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LANTRONIX®

PremierWave® XC HSPA+
Intelligent Gateway User Guide

Part Number 900-678
Revision D February 2017

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Revision History

Date	Rev.	Comments
October 2016	F	Updated document to firmware release 8.0.0.0R19. Changes include: ◆ Added Modbus, IPv6, and Initial Send content. ◆ Updated Flash and SNMP information. ◆ Removed Query Port content.
May 2013	A	Initial document for firmware release 7.7.0.0R27.
April 2014	B	Updated document to firmware release 7.8.0.0.
August 2014	C	Updated document to firmware release 7.9.0.0.
February 2017	D	Updated document to firmware release 8.0.0.0. Changes include adding IPv6, TCP Keep Alive, IKEv2, log verbosity, cellular modem IO, and cellular network traffic information.

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1: Using This Guide

Purpose and Audience

This guide provides the information needed to configure, use, and update the Lantronix® PremierWave® XC HSPA+ intelligent gateway. It is intended for software developers and system integrators who are installing this product into their designs.

Summary of Chapters

The remaining chapters in this guide include:

Chapter	Description
2: Introduction	Main features of the product and the protocols it supports. Includes technical specifications.
3: Installation of the PremierWave XC HSPA+ Device	Instructions for installing the PremierWave XC HSPA+ device.
4: Device Discovery and Quick Setup	Instructions for viewing the device and configuration using UPnP and the DeviceInstaller™ utility.
5: Configuration Using Web Manager	Instructions for accessing Web Manager and using it to configure settings for the device.
6: Network Settings	Instructions for configuring network settings.
7: Cellular	Instructions for configuring cellular settings.
8: Input/Output Ports	Instructions for configuring relay output and digital input settings.
9: Action Settings	Instructions for configuring alarm settings.
10: Line and Tunnel Settings	Instructions for configuring line and tunnel settings.
11: Terminal and Host Settings	Instructions for configuring terminal and host settings.
12: Network Services	Instructions for configuring DNS, FTP, HTTP and Syslog settings.
13: SMS Settings	Instructions for configuring SMS Settings.
14: Updating Firmware	Instructions for obtaining and updating the latest firmware for the device.
15: Security Settings	Instructions for configuring SSL security settings.
16: Maintenance and Diagnostics Settings	Instructions to view statistics, files, and diagnose problems.
17: Management Interface Settings	Instructions for configuring CLI and XML settings.
18: Branding the PremierWave XC HSPA+ Device	Instructions on how to brand your device.
Appendix A: Technical Specifications	Technical specifications for the device.
Appendix B: Compliance	Lantronix compliance information.
Appendix C: Lantronix Technical Support	Instructions for contacting Lantronix Technical Support.
Appendix D: Binary to Hexadecimal Conversions	Instructions for converting binary values to hexadecimals.

Additional Documentation

Visit the Lantronix Web site at www.lantronix.com/support/documentation for the latest documentation and the following additional documentation.

Document	Description
PremierWave XC HSPA+ Intelligent Gateway Command Reference	Instructions for accessing Command Mode (the command line interface) using a Telnet connection, SSH connection or through the port. Detailed information about the commands. Also provides details for XML configuration and status.
PremierWave XC HSPA+ Intelligent Gateway Quick Start	Instructions for getting the PremierWave XC HSPA+ device up and running.
DeviceInstaller™ Utility Online Help	Instructions for using the Windows® operating system-based utility to locate the intelligent gateway and to view its current settings.
Com Port Redirector Quick Start and Online Help	Instructions for using the Windows operating system-based utility to create virtual com ports.
Secure Com Port Redirector User Guide	Instructions for using the Windows operating system-based utility to create secure virtual com ports.

2: Introduction

The PremierWave XC HSPA+ intelligent gateway is an industrial grade GSM/GPRS 3.5G cellular solution that enables customers to quickly connect their machines and assets for out-of-the-box Internet access, remote monitoring, control and cloud platform connectivity.

With highly configurable and easy to use software offering enterprise level security, the PremierWave XC HSPA+ intelligent gateway makes it possible to combine multiple application use cases in a compact, ruggedized platform.

Key Features

Communicate with Industrial Equipment and Machines Remotely and Securely

- Setup secure communication channels with serial and Ethernet based devices

Cellular Routing

- Ethernet to Cellular Routing
- NAT, Port Forwarding, Firewall

WAN Failover and Failback Support

- Support mission critical applications with a secondary path to the internet via cellular WAN

Device Server Application Suite

- Control and monitor serial port based devices over the IP network
- Supporting multiple virtual serial connections
- Multiple connection modes and configuration options to enable transparent tunneling of hundreds of serial protocols

Event Triggers and Actions

- Multiple configurable actions for pre-defined event triggers
- Simple PLC operations and system state change notifications
- Actions include sending email, posting to a Web Service, sending SMS, triggering relay output

Enterprise Class Management Features

- Powerful and flexible Web browser based UI
- CLI for advanced administration tasks
- XML for batch configuration and status

Advanced SMS Features

- SMS Control and Status Features
- SMS Actions on Event Triggers
- Number White-listing by application

Global Cellular Coverage

- Penta-band UMTS/HSPA+ (800/850/900/1900/2100 MHz)
- Quad Band GSM/GPRS/EDGE (850/900/1800/1900 MHz)

Industrial Grade

- **Temperature Range:** Operating temperature at -40°C to +70°C. Storage temperature at -40°C to +85°C

Wide Voltage Range: 9 - 30VDC input voltage through locking barrel connector

Flexible Connectivity Options

- **Serial Ports:** Two RS-232/422/485 ports with support from 300 to 921 kbps data rate
- **Ethernet port:** Auto-Sensing and Auto MDIX (cross-over) 10/100
- **Digital Inputs:** Two configurable inputs suitable for TTL input levels and tolerant up to 30VDC input voltage
- **Relay Output:** One independently isolated mechanical form-C relay
- **USB:** One USB host port

Applications

The PremierWave XC HSPA+ intelligent gatewayis very suitable for these application scenarios:

Remote Monitoring/Control

- Data Display Services/Digital Signage
- Oil and Gas Exploration
- Smart Metering
- Street Lighting
- Gas Station Pump Control
- Irrigation Pump Control
- Industrial Controls and Instrumentation
- Fixed Telemetry
- Railway Maintenance
- Food and Beverage Temperature Control
- Security and Access Control Panels
- In-home Monitoring

Out-of-Band Connectivity

- Point-of-Sale/Kiosks
- Call Boxes

Business Continuity Solutions

- Primary WAN Link
- Secondary WAN Failover/Failback

Protocol Support

The PremierWave XC HSPA+ intelligent gateway contains a full-featured IP networking stack:

- ARP, HTTP, HTTPS, SMTP AUTH, SNMP v1/v2c/v3, UDP/IP, TCP/IP, SSH, SSL, TLS, RSS, UPnP, ICMP, BOOTP, DHCP, Auto IP, Telnet, SNTP, FTP, FTPS, DNS, TFTP, XML and Syslog for network communications and management
- FTP and HTTP/HTTPS web server for firmware upgrades and uploading/downloading files
- TCP/IP, UDP/IP, Telnet, SSH, SSL, TCP AES and UDP AES for command/response based data acquisition application or alarm triggered connection
- HTTP/HTTPS web based monitoring of input readings, chart and data logging
- SMTP AUTH, SMS, HTTP/HTTPS Post, FTP/FTPS Put and SNMP Traps for alarm-triggered notification
- SNTP and Cellular Network for device clock synchronization

Troubleshooting Capabilities

The PremierWave XC HSPA+ device server offers a comprehensive diagnostic toolset that lets you troubleshoot problems quickly and easily. Available from the CLI or Web Manager, the diagnostic tools let you:

- View critical hardware, memory, buffer pool, IP socket information and routing table
- Perform ping and traceroute operations
- Conduct forward or reverse DNS lookup operations
- View all processes currently running on the PremierWave XC HSPA+ intelligent gateway including CPU utilization
- View system log messages

Configuration Methods

After installation, the PremierWave XC HSPA+ unit requires configuration. For the unit to operate correctly on a network, it must have a unique IP address on the network. There are four basic methods for logging into the PremierWave XC HSPA+ intelligent gateway and assigning IP addresses and other configurable settings:

- **Web Manager**: View and configure all settings easily through a web browser using the Lantronix Web Manager. (See *Configuration Using Web Manager on page 32*.)
- **DeviceInstaller**: Configure the IP address and related settings and view current settings on the PremierWave XC HSPA+ intelligent gateway using a Graphical User Interface (GUI) on a PC attached to a network. You will need the latest version of the Lantronix® DeviceInstaller™ utility. (See *Accessing the PremierWave XC HSPA+ Device Using DeviceInstaller on page 30*.)
- **Command Mode:** There are a few methods for accessing Command Mode (CLI): making a Telnet connection, or connecting a PC or other host running a terminal emulation program to the unit's serial port. (See the *PremierWave XC HSPA+ Intelligent Gateway Command Reference* for instructions and available commands.)
- **XML:** The PremierWave XC HSPA+ intelligent gateway supports XML-based configuration and setup records that make device configuration transparent to users and administrators. XML is easily editable with a standard text or XML editor. (See the *PremierWave XC HSPA+ Intelligent Gateway Command Reference* for instructions and commands).

Addresses and Port Numbers

Hardware Address

The hardware address is also referred to as the Ethernet address, physical address, or MAC address. The first three bytes of the Ethernet address are fixed and identify the unit as a Lantronix product. The fourth, fifth, and sixth bytes are unique numbers assigned to each unit. Sample hardware address:

- `00-80-A3-14-1B-18`
- `00:80:A3:14:1B:18`

IP Address

Every device connected to an IP network must have a unique IPv4 address. This address references the specific unit.

Port Numbers

Every TCP connection and every UDP datagram is defined by a destination and source IP address, and a destination and source port number. For example, a Telnet server commonly uses TCP port number 23.

The following is a list of the default server port numbers running on the PremierWave XC HSPA+ intelligent gateway:

- TCP Port 22: SSH Server (Command Mode configuration)
- TCP Port 23: Telnet Server (Command Mode configuration)
- TCP Port 80: HTTP (Web Manager Configuration)
- TCP Port 21: FTP
- UDP Port 30718: LDP (Lantronix Discovery Protocol) port
- TCP/UDP Port 10001: Tunnel 1 (see note below)
- UDP Port 1900 and TCP Port 30179: UPnP

Note: *Additional TCP/UDP ports and tunnels will be available, depending on the product type. The default numbering of each additional TCP/UDP port and corresponding tunnel will increase sequentially (i.e., TCP/UDP Port 1000X: Tunnel X).*

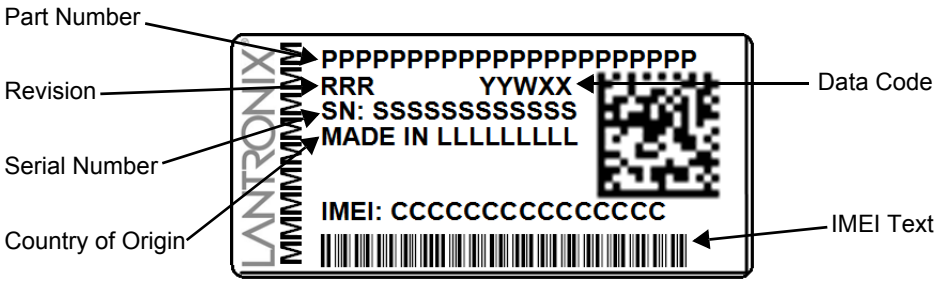
Product Information Label

The product information label on the unit contains the following information about the specific unit:

- Part Number
- International Mobile Equipment Identity (IMEI) Number
- Serial Number (MAC Address)
- Country of Origin
- Product Revision
- Manufacturing Date Code

Note: *The hardware address on the label is also the product serial number. The hardware address on the label is the address for the Ethernet (eth0) interface.*

Figure 2-1 PremierWave Unit Product Label



3: Installation of the PremierWave XC HSPA+ Device

This chapter describes how to install the PremierWave XC HSPA+ intelligent gateway. It contains the following sections:

- *Package Contents*
- *User-Supplied Items*
- *Hardware Components*
- *Installing the PremierWave XC HSPA+ Unit Device*

Package Contents

The PremierWave XC HSPA+ package includes the following items:

- PremierWave XC HSPA+ intelligent gateway
- RJ-45 Ethernet Straight CAT5 cable
- Two External antennas with an SMA connector
- One Power Supply 12 VDC with international adapters (PXC2102H2-01-S) or One DC Power Cable (PXC2101H2-01-02-S)
- Mounting components (DIN rail mounting adapter, cover plates, and rubber feet)
- *PremierWave XC HSPA+ Quick Start Guide*

User-Supplied Items

To complete your installation, you need the following items:

- RS-232/422/485 serial devices that require network connectivity
- Devices and sensors that require network connectivity.
  - A serial cable, as listed below, for each serial device. One end of the cable must have a female DB9 connector for the serial port.
  - A null modem cable to connect the serial port to another DTE device.
  - A straight-through modem cable to connect the serial port to a DCE device.
- An available connection to your Ethernet network and an Ethernet cable.
- A working AC power outlet if the unit will be powered from an AC outlet using the included 12 VDC power supply
- If the unit uses the DC power cable (PXC2102H2-01-02-S) then a DC power supply with terminal blocks or screw terminals
- A network SIM card (and data services) from a service provider

Hardware Components

Front/Top Panel

Figure 3-1 shows the top panel view of the PremierWave unit. *Table 3-2*, *Table 3-3*, and *Table 3-4* list and explain the behavior of the LEDs on the top panel.

LED Indicators: 1 Power LED, 2 Serial Activity LEDs, 1 USB LED, 1 Cellular Status LED, 5 Signal Strength LEDs (two of which are dual-colored), 1 Diagnostic LED, and 2 Ethernet LEDs (on the RJ45 port).

Figure 3-1 PremierWave XC HSPA+ Unit

Table 3-2 PremierWave XC HSPA+ LEDs and Descriptions

LED	Description
Power	◆ GREEN - displays a solid light when power is properly supplied ◆ OFF - no power supplied
Cellular (Cell) Status	◆ GREEN - displays solid when there is a connection to the packet domain on the cellular network (e.g., a data or GPRS/UMTS/HSPA connection) ◆ AMBER - displays solid when there is a connection to the cellular network (e.g., a GSM connection) ◆ OFF - indicates WWAN (cellular) interface is inactive or disabled
Serial 1	◆ GREEN - flashes when Serial port 2 is transmitting data ◆ AMBER - flashes when Serial port 2 is receiving data ◆ OFF - when no data is being transmitted or received through Serial port 2
Serial 2	◆ GREEN - flashes when Serial port 2 is transmitting data ◆ AMBER - flashes when Serial port 2 is receiving data ◆ OFF - when no data is being transmitted or received through Serial port 2
USB	◆ GREEN - displays a solid light when a USB device is connected to and is functioning properly ◆ OFF- when no USB device is connected
Signal Strength	◆ Indicates cellular signal strength when connection is established (see *Table 3-2*)

Table 3-3 Fault Conditions Indicated by Blink Patterns

Note: *The fault LED blink patterns in this table are listed in order of priority.*

Fault Conditions	Blink Pattern
No Ethernet link when eth0 (Ethernet Network) is enabled.	Long, long, short, short, 2 seconds off (pattern repeats)
No IP obtained from Ethernet network when eth0 interface is enabled.	Long, long, short, short, short, 2 seconds off (pattern repeats)
No link (no SIM detected)	Long(pattern repeats)
No cellular link when wwan0 (Cellular Network) is enabled	Long, long, long, long, short, 2 seconds off (pattern repeats)
No IP obtained from cellular networkwhen wwan0 (Cellular Network) is enabled and bridge mode is disabled	Long, long, long, short, short, short, 2 seconds off (pattern repeats)
When the internal device temperature is above operating limit.	Long, short, short, short, 2 seconds off (pattern repeats)
When the internal device temperature is below operating limit.	Short, short, short, short, 2 seconds off (pattern repeats)
Primary power source (barrel connector) is under-volt (below 9 volts).	Long, short, short (pattern repeats)
Secondary power source (terminal) is under-volt (below 9 volts).	Long, short, short, short (pattern repeats)

Table 3-4 Cellular Signal Strength Indicator

Signal Strength	Color & Number of LED Signal Bars
Greater than or equal to -64 dBm	5 Green
Greater than or equal to -85 dBm and less than -64 dBm	4 Green
Greater than or equal to -75 dBm and less than -85 dBm	3 Green
Greater than or equal to -86 dBm and less than -75 dBm	2 Amber
Greater than or equal to -112 dBm and less than -86 dBm	1 Amber
Less than -113 dBm or unmeasurable	All Off

Notes:

- *For Table 3-3 above, a "long" blink is 0.7 seconds of light followed by 0.3 seconds of no light. A "short" blink is a light that is on for only 0.2 seconds and followed by 0.2 seconds of no light.*
- *The diagnostic blink patterns reflect the highest priority fault condition. Also, the Diagnostic LED will give an initial, identifying blink pattern to indicate the type of diagnostic information it will display. All power and other non-network related diagnostic patterns, with the exception of Temperature events and No SIM Card events, begin with one long blink. All wired LAN related diagnostics patterns begin with two long blinks. All cellular-related diagnostics patterns begin with four long blinks.*

The PremierWave device has two male DB9 serial ports that support RS-232/422/485. *Figure 3-5* shows the front view of the device. The default serial port settings are 9600 baud, 8 bits, no parity, 1 stop bit, no flow control.

Figure 3-5 PremierWave XC HSPA+ Male DB9 DTE Serial Ports

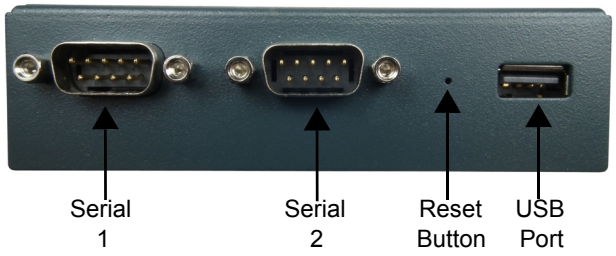


Figure 3-6 PremierWave XC HSPA+ Pinout Configuration for RS-232

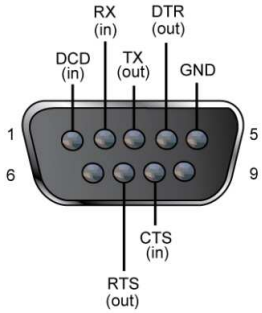


Figure 3-7 PremierWave XC HSPA+ Pinout Configuration for Full Duplex RS-422/485 (4-wire)

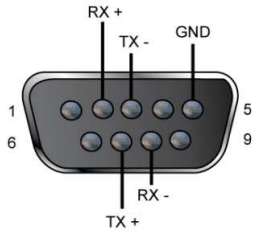
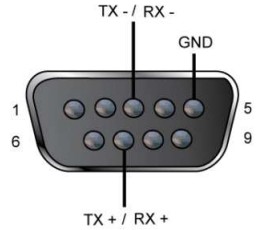


Figure 3-8 PremierWave XC HSPA+ Pinout Configuration for Half Duplex RS-422/485 (2-wire)



Ethernet LEDs

The Ethernet port (see *Figure 3-11*) has two LEDs that indicate the status of the connection as described in the *Table 3-9* and *Table 3-10* below:

Table 3-9 Left Ethernet LED

Color/Status	Solid Light	Blinking Pattern
Green	100 Mbps Link	100 Mbps Activity
Amber	10 Mbps Link	10 Mbps Activity

Table 3-10 Right Ethernet LED

Color/Status	Solid Light
Green	Full Duplex
OFF	Half Duplex

The Ethernet port can connect to an Ethernet (10 Mbps) or Fast Ethernet (100 Mbps) network.

Reset Button

You can reset the PremierWave XC HSPA+ intelligent gateway to factory defaults, including clearing the network settings. The IP address, gateway, and netmask are set to 00s. To reset the unit to factory defaults, perform the following steps.

1. Place the end of a paper clip or similar object into the reset opening (see *Figure 3-5*) and press and hold down micro switch during a power cycle for 10-15 seconds.