Supplement for
HE-XEC

XL Series Ethernet COM Module

PREFACE

This manual explains how to use the XL Series Ethernet COM Module.

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LIMITED WARRANTY AND LIMITATION OF LIABILITY

Horner APG, LLC. ("HE-APG") warrants to the original purchaser that the XL Series Ethernet COM Module manufactured by HE-APG is free from defects in material and workmanship under normal use and service. The obligation of HE-APG under this warranty shall be limited to the repair or exchange of any part or parts which may prove defective under normal use and service within two (2) years from the date of manufacture or eighteen (18) months from the date of installation by the original purchaser whichever occurs first, such defect to be disclosed to the satisfaction of HE-APG after examination by HE-APG of the allegedly defective part or parts. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR USE AND OF ALL OTHER OBLIGATIONS OR LIABILITIES AND HE-APG NEITHER ASSUMES, NOR AUTHORIZES ANY OTHER PERSON TO ASSUME FOR HE-APG, ANY OTHER LIABILITY IN CONNECTION WITH THE SALE OF THIS XLe Ethernet COM Module. THIS WARRANTY SHALL NOT APPLY TO THIS XLe Ethernet COM Module OR ANY PART THEREOF WHICH HAS BEEN SUBJECT TO ACCIDENT, NEGLIGENCE, ALTERATION, ABUSE, OR MISUSE. HE-APG MAKES NO WARRANTY WHATSOEVER IN RESPECT TO ACCESSORIES OR PARTS NOT SUPPLIED BY HE-APG. THE TERM "ORIGINAL PURCHASER", AS USED IN THIS WARRANTY, SHALL BE DEEMED TO MEAN THAT PERSON FOR WHOM THE XLe Ethernet COM Module IS ORIGINALLY INSTALLED. THIS WARRANTY SHALL APPLY ONLY WITHIN THE BOUNDARIES OF THE CONTINENTAL UNITED STATES.

In no event, whether as a result of breach of contract, warranty, tort (including negligence) or otherwise, shall HE-APG or its suppliers be liable of any special, consequential, incidental or penal damages including, but not limited to, loss of profit or revenues, loss of use of the products or any associated equipment, damage to associated equipment, cost of capital, cost of substitute products, facilities, services or replacement power, down time costs, or claims of original purchaser's customers for such damages.

To obtain warranty service, return the product to your distributor with a description of the problem, proof of purchase, post paid, insured and in a suitable package.

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.

Table of Contents

LIMITED WARRANTY AND LIMITATION OF LIABILITY **4**

CHAPTER 1 : SAFETY / COMPLIANCE **7**
   1.1   Safety Warnings and Guidelines 7

CHAPTER 2 : INTRODUCTION **9**
   2.1   Overview 9
   2.2   Ethernet COM Module (XEC) Option 9

CHAPTER 3 : INSTALLATION **11**
   3.1   Installation Procedure (XLe OCS illustration) 11

CHAPTER 4 : CONFIGURATION USING THE SYSTEM MENU of the OCS **13**
   4.1   Overview 13
   4.2   Enabling and Configuring the Ethernet Port (XLe illustration) 13

CHAPTER 5 : CONFIGURING CSCAPE FOR ETHERNET COMMUNICATION **15**

APPENDIX A (use COM port Redirector only for Cscape version 8.6 and previous releases) **17**
   1   Overview 17
   2   Installing Com Port Redirector 17
   3   Creating Virtual COM Ports 19
   4   Configuring COM Port Redirector 20
   5   Technical Support Contacts 22

INDEX **23**

TABLE OF FIGURES **24**

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 <u>not</u> replace the fuse again as a repeated failure indicates a defective condition that will <u>not</u> 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 <u>not</u> 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 XL Series, an Ethernet COM Module (XEC) can provide Ethernet communications, by installing it internal to the OCS.

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

Internal to the XL OCS, there is a CPU board, and up to two installed modules. Model XX000 has 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 Mbps) and 100 BaseTx (100 Mbps) 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 EnvisionRV to communicate with an XL Series OCS over a LAN or over the Internet.

- Horner OPC Server installed on PC, to allow other standard PC applications (database, spreadsheet programs etc.) access to OCS registers.

- Modbus TCPIP protocol downloaded from http://www.heapg.com/Pages/TechSupport/Downloads.html to communicate with other Modbus TCPIP protocol supporting devices.

> **Note: When using 'Open' and 'Close' ladder functions to start and end Modbus TCPIP communications ladder program must wait for the power flow at the output of these functions (usually it takes 10-15 seconds for the reconfiguration of the Ethernet COM module to complete).**

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).

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.
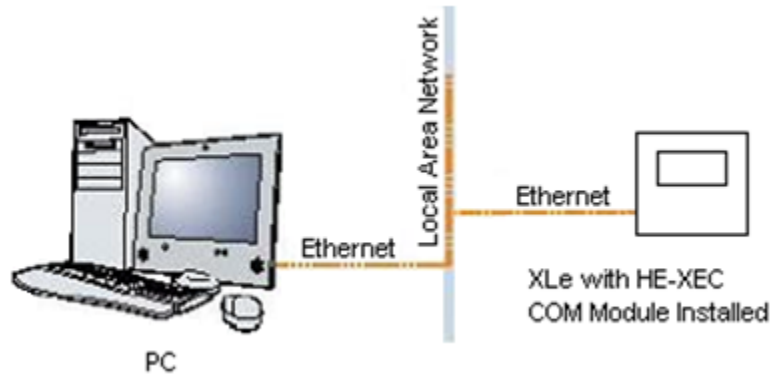

Figure 2.1 – PC to XLe Local Area Network (LAN) Connection

CHAPTER 3: INSTALLATION

Note: Each XL Series OCS is shipped with a datasheet in the box. **The datasheet is the first document that should be read for model-specific information such as pin-outs, jumper settings, and other key installation information.** A User Manual is also available that provides general information that can be downloaded from our web. Visit our website (see page 22) to obtain user documentation and updates.

3.1   Installation Procedure (XLe OCS illustration)

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**).

REMOVE FOUR SCREWS AS SHOWN AND REMOVE BACK COVER.
DISCARD BACK COVER ONLY! DO NOT DISCARD SCREWS!
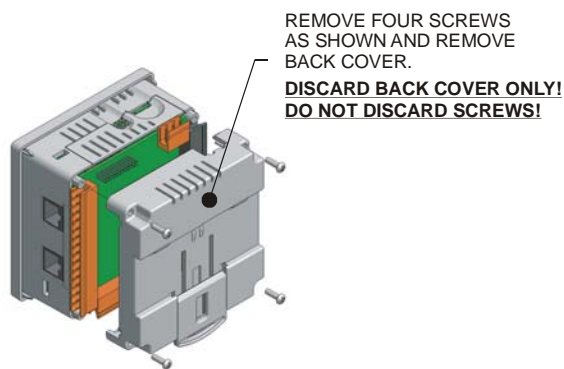
Figure 3.1 – Removing Back Cover of the XLe

001XLE058
INSTALL COM BOARD BY ALIGNING CONNECTOR AND SEATING BOARD FULLY ON STANDOFFS.

INSTALL NEW BACK COVER RE-USING THE FOUR SCREWS.
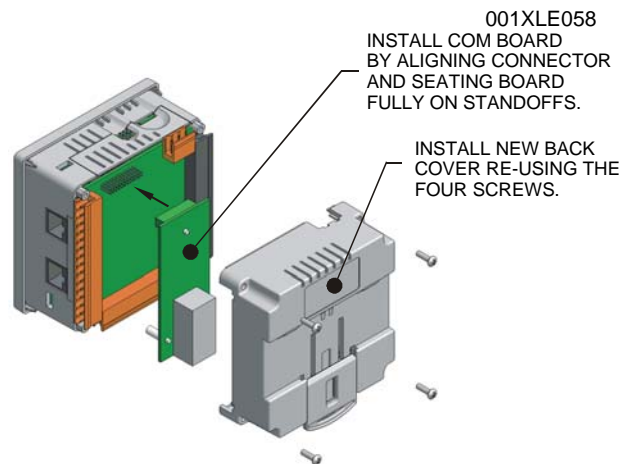
Figure 3.2 – Installing the XEC COM Module in the XLe

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.

NOTES

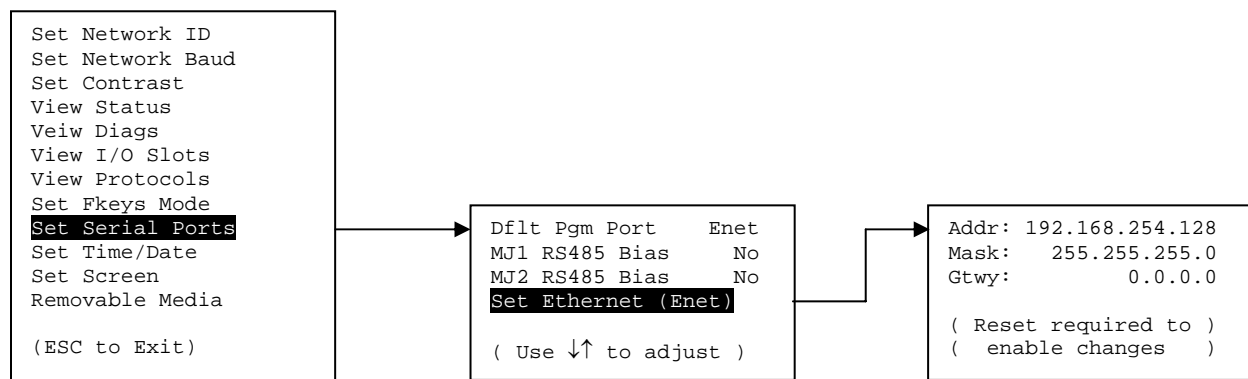# CHAPTER 4: CONFIGURATION USING THE SYSTEM MENU of the OCS

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 XL Series OCS (see CHAPTER 3), its Ethernet port must then be enabled and configured, before it can be used. This is accomplished using the OCS built-in System Menu, which is accessed via the front panel user interface.

4.2   Enabling and Configuring the Ethernet Port (XLe illustration)

Note: Accessing System Menu is slightly different for each model, but once in System Menu getting to the Ethernet configuration is very similar.

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
Veiw Diags
View I/O Slots
View Protocols
Set Fkeys Mode
Set Serial Ports
Set Time/Date
Set Screen
Removable Media

(ESC to Exit)
```

```
Dflt Pgm Port    Enet
MJ1 RS485 Bias     No
MJ2 RS485 Bias     No
Set Ethernet (Enet)

( Use ↓↑ to adjust )
```

```
Addr: 192.168.254.128
Mask:   255.255.255.0
Gtwy:         0.0.0.0

( Reset required to )
(  enable changes   )
```

Figure 4.1 –
Main Menu Screen

Figure 4.2 –
Set Serial Ports Screen

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.**

NOTES

CHAPTER 5: CONFIGURING CSCAPE FOR ETHERNET COMMUNICATION

After the Ethernet COM module has been installed and configured in the OCS, use Cscape to verify that the PC and OCS can now communicate as follows:

1. Use a crossover Ethernet cable to connect directly from the PC to the OCS.

2. Communication settings can be configured using **Add Target** dialog by choosing **Tools > Editor Options > Communications Port** and then click Configure >> . (Figure 5.1).
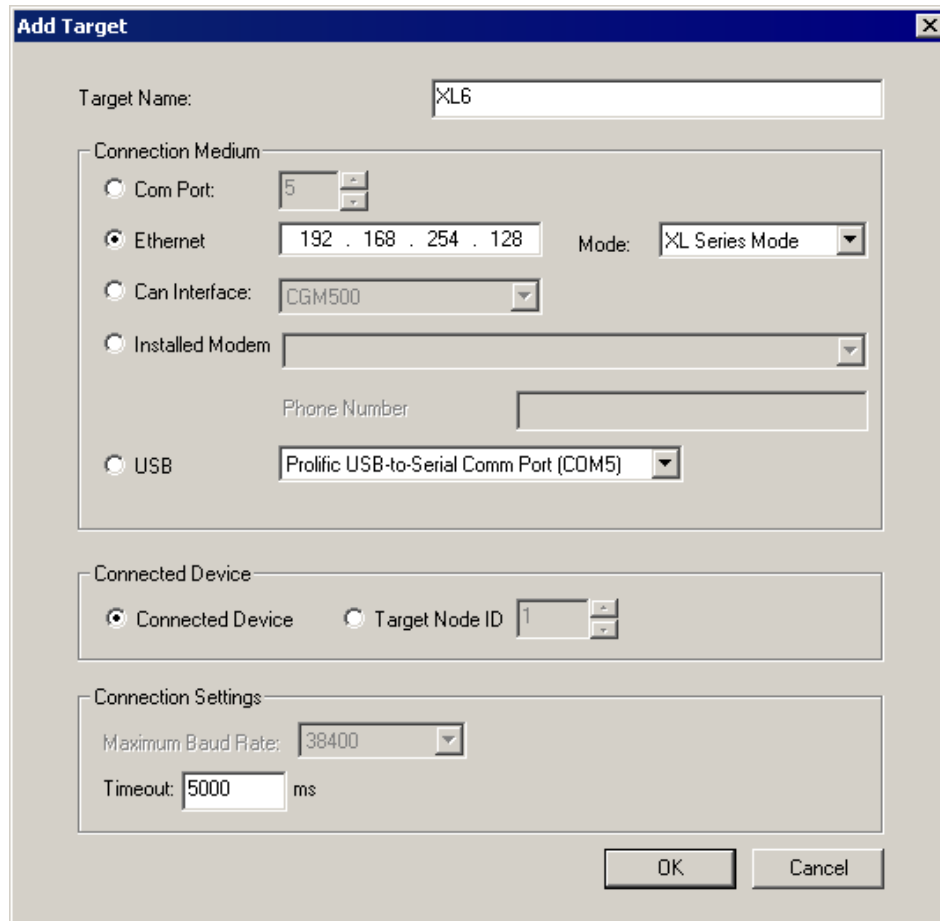

Figure 5.1 – Cscape Program Options - Communications Port Tab

3. Select '**Ethernet**' and set IP address of the OCS. Select XL Series Mode.

4. Select '**Connected Device**' for communicating with the OCS connected on the Ethernet. Select 'Target Node ID' with node ID from the dropdown list for communicating with the node ID via the Ethernet connection.

5. Set 'Time Out' = 1000mS for local communication, keep this value high for communication outside the local network.

6. Click OK to close '**Add Target**'.

7. Click OK to close '**Editor Options**'.
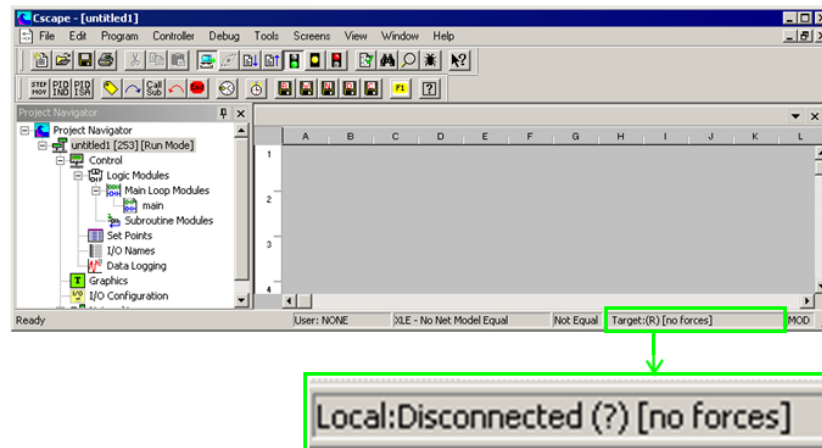
Figure 5.2 – Cscape-Ethernet not connected

Local:xx indicates the Node ID of the **local unit**, the unit to which **Cscape** is physically connected through the communication port.
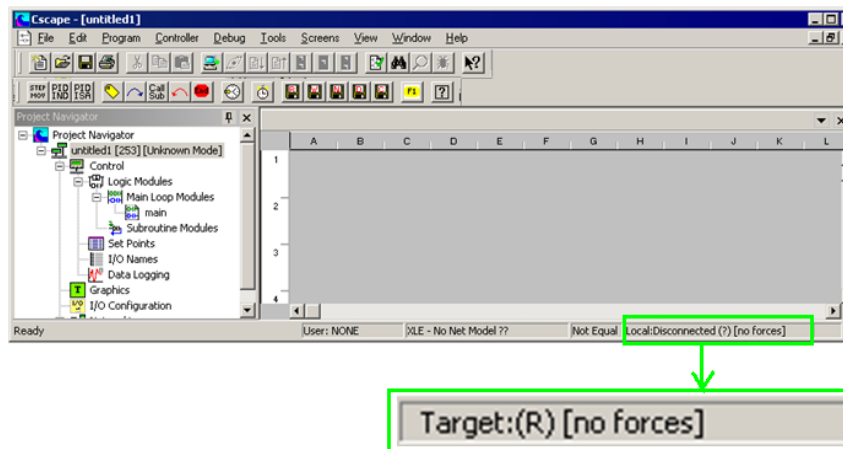
Figure 5.3 – Cscape-Ethernet Connected

Target:yy — Indicates the Node ID of the **remote unit** to that **Cscape** is logically attached to and is actually controlling.

(R), **(D)**, **(I)**, and **(?)** indicate the operation mode of the remote unit -- **(R)**unning, **(D)**o I/O, or **(I)**dle. If **(?)** is displayed **Cscape** is not communicating with the remote unit.

APPENDIX A (use COM port Redirector only for Cscape version 8.6 and previous releases)

Note: The focus of this section is the configuration required on the *PC end* of the Serial Port Tunnel using **Com Port Redirector** software. Additional configuration is required on the *XL OCS end* of the Serial Port Tunnel using the OCS **System Menu**, which is covered in CHAPTER 4.

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 Cscape) can use Ethernet to communicate to an XL Series OCS, 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 XL Series OCS. This connection can be direct using a crossover cable, or via LAN, using hubs, switches and routers.
- If the PC and XL Series OCS are not on the same LAN, both the PC and the XL Series OCS 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: (illustration is for XLe OCS with XEC installed)

- Install COM Port Redirector on the PC that will communicate with the XLe (Appendix A Section 2).
- Create one or more virtual COM ports on the PC (Appendix A Section 3).
- Configure COM Port Redirector for communication with XL Series OCS (Appendix A Section 4).

2   Installing Com Port Redirector

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

a. 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 6.1.

Figure 6.1 – Initial InstallShield Wizard Screen

b. Click the **Next** button. The installation files are unpacked and the **Welcome** screen in Figure 6.2 appears.
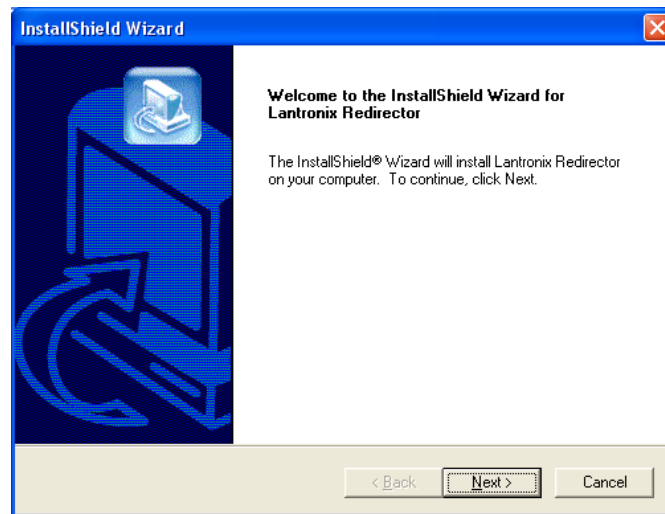

Figure 6.2 – Welcome Screen

c. Click the **Next** button. The **Choose Destination Location** dialog box appears (Figure 6.3).
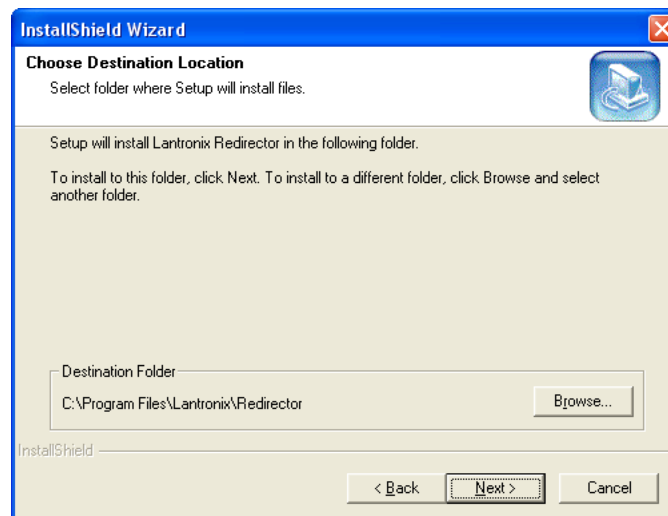

Figure 6.3 – Choose Destination Location Dialog Box

d. 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.*

e. Click **Next**. The program is installed. After the installation, the **InstallShield Wizard Complete** dialog
    box appears (Figure 6.4).

Figure 6.4 – InstallShield Wizard Complete Dialog Box

f. 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.*

3   Creating Virtual COM Ports

Now that COM Port Redirector is installed on the PC (Appendix A Section 2), use it to create virtual COM
ports on the PC, with the following procedure:

a. 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 6.5).
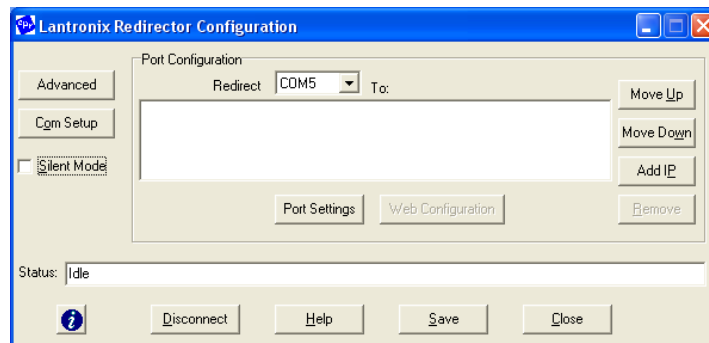
Figure 6.5 – COM Port Redirector Configuration Window

b. Click the **Com Setup** button. A **Com Setup** dialog box similar to the one in Figure 6.6 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 6.6, these are COM1 through COM4. Your unavailable communication ports may vary from those in Figure 6.6.
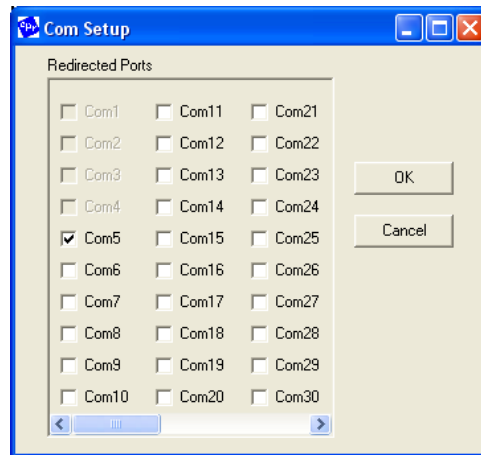
Figure 6.6 – COM Setup Dialog Box

c. 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 6.5).

d. 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.

e. 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.*

4   Configuring COM Port Redirector

Now that COM Port Redirector has been installed (Appendix A Section 2) and one or more virtual COM ports have been created (Appendix A Section 3), configure COM Port Redirector for communication with an XLe controller, using the following procedure:

a. 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 6.7).
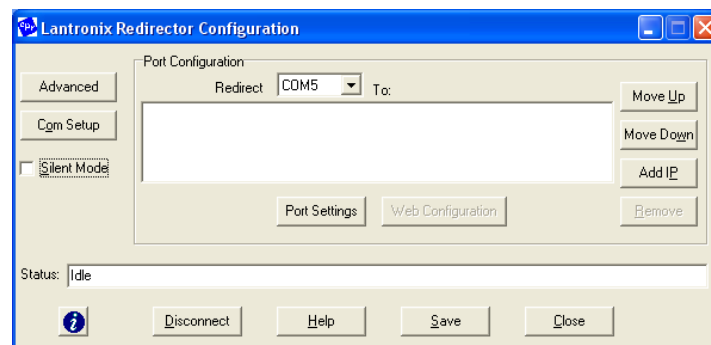

Figure 6.7 – COM Port Redirector Configuration Window

b. Using the **Redirect To** drop-down list at the top of the COM Port Redirector Configuration window, select a redirected (virtual) COM port.

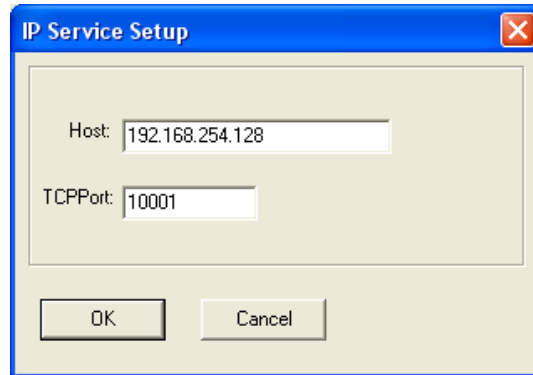c. Click the **Add IP** button. The **IP Service Setup** dialog box appears (Figure 6.8).

Figure 6.8 – IP Service Setup Dialog Box

d. 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).

e. In the **TCPPort** field, enter **10001**.

f. Click the **OK** button.

g. Click the **Port Settings** button. The Port Settings dialog box appears (Figure 6.9).

h. Check the **Timeout Reconnect** and **Raw Mode** checkboxes.
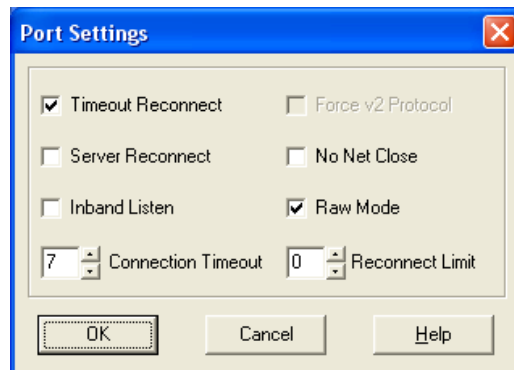
Figure 6.9 – Port Settings Dialog Box

The Port Settings shown in Figure 6.9 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**

i.   Click **OK**.

j.   Click the **Save** button.

k.   Click the **Close** button.

5   Technical Support Contacts

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

North America:
Tel: (+) (317) 916-4274
Fax: (+) (317) 639-4279
Web: www.heapg.com
Email: techsppt@heapg.com

Europe:
Tel: (+) 353-21-4321-266
Fax: (+) 353-21-4321-826
Web: www.horner-apg.com
Email: tech.support@hornerapg.com

INDEX

TABLE OF FIGURES