XPress™ Wireless

Ethernet Bridge

User Guide

Revision history—90001305

Revision	Date	Description
A	June 2012	Baseline release.
B	February 2013	Added the following steps to page 15: 5 Reconnect power. 6 Press and hold the white reset button for 10 seconds. This will cause the LEDs to flash off then back on. The radio is now set to factory defaults.
C	August 2016	Updated links and the template. Added missing antennas.

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Warranty

To view product warranties online, visit www.digi.com/howtobuy/terms.

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Customer support

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If you have a customer account, sign in to the Customer Support Web Portal at www.digi.com/support/eservice.

Contents

Hardware

Overview

Thank you for your purchase of the Product Name.

The Product Name replaces costly wiring with a solution that can wirelessly connect industrial PLCs, digital signs, security cameras, access controllers and more. With a range of up to 15 miles, the ability to transmit through as many as 10 standard walls, a 1.5 Mb/s data rate, and the added range and capabilities of the 900 MHz band, the easy-to-use, long-range XPress Wireless Ethernet Bridge communicates where Wi-Fi and other wireless data products fall short.

If you have purchased a single Product Name, you will receive the following:

- One XPress Ethernet Bridge RF Modem (-W = international variant)
- One 2.1 dBi weatherproof dipole antenna
- One 12 VDC power supply
- One Power over Ethernet (POE) injector

If you have purchased a pair of Product Names, you will receive two of each item. Additional configuration is typically not required when XEBs are operated as a pair.

This document contains information on the Product Name functionality only. If you have purchased an Product Name with XPress Crypto Module, refer to the User Manual Supplement for XPress Crypto Module with FIPS 140-2 Security for more information.

Setup the Product Name

Identify the kit components

Carefully unpack and verify the contents of your kit. Your kit should include the following:

Product Name: pair

Product Name: single

Specifications

Summary

The Product Nameallows the user to create a long-range, wireless Ethernet network with up to 16 active (63 total) subscriber units per access point.

Configuring a wireless link with the XEB requires the establishment of six elements:

- Each radio must know whether it is to be an access point (AP) or subscriber unit (SU)
- Each radio must have an IP address that is unique among all others on the same network
- The AP must know how many SUs are expecting communication with it
- The AP and any given SU must agree on which radio frequency channel they are using. This can be set manually or allowed to change automatically.
- The SU must be assigned a unique subscriber ID to specify which time division slot it will use when communication with the AP
- The AP and any given SU must share a common 128-bit encryption key

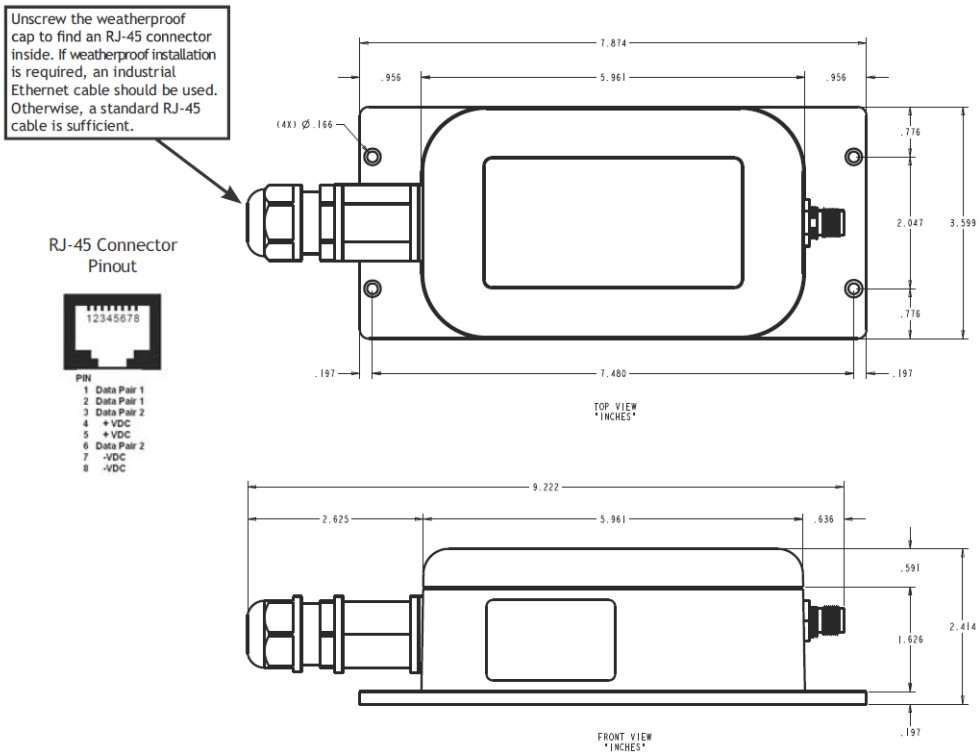
The access point (AP) automatically scans for the best of the 12 available radio frequency channels, encrypts Ethernet data received from the network, and transmits it wirelessly to the correct subscriber unit (SU). The AP is constantly monitoring the radio link and can automatically change the channel if performance is degraded due to interference. If two AP units are very close to one another, they may interfere if operating on adjacent frequency channels. Place them at least 10 feet apart or manually select non-adjacent channels for their operation. Also, the SU should be placed at least 10 feet from the AP to avoid overloading the radio's receiver.

Any 10/100 BaseT Ethernet client device (ECD) can be connected to an XPress subscriber unit. Each SU encrypts Ethernet traffic received from the attached ECD and transmits the data wirelessly to its AP. Each SU can be plugged directly into an ECD without adding drivers or loading software. Essentially, once the AP/SU pair is configured and running, it behaves like a continuous Ethernet cable.

Specifications

Characteristic	Specification/Description
RF Transmission Rate	1.536 Mb/s
Ethernet Throughput	935 kb/s
Output Power	+21 dBm (125 mW), (4 W EIRP with 15 dBi antenna)
Receiver Sensitivity	-97 dBm at 10^{-4} bit error rate
Range	Up to 1000 ft (300 m) indoor with 2.1 dBi dipole antennas Up to 2 miles (3.2 km) outdoor line of sight with 2.1 dBi dipole antennas Up to 15 miles (24 km) outdoor line of sight with high- gain antennas
Radio Channels / Bandwidth	12 channels (6 in international version) with 2.0833 MHz spacing and 1.75 MHz occupied bandwidth
Manual Frequency Select	Channel selected with dip switch or via web browser interface
Connector Types	RF RPTNC female / Ethernet RJ-45 / Power Jack P5-2.1 mm center positive
Status LEDs	Power, Ethernet Link, RF RX, RF TX, 4/Channel and 6/Link Quality
Error Correction Technique	Sub-block error detection and retransmission
Adjacent Band Rejection	SAW receiver filter attenuates cellular interference
Regulator Type	Switching regulator
Browser Management Tools	QoS Statistics, Network Settings, Spectrum Analyzer and Firmware Upgrading
Power Consumption	Transmit: 1.7 W Receive: 0.8 W
Voltage	Power over Ethernet 9-48 VDC pins 4/5 positive and 7/8 ground
Temperature Range	Radio/Enclosure: -40 C to 70 C; PoE Injector: -40 C to 85 C; Power Supply: 0 C to 40 C
Transmit Current Draw	175 mA @ 9 VDC; 140 mA @ 12 VDC; 35 mA @ 48 VDC
Size	9.22” L x 3.60” W x 2.19” H; 320 grams
Weatherproofing	The XPress enclosure is IP65 rated and tested for weatherproof installation. The PoE injector and power supply are not weatherproof and should be installed indoors.
Certifications and Compliance	FCC Part 15; Industry Canada (IC); contains FCC ID: R4N-AW900MR and IC: 5305A-AW900MR; UL 60950-1; CSA C22.2, No. 60950-1, E112790; RoHS

Physical dimensions



900 MHz channels

Channel	US/Canada	International	Center Frequency
0	x	x	Auto Mode
1	x		903.12500 MHz
2	x		905.20833 MHz
3	x		907.29167 MHz
4	x		909.37500 MHz
5	x		911.45833 MHz
6	x		913.54167 MHz
7	x	x	915.62500 MHz
8	x	x	917.70833 MHz
9	x	x	919.79167 MHz
10	x	x	921.87500 MHz
11	x	x	923.95833 MHz
12	x	x	926.04167 MHz

Setup and initialization

Setup

1. Consult IT - Each XPress radio comes default with a static IP address of 192.168.17.17. We recommend connecting each radio to a standalone computer disconnected from any shared network, and consulting with your IT department before connecting them to any shared network.
2. Install hardware - If the device is to be used outdoors, mount it vertically with the antenna facing up. This orientation will mitigate any environmental effects and allow drainage. Attach the antenna to the XPress radio. Antenna installation is required to maintain device sealing. Attach the Ethernet cable (straight or cross-over) between the XPress radio and the “DATA + PWR” jack on the PoE injector. In order to maintain the seal around the Ethernet cable, the Ethernet gland cap should be firmly tightened.
3. Configure the radios - Use either the Digital Setup method as shown below, or use the DIP switch method; see page 3 of the XPress Ethernet Bridge Multipoint: User Guide (part number 90000888) manual at www.digi.com:
ftp://ftp1.digi.com/support/documentation/90000888_B.pdf

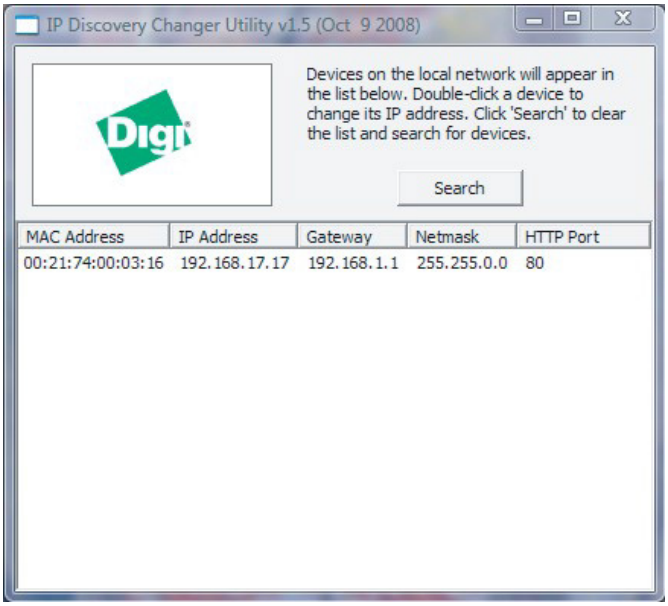
Note XEB09-CIPA(-W) radios come pre-configured as a paired set. No configuration is required.

Digital setup

1. Perform the digital configuration using the XPress built-in browser interface. It should be powered on and connected at least temporarily to a network containing a computer that can run a conventional web browser.
2. Download the Digi IP Discovery Utility from our website at:
http://ftp1.digi.com/support/utilities/changer_digi.zip

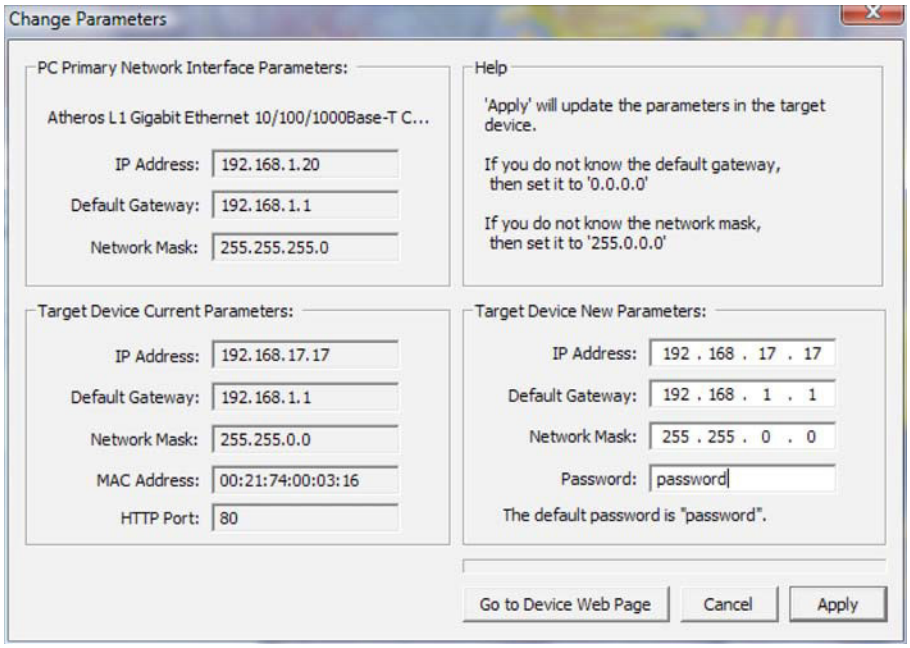
Note This utility only runs on Windows, not Linux or Mac. If you must use a non-Windows computer for configuration, make sure your subnet mask allows your computer to see 192.168.17.17. Connect to that default IP address with your web browser, continuing the setup procedure with step 6.

3. Unzip and run the IP Discovery Utility (changer_DIGI.exe) and a window appears that is similar to this:



4 The XPress should appear in the list at the default IP address of 192.168.17.17. If it does not, click **Search** to regenerate the list. If it still does not appear, you have a connection issue and need to re-examine the cabling or you may have a firewall issue on your computer.

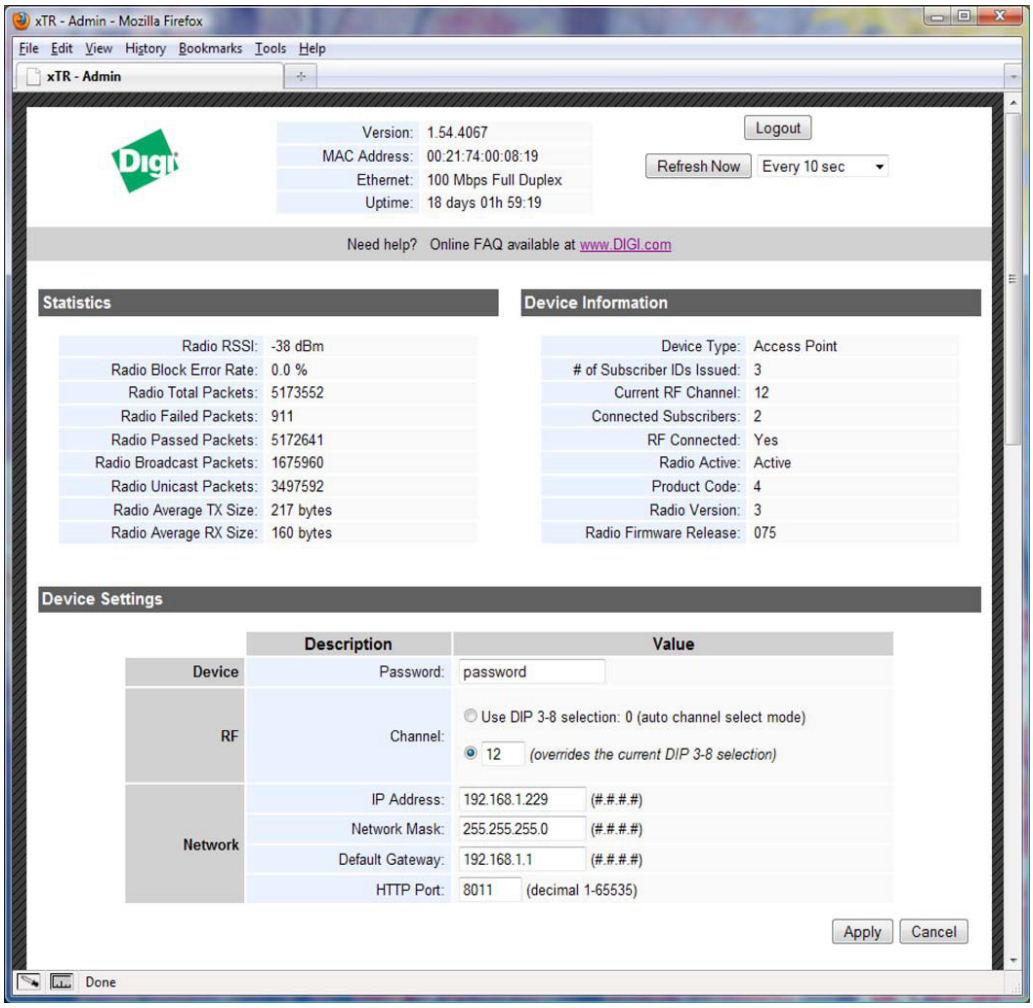
5 Double-click the list item that refers to the XPress being configured. A window appears that is similar to the following picture:



6 This information is the current status of the radio, while the boxes on the right allow you to change it. It is important that the IP address of the XPress is in the same subnet as your computer. For example, if the subnet mask is 255.255.255.0 (a class C network), the first three number groups of the IP address must match. Choose your desired parameters and click **Apply**.

7 Make note of the chosen IP address and password, then click **Go to Device Web Page**. This causes your default web browser to launch with the device IP address in the browser address bar. You may also launch the browser on your own and enter the web page address manually.

8 The browser page that loads first shows the current device information and QoS statistics and provides a login at the upper right. Log in using the password you just specified (or "password" if you kept the default). If the login succeeds, an admin page similar to this appears:



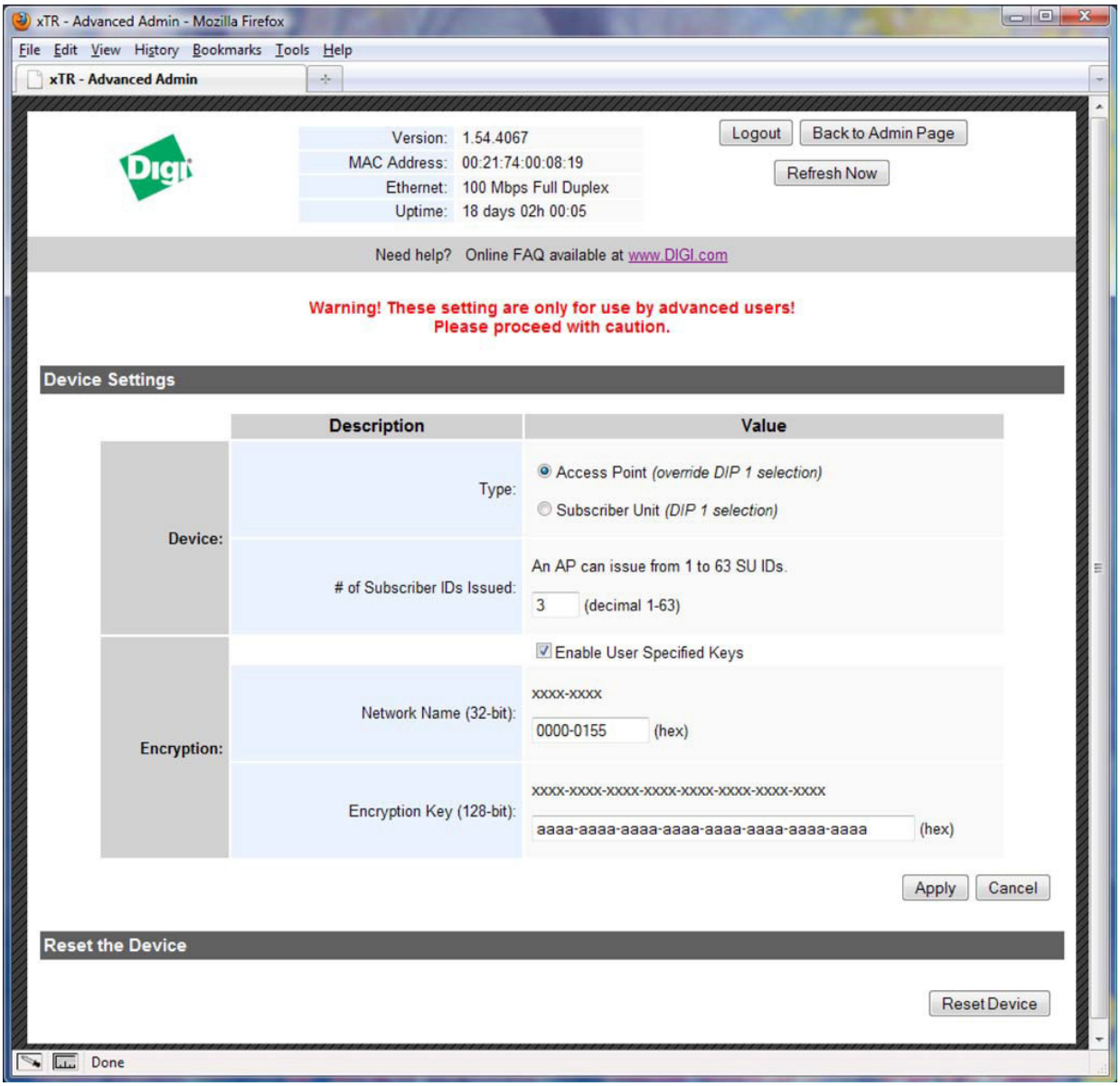
9 The admin page has sections similar to the login page showing radio statistics and device information, and it adds several new sections. The **Device Setting** section allows you to set the network information and choose an RF frequency channel. The default is to allow the radio to choose its own frequency based on minimizing interference. If you set a fixed channel, make sure the AP and all SUs use the same one. References to DIPs refer to switches inside the radio that are used in the legacy method of configuration and you can ignore them when using the browser method.

10 If you scroll down in the admin browser page, you will come to three more sections:

- A graphical spectrum analyzer display that may help you to select radio channels that avoid interference.
- A section to be used if an update to the XPress firmware is required. Note that there are two possible firmware loads for this unit, one for compatibility with older XPress Ethernet Bridge Multipoint radios (XEB09-Bxxx), and an international version that limits the frequency band to 915-928 MHz (channels 7 through 12). The latest firmware is found online at http://

www.digi.com/support/productdetail?pid=4465&type=firmware. To change firmware download the desired .bin and .webbin files, and click **Upload Firmware** to install the files one at a time. We recommend contacting technical support before changing firmware.

- An Advanced Links section, which indicates that it should only be used by advanced users. Despite this warning, you need to click the **Advanced Admin** button in order to set the device type, ID and encryption key. A page appears similar to the following:



11 On the Advanced Admin page, set the parameters as follows:

- Choose **Device Type**: Access Point or Subscriber Unit.
- For **# of Subscriber IDs Issued**, assign unique ID numbers in numeric order from 1 to 63.
- For an Access Point, type the numbers of Subscriber Units that will be communicating with it.
- Click the **Enable User Specified Keys** box.

- In the **Network Name** field, choose an 8-digit hex (0-9 and A-F) network name that will be common among the AP and its SUs and type it. The hyphen is required.
- **Encryption Key (128-bit)**: choose a 32-digit hex encryption key and type it. The hyphens are required. This key must match between the AP and the SU so make a note of it as well.

12 After entering the parameters, click **Apply** to save them to the radio.

13 When all of the radios are keyed and operating, connect them to your network and Ethernet devices as desired and cycle the radio's power to begin normal operation. Now you can perform browser management of the SUs over the wireless network.

Note Avoid plugging actively linked radios into the same switch because this corrupts its routing table and may cause network problems just as if you had plugged a CAT5 cable directly between two ports of a switch.

The POE injector

The Product Name uses a passive POE injector that follows the 802.3af standard.

As seen above, the Product Name connects to the POE injector using another Ethernet cable to the female RJ45 receptor. The 12 V power supply included with the radio plugs into the barrel jack receptor.

The RJ45 Male connector connects to your network or Ethernet-enabled device.

CAUTION! Failure to follow instructions can result in damage to the radio and other equipment connected to the POE injector.

Issue a factory reset

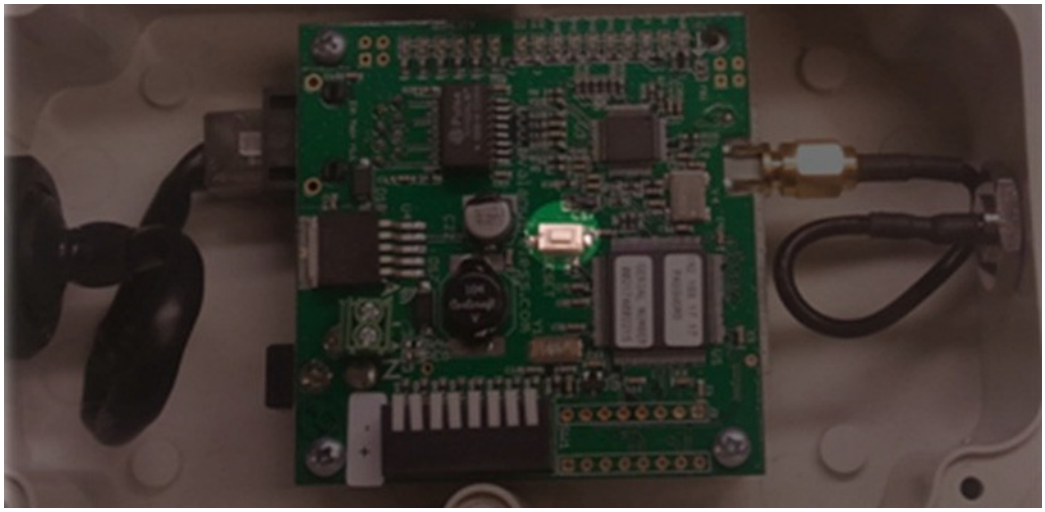
The Product Name comes in a plastic IP67-rated industrial case providing the radio some protection from dust, rain, and other harmful contaminants. This enclosure also proves to be a barrier to you while trying to issue a factory reset to the radio.

Requirements

(1) 4-inch Phillips screwdriver with a #1 tip

Perform a reset

1. Make sure XPress Ethernet Bridge XEB is unplugged and powered off.
2. Find six holes on the bottom of the XEB, which should be fairly deep.
3. Remove the screws, using moderate to heavy pressure to avoid stripping the screws.
4. Remove the lid and locate the WHITE RESET button on the board.
5. Reconnect power.
6. Press and hold the white reset button for 10 seconds (it is highlighted in the following picture). This will cause the LEDs to flash off then back on. The radio is now set to factory defaults.



Update the firmware

Product Names have a web browser interface that includes the capability of upgrading new firmware. The following steps guide you through the upgrade process.

Note Any customers who use the crypto module or the international variant of the Xpress (XEB09-CIPA-W) must contact Digi technical support for firmware updates.

1. Verify the radio is a 900 MHz unit. (Part No.: XEB09-CIxx)

2 Enter the IP Address of the radio into your web browser to connect to the WebUI (Default IP is 192.168.17.17). If necessary, use the IP Discovery utility to scan your network and find the IP address of the unit.

3 The opening page of the webUI shows the firmware version number for the WebUI and the radio.

- The WebUI firmware version number is found at the top of the web page to the left of the login box.
- The Radio firmware version number is found as the last item under **Device Information.**

Note If your WebUI firmware version number is lower than 1.37.xxxx and/or your radio firmware version number is lower than 060, contact Digi technical support to update your firmware.

4 If your WebUI firmware version number is 1.57.xxxx, you will need to update to version 1.6x.xxxx.

5 If your Radio firmware version number is 075, you will need to update to version 08x.

6 If an upgrade is needed for either the WebUI or the Radio, please download the appropriate .zip folder. Both firmware types will be located within .zip folder on the Digi Support Website.

7 Using the radio's web browser interface in step one, enter the password and click the Login button. (If you don't know the password, use the Finder utility to read or reset it.)

8 Near the bottom of the admin page, there is a section titled **Upload New Firmware**. Enter the path to the radio Firmware Update file ending in .bin, or click the **Browse** button to find it.

9 Next, click **Upload Firmware** and **OK** to confirm. After a few seconds the radio should reset and return to the login page.

10 Repeat step eight for the WebUI firmware update file wnsing in .webbin

By looking for the version numbers on the login page in step two, you can verify the updates have loaded successfully.

Note If you receive a new radio with version 08x radio firmware and 1.6x.xxxx WebUI firmware, and you wish to integrate the new radio into an existing network that uses radio firmware version 075 and WebUI version 1.57.xxxx, you will need to load the older firmware onto the new radio. They are not backwards compatible. The steps to revert firmware will be the same as upgrading, except you will need to downgrade the WebUI firmware first, then downgrade the radio firmware.

FCC certification

FCC

The Product Name complies with Part 15 of the FCC rules and regulations. Compliance with labeling requirements, FCC notices and antenna regulations is required.

IMPORTANT: The Product Name has been certified by the FCC for use with other products without any further certification (as per FCC section 2.1091). Changes or modifications not expressly approved by Digi International could void the user's authority to operate the equipment.

IMPORTANT: The Product Name has been certified for fixed base station and mobile applications. If modules will be used for portable applications, the device must undergo SAR testing.

ANTENNAE: The Product Name is approved for use with the following Digi weatherproof antennae:

- A09-HTM-675 (2.1 dBi dipole RPTNC male)
- A09-Y10TM-P10I (10 dBi Yagi RPTNC male)
- A09-Y15TM-P10I (15 dBi Yagi RPTNC male)
- A09-Y8NF (8.1 dBi Yagi N female)
- A09- Y11NF (11.1 dBi Yagi N female)
- A09-Y15NF (15.1 dBi Yagi N female)