

## *RuggedNet*<sup>®</sup>

### GXPoE+/Si and GXHPoE/Si

Unmanaged 30W and 60W Gigabit PoE Extender  
with Booster Technology



## User Manual

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## Safety Warnings and Cautions



**ATTENTION:** Observe precautions for handling electrostatic discharge sensitive devices.



**WARNING:** Potential damage to equipment and personal injury.



**WARNING:** Risk of electrical shock.

## Customer Support Information

If you encounter problems while installing this product, contact Omnitron Technical Support:

Phone: (949) 250-6510

Fax: (949) 250-6514

Address: Omnitron Systems Technology, Inc.

38 Tesla

Irvine, CA 92618, USA

Email: [support@omnitron-systems.com](mailto:support@omnitron-systems.com)

URL: [www.omnitron-systems.com](http://www.omnitron-systems.com)

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# RuggedNet GXPoE+/Si and GXHPoE/Si User Manual

## Product Overview

RuggedNet GXPoE+/Si and GXHPoE/Si are industrial unmanaged copper gigabit Ethernet PoE Extenders. They enable the delivery of Ethernet data and Power over Ethernet (PoE) beyond the standard 100 meter limit of twisted pair copper cabling. PoE Extenders provide cost-effective connectivity for data and power to remote PoE devices where external power is not available or hard to provision.



*RuggedNet GXPoE+/Si or GXHPoE/Si 2 and 3-Port Models*

## Front Panel

The RuggedNet GXPoE+/Si and GXHPoE/Si are 10/100/1000BASE-T Ethernet extenders that function as both Powered Devices (PD) and Power Sourcing Equipment (PSE). The front of the PoE Extender provides access to one RJ-45 PoE/PD port and one or two RJ-45 PoE/PSE ports.



*Front Panel Layout*

## RJ-45 Ports

The RJ-45 Ethernet ports support 10BASE-T, 100BASE-TX and 1000BASE-T speeds, auto-negotiation and auto MDI/MDI-X crossover.

The GXPoE+/Si PoE/PD port can be powered by a IEEE 802.3at (30W) or High-Power 60W switch. When powered by IEEE 802.3at or High-Power 60W, the

PoE/PSE ports can provide up to 20 watts and support 802.3af, 802.3at and 802.3bt compliant devices. When a non-PoE device, such as a laptop, is connected to the PoE Extenders for data only applications, no power is applied.

The GXHPoE/Si PoE/PD port can be powered by a IEEE 802.3at (30W) or High-Power 60W switch. When powered by IEEE 802.3at, the PoE/PSE ports can provide up to 20 watts and support 802.3af, 802.3at and 802.3bt compliant devices.. When powered by High-Power 60W, the PoE/PSE ports can provide up to 44 watts and support 802.3af, 802.3at and 802.3bt compliant devices. When a non-PoE device, such as a laptop, is connected to the PoE Extenders for data only applications, no power is applied.

### Booster Technology

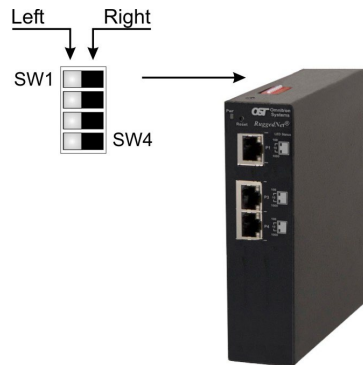
Due to the voltage drop across copper cabling, the voltage at the end of an extended topology can be below the minimum IEEE voltage requirement for the attached PD. RuggedNet PoE Extenders have smart voltage-boosting technology that boosts the output voltage to 56 to 57VDC to ensure compliance with the IEEE specification between PoE Extenders in a daisy chain.

### Installation Procedure

- 1) Configure DIP-switches
- 2) Example Topologies
- 3) Determine the Amount of PoE Power Available
- 4) Connect Cables and Devices
- 5) Verify Operation

#### 1) Configure DIP-switches

DIP-switches are located on the top of the RuggedNet PoE Extender.



*DIP-switch Bank Locations*

The table below provides a description of each DIP-switch position and function.

Switch	Position	Function
SW1 - SW4	Left	Reserved
	Right	

*DIP-switch Definitions for GXPoE+/Si*

Switch	Position	Function
SW1	Left	Port 1 PoE/PD - Auto (Factory default)
	Right	Port 1 PoE/PD - Force up to 60 watts
SW2	Left	Port 2 PoE/PSE - Auto (Factory default)
	Right	Port 2 PoE/PSE - Force up to 60 watts
SW3	Left	Port 3 PoE/PSE - Auto (Factory default)
	Right	Port 3 PoE/PSE - Force up to 60 watts
SW4	Left / Right	Reserved

*DIP-switch Definitions for GXHPoE/Si*

#### SW1: Port 1 PD - “Auto/Force”

When the Port 1 Auto/Force DIP-switch is in the default Auto position, the PoE/PD port is in the auto mode, it will negotiate using 2 pair power if the input power is 802.3af, or 4 pair power if the input power is 802.3at or High-Power 60 watts. 2 and 4 pair operation depends on the input power and the model of the extender. The GXHPoE/Si negotiates PoE power on 4 pairs and the GXPoE+/Si negotiates PoE power on 2 pairs.

When this DIP-switch is in the Force position, the PoE/PD port is in the forced mode and configured for 4 pair operation allowing up to 60 watt input power. Forced operation depends on the input power and the model of the extender.

#### SW2 and SW3: Port 2 and Port 3 - “Auto/Force”

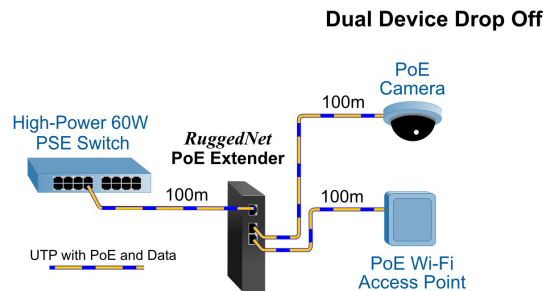
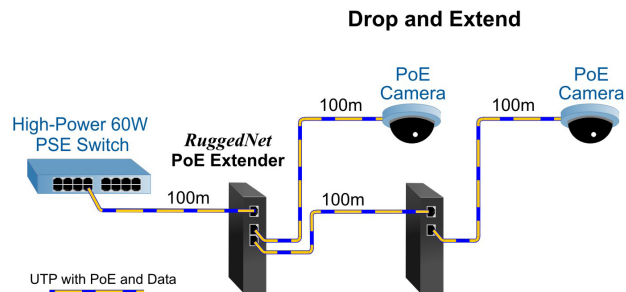
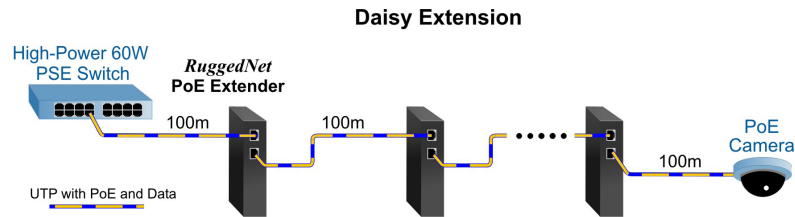
When these DIP-switches are in the default Auto position, the port will automatically perform the IEEE standard PoE detection, classification and powering functions to the attached PD.

When these DIP-switches are in the Force position, a maximum of 60 watts of power will be available to the PD.

#### SW4: Reserved

## 2) Example Topologies

The PoE Extenders can be deployed in a daisy chain topology, dropping one or two PDs from a single extender or dropping a PD at the end of the daisy chain. Other combinations can be supported depending on the amount of PoE power available.



## 3) Determine the Amount of PoE Power Required

There are several factors to consider when extending Powered Devices over standard copper cabling:

- The power source: 802.3at (30 watts) or HPOe (60 watts)
- The power required by the PD: Class of PD: 802.3af, 802.3at or 60W
- The power loss in the cabling: Category 5, Category 5e or Category 6
- The power consumed by the PoE Extender:

Maximum Power Consumption per PoE Extender		
PoE Extenders in a Daisy Chain	802.3at 30W PSE	High-Power 60W PSE
1st Extender	6.6 watts	9 watts
2nd Extender	5.9 watts	8 watts
3rd Extender	5.4 watts	7 watts
4th Extender	4.9 watts	6.2 watts
5th Extender	-	5.7 watts
6th Extender	-	5.2 watts
7th Extender	-	4.9 watts

NOTE: The PoE Extender will consume less power depending on the Class of PD attached to the PoE/PSE port.

The table below provides a summary of the distance and available power when multiple PoE extenders are connected in a daisy chain.

PSE Source Power	Number of Extenders	Distance Meters / Feet	Available Power for PD per Cable Type		
			Category 5	Category 5e	Category 6
802.3at 30W	1	200m / 656 ft.	17.6 watts	18.6 watts	19.9 watts
	2	300m / 984 ft.	11.3 watts	12.2 watts	13.5 watts
	3	400m / 1,312 ft.	6.0 watts	6.7 watts	7.9 watts
	4	500m / 1,640 ft.	1.2 watts	1.8 watts	2.9 watts
High-Power 60W	1	200m / 656 ft.	38.8 watts	40.8 watts	43.5 watts
	2	300m / 984 ft.	29.2 watts	31.1 watts	34.0 watts
	3	400m / 1,312 ft.	21.4 watts	23.2 watts	25.9 watts
	4	500m / 1,640 ft.	14.8 watts	16.6 watts	19.0 watts
	5	600m / 1,968 ft.	9.1 watts	10.7 watts	12.9 watts
	6	700m / 2,296 ft.	4.0 watts	5.4 watts	7.4 watts
	7	800m / 2,624 ft.	-	Data Only	2.4 watts

## 4) Connect Cable and Devices

- Connect the RJ-45 port on the PoE PSE equipment to the P1-PD port on the RuggedNet GXPoE+/Si or GXHPoE/Si using a Category 5 or better cable.
- Verify the PWR and P1-PD LEDs on the RuggedNet GXPoE+/Si or GXHPoE/Si are functioning per the LED table on the next page.
- Connect the RJ-45 P2-PSE or P3-PSE port on the RuggedNet GXPoE+/Si or GXHPoE/Si to the Powered Device using a Category 5 or better cable.
- Verify the P2-PSE or P3-PSE LED on the RuggedNet GXPoE+/Si or GXHPoE/Si is functioning per the LED table on the next page.

## 5) Verify Operation

Verify the GXPoE30/Si or GXHPoE60/Si is operational by viewing the LED indicators.

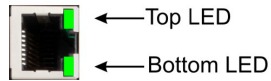
Once power is applied through the PoE/PD port on the module, all module functions are active. The PoE/PSE port is operational and will start detecting / classifying once a PD device is attached to the port.

This facilitates installation and troubleshooting by ensuring each link is operational. This is especially beneficial when multiple Extenders are daisy chained.

Power - LED Indicators		
Legend	Indicator	Description
Pwr	OFF	Unit not powered
	Green - ON	Unit powered

*Power LED Indicators*

Located on the RJ-45 Port



*Front Panel LED Locations*

PoE/PD Port - LED Indicators			
Legend	Location	Indicator	Description
P1-PD	Front of the Module	OFF	No PSE power
		Green - single blink	Powered by 802.3af PoE 15W
		Green - two blinks	Powered by 802.3at PoE 30W
		Green - three blinks	Powered by High-Power PoE 60W
10	Both Top & Bottom LED	OFF	No link
		Green - ON	Port linked at 10Mbps
		Green - Blinking at 20Hz	Port data activity at 10Mbps
100	Top LED	OFF	No link
		Green - ON	Port linked at 100Mbps
		Green - Blinking at 20Hz	Port data activity at 100Mbps
1000	Bottom LED	OFF	No link
		Green - ON	Port linked at 1000Mbps
		Green - Blinking at 20Hz	Port data activity at 1000Mbps

*PoE/PD LED Indicator*

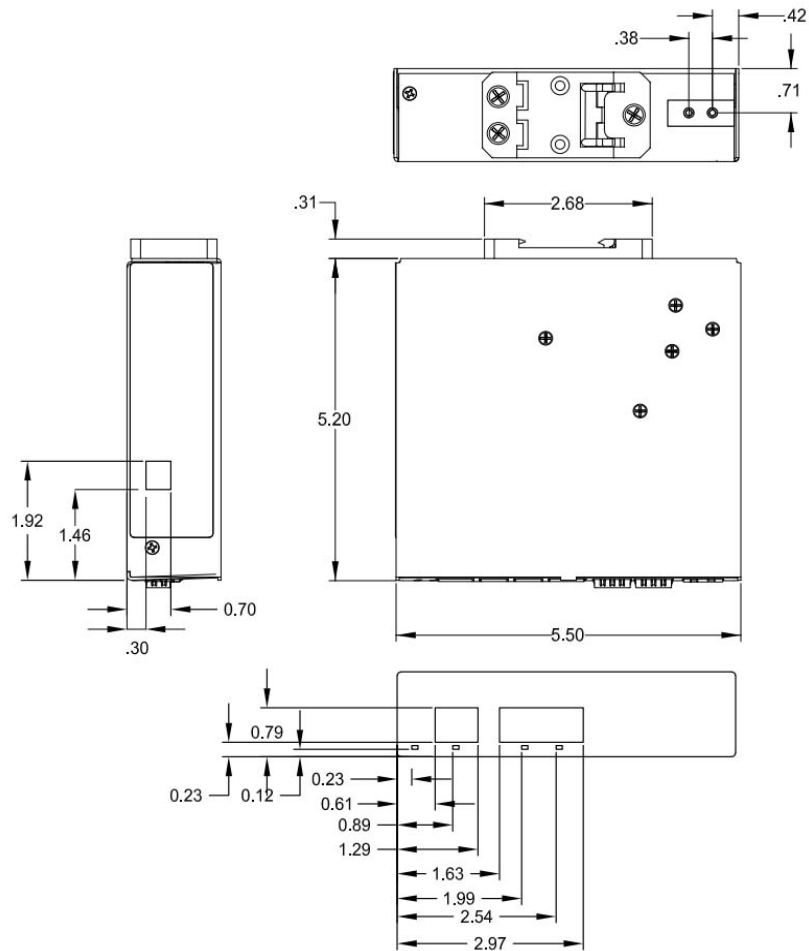
PoE/PSE Port 2 - LED Indicators			
Legend	Location	Indicator	Description
P2-PSE	Front of the Module	OFF	No PSE power
		Green - single blink	Powered by 802.3af PoE 15W
		Green - two blinks	Powered by 802.3at PoE 30W
		Green - three blinks	Powered by High-Power PoE 60W
		Yellow - ON	Failed PoE negotiation
		Yellow - Blinking at 1Hz	Can not provide the requested power
10	Both Top & Bottom LED	OFF	No link
		Green - ON	Port linked at 10Mbps
		Green - Blinking at 20Hz	Port data activity at 10Mbps
100	Top LED	OFF	No link
		Green - ON	Port linked at 100Mbps
		Green - Blinking at 20Hz	Port data activity at 100Mbps
1000	Bottom LED	OFF	No link
		Green - ON	Port linked at 1000Mbps
		Green - Blinking at 20Hz	Port data activity at 1000Mbps

*P2 PoE/PSE LED Indicator*

PoE/PSE Port 3 - LED Indicators			
Legend	Location	Indicator	Description
P3-PSE	Front of the Module	OFF	No PSE power
		Green - single blink	Powered by 802.3af PoE 15W
		Green - two blinks	Powered by 802.3at PoE 30W
		Green - three blinks	Powered by High-Power PoE 60W
		Yellow - ON	Failed PoE negotiation
		Yellow - Blinking at 1Hz	Can not provide the requested power
10	Both Top & Bottom LED	OFF	No link
		Green - ON	Port linked at 10Mbps
		Green - Blinking at 20Hz	Port data activity at 10Mbps
100	Top LED	OFF	No link
		Green - ON	Port linked at 100Mbps
		Green - Blinking at 20Hz	Port data activity at 100Mbps
1000	Bottom LED	OFF	No link
		Green - ON	Port linked at 1000Mbps
		Green - Blinking at 20Hz	Port data activity at 1000Mbps

*P3 PoE/PSE LED Indicator*

## Mechanical



## Specifications

<b>Standard Compliances</b>	IEEE 802.3, IEEE 802.3at PoE+, IEEE 802.3bt, High-Power 60W PoE	
<b>Environmental</b>	REACH, RoHS and WEEE	
<b>PoE/PD Mode</b>	IEEE Alternate A (Alt A)	
<b>Frame Size</b>	Up to 10,240 bytes	
<b>Port Types</b>	Copper:	10/100/1000BASE-T (RJ-45)
<b>Cable Types</b>	Copper:	EIA/TIA 568A/B, Cat 5 UTP and higher
<b>Power Requirements</b>	PoE/PD (input): PoE/PSE (output):	+/-42.5 to +/-57VDC (per IEEE) +/-50 to +/-57VDC (per IEEE) 56VDC (typical)
<b>Dimensions W x D x H</b>	1.5" x 5.5" x 5.5" (38.1 mm x 139.7 mm x 139.7 mm)	
<b>Weight</b>	1.56 lb. (708 grams)	
<b>Operating Temperature</b>	Extended:	-40 to +75°C
<b>Humidity</b>	5 to 95% (non-condensing)	
<b>Altitude</b>	-100m to 4,000m (operational)	
<b>MTBF (hours)</b>	1xPD Port + 1xPSE Port: 375,000 1xPD Port + 2xPSE Ports: 317,000	
<b>Warranty</b>	Lifetime warranty with 24/7/365 free Technical Support	

## Standards and Compliances

<b>Safety</b>	UL 62368-1, UL 60950-1, IEC 62368-1, IEC 60950-1, EN 62368-1, EN 60950-1, CAN/CSA C22.2 No. 62368-1-14, CAN/CSA C22.2 No. 60950-1, CE Mark, UKCA
<b>EMC</b>	EN 55032/24 CE Emissions/Immunity, IEC 61000-6-4 Industrial Emissions, IEC 61000-6-2 Industrial Immunity
<b>EMI</b>	CISPR 32, FCC 47 Part 15 Subpart B Class A
<b>EMS</b>	IEC 61000-4-2 ESD: Contact: 4 kV; Air: 8 kV, IEC 61000-4-3 RS: 80 MHz to 1 GHz: 3 V/m (passed industrial rating of 10V/m), IEC 61000-4-4 EFT: Power: 1 kV (passed industrial rating of 2 kV), IEC 61000-4-4 EFT: Signal: 0.5 kV (passed industrial rating of 1 kV), IEC 61000-4-5 Surge: Power: 1 kV (passed industrial rating of 2 kV), IEC 61000-4-5 Surge: Signal: 1 kV, IEC 61000-4-6 CS: Signal: 3 Vrms (passed industrial rating of 10 Vrms)
<b>ACT</b>	TAA, BAA, NDAA
<b>IP Rating</b>	IP40 Protection