LANTRONIX®

xPico™
Development Kit User Guide

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Revision History

Date	Rev.	Comments
August 2012	A	Initial Document.

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1. Introduction

About this Guide

This guide provides the information needed to use the xPico with the Development Kit. The intended audience is the engineers responsible for integrating the xPico into their product.

Notes: Everything required to evaluate the CoBos OS-based turnkey application is provided in the development kit. See Contents of the Kit.

Additional Documentation

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

Document	Description
xPico Development Kit Quick Start Guide	Instructions for getting the xPico module up and running on the evaluation board.
xPico Integration Guide	Provides information for integrating the xPico module on a customer platform.
xPico Product Brief	Provides a quick reference to xPico technical specifications.
xPico User Guide	Provides information needed to configure, use, and build CoBos applications on the xPico.

2. Development Kit

Using an xPico sample and the xPico Development Kit, you can get familiar with the product and understand how to integrate the xPico into a given product design.

Contents of the Kit

The xPico Development Kit contains the following items:

♦ xPico Module
♦ xPico Evaluation Board
♦ 5V Wall Adaptor
♦ xPico Mounting Quick Clip
♦ RS-232 Cable, DB9F/F, Null Modem
♦ CAT5 Ethernet Cable
♦ 40-pin Connector Sample

Evaluation Board Description

The xPico evaluation board provides a test platform for the Lantronix xPico device server products. The evaluation board uses either 5V power from a USB device port connector or power supplied to the Ethernet connector via PoE. The Development Kit includes a 5V wall adapter with a USB plug to allow powering the evaluation board from a standard power strip. The evaluation board includes all necessary regulators to power the 3.3V xPico module. The evaluation board has the following features:

♦ Two DB9 serial port connectors with one driven by a multi-protocol RS232, RS422, RS485 transceiver at rates up to 1Mbps. The second DB9 is driven by an RS232 transceiver. Serial port modes are configured by on-board jumpers.
♦ One RJ45 10/100 Ethernet port with an integrated PoE regulator to allow powering from standard PoE PSE.
♦ One Mini-Type B USB device port connector for 5V input power. This port also has an integrated USB-to-serial converter. The USB-to-serial converter can be connected to the xPico serial port via a board jumper setting.
♦ LEDs for the xPico Ethernet and System status outputs along with two additional LEDs that can be driven via jumper wire.
♦ Access to all logic level IO signals on the xPico via header pins for measurements and connections to other places.

The figure below shows the xPico evaluation board and highlights all of the various connectors and configuration jumpers. The following table lists each of the connectors and jumper headers along with their function. Further description and pin assignments are included in subsequent sections.
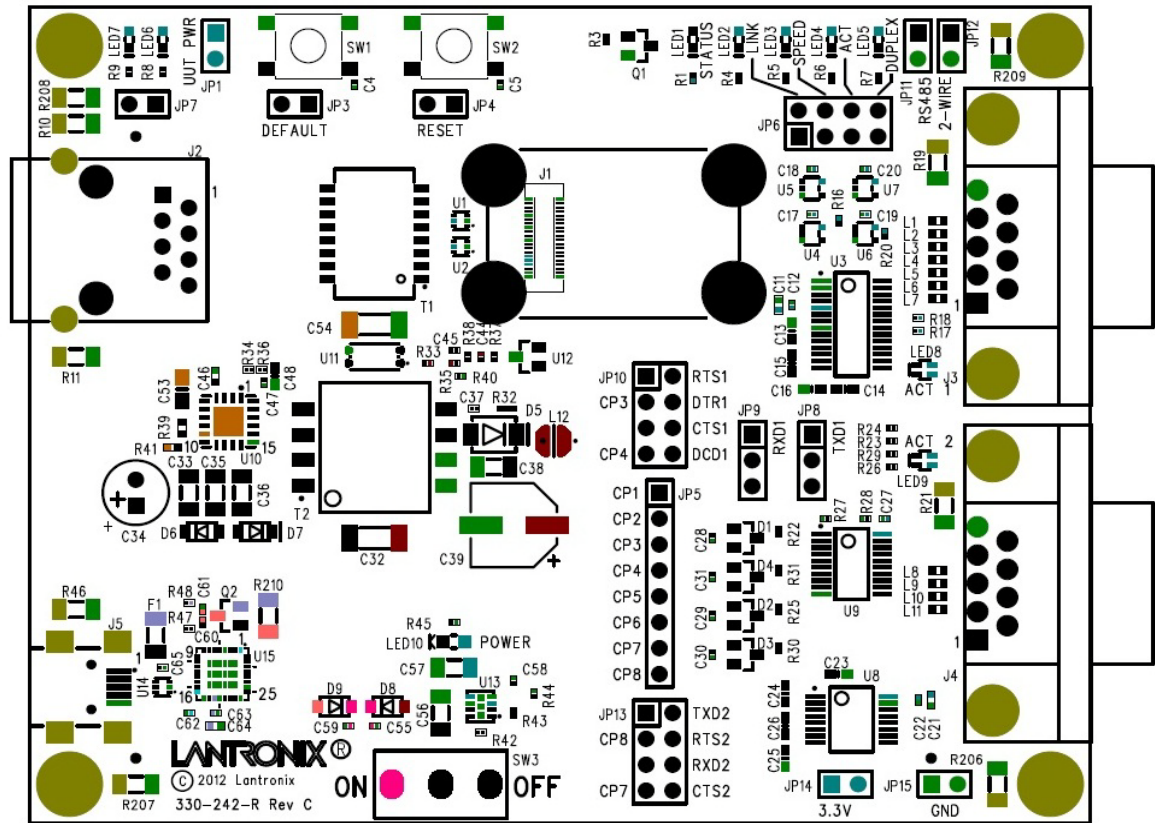
Figure 2-1 xPico Evaluation Drawing

Table 2-1   Evaluation Board Connectors, Header and Switches

Ref Des.	Connector/Header Function
J1	**xPico Module Socket** 40 pin socket for xPico module
J2	**RJ45 Connector** 10/100Mbps Ethernet connector. PoE powered device port.
J3	**Serial Port 1 DB9** Standard RS232/RS422/RS485 DB9 serial port connector.
J4	**Serial Port 2 DB9** Standard RS232 DB9 serial port connector.
J5	**Mini USB Connector** Standard USB device port that can be used to power the evaluation board or drive the evaluation board USB-to-serial converter.
JP1	**Module Power Jumper** Power connection to the module
JP3	**Default Button Jumper** Allows access to module reset to default signal and SW1 push button. Install to use SW1 as reset to default button.
JP4	**HW Reset Button Jumper** Allows access to module HW reset signal and SW2 push button. Install to use SW2 as HW reset button.

Ref Des.	Connector/Header Function
JP5	**Configurable Pin Header** Provides access to xPico module configurable pins CP1 to CP8
JP6	**Ethernet LED Header** Allows access to Ethernet LED signals. Install to drive evaluation board Ethernet LEDs with module LED signals.
JP7	**Spare LED Header** Provides two additional LEDs. Jumper to desired active low signal to light LED6 and LED7
JP8	**Serial Port 1 TX Source Header** Install jumper to select between DB9 serial port or USB-to-serial.
JP9	**Serial Port 1 RX Source Header** Install jumper to select between DB9 serial port or USB-to-serial.
JP10	**Serial Port 1 Breakout Header** Install jumpers to connect xPico Serial Port 1 flow control signals to the RS232/RS422/RS485 transceiver for Serial Port 1.
JP11	**Serial Port 1 RS232/RS422/RS485 Mode Jumper** Leave open for RS232 mode. Install for RS422/RS485
JP12	**Serial Port 1 RS422/RS485 Mode Jumper** Leave open for RS232 or 4-wire mode. Install for 2-wire mode.
JP13	**Serial Port 2 Breakout Header** Install jumpers to connect xPico Serial Port 2 TX/RX and configurable pins to the RS232 transceiver for Serial Port 2.
JP14	**3.3V Power Header** Provides access to the internal 3.3V power rail.
JP15	**Ground Header** Provides access to the internal signal ground rail.
SW1	**Module Reset to Default** When pushed asserts the xPico module reset to default function.
SW2	**Module Hardware Reset** When pushed asserts the xPico module hardware reset to reboot the module.
SW3	**Board Power Switch** Switches ON or OFF the logic power rails.

Serial Port 1 and 2 RS232/RS485 Interfaces

The evaluation board has one multiprotocol RS-232/RS422/RS485 port and one RS232 port for connection to the xPico internal UARTs. The ports are DB9 type connectors labeled J3 and J4. Included with the kit is a DB9-to-DB9 null modem cable (Lantronix P/N 500-164-R). The null modem cable can be used to connect either J3 or J4 directly to a standard PC RS232 serial port.

The tables below list the RS232/RS422/RS485 signals and corresponding pins on the evaluation board DB9 connectors. All signals at J3 are level-shifted by a multiprotocol transceiver.   J4 is an RS232 port only.

Table 2-2   RS-232 Signals on J3 and J4 Serial Ports

xPico Evaluation Board PIN FUNCTION	DB9 Pin #
Serial Port	
TX_232 (Data Out)	3
RX_232 (Data In)	2
CTS_232 (HW Flow Control Input)	8
RTS_232 (HW Flow Control Output)	7
DTR_232 (Modem Control Output)	4
GND (Ground)	5

Table 2-3   RS-422 4-Wire Signals on Serial Ports (J3 only)

xPico Evaluation Board PIN FUNCTION	DB9 Pin #
Serial Port	
TX- (Data Out)	3
RX+ (Data In)	2
TX+ (Data Out)	7
RX- (Data In)	4
GND (Ground)	5

Table 2-4   RS-485 2-Wire Signals on Serial Ports(J3 only)

xPico Evaluation Board PIN FUNCTION	DB9 Pin #
Serial Port	
TX-/RX- (Data IO)	3
TX+/RX+ (Data IO)	7
GND (Ground)	5

The J3 DB9 port is configured for RS232, RS422 (4-wire), or RS485 (2-wire) by jumper settings on JP11 and JP12. *Table 2-5* lists the correct jumper installation for each mode.

Table 2-5   JP11 and JP12 Jumper Settings for Serial Port 1 (J3)

xPico Evaluation Board Serial Port 1 Mode (J3)	JP11	JP12
RS232	OUT	OUT
RS485 2-wire	IN	IN
RS422 4-wire	IN	OUT

Figure 2-2   JP11 and JP12 Headers
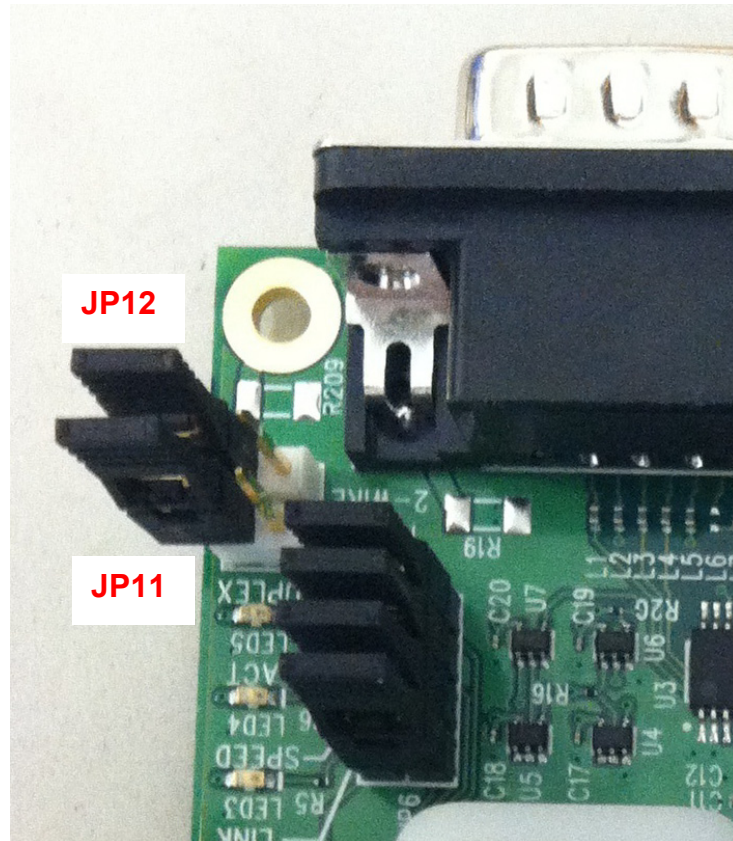
All of the xPico module serial port signals can be used as configurable pins. Jumper headers JP10 and JP13 have been included to allow for each of the serial port signals to be connected or disconnected from the serial port transceiver. The tables below list the JP10 and JP13 serial port signal connections. Install jumper or remove as needed for desired function. In addition, the first serial port on the xPico module can be connected to either the DB9 serial port on J3 or to the USB on J5 via the on board USB-to-serial converter. Jumpers JP8 and JP9 allow for the selection of sending the J3 DB9 or J5 USB-to-Serial Port 1.

In order to access the unit through the J5 USB port, you will need to install the USB-to-serial VCP driver from FTDI on your PC. It is available in the installation directory of DeviceInstaller 4.3.0.2 and later versions, for installation. It can also be obtained from the FTDI website provided below. Once installed, you will be able to view the xPico boot messages as well as provide command inputs through any PC terminal program, such as Tera Term.

Download FTDI USB-to-serial drivers at this website:
http://www.ftdichip.com/Drivers/VCP.htm

Table 2-6   JP8 and JP9 Port 1 DB9 Serial or USB/Serial Selection Headers

Serial Port 1 External Connection	JP8	JP9
Serial Port 1 to J3 DB9 for RS232/RS422/RS485	Jumper pins 1 to 2	Jumper pins 1 to 2
Serial Port 1 to J5 USB via USB-to-serial converter	Jumper pins 2 to 3	Jumper pins 2 to 3

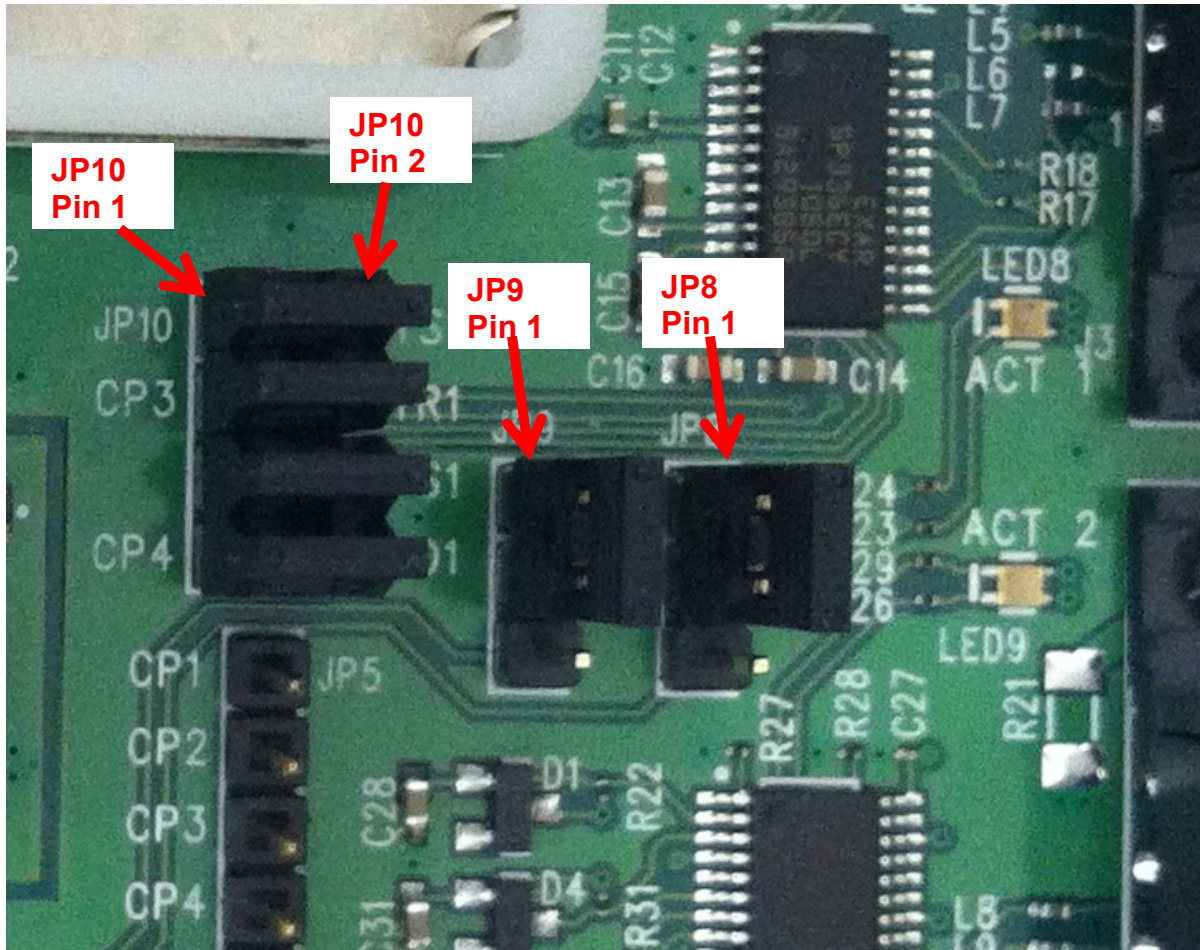*Figure 2-3   JP8, JP9, and JP10 Headers*

Table 2-7   JP10 Serial Port 1 Flow Control Break Out Header

xPico Module J1 Pin	xPico Module PIN FUNCTION	JP10 Pin #	JP10 Pin #	JP3 Evaluation Board Function
5	Serial port RTS1 or TX enable or configurable pin	1	2	RS232 RTS, RS485 TX Enable
16	Serial port CTS1 or configurable pin	5	6	RS232 CTS
28	Configurable pin CP3 or Serial port DTR1	3	4	RS232 DTR
30	Configurable pin CP4 or Serial port DCD1	7	8	RS232 DCD

Table 2-8   JP13 Serial Port 2 Break Out Header

xPico Module J1 Pin	xPico Module PIN FUNCTION	JP13 Pin #	JP13 Pin #	J4 Evaluation Board Function
25	Serial port TX2 or configurable pin	1	2	RS232
23	Serial port RX2 or configurable pin	5	6	RS232
3	CP8, Serial port RTS2	3	4	RS232 RTS
27	CP7, Serial port CTS2	7	8	RS232 CTS

Figure 2-4   JP13 Header
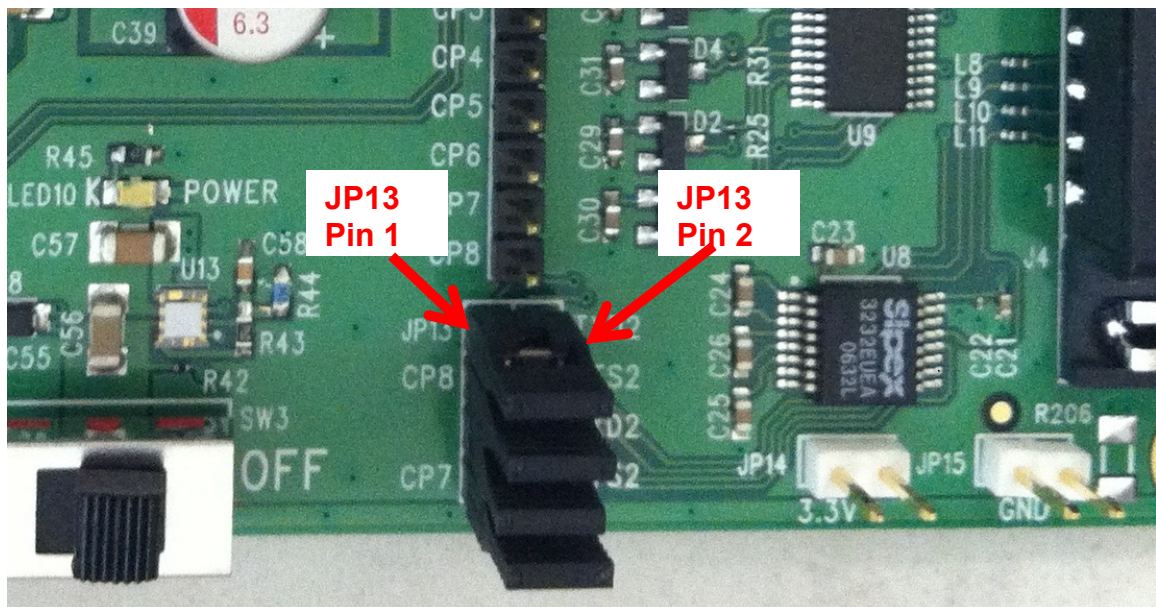
Ethernet Port

The xPico evaluation board includes one RJ45 with on-board magnetics for connection to the xPico module 10/100Mbps Ethernet interface. Connector J2 is the Ethernet port.

Power Supply

The evaluation board provides several options for input power. Included with the kit is a 5V wall adapter. The 5V wall adapter plugs into USB connector J5. In addition to powering from the wall adapter, the evaluation board can be powered from a standard PC USB Host port by connecting a USB cable between the PC and J5. The evaluation board can also be powered via Power-Over-Ethernet (PoE). The integrated PoE regulator accepts power from the Ethernet port on J2.

Table 2-9   Evaluation Board Power Options

Input Power Option	Description
5V Wall Cube	Connect 5V wall cube to J5 USB port. *Note:* *USB-to-serial not available in this option.*
USB Host Port	Connect J5 USB power to a PC USB Host Port. *Note:* *Host port can communicate with serial port via on-board USB-to-serial converter. See* Table 2-1 *for JP8 and JP9 jumper pin selection.*
PoE	Connect J2 Ethernet port to external PoE PSE switch or PoE injector

LEDs

The xPico evaluation board includes several LEDs for signal and unit status. The table below lists all of the LEDs and their function.

Table 2-10   LEDs Signals

J1 Pin	LED Ref Design	Color	LED Function
20	LED1	Orange	**xPico Status** LED blinks with patterns indicating module status. See the xPico user guide for a full description of the status LED blink patterns.
4	LED2	Orange	**Ethernet Link** LED is ON when the Ethernet port has a valid link
6	LED3	Orange	**Ethernet Speed** LED is ON when Ethernet is in 100Mbps mode
8	LED4	Orange	**Ethernet Activity** LED blinks when there is activity on the Ethernet port
14	LED5	Orange	**Ethernet Duplex** LED is ON when Ethernet is in half duplex mode
	LED6	Orange	**Spare LED** LED is ON when JP7 pin 1 is driven low
	LED7	Orange	**Spare LED** LED is ON when JP7 pin 2 is driven low.
10	LED8	Green	**Serial Port 1 TX Activity** LED is ON for activity on the Serial Port 1 transmit line
7	LED8	Orange	**Serial Port 1 RX Activity** LED is ON for activity on the Serial Port 1 receive line
25	LED9	Green	**Serial Port 2 TX Activity** LED is ON for activity on the Serial Port 2 transmit line
23	LED9	Orange	**Serial Port 2 RX Activity** LED is ON for activity on the Serial Port 2 receive line
	LED10	Blue	**3.3V Power LED** LED is ON when the evaluation board power supply is generating 3.3V

Additional Headers

The table below lists the pin functionality of the additional evaluation board headers.

Table 2-11   Additional Headers

J1 Pin	Header Pin	Signal	Function
36	JP3 pin 1	Module reset to defaults (active low)	Install jumper (JP3 pins 1 to 2) to use SW1 for asserting default function.
38	JP4 pin 1	Module hardware reset (active low)	Install jumper (JP4 pins 1 to 2) to use SW2 for asserting hardware reset.
35	JP5 pin 1	CP1, configurable pin	Test point
26	JP5 pin 2	CP2, configurable pin	Test point
28	JP5 pin 3	CP3, configurable pin	Test point
30	JP5 pin 4	CP4, configurable pin	Test point
32	JP5 pin 5	CP5, configurable pin	Test point
34	JP5 pin 6	CP6, configurable pin	Test point
27	JP5 pin 7	CP7, configurable pin	Test point
3	JP5 pin 8	CP8, configurable pin	Test point

Evaluation Board Schematic
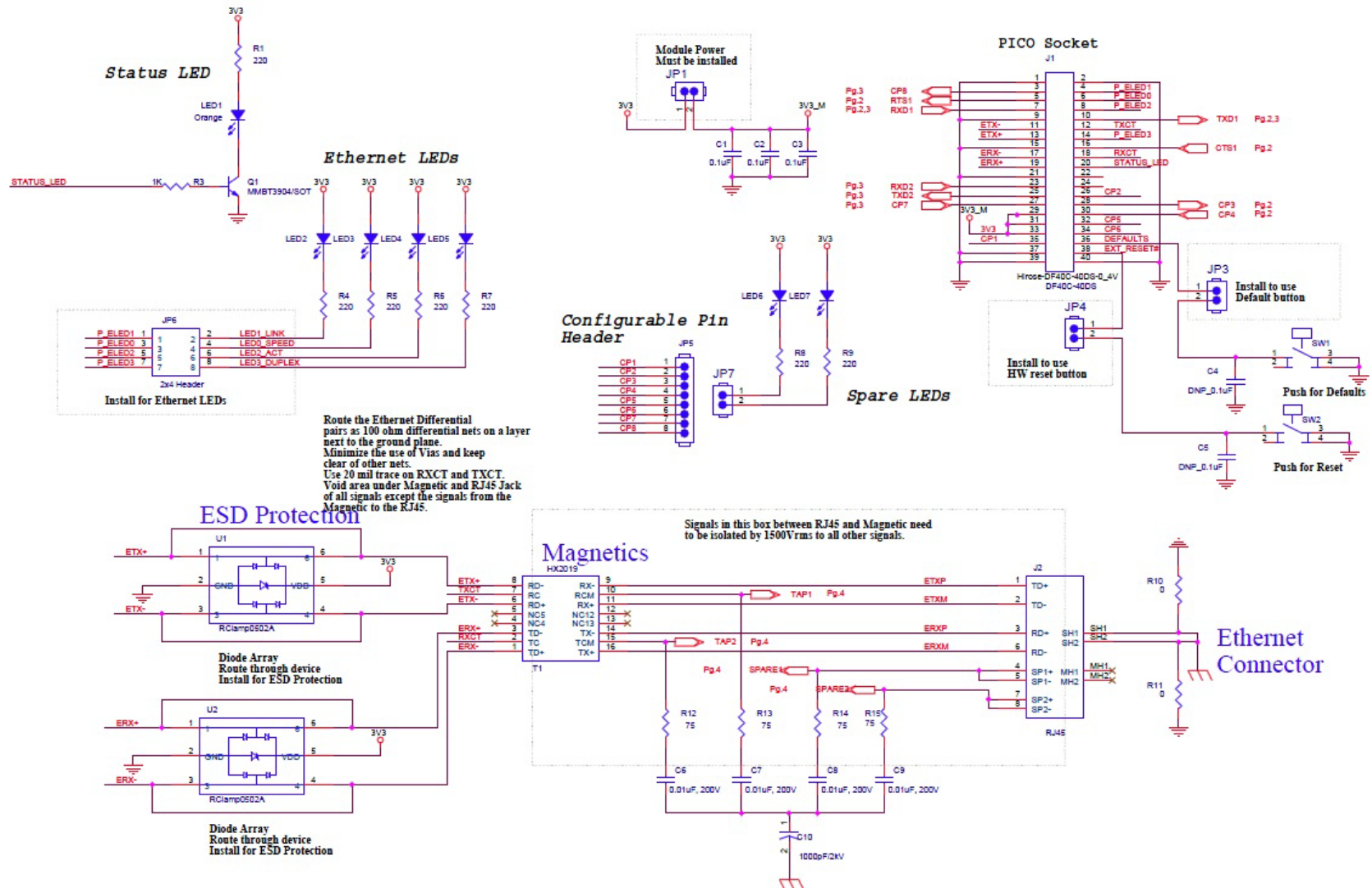
Figure 2-5   Evaluation Board Schematic, Part 1 of 5
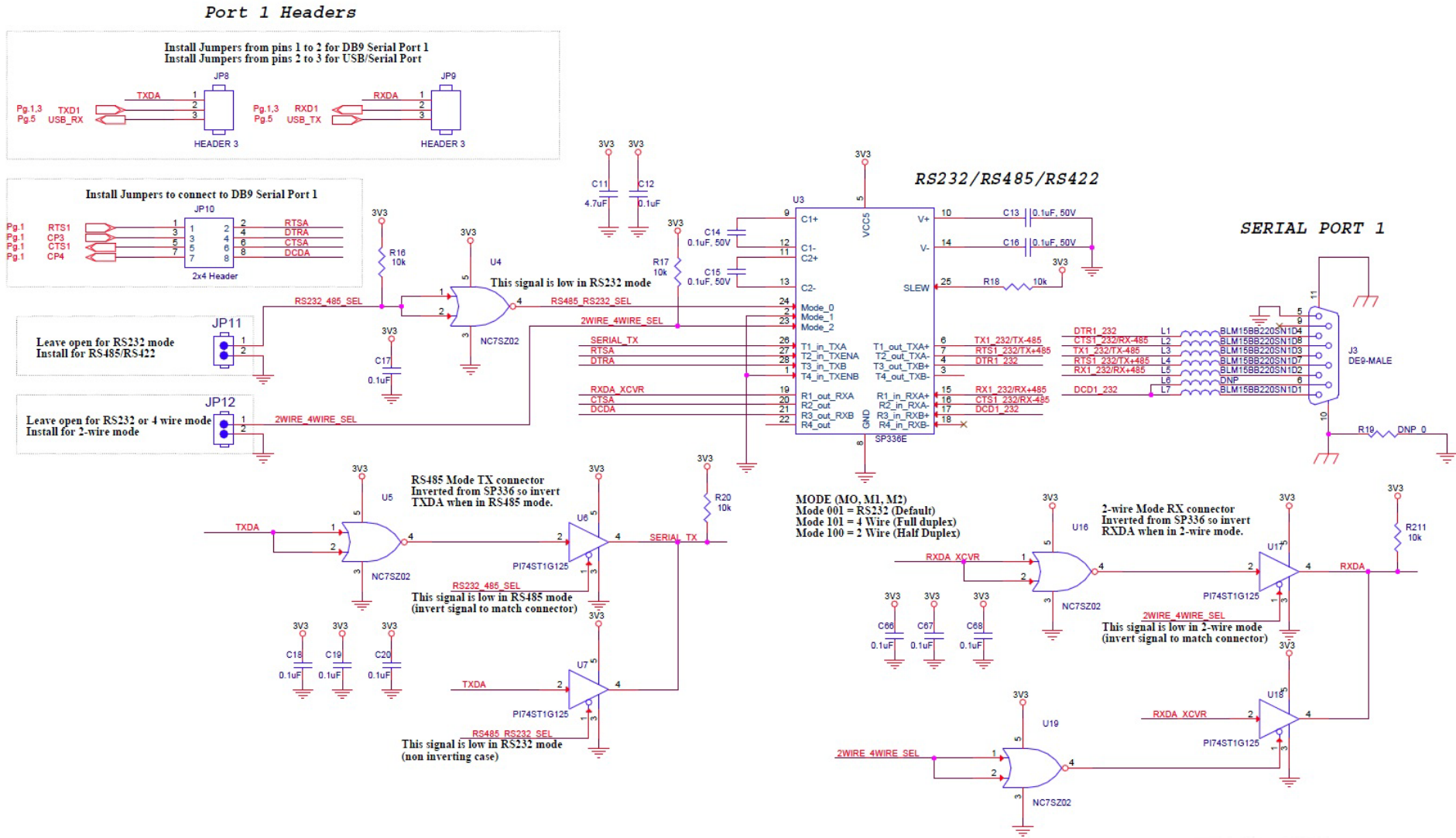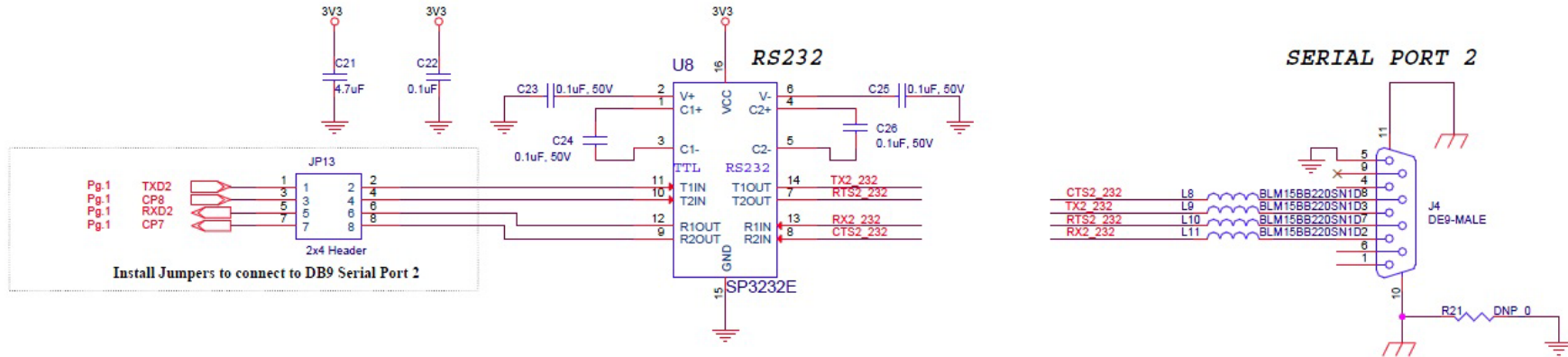
Figure 2-6   Evaluation Board Schematic, Part 2 of 5

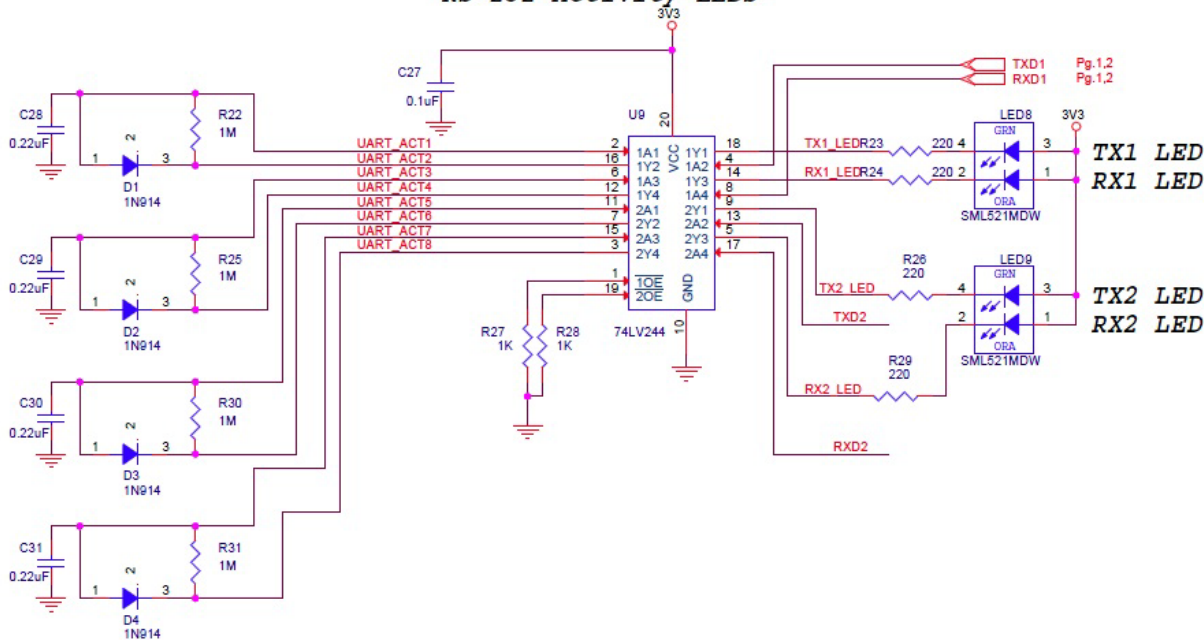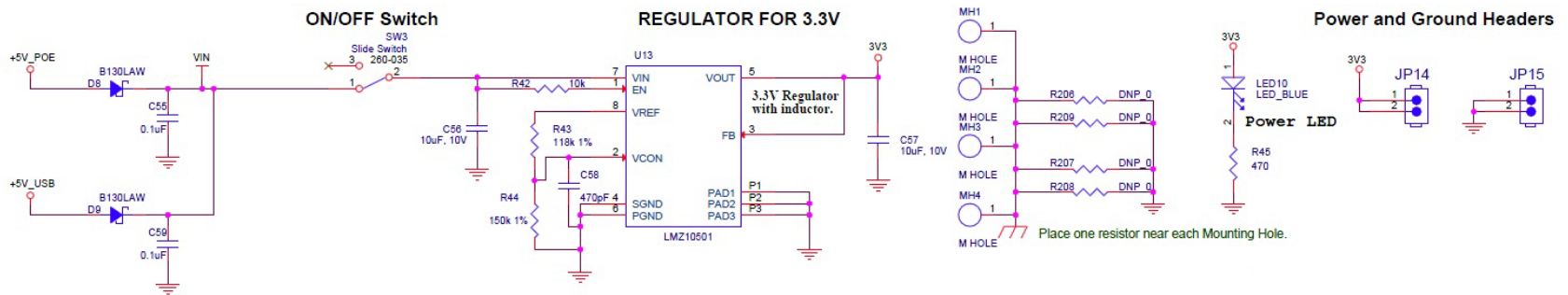**Figure 2-7   Evaluation Board Schematic, Part 3 of 5**
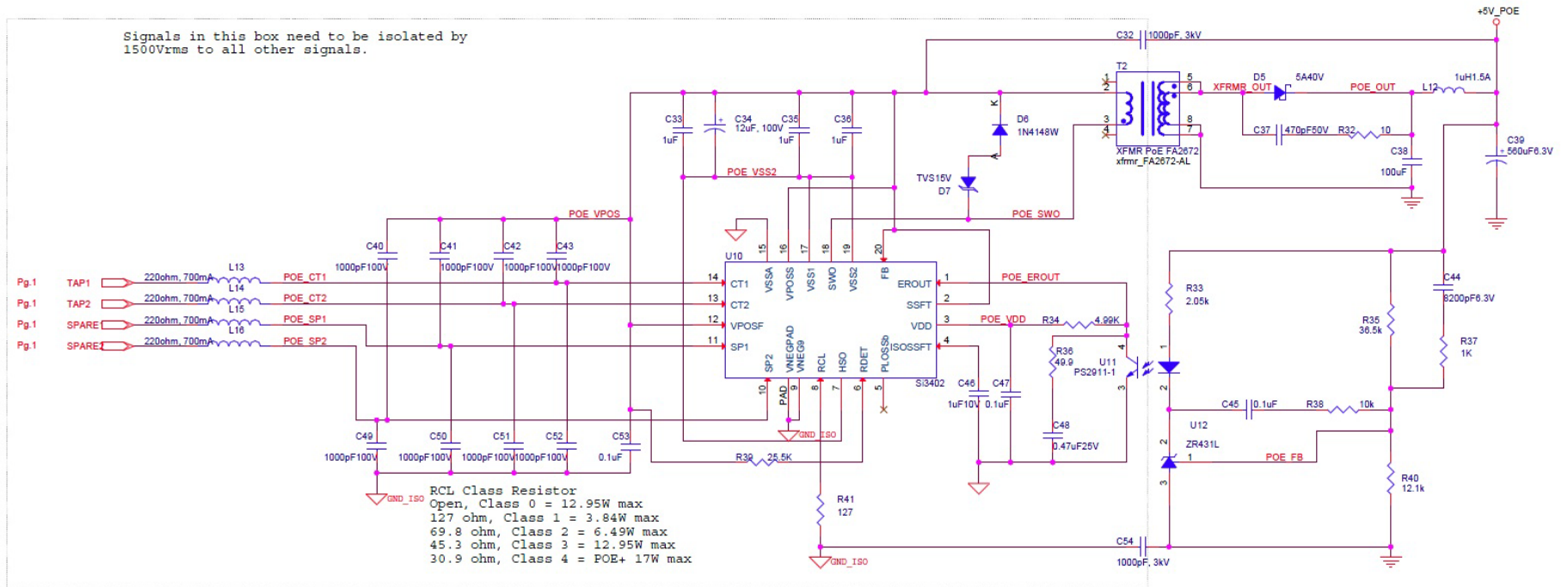
Figure 2-8   Evaluation Board Schematic, Part 4 of 5

POE Controller

Figure 2-9   Evaluation Board Schematic, Part 5 of 5