



XPort® EDGE **Embedded Ethernet Gateway** **Data Sheet**

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1: Functional Description

Overview

This document provides detailed technical and compliance specifications about the XPort® EDGE embedded Ethernet gateway.

The XPort EDGE is the next generation of the world's best-selling embedded Ethernet device server that provides full IoT gateway connectivity to any device with serial capability. By embedding XPort EDGE into a product design, manufacturers can offer secure network connectivity with integrated device management and cloud connectivity within weeks.

With customer proven **TruPort** technology that includes production-ready essential IoT connectivity firmware, cloud-based management and an integrated device security framework, XPort EDGE delivers a complete network and IoT connectivity offload solution for any microcontroller.

Device manufacturers can also partition their system design by extending the capabilities of XPort EDGE with custom application firmware that works together with the host microcontroller within their devices.

Applications

XPort EDGE is the only intelligent, secure and managed embedded Ethernet gateway for the industrial internet.

Key vertical markets include:

- ◆ Factory Automation
- ◆ Smart Buildings
- ◆ Physical Security and Access Control
- ◆ Healthcare and Medical Devices
- ◆ Resource Management
- ◆ Energy Monitoring

A representative set of devices include:

- ◆ Alarm Panels
- ◆ Door Access Controllers
- ◆ Gaming Machines
- ◆ Industrial Machines
- ◆ Medical Devices
- ◆ Solar PV Inverters

The XPort EDGE is designed for applications in a variety of industries where reliability, extended operating temperature range, and long product lifecycles are business critical.

Product Features

Accelerate your Product Launch

- ◆ Minimal development effort needed to add IoT functionality to any device
- ◆ The only complete, integrated solution in an RJ45 form factor (10/100 Ethernet Transceiver with HP Auto-MDIX support)
- ◆ Automatic network connection management
- ◆ TruPort® Serial and TruPort Socket providing industry's most compatible device data access technology
- ◆ Pre-integration with Lantronix Gateway Central for cloud-based remote management
- ◆ Pre-integration with MACH10 Global Device Manager for scalable, multi-tenant device management
- ◆ Simple integration with host microcontroller via one (1) Universal Asynchronous Receiver Transmitter (UART) and up to 3 configurable pins
- ◆ Web Service API, XML Configuration, Serial Command API

Enterprise Class Security

- ◆ Enhanced device and data transport security
- ◆ HTTPS for secure management interface
- ◆ SSL/TLS 1.2 with X.509 Certificate Management
- ◆ Secure Boot and Secure Firmware Updates
- ◆ Secure Network Attach (EAPOL)
- ◆ Enable/Disable Network Services using fine-grained service level control

Fully Certified and Industrial-Rated

- ◆ Operating temperature range: -40°C to +85°C

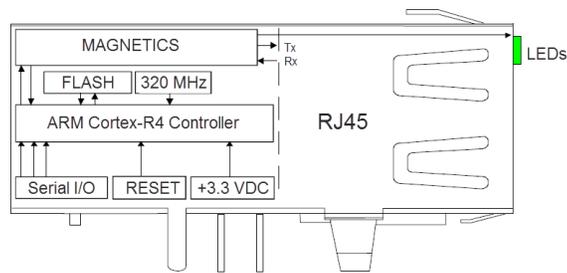
2: Hardware and Software Description

The XPort EDGE is a highly integrated module that includes a 32-bit ARM Cortex-R4 controller, 10/100 Mbps Ethernet MAC/PHY with Magnetics, RAM, flash in a compact RJ45 connector form factor.

The module includes the following data communication interfaces:

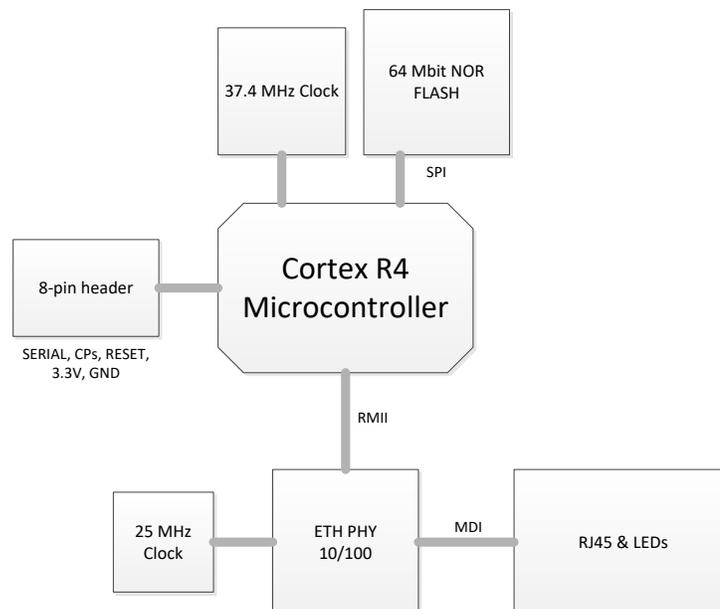
- ◆ One 10/100 Ethernet transceiver with HP Auto-MDIX support
- ◆ One 300 to 4 Mbps UART with hardware flow control
- ◆ Up to 3 GPIO lines (Configurable Pins)

The XPort EDGE series operates on 3.3V power with 3.3V logic.



XPort EDGE Block Diagram

Figure 2-1 XPort EDGE Block Diagram



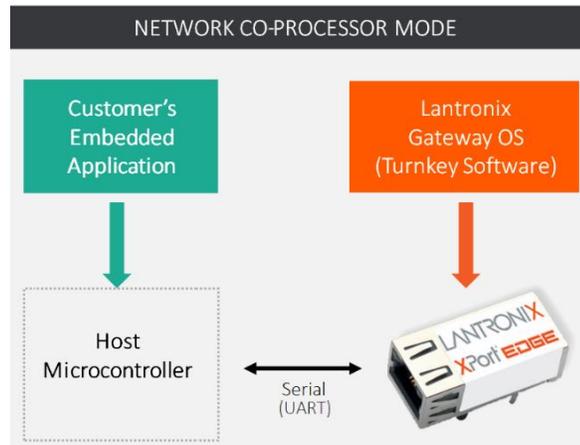
Software Features

The XPort EDGE embedded gateway software stack provides essential IoT connectivity infrastructure for building secure connected products. Device manufacturers can offload this complexity from their application microcontroller when interfacing with the module in **Network Co-processor Mode** or use the module standalone in **Microcontroller Mode** (Hostless).

Network Co-Processor Mode

The module completely offloads secure network connectivity requirements for attached microcontrollers thereby reducing device firmware complexity while accelerating OEM's time to introduce and support secure connected products in the market. The host microcontroller communicated with XPort EDGE via the UART interface.

Figure 2-2 Network Co-Processor Mode



Microcontroller Mode

In addition, the XPort EDGE also can be used as a microcontroller in standalone mode. With the provided SDK, device manufacturers can leverage not only the network stack, but also the complete application framework that includes the configuration management system, reliable remote firmware upgrades, automated connection management features described below.

Figure 2-3 Microcontroller Mode



TruPort Serial

TruPort Serial, a robust serial to Ethernet application that supports the transparent transport of hundreds of serial protocols over the network. TruPort Serial is very suitable for use in network co-processor mode based applications requiring very little to no programming and development effort.

Key capabilities included are:

- ◆ Support serial via UART TTL interface
- ◆ Advanced connectivity modes and configuration knobs to tune the connection parameters for a specific protocol without requiring custom software programming
- ◆ Automatic and Manual connect modes
- ◆ Inbound (Accept Mode) and Outbound (Connect Mode) connections
- ◆ Many Connectivity – Up to 4 in-bound connections, and up to 4 out-bound connections
- ◆ Support for UDP, TCP, TLS, HTTP(S)
- ◆ Modem emulation mode enables connecting to different servers using a standard AT command set
- ◆ AES (128-bit, 192-bit, 256-bit) Encrypted session and TLS session modes for secure tunneling

TruPort Socket

Connect your device microcontroller to multiple services and communicate directly with mobile devices and cloud services at the same time via TruPort Socket. The simple API for TruPort Socket is available via the UART interface.

Seamlessly switch between data mode and module management mode (CLI access) for total control and data channel access from your device host microcontroller.

Access TCP, UDP, TLS, HTTP, SMTP, WebSockets channels and communicate with external services through these channels without implementing these protocol stacks within your microcontroller.

Secure Network Attach (802.1X/EAP)

Connect to Enterprise Ethernet networks and switch ports enabled with controlled access. With support for 802.1X and EAP authentication methods along with support PKI support and X.509 certificate management, connectivity to the enterprise network is handled via configuration and without any coding and development activities.

TruPort Security

Device manufacturers are exposed to new security risks that emerge with having connected products. They also have to navigate the engineering complexity of providing integrated security within their connected devices. Lantronix TruPort Security provides an integrated device security framework that lets device manufacturers build this into their connected products from the start of their design cycle instead of as an after-thought or bolted on component.

TruPort Security enables building secure connected products quickly and easily with a full range of features including:

- ◆ Secure Boot – run only signed software on device
- ◆ Secure Firmware Over the Network (FOTN) - Accept signed firmware and reliable over the network

- ◆ Secure Connectivity – Enterprise Security, Data-in-motion authentication and encryption
- ◆ Encrypted Storage – stored configuration and device data securely
- ◆ Fine Grained Port Access Control – Prevent back-doors with fine grained control over network ports
- ◆ Root of Trust and Device Identity – Certificate Management, Secure Key Storage, OEM Keys
- ◆ Role Based Access Control – Policy driven access control to gateway and device capabilities
- ◆ Monitoring and Updates – Monitor critical security vulnerabilities and provide regular updates

Configuration and Management Interface

Access the module configuration and management engine via the microcontroller or via the network. Command Line Interface (CLI) mode offers a text based interactive interface versus writing an elaborate driver interface for the AT command and control interface on the device microcontroller. XML and Web API offer the ability to program the module configuration via the Over-The-Network (OTN) interface. For more details on the usage of these management interfaces, refer to the *XPort EDGE User Guide* available at <https://www.lantronix.com/products/xport-edge/> for more details.

Reliable Firmware Over-The-Network (FOTN) Updates

As device requirements evolve and new product features are provided, device manufacturers can leverage the reliable OTN firmware upgrade capabilities to prevent “system bricks”. OTN firmware upgrade always ensures there is at-least one known version of firmware available in the event an upgrade operation does not succeed. It operates over the connected network and does not require placing the module into specific operational modes in order to trigger the update. Updates can be performed remotely and securely using the included Secure Boot features.

Pre-integration with MACH10 Platform

Quickly deliver secure and robust web-scale device management and monitoring for your connected products with MACH10 Global Device Manager.

Pre-integrated support within XPort EDGE gateways enables your connected products and the gateway to be managed across the product lifecycle from deployment to decommissioning.

Remote Gateway Management with Lantronix Gateway Central

Leverage powerful monitoring and management capabilities for Lantronix gateways using Lantronix Gateway Central. Use Google-like search to quickly locate gateways, trigger centralized remote firmware updates and setup customized alerts and notifications on monitoring parameters across your fleet of Lantronix gateways.

With Lantronix Gateway Central, you can maintain a consistent factory configuration or default field configuration or stay on an approved firmware baseline without paying for custom programming services.

3: Interfaces

The XPort EDGE offers various interfaces to allow for easy connectivity to the module. Interfaces include one Ethernet 10/100-Base port and one UART with hardware handshake signals, baud rate and configuration capability of up to 4 Mbps. If the handshake feature is not used, pins used for UART hardware handshake (RTS, CTS, DTR) can be configured as CPx.

Signal Descriptions

Table 3-1: XPort EDGE PCB Interface Signals

Signal Name	Pin	Function
GND	1	Circuit Ground
Vcc	2	+3.3V Power In
Reset (In)	3	External Reset In
TXD	4	Serial Data Out
RXD	5	Serial Data In
CP1	6	<ul style="list-style-type: none">♦ Flow control: Request to Send (RTS) output for connection to CTS of attached device.♦ Programmable input/output: CP1 can be driven or read through software control, independent of serial port activity.
CP2	7	<ul style="list-style-type: none">♦ Programmable input/output: CP2 can be driven or read through software control, independent of serial port activity.
CP3	8	<ul style="list-style-type: none">♦ Flow control: CTS (Clear to Send) input for connection to RTS of attached device.♦ Programmable input/output: CP3 can be driven or read through software control, independent of serial port activity.

UART

- ♦ The XPort EDGE module supports one UART interface
- ♦ The UART supports data rates up to 4 Mbps, with Odd/Even parity, and 1 & 2 stop bits
- ♦ Software flow control (Xon, Xoff)
- ♦ Operational mode as a DTE device
- ♦ UART supports TX, RX, RTS, CTS (hardware flow control)

Table 3-2: XPort EDGE UART Signal Definitions

Pin Name	Description	Other Role	Pin
TXD	Serial transmit data output	None	4
RTS	Serial ready-to-send/serial transmit enable output	CP1	6
RXD	Serial receive data input	None	5
CTS	Serial clear-to-send input	CP3	8

Ethernet

The 10/100 Ethernet magnetics, network status LEDs, and RJ45 connector are integrated into the XPort EDGE unit.

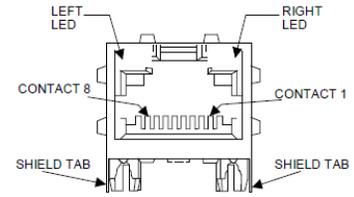


Table 3-3: Ethernet Interface Signals

Signal Name	DIR	Pin	Primary Function
TX+	Out	1	Transmit Data +
TX-	Out	2	Transmit Data -
RX+	In	3	Receive Data +
RX-	In	6	Receive Data -
Not Used		4	Terminated
Not Used		5	Terminated
Not Used		7	Terminated
Not Used		8	Terminated
SHIELD			Chassis Ground

Ethernet LEDs

Table 3-4: Ethernet LEDs

LINK LED (Left)		ACTIVITY LED (Right)	
Color	Meaning	Color	Meaning
Off	No Link, or Link at 10Mbps	Off	No Link
Green	Link at 100Mbps	Amber	<ul style="list-style-type: none"> ♦ Steady ON: Link and no Activity ♦ Blinking: Link with Activity

General Purpose I/O Pins

The XPort EDGE embedded Ethernet gateway contains 3 configurable General Purpose Input/Output (GPIO) pins. Mapping of these functions to CPs will be driven via configuration and applied at system initialization.

Each CP can be configured as a general purpose input, general purpose output, microcontroller peripheral block or a soft function.

Table 3-5: XPort EDGE Configurable General Purpose I/O Pins (GPIO)

Note: After a reset or power cycle, the I/O pins will return to saved role configurations.

Pin Name	Description	State during Reset	Pin Pulled	Other Roles	PCB Pin Number
CP1	Configurable I/O 1	Disabled	Up 10K	UART RTS	6
CP2	Configurable I/O 2	Disabled	Hi-Z	UART DTR	7
CP3	Configurable I/O 3	Disabled	Hi-Z	UART CTS	8

Note: Any CPx can be configured as the Default# role for restoring the unit to factory default parameter values.

System Pins

The XPort EDGE module has two system pins:

- ◆ **RESET#** is the unit hardware reset, active low. Drive low for 50 ms to reboot unit. Signal should be driven high or pulled high after reset.
- ◆ **DEFAULT#** is the unit reset to factory default configuration, active low. Drive low for 6 seconds or longer to reset unit to default settings. May be left floating if unused.

Note: See the *XPort EDGE Embedded Ethernet Gateway Integration Guide* available at <https://www.lantronix.com/products/xport-edge/> for more details.

Table 3-6: XPort EDGE System Signal Definitions

Pin Name	Description	Pin Pulled	Other Roles	PCB Pin Number
RESET#	External reset	Up 100K	None	3
Default#	Reset to Factory Default Configuration	See Configurable Pins	Any CPx, roles configurable	6, 7 or 8

Memory

The XPort EDGE module comes with the following memory profile:

- ◆ **Flash Memory:** 8 MB serial NOR flash shared between the boot, OS and user space
- ◆ **SRAM:** 2 MB SRAM

4: Electrical Characteristics

Absolute Maximum Ratings

Parameter/Signal	Symbol	Min.	Max.	Unit
Supply Voltage	VCC	0	3.9	VDC
CPx, Reset, Data In, Data Out Voltage	VCP	-0.5	3.9	VDC
Device's Operating Temperature	Ta	-40	85	°C
Device's Storage Temperature	Ta	-40	85	°C

Warning: Stressing the device beyond the Absolute Maximum Ratings may cause permanent damage.

Recommended Operating Conditions

Table 4-1 specifies the recommended operation conditions and parameters for optimum performance of the XPort EDGE module.

Table 4-1: Recommended Operating Conditions for XPort EDGE Module

Parameter	Symbol	Min	Typ	Max	Units
Supply Voltage	VCC	3.15	3.3	3.45	VDC
Supply Voltage Ripple/Droop	VCCpp			+/-1%	
Device's Operating Temperature	Ta	-40		85	°C
Device's Storage Temperature	Ta	-40		85	°C
Device's Operating Humidity (relative, non-condensing)		5%		95%	
Power Supply Ramp Rate ¹	VCC	40		1000	microsec
Vibration (Operational)				27.5	G
Non-Operational Shock				65	G

¹For slower power supply ramp rates it is recommended to assert reset for 50 ms after power reaches 3.15V.

Note: Exposure of the device for extended periods beyond the Operating Conditions may affect the device reliability.

DC Characteristics – Digital I/O Signals

Table 4-2: DC Characteristics & Digital I/O Signals

Parameter/Signal	Symbol	Min.	Typ.	Max	Unit
RESET# Input Low	VIL	-0.5		0.8	V
RESET# Input High	VIH	2.0		VCC+0.5	V
CPx, UART Input Low	VIL	-0.5		0.8	V
CPx, UART Input High	VIH	2.0		VCC+0.5	V
CPx, UART Output Low @ 2mA	VOL			0.4	V
CPx, UART Output High @ 2mA	VOH	VCC-0.4			V

Table 4-3: XPort EDGE Power Consumption

Parameter/Signal	Symbol	Min.	Typ.	Max.	Unit
VCC Current – Idle, no Ethernet cable connected	VCC_I		92		mA
VCC Current – With 100BASE-T Activity	VCC_I		160		mA
VCC Current – With 10BASE-T Activity	VCC_I		180		mA

Power, Reset, Wake, Shutdown and Default Timing

The diagrams below show the timing requirement for VCC, RESET# and DEFAULT#.

Figure 4-1 Reset Timing

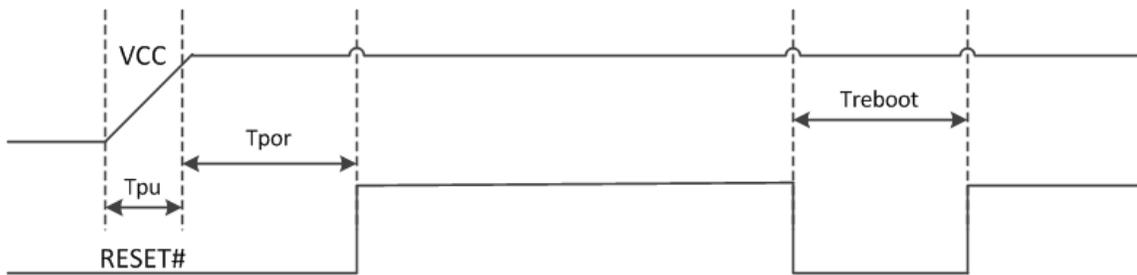


Figure 4-2 Reset to Defaults Timing

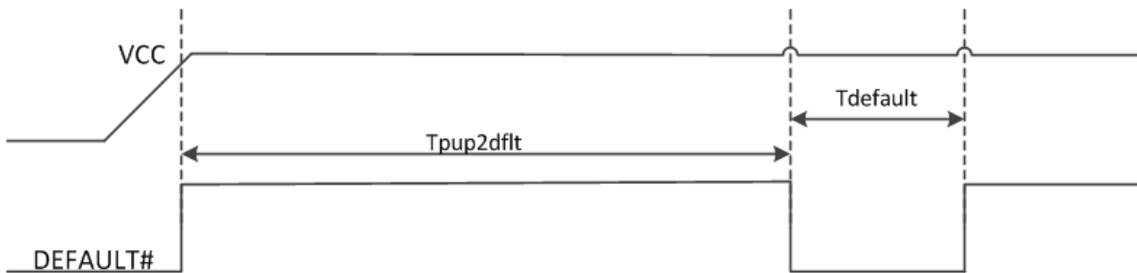


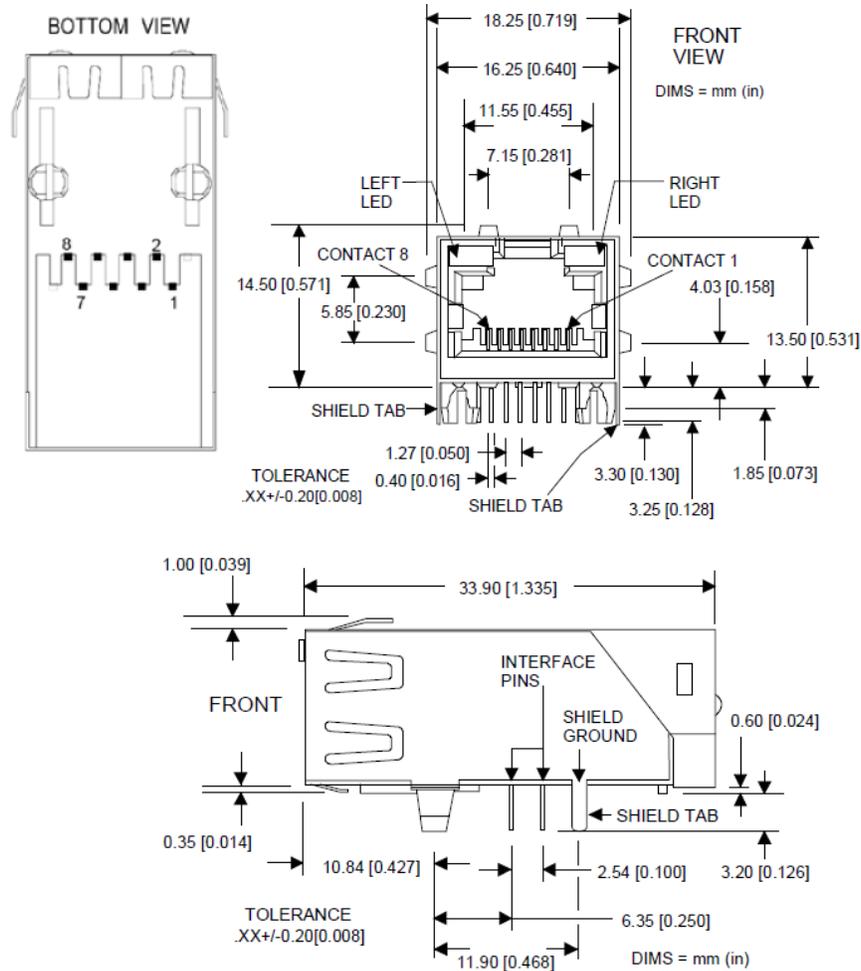
Table 4-4 Timing

Parameter	Description	Minimum	Maximum	Unit
T _{pu}	Time for VCC to reach 90% of its maximum value	40	1000	us
T _{por}	Time from VCC to reach 90% of its maximum value and de-assertion of external reset.	50		ms
T _{reboot}	Recommended reset pulse for system reboot	50		ms
T _{pu2dflt}	Time from VCC power up to DEFAULT# assertion. Note DEFAULT# can be left floating if unused.	0		ns
T _{default}	Assertion time for DEFAULT# to unit reset to default and reboot.	6		S

5: Package Description and Mechanical Footprint

Dimensions

Figure 5-1 XPort EDGE Dimensions



Housing and Weight

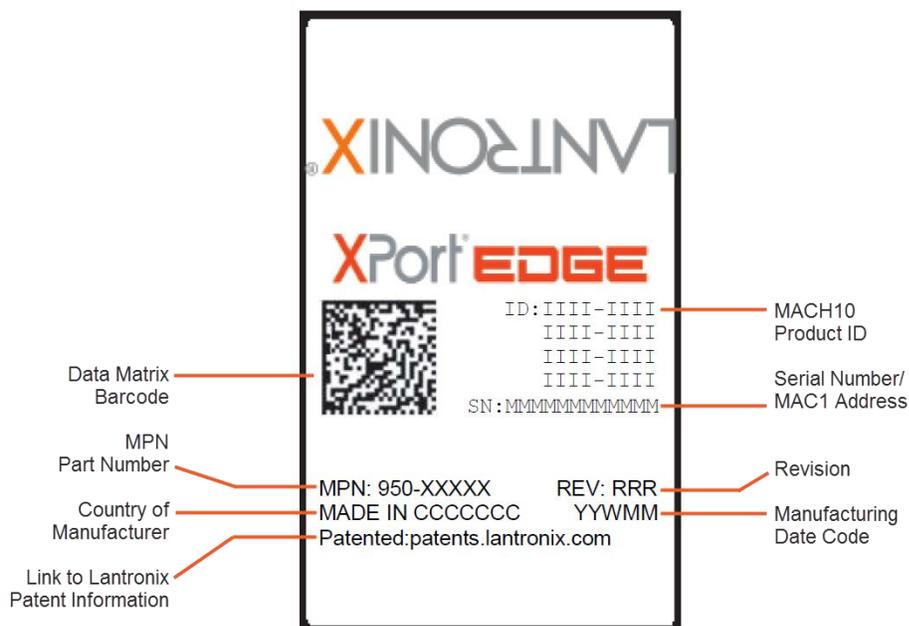
Table 5-1 Housing and Weight

Category	Description
Weight	8.8 grams (0.31 oz)
Housing	Metal shell

6: Product Information Label

The product information label contains important information about your specific module, including the MPN part number, revision, manufacturing date code, country of manufacture, data matrix barcode, and MAC address.

Figure 6-1 XPort EDGE Module Label



The XPort EDGE module uses the Datamatrix ECC200 bar code standard. The field definitions are as follows:

Table 6-1: Datamatrix ECC200 Barcode Standard Descriptions

Field	Description	Example
V1	Barcode version	4
C1	Count of tags	3
P1	Part number of the module	950-00101
R1	Revision of the module	A11
S1	Serial number	0080A3980404
S2	ID	AAAABBBBCCCCDDDDDEEEEEFFFFGGGGHHHH
E1	End of barcode	N/A

7: Compliance

(According to ISO/IEC Guide and EN 45014)

Manufacturer's Name & Address:

Lantronix, Inc., 7535 Irvine Center Drive, Suite 100, Irvine, CA 92618 USA

Declares that the following product:

Product Name: XPort® EDGE

Conforms to the following standards or other normative documents:

Safety

- ◆ UL/IEC 62368-1

Emissions

- ◆ FCC Part 15, Subpart B, Class B
- ◆ EN 55032:2012, Class B

Immunity

- ◆ EN 55024: 2010
- ◆ EN 61000-3-2:2014
- ◆ EN 61000-3-3:2013
- ◆ IEC 61000-4-2: 2009
- ◆ IEC 61000-4-3: 2006 + A1: 2008 + A2: 2010
- ◆ IEC 61000-4-4: 2004
- ◆ IEC 61000-4-5: 2006
- ◆ IEC 61000-4-6: 2009
- ◆ IEC 61000-4-8: 2010
- ◆ IEC 61000-4-11: 2004

Note: *To represent a customer target system, Emissions and Immunity tests were performed with an XPort EDGE installed on an XPort EDGE evaluation board.*

ESD Handling and Latch Up

- ◆ HBD Contact Discharge per JEDEC EID/JESD22-A117 (at 1.5KV)

RoHS, REACH, and WEEE Compliance Statement

Please visit <http://www.lantronix.com/legal/rohs/> for Lantronix's statement about RoHS, REACH and WEEE compliance.

8: Ordering Information

Table 8-1: XPort EDGE Order Information

Part Number	Description	Package Type	MOQ
XPE200100S	XPort EDGE Embedded Ethernet Gateway, UART, RJ45 Eth, Sample	Box	1
XPE200100B	XPort EDGE Embedded Ethernet Gateway, UART, RJ45 Eth, Tray	Tray	200
XPE200100EK	XPort EDGE Evaluation Kit (Module Included)	Box	1

Warranty

The XPort EDGE module comes with a 2-year warranty. For more details on the Lantronix warranty replacement policy, please go to our web site at www.lantronix.com/support/warranty.

Contact Information

For details contact your local Lantronix representative or Lantronix directly:

- ◆ Asia Pacific Region via e-mail at asiapacific_sales@lantronix.com
- ◆ Europe via e-mail at eu_sales@lantronix.com
- ◆ Japan via e-mail at japan_sales@lantronix.com
- ◆ United States via e-mail at sales@lantronix.com or call OEM sales support at 800-526-8764.

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