

## Quick Start Guide

This quick start guide describes how to install and use the Hardened Ethernet Extender. This is the Hardened Ethernet Extender of choice for harsh environments constrained by space.

### Installation

**ED3638T (Transmitter):** This is a PoL (Power over Link) transmitter. Data and power can be delivered at the same time through coaxial cable to turn on and communicate with ED3638R (Receiver) via BNC interface.

**ED3638R (Receiver):** This is a PoL (Power over Link) Receiver. ED3638R (Receiver) can be powered either by ED3638T (Transmitter) through coaxial cable or power supply. The Ethernet port supports IEEE802.3at PoE/PSE for fulfilling PoE/PD application.

#### <Warning>

- Removes the device power before installation.
- Removes the device power before any I/O and DIP switch configuration.
- Do not connect ED3638T and ED3638R to the same power source. Devices may be damaged due to power loop back through the PoL linked via coaxial cable.

#### PoL (Power over Link) Mode Enable Installation

- Ensures all power sources are disconnected from ED3638T and ED3638R.
- Ensures ED3638T PoL (Power over Link) DIP switch is in **On** position (Up position).
- Sets ED3638T Type DIP switch to Perf (Performance, Up position) to acquire better Line Speed (but poor noise immunity). Or sets Type DIP switch of ED3638T to Std (Standard, Down position) to acquire standard Line Speed (but better noise immunity).
- Checks if ED3638R Mode is set to Rmt on DIP switch (Remote, Up position).
- Connects one end of the coaxial cable to BNC interface of the ED3638T and the other end to BNC interface of the ED3638R.
- Connects power source to ED3638T.
- Data and power can be delivered from ED3638T, and at the same time through coaxial cable to turn on and communicate with ED3638R.

**<Note>** The equipment is designed for building installation and not intended to be connected to exposed (outside plant) networks including campus environment or equivalent.

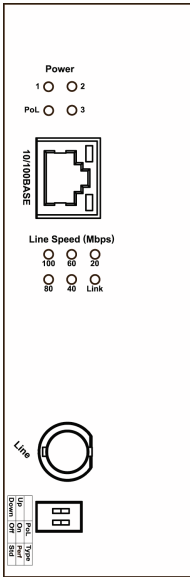
#### PoL (Power over Link) Mode Disable Installation

- For longer distance (e.g. over 1.4km) extension application, ED3638R may not be able to receive power from ED3638T. A separate power may be applied on ED3638R.
- Ensures all power sources are disconnected from ED3638T and ED3638R.
- Ensures ED3638T PoL (Power over Link) DIP switch is in **Off** position (Down position).
- Sets ED3638T Type DIP switch to Perf (Performance, Up position) to acquire better Line Speed (but poor noise immunity). Or sets Type DIP switch of ED3638T to Std (Standard, Down position) to acquire standard Line Speed (but better noise immunity).

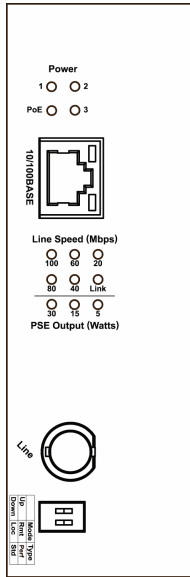
- Connects power source to ED3638T.
- Checks if ED3638R Mode is set to Rmt on DIP switch (Remote, Up position).
- Connects power source to ED3638R.
- Connects one end of the coaxial cable to BNC interface of the ED3638T and the other end to BNC interface of the ED3638R.
- Data can be transmitted between ED3638T and ED3638R via coaxial cable.

## Physical Description

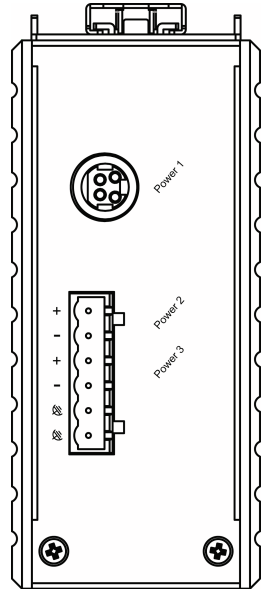
### The Port Status LEDs and Power Inputs



ED3638T




ED3638R

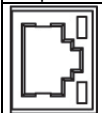


- DC Terminal Block Power Inputs: 2.5A @ 48VDC (Peak current 3.26A). There are two pairs of power inputs can be used to power up this Ethernet Extender. Redundant power supplies function is supported. You only need to have one power input connected to run the Ethernet Extender.
- DC JACK Power input: 2.5A @ 48VDC (Peak current 3.26A).

Power supply suggestion	30 watts application
SDR-120-48 / DR-120-48 (120W 48VDC)	For one pair
SDR-240-48 (240W 48VDC)	For three pairs
SDR-480-48 (480W 48VDC)	For seven pairs

Power Input Assignment			
Power1		48VDC	DC Jack
Power2	+	T:46-57V / R:46-57V DC	Terminal Block
	-	Power Ground	
Power3	+	T:46-57V / R:46-57V DC	
	-	Power Ground	
		Earth Ground	

DIP Switch	Down	Up
ED3638T		
PoL	Disable Power over Link	Enable Power over Link
Type	Std (Standard) Standard line speed Better noise immunity	Perf (Performance) Better line speed Poor noise immunity
ED3638R		
Mode	Loc (Local) Set ED3638R to Local Mode	Rmt (Remote) Set ED3638R to Remote Mode
Type	Std (Standard) Standard line speed Better noise immunity	Perf (Performance) Better line speed Poor noise immunity

LEDs	State	Indication		
Power 1/2/3	Steady	Power received		
	Off	Power off		
PoL	Steady	Power Ethernet extension interface function is enabled		
	Off	No power is transmitted over Ethernet extension interface		
PoE	Steady	Powered device (PD) is connected		
	Off	Powered device (PD) is disconnected		
Link	Steady	A valid Extender connection established		
	Fast Flashing	Data transmission or receiving		
	Slow Flashing	Extender port under negotiation mode		
	Off	Extender interface connection is not established		
Line Speed	Steady	Displays the link speed in Mbps		
PSE Output	Steady	PoE power can be transmitted for PD		
	All off	No PoE power can be transmitted for PD		
	Green	Steady	A valid Ethernet connection established	
		Flashing	Data transmission or receiving	
		Off	Non-Ethernet connection is established	
	Yellow	Steady	Link speed at 100Mbps	
		Off	Link speed at 10Mbps	

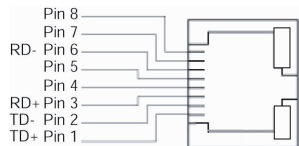
Power over Link (PoL) Enabled		
Distance	Data Rate	ED3638R PoE Output
400M	100Mbps	30.0W
800M	60Mbps	15.4W
1000M	50Mbps	12.0W
1200M	45Mbps	8.0W
1600M	20Mbps	6.0W
1800M	15Mbps	4.0W

Power over Link (PoL) Disabled Power Supply Applied on ED3638R		
Distance	Data Rate	ED3638R PoE Output
2000M	9Mbps	30.0W
2200M	6Mbps	30.0W
2400M	4Mbps	30.0W

**<Note>** The Reference Performance is tested on 5C2V / RG6AU Coaxial Cable on a roll type (Cable impedance: 75ohm).

## **10/100Base-TX and Ethernet Extender Connectors**

10/100Base-TX Connection  
The following lists the pinouts of 10/100Base-TX RJ-45 port.



Pin	Regular Port	PoE Port
1	Output Transmit Data +	Output Transmit Data +
2	Output Transmit Data -	Output Transmit Data -
3	Input Receive Data +	Input Receive Data +
4		Positive (VCC+)
5		Positive (VCC+)
6	Input Receive Data -	Input Receive Data -
7		Negative (VCC-)
8		Negative (VCC-)

## Functional Description

- Meets EN61000-6-2 & EN61000-6-4 EMC Generic Standard Immunity for industrial environment.
- Ethernet port: Supports IEEE802.3/802.3u/802.3x. Auto-negotiation: 10/100Mbps, full/half-duplex; Auto MDI/MDIX.
- Auto data rate negotiation for Ethernet extension interface.
- 5C2V/RG6AU coaxial cable for BNC connector.
- Six speeds with speed indicator LEDs on front panel of unit, up to 100Mbps @ about 600meters (1,968ft.), down to 1Mbps @ about 3,000meters (9,842ft.).
- Supports Power over Link (PoL) and provides IEEE802.3at power output up to 500meters (1,640ft.) and IEEE802.3af power output up to 800meters (2,624ft.).
- Supports Power over Ethernet application up to 1,900meters (6,233ft.) for Max. 5 watts power consumed PoE powered devices.
- Power consumption:
  - **Enable** Power over Link (PoL) function: Max. 65Watts
  - **Disable** Power over Link (PoL) function: ED3638T: Max. 5W. ED3638R: Max. 35W with PoE output, Max. 5W without PoE output.
- Power Supply: Redundant T:46-57V / R:46-57V DC Terminal Block power inputs and 48VDC Latched DC JACK interface.
- Operating temperature range @ -40°C to 75°C (-40°F to 167°F). Tested for functional operation @ -40°C to 85°C (-40°F to 185°F).
- Supports Din-Rail or Panel Mounting installation.

## Preface

This manual describes how to install and use the Hardened Ethernet Extender. The Hardened Ethernet Extender introduced here provides one channel for Ethernet over existing coaxial cable.

The Hardened Ethernet Extender fully complies with IEEE802.3 10Base-T and IEEE802.3u 100Base-TX standards.

In this manual, you will find:

- Product overview
- Features on the Hardened Ethernet Extender
- Illustrative LED functions
- Installation instructions
- Specifications

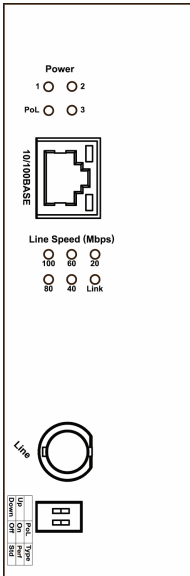
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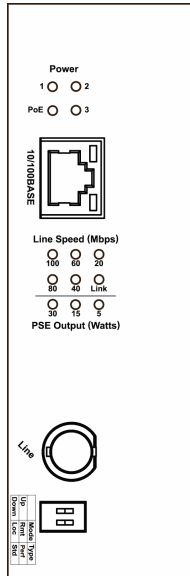
## Introduction

The Hardened Ethernet Extender provides one channel for Ethernet over existing coaxial cable. This Hardened Ethernet Extender solution is perfectly fitted in the industrial applications or rugged environment.

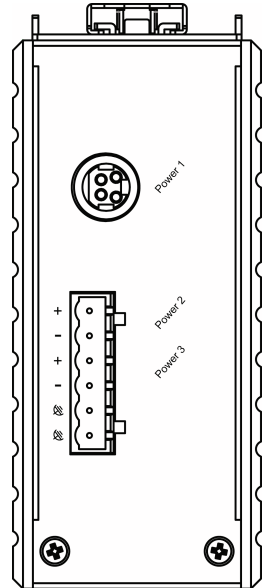
## Product Overview



ED3638T



ED3638R



## Product Features

- Meets EN61000-6-2 & EN61000-6-4 EMC Generic Standard Immunity for industrial environment.
- Ethernet port: Supports IEEE802.3/802.3u/802.3x. Auto-negotiation: 10/100Mbps, full/half-duplex; Auto MDI/MDIX.
- Auto data rate negotiation for Ethernet extension interface.
- 5C2V/RG6AU coaxial cable for BNC connector.
- Six speeds with speed indicator LEDs on front panel of unit, up to 100Mbps @ about 600meters (1,968ft.), down to 1Mbps @ about 3,000meters (9,842ft.).



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- Supports Power over Ethernet application up to 1,900meters (6,233ft.) for Max. 5 watts power consumed PoE powered devices.
- Power consumption:
  - **Enable** Power over Link (PoL) function: Max. 65Watts
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- Power Supply: Redundant T:46-57V / R:46-57V DC Terminal Block power inputs and 48VDC Latched DC JACK interface.
- Operating temperature range @ -40°C to 75°C (-40°F to 167°F). Tested for functional operation @ -40°C to 85°C (-40°F to 185°F).
- Supports Din-Rail or Panel Mounting installation.

## Packing List

When you unpack this product package, you will find the items listed below. Please inspect the contents, and report any apparent damage or missing items immediately to our authorized reseller.

- The Hardened Ethernet Extender
- User's Manual
- AC to DC Power Adaptor and Power Cable (optional)

# One-Channel Hardened Ethernet Extender

## Ports

The Hardened Ethernet Extender provides TX ports and one Ethernet Extender port.

For the TX ports, it uses RJ-45 connector and auto senses the speed of 10/100Mbps.

For the Ethernet Extender port, it uses BNC connectors and auto senses the speed of Link (below 20)/20/40/60/80/100Mbps.

## Ethernet Extender Mode Settings

Ethernet Extender mode settings are made very simple by means of a DIP (Dual Inline Package) switch on the top panel of the Hardened Ethernet Extender.

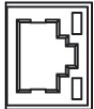
## DIP Switch

DIP Switch	Down	Up
ED3638T		
PoL	Disable Power over Link	Enable Power over Link
Type	Std (Standard) Standard line speed Better noise immunity	Perf (Performance) Better line speed Poor noise immunity
ED3638R		
Mode	Loc (Local) Set ED3638R to Local Mode	Rmt (Remote) Set ED3638R to Remote Mode
Type	Std (Standard) Standard line speed Better noise immunity	Perf (Performance) Better line speed Poor noise immunity

## Front Panel & LEDs

### LED Indicators

The LED indicators give you instant feedback on status of the Hardened Ethernet Extender:

LEDs	State	Indication	
Power 1/2/3	Steady	Power received	
	Off	Power off	
PoL	Steady	Power Ethernet extension interface function is enabled	
	Off	No power is transmitted over Ethernet extension interface	
PoE	Steady	Powered device (PD) is connected	
	Off	Powered device (PD) is disconnected	
Link	Steady	A valid Extender connection established	
	Fast Flashing	Data transmission or receiving	
	Slow Flashing	Extender port under negotiation mode	
	Off	Extender interface connection is not established	
Line Speed	Steady	Displays the link speed in Mbps	
PSE Output	Steady	PoE power can be transmitted for PD	
	All off	No PoE power can be transmitted for PD	
	Green	Steady	A valid Ethernet connection established
		Flashing	Data transmission or receiving
		Off	Non-Ethernet connection is established
	Yellow	Steady	Link speed at 100Mbps
		Off	Link speed at 10Mbps

Power over Link (PoL) Enabled		
Distance	Data Rate	ED3638R PoE Output
400M	100Mbps	30.0W
800M	60Mbps	15.4W
1000M	50Mbps	12.0W
1200M	45Mbps	8.0W
1600M	20Mbps	6.0W
1800M	15Mbps	4.0W

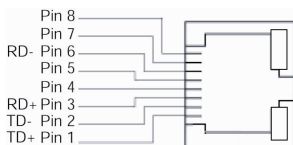
Power over Link (PoL) Disabled Power Supply Applied on ED3638R		
Distance	Data Rate	ED3638R PoE Output
2000M	9Mbps	30.0W
2200M	6Mbps	30.0W
2400M	4Mbps	30.0W

**<Note>** The Reference Performance is tested on 5C2V / RG6AU Coaxial Cable on a roll type (Cable impedance: 75ohm).

### **10/100Base-TX and Ethernet Extender Connectors**

#### 10/100Base-TX Connection

The following lists the pinouts of 10/100Base-TX RJ-45 port.



Pin	Regular Port	PoE Port
1	Output Transmit Data +	Output Transmit Data +
2	Output Transmit Data -	Output Transmit Data -
3	Input Receive Data +	Input Receive Data +
4		Positive (VCC+)
5		Positive (VCC+)
6	Input Receive Data -	Input Receive Data -
7		Negative (VCC-)
8		Negative (VCC-)

## Installation

This chapter gives step-by-step installation instructions for the Hardened Ethernet Extender.

### Selecting a Site for the Equipment

As with any electric device, you should place the equipment where it will not be subjected to extreme temperatures, humidity, or electromagnetic interference. Specifically, the site you select should meet the following requirements:

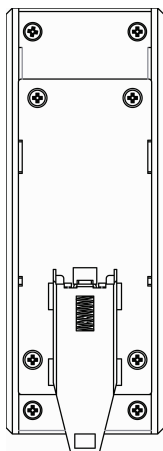
- The Surrounding Air temperature should be between -40 to 75 degrees Celsius.
- The relative humidity should be less than 95 percent, non-condensing.
- Surrounding electrical devices should not exceed the electromagnetic field (RFC) standards.
- Make sure that the equipment receives adequate ventilation. Do not block the ventilation holes of the equipment.
- The power outlet should be within 1.8 meters of the product.

### DIN Rail Mounting

Fix the DIN rail attachment plate to the back panel of the Hardened Ethernet Extender.

Installation: Place the Hardened Ethernet Extender on the DIN rail from above using the slot. Push the front of the Hardened Ethernet Extender toward the mounting surface until it audibly snaps into place.

Removal: Pull out the lower edge and then remove the Hardened Ethernet Extender from the DIN rail.



## Connecting to Power

Redundant DC Terminal Block Power Inputs or 48VDC DC Jack:

### Redundant DC Terminal Block Power Inputs

There are two pairs of power inputs can be used to power up this device. You only need to have one power input connected to run the Hardened Ethernet Extender.

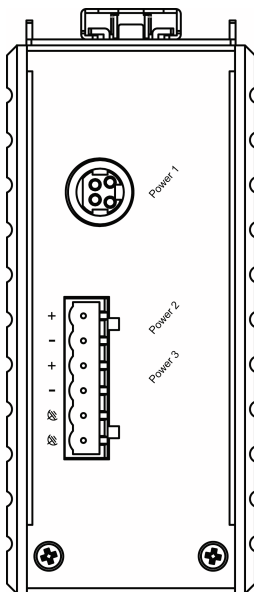
**Step 1:** Connect the DC power cord to the plug-able terminal block on the Hardened Ethernet Extender, and then plug it into a standard DC outlet.


**Step 2:** Disconnect the power cord if you want to shut down the Hardened Ethernet Extender.

### 48VDC DC Jack

**Step 1:** Connect the supplied AC to DC power adapter to the receptacle on the topside of the Hardened Ethernet Extender.

**Step 2:** Connect the power cord to the AC to DC power adapter and attach the plug into a standard AC outlet with the appropriate AC voltage.



Power Input Assignment			
Power1		48VDC	DC Jack
Power2	+	T:46-57V / R:46-57V DC	Terminal Block
	-	Power Ground	
Power3	+	T:46-57V / R:46-57V DC	
	-	Power Ground	
		Earth Ground	



## Specifications

Applicable Standards	IEEE802.3 10Base-T, IEEE802.3u 100Base-TX
Fixed Ports	10/100Mbps Ethernet ports with RJ-45 connectors 1 x Ethernet Extender port with BNC connector
Speed 10Base-T 100Base-TX Ethernet Extender	10/20Mbps for half/full-duplex 100/200Mbps for half/full-duplex Link (Below 20), 20, 40, 60, 80, 100Mbps
Switching Method	Store-and-Forward
Forwarding rate	14,880/148,810pps for 10/100Mbps
Cable 10Base-T 100Base-TX Ethernet Extender	4-pair UTP/STP Cat. 3, 4, 5 up to 100m 4-pair UTP/STP Cat. 5 up to 100m Coaxial cable
LED Indicators	Per Unit (3 LEDs)- Power1, Power2, Power3
	ED3638T- PoL; Line Speed (Mbps): Link, 20, 40, 60, 80, 100 ED3638R- PoE; Line Speed (Mbps): Link, 20, 40, 60, 80, 100; PSE Output (Watts): 5, 15, 30
Dimensions	50mm (W) × 110mm (D) × 135mm (H) (1.97" (W) × 4.33" (D) × 5.31" (H))
Weight	0.77Kg (1.7lbs.)
Power	Terminal Block: T:46-57V / R:46-57V DC DC Jack: 48VDC, External AC/DC required Terminal Block & DC Jack Power Inputs: 2.5A @ 48VDC (Peak current 3.26A)
Power Consumption	Enable PoL: Max. 65Watts Disable PoL: ED3638T: Max. 5W ED3638R: Max. 35W with PoE output Max. 5W without PoE output
Operating Temperature	-40°C ~ 75°C (-40°F ~ 167°F) Tested for functional operation @ -40°C ~ 85°C (-40°F ~ 185°F)
Storage Temperature	-40°C ~ 85°C (-40°F ~ 185°F)
Humidity	5 ~ 95%, non-condensing
EMI	FCC Part 15, Class A EN61000-6-4: EN55022, EN61000-3-2, EN61000-3-3
EMS	EN61000-6-2: EN61000-4-2 (ESD Standard) EN61000-4-3 (Radiated RFI Standards) EN61000-4-4 (Burst Standards) EN61000-4-5 (Surge Standards) EN61000-4-6 (Induced RFI Standards) EN61000-4-8 (Magnetic Field Standards)
Environmental Test Compliance	IEC60068-2-6 Fc (Vibration Resistance) IEC60068-2-27 Ea (Shock) IEC60068-2-32 Ed (Free Fall)