



GigaSpire Installation Guide: Indoor Wi-Fi Gateway & Satellite Systems

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About this Guide

This document provides the installation practice for the latest generation of Calix GigaSpire indoor Wi-Fi gateway and satellite systems. The following products are included in this installation Guide:

- GigaSpire u4.2 (GS2029E) Dual band Wi-Fi 6
- GigaSpire u6.3 (GS4229E) Dual Band Wi-Fi 6 RG with Dual POTS
- GigaSpire 7u6 (GS3137E) Tri-band Wi-Fi 7 RG/Mesh with Single POTS
- GigaSpire 7u6m (GM2038) Tri-band Wi-Fi 7 Mesh

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

IMPORTANT NOTE: 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 within a minimum distance of:

- u4.2 - 20 cm between the radiator and your body
- u6.3 - 20 cm between the radiator and your body
- 7u6 - 22 cm between the radiator and your body
- 7u6m - 20 cm between the radiator and your body

This device contains license-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's license-exempt RSS(s). Operation is subject to the following two conditions:

- (1) This device may not cause interference.
- (2) This device must accept any interference, including interference that may cause undesired operation of the device.

Cet équipement est conforme aux limites d'exposition aux rayonnements de la FCC définies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé à une distance minimale de:

- u4.2 - 20 cm entre le radiateur et votre corps
- u6.3 - 20 cm entre le radiateur et votre corps
- 7u6 - 22 cm entre le radiateur et votre corps
- 7u6m - 20 cm entre le radiateur et votre corps

Cet appareil contient des émetteurs / récepteurs exempts de licence qui sont conformes au (x) RSS (s) exemptés de licence d'Innovation, Sciences et Développement économique Canada. L'opération est soumise aux deux conditions suivantes:

- (1) Cet appareil ne doit pas provoquer d'interférences.
- (2) Cet appareil doit accepter toute interférence, y compris les interférences susceptibles de provoquer un fonctionnement indésirable de l'appareil.

IMPORTANT NOTE: IC Radiation Exposure Statement

This equipment complies with IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated within a minimum distance of:

- u4.2 - 20 cm between the radiator and your body
- u6.3 - 30 cm between the radiator and your body

- 7u6 - 60 cm between the radiator and your body
- 7u6m - 60 cm between the radiator and your body

Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé à une distance minimale de:

- u4.2 - 20 cm entre le radiateur et votre corps
- u6.3 - 30 cm entre le radiateur et votre corps
- 7u6 - 60 cm entre le radiateur et votre corps
- 7u6m - 60 cm entre le radiateur et votre corps

Radio Local Area Network Standards

- Devices shall not be used for control of or communications with unmanned aircraft systems.
- Devices shall not be used on oil platforms.
- Devices shall not be used on aircraft, except for the low-power indoor access points, indoor subordinate devices, low-power client devices, and very low-power devices operating in the 5925-6425 MHz band, that may be used on large aircraft as defined in the Canadian Aviation Regulations, while flying above 3,048 meters (10,000 feet).
- Devices shall not be used on automobiles.
- Devices shall not be used on trains.
- Devices shall not be used on maritime vessels.
- Operation shall be limited to indoor use only.

Normes des réseaux locaux radio

- Les dispositifs ne doivent pas être utilisés pour commander des systèmes d'aéronef sans pilote ni pour communiquer avec de tels systèmes.
- Les dispositifs ne doivent pas être utilisés sur les plateformes de forage pétrolier.
- Les dispositifs ne doivent pas être utilisés dans les aéronefs, à l'exception des points d'accès intérieurs de faible puissance, des dispositifs subordonnés intérieurs, des dispositifs clients de faible puissance et des dispositifs de très faible puissance fonctionnant dans la bande de 5925 à 6425 MHz, qui peuvent être utilisés dans les gros aéronefs tel qu'il est défini dans le Règlement de l'aviation canadien, et ce, lorsqu'ils volent à une altitude supérieure à 3048 mètres (10000 pieds).
- Les dispositifs ne doivent pas être utilisés dans les automobiles.
- Les dispositifs ne doivent pas être utilisés dans les trains.
- Les dispositifs ne doivent pas être utilisés sur les navires maritimes.
- Le fonctionnement doit être limitée à une utilisation à l'intérieur seulement.

Safety Notice Conventions

This document uses the following safety notice conventions.

Note: Some of the notices below may be excluded from this document based on the incorporated features.



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.

Current Safety Notices



Caution! Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

Attention! L'utilisation des commandes ou réglages ou l'exécution des procédures autres que celles spécifiées dans les présentes exigences peuvent être la cause d'une exposition à un rayonnement dangereux.

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

GigaSpire Systems Products Overview

This chapter introduces the GigaSpire indoor Wi-Fi gateway and satellite systems including the GigaSpire u6.3 (GS4229E), u4.2 (GS2029E), 7u6 (GS3137E), and 7u6m (GM2038) models and provides an overview of installation considerations.

Topics Covered

This chapter covers the following topics:

- Introducing the GigaSpire indoor Wi-Fi gateway and satellite systems
- Product dimensions
- System interfaces
- Powering options
- Mounting options
- Installation considerations

Introducing the GigaSpire Indoor Wi-Fi Gateway and Satellite Systems

- The **GigaSpire® u6.3** (GS4229E) is a larger form factor Ethernet Wi-Fi 6 gateway system for use in residential applications with larger spaces, where a 'two-box model' (RG separate from ONT) with multiple LAN Ethernet ports is preferred or required. The u6.3 is equipped with a 2.5GE Ethernet WAN uplink port for connecting to the broadband service access device (ONT or modem), as well as one 2.5GE and four 1GE LAN ports to provide multi-gigabit services throughput on the LAN.
- The **GigaSpire® u4.2** (GS2029E) is a smaller form factor Ethernet Wi-Fi 6 gateway system for use in residential applications with smaller spaces, where a 'two-box model' (RG separate from ONT) with only one LAN Ethernet port is preferred or required. The u4.2 is equipped with an 2.5GE Ethernet WAN uplink port for connecting to the broadband service access device (ONT or modem) and one 2.5GE LAN port to provide multi-gigabit services throughput on the LAN.
- The **GigaSpire® 7u6** (GS3137E) is a smaller form factor Ethernet Wi-Fi 7 residential gateway used primarily in residential applications. The 7u6 is equipped with a 2.5GE Ethernet WAN uplink port for connecting to the broadband service access device (ONT or modem), as well as three 2.5GE LAN ports to provide multi-gigabit services throughput on the LAN. A single VoIP port is also included.
- The **GigaSpire® 7u6m** (GM2038) is a smaller form factor Ethernet Wi-Fi 7 mesh satellite for use in residential applications where extended Wi-Fi reach is desirable. The 7u6m provides a 2.5 GE WAN up-link to any Calix gateway system as well as a 2.5 GE LAN side interface for customer multi-media devices.

u6.3 (GS4229E)	u4.2 (GS2029E)
	
7u6 (GS3137E)	7u6m (GM2038)
	

The GigaSpire u6.3, u4.2, and 7u6m offer the following network interfaces:

Interface	u6.3	u4.2	7u6	7u6m
Wi-Fi	4x4 @ 5 GHz (Wi-Fi 6) 2x2 @ 2.4 GHz (Wi-Fi 6)	2x2 @ 5 GHz (Wi-Fi 6) 2x2 @ 2.4 GHz (Wi-Fi 6)	2x2 @ 6 GHz (Wi-Fi 7) 2x2 @ 5 GHz (Wi-Fi 7) 2x2 @ 2.4 GHz (Wi-Fi 7)	2x2 @ 6 GHz (Wi-Fi 7) 2x2 @ 5 GHz (Wi-Fi 7) 2x2 @ 2.4 GHz (Wi-Fi 7)
WAN	(1) x 2.5 GE Ethernet	(1) x 2.5 GE Ethernet	(1) x 2.5 GE Ethernet	(1) x 2.5 GE Ethernet
LAN	(1) x 2.5 GE Ethernet (4) x 1GE Ethernet	(1) x 2.5 GE Ethernet	(3) x 2.5 GE Ethernet	(1) x 2.5 GE Ethernet
POTS	2	N/A	1	N/A
USB	USB 2.0 Type A	USB 2.0 Type A	USB 2.0 Type A	N/A

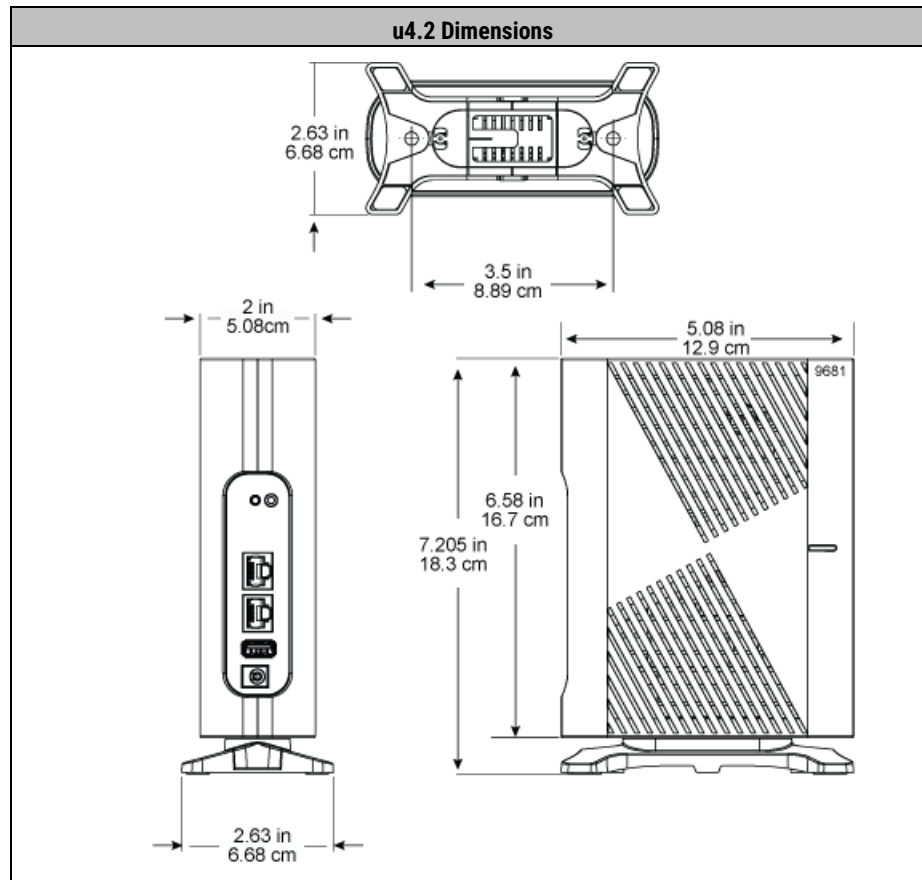
Refer to the product data sheets on calix.com for complete details regarding features and specifications:

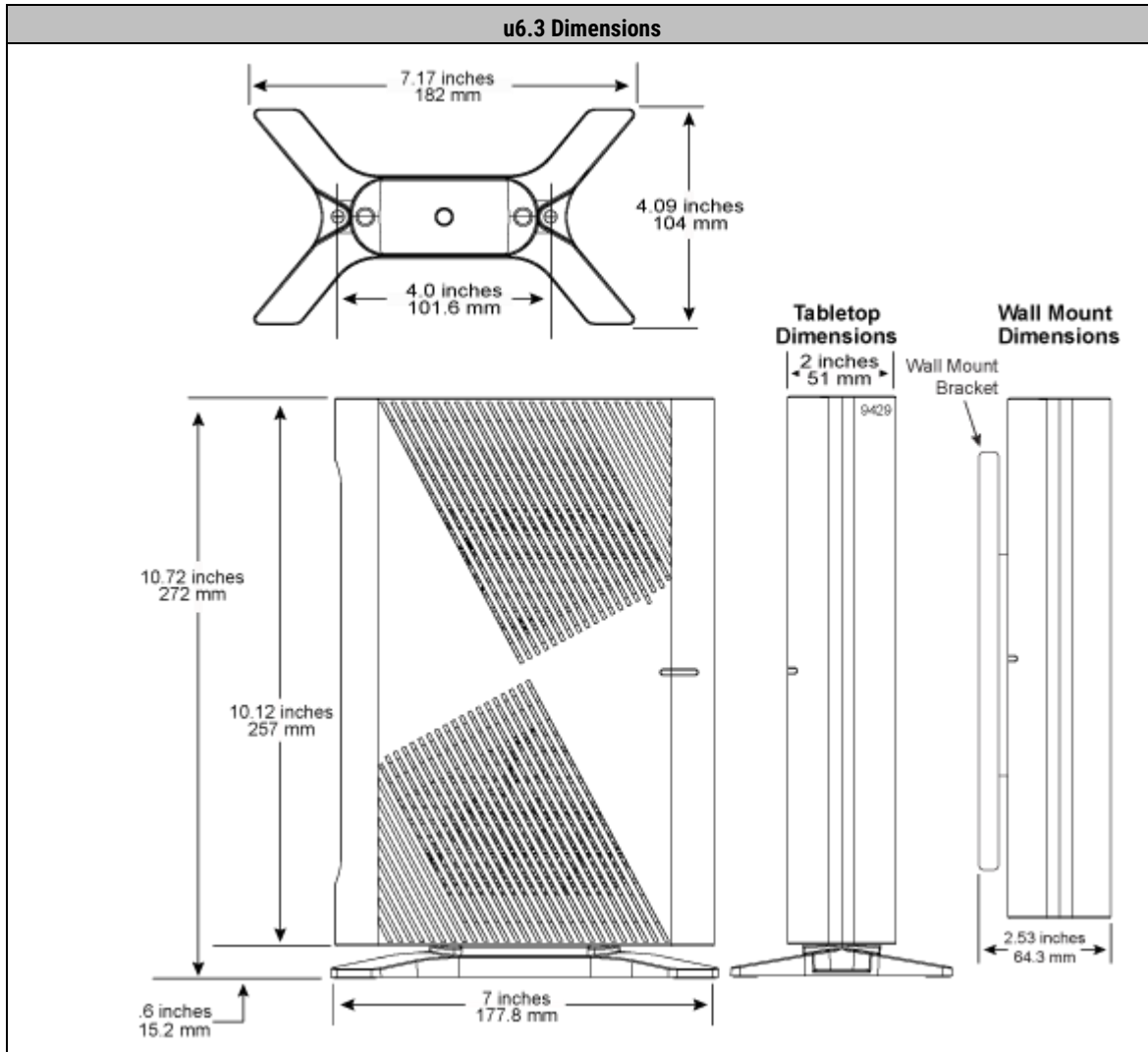
- 250-00452 Datasheet, GigaSpire u4.2 (GS2029E) 2.5 GE WAN, 2.5 GE LAN, Dual Wi-Fi Gateway System
- 250-00454 Datasheet, GigaSpire u6.3 (GS5229E) 2.5 GE WAN, 2.5 GE LAN, (4) 1 GE LAN, Dual Wi-Fi Gateway System, 2 POTS, 1 USB
- 250-00460 Datasheet, GigaSpire 7u6m (GM2038) 2.5 GE WAN, 2.5 GE LAN, Tri-Band Wi-Fi 7 Mesh Satellite

Product Dimensions

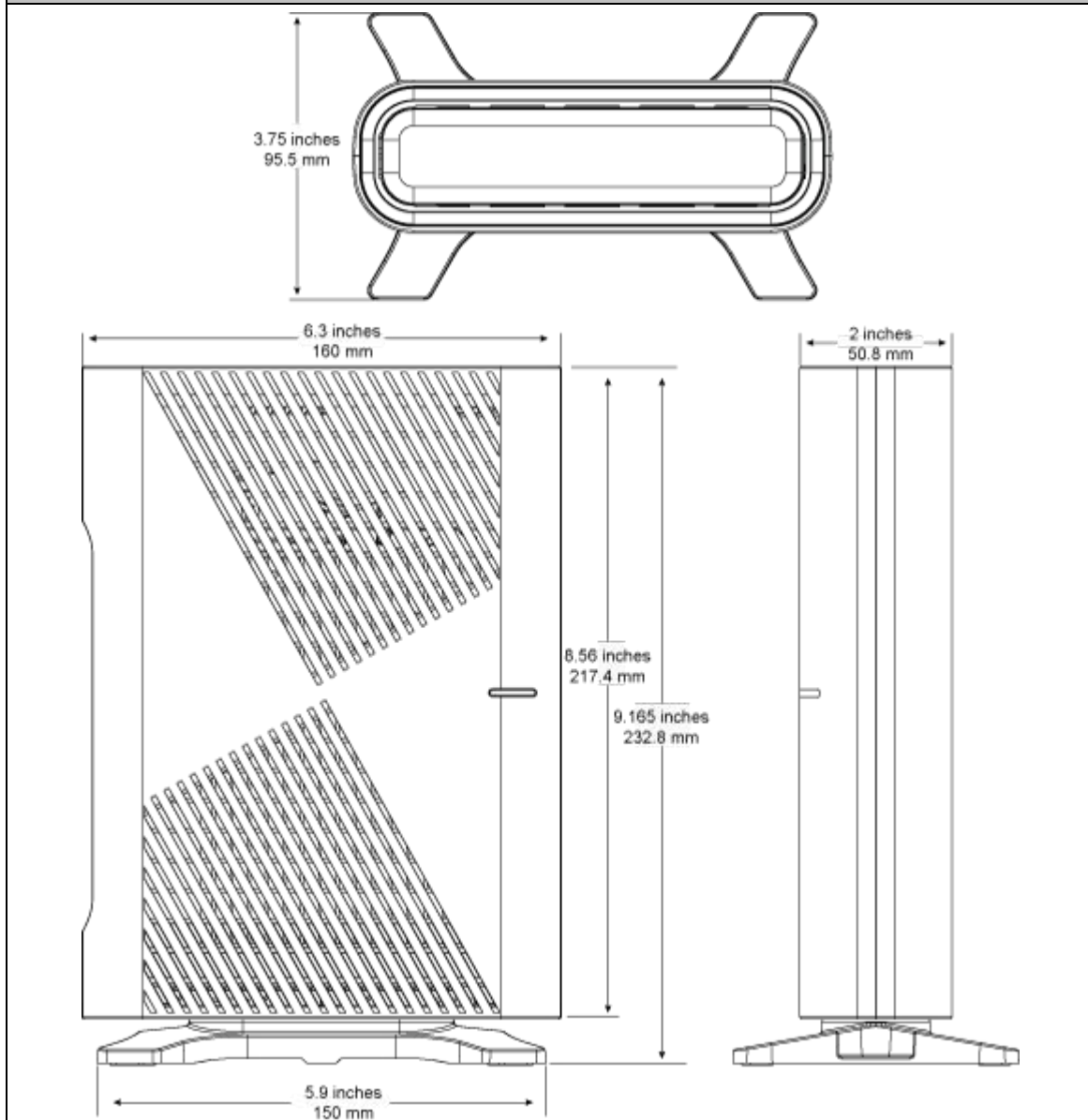
The u4.2 and u6.3 product dimensions are shown below for reference.

When installed, total dimensions vary slightly between tabletop (foot/bracket below) and wall mount configurations.



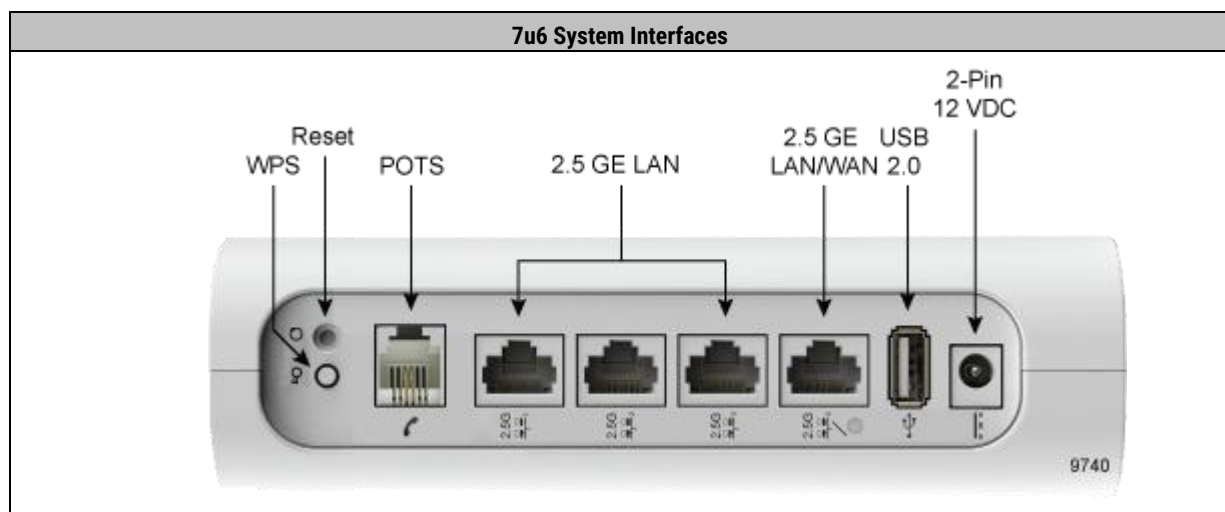
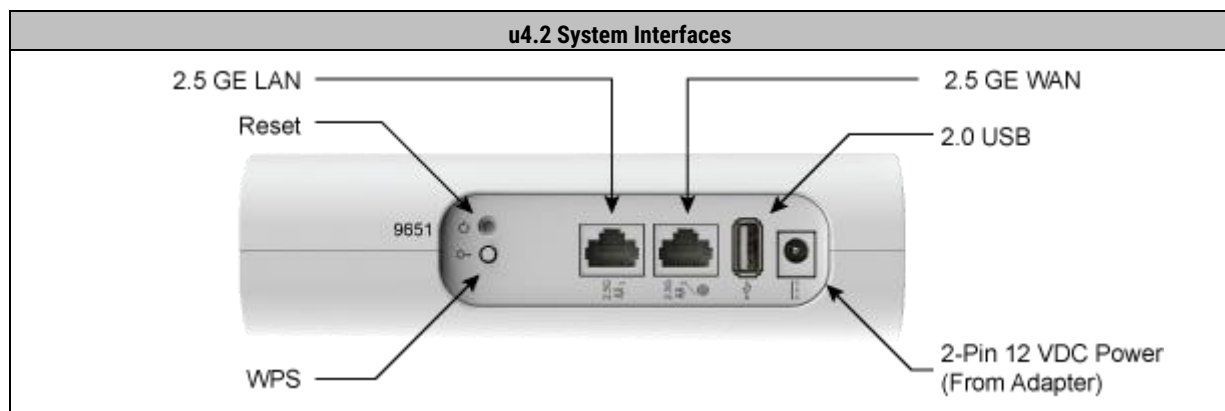
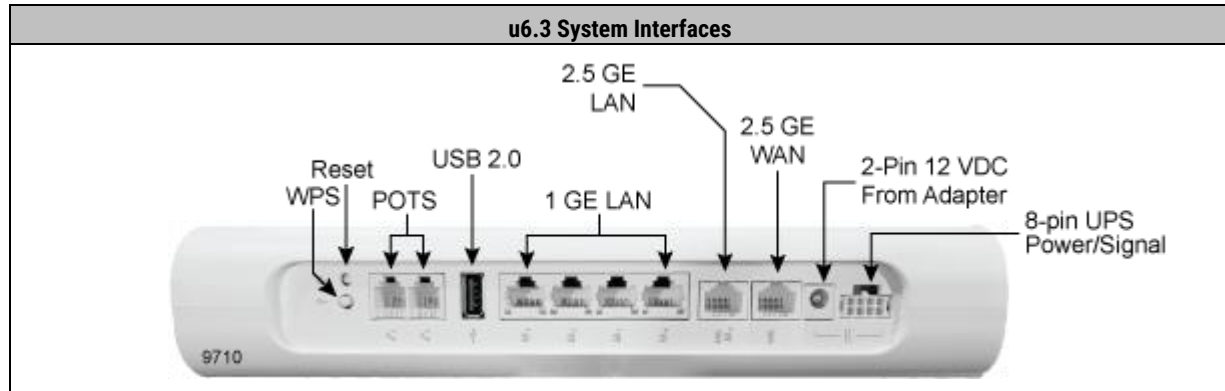


7u6/7u6m Dimensions

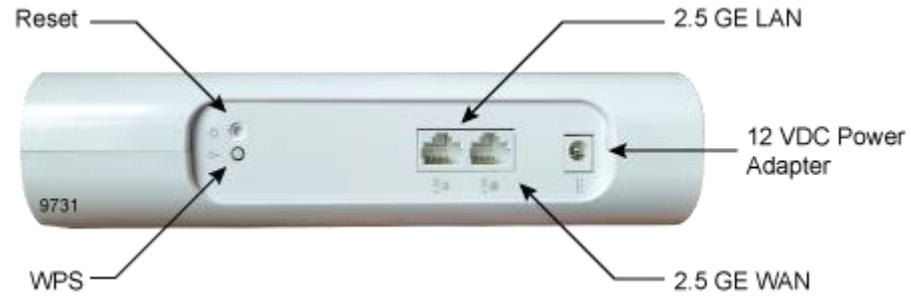


System Interfaces

The system interfaces for the GigaSpire u6.3, u4.2, and 7u6m are shown below.



7u6m Satellite Interfaces



Powering

The GigaSpire systems accept local AC power using a Calix-supplied AC/DC adapter cable. The DC end of the adapter cable has a two-pin barrel connector that attaches to the GigaSpire system. Plug the other end (AC adapter) end into any standard AC power outlet.

Note: The system must be powered using a UL Listed power source compliant with ES1, PS2/LPS, rated output 12VDC, 2.0A (u4.2), 2.5A (u6.3), or 3.0A (7u6, 7u6m), Tma = 40° C minimum, Altitude 5000m.

Note: For the u4.2, network standby mode power consumption is less than 8 Watts.

UPS power option - u6.3 only (Optional and ordered separately)

The GigaSpire u6.3 also accepts DC power from a UPS. Connect the UPS power & signal cable to the GigaSpire's 8-pin interface. Use the cable supplied with the UPS to connect its DC power supply to the GigaSpire.

A UPS is available from Calix as described below:

- 100-05565: UPS, SFU Indoor 12 V, 20 AH, 30 W, Audible Alarm (R2)

A VAC power cord (from wall to UPS) is not included with the UPS. A standard power cord is required to supply power to the UPS. These commercially available power cables are readily available in varying lengths.



Mounting Options

The GigaSpire systems ship with a multi-purpose stand that supports mounting on horizontal or vertical surfaces:

- **Horizontal surfaces** - For "desktop" orientation –free standing on a flat horizontal surface such as a desktop, shelf, or table– attach the stand to the bottom of the system via its snap-in posts, to serve as a foot. See *Installing the System on a Horizontal Surface* (on page [25](#)) for instructions.
- **Vertical surfaces** - To mount the system on a vertical surface –a wall, back of a cabinet, or back of a structured wiring enclosure– attach the stand to the side of the system to serve as a mounting bracket. See *Installing the System on a Vertical Surface* (on page [26](#)) for instructions.

Installation Considerations

Review the following guidelines before starting installation activities.

Guidelines

Follow these general guidelines and practices:

- Determine which mounting method to use at each site before beginning the installation. See *Powering Options* and *Mounting Options* for details and guidance.
- Follow all standard safety precautions when performing installation tasks.
- Keep cabling neat and secure for safety and strain relief. Use cable ties and screw clips for dressing long-run cables as needed.

User-supplied items

Bring the following materials and tools to the installation site, as needed:

Materials

- WAN link: Ethernet Cat5e or above Ethernet cable
- Mounting screws (2) for stand/bracket mount (wall-mounts only); spec: #10 (M4.8) x 1-inch length.

Tools

Bring the following tools to the installation site:

- Level
- Pencil (to mark bracket and drill hole locations; wall-mount)
- Power drill with drill and driver bits (to install mounting screws; wall-mount)

Chapter 2

Installing the GigaSpire System

This chapter describes how to install the GigaSpire system at the service 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
- Option 1: Installing the system on a horizontal surface (desktop or shelf)
- Option 2: Installing the system on a vertical surface (wall or structured wiring enclosure)
- Connecting the WAN Ethernet Link
- Connecting Wired Service Interfaces
- Connecting power
 - Connecting AC power
 - Connecting UPS power (u6.3 only)
- Activating the system

Unpacking the System

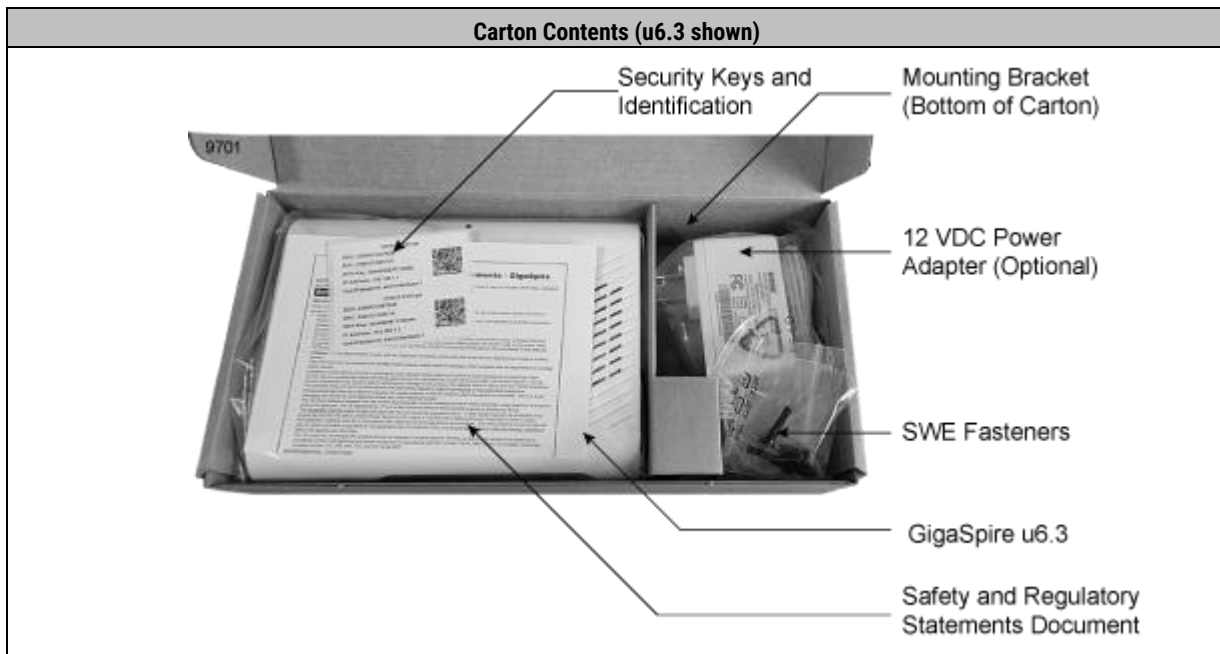
Each GigaSpire system ships in a carton containing the following items:

Qty	Description
1	GigaSpire system
1	Stand / mounting bracket*
1	Power cable with AC/DC (120VAC to 12VDC) adapter
2	Product identification labels (with default Wi-Fi SSID and RG admin user login info)
1	Package Structured Wiring Enclosure Fasteners (2 pins and 2 receptacles)
1	Safety and regulatory statements guide

***Note:** Mounting screws are not included. See Mounting Options for screw spec recommendation.

To unpack the system

1. Open the box containing the system.
2. Remove the system from the pulp tray to retrieve items packed underneath.



3. Check to ensure supplied items are present before proceeding:
 - Remove the stand/bracket and set aside for use during installation.
 - Remove the power adapter with cable and set aside for use during installation.

Selecting an Installation Location

Consider several factors when selecting an installation location for the system:

- Proximity to power:
 - **AC power:** The supplied power cable is five feet long. You must locate the system within (5 feet) reach of an AC power outlet to use standard AC power.
- Proximity to network termination point:
 - **Distance from ONT:** The system uses a wired Ethernet link to connect to the WAN. The maximum distance to the network termination device (ONT or modem) equals the maximum Ethernet cable length of 100 meters (328 feet).
- **Mounting type:** Depending on the selected mounting type (horizontal or vertical surface), select a location with a surface that can support that mounting type.
- **Location within serving area:** Environmental factors including centralized location and structural materials can affect Wi-Fi performance. Consider the factors described below.

Wi-Fi AP placement

Direct line-of-sight to the Wi-Fi access point (AP) is not essential for client signal quality, thanks to MIMO technology and an omni-directional antennae array in the AP. However, to achieve the best possible Wi-Fi coverage and performance, Calix recommends the following guidance:

- Prioritize a centralized location; the closer the AP system is to the center of the serving area, the better.
- Elevate the system as high up as practical; higher elevation helps the Wi-Fi signal clear lower/ground-level obstructions including items such as couches and furniture. For wall mounting, ensure the unit is a minimum of 5 feet (1.5m) away from any obstructions.
- The Calix best practice is to place the Wi-Fi gateway in an open area to enable Wi-Fi signal to broadcast freely with minimal 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.

Effects of Building Materials on Wi-Fi Signals	
Material	Wi-Fi Attenuation
• Wood, Drywall, Particle Board, Tile • Glass	Low
• Bricks, Cinder Block • Water	Medium
• Plaster, Stucco • Concrete	High
• Metal • Tinted or Low-E Glass (metalized)	Very High



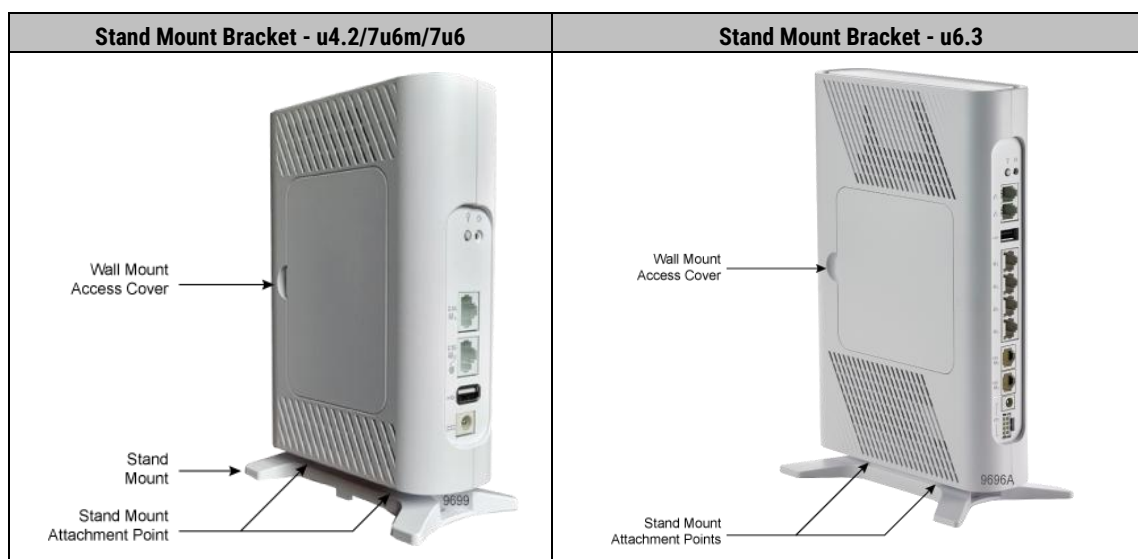
CAUTION! Use of controls or adjustments or performance of procedures other than those specified in this document may result in hazardous radiation exposure.

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.

Option 1: Installing the System on a Horizontal Surface

This topic describes how to install a GigaSpire system onto any flat horizontal surface, such as a desktop, shelf, or table.

With a "desktop" arrangement, the system's multi-purpose stand/bracket attaches to the bottom of the unit, serving as a foot for free-standing operation on a horizontal surface. The stand snaps onto the bottom of the system via a pair of mating posts, and has rubber pads underneath to reduce accidental slippage on flat surfaces.



The photo above shows the u4.2/7u6m/7u6 and u6.3 GigaSpire. The u6.3 application applies the same stand mount configuration as the u4.2 however the footprint is slightly less. See *Product Dimensions* (on page [13](#)) for specific information.

To install the system on a horizontal surface

1. Get the system and its stand/bracket from the ship kit.
2. Attach the stand to the bottom of the system:
 - a. Align the stand's (2) posts with the (2) counterpart keyhole slots on the bottom of the system.
 - b. Insert the posts into the slots at the wide end of the keyholes.
 - c. Slide the stand laterally so the posts fit snugly into the narrow ends of the keyholes.
3. Orient the system upright with its stand at the bottom to serve as a foot.
4. Set the system down on a horizontal surface at its installation location.

Note: Calix recommends locating the system within five feet of an AC power outlet to avoid the use of an extension cord.

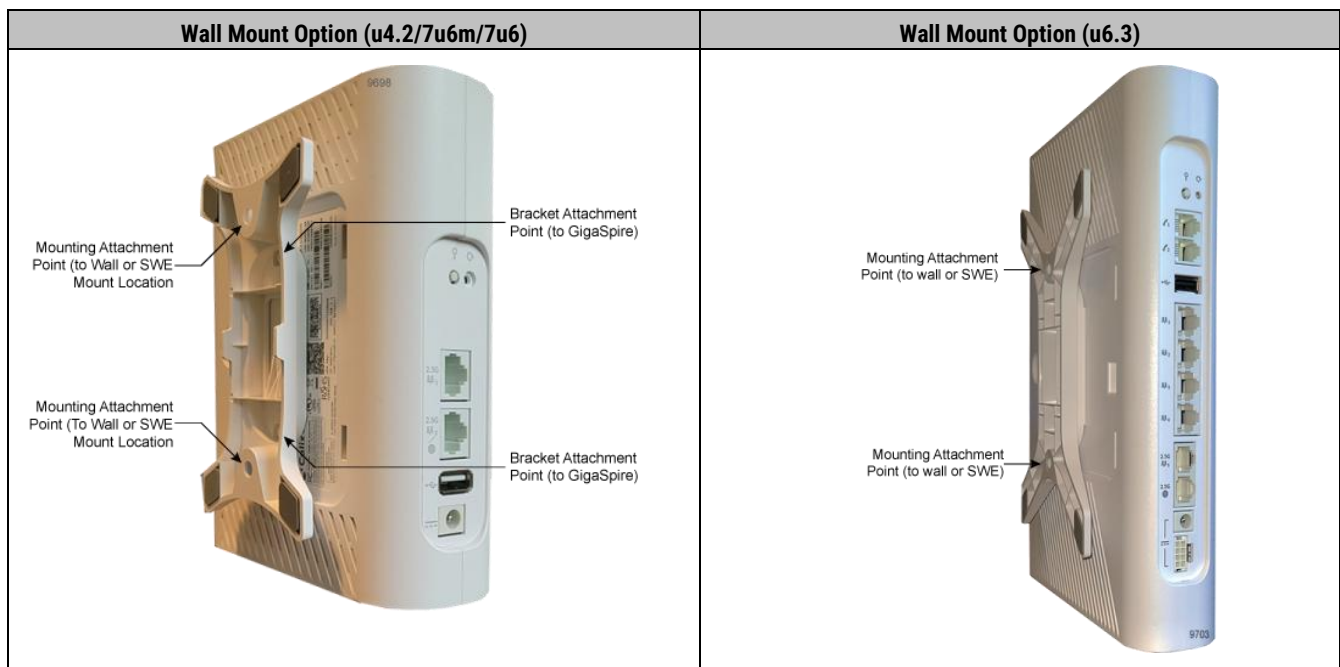
Option 2: Installing the System on a Vertical Surface

This topic describes how to install GigaSpire systems onto a flat vertical surface, such as a wall, the back of a cabinet, or inside a structured wiring enclosure (SWE). For simplicity, this topic shall refer to this installation option as simply wall-mount installation.

Note: Steps described below are interchangeable with respect to either model.

To support wall-mount installations, the system's multi-purpose stand attaches to the *side* of the unit to serve as a mounting bracket.

First, you attach the stand/bracket to the vertical surface using (2) mounting screws, and then you hang the system onto the bracket in snap-on fashion —where slots on the side of the system (located behind a removable cover panel) fit onto counterpart posts on the stand.



Guidelines

Follow these installation guidelines for wall-mount installations:

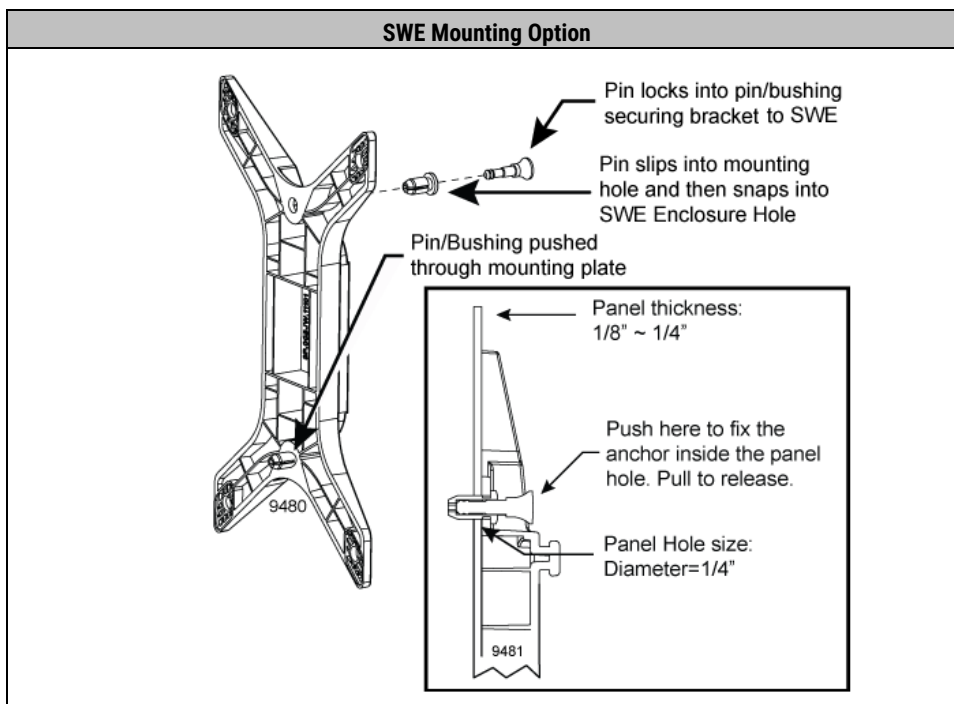
- User-supplied hardware is required to attach the stand/bracket to a wall. Mounting screws are not included. See Mounting Options for screw specifications.
- The wall-mount instructions below assume the mounting screw will be drilled into a wall stud. If a stud is not close enough, use wall anchors instead (not supplied).
- When selecting an installation location, Calix recommends locating the system within five feet of an AC power outlet to avoid needing a power extension cord.

To install the bracket onto a vertical surface (wall or SWE)

1. Get the stand/bracket from the shipping carton.
2. At the mounting location, mark the position for the bracket on the wall.
 - a. Hold the bracket against the wall at the mounting position.
 - b. Using a pencil, mark the two (2) hole locations to drill for screws.

Note: For structured wiring enclosure (SWE) installations, skip to step 4.

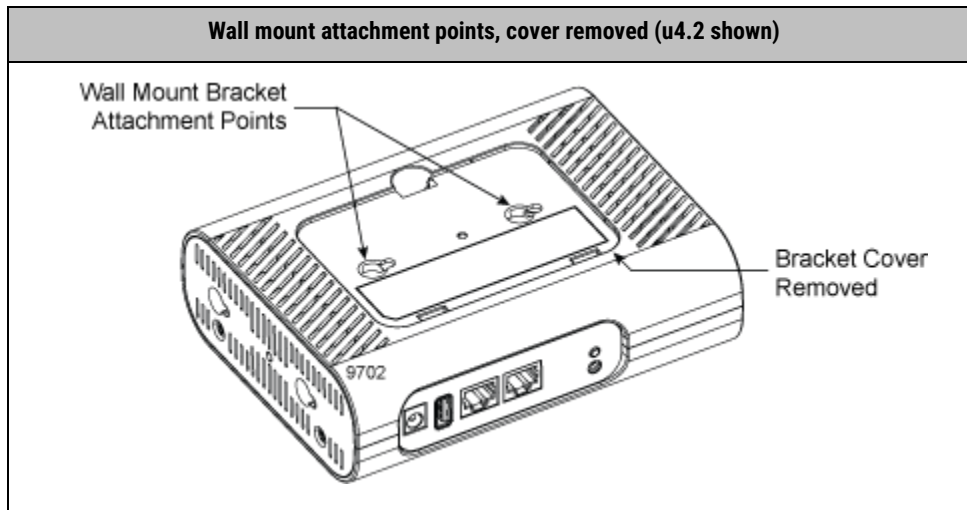
3. Drill two (2) holes into the wall at the marked locations.
4. Hold the bracket against the wall or SWE at the marked location and attach it as follows:
 - a. Attach to a wall:
 - Insert the first mounting screw into the upper of (2) holes in the bracket, and then use a screwdriver to screw it completely into the hole.
DO NOT OVER-TIGHTEN the screw or else risk cracking the plastic bracket.
 - Insert the second mounting screw into the lower of (2) holes in the bracket, and then use a screwdriver to screw it completely into the hole.
 - b. Attach to a SWE rear panel:
 - Insert the first pin/bushing into the upper of (2) holes in the bracket and push it all the way through the aligned holes in the SWE rear panel, as shown.
 - Insert the second pin/bushings into the lower of (2) holes in the bracket and push it all the way through the aligned holes in the SWE rear panel.



5. Once both screws or pin/bushing sets are installed, check the bracket to confirm it is tightly attached to the wall or SWE before proceeding to the next task below.

To install the system onto the mounting bracket

1. Get the GigaSpire system from the ship kit.
2. Remove the cover from the system's side panel to access its interior compartment.
 - a. With a finger, press on the tab to release the catch.
 - b. Pull on the tab to remove the cover.



- c. Store the cover for future use if needed.
3. Attach the unit to the mounting bracket:
 - a. Align the (2) keyhole slots on the system (located inside the compartment) with the (2) counterpart posts on the bracket.
 - b. Hang the system onto the bracket posts at the wide end of the keyholes.
 - c. Slide the system down onto the posts until the posts fit into the narrow ends of the keyholes.

User-supplied hardware

For mounting on a vertical surface, some user-supplied hardware is required. Specifically, two (2) screws are required to attach the stand (bracket) to the wall or other vertical surface, but are not included in the kit.

Calix recommends using wall mounting screws with the following spec: #10 (M4.8) x 1-inch length.

Proceed to topics [Connecting to the Network](#) and [Connecting Power](#) for instructions to connect power and network cables to the system.

Connecting the WAN Ethernet Link

The GigaSpire systems are equipped with a WAN Ethernet port for connecting to the broadband network. Follow these guidelines to connect the system to the network:

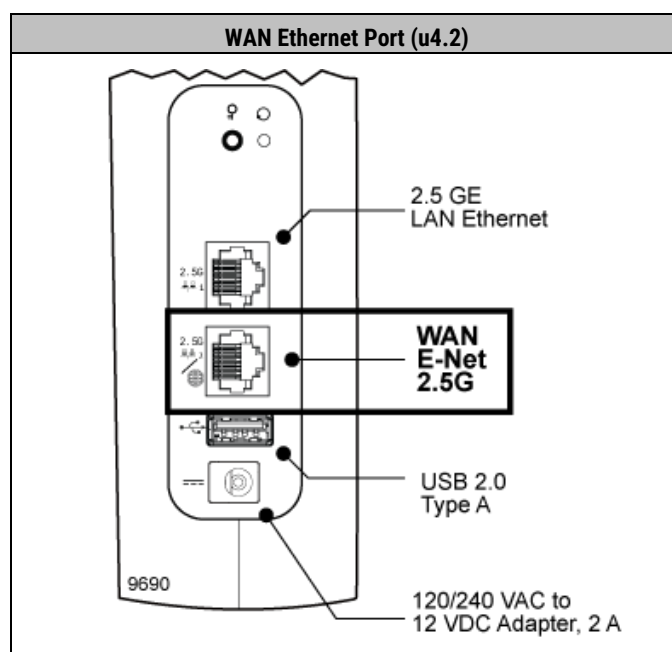
- **RG mode:** For systems that will operate in gateway (RG) mode, use a standard Ethernet data cable (not supplied) to connect the system's WAN Ethernet port to a LAN Ethernet port on the broadband service device (ONT or modem).

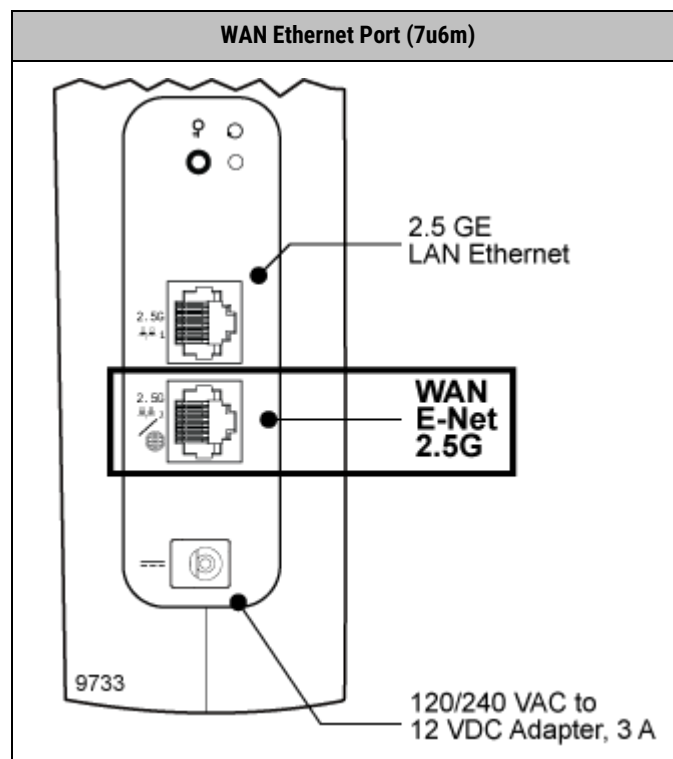
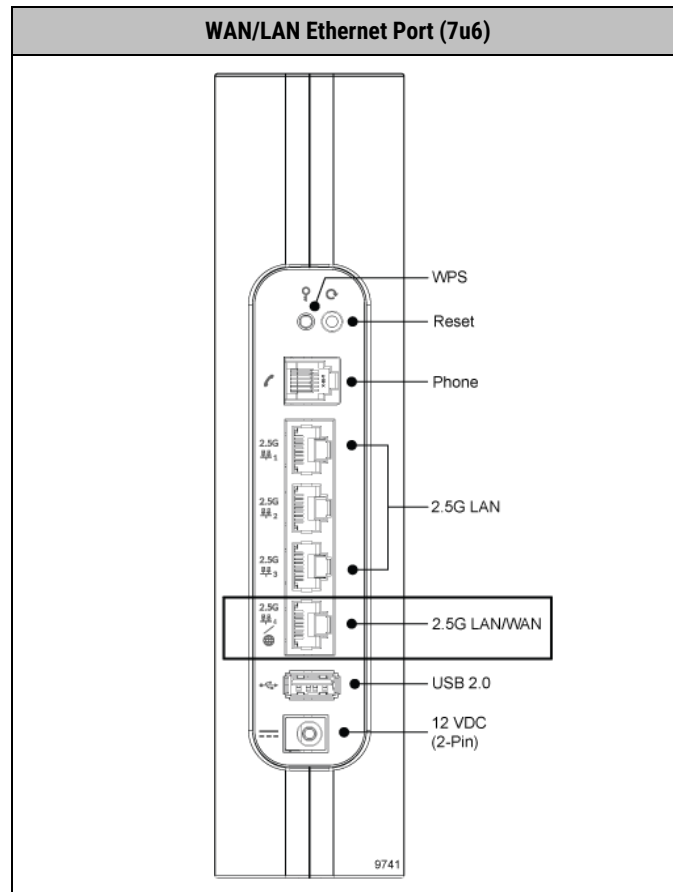
Note: To allow maximum throughput bandwidth to the gateway, Calix recommends connecting to an ONT equipped with a multi-gigabit LAN port. For example, connect to an XGS-PON ONT (most are equipped with a 10GE or 2.5GE LAN port), such as the Calix GP1101X ONT.

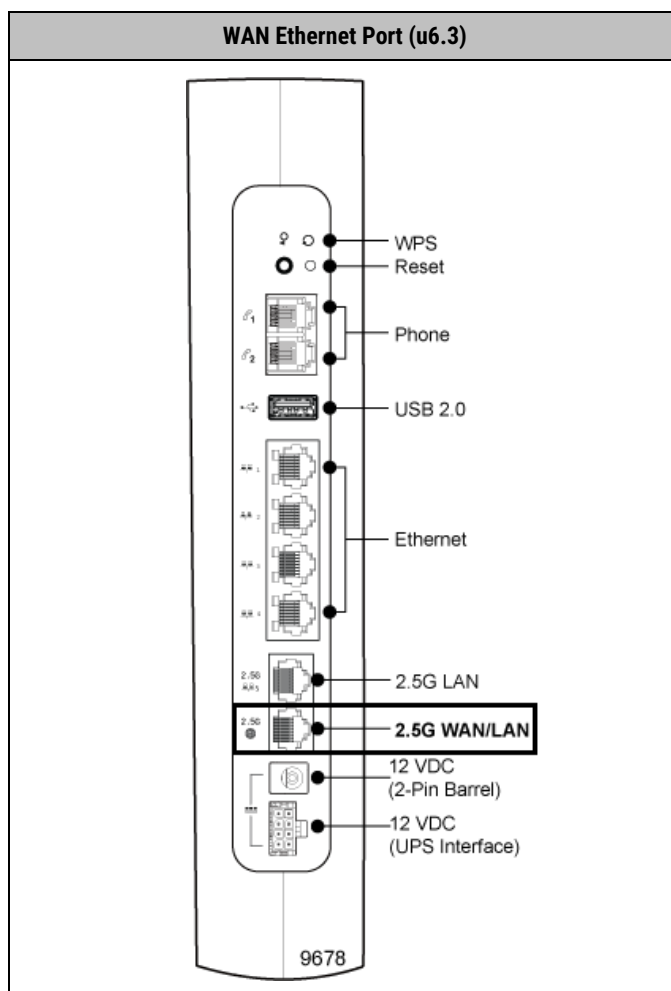
- **Satellite mode:** For systems that will operate in mesh satellite mode, you can use either a wired (Ethernet) or wireless backhaul link to connect to the RG system. Follow the instructions below only for systems that will use a wired connection to the gateway.

To connect to the network

1. Bring an Ethernet data cable (not supplied) to the GigaSpire location.
2. Connect the Ethernet cable to the system's WAN Ethernet port located on the system's interface panel.







3. Connect the Ethernet cable's other end to the upstream device:
 - For gateways, connect the uplink cable to the broadband service device's LAN Ethernet port.
 - For satellites, connect the uplink cable to an available LAN Ethernet port on the gateway system.
4. Dress, tuck, or tie back any cable slack to prevent accidental catching or snags on the cable, as needed.

Connecting Wired Services Interface

This section describes how to connect service lines to the system's LAN-side interfaces:

- The GigaSpire u6.3 is equipped with five LAN Ethernet ports (one 2.5GE port and four 1GE ports) and two POTS voice ports.
- The GigaSpire 7u6 is equipped with three 2.5GE LAN Ethernet ports and one combination 2.5GE LAN/WAN Ethernet port with a single voice port.
- The GigaSpire u4.2 and 7u6m are both equipped with one LAN Ethernet port (one 2.5GE port).

To provide wired services on the LAN, connect an Ethernet cable to the LAN ports as described below.

To connect a LAN Ethernet cable

1. Bring one or more Ethernet data cables to the GigaSpire location.
2. Connect the Ethernet cable to a LAN Ethernet port on the system's interface panel.
3. Connect the far end of the Ethernet cable to any LAN client device located on the premises.
4. Repeat steps 1-3 to connect additional Ethernet devices on the LAN, as needed.

To provide telephony voice services, connect a phone cable to the POTS port(s) as described below.

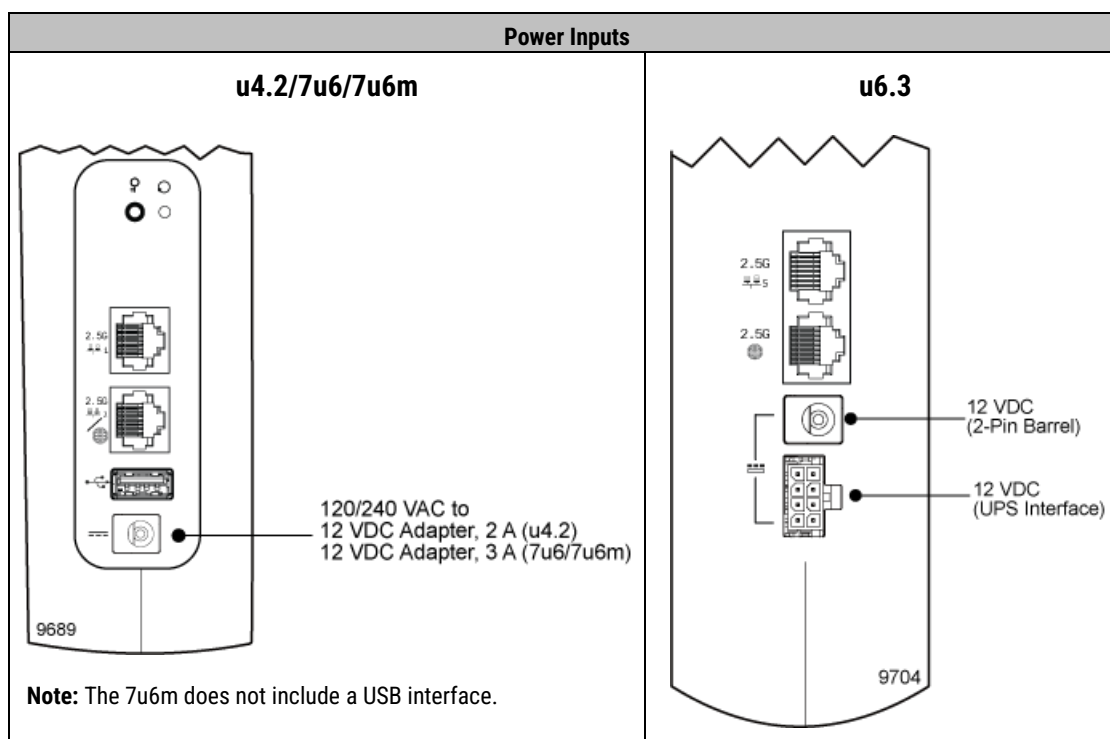
To connect a phone cable (u6.3 systems only)

1. Bring one or more phone cables to the GigaSpire location.
2. Connect the phone cable to POTS port 1 (RJ-11 connector).
3. Connect the far end of the cable to a telephony device located on the premises.
4. Repeat steps 1-3 to connect a second phone line using POTS port 2, as needed.

Connecting AC Power

Calix supplies an AC power cable (with AC/DC adapter) with each system. Connect the system to AC power as described below.

Note: GigaSpire u6.3 systems are also equipped with an 8-pin interface for connecting to an external UPS.



To connect the system to AC power

1. Get the AC power adapter cable from the installation kit.
2. Connect the power cable's device end (2-pin barrel connector) to the GigaSpire's power input jack.
3. Route the cable's other end (2-prong power adapter) to a nearby AC outlet and plug in.

Note: Indoor installations assume that grounding support for the system is provided via the power cable connected to a Ground Fault Circuit Interrupt (GFCI) outlet.

To connect power to the UPS

Note: A UPS power interface is included on the u6.3 however both AC power and UPS power cannot be connected at the same time.

- The AC power cord (used between AC wall outlet and UPS) is 8 feet long. Make sure to locate the UPS within that distance from an AC outlet.

If using an optional Uninterruptible Power Supply (UPS) for battery backup support, the UPS must be located near the GigaSpire system to ensure that its low-voltage power supply cord is long enough to reach the GigaSpire.

Depending on your UPS (sold separately), varying lengths of power cords may be included:

- The AC power cord (used between AC wall outlet and UPS) is 8 feet long. Make sure to locate the UPS within that distance from an AC outlet.
- The DC power/signal cord (used between UPS and GigaSpire) offers up to three lengths based on UPS model.
 - Connectorized power & signal cable: 8-pin (GigaCenter end) to 8-pin terminal block (UPS end) cable; 1 meter (3 foot) or 3 meter (10 foot) lengths.
 - Connectorized power & signal cable: 8-pin (GigaCenter end) to unterminated (UPS end) cable; 6 meter (20 foot) length.

Note: If using your own supplied cable, the UPS must be located less than 50 feet (15.2 meters) from the GigaSpire if using an 18 AWG Type I power cord, or less than 70 feet (21.3 meters) from the GigaSpire if using an 16 AWG Type II power cord.



WARNING! High voltage electrical and pressurized natural gas lines may be present. Make sure you identify locations of all utility connections before drilling through any surface.



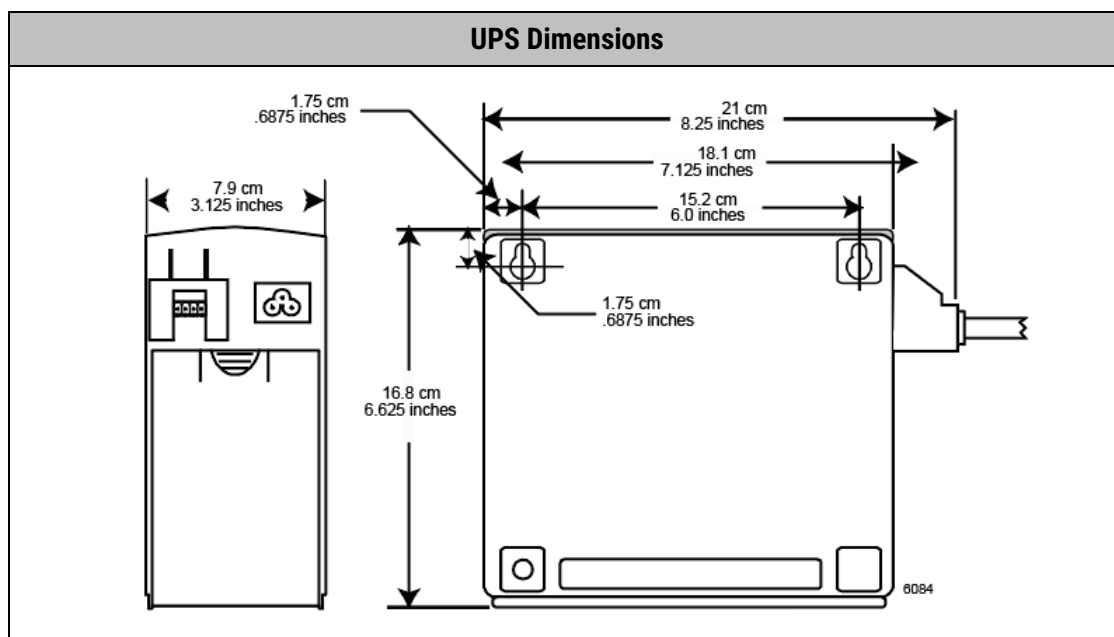
CAUTION! The UPS is designed for indoor installation and must be installed in a location with adequate airflow.

Make sure the UPS is not under water pipes which may leak or drip from condensation.

Most indoor UPS systems support a wall-mounting option. The procedure below includes instructions to install it with or without using the wall-mount option.

Installing the UPS

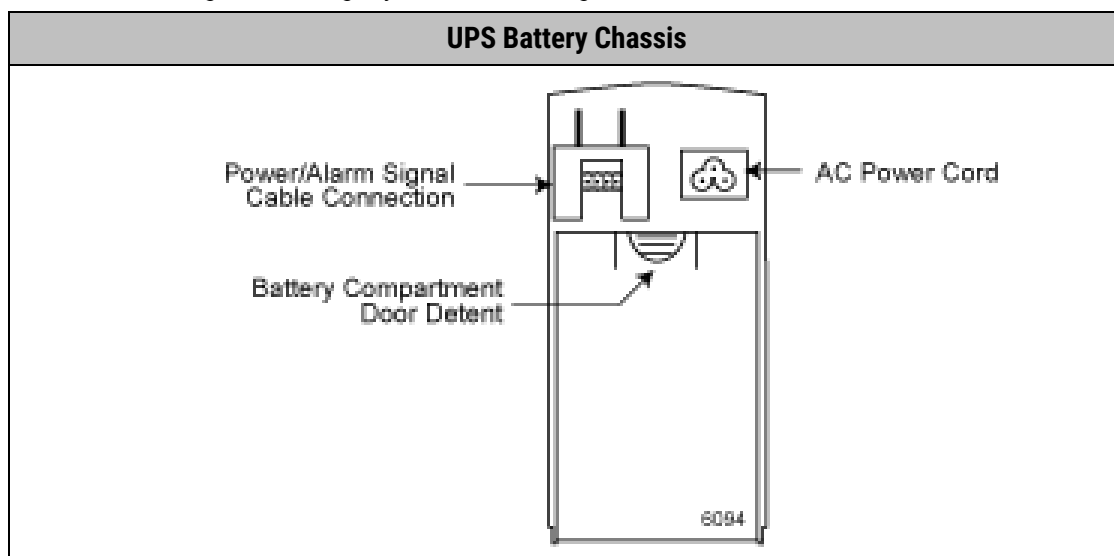
1. Unpack the UPS and associated hardware from the carton.
2. Find a suitable installation location for the UPS and then install it using one of the following options:
 - To mount the UPS onto a wall, proceed to step 3 below.
 - To set a free-standing UPS on a flat surface (floor, shelf, desktop), place the UPS on that surface and then skip to step 4 below.
3. Install two pan-head screws (not included) into a wall on which to hang the UPS:



- a. Pre-drill two mounting holes at appropriate locations per the mounting hole pattern shown above (to accept 8-32 pan-head screws, not provided).

Important: Make sure the material on which you are mounting the UPS is of sufficient strength to support its weight of 7.2 pounds (3.3 kgs).

- b. Insert a screw into each hole, leaving 3/16-inch (.48 cm) of the screw protruding from the wall.
- c. Align the key slots on the top of the UPS with the screws and slide the unit down into place.
- d. If the UPS is not snug after test fitting the mounting screws, remove the UPS and tighten the mounting screws slightly to allow for a tighter fit.



4. Unpack the battery and slide it into the UPS housing.

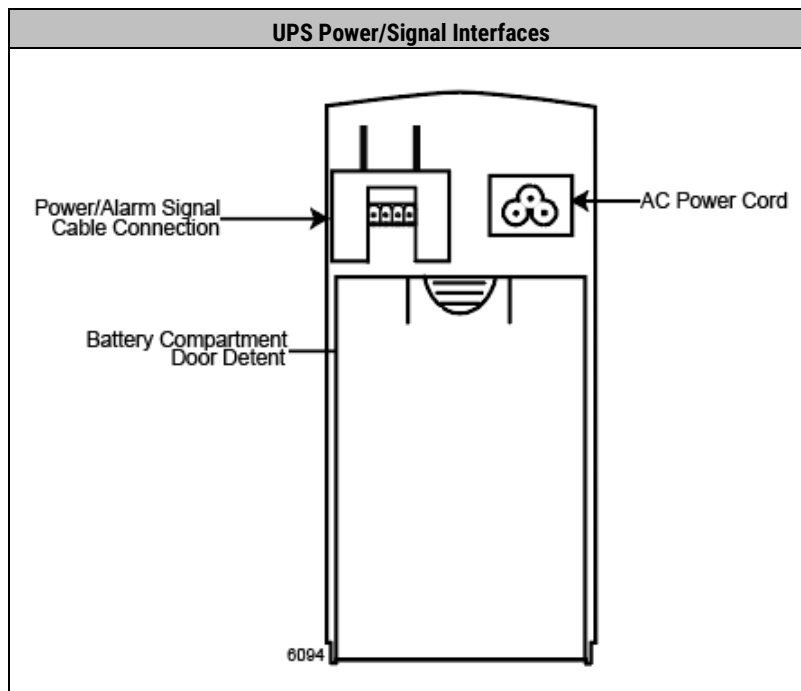
5. Attach the battery leads to the battery (red to red, black to black).

Re-install the battery cover. After the UPS is mounted with battery installed, proceed with connecting power cables:

- Connect the AC power cable to the UPS and then to an AC power outlet.
- Connect the DC power cable to the UPS and then to the GigaSpire.

To connect the UPS AC power cable

1. Get the UPS AC power cable from the UPS kit.
2. Connect the AC power cable's female end to the three-pin receptacle on the UPS rear panel.
3. Route the AC power cable's other (male) end to a nearby AC power outlet and plug it in.



To connect the low voltage power cable

1. Get the DC power cable from the UPS kit.
2. On the UPS rear panel, lift the protective housing surrounding the VDC terminal block to expose it for cabling, and then connect the cable's 7-pin connector end to the UPS VDC terminal block.
3. Route the cable's other end to the GigaSpire and connect to the 8-pin DC input connector.

Activating the System

Once the system is fully cabled, it is ready to activate and connect to the network.

To activate the system

1. If you have not done so already, apply power to the GigaSpire system to initiate activation.
 - Plug the power cable's 2-prong adapter into an AC power outlet or a UPS as appropriate.
 - For systems using a UPS for DC power: Plug the UPS AC power cable's 3-prong connector into an AC power outlet.
2. Observe as the system powers up and transitions to 'in service' status (green LED).

Next steps

Before completing the installation, verify system startup operation:

- Verify that the system's status LED shows expected 'in service' state (green) before considering the installation complete. Refer to System LED Behavior for expected behavior.
- Verify with your back office that the system checked in to Calix Cloud as applicable.
- For gateway system turn-up instructions, refer to the following related user documentation:
 - *EXOS Systems: Service Provider's Guide*
 - *Calix Deployment Cloud Help*
- For systems that will operate in mesh satellite mode, pair the satellite system to the gateway system using the WPS button on each unit. Refer to the *EXOS Systems: Service Provider's Guide* for instructions.



Appendix A

Appendix

This appendix provides general reference information about the systems.

Topics Covered

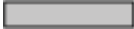
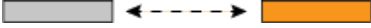
This appendix covers the following topics:

- *System LED behavior - RG Mode* (on page [40](#))
- *System LED behavior - Mesh Mode* (on page [41](#))
- *System specifications* (on page [43](#))
- *Agency listings* (on page [45](#))

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	- Power is OFF - the unit has not been turned on, - or - There is no power to the unit - or - UPS battery has been discharged and can no longer power the unit (for compatible models only)	 Solid Gray (Off)
	Boot-up, SW Upgrade in Progress	- Unit is in the process of being booted up or service/software is being upgraded - Flashing amber every 1 second	 Off and Amber (1000 msec cycle)
	Boot-up Failure	Unit boot up failed.	 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	System is "In Service" and connected to the internet.	 Solid Green
Service Failure, no internet	No Internet	No service, no internet	 Solid Red

System LED Behavior - Mesh 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	- For Satellite/Mesh mode, upon pressing the WPS button a single time (3+ seconds), WPS is enabled. - The LED bar begins to flash 1 second green/off and continues to do so for up to 120 seconds. - 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.	 Green and Off (1000 msec)
	Mesh Connected	Meshing is complete, is in service, and connected to the internet.	 Solid Green

Mode	Status	Description - Mesh Mode	Color
Mesh	Gateway Not Found	- 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. - LED bar remains red for another 60 seconds, then revert to the No Internet failure status. - If pairing is accomplished, LED bar will change to reflect Gateway status.	 Solid Red

System Specifications

Hardware specifications for the GigaSpire systems follow:

Dimensions		
Width	u4.2	2.0 in (5.1 cm); 3.7 in (9.4 cm) w/stand
	u6.3	
	7u6/7u6m	
Height	u4.2	6.6 in (25.7 cm) without stand; 7.2 in (27.3 cm) w/stand
	u6.3	10.1 in (25.6 cm); 10.75 in (27.3 cm) in with stand
	7u6/7u6m	8.9 in (22.6 cm); 9.6 in (24.4 cm) w/stand
Depth	u4.2	5.1 in (13.0 cm)
	u6.3	7.0 in (17.8 cm)
	7u6/7u6m	6.3 in (16 cm)
Power		
AC / DC	u4.2	Input voltage: 12 VDC (nominal) External Power Adapter (1.5 m): 12 VDC, 2A 2-pin barrel connector Note: Network standby mode power consumption is less than 8 Watts.
	u6.3	Input voltage: 12 VDC (nominal) External Power Adapter (1.5 m): 12 VDC, 2.5A 2-pin barrel connector 8-pin power connector, UPS power/signal
	7u6/7u6m	Input voltage: 12 VDC (nominal) External Power Adapter (1.5 m): 12 VDC, 3A 2-pin barrel connector
Network Interfaces		
WAN	u4.2, u6.3, 7u6, 7u6m	One (1) 2.5GE (100/1000/2500 Base-T) port, RJ-45
LAN	u4.2, 7u6m	One (1) 2.5GE (100/1000/2500 Base-T) port, RJ-45
	7u6	Three (3) 2.5GE (100/1000/2500 Base-T) port, RJ-45
	u6.3	One (1) 2.5GE (100/1000/2500 Base-T) port, plus four (4) 1GE (100/1000 Base-T) ports, RJ-45
Wireless	u4.2	2.4 GHz 802.11 b/g/n/ac/ax 5 GHz 802.11 a/n/ac/ax Dual band internal, 4x4 streams (2X2 @ 2.4GHz, 2x2 @ 5GHz, simultaneous) 2x2 UL/DL MU-MIMO, Explicit high-power, dynamic beamforming

Network Interfaces		
Wireless	7u6/7u6m	2.4 GHz 802.11 b/g/n/ac/ax/be, 2x2 5 GHz 802.11 a/n/ac/ax/be, 2x2 6 GHz 802.11be, 2x2 Tri-band internal, simultaneous
	u6.3	2.4GHz, 802.11b/g/n/ac/ax 5GHz, 802.11a/n/ac/ax Dual band internal, 6x6 stream (2X2 @ 2.4GHz, 4x4 @ 5GHz, simultaneous) 4x4 UL/DL MU-MIMO, Explicit high-power, dynamic beamforming
Additional Interfaces	u4.2	One (1) USB 2.0 Type A One (1) WPS push-button actuator One (1) reset button
	7u6	One (1) WPS push-button actuator One (1) reset button One (1) USB 2.0 Type A (One (1) VoIP port
	7u6m	One (1) WPS push-button actuator One (1) reset button
	u6.3	One (1) USB 2.0 Type A One (1) WPS push-button actuator One (1) reset button Two (2) VoIP ports
Environmental		
Operating temperature		Indoor ambient temperature: 0 to 40 degrees C (32 to 104 degrees F)
Operating and storage relative humidity		10 to 90 % and 5 to 95% non-condensing respectively
Certification and Compliance		
Emissions		FCC Part 15 Class B, ICES-003 Class B, CISPR-22
Safety		UL 62368 and UL 1697 approved

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.

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 or more 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 radio/TV technician for help..

FCC CAUTION

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

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.

6PP + 6ID

- FCC regulations restrict the operation of this device to indoor use only.
- This device is prohibited from being operated on oil platforms, cars, trains, boats, and aircraft, except it can be operated in large aircraft while flying above 10,000 feet in the 5.925-6.425 GHz band.
- Transmitters in the 5.925-7.125 GHz band are prohibited from operating to control or communicate with unmanned aircraft systems.

5G B1

This device is restricted to indoor use.

Hazardous Materials

There are no hazardous materials identified for the GigaSpire systems.

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	EN 300 328 (pending)
CAN ICES-003 Class B	CSA C22.2 No. 62368-1	EN 301 893 (pending)
ANSI C63.4	IEC 62368-1	EN 301 489-1 (pending)
FCC Part 15.247	ITU-T K21	EN 301 489-17 (pending)
FCC Part 15.203	ITU-T K44	EN 55032 Class B (pending)
FCC Part 15.207	EN 62368-1 (pending)	EN 61000-3-2 (pending)
FCC Part 15.209	IC: 4009A-GS2029E (u4.2) IC: 4009A-GS5229XX (u6.3)	EN 61000-3-3
4009A-GM2038	EN 62311	EN 50581
RSS 102	CE / RED, RoHS, WEEE, Energy	EN55032 (pending)
RSS 247	Telcordia GR-63	EN 50564
FCC Part 15.407	Telcordia-GR-1089	CISPR 32 Class B
NEC (National Electrical Code)	Wi-Fi Alliance Certified 802.11ax (u6.3)	IEEE: 802.3, 802.3ab, 802.3u, 802.3bz, 802.1p, 802.1Q
Telcordia GR-909	 (u4.2/u6.3 only)	CISPR-22
DFS Certification - u6.3		

Radiated Emissions

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