device will propagate through both media converters and will result in a loss of link at the near end device.

### Fiber Fault Alert (Switch 3)

Switch Position	Fiber Port 1	Fiber Port 2
Up (default)	Enabled	Enabled
Down	Disabled	Enabled

**Enabled:** If the media converter detects a loss of signal on the fiber receiver, it will immediately disable its fiber transmitter signal on the same port. This, in effect, notifies the fiber link partner that

an error condition exists on the fiber connection. Fiber port 2, Fiber Fault Alert (FFA) is always enabled.

If the remote media converter is set up for (FFA) and the local media converter is set up with Link Pass-Through, a loss of fiber link on either the transmit or receive line will be passed through to the local copper connection thus notifying the connected device.

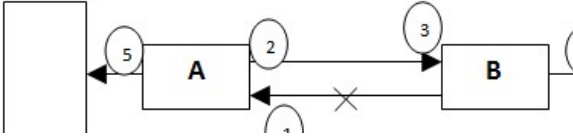
If the media converter has been set to Smart Link Pass-Through mode, the effect will be the same as FFA, since the link loss on the fiber receiver will result in bringing down the copper link, which will in turn cause the transmit fiber link to be brought down.

**Note: This feature only takes effect if Fiber Negotiation has been turned off.**

**Disabled:** The media converter will not monitor for or generate Fiber Fault Alert.

## Illustration of the FFA

The following diagram is an illustration of the operation of this feature.



**(A)** – Remote Media Converter setup for Fiber Fault Alert Enabled, Fiber Negotiation – OFF and Link Mode – Standard.

**(B)** – Local Media Converter setup for Fiber Fault Alert Enabled, Smart Link Pass-Through On and Fiber Negotiation - OFF

1 – **(A)** Loses fiber connection on its receiver.

2 – **(A)** Sends FFA.

3 – **(B)** Detects FFA signal and shuts down the fiber link.

4 – **(B)** Drops link on copper connection because Smart Link Pass-Through is configured.

5 – **(A)** Link on copper connection is not affected because Smart Link Pass-Through mode is set to Standard.

### Duplex copper (Switch 4)

Switch Position	Copper port 1	Copper port 2
Up (default)	Full Duplex	N/A
Down	Half Duplex	N/A

Note: When Auto Negotiation (SW1) is set to Off, the media converter will use this Duplex setting for copper port 1.

**Full Duplex:** The media converter will be set to Full Duplex mode.

**Half Duplex:** The media converter will be set to Half Duplex mode.

### Speed copper (Switch 5)

Switch Position	Copper port 1	Copper port 2
Up (default)	100	N/A
Down	10	N/A

**Note** When Auto Negotiation (SW1) is set to Off, the media converter will use this switch setting for copper port 1 speed.

**100:** When Switch 5 is in the Up position, the S-1110HP will force the speed to 100 Mbps.

**10:** When Switch 5 is in the Down position the media converter will force the speed to 10 Mbps.

### Auto Fiber Negotiation (Switch 6)

Switch Position	Fiber 1 1000 Mbps	Fiber 2 1000 Mbps
Up (default)	Auto	Auto
Down	Off	Auto

**Auto:** The Media Converter will negotiate Ethernet parameters on the fiber connection. This will ensure that the most optimal connection parameters will be in effect. If connecting to another Perle Media Converter, this parameter should be set to Auto. The Media Converter Module will advertise 1000Mbps, Full and Half Duplex, no Pause. Fiber port 2 is always set to Auto.

**Off:** The Media Converter Module's fiber will be fixed to 1000Mbps, Full Duplex.

### When using a Fast Ethernet module Full/Half Duplex on Fiber (Switch 6)

Switch Position	Fiber 1 (100 Mbps)	Fiber 2 (100 Mbps)
Up (default)	Full Duplex	Full Duplex
Down	Half Duplex	Full Duplex

**Full Duplex:** The Media Converter Module will be set to Full Duplex mode on its fiber link.

**Half Duplex:** The Media Converter Module will be set to Half Duplex mode on its fiber link.

**Loopback Fiber-1 (Switch 7)**

**Loopback Fiber-2 (Switch 8)**

Switch Position	Mode
Up (default)	Disabled
Down	Enabled

**Disabled:** The loopback feature is disabled. This is default position for normal 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 is looped back to the transmit (TX) fiber connection. The data link will be disabled; however, power to the powered devices will be maintained. This mode will override all other switch settings.

Note: On media converters with two fiber ports, both ports can be in loopback mode at the same time.

## Bank 2

**PSE Enable Copper-1 (Switch 1, 2)**

**PSE Enable Copper-2 (Switch 4, 5) (dual copper models only)**

Switch Position 1, 4	Switch Position 2, 5	Type
Up (default)	Up (default)	PSE enabled, normal detection
Up	Down	PSE enabled, High capacitance detection
Down	Up	N/A
Down	Down	PSE disabled

These switches must be set in order to enable the power sourcing function and to indicate the type of device detection required. If the device type is unknown, the default should be used as per IEEE802.3af/at/bt standards.



**Enabled Normal:** When enabled, the media converter will perform Power Sourcing Equipment (PSE) functions as per IEEE802.3af (POE), 802.3at-2009 (POE+) or 802.3bt (PoE++) standards.

**Enabled High Capacitance:** The media converter will use high capacitance to detect whether device connected is a PD device.

**Disabled:** When disabled the media converter will not perform PSE functions.

### PD Power Reset Port 1 (Switch 3)

### PD Power Reset Port 2 (Switch 6) (dual copper models only)

Switch Position	Mode
Up (default)	Disabled
Down	Enabled

**Disabled:** When disabled, the loss of fiber link has no effect on PSE power to the PD device.

**Enabled:** When enabled, if the media converter detects loss of link on any fiber port it will turn off PSE output power to the PD device connected to copper port 1 and/or 2. After 2 seconds, the media converter will restore power to the PD and the power will remain on until one of the fiber links transitions from the link up to link down state.

### Fiber Redundancy (Switch 7)

### Dual fiber models only

Switch Position	Mode
Up (default)	Disabled
Down	Enabled

**Disabled:** When this feature is disabled, both fiber ports will operate as independent ports on the media converter. Normal media converter rules and functions will apply.

**Enabled:** When this feature is enabled, fiber port 1 will be the primary active fiber connection port and fiber port 2 will be in standby and in an inactive state. Should a loss of link occur on fiber port 1, fiber port 2 will be activated within 50 ms. The MAC caching table for fiber port 2 will be cleared and the media converter will begin to re-learn MAC address routing. See Redundant Primary for information on link connections.

## Redundant Primary (Switch 8)

**Note:** This switch is used in conjunction with the Fiber Redundancy feature to determine the behaviour after link restoration.

Switch Position	Mode
Up (default)	Disabled
Down	Enabled

**Disabled:** Following the loss of link on fiber port 1 and the activation of fiber port 2, fiber port 2 will remain the primary port until its link is lost at which time a switch over to fiber port 1 will occur.

**Enabled:** Fiber port 1 will be designated as the Primary fiber port. If a loss of link occurs on fiber port 1 which causes a switch over to fiber port 2, the S-1110HP will monitor fiber port 1 for link restoration. Once the link is re-established and remains so for 6 seconds, fiber port 1 will be re-activated and fiber port 2 will be put back into stand-by-mode. Both Perle media converters must have switch 8 down (enabled)..

## Installing the SFP Fiber Module

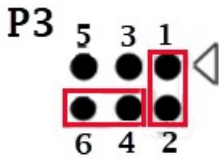
The S-1110HP/SFP/DSFP model requires an SFP(s) fiber module(s). Locate appropriate fiber module(s) and insert the SFP(s) into the opening on the front of the media converter.

1. Ensure the SFP module is properly seated.
2. The SFP module may be inserted before or after applying power to the media converter
3. Proceed with cable connections.

## Using SFP's with SGMII Interfaces

This media converter can operate with SFP's that utilize an SGMII interface. This feature is enabled on the S-1110HP-SFP/DSFP model through the hardware strapping listed below.

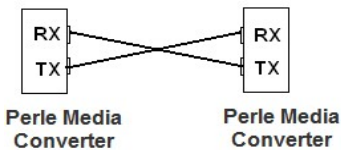
- To set SGMII Interface support on SFP port one, strap pins 1 and 2 jumper P3 (see diagram below).
- To set SGMII Interface support on SFP port two, strap pins 4 and 6 jumper P3 (see diagram below).



(See Page 10 for location of Jumpers)

## Installing the Duplex Fiber Cable

1. Locate a 1000Base-X compliant duplex (2 strands) fiber cable with appropriate connectors.
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 (crossed) at the opposite end.



## Installing the Simplex Fiber Cable

1. Locate a 1000Base-X compliant simplex (1 strand) fiber cable with appropriate connectors. Ensure that the TX wavelength matches the RX wavelength at the other end and the RX wavelength matches the TX wavelength at the other end.
2. Connect the fiber cable from one media converter to the other media converter/switch/fiber device.

## Installing the Copper Cable

1. Locate 10/100/1000Base-T compliant copper cables with the appropriate connectors.
2. Connect the RJ-45 cable between the Perle media converter and the device.

**Note:** The Perle media converter supports Auto-MDIX which allows connection of a straight-through or cross-over Ethernet cable.

## Grounding the Media Converter

If your installation requires additional grounding the following procedure can be followed.

Grounding the chassis requires the following items:

- One grounding lug (not provided).
- One 18 - 12 AWG wire (not provided).
- Cross-head screwdriver (not provided).

**Note:** For your safety, when installing this equipment, always ensure that the chassis ground connection is installed first and disconnected last.

## Attaching the Grounding Lug



1. Attach the grounding lug to one end of an 18-12 AWG wire.
2. Attach the grounding lug to the chassis and secure with the grounding screw(s).

## Attaching the Power Cord Strain Relief Clip



1. Feed the power cord through the opening in the power cord relief clip.
2. Attach the power cord relief clip to the chassis and secure with the provided screw.
3. Plug the power cord into the DC power connector at the rear of the chassis.

4. Plug the other end of the power cord into an appropriate power outlet.

## Powering up the Perle Media Converter

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

## Extended Temperature models supplied with a Pluggable Terminal Block

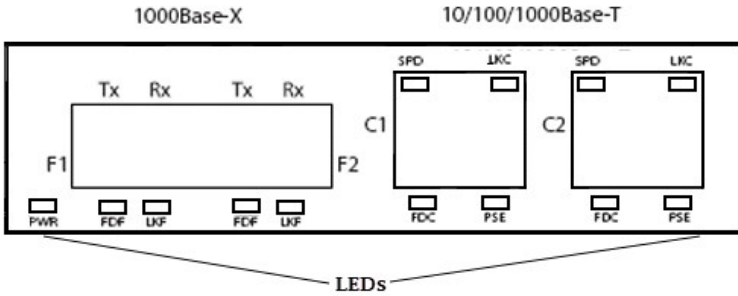
1. Ensure the Power Source is off.
2. Unplug the terminal block from the Media Converter (if attached).
3. Strip both wires 5mm (3/16th inch)
4. Loosen the terminal block screws and connect Positive (+) wire to the left terminal. Connect the Negative (-) wire to the right terminal. Tighten terminal screws (0.22Nm-0.25Nm torque).
5. Plug the terminal block into the Media Converter
6. Turn on power source.
7. Check that the PWR LED light is lit.
8. For extra power cable strain relief, attach the strain clip to the case as shown below, and thread the power cable through the clip in either one or two loops.



**Note:** If Media Converter is operated in temperatures above 40 degrees centigrade ambient, please ensure that the power adapter used is rated for the operating temperature.

# Status LEDs

The status LEDs are located on the front panel of unit



## PWR

**On** – Power is applied to the unit

**Blinking (slow)** – Loopback mode (one or both fiber interfaces are in loopback mode)

**Blinking (fast)** Power On failure. See LED Pattern to determine pattern combination and failure cause

### LED Pattern

FDF	LKF	FDC	PSE	
Off	Off	On	On	SFP incompatible
All other LED patterns				Internal hardware failure

## FDF-1/2 (Fiber 1/2 Duplex)

**On** – Full Duplex

**Off** – Half Duplex

## LKF-1/2 (Status on Fiber Link 1/2)

**On** – Fiber link is present

**Off** – No fiber link present

**Blinking (slow)** – Fiber link appears functional – Fiber link has been brought down by Smart Link Pass-Through

**Blinking (fast)** – Fiber link up and receiving data

**SPD-(Copper Port 1/2)****Green** – 1000 Mbps**Yellow** – 100 Mbps**Off** – 10 Mbps (if link is currently established)**FDC-1/2 (Duplex on Copper 1/2)****On** – Full Duplex Mode**Off** – Half Duplex Mode**LKC-1/2 (Link Status on Copper port 1/2)****On** – Copper link is present**Off** – No copper link present**Blinking (slow)** – Copper link appears functional – Copper link has been brought down by Smart Link Pass-Through.**Blinking (fast)** – Copper link up and receiving data**PSE-1/2****Solid Green (Active)** – The PSE has successfully detected a compliant PD and is applying power over the UTP.**Solid Yellow (Inactive)** – The PSE is not active. The PSE has been configured to provide power, however

- a compliant PD is not detected - no power applied
- a PSE has turned off power for Reset function

**Off – (Disabled)** The PSE function is disabled in the configuration.**Error conditions**

A blinking red light is an error condition. The led light will cycle with a 3 second stop interval between the error condition code.

PSE LEDs	
1 blink	PD Capacitance too high
2 blinks	PD Resistance too low or short circuit
3 blinks	PD Resistance too high

# Other Features

## Auto-MDIX

Auto-MDIX (automatic medium-dependent interface crossover) detects the signalling on the 10/100/1000BASE-T interface to determine the type of cable connected (straight-through or crossover) and automatically configures the connection.

## Pause (IEEE 802.3xy)

Integrated Pause signalling is an IEEE feature that temporarily suspends data transmission between two devices in the event that one of the devices becomes overwhelmed with data. The Perle media converter can generate and respond to Pause messages. If Auto negotiation is set to On, the media converter will advertise symmetrical and asymmetrical pause. If Auto negotiation is set to Off, the Pause receive and send will be disabled.



# Troubleshooting

## General

1. Ensure power is supplied to the media converter. For S-1110HP models see the Perle provided power supply. For Extended Temperature models with a terminal block, ensure the external power source is correct. See the Technical Specification section in this guide.
2. Ensure the remote device's fiber type is compatible with the media converter. If using a simplex fiber connection, ensure that you have both an Upstream (U) and Downstream (D) media converter.
3. Ensure all cabling is of the correct type and is in good working order.
4. 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 on both media converters. Leave all other switches in the Up position.
2. Connect the copper device to the copper port on the media converter. The LKC LED light indicates good copper connection. If the LKC LED is not lit, the check the copper cable and the attached device.
3. Repeat for the far end media converter.
4. Connect the fiber cable to both media converters. The LKF LED indicates good fiber connection. If no LKF LED is lit, then check the fiber cabling. Ensure the transmitter and receiver pairs are crossed.
5. Return the units to the desired configuration. Plug the other end of the power cord into an appropriate power outlet.

### Method 2:

The fiber connection can also be verified by configuring the remote media converter for loopback mode. The LKF 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 through the fiber, back to the local converter and passed to the copper link.

### **No Power to the PD**

1. Ensure that the power supply being used, is the one provided with the product.
2. Ensure there is power being supplied to the outlet.

# Technical Specifications

<b>Power Input Voltage</b>	53v DC to 57v DC
<b>Power consumption</b>	5.7 watts
<b>Power over Ethernet (PSE)</b>	90 watts per copper port
<b>Operating Temperature</b>	0°C to 50°C (32°F to 122°F)
<b>Extended Temp Models</b>	-40°C to 75°C (-40°F to 167°F)
<b>Storage Temperature</b>	-25°C to 70°C (-13°F to 158°F)
<b>Extended Temp Models</b>	-40°C to 85°C (-40°F to 185°F)
<b>Operating Humidity</b>	5% to 90% non-condensing
<b>Storage Humidity</b>	5% to 95% non-condensing
<b>Operating Altitude</b>	Up to 3,048 m (10,000 ft)
<b>Dimensions</b>	150 mm by 96 mm by 26 mm
<b>Safety</b>	
UL/ULC/EN 62368-1 CAN/CSA C22.2 No. 62368-1-14 Laser Class I Safety – IEC 60825-1:2014 IEC-60825-1:2014 standard and complies with FDA/CDRH 21 CFR1040.10 and 21 CFR1040.11	
<b>EMI/EMC</b>	
FCC 47 Part 15 Class A ICES-003 EN55032 (CISPR32) EN61000-6-4 EN55024 IEC/EN 61000-4-2 (ESD): Contact: EN 61000-4-3 (RS) EN 61000-4-4 (EFT) EN 61000-4-5 (Surge) EN 61000-4-6 (CS) EN 61000-4-8 (PFMF) EN 61000-4-11	

# PSE Function

## PoE

- IEEE 802.3af (PoE) up to 15.4 Watts per UTP port.

## PoE+

- IEEE 802.3at-2009 (PoE+)
- Up to 30 Watts on a single UTP port model and up to 25.5 Watts per port on a dual UTP port model
- PoE+ models will also support 802.3af PDs (Type 1) and PoE+ PDs (Type 2)

## High-Power (HP)

- Support for type 3 and 4 devices
- Single and double signatures

## PoE Specifications

Standard	IEEE802.3af	IEEE802.3at	IEEE802.3bt	IEEE802.3bt
PSE Type	Type 1	Type 2	Type 3	Type 4
Power Supplied by PSE	15.4W	30W	60W	90W
Minimum power available to PD	12.95W	25.5W	51W	71W
Cabling (Max 100m)	CAT 3 or better	CAT 5 or better	CAT 5 or better	CAT 5 or better
Power over	2 pairs	2 pairs	2 pairs, class 0-4	4 pairs, class 7-8
			4 pairs, class 0-4	
			4 pairs, class 5-6	
Nominal Current	350mA	600mA	600mA	1000mA

# Fiber Optic Specifications

## 2 Port Models

Single HP Single Fiber port	Mode	Wavelength (TX/RX) nm	TX Power (DB)	RX Power (DB)	Budget
S-1110HP-SC05 S-1110HP-ST05	MM	TX: 850 RX: 850	Min: -9.5 Max: -4	Min: -17 Max: -3	7.5
S-1110HP-SC05U S-1110HP-SC05D	MM	TX: 1310/1550 RX: 1550/1310	Min: -8 Max: 0	Min: -18 Max: 0	10
S-1110HP-SC2 S-1110HP-ST2	MM	TX: 1310 RX: 1310	Min: -20 Max: -12	Min: -31 Max: -14	11
S-1110HP-SC10 S-1110HP-ST10	SM	TX: 1310 RX: 1310	Min: -9.5 Max: -3	Min: -20 Max: -3	10.5
S-1110HP-SC10U S-1110HP-SC10D	SM	TX: 1310/1490 RX: 1490/1310	Min: -9 Max: -3	Min: -20 Max: -3	11
S-1110HP-SC20U S-1110HP-SC20D	SM	TX: 1310/1490 RX: 1490/1310	Min: -8 Max: -3	Min: -22 Max: -3	14
S-1110HP-SC40 S-1110HP-ST40	SM	TX: 1310 RX: 1310	Min: -3 Max: 5	Min: -23 Max: -3	20
S-1110HP-SC40U S-1110HP-SC40D	SM	TX: 1490/1310 RX: 1310/1490	Min: -8 Max: 3	Min: -22 Max: -3	14
S-1110HP-SC70 S-1110HP-ST70	SM	TX: 1550 RX: 1550	Min: -2 Max: 5	Min: -23 Max: -3	21
S-1110HP-SC120 S-1110HP-ST120	SM	TX: 1550 RX: 1550	Min: 0 Max: 5	Min: -32 Max: -3	32
S-1110HP-SC160 S-1110HP-ST160	SM	TX: 1550 RX: 1550	Min: 2 Max: 5	Min: -34 Max: -9	31
S-1110HP-SC80U S-1110HP-SC80D	SM	TX: 1510 nm RX: 1590 nm	Min: -2 Max: 3	Min: -26 Max: -3	24
S-1110HP-SC120	SM	TX: 1550 nm RX: 1550 nm	Min: 0 Max: 5	Min: -32 Max: -3	32
S-1110HP-SFP	<b>Note 1</b>				

**Note 1:** Fiber characteristics will depend on the SFP fiber module selected.

## 3 Port Models

Dual HP Single Fiber port	Mode	Wavelength (TX/RX) nm	TX Power (DB)	RX Power (DB)	Budget
S-1110DHP-SC05 S-1110DHP-ST05	MM	TX: 850 RX: 850	Min: -9.5 Max: -4	Min: -17 Max: -3	7.5
S-1110DHP-SC2 S-1110DHP-ST2	MM	TX: 1310 RX: 1550	Min: -9.5 Max: -4	Min: -17 Max: -3	7.5

Dual HP Single Fiber port	Mode	Wavelength (TX/RX) nm	TX Power (DB)	RX Power (DB)	Budget
S-1110DHP-SC10 S-1110DHP-ST10	SM	TX: 1310 RX: 1310	Min: -9.5 Max: -3	Min: -20 Max: -3	<b>Budget</b>
S-1110DHP-SC20 S-1110DHP-ST20	SM	TX:1310 RX: 1310	Min: -18 Max: -7	Min: -32 Max: -3	14
S-1110DHP-SC40 S-1110DHP-ST40	SM	TX: 1310 RX: 1310	Min: -3 Max: 5	Min: -2 0 Max: -3	10.5
S-1110DHP-SC70 S-1110DHP-ST70	SM	TX: 1550 RX: 1550	Min: -2 Max: 5	Min: -23 Max: -3	21
S-1110DHP-SC120 S-1110DHP-ST120	SM	TX: 1550 RX: 1550	Min: 0 Max: 5	Min: -32 Max: 9	32
S-1110DHP-SC160 S-1110DHP-ST-160	SM	TX: 1550 RX:1550	Min: 2 Max: 5	Min: -34 Max: -9	32
S-1110DHP-SC05U S-1110DHP-SC05D	MM	TX: 1310/1550 RX: 1550/1310	Min: -8 Max: 0	Min: -18 Max: 0	10
S-1110DHP-SC10U S-1110DHP-SC10D	SM	TX: 1310/1490 RX: 1490/1310	Min: -9 Max: -3	Min: -20 Max: -3	11
S-1110DHP-SC20U S-1110DHP-SC20D	SM	TX: 1310/1490 RX: 1490/1310	Min: -8 Max: -3	Min: -22 Max: -3	14
S-1110DHP-SC40U S-1110DHP-SC40D	SM	TX: 1310/1490 RX: 1490/1310	Min: -3 Max: 2	Min: -23 Max: -3	20
S-1110DHP-SC80U S-1110DHP-SC80D	SM	TX: 1510/1590 RX: 1590/1510	Min: -2 Max: 3	Min: -26 Max: -3	24
S-1110DHP-SC120 S-1110DHP-ST120	SM	TX: 1550/1510 RX: 1510/1590	Min: 0 Max: 5	Min: -32 Max: -9	32
S-1110DHP-SFP	SFP	<b>Note 1</b>			

**Note 1: Fiber characteristics will depend on the SFP fiber module selected.**

## 4 port Models

Dual HP Dual SFP	Mode	Wavelength (TX/RX)	TX Power (DB)	RX Power (DB)	Budget
S-1110DHP-DSFP	SFP	<b>Note 1</b>			

**Note 1: Fiber characteristics will depend on the SFP fiber module selected.**

## Extended Temperature (XT) 2 port models

Dual HP Dual SFP	Mode	Wavelength (TX/RX) nm	TX Power (DB)	RX Power (DB)	Budget
S-1110HP-SC05-XT S-1110HP-ST05-XT	MM	TX: 850 RX: 850	Min: -9.5 Max: -4	Min: -17 Max: -3	7.5

Dual HP Dual SFP	Mode	Wavelength (TX/RX) nm	TX Power (DB)	RX Power (DB)	Budget
S-1110HP-SC10-XT S-1110HP-ST10-XT	SM	TX: 1310 RX: 1310	Min: -9.5 Max: -3	Min: -20 Max: -3	10.5
S-1110HP-SC10U- XT S-1110HP-SC10D- XT	SM	TX: 1310 RX: 1490	Min: -9 Max: -3	Min: -20 Max: -3	11
S-1110HP-SFP-XT	SFP	<b>Note 1</b>			

**Note 1:** Fiber characteristics will depend on the SFP fiber module selected.

### Extended Temperature (TX) 3 port models

Dual HP Single fiber	Mode	Wavelength (TX/RX)	TX Power (DB)	RX Power (DB)	Budget
S-1110DHP-SC05- XT S-1110-DHP-ST05- XT	MM	TX: 850 RX: 850	Min: -9.5 Max: -4	Min: -17 Max: -3	7.5
S-1110DHP-SC10- XT S-1110DHP-ST10- XT	SM	TX: 1310 RX: 1310	Min: -9.5 Max: -3	Min: -20 Max: -3	10.5
S-1110DHP- SC10U-XT S-1110DHP-SC10D -XT	MM	TX: 1310/1490 RX: 1490/1310	Min: -9 Max: -3	Min: -20 Max: -3	11
S-1110HP-DSFP- XT	SFP	<b>Note 1</b>			
S-1110DHP-SFP- XT	SFP	<b>Note 1</b>			

**Note 1:** Fiber characteristics will depend on the SFP fiber module selected.

### Extended Temperature (TX) 4 port models

Dual HP Dual SFP	Mode	Wavelength (TX/RX)	TX Power (DB)	RX Power (DB)	Budget
S-1110DHP-DSFP- XT	MM	<b>Note 1</b>			

**Note 1:** Fiber characteristics will depend on the SFP fiber module selected.

## **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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