

CopperLink™ Model 2300 Long Range Ethernet Extender

Quick Start Guide



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.



- **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

- CL2300 Long Range Ethernet Extender
- External power supply for CopperLink Model 2300
- Ethernet cable with RJ45 plugs on each end (included)

1.2 What you will need

- Default Remote unit 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 rear panel of the CL2300 Router.

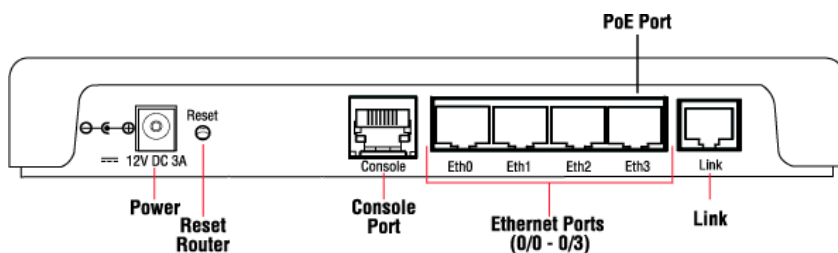


Figure 1. All connectors are on the rear panel of the CL2300 Ethernet Extender

Connect the Line Interface

To function properly, the CL2300 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 Long Range Ethernet Extender is equipped with a RJ-45 interface jack (*Line*), which conforms to the T568B standard. Any standard Category 5e cable can be used to directly connect two routers. Depending on the router model, it will have a two-wire, four-wire or eight-wire interface. Observe the signal/pin relationship on the CL2300's *Line* interface jack for each pair in Figure 2. Figure 4 shows the proper way to wire a cable with a RJ-45 jack on one end and four RJ-11 jacks on the other.

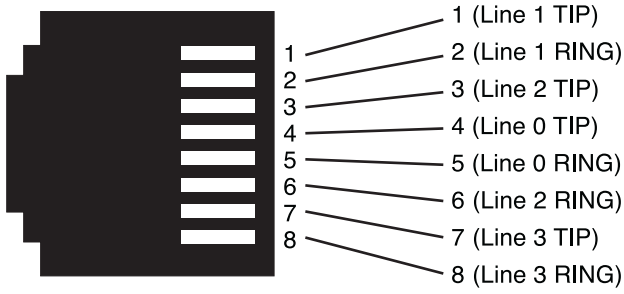


Figure 2. CL2300 (RJ-45) twisted pair line interface

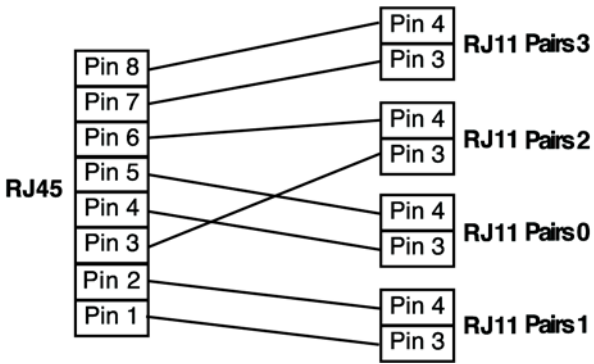


Figure 3. CopperLink Pinout for two devices

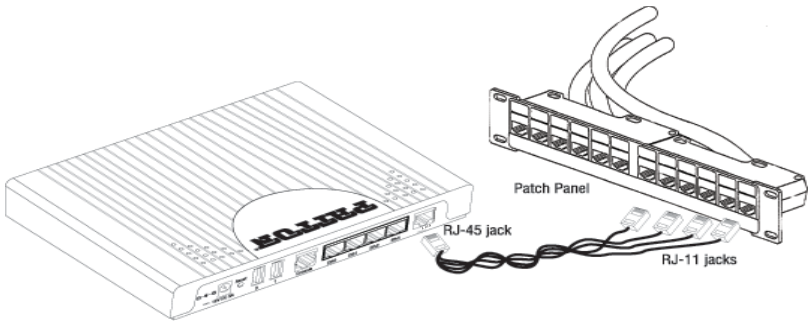


Figure 4. RJ-45 to RJ-11 cable

2.0 Connecting Interfaces

2.1 Connecting Console Interface

Install the supplied RJ-45-to-RJ-45 cable with the DB9-RJ45 adapter between the CL2300 RS-232 port and an open serial port on your computer. If you need to assemble your own cable, refer to the pinout diagram in figure 5.

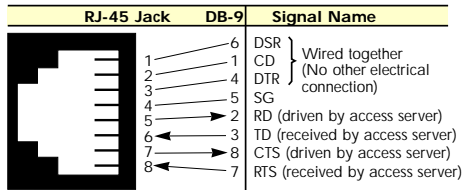


Figure 5. DB-9-to-RJ-45 cable diagram

2.2 Connect the Ethernet Interface

The 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. Figure 6 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.

2.3 Connect the PoE Interface (optional)

The RJ-45 port is an Auto-MDIX 10/100Base-T interface. This port is designed to connect directly to a 10/100Base-T network. Figure 6 shows the signal/pin relationships on this interface. You may connect this port to any Ethernet enabled device using a straight-through or crossover cable that is up to 328 ft long. PoE enabled devices such as IP cameras, Voice over IP (VoIP) phones and wireless access points may draw the PoE. The router injects power on the data pair pins 1/2 (PoE+) and 3/6 (PoE-) of the connector labeled "Eth 3." The power injection conforms to the 802.3af specification, and will deliver the 55 volts with a maximum of 13 watts. A 12 volt 3 amp external power supply is required for PoE.

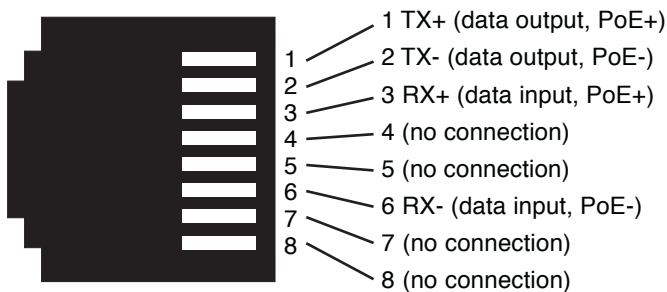


Figure 6. CL230010/100Base-T RJ-45 Connector Pinout

Note PoE referenced in Figure 6 applies to Ethernet 0/3 only.

2.4 Connect the Power Source

The Long Range Ethernet Extender does not have a power switch; it powers on once the device is plugged in. The power connection is made via the barrel jack on the rear panel of the CL2300. No configuration is necessary for the power supply.

2.5 Router/Bridge Status LEDs

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

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

Table 1. CL2300 front panel LEDs

LED Name	LED Function	Description
Power	ON	Indicates power is applied.
R	OFF	WAN is configured as Local.
	ON	WAN is configured as Remote.
CopperLink Pair (one LED for each port [1 on CL3301, 2 on CL3302, 4 on CL3304])	OFF	Port is configured as DOWN.
	ON	Port is in data mode.
	SLOW BLINK	Port is in handshake mode (looking for a remote signal).
PoE	OFF	PoE is turned off.
	ON	PoE is turned on.
Ethernet (0/0 - 0/3)	ON	Port is linked.
	OFF	Data is passing over the port.

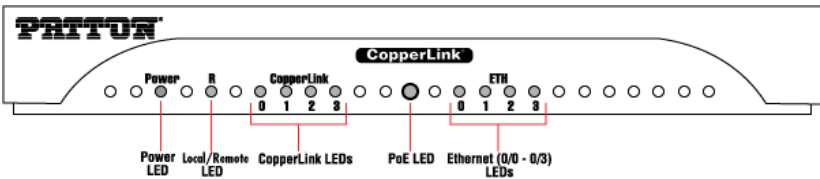


Figure 7. CL2300 front panel

3.0 Wizard Interface

The CL2300 provides a browser interface that allows you to configure and manage the Ethernet extender. After you set up the IP address for the CL2300, 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 CL2300.

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 CL2300 Web GUI. Login to the Web GUI using the following credentials in figure 8.

- username: admin
- password: [blank]

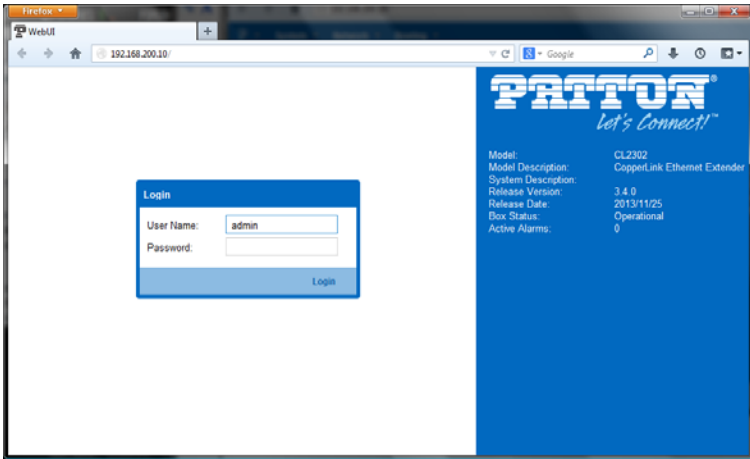


Figure 8. Login

The CL2300 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.

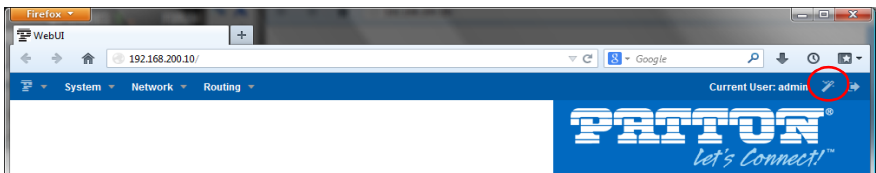


Figure 9. Wizard Home page

Once the wizard icon is selected, you will have the options of supported set ups as shown in figure 10. Click on CL2300 Basic Setup.

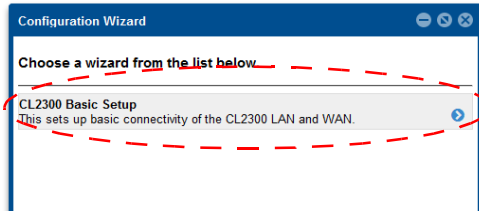


Figure 10. Choose Wizard

Clicking on the CL2300 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.

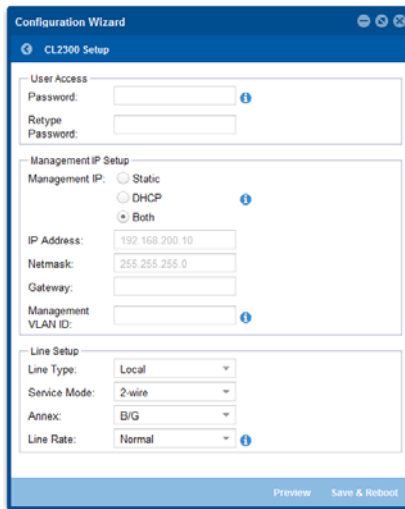


Figure 11. Basic Setup

- **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 CL2300 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 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 2300 when received in a 2pk is already configured one CL2300 as Local and one CL2300 as Remote.
- **Service Mode:** Configures the number of pairs (wires) you want to use. The CL2300 will default to the maximum number of wires available on your version of the CopperLink. CL2301 (2-wire); CL2302 (4-wire); CL2304 (8-wire).
- **Annex:** Please consult support before changing this setting.
- **Line Rate Configuration:** This will increase the potential line rate of the CL2300. Your CopperLink 2300 is defaulted to automatically select the optimal rate based on the distance (adaptive).

Note There are two mates: Normal (TCPAM16|32) and Extended (TCPAM64|128). 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 CL2300 Basic Configuration wizard page to preview configurations and reboot. Figure 12 depicts is what you can expect to see if you click on the preview tab.

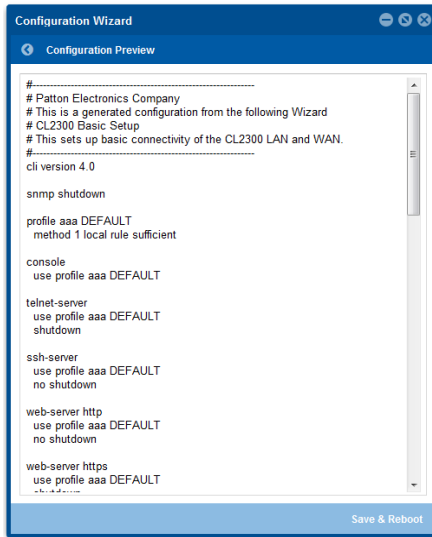


Figure 12. Configure Preview Option

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.

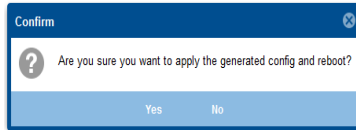


Figure 13. Confirmation

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 2300 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 2300 when received in a 2pk is already configured one CL2300 as Local and one CL2300 as Remote.

```
node(prt-line)# mode {local|remote}
```

Annex Type: Please consult support before changing this setting.

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

Line Rate Configuration: This will increase the line rate of the CL2300. Your CopperLink 2300 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 2300 is defaulted to automatically select the optimal setting. Please consult manual for the 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~(prt-line)# 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 synch. As overall bandwidth increases, your signal to noise ratio decreases; the higher the number the better. Your CL2300 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-line)[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 synch.

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

Service Mode: Configures the number of pairs (wires) you want to use. The CL2300 will default to the maximum number of wires available on your version of the CopperLink. CL2301 (2-wire); CL2302 (4-wire); CL2304 (8-wire).

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

Shutdown: Disables or Enables CopperLink port(s).

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

Exit: Return to parent mode.

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

Show: Displays all the configured options of the CL2300 CopperLink port(s).

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

5.0 Additional Information

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

A Customer and Technical Support

Toll-Free VoIP support: call 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

B Compliance

B.1 EMC

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

B.2 Safety

- UL 60950-1/CSA C22.2 NO. 60950-1
- IEC/EN60950-1
- AS/NZS 60950-1

B.3 PSTN Regulatory

- FCC Part 68
- CS-03
- AS/ACIF 5043:2003

C FCC Part 68 (ACTA) Statement

This equipment complies with Part 68 of FCC rules and the requirements adopted by ACTA. On the bottom side of this equipment is a label that contains — among other information — a product identifier in the format *US: AAAEQ##TXXXX*. If requested, this number must be provided to the telephone company.

The method used to connect this equipment to the premises wiring and telephone network must comply with the applicable FCC Part 68 rules and requirements adopted by the ACTA.

If this equipment causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But if advance notice isn't practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

The telephone company may make changes in its facilities, equipment, operations or procedures that could affect the operation of the equipment. If this happens the telephone company will provide advance notice in order for you to make necessary modifications to maintain uninterrupted service.

If trouble is experienced with this equipment, for repair or warranty information, please contact our company. If the equipment is causing harm to the telephone network, the telephone company may request that you disconnect the equipment until the problem is resolved.

Connection to party line service is subject to state tariffs. Contact the state public utility commission, public service commission or corporation commission for information.

C.1 Industry Canada Notice

This equipment meets the applicable Industry Canada Terminal Equipment Technical Specifications. This is confirmed by the registration number. The abbreviation, IC, before the registration number signifies that registration was performed based on a Declaration of Conformity indicating that Industry Canada technical specifications were met. It does not imply that Industry Canada approved the equipment.

This Declaration of Conformity means that the equipment meets certain telecommunications network protective, operational and safety requirements. The Department does not guarantee the equipment will operate to the user's satisfaction. Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above condition may not prevent degradation of service in some situations. Repairs to some certified equipment should be made by an authorized maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment. Users should ensure for their own protection that the ground connections of the power utility, telephone lines and internal metallic water pipe system, are connected together. This protection may be particularly important in rural areas.

D 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).

E 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/.

F Authorized European Representative

D R M Green

European Compliance Services Limited.

Greyfriars Court

Paradise Square

Oxford, OX1 1BE, UK

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F.3 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.