



xPico® 110

Wired Device Server Module Evaluation Kit User Guide

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Revision History

Date	Rev.	Comments
April 2017	A	Initial document.

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1: Introduction

About this Guide

This guide provides the information needed to use the Lantronix® xPico® 110 Device Server with the evaluation kit. The intended audience is the engineers that design the xPico 110 into their products.

Notes: All the Hardware and Firmware required to evaluate the xPico 110 turnkey application are provided in the Evaluation Kit. See [xPico 110 Evaluation Kit Contents](#) for more information.

Additional Documentation

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

Document	Description
<i>xPico 110 Wired Device Server Evaluation Kit - Quick Start Guide</i>	Instructions for getting the xPico 110 module up and running on the evaluation kit.
<i>xPico 110 Wired Device Server User Guide</i>	Provides information needed to configure, use, and build applications on the xPico.
<i>xPico 110 Wired Device Server - Integration Guide</i>	Provides information for integrating the xPico 110 module within the customer's product.
<i>xPico 110 Wired Device Server - Product Brief</i>	Provides a quick reference to xPico 110 technical specifications.

2: Evaluation Kit

The xPico 110 evaluation kit helps you get familiar with your xPico 110 wired device server so that you may understand how to integrate it into a given product design.

xPico 110 Evaluation Kit Contents

- ◆ xPico 110 Module
- ◆ xPico Evaluation Board
- ◆ 5V Wall Adaptor

xPico 110 Evaluation Kit Description

The xPico 110 evaluation kit provides a test platform for the Lantronix xPico 110 device server. The evaluation kit uses either 5V power from a USB device port connector or power supplied to the Ethernet connector via PoE. The evaluation kit also provides a header for connection to a 2.2V to 5.5V external source, such as a battery. The evaluation kit includes a 5V wall adapter with a USB plug to allow powering the evaluation kit from a standard power strip. The evaluation kit includes all necessary regulators to power the 3.3V xPico 110 module. The evaluation kit has the following features:

- ◆ One DB9M serial port connector with a multi-protocol RS232, RS422, RS485 transceiver at rates up to 1Mbps. Serial port modes are configured by on-board jumpers.
- ◆ A second RS232 serial port is available on a header.
- ◆ 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 second serial port via a board jumper setting.
- ◆ LEDs for the xPico Ethernet, WLAN, Serial port activities, and System status outputs along with two additional LEDs that can be driven via jumper wire are provided.
- ◆ 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 kit 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 110 Evaluation Kit XPW100100K-01 Connectors and Jumpers

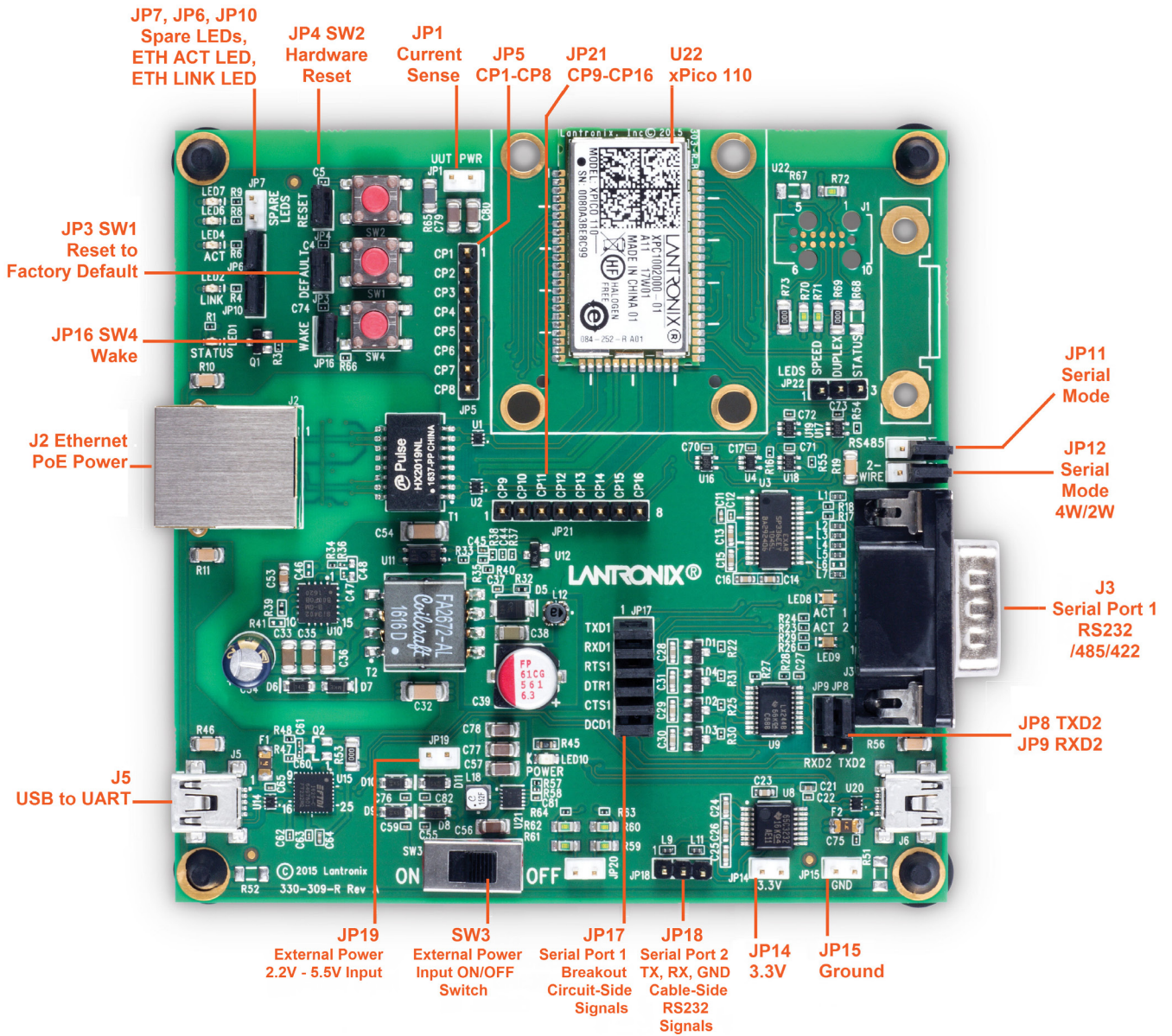


Table 2-1 Evaluation Kit Connectors, Header and Switches

Ref Des.	Connector/Header Functions
U22	<p>xPico 110 Module PCB Pads 76-pin castellation pads.</p> <p>Note: The evaluation kit comes with an xPico 110 already soldered onto the board, and is ready for testing.</p> <p>WARNING: If you need to replace or install a new xPico 110 sample onto the evaluation kit, an experienced SMT device soldering technician is highly recommended since the xPico 110 requires all the solder pads to be connected, especially those Ground pads pin 71 to pin 76 underneath the module. These pads need to have no soldering voids as possible to assure low impedance connections to Ground for best performance in both functionality, and EMC tests.</p>
J2	<p>RJ45 Connector 10/100Mbps Ethernet connector. PoE powered device port. Functional for xPico Ethernet modules.</p>
J3	<p>Serial Port 1 DB9M Standard RS232/RS422/RS485 DB9M serial port connector.</p>
J5	<p>Mini USB-B Receptacle Connector Standard USB device port that can be used to power the evaluation kit and/or drive the evaluation kit USB-to-Serial converter. The USB serial port converter then can be connected to the module second serial port via a jumper setting at JP8 and JP9</p>
JP1	<p>Module Power Jumper Allows for voltage measurement of the xPico module current sense resistor. The current sense resistor is 0.301 ohms. Thus, measured current in mA = measured voltage on JP1 * 1000 / 0.301 ohms</p>
JP3	<p>Default Button Jumper Allows access to module reset to default signal and SW1 push button. Install jumper to use SW1 as reset to default button.</p>
JP4	<p>Hardware Reset Button Jumper Allows access to module Hardware reset signal and SW2 push button. Install jumper to use SW2 as Hardware reset button.</p>
JP5	<p>Configurable Pin Header – 1st 8 CPs Provides access to xPico 110 module configurable pins CP1 to CP8</p>
JP6	<p>Ethernet ACT LED Header Allows access to Ethernet activity LED4. Install jumper to use the LED on board.</p>
JP7	<p>Spare LED Header Provides two additional LEDs. Jumper to desired active low signal to light LED6 and LED7</p>
JP8	<p>Serial Port 2 TX Source Header Install jumper to select between DB9 serial port or USB-to-serial.</p>
JP9	<p>Serial Port 2 RX Source Header Install jumper to select between DB9 serial port or USB-to-serial.</p>
JP10	<p>Ethernet LINK LED Header Allows access to Ethernet LINK LED2. Install jumper to use the LED on board</p>
JP11	<p>Serial Port 1 RS232/RS422/RS485 Mode Jumper Leave open for RS232 mode. Install for RS422/RS485</p>

Ref Des.	Connector/Header Functions
JP12	Serial Port 1 RS422/RS485 Mode Jumper Leave open for RS232 or 4-wire mode. Install for 2-wire mode.
JP14	3.3V Power Header Provides access to the internal 3.3V power rail.
JP15	Ground Header Provides access to the internal signal ground.
JP16	WAKE Header (Reserved, not used)
JP17	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.
JP18	Serial Port 2 Signal Header Provides access to the module second serial port. The signals on this header have been buffered by an RS232 transceiver.
JP19	External Power Header Provides connection point for an external 2.2V to 5.5V power source, such as a battery when not using USB Ports J5 VBUS power. This is connected to a 3.3V step up/down regulator that will power the evaluation kit and module circuitry. <i>Note: When JP19 is used, don't forget to connect JP15 for the return Ground.</i>
JP21	Configurable Pin Header – 2st 8 CPs Provides access to xPico 110 module configurable pins CP9 to CP16
SW1	Module Reset to Default When pushed and hold for a defined period, the xPico 110 module resets to factory default function.
SW2	Module Hardware Reset When pushed, the XPico 110 module resets (same as power cycle reset)
SW3	Board Power Switch Switch to turn ON/OFF external power input at JP19.
SW4	WAKE Button (Reserved, not used)

Serial Port 1 RS232/RS485 and Serial Port 2 RS232 Interface

The evaluation kit has one multiprotocol RS-232/RS422/RS485 port and one RS232 port for connection to the xPico 110 internal UARTs. Serial port 1 is a DB9M type connector labeled J3. Serial Port 2 is a 3-pin header, JP18. The null modem cable can be used to connect J3 directly to a standard PC RS232 serial port.

The tables below list the RS232/RS422/RS485 signals and corresponding pins on the evaluation kit DB9M connectors. All signals at J3 are level-shifted by a multiprotocol transceiver. JP18 is an RS232 port only.

Table 2-2 RS-232 Signals on J3 Serial Port

xPico 110 Evaluation Kit PIN FUNCTION SERIAL PORTS	DB9M Pin #
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
DCD_232 (Modem Control Input)	1
GND (Ground)	5

Table 2-3 RS-422 4-Wire Signals on J3 Serial Port

xPico 110 Evaluation Kit PIN FUNCTION SERIAL PORTS	DB9M Pin #
TX- (Data Out)	3
RX+ (Data In)	2
TX+ (Data Out)	7
RX- (Data In)	8
GND (Ground)	5

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

xPico 110 Evaluation Kit PIN FUNCTION SERIAL PORTS	DB9M Pin #
TX-/RX- (Data IO)	3
TX+/RX+ (Data IO)	7
GND (Ground)	5

The J3 DB9M port is configured for RS232, RS422 (4-wire), or RS485 (2-wire) by jumper settings on JP11 and JP12. [Table 2-5](#) lists the jumper installation for each mode.

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

xPico 110 Evaluation Kit Serial Port 1 Mode (J3)	JP11	JP12
RS232 (Default)	OUT	OUT
RS485 2-wire	IN	IN
RS422 4-wire	IN	OUT

JP18 is for connection to the module second serial port through an RS232 transceiver. The pin assignments for JP18 are listed below.

Table 2-6 JP18 Serial Port 2 RS232 Connections (cable-side signals)

xPico Evaluation Kit Serial Port 2	JP18 pin
TX RS232 output	1
Signal Ground	2
RX RS232 input	3

Jumper headers JP17, JP8 and JP9 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 JP17, JP8, and JP9 serial port signal connections. JP17 has all the serial signals, and also CP3 and CP4 which can be used for DTR and DCD signals. Install jumper or remove as needed for desired function of CPs or serials. In addition, the second serial port on the xPico 110 module can be connected to either the serial port JP18 or to the USB on J5 via the on board USB-to-serial converter U15 (FTDI device). Jumpers JP8 and JP9 allow for the selection of sending the JP18 or J5 USB-to-Serial converter 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, for installation. It can also be obtained from the FTDI website provided below. Once installed, you will be able to view the xPico110 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 2-7 JP17 Serial Port 1 Flow Control Break Out Header

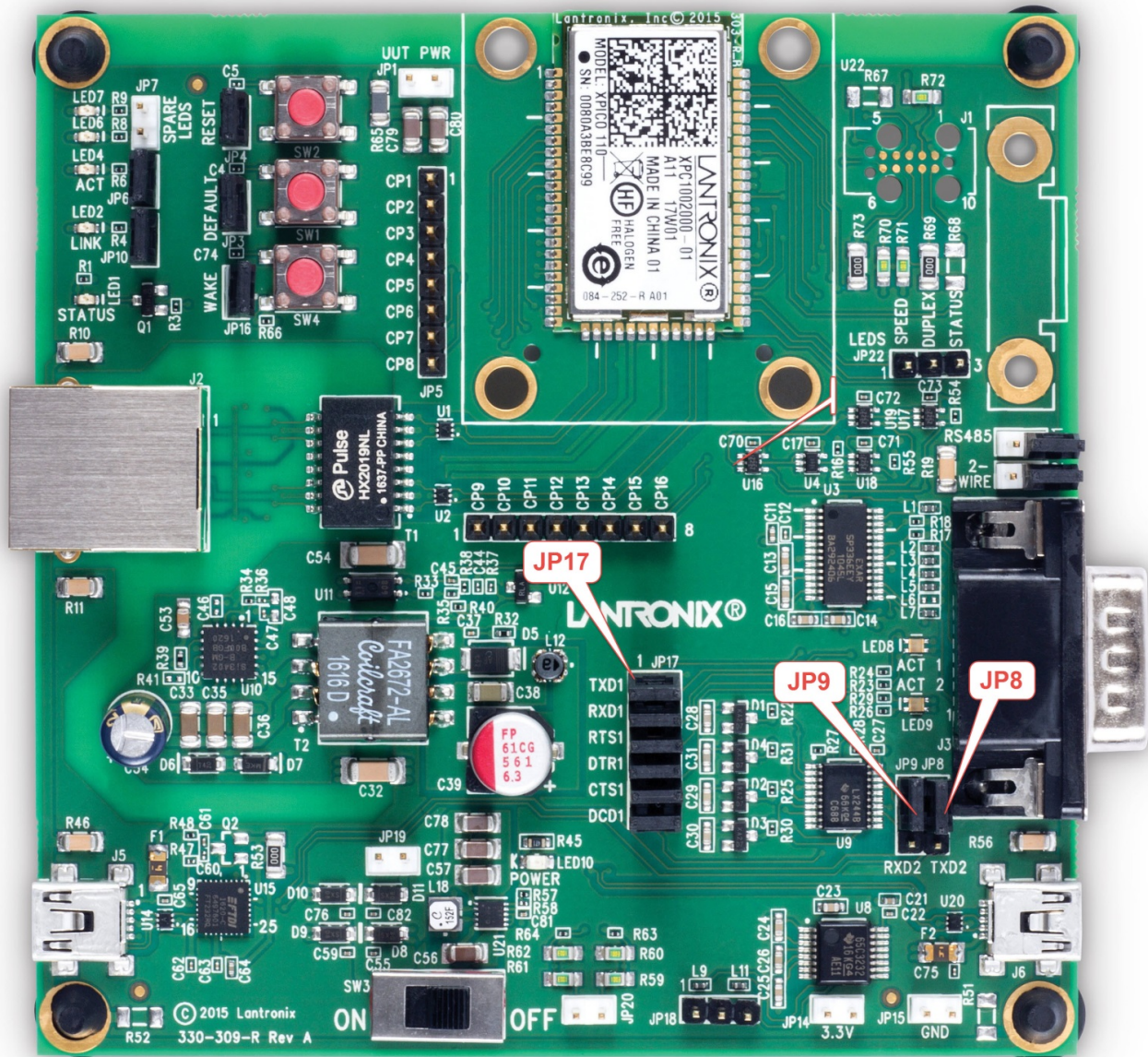
xPico 110 Module U22 Pin	xPico Module PIN FUNCTION	JP17 Pin #	JP17 Pin #	JP3 Evaluation Kit Function
57	Serial Port TXD1 (output)	2	1	RS232, RS485 TX
56	Serial port RXD1 (input)	4	3	RS232, RS485 RX
55	Serial port RTS1 or TX enable or configurable pin	6	5	RS232 RTS, RS485 TX Enable
12	Configurable pin CP3 or Serial port DTR1	8	7	RS232 DTR
54	Serial port CTS1	10	9	RS232 CTS
13	Configurable pin CP4 or Serial port DCD1	12	11	RS232 DCD

Note: JP17 jumpers 7 to 8 and 11 to 12 are not installed by default. All other JP17 jumpers are installed at the factory.

Table 2-8 JP8 and JP9 Port 2 Serial or USB/Serial Selection Headers

Serial Port 1 External Connection	JP8	JP9
Serial Port 2 to JP18 for RS232 (Default)	Jumper pins 1 to 2	Jumper pins 1 to 2
Serial Port 2 to J5 USB via USB-to-serial converter	Jumper pins 2 to 3	Jumper pins 2 to 3

Figure 2-2 JP8, JP9, and JP17 Headers



Ethernet Port

The xPico 110 evaluation kit includes one RJ45 connector with on-board magnetics for connection to the xPico 110 module 10/100Mbps Ethernet interface. Connector J2 is the Ethernet port.

Power Supply

The evaluation kit 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 kit can be powered from a standard PC USB Host port by connecting a USB cable between the PC and J5. The evaluation kit can also be powered via Power-Over-Ethernet (PoE). The integrated PoE regulator accepts power from the Ethernet port on J2. The final option is to connect DC power to header JP19.

Table 2-9 Evaluation Kit Power Options

Input Power Option	Description
5V Wall Cube	Connect 5V wall cube to the J5 USB port. <i>Note: USB-to-serial and USB device port not available in this option.</i>
USB	Connect J5 USB power to a PC USB Host Port. <i>Note: For J5 connection, PC Host port can communicate with serial port 2 via on-board USB-to-serial converter. See Table 2-1 for JP8 and JP9 jumper pin selection.</i>
PoE	Connect J2 Ethernet port to external PoE PSE switch or PoE injector.
JP19	Connect a 2.2V to 5.5V DC power source to JP19 pin 1 (+). Connect the power supply DC ground to JP19 pin 2 (-).

LEDs

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

Table 2-10 LEDs Signals

U22 Pin	LED Ref Design	Jumper option	Color	LED Function
41	LED1	Hardwired	Orange	xPico 110 Status LED blinks with patterns indicating module status. See the xPico 110 user guide for a full description of the status LED blink patterns.
47	LED2	JP10	Orange	Ethernet Link Status LED is ON when there is a valid Ethernet link
46	LED4	JP6	Orange	Ethernet Activity LED blinks when there is activity on the Ethernet port
None	LED6	JP7-1	Orange	Spare LED LED is ON when JP7 pin 1 is driven low
None	LED7	JP7-2	Orange	Spare LED LED is ON when JP7 pin 2 is driven low
None	LED8	Hardwired	Green	Serial Port 1 TX Activity LED is ON for activity on the Serial Port 1 transmit line
None	LED8	Hardwired	Orange	Serial Port 1 RX Activity LED is ON for activity on the Serial Port 1 receive line
None	LED9	Hardwired	Green	Serial Port 2 TX Activity LED is ON for activity on the Serial Port 2 transmit line
None	LED9	Hardwired	Orange	Serial Port 2 RX Activity LED is ON for activity on the Serial Port 2 receive line
None	LED10	Hardwired	Blue	3.3V Power LED LED is ON when the evaluation kit power supply is generating 3.3V

Additional Headers

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

Table 2-11 Additional Headers

U22 Pin	Header Pin	Signal	Function
40	JP3 pin 1	Module reset to defaults (active low)	Install jumper (JP3 pins 1 to 2) to use SW1 for asserting default function.
51	JP4 pin 1	Module hardware reset (active low)	Install jumper (JP4 pins 1 to 2) to use SW2 for asserting hardware reset.
39	JP16		Reserved
45	JP5 pin 1	CP1, configurable pin	Test point
42	JP5 pin 2	CP2, configurable pin	Test point
12	JP5 pin 3	CP3, configurable pin	Test point, can be DTR1 if jumper is on JP17 pin 7 to pin 8
13	JP5 pin 4	CP4, configurable pin	Test point, can be DCD1 if jumper is on JP17 pin 11 to pin 12
16	JP5 pin 5	CP5, configurable pin	Test point
17	JP5 pin 6	CP6, configurable pin	Test point
14	JP5 pin 7	CP7, configurable pin	Test point
15	JP5 pin 8	CP8, configurable pin	Test point
6	JP21 pin 1	CP9, configurable pin	Test point
7	JP21 pin 2	CP10, configurable pin	Test point
8	JP21 pin 3	CP11, configurable pin	Test point
9	JP21 pin 4	CP12, configurable pin	Test point
10	JP21 pin 5	CP13, configurable pin	Test point
11	JP21 pin 6	CP14, configurable pin	Test point
43	JP21 pin 7	CP15, configurable pin	Test point
44	JP21 pin 8	CP16, configurable pin	Test point

Note: Please refer to the *xPico 110 Wired Device Server Integration Guide* for evaluation board schematics.