USER MANUAL

EnviroNET™ CopperLink Ethernet Extenders Model EHA2168

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.

PATTON Electronics Co.

Part# 07MEHA-QS
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Rev. A
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SALES OFFICE
(301) 975-1000
TECHNICAL SUPPORT
(301) 975-1007

An ISO-9001Certified Company

CONTENTS

1.0 WARRANTY INFORMATION

Patton Electronics warrants all CopperLink Ethernet Extender components to be free from defects, and will—at our option—repair or replace the product should it fail within one year from the first date of the shipment.

This warranty is limited to defects in workmanship or materials, and does not cover customer damage, abuse or unauthorized modification. If this product fails or does not performs as warranted, your sole recourse shall be repair or replacement as described above. Under no condition shall **Patton Electronics** be liable for any damages incurred by the use of this product. These damages include, but are not limited to, the following: lost profits, lost savings and incidental or consequential damages arising from the use of or inability to use this product. **Patton Electronics** specifically disclaims all other warranties, expressed or implied, and the installation or use of this product shall be deemed an acceptance of these terms by the user.

Note Conformity documents of all Patton products can be viewed online at www.patton.com under the appropriate product page.

1.1 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, reorienting 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).

1.2 CE DECLARATION OF CONFORMITY

We certify that the apparatus identified in this document 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 advice in the documentation accompanying this product shall be obeyed. The conformity to the above directive is indicated by the CE sign on the device.

WARNING

This device is NOT intended nor approved for connection to the PSTN. It is intended only for connection to customer premise equipment.

1.3 AUTHORIZED EUROPEAN REPRESENTATIVE

D R M Green

European Compliance Services Limited.

Oakdene House, Oak Road

Watchfield,

Swindon, Wilts SN6 8TD, UK

1.4 SERVICE

All warranty and non-warranty repairs must be returned freight prepaid and insured to Patton Electronics. All returns must have a Return Materials Authorization number on the outside of the shipping container. This number may be obtained from Patton Electronics Technical Services at:

- Tel: **+1 (301) 975-1007**
- Email: **support@patton.com**
- URL: **http://www.patton.com**

Note Packages received without an RMA number will not be accepted.

WARNING

- **This device contains no user serviceable parts. The equipment shall be returned to Patton Electronics for repairs, or repaired by qualified service personnel.**
- **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. The mains outlet that is utilized to power the devise shall be within 10 feet (3 meters) of the device, shall be easily accessible, and protected by a circuit breaker.**
- **Do not work on the system or connect or disconnect cables during periods of lightning activity.**
- **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.**

WARNING

The Interconnecting cables shall be acceptable for external use and shall be rated for the proper application with respect to voltage, current, anticipated temperature, flammability, and mechanical serviceability

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.

2.0 GENERAL INFORMATION

Thank you for your purchase of this Patton Electronics product. This product has been thoroughly inspected and tested and is warranted for one year for parts and labor. If any questions or problems arise during installation or use of this product, contact Patton Electronics Technical Support at +1 (301) 975-1007.

2.1 FEATURES

- Easy to install standalone EnviroNET CopperLink Ethernet Extenders (no configuration required)
- Auto MDIX Ethernet
- Auto-sensing full or half-duplex Ethernet
- Auto-sensing 10/100Base-TX
- Extends network connections up to 4,000 ft (1.22 km) over 2-wire 24-AWG unconditioned lines
- Line rate of 12.5 Mbps
- Transparent operation
- Surge suppression up to 20 kA (8/20 μs)
- Made in the USA

2.2 DESCRIPTION

The Patton Electronics CopperLink/L and EnviroNET CopperLink/R Ethernet Extenders provide high-speed LAN connections between peered Ethernet LANs, remote PCs, or any other network enabled 10/100Base-T device.

Operating in pairs, a CopperLink/L (local) located at one end of the LAN extension and the EnviroNET CopperLink/R (remote) at the other end, these units can automatically forward LAN broadcasts, multicasts, and frames across a 2-wire voice-grade twisted-pair link. The data is passed transparently (unmodified) through the CopperLink Ethernet Extenders. The CopperLink Ethernet Extenders automatically add and delete MAC addresses, only passing packets across the CopperLink link that are meant for the remote peered LAN.

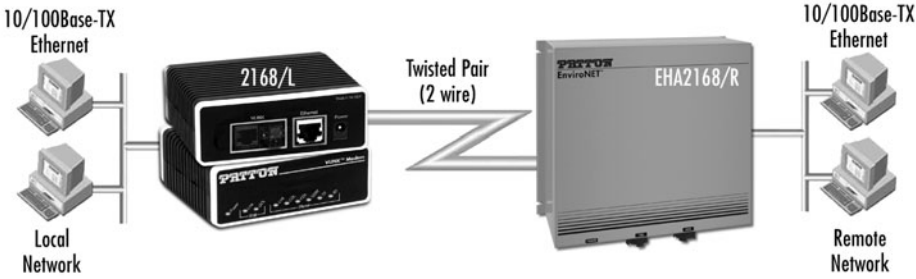

Figure 1. Typical application

The CopperLink/L modem and EnviroNET CopperLink/R modem work together to create a transparent extension between two peered Ethernet LANs. Figure 1 shows a typical point-to-point application.

3.0 INSTALLATION

Because the EnviroNET CopperLink Ethernet Extender requires no configuration, it can be installed quickly.

3.1 UNIT INSTALLATION

Do the following:

1. Make a ground connection for the unit (refer to section 3.2, “Grounding the EHA2168” on page 9).
2. Connect the line interface between the units (refer to section 3.3, “Connecting the Twisted-Pair Line Interface” on page 9)

   Note See Figure 2 for the EHA2168 unit’s bottom panel arrangements.

3. Connect the Ethernet interface (refer to section 3.4, “Connecting the 10/100Base-T Ethernet Interface” on page 10).
4. Connect the power plug (refer to section 3.5, “Connecting Power” on page 11).

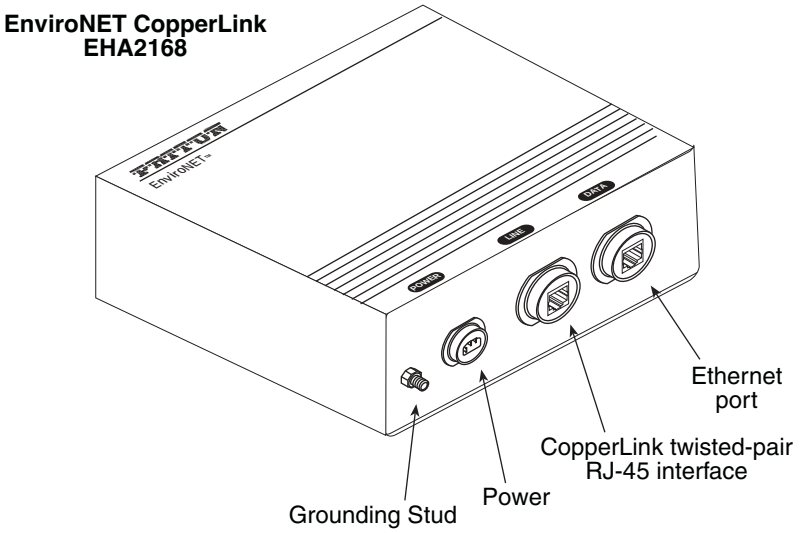

Figure 2. EHA2168 Bottom Panel

3.2 GROUNDING THE EHA2168

Before installing the EnviroNET CopperLink Ethernet Extender, it is important to establish a good grounding connection first.

1. Assemble a ground wire using #10 AWG wire with green-and-yellow-colored insulation and two ring terminals. Make the wire long enough to reach one of the following **earth** ground sources:

   — The building ground rod (generally located at the site's main service entrance)

   — A sprinkler system pipe

   — A cold-water pipe

   — Building structural steel

2. Install the grounding wire between the grounding stud (see Figure 2 on page 8) and the grounding source.

3.3 CONNECTING THE TWISTED-PAIR LINE INTERFACE

The EnviroNET CopperLink Ethernet Extender supports communication between two peer Ethernet LAN sites over a distance of up to 4,000 ft (1.22 km) over 24 AWG (0.5 mm) twisted-pair wire.

> **Note** Actual distance and link performance may vary depending on the environment and type/gauge of wire used.

Follow the steps below to connect the CopperLink Ethernet Extenders interfaces.

> **Note** The CopperLink units work in pairs. One of the CopperLink units must be an L (local), and the other unit must be an R (remote). It does not matter which end is the L and which is the R. The link is always initiated by the R. As long as the L is powered on, the R can establish a link by being powered on or by having its power reset.

1. To function properly, the two CopperLink Ethernet Extenders must be connected together using 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.

2. The EnviroNET CopperLink Ethernet Extender is equipped with an RJ-45 interface jack that can be used on the CopperLink interface (*Line*). This CopperLink interface is a two-wire interface. Observe the signal/pin relationships on the CopperLink Ethernet Extender's CopperLink interface jack.

The **RJ-45 connector** on the CopperLink Ethernet Extender's twisted pair interface **is polarity insensitive** and is wired for a two-wire interface. The signal/pin relationship is shown in Figure 3.

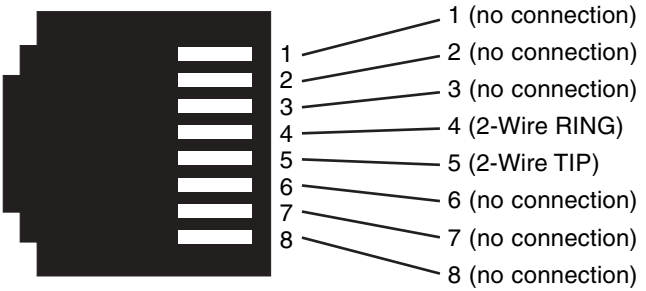

Figure 3. CopperLink Ethernet Extender (RJ-45) twisted pair line interface.

3.4 CONNECTING THE 10/100BASE-T ETHERNET INTERFACE

The unshielded RJ-45 port labeled *Data* on the EHA2168 model is the Auto-MDIX10/100Base-T interface. This port is designed to connect directly to a 10/100Base-T network. Figure 4 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.

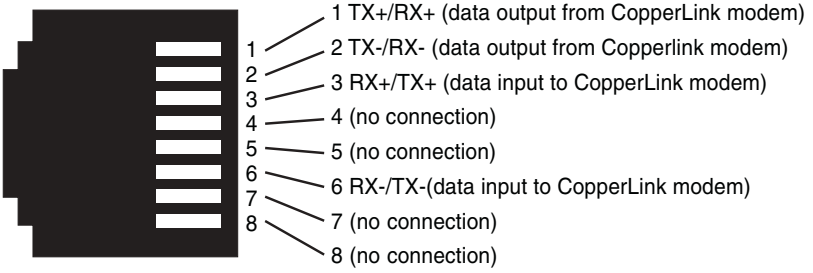

Figure 4. CopperLink Ethernet Extender 10/100Base-T RJ-45 Connector Pinout.

3.5 CONNECTING POWER

The EHA2168 is an internally powered unit. The power connection is made via the 3-pin power connector on the bottom panel of the EnviroNET CopperLink Ethernet Extender. A mating connector is provided to create the mating cable (see Figure 5). No configuration is necessary for the power supply.

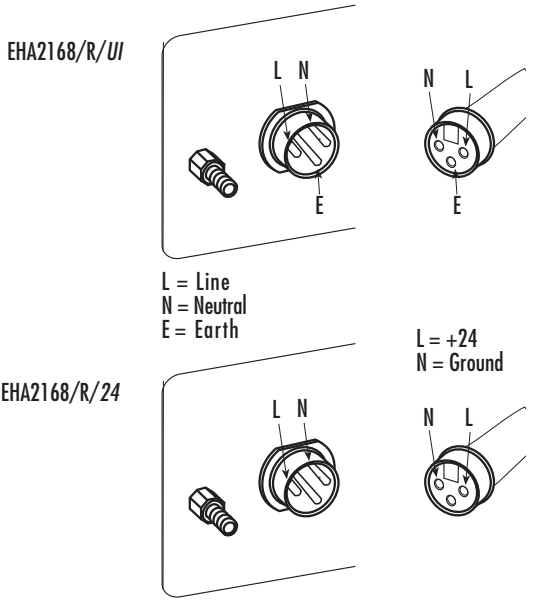

Figure 5. Connecting the power cable

The EnviroNET CopperLink Ethernet Extender does not have a power switch, so it powers up as soon as it is plugged in.

WARNING

There are no user-serviceable parts in the EnviroNET CopperLink Ethernet Extender.Fuse replacement should only be performed by qualified service personnel. Contact Patton Electronics Technical support at (301) 975-1007 for more information.

Note It does not matter whether the positive (+) or negative (-) side of the DC power supply is grounded. However, the polarity on the power source must be matched up properly to the EHA2168 power input (i.e. negative power source terminal to negative power input; positive power source terminal to positive power input).

4.0 CONFIGURATION

The EnviroNET CopperLink Model EHA2168/R requires no configuration.

5.0 OPERATION

Once the EnviroNET CopperLink Ethernet Extenders are properly installed, they should operate transparently. No user settings required.

5.1 POWER UP

Before applying power to the CopperLink Ethernet Extender, please review section 3.5, “Connecting Power” on page 11. Verify that the unit is plugged directly into the AC Mains power.

WARNING

There are no user-serviceable parts in the EnviroNET CopperLink Ethernet Extender. Fuse replacement should only be performed by qualified service personnel. Contact Patton Electronics Technical support at (301) 975-1007 for more information.

APPENDIX A
SPECIFICATIONS

A.1 LAN CONNECTION

- Unshielded RJ-45, 10/100Base-T, IEEE 802.3 Ethernet
- CopperLink Connection: RJ-45 only

A.2 TRANSMISSION LINE

Two-wire unconditioned twisted pair.

A.3 COPPERLINK LINE RATE

12.5 Mbps symmetric upstream/downstream.

A.4 COPPERLINK DISTANCE

4,000 ft (1.22 km) at 12.5 Mbps symmetric upstream/downstream.

A.5 COPPERLINK SURGE SUPPRESSOR

Gas tube with maximum current surge: 20 kA (8/20 μs).

A.6 POWER REQUIREMENTS

UAC: 110, 220VAC, 2.25W

A.7 TEMPERATURE RANGE

32–122°F (0–50°C)

A.8 HUMIDITY

Up to 90% non-condensing.

A.9 DIMENSIONS

8”H x 9.25”W x 3.25”D

A.10 WEIGHT

6.4lb (2.9kg)

APPENDIX B

COPPERLINK SERIES INTERFACE PIN ASSIGNMENT

B.1 10/100BASE-T INTERFACE

RJ-45

- Pin 1: TX+/RX+
- Pin 2: TX-/RX-
- Pin 3: RX+/TX+
- Pin 6: RX-/TX-
- Pins 4, 5, 7, 8: no connection

B.2 COPPERLINK INTERFACE

RJ-45

- Pin 4: RING
- Pin 5: TIP
- Pins 1, 2, 3, 6, 7, 8: no connection

Notes

Notes