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## Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



## Description

Ideally suited for IoT applications the Lantronix® xPico® Wi-Fi® embedded device servers are a family of extremely compact low power networking solution that enables IEEE 802.11 wireless LAN connectivity on virtually any solution with a SPI or serial interface. Lantronix' industry-proven device server application and full IP stack allows seamless remote access to device data simplifying design integration while providing robust connectivity.



The xPico Wi-Fi device servers are members of the Lantronix xPico product family providing unmatched flexibility whether it is Wi-Fi or Ethernet when it comes to choosing the right network device for your application. This document describes the xPico Wi-Fi surface mount technology versions. The xPico family also includes a functionally equivalent version of the Wi-Fi device (XPW1001000-01) that is provided in board to board connector that enables the interchangeability with the xPico embedded wired server (XPC1001000-01).

As one of the smallest embedded device server in the world, xPico Wi-Fi device server can be utilized in designs typically intended for chip solutions, benefitting in advantages to cost and time to market.

xPico Wi-Fi device servers are state-of-the-art and innovative solutions, that set new standards in reliability and functionality and offers all the capabilities one can expect including a unique simultaneous Soft-AP and Client mode.

A key benefit with xPico Wi-Fi device server 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

xPico Wi-Fi device server are module approved, FCC Class B, UL and EN EMC and safety compliant.

## Applications

Suitable example applications for the xPico Wi-Fi device server include such IoT applications as:

- ◆ Industrial
  - valve and sensor control,
  - Lock and access systems,
- ◆ Energy Management
  - Smart Meter Connectivity
- ◆ Medical
  - Connecting Infusion pumps to hospital IT
- ◆ Home Automation
  - water softening devices networking
  - Controlling home appliances from mobile devices

## Features

- ◆ Serial to Wi-Fi device server module with 802.11 b/g/n at 2.4GHz
- ◆ ARM Cortex M3 processor
- ◆ xPico SMT-76 castellation Form Factor
  - With on-board Antenna (est. 31.1mm x 18.3mm)
  - Without on-board Antenna (est. 26.1 mm x 18.31mm)
- ◆ Simultaneous SoftAP and client modes
- ◆ Supports Roaming, QuickConnect,
- ◆ Power Management Framework
- ◆ Low power of approximately 6µA standby
- ◆ Two serial ports (921Kbps) , SPI (30 MHz) , and up to 8 GPIO<sup>1</sup>
- ◆ USB. 2.0 Full Speed device port with integrated PHY.
- ◆ Feature-rich device server application suite, Full IP stack, and web server
- ◆ 256-bit AES Encryption, WPA2-Personal
- ◆ Industrial operating temperature of -40° to +85° C
- ◆ 5-Year Warranty

<sup>1</sup> Some interfaces share module pins.

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# 1: Introduction

This data sheet describes the SMT models, xPico W1002 and W1003, which are all referred to generally as the Lantronix® xPico® Wi-Fi SMT family of embedded Wi-Fi device servers in this document.

The xPico W1002 and W1003 provide much of the circuitry and all of the software required to connect a micro controller or similar host device to an IEEE 802.11 b/g/n Wireless local area network (WLAN). The xPico W1000 family of device servers are available either in a very small and attractive 76-pad castellation surface mount package (SMT), or a connector version (xPico Wi-Fi device server, XPW1001000-01). The SMT form factor is itself available in two versions, with or without an onboard ceramic chip antenna.

For the purposes of this document the xPico W1002 and xPico W1003 modules will be referred to collectively as xPico Wi-Fi SMT embedded device servers.

For an embedded solution an external controller can connect through industry standard interfaces such as serial, SPI or USB 2.0 (Device) and with very little to no driver effort have the ability to connect and communicate to either an IEEE 802.11 b/g/n Access Point or Client.

The xPico Wi-Fi SMT device server is targeted for applications that have a need to be Wi-Fi enabled with requirements of low power, single channel 802.11 b/g/n, industrial ready and ready to go solution at a very competitive price.

The xPico Wi-Fi SMT device server is easy to integrate as Lantronix removes much of the design headaches by providing a platform with proven reliability with most of the necessary certification aspects taken care of and with very minimal software to develop.

The xPico Wi-Fi SMT device server supports the unique mode of simultaneous Soft Access Point (Soft-AP) and Client. As a device server the device provides all the necessary functional programmability and protocols to maintain an efficient and robust WLAN connection.

- ◆ no additional code needed on MCU (Zero Host Load)
- ◆ MAC address included
- ◆ Little to no software integration needed

The xPico Wi-Fi SMT device server benefits from the many years of experience Lantronix has with device servers, both wired and wireless. The xPico W1000 is easy to maintain. With technical support available and failsafe firmware upgrades from a remote manager.

Key features of the xPico Wi-Fi SMT device server include:

- ◆ Lantronix Feature-rich device server application suite
- ◆ Wi-Fi Client
- ◆ Soft AP with DHCP server
- ◆ Lantronix QuickConnect,
- ◆ Industrial Temperature Operation (-40° to +85° C)
- ◆ Robust and reliable firmware upgradability
- ◆ Web server
- ◆ DHCP & DNS server in AP mode
- ◆ Serial Tunnel

## **2: Hardware and Software Description**

The xPico Wi-Fi SMT embedded device server is a complete solution (hardware and software). This powerful device server comes with a connection manager, a reliable and proven operating system stored in flash memory, an embedded web server, a full TCP/IP protocol stack, and standards-based (AES) encryption.

The xPico Wi-Fi SMT software runs on an ARM Cortex M3 controller and has an IEEE 802.11 b/g/n radio. The xPico Wi-Fi SMT device server communicates to the edge device through a serial, SPI or USB interface. The xPico Wi-Fi SMT device server runs on 3.3V, and has a built-in voltage supervisory circuit that will trigger a reset if the supply voltage drops to unreliable levels.



### 3: Package Description and Mechanical Footprint

The xPico Wi-Fi SMT device server is available in two package options.

#### xPico W1002 and xPico W1003 Device Servers

The xPico W1002 and XPCW1003 device servers are both surface mount modules that has the following dimensions and pad layout. The primary difference is the xPico W1003 module has an increase in size to accommodate the on-module antenna. Both devices have the same castellation and pad configuration and footprint.

Figure 1: xPico W1002 (XPC W1002) Embedded Device Server



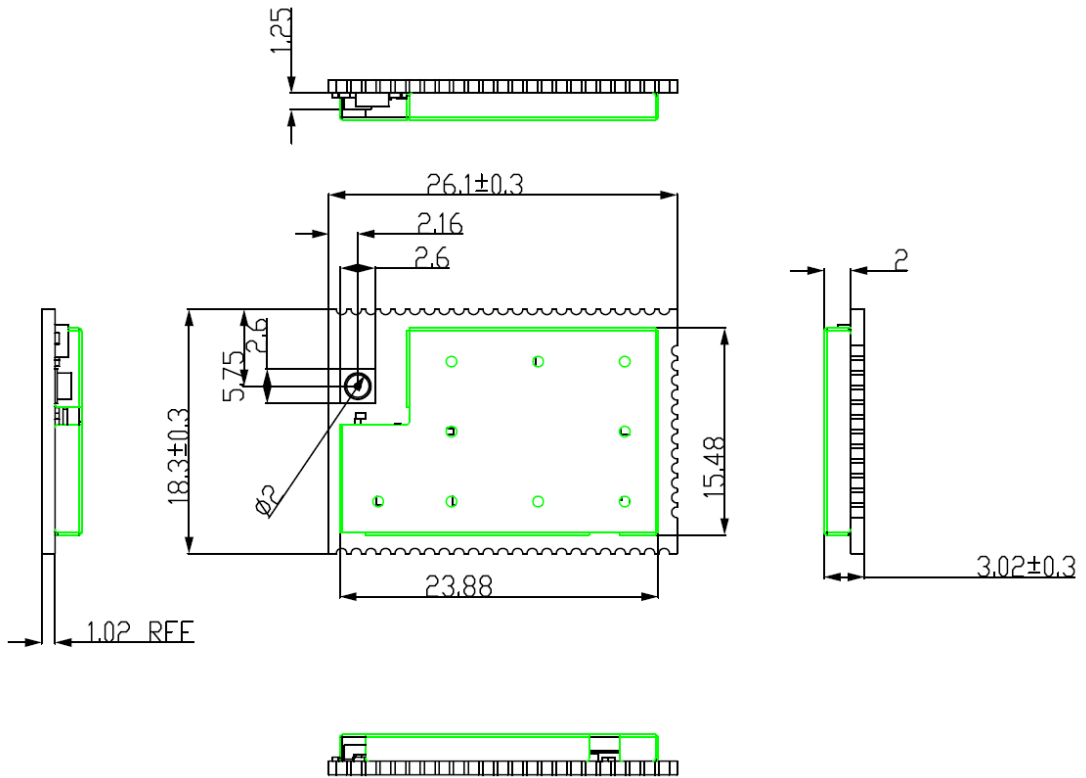
Figure 2: xPico W1003 (XPC W1003) Embedded Device Server



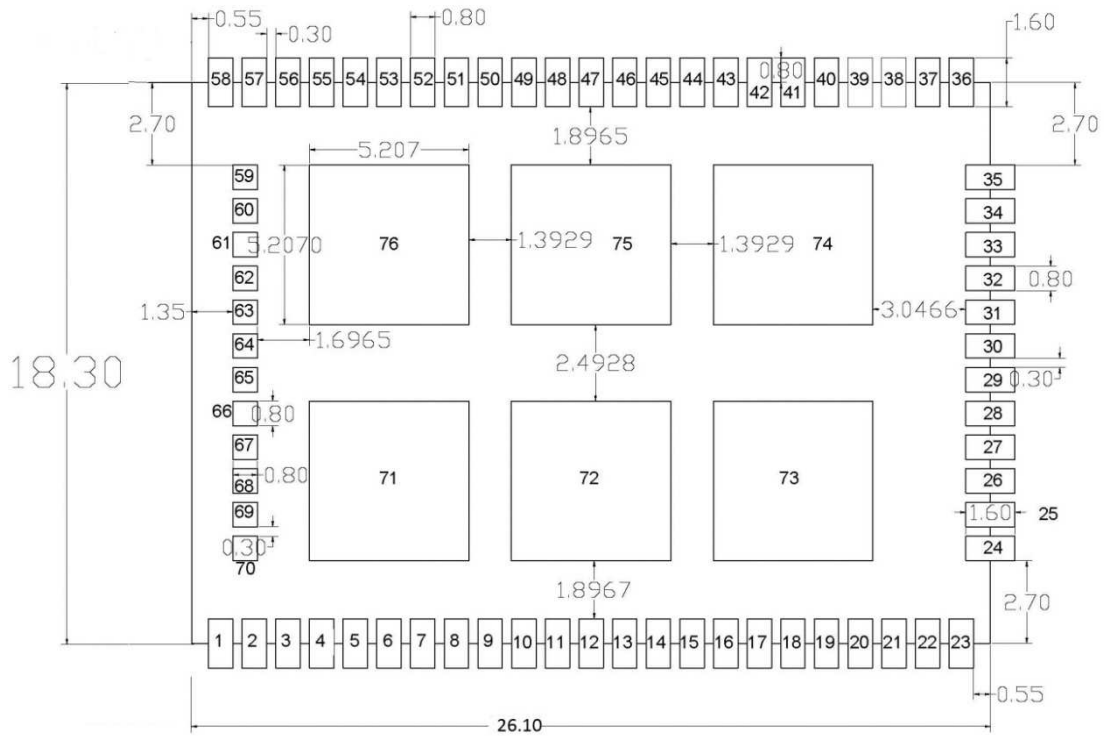
#### Dimensions

The size and thickness of the xPico W1002 device server SMT module is without the on-module antenna is (estimated) 26.1 mm (L) x 18.3 mm (W) x 4.0mm (H) +/- 0.1 mm (including shielding). The PCB footprint is shown in [Figure 34](#).

**Figure 3: Mechanical Footprint for xPico W1002 (without On-Module Antenna) Device Server**



**Figure 4: Layout Footprint for xPico W1002 (without On-Module Antenna) Device Server**





## xPico Wi-Fi SMT Package Pad Layout

Table 1 below contains the definition of the xPico Wi-Fi SMT pads and signals.

**Table 1: xPico Wi-Fi SMT Package Pad Layout and Signals**

PAD#	xPico® Wi-Fi SMT	PAD#	xPico® Wi-Fi SMT	PAD#	xPico® Wi-Fi SMT	PAD#	xPico® Wi-Fi SMT
1	GND	2	RF1	3	GND	4	RESERVED
5	GND	6	RESERVED	7	RESERVED	8	RESERVED
9	RESERVED	10	RESERVED	11	RESERVED	12	CP3/MISO
13	CP4/MOSI	14	CP7/SCK	15	CP8/CS	16	CP5
17	CP6	18	USB1+	19	USB1-	20	GND
21	RESERVED	22	RESERVED	23	GND	24	GND
25	RESERVED	26	RESERVED	27	GND	28	RESERVED
29	RESERVED	30	RESERVED	31	RESERVED	32	GND
33	RESERVED	34	RESERVED	35	GND	36	GND
37	RESERVED	38	RESERVED	39	WAKE	40	DEFAULT#
41	SYS_LED	42	CP2/INT	43	RESERVED	44	RESERVED
45	CP1	46	RESERVED	47	LED0/LNK	48	VCC
49	VCC	50	VCC	51	RESET#	52	RXD2
53	TXD2	54	CTS1	55	RTS1	56	RXD1
57	TXD1	58	GND	59	RF1_CTL	60	GND
61	GND	62	RESERVED	63	RESERVED	64	GND
65	GND	66	RESERVED	67	RESERVED	68	RESERVED
69	GND	70	GND	71	GND	72	GND
73	GND	74	GND	75	GND	76	GND

## Pin and Pad Definitions

**Table 2** describes the xPico Wi-Fi interface signal definitions as used in the SMT modules. The Signal Name column identifies the signal pin being described while the Description column provides definitions of the signal pin depending upon the member of the xPico family being used. Differentiating the signal pins is beneficial when using multiple xPico device types on a single platform.

**Table 2: xPico Wi-Fi Interface Signal Definitions:**

SMT Pad Number	Signal Name	Description	Reset State	Internal Pull-up/Pull Down	Drive Strength
1, 3, 5, 20, 23, 24, 27, 32, 35, 36, 58, 60, 61, 64, 65, 69, 70, 71, 72, 73, 74, 75, 76	GND	Signal Ground			
2	RF1	RF antenna pad			
4, 6, 7, 8, 9, 10, 11, 21, 22, 25, 26, 28, 31, 33, 34, 46, 30, 29, 37, 38, 43, 44, 62, 63, 66, 67, 68	RESERVED	No Connect, Reserved for Future Use			
12	CP3/MISO	Configurable GPIO / SPI Master serial data input, SPI Slave serial data output	Input, Floating	30K to 50K	8mA
13	CP4/MOSI	Configurable GPIO / SPI Master serial data output, SPI Slave serial data input	Input, Floating	30K to 50K	8mA
14	CP7/SPI_CLK	Configurable GPIO / SPI clock	Input, Floating	30K to 50K	8mA
15	CP8/SPI_CS	Configurable I/O, multiplexed with SPI interface Chip Select	Input, Floating	30K to 50K	8 mA
16	CP5	Configurable GPIO	Input, Floating	30K to 50K	8mA
17	CP6	Configurable GPIO	Input, Floating	30K to 50K	8mA
18	USB1+	USB (Positive)			
19	USB1-	USB (Negative)			
39	WAKE	System Wake Up or Shutdown	Input, Floating	30K to 50K	
40	DEFAULT#	Unit reset to default, active low. Drive low to reset unit to default settings.	Input, Floating	30K to 50K	
41	SYSTEM_LED	System Status LED, Active High	Input, Floating	30K to 50K	8mA

SMT Pad Number	Signal Name	Description	Reset State	Internal Pull-up/Pull Down	Drive Strength
42	CP2/SPI_INT	Configurable GPIO / SPI interrupt External Interrupt input	Input, Floating	30K to 50K	8mA
45	CP1	GPIO	Input, Floating	30K to 50K	8mA
47	Wi-Fi LED	LED function for WLAN Link indication, Active Low	Input, Floating	30K to 50K	8 mA
48, 49, 50	VCC	3.3V Power Input			
51	RESET#	Unit hardware reset, active low. Drive low to reboot unit	Input Pull up	30K to 50K	
52	RXD2	UART2 serial receive data input	Input, Floating	30K to 50K	
53	TXD2	UART2 serial transmit data output	Input, Floating	30K to 50K	8mA
54	CTS1	UART1 clear to send	Input, Floating	30K to 50K	
55	RTS1	UART1 serial ready to send (DTE)	Input, Floating	30K to 50K	8mA
56	RXD1	UART1 Serial receive data input	Input, Floating	30K to 50K	
57	TXD1	UART1 serial transmit data output	Input, Floating	30K to 50K	8mA
59	RF1_CTL	Antenna Switch control. Pull low to select an external antenna connected to the RF1 pad (pin 2). Note XPCW1002 only.	Input Pull up	100K	

## MSL Handling Instructions

**CAUTION:** THIS BAG CONTAINS MOISTURE-SENSITIVE DEVICES.

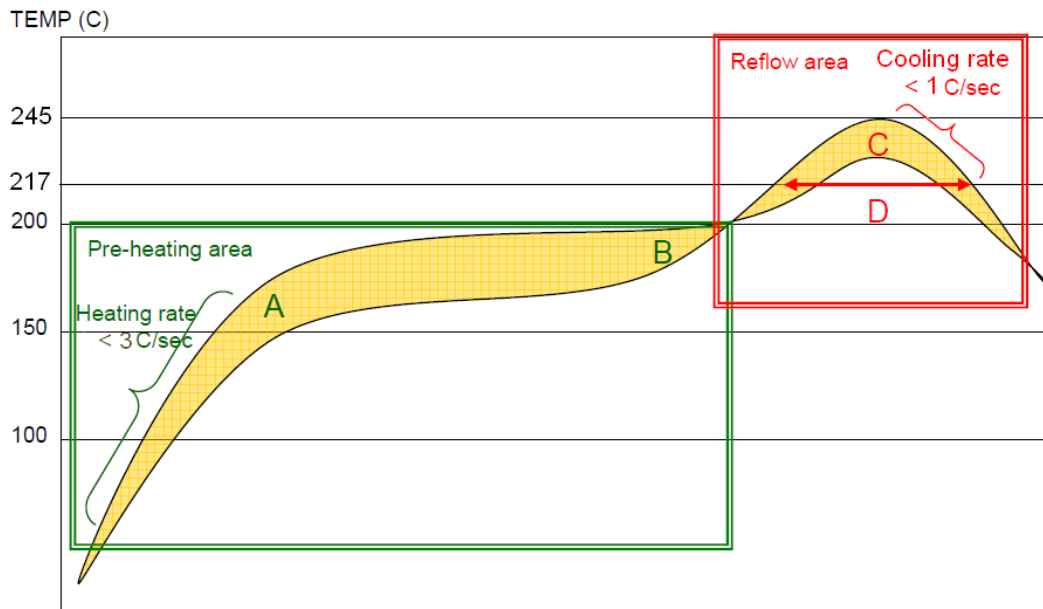
1. Shelf life in sealed bag: 12 months at <40°C and <90% relative humidity (RH)
2. After this bag is opened, devices that will be subject to reflow solder or equivalent processing (peak package body temperature of 250°C) must be:
  - a. Mounted within 168 hours at factory conditions of <30°C, 60% RH,
  - b. Stored at per J-STD-033
3. Devices require bake, before mounting, if:
  - a. Humidity Indicator Card reads >10% when read at 23°C +/- 5°C,
  - b. Condition 2a or 2b are not met
4. If baking is required, refer to IPC/JEDEC JSTD 033 for bake procedure. If the product is baked, it shall be for 16 hours.

## Reflow Profile Guideline

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

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

- ◆ The solder composition typically sets the peak temperatures of the profile.
- ◆ Recommend lead free solder pastes SAC305: Type 4, water soluble or no clean are acceptable.
- ◆ Reflow equipment needed at least nine heater zones. Recommend forced air type reflow oven with Nitrogen.
- ◆ It is recommended that the peak temperature at the solder joint be within 235°C ~ 245°C and the maximum component temperature should not exceed 245°C.
- ◆ It is recommended that time above 217°C for the solder joints is between 40-90s, and with a minimum of 40s.
- ◆ Excessive ramp/cooling rates ( $>3^{\circ}\text{C/s}$ ) should be avoided.
- ◆ To develop the reflow profile, it is recommended 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 solder joints of SiP Module.
- ◆ When developing the reflow profile, it is recommended that the actual fully loaded assembly be used to make sure that the total thermal mass is accounted for.



- (1) Solder paste alloy: SAC305(Sn96.5/Ag3.0/Cu0.5)(Lead Free solder paste is recommended by USI.)
- (2) A-B. Temp.(Pre-heat): 150~200°C; soak time:60~120sec.
- (3) C. Peak temp:  $<245^{\circ}\text{C}$
- (4) D. Time above 217 °C: 40~90sec.
- (5) Suggestion: Optimal cooling rate is  $<1^{\circ}\text{C/sec}$ . from peak to 217 °C.
- (6) Nine heater zones at least for Reflow equipment.
- (7) Nitrogen usage is recommended and the oxygen concentration is controlled less than 1500 ppm.

**Note:** Need to inspect solder joint by X-ray post reflow.

## 4: Host Interfaces

The xPico Wi-Fi SMT device server offers a number of industry common interfaces to allow for easy connectivity to the module. These include UART for asynchronous serial communication, serial peripheral interface, for synchronous formatted data and USB host interface.

### UART

- ◆ The xPico Wi-Fi SMT device server supports two UART interfaces (UART1, UART2)
- ◆ Both UARTs support asynchronous data rate up to 921 Kbps, with Odd/Even parity, and 1 & 2 stop bits
- ◆ Software flow control (XON, XOFF) for both UART1 and UART2
- ◆ Modem control (DTR, DCD) pins for UART1 only. Enabled by device configuration as pins are shared with configurable pins (CPs)
- ◆ Operational mode as a DTE device
- ◆ UART1 – supports TX, RX, RTS, CTS (hardware flow control)
- ◆ UART2 – supports TX, RX functions only. Hardware flow control is supported by using software controlled configurable pins.

**Table 3: xPico UART Signal Definitions**

Signal	SMT Pin	Description
TXD1	57	Serial Port 1 Transmit Data output
RXD1	56	Serial Port 1 Receive Data Input
RTS1	55	Serial Port 1 Ready-to-Send/ Serial Transmit Enable
CTS1	54	Serial Port 1 Clear to Send
TXD2	53	Serial Port 2 Transmit Data output
RXD2	52	Serial Port 2 Receive Data Input
RTS2	*	Serial Port 2 Ready-to-Send/ Serial Transmit Enable
CTS2	*	Serial Port 2 Clear to Send

*\*. Note: Serial Port 2 Flow Control uses Configurable Pins, which can be shared with other functions. Refer to the xPico Wi-Fi Embedded Device Server User Guide for more information.*

**Note:** For xPico Wi-Fi 5V tolerant pins, in order to sustain a voltage higher than  $V_{cc}+0.3$ , the internal pull-up/pull-down resistors must be disabled. Refer to the xPico Integration Guide for more detail.



## Serial Peripheral Interface (SPI)

The xPico Wi-Fi SMT device server has available a slave/master SPI interface that can be clocked at 30MHz. The SPI is multiplexed with five configurable GPIO pins and is managed by configuration at system initialization.

- ◆ Five Wire Interface consisting of Serial In, Serial Out, Chip Select, Serial Clock and Interrupt
- ◆ Configurable Master and Slave mode

**Table 4: xPico W1001 UART Signal Definitions**

Signal	SMT Pin	Description
SPI_INT	42	SPI interrupt External Interrupt input
SPI_CLK	14	SPI clock
MISO	12	SPI Master serial data input, SPI Slave serial data output
MOSI	13	SPI Master serial data output, SPI Slave serial data input
SPI_CS	15	SPI Chip Select

**Note:** For xPico Wi-Fi 5V tolerant pins, in order to sustain a voltage higher than  $V_{cc}+0.3$ , the internal pull-up/pull-down resistors must be disabled. Refer to the xPico Integration Guide for more detail.

Figure 8 shows the relative timings on the SPI interface of the xPico Wi-Fi module.

**Figure 7: SPI Timing Diagram - Slave Mode**

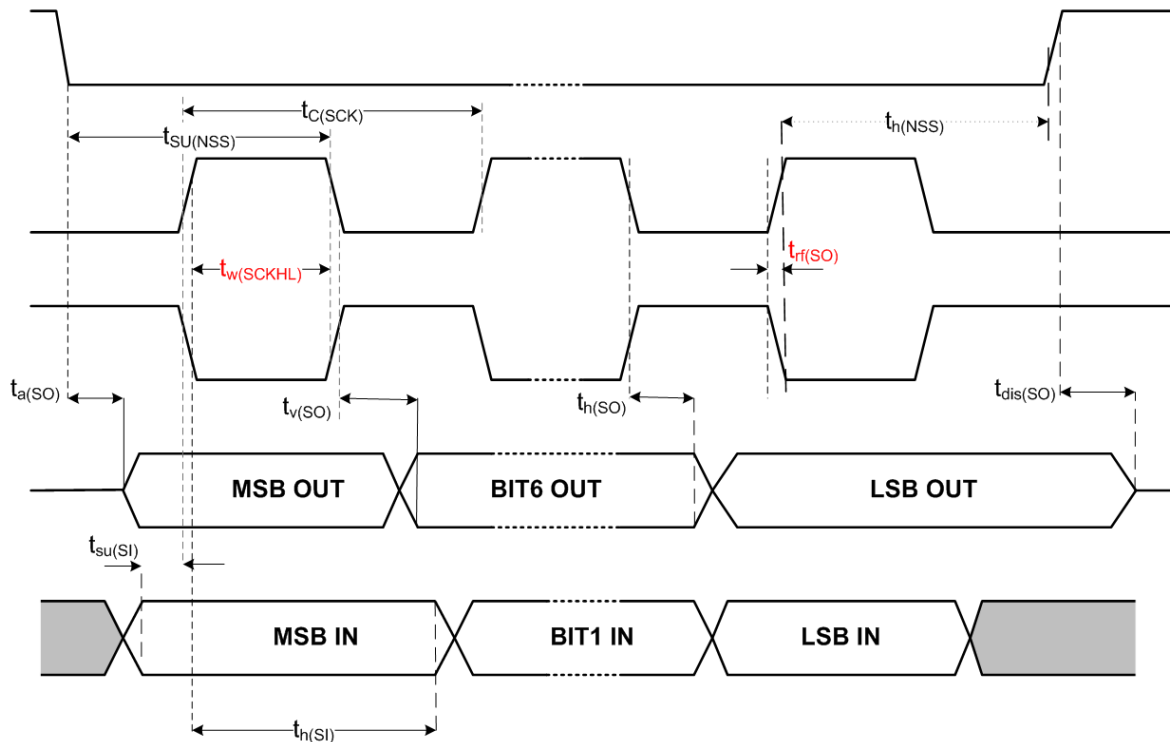
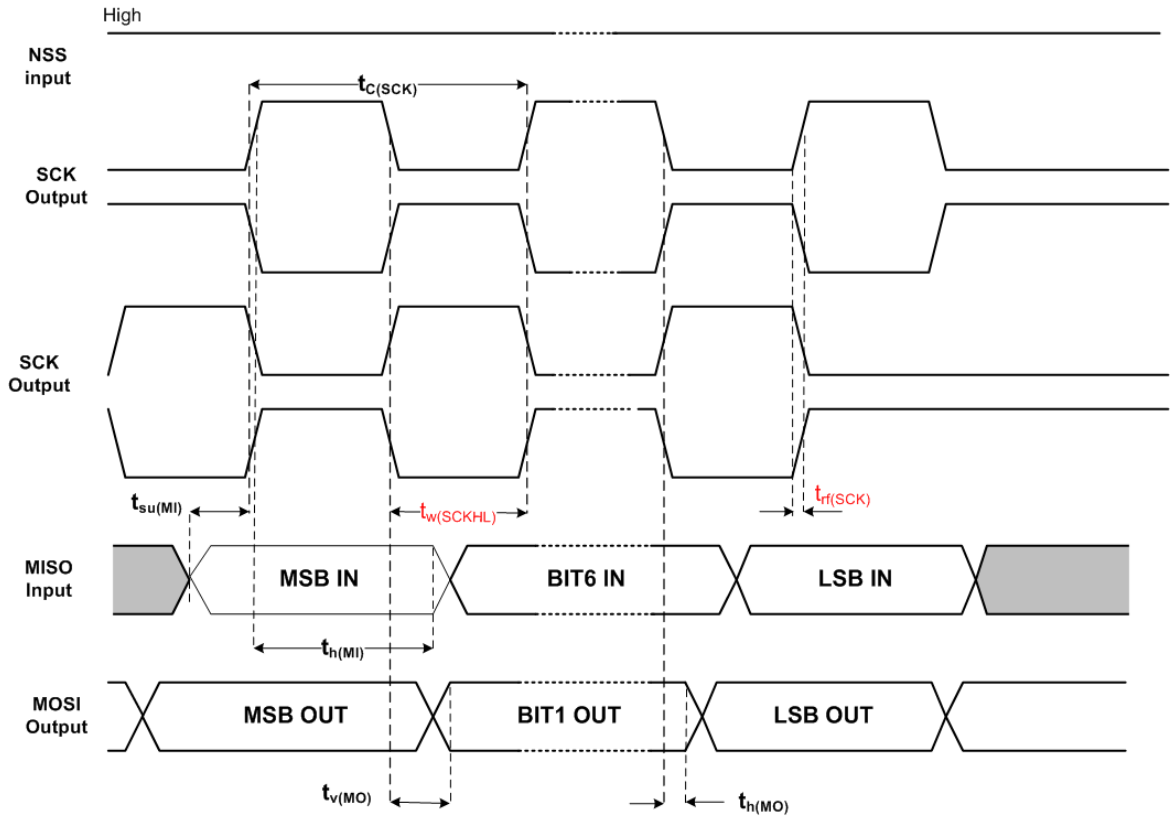


Figure 8: SPI Timing Diagram – Master Mode



See the *xPico Wi-Fi Embedded Device Server User Guide* for information on how to configure and use the SPI interface and its modes.

## SPI Interface Characteristics

Unless otherwise specified, the parameters given in *the table below* for SPI are derived from tests performed under the ambient temperature of +25C, and VCC = 3.3V.

Table 5: SPI Characteristic

Symbol	Parameter	Conditions	Min	Max	Unit
f <sub>SCK</sub> 1/t <sub>c</sub> (SCK)	SPI clock frequency	Master mode	-	30	MHz
		Slave mode	-	30	
t <sub>r</sub> (SCL) t <sub>f</sub> (SCL)	SPI clock rise and fall time	Capacitive load: C=30pF		8	Ns
DuCy(SCK)	SPI slave input clock duty cycle	Slave mode	30	70	%
t <sub>su</sub> (NSS) <sup>(2)</sup>	NSS setup time	Slave mode	4t <sub>PCLK</sub>	-	Ns
t <sub>h</sub> (NSS) <sup>(2)</sup>	NSS Hold time	Slave mode	2t <sub>PCLK</sub>	-	

Symbol	Parameter	Conditions	Min	Max	Unit
$t_{w(SCLH)}^{(2)}$ $t_{w(SCLL)}^{(2)}$	SCK high and low time	Master mode, $f_{PCLK}=30$ MHz, presc=2	$t_{PCLK}-3$	$t_{PCLK}+3$	
$t_{SU(MI)}^{(2)}$ $t_{SU(SI)}^{(2)}$	Data input setup time	Master mode	5	-	
		Slave mode	5	-	
$t_{h(MI)}^{(2)}$ $t_{h(SI)}^{(2)}$	Data input hold time	Master mode	5	-	
		Slave mode	4	-	
$t_{a(SO)}^{(2)(3)}$	Data output access time	Slave mode, $f_{PCLK}=20$ MHz,	0	$3t_{PCLK}$	
$t_{dis(SO)}^{(2)(4)}$	Data output disable time	Slave mode	2	10	
$t_{v(SO)}^{(2)(1)}$	Data output valid time	Slave mode (after enable edge)	-	25	
$t_{v(MO)}^{(2)(1)}$	Data output valid time	Master mode (after enable edge)	-	5	
$t_{h(SO)}^{(2)}$	Data output hold time	Slave mode (after enable edge)	15	-	
$t_{h(MO)}^{(2)}$		Master mode (after enable edge)	2	-	
<p>1. Remapped SPI1 characteristics to be determined.</p> <p>2. Based on characterization, not tested in production.</p> <p>3. Min. time is for the minimum time to drive the output and the max time is for the maximum time to put data in Hi-Z.</p> <p>4. Min time is for the minimum time to invalidate the output and the max time is for the maximum time to put the data in Hi-Z.</p>					

## USB Device

The xPico Wi-Fi SMT device server has one certified USB 2.0 Full Speed (12MHz) Device port interface for connection to an upstream USB device. The port uses an integrated PHY and provides a differential pair, signals DDP and DDM.

- ◆ Support for USB CDC/ACM Serial profile<sup>2</sup> which will have the xPico Wi-Fi module appear as a CDC/ACM device enumerated as a virtual COM port.

**Table 6: xPico USB Signal Definitions**

Signal	SMT Pin	Description
USB1+	18	USB1 Device Port Positive Pin
USB1-	19	USB1 Device Port Negative Pin

<sup>2</sup> Available in a future software release.

## Configurable General Purpose I/O Pins (GPIO)

The xPico Wi-Fi SMT device server provides up to eight configurable General Purpose Input/Output (GPIO) pins. Certain of the GPIOs are multiplexed with other interface functions (e.g. SPI). Mapping of these functions to CPs will be driven via configuration and applied at system initialization.

Each CP can be configured as a general purpose input, general purpose output, microcontroller peripheral block or a soft function (e.g. modem control). These pins are 3.3V CMOS logic level and 5V input tolerant. For more information on how to use, configure and manage the utilization of the available GPIO please refer to the section on Configurable Pins in the *xPico Wi-Fi Embedded Device Server User Guide*.

**Note:** For xPico Wi-Fi 5V tolerant pins, in order to sustain a voltage higher than  $V_{cc}+0.3$ , the internal pull-up/pull-down resistors must be disabled. Refer to the *xPico Integration Guide* for more detail.

**Table 7: xPico GPIO Signal Definitions**

Signal	SMT Pin	Description
CP1	45	Configurable I/O
CP2	42	Configurable I/O-SPI interrupt input
CP3	12	Configurable I/O- SPI MISO
CP4	13	Configurable I/O-SPI MOSI
CP5	16	Configurable I/O
CP6	17	Configurable I/O
CP7	14	Configurable I/O-SPI Clock
CP8	15	Configurable I/O-SPI Chip Select

## System Pins

The following system pins are available in the product

**Table 8: xPico System Signal Definitions**

Signal	SMT Pin	Description
WLAN_LED	47	LED function for WLAN Link indication, Active Low. This signal is intended to drive an external LED. The blink patterns of the LED denote various WLAN states.
SYSTEM_LED	41	System Status LED, Active High. This signal is intended to drive an external LED. The blink patterns of the LED denote various system states.

## Reset Pins

xPico Wi-Fi device server has two signals that can be used as reset signals.

**Table 9: xPico Reset Signal Definitions**

Signal Name	SMT Pin	Description
DEFAULT#	40	Unit reset to default, active low. While device is running, drive low for greater than 6 seconds, then release to reset unit to factory defaults. While device is held in reset(EXT_RESET# low), drive low, release reset to boot device with Line 1 CLI default settings (original configuration is preserved), then release DEFAULT# after CLI session is established.
EXT_RESET#	51	Unit hardware reset, active low. Assert low for a minimum of 50ms to reboot unit. Signal may be left floating.
WKUP	39	Toggle signal from low to high can wake device from Sleep or Standby mode. Hold low to allow device to enter Sleep or Standby mode. Subject to configuration settings. Signal may be left floating.

## 5: Power, Reset, Wake, and Default Timing

Figure 9: Timing Requirements for VCC, Reset, Default and Wake below shows the timing requirement for VCC, RESET#, DEFAULT#, and WAKE.

Figure 9: Timing Requirements for VCC, Reset, Default and Wake

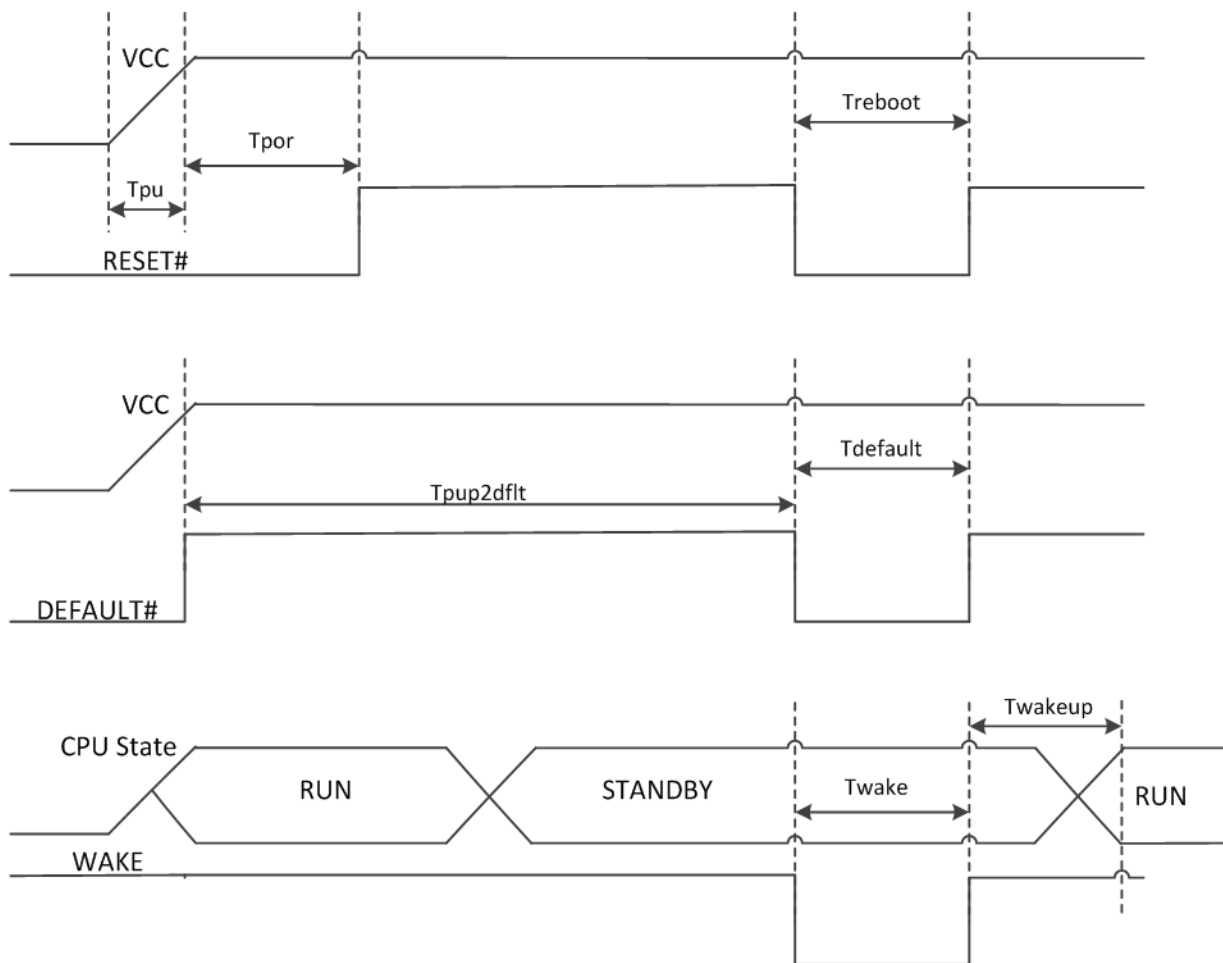


Table 10 below lists the various power sequence timing requirements.

**Table 10: Power Sequence Timing Requirements**

Parameter	Description	Minimum	Maximum	Unit
T <sub>pu</sub>	Time for VCC to reach 90% of its maximum value	20		us/V
T <sub>por</sub>	Time from VCC to reach 90% of its maximum value and de-assertion of external reset. Note RESET# can be left floating if unused	0		S
T <sub>reboot</sub>	Recommended reset pulse for system reboot	300		ns
T <sub>pup2dflt</sub>	Time from VCC power up to DEFAULT# assertion. Note DEFAULT# can be left floating if unused.	0		ns
T <sub>default</sub>	Assertion time for DEFAULT# to unit reset to default and reboot	6		S
T <sub>wake</sub>	Wake pulse width. Note wakeup is triggered on the rising edge. Note, WAKE signal may be left floating if unused.	1		us
T <sub>wakeup</sub>	Time from rising edge of WAKE signal to system up		TBD	

## 6: Module Specifications

The following sections provide the specification and performance attributes of the xPico Wi-Fi SMT device server module.

### IEEE 802.11 Wireless LAN Specifications

[Table 11](#) shows the specifications for the xPico Wi-Fi SMT device server IEEE 802.11 radio.

**Table 11: xPico Wi-Fi Device Server Radio Specification**

Feature	Description
Frequency Band	2.412 – 2.484 GHz (Channels 1 – 14)
Supported Data Rates	802.11n: 6.5, 13, 19.5, 26, 39, 52, 58.5, 65 Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11b: 1, 2, 5.5, 11 Mbps
Modulation	OFDM with BPSK, QPSK, 16-QAM, 64-QAM 801.11b with CCK and DSSS
Preamble Modes	Long, Short, HT (800 ns) modes
802.11 MAC Features	A-MPDU (Tx/Rx), WMM-PS, PSMP, Multiphase PSMP, Block Ack policy, RIFS AES (CCMP), TKIP, WEP 64/128-bit, WPA, WPA2
802.11 PHY Features	802.11b, 802.11g, 802.11n (Single-Stream) STBC Reception for extended range and higher throughput Greenfield mode (Tx/Rx)
802.11 modes	b/d/g/h/i/j/k/n/w/r



## 7: Antenna Connection Options

The xPico W1002 embedded device server supports wireless connectivity via the u.fl connector on the module and one RF SMT pad for external PCB antenna connection.

The xPico W1003 embedded device server offers an on-module ceramic chip antenna option only. The xPico W1003 module does not have the u.fl option or RF SMT pad for an external PCB antenna connection. xPico Wi-Fi SMT device servers are certified using the antennas listed in [Table 12](#) and [Table 13](#) below.

Refer to the compliance section below for certification requirements related to antenna selection.

**Table 12: xPico Wi-Fi SMT Device Server External Antenna Options**

Antenna Type	Peak Gain Typical	Vendor	Vendor Part Number
Swivel type antenna, with RP-SMA(M) connector	2 dBi, 2.4 GHz to 2.5 GHz	Wanshih	WSS002
PCB Strip Antenna with 50mm cable to U.FL connector With tape backing	1.5-2.5 dBi 2.4 GHz to 2.5 GHz	Ethertronics	1001077

**Table 13: xPico Wi-Fi SMT Device Server On-Module Antenna**

Antenna Type	Peak Gain Typical
On module ceramic chip antenna	2.5 dBi 2.4Ghz to 2.5Ghz

The xPico W1002 module provides an RF Pad/external trace option to solder a custom antenna to the device. The *xPico Integration Guide* provides guidelines on how to connect an external antenna to the device through a RF PCB trace transmission line. The integration guide also provides a reference design. The RF signal is available on RF1, pin 2, when RF\_CTL, pin 59, is pulled low with a low ohm resistor.

**Note:** *The xPico Wi-Fi SMT module has been certified with the on module chip antenna and the antennas listed above connected to the on module U.FL connector. Use of antenna connections to RF1, pin 2, may require re-certification.*

## 8: General Technical Data

**Table 14: General Technical Data**

<b>Category</b>	<b>Description</b>
Firmware	OTA Upgradable
Internal Web Server	Serves Web Pages Storage Capacity: 512 KB
Weight	2.6 grams (xPico W1002 embedded device server) 2.75 grams (xPico W1003 embedded device server)
Material	Metal Shell
Temperature	Operating Range: -40°C to +85°C (-40°F to +185°F) Storage Range: 40°C to +85°C (-40°F to +185°F)
Relative Humidity	Operating: 5% to 85% no- condensing
Shock/Vibration	Non-operational Shock: 500 g's. Non-operational vibration: 20 g's.