Cambium Networks™

Quick Start Guide

PTP 820C
System Release 10.9

Introduction

Thank you for purchasing Cambium Networks PTP 820C equipment. This guide is provided to assist operators in setting up and configuring a PTP 820C 2+0 dual-polarization direct-mount link with Multi-carrier ABC and XPIC.
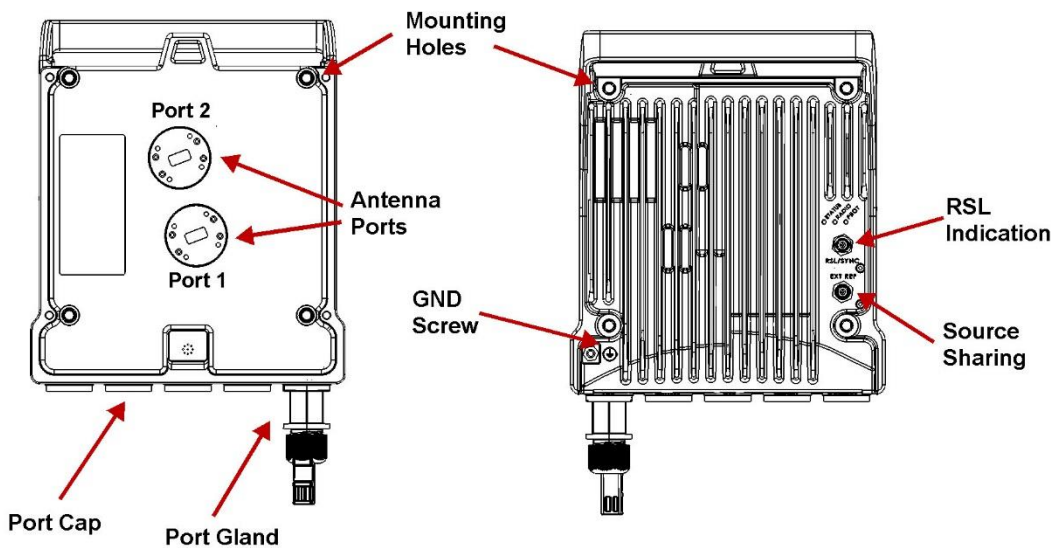
For detailed instructions of all supported PTP 820C link types, refer the *PTP 820C Installation Guide.*

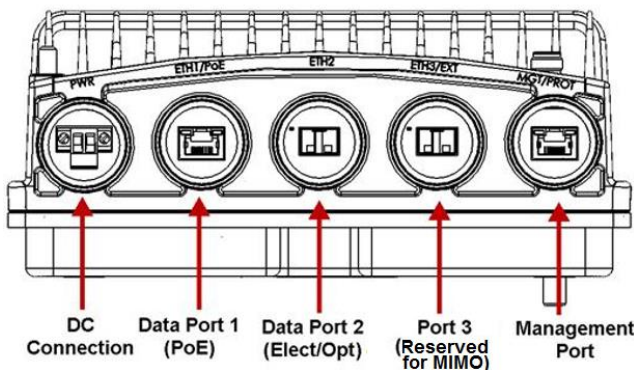For detailed instructions of software configurations, refer the *PTP 820 C/S User Guide*.

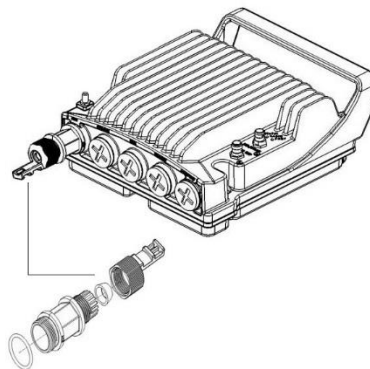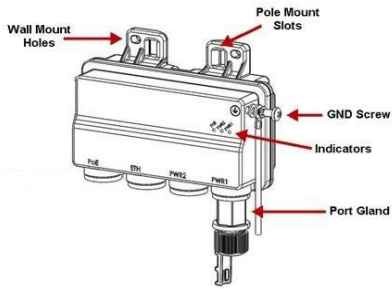The documents can be located here:

https://support.cambiumnetworks.com

PTP 820C Rear View and Front View

PTP 820C Interfaces

Cable Gland Constructor

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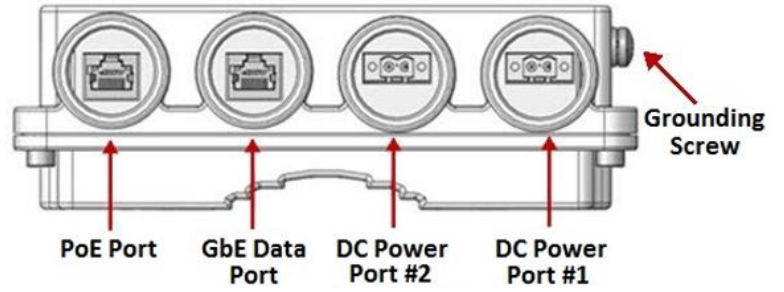## PoE Injector

PoE Injector Interfaces

Installing the Unit

This Quick Setup guide provides instructions for installing and configuring a 2+0 dual-polarization direct-mount pipe configuration using XPIC. These instructions can also be used for a direct-mount 1+0 configuration that can later be upgraded to 2+0 with an additional activation key and minimal software configuration, no additional hardware installation required.

Hardware configuration, including the type of mediation devices required, differs for different configurations. For other configurations besides the 2+0 dual-polarization direct-mount XPIC configuration described in this Quick Setup guide, refer to the PTP 820C Installation Guide.

When tightening the captive screws, use 20 Nm torque for radio-antenna, radio-mediation device, and mediation device-antenna connections. In order to avoid misalignment, screws should be tightened progressively.
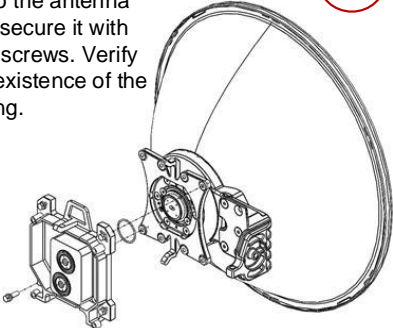
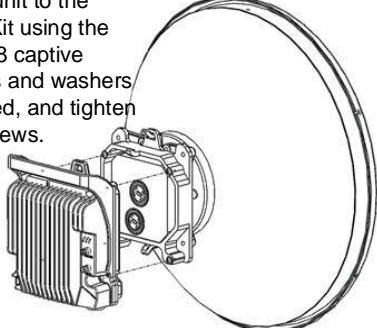|	
	Note Do not remove the transparent pressure window located on the antenna interface.
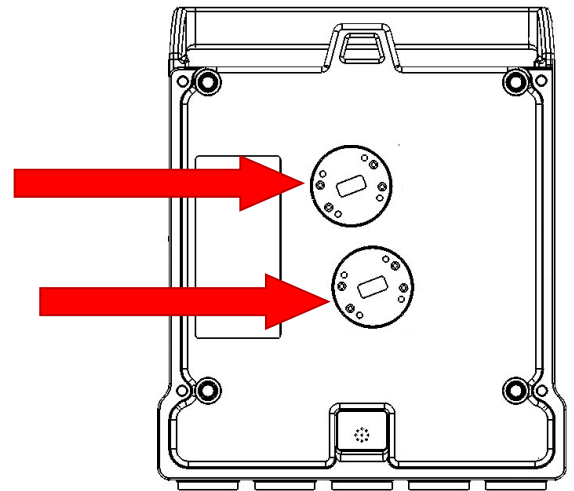
To install a PTP 820C unit in a direct-mount dual-polarization configuration

1. Prior to the installation, follow the antenna manufacturer's instructions to use the circular adaptor. (Remove the existing rectangular transition, swap the O-ring, and install the circular transition instead.)
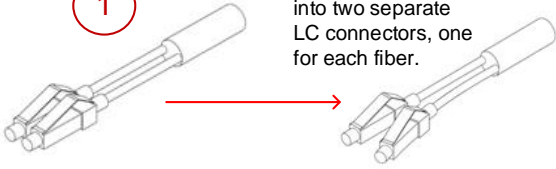
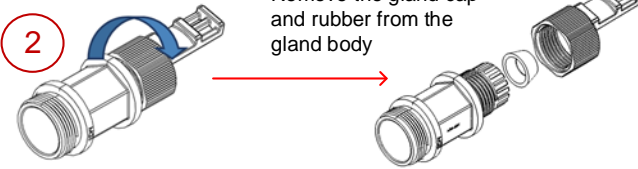2. Connect the OMT Kit to the antenna and secure it with four screws. Verify the existence of the O-ring.

3. Connect the PTP 820C unit to the OMT Kit using the four M8 captive screws and washers supplied, and tighten the screws.
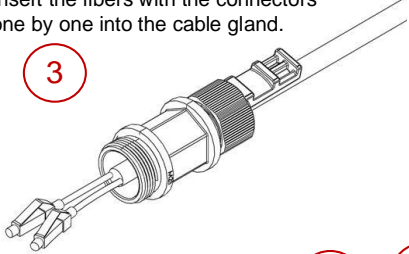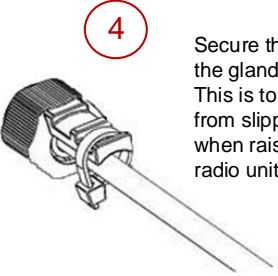
To connect an optical Ethernet cable and SFP
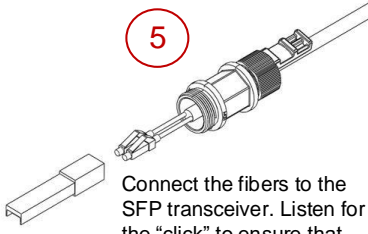
1. Split the connector into two separate LC connectors, one for each fiber.

2. Remove the gland cap and rubber from the gland body
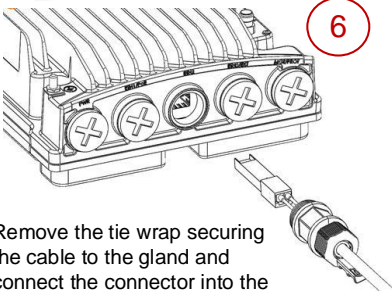
3. Slide the gland cap into the cable. Slide the rubber into the cable. Insert the fibers with the connectors one by one into the cable gland.

4. Secure the cable to the lip of the gland using a tie wrap. This is to prevent the cable from slipping from the gland when raising the cable to a radio unit on a tower.

5. Connect the fibers to the SFP transceiver. Listen for the "click" to ensure that they are fully inserted.

6. Remove the tie wrap securing the cable to the gland and connect the connector into the PTP 820C connector.

7. Hand-tighten the gland to the radio unit until there is full contact between the gland and the radio unit and hand-tighten the gland cap.
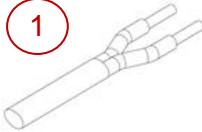
8. Secure the cable to the gland using a tie wrap.
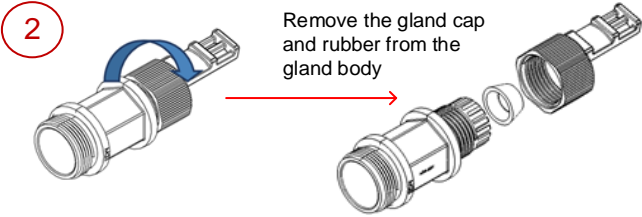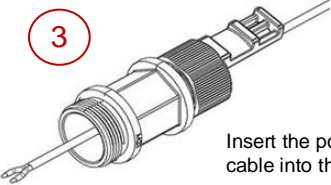
To connect an electrical Ethernet cable

1   Remove the gland cap and rubber from the gland body

Insert the CAT5E cable into the gland cap and into the rubber gland.

2

3

Secure the cable to the lip of the gland using a tie wrap. This is to prevent the cable from slipping from the gland when raising the cable to a radio unit on a tower.

4

Connect the CAT5E cable to the PTP 820C.

5

Hand-tighten the gland to the radio unit until there is full contact between the gland and the radio unit and hand-tighten the gland cap.

6

Secure the cable to the gland using a tie wrap.

To connect a DC power cable
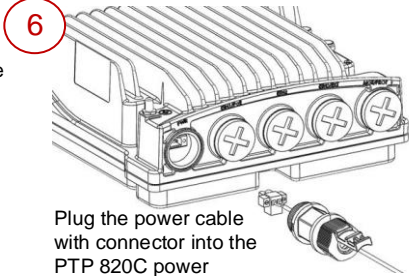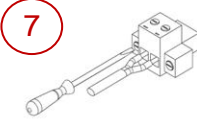
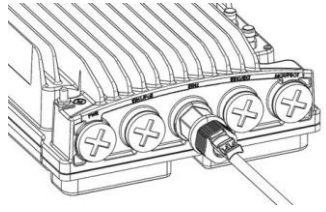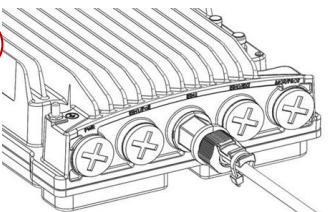1   Strip off 45 mm from the cable jacket and expose 10 mm at the edge of each of the two wires.
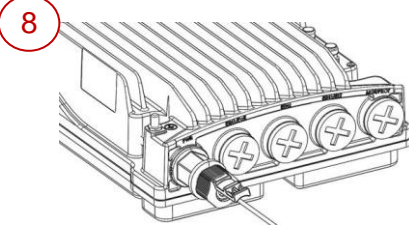
2   Remove the gland cap and rubber from the gland body
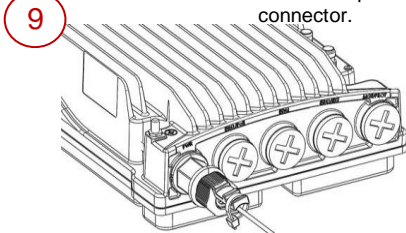
3   Insert the power cable into the gland.

4   Insert the power cable wires into the power connector. Match "+" to the 0V wire and "-" to the -48V wire.

5   Tighten the two top screws.

6   Plug the power cable with connector into the PTP 820C power connector.

7   Tighten the two front screws.
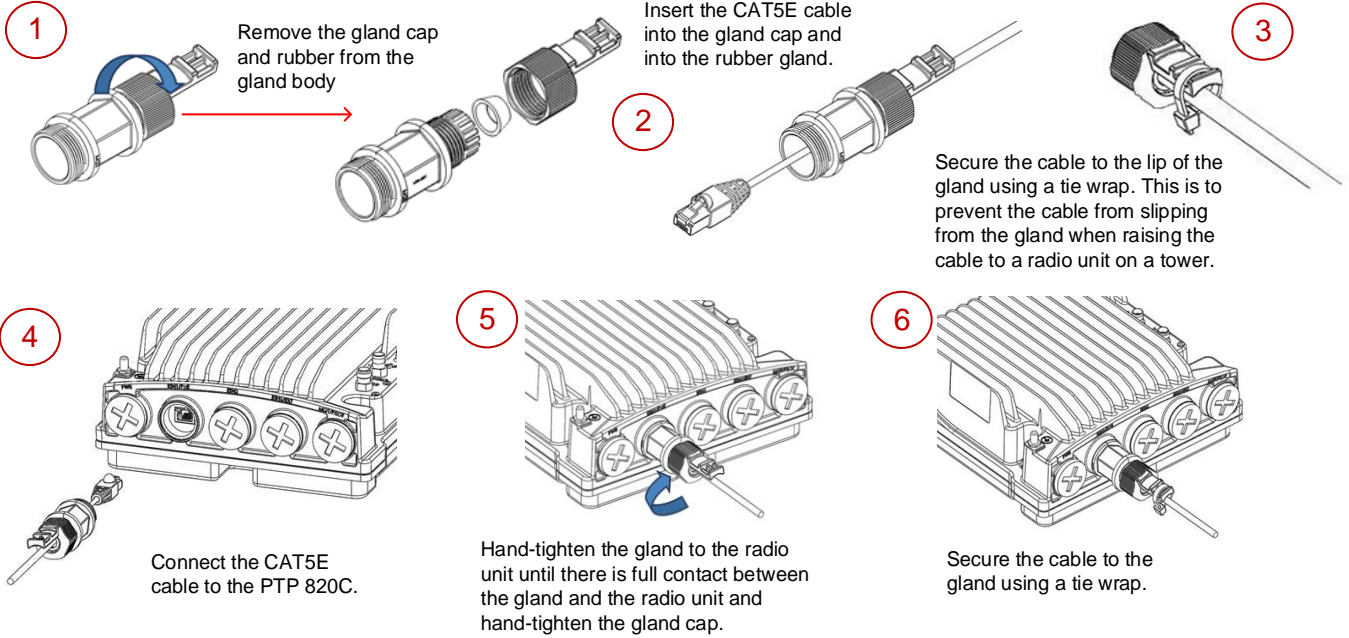
8   Hand-tighten the gland to the radio unit until there is full contact between the gland and the radio unit and hand-tighten the gland cap.

9   Secure the cable to the gland using a tie wrap.

Cable Grounding

- No grounding is required for optical (SFP) cables.
- External shielded CAT5E cable should be grounded to the antenna tower at the top (next to the PTP 820 unit) and the bottom of the external run and every 50m using the PTP 820 Grounding kit for CAT5E F/UTP 8mm cable.

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PTP 820C Quick Start Guide

Installing and Connecting a PoE Injector

To mount a PoE Injector on the wall

1. Mount and tighten the PoE Injector to a wall using two M6 bolts and anchors. Use Anchor Stainless Steel with flanged Hexagonal nut M6X70.

2. Drill two 6mm diameter holes with 100mm between the center of the holes.
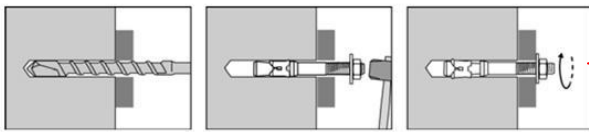
3. Insert the anchors with the bolts, place the washers on the bolts, and tighten the nuts.
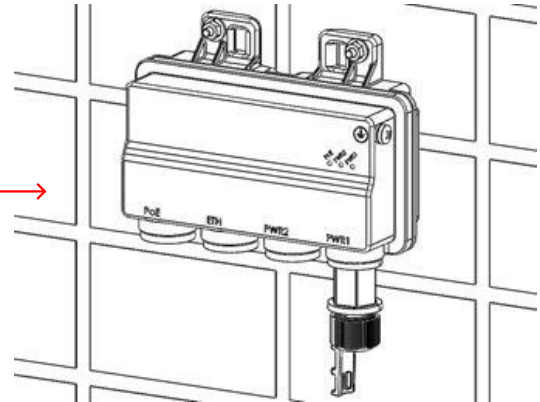
To mount a PoE Injector on a pole

1. Mount and tighten the Injector to a 114mm pole using a stainless steel hose clamp.

2. Pass the hose clamp through the pole mount slots.

3. Attach the Injector to the pole.

4. Connect the ends of the hose clamp and tighten using the captive screw.

Page 9
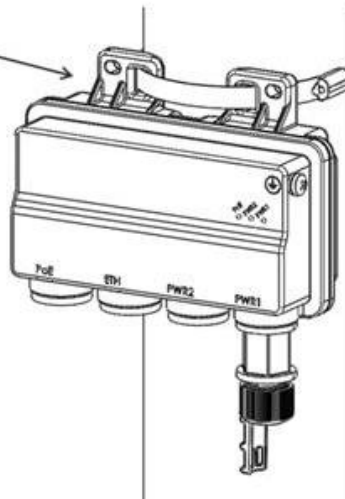
To mount a PoE Injector on a 19" rack

1. Mount the Injector to a 19" rack using a 19" rack adaptor.
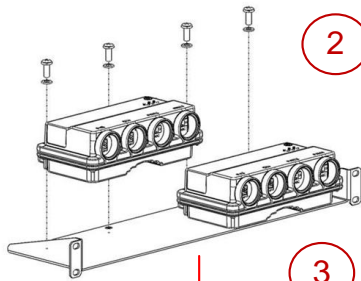
2. Mount the Injector on the adaptor through the wall mounting holes, using M6 screws and washers.

3. Mount the adaptor to the rack using four M6 screws and cage nuts.
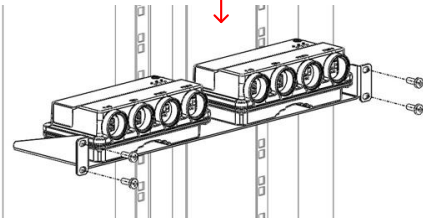
To mount a PoE Injector on an ETSI rack

1. Mount the PoE Injector to an ETSI rack using a 19" rack adaptor and ETSI adapting ears.

2. Connect ETSI adapting ears to a 19" rack adaptor using four M6 screws.

3. Mount the PoE Injector on the adaptor through the wall mounting holes, using M6 screws and washers.

4. Mount the 19" rack adaptor with the ETSI ears on the ETSI rack using four M6 screws and cage nuts.
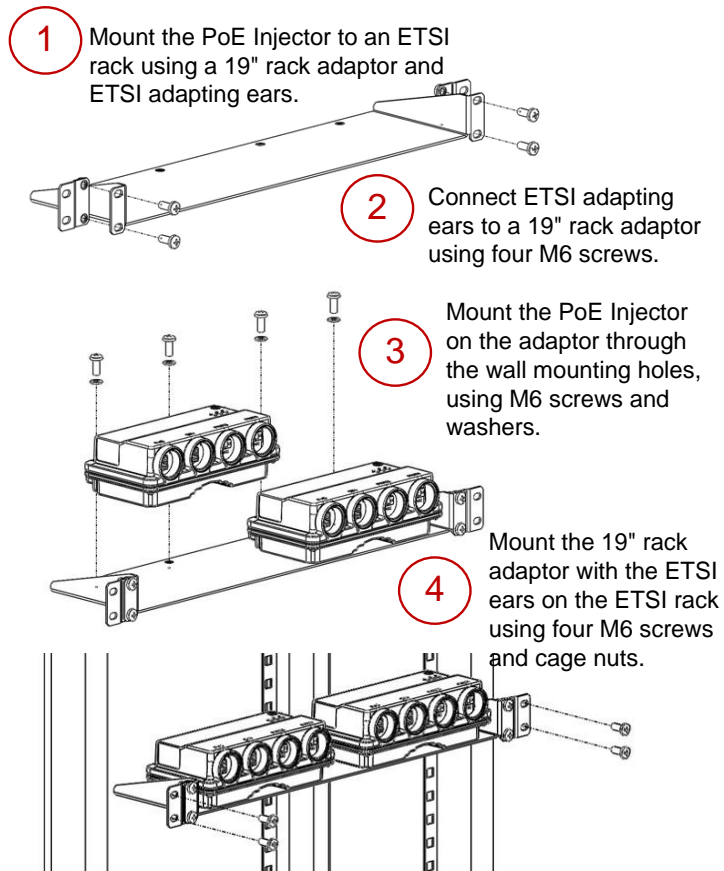
To ground a PoE Injector

1. On the right side of the PoE Injector, loosen the screw, plain washer, and serrated washer.

2. Place the cable lug supplied with the PoE Injector kit between the plain and serrated washer.

3. Tighten the screw.

To connect the PoE Injector cables

- The total length of the cable between the PTP 820C port and the Switch/Router the device is connected to should not exceed 100m/328ft. This length includes the connection between the PTP 820C and the PoE Injector ($x_{1} + x_{2} \leq$ 100m/328ft in the figure to the right).

- The length of the cable connecting the customer equipment to the PoE injector should not be longer than 10m (according to ANSI/TIA-568 standard).
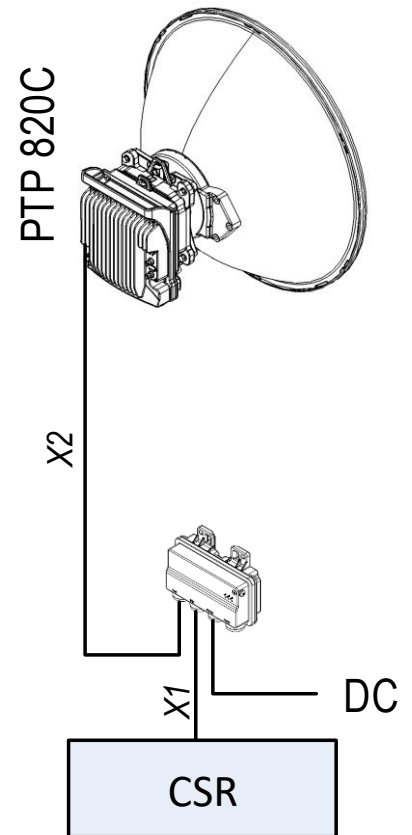
Grounding the PTP 820C

1. Loosen the nut, plain washer, and serrated washer from the GND stud, using the metric offset hexagon key and the wrench.

2. Place the cable lug supplied with the grounding kit in place on the screw and secure the cable lug.

3. Connect the second side of the GND cable to the main or terminal ground bar of the site.

4. Perform a resistance test between the 2 lugs of the GND cable and verify that the result is 0-2 ohms.
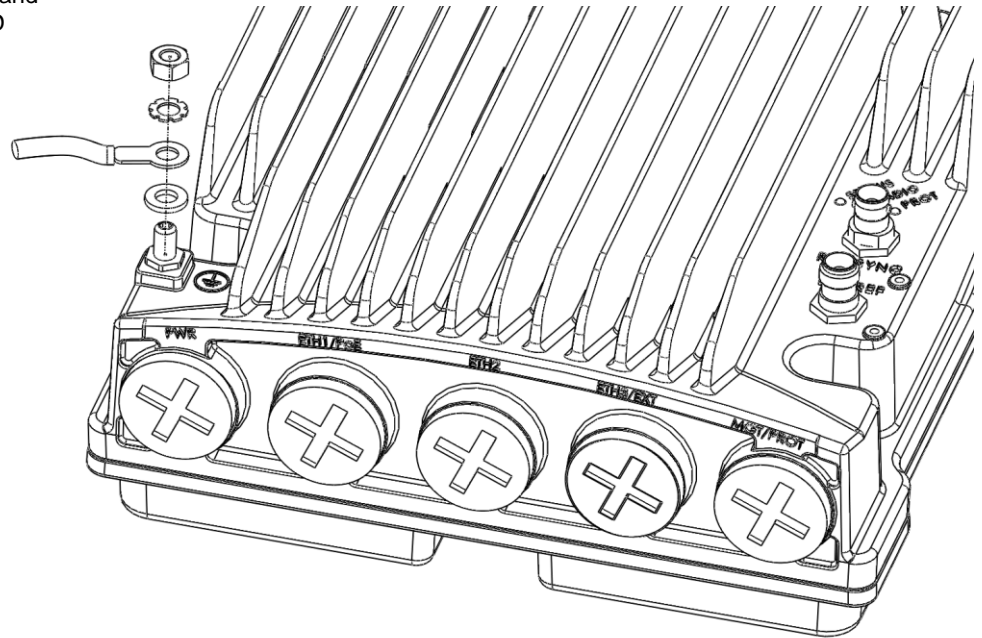
Notes:

The unit's earthing screw terminal shall be permanently connected to protective earth in a building installation in accordance with applicable national code and regulations by a service person.

A 2-pole circuit breaker, a branch circuit protector, suitably certified in accordance with applicable national code and regulations, rated maximum 20A, shall be installed for full power disconnection in a building installation.

Any outdoor antenna cable shield shall be permanently connected to protective earth in a building installation.

Grounding for MultiCore Mediation Devices

MultiCore Mediation Devices (MCMDs) are not grounded. In order to add grounding, the MCMD can be connected to the PTP 820C using a Grounding Jumper. To connect the Grounding Jumper:

1 When you secure the MCMD to the antenna, connect one end of the Grounding Jumper to the lower left screw that connects the MCMD to the antenna.

2 When you perform the PTP 820C grounding procedure described above, connect the other end of the Grounding Jumper to the PTP 820C grounding screw, along with the PTP 820C grounding cable. The order in which you place the two cables is not important.
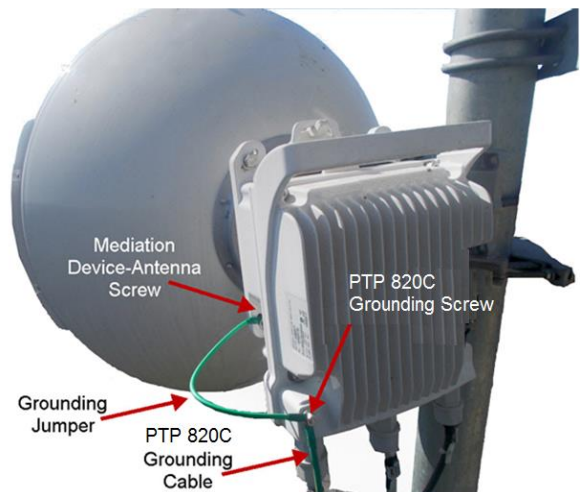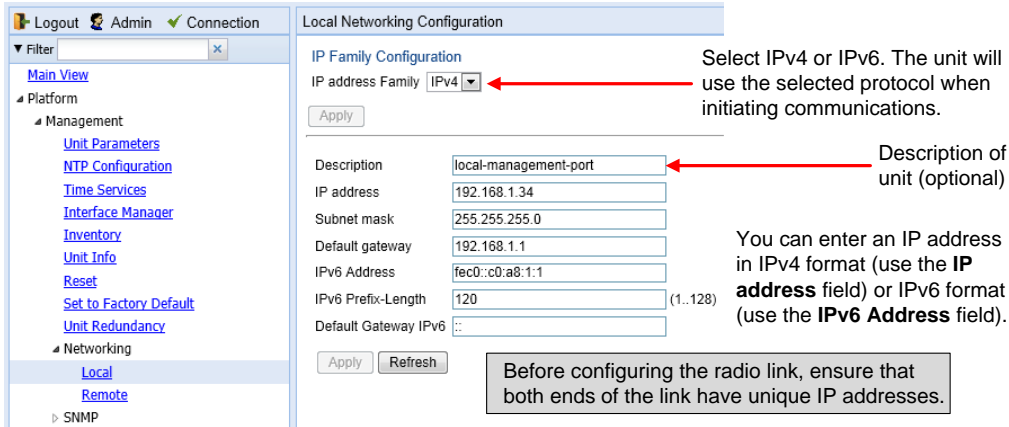
Connecting to the Unit

1. Connect your laptops LAN port to the MGT port on the PTP 820C.

2. Configure an IP address on the laptop within the same subnet as the PTP 820C unit. The default PTP 820C IP address is 192.168.1.1. Set the PC address to e.g. 192.168.1.10 and subnet mask to 255.255.255.0. Record the initial settings before changing.

3. On the laptop, open the Internal Protocol (TCP/IP) Properties page and set the parameters shown in the figure on the right.

4. Open a web browser (Internet Explorer or Mozilla Firefox), enter the default IP address "192.168.1.1" in the Address Bar. Once the Login page opens, enter "admin" in both the **User Name** and **Password** fields, and click **Apply**.
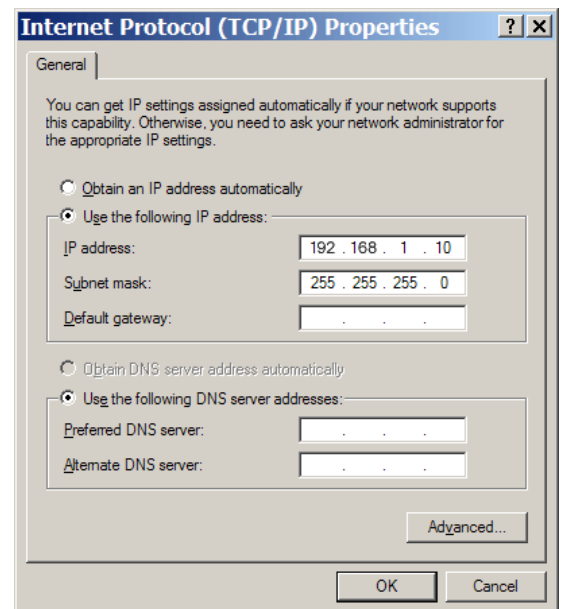
Changing the Default IP Address

Select **Platform** > **Management** > **Networking** > **Local**. The Local Networking Configuration page opens.

Select IPv4 or IPv6. The unit will use the selected protocol when initiating communications.

Description of unit (optional)

You can enter an IP address in IPv4 format (use the **IP address** field) or IPv6 format (use the **IPv6 Address** field).

Before configuring the radio link, ensure that both ends of the link have unique IP addresses.

Installing the Activation Key

New PTP 820C units are delivered with a default activation key that enables you to manage and configure the unit. Additional feature and capacity support requires you to enter an activation key cipher in the Activation Key Configuration page. Contact your vendor to obtain your activation key cipher.

If the activation-key-enabled capacity and feature set is exceeded, an Activation Key Violation alarm occurs and the Web EMS displays a yellow background and an activation key violation warning. After a 48-hour grace period, all other alarms are hidden until the capacity and features in use are brought within the activation key's capacity and feature set.

Demo mode is available, which enables all features for 60 days. When demo mode expires, the most recent valid activation key goes into effect.

To enter a new activation key, select **Platform > Activation Key > Activation Key Configuration**. The Activation Key Configuration page opens.

Configuring the Link

The Web EMS provides wizards to configure radio links. The wizards guide you through configuration of the basic radio parameters and services necessary to establish a working pipe link.

T o configure a 1+0 link using the Quick Configuration wizard, select **Quick Configuration > PIPE > Multi-Carrier ABC > 2+0**. Page 1 of the 2+0 Quick Configuration wizard opens.

①

Link Setup (PIPE) 2 + 0 Multi Carrier ABC

Link Setup Progress   0%

ⓘ Select one Ethernet and one radio interface. Then select the total number of radio interfaces in the ABC group and the PIPE type. The selected radio interface will be the first radio in the ABC group. In the next step(s) you will select the other interfaces.

Interface Selection, 2 + 0 ABC

Ethernet Interface   Ethernet: Slot 1, Port 1 (LAG: Group #1) ▾   Create LAG
Radio #1 Interface   Radio: Slot 2, Port 1 ▾
Number of Radio interfaces 2
PIPE Type   dot1q ▾

<< Back   Next >>   Finish

Select an Ethernet interface or LAG for the link. Click **Create LAG** to open a wizard that guides you through the steps to create a LAG.

Select the first radio interface for the ABC group.

Select the Attached Interface type for the service that will connect the radio and Ethernet interfaces:
- **s-tag** – All S-VLANs and untagged frames are classified into the service.
- **dot1q** – All C-VLANs and untagged frames are classified into the service.

②

Link Setup (PIPE) 2 + 0 Multi Carrier ABC

Link Setup Progress   10%

ⓘ Select the second radio interface.

Radio #2 selection, 2 + 0 ABC

Radio #2 Interface   Radio: Slot 2, Port 2 ▾

<< Back   Next >>   Finish

Select the second radio interface for the ABC group.

③

Link Setup (PIPE) 2 + 0 Multi Carrier ABC

Link Setup Progress   25%

ⓘ Select XPIC groups by checking the desired radio interfaces.

Radio XPIC Configuration

☑ XPIC - Radio: Slot 2, Port 1 & Radio: Slot 2, Port 2

<< Back   Next >>   Finish

Select the XPIC checkbox.

4

Link Setup (PIPE) 2 + 0 Multi Carrier ABC

Link Setup Progress   30%

ⓘ Enter the radio parameters for the selected radio interfaces.

Radio Parameters Configuration - XPIC: Radio: Slot 2, Port 1 & Radio: Slot 2, Port 2, 2 + 0 ABC

TX Frequency (MHz) 6400.000   (5850.000..6450.000)
RX Frequency (MHz) 6150.000   (5850.000..6450.000)
TX Level (dBm)   5 ⌄
TX Mute   Off ⌄

<< Back   Next >>   Finish

Set the transmission and received radio frequency in MHz.

Enter the desired TX signal level (TSL). The range of values depends on the frequency and RFU type.

Select **On** or **Off** to mute or unmute the TX output of the RFU.

5

Link Setup (PIPE) 2 + 0 Multi Carrier ABC

Link Setup Progress   50%

ⓘ Select an MRMC script and profile for the selected radio interfaces

Radio MRMC Script Configuration - XPIC: Radio: Slot 2, Port 1 & Radio: Slot 2, Port 2, 2 + 0 ABC

Script ID   Script: 1507, XPIC, BW:40 MHz, OBW:37.4 MHz, 58.224-349.341 Mbps, XPIC, ETSI+FCC, ACCP ⌄
Operational Mode   Adaptive ⌄
Maximum profile   Profile: 10, 2048 QAM, 349.341 Mbps ⌄
Minimum profile   Profile: 0, 4 QAM, 58.224 Mbps ⌄

<< Back   Next >>   Finish

Select the MRMC script you want to assign to the radio. Make sure to assign a script that supports XPIC.

Select the ACM mode: **Fixed** or **Adaptive**.
- Fixed ACM mode applies constant TX and RX rates.
- In Adaptive ACM mode, TX and RX rates are dynamic. An ACM-enabled radio system automatically chooses which profile to use according to channel fading conditions.

If you selected **Fixed** in the **Operational Mode** field, the **Profile** field appears instead of these fields. Select the ACM profile for the radio in the **Profile** field.
If you selected **Adaptive** in the **Operational Mode** field, enter the maximum and minimum profiles for the script in these fields.

6

Link Setup (PIPE) 2 + 0 Multi Carrier ABC

Link Setup Progress   75%

ⓘ To configure In Band management, choose 'Yes'
If you choose 'Yes', you will need to select a Management VLAN.

Management Configuration, 2 + 0 ABC

In Band Management   Yes ⌄
Management VLAN   1 ⌄
☐ In Band includes Ethernet interface

<< Back   Next >>   Finish

Select **Yes** to configure in-band management or **No** if you do not need in-band management.

If you selected **Yes** above, select the management VLAN.

Select this box if you want to use the Ethernet interface as well as the radio interface for in-band management.

⑦

Link Setup (PIPE) 2 + 0 Multi Carrier ABC

Link Setup Progress   100%

Following are the parameters that you have selected, 2 + 0 ABC

XPIC: Radio: Slot 2, Port 1 & Radio: Slot 2, Port 2

TX Frequency: 6400 MHz, RX Frequency: 6150 MHz

TX Level (dBm): 5 TX Mute: Off

MRMC Script ID: 1507, Operational Mode: Adaptive, Maximum profile: 10, Minimum profile: 0

Ethernet Interface: LAG: Group #1

PIPE Type: dot1q

In Band Management: Yes, Management VLAN: 1, Ethernet included: No

⚠ Warning: After you click Submit, the system will be configured with these parameters and the interfaces will be reset. Traffic will be affected.

[<< Back] [Next >>] [Submit] ← Review the parameters and click **Submit** to complete configuration of the link. After you click **Submit**, the unit is reset.

Link Verification

Verify that the Received Signal Level (RSL) is up to +/- 3 dB from the expected (calculated) level at both ends of the link.

You can measure the RSL at the BNC port indicated in the figure to the left. The voltage at the BNC port is 1.XX where XX is the RSL level. For example: 1.59V means an RSL of -59 dBm. Note that the voltage measured at the BNC port is not accurate and should be used only as an aid).

Verify that the Radio Bit Error Rate (BER) is 10E-11 or higher.

If working with ATPC, verify that ATPC is operating as expected (RSL = reference level).

To display the current RSL (RX) using the Web EMS, go to the Radio Parameters page (**Radio > Radio Parameters**).

To display the BER using the Web EMS, go to the Aggregate PM report (**Radio > PM & Statistics > Aggregate**).

To display the RSL PMs using the Web EMS, go to the Radio Parameters page (**Radio > PM & Statistics > Signal Level**).

Antenna Alignment and Optimization

1. Align the antennas with only one co-polarized carrier activated. To mute the second carrier, select the carrier in the Radio Parameters page of the Web EMS (**Radio > Radio Parameters**) and set **TX mute** to **O**

2. Adjust the antenna alignment until you achieve the maximum RSL for the first-carrier link (the "RSLwanted"). This RSL should be within approximately +/-3 dB from the expected level.

3. Unmute all carriers.

4. Check the XPI in the **Modem XPI** field of the Radio Parameters page in the Web EMS. The XPI should be at least 25dB. If it is not, adjust the OMT assembly on the back of the antenna *at only one side of the link* to maximize the XPI. Adjust the OMT by rotating the OMT and its attached ODU on the back of the antenna. Loosen the four bolts that connect the OMT to the antenna. Move the OMT in small increments. After each increment, refresh the Web EMS screen and review the XPI reading. It is recommended to achieve XPI levels between 25dB and 30dB. Once a good XPI has been achieved, lock-off the OMT by securing the bolts, progressively, so as to not de-align the OMT.

Radio Parameters Page

Modem XPI field.

TX mute field.

RSL Connector Source field.

> **Note**
>
> In some cases, the XPI might not exceed the required 25dB minimum due to adverse atmospheric conditions, such as heavy rain. If you believe this to be the case, maximize the XPI by following the alignment process described above. Afterwards, monitor the XPI to ensure that it exceeds the 25dB minimum when propagation conditions improve.

Problems and warranty

Reporting problems

If any problems are encountered when installing or operating this equipment, follow this procedure to investigate and report:

1   Search this document and the software release notes of supported releases.

2   Visit the support website.

3   Ask for assistance from the Cambium product supplier.

4   Gather information from affected units, such as any available diagnostic downloads.

5   Escalate the problem by emailing or telephoning support.

Repair and service

If unit failure is suspected, obtain details of the Return Material Authorization (RMA) process from the support website (https://support.cambiumnetworks.com).

Hardware warranty

Cambium's standard hardware warranty is for one (1) year from date of shipment from Cambium Networks or a Cambium distributor. Cambium Networks warrants that hardware will conform to the relevant published specifications and will be free from material defects in material and workmanship under normal use and service. Cambium shall within this time, at its own option, either repair or replace the defective product within thirty (30) days of receipt of the defective product. Repaired or replaced product will be subject to the original warranty period but not less than thirty (30) days.

To register PMP and PTP products or activate warranties, visit the support website. For warranty assistance, contact the reseller or distributor. The removal of the tamper-evident seal will void the warranty.

⚠	**Caution**
	Using non-Cambium parts for repair could damage the equipment or void warranty. Contact Cambium for service and repair instructions.
	Portions of Cambium equipment may be damaged from exposure to electrostatic discharge. Use precautions to prevent damage.

Cambium Networks

Cambium Networks provides professional grade fixed wireless broadband and microwave solutions for customers around the world. Our solutions are deployed in thousands of networks in over 153 countries, with our innovative technologies providing reliable, secure, cost-effective connectivity that's easy to deploy and proven to deliver outstanding metrics.

Our flexible Point-to-Multipoint (PMP) solutions operate in the licensed, unlicensed and federal frequency bands, providing reliable, secure, cost effective access networks. With more than three million modules deployed in networks around the world, our PMP access network solutions prove themselves day-in and day-out in residential access, leased line replacement, video surveillance and smart grid infrastructure applications.

Our award-winning Point to Point (PTP) radio solutions operate in licensed, unlicensed and defined use frequency bands including specific FIPS 140-2 solutions for the U.S. Federal market. Ruggedized for 99.999% availability, our PTP solutions have an impeccable track record for delivering reliable high-speed backhaul connectivity even in the most challenging non-line-of-sight RF environments.

Cambium Networks solutions are proven, respected leaders in the wireless broadband industry. We design, deploy and deliver innovative data, voice and video connectivity solutions that enable and ensure the communications of life, empowering personal, commercial and community growth virtually everywhere in the world.

Contacting Cambium Networks

Support website:	https://support.cambiumnetworks.com
Main website:	http://www.cambiumnetworks.com
Sales enquiries:	solutions@cambiumnetworks.com
Support enquiries:	https://support.cambiumnetworks.com
Repair enquiries:	https://support.cambiumnetworks.com
Telephone number list:	http://www.cambiumnetworks.com/contact
Address:	Cambium Networks Unit B2, Linhay Business Park, Eastern Road Ashburton, United Kingdom, TQ13 7UP