eXP-S1110 PoE Gigabit Ethernet Extenders

perle.com/products/10-100-1000-poe-ethernet-extender.shtml

10/100/1000 PoE Ethernet Copper Extenders

- Extends 10/100/1000Base-T up to 10,000 feet (3 KM)
- Power remote PoE devices across 2-wire twisted pair or coaxial cable
- On-board PoE power controller for true compatibility with IEEE 802.3af standard
- High-Speed – up to 200 mbps aggregate line rate
- Transparent operation for all Ethernet protocols including 802.1Q VLAN packets and IP video compression schemes
- Unique PD Reset feature enables a central site to reset the **remote PoE device without a truck roll**
- Advanced features: Link Pass-Through*, Interlink Fault Feedback*, Auto-MDIX and Loopback, Plug and Play - Auto configuration of VDSL

Perle **eXP-S1110 PoE Gigabit Ethernet Extenders** transparently extend Ethernet beyond the general IEEE 802.3af limits of 328ft / 100m **while providing Power over Ethernet (PoE)** to standards-based compliant devices such as IP cameras, VoIP phones and wireless access points.

This technology enables users to transparently **extend up to four 10/100/1000 Power over Ethernet connections** across copper wiring. Use single twisted pair (CAT5/6/7), coax or any existing copper wiring previously used in alarm circuits, E1/T1 circuits, RS-232, RS-422, RS-485, CCTV and CATV applications.

At the central site, the 10/100/1000 Ethernet Extender has full PoE support and **operates as a Powered Device (PD)** under IEEE 802.3af supporting end-span and mid-span power sources (PSE). Alternatively, the unit can be powered by the included 48v adapter. The PoE Ethernet Extender at the central site then transmits power over the copper wire to power the remote PoE Ethernet Extender and attached PD. The remote PoE Ethernet Extenders are **classified as Power Sourcing Equipment (PSE)**. While using standard UTP cables that carry Ethernet data, Perle eXP-S1110 PoE Ethernet Extenders **provide up to 15.4 watts of power** to Powered Devices (PDs). For longer distance applications the remote PoE Extender (CPE) can be powered by a local 48v adapter. Learn more about PoE.

These simple and effective point to point Ethernet Copper Extenders are perfect for commercial buildings, residential units, hospitality environments, and connecting a remote office or private-network backbone to a corporate LAN … anywhere you need 10/100/1000 Ethernet communication links for PoE devices **up to 10,000ft (3KM) in distance.**

Perle's advanced features such as Link Pass-Through* and Interlink Fault Feedback*, Loopback and remote PD reset*, enable Network administrators to "see everything" 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 Ethernet Extenders the smart choice for IT professionals. **eXP-S1110 PoE Gigabit Ethernet Extenders** are also available with support for Extended Temperature Environments and PoE+.

eXP-S1110 PoE Gigabit Ethernet Extender Features

Extend Ethernet over twisted pair	Extend an Ethernet link over category 5e, 6 and 7 cabling up to 10,000 feet (3 km)
Extend Ethernet over Coaxial cable	Extend an Ethernet link over 75 ohm coaxial cable
On-board PoE Power Controller	As a fully compliant IEEE 802.3af PSE end-span device, this Ethernet Extender's PoE power controller provides compliant power provisioning and monitoring, properly sensing through signature detection whether or not the attach ethernet devices are PoE capable or not. This provides a safe connection for both PoE and Non-PoE capable devices. *Competitive PoE Ethernet Extender products operate as a simple passive power injector and will always apply power to RJ45 port pins which may result in damage if non-PoE compliant Ethernet devices are accidently attached.* *Click here for more details*
Advanced Power capabilities	- ALT A/B and legacy PoE RJ45 pin selection - Current limiting protection - Remote PD reset
Fully compliant 802.3af PoE PSE	- Enable/Disable PSE power - PD signature detection - Over-Current Protection - PD power classification detection (Class 0,1,2,3)
Fully Compliant 802.3af/at PoE PD	Only PoE Ethernet Extender solution that provides a Class 0 or 4 signature to PSE for proper operation with PSE equipment such as Cisco PoE switches. *Competitive PoE Ethernet extender solutions cannot be powered by Cisco PoE switches as they cannot provide the necessary PoE PD signature required by the switch. Without this, the switch will not supply power at all.*
PSE Status Indicator	A multi-color LED provided presents the status of the PSE function for easy troubleshooting of power over Ethernet connections
PD Power Reset (Port 1)	Ideal for remotely resetting equipment, this configurable function performs a momentary power reset to the attached Powered Device (PD) on Port #1. Read our PD Reset Tech Note for further details on this feature
Power Multiplier Selection	When used with 4-pair cable such as CAT5 on the VDSL Interlink port, an optional internal strap selection on the Ethernet Extender will provide VDSL transmission data on 1 pair and power across the 3 other pairs enabling even greater distances for power transmission to be achieved.

Broadest range of PoE devices supported	Support is included for a broad range of PD (Powered Devices) • IEEE 802.3af PoE (Alternative A and B) • Legacy High Capacitance PDs • Cisco legacy VoIP phones and Wireless Access Points
High-Speed Performance	Utilizes second generation VDSL2 technology (ITU-T Recommendation G.993.). When operating under "Profile 30a", Perle Ethernet Extenders can provide an aggregate VDSL line rate capability of up to 200 mbps. *Actual distance and performance may vary depending on the type / gauge and condition of the wire used and if required, the amount of power you require across the VDSL Link*
Plug and Play operation	Perle Ethernet Extenders will automatically configure your VDSL interlink connection. The CO/CPE peer association will be determined automatically by the Ethernet Extender. No need to set CO / CPE VDSL pairing. Once a connection is made, both ends will automatically adjust relevant VDSL parameters to optimize the level of bandwidth possible across the copper link.
Link Pass-Through*	With Link Pass-Through the state of the 10/100/1000Base-T Ethernet connection is "passed through" the VDSL link to the 10/100/1000Base-T Ethernet connection on its remote peer. A managed switch on the remote end can then report the state (link up or link down) to its network management system so that any errors can be detected and recovered early. *Competitive Ethernet extenders without this feature will never detect or report any error conditions.*
Interlink Fault Feedback*	Similar to the Link Pass-Through feature, a loss of VDSL link will drop the 10/100/1000 Ethernet port on each end until the link recovers.
Auto-Negotiation	The Ethernet Extender supports auto negotiation on the 10/100/1000Base-T interface.
Auto-MDIX	Auto-MDIX (Automatic Medium-Dependent Interface crossover) detects the signaling on the 10/100/1000 Ethernet RJ45 interface and determines the type of cable connected (straight-through or crossover) and automatically adopts a compatible pinout.
Fixed Speed and Duplex	Some Ethernet equipment require a fixed speed and duplex be used or cannot auto-negotiate. By disabling Auto-Negotiation on the Ethernet Extender, a fixed speed of 10 or 100 mbps as well as Full or half Duplex can be configured through DIP switches.
VLAN	Transparent to tagged VLAN (802.1Q) packets.
Transparent to IP Video compression protocols	Fully transparent to such IP video compression schemes such as MPEG-4, H.264 and MJPEG.
Power Strain Relief strap	A strain relief strap is provided to ensure a solid and secure power connection to the Ethernet Extender. Ideal for areas that may be exposed to vibration.
Loopback	When enabled, will perform a loopback on the copper VDSL Interlink.

*Available on 1 port models.

Power	Remote (Power over Ethernet)		Local (power over link - VDSL)	
	eXP-1S1110E	eXP-4S1110E	eXP-1S1110L	eXP-4S1110L
Unit Powered by	Local power adapter or VDSL		- Local power adapter or - PoE Power Sourcing Equipment such as a Cisco PoE+ Switch on port #1 - PoE+ power injector	
Provides Power to:	Ethernet		Link (VDSL Interlink)	
Power adapter connector	Barrel or terminal block			
Input Voltage Range from adapter	46V to 57		29 to 57	
Input Voltage Range from VDSL (parasitic)	24 to 57		N/A	
Universal AC Adapter	48vDC, 60 watts is included when purchased an individual basis. One 48vDC 60 watts adapter is provided in each kit.			
Power Connectors	5.5mm x 9.5mm x 2.1mm barrel socket and 2 pin terminal Block			

Ethernet	Remote (Power over Ethernet)		Local (power over link - VDSL)	
	eXP-1S1110E	eXP-4S1110E	eXP-1S1110L	eXP-4S1110L
10/100/1000Base-T Port(s)	1 port RJ45 Shielded	4 port RJ45 Shielded	1 port RJ45 Shielded	4 port RJ45 Shielded
Auto-MDIX	Auto-MDIX enables proper operation with either straight-through or crossover cabling			
Distance	Distance up to 100 meters (328 feet) as per IEEE 802.3			
Maximum Frame Size	1522			
Type of PoE device	PSE (PoE) IEEE 802.3af		PD (Class 0 or 4 device)	
PoE PSE Maximum Power (Watts)	Refer to the Power Reach Installation Planning Guide		N/A	

	PoE PSE RJ45 Cable Pinout	Alternative A (default) on all ports: Pins 3,6 Neg, Pins 1,2 Pos Alternative B: selectable on port #1: Pins 7,8 Neg, Pins 4,5 Pos Legacy Cisco Pre-Standard: selectable on port #1: Pins 7,8 Pos, Pins 4,5 Neg	N/A

	Remote (Power over Ethernet)		Local (power over link - VDSL)	
VDSL – Interlink	eXP-1S1110E	eXP-4S1110E	eXP-1S1110L	eXP-4S1110L
RJ45, BNC, Terminal Block	Ethernet Extenders must be connected in pairs using unconditioned wire. Circuits that run through signal equalization equipment are not permitted. TIP and RING are polarity insensitive. Surge suppression of 400 volts between TIP and RING. Choice of RJ45, BNC or terminal block models for VDSL link connector: • RJ45 – RING pin 4, TIP pin 5 (TIA 568 A/B) • BNC – Coaxial 50 and 75 ohm cable with BNC connector • Terminal Block – 2 position screw connectors for use with twisted pair telephone, alarm or serial cabling between 19 (0.9 mm) and 26 AWG (0.44 mm).			
Power Injection over the Interlink (VDSL) – 2-wire	N/A		Injects SELV compliant voltage and VDSL data across a single pair of cooper wires (pins 4 and 5) or 2 conductor BNC coaxial cable	
Short Circuit Protection	N/A		Short Circuit protection provided	
Reverse Polarity Protection	The voltage from the VDSL link requires proper polarity in order to provide power to the remote extender. Reverse polarity protection however will ensure that there is no damage to the extender		N/A	
Power Multiplier Selection	When used with 4-pair cable such as CAT5 on the VDSL Interlink port, an optional internal strap selection on the Ethernet Extender will provide VDSL transmission data on 1 pair and power across the 3 other pairs enabling even greater distances for power transmission to be achieved			
VDSL Line Rate/Reach	Actual distance and rates experienced will depend on condition and gauge of wire used. This Rate/Reach table applies to 24 AWG (0.5 MM) twisted pair wiring on RJ45 (RJ) and terminal block (TB) models.			

High Speed Asymmetric

Reach (Distance)	VDSL Rate (Mbps)

feet	meters	Downstream	Upstream
500	152	101	92
1000	305	101	63
1500	457	90	38
2000	610	62	24
2500	762	55	10
3000	914	42	5
3500	1000	35	3

High Speed Symmetric

Reach (Distance)		VDSL Rate (Mbps)	
feet	meters	Downstream	Upstream
500	152	101	101
1000	305	85	101
1500	457	62	47
2000	610	60	29
2500	762	44	14
3000	914	30	7
3500	1000	29	4

Long Reach Symmetric

Reach (Distance)		VDSL Rate (Mbps)	
feet	meters	Downstream	Upstream
500	152	53	44
1000	305	53	43
2500	762	39	18
4000	1219	25	4
5500	1676	17	1.9
7000	2134	8	2.3
7500	2286	7	2.2
8000	2438	5	2.2

Long Reach Asymmetric

Reach (Distance)		VDSL Rate (Mbps)	
feet	meters	Downstream	Upstream
500	152	78	16
1000	305	78	16
2500	762	55	10
4000	1219	31	0.8
5500	1676	20	0.6
7000	2134	11	0.6
7500	2286	10	0.6
8000	2438	8	0.6

This table applies when the power multiplier option is selected

Power Budget	The amount of available power at the PoE PD is dependent on the scenario planned. Refer to the Power Reach Installation Planning Guide

	Remote (Power over Ethernet)		Local (power over link - VDSL)	
Indicators	**eXP-1S1110E**	**eXP-4S1110E**	**eXP-1S1110L**	**eXP-4S1110L**
Power / TST	This green LED is turned on when power is applied to the Ethernet Extender. Otherwise it is off. The LED will blink when in Loopback test mode.			
CO - Local	Ethernet Extender is operating in CO VDSL mode			
CPE - remote	Ethernet Extender is operating in CPE VDSL mode			
ILNK	Indicates Link Status and activity on the Interlink (VDSL) port			
ETH	Indicates link status and activity on Ethernet port(s).			

PSE Status	This LED will signify the status of the PSE function. Using multi-color and blinking the unit will show the following status for the PSE; GREEN — Solid: The PSE has successfully detected a compliant PD and is applying power over the UTP (for legacy pin out simply show active power when applied) YELLOW — Solid: The PSE is not active. This means the PSE has been configured to provide power, but the PD is : • Not connected • Has not detected a compliant PD and is not applying power • PSE has turned off power for Reset function OFF — PSE function switch disabled RED — Blinking: Error Conditions • Capacitance too High — 1 blink • Resistance too Low or short circuit — 2 blinks • Resistance too high or open circuit — 3 blinks

	Remote (Power over Ethernet)		Local (power over link - VDSL)	
Switches	**eXP-1S1110E**	**eXP-4S1110E**	**eXP-1S1110L**	**eXP-4S1110L**
Access	Switch settings are accessible through a side opening in the chassis			
Rate/Reach	Two switches enable the user to select the right balance between speed and distance for their environment.			
Signal to Noise Ratio	Selectable Signal to Noise Ratio (SNR) of 6dB or 9dB. The higher SNR number provides better impulse noise protection but lowers performance.			
Auto-Negotiation (802.3u) control on Port 1	*Enabled (Default)* - The Ethernet Extender uses 802.3u Auto-negotiation on the 10/100/1000Base-T interface. It is set to advertise full duplex. *Disabled* - The Ethernet Extender sets the port according to the position of the speed and duplex switches.			
Force Ethernet Speed on Port 1	When Auto-Negotiation switch is disabled, a fixed speed can be forced on port 1 to 100 (Default) or 10			
Force Ethernet Duplex on Port 1	When Auto-Negotiation switch is disabled, Full or half Duplex can be forced on port 1 to Full (Default) or Half			
Link Mode	*Standard (Default)* – The 10/100/1000Base-T link remains active independent of the state of the Ethernet link on its remote peer. *Link Pass-Through*- state of the 10/100/1000Base-T Ethernet connection is "passed through" or propagated across the VDSL link to the 10/100/1000Base-T Ethernet link on its remote Ethernet Extender peer.			
Interlink Fault Feedback	*Enabled* – A loss of VDSL link will drop the 10/100/1000 Ethernet port on each end until the link recovers *Disabled (Default)* - The state of the VDSL link is not propagated to the 10/100/1000Base-T port			

Loopback	*Enabled* – The VDSL interlink will perform a loopback function, retransmitting all received Ethernet frames back to its remote peer. *Disabled (Default - Up)*	
PoE PD Class selection	N/A	(Internal strap) for PoE PD classification type identification for attached IEEE 802.3at compliant PoE+ switch on port #1 Class 0 – PoE PD device - 0.44-12.94W (Default) Class 4 – PoE+ PD device 12.95 – 25.5W
PD Reset (Port 1)	When enabled (down), the Ethernet Extender will upon loss of link on the VDSL Interlink port, turn off PSE output power to the PD device for 2 seconds then turn the power back on. The power remains on until the VDSL link transitions from up to down again. When PD Power Reset is disabled (default), loss of VDSL link has no effect on power supplied to the PD device.	N/A

Environmental Specifications	eXP-1S1110E	eXP-4S1110E	eXP-1S1110L	eXP-4S1110L
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)			
Current mA	123 @ 48vdc	179 @ 48vdc	144 @ 48vdc	200 @ 48vdc
Unit Power Consumption watts	5.9	8.6	6.9	9.6
Heat Output (BTU/HR)	20.13	29.34	23.54	32.76
MTBF with power adapter (Hours)**	185,061	169,935	199,390	182,735
MTBF without power adapter (Hours)**	300,472	262,530	340,165	294,389

Mounting	eXP-1S1110E	eXP-4S1110E	eXP-1S1110L	eXP-4S1110L
Wall/Desk	Standard			
Din Rail Kit	Optional			
Rack Mount Kit	Optional			

Product Weight and Dimensions	eXP-1S1110E	eXP-4S1110E	eXP-1S1110L	eXP-4S1110L
Weight	0.58 Kg, 1.3 lbs	0.61Kg, 1.34 lbs	0.58 Kg, 1.3 lbs	0.61Kg, 1.34 lbs
Dimensions	163 x 116 x 37 mm, 6.4 x 4.6 x 1.46 inches			

Packaging	eXP-1S1110E	eXP-4S1110E	eXP-1S1110L	eXP-4S1110L
Shipping Weight	1.27 Kg, 2.8 lbs	1.3 Kg, 2.86 lbs	1.27 Kg, 2.8 lbs	1.3 Kg, 2.86 lbs
Shipping Dimensions	20 x 30 x 7 cm, 7.9 x 11.8 x 2.8 inches			

| Regulatory Approvals	eXP-1S1110E	eXP-4S1110E	eXP-1S1110L	eXP-4S1110L
Emissions	CISPR 32:2015/EN 55032:2015 (Class A)			
	IEC/EN 61000-3-2			
	IEC/EN 61000-3-3			
Immunity	CISPR 24:2010/EN 55024:2010			
	IEC/EN 61000-4-2			
	IEC/EN 61000-4-3			
	IEC/EN 61000-4-4			
	IEC/EN 61000-4-5			
	IEC/EN 61000-4-6			
	IEC/EN 61000-4-8			
	IEC/EN 61000-4-11			
Electrical Safety	UL 60950-1			
	IEC 60950-1(ed 2); am1, am2			
	EN 60950-1:2006+A11:2009+A1:2010+A12:2011+A2:2013			
	CSA C22.2 No. 60950-1			
Environmental	Reach, RoHS and WEEE Compliant			

Other	ECCN: 5A991
	HTSUS Number: 8517.62.0050
	Perle Lifetime warranty

*Available on 1 port models.

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

Extend 10/100/1000 Ethernet across Twisted Pair or Coaxial Cable to a Remote PoE device

Extend an Ethernet link to a PoE device beyond the 100 meter (328 feet) limit using Ethernet Extenders. Distances of up to 3 km (10,000 feet) can be achieved over twisted pair Cat 5,6 or 7 or Coaxial cable. For long reach applications, the remote extender provides power to PoE devices such as IP cameras and Access Points. A locally attached AC Adapter is used.
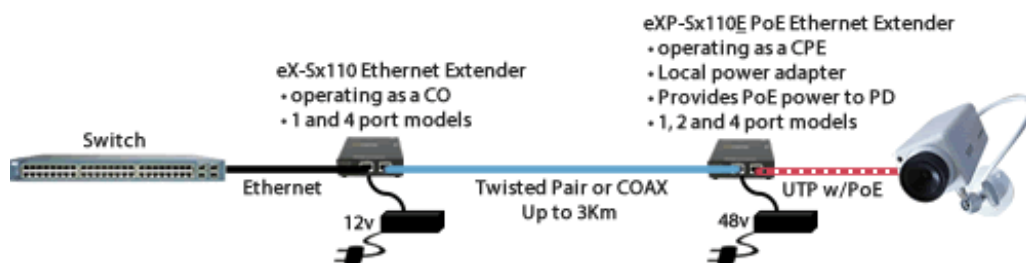

Extend 10/100/1000 Ethernet across Twisted Pair or Coaxial Cable. Ethernet Extender Parasitically Powered

Extend an Ethernet link beyond the 100 meter (328 feet) limit using Ethernet Extenders over twisted pair Cat 5,6 or 7 or Coaxial cable. There may be occasions where even though there are no PoE devices on the link, the remote extender simply requires parastic power from its peer extender over the VDSL link.
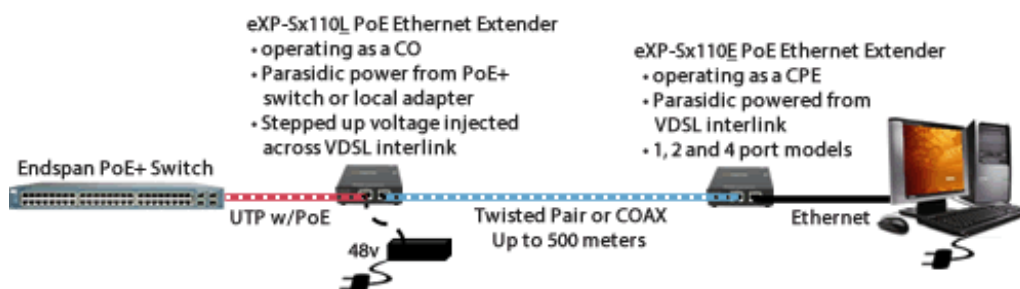
When there is a requirement for a PoE PD to be connected over a twisted pair link and no AC power is available at the remote site, the eXP series can provide power to the remote site over the VDSL Interlink. The remote Ethernet Extender will derive its power parasitically from the line and pass along the remaining power to the PoE device. The local Ethernet Extender can be powered by a locally attached AC adapter or by a PoE+ switch or injector.
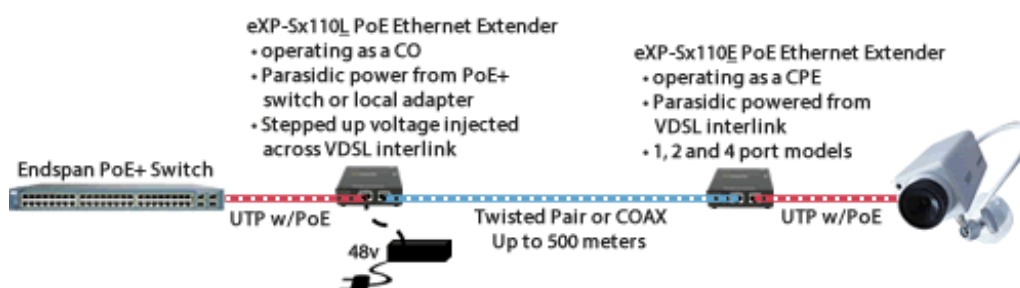
If a 4-pair cable such as CAT5 is used for the VDSL Interlink, the power multiplier feature can be enabled which provides the capability to provide both power and ethernet over longer distances. This is done by providing power over 3 pairs of wires with VDSL data on the 4th pair.