



Supplement for  
*HE-XEC*

# **XLe Ethernet COM Module**

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## PREFACE

This manual explains how to use the XLe Ethernet COM Module.

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## ABOUT PROGRAMMING EXAMPLES

Any example programs and program segments in this manual or provided on accompanying diskettes are included solely for illustrative purposes. Due to the many variables and requirements associated with any particular installation, Horner APG cannot assume responsibility or liability for actual use based on the examples and diagrams. It is the sole responsibility of the system designer utilizing the XLe Ethernet COM Module to appropriately design the end system, to appropriately integrate the XLe Ethernet COM Module and to make safety provisions for the end equipment as is usual and customary in industrial applications as defined in any codes or standards which apply.

**Note: The programming examples shown in this manual are for illustrative purposes only. Proper machine operation is the sole responsibility of the system integrator.**

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## CHAPTER 1: SAFETY / COMPLIANCE

### 1.1 Safety Warnings and Guidelines

When found on the product, the following symbols specify:



**Warning:** Consult user documentation.



**Warning:** Electrical Shock Hazard.

**WARNING:** To avoid the risk of electric shock or burns, always connect the safety (or earth) ground before making any other connections.

**WARNING:** To reduce the risk of fire, electrical shock, or physical injury it is strongly recommended to fuse the voltage measurement inputs. Be sure to locate fuses as close to the source as possible.

**WARNING:** Replace fuse with the same type and rating to provide protection against risk of fire and shock hazards.

**WARNING:** In the event of repeated failure, do not replace the fuse again as a repeated failure indicates a defective condition that will not clear by replacing the fuse.

**WARNING:** Only qualified electrical personnel familiar with the construction and operation of this equipment and the hazards involved should install, adjust, operate, or service this equipment. Read and understand this manual and other applicable manuals in their entirety before proceeding. Failure to observe this precaution could result in severe bodily injury or loss of life.

- All applicable codes and standards need to be followed in the installation of this product.
- For I/O wiring (discrete), use the following wire type or equivalent: Belden 9918, 18 AWG or larger.

Adhere to the following safety precautions whenever any type of connection is made to the module.

- Connect the green safety (earth) ground first before making any other connections.
- When connecting to electric circuits or pulse-initiating equipment, open their related breakers. Do not make connections to live power lines.
- Make connections to the module first; then connect to the circuit to be monitored.
- Route power wires in a safe manner in accordance with good practice and local codes.
- Wear proper personal protective equipment including safety glasses and insulated gloves when making connections to power circuits.
- Ensure hands, shoes, and floor are dry before making any connection to a power line.
- Make sure the unit is turned OFF before making connection to terminals. Make sure all circuits are de-energized before making connections.
- Before each use, inspect all cables for breaks or cracks in the insulation. Replace immediately if defective.

NOTES



## CHAPTER 2: INTRODUCTION

### 2.1 Overview

To supplement the built-in MJ1 and MJ2 serial ports on the XLe, an Ethernet COM Module (XEC) can provide Ethernet communications, by installing it internal to the XLe controller.

**Note:** MJ1 shares its serial port with the XEC, so when the XEC is installed and active, the MJ1 connector is inactive.

Internal to the XLe, there is a CPU board, and up to two installed modules. Models XE000 and XE100 have no installed I/O or COM modules. All other models have an I/O module in Slot 1 and can have a user-installed COM module, such as the XEC, in Slot 2.

The Ethernet COM module supports both 10 BaseT (10 MHz) and 100 BaseTx (100 MHz) as well as both half and full duplex communication. Both the connection speed and the duplex are auto-negotiated.

### 2.2 Ethernet COM Module (XEC) Option

An installed Ethernet COM module allows PC applications, such as Cscape and Remote Viewer, to communicate with an XLe over a Local Area Network or over the Internet. In addition, the Horner OPC Server can be installed on a PC to allow other standard PC applications (such as database and spreadsheets programs) access to XLe register data.

Although the physical connection between the Ethernet COM Module and the Local Area Network is done using a standard Ethernet cable (CAT5 or better with RJ45 modular plug), a **Serial Port Tunnel** protocol is employed that allows the PC application (e.g. Cscape) to operate as if one of the PC COM ports was connected to the XLe via a serial cable.

Figure 2.1 illustrates a PC connected to an XLe controller over a Local Area Network. The PC can be directly connected to the XLe, using a crossover cable, or it can connect via a Local Area Network (LAN), using hubs, switches and routers. In addition, if the LAN includes a Gateway server, communication with the XLe from outside the LAN (e.g. via the Internet) can be performed.

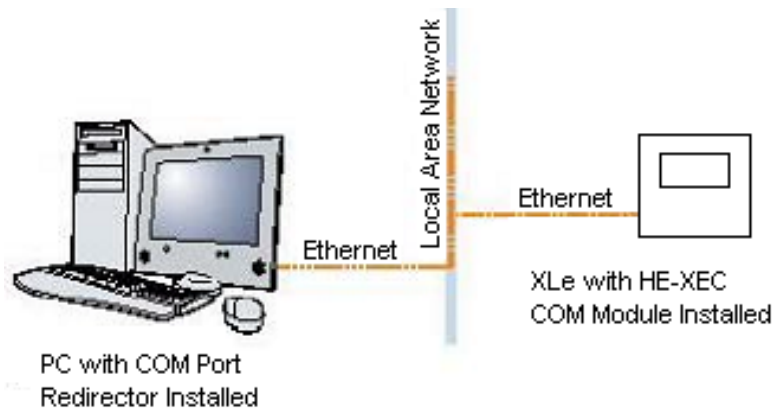


Figure 2.1 – PC to XLe Local Area Network (LAN) Connection

### 2.3 Serial Port Tunneling

As mentioned in Section 2.2, the XLe Ethernet COM module communicates over Ethernet using a **Serial Port Tunnel** protocol. The Serial Port Tunnel protocol allows XLe firmware and PC application software to communicate with each other as though the PC and the XLe were connected via serial ports, even though they are actually connected via Ethernet ports.

The Serial Port Tunnel has two ends: The XLe is at one end of the tunnel and the PC is at the other end of the tunnel.

On the XLe end of the Serial Port Tunnel, the Ethernet COM module must be installed (CHAPTER 3) and configured (CHAPTER 4) in the XLe. Configuration consists of using the XLe **System Menu** to enable the Ethernet port as the Default Programming Port and to set up the Ethernet port's IP Address, Subnet Mask and optionally the Gateway IP Address. The Gateway IP Address is required if the XLe will be accessed from outside the Local Area Network (e.g., the Internet).

On the PC end of the Serial Port Tunnel, the **Com Port Redirector** utility (CHAPTER 5) must be installed and properly configured on the PC. The Com Port Redirector allows one or more **virtual** COM ports to be created on the PC, and each one can be assigned to a different target XLe IP Address, thus allowing access to multiple XLe controllers.

After installing and configuring both the Ethernet COM module (in the XLe) and the Com Port Redirector (in the PC), the user must configure the PC application (e.g. Cscape) to communicate using one of the **virtual** COM ports created by the Com Port Redirector.

### 2.4 Technical Support Contacts

For manual updates and assistance, contact Technical Support at the following locations:

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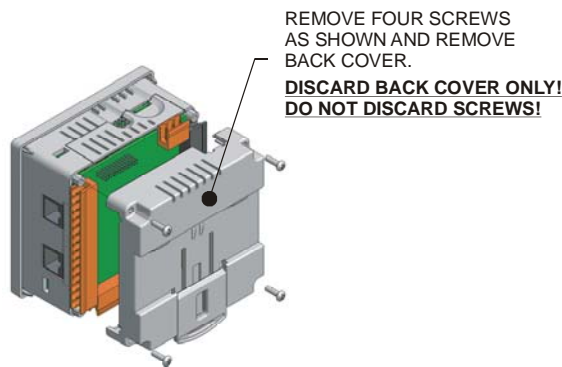
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## CHAPTER 3: INSTALLATION

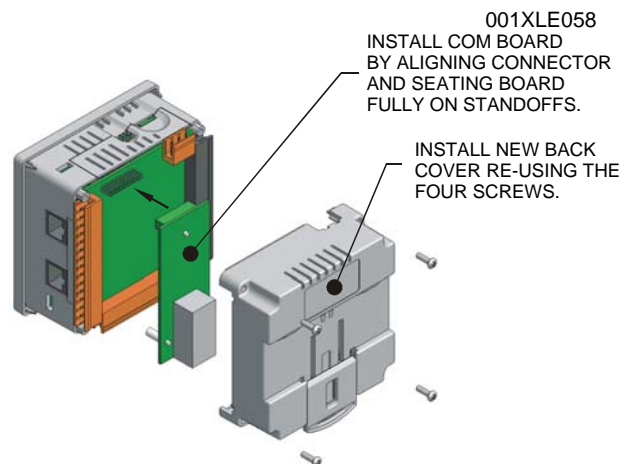
**Note:** Each XLe unit is sent with a datasheet in the box. **The datasheet is the first document that should be read for model-specific information related to XLe models such as pin-outs, jumper settings, and other key installation information.** A User Manual is also available (MAN0805) that provides general information that is common to XLe models and can be downloaded from our web. Visit our website (see page 10) to obtain user documentation and updates.

### 3.1 Installation Procedure

1. Disconnect all power from the XLe unit including I/O power.
2. Remove the four screws on the back of the XLe unit and remove the back cover. The back cover can be discarded or saved, but it will be replaced with the extended back cover that ships with the XEC Ethernet COM module. Screws are re-used (**Figure 3.1**).



**Figure 3.1 – Removing Back Cover of the XLe**



**Figure 3.2 - Installing the XEC COM Module in the XLe**

3. Plug the XEC COM module onto the 24-pin connector. Make sure all the pins are properly aligned (**Figure 3.2**).
4. Place the extended back cover onto the unit. It can be helpful to tip it at an angle so the connector on the XEC COM module passes through the opening on the back cover.
5. Place the screw back into the hole and turn the screw slowly counter clockwise until it clicks into the threads. This prevents the screw from being cross-threaded. Now, turn the screw clock-wise until the cover is firmly secured. Repeat this process for all four (4) screws.

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## CHAPTER 4: XLE CONFIGURATION USING THE SYSTEM MENU

**Note:** The focus of this chapter is the configuration required on the *XLe end* of the Serial Port Tunnel using the XLe unit's built-in **System Menu**. Additional configuration is required on the *PC end* of the Serial Port Tunnel using **Com Port Redirector** software, which is covered in CHAPTER 5.

### 4.1 Overview

The XEC COM module contains a Lantronix XPort device, which uses Serial Port Tunnel protocol, to serve as a bridge between one of the XLe serial ports and an Ethernet-based Local Area Network (LAN).

After installing the XEC COM module in the XLe (see CHAPTER 3), its Ethernet port must then be enabled and configured, before it can be used. This is accomplished using the XLe unit's built-in System Menu, which is accessed via the XLe front panel user interface.

### 4.2 Enabling and Configuring the Ethernet Port

First start the XLe **System Menu**, by pressing the ↓ and ↑ keys on the unit's front panel at the same time to open the Main Menu screen (Figure 4.1). Then press the ↓ key until the **Set Serial Ports** item is highlighted and press ENTER, which opens the Set Serial Ports screen (Figure 4.2). At this point, the **Dflt Pgm Port** (Default Programming Port) system setting should already be highlighted.

```

Set Network ID
Set Network Baud
Set Contrast
View Status
View Diags
View I/O Slots
View Protocols
Set Fkeys Mode
Set Serial Ports
Set Time/Date
Set Screen
Removable Media
(ESC to Exit)

```

**Figure 4.1**  
Main Menu Screen

```

Dflt Pgm Port      Enet
MJ1 RS485 Bias    No
MJ2 RS485 Bias    No
Set Ethernet (Enet)
( Use ↓↑ to adjust )

```

**Figure 4.2**  
Set Serial Ports Screen

```

Addr: 192.168.254.128
Mask: 255.255.255.0
Gtwy: 0.0.0.0

( Reset required to )
( enable changes )

```

**Figure 4.3**  
Set Ethernet (Enet) Screen

To enable the Ethernet port as the Default Programming Port, change the highlighted **Dflt Pgm Port** setting to **Enet**, by pressing ENTER, ↓, ENTER. **Note: The XEC and the MJ1 port share the same internal serial port. For this reason, enabling the Ethernet Port deactivates the MJ1 port.**

To configure the Ethernet port, open the Set Ethernet (Enet) screen (Figure 4.3), by pressing the ↓ key until the **Set Ethernet (Enet)** Sub-Menu item is highlighted, and then press ENTER.

The user should at least configure the **Addr** (XLe unit's IP Address) and **Mask** (LAN Subnet Mask) settings for proper operation on the LAN. If the XLe must be accessed from outside the LAN (e.g. from the Internet), the **Gtwy** (Gateway device's IP Address) setting must also be configured.

Each setting (Addr, Mask and Gateway) is split into four fields, which are separated by dot (.) characters. To configure a setting, use ↓ or ↑ to highlight it and press ENTER, then use the numeric and dot keys to put in the new setting, and finally press ENTER again to save the new setting. **Note: After changing any of these three settings, power cycle the XLe.**

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## CHAPTER 5: COM PORT REDIRECTOR

**Note:** The focus of this chapter is the configuration required on the *PC end* of the Serial Port Tunnel using **Com Port Redirector** software. Additional configuration is required on the *XLe end* of the Serial Port Tunnel using the XLe unit's built-in **System Menu**, which is covered in CHAPTER 4.

### 5.1 Overview

Com Port Redirector is a software utility that installs virtual Windows communication ports. These virtual communication (or COM) ports are redirected to the PC Ethernet port, so PC applications (such as Cscope) can use Ethernet to communicate to an XLe, which has an installed XEC COM module.

Observe the following general guidelines when using COM Port Redirector.

- The PC running COM Port Redirector must have a good network connection to the XLe. This connection can be direct using a crossover cable, or via LAN, using hubs, switches and routers.
- If the PC and XLe are not on the same LAN, both the PC and the XLe must have a correct Gateway IP Address configured, allowing WAN (or Internet) communication between them.
- Do not run COM Port Redirector with other software that installs a virtual COM port.
- Do not run COM Port Redirector with other Comport Redirection software on the same PC.

The following is a summary of the necessary steps for preparing COM Port Redirector for use:

- Install COM Port Redirector on the PC that will communicate with the XLe (Section 5.2).
- Create one or more virtual COM ports on the PC (Section 5.3).
- Configure COM Port Redirector for communication with XLe controllers (Section 5.4).

### 5.2 Installing Com Port Redirector

To install COM Port Redirector on the PC, use the following procedure:

1. Perform the appropriate option to start the installation:
  - If COM Port Redirector is on a CD-ROM, insert the CD-ROM into the computer's CD-ROM drive.
  - If COM Port Redirector was downloaded from the web, double-click the downloaded file.

Either option displays the **Initial InstallShield Wizard** screen in Figure 5.1.



Figure 5.1 – Initial InstallShield Wizard Screen

2. Click the **Next** button. The installation files are unpacked and the **Welcome** screen in Figure 5.2 appears.

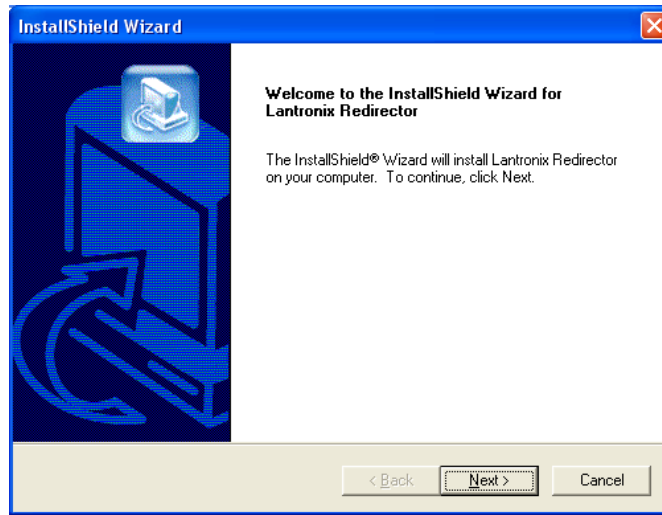


Figure 5.2 – Welcome Screen

3. Click the **Next** button. The **Choose Destination Location** dialog box appears (Figure 5.3).

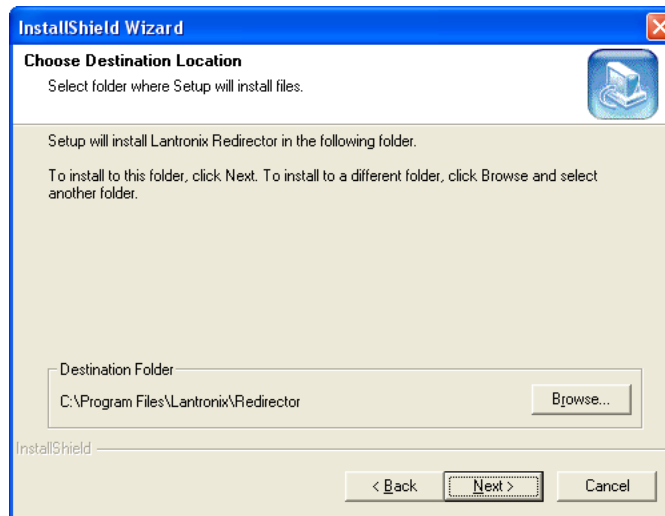


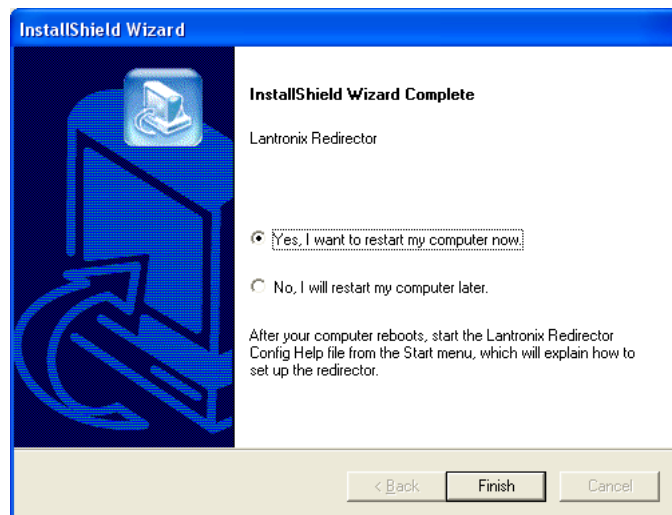
Figure 5.3 – Choose Destination Location Dialog Box

4. The path under **Destination Folder** shows where the COM Port Redirector software will be installed. We recommend the default location. To change this location, click the **Browse** button and select a different location.

**Note:** The Choose Destination Location dialog box has a **Back** button you can click to return to the previous screen.



5. Click **Next**. The program is installed. After the installation, the **InstallShield Wizard Complete** dialog box appears (Figure 5.4).



**Figure 5.4 – InstallShield Wizard Complete Dialog Box**

6. Click **Finish** to complete the installation and **reboot** your computer.

**Note:** After you complete the installation, we recommend checking the Read Me file to obtain the latest information about COM Port Redirector.

### 5.3 Creating Virtual COM Ports

Now that COM Port Redirector is installed on the PC (Section 5.2), use it to create virtual COM ports on the PC, with the following procedure:

1. Click the **Start** button in the Windows Taskbar, point to **All Programs, Lantronix, Redirector**, and click **Configuration**. The **COM Port Redirector Configuration** window appears (Figure 5.5).

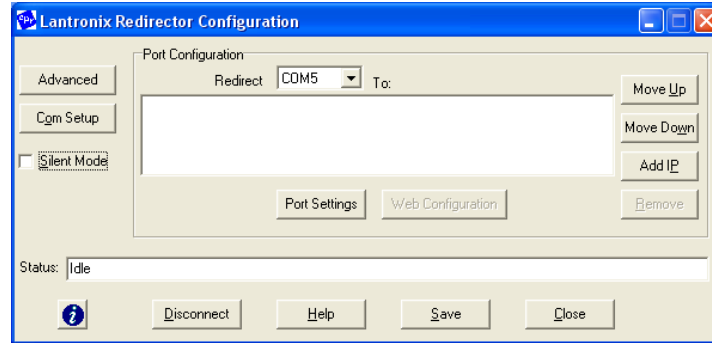


Figure 5.5 – COM Port Redirector Configuration Window

2. Click the **Com Setup** button. A **Com Setup** dialog box similar to the one in Figure 5.6 appears, with the first logical communications port checked. The physical communication ports on the computer where COM Port Redirector is installed are displayed as gray and unavailable. In Figure 5.6, these are COM1 through COM4. Your unavailable communication ports may vary from those in Figure 5.6.

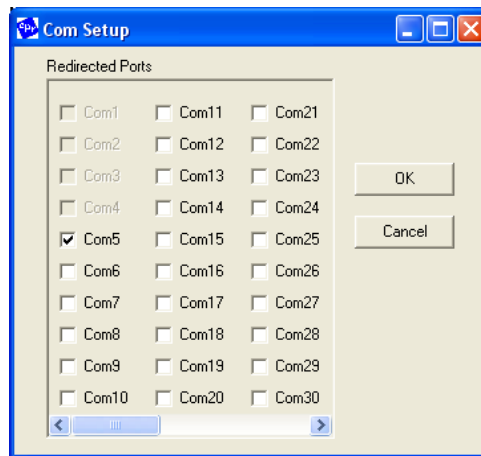


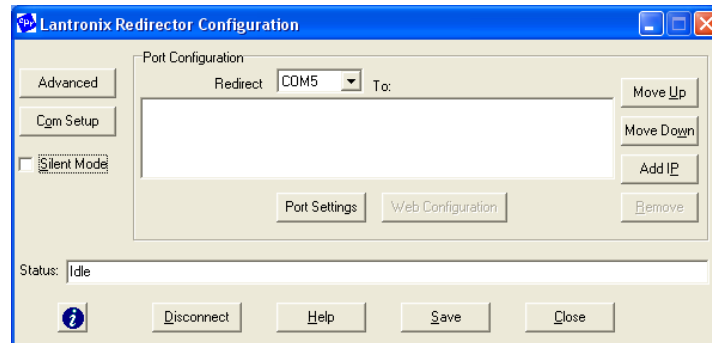
Figure 5.6 – COM Setup Dialog Box

3. Click all the logical ports to which the PC will be redirected. A checkmark appears next to each logical port selected. Each port selected will be available from the **Redirect To** drop-down list in the COM Port Redirector Configuration window (Figure 5.5).
4. To deselect a port, click it again to remove the checkmark next to it. Removing the checkmark indicates the port will not be available from the **Redirect To** drop-down list.
5. When finished, click **OK**. **Note:** After using the Com Setup dialog box to add or remove COM ports, close Com Port Redirector and **reboot** your computer.

## 5.4 Configuring COM Port Redirector

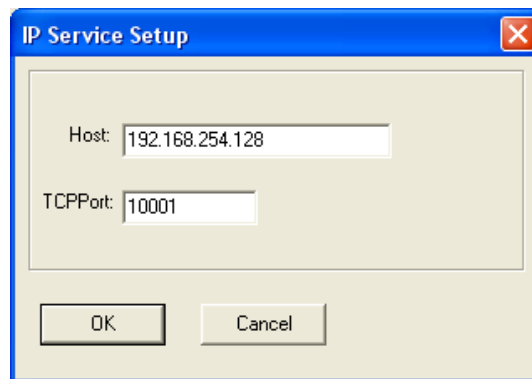
Now that COM Port Redirector has been installed (Section 5.2) and one or more virtual COM ports have been created (Section 5.3), configure COM Port Redirector for communication with an XLe controller, using the following procedure:

1. Click the **Start** button in the Windows Taskbar, point to **All Programs, Lantronix, Redirector**, and click **Configuration**. The **COM Port Redirector Configuration** window appears (Figure 5.7).



**Figure 5.7 – COM Port Redirector Configuration Window**

2. Using the **Redirect To** drop-down list at the top of the COM Port Redirector Configuration window, select a redirected (virtual) COM port.
3. Click the **Add IP** button. The **IP Service Setup** dialog box appears (Figure 5.8).



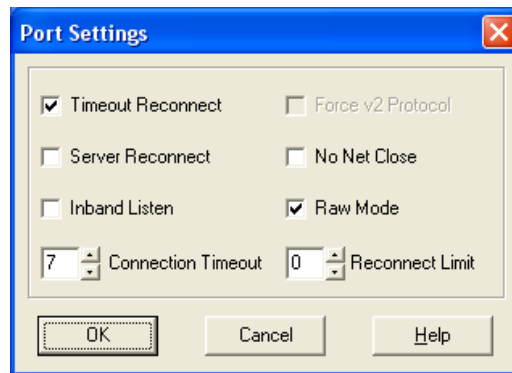
**Figure 5.8 – IP Service Setup Dialog Box**

4. In the **Host** field, enter the IP Address of the target XLe controller.

**Note:** The IP Address shown in Figure 5.8 is the XLe default value; enter the actual IP Address that was configured into the target XLe (see CHAPTER 4).

5. In the **TCPPort** field, enter **10001**.
6. Click the **OK** button.

7. Click the **Port Settings** button. The Port Settings dialog box appears (Figure 5.9).
8. Check the **Timeout Reconnect** and **Raw Mode** checkboxes.



**Figure 5.9 – Port Settings Dialog Box**

The Port Settings shown in Figure 5.9 affect COM Port Redirector as follows:

**Timeout Reconnect** If checked, COM Port Redirector automatically tries to reconnects to an XLe if the connection times out (possibly because the Ethernet cable was unplugged). When reconnecting, COM Port Redirector keeps trying until the connection succeeds or until the **Cancel** button in the pop-up connection dialog box is clicked.

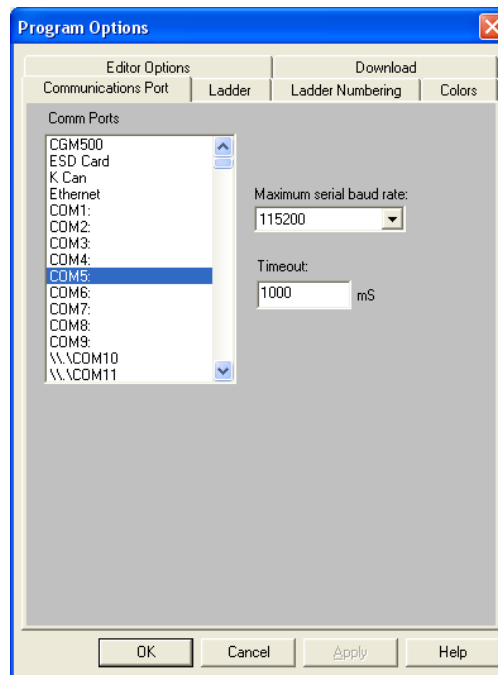
**Raw Mode** If checked, Serial Port Tunnel protocol is enabled. **Note: Raw Mode must be checked, or communication with the XLe will fail**

9. Click **OK**.
10. Click the **Save** button.
11. Click the **Close** button.

## CHAPTER 6: VERIFYING ETHERNET COMMUNICATION

After the Ethernet COM module has been installed (CHAPTER 3) and configured (CHAPTER 4) in the XLe and COM Port Redirector has been installed and configured in the PC (CHAPTER 5), use Cscope to verify that the PC and XLe can now communicate as follows:

1. Use a crossover Ethernet cable to connect directly from the PC to the XLe.
2. Start Cscope and click on the **Options** item under the **Tools** menu, and then select the **Communications Port** tab (Figure 6.1).



**Figure 6.1 – Cscope Program Options - Communications Port Tab**

3. From the **Comm Ports** list, select the (virtual) COM port that was created (Section 5.3) and configured for communication (Section 5.4).
4. The **Maximum serial baud rate** setting has no effect, but the **Timeout** value can be increased if communication becomes unreliable due to a slow or congested network.
5. Click **OK**. A pop-up message should appear on the PC that says **Attempting to connect to service**.
6. If the pop-up message changes to **Successfully redirected to service**, communication is verified.
7. If the pop-up message changes to **Failed to connect to any service**, communication failed. Ensure all settings are correct and that the PC to XLe Ethernet cable is properly attached.
8. To hide the pop-up window, check the **Silent Mode** checkbox in the Com Port Redirector Configuration window.

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