

CopperLink[™] Model 2300E Light Industrial Long Range Ethernet Extender

Quick Start Guide



CE **Important**—This is a Class A device and is intended for use in a light industrial environment. It is not intended nor approved for use in an industrial or residential environment.



WARNING

- **This device contains no user serviceable parts. The equipment shall be returned to Patton Electronics for repairs, or repaired by qualified service personnel.**
- **The external power adapter shall be a listed Limited Power Source. The mains outlet that is utilized to power the device shall be within 10 feet (3 meters) of the device, shall be easily accessible, and protected by a circuit breaker.**
- **If an AC power adapter is used, ensure that the power cable used meets all applicable standards for the country in which it is to be installed, and that it is connected to a wall outlet which has earth ground.**
- **Hazardous network voltages are present in WAN ports regardless of whether power to the unit is ON or OFF. To avoid electric shock, use caution when near WAN ports. When detaching the cables, detach the end away from the device first.**
- **Do not work on the system or connect or disconnect cables during periods of lightning activity.**

1.0 Hardware Installation

1.1 Contents of Package

- CL2300E Light Industrial Long Range Ethernet Extender
- External power supply for CopperLink Model 2300E (only EUI version)
- Ethernet cable with RJ45 plugs on each end (included)
- DB9 Male to Female 10ft Cable

1.2 What you will need

- Default Remote IP address: 192.168.200.10
- Default Local unit IP address: 192.108.200.11
- Default username: admin
- Default password: (no password)
- PC Computer

1.3 Identify the connector and attach the cables

All connectors are on the front panel of the model CL2300E (see **figure 1** and **figure 2**).

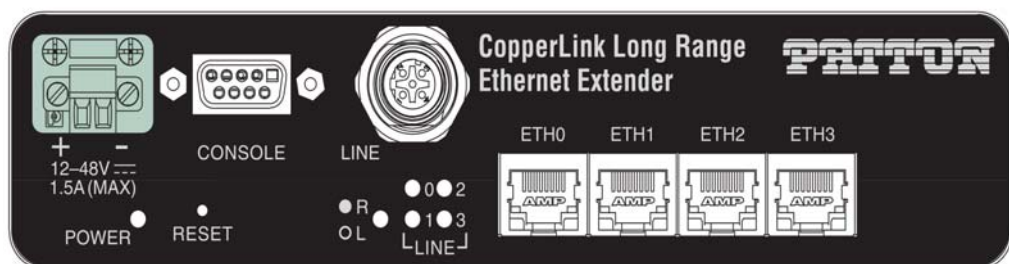


Figure 1. CL2300E Ethernet Extender front panel

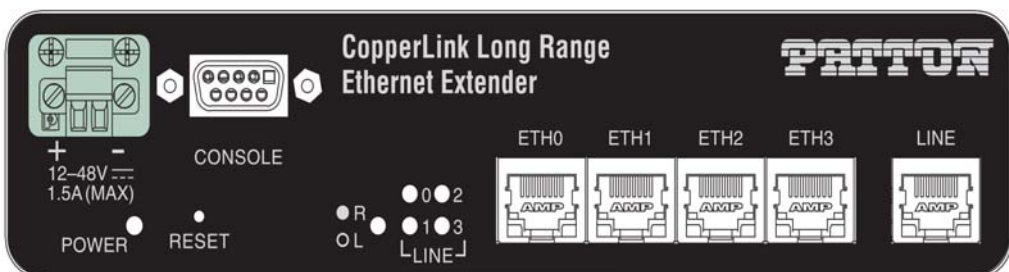


Figure 2. CL2300E Ethernet Extender front panel

Connect the Line Interface

To function properly, the CL2300E must be connected using a twisted-pair, unconditioned, dry, metal wire, between 19 (0.9mm) and 26 AWG (0.4mm). Leased circuits that run through signal equalization equipment are not acceptable.

The Ethernet Extender is equipped with either an RJ45 or M12 female connector as its CopperLink interface (Line). The M12 uses D-Coding (typically used for telecom). Any twisted pair cable can be used to directly connect two Ethernet Extenders. Depending on the CopperLink Ethernet Extender model, it will have a two-wire, four-wire or eight-wire interface. Observe the signal/pin relationship on the CL2300E's *Line* interface jack for each pair in **figure 3** and **figure 4**

The signals are differential. For example, pins 1 and 2 can be freely swapped. Pins 3 and 4 can also be swapped. Naturally, you CANNOT swap pins 1 and 3 or any other combination.

- Pair 1: pins 1 and 2
- Pair 2: pins 3 and 4 (only used in 4 wire mode)
- Pair 3: pins
- Pair 4: pins

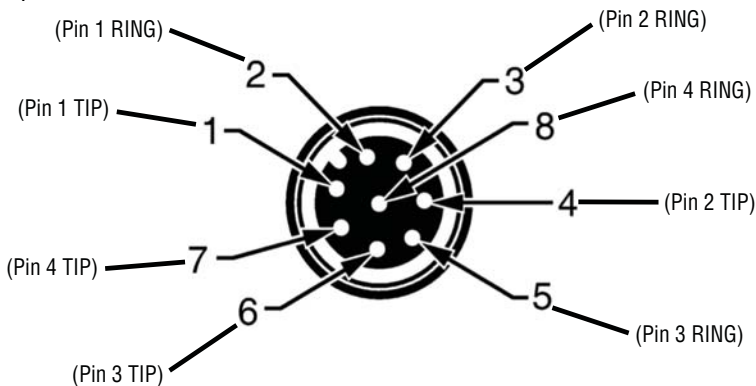


Figure 3. CL2300E M12 Female

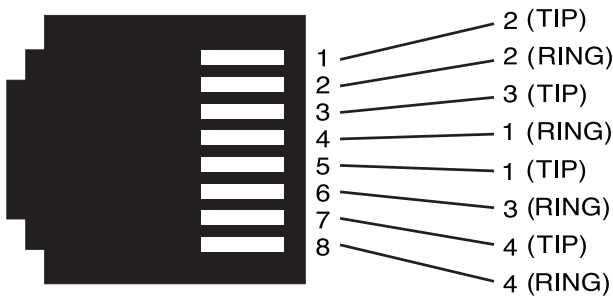


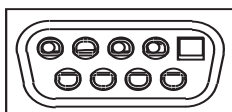
Figure 4. CL2300E RJ45 Connector Pinout

2.0 Connecting Interfaces

2.1 Connecting Console Interface

The console interface presented on a female DB9 RS-232 connector. The interface is wired as a DTE (Data Terminal Equipment). This means that the straight through male to female DB9 cable provided can be used to connect to a DCE (Data Computing Equipment) port of a personal computers. The three active pins are (Transmit, Receive, and Ground)

*Square pin indicates pin 1.



Pin	Function
2	Transmit (carries data from DTE to DCE)
3	Receive (carries data from DCE to DTE)
5	Ground

Figure 5. DB9 Female Interface

The console interface is configured to the following settings:

Baud Rate	19200
Data	8 bit
Parity	None
Stop	1 bit
Flow Control	None

2.2 Connect the Ethernet Interface

The Light Industrial Long Range Ethernet Extender has four unshielded RJ-45 auto-MDIX10/100Base-T interfaces. These are designed to connect directly to a 10/100Base-TX network. shows the signal/pin relationships on this interface. You may connect this port to a hub or PC using a straight through or crossover cable that is up to 328 ft long.

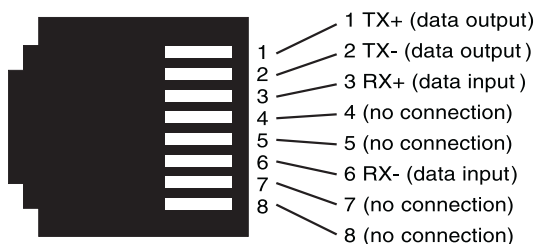


Figure 6. CL2300E 10/100Base-T RJ-45 Connector Pinout

2.3 Connect the Power Source

The CL2300E does not have a power switch, so it powers up as soon as it is plugged in. The power connection is made via the terminal block on the rear panel of the CL2300E. No configuration is necessary for the power supply.

2.4 Ethernet Extender Status LEDs

The LEDs indicate the status of power, the WAN (CopperLink), and Ethernet connections.

Note When powered down, the LED indicators are clear; when powered on, the LED indicators are green.

Table 1. CL2300E front panel LEDs

LED Name	LED Function	Description
Power	ON	When lit, Indicates power is applied.
R/L	OFF	CopperLink Extender is configured as Local.
	ON	CopperLink Extender is configured as Remote.
CopperLink Pair (one LED for each port [1 on CL3301E, 2 on CL3302E, 4 on CL3304E])	OFF	Corresponding pair is DOWN, and traffic will not flow.
	ON	Corresponding pair is UP, and traffic will flow.
	SLOW BLINK	Handshake mode (looking for signal).
	FAST BLINK	Training mode (active communication with CPE/CO).
Ethernet (0/0 - 0/3)	ON	On when the Ethernet connection on the corresponding port has a link indication.
	OFF	Flashes when data is received or transmitted at the corresponding Ethernet port. Once the unit is up, the ETH LED is on or flashes. (requires a connection to another device)

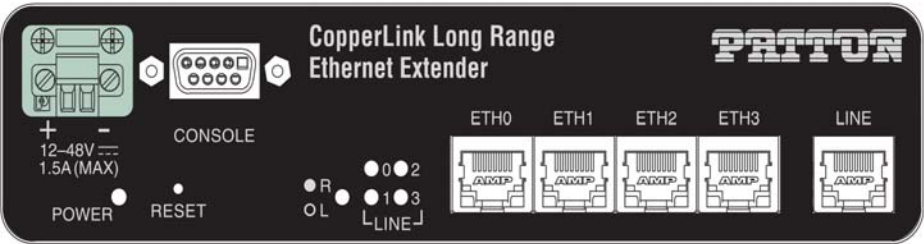


Figure 7. CL2300E LEDs

3.0 Wizard Interface

The CL2300E provides a browser interface that allows you to configure and manage the Ethernet extender. After you set up the IP address for the CL2300E, you can access the Web interface applications directly in your Web browser by entering the configured IP address. You can then use your Web browser to list and manage configuration parameters from a PC.

Note Earlier versions predating Internet Explorer 9.0 browser are not compatible with the CL2300E

3.1 Connect with Web GUI

1. Connect the ethernet cable.
2. Connect the power supply.
3. Connect via web browser to the default address 192.168.200.10 OR connect to 192.168.200.11 for 2 pack local units.
4. Login with the default username *admin* without a password.

Once the network connection is established, you will be able to reach the CL2300E Web GUI. Login to the Web GUI using the following credentials in **figure 8**.

- Username: *admin*
- Password: [blank]

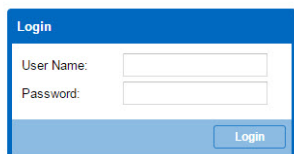
A screenshot of the login form in the Patton CL2300E Web GUI. It features a blue header with the word "Login" in white. Below the header, there are two input fields: "User Name:" and "Password:". The "Password:" field is currently empty. At the bottom right of the form is a blue "Login" button.

Figure 8. Login

The CL2300E includes a Wizard within the GUI. The icon to the wizard is in the top right corner of your browser as it displays in **figure 9**.



Figure 9. Wizard Homepage

Once the wizard icon is selected, you will have the options of supported set ups as shown in **figure 10**. Click on CL2300E Basic Setup.

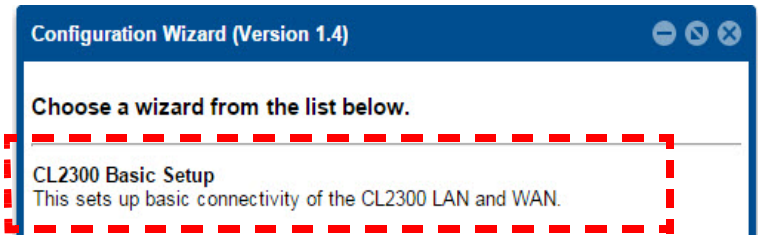


Figure 10. Choose Wizard

Clicking on the CL2300E Basic Setup will bring up the most common configurations used on the CopperLink Ethernet Extenders.

figure 11 depicts options to configure through the Basic Setup Wizard.

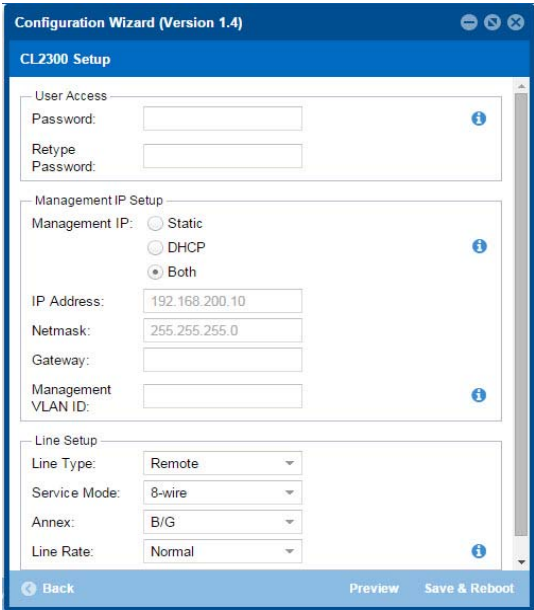


Figure 11. Basic Setup

- **User Access: (optional configuration)** Users may change the password for the admin user.
- **Management IP Setup:**
 - **Static:** create your own IP address, netmask and gateway (optional-the gateway is required for remote management).
 - **DHCP:** The CL2300E management port will accept an IP address from a DHCP server.

- **Both:** This choice will assign two IP addresses (one static and one DHCP to the management port.)
- **Management VLAN ID:** (optional) define a VLAN ID for management traffic.
- **Line Setup:** This is where you can manually set your CopperLink line options.
 - Note** The Copperlink Ethernet Extenders by default are set to plug-and-play operation
 - **Line Type (Local or Remote):** This will set the Ethernet Extender as Local or Remote. Local is typically used at the network, Remote is typically used at the remote device or remote network. Your CopperLink 2300E when received in a 2pk is already configured one CL2300E as Local and one CL2300E as Remote.
 - **Service Mode:** Configures the number of pairs (wires) you want to use. The CL2300E will default to the maximum number of wires available on your version of the CopperLink. CL2301E (2-wire); CL2302E (4-wire); CL2304E (8-wire).
 - **Annex:** Please consult support before changing this setting.
 - **Line Rate Configuration:** This will increase the potential line rate of the CL2300E. Your CopperLink 2300E is defaulted to automatically select the optimal rate based on the distance (adaptive).

Note There are two modes: Normal (TCPAM16132) and Extended (TCPAM641128). Selecting the Extended mode will double the bandwidth, but will reduce the reach (distance) in half. Default is normal.

On the bottom right corner of the CL2300E Basic Configuration wizard page to preview configurations and reboot. **figure 12** depicts what you can expect to see if you click on the preview tab.

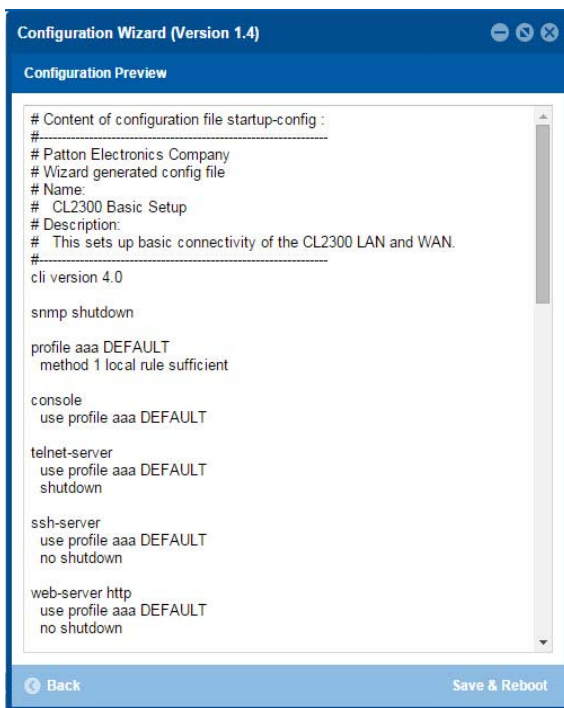


Figure 12. Configure Preview Option

When the user chooses the save and reboot option, a prompt will ask you to confirm. If the configuration is correct, select “Yes” as shown in **figure 13**.

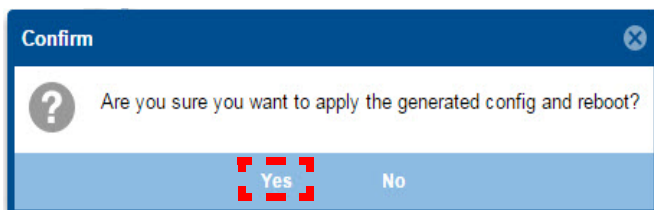


Figure 13. Confirmation

Typically the time to reboot and reestablish a CopperLink link and pass traffic once again will be under 2 minutes.

4.0 CLI Operation and Configuration

You can connect a PC to configure the CopperLink 2300E using the CLI.

4.1 Connect with SSH

1. Connect the Ethernet cable.
2. Connect the power supply.
3. Connect via SSH to the extender through remote or local IP addresses
 - Default remote IP address: 192.168.200.10
 - Default local IP address: 192.168.200.11
4. Login with the default username *admin* and no password.

4.2 Connect with Console

1. Connect the RS232 Console cable. (8-N-1 19200)
2. Connect the power supply.
3. Login with the default username *admin* and no password.

4.3 Change the IP address (default: 192.168.200.10)

Follow the command sequence below.

```
node~>enable
node~#configure
node~(cfg)#context ip router
node~(ctx-ip) [router]#interface LAN
node~(if-ip) [router.LAN]#no ipaddress 192.168.200.10/24
node~(if-ip) [router.LAN]#ipaddress <new address>/<new mask>
```

4.4 Change the default username

The default username will be removed once a new one is created.

Follow the command sequence below.

```
node~>enable
node~#configure
node~(cfg)#superuser <username> password <password>
```

4.5 Save the Configuration

Follow the command sequence below.

```
node~>enable
node~#configure
node~(cfg)#copy running-config startup-config
```

4.6 CopperLink LINE Commands

Local and Remote: This will set the Ethernet Extender as Local or Remote. Local is typically used at the network, Remote is typically used at the remote device or remote network. Your CopperLink 2300E when received in a 2pk is already configured one CL2300E as Local and one CL2300E as Remote.

```
node(cfg)# mode {local|remote}
```

Annex Type: Please consult support before changing this setting.

```
node~(pf-dsl)[<name>]# annex-type { b-g | a-f }
```

Line Rate Configuration: This will increase the line rate of the CL2300E. Your CopperLink 2300E is defaulted to automatically select the optimal rate based on the distance (adaptive).

```
node(prt-line)[0/0]# payload-rate {adaptive [max <192..15296>] | <192..15296>}
```

Modulation Scheme: Note higher TC-PAM rates will increase maximum payload rates available but will decrease distance. Your CopperLink 2300E is defaulted to automatically select the optimal setting. Please consult manual for rate reach chart to determine your optimal setting if you choose to hard set this value. Higher TC-PAM rates are ideal for shorter cable runs offering max symmetrical (upstream/downstream) speeds of 11.4 Mbps (TCPAM64) and 15.3 Mbps (TCPAM128) per pair.

```
node(prt-line)[0/0]# tcpam {auto(16/32) | auto(64/128) | 16 | 32 | 64 | 128}
```

CopperLink Ports: The configurations below are used to configure various aspects of the CopperLink port(s).

```
node~(cfg)# port dsl 0 0
```

Signal to Noise Ratio: Configures the acceptable noise margin for adaptive rate. SNR is the relative strength of the DSL signal to Noise ratio. 6dB is generally the lowest dB recommended in order for the modem to be able to synch. Generally speaking, as overall bandwidth increases, your signal to noise ratio decreases. The higher the number the better. Your CL2300E is defaulted at 6 giving you the highest likelihood to connect.

```
node(prt-line)[0/0]# snr-margin <-10..22>
```

Below 6dB	bad
6dB-10dB	fair
11dB-20dB	good

Description: This is the description of the port/line (CopperLink connection). (Ex: "This line goes to building 4") When entering a description with spaces in the text, the description must be in quotations.

```
node~(prt-dsl)[0/0]# description <description>
```

Use Profile: Configures the acceptable noise margin for adaptive rate. SNR is the relative strength of the DSL signal to Noise ratio. 6dB is generally the lowest dB recommended in order for the modem to be able to synch.

```
node~(prt-dsl) [0/0]# use profile <name>
```

Service Mode: Configures the number of pairs (wires) you want to use. The CL2300E will default to the maximum number of wires available on your version of the CopperLink. CL2301E (2-wire); CL2302E (4-wire); CL2304E (8-wire).

```
node~(prt-dsl) [0/0]# service-mode { 2-wire | 4-wire | 6-wire | 8-wire }
```

Shutdown: Disables or Enables CopperLink port(s).

```
node~(prt-dsl) [0/0]# [no] shutdown
```

Exit: Goes back to parent mode.

```
node~(prt-dsl) [0/0]# exit
```

Show: Displays all the configured options of the CL2300E CopperLink port(s)

```
node(cfg)# show prt-line 0
```

5.0 Additional Information

For detailed information about configuring and operating guidance, set up procedures, and troubleshooting, refer to the *CopperLink 2300E Series User Manual* available online at www.patton.com/manuals

6.0 Customer and Technical Support

Toll-Free VoIP support: call [sip:support@patton.com](tel:sip:support@patton.com) with a VoIP SIP phone

Online support: www.patton.com

E-mail support: support@patton.com—answered within 1 business day

Telephone support:

Standard	USA	+1 (301) 975-1007	Monday - Friday	8:00 am to 5:00 pm EST (1300 to 2200 UTC/GMT)
Alternate	Switzerland	+41 (0)31-985-2555	Monday - Friday	8:00 am - 5:00 pm CET (0900 to 1800 UTC/GMT)

7.0 Compliance

7.1 EMC

- FCC Part 15, Class A
- EN55022, Class A
- EN55024
- EN61010

7.2 Safety

- UL 60950-1/CSA C22.2 NO. 60950-1
- IEC/EN60950-1
- AS/NZS 60950-1
- EN61010 (Safety for control equipment) **(PENDING)**

7.3 Shock and Vibration

- IEC61373 Category I Class B (Shock table 1 - IEC60068-2-7)**(PENDING)**

7.4 Dimensions

- 6.1"L x 8.0"W x 2.1"H
- 1.95 lb.

7.5 Radio and TV Interference (FCC Part 15)

This equipment generates and uses radio frequency energy, and if not installed and used properly—that is, in strict accordance with the manufacturer's instructions—may cause interference to radio and television reception. This equipment has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart B of Part 15 of FCC rules, which are designed to provide reasonable protection from such interference in a commercial installation. However, there is no guarantee that interference will not occur in a particular installation. If the equipment causes interference to radio or television reception, which can be determined by disconnecting the cables, try to correct the interference by one or more of the following measures: moving the computing equipment away from the receiver, re-orienting the receiving antenna, and/or plugging the receiving equipment into a different AC outlet (such that the computing equipment and receiver are on different branches).

7.6 EC Declaration of Conformity

Product Description: Long Range CopperLink Ethernet Extender

We certify that the apparatus identified above conforms to the requirements of Council Directive 1999/5/EC on the approximation of the laws of the member states relating to

Radio and Telecommunication Terminal Equipment and the mutual recognition of their conformity.



The safety advises in the documentation accompanying the products shall be obeyed. The conformity to the above directive is indicated by the CE sign on the device.

The signed Declaration of Conformity can be downloaded from www.patton.com/certifications/.

8.0 Authorized European Representative

D R M Green
European Compliance Services Limited.
Greyfriars Court
Paradise Square
Oxford, OX1 1BE, UK

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11.0 Warranty, Trademark, & Compliance Information

For warranty, trademark and compliance information, refer to the *CopperLink User Manual* located online at www.patton.com/manuals.



In accordance with the requirements of council directive 2002/96/EC on Waste of Electrical and Electronic Equipment (WEEE), ensure that at end-of-life you separate this product from other waste and scrap and deliver to the WEEE collection system in your country for recycling.

