

# Application Note:

## *xPico 200 Series Layer 2 Wi-Fi to Ethernet Bridge*

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## Revision History

Date	Rev.	Comments
February 2021	A	Initial document.

For the latest revision of this product document, please check our online documentation at [www.lantronix.com/support/documentation](http://www.lantronix.com/support/documentation).

## Overview

This document describes using two xPico 200 Series modules as a Layer 2 Ethernet to Wi-Fi bridge configuration. The following example uses a standard private LAN/WLAN Layer 3 configuration but the xPico firmware will allow the Layer 2 traffic to pass through the network.

Figure 1 illustrates one xPico 200 series module (Module 1) configured as an AP to ETH bridge and the other (Module 2) configured as a WLAN to ETH bridge. This design can be used when it is not possible to run an Ethernet cable in a use case or where certain Layer 2 devices are used to send raw Ethernet frames (some video cameras).

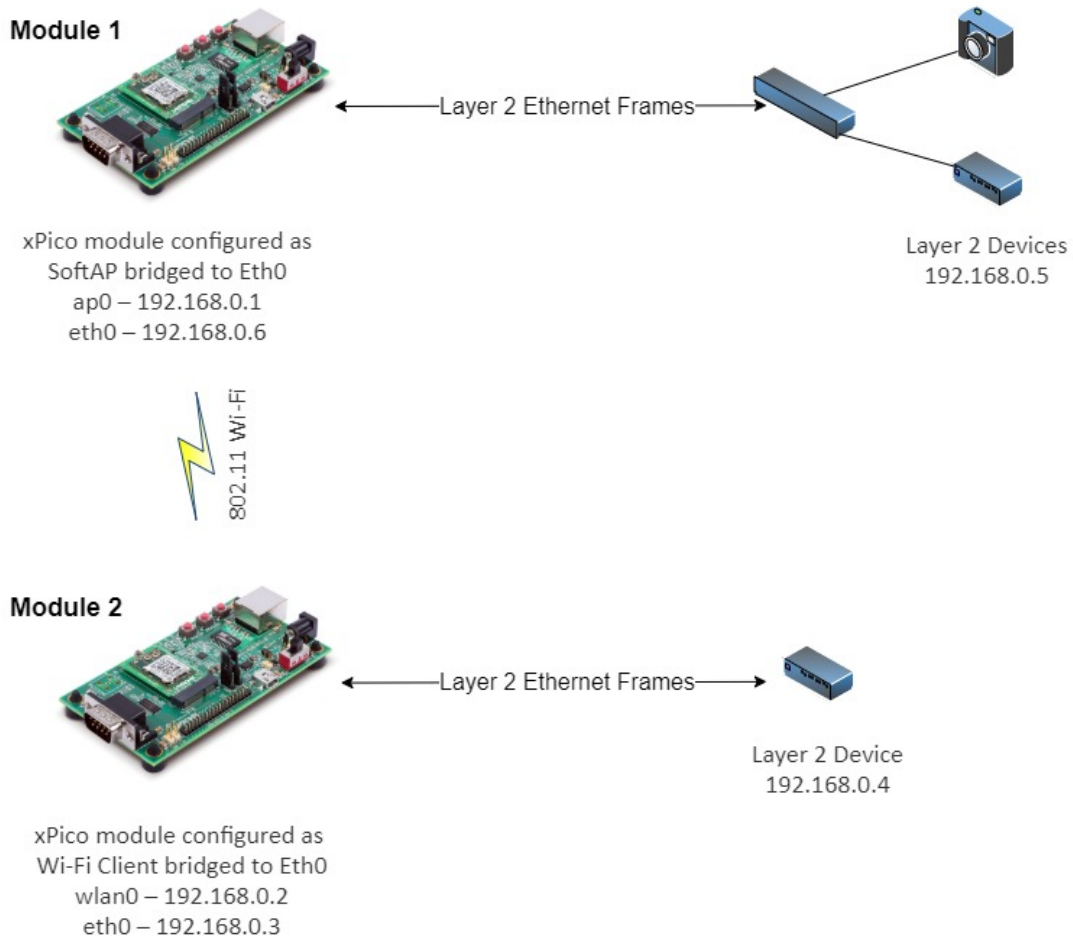


Figure 1: Example Layer 2 Ethernet to Wi-Fi bridge configuration

## Example Hardware and Software Used

In this example, the following are used:

- Two xPico 200 Series Evaluation Kits
- Layer 2 Ethernet frame generator

## Web UI Configuration

The WLAN profile configuration in this section refers to xPico Module 2 as shown in Figure 1.

### WLAN Profile configuration

The WLAN Profile configuration is applied to the xPico 200 module that has wlan0 enabled (Module 2).

You have the option of setting up a WLAN profile as shown in Figure 2 or using the QuickConnect option once the ap0 settings are applied.

The "Network Name" here must match the SSID in the Access Point ap0 Configuration on the other module.

This WLAN configuration example uses no security so authentication is not required. Security settings are allowed but must match between this and the Access Point ap0 Configuration on the other module.

The screenshot displays the 'WLAN Profile Itrx Configuration' interface for the xPico 270 device. The interface is organized into three main sections: Basic, Security, and Advanced. In the Basic section, the 'Network Name' is set to 'litr', the 'State' is 'Enabled', and the 'Suite' is 'None'. The Security section is currently empty. The Advanced section shows 'TX Power Maximum' set to '19 dBm' and 'Power Management' set to 'Disabled'. The page includes a sidebar menu on the left with various configuration options like 'QuickConnect', 'Status', 'AES Credentials', etc. The top right corner shows the user 'admin' and a 'Logout' link. A footer at the bottom indicates 'Copyright © Lantronix, Inc. 2007-2020. All rights reserved.'

Figure 2: WLAN Profile

# Network Interface Configurations – xPico 200 operating as AP to ETH bridge

The Network Interface configuration in this section refers to xPico Module 1 as shown in Figure 1.

## AP0 configuration

Configure the ap0 Interface settings on xPico Module 1 as shown in Figure 3.

Note that this will be a point to point IP connection without a gateway.



Figure 3: ap0 interface configuration

Configure the ap0 Link settings on xPico Module 1 as shown in Figure 4.



Figure 4: ap0 link configuration

## ETH0 configuration

Configure the eth0 settings on xPico Module 1 as shown in Figure 5.

The screenshot shows the xPico 270 web interface. On the left is a navigation menu with 'Network' selected. The main content area is titled 'Interface eth0 Configuration'. At the top, there are tabs for 'ap0', 'eth0', 'wlan0', and 'lo0', with 'eth0' being the active tab. Below the tabs are 'Interface' and 'Link' buttons, and a 'Status' dropdown set to 'Configuration'. The configuration form includes the following fields:

- State:  Enabled  Disabled
- Hostname:
- Priority:
- MSS:  bytes
- DHCP Client:  Enabled  Disabled
- IP Address:
- Domain:
- Default Gateway:
- Primary DNS:
- Secondary DNS:
- IPv6 State:  Enabled  Disabled

A 'Submit' button is located at the bottom of the form. The footer contains the copyright notice: 'Copyright © Lantronix, Inc. 2007-2020. All rights reserved.'

Figure 5: eth0 configuration

## WLAN0 configuration

Configure the wlan0 settings on xPico Module 1 as shown in Figure 6.

The screenshot shows the xPico 270 web interface. On the left is a navigation menu with 'Network' selected. The main content area is titled 'Interface wlan0 Configuration'. At the top, there are tabs for 'ap0', 'eth0', 'wlan0', and 'lo0', with 'wlan0' being the active tab. Below the tabs are 'Interface' and 'Link' buttons, and a 'Status' dropdown set to 'Configuration'. The configuration form includes the following fields:

- State:  Enabled  Disabled
- Hostname:
- Priority:
- MSS:  bytes
- DHCP Client:  Enabled  Disabled
- IP Address:
- Domain:
- Default Gateway:
- DNS:
- Primary DNS:
- Secondary DNS:
- IPv6 State:  Enabled  Disabled

A 'Submit' button is located at the bottom of the form. The footer contains the copyright notice: 'Copyright © Lantronix, Inc. 2007-2020. All rights reserved.'

Figure 6: wlan0 configuration

## Bridge configuration

Configure the bridge settings on xPico Module 1 as shown in Figure 7.

The screenshot shows the xPico 270 web interface. The left sidebar contains a menu with 'Bridge' highlighted. The main content area is titled 'Bridge Configuration' and includes a 'Status' tab and a 'Configuration' tab. The configuration fields are: 'Interface' (dropdown menu set to 'ap0'), 'State' (radio buttons for 'Enabled' and 'Disabled', with 'Enabled' selected), and 'Allow All Multicast' (radio buttons for 'Enabled' and 'Disabled', with 'Enabled' selected). A 'Submit' button is located below the fields. The right sidebar shows a user 'admin' with a '[Logout]' link and a note: 'Bridging allows a "bridged machine" to send and receive frames via wlan0 or ap0. NOTE: A reboot is required for configuration changes to take effect.' The footer contains the copyright notice: 'Copyright © Lantronix, Inc. 2007-2020. All rights reserved.'

Figure 7: Bridge configuration

## Network Interface Configurations – xPico 200 operating as WLAN to ETH bridge

The Network Interface configuration in this section refers to xPico Module 2 as shown in Figure 1.

### AP0 config

Configure the ap0 settings on xPico Module 2 as shown in Figure 8.

Note that this will be a point to point IP connection without a gateway.

The screenshot shows the xPico 270 web interface. The left sidebar contains a menu with 'Network' highlighted. The main content area is titled 'Interface ap0 Configuration' and includes a 'Status' tab and a 'Configuration' tab. The configuration fields are: 'State' (radio buttons for 'Enabled' and 'Disabled', with 'Disabled' selected), 'Priority' (input field with '1'), 'MSS' (input field with '1460' and 'bytes' label), 'IP Address' (input field), 'Default Gateway' (input field with '<None>'), 'Primary DNS' (input field with '<None>'), and 'Secondary DNS' (input field with '<None>'). Below these is a section for 'DHCP IP Address Range' with 'Start' (input field with '<Minimum>') and 'End' (input field with '<Maximum>') fields. A 'Submit' button is located below the fields. The right sidebar shows a user 'admin' with a '[Logout]' link and a note: 'These settings pertain to the Network Interface on the device. To see the effect of these selections after a reboot, view the corresponding Status. Changes will take effect after reboot or wake from standby. When ap0 is enabled, DHCP Server will assign IP addresses to ap0's clients. DHCP Server manages up to 6 simultaneous clients. (Only 5 if wlan0 is enabled.)' The footer contains the copyright notice: 'Copyright © Lantronix, Inc. 2007-2020. All rights reserved.'

Figure 8: ap0 configuration

## ETH0 configuration

Configure the eth0 settings on xPico Module 2 as shown in Figure 9.

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Figure 9: eth0 configuration

## WLAN0 configuration

Configure the wlan0 settings on xPico Module 2 as shown in Figure 10.

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Figure 10: wlan0 configuration



## Bridge configuration

Configure the bridge settings on xPico Module 2 as shown in Figure 11.

The screenshot displays the web management interface for the xPico 270 device. The page title is "xPico 270" and the user is logged in as "admin". The main content area is titled "Bridge Configuration" and contains the following fields:

- Interface:** A dropdown menu set to "wlan0".
- Mode:** A dropdown menu set to "Dynamic".
- Allow All Multicast:** Radio buttons for "Enabled" (selected) and "Disabled".

A "Submit" button is located below the "Allow All Multicast" field. On the right side, a note reads: "NOTE: A reboot is required for configuration changes to take effect." The sidebar menu on the left includes options such as QuickConnect, Status, AES Credentials, Bluetooth, Bluetooth SPP, Bridge (highlighted), CLI Server, Clock, ConsoleFlow, CPM, Device, Diagnostics, Discovery, File System, HTTP Server, Line, Network, NTP, Power, Radio, SPI, TLS Credentials, Tunnel, User, and WLAN Profiles. The footer contains the copyright notice: "Copyright © Lantronix, Inc. 2007-2020. All rights reserved."

Figure 11: Bridge configuration