Getting Started with the LX-8000 Series

Corporate Headquarters
MRV Communications, Inc. Corporate Center
20415 Nordhoff Street
Chatsworth, CA 91311
Tel: 818-773-0900
Fax: 818-773-0906
www.mrv.com (Internet)

MRV Americas Service and Support
295 Foster Street
Littleton, MA 01460
Tel: 800-435-7997
Tel: +001 978-952-4888 (Outside U.S.)
Email: service@mrv.com

MRV America Sales
295 Foster Street
Littleton, MA 01460
Tel: 800-338-5316 (U.S.)
Email: sales@mrv.com

MRV International Sales
Business Park Moerfelden
Waldeckerstrasse 13
64546 Moerfelden-Walldorf
Germany
Tel: (49) 6105/2070
Fax: (49) 6105/207-100
Email: sales@mrv.com

451-0331G
All rights reserved. No part of this publication may be reproduced without the prior written consent of MRV Communications, Inc. The information in this document is subject to change without notice and should not be construed as a commitment by MRV Communications, Inc. MRV Communications, Inc. reserves the right to revise this publication, and to make changes in content from time to time, without obligation to provide notification of such revision or changes. MRV Communications, Inc. assumes no responsibility for errors that may appear in this document.

Copyright © 2006 by MRV Communications, Inc.

Should you experience trouble with this equipment, please contact one of the following support locations:

• **If you purchased your equipment in the Americas**, contact MRV Americas Service and Support in the U.S. at 978-952-4888. (If you are calling from outside the U.S., call +011 978-952-4888.)

• **If you purchased your equipment outside the Americas (Europe, EU, Middle-East, Africa, Asia)**, contact MRV International Service and Support at 972-4-993-6200.

**FCC Notice**

### CAUTION

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, can cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

• Reorient or relocate the receiving antenna.

• Increase the separation between the equipment and receiver.

• Connect the power cord of the equipment into an outlet on a circuit that is different from that to which the receiver is connected.

• Consult the dealer or experienced radio/TV technician for help.

Changes or modifications not expressly approved by MRV Communications, Inc. could void the user’s authority to operate the equipment.
BSMI Notice

警告使用者：

這是甲類的資訊產品，在居住的環境中使用時可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

VCCI Notice

This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance may arise. When such trouble occurs, the user may be required to take corrective actions.

この装置は、情報処理装置等電波障害自主規制協議会（V C C I）の基準に基づくクラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

WARNING

Both power sources must be disconnected before servicing the unit.

EXPORT NOTICE

MRV models contain 128-bit encryption software. Export of this product is restricted under U.S. law. Information is available from the U.S. Department of Commerce, Bureau of Export Administration at www.bis.doc.gov.

Licensing Notice

This software is licensed as described in the "License" file on the LX-Series CD Kit and at the MRV website when downloading software.
# Table of Contents

**Preface** .......................................................................................................................... 11  
Customer Support ............................................................................................................. 11  
Other Documentation ......................................................................................................... 12  

**Overview of the LX-8000 Series** .................................................................................. 13  
Conventions ......................................................................................................................... 13  
System Specifications ......................................................................................................... 14  

**Installing the LX-8000 Series** ..................................................................................... 15  
Hardware Installation ......................................................................................................... 15  
  Unpack and Inspect the Unit ............................................................................................. 15  
  Package Contents ............................................................................................................. 15  
LX-8000 Indicators and Interfaces ....................................................................................... 16  
  Front Panel LEDs ............................................................................................................ 16  
  Rear Panel LEDs ............................................................................................................. 18  
  Power Monitoring ............................................................................................................ 19  
Environmental and Installation Considerations ................................................................. 19  
Mounting the Unit into a 19-inch or 23-inch Rack ............................................................. 20  
Cable Connections ............................................................................................................. 21  
  Connect the Power Cable ............................................................................................... 21  
  Connecting the Ethernet Interface ............................................................................... 21  
  Connect Serial Device Cables ...................................................................................... 21  
  Connecting Your Management Station ........................................................................... 21  
  Connecting DC Power ................................................................................................. 22  
Modem Port (Optional) ....................................................................................................... 23  
Powering On ......................................................................................................................... 23  
System Login and Passwords ............................................................................................... 24  
Resetting the Unit ............................................................................................................... 24  

**Configuring the LX-8000 Series for the First Time** ..................................................... 25  
Configuring the LX-8000 Unit for the First Time .............................................................. 25  
  First Time Quick Configuration ...................................................................................... 25  
  Assigning an IP Address via the Network ..................................................................... 27  
Manually Setting the IP Address Via the CLI .................................................................... 28  
Accessing and Configuring the Graphical User Interface (GUI) ......................................... 28  
  Web Configure Mode .................................................................................................... 31  
  Web Access Mode ........................................................................................................ 32  
  Menu/Config Mode ....................................................................................................... 33  
GUI EZ Configuration ......................................................................................................... 33  
  Launching the EZConfig GUI ..................................................................................... 33  
Software Upgrades ............................................................................................................ 34  
IP Configuration Menu ...................................................................................................... 34  
Booting from Defaults ....................................................................................................... 34  
Accessing and Configuring Additional Features .................................................................. 34  
  Connecting to the LX-8000 Series via Telnet or SSH ................................................. 34  
  Accessing from a Terminal Attached to an LX-8000 Series Serial Port ....................... 35  
Additional Considerations ................................................................................................. 35  
Command Line Interface (CLI) Tree Structure .................................................................. 36
Figures

LX Series 8020 Front Panel ....................................................................................................... 16
LX Series 8040 Front Panel ....................................................................................................... 16
LX Series Dual AC 8040 Rear Panel ....................................................................................... 18
LX Series Single AC 8040 Rear Panel ..................................................................................... 18
LX Series DC 8040 Rear Panel .............................................................................................. 18
Mounting an LX-8000 Series in Rack .................................................................................... 20
Connecting DC Power ............................................................................................................ 22
LX Series RESET Switch Location .......................................................................................... 24
Basic Menu Structure ............................................................................................................ 36
Connecting the Temperature/Humidity Sensor ...................................................................... 40
Connecting the 5250 ............................................................................................................... 41
Connecting the 5150 ............................................................................................................... 42
Connecting the 4800 ............................................................................................................... 43
Typical Alarm Inputs Connections .......................................................................................... 45
Typical Interface Design for Control Output Signals ............................................................. 46
POST Test Error Code Sample .............................................................................................. 56
Serial Device Connector (RJ-45) Signal Assignments ............................................................ 57
10/100 Connector Assignments .............................................................................................. 58
DB-25 Pins ............................................................................................................................. 59
Adapter Wiring, LX Series to DTE .......................................................................................... 61
Adapter Wiring, RJ-45 to DB-9, LX Series to DTE ................................................................. 62
Adapter Wiring, LX Series to DCE .......................................................................................... 63
Adapter Wiring, LX-Series to DCE, with RING ..................................................................... 64
Modular Cables for RTS/CTS Flow Control (Eight-Wire), Concurrent with Modem Control Signalling
Tables

LX-8000 Series Specifications ................................................................. 47
Temperature/Humidity Sensor Specifications ....................................... 49
LX-8000 Series Factory Defaults ............................................................ 51
POST Test Error Codes ................................................................................ 53
Preface

This guide contains all the information you need to get the LX-8000 Series up and running.

This guide is organized as follows:

- **Preface** - Describes the manual’s organization and how to contact customer support.
- **Chapter 1** – Provides an overview of the LX-8000 Series, including supported communication speeds, software requirements, and conventions.
- **Chapter 2** – Describes how to install and connect the LX-8000 Series, as well as the unit’s LEDs and connectors.
- **Chapter 3** – Explains how to configure the unit for the first time, access the Graphical User Interface, install Java Runtime Environment (JRE), and connect to the LX-8000 Series via telnet and SSH.
- **Chapter 4** – Describes alternative port capabilities, including temperature/humidity sensors, 5250/5150/4800 power control units, and using LX ports as alarm input and control output port points.
- **Appendix A** – Provides the electrical, environmental, and physical requirements for the LX-8000 Series installation.
- **Appendix B** - Lists the factory default settings.
- **Appendix C** – Provides the error code definitions for the POST test error codes.
- **Appendix D** - Describes how to cable the LX-8000 Series unit.

Customer Support

Should you experience trouble with this equipment, please contact your MRV Americas Service and Support customer representative in the USA at 978-952-4888. International customers call +011 978-952-4888.
Other Documentation

Other manuals in the LX documentation set are:

- **LX-Series Commands Reference Guide** - Describes each individual command in the LX CLI tree.
- **LX-Series Configuration Guide** - Provides information on network configuration, initial setup, how to set up for remote console functions, RADIUS, and system administration. Provides basic information regarding the Network Management System (NMS), and procedures on how to use the Management Information Base (MIB) structure (as pointers to objects in the devices) to manage these units.
- **Software Release Notes** - Cites supported features as well as any notes and restrictions for the current software version.
Chapter 1

Overview of the LX-8000 Series

The new LX-8000 Series brings dual power to the LX-Series line. The LX-8000 Series is a secure standalone communication server that is designed for applications requiring secure console or serial port management in environments requiring high-reliability and/or dual power. The LX-8000 Series provides the most secure and robust feature set to meet your remote console management and terminal server needs. The LX-8000 Series includes the most comprehensive security features, such as per port access protection, RADIUS, Secure Shell v2.0, PPP PAP/CHAP, PPP dial-back, on-board database, menus, and others.

The LX-8000 Series console management solution enables centrally located or remote personnel to connect to the console or craft ports of any network element or server. This serial connection allows administrators to manage and configure the remote network devices and servers, as well as perform software upgrades as if attached locally.

The LX-8000 Series is available in two base models: the 20-port LX-8020S and the 40-port LX-8040S, each with single or dual AC power supplies or dual DC power supplies and an optional internal modem. The LX-8000 Series also provides 20- and 40-port densities of RS-232 DTE RJ45 Serial ports, as well as V.90/K56 flex Internal Modem options. The LX-8000 Series is specifically designed for applications requiring secure console or serial port management with optimal performance, security, and reliability.

The LX-8000S models are designed for telco applications that demand high quality and reliability standards, dual power, and NEBS Level-3 Certification. The LX-8000 dual DC powered units are NEBS Level-3 compliant.

Conventions

The following conventions are used throughout this guide:

- **User prompt** – The user prompt is (for example) InReach:0> for Non-superusers or InReach:0>> for superusers. The prompt will change based on a login user profile, as configured by the Superuser. The 0 represents the session number.
Overview of the LX-8000 Series

- **Configure Mode prompt** – A sample configure mode prompt is Async 1-6:0 >>, where Async is a reminder that tells you which part of the configuration you are in, 1-6 is the range of ports any operation will affect, 0 is a session number, and >> indicates superuser mode. To get to the Async 1-6:0 >> prompt, you must first type `port async 1 6` at the Config:0 >> prompt. Note that you do not add a dash between the range numbers in port async 1 6.

- **Command execution** – Unless otherwise specified, commands are executed when you press <RETURN>.

- **Keyboard characters (keys)** – Keyboard characters are represented using left and right angle brackets (< and >). For example, the notation <CTRL> refers to the CTRL key; <A> refers to the letter A; and <Enter> refers to the RETURN key.

- **Typographical conventions** – The following typographical conventions are used:
  - **Monospace Typeface** – indicates text that can be displayed or typed at a terminal (i.e., displays, user input, messages, prompts, etc.).
  - **italics** – are used to indicate variables in command syntax descriptions.

- **Help Key (?)** - At any prompt level, you can press ? to display the available commands at that level. The only time this is not true is if you are in the midst of entering a command. If ? is at the end of a partial command, the LX displays a list of valid arguments to assist you in adding to the current command line.

- **Tab** - Press the Tab button to complete a partially entered command. You must enter the first three characters of a command for autocomplete to work. If the command is already complete, the Tab button displays available commands.

- **Command Recall** - The up arrow recalls previously used commands.

- **Ctrl-F** – Moves forward to the next session.

- **Ctrl-B** – Moves back to the previous session.

- **Ctrl-L** – Returns you to the Local Command Mode.

- **Ctrl-K** – Clears the current command line.
  
  NOTE: You must press the Enter key after you type Ctrl-F, Ctrl-B, Ctrl-L, or Ctrl-K.

### System Specifications

The following table lists important system specifications:

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface</td>
<td>DTE RS-232 - RJ-45</td>
</tr>
<tr>
<td>Serial Line Speed</td>
<td>134.5 bps to 230 Kbps</td>
</tr>
<tr>
<td>Ethernet Interface (2)</td>
<td>10/100 Auto Sensing/MDI/MDIX</td>
</tr>
<tr>
<td>Default Serial Line Speed</td>
<td>9600 bps</td>
</tr>
</tbody>
</table>
Chapter 2

Installing the LX-8000 Series

Hardware Installation

This section explains how to install an LX-8000 Series Communications server and place it into operation.

Unpack and Inspect the Unit

Place all packing materials back into the shipping carton and save the carton. (If you need to return the unit to MRV or your distributor, you should return it in the original carton.)

Package Contents

The LX-8000 unit shipping carton contains the following items:

- One rack mounting kit. MRV provides the following mounting screws: Eight 6-32 x 5/16” flathead screws for attaching the ears to the unit, and four 10-32 screws to attach to the rack.
- One power cord appropriate to your particular AC LX model (two power cords on redundant AC units). Power cords for DC units are not supplied.
- One 8-wire RJ-45 serial crossover cable.
- One female DB-9 to RJ-45 adapter.
- One software/documentation CD.
LX-8000 Indicators and Interfaces

This section explains the LX-8000 unit’s indicators and interfaces.

Front Panel LEDs

This section explains the front panel LEDs (see Figures 1 and 2).

![Figure 1 - LX Series 8020 Front Panel](image1)

![Figure 2 - LX Series 8040 Front Panel](image2)

100 Mbps

This green LED indicates speed. If the link is 100 Mbps, the LED comes ON.
Port Status LEDs

Each of the 20 (or 40) green LEDs flash when receive, transmit, or status activity is detected on its corresponding serial port. The port status LEDs are used in several ways. During the initialization process, the LEDs indicate self-tests are being performed, and if any self-test fails, they indicate an error code. After a POST test and a system software boot, the lights indicate when a port is actively being used.

System Fault

The FLT LED turns solid red when a fault condition exists or maintenance is required. This LED remains on until the initial Power On Self Test (POST) completes successfully. The FLT LED blinks red when the POST was unsuccessful.

System OK

The OK LED blinks green when the system’s voltages are normal and the unit has passed the POST test.

A and B FEED

NOTE: On non-redundant systems, the B feed will be off.

The OK LED turns green when a cable is plugged into the A or B side of the AC or DC feed and power is present (the range is 90V to 230V). The B side is present only on redundant systems. The FEED LEDs only indicate whether or not power is present at each input connector. The FLT LED turns red when power is lost on the A or B side of the AC or DC feed.

A and B REG

NOTE: On non-redundant systems, the B REG will be off.

NOTE: If the A or B FEED FLT LED is red, the A or B (depending on which side) REG FLT LED will also be red.

The OK LED turns green when the A or B regulation power input to the board is functioning within tolerance. The FLT LED turns red when the internal power supply is malfunctioning or outside specifications (this indicates that one of the internal power supplies within the unit is malfunctioning, or not receiving input power).

TEMP

The OK LED turns green when the system temperature is within limits. The FLT LED turns red when the system temperature exceeds the limits. A maximum of 60°C (140°F) and a minimum of 0°C (32°F) is the default.
Rear Panel LEDs

This section explains the rear panel LEDs and shows you a rear view of the various LX-8000 models (see Figure 3 through Figure 5).

![Figure 3 - LX Series Dual AC 8040 Rear Panel](image)

![Figure 4 - LX Series Single AC 8040 Rear Panel](image)

![Figure 5 - LX Series DC 8040 Rear Panel](image)
RCV

The RCV LED is one of two integral LEDs on the 10/100 jack. This yellow LED flashes to indicate receive activity on the link.

LINK

This green LED defaults to a link good indicator. If the link is present and operating, the LED comes ON.

Power Monitoring

The LX-8000 Series platforms provide power input presence detection and internal power supply output regulation failure detection capabilities. The hardware notifies the LX Series OS of the presence or change in presence of voltage. The system intern logs syslog messages to the on board syslog and or external syslog server indicating the specific failure. The LX Series Trigger Action feature can be set up to monitor and trigger on these "Power Input" trigger messages and then send notification out via SNMP Trap, SMS, E-mail, etc. via the LX Series Notification feature.

The Primary Side AC Line Voltage Monitor provides a pair of electrically isolated interfaces to detect AC power failures. Failure of either input is detected and reported to the LX Series system software as well as to the front panel power status LEDs.

The Primary Side DC Voltage Monitoring inputs are monitored through opto-isolators for DC rail presence detection. Failure of either the A or B input is detected and reported to the LX Series system software as well as to the front panel power status LEDs.

In addition to the Primary Side input monitoring, Secondary Voltage Monitoring of the system internal power supply / supplies regulated outputs are also monitored for presence. Failure of either output is detected and reported to the LX Series system software as well as to the front panel power status LEDs.

Environmental and Installation Considerations

- Unit must be installed in an environment with 5% to 90% humidity, noncondensing, 0° - 40° C (32°-104° F).
- Do not choose a location where the unit will be exposed to direct sunlight or subjected to vibration.
- Do not place an object on the side(s) of the unit that might block airflow through the unit.
- The unit may be front, rear, or center mounted.
- There is no mounting difference between the 19” and 23” rack mount ears.
Mounting the Unit into a 19-inch or 23-inch Rack

Attach the brackets to the unit, and then mount the unit in the rack. Refer to Figure 6 for further information.

The three bottom side screws hold the cover on the unit. To front-mount the unit, you must remove the front and center top and bottom screws before attaching the rack-mount brackets. Then insert the supplied screws through the brackets and into the same holes.

If you reverse-mount the unit, remove the rear and center top and bottom screws, and insert the supplied screws through the rack-mount ears.

Figure 6 - Mounting an LX-8000 Series in Rack
Cable Connections

This section explains the cable connections for the LX-8000 unit.

Connect the Power Cable

Connect the supplied power cable to the rear of the LX-8000 unit and plug the other end into a 3-prong wall outlet.

Connecting the Ethernet Interface

NOTE: The LX-8000 Ethernet ports support the MDI/MDIX feature that allows you to use straight-through or crossover cabling. For MDIX to function, port speed and duplex must be set to auto.

NOTE: This port is set to auto negotiation by default. You can manually configure the port speed and duplex if you want. Refer to the LX-Series Commands Reference Guide for further details.

Connect a category 3 (CAT 3) cable for 10 Mbps operation, or a category 5 (CAT 5) cable for 10/100 Mbps operation to the 10/100 connector(s) on the rear of the LX-8000 Series (see Figure 3) and the other end to your network. The LINK LED comes on steady green if the cable is properly connected.

Connect Serial Device Cables

Connect the serial device cables to the 8-pin RJ-45 jacks on the rear of the unit.

NOTE: LX-8000 Series serial ports provide concurrent support for RTS/CTS flow control and modem control. Refer to Appendix A and Appendix D for further information.

Connecting Your Management Station

Connect the management station to the DIAG port (port 0) using the connector and cable you received with the LX-8000 unit. Refer to “Connecting to the Diagnostic Port (Port 0)” in Appendix D for more information on DIAG port connections.
Connecting DC Power

This section describes how to connect power to the DC version of the LX-8000 Series.

After you have installed the LX-8000 unit, you can connect the DC power as described in the following procedure (refer to Figure 7):

1. Connect the LX-8000 to the facility's bonding network (or earth ground) using the points on the rear panel of the LX-8000. A grounding lug is required to do this. This grounding lug is not available through or provided by MRV. You can obtain it through any electrical connector supplier. The grounding lug used must have two #10 screw holes that are spaced .625 inches apart (center to center). The connection to the facility's bonding network should be made per local practices, using wire with a minimum conductor size of 18 AWG.

2. Use the two #10 screws (included) on the rear panel to secure the grounding lug to the chassis.

3. Using a ¼-inch nut driver, remove the terminal block nuts.

4. Attach the facility’s “A” feed to the terminal block labeled “A”.

   **NOTE:** Be sure that the -48VDC is connected to the minus side, and the 48VDC return is connected to the plus side.

5. Attach the facility’s “B” feed to the terminal block labeled “B”.

6. Replace the nuts and tighten them securely.

   The DC leads should be 22 AWG or larger. They should be terminated with a #6 ring terminal suitable for the wire AWG used.
NOTE: The LX-8000 will run with only one DC power feed connected. The second input is provided for redundant system power, which is used in high reliability installations.

7. Attach the clear plastic safety guard to the terminal blocks. (The clear plastic safety guard is provided with the LX-8000 kit.)

Modem Port (Optional)

The modem port is a V.90/K56flex Kbps optional factory installed modem on the LX-8000 Series. The modem port allows you to dial back from, or dial in to or out of the LX-8000. If the modem is present, connect your phone line to the modem’s RJ11 connector. If the modem is not installed, the RJ11 connector will not be present on the front of the unit.

The Modem port number is as follows for LX-8000 models:

- LX-8020 - port number 21
- LX-8040 - port number 41

At the InReach:0>> prompt, enter the show port async 41 modem command to display a screen containing the LX-8040 modem port fields.

Powering On

The Power On Self Test (POST) starts when you apply power to the LX-8000 Series unit. The port status LEDs flicker and the FLT LED remains on while the test is running (this may take only a few seconds). If the unit passes the POST test, the FLT LED extinguishes, and the OK LED turns green. If there is a failure, the FLT LED stays on, and the port status LEDs begin flashing an error code. Refer to Appendix C for an explanation of the codes.

When the POST test is completed, you are presented with two options: [B] Boot System and [L] Login to System Setup. If you choose neither, the unit boots on its own after eight seconds. If you type L, a password prompt appears. The default password is access. The Main Menu appears after you enter the password. The Main Menu allows you to change the boot settings and IP address assignments. You can review the factory default boot setting by referring to the “Additional Considerations for an Internet Environment” on page 37. The system loads the LX-Series software from flash and then loads the system configuration file.

If the LX boots with default operational parameters, the Quick Configuration menu appears. Refer to the “System Maintenance” chapter in the LX-Series Configuration Guide for further information on the Main menu. Refer to “First Time Quick Configuration” on page 25 for further details on the Quick Configuration menu.

Once the unit finishes loading the operating system, you can access the unit. At your management station, access the unit with any terminal emulation software. The terminal settings are 9600 baud, eight data bits, no parity, one stop bit, Xon/Xoff flow control, autowrap enabled, and terminal type ANSI. The Login: screen appears.
System Login and Passwords

The following username and passwords are the defaults the first time you use the LX-8000 Series.

- The default login username is **InReach** (be sure to use a capital I and R). The default login password is **access**.
- To enter the superuser mode at the **InReach>** prompt, enter **enable**. The default password is **system**.

These passwords prevent persons who do not know them from accessing the server. Change the default passwords to other values as part of your basic server setup. You can use any character or number in a password. However, backspace, tab, and escape are not supported. Refer to the “Password Enable” section in the Subscriber chapter of the *LX-Series Commands Reference Guide* for information on changing passwords.

![IMPORTANT]

Take steps to ensure that the password is not lost or forgotten. If you forget the password, call Customer Support.

Resetting the Unit

To reset the LX-8000 Series, use a paper clip to momentarily press the reset button, which is behind the small hole labeled R on the front panel. Refer to Figure 8 for the exact location.

![Figure 8 - LX Series RESET Switch Location]

When the LX-8000 Series enters the RESET state, all front panel LEDs illuminate. When you release the reset button, the unit begins to execute the Power On Self Test (POST).

If the LX-8000 Series detects an error, the red FLT LED comes on and the front panel LEDs light up to display an error code. This error sequence is repeated continually until the error is corrected or you power off the unit. During this time, no data is exchanged over the Ethernet cable or serial ports.

If the LX-8000 Series does not detect an error, the unit begins loading software from the internal flash. Once loaded, the LX-8000 Series resumes normal operations.
Configuring the LX-8000 Series for the First Time

Chapter 3

Configuring the LX-8000 Unit for the First Time

You can choose from five options to configure the unit for the first time:

- **First Time Configuration Utility** - The first time an LX-8000 unit boots up at default parameters, you are presented with the option to run the Initial Connectivity setup. Enter y and press <Enter>. Refer to “First Time Quick Configuration” for further details.

- **Assign the IP Address via the Network** - Refer to “Assigning an IP Address via the Network” for further details. Use this option if your network is using DHCP, BOO TP, or RARP.

- **Setting the IP Address Manually** - Refer to “Manually Setting the IP Address Via the CLI”.

- **Creating and Loading a Default Configuration File** - Refer to “Applying Default Configurations to Other Units” in the *LX-Series Configuration Guide*.

- **Configuring the LX-8000 Manually via the CLI** - Refer to “Upgrading Software with the ppciboot Main Menu” in the *LX-Series Configuration Guide*.

First Time Quick Configuration

**NOTE:** The first time quick configuration runs only on the DIAG port (port 0) on all models when booting from default parameters. The DIAG port (port 0) of the LX-8020 and LX-8040 is on the front of the unit.

**NOTE:** Display problems may occur during bootup when you attach a terminal to the DIAG port (port 0) and the display setup is configured to Smooth-2 Scroll. To avoid this, change the scroll setting to Jump Scroll.

Use the following procedure to configure your LX-8000 unit for the first time.
1. Plug in the terminal at the DIAG port (port 0 - port values are 9600 bps, eight data bits, one stop bit, no parity, and Xon/Xoff flow control). The Main Menu appears.

2. Press b to boot the LX-8000 unit. The setup takes a minute or two. The unit has loaded to factory defaults, would you like to run Initial Connectivity Setup? y/n message appears.

3. Press y (yes) and press Enter. The “Enter your superuser password” message appears, followed by the Superuser Password prompt.

4. Enter superuser password system. The Quick Configuration menu appears:

<table>
<thead>
<tr>
<th>Quick Configuration menu</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Unit IP address</td>
</tr>
<tr>
<td>2 Subnet mask</td>
</tr>
<tr>
<td>3 Default Gateway</td>
</tr>
<tr>
<td>4 Domain Name Server</td>
</tr>
<tr>
<td>5 Domain Name Suffix</td>
</tr>
<tr>
<td>6 Cluster Secret</td>
</tr>
<tr>
<td>7 Superuser Password</td>
</tr>
<tr>
<td>8 Exit and Save</td>
</tr>
</tbody>
</table>

Enter your choice:

5. Press the number corresponding to the parameter you want to set.

6. Enter the appropriate information and press <Enter> to return to the Quick Configuration menu. Once you enter a parameter value, a data entry line specific to that parameter appears on the Quick Configuration menu.

7. Continue in this way through the menu, configuring as many parameters as you want. You are not required to configure all parameters.

NOTE: You should change the Superuser Password, since this is the first time you are configuring the LX-8000 unit (the default password is system). The login username and password are case-sensitive.
8. Press \texttt{8} (Exit and Save) to save your changes. The "Is this information correct?" message appears.

\begin{center}
\begin{tabular}{|l|c|}
\hline
1 Unit IP address & 10.80.1.5 \\
2 Subnet mask & 255.0.0.0 \\
3 Default Gateway & \\
4 Domain Name Server & \\
5 Domain Name Suffix & \\
6 Cluster Secret & Configured \\
7 Superuser Password & Not Changed \\
8 Exit and Save & \\
\hline
\end{tabular}
\end{center}

Is this information correct? (y/n) :

9. Press \texttt{y} (yes) and press <Enter>. The Save this information to flash? message appears.

10. Press \texttt{y} (yes) and press <Enter>. The information is saved to flash.

11. Press <Enter> several times to display the Login: prompt.

12. Enter your login name. The default is InReach.

13. Enter your password. The default is access. You can now use the LX-8000 unit.

\textbf{Completing the First Time Configuration}

Once configured, the system stores the configuration in a file called Config.prm by default. From here you can continue configuring the unit via the CLI, Telnet, SSH, or by using the web browser.

- To use the CLI, refer to Figure 9 on page 36 for the CLI tree structure and to the LX-Series Commands Reference Guide for information on specific commands.
- To use Telnet, refer to “Connecting to the LX-8000 Series via Telnet or SSH” on page 34.
- To use the web browser, refer to “Accessing and Configuring the Graphical User Interface (GUI)” on page 28.

\textbf{Assigning an IP Address via the Network}

If you are running DHCP, BOOTP, or RARP, the LX-8000 obtains its own IP information automatically while it boots.

Once the unit has been assigned an IP address from your network, you can configure the unit.

- To use the CLI, refer to Figure 9 on page 36 for the CLI tree structure and to the LX-Series Commands Reference Guide for information on specific commands.
- To use Telnet, refer to “Connecting to the LX-8000 Series via Telnet or SSH” on page 34.
- To use the web browser, refer to “Accessing and Configuring the Graphical User Interface (GUI)” on page 28.
Manually Setting the IP Address Via the CLI

If the unit boots up with or without an IP address from the network, you can change the addressing via the CLI.

Use the following procedure to change the IP address information as needed:

1. Connect the terminal to the DIAG port (port 0 - port values are 9600 bps, eight data bits, one stop bit, no parity, and Xon/Xoff flow control).
2. Press <Enter> several times to display the Login: prompt.
3. Enter your login name. The default is InReach.
4. Enter your password. The default is access. The InReach:0> user prompt appears.
5. Enter enable and press <Enter>. The InReach:0> user prompt appears.
6. Enter the default system and press <Enter>. The InReach:0> superuser prompt appears.
7. Enter config and press <Enter>. The InReach:0> superuser prompt appears.
8. Enter interface 1 and press <Enter>. The InReach:0> superuser prompt appears.
9. Enter address ip_address mask network_mask and press <Enter>. The Intf 1-1:0>> prompt reappears.
10. Enter broadcast broadcast_address and press <Enter>. The Intf 1-1:0>> prompt reappears.
11. Enter exit and press <Enter>. The InReach:0> superuser prompt appears.
12. Enter gateway gateway_address and press <Enter>. The InReach:0> superuser prompt appears.
13. Enter exit and press <Enter>. The InReach:0> superuser prompt appears.
14. Enter save config flash to save your changes.

Accessing and Configuring the Graphical User Interface (GUI)

IMPORTANT

If your browser is connected to an LX running an older software version, you must close the browser completely and clear the cache before connecting your browser to an LX running a more recent software version. This is because the Java saves the applet to your PC. If you fail to close the browser completely, the browser will use the old applet when you connect to the LX running a later software version, and therefore some features will be missing from the GUI windows.

This section describes how to access and configure the LX via the GUI. To perform this procedure, you need a PC with Java Runtime Environment (JRE) 1.4.2 or later installed.
NOTE: For optimum GUI performance, MRV recommends that your PC run at 500 MHz or better. The minimum requirement for desktop color settings is 256.

The GUI has two modes: Configuration and Menu. The one you can access depends on what privileges the administrator has given you.

To access the GUI, do the following:

1. At your browser, type the IP address of your LX-8000 unit. The LX Series Console page appears.

![GUI Image](image)

NOTE: Make sure that your PC has access to the World Wide Web. You may need to download the latest release of the Java plug-in to your PC. This download is performed automatically if the GUI sees that the plugin version is out of date, or not available at all. If for some reason your PC does not download the Java plug-in automatically, click on the **Download** link and install the software manually from the http://java.sun.com web site.

2. If you need to download Java, the following window appears automatically.

![Security Warning Image](image)
3. Click **Yes**. The plugin is downloaded and then the installation begins. A Java Runtime Environment window appears after about two minutes.

**NOTE:** Depending on the speed of your PC, this may take several minutes.

4. Follow the defaults to the end of the install.

5. When your browser connects to the LX, the Java Security Warning window appears.

**NOTE:** Your Java Security Warning window may vary, depending on your PC operating system.

6. Click on **Grant this session**. The Java Security Warning window closes. The LX Series Console page reappears, now with the console selection visible.
7. Choosing **Encrypted Console** means the GUI will run slower, but with security. Choosing **Not Encrypted Console** means the GUI will run faster, but without security.

8. Select **Encrypted** or **Not Encrypted** and then select **Open Console**. A login window appears.

9. Enter your Username and Password, and click **Login**.

**NOTE:** By default, authentication is done against the LX local user database. To start, use the known username **InReach** and password **access**.

When you login, the next screen that appears depends on which mode you are authorized to configure and monitor. Refer to “Web Configure Mode” on page 31 or “Web Access Mode” on page 32, depending on which mode you can access.

**Web Configure Mode**

If you are authorized to access the Web Configure Mode, do the following:

1. If you log in as a user, the following window appears.

2. To log in as a superuser, click the **Admin** button on the tool bar and log in with the default Superuser password **system**. You can now configure the unit via the GUI.
3. Click on the menu items on the left side of the window. For example, selecting **Ports: Async** opens the Async ports window.

### Web Access Mode

If you have Web Access Mode, your preconfigured menu screen appears when you login. Click on the various menu items on the left side of the window to perform preconfigured menu option tasks.
Menu/Config Mode

When you have both Menu and Config modes, your initial login presents the menu. Then select **View: Config** to open the Config Mode window. After completing your configuration, click on the **Save** button on the toolbar to save your changes.

GUI EZ Configuration

The GUI EZConfig is an ease-of-use configuration tool for basic LX configuration after initial installation. More experienced users with more complex networks to configure should use the standard GUI, rather than the EZConfig GUI.

Launching the EZConfig GUI

To access the EZConfig GUI windows:

1. Open your browser.
2. Select **Encrypted console** or **Non-encrypted console** and click **Open Console**.
3. Enter a valid username and password and click **Login**. The top-level LX Console window appears.
4. Login as superuser (the default is **system**).
5. In the top right side of the window, select the down arrow to the right of **View: Config**.
6. Choose **EZConfig** from the pull-down menu. The five-option menu appears as shown in the following window.

Select each of the following menu options to open a specific window for quick configuration.

1. System setup
2. Network setup
3. Subscribers
4. Async Port
5. Boot setup

Follow the menu and the accompanying help text to configure the LX unit.
Software Upgrades

To upgrade software using the ppciboot menu, refer to “Upgrading Software with the ppciboot Main Menu” in the LX-Series Configuration Guide. To upgrade software using the CLI, refer to “Upgrading Software and ppciboot with the Command Line Interface” in the same manual.

IP Configuration Menu

For details on using the IP Configuration Menu, refer to “Using the IP Configuration Menu” in the LX-Series Configuration Guide.

Booting from Defaults

For information on how to boot your unit from defaults, refer to “Booting from Defaults” in the LX-Series Configuration Guide.

Accessing and Configuring Additional Features

The following sections describe additional LX-8000 features you can access and configure.

Connecting to the LX-8000 Series via Telnet or SSH

**Telnet Directly into the Communication Server**

NOTE: The default telnet port is 23. The default SSH port is 22.

1. Telnet to the unit from your machine.
2. Enter your subscriber login name, then your password.
3. If you entered the password correctly, the **user>** prompt is displayed.

**Connecting to a Serial Port**

NOTE: Devices connected to serial ports 1-40 on the LX-8040 are assigned telnet port numbers 2100-6000 by default. For example:

- Port 1 = 2100
- Port 2 = 2200
- Port 3 = 2300

NOTE: The corresponding SSH port numbers are 2122-6022. For example:

- Port 1 = 2122
- Port 2 = 2222
- Port 3 = 2322

You can gain telnet/ssh access to a serial device by using the LX IP address and default port number of that serial port.

**Changing the Telnet Port**

To change the interface telnet port number, use the following commands:

**InReach> enable**
Configuring the LX-8000 Series for the First Time

Password> system
InReach>> config
Config:0>> interface 1
Intf 1-1:0>> telnet port #

NOTE: If you change the port number, be sure not to use a socket number assigned to another application or daemon.

Accessing from a Terminal Attached to an LX-8000 Series Serial Port

Use the following procedure to access the command line interface port from a dumb terminal attached to an LX Series serial port, which is set for access local, or dynamic:

1. Hit the return key several times to autobaud (if autobaud is enabled) the port and get the Login: prompt.
2. Enter your login name. The default is InReach.
3. Enter your password. The default is access.

Additional Considerations

Other considerations include the following:

• Setting up users
• Authentication/Security
• Configuring modem settings

For further information on these issues, refer to the LX-Series Commands Reference Guide, and to the Support area of the MRV website at www.mrv.com.
Command Line Interface (CLI) Tree Structure

The command line interface structure is designed to be as intuitive as possible. Refer to “Navigating the LX Command Line Interface (CLI)” in the *LX-Series Commands Reference Guide* for detailed information on the menu tree modes. See Figure 9 for the CLI menu structure.

![Figure 9 - Basic Menu Structure](image_url)

*Note:* The Protocol Command Modes include Async, Localsyslog, Remotesyslog, SMTP, SNPP, TAP, and WEB.

**Figure 9 - Basic Menu Structure**
Additional Considerations for an Internet Environment

If you plan to use the unit in an Internet environment, you must define addressing and identification characteristics to enable Internet hosts to recognize the unit as a member of the network. Using ppciboot, an LX-Series unit can be configured to obtain an IP address and other parameter values from the network when the unit boots.

Autobauding Feature

Autobaud is disabled on all ports. The administrator can enable autobaud on a per-port basis, except for the DIAG port (port 0). Default settings for the DIAG port (port 0) are 9600/8/None/1.

Reinitializing/Powering Off the Unit

To reinitialize the unit, enter the following command from the superuser mode:

```
reload
```

To power off the unit, disconnect the power cord.
The LX-8000 Series offers extended capabilities beyond traditional RS-232 communication uses. For example, a port with specialized hardware attached can be configured to monitor temperature and humidity remotely. The following sections present some of these capabilities.

**Sensor (Temperature/Humidity) Ports**

NOTE: Refer to Appendix A for Temperature/Humidity sensor technical specifications.

You can configure ports to act as temperature and humidity monitors when connected to an In-Reach Temperature/Humidity Sensor. The Temperature/Humidity Sensor provides an accurate measurement of the temperature/humidity in the area in which your LX Series unit is placed.

The following section explains how to connect and install the sensor.

**Connecting the Temperature/Humidity Sensor**

A 10-foot Male RJ-45 to Male RJ-45 straight-through cable (P/N MX-151-3027) connects the temperature/humidity sensor to an LX-8000 async port. The LX unit can be configured to support the sensor on any async port other than the DIAG port (port 0).

To connect the sensor:

1. Connect one end of the RJ-45 double-ended straight through cable to the temperature/humidity sensor. The maximum length of this cable is 50 feet.
2. Connect the other end to any port you have configured as a sensor port.

![Figure 10 - Connecting the Temperature/Humidity Sensor](image)

You must change the port’s “access” to “sensor” before performing any monitoring. Use the following command, in the Async Port Configure Mode, to configure asynchronous port 4 as a Sensor Port:

```
Async 4-4:0>> access sensor
```

Once the sensor is enabled, you can check the temperature with the following command:

```
InReach:0>> show port async 4 status
```

3. You can also monitor the temperature/humidity remotely through the LX CLI. Refer to the *LX-Series Commands Reference Guide* for a detailed explanation of the commands used to configure and view your temperature/humidity sensor through the CLI interface.

**5250 Power Management**

The 5250 Power Control Series family of products provides easy, practical, and secure solutions for power distribution, power management and load-measurement for data centers and remote sites.

5250 Power Control Series products are available in a variety of models for 100-120VAC up to 30A, and for 230VAC up to 16A (Continental Europe). A 5250 Series offers individual remote control over the power on/off status to a maximum of 32 devices.

See the Technical Specifications Appendix for more information about available 5250 Power Control Series models.

The following section explains how to connect and install the 5250.
Connecting the 5250

The 5250 Series is equipped with a single RJ45 RS-232 serial port for attachment to the LX serial port using the supplied RJ45 to RJ45 crossover cable and RJ45 to DB9F serial port adapter as required. See the Technical Specifications in *Getting Started with the 5250 Power Control Series* for more information about the RS-232 serial port.

To connect the 5250:

1. Connect one end of the standard RJ-45 double-ended crossover cable to the serial port of the 5250.
2. Connect the other end to any LX-Series port you have configured as a power management port.

You must change the port’s “access” to “power model ir5250” before performing any control and monitoring. Use the following command, in the Async Port Configure Mode, to configure asynchronous port 1 as a 5250 port:

```
Async 1-1:0>> access power model ir5250
```

After the 5250 is enabled, you can check its status with the following command:

```
InReach:0>> show port async 1 status
```

3. You can also control and monitor the 5250 remotely through the LX CLI. See the *LX-Series Commands Reference Guide* for a detailed explanation of the commands used to configure and view your 5250 through the CLI interface. See Chapter 3 for details on how to access the GUI interface.
5150 Power Strip Management

The 5150 Series family of products provides easy, practical, and secure solutions for power distribution, power management and load-measurement for remote internetworking equipment and branch AC circuits.

5150 Series products are available in 8-outlet and 16-outlet configurations for 100-120VAC up to 30A, and for 230VAC up to 16A (Continental Europe). A 5150 Series offers individual remote control over the power on/off status to a maximum of 16 devices.

The following section explains how to connect and install the 5150.

Connecting the 5150

The 5150 Series is equipped with a single RJ45 RS-232 serial port for attachment to a PC or networked terminal server using the supplied RJ45 to RJ45 crossover cable and RJ45 to DB9F serial port adapter as required. See the Technical Specifications in *Getting Started with the MRV Communications 5150 Power Control Series* for more information on the RS-232 serial port.

To connect the 5150:

1. Connect one end of the standard RJ-45 double-ended crossover cable to the serial port of the 5150.
2. Connect the other end to any port you have configured as a power management port.

You must change the port’s “access” to “power model ir5150” before performing any control and monitoring. Use the following command, in the Async Port Configure Mode, to configure asynchronous port 1 as a 5150 port:

```
Async 1-1:0>> access power model ir5150
```

Once the 5150 is enabled, you can check its status with the following command:

```
InReach:0>> show port async 1 status
```
3. You can also control and monitor the 5150 remotely through the LX CLI. Refer to the *LX-Series Commands Reference Guide* for a detailed explanation of the commands used to configure and view your 5150 through the CLI interface.

**4800 Power Strip Management**

The 4800 -48 VDC Series family of products provides easy, practical, and secure solutions for power distribution, power management and load-measurement for remote internetworking equipment and branch AC circuits.

4800 Series products are available in a 4-outlet configuration. A 4800 Series offers individual remote control over the power on/off status to a maximum of four DC powered devices. The 4800 supports -48 VDC up to 70A.

The following section explains how to connect and install the 4800.

**Connecting the 4800**

The 4800 Series is equipped with a single RJ45 RS-232 serial port for attachment to a PC or networked terminal server using the supplied RJ45 to RJ45 crossover cable and RJ45 to DB9F serial port adapter as required. See the Technical Specifications in *Getting Started with the MRV Communications 4800 Power Control Series* for more information on the RS-232 serial port.

To connect the 4800:

1. Connect one end of the standard RJ-45 double-ended crossover cable to the serial port of the 4800.
2. Connect the other end to any LX port you have configured as a power management port.

![Figure 13 - Connecting the 4800](image_url)
You must change the port’s “access” to “power model ir4800” before performing any control and monitoring operations. Use the following command, in the Async Port Configure Mode, to configure asynchronous port 10 as a 4800 port:

```
Async 1-10:0>> access power model ir4800
```

Once the 4800 is enabled, you can check its status with the following command:

```
InReach:0>> show port async 10 status
```

3. You can also control and monitor the 4800 remotely through the LX CLI. Refer to the *LX-Series Commands Reference Guide* for a detailed explanation of the commands used to configure and view your 4800 through the CLI interface.

### Using LX Ports as Alarm Inputs and Control Outputs

The LX-Series can be configured to provide two low voltage/low current outputs per port which can be used to control remote devices. Using the DTR and RTS signals, these are designated *Control Outputs*. They can be used to control external equipment, or they may be used as the controlling voltage for *Alarm Inputs* circuits.

The LX-Series can be configured to provide two signal monitor inputs per port using the DSR and CTS signal to provide a remote device monitoring capability. These are designated *Alarm Inputs*. The following sections describe the use of these signals in greater detail.

Some common terms are:

- **Alarm Inputs** - LX-Series port input signals DSR and CTS used in conjunction with the Signal-Notice software feature to monitor real world events.
- **Alarm Points** - High impedance, low current, isolated inputs available in the MRV Corporation IR-7104 product.
- **Control Outputs** - LX-Series port output signals DTR and RTS managed with the Access Control software commands that could be used to control external equipment or provide a controlling voltage for Alarm Inputs.
- **Control Relays** - True SPDT (Single Pole Double Throw) “Form C” Relay contact points available in the MRV Corporation IR-7104 product.

#### Alarm Inputs Setup and Usage

The LX-Series can be configured to provide two Alarm Inputs per port using the DSR and CTS signals. These are enabled with the Signal-Notice feature. Signal-Notice utilizes sets of Trigger-Action-Rule commands to detect contact closure/opens. The contacts you are monitoring may be located within your facility, for example doors alarms, window alarms or fluid level sensors. The contacts may also be contained within your equipment you wish to monitor, for example equipment fault alarms, temperature alarms and other error condition signals. The signaling device may be a simple electro-mechanical device such as a switch, a magnetic contact or a relay. The signaling device may also be electrical such as an opto-isolator, a CMOS driver or a transistor circuit. Typical circuits are illustrated in Figure 14.
Alarm Inputs use the LX-Series input circuits (DSR and CTS) to detect level transitions. These input circuits sit at the 0V level when left unconnected and can accept a voltage input in the range of ±10V.

![Figure 14 - Typical Alarm Inputs Connections](image)

An external voltage within the range of ±10V is required in order for a change to be detected when the contact opens or closes. Typically, an LX-Series Control Output is used to provide the controlling voltage for the Alarm Inputs, but it is not required. An external voltage could be used as long as it is within both the ±10V limits and the limits of the contacts or semiconductor used in the circuit. A common Signal Ground is required. Refer to Figure 14 for typical implementations.

Important design issues to remember are:

- Electro-mechanical contacts must be rated up to 10V and 3.5mA.
- The inputs present a nominal 5K Ohm impedance but can vary from 3K to 7K Ohm.
- Input levels must be 0.6V or lower to guarantee a low state and 2.4V or higher to guarantee a high state.
- LX-Series products do not support the use of TXD as the controlling voltage for Alarm Inputs. DTR or RTS must be used.
- DTR or RTS can provide the controlling voltage for up to 2 Alarm Inputs each.
- A common Signal Ground is required. Twisted pair connections are recommended to reduce sensitivity to noise.

Note that provisions for handling alarm contact bounce and alarm flooding are available in the IR-7104 Alarm Manager family only.

**Control Output Setup and Usage**

The LX-Series can be configured to provide two low voltage/low current Control Outputs per port using the DTR and RTS output signals. Typically the Control Output is used as the controlling voltage for the LX-Series Alarm Inputs. In another case you can design an interface to transition from the output signals to a higher capacity circuit to implement a control subsystem. An example circuit is shown in Figure 15.
Important design issues to remember are:

- Special design attention is required when using Control Outputs in a control subsystem.
- Upon a restart or power up the states of DTR and RTS will transition several times as the LX-Series begins its start-up initialization.
- The states are **undefined** upwards of 30 Seconds + the *Boot Delay Timer* value in some configurations, i.e. the signals are non-latching through power cycles.
- Note that negative voltage could be present on the interface until the software is completely initialized.
- Control Outputs in the LX-Series guarantee ±5.0V drive into a 3K Ohm load.
- External loading below 3K Ohm can be tolerated but under no circumstances should the device load the LX-Series output below ±2.5V/7.6mA absolute maximum drive.
- A common Signal Ground is required.
- The MRV Corporation IR-7104 family can provide true Form C SPDT Relay outputs rated to 30VDC/1A per contact if higher capacity and stable contacts are required through restart and power cycles.

![Typical Interface Design for Control Output Signals](image)

**Figure 15 - Typical Interface Design for Control Output Signals**

You must change the LX-Series port access type to control to utilize DTR and RTS as the Control Outputs. For example:

```
InReach:0>> config port async # access control
```

If you want the DTR signal to be asserted High (positive voltage) on the port:

```
InReach:0>> control port async # dtr high
```

Refer to the *LX-Series Configuration Guide* for a detailed explanation of the commands to set up a port in the Control function.
# Appendix A - Technical Specifications

The following table provides the specifications for the LX-8000 Series.

**Table 1 - LX-8000 Series Specifications**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terminal Signals</td>
<td>Transmit Data, Receive Data, Signal Ground, Data Set Ready/Data Carrier Detect (DSR/DCD), Data Terminal Ready (DTR), Clear-to-Send (CTS), and Request-to-Send (RTS). Supports concurrent modem control.</td>
</tr>
<tr>
<td>Terminal Cabling</td>
<td>Modular RJ-45 DTE</td>
</tr>
<tr>
<td>Serial Line Speed</td>
<td>LX-8000 Series - 134.5 bps to 230 Kbps</td>
</tr>
<tr>
<td>Number of Serial Ports</td>
<td>LX 8020 - 20 ports&lt;br&gt; LX 8040 - 40 ports</td>
</tr>
<tr>
<td>Modem (optional)</td>
<td>V.90/K56flex 56 Kbps</td>
</tr>
<tr>
<td>LEDs</td>
<td>FLT, OK, RS232 Activity (20 on 20-port, 1-40 on 40-port unit), Port LEDs 1, 10/100 Ethernet RCV, 10/100 Ethernet Link, 100Mbps speed, A Feed OK/Fault, B Feed OK/Fault, A Regulated OK/Fault, B Regulated OK/Fault, and Temp OK/Fault.</td>
</tr>
<tr>
<td>Controls</td>
<td>Reset push button switch</td>
</tr>
<tr>
<td>Dimensions</td>
<td>LX-8000 Series&lt;br&gt; Height 4.3 cm (1.71 in)&lt;br&gt; Depth 25.4 cm (10.0 in)&lt;br&gt; Width 44.4 cm (17.5 in) - fits in a 19-inch rack</td>
</tr>
<tr>
<td>Weight</td>
<td>LX 8020S w/modem - 3.58 kg (7.9 lbs.)&lt;br&gt; LX-8040S w/modem - 3.81 kg (8.4 lbs.)</td>
</tr>
</tbody>
</table>
### Appendix A - Technical Specifications

<table>
<thead>
<tr>
<th>Processor/Speeds</th>
<th>132 MHz RISC system board processor with integral encryption co-processor.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory</td>
<td>16 MB Flash, 128MB SDRAM</td>
</tr>
<tr>
<td>Environment</td>
<td>5% to 85% humidity Long Term, noncondensing.</td>
</tr>
<tr>
<td></td>
<td>5% to 90% humidity Short Term (DC units only)</td>
</tr>
<tr>
<td></td>
<td>Operating Temperature: 0 - 40°C (32° - 104° F) Long Term, -5 - 50°C (23° - 122° F) Short Term (DC units only)</td>
</tr>
<tr>
<td></td>
<td>Storage Temperature: -40 to 85°C (-40 to 185° F)</td>
</tr>
<tr>
<td>Power Requirements</td>
<td><strong>AC</strong> - 100 - 240 VAC, 50 - 60 Hz, 0.5 Amps.</td>
</tr>
<tr>
<td></td>
<td>Single AC Supply Unit: 24W (83 BTU)</td>
</tr>
<tr>
<td></td>
<td>Dual AC Supply Unit: 38W (129 BTU)</td>
</tr>
<tr>
<td></td>
<td><strong>48V DC</strong> - 36 - 72V dual feed 0.75 Amp, 19.5W (66 BTU).</td>
</tr>
<tr>
<td>Minimum Software</td>
<td>LX-8000 Series requires V3.4.2 and ppciboot 3.4.0 or greater.</td>
</tr>
<tr>
<td>Requirements</td>
<td></td>
</tr>
<tr>
<td>Ethernet Interfaces</td>
<td>10/100 TX, Auto/10/100 Mbps duplex half full auto, MDI/MDIX</td>
</tr>
<tr>
<td>Control Output Ratings</td>
<td>RTS/DTR: 5.0V @ 1.6mA (Nominal), 2.5V @ 7.6mA (Absolute Maximum)</td>
</tr>
<tr>
<td>Real Time Clock Battery</td>
<td>32.768KHz crystal, Dallas RTC</td>
</tr>
<tr>
<td></td>
<td>Lithium battery. Capacity is 48mAH. Power down shelf-life &gt; 3 years at 20°C</td>
</tr>
</tbody>
</table>
The following table provides the specifications for the Temperature/Humidity Sensor.

**Table 2 - Temperature/Humidity Sensor Specifications**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface</td>
<td>Proprietary</td>
</tr>
<tr>
<td>Maximum Cable Length</td>
<td>50 feet</td>
</tr>
<tr>
<td>Operating Environment</td>
<td>0 to 70 deg. C (+32 to 158 deg. F) 5 to 90% humidity non-condensing</td>
</tr>
<tr>
<td>Dimensions</td>
<td>Height: 0.8 inches</td>
</tr>
<tr>
<td></td>
<td>Length: 3.15 inches</td>
</tr>
<tr>
<td></td>
<td>Width: 1.57 inches</td>
</tr>
<tr>
<td>Weight</td>
<td>1.2 oz</td>
</tr>
<tr>
<td>Accuracy</td>
<td>Temp: +/-3 deg C</td>
</tr>
<tr>
<td></td>
<td>Humidity: +/-5%</td>
</tr>
</tbody>
</table>
The following table provides the factory defaults for the LX-8000 Series.

**Table 3 - LX-8000 Series Factory Defaults**

<table>
<thead>
<tr>
<th>Port Type</th>
<th>Default Settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIAG Port/local management port (default settings)</td>
<td>The DIAG port (port 0) is the console management port. Autobaud is disabled. 9600/8/1/None. Quick Start is enabled. Access is Local. Auto Protocol Detect (APD) is disabled. Flow Control is Xon/Xoff.</td>
</tr>
<tr>
<td>All Ports Except Management and Modem Ports (default settings)</td>
<td>Autobaud is disabled. 9600/8/1/None. Access is Remote. APD is disabled. Flow Control is Xon/Xoff.</td>
</tr>
<tr>
<td>Modem Port (default settings)</td>
<td>Autobaud is disabled. Speed is 57600. Access is Local. APD is enabled. Flow Control is CTS.</td>
</tr>
</tbody>
</table>
ppciboot Factory Default Settings

The following table lists the factory default settings.

<table>
<thead>
<tr>
<th>Main Menu Configuration</th>
<th>Factory Default Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boot from Network</td>
<td>yes</td>
</tr>
<tr>
<td>Save boot image to flash</td>
<td>no</td>
</tr>
<tr>
<td>Boot from flash</td>
<td>yes</td>
</tr>
<tr>
<td>Time Out, in seconds</td>
<td>8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IP Configuration Menu Configuration</th>
<th>Factory Default Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP Assignment method #1</td>
<td>DHCP</td>
</tr>
<tr>
<td>IP Assignment method #2</td>
<td>BOOTP</td>
</tr>
<tr>
<td>IP Assignment method #3</td>
<td>RARP</td>
</tr>
<tr>
<td>IP Assignment method #4</td>
<td>User Defined</td>
</tr>
</tbody>
</table>

NOTE: For defaults on specific commands, refer to the *LX-Series Commands Reference Guide*.

Each LX Series unit is configured at the factory to use a default set of initialization parameters that sets all ports to operate with asynchronous ASCII terminal devices.
Appendix C - POST Test Error Codes

Error Code Definitions

The following table provides the definitions for the LX-8000 Series POST test error codes.

Table 4 - POST Test Error Codes

<table>
<thead>
<tr>
<th>Error Definition</th>
<th>Error Code (in Hexadecimal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Clock Slow</td>
<td>1020</td>
</tr>
<tr>
<td>Reading Invalid Default Value from CPLD Diagnostic Register</td>
<td>2010</td>
</tr>
<tr>
<td>Reading Invalid Default Value from Expansion CPLD Diagnostic Register</td>
<td>2011</td>
</tr>
<tr>
<td>Reading Invalid Pattern Value from CPLD Diagnostic Register</td>
<td>2020</td>
</tr>
<tr>
<td>Reading Invalid Pattern Value from Expansion CPLD Diagnostic Register</td>
<td>2021</td>
</tr>
<tr>
<td>Reading Invalid Value from CPLD System Fail Status Register</td>
<td>2030</td>
</tr>
<tr>
<td>CPLD FAIL bit is set in the CPLD System Fail Status Register</td>
<td>2035</td>
</tr>
<tr>
<td>Watchdog Timer Failed</td>
<td>2040</td>
</tr>
<tr>
<td>Invalid HW Type</td>
<td>2050</td>
</tr>
<tr>
<td>Fast Ethernet Controller (FEC) Reset Delay Timeout</td>
<td>3010</td>
</tr>
<tr>
<td>Fast Ethernet Controller (FEC) Transmission Failed Timeout</td>
<td>3020</td>
</tr>
<tr>
<td>Fast Ethernet Controller (FEC) Reception Failed Timeout</td>
<td>3030</td>
</tr>
<tr>
<td>Fast Ethernet Controller (FEC) Invalid Data Received</td>
<td>3040</td>
</tr>
<tr>
<td>No PHY Device Detected</td>
<td>3050</td>
</tr>
<tr>
<td>Quadart Loopback operation timeout for Quadart 1</td>
<td>4210</td>
</tr>
<tr>
<td>Quadart Loopback operation timeout for Quadart 2</td>
<td>4220</td>
</tr>
</tbody>
</table>
### Appendix C - POST Test Error Codes

<table>
<thead>
<tr>
<th>Error Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quadart Loopback operation timeout for Quadart 3</td>
<td>4230</td>
</tr>
<tr>
<td>Quadart Loopback operation timeout for Quadart 4</td>
<td>4240</td>
</tr>
<tr>
<td>Quadart Loopback operation timeout for Quadart 5</td>
<td>4250</td>
</tr>
<tr>
<td>Quadart Loopback operation timeout for Quadart 6</td>
<td>4260</td>
</tr>
<tr>
<td>Quadart Loopback operation timeout for Quadart 7</td>
<td>4270</td>
</tr>
<tr>
<td>Quadart Loopback operation timeout for Quadart 8</td>
<td>4280</td>
</tr>
<tr>
<td>Quadart Loopback operation timeout for Quadart 9</td>
<td>4290</td>
</tr>
<tr>
<td>Quadart Loopback operation timeout for Quadart 10</td>
<td>42A0</td>
</tr>
<tr>
<td>Quadart Invalid Data Received for Quadart 1</td>
<td>4410</td>
</tr>
<tr>
<td>Quadart Invalid Data Received for Quadart 2</td>
<td>4420</td>
</tr>
<tr>
<td>Quadart Invalid Data Received for Quadart 3</td>
<td>4430</td>
</tr>
<tr>
<td>Quadart Invalid Data Received for Quadart 4</td>
<td>4440</td>
</tr>
<tr>
<td>Quadart Invalid Data Received for Quadart 5</td>
<td>4450</td>
</tr>
<tr>
<td>Quadart Invalid Data Received for Quadart 6</td>
<td>4460</td>
</tr>
<tr>
<td>Quadart Invalid Data Received for Quadart 7</td>
<td>4470</td>
</tr>
<tr>
<td>Quadart Invalid Data Received for Quadart 8</td>
<td>4480</td>
</tr>
<tr>
<td>Quadart Invalid Data Received for Quadart 9</td>
<td>4490</td>
</tr>
<tr>
<td>Quadart Invalid Data Received for Quadart 10</td>
<td>44A0</td>
</tr>
<tr>
<td>Memory Error at (printing address)</td>
<td>5010</td>
</tr>
<tr>
<td>Memory Data Bus Failed</td>
<td>5020</td>
</tr>
<tr>
<td>Memory Address Bus Failed High</td>
<td>5030</td>
</tr>
<tr>
<td>Memory Address Bus Failed Low</td>
<td>5040</td>
</tr>
<tr>
<td>Flash Checksum Error</td>
<td>5055</td>
</tr>
</tbody>
</table>
POST Test Error Code Sample

NOTE: This example applies to 20 and 40 port LX-8000 units. The 20 and 40 port LX units use only the first eight LEDs when generating error codes.

The following sample illustrates the Port Status LED sequence for Error 2030 (Reading Invalid Value from PLD System Fail Status Register) on the LX-8020. In this example:

1. A POST test failure occurs on an 20-port unit. All LEDs flash eight times, very quickly, then the error code is displayed.

2. You record that LED 3 turns on. Again, all LEDs flash eight times very quickly, then the rest of the error code is displayed.

3. You record that LEDs 3 and 4 turn on. Figure 16 explains how to interpret the sample error code.

NOTE: In hexadecimal, 0 indicates the LED is OFF. 1 indicates the LED is ON.

Each group of four LEDs is converted to a hexadecimal value as follows:

- 0 = 0000
- 1 = 0001
- 2 = 0010
- 3 = 0011
- 4 = 0100
- 5 = 0101
- 6 = 0110
- 7 = 0111
- 8 = 1000
- 9 = 1001
- A = 1010
- B = 1011
- C = 1100
- D = 1101
- E = 1110
- F = 1111
Appendix C - POST Test Error Codes

Figure 16 - POST Test Error Code Sample

1 - All flash for 2 seconds

2 - High error code (20 Hex)

3 - Cycle 1 through 8

4 - Low error code (30 Hex)

5 - All extinguished

You can generate the Error Code result from steps 2 and 4 above. Put an x in the column in which the LEDs were illuminated and record the value.

<table>
<thead>
<tr>
<th>LED</th>
<th>1 2 3 4 5 6 7 8</th>
<th>1 2 3 4 5 6 7 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Binary Value</td>
<td>8 4 2 1</td>
<td>8 4 2 1</td>
</tr>
<tr>
<td>Cycle 1</td>
<td>- - x -</td>
<td>- - x x</td>
</tr>
<tr>
<td>(from step 2)</td>
<td></td>
<td>(from step 4)</td>
</tr>
<tr>
<td>Result in Hex</td>
<td>2 0</td>
<td>2+1=3 0</td>
</tr>
</tbody>
</table>

Therefore, the High error code is 20, and the Low error code is 30, which means the combined error code is 2030.
Appendix D - Cabling the LX-8000 Series

Cabling Considerations

Standard cabling items available from MRV allow you to connect to any serial device that uses male or female DB-25 or DB-9 connectors. All you need is the appropriate cable (crossover cable for connecting to a DTE (Data Terminal Equipment) device, straight-through cable for connecting to a DCE (Data Communication Equipment) device), and the correct modular adapter (male or female DB-25 connector), which is essentially an RJ-45-to-DB25 adapter.

Serial Device Connectors

The signal assignments of the 8-pin jacks are shown in Figure 17.

![Figure 17 - Serial Device Connector (RJ-45) Signal Assignments](image)

<table>
<thead>
<tr>
<th>Pin</th>
<th>Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CTS</td>
</tr>
<tr>
<td>2</td>
<td>DTR</td>
</tr>
<tr>
<td>3</td>
<td>TXD</td>
</tr>
<tr>
<td>4</td>
<td>SGND</td>
</tr>
<tr>
<td>5</td>
<td>SGND</td>
</tr>
<tr>
<td>6</td>
<td>RXD</td>
</tr>
<tr>
<td>7</td>
<td>DSR</td>
</tr>
<tr>
<td>8</td>
<td>RTS</td>
</tr>
</tbody>
</table>

Diagnostic Port Connector (Port 0)

The pinout for the Diagnostic Port connector is the same as that of the serial connector.
10/100 Connector

Figure 18 shows the standard 10/100 (RJ-45 jack) connector signal assignments.

![10/100 Connector PINOUT](image)

**Figure 18 - 10/100 Connector Assignments**

Ordering Cables

MRV also supplies crossover cables and modular adapters for use with all LX-8000 Series units. To order cables, adapters or other cabling accessories from MRV, contact your Sales representative or distributor.

Modular Adapters

MRV provides the following modular adapters for use with LX-8000 Series units:

- Female DB-9 (PN MX-350-0308)
- Female DB-25 (PN MX-350-0181)
- Male DB-25 (PN MX-350-0179) – supports RING
- Male DB-25 (PN MX-350-0180) – supports RTS/CTS

This section describes the pinouts and wiring of the MRV-supplied DB-25 adapter.

Pin Assignments

The following table shows the pinouts for a standard RS-232 DB-25 connector.

<table>
<thead>
<tr>
<th>Pin</th>
<th>Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cable Shield</td>
</tr>
<tr>
<td>2</td>
<td>Transmit Data</td>
</tr>
<tr>
<td>3</td>
<td>Receive Data to DCE</td>
</tr>
<tr>
<td>4</td>
<td>RTS (Request to Send)</td>
</tr>
<tr>
<td>5</td>
<td>CTS (Clear to Send)</td>
</tr>
<tr>
<td>6</td>
<td>DSR (Data Set Ready)</td>
</tr>
<tr>
<td>7</td>
<td>Signal Ground</td>
</tr>
<tr>
<td>8</td>
<td>Data Carrier Detect</td>
</tr>
<tr>
<td>Pin</td>
<td>Description</td>
</tr>
<tr>
<td>-----</td>
<td>------------------------</td>
</tr>
<tr>
<td>9</td>
<td>Unused</td>
</tr>
<tr>
<td>10</td>
<td>Unused</td>
</tr>
<tr>
<td>11</td>
<td>Unused</td>
</tr>
<tr>
<td>12</td>
<td>Unused</td>
</tr>
<tr>
<td>13</td>
<td>Unused</td>
</tr>
<tr>
<td>14</td>
<td>Unused</td>
</tr>
<tr>
<td>15</td>
<td>Unused</td>
</tr>
<tr>
<td>16</td>
<td>Unused</td>
</tr>
<tr>
<td>17</td>
<td>Unused</td>
</tr>
<tr>
<td>18</td>
<td>Unused</td>
</tr>
<tr>
<td>19</td>
<td>Unused</td>
</tr>
<tr>
<td>20</td>
<td>Data Terminal Ready</td>
</tr>
<tr>
<td>21</td>
<td>Unused</td>
</tr>
<tr>
<td>22</td>
<td>Ring Indicate</td>
</tr>
<tr>
<td>23</td>
<td>Unused</td>
</tr>
<tr>
<td>24</td>
<td>Unused</td>
</tr>
<tr>
<td>25</td>
<td>Unused</td>
</tr>
</tbody>
</table>

Figure 19 shows serial DB-25 pin assignments.

---

Figure 19 - DB-25 Pins
Connecting to the Diagnostic Port (Port 0)

NOTE: Display problems may occur during bootup when you attach a VT420 terminal to the DIAG port (port 0) and the VT420 display setup is configured to Smooth-2 Scroll. To avoid this, change the VT420 scroll setting to Jump Scroll.

Connect the provided serial port cable to the DIAG connector (port 0), and the other end to your terminal. You can use this direct connect serial link to send commands to the boot loader and diagnostics. This port is used to log system messages during bootup. You can also use port 0 to manage and configure the LX-8000 once the unit completes the bootstrap process.

Modem Control/Hardware Flow Control

LX-8000 Series serial ports can be set up to support RTS/CTS flow control. The adapters shown in Figure 20 and Figure 21 illustrate RTS/CTS flow control for DTE devices using DB25 and DB9 connectors. Figure 22 illustrates RTS/CTS flow control for a DB-25 connector on a DCE device like a modem. LX-8000 Series serial ports can also be set up to support modem control (except for the DIAG port (port 0)). Figure 20, Figure 21, and Figure 22 support modem control as needed. Only Figure 21 and Figure 22 support concurrent modem control and RTS/CTS flow control between the LX-8000 Serial Port and the attached device.

The adapter shown in Figure 22 supports modem control.

NOTE: You would use a "null-modem" cable when making a direct connection between the serial ports of two communication servers (i.e., no modems involved) or other DTE device. For that application, use a DTE-to-DTE cable.

RJ-45 Wiring Considerations

You should give special consideration to the wiring scheme when connecting a device such as a terminal to a LX-8000 Series serial port. The LX-8000 Series is considered a DTE device. To connect to another DTE device such as a terminal, you will need crossover wiring, as shown in Figure 20 and Figure 21. When a DCE device is connected to an LX-8000 Series serial port, straight-through wiring is required, as shown in Figure 22.

NOTE: In general, an ethernet category 3 (CAT 3) or category 5 (CAT 5) may introduce noise due to the crossing of pins 3 and 6 (transmit and receive). Flat eight wire cables are recommended.
Modular Adapters (RJ-45 to DB-25)

You can obtain adapters with male and female DB-25 connectors from MRV. These adapters direct signals from the RJ-45 connector on the cable to the correct pin on the DB-25 connector. Figure 20, Figure 21, Figure 22, and Figure 23 show how devices are cabled when you use these adapters.

Application (see Figure 20): Use RJ-45 to DB-25 to connect your LX-Series unit to a PC.

Figure 20 - Adapter Wiring, LX Series to DTE
Appendix D - Cabling the LX-8000 Series

Application (see Figure 21): Use RJ-45 to DB-9 to connect your LX-Series unit to a PC or other serial port using a D sub-9 connector.

Figure 21 - Adapter Wiring, RJ-45 to DB-9, LX Series to DTE
Application (see Figure 22): Use LX-Series to DCE to connect your LX-Series unit to a modem.

![Diagram of LX-Series cabling to a modem](image)

**Table 1: Gender Pinout Chart**

<table>
<thead>
<tr>
<th>Pin</th>
<th>Gender</th>
<th>LX Series Connector</th>
<th>Male RJ-45 Connector</th>
<th>Female RJ-45 Connector</th>
<th>Male DB-25 Connector</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Male</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Male</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td>3</td>
<td>Male</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>Male</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>5</td>
<td>Male</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Male</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>7</td>
<td>Male</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>8</td>
<td>Male</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>4</td>
</tr>
</tbody>
</table>

**Adaptor Wiring MX-350-0180**

(Female RJ-45 to male DB25)

---

**Figure 22 - Adapter Wiring, LX Series to DCE**
NOTE: In order to expand the functionality of the serial interface, the LX-8000 Series modular cabling allows you to connect different signals to pin 7 of the LX-8000 Series. (This pin is an input to the LX-8000 Series.) When a DCE device is connected to an LX-8000 Series serial port, the device's DCD output is connected to pin 7. In this case, the signal at pin 7 is referred to as DCD. DCD is used here for session control only, not for flow control.

When a DTE device is connected to an LX-8000 Series serial port, the device's DTR output is connected to pin 7 of the LX-8000 Series. In this case, the signal at pin 7 is referred to as DSR. (This cabling scheme also provides DECconnect compatibility, since DECconnect does not support the DCD signal.)

**MRV 8-Wire Cabling**

This cabling scheme provides XMT, RCV, DCD/DSR, DTR, RTS, CTS, and two signal ground wires. This cabling is provided through RJ-45 connectors. Using this cabling scheme you can concurrently use modem control and RTS/CTS hardware flow control, since there are four control signals. This scheme is useful with relatively high speed devices, complex modem control applications.

In Figure 24, one signal is referred to as CTS. The CTS signal designation refers to the signal observed at pin 1 of each serial port. Pin 1 is multiplexed to these signals.
This scheme is useful with the following applications:

- Terminal emulation and file transfer applications, such as Kermit, Xmodem, Microphone, etc.
- Applications such as PPP using low speed modems.
- Applications such as PPP using high speed modems.
- Applications using CCITT V.42-compliant modems, or other devices operating at high port speeds.

Application (see Figure 24): Use RTS/CTS to connect your LX-Series unit to a modem.

Figure 24 - Modular Cables for RTS/CTS Flow Control (Eight-Wire), Concurrent with Modem Control Signalling
INDEX

Numerics
10/100 connectors 58
4800 power management 43
4800 series
   connecting to 43
5150 power management 42
5150 series
   connecting to 42
5250 Power Management 40
5250 Series
   connecting to 41
8-wire cabling 64
A
A and B Feed LEDs 17
A and B REG LEDs 17
adapter wiring 61
adapters 61
autobauding feature 37
C
cables
   ordering 58
cabling 21
   signals 64
command recall 14
configured 52
Configuring the LX-8000 Unit for the First Time 25
connecting DC power 22
connecting the power cable 21
connecting to a serial port 34
conventions 13
crossover cables 57
D
DB-25 connectors 61
DB-25 pin assignments 64
DC power
   connecting 22
diagnostic port connector 57
dTE devices
   connecting to LX-8000 Series 64
dTE wiring 61
E
environment 19
environmental considerations 19
error code definitions 53
ethernet connection 21
EZConfig GUI 33
F
first time quick configuration 25
flow control 60
FLT - fault LED 17
front panel LEDs 16
G
Graphic User Interface (GUI)
   accessing 28
H
hardware installation 15
help key 14
I
iBoot factory default settings 52
installation
   hardware 15
installing Java Runtime Environment (JRE) 29
Installing the LX Series
   site requirements 47, 49, 51
internet access
   IP addresses 37
internet environment 37
IP address
   assigning via the network 27
   manually setting 28
IP information
   obtaining 27
J
Java
   installing 29
L
LED
   link 19
   receive 19
   system fault 17
LEDs 18, 24
   A and B Feed 17
   A and B REG 17
   port status 17
   speed 16
   system OK 17
   TEMP 17
LINK LED 19
login username 24
   default 24
INDEX

LX Series Dual AC 8040 rear panel 18
LX Series Single AC 8040 rear panel 18
LX-8000 Series
  about 13
  cabling 47
  Control Output Ratings 48
  controls 47
  dimensions 47
  environment 48
  Ethernet connections 48
  LEDs 47
  memory 48
  minimum software requirements 48
  modem 47
  power requirements 48
  processor 48
  real time clock 48
  signals 47
  speeds 47
  weight 47
LX-8000 Series ports
  accessing from a terminal 35
LX-8000 Series serial ports
  number of 47
LX-8000 Unit
  configuring for the first time 25
LX-8020 front panel 16
LX-8040 front panel 16
M
management station
  connecting to 21
manually setting the IP address 28
menu tree structure 36
modem port 23
modular adapters 58
O
OK LED 17
organization of user guide 11
P
package contents 15
passwords 24
  defaults 24
pinouts
  DB-25 58, 64
  RJ-45 64
  RJ-45 jacks 57
port status LEDs 17
ports 39
POST test error code sample 55
power cable 21
power on self test (POST) 23
powering on 23
ppcbiboot factory default settings 52
prompts 13
Q
quick configuration
  first time 25
R
rack-mounting the unit 20
RCV LED 19
real time clock battery 48
rear panel connections 18
rear panel LEDs 18
reinitializing/powering off the unit 37
RESET switch 24
resetting the unit 24
RJ-45 jacks 21
RJ-45 wiring 60
S
sensor ports 39
serial device cables
  connecting to RJ-45 jacks 21
speed LED 16
System Login 24
system specifications 14
T
tab button 14
technical specifications 47
  LX-8000 Series 47, 51
  temperature/humidity sensor 49
telnet directly to the communication server 34
telnet port
  changing 34
TEMP LED 17
temperature/humidity sensor
  accuracy 49
  cable length 49
  connecting the 39
  dimensions 49
  environment 49
  interface 49
  weight 49
INDEX

typographical conventions 14

U

Unpacking and inspecting the unit 15

W

web configure mode 31
wiring schemes
for RJ-45 60