



# **GigaPro p6dx (GPR2022H) & GigaPro p6lx (GPR2022LH) Installation Guide**

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# About this Guide

This document provides the installation practices for the Calix Integrated ONT/Gateway systems GPR2022H & GPR2022LH GigaPro Installation Guide.

## **Intended Audiences**

This document is intended for use by network planning engineers, outside plant engineers, and field/craft personnel responsible for installation and maintenance of Calix premises equipment.

## **Safety and Regulatory Information**

## Safety Notices

This document uses the following safety notice conventions.



**DANGER!** Danger indicates the presence of a hazard that will cause severe personal injury or death if not avoided.

**DANGER!** Danger indique la présence d'un danger qui entraînera des blessures graves ou la mort s'il n'est pas évité.



**WARNING!** Warning indicates the presence of a hazard that can cause severe personal injury if not avoided.

**ATTENTION!** Avertissement indique la présence d'un danger pouvant entraîner des blessures graves s'il n'est pas évité.



**CAUTION!** Caution indicates the presence of a hazard that can cause minor to moderate personal injury if not avoided.

**MISE EN GARDE!** Attention indique la présence d'un danger qui peut causer des blessures légères à modérées s'il n'est pas évité



**ALERT!** Alert indicates presence of a hazard that can cause damage to equipment or software, loss of data, or service interruption if not avoided.

**ALERTE!** L'alerte indique la présence d'un danger susceptible d'endommager l'équipement ou les logiciels, de perdre des données ou d'interrompre le service s'il n'est pas évité.



**DANGER! CLASS 1 LASER PRODUCT. INVISIBLE LASER RADIATION MAY BE PRESENT.** Fiber optic radiation can cause severe eye damage or blindness. Do not look into the open end of an optical fiber.

**DANGER! PRODUIT LASER DE CLASSE 1. UN RAYONNEMENT LASER INVISIBLE PEUT ÊTRE PRÉSENT.** Le rayonnement de la fibre optique peut causer de graves lésions oculaires ou la cécité. Ne regardez pas dans l'extrémité ouverte d'une fibre optique.

## Important Safety Instructions

When using your equipment, basic safety precautions must always be followed to reduce the risk of fire, electric shock, and injury to persons, including the following:

- Do not use this product near water. For example, near a bathtub, washbowl, kitchen sink, or laundry tub, in a wet basement, or near a swimming pool.
- Use only the power cord indicated in this manual.
- For external power supplies, the external power supply used in this device is to be Class II or a Limited Power Source (LPS) power supply.



## Chapter 1

# GigaPro p6dx (GPR2022H) & GigaPro p6lx (GPR2022LH) Product Overview

This chapter introduces the Calix GigaPro p6dx (GPR2022H) & GigaPro p6lx (GPR2022LH) outdoor integrated ONT/Gateway system and provides details of installation considerations.

### Topics Covered

This chapter covers the following topics:

- Introducing the GigaPro p6dx & GigaPro p6lx outdoor Wi-Fi AP system
- Product dimensions
- Exploring the access compartment
- Powering options
- Mounting options
- Installation considerations

## *Introducing the GigaPro p6dx & GigaPro p6lx outdoor integrated ONT/Gateway system*

The Calix GigaPro™ p6dx & p6lx is a Wi-Fi 6, dual-band, long range outdoor system. The p6dx & p6lx offers 120° coverage for over 1 mile, bringing high-bandwidth services to buildings, equipment, devices, and sensors. This intelligent outdoor rated, high-performance system supports multi-Gigabit throughput for streaming video and data services.

### CONNECTIVITY AND PERFORMANCE

The GigaPro™ p6dx & p6lx is a dual-band, outdoor Wi-Fi 6 system leveraging Wi-Fi 6 technology. Standard connectivity includes a 2.5 Gigabit Ethernet WAN/LAN port, a Gigabit Ethernet LAN port and an SFP+ cage capable of housing GPON or XGS-PON SFP+ modules for WAN connectivity. The GigaPro p6dx & GigaPro p6lx

broadcasts a Wi-Fi signal at distances from 10 meters up to 1 mile+ accomplished through high-powered antennas and a focused signal covering 120° of territory. Calix engineered the GigaPro p6dx & GigaPro p6lx with simultaneous dual-band 2.4 GHz and 5 GHz operation and dynamic beamforming in all spectrums. Leveraging the latest Wi-Fi 6 standard and focused sector array antenna features, the GigaPro p6dx & GigaPro p6lx provides long range, higher efficiency with less interference compared to earlier generations of Wi-Fi technology. The GigaPro p6dx & GigaPro p6lx also supports Dynamic Frequency Selection (DFS) channels at 5 GHz to maximize transmission. The system works in operating temperature environments from -40° C to 70° C. The system is protected by a hardened case with an Ingress Protection (IP67) rating preventing dust and water penetration from damaging the system and shortening the life span.

The GigaPro p6dx & GigaPro p6lx enables rural residential and commercial businesses to connect to high-speed access services and support multi-gigabit broadband data, HD streaming video and connectivity from a number of devices over 6x6 streams of Wi-Fi (2x2 @ 2.4 GHz, 4x4 @ 5 GHz) using multi-user multiple-input and multiple-output (MU-MIMO) and beamforming to make it the perfect solution for farms, mobile home parks, marinas, athletic fields, and more.

The GigaPro p6dx & GigaPro p6lx offers two power options. If standard AC power is unavailable, the 2.5 Gigabit port can accept an 802.3bt feed to power the system at up to 100M from its source. For example, the Calix GigaPro Managed Switch (GPR8802x), can be used to source power to the GigaPro p6dx & GigaPro p6lx at locations not equipped for standard AC power.

With the GigaPro p6dx & GigaPro p6lx integrated system, installation and activation services at a subscriber's premises or business can be quickly completed. Using the Calix CommandWorx mobile app, and a phone or laptop, a field technician can install and apply the subscriber's service profile without special equipment or assistance from the central office.

Calix also provides the Calix Service Cloud, allowing the service provider to configure, activate, and upgrade the GigaPro p6dx & GigaPro p6lx quickly from a remote location using in-band management or TR-069. Troubleshooting capabilities, remote software downloads, and service activation features ensure that services are delivered and maintained without truck rolls or hardware upgrades.

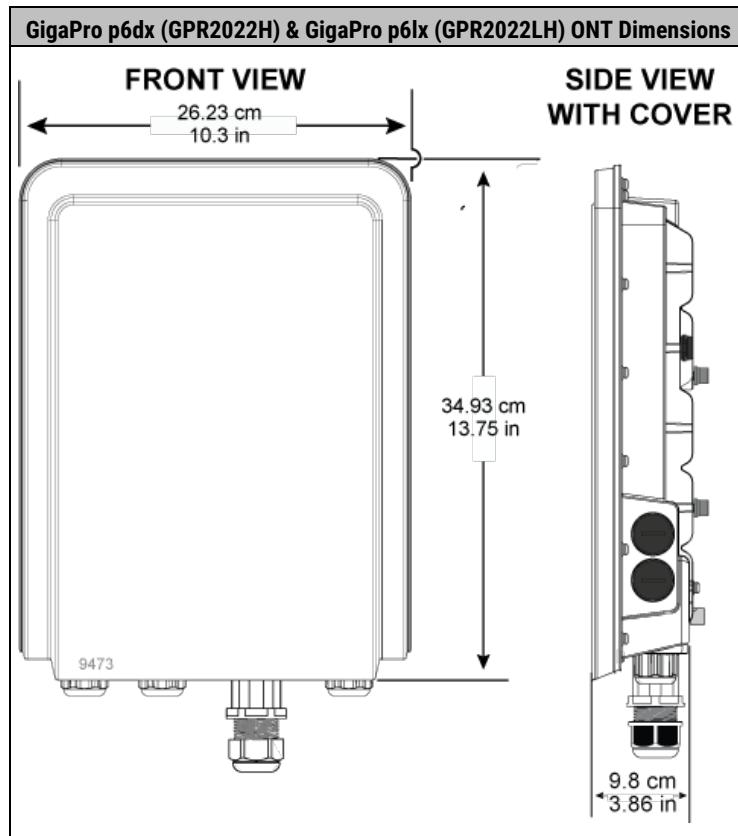


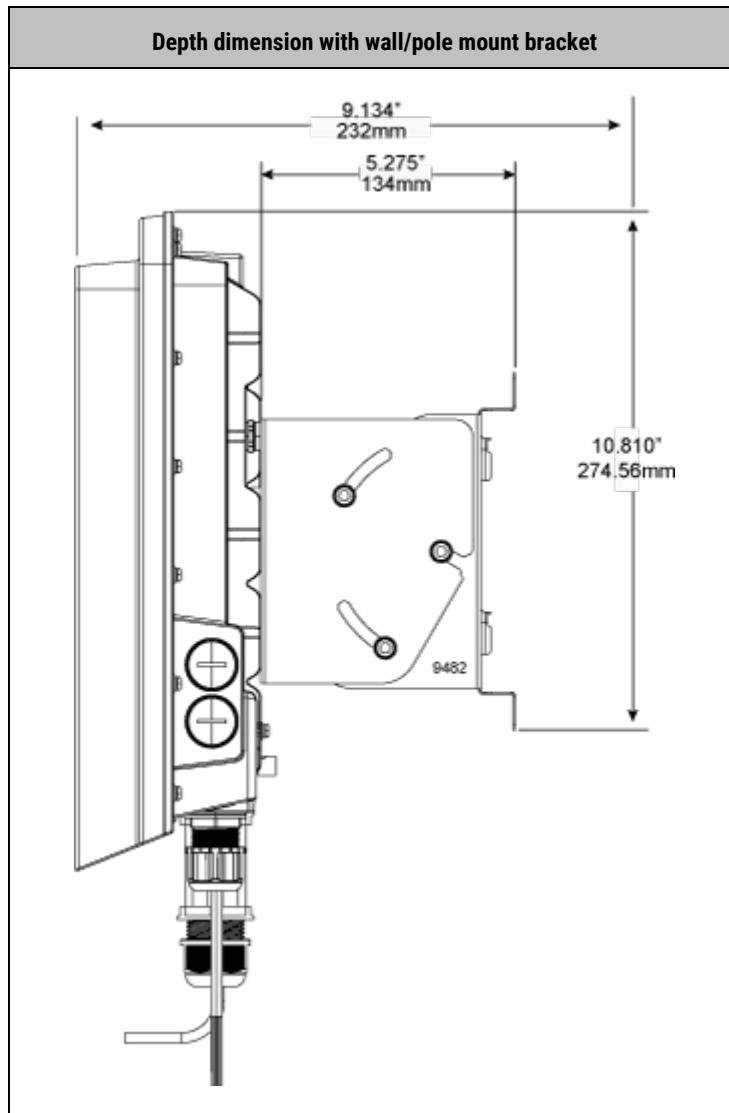
## ***Product Dimensions***

The GigaPro p6dx & GigaPro p6lx system's exterior dimensions are as follows:

### **Dimensions**

- Width: 10.3 in (26.2 cm)
- Height: 13.8 in (35.0 cm)
- Depth: 3.9 in (9.8 cm)
- Weight: 7.3 pounds (3.3 kg)





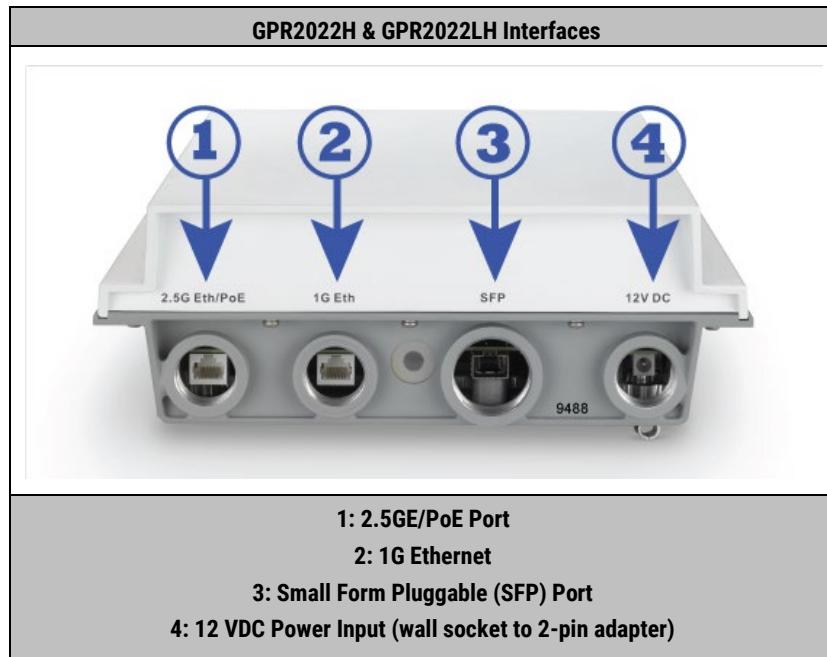
## Exploring the Access Compartment

The GigaPro GPR2022H & GPR2022LH has a recessed interface compartment located on the bottom of the unit. The interface panel includes:

- 2.5GE/PoE port
- 1G Ethernet port
- Small Form Pluggable (SFP/SFP+) interface port

**Note:** Hardened SFP+ modules are compatible with the p6dx & p6lx however the system must be running EXOS-24.2.0.0 or above.

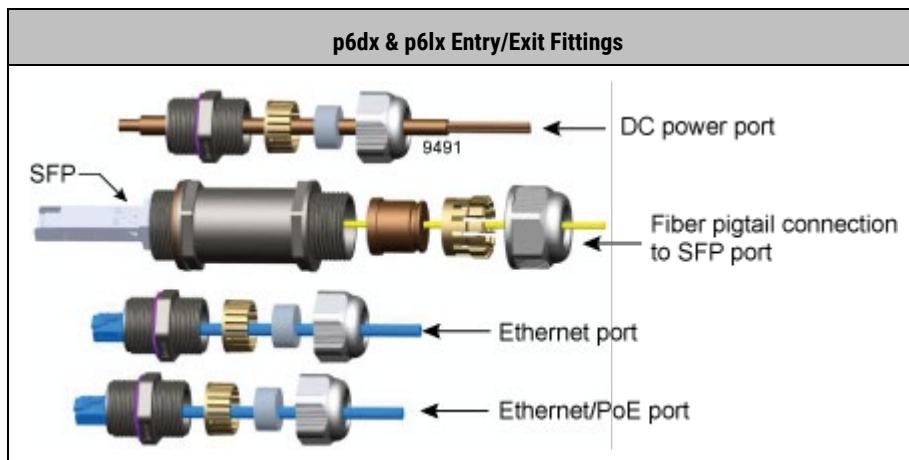
- 12 VDC input from wall socket via voltage adapter



- Interfaces are recessed at the bottom of the unit.

**Note:** To ensure the best possible performance, make sure the interfaces are oriented downward after installation.

Fittings are provided that ensures the ONT remains watertight in an expected outdoor environment. Each port requires fittings to be assembled as shown below. Doing so ensures that cabling is properly protected and that the openings remain weather resistant.



## Powering Options

The GigaPro p6dx & GigaPro p6lx system supports two options for power:

- **Local AC power:** You can power the system via a standard AC power outlet using a Calix power adapter cable.
- **Power over Ethernet (PoE):** You can line-power the system via the Ethernet uplink data cable using a PoE injector or PoE switch.

**Note:** You can use the local power *or* PoE option for each system, but not both at the same time.

### Local Power Option

The GigaPro p6dx & GigaPro p6lx system accepts local power using a Calix-supplied adapter cable that plugs into any standard AC power outlet. The DC end of the adapter cable has a two-pin barrel connector to connect to the p6dx & p6lx system's local power interface.

**Note:** Although the p6dx & p6lx is designed for outdoor use, it is possible to install this device outdoors. The same power supply can be used in an outdoor environment.

## PoE Power Option



Make sure the access point is powered using a UL-compliant PoE power source. Connect the access point to the PoE network without routing to the outside plant.

The GigaPro p6dx & GigaPro p6lx system includes an 802.3bt Power over Ethernet (PoE) Powered Device (PD). The system accepts PoE power via an Ethernet data cable connected to its WAN uplink port.

To employ the PoE option, you must provide the following:

1. Standard PoE power sourcing equipment<sup>1</sup> (PSE) –either a PoE injector<sup>1</sup> or PoE switch<sup>2</sup>– to apply power to the Ethernet cable. Install the PoE injector or switch at an outdoor location upstream of the p6dx & p6lx system, between it and the ONT.<sup>2</sup>
2. An Ethernet data cable for dual-purpose use –as the network uplink connection and as the PoE power input. Use Cat 6 Ethernet cable; maximum 328-foot (100m) length.

<sup>1</sup> **Note:** To ensure the best possible performance, Calix recommends using a PSE offering from Calix since these devices have been thoroughly tested for all supported use cases. Calix PSE options include a PoE injector (100-06005) and a PoE++ switch (100-05774).

<sup>2</sup> **Note:** The Calix PoE switch option (GPR8802x) is also an ONT, so separate switch and ONT equipment is not required when using a GPR8802x for a PoE power supply.

**Note:** Under-powered PoE systems may experience a decrease in over-all CPU frequency to compensate for a lower power source. If the CPU cannot compensate appropriately, radio power may drop which may result in lower Wi-Fi performance.

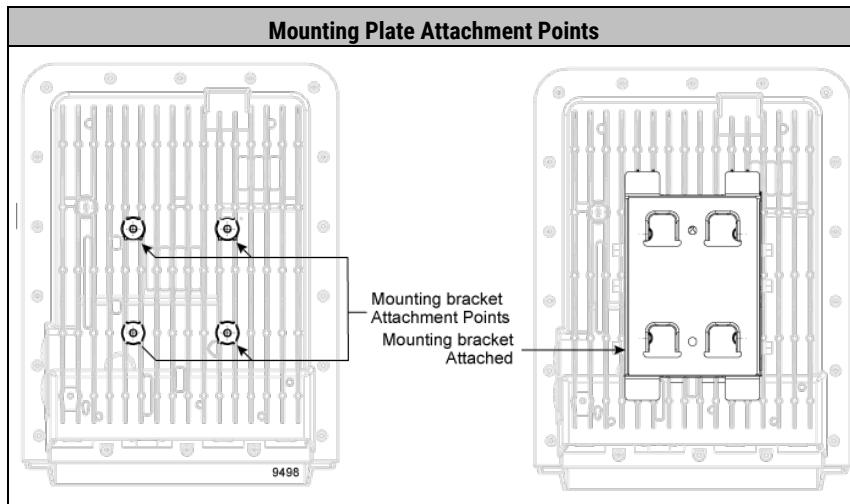
Whether using a PoE injector or PoE switch, you must install an Ethernet Surge Protector (ESP) between the PSE and the PD. Ground the ESP to ensure proper safety, equipment protection, and performance.

## Mounting Options

Calix provides a wall/pole mount bracket in the giftbox of the GigaPro p6dx & GigaPro p6lx.

Four (4) fasteners to physically attach the p6dx & p6lx with the bracket are provided. However, fasteners are not provided when attaching the bracket to a wall or finished ceiling.

**Note:** In the example shown below, the rear bracket is attached to the ONT using (4) M6 x 12mm screws.



With the rear bracket attached to the ONT, the front bracket can now be attached.

# Installation Considerations

Review the following considerations and guidelines before starting installation activities.

## General Guidelines

Follow these general guidelines and practices:

- Read this document completely before starting the installation.
- Determine the system powering method to use for your installation, from among two options. See Powering Options and Selecting an Installation Location for details and guidance.
- Determine the system mounting method to use for your installation, from among two options (wall or pole mount). See Mounting Options and Selecting an Installation Location for details and guidance.
- Follow standard safety precautions when performing installation tasks.
- Keep all cabling secured for safety and strain relief. Use cable ties, screw clips, and velcro straps for dressing cables as needed.

## Network Uplink

The GigaPro p6dx & GigaPro p6lx system is equipped with a 2.5GE WAN Ethernet port for uplink connections to the network. Connect the system to the network following these guidelines:

- **RG mode:** Connect to an ONT LAN port for network access using a standard Ethernet data cable (up to 328 feet/100 m long). If the system uses PoE power, connect to a PoE injector's PD port instead.

**Note:** Calix recommends connecting the p6dx & p6lx system to an ONT equipped with a 2.5GE LAN port to provide maximum uplink bandwidth. Typically, this means using a GP1100X or GP1101X for indoor applications while a GP4200XH or GP4201XH is preferred for outdoor environments.

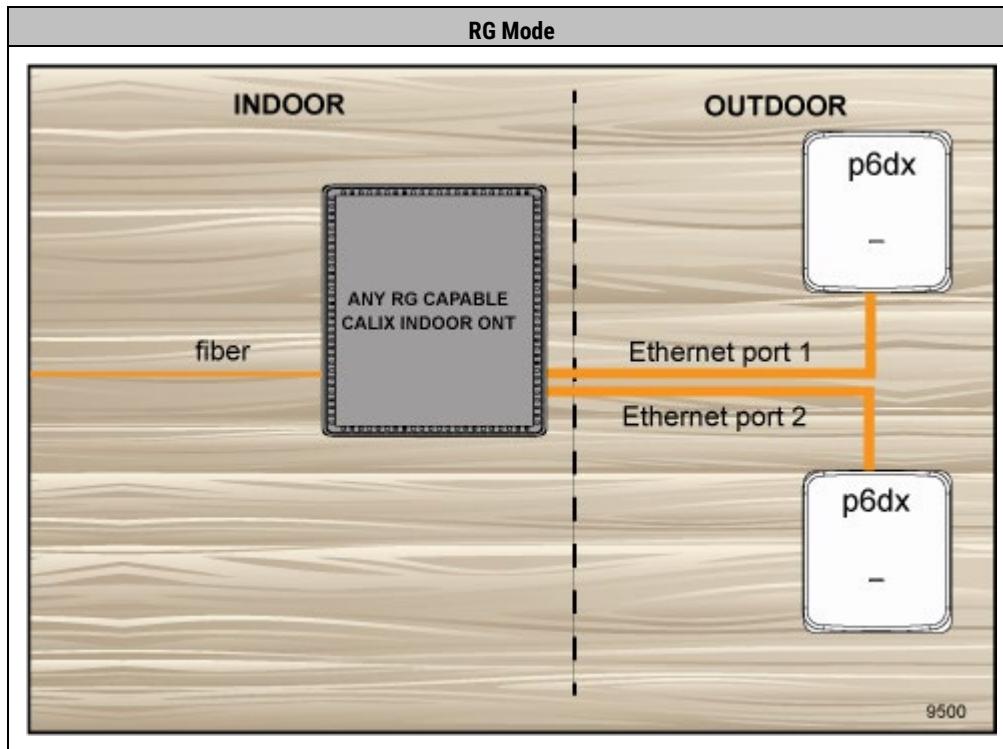
- **Satellite mode (Mesh):** Use either a wired (Ethernet) or wireless backhaul link to connect to the RG system.

## Supported Topologies

The GigaPro p6dx & GigaPro p6lx Wi-Fi AP system can operate in either RG mode or satellite mode. Supported deployment topologies depend on the operating mode.

### RG mode

When operating as an RG, the p6dx & p6lx system must connect to an ONT for its network uplink (point-to-point topology). If the ONT has multiple LAN ports, it can serve multiple p6dx & p6lx RG systems in a star topology.







## Chapter 2

# Installing the GigaPro System

This chapter describes how to install the GigaPro p6dx & GigaPro p6lx system hardware in an outdoor location. This process includes guidance for identifying an appropriate installation location, system hardware installation instructions, and cabling instructions.

### Topics Covered

This chapter covers the following topics:

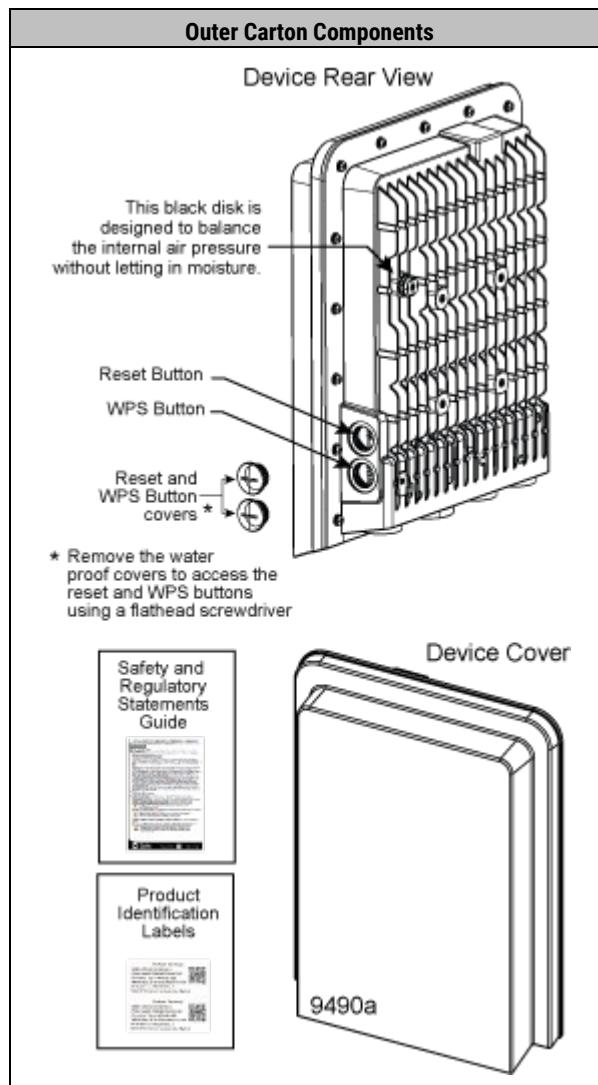
- Unpacking the system
- Selecting an installation location
- Installing the system on a wall or pole
- Grounding the p6dx & p6lx
- Installing power and network cables

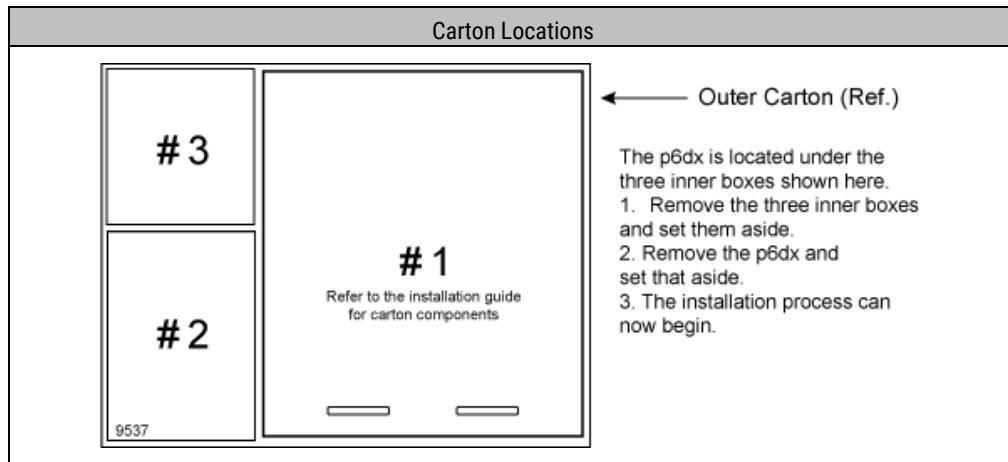
## Unpacking the System

Each GigaPro p6dx & GigaPro p6lx system ships in a box that contains the following:

### Outer Carton

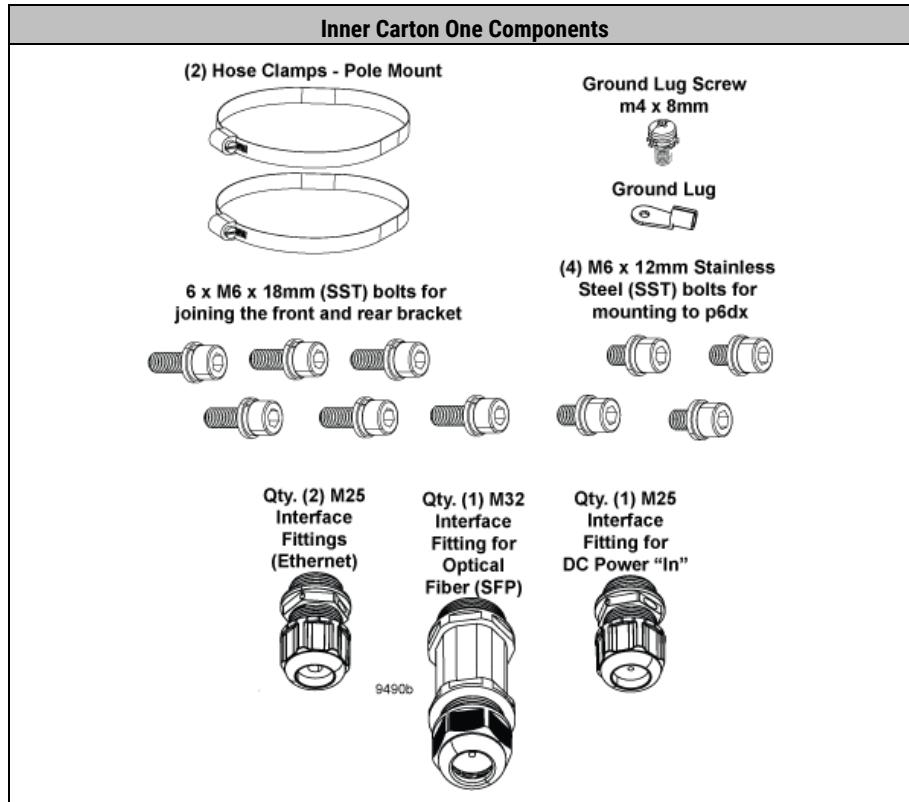
- (1) GigaPro p6dx (GPR2022H) & GigaPro p6lx (GPR2022LH) system
- (1) Safety and Regulatory Statements Guide
- (2) Spare product identification labels - shows default Wi-Fi SSID and RG login credentials
- (3) Spare parts cartons (Inner carton one, two, and three) - Not Shown





### Inner Carton One

- (2) Hose Clamps
- (3) M25 interface fittings (2x for ethernet, 1x for power port)
- (1) M32 interface fitting (for SFP port)
- (1) Ground lug and screw (m4 x 8mm)
- (4) m6 x 12mm (for attaching mounting bracket to p6dx & p6lx)
- (6) m6 x 18mm (for attaching rear bracket to front bracket)

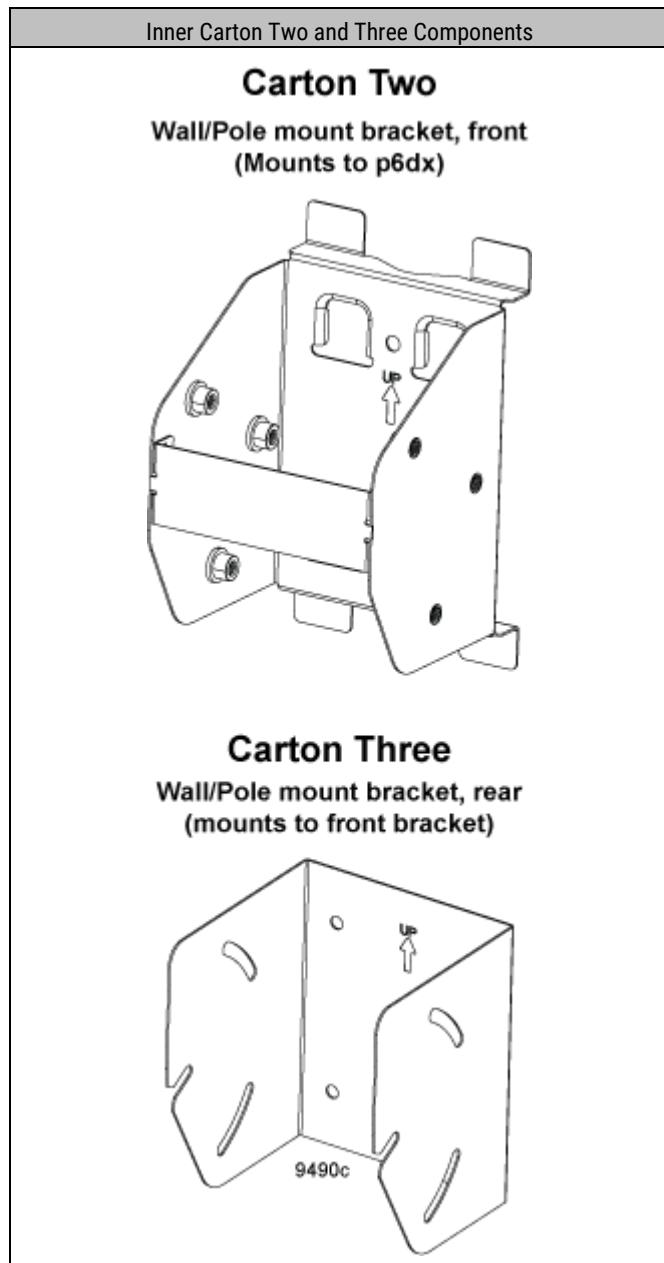


**Inner Carton Two**

- (1) Front wall mount or pole mount bracket

**Inner Carton Three**

- (1) Rear wall mount or pole mount bracket



## To unpack the system

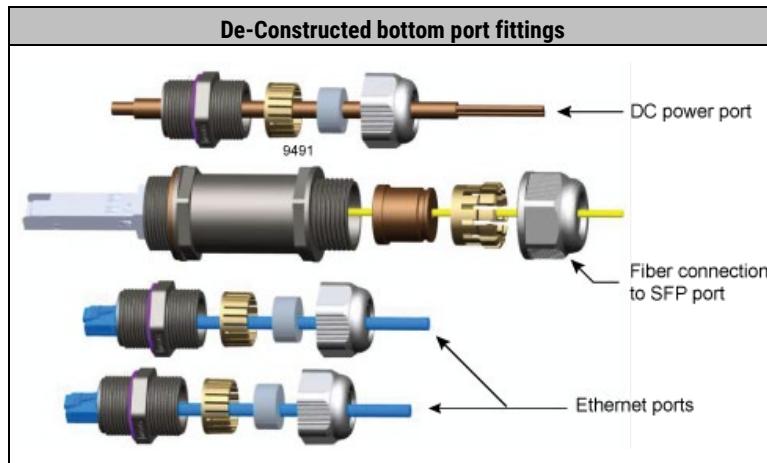
- Open the outer carton for the GigaPro p6dx & GigaPro p6lx system.
- Remove the spare part cartons (located as shown above) and set aside.
- Remove the p6dx & p6lx ONT from the carton and set aside.
- Locate the product identification label and store it in a safe place for use during initial start-up.
- Familiarize yourself with the contents of the Safety and Regulatory Statements guide.

**Note:** The spare parts cartons include necessary components needed for installation. Refer to the breakdown above for determining what parts are located in each box.

## About the port fittings on the bottom of the chassis

To ensure a tight seal on the fittings exiting the bottom of the p6dx & p6lx, the connections must be installed per the illustration below.

**Note:** When installing these fittings, make sure all connections are fully seated and that none of the fittings are cross-threaded.



## Selecting an Installation location

Based on the information provided in the Installation Considerations topic, consider the following factors when selecting an installation location:

- Proximity to the network termination point
  - **Distance from the ONT (RG systems):** All systems operating in RG mode must use a wired Ethernet uplink. The maximum distance from the ONT providing the network termination must be 328 feet / 100 meters (the maximum supported length of Ethernet cables). This total span length could potentially double for systems using PoE power, where that cable span length can be used on *both* sides of a PoE injector.
  - **Distance from the RG (Satellite systems):** Systems operating in satellite mode can use either a wired (Ethernet) or wireless backhaul link to the RG system. For wired connections, the maximum distance from the RG must be 328 feet / 100 meters (the maximum supported length of Ethernet cables). For wireless connections, the maximum distance from the RG may vary from site to site based on environmental factors that affect signal strength. As a rule, Calix recommends locating satellites at a distance where they can receive a signal of -60 dBm or better.

### Proximity to power

- **Distance from AC power outlet (local power option):** The Calix outdoor power adapter cable is 10 feet long. Therefore, unless you use an outdoor rated (and user supplied) power extension cord to extend the reach for power, you must locate the system within 10 feet of an AC power outlet.
- **Distance from PoE injector (PoE power option):** The same distance limits for the wired Ethernet cable described above apply here. If the ONT's LAN Ethernet port providing the link is PoE powered (for example, from a Calix GP4200A ONT's 2.5GE port), the maximum distance must be 328 feet / 100 meters. If using a PoE injector, that distance can be up to twice as far.
- **Mounting type:** The system must be installed on a high vertical surface (wall or ceiling) using the wall/ceiling mount bracket included with the p6dx & p6lx. Is there a suitable wall, pole, or header of sufficient height at the targeted location? The answers to this question should help identify an appropriate location for AP placement.
- **Location within targeted Wi-Fi serving area:** Several environmental factors, including proximity to the center of a coverage space, elevation above the ground, and the composition of surrounding structures should also factor into AP placement selection. See the section below for additional details to consider.

Consider all factors above before selecting a location and proceeding with the installation.

## Wi-Fi access point (AP) placement

In a Wi-Fi serving area, direct line-of-sight to the AP is not essential for signal quality, thanks to MIMO technology and an omni-directional antennae array. However, to achieve the best possible Wi-Fi coverage and performance, Calix recommends the following:

- Prioritize a centralized location; the closer the AP system is to the center of the target area, the better.
- Elevate the system as high as possible; a higher elevation helps the signal clear lower/ground-level obstructions.

Some building materials block Wi-Fi signals more than others. See the table below for reference; lower attenuation yields better performance. Consider the materials in surrounding structures when selecting an installation location for the system.

Building Materials: Effect on Wi-Fi Signals	
Material	Wi-Fi Attenuation
<ul style="list-style-type: none"> <li>• Wood, Drywall, Particle Board, Tile</li> <li>• Glass</li> </ul>	Low
<ul style="list-style-type: none"> <li>• Bricks, Cinder Block</li> <li>• Water</li> </ul>	Medium
<ul style="list-style-type: none"> <li>• Plaster, Stucco</li> <li>• Concrete</li> </ul>	High
<ul style="list-style-type: none"> <li>• Metal</li> <li>• Tinted or Low-E Glass (metalized)</li> </ul>	Very High



**CAUTION!** Use of controls or adjustments or performance of procedures other than those specified in this document may result in hazardous radiation exposure.

**MISE EN GARDE!** L'utilisation de commandes ou de réglages ou l'exécution de procédures autres que celles spécifiées ici peuvent entraîner une exposition à des rayonnements dangereux.

## Installing the System on a Wall/Pole

Use the Calix wall/pole mount bracket to install the GigaPro p6dx & GigaPro p6lx system on a wall or pole, or other vertical flat surface.

Installing the mounting brackets involves first attaching the front bracket to the p6dx & p6lx and then attaching the wall mount bracket to the front bracket. Finally, you can attach the p6dx & p6lx to the wall or pole, depending on the application. Refer to "Mounting Options" for additional information. For required tools, see "Installation Considerations."

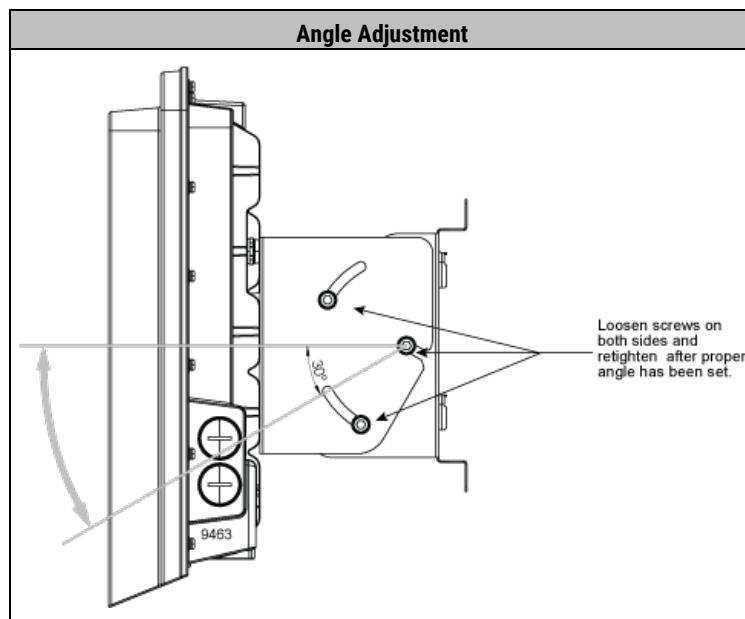
**Note:** The wall or pole mount bracket kit is included with the GPR2022H & GPR2022LH. Most of the fasteners used in the wall/pole mount kit use a hex head pattern for removing and tightening fasteners. The following chart shows the metric value with the corresponding imperial value.

Hex Key Wrench Sizes*		
Fastener Designation	Metric Value	Imperial Value
M4	4mm	5/32"
M5	5mm	3/16"
M6	6mm	7/32"
M8	8mm	5/16"

\*Hex Key & Allen Wrench are the same size.

## Adjusting the Installation Angle of the p6dx & p6lx

Note that the front mounting bracket swings up and down from 0 to 30°. This is offered to allow the p6dx & p6lx to be mounted at an angle. The slots in the rear mounting bracket allow for this variation in angle and can be set based on your environment.



## Wall Mounting the p6dx & p6lx

### Installing the system on a wall

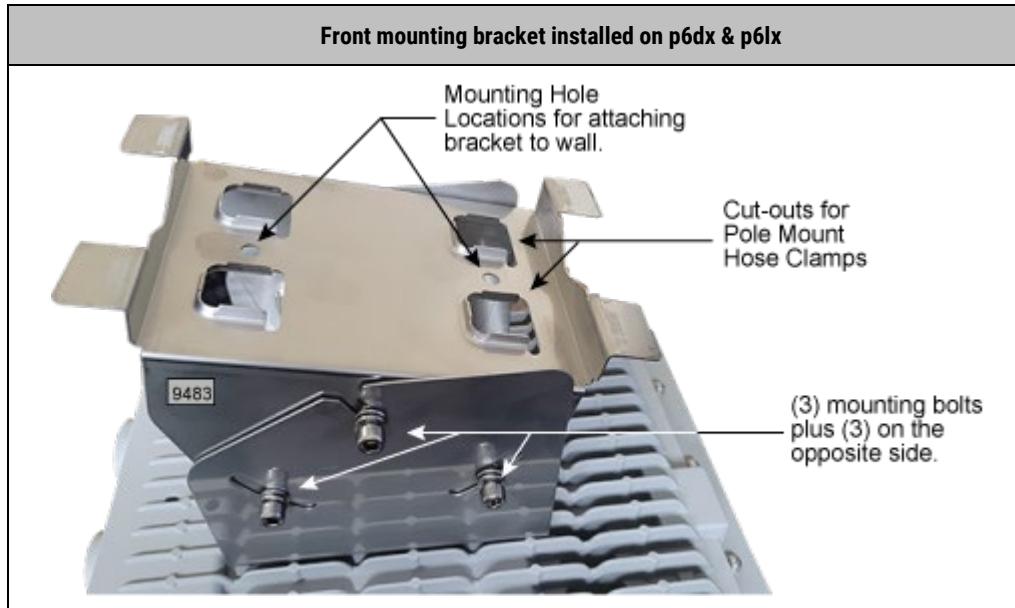
Follow the instructions below to install the p6dx & p6lx system using the supplied bracket.

1. Temporarily place the rear mounting bracket against the wall or pole and mark the locations of the two mounting holes. Set this bracket aside.
2. Install the rear mounting bracket to the p6dx & p6lx using the (4) M6-12 mounting bolts.

**Note:** Ensure the location you select accommodates the length of the power cord with respect to the power outlet.

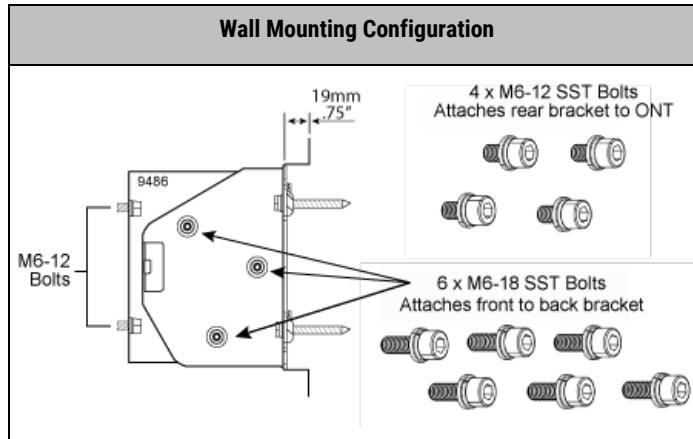
3. Install the front mounting bracket to the rear mounting bracket using the (6) M6-18 mounting bolts.

**Note:** When securing the bracket to the wall, a #14 screw at least 2-1/2" long is required (M6 with minimum length of 65mm). In addition, all appropriately sized wall anchor or the like must be used to provide enough strength.

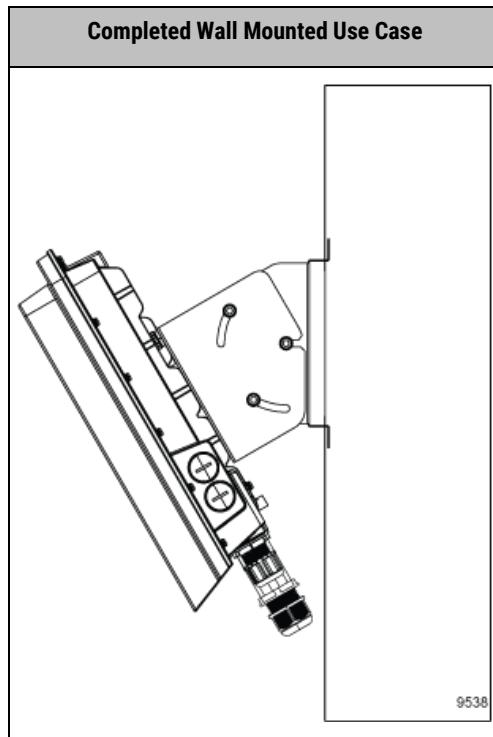


4. Attach the completed assembly to the wall using fasteners appropriate to your environment.

**Note:** A gap exists between the wall and the mounting holes on the front bracket as shown below.



An example of a completed installation is shown below for reference.

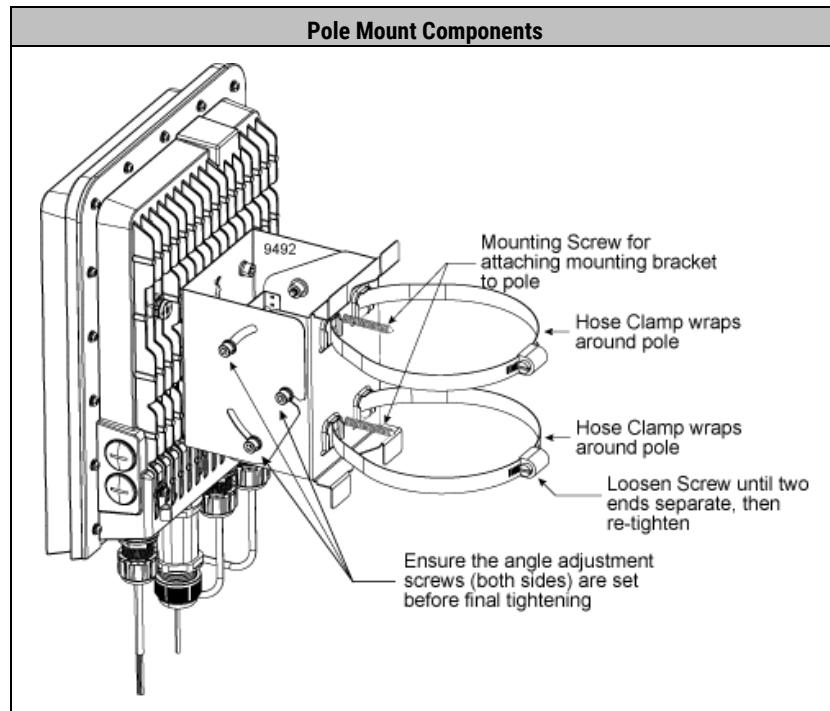


## Pole Mounting the p6dx & p6lx

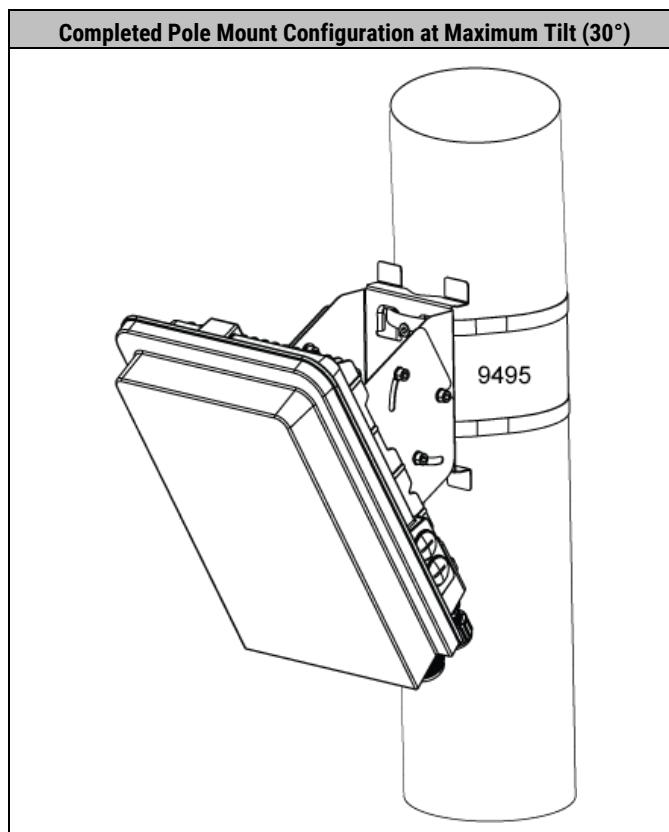
Installing the p6dx & p6lx on a pole follows many of the same procedures as detailed in the previous topic. Of note are the following changes from a wall mount deployment:

- For optimal distance and bandwidth performance, the p6dx & p6lx should be installed 25 and 40 feet above the ground without any nearby obstructive objects.
- The provided hose clamps will secure the p6dx & p6lx to any pole between 2 and 6 inch circumference (5 and 15.2 cm). To mount the unit, unscrew each hose clamp until the ends separate. Slip the hose clamp around the pole, and then re-tighten the hose clamps until tight.

This pole mount use case is watertight. To ensure this remains fully sealed, tighten the outside fittings on the bottom of the unit.



Once complete, the completed pole mount installation will look similar to the drawing below.



## Grounding the p6dx & p6lx

In a wall or pole mount configuration, the p6dx & p6lx is grounded through the metal attachment posts. The bracket itself is grounded via a ground wire that is routed to the building's grounding system.

The GigaPro™ p6dx & p6lx grounding kit includes a ground lug and mounting screw (8-32 phillips head screw with pawl washer) to attach the cable to the p6dx & p6lx chassis ground terminal.

**Note:** Ensure you ground the system before putting it into service.

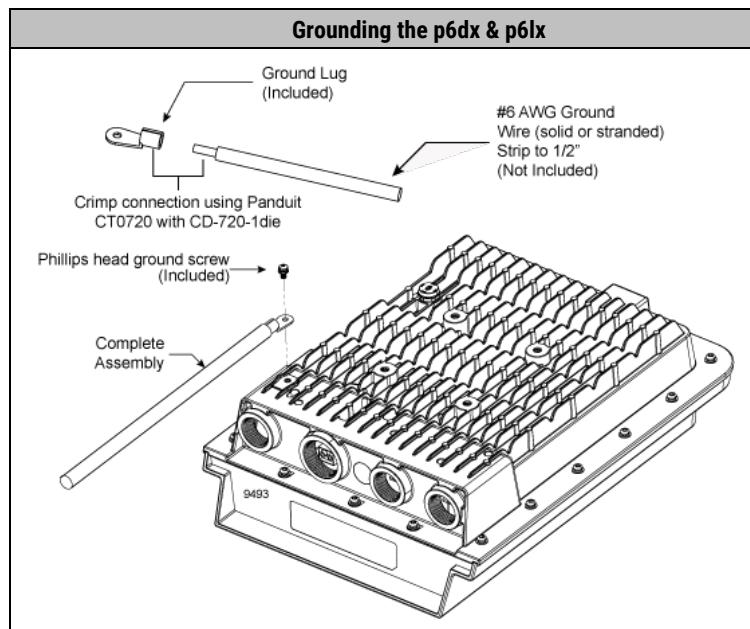
**Note:** The #6 ground cable is not included in the p6dx & p6lx giftbox. The p6dx & p6lx allows for a stranded or solid copper wire. When sourcing the ground cable, make sure the cable is long enough to reach the main external ground termination or an intermediate grounding convergence point that routes back to the main ground.



**ALERT!** Beware of electrostatic discharge. Follow standard ESD precautions. Always wear a grounded ESD wristband to avoid damaging the electronic equipment.

### To ground the p6dx & p6lx chassis

1. Get the ground cable and hardware from the mounting kit.
2. Connect the ground cable to the p6dx & p6lx chassis as follows:
  - a. Position the ground lug against the p6dx & p6lx chassis ground terminal (located on the back of the unit).



- b. Insert the ground screw through the ring lug into the chassis ground terminal.
- c. Using a Phillips screwdriver, turn the screw until fully tightened using 27 inch-pounds of torque.
3. Route and connect the ground cable to the external ground termination location.

**Note:** See guidelines below for establishing and connecting to an earth ground system.

## Additional Grounding Considerations

The National Electric Code (NEC), the Rural Electric Association (REA), and state and local codes require that this equipment (aka "the system") be properly grounded. The system must be installed using the ground lug supplied with the system to be compliant with UL listings. A proper ground bonds the system to the building's primary earth electrode. The bonding conductor used must be a #6 AWG copper or equivalent. The NEC grounding requirement stipulates that earth electrodes must conduct to earth with no more than 25 ohms of resistance. If 25 ohms cannot be achieved with a single electrode, a secondary electrode must be used and bonded together using a #6 AWG copper conductor or equivalent.

The system must be installed to an auxiliary ground source to be compliant with UL listings. The primary method of grounding in this application will be to bond the main p6dx & p6lx chassis to the building's electrical ground circuit. The bonding conductor used must be a #6 AWG copper (solid or stranded) or equivalent fastened to the MEM using a #8-32 phillips head screw with external tooth washer.

For installations requiring a bonding conductor of #6 AWG copper or equivalent, Calix offers a Ground Lug Kit (included). This kit includes a ground lug and a #8-32 x 7/16-inch phillips head screw and external tooth washer.

### Ground electrode requirements

The secondary ground electrode must be spaced at least 8 feet away from the primary electrode. The primary and secondary electrodes, once bonded together, become the building's primary ground point. Neither UL, NEC, nor REA require any additional electrodes to be installed unless the system is located more than 20 feet away from the building's earth electrode.

If the system cannot be installed within 20 feet of the building's primary earth electrode, an additional ground electrode must be provided and bonded to the primary ground point of the building. A #6 AWG copper conductor or equivalent bonding jumper must be used between the earth electrodes and the system.

A suitable earth electrode is a copper clad steel rod that is driven into the earth at least 8 feet deep or a metallic coldwater pipe that is underground for a distance of at least 10 feet. If a water pipe is used as an earth electrode, it must be no more than 5 feet from the outer wall where the system is mounted.

All ground conductors are required to provide a low impedance path to the earth electrode. The conductor must take the shortest and most direct path to the earth electrode and be free of any

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sharp bends. If ground conductors are to be placed inside metallic conduit they must be bonded to the conduit at both ends using a UL listed bonding type connector.

**Important:** Extreme care must be taken when attaching the ground connectors to the utility (earth) ground rod. If the ground is interrupted or disturbed in any way, an unsafe condition will exist.

### Calix best practice

Calix requires use of an earth ground circuit (earth electrode) at the installation site to provide protection from electric shock for equipment and personnel. The ground circuit may consist of a simple copper rod driven into the earth or a complex system of buried rods and wires. The lower the resistance of the electrode-to-earth connection, the more effective the ground system is for safety and lightning protection.

Proper grounding conditions and requirements vary per site. BICSI (Building Industry Consulting Service International) calls for a 5-ohm maximum standard based on IEEE 142-2007 (also known as the Green Book, *Recommended Practice for Grounding of Industrial and Commercial Power Systems*), Chapter 4 ("Connection to Earth"), Section 4.1.3 ("Recommended Acceptable Values"). **Calix recommends achieving a ground impedance of no greater than 5 ohms**, wherever practical, to facilitate proper operation of high-speed services and for safety during surge events. Consult IEEE 142-2007 Chapter 4 for considerations and guidance on how to achieve no more than 5 ohms impedance when connecting to a given ground field.



**ALERT!** Failure to achieve ground circuit impedance within the recommended range limits the site's potential safety from risk of shock and can adversely affect performance of broadband services.

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Additionally, when using PoE power, be sure to install an Ethernet surge protector (ESP) between the PSE and PD and connect it to the local ground system. Terminate the PoE Ethernet cable segments to the ESP to ensure proper grounding of the PoE line for safety and equipment protection.

## Installing Power and Network Cables

After mounting the GigaPro p6dx & GigaPro p6lx system on a wall or pole, and after establishing a ground connection for the system, you must connect power and/or network cables to the system before completing the installation.

The type and count of cables to install for the p6dx & p6lx system may vary from site to site depending on several factors, including the powering option selected and the operating mode of the Wi-Fi AP. Each p6dx & p6lx installation site requires from one to three cables installed based on these factors.

Determine the type and count of cables to install:

If ...	and ...	and ...	and ...	then ...	with ...
Wi-Fi AP mode =	Network uplink =	Power option =	Will link a wired satellite =	Cable count =	Cable types <sup>1</sup> =
RG	Wired	Local	not supported <sup>2</sup>	x	n/a
			No	2	Power, Eth. 1
		PoE	not supported <sup>2</sup>	x	n/a
			No	1	Eth. 1
Satellite	Wired	Local	not supported <sup>2</sup>	2	Power, Eth. 1
	Wireless	Local	not supported <sup>2</sup>	1	Power
		PoE	not supported <sup>2</sup>	1	Eth. 1

<sup>1</sup> Where 'Eth. 1' = WAN Ethernet cable, and 'Eth. 2' = LAN Ethernet cable

<sup>2</sup> Daisy-chained satellites are supported, but only with wireless connections between satellites.

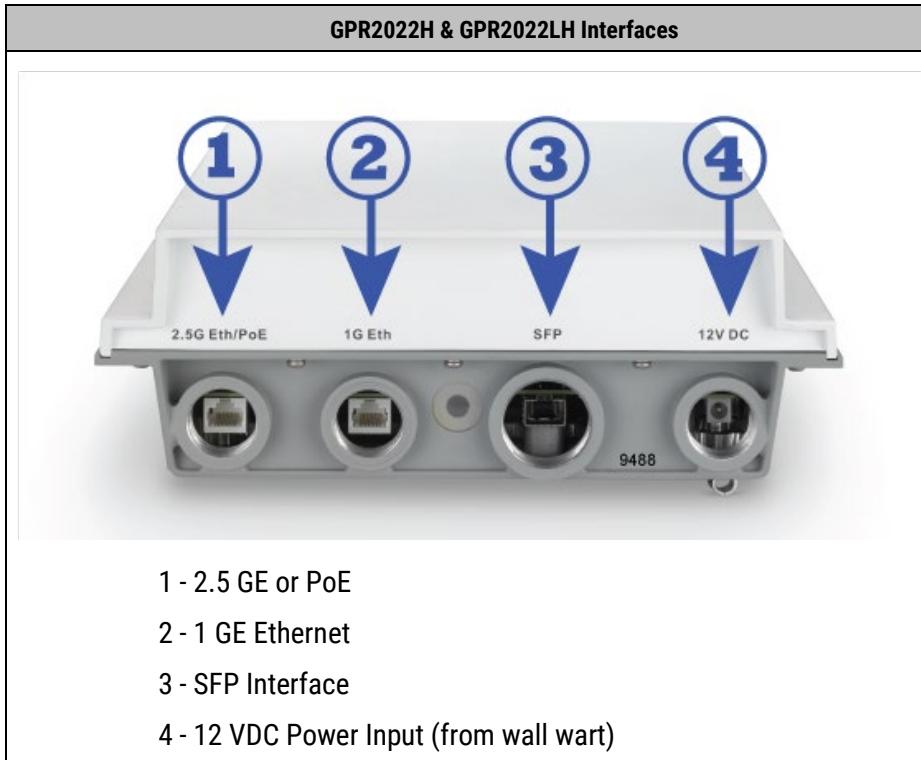
For details about power options, see Powering Options. For details about network uplink options and requirements, see Installation Considerations.

### Preparing the access panel for cable entry

The access panel has two possible ports for cable entry. Follow this guidance when attaching cables:

- Refer to "Exploring the Access Compartment" for complete details about which entry ports to use. As a quick reference:
  - Local power cable entry
  - WAN Ethernet/PoE cable entry

**Note:** The two remaining ports are reserved for WPS initiation and device reset.



1. Route the cable(s) down and away from the p6dx & p6lx mounting location toward the far-end termination point.
2. Dress and secure the cable(s) using cable ties or velcro straps.

**\*Note:** Before proceeding, Calix recommends verifying that the p6dx & p6lx system powers up properly and comes into service as expected. Continue to the next chapter "Final Setup and Activation" to perform these tasks before completing the installation.





## Chapter 3

# Final Setup and Activation

This chapter describes how to finish the GigaPro p6dx & GigaPro p6lx installation process and activate the system for service.

### Topics Covered

This chapter covers the following topic:

- Powering up the system

## Powering up the System

After you have installed cables, the GigaPro™ p6dx & p6lx system is ready to power up and connect to the network.

Use one of the following procedures to apply power to the system.

- If you installed a Calix power adapter cable\* to use a local AC power supply, follow the first procedure below.
- If you installed just an Ethernet cable\* for use with a Power over Ethernet (PoE) system, follow the second procedure below.

**\*Note:** Refer to "Installing Power and Network Cables" for details about installing these cables.

### Procedure 1: To apply local power to the system

1. Verify that the Calix-supplied power cable (installed previously\*) is connected to the p6dx & p6lx power input.
2. Route the power cable's far end to the nearest AC power outlet, and then plug its 3-prong connector into the outlet.
3. Observe as the GigaPro™ p6dx & p6lx system powers up. Refer to System LED Behavior for expected behavior.
4. Dress and secure the power cable between the GigaPro™ p6dx & p6lx and the power outlet as appropriate.

### Procedure 2: To apply PoE power to the system

1. Verify that an Ethernet data cable (installed previously) is connected to the p6dx & p6lx WAN Ethernet port.
2. Route the Ethernet cable's far end to the PoE Power Sourcing Equipment (PSE) located upstream (PoE injector or switch) and connect it to an available PoE port.
3. If the PSE is not already powered up, apply power to the PSE so that it can supply the PoE line feeding the GigaPro™ p6dx & p6lx system. Otherwise, skip to step 4.
4. Observe as the GigaPro™ system powers up. Refer to System LED Behavior for expected behavior.
5. Dress and secure the Ethernet cable between the p6dx & p6lx unit and the PoE PSE as appropriate.

### Next steps

Before completing the installation, verify system startup operation:

- Verify that the system LED shows expected 'in service' status. Refer to System LED Behavior for expected behavior.
- Verify with your back office that the system checked in to Calix Cloud or other suitable management device.



# Appendix

This appendix provides general reference information about the GigaPro p6dx (GPR2022H) & GigaPro p6lx (GPR2022LH).

## Topics Covered

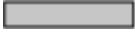
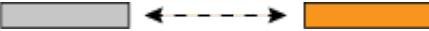
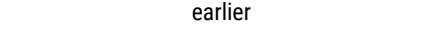
This appendix covers the following topics:

- System LED behavior
- System specifications
- Agency listings

## System LED Behavior - RG Mode

The table below includes the various statuses with their corresponding LED pattern.

The ONT(s) includes a single LED located on the front of the unit.

LED Behavior - RG Mode			
Status	Status	Description - RG Mode	Color
Power Off and Boot-up	Off	<ul style="list-style-type: none"> <li>Power is OFF - the unit has not been turned on, or</li> <li>There is no power to the unit or</li> <li>UPS battery has been discharged and can no longer power the unit (for compatible models only)</li> </ul>	 Solid Gray (Off)
	Boot-up, SW Upgrade in Progress	<ul style="list-style-type: none"> <li>Unit is in the process of being booted up or service/software is being upgraded</li> <li>Flashing amber every 1 second</li> </ul>	 Off and Amber (1000 msec cycle)
	Boot-up Failure	<ul style="list-style-type: none"> <li>Unit boot up failed.</li> </ul>	 Off and Red (800 msec cycle) - R24.2 and earlier  Off and Red (1000 msec cycle) - R24.3 and later
In Service	Connected to Internet	<ul style="list-style-type: none"> <li>System is "In Service" and connected to the internet.</li> </ul>	 Solid Green
Service Failure, no internet	No Internet	<ul style="list-style-type: none"> <li>No service, no internet</li> </ul>	 Solid Red

## System LED Behavior - Mesh (Satellite) Mode

The table below includes the various statuses with their corresponding LED pattern (front or side of the unit).

**Note:** For any Mesh satellite, backhaul pairing can be started by pressing the WPS button for 3 seconds or an equivalent method via a GUI or smartphone application.

WPS is enabled upon pressing the WPS button a single time. After pressing the button, the ONT will stay in pairing mode for 120 seconds.

During this time, other Wi-Fi capable devices can be paired to the Gateway Wi-Fi radios (5 GHz band) by initializing a similar WPS function on other ONTs or satellites thereby creating an association with the Gateway SSID and the mesh satellite. When the Gateway and the mesh satellite are successfully paired, they will have the same primary SSID (2.4 and 5 GHz).

LED Behavior - Mesh Satellite Mode			
Mode	Status	Description - Mesh Mode	Color
Mesh	WPS Pressed, pairing attempt has started	<ul style="list-style-type: none"> <li>For Satellite/Mesh mode, upon pressing the WPS button a single time (3+ seconds), WPS is enabled.</li> <li>The LED bar begins to flash 1 second green/off and continues to do so for up to 120 seconds.</li> <li>If the Gateway has also initialized WPS during this time, the Satellite can be paired to the Gateway Wi-Fi radios (5 GHz band) thereby creating an association with the Gateway SSID.</li> </ul>	 Green and Off (500 msec)
	Mesh Connected	<ul style="list-style-type: none"> <li>Meshing is complete, is in service, and connected to the internet.</li> </ul>	 Solid Green
	Gateway Not Found	<ul style="list-style-type: none"> <li>If no device is found after the initial 120 second time-out, the WPS/Strength LED bar shifts from the blinking green to solid Red.</li> <li>LED bar remains red for another 60 seconds, then revert to the No Internet failure status.</li> <li>If pairing is accomplished, LED bar will change to reflect Gateway status.</li> </ul>	 Solid Red

## System Specifications

Hardware specifications for the GPR1027E system follow:

Dimensions	
Width	<ul style="list-style-type: none"> <li>5 in (12.7 cm)</li> </ul>
Height	<ul style="list-style-type: none"> <li>7 in (17.8 cm)</li> </ul>
Depth	<ul style="list-style-type: none"> <li>1.6 in (3.9 cm)</li> </ul>
Weight	<ul style="list-style-type: none"> <li>2.4 pounds (1.1 kg)</li> </ul>
Data	
Drop Length	<ul style="list-style-type: none"> <li>328 feet (100 m)</li> </ul>
CAT5	<ul style="list-style-type: none"> <li>CAT 5E cable for 2.5 GigE</li> </ul>
Management	<ul style="list-style-type: none"> <li>Includes QoS 802.11Q VLAN, 802.11p Voice - Video, data and Q-in-Q tagging</li> </ul>
Wireless	
2.4 GHz: 802.11 b/g/n/ac/ax	<ul style="list-style-type: none"> <li>2 x 2 UL/DL MU-MIMO</li> </ul>
5 GHz: 802.11 a/n/ac/ax	<ul style="list-style-type: none"> <li>4 x 4 UL/DL MU-MIMO, explicit high power, dynamic beam forming</li> </ul>
2.4 GHz, 5 GHz Simultaneous	<ul style="list-style-type: none"> <li>DCM, TWI, extended GI</li> </ul>
Auto-channel selecting and interference detection	<ul style="list-style-type: none"> <li>Wireless Security: Wi-Fi protected access (WPA/WPA2/WPA3) WEP, Wi-Fi multimedia (WMM) 802.11k,802.11v,802.11r</li> </ul>
WPS push button	<ul style="list-style-type: none"> <li>MAC address filtering</li> </ul>
Remote Management	
<ul style="list-style-type: none"> <li>TR-069 Remote Management</li> </ul>	
<ul style="list-style-type: none"> <li>TR-098 Internet Gateway Device Data Model</li> </ul>	
Powering and Alarms	
AC / DC	<ul style="list-style-type: none"> <li>External Power Adapter (16 ft/4.91 m): 12 VDC, 3A 2-pin barrel connector (not included, ordered separately)</li> <li>Input voltage: 12 VDC (nominal), 10 VDC (min), 15 VDC (max)</li> </ul>
Power over Ethernet (PoE)	<ul style="list-style-type: none"> <li>PoE 802.3BT PD</li> </ul>

Network Interfaces	
WAN/LAN	<ul style="list-style-type: none"> <li>• Wired: 10/100/1000/2500</li> <li>• BASE-TX Ethernet Port, RJ-45 connector</li> </ul>
Wireless	<ul style="list-style-type: none"> <li>• 2x2 2.4 GHz, 4x4 5 GHz internal antennas</li> <li>• Power: 2-pin barrel connector</li> </ul>
Environmental	
Operating temperature (ambient) Operating and storage relative humidity	<ul style="list-style-type: none"> <li>• Outdoor ambient temperature: -40° C to 70° C</li> <li>• 10 to 90 % and 5 to 95% non-condensing</li> <li>• Operating and storage relative humidity: 10 to 90 % and 5 to 95% non-condensing respectively</li> </ul>
Certification and Compliance	
Emissions	<ul style="list-style-type: none"> <li>• FCC Part 15 Class B</li> <li>• Industry Canada (IC) ICES-003 Class B</li> <li>• ICES-003 Class B, CISPR-22</li> </ul>
Safety	<ul style="list-style-type: none"> <li>• UL 62368 and UL 1697 approved</li> </ul>
Compliance	<ul style="list-style-type: none"> <li>• IEEE: 802.3, 802.3ab, 802.3u, 802.11p, 802.11Q</li> <li>• Wi-Fi Alliance Certified 802.11ax (Wi-Fi 6)</li> </ul> 

## Agency Listings

**FCC WARNING:** These devices comply with Part 15 of the FCC Rules and Regulations. Operation is subject to the following conditions.

This device may not cause harmful interference, and, this device must accept any interference received, including interference that may cause undesired operation.

These devices have been tested and found to comply with the limits for a Class B digital device pursuant to Part 15 of the FCC Rules and Regulations. These limits are designed to provide reasonable protection against harmful interference when this equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions in this guide, may cause harmful interference to radio and television communications.

### Hazardous Materials

There are no hazardous materials identified for the GigaPro p6dx & GigaPro p6lx.

### Application Standards

Following is a list of standards that apply to this product:

Standards		
FCC Part 15, Sub Part B, class B	UL 62368-1	IEEE: 802.3, 802.3AB, 302.3U, 802.11p, 802.11Q
CAN ICES-003 Class B	CSA C22.2 No. 62368-1	Telcordia GR-2890
ANSI C63.4	IEC 62368-1	Telcordia GR-909
FCC Part 15.247	ITU-T K21	Telcordia GR-1244
FCC Part 15.203	ITU-T K44	Telcordia GR-950
FCC Part 15.207	EN 62368-1	Telcordia-GR-1089
FCC Part 15.209	IC: 4009A-GPR2022XX	Telcordia GR-63
FCC ID: 2ABLK-GPR2022XX	EN 62311	NEC (National Electrical Code)
RSS 102	CE / RED, RoHS, WEEE, Energy	Wi-Fi Alliance Certified 802.11ax
RSS 247	FCC Part 15.407	
		

## Radiated Emissions

This Class-B digital device complies with radiated emissions requirements as defined in Canadian ICES-003.

## Product Compliance

GigaSpire BLAST systems have achieved National Fire Protection Association (NFPA) compliance.

## Conformité du Produit

Les systèmes GigaSpire BLAST sont maintenant conformes à la National Fire Protection Association (NFPA).

## Power Supply

The unit must be powered by a listed power adapter or DC power source marked "LPS" (Limited Power Source) and rated output between 12 VDC, 3 A minimum, TMA = 40° Celsius minimum. If additional help is needed on implementing a power supply, please contact your local Calix service professional.

An external power supply is not included with the following rating:

GigaPro p6dx (GPR2022H) & GigaPro p6lx (GPR2022LH)

- Input voltage: 12 VDC (nominal)
- 10 VDC (min.), 15 VDC (max)
- External Power Adapter: 12 VDC, 3 A
- PoE 802.3bt PD
- Calix p/n 100-06013



**DANGER!** Using non-approved or incorrect power adapters can result in injury.

**DANGER!** L'utilisation d'adaptateurs d'alimentation non approuvés ou incorrects peut entraîner des blessures.

**Note:** When using the power adapter, units will be inoperable after loss of main power.



# Calix Safety and Regulatory Statements - GigaPro

**NOTE:** This Safety and Regulatory Statements Guide applies to all GigaPro devices that may or may not include a Wi-Fi radio. Disregard any statements made here if the feature or function is not present on any particular model.

## Before you Begin

### IMPORTANT SAFETY INSTRUCTIONS

When using your equipment, basic safety precautions should always be followed to reduce the risk of fire, electric shock, and injury to persons, including the following:

- Professional installation is required.
- Read all the instructions listed here and/or in the user manual before you operate this device. Give attention to all safety precautions. Retain the instructions for future reference.
- Always use caution when handling live electrical connections.
- Do not install electrical equipment in wet or damp conditions.
- Ensure that the power source for the system is adequately rated to assure safe operation and provides current overload protection.
- Do not allow anything to rest on the power cable, and do not place this product where people will stand or walk on the power cable.
- To avoid electric shock caused by over-voltage from the PSTN, DO NOT connect the POTS port on this unit directly to any external PSTN line.
- **Children:** Do not allow children to play with the GigaSpire. It contains small parts that could become detached and create a choking hazard.
- This unit must only be used with the certified power adapter model inside the package, which complies with the requirement of a limited power source.
- Installation of this device must be in accordance with national wiring codes and conform to local regulations and electrical codes.
- Do not use any accessories other than those approved by the manufacturer or your service provider. Use of non-original or non-approved accessories may result in loss of performance, damage to the product, fire, electric shock or injury, and may violate regulations. The warranty does not cover product failures that have been caused by use of non-original or non-approved accessories.
- It is recommended that the customer install an AC surge protector in the AC outlet to which this device is connected. This is to avoid damaging the device by local lightning strikes and other electrical surges.
- The pluggable external power supply provided with the unit should be mounted outdoors. If other power supplies are employed, they should be LISTED ITE with a Limited Power Source (LPS) output or LISTED with a National Electric Code (NEC) Class 2 output.
- All installation methods shall be in accordance with national and local regulations and practices. The wiring method should include the use of Listed wire/cable acceptable for the application per the National Code, and should be one that an Authority Having Jurisdiction (AHJ) can approve per the Code.
- For US products, no wiring to the product should be exposed in lengths beyond 140 feet, as the circuits should avoid exposure to accidental contact with lightning and power conductors in accordance with NEC Article 725-57 (NEC 2005). The installer should also consider Articles 210, 240, 250, 770, and 810 of the NEC.

### ENVIRONMENTAL CONDITIONS

- Maximum environmental values during use:
- Outdoor ambient temperature with Calix enclosure: -22 to 158° F, (-30° C to +70° C), 5%–95% non-condensing, Altitude: -200 to 6,000 feet (@40° C) and 6,000 ft to 10,000 ft (@30° C)

### REQUIRED SAFETY STATEMENTS

- **Potentially Explosive Atmosphere:** Do not use the GigaSpire in an area where a potentially explosive atmosphere exists.
- **Atmosphère potentiellement explosive:** N'utilisez pas le GigaSpire dans un endroit où existe une atmosphère potentiellement explosive.
- **Intended Use:** This product is classified as telecommunications equipment intended for direct purchase by the public.
- This product is designed and approved for use in an outdoor location only.



**CAUTION!** Use of any controls, adjustments, or procedures other than those specified herein may result in hazardous radiation exposure.

- **Utilisation prévue:** Ce produit est classé comme équipement de télécommunication non destiné à l'achat direct par le public. Ce produit est conçu et approuvé pour utilisation en intérieur uniquement.



**MISE EN GARDE !** L'utilisation de contrôles, réglages ou procédures autres que ceux spécifiés dans ce manuel peut entraîner une exposition dangereuse à des rayonnements.

- Connect the power supply cord only to an AC power outlet that meets GigaSpire specifications.
- Never alter the AC power cord. If necessary, have the correct outlet installed by a qualified electrician or call your service provider for assistance.
- To reduce the risk of damage to the electric cord, remove it from the outlet by holding onto the AC power adapter rather than the cord.
- Make sure the cord is positioned so that it will not be stepped on, tripped over, or otherwise subjected to damage or stress.





**WARNING!** Do not use any other power adapter except the one that accompanies this unit or a power supply identified in the list below. Use of another adapter could result in damage to the unit. To prevent electrical shock, please do not open the cover. The following power adapter is qualified for use with this GigaSpire.

#### ALIMENTATION ÉLECTRIQUE

- Connectez le cordon d'alimentation uniquement à uneprise d'alimentation CA conforme aux spécifications GigaSpire.
- Ne modifiez jamais le cordon d'alimentation CA. Si nécessaire, faites installer la bonne prise par un électricien qualifié ouappelez votre fournisseur de service pour obtenir de l'aide.
- Pour réduire le risque d'endommager le cordon électrique, retirez-le de la prise en le tenant par la fiche moulée de l'adaptateur secteur plutôt que par le cordon.
- Assurez-vous que le cordon est positionné de sorte qu'il ne puisse pas marcher dessus, trébucher ou subir d'autres dommages ou contraintes.



**Attention !** N'utilisez pas d'autre adaptateur secteur que celui qui accompagne cet appareil ou une alimentation électrique autre que celle identifiée dans la liste ci-dessous. L'utilisation d'un autre adaptateur pourrait endommager l'appareil. Pour éviter les chocs électriques, n'ourez pas le couvercle. L'adaptateur électrique suivant est qualifié pour être utilisé avec le GigaSpire.

#### Federal Communications Commission (FCC)

Note: Professional Installation is required.

##### 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 technician for help.

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

**CAUTION:** This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter except in accordance with FCC multi-transmitter product procedures.

##### ADDITIONAL CONSIDERATIONS

The country code selection is for non-US models only and is not available on any US models. Per FCC regulations, all Wi-Fi products marketed in the US must be fixed to US operational channels only.

##### FCC RADIATION EXPOSURE STATEMENT

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of (56cm for p6ix GPR2022LH and 51cm for p6dx GPR2022H) between the radiator & your body.

\* - Distance to be determined once all values are known.

#### Industry Canada Requirements - English

Note: Professional Installation is required.

Conformity with the requirements and other relevant provisions of the following Canadian standards:

- CAN ICES-3 (B)/NMB-3(B)
- This device complies with ISED's licence-exempt RSS standards. Operation is subject to the following two conditions:
  - (1) This device may not cause interference, and
  - (2) This device must accept any interference, including interference that may cause undesired operation of the device.

##### RADIATION EXPOSURE STATEMENT

This equipment complies with ISED radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of (35cm for p6ix GPR2022LH and 31cm for p6dx GPR2022H) between the radiator & your body.

#### Industrie Canada Exigences - français

Note: Une installation professionnelle est requise.

The manufacturer declares that this product is in co

Le fabricant déclare que ce produit est conforme aux exigences et autres dispositions pertinentes des normes canadiennes suivantes :

- CAN-ICES-3 (B)/NMB-3(B)
- Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :
  - (1) L'appareil ne doit pas produire de brouillage, et
  - (2) L'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

## DECLARATION D'EXPOSITION AUX RADIATIONS

Cet équipement est conforme aux limites d'exposition aux rayonnements ISED établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de (35cm pour p6lx GPR2022LH et 31cm pour p6dx GPR2022H) de distance entre la source de rayonnement et votre corps.

\* - Distance à déterminer une fois que toutes les valeurs sont connues.

## European Union

### DISPOSING OF AND RECYCLING YOUR PRODUCT

#### WEEE DIRECTIVE: REQUIREMENT ACCORDING TO WEEE DIRECTIVE 2012/19/EU

Disposal of old electrical and electronic equipment (Applicable in the European countries with separate collection systems).



This symbol on the product indicates that this product shall not be treated as household waste. Instead it shall be handed over to the applicable collection point for the recycling of electrical and electronic equipment. By ensuring this product is disposed of correctly, you will prevent potential negative consequences for the environment and human health, which could otherwise be caused by inappropriate waste handling of this product. The recycling of materials will help to conserve natural resources. Calix offers take-back and recycling services for products in many locations around the world. Customers are advised to contact the local Calix representative for further information.

## CALIX, INC. AND THE ENVIRONMENT

At Calix Inc., we understand and are committed to reducing any impact our operations and products may have on the environment. To minimize this impact, Calix Inc. designs and builds its products to be as environmentally friendly as possible, by using recyclable, low toxic materials in both products and packaging.

## ROHS COMPLIANCE

This equipment meets the requirements detailed in the European RoHS Directive 2011/65/EU.

## FOR RADIO EQUIPMENT ONLY



You must set the correct country code with the set WLAN country-code command to avoid violating local radio spectrum laws. This command sets the selectable channel range and transmit power level so that a WLAN connection can be established. For more information about country codes, see the hardware guide for your device.

This device complies with the essential requirements of the Radio Equipment directive: 2014 / 53 / EU. The following test methods have been applied to prove presumption of conformity with the essential requirements of the Radio Equipment directive: 2014 / 53 / EU: EN 300 328 (2.4 GHz), EN 301 893 (5 GHz) EN 62311:2008, EN 50385, EN 301489-1, EN 301489-17, EN62368-1.

FREQUENCIES	MAX POWER OF REGULATORY DOMAIN		OUTDOOR
	US	CAN	
2400-2483.5	1000 mW	1000 mW	Outdoor
5150-5250	1000 mW	N/A	Outdoor
5250-5350	250 mW	200 mW	Outdoor
5470-5725	250 mW	1000 mW	Outdoor
5725-5850	1000 mW	1000 mW	Outdoor

## RADIATION EXPOSURE STATEMENT

The minimum distance between the user and/or any bystander and the radiating structure of the transmitter is 20 cm.

J			NOTICE OF WIRELESS RADIO LAN USAGE IN THE EUROPEAN COMMUNITY
BE	BG	CZ	This device is restricted to <b>outdoor use</b> when operated in the European Community using channels in the 5.15-5.35 GHz band to reduce the potential for interference.
DK	DE	EE	This device is a 2.4 GHz wideband transmission system (transceiver), intended for use in all EU member states and EFTA countries, except in France where restrictive use applies. This device may not be used for setting up outdoor radio links in France and in some areas, the RF output power may be limited to 10 mW EIR P in the frequency range of 2454 – 2483.5 MHz. For detailed information, the end-user should contact the national spectrum authority in France.
IE	EL	ES	This equipment may be operated in AL, AD, BE, BG, DK, DE, FI, FR, GR, GW, IS, IT, HR, LI, LU, MT, MK, MD, MC, NL, NO, AT, OL, PT, RO, SI, SM, SE, RS, SK, ES, CI, HU, CY
FR	HR	IT	
CY	LV	LT	
LU	HU	MT	
NL	AT	PL	
PT	RO	SI	
SK	FI	SE	
UK	LI	IS	
NO	TR	CH	

## USAGE NOTES

- To remain in conformance with European National spectrum usage regulations, frequency and channel limitations will be applied on the products per the country where the equipment is deployed.
- Access points will support DFS (Dynamic Frequency Selection) and TPC (Transmit Power Control) functionality as required when operating in 5 GHz within the EU.

## 5 GHZ WIRELESS FREQUENCY AND CHANNEL OPERATION IN EEC COUNTRIES

The table below provides a list of allowable frequency ranges and channels in various EEC countries.



Allowable 802.11a Frequencies and Channels	Countries
5.15-5.25 GHz (Channels 36, 40, 44, 48)	Liechtenstein
5.15-5.25 GHz and 5.725-5.875 GHz (Channels 36, 40, 44, 48, 149, 153, 157, 161, 165, 169)	Austria
5.15-5.35 GHz (Channels 36, 40, 44, 48, 52, 56, 60, 64)	France
5.15-5.35 and 5.47-5.725 GHz (Channels 36, 40, 44, 48, 52, 56, 60, 64, 100, 104, 108, 112, 116, 120, 124, 128, 132, 136, 140)	Denmark, Germany, Iceland, Finland, Netherlands, Norway, Poland, Sweden, Slovenia, Luxembourg, U.K., Ireland, Slovak, Switzerland, Hungary, Italy
5.15-5.35 GHz and 5.725-5.875 GHz (Channels 36, 40, 44, 48, 52, 56, 60, 64, 149, 153, 157, 161, 165, 169)	Czech Republic

## License Information

### OPEN SOURCE SOFTWARE UTILIZATION NOTICE

The GigaSpire family uses Open Source software programs. Such software programs are made available subject to certain third-party terms and conditions.

The fact that you are about to begin using or have purchased this product requires that you be informed of the use of these software packages and/or libraries and in some cases, the third-party terms and conditions applicable to such software. This information can be found on the manufacturer's support portal. Refer to the appropriate software release notes for additional information on Open Source software programs used by this product.

### Declaration of Conformity

Language	Declaration of Conformity
български [Bulgarian]	С настоящото Calix Inc. Този декларация тази Wireless Broadband Terminal за достъп в е съответствие с Директиви 2014/53 / ЕС. Търният текст на ЕС декларацията за съответствие е достъпна онлайн от сайта на декларациите на Calix ( <a href="https://www.calix.com/declarations">https://www.calix.com/declarations</a> ).
hrvatski [Croatian]	OOVime Calix Inc. To izjavljuje ovaj bežični širokopojasni pristup terminalu u skladu s Direktivom 2014/53 / EU. Puni tekst izjave o skladnosti za EU je dostupan online od calixs web deklaracije ( <a href="https://www.calix.com/declarations">https://www.calix.com/declarations</a> ).
English	Hereby, Calix Inc. declares that this Broadband wireless Access Terminal is in compliance with Directive 2014/53/EU. The full text of the EU declaration of conformity is available online from the Calix Declarations site ( <a href="https://www.calix.com/declarations">https://www.calix.com/declarations</a> ).
český [Czech]	Tim Calix Inc. Která deklaruje toto Wireless Broadband Access Terminal je v souladu se směrnicí 2014/53 / EU. Úplně znění EU prohlášení o shodě je k dispozici online na webové stránce prohlášení Calichu ( <a href="https://www.calix.com/declarations">https://www.calix.com/declarations</a> ).
Deutsch [German]	Hiermit Calix Inc. Das erklärt der Wireless Broadband Access Terminal in Übereinstimmung mit der Richtlinie 2014/53 / EU. Der vollständige Wortlaut der EU-Konformitätserklärung wird online von den Calix Websit Eklärungen zur Verfügung ( <a href="https://www.calix.com/declarations">https://www.calix.com/declarations</a> ).
Eesti [Estonian]	Käesolevaga Calix Inc. See kinnitab seda traadita lairibahüenduse Terminal on kooskõlas direktiivi 2014/53 / EL. Tervitakse EU vastavusdeklaratsiooni on saadaval võrgus Calix veebilehel deklaratsioonid ( <a href="https://www.calix.com/declarations">https://www.calix.com/declarations</a> ).
español [Spanish]	Por la presente, Calix Inc. Que declara esta Terminal de banda ancha de acceso inalámbrico está en conformidad con la Directiva 2014/53 / UE. El texto completo de la declaración de conformidad de la UE está disponible en línea desde el sitio web Declaraciones de Calix ( <a href="https://www.calix.com/declarations">https://www.calix.com/declarations</a> ).
Ελληνική [Greek]	Δια την παρόντα, Calix Inc. Αυτό δηλώνει ότι το Wireless Terminal Ευρυζωνική πόρθηση είναι σε συμμόρφωση με την οδηγία 2014/53 / ΕΕ. Το τέλες κέιμενο της δηλωσης συμμόρφωσης ΕΕ είναι διαθέσιμο στο διαδίκτυο από την ιστοσελίδα Calix Δηλώσεις ( <a href="https://www.calix.com/declarations">https://www.calix.com/declarations</a> ).
français [French]	Par la présente, Calix Inc. Cet accès haut débit sans fil terminal est conforme à la directive 2014/53 / UE. Le texte intégral de la déclaration de conformité C'est disponible en ligne à partir des déclarations de site Calix ( <a href="https://www.calix.com/declarations">https://www.calix.com/declarations</a> ).
Italiano [Italian]	Con la presente, Calix Inc. Che dichiara questo terminale di accesso wireless a banda larga è conforme alla Direttiva 2014/53 / UE. Il testo integrale della dichiarazione di conformità UE è disponibile online dal sito Dichiarazioni Calix ( <a href="https://www.calix.com/declarations">https://www.calix.com/declarations</a> ).
Latvijas [Latvian]	Ar šo, Calix Inc. Tas pazio, šis bezvadu plātošanas piekives terminals atbilst Direktivas 2014/53 / ES. Pilns teksts ES atbilstības deklarācijas ir pieejams tā Calix tīmekļa deklarācijās ( <a href="https://www.calix.com/declarations">https://www.calix.com/declarations</a> ).
Lietuvių [Lithuanian]	Šiuo dokumentu Calix Inc. Tai deklaruojai tai bevežės plātojusių prieigos terminalas atitinka Direktivos 2014/53 / ES. Visą tekštą ES atitikties deklaracija galima rasti internete nuo CALIX svetainės deklaracijas ( <a href="https://www.calix.com/declarations">https://www.calix.com/declarations</a> ).
Magyar [Hungarian]	Ezáltal Calix Inc. Hogy kijelenti ezt Wireless Broadband Access Terminal irányelvnek megfelelően 2014/53 / EU. A teljes szöveg az EU-megfelelőségi nyilatkozat elérhető online az Calix honlapján Nyilatkozatok ( <a href="https://www.calix.com/declarations">https://www.calix.com/declarations</a> ).
Polski [Polish]	Niniejszym, Calix Inc. Deklaruję, że ten Szerokopasmowy dostęp bezprzewodowy terminal jest zgodny z dyrektywą 2014/53 / UE. Pełny tekst deklaracji zgodności UE jest dostępny on-line ze strony internetowej calix deklaracji ( <a href="https://www.calix.com/declarations">https://www.calix.com/declarations</a> ).
português [Portuguese]	Por este meio, Calix Inc. Que declara esta Terminal de Acesso de Banda Larga sem fios está em conformidade com a Directiva 2014/53 / UE. O texto completo da declaração UE de conformidade está disponível online a partir de declarações do Web site da Calix ( <a href="https://www.calix.com/declarations">https://www.calix.com/declarations</a> ).
român [Romanian]	Prin prezența, Calix Inc poate declara que acces de bandă largă fără fir Terminal este în conformitate cu Directiva 2014/53 / EU. Textul integral al declarației de conformitate UE este disponibil online din calix declarare site-ul ( <a href="https://www.calix.com/declarations">https://www.calix.com/declarations</a> ).
slovenščina [Slovenian]	S tem lahko Calix Inc. razglasiti, da širokopasovnega brezžičnega dostopa Terminal je v skladu z Direktivo 2014/53 / EU. Celotno besedilo izjave EU o skladnosti je na voljo na spletni strani izjavimi calix ( <a href="https://www.calix.com/declarations">https://www.calix.com/declarations</a> ).
slovenský [Slovak]	Týmto Calix Inc. môže vyhľásiť tento que Broadband Wireless Access Terminal je v súlade so smernicou 2014/53 / EÚ. Úplné znenie vyhľásenia o zhode EÚ je k dispozícii online na webovej stránke vyhľásenie calichu ( <a href="https://www.calix.com/declarations">https://www.calix.com/declarations</a> ).