LANTRONIX®

XPort™


# XPort™ Integration Guide

Part Number 900-310
Revision A 11/03

## Copyright and Trademark



XPort, with its patent-pending technology, is a trademark of Lantronix.

Ethernet is a trademark of XEROX Corporation. UNIX is a registered trademark of The Open Group. Windows 95, Windows 98, Windows 2000, Windows NT, and Windows XP are trademarks of Microsoft Corp. Netscape is a trademark of Netscape Communications Corporation.

## Contacts

**Lantronix Corporate Headquarters**
15353 Barranca Parkway
Irvine, CA 92618, USA
Phone:949-453-3990
Fax: 949-453-3995

**Technical Support**
Phone: 800-422-7044 or 949-453-7198
Fax: 949-450-7226
Online: www.lantronix.com/support
Email mailto:support@lantronix.com

**Sales Offices**
For a current list of our domestic and international sales offices, go to the Lantronix web site at http://www.lantronix.com/about/contact/index.html

## Disclaimer and Revisions

Operation of this equipment in a residential area is likely to cause interference, in which case the user, at his or her own expense, will be required to take whatever measures may be required to correct the interference.

***Note:*** *This product has been designed to comply with the limits for a Class B digital device pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with this guide, may cause harmful interference to radio communications.*

Changes or modifications to this device not explicitly approved by Lantronix will void the user's authority to operate this device.

***Note:*** *With the purchase of XPort, the OEM agrees to an OEM firmware license agreement that grants the OEM a non-exclusive, royalty-free firmware license to use and distribute the binary firmware image provided, only to the extent necessary to use the XPort hardware. For further details, please see the XPort OEM firmware license agreement.*

| Date | Rev. | Comments |
|---|---|---|
| 11/03 | 900-310A | |

# Contents

# List of Figures



# List of Tables

# 1: Introduction

## About the Integration Guide

This guide provides the information needed to test the XPort™ device server on the XPort Evaluation Board. The intended audience is the engineer responsible for integrating the XPort into your product.

## Additional Documentation

The following guides are available on the product CD and the Lantronix Web site (www.lantronix.com)

| | |
|---|---|
| ***XPort™ Getting Started*** | Provides the steps for getting the hardware and software up and running. |
| ***XPort™ User Guide*** | Provides information needed to configure, use, and update the *XPort* firmware. |
| ***Device Installer User Guide*** | Provides instructions for using the Windows-based utility to configure the XPort and other Lantronix device servers. |
| ***Com Port Redirector User Guide*** | Provides information on using the Windows-based utility to create a virtual com port. |
| ***Creating Custom Web Pages*** | Explains in detailed steps how to create custom web pages for Lantronix device servers. |

# 2: Description and Specifications

The XPort embedded device server is a complete network-enabling solution enclosed within an RJ45 package. This miniature serial-to-Ethernet converter empowers original equipment manufacturers (OEMs) to quickly and easily go to market with networking and web page serving capabilities built into their products.

This chapter includes the following topics:



## The XPort

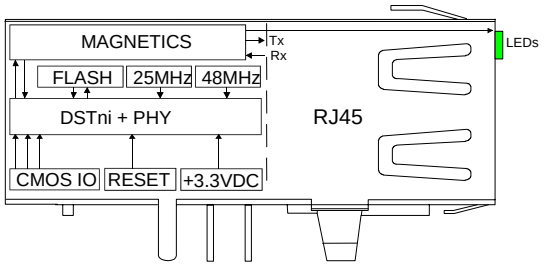
The XPort contains Lantronix's own DSTni controller, with 256 Kbytes of SRAM, 2 Kbytes of boot ROM, and integrated AMD 10/100 PHY.

The XPort also contains the following:

- 3.3-volt serial interface
- 4-Mbit flash memory
- Ethernet magnetics
- Power supply filters
- Reset circuit
- +2.5V regulator
- 25-MHz crystal (Ethernet), 48-MHz crystal (DSTni), and Ethernet LEDs

The XPort requires +3.3-volt power and is designed to operate in an extended temperature range (see technical data).

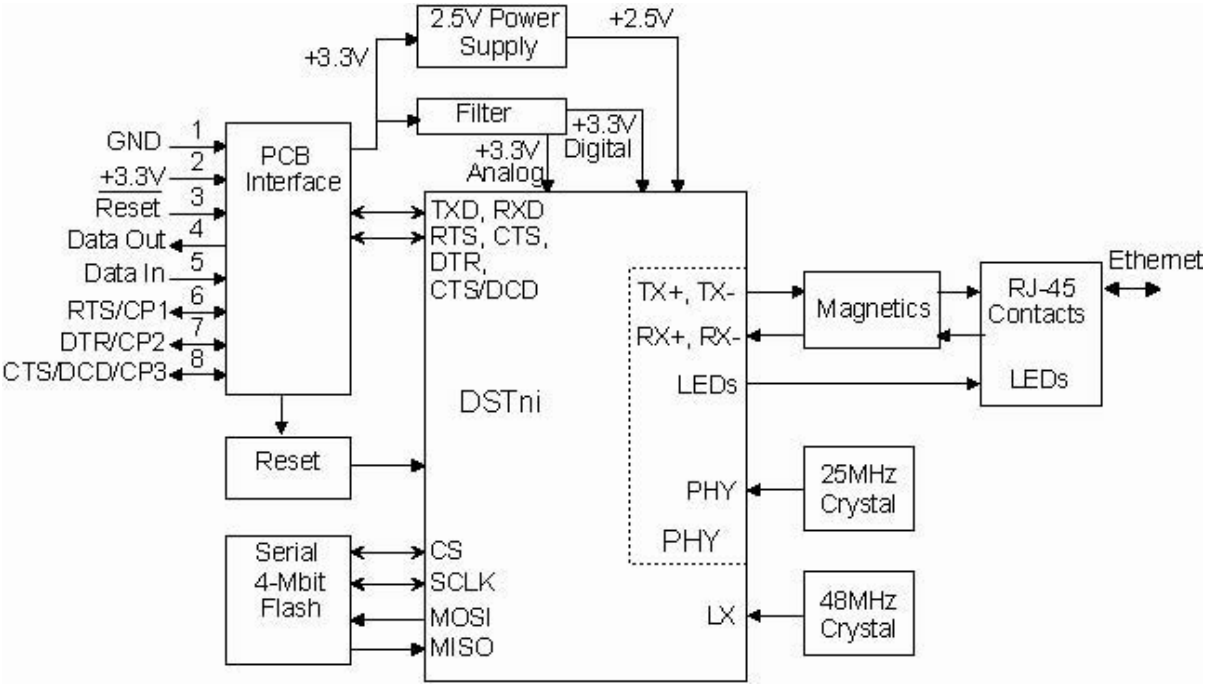
**Figure 2-1. Side View**




## XPort Block Diagram

The following drawing is a block diagram of the XPort showing the relationships of the components.

**Figure 2-2. XPort Block Diagram**



## Serial Interface

The unit has a serial port that is compatible with RS-232 serial standards at data rates up to 230kbps. The PCB interface includes +3.3V, ground, and reset. The serial signals (pins 4–8) are 3.3V CMOS logic level. (**not** 5V tolerant). Serial signals would normally connect to an internal device, such as a UART, but for prototype and evaluation work, requiring an external cable running with RS-232 voltage levels, the XPort must interface to a serial transceiver chip. We supply an RS-232 transceiver on the XPort Evaluation Board for this purpose.

**Table 2-1. Serial Interface Signals**

| Signal Name | XPort Pin # | Primary Function |
|---|---|---|
| GND | 1 | Circuit ground |
| 3.3V | 2 | +3.3V power in |
| $\overline{\text{Reset}}$ | 3 | External reset in |
| Data Out | 4 | Serial data out (driven by DSTni's built-in UART) |
| Data In | 5 | Serial data in (read by DSTni's built-in UART) |
| CP1/RTS (Configurable Pin 1) | 6 | CP1 can be configured as follows:<br>**Flow control:** RTS (Request to Send) output driven by DSTni's built-in UART for connection to CTS of attached DTE device.<br><br>**Programmable input/output:** CP1 can be driven or read through software control, independent of serial port activity. |
| CP2/DTR (Configurable Pin 2) | 7 | CP2 can be configured as follows:<br>**Modem control:** DTR (Data Terminal Ready) output driven by DSTni for connection to DCD of attached DTE device.<br><br>**Programmable input/output:** CP2 can be driven or read through software control, independent of serial port activity. |
| CP3/CTS/DCD (Configurable Pin 3) | 8 | CP3 can be configured as follows:<br>**Flow control:** CTS (Clear to Send) input read by DSTni's built-in UART for connection to RTS of attached DTE device.<br><br>**Modem control:** DCD (Data Carrier Detect) input read by DSTni's built-in UART for connection to DTR of attached DTE device.<br><br>**Programmable input/output:** CP3 can be driven or read through software control, independent of serial port activity. |

## Ethernet Interface

The Ethernet interface magnetics, RJ45 connector, and Ethernet status LEDs are all in the device server shell.

**Table 2-2. Ethernet Interface Signals (Industry Standards)**

| Signal Name | DIR | Contact | Primary Function |
|---|---|---|---|
| TX+ | Out | 1 | Differential Ethernet transmit data + |
| TX- | Out | 2 | Differential Ethernet transmit data - |
| RX+ | In | 3 | Differential Ethernet receive data + |
| RX- | In | 6 | Differential Ethernet receive data - |
| Not used | | 4 | Terminated |
| Not used | | 5 | Terminated |
| Not used | | 7 | Terminated |
| Not Used | | 8 | Terminated |
| SHIELD | | | Chassis ground |

## LEDs

The XPort contains the following LEDs:

- 10 Mbps Link/Activity (bi-color, left LED)
- 100 Mbps Link/Activity (bi-color, right LED)

**Figure 2-3. XPort LEDs**

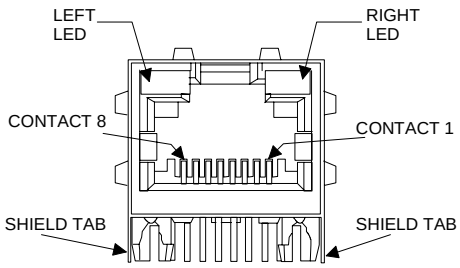



**Table 2-3. XPort LED Functions**

| Left LED | Right LED | Meaning |
|---|---|---|
| Off | Off | No link |
| Off | Solid amber | 100Base-T half duplex link |
| Off | Blinking amber | 100Base-T half duplex; activity |
| Off | Solid green | 100Base-T full duplex link |
| Off | Blinking green | 100Base-T full duplex; activity |
| Solid amber | Off | 10Base-T half duplex link |
| Blinking amber | Off | 10Base-T half duplex; activity |
| Solid green | Off | 10Base-T full duplex link |
| Blinking green | Off | 10Base-T full duplex; activity |

# Dimensions

The XPort dimensions are shown in the following drawings.

**Figure 2-4. Front View**

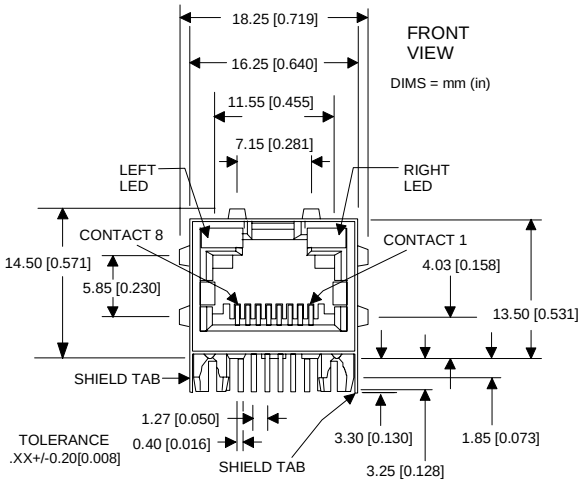



**Figure 2-5. Bottom View**

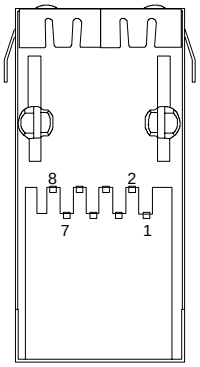
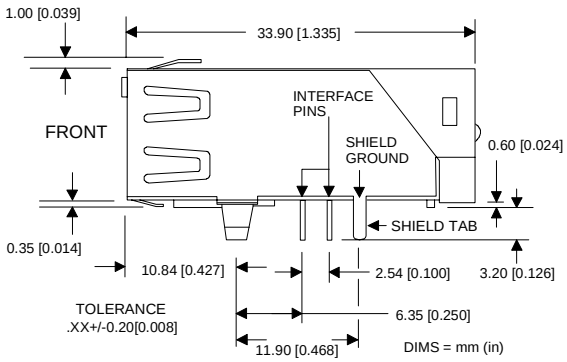


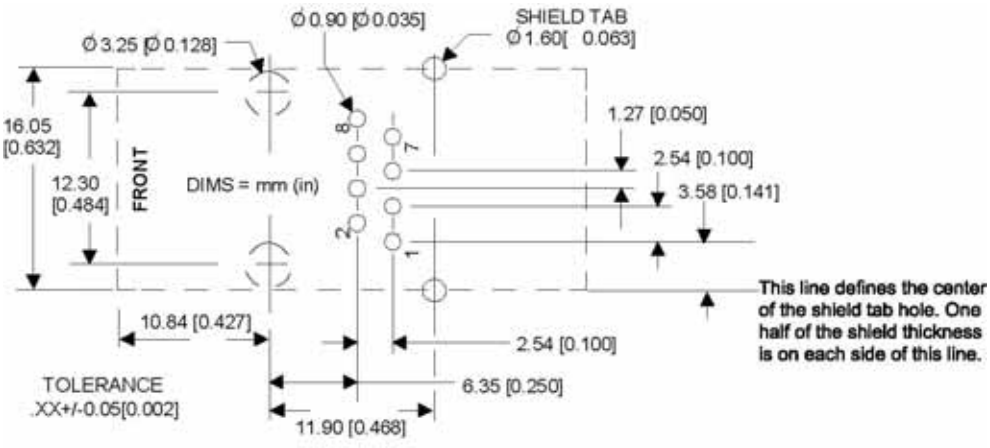

**Figure 2-6. Side View**



## Recommended PCB Layout

The hole pattern and mounting dimensions for the XPort device server are shown in the following drawing.

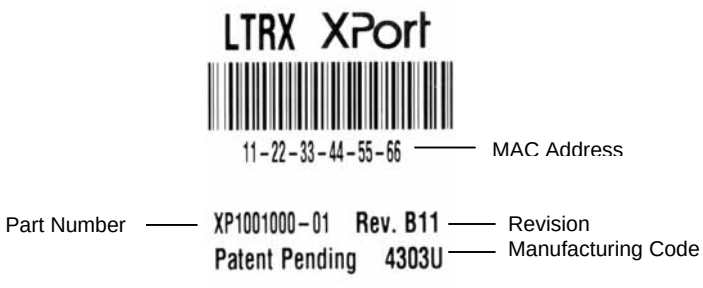
**Figure 2-7. PCB Layout**




## Product Information Label

The product information label contains important information about your specific unit, such as its product ID (name), bar code, part number, and Ethernet (MAC) address.

**Figure 2-8. Product Label**



## Technical Specifications

**Table 2-4. Technical Specifications**

| Category | Description |
|---|---|
| CPU, Memory | Lantronix DSTni 186 CPU, 256-Kbyte zero wait state SRAM, 512-Kbyte flash, 2-Kbyte boot ROM |
| Firmware | Upgradeable via TFTP and serial port |
| Reset Circuit | 200 ms power up/down reset pulse. Reset triggered at 3.08V. Manual reset input supplies a 200 ms reset. |
| Serial Interface | CMOS (asynchronous) 3.3V-level signals (not 5V tolerant)<br>Baud rate software selectable (300 to 230400 bps) |
| Serial Line Formats | Data bits: 7 or 8<br>Stop bits: 1 or 2<br>Parity: odd, even, none |
| Modem Control | DTR/DCD, CTS, RTS |
| Flow Control | XON/XOFF (software), CTS/RTS (hardware), None |
| Programmable I/O | 3 PIO pins (software selectable), sink or source 8mA max. |
| Network Interface | RJ45 Ethernet 10Base-T or 100Base-TX (auto-sensing) |
| Compatibility | Ethernet: Version 2.0/IEEE 802.3 |
| Protocols Supported | ARP, UDP/IP, TCP/IP, Telnet, ICMP, SNMP, DHCP, BOOTP, TFTP, Auto IP, SMTP, and HTTP |
| LEDs | 10Base-T and 100Base-TX, Link, Activity, Full/half duplex. Pins 6 and 8 can also drive external LEDs for XPort status & diagnostics. |
| Management | Internal web server, SNMP (read only)<br>Serial login, Telnet login |
| Security | Password protection, locking features, optional Rijndael 128-bit encryption |
| Internal Web Server | Serves static web pages and Java applets<br>Storage capacity: 384 Kbytes |
| Weight | 0.34 oz (9.6 grams) |
| Material | Metal shell, thermoplastic case |
| Temperature | Operating range: -40°C to +85°C (-40°F to 185°F) |
| Shock/Vibration | Non-operational shock: 500 g's<br>Non-operational vibration: 20 g's |
| Warranty | One-year limited warranty |
| Included Software | Windows™ 98/NT/2000/XP-based Device Installer configuration software and Windows™-based Com Port Redirector |
| EMI Compliance | Radiated and conducted emissions - complies with Class B limits of EN 55022:1998<br>Direct & Indirect ESD - complies with EN55024:1998<br>RF Electromagnetic Field Immunity - complies with EN55024:1998<br>Electrical Fast Transient/Burst Immunity - complies with EN55024:1998<br>Power Frequency Magnetic Field Immunity - complies with EN55024:1998<br>RF Common Mode Conducted Susceptibility - complies with EN55024:1998 |

# 3: Development Kit

The XPort Development Kit includes everything you need to begin to integrate the XPort into your product design.

This chapter includes the following topics:



## Contents of the Kit

The development kit contains the following items:

- XPort Evaluation Board
- XPort Device Server
- +5VDC Universal Power Supply with snap-fit plugs for different countries
- RS-232 cable, DB9M/F
- CAT5e UTP RJ45M/M Ethernet cable
- CD with software utilities and documentation (in PDF format)
- Serial adaptor, 25-pin to 9-pin

## Evaluation Board Description

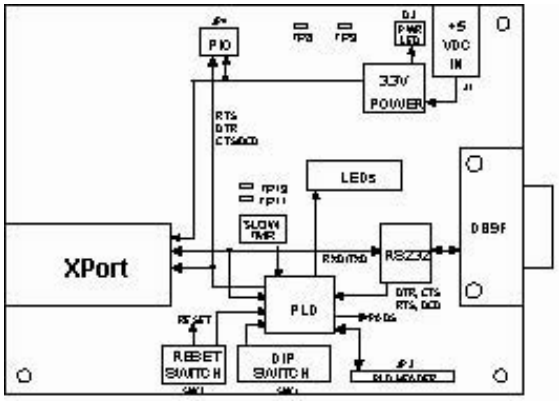
The XPort Evaluation Board provides a test platform for the Lantronix XPort device server.

The XPort Evaluation Board supplies an RS-232 serial interface to 3.3V CMOS level interface connection for the XPort. It also supplies the XPort device server with +3.3V. Evaluation board controls include a programmable logic device (PLD), reset push button switch, DIP switch, timer circuit, and reset circuit.

In addition to the status LEDs on the XPort, the evaluation board contains multiple LEDs. The power supply drives the red LED. The PLD droves the remaining LEDs; in the basic mode of operation, these LEDs indicate whether the RS-232 interface is valid, whether the serial interface transmit data and serial interface receive data are active, and the state of the three configurable pins, CP1, CP2, and CP3.

The PLD and a six-position DIP switch control the evaluation board mode of operation. The switch outputs are inputs to the PLD to select the desired mode of operation.

## Evaluation Board Block Diagram




### Major Components

The major components of the evaluation board include:

- RS-232 transceiver
- Universal Power Adapter
- Reset switch
- DIP switch
- DB9 interface connector
- Test points to monitor all XPort pins
- 6-pin header (JP4) for connecting user devices or circuits to CP1, CP2, and CP3.
- Power, signal ground, and reset inputs are also available on JP4.

## Serial RS-232 Interface

The RS-232 level serial interface is implemented with a transceiver that converts 3.3V CMOS levels to RS-232 levels. A straight-through serial cable with 9-pin connectors (M/F) is all you need to connect to a DTE device such as a PC.

The table below lists the RS-232 signals. Note that XPort signal pins 6, 7, and 8 are configurable pins you can optionally set for functions other than RS-232 control. A configuration DIP switch determines whether to route the XPort configurable pins to the RS-232 converter.

**Table 3-1. RS-232 Signals**

| XPort Signal | XPort Pin | Direction | DB9 Pin # | DTE Device Signal |
|---|---|---|---|---|
| DTR | Pin 7 | Out | 1 | DCD |
| Data Out | Pin 4 | Out | 2 | RXD |
| Data In | Pin 5 | In | 3 | TXD |
| DCD | Pin 8 | In | 4 | DTR |
| Ground | Pin 1 | -- | 5 | GND |
| CTS | Pin 8 | In | 7 | RTS |
| RTS | Pin 6 | Out | 8 | CTS |

## RS-232 Port

The evaluation board uses a Maxim MAX3238 IC to convert all RS-232 interface signals to 3.3V CMOS-level XPort signals.

We selected the MAX3238 IC for its capability of true RS-232-level performance from a +3.3V input power source and for its 15kV ESD protection. The part also includes an RS-232 valid output that lights an LED by means of the PLD circuit.

## Power Supply

The evaluation board contains a +3.3V regulator that receives input power by means of a 2.5mm input power jack. The input power should be 5VDC from a regulated DC source. The evaluation kit provides a +5VDC power module.

We recommend that you also connect the evaluation board to an earth ground. You can use the chassis ground rectangle (copper tape), TP7, or the shell of the DB9 connector.

## General Control PLD

The purpose of the PLD is to provide general evaluation board mode control and LED signal-level monitoring. The PLD works with the 6-position mode control switch (SW1) and the timer and reset circuits to provide mode control.

The PLD is a Lattice ISPLSI2032VE part, which is contained in a 48-pin TQFP package. This part contains 32 I/O and 32 microcells and is in-circuit programmable. A 1x8-pin header (JP3) provides for standard Lattice in-circuit programming.

## Configuration Switch Bank

Switch module SW1 contains six independent switches for configuring the PLD on the evaluation board. The PLD controls how the signals from the XPort are routed on the evaluation board. Positions 1 and 6 are for self-test. Positions 2 through 5 are for configuring XPort pins for various operations.

Three XPort pins are configurable pins. You can configure these pins for hardware flow control or as LED status indicators on the evaluation board. For information about configuring these pins, see the *XPort User Guide*.

On the evaluation board, configurable pins are shown as CP1, CP2, CP3, and SW1 switch positions are shown as SW1-1 through SW1-6.

***Note:*** *In the following sections, the terms LED1 and LED3 refer to diagnostic modes. You can put control of two of the XPort pins into these modes.*

**Table 3-2. Configuration Switch Settings**

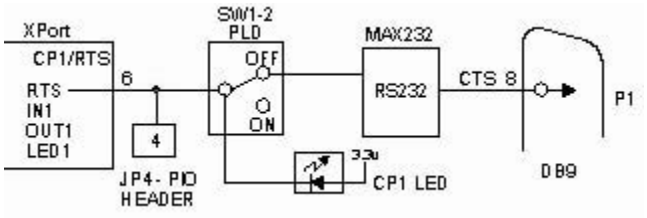
| SW1 | POS | Function |
|---|---|---|
| 1 | ON | SW1-1 and SW1-6 ON for self-test mode. (Factory test) |
| | OFF | Normal mode. |
| 6 | ON | SW1-1 and SW1-6 ON for self-test mode. (Factory test) |
| | OFF | Normal mode. |
| 2 | OFF | XPort CP1/RTS (pin 6) is connected to the RS-232 transceiver, which connects to the CTS of an attached DTE device through DB9 pin 8. Use this setting if CP1 is set up for hardware flow control. |
| | ON | XPort CP1/RTS (pin 6) is *not* connected to an RS-232 transceiver. Use this setting if CP1 is set up as an IN1, OUT1, or LED1. |
| 3 | OFF | XPort CP2/DTR (pin 7) is connected to the RS-232 transceiver, which connects to DCD of an attached DTE device through DB9 pin 1. Use this setting if CP2 is set up for hardware handshaking. |
| | ON | XPort CP2/DTR (pin 7) is *not* connected to the transceiver. Use this setting if CP2 is set up as an IN2 or OUT2. |
| 4 | OFF | Use this setting when XPort CP3/CTS/DCD (pin 8) is set up for hardware handshaking. With SW1-5 configured appropriately, CP3 will connect to DTR of an attached DTE device. |
| | ON | Use this setting when XPort CP3/CTS/DCD (pin 8) is set up for hardware flow control. With SW1-5 configured appropriately, CP3 will connect to RTS of an attached DTE device. |
| 5 | OFF | XPort CP3/CTS/DCD (pin 8) is connected to the RS-232 transceiver, which connects to either the DTR (DB9 pin 4) or the RTS (DB9 pin 7) of an attached DTE device, depending on the setting on SW1-4. Use this setting if CP3 is set up for hardware flow control or handshake. |
| | ON | XPort CP3/CTS/DCD (pin 8) is *not* connected to the transceiver. Use this setting if CP3 is set up as an IN3, OUT3, or LED3. |

## SW1-2 Options

SW1-2 controls the routing of the CP1/RTS (configurable pin 1) signal from the XPort. CP1 is connected to pin 6 of the XPort and can be software configured as CTS, IN1, OUT1, or LED1. SW1-2 is an input to the PLD, which does the actual switching. The drawings represent the logical switching function.

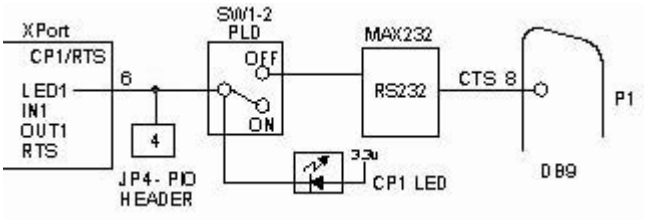
In this drawing, SW1-2 is OFF, which connects XPort pin 6 to the RS-232 transceiver. The XPort configurable pin 1 (CP1) is configured for CTS.

**Figure 3-1. SW1-2 OFF**




In the next drawing, SW1-2 is ON, which disconnects pin 6 from the RS-232 transceiver. The XPort configurable pin 1 (CP1) is configured for LED1.

**Figure 3-2. SW1-2 ON**




When configurable pin 1 is configured for LED1, it functions as a status indicator for the serial port.

**Table 3-3. CP1 Status Indicator**

| Condition | CP1 LED State |
|---|---|
| Idle channel | Solid on |
| Connected to network | 4 blinks every 4 seconds |

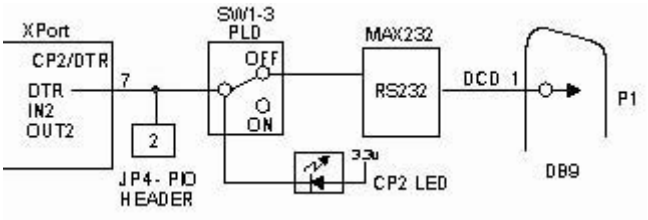
CTS and RTS work together for hardware flow control. Configure CP3 as RTS when CP1 is configured as CTS. Select hardware flow control as described in *Flow* in the *XPort User Guide*. See the *Device Installer User Guide* for information on configuring CP1 as IN1 or OUT1.

## SW1-3 Options

SW1-3 controls the routing of the CP2/DTR (configurable pin 2) signal from the XPort. CP2 is connected to pin 7 of the XPort and can be software configured as DCD, IN2, or OUT2. SW1-3 is an input to the PLD that does the actual switching. The drawings represent the logical switching function.

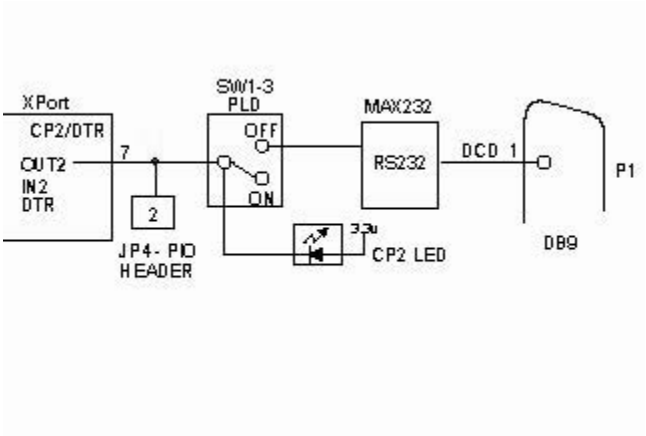
In this drawing, SW1-3 is OFF, which connects XPort pin-7 to the RS-232 transceiver. The XPort CP2 is configured for DCD.

**Figure 3-3. SW1-3 OFF**




In the drawing below, SW1-3 is ON, which disconnects XPort pin-7 from the RS-232 transceiver. The XPort CP2 is configured for OUT2.

**Figure 3-4. SW1-3 ON**




See the *Device Installer User Guide* for information on configuring CP2 as IN2 or OUT2.

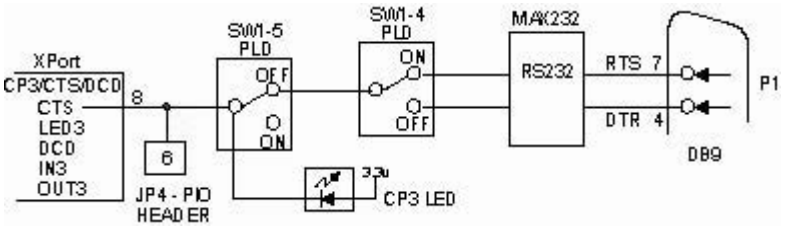
## SW1-4, SW1-5 Options

SW1-5 controls the routing of the CP3/CTS/DCD signal from the XPort. CP3 is connected to pin 8 of the XPort, and you can software configure it as RTS, LED3, DTR, IN3, or OUT3. With SW1-5 in the OFF position, the CP3 signal is routed to SW1-4.

SW1-4 and SW1-5 are inputs to the PLD, which does the actual switching. The drawings represent the logical switching functions.

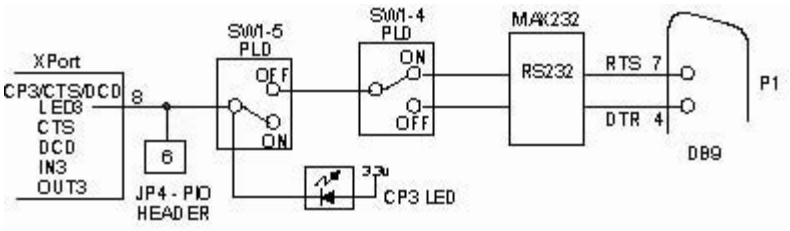
CP3 options are a little more complicated because both SW1-4 and SW1-5 are used in the configuration setup. In this drawing, SW1-5 is OFF, which connects XPort pin-8 to the RS-232 transceiver. The XPort CP3 is configured for RTS. SW1-4 is ON, routing the signal from XPort pin-8 to P1 pin-7 (RTS).

**Figure 3-5. SW1-5 OFF and SW1-4 ON**




In the next drawing, SW1-5 is ON, which disconnects XPort pin-8 from the RS-232 transceiver. The XPortCP3 is configured for LED3.

**Figure 3-6. SW1-5 ON and SW1-4 ON**



When CP3 is configured for LED3, it functions as a diagnostic indicator. The LED3 signal in combination with the LED1 signal indicates diagnostic information as shown in the following table.

***Note:*** *CP1 must be configured for LED1, and CP3 must be configured for LED 3 for diagnostic mode.*

**Table 3-4. LED States**

| Condition | CP3 LED (LED3) | CP1 LED (LED1) |
|---|---|---|
| No errors | OFF | ON |
| Network controller error | ON | Blink 3x/4 sec OFF |
| Duplicate IP address present | ON | Blink 5x/4 sec OFF |
| No DHCP response | Blink 2x/sec | Blink 5x/4 sec OFF |
| Setup menu active | Blink 2x/sec | See Note. |

***Note:*** *During a Telnet connection, CP1 LED (LED1) is ON. For a serial port connection, CP1 LED (LED 1) blinks for 2 seconds, then OFF for 2 seconds. (It appears as 4 blinks, then OFF for 2 seconds)*

CTS and RTS work together for hardware flow control. Configure CP3 as RTS when CP1 is configured as CTS. Select hardware flow control as described in *Flow* in the *XPort User Guide.*

See the *Device Installer User Guide* for information on configuring CP3 as IN3 or OUT3. JP4 can be used to monitor XPort pins 6 (CP1), 7 (CP2), and 8 (CP3). You can also use it to connect external circuitry or LEDs to the evaluation board.

**Figure 3-7. JP4 Configurable Pins Interface Header Footprint**

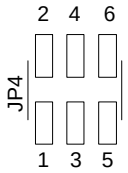



**Table 3-5. JP4 Connections**

| JP4 Pin # | Connects To |
|---|---|
| 1 | 3.3V |
| 2 | XPort pin 7, CP2 |
| 3 | Signal ground |
| 4 | XPort pin 6, CP1 |
| 5 | External reset – XPort pin 3 |
| 6 | XPort pin 8, CP3 |

## Timer

The timer circuit is a National LMC555 IC. Its purpose is to generate a timer clock (approximately 10 counts per second). This clock is routed to the input clock pin of the PLD to be used for state machine and counter functions.

# Board Layout

## Component Identification

**Figure 3-8. Board Layout**

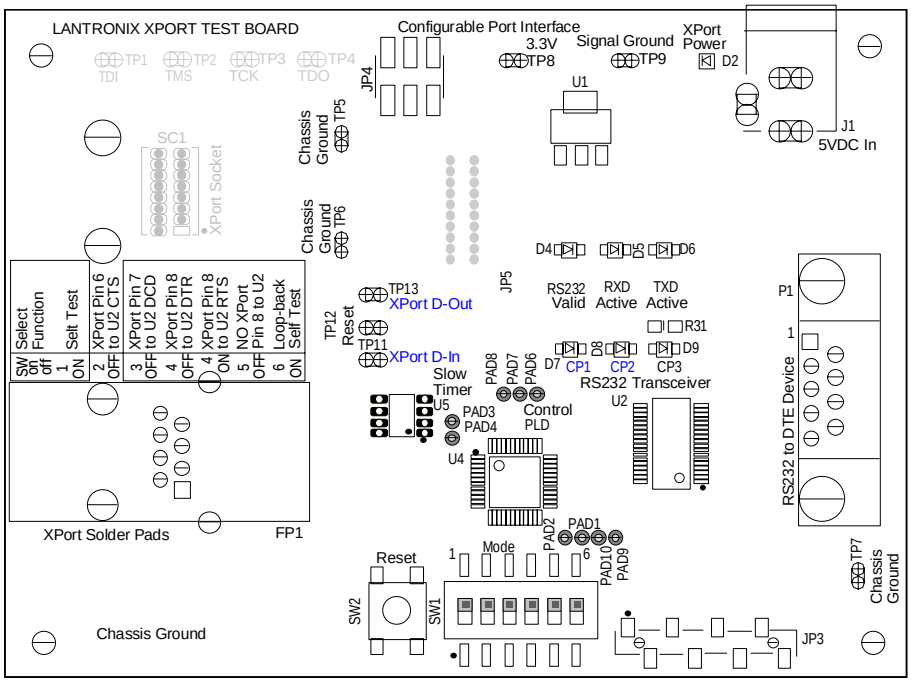



**Table 3-6. – Board Components**

| Label | Function | Label | Function |
|---|---|---|---|
| P1 | RS-232 interface. DB9F connector | TP1 | NA |
| J1 | +5VDC input connector | TP2 | NA |
| SC1 | NA | TP3 | NA |
| SW1 | Mode switch | TP4 | NA |
| SW2 | Reset switch | TP5 | Chassis ground |
| D2 | XPort power (red) (LED) | TP6 | Chassis ground |
| D4 | RS-232 valid (green) (LED) | TP7 | Chassis ground |
| D5 | RXD active (green) (LED) | TP8 | XPort 3.3VDC (3V3) |
| D6 | TXD active (green) (LED) | TP9 | Signal ground |
| D7 | CP1- XPort pin 6 goes low (LED) | | |
| D8 | CP2- XPort pin 7 goes low (LED) | TP11 | XPort pin 5, data in |
| D9 | CP3- XPort pin 8 goes low (LED) | TP12 | XPort pin 3, reset |
| JP3 | Programming for PLD | TP13 | XPort pin 4, data out |
| JP4 | Configurable pins interface header connector | FP1 | XPort solder pads |
| JP5 | Factory test – **no** connector | | |

# A: Compliance and Warranty Information

## Compliance Information

(According to ISO/IEC Guide 22 and EN 45014)

**Manufacturer's Name & Address:**

Lantronix 15353 Barranca Parkway, Irvine, CA 92618 USA

*Declares that the following product:*

**Product Name Model:** XPort Embedded Device Server

*Conforms to the following standards or other normative documents:*

**Electromagnetic Emissions:**

EN55022: 1998 (IEC/CSPIR22: 1993) Radiated RF emissions, 30MHz-1000MHz

Conducted RF Emissions – Telecom Lines – 150 kHz – 30 MHz

FCC Part 15, Subpart B, Class B

IEC 1000-3-2/A14: 2000

IEC 1000-3-3: 1994

**Electromagnetic Immunity:**

EN55024: 1998 Information Technology Equipment-Immunity Characteristics

Direct ESD, Contact Discharge

Indirect ESD

Radiated RF Electromagnetic Field Test

Electrical Fast Transient/Burst Immunity

RF Common Mode Conducted Susceptibility

Power Frequency Magnetic Field Test

**Manufacturer's Contact:**

Director of Quality Assurance, Lantronix
15353 Barranca Parkway, Irvine, CA 92618 USA
Tel: 949-453-3990
Fax: 949-453-3995

## Warranty

Lantronix warrants each Lantronix product to be free from defects in material and workmanship for a period of ONE YEAR. During this period, if a customer is unable to resolve a product problem with Lantronix Technical Support, a Return Material Authorization (RMA) will be issued. Following receipt of a RMA number, the customer shall return the product to Lantronix, freight prepaid. Upon verification of warranty, Lantronix will -- at its option -- repair or replace the product and return it to the customer freight prepaid. If the product is not under warranty, the customer may have Lantronix repair the unit on a fee basis or return it. No services are handled at the customer's site under this warranty. This warranty is voided if the customer uses the product in an unauthorized or improper way, or in an environment for which it was not designed.

Lantronix warrants the media containing its software product to be free from defects and warrants that the software will operate substantially according to Lantronix specifications for a period of 60 DAYS after the date of shipment. The customer will ship defective media to Lantronix. Lantronix will ship the replacement media to the customer.

In no event will Lantronix be responsible to the user in contract, in tort (including negligence), strict liability or otherwise for any special, indirect, incidental or consequential damage or loss of equipment, plant or power system, cost of capital, loss of profits or revenues, cost of replacement power, additional expenses in the use of existing software, hardware, equipment or facilities, or claims against the user by its employees or customers resulting from the use of the information, recommendations, descriptions and safety notations supplied by Lantronix. Lantronix liability is limited (at its election) to:

- Refund of buyer's purchase price for such affected products (without interest).
- Repair or replacement of such products, provided that the buyer follows the above procedures.

There are no understandings, agreements, representations or warranties, expressed or implied, including warranties of merchantability or fitness for a particular purpose, other than those specifically set out above or by any existing contract between the parties. Any such contract states the entire obligation of Lantronix. The contents of this document shall not become part of or modify any prior or existing agreement, commitment or relationship.

For details on the Lantronix warranty replacement policy, go to our web site at http://www.lantronix.com/support/warranty/index.html

# B: Acronyms

**CMOS**
Complementary Metal Oxide Semiconductor

**CTS**
Clear to Send

**DIP**
Dual Inline Package

**DCD**
Data Carrier Detect

**DCE**
Data Circuit terminating Equipment

**DTE**
Data Terminal Equipment

**DTR**
Data Terminal Ready

**ESD**
Electrostatic Discharge

**IC**
Integrated Circuit

**PCB**
Printed Circuit Board

**PLD**
Programmable Logic Device

**TP**
Test Point

**TQFP**
Thin Quad Flat Pack

**UART**
Universal Asynchronous Receiver Transmitter