xPico® 110
Wired Device Server Module
Integration Guide

Part Number 900-782-R
Revision A March 2017

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This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

1. Reorient or relocate the receiving antenna.
2. Increase the separation between the equipment and receiver.
3. Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
4. Consult the dealer or an experienced radio/TV technician for help.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This device is intended only for OEM Integrators. The OEM integrator should be aware of the following important issues.

Revision History

Date	Rev.	Comments
March 2017	A	Initial document.

For the latest revision of this product document, please check our online documentation at www.lantronix.com/support/documentation.

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1. *Introduction*

About the Integration Guide

This integration guide provides the information needed to integrate a Lantronix® xPico® *110* wired device server module into customer-printed circuit boards. This document is intended for engineers responsible for integrating xPico 110 into their product.

The sections in chapter 2 provide board schematic and layout recommendations for the xPico 110 device server module. Signals that are unused can be left floating. The user is advised to follow the design guide below for all indicated sections in circumstances where the application has the potential to use both components as a stuff option.

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 Wired Device Server Module User Guide	Provides information needed to configure, use, and update the xPico firmware.
xPico Wired Device Server Module User Guide	Provides information needed to configure, use, and update the xPico firmware.
xPico 110 Evaluation Kit Quick Start Guide	Provides the steps for getting the xPico 110 device server up and running.
xPico 110 Evaluation Kit User Guide	Provides a detailed description of the xPico 110 evaluation kit hardware
APS: Modbus Protocol User Guide	Provides detailed information for installing and operating the IAP device server using our Modbus firmware.
DeviceInstaller™ User Guide	Provides instructions for using the Windows® based utility to configure the xPico and other Lantronix device servers.
Com Port Redirector User Guide	Provides information on using the Windows based utility to create a virtual com port.

2. Functional Description

Designed for quick integration with minimal engineering effort, the chip-sized xPico 110 wired device server module provides simplicity and flexibility making it the easiest and fastest network-enabling module on the market.

The xPico 110 wired device server module is an extremely compact networking solution that enables Ethernet connectivity on virtually any device with a serial interface. The included industry-proven Lantronix device server application and full IP stack allow seamless remote access to device data simplifying design integration while providing robust connectivity.

As one of the smallest wired device server modules, the xPico 110 can be utilized in designs typically intended for chip solutions. A key difference between the xPico 110 wired device server module as compared to other devices in the market is that there is virtually no need to write a single line of code, translating to a much lower development cost and faster time-to-market.

Table 2-1 xPico 110 Part Numbers

Part Number	Description
XPC100200S-01	xPico 110 Wired Device Server Module, SMT, AES, Industrial Temp, 10-pack
XPC100200B-01	xPico 110 Wired Device Server Module, SMT, AES, Industrial Temp, Tape & Reel, BULK
XPC100200K-01	xPico 110 Evaluation Kit, Wired Device Server Module

xPico 110 Features

The xPico 110 wired device server module contains Lantronix DSTni® EX controller, with internal 256 KBytes of SRAM, 16 KBytes of boot ROM, and integrated 10/100 PHY.

- 3.3-volt serial interface
- 16 Configurable I/O pins
- All logic level I/O pins are 5V input tolerant
- 4-Mbit flash memory
- Power supply filters
- Reset circuit
- +1.8V regulator

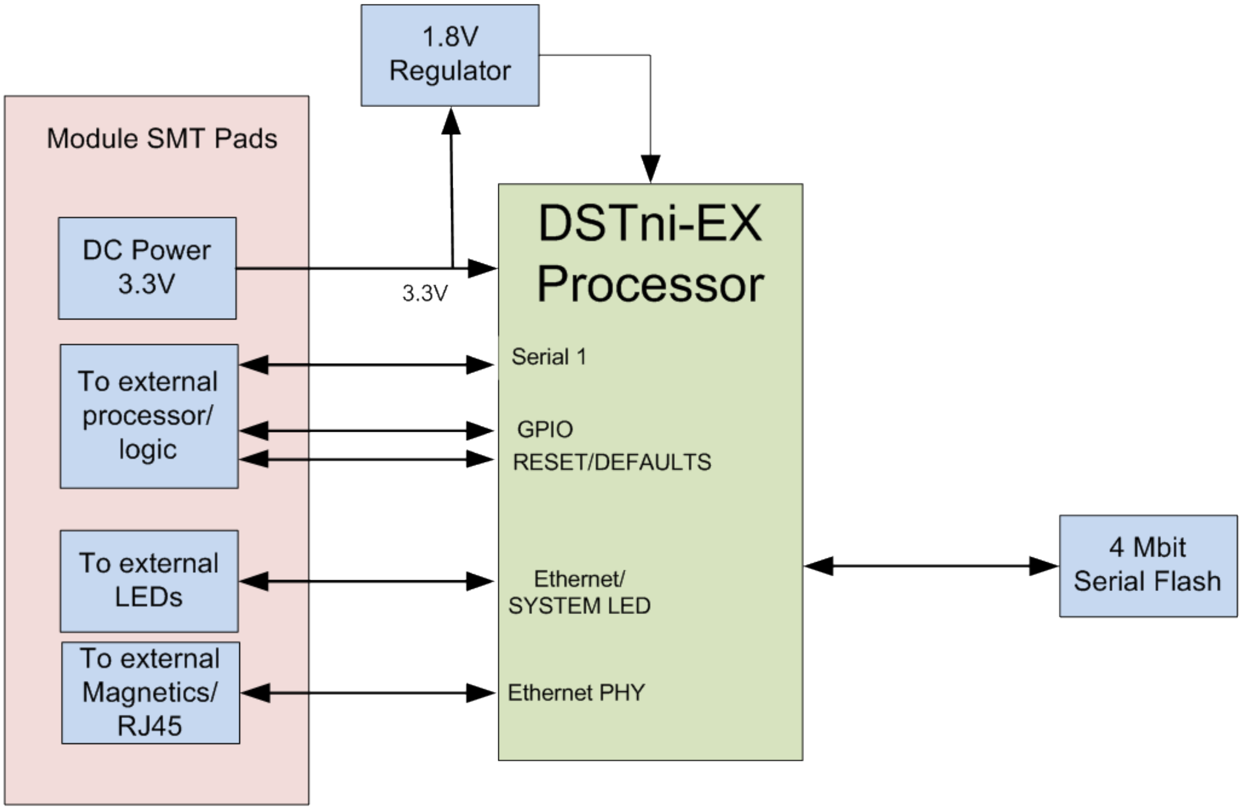
Note: *The xPico 110 wired device server module does not contain integrated Ethernet magnetics. An external Ethernet magnetic module and RJ45 Jack is required to interface to a standard 10/100 Mbps Ethernet network.*

The xPico 110 unit requires +3.3-volt power, and is designed to operate in an extended temperature range (see *Specifications*).

Block Diagram

The following drawing is a block diagram of the xPico 110 wired device server module.

Figure 2-2 xPico 110 Block Diagram



PCB Interface

The xPico 110 unit has a serial interface compatible with data rates up to 921,600 bps (in high-performance mode). The serial signals (RX, TX, RTS, CTS, and all CPs) are 3.3V CMOS logic level and 5V tolerant. The serial interface pins include +3.3V, ground, and reset. The serial signals usually connect to an internal device, such as a UART. For applications requiring an external cable running with RS-232 or RS422/485 voltage levels, the xPico 110 device must be designed with an external serial transceiver chip with appropriate protocol. All configurable I/O pins are 3.3V CMOS logic level and 5V input tolerant.

An external Ethernet magnetic module and RJ45 is required to interface the xPico 110 to a standard 10/100Mbps Ethernet network.

Shown below is the xPico 110 pin connection diagram.

Table 2-3 xPico 110 PCB Interface Signals

Signal Name	Pin #	Primary Function	Reset State	Internal Pull-up	Driver Strength
POWER, GROUND, AND UNUSED PINS					
GND	1, 3, 5, 20, 23, 24, 27, 32, 35, 36, 58, 60, 61, 64, 65, 69, 70	Ground pins for Signal and Power			
THERMAL PAD GND	71, 72, 73, 74, 75, 76	Power Ground and heat relief			
+3.3V	48, 49, 50	3.3V Input Power			
RESERVED	18, 19, 29, 30	Reserved pins. Do not use, leave them open			
NC	2, 4, 21, 22, 39, 59	No internal connection			
ETHERNET SIGNALS					
ETX+	25	Ethernet Transmit Differential (positive)	Output		
ETX-	26	Ethernet Transmit Differential (negative)	Output		
ETCT	28	Ethernet Transmit Center Tap			
ERX+	33	Ethernet Receive Differential (positive)	Input		
ERX-	34	Ethernet Receive Differential (negative)	Input		
ERCT	31	Ethernet Receive Center Tap			

Signal Name	Pin #	Primary Function	Reset State	Internal Pull-up	Driver Strength
SERIAL SIGNALS – PORT 1					
TXD1	57	Serial-1 Transmit Data	Output		2mA
RTS1	55	Serial-1 Ready-To-Send/Serial Transmit Enable	Output		2mA
RXD1	56	Serial-1 Receive Data	Input	Active 56K to 122K	
CTS1	54	Serial-1 Clear-To-Send	Input	Active 56K to 122K	
SERIAL SIGNALS – PORT 2					
TXD2	53	Serial-2 Transmit Data	Output		2mA
RXD2	52	Serial-2 Receive Data	Input	Active 56K to 122K	
CONFIGURABLE I/O PINS					
CP1	45	Configurable IO - 1	Input	Active 56K to 122K	4mA
CP2	42	Configurable IO - 2	Input	Active 56K to 122K	4mA
CP3	12	Configurable IO - 3	Input	Active 56K to 122K	4mA
CP4	13	Configurable IO - 4	Input	Active 56K to 122K	4mA
CP5	16	Configurable IO - 5	Input	10K	4mA
CP6	17	Configurable IO - 6	Input	10K	4mA
CP7	14	Configurable IO - 7	Input	Active 56K to 122K	4mA
CP8	15	Configurable IO - 8	Input	Active 56K to 122K	4mA
CP9	6	Configurable IO - 9	Input	Active 56K to 122K	4mA
CP10	7	Configurable IO - 10	Input	Active 56K to 122K	4mA
CP11	8	Configurable IO - 11	Input	Active 56K to 122K	4mA

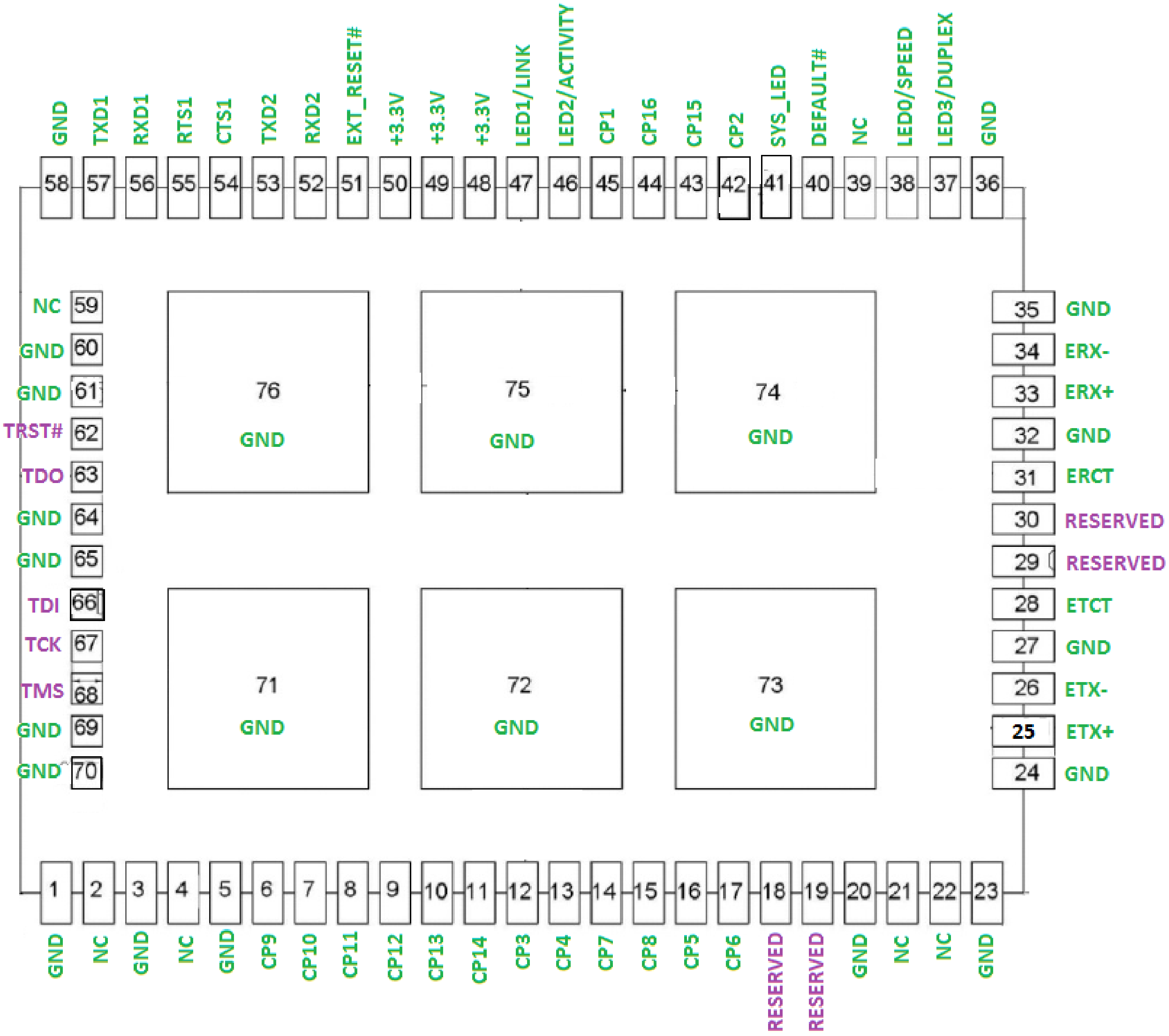
Signal Name	Pin #	Primary Function	Reset State	Internal Pull-up	Driver Strength
CP12	9	Configurable IO - 12	Input	Active 56K to 122K	4mA
CP13	10	Configurable IO - 13	Input	Active 56K to 122K	4mA
CP14	11	Configurable IO - 14	Input	Active 56K to 122K	4mA
CP15	43	Configurable IO -15	Input	Active 56K to 122K	4mA
CP16	44	Configurable IO - 16	Input	Active 56K to 122K	4mA
POWER-ON RESET AND RESET-TO-DEFAULT-PARAMETER SIGNALS					
EXT_RESET#	51	Hardware Reset. Active Low. Not 5V tolerant	Input	10K	
DEFAULT#	40	Reset Device Configurations to Default Values. Active Low. See instructions for use.	Input	Active 56K to 122K	
LED SIGNALS					
LED0/SPEED	38	Ethernet Speed LED. Active Low	Output		8mA
LED1/LINK	47	Ethernet Link LED. Active Low	Output		8mA
LED2/ACTIVITY	46	Ethernet Activity LED. Active Low	Output		8mA
LED3/DUPLEX	37	Ethernet Duplex LED. Active Low	Output		8mA
SYS_LED	41	Device Status LED. Active High	Input	Active 56K to 122K	4mA
JTAG SIGNALS (FOR MANUFACTURING TEST ONLY, DO NOT USE)					
TRST#	62	JTAG Test Reset. For Factory Test Only. Do not use, leave open			
TDO	63	JTAG Test Data Output. For Factory Test Only. Do not use, leave open			
TDI	66	JTAG Test Data Input. For Factory Test Only. Do not use, leave open			

Signal Name	Pin #	Primary Function	Reset State	Internal Pull-up	Driver Strength
TCK	67	JTAG Test Clock. For Factory Test Only. Do not use, leave open			
TMS	68	JTAG Test Mode Select. For Factory Test Only. Do not use, leave open			

Note 1: The CP pins can be configured as pull-up or pull-down.

Note 2: It is highly recommended to connect RTS and CTS for serial port 1.

Figure 2-4 xPico 110 Castellation Pin-Out



Ethernet Interface

The xPico 110 wired device server module integrates an internal 10/100 Mbps Ethernet MAC and PHY. An external magnetic module and RJ45 is required in order to connect to a standard 10/100Mbps Ethernet network.

Table 2-5 Ethernet Interface Signals for xPico 110

Signal Name	DIR	Contact	Primary Function	Signal Layout Requirement
ETX+	Out	25	Differential Ethernet transmit data +	100 ohm differential with ETX-
ETX-	Out	26	Differential Ethernet transmit data -	100 ohm differential with ETX+
ERX+	In	33	Differential Ethernet receive data +	100 ohm differential with ERX-
ERX-	In	34	Differential Ethernet receive data -	100 ohm differential with ERX+
ETCT		28	Ethernet transmit center tap connection	Route > 20 mil width
ERCT		31	Ethernet receive center tap connection	Route > 20 mil width

The table below lists several magnetic modules and combination RJ45/magnetic jacks that can be used with the xPico 110 unit.

Table 2-6 Recommended Magnetic Modules and Combo RJ45/Magnetic Module Connectors

Type	Manufacturer	Part Number
Magnetic only (requires RJ45)	BI-Tech	HS91-011-80LFTR
Magnetic only (requires RJ45)	Mingtek	HN0013SG
Combination RJ45/Magnetic	Belfuse	08B0-1D1T-06-F
Combination RJ45/Magnetic	Midcom	MIC2411D-0117T-LF3
Magnetic for POE	PULSE	HX2019

The Ethernet differential pair signals, ERX-/ERX+ and ETX-/ETX+ should be routed as 100-ohm differential pairs on a layer next to the signal ground plane. The use of vias on these signals should be minimized. The center tap signal connections between the magnetic and xPico (wired) module are required. Center tap signals RCT and TCT should be routed with at least 20 mil trace thickness. The area between the magnetic module and RJ45 jack, including the area under both, should be voided of all signals and planes, except for the signals connecting to both. The signals connecting between the RJ45 and magnetic are required to be isolated by 1500Vrms from all other signals and planes, including chassis and signal ground. The connector shield should be connected to chassis. It is recommended that 1206 resistor pads from chassis ground to signal ground be placed next to each of the shield tabs. The resistor pads allow for 0 ohm jumper, ferrite beads, or decoupling caps to be installed as needed for EMI/EMC improvement.

The Ethernet LED signals should be routed to discrete LEDs or to the LED pins on the RJ45 through 220 ohm or larger resistors. The LED signals are active low. The Ethernet LED signals should be isolated from the signals that connect between the RJ45 and magnetic module.

Also shown in the reference schematic is a recommended TVS array that can be used to improve ESD and EFT in harsh environments. The device shown is a Semtec RClamp0502A. This device features route through pin assignments allowing for the Ethernet differential signal pairs to be routed without altering the trace impedance or adding vias. Due to this routing, the device could be installed or depopulated as needed.

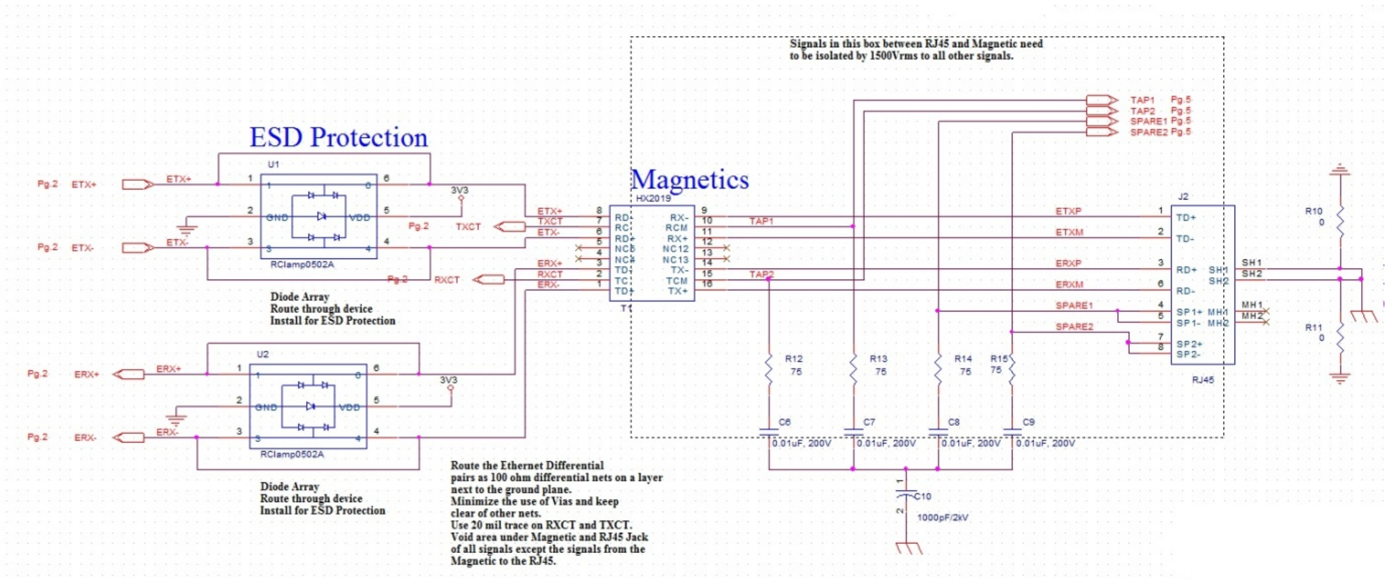
See the Lantronix app note***, How to Connect a Lantronix Embedded Module to a Wired Ethernet Port*** for more details on Ethernet connection and routing, http://www.lantronix.com/pdf/appnotes/Connect-LTRX-Embed-Module-to-Wired-Ethernet_AN.pdf.

The xPico 110 module can also be powered from POE using a POE magnetic and POE powered device controller. Lantronix uses the Silabs Si3402 POE controller to power the xPico development board via POE. If using POE the Ethernet magnetic module should be changed to a POE compatible module such as Pulse HX2019.

Refer to the evaluation board schematic in the *xPico 110 Evaluation Kit User Guide* for an example circuit. See www.lantronix.com/support/documentation.

Refer to the SiLabs data sheet for Si3402 for more information on using the SiLabs POE controller.

Figure 2-7 Ethernet Connection Example



Signals in this box between RJ45 and Magnetic need to be isolated by 1500Vrms to all other signals.

Diode Array
Route through device
Install for ESD Protection

Diode Array
Route through device
Install for ESD Protection

Route the Ethernet Differential pairs as 100 ohm differential nets on a layer next to the ground plane.
Minimize the use of Vias and keep clear of other nets.
Use 20 mil trace on RXCT and TXCT.
Void area under Magnetic and RJ45 Jack of all signals except the signals from the Magnetic to the RJ45.

Serial Interface

The xPico 110 has two external serial interfaces. The signal levels on the serial interface are 3.3V logic level with 5V tolerant inputs. The serial interfaces require an external transceiver in order to connect to external RS232, RS485, or RS422 networks. The signals of Serial Port 1 may be connected as shown in the reference schematic, *Figure 2-9* serial port example, below. The transceiver shown in the reference schematic is of type Exar, part number SP336. This transceiver is a multiprotocol RS232, RS485, RS422 transceiver. Single protocol transceivers may be used as required. The xPico interface may also be directly connected to the UART interface of an external CPU. Serial Port 2 is a three wire interface only. It operates like Serial Port 1, except it does not support hardware Flow Control (i.e. no RTS/CTS) and modem control (i.e. no DTR/DCD). It is highly recommended to connect RTS and CTS for serial port 1.

Table 2-8 xPico 110 Serial Port Signals

Signal	Pin	Description	Reset State
TXD1	57	Serial Transmit Data output	Output
RTS1	55	Serial Ready-to-Send / Serial Transmit enable	Output
RXD1	56	Serial Receive Data input	Input
CTS1	54	Serial Clear-to-Send	Input
TXD2	53	Serial Transmit Data output 2	Output
RXD2	52	Serial Receive Data input 2	Input

Figure 2-9 Serial Port Example

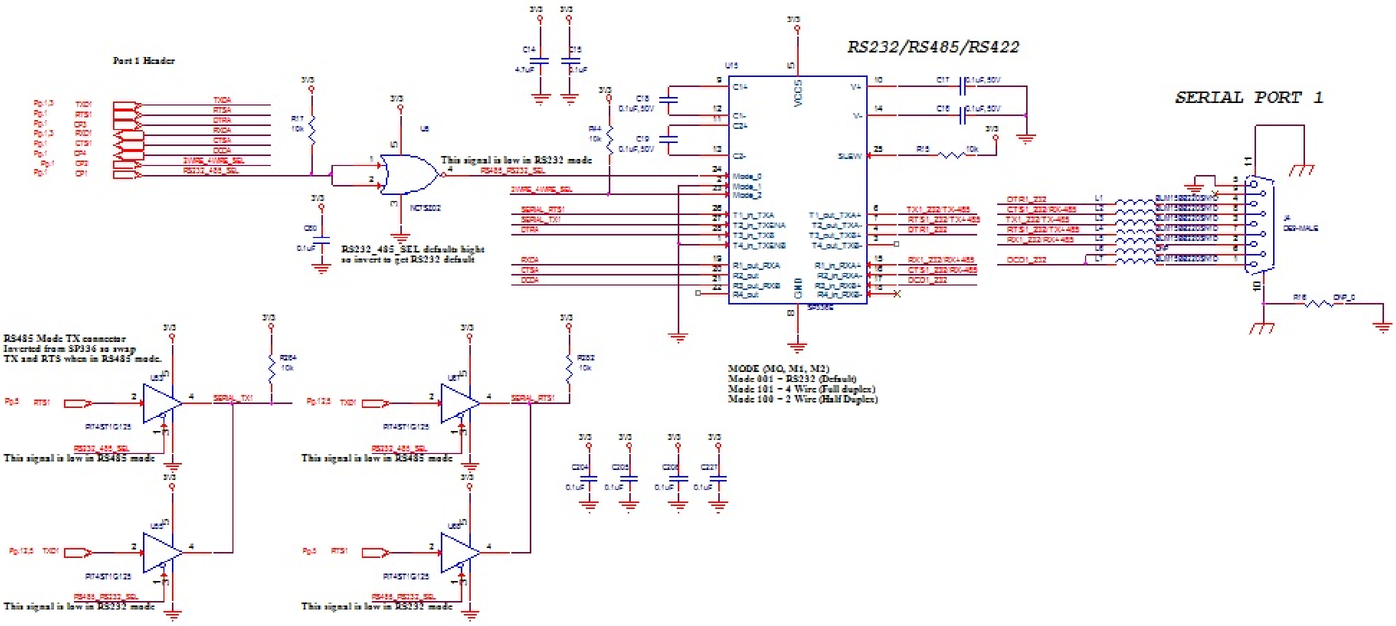


Table 2-10 RS232 Connections (Serial Transceiver Required)

xPico Signal		**DCE Connector**			**DTE Connector**		
Signal (Logic)	Description	DB9	DB25	Signal	DB9	DB25	Signal
RXDx	Data In	2	3	RXDx	3	2	TXDx
TXDx	Data Out	3	2	TXDx	2	3	RXDx
RTSx	H/W Flow Control Output	7	4	RTSx	8	5	CTSx
CTSx	H/W Flow Control Input	8	5	CTSx	7	4	RTSx
CPx	Modem Control Input	1	8	DCDx	4	20	DTRx
CPy	Modem Control Output	4	20	DTRx	1	8	DCDx

Table 2-11 RS422/485 Connections (Serial Transceiver Required)

xPico Signal (logic)	**Description**	**RS485 Signal**	**DB25 4 Wire**	**DB25 2 Wire**	**DB9 4 wire**	**DB9 2 wire**
TXDx	Data Out	TX+485	14	14	7	7
TXDx	Data Out	TX-485	15	15	3	3
RXDx	Data In	RX+485	21	14	2	7
RXDx	Data In	RX-485	22	15	8	3
RTSx	TX Enable					
CPx	RS485 Select					
CPy	RS485 2-wire					

LEDs

The xPico 110 wired device server module contains several external signals that are intended to drive external status LEDs. The LEDs are listed below. The signals may be connected as shown in the reference schematic figure below.

Note: *The System LED usually remains* ***on****. When the* ***Default*** *button is pressed for 5-6 seconds, the System LED starts blinking every second to indicate the default button can be released to complete resetting the unit to factory default. The unit reboots after release of the* ***Default*** *button.*

Table 2-12 xPico Status LED Output Signals for xPico 110

Signal	Pin	Description
LED0/SPEED	38	Ethernet speed LED, active low
LED1/LINK	47	Ethernet Link LED, active low
LED2/ACTIVITY	46	Ethernet Activity LED, active low
LED3/DUPLEX	37	Ethernet Duplex LED, active low
SYSTEM_LED	41	System status LED, active high

General Purpose I/O Pins

The xPico 110 wired device server module has 16 configurable I/O pins. Listed below are the configurable I/O pins. These pins are 3.3V CMOS logic level and 5V input tolerant.

Table 2-13 Configurable I/O Pins for xPico 110

Signal	Pin	Description for xPico 110	Reset State
CP1	45	Configurable I/O	Input
CP2/INT	42	Configurable I/O-External interrupt input	Input
CP3	12	Configurable I/O	Input
CP4	13	Configurable I/O	Input
CP5	16	Configurable I/O	Input
CP6	17	Configurable I/O	Input
CP7	14	Configurable I/O	Input
CP8	15	Configurable I/O	Input
CP9	6	Configurable I/O	Input
CP10	7	Configurable I/O	Input
CP11	8	Configurable I/O	Input
CP12	9	Configurable I/O	Input
CP13	10	Configurable I/O	Input
CP14	11	Configurable I/O	Input
CP15	43	Configurable I/O	Input
CP16	44	Configurable I/O	Input

Reset Pins

The xPico 110 wired device server module has two signals for use as reset signals. Signal `EXT_RESET#` is a hardware controlled input signal that will reboot the xPico processor when asserted low. Signal `DEFAULT#` is polled by the xPico software. When `DEFAULT#` is asserted low for six seconds, the unit will reset the system to the default manufacturing settings and reboot the unit.

Table 2-14 Reset Signals

Signal	Pin	Description	Reset State	Internal pull-up
`EXT_RESET#`	51	Unit hardware reset, active low. Assert low for a minimum of 50 milliseconds, then release to reboot unit. Signal may be left floating.	Input	10K
`DEFAULT#`	40	Unit reset to default, active low. Drive low and reboot the device to reset unit to factory defaults.	Input	Active 56K to 122K

Evaluation Board Schematics for xPico 110

DISLAIMER: Circuits and components in evaluation board schematics are for application examples only. Customers should always consult component vendors of their choice for the latest circuits, component status, etc. to achieve an optimal design, cost, and lead time.

Figure 2-15 Evaluation Board Schematic, Sheet 1 of 6

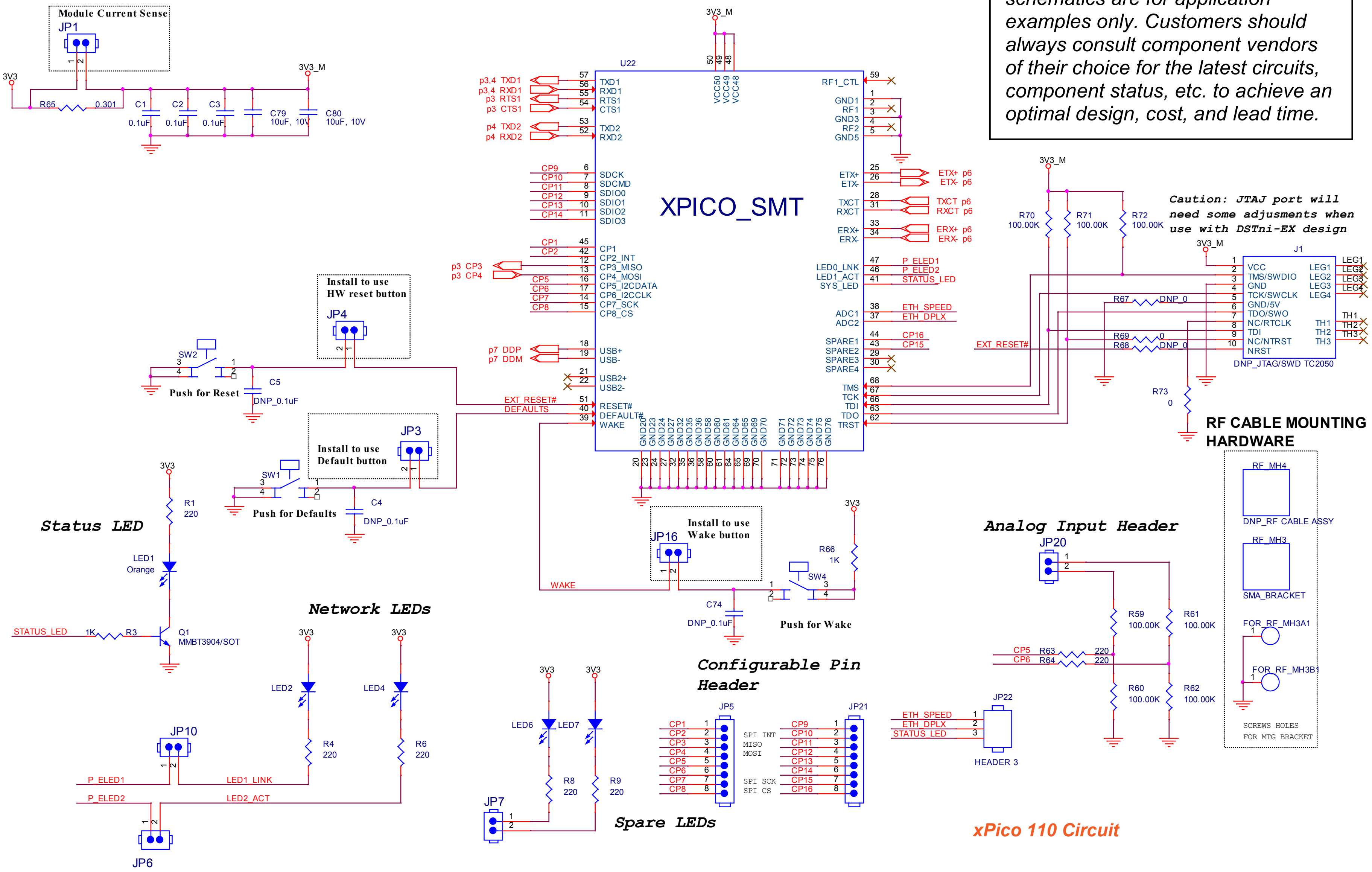
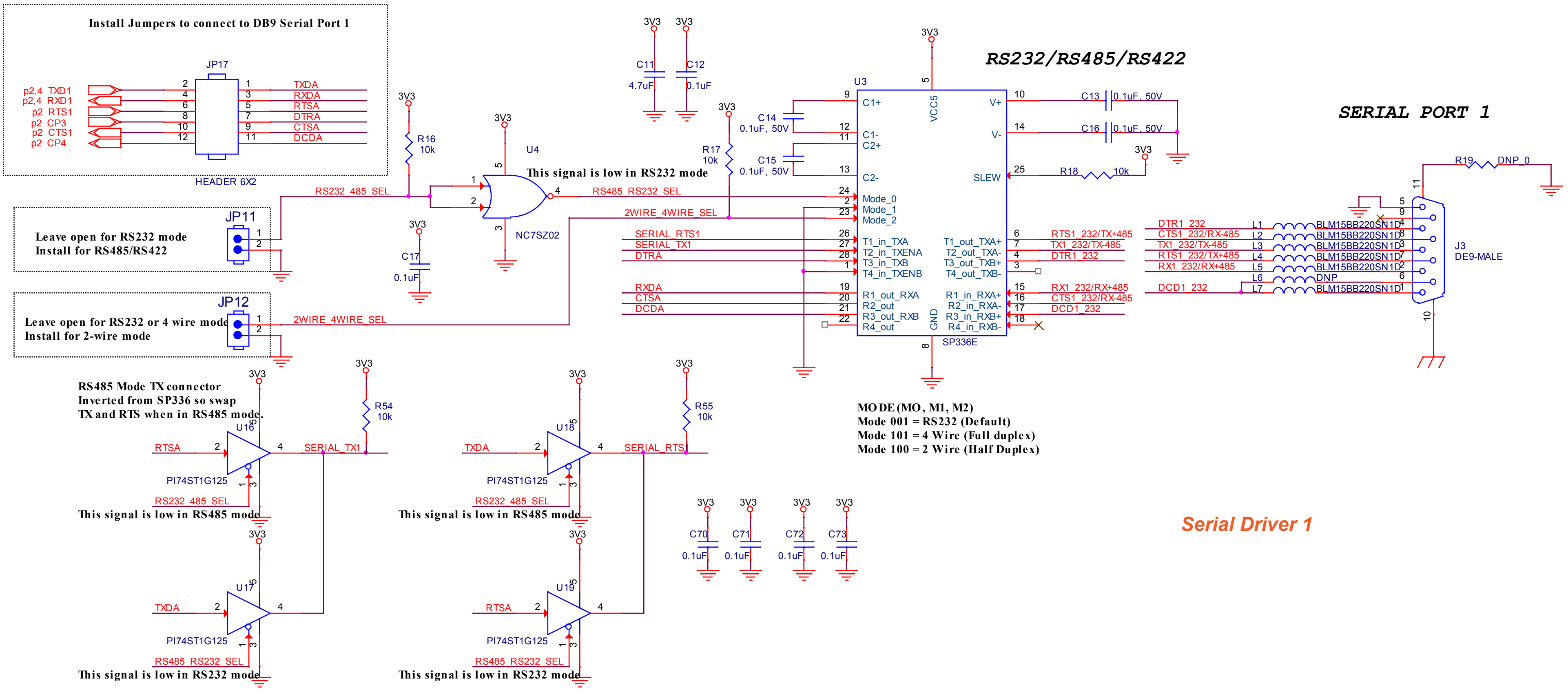


Figure 2-16 Evaluation Board Schematic, Sheet 2 of 6



Note: R10, R11, R19, R46, and R56 could be 0 ohm resistors, ferrites, or ceramic capacitors for EMC purpose, recommended 0.001 uF.

Figure 2-17 Evaluation Board Schematic, Sheet 3 of 6

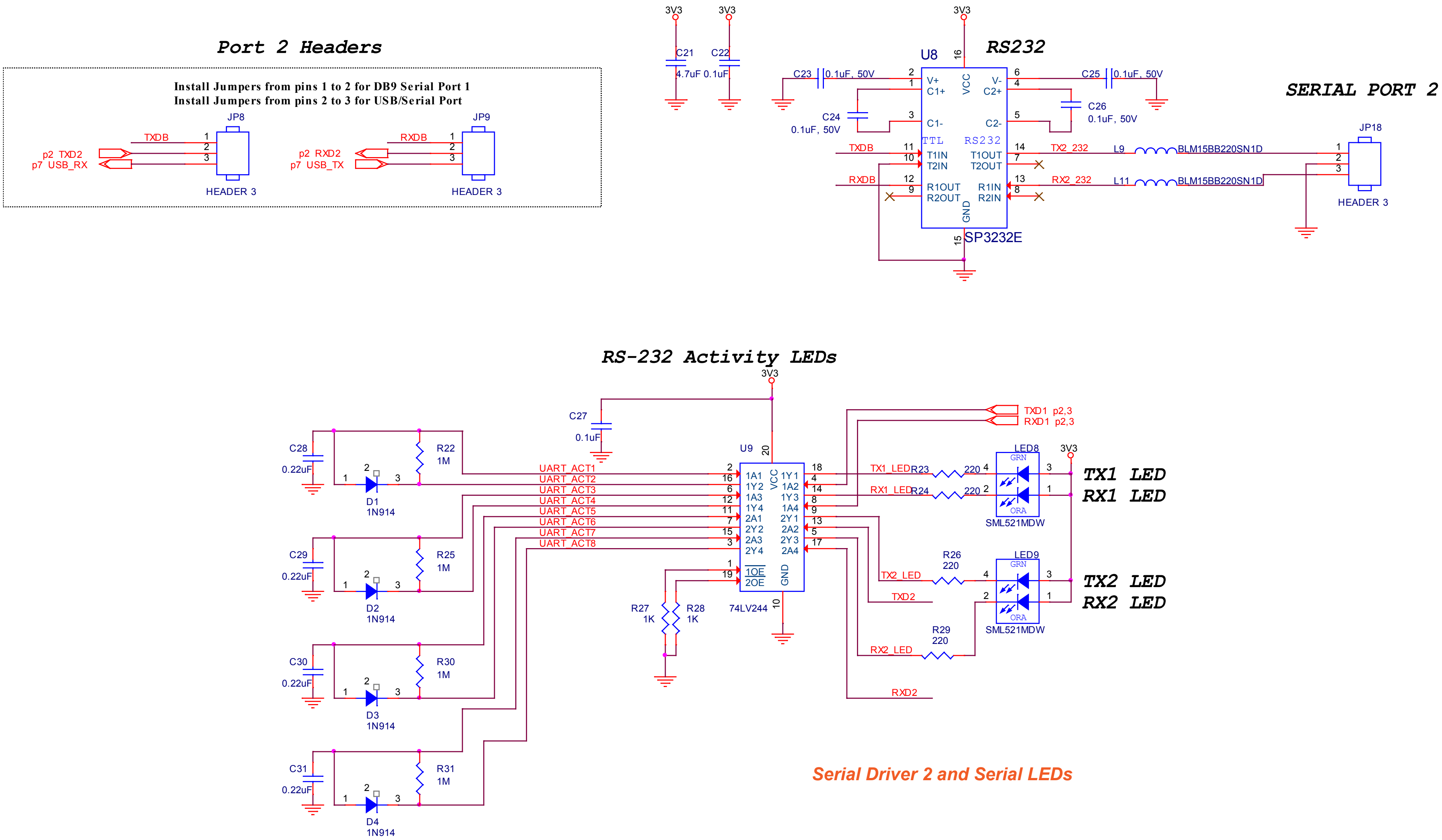
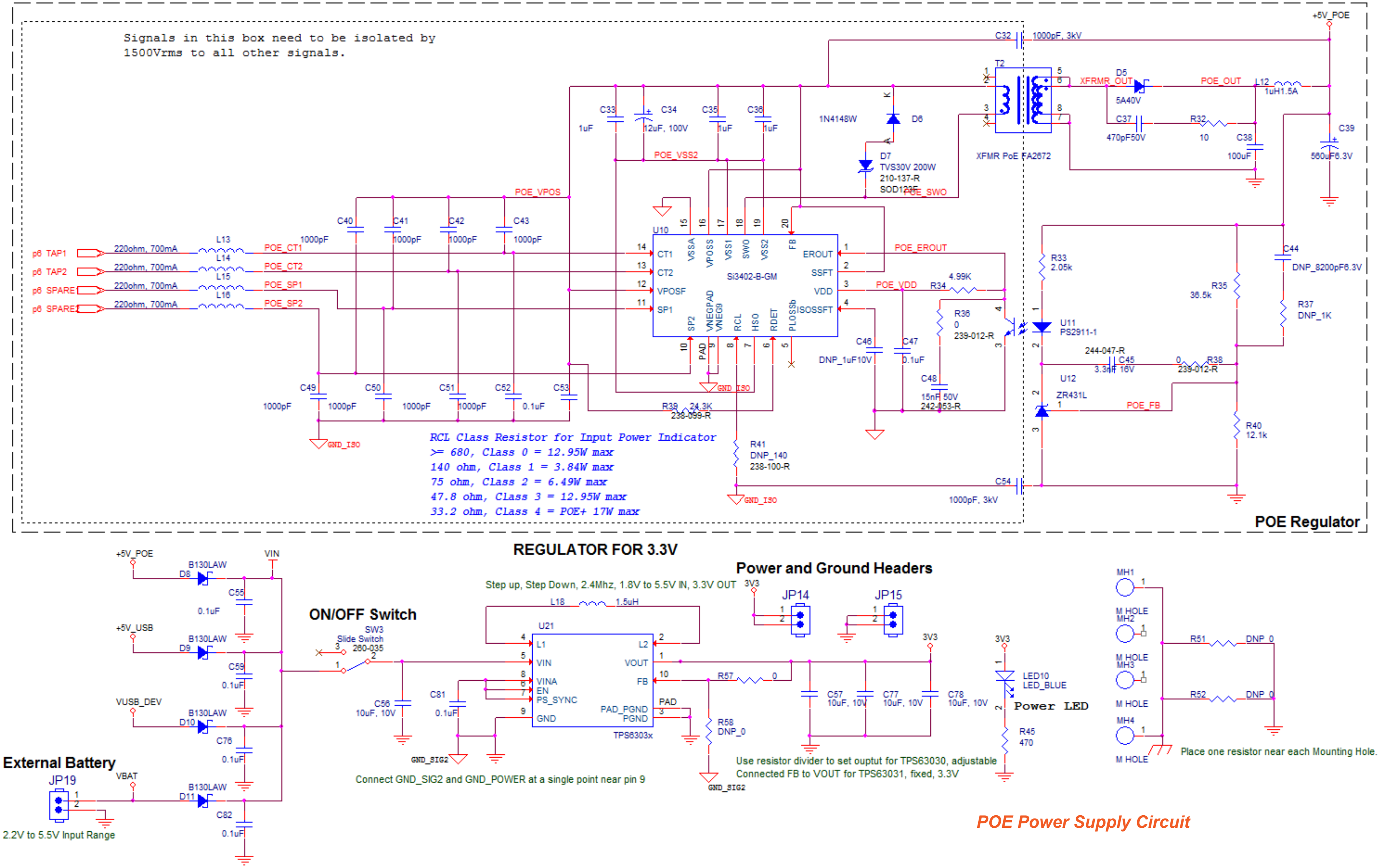


Figure 2-18 Evaluation Board Schematic, Sheet 4 of 6



Signals in this box need to be isolated by 1500Vrms to all other signals.

RCL Class Resistor for Input Power Indicator
>= 680, Class 0 = 12.95W max
140 ohm, Class 1 = 3.84W max
75 ohm, Class 2 = 6.49W max
47.8 ohm, Class 3 = 12.95W max
33.2 ohm, Class 4 = POE+ 17W max

Step up, Step Down, 2.4Mhz, 1.8V to 5.5V IN, 3.3V OUT

Connect GND_SIG2 and GND_POWER at a single point near pin 9

Use resistor divider to set ouptut for TPS63030, adjustable
Connect FB to VOUT for TPS63031, fixed, 3.3V

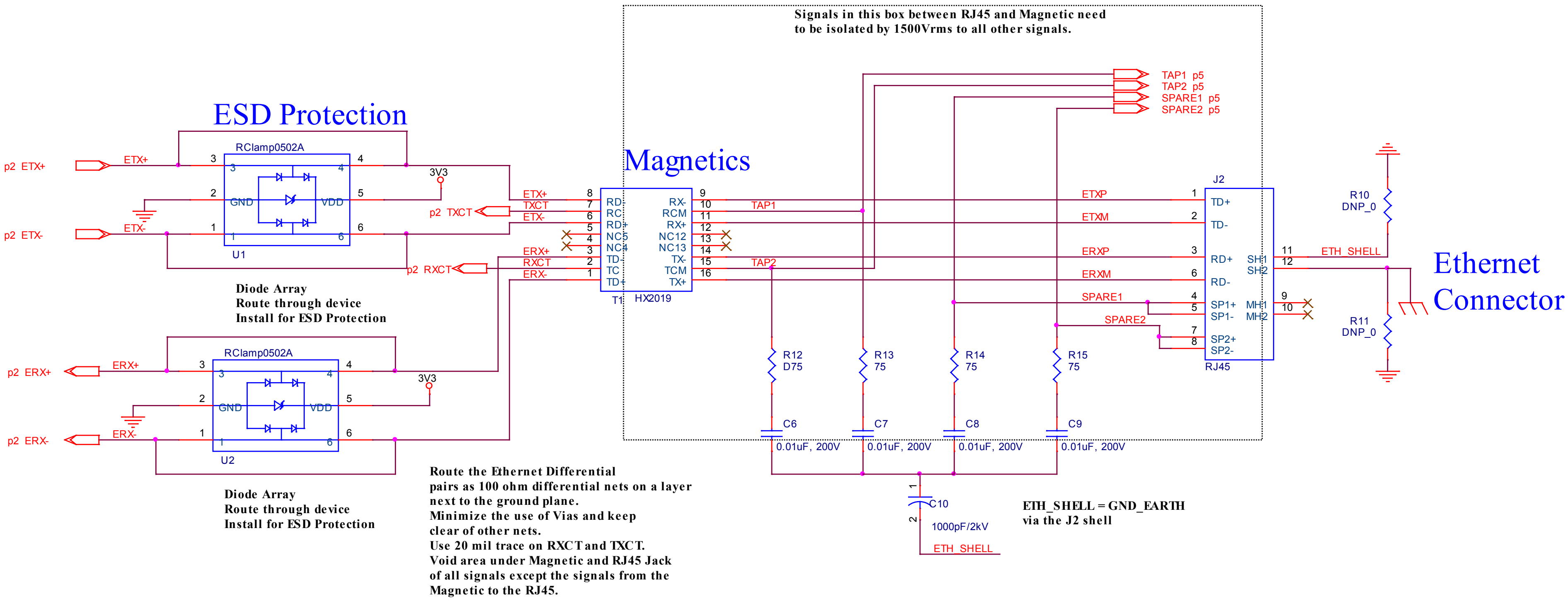
Place one resistor near each Mounting Hole.

2.2V to 5.5V Input Range

POE Power Supply Circuit

Figure 2-19 Evaluation Board Schematic, Sheet 5 of 6

`Components in this page are not populated if Ethernet Circuit is not used.`



Signals in this box between RJ45 and Magnetic need to be isolated by 1500Vrms to all other signals.

Diode Array
Route through device
Install for ESD Protection

Diode Array
Route through device
Install for ESD Protection

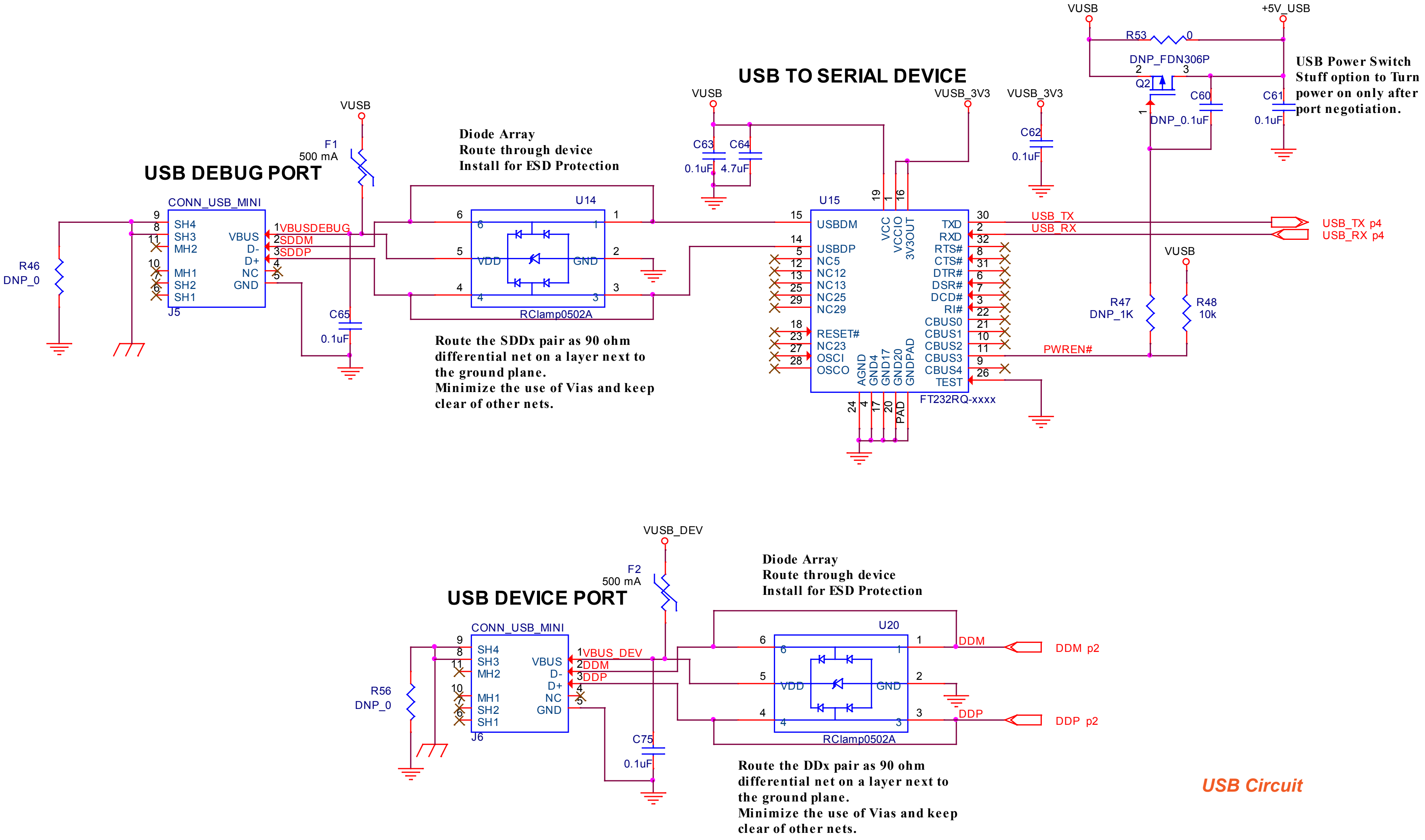
Route the Ethernet Differential pairs as 100 ohm differential nets on a layer next to the ground plane.
Minimize the use of Vias and keep clear of other nets.
Use 20 mil trace on RXCT and TXCT.
Void area under Magnetic and RJ45 Jack of all signals except the signals from the Magnetic to the RJ45.

ETH_SHELL = GND_EARTH
via the J2 shell

Ethernet Circuit

Note: R10, R11, R19, R46, and R56 could be 0 ohm resistors, ferrites, or ceramic capacitors for EMC purpose, recommended 0.001uF.

Figure 2-20 Evaluation Board Schematic, Sheet 6 of 6



Note: *Since the Evaluation Board is common for both xPico 110 and xPico Wi-Fi device servers, the USB circuit above is only for xPico Wi-Fi units, and not applicable to xPico 110 device servers.*

3. Mounting Instructions and PCB Footprint

The xPico 110 dimensions and mounting instructions are shown in *Chapter 4: Specifications*. You may also directly access the CAD files through the Lantronix website.

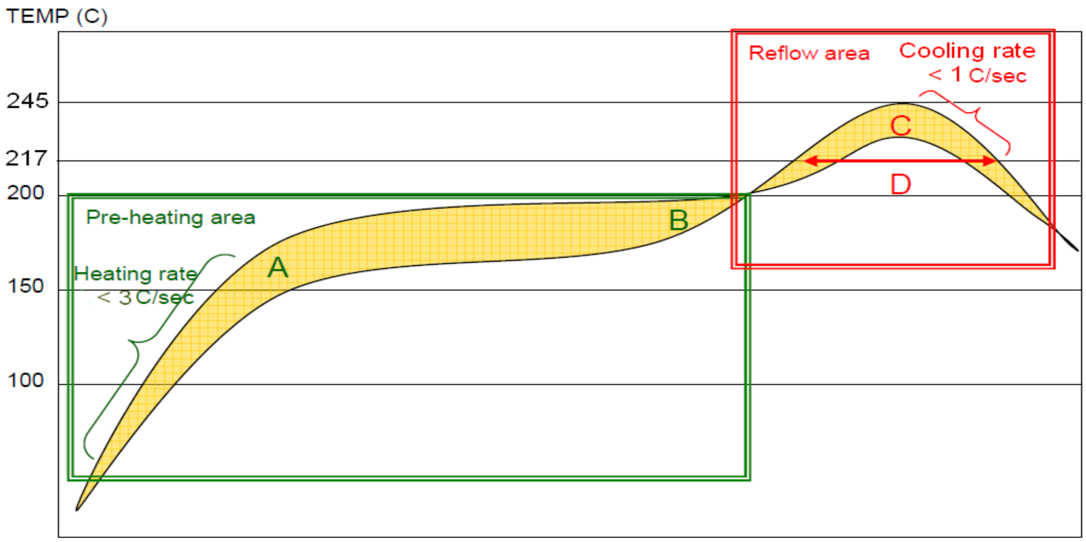
Reflow Profile Guideline

The reflow profile is dependent on many factors including flux selection, solder composition, and the capability of the user's reflow equipment.

Lantronix does not recommend a specific reflow profile but provides the following general guidelines:

- The solder composition typically sets the peak temperatures of the profile.
- Lantronix recommends lead free solder pastes SAC305: Type 4. Water soluble or no-clean solder pastes are acceptable.
- Reflow equipment is needed at nine heater zones at minimum. Lantronix recommends a forced air type reflow oven with nitrogen.
- Lantronix recommends that the peak temperature at the solder joint be within 235°C ~ 245°C, and the maximum component temperature should not exceed 260°C.
- Lantronix recommends that the solder joint heating time above 217°C last between 40-90 seconds, and at a minimum of 40 seconds.
- Excessive ramp/cooling rates (>3°C/s) should be avoided.
- To develop the reflow profile, Lantronix recommends that the user place thermocouples at various locations on the assembly to confirm that all locations meet the profile requirements. The critical locations are the module solder joints.
- When developing the reflow profile, Lantronix recommends that a fully loaded assembly be used to assure that the total thermal mass is accounted for.

Figure 3-1 Recommended Reflow Profile



(1) Solder paste alloy: SAC305(Sn96.5/Ag3.0/Cu0.5)(Lead free solder paste is recommended by Lantronix.)
(2) A-B. Temp.(Pre-heat): 150~200 °C; soak time:60~120 seconds.
(3) C. Peak temp: <245 °C
(4) D. Time above 217 °C: 40~90 sec.
(5) Suggested optimal cooling rate is <1 °C /sec. from peak to 217 °C.
(6) Utilize a minimum of nine heater zones for Reflow equipment.
(7) Nitrogen usage is recommended when the oxygen concentration is controlled at less than 1500 ppm.

Note: *Need to inspect solder joint by X-ray post reflow for voiding and solder shorts.*

MSD (Moisture Sensitive Device) Control for the Module

1. The xPico embedded device server is a moisture sensitive device; the MSL level is 3.
2. Modules to be subjected to reflow solder or other high temperature processes must be mounted within 168 hours of opening the vacuum containment bag in factory conditions.
3. The module requires baking before mounting, if:
    a. The Humidity Indicator Card reads >10% when read at 23± 5°C
    b. The MSL3 are not met
4. If baking is required, optional condition as below (refer to IPC/JEDEC J-STD-033):
    a. Bake 9 hours at 125°C (Tray base)
    b. Bake 33 hours at 90°C/≦5%RH (Tray base)
    c. Bake 13 days at 40°C/ ≦5%RH (Tape/Reel base)

Note: *After baking, the floor time of module should be recalculated. The xPico 110 device server cannot be exposed to more than three reflow cycles.*

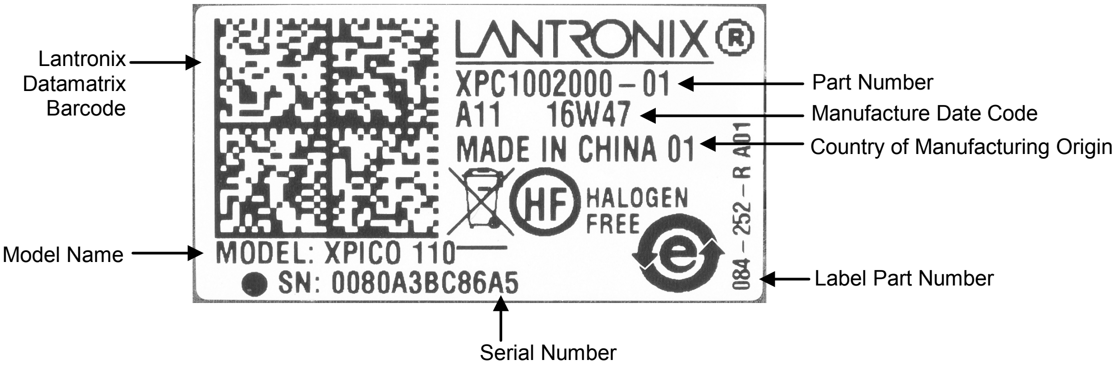
The xPico 110 embedded device server is moisture sensitive and needs to be handled within proper MSL 3 guidelines to avoid damage from moisture absorption. After the moisture barrier bag (MBB) is opened, the part should go through reflow for board assembly within 48 hours at factory conditions of <30°C/60% RH, or stored at <10% RH. If both of these conditions are not met, baking is required before board mounting.

For removal from a customer PCB, the customer PCB must first be baked. Baking should be done for a minimum of 8 hours at 125°C. It is recommended that during removal, localized heating be used, and the maximum body temperature of device should not exceed 200°C.

Product Information Label

The product information label contains important information about your specific unit, such as its part number, revision, manufacturing date code, product model, country of origin, datamatrix barcode and MAC address.

Figure 3-2 xPico Product Label



4. Specifications

Electrical Specifications

***Caution:* Stressing the device above the rating listed in this table may cause permanent damage to the device. Exposure to Absolute Maximum Rating conditions for extended periods may affect the device reliability.**

Table 4-1 Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Units
Supply Voltage	V_{CC}	0	3.6	Vdc
Operating Temperature		-40	85	°C
Storage Temperature		-40	85	°C

Table 4-2 xPico 110 Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Units
Supply Voltage	V_{CC}	3.15	3.3	3.46	Vdc
Supply Voltage Ripples	V_{CC_PP}			2	%
100 BaseTX Active (Normal CPU Speed)	I_{CC}		200		mA
10 BaseT Active (Normal CPU Speed)	I_{CC}		220		mA
No Link (Normal CPU Speed)	I_{CC}		150		mA
100 BaseTX Active (High CPU Speed)	I_{CC}		240		mA
10 BaseT Active (High CPU Speed)	I_{CC}		260		mA
No Link (High CPU Speed)	I_{CC}		190		mA
100 BaseTX Active (Low CPU Speed)	I_{CC}		170		mA
10 BaseT Active (Low CPU Speed)	I_{CC}		190		mA
No Link (Low CPU Speed)	I_{CC}		120		mA
Supply Reset Threshold	V_{RST}	2.7			Vdc
CPx Pull-ups, except CP5, CP6	R_{PU}	56		122	Kohm
CP5,CP6 Pull-up	R_{PU}		10		Kohm
CPx, RX Input Low Voltage	V_{CP_IL}			0.8	Vdc
CPx, RX Input High Voltage	V_{CP_IH}	2		5.5	Vdc
CPx, TX Output Low Voltage (I_{OL} = 4 mA)	V_{CP_OL}			0.4	Vdc
CPx, TX Output High Voltage (I_{OH} = -4 mA)	V_{CP_OH}	2.4			Vdc
Reset Pin Low Voltage	VRES_IL			0.36	Vdc
Reset Pin High Voltage	VRES_IL	2.0		3.46	Vdc

Technical Specifications

Table 4-3 xPico 110 Technical Specification

Category	Description
CPU, Memory	Lantronix DSTni-EX 186 CPU, 256-Kbyte zero wait state SRAM, 512-Kbyte flash, 16-Kbyte boot ROM
Firmware	Upgradeable via TFTP and serial port
Reset Circuit	Internal 200ms power-up reset pulse. Power-drop reset triggered at 2.6V. External reset input causes an internal 200ms reset.
Serial Interface	CMOS (Asynchronous) 3.3V-level signals Rate is software selectable: 300 bps to 921600 bps
Serial Line Formats	Data bits: 7 or 8 Stop bits: 1 or 2 Parity: odd, even, none
Modem Control	DTR/DCD, CTS, RTS <- Serial 1 only
Flow Control	Serial 1: XON/XOFF (software), CTS/RTS (hardware) Serial 2: XON/XOFF (software)
Programmable I/O	16 PIO pins (software selectable), sink or source 4mA max.
Network Interface	10/100Mbps Ethernet, requires external magnetics and RJ45
Compatibility	Ethernet: Version 2.0/IEEE 802.3 (electrical), Ethernet II frame type
Protocols Supported	ARP, UDP/IP, TCP/IP, Telnet, ICMP, SNMP, DHCP, BOOTP, TFTP, Auto IP, SMTP, and HTTP
LEDs	Link, Activity, Link Speed, Duplex, System Status logic level outputs
Management	Internal web server, SNMP (read only) Serial login, Telnet login
Security	Password protection, locking features, optional Rijndael 256-bit encryption
Internal Web Server	Serves static Web pages and Java applets Storage capacity: 384 Kbytes
Temperature	Operating range: -40°C to +85°C (-40°F to 185°F)
Warranty	For details on the Lantronix warranty policy, go to our web site at www.lantronix.com/support/warranty.
Included Software	Windows 98/NT/2000/XP-based Lantronix® DeviceInstaller™ configuration software and Windows based Com Port Redirector
EMI Compliance	See *A:Compliance*.

xPico 110 Mechanical Dimensions

Figure 4-4 Device Dimensions (in mm), Part 1 of 2

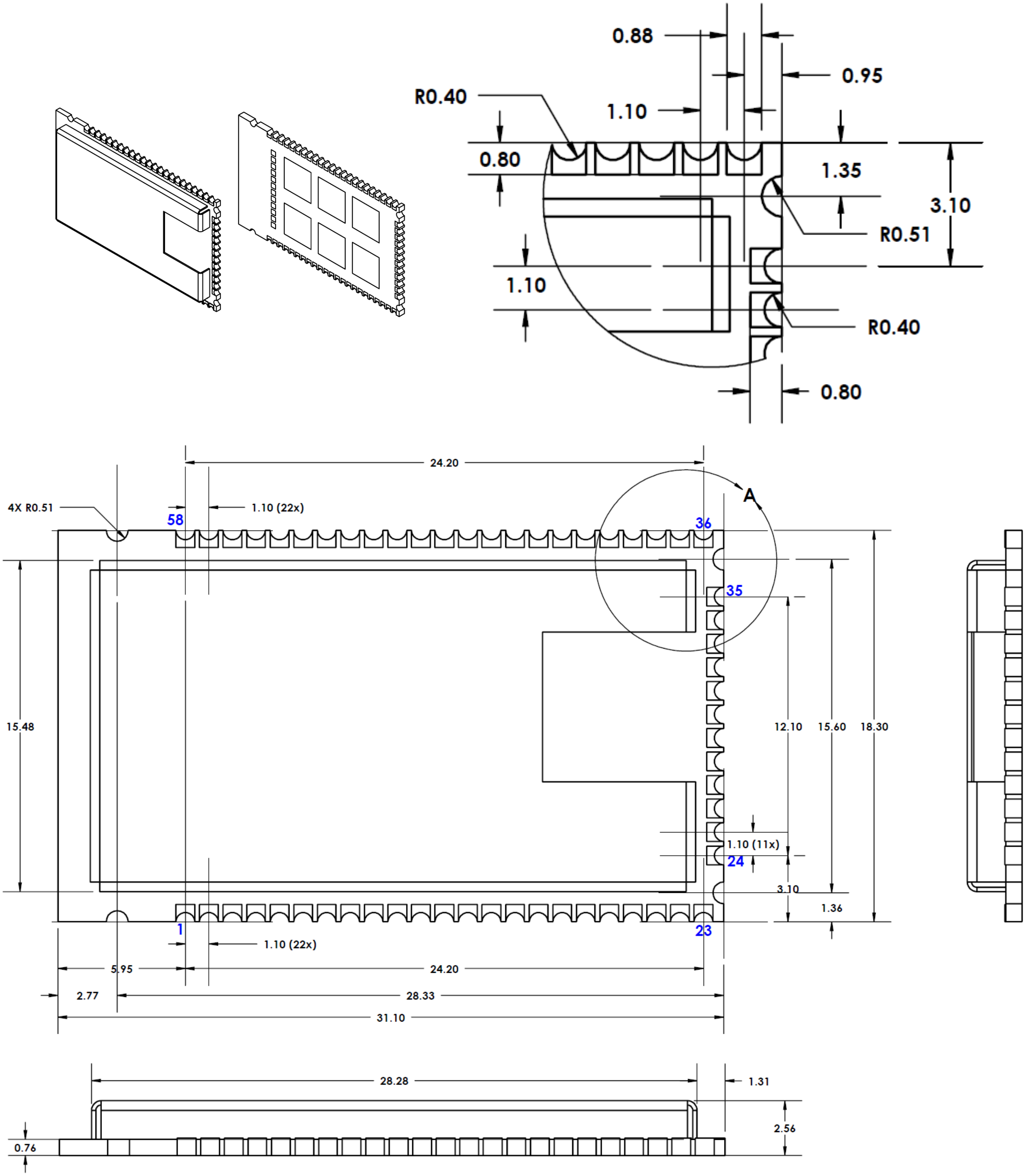


Figure 4-5 Device Dimensions (in mm), Part 2 of 2

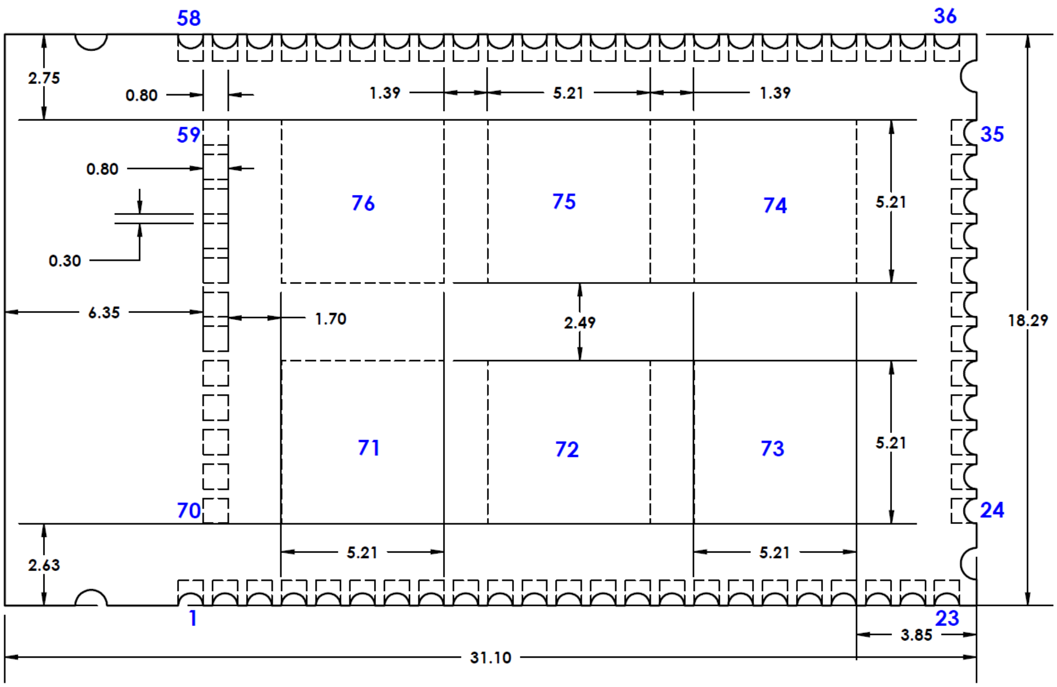
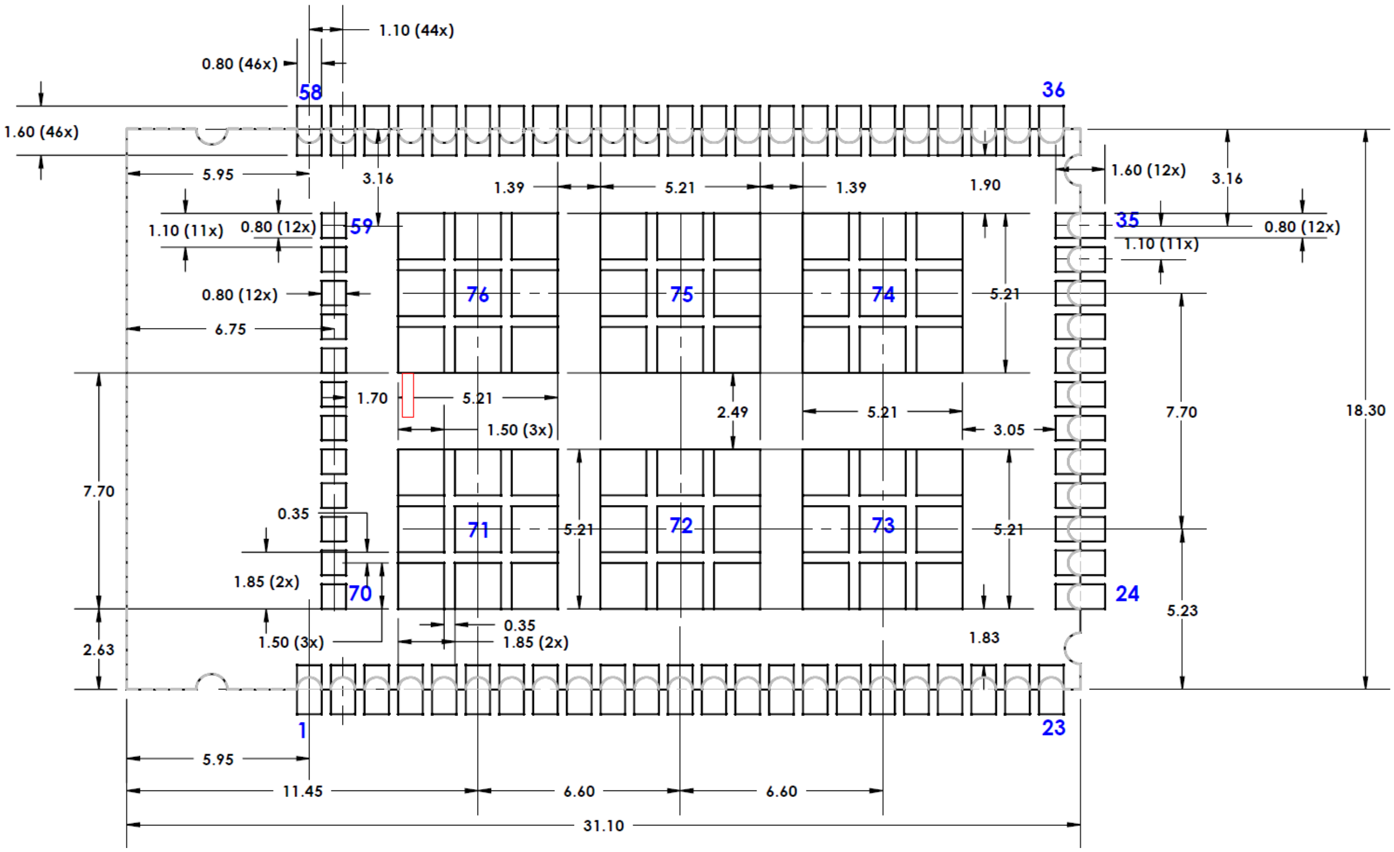


Figure 4-6 Recommended Footprint (in mm)



A: Compliance

(According to ISO/IEC Guide 22 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 Model: xPico® 110 Wired Device Server Module

Conforms to the following standards or other normative documents:

Note: Tested when installed on the evaluation board.

Electromagnetic Emissions/Immunity:

Table A-1 Electromagnetic Emissions

Test Description	Specification
Radiated Emissions	EN 55022:2010 Class B
Radiated Emissions	CFR Title 47 Part 15 Subpart B, Class B Emissions
Conducted Emissions	EN 55022:2010 Class B
Conducted Emissions	CFR Title 47 Part 15 Subpart B, Class B Emissions

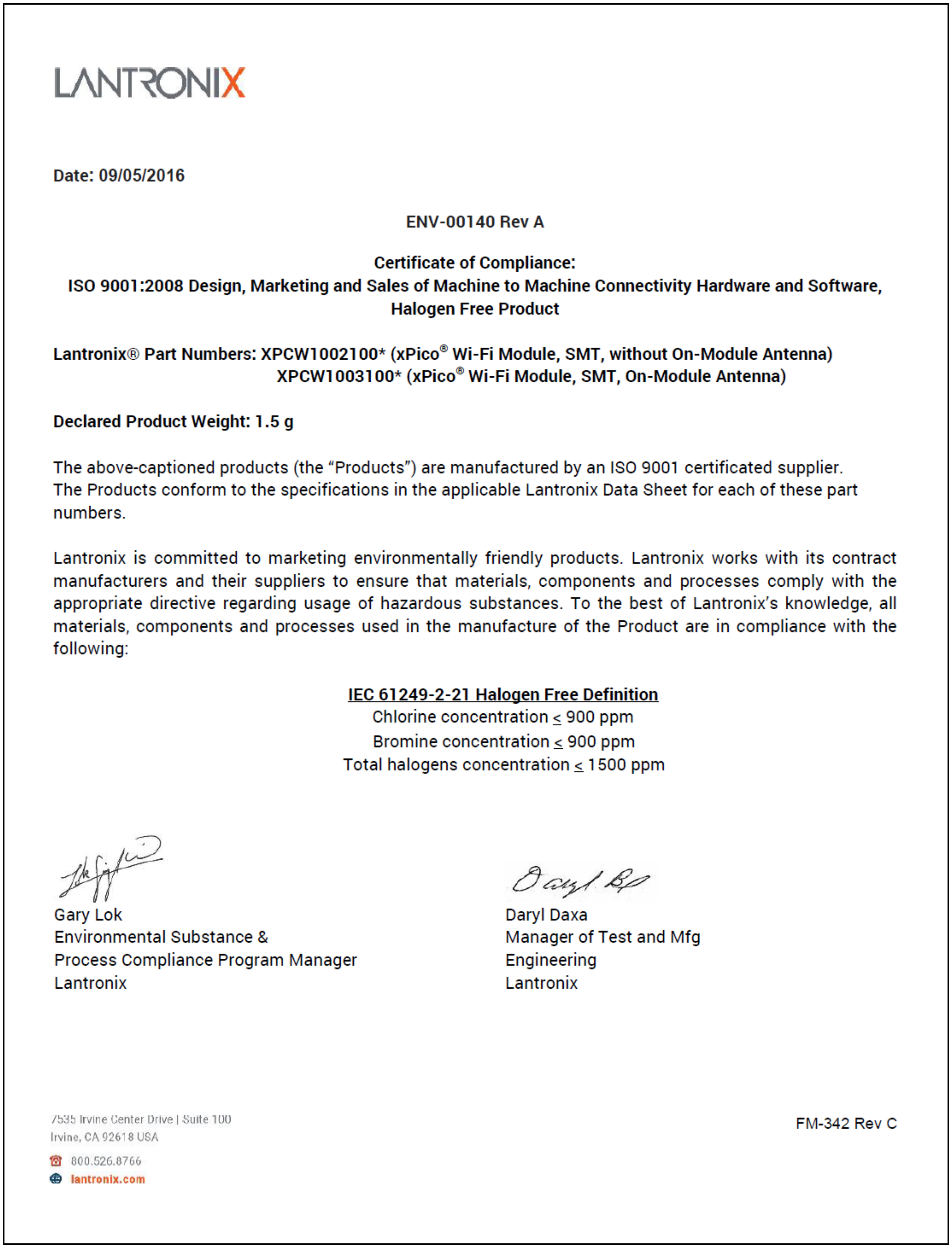
Table A-2 Electromagnetic Immunity

Test Description	Specification	Test Method
ESD	EN 55024:2010	EN 61000-4-2:2009
Radiated Immunity	EN 55024:2010	EN 61000-4-3:2010
EFT	EN 55024:2010	EN 61000-4-4:2004
Surge	EN 55024:2010	EN 61000-4-5:2005
Conducted Immunity	EN 55024:2010	EN 61000-4-6:2009
Magnetic Field Immunity	EN 55024:2010	EN 61000-4-8:2010
Voltage Interruptions	EN 55024:2010	EN 61000-4-11:2004
Voltage Dips	EN 55024:2010	EN 61000-4-11:2004

Safety: Low Voltage Directive (2006/95/EC)

- IEC 60950-1:2005 (2nd Edition); Am 1:2009 + EN 60950-1:2006 + A1:2010 + A11:2009 + A12:2011
- UL 60950-1, 2nd Edition, 2011-12-19 (Information Technology Equipment - Safety - Part 1: General Requirements)
- CSA C22.2 No. 60950-1-07, 1st Edition, 2011-12 (Information Technology Equipment - Safety - Part 1: General Requirements)

Figure A-3 Certificate of Compliance for Halogen Free



LANTRONIX

Date: 09/05/2016

ENV-00140 Rev A

Certificate of Compliance:
ISO 9001:2008 Design, Marketing and Sales of Machine to Machine Connectivity Hardware and Software,
Halogen Free Product

Lantronix® Part Numbers: XPCW1002100* (xPico® Wi-Fi Module, SMT, without On-Module Antenna)
XPCW1003100* (xPico® Wi-Fi Module, SMT, On-Module Antenna)

Declared Product Weight: 1.5 g

The above-captioned products (the "Products") are manufactured by an ISO 9001 certificated supplier. The Products conform to the specifications in the applicable Lantronix Data Sheet for each of these part numbers.

Lantronix is committed to marketing environmentally friendly products. Lantronix works with its contract manufacturers and their suppliers to ensure that materials, components and processes comply with the appropriate directive regarding usage of hazardous substances. To the best of Lantronix's knowledge, all materials, components and processes used in the manufacture of the Product are in compliance with the following:

IEC 61249-2-21 Halogen Free Definition
Chlorine concentration ≤ 900 ppm
Bromine concentration ≤ 900 ppm
Total halogens concentration ≤ 1500 ppm

Gary Lok
Environmental Substance &
Process Compliance Program Manager
Lantronix

Daryl Daxa
Manager of Test and Mfg
Engineering
Lantronix

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☎ 800.526.8766
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FM-342 Rev C

Federal Communication Commission Interference Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the 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 the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Caution*: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.*

Manufacturer's Contact:

Lantronix, Inc.
7535 Irvine Center Drive
Suite 100
Irvine, CA 92618 USA
Tel: 949-453-3990
Fax: 949-453-3995

RoHS, REACH and WEEE Compliance Statement

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