



ONECELL[®] Hardware Installation Guide

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Document revision history

The following section lists documentation changes in *ONECELL[®] Hardware Installation Guide* (M0305AN).

Revision Draft 02 (August 22, 2022)

- Added n77C content to [Table A-2](#) on page A-4
- Added [Figure A-1](#) on page A-8
- Replaced [Figure A-2](#) on page A-9

Revision Draft 01 (June 20, 2022)

- Added RP5200i procedures
 - [Chapter 4, RP5200i installation](#)
 - [Replacing RP5200i Radio Points](#) on page D-16
 - [Replacing RP5200i Radio Modules](#) on page D-71

About this document

This document provides the procedures for installing and configuring the Baseband Controller and Radio Points.

Audience

This document is written for computer hardware installers and administrators, network architects and business planners who are responsible for the planning and design of the CommScope ONECELL deployment environment.

Purpose

This guide provides the information necessary for installing the ONECELL hardware in the operator's network.

What you need to know

The reader should have a basic understanding of:

- Data networks
- LTE technology
- General telecommunications practices

Customer documentation

The following table lists available documents in the ONECELL documentation suite.

Table 1. Customer documentation

| Title | Contents |
|--|--|
| <i>ONECELL[®] Network Planning Guide, v6.5 (M0306AN)</i> | Describes main components of the ONECELL system; including its hardware components, how to engineer an in-building system and best practices for deployment. |
| <i>ONECELL[®] Central Cloud Installation Guide, v6.5 (M0306AU)</i> | Describes installation of Central Cloud over StarlingX. |
| <i>ONECELL[®] Service Management and Orchestration Administration Guide, v6.5 (M0306AV)</i> | Describes administering the Central and Edge Clouds over StarlingX and its components. |
| <i>ONECELL[®] Troubleshooting Systems Guide, v6.5 (M0306AT)</i> | Covers common troubleshooting scenarios in deployed devices and troubleshooting methods. |
| <i>ONECELL[®] 5G OM and KPI Reference, v6.5 (M0306AX)</i> | Describes the operational measurements and key performance indicators for ONECELL 5G devices. |
| <i>ONECELL[®] 5G Device Alarm Reference, v6.5 (M0306AR)</i> | Includes ONECELL 5G device alarm information. |
| <i>ONECELL[®] Feature Guide, v6.5 (M0306AM)</i> | Contains a description of anchor features for the current and previous releases, and a system overview; including CommScope- and vendor-provided components. |
| <i>ONECELL[®] LTE Administration (M0306AP)</i> | Describes how to operate, maintain, and manage ONECELL LTE devices using the Baseband Controller's Web UI. |
| <i>ONECELL[®] LTE OM and KPI Reference (M0306AQ)</i> | Describes the operational measurements and key performance indicators for ONECELL LTE devices. |
| <i>ONECELL[®] LTE Device Alarm Reference (M0306AY)</i> | Includes ONECELL LTE device alarm information. |
| <i>ONECELL[®] Hardware Installation Guide (M0305AN)</i> | Includes detailed installation instructions for Baseband Controller, RP2000 series and RP5100 series hardware. |

Conventions

This guide uses the following text conventions, as applicable.

Table 2. Conventions

| Convention | Description |
|---------------------------|---|
| Syntax symbols | |
| < > | Enclose a required parameter or set of parameters. For example: >band-class <class> <class> is a required parameter. |
| [] | Enclose an optional parameter or set of parameters. For example: >activate image <version> [reboot] [reboot] is an optional parameter. |
| | Separates items on a list of parameters, only one of which can be used. For example: >channel-included <yes no> A valid command is: >channel-included yes |
| Font usage | |
| Bold input font | Indicates text that must be entered exactly as shown. For example: Enter ping 192.23.10.12 . |
| <i>Italic input font</i> | Indicates a variable parameter for which you must provide an actual value. For example: >authentication key <aukey> <aukey> is a variable parameter. A valid command is: >authentication key 9782503000 |
| Plain output font | Indicates system output in a command line or system-generated file. For example: IP address 192.23.10.12 is alive. |
| <i>Italic output font</i> | Indicates a variable in system output in a command line or system-generated file. For example: Installation of release <release> is complete. |

Table 2. Conventions

| Convention | Description |
|--------------------------|--|
| <i>Plain italic font</i> | Indicates file names, directory paths, book titles, chapter titles, and user accounts. |
| Bold font | Indicates text that appears on screen exactly as shown, for example, names of screens, names of buttons, items on menus, and items on pull down lists. |
| blue text | Indicates a hypertext link. |
| Other conventions | |
| > | Indicates graphical user interface (GUI) menu path. For example: Select Edit > Add Network to open the Add Network screen. |

Notes, cautions, and warnings



NOTE

Notes provide additional information about the subject text.



CAUTION

Cautions indicate that procedures, if performed incorrectly, can cause equipment damage or data loss.



WARNING

Warnings indicate that procedures, if performed incorrectly, can harm you.

Part I: Overview and preparation

Chapter 1 CommScope ONECELL® overview

Chapter 2 Preparing to install the ONECELL system

CommScope ONECELL[®] overview

This chapter contains a high level overview of the ONECELL deployment and the ONECELL components installed in the ONECELL system.

| | |
|---|---------------------|
| Overview | 1-2 |
| CommScope ONECELL system | 1-2 |
| ONECELL hardware components | 1-3 |

Overview

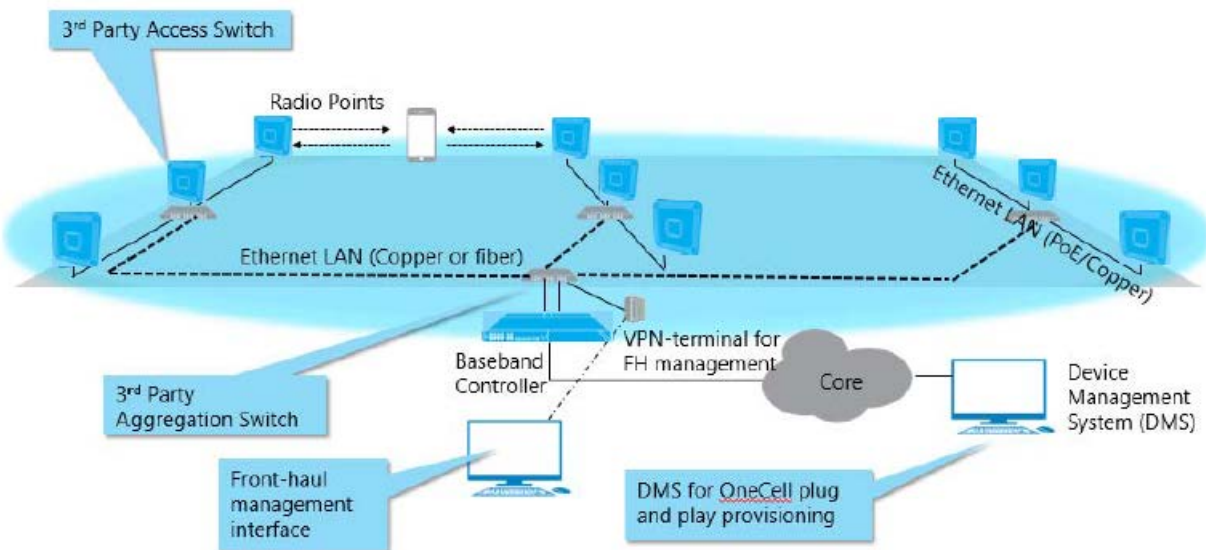
ONECELL is a revolutionary wireless system that can deliver the ultimate in wireless performance.

- It eliminates cell borders and handovers
- It can cover a large area with consistent user experience without any significant interference
- It can take advantage of multiple distributed radio points to deliver a stronger signal on both the downlink and the uplink
- It can deliver greater capacity through distributed (multi-user and single-user) MIMO and Coordinated Multipoint (CoMP)
- It has the flexibility to neutralize macro interference in co-channel small cell deployments
- It can be used to deliver unprecedented levels of capacity to hot spot areas by deploying radio points with overlapping coverage and enabling multi- user MIMO

In addition to these important benefits in user experience and data capacity, ONECELL provides superior economics and investment protection, ease of deployment and support for multi-operator deployments.

CommScope ONECELL system

ONECELL is an in-building, enterprise solution for LTE that provides an in-building consistent signal. It operates as a wireless network with a single cell, called a Baseband Controller, over distributed Radio Points. Network operators benefit from the ONECELL because they reduce the load on their infrastructure.

Figure 1-1. ONECELL solution

ONECELL hardware components

The ONECELL hardware consists of the following components:

- Baseband Controller
 - Baseband Controller Chassis
 - Baseband Controller Module
 - Power/Fan Unit (PFU)

Baseband Controller physical ports

The following ports are on the front panel of the Baseband Controller Module. [Table 1-1](#) shows the port assignments. In addition, there is a connector used for the GPS antenna cable.



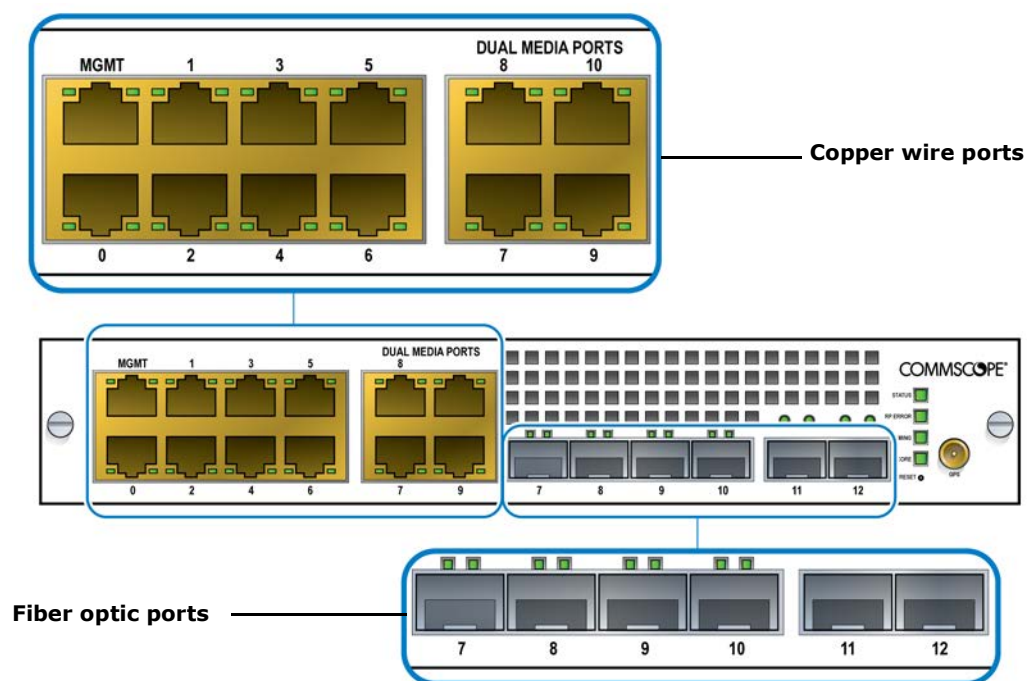
NOTE

For more detailed BC port information, see *ONECELL® Network Planning Guide, v6.5 (M0306AN)*.

Table 1-1. Baseband Controller physical port assignments

| Port Assignment | Network | Port Speed | Media Type | Description |
|-----------------|--------------------------|------------|------------------------|---|
| MGMT | Local Management | 1 Gbps | RJ45 | External Interface to access the WebGUI on the Baseband Controller. |
| 0 | Not used | 1 Gbps | RJ45 | Not used |
| 1-6 | IQ Data | 1 Gbps | RJ45 | Fronthaul IQ Data Traffic between the Baseband Controller and Radio Points via an Ethernet switch on copper (RJ45) port. |
| 7 | Boundary Clock | 1 Gbps | Dual Media RJ45 or SFP | Boundary Clock Input of IEEE 1588 PTP Timing signal via dual media port. |
| 8 | IPsec | 1 Gbps | Dual Media RJ45 or SFP | Backhaul Traffic (S1 and OAM Interfaces) via dual media port. VLAN tags are configurable in Dual IPsec mode to separate different traffic streams on the same port. |
| 9 | X2 and Redundancy | 1 Gbps | Dual Media RJ45 or SFP | Fronthaul Traffic for X2 and Redundancy Cluster data via dual media port. |
| 10 | RP Management and Timing | 1 Gbps | Dual Media RJ45 or SFP | Fronthaul Traffic for IEEE 1588 PTP timing and SOAP/XML control data via dual media port. Timing and OAM data traffic between Baseband Controller and Radio Points through an Ethernet switch(s) |
| 11 | IQ Data | 10 Gbps | SFP+ | Fronthaul IQ Data Traffic between the Baseband Controller and Radio Points via Ethernet switch on Fiber (SFP) port. |
| 12 | Not used | 10 Gbps | SFP+ | Not used |

Figure 1-2. Baseband Controller ports



Preparing to install the ONECELL system

This section has the steps to complete before starting the ONECELL installation.

| | |
|--|---------------------|
| Overview | 2-2 |
| Before installing the ONECELL components | 2-2 |

Overview

This document describes the ONECELL installation and includes:

- [Chapter 3, Baseband Controller installation](#)
- [Chapter 5, RP5100i installation](#)
- [Chapter 6, RP5100r installation](#)
- [Chapter 7, RP2000 Installation](#)
- [Chapter 8, RP2100 Installation](#)

Before installing the ONECELL components

Before installing the ONECELL components, the system integrator must plan the network for the topology that will be deployed. See *ONECELL[®] Network Planning Guide*, v6.5 (M0306AN).

CommScope recommends that cables and switches be in place before installing the ONECELL components. See [Appendix E, Cable installation and power separation guidelines](#) for more information.

Commissioning the ONECELL network

To bring your ONECELL system up, you'll need to commission the system by configuring it. The commissioning procedures are dependent on the site installation. Contact your CommScope representative for your commissioning procedures.

Part II: ONECELL component installation

Chapter 3 Baseband Controller installation

Chapter 5 RP5100i installation

Chapter 6 RP5100r installation

Chapter 7 RP2000 Installation

Chapter 8 RP2100 Installation

Baseband Controller installation

This chapter contains the Baseband Controller installation procedures, including chassis installation into a rack, Baseband Controller Module and Power/Fan Unit installation into the Baseband Controller Chassis and the cables required for a basic installation.

| | |
|--|---------------------|
| Preparing for Baseband Controller installation | 3-2 |
| Installing the Baseband Controller into a rack | 3-2 |

Preparing for Baseband Controller installation

Open the shipping box. It should have the components for one complete Baseband Controller Module:

- Baseband Controller Chassis – including four mounting screws
- Baseband Controller Module
- Power/Fan Unit (PFU)

The Baseband Controller is 1U high. Be sure there is enough room for the Baseband Controller in the rack.



NOTE

If you are installing a ONECELL system with GPS timing, you will need a coaxial cable with an SMA-type male connector to the Baseband Controller. For information on RF gain requirements, see *ONECELL® Network Planning Guide*, v6.5 (M0306AN).

Installing the Baseband Controller into a rack

The Baseband Controller can be installed in a 19-inch or 600mm rack. The Baseband Controller Chassis package contains two kits: one with 19-inch brackets and one with 600mm brackets.



CAUTION

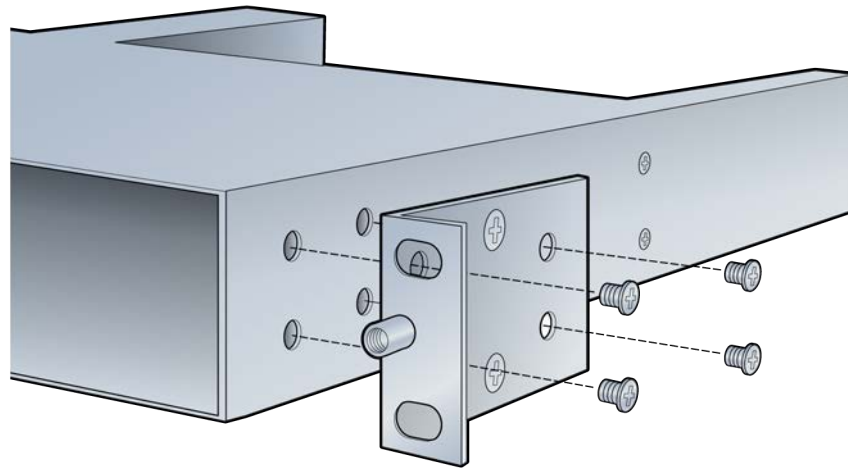
The Baseband Controller, when mounted, must be in the horizontal position. No other orientations are allowed.



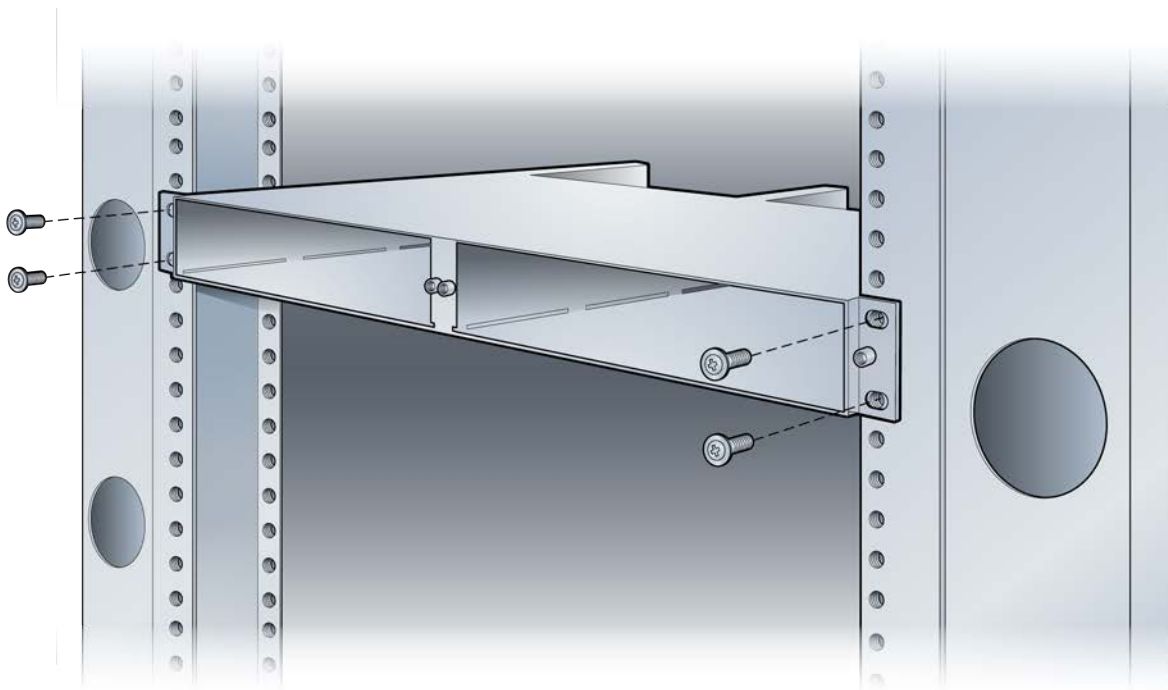
NOTE

The chassis requires four screws to secure it into the rack.

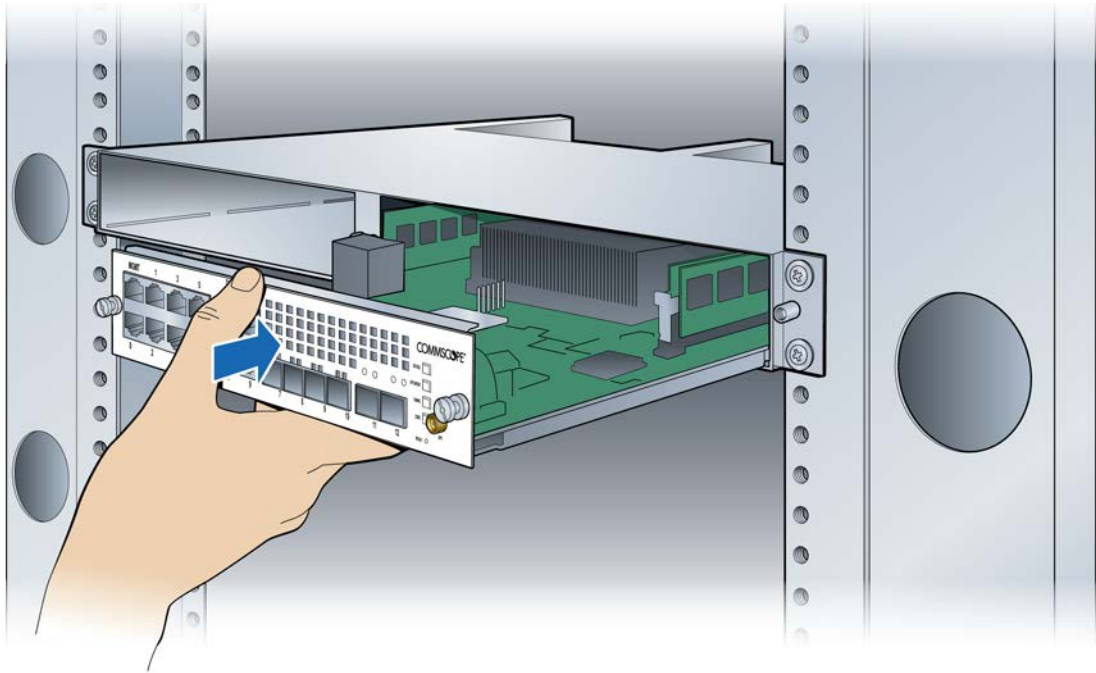
- 1 Select the 19-inch or 600mm bracket kit according to the size of the rack. Attach the brackets to the Baseband Controller Chassis



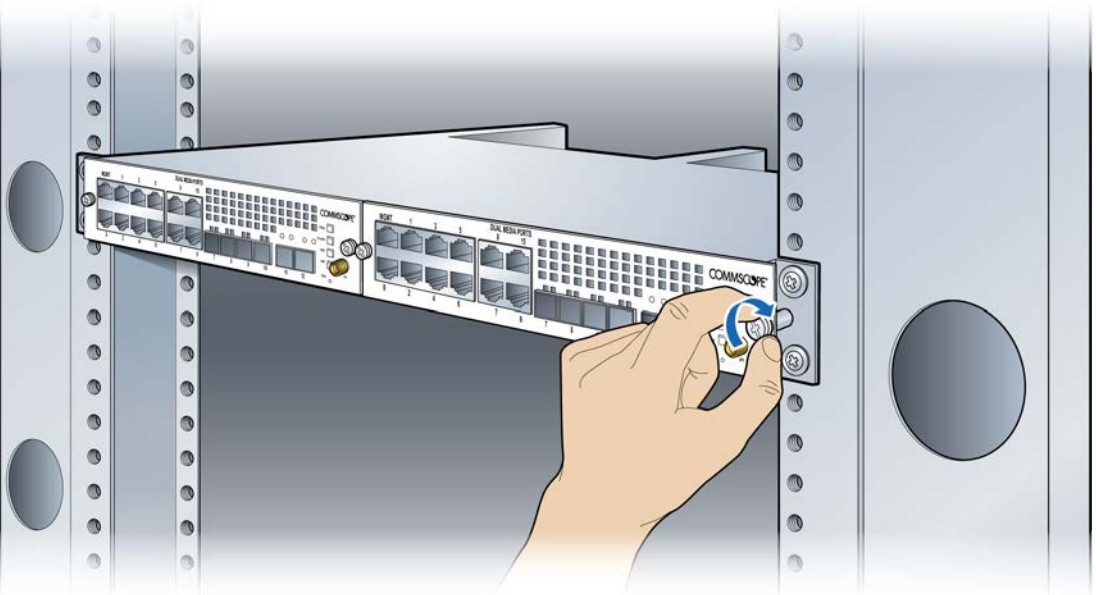
- 2 Slide the chassis into the rack.
- 3 Line up the holes in the chassis ears to the holes in the rack.
- 4 Secure the chassis with the screws.



- 5** Carefully slide the BC into the front of the chassis.



- 6** Secure the BC by tightening the front panel screws.

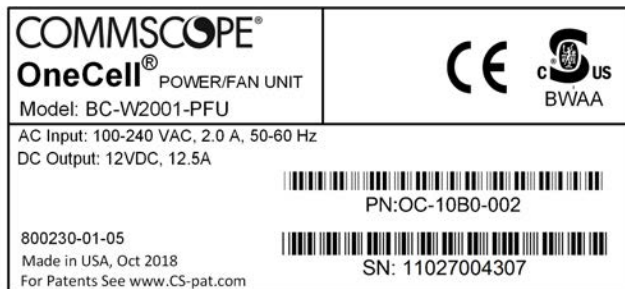


- 7 In the back of the rack, carefully slide the PFU into the back of the chassis.

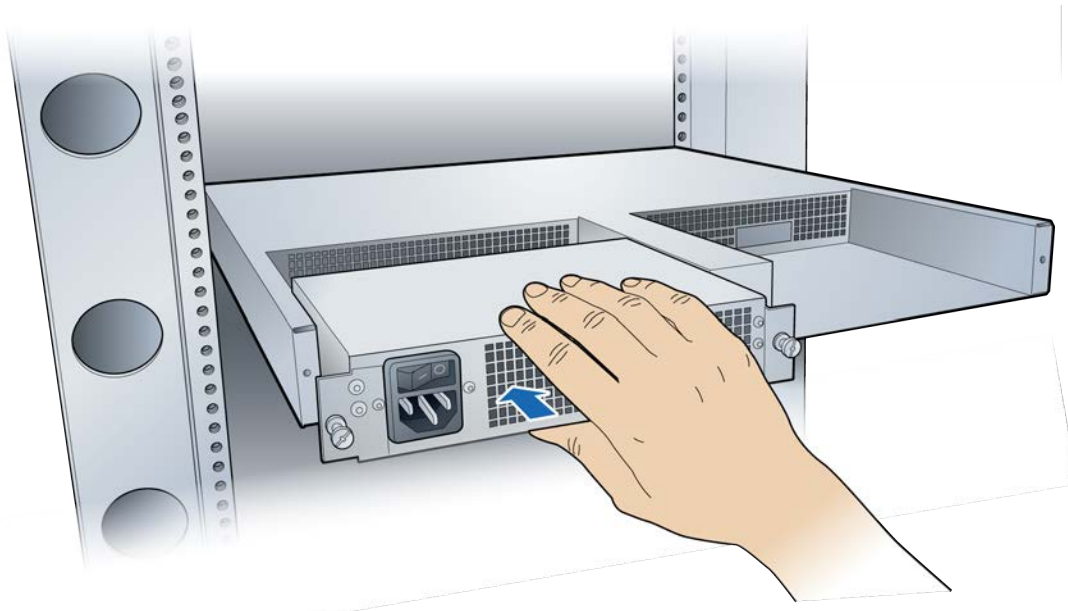


The PFU has a fan hazard. A label is affixed to the top of the PFU indicating the hazard.

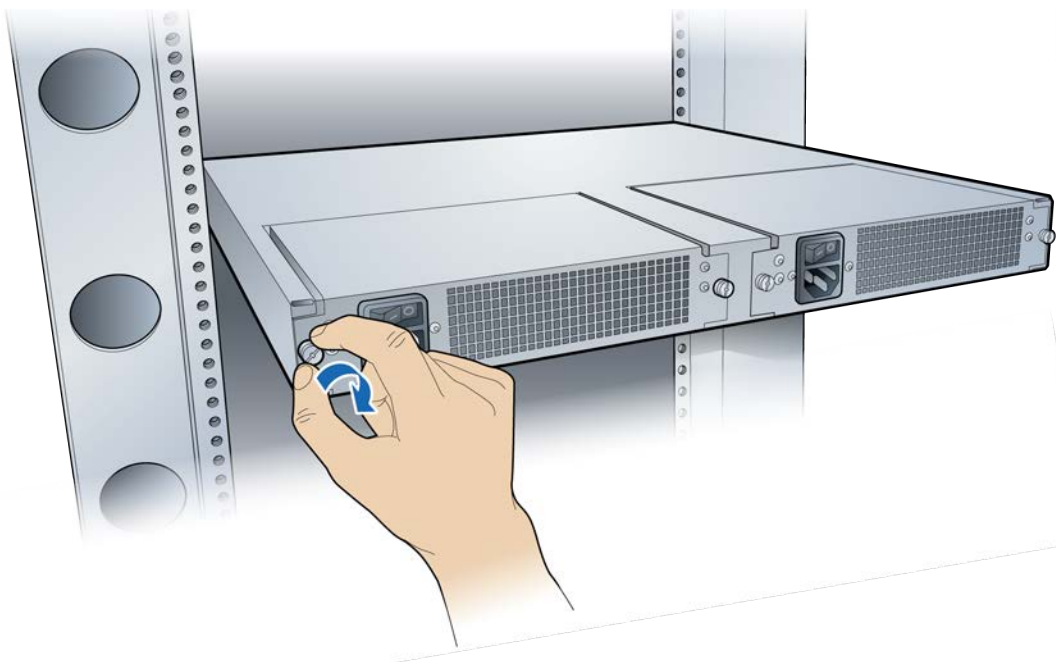
Figure 3-1. Fan label



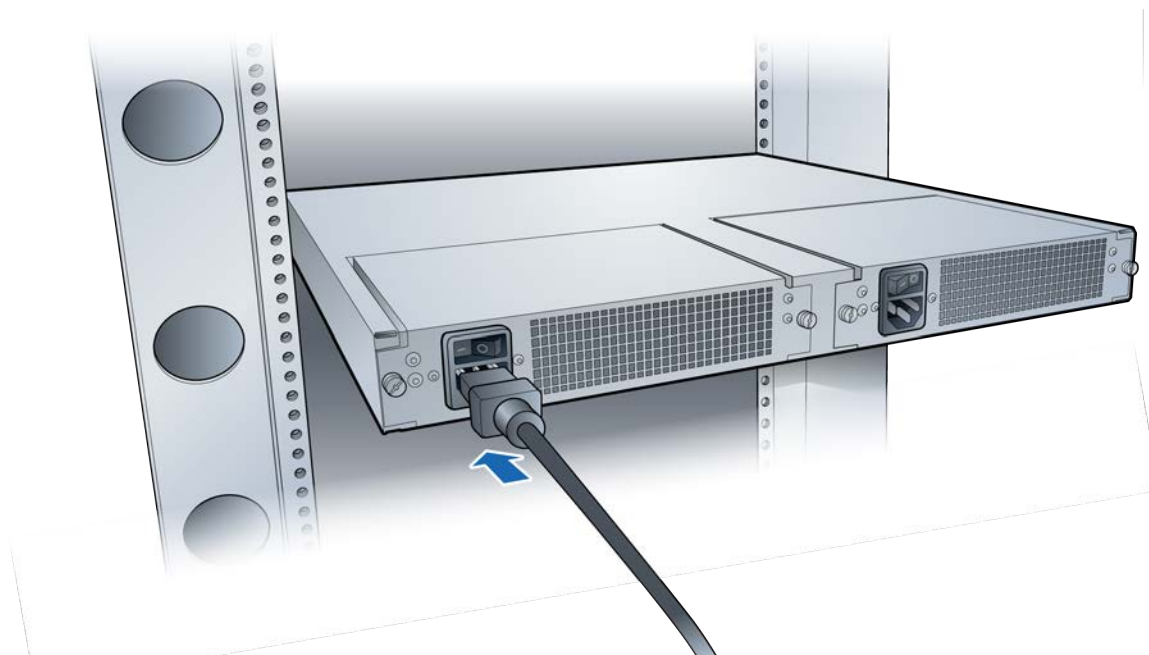
NOTE: The connectors on the PFU should fit easily into the connector on the BC. Do not force the PFU into the chassis.



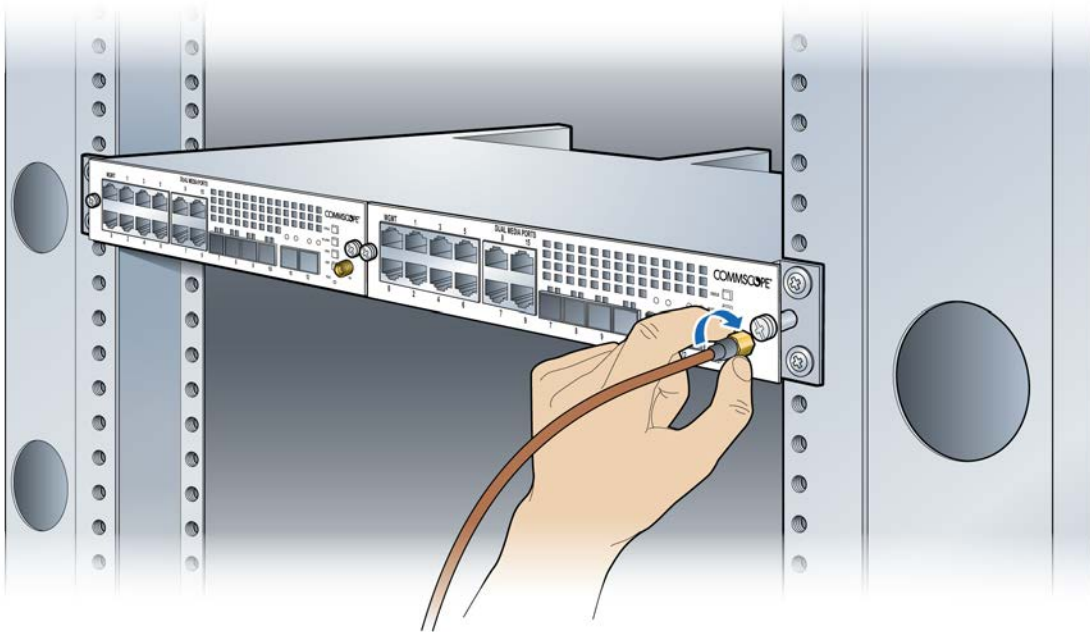
- 8** Secure the PFU by tightening the thumb screws.



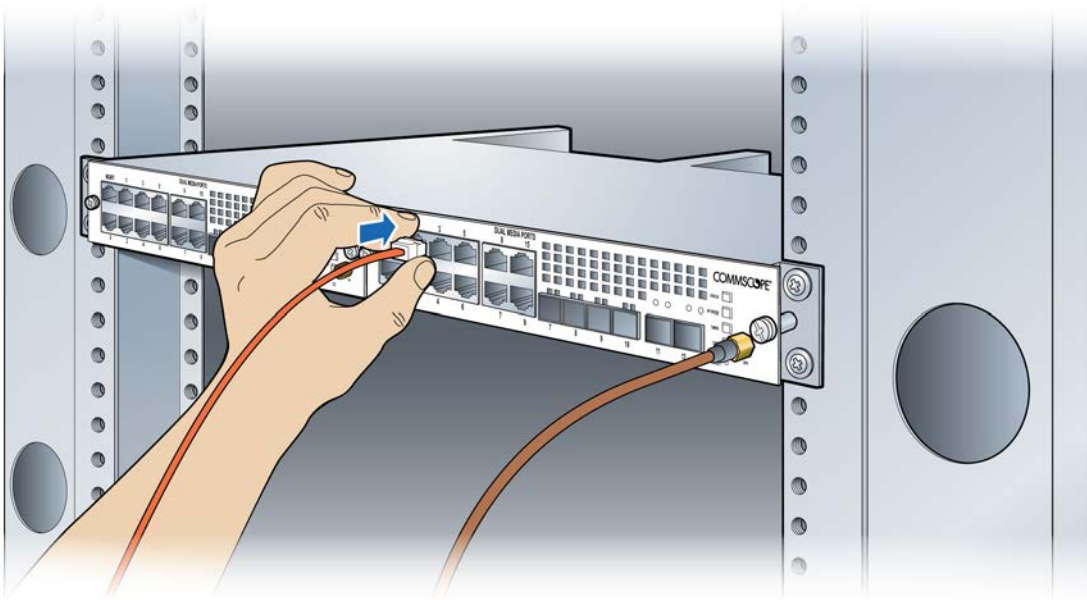
- 9** Connect the power cord to the PFU.



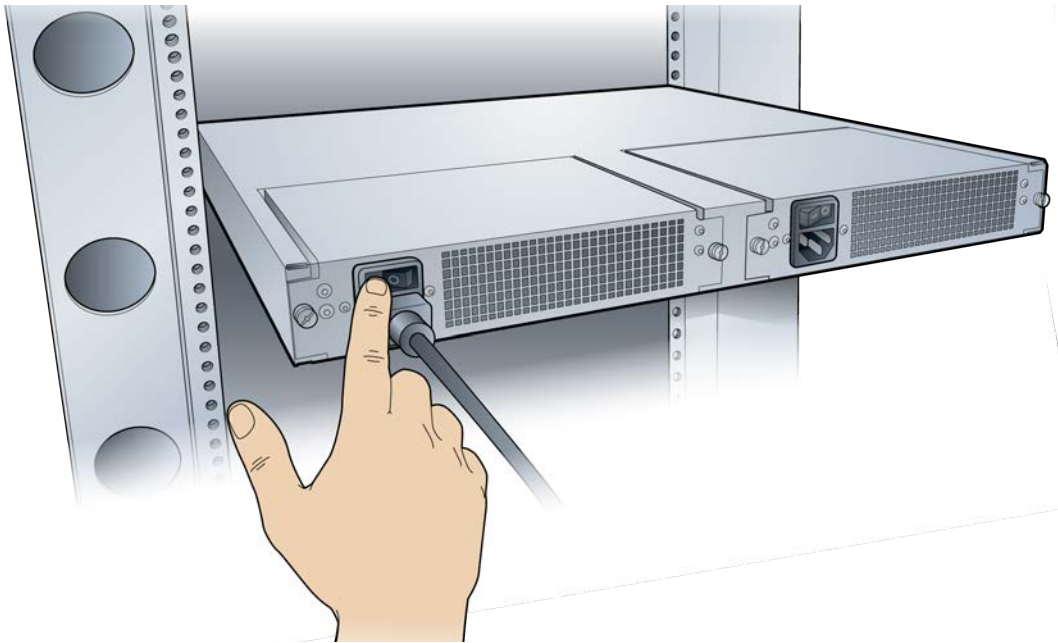
- 10** On the Baseband Controller Module's front panel, connect the GPS antenna cable.



- 11** Connect the Ethernet or fiber optic cable to the appropriate port.



12 On the back of the Baseband Controller, turn on the power.



The LEDs on the front panel will be solid green, when the power is on. If none are on, check your power connection. If the LED pattern is other than all green, see [Baseband Controller LED patterns](#) on page B-2.

RP5200i installation

This chapter describes installing RP5200i Radio Points on ceiling tiles, above ceiling tiles, on poles and in a flown configuration.

| | |
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| RP5200i installation overview | 4-2 |
| Ceiling mount | 4-3 |
| Wall mount | 4-12 |
| Flown Mount | 4-23 |
| Pole mount | 4-29 |

RP5200i installation overview

The RP5200i is a Radio Point for indoor ONECELL solutions.



NOTE

Once the Radio Point is installed and powered on, it may take up to 20 minutes for the frequency to stabilize and lock.



NOTE

The **PRIMARY** port is the data and power connection; the **SECONDARY** port is for power only. For more information, see *ONECELL[®] Network Planning Guide*, v6.5 (M0306AN).

The RP5200i mounting options are:

- [Ceiling mount](#)
- [Wall mount](#)
- [Flown mount installation](#)

Ceiling mount

Mounting the Radio Point (RP) above or on the ceiling tile requires the following hardware provided by CommScope, shown in [Figure 4-1](#) and [Figure 4-2](#).

| | |
|---|--|
| 1 | 4" octagon box, 1-1/2" deep with 1/2" side cutouts |
| 2 | RP plate and 4 screws |
| 3 | Mounting plate and 2 screws |
| 4 | 1 Red and 1 Blue RJ45 jacks |
| 5 | 1 Red Primary cable and 1 Blue secondary cable |
| 6 | Drop rail, clamp and 2 screws |

Figure 4-1. CommScope ceiling mounting kit

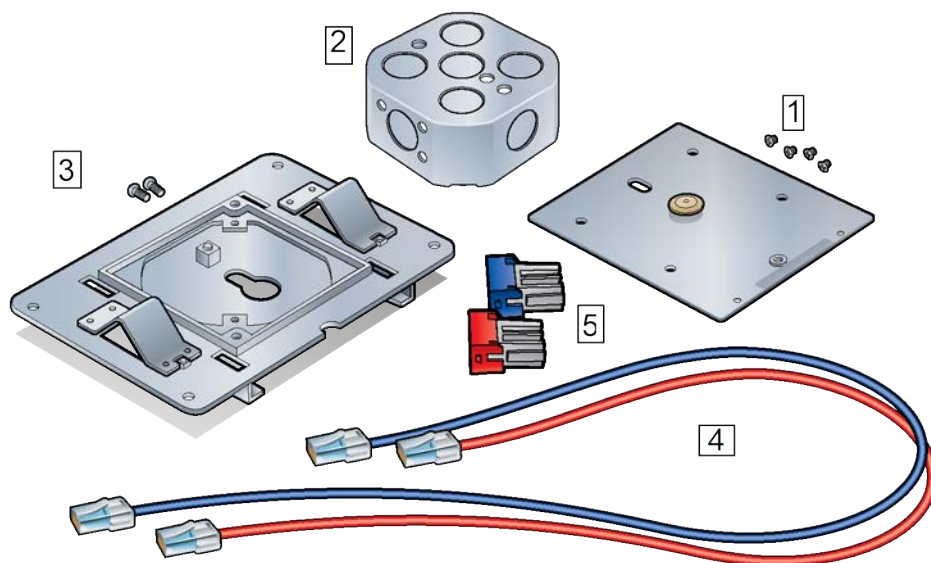
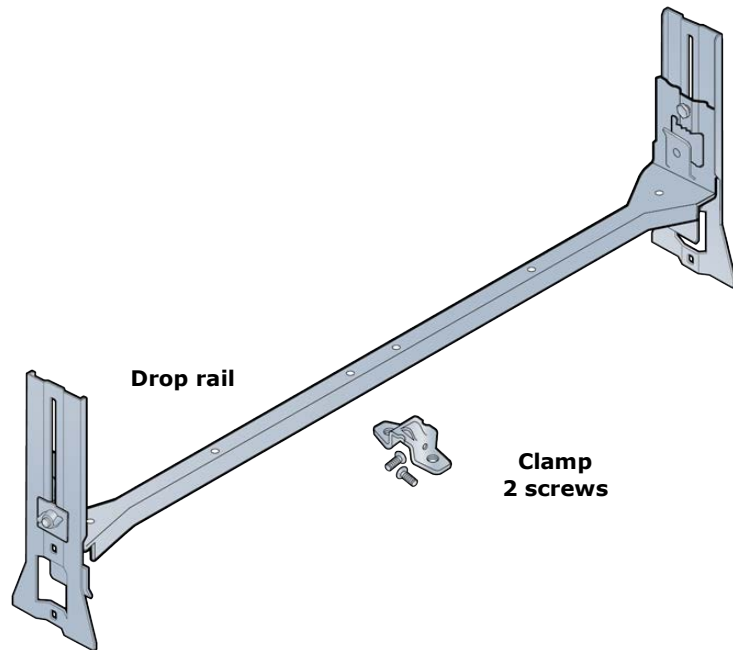
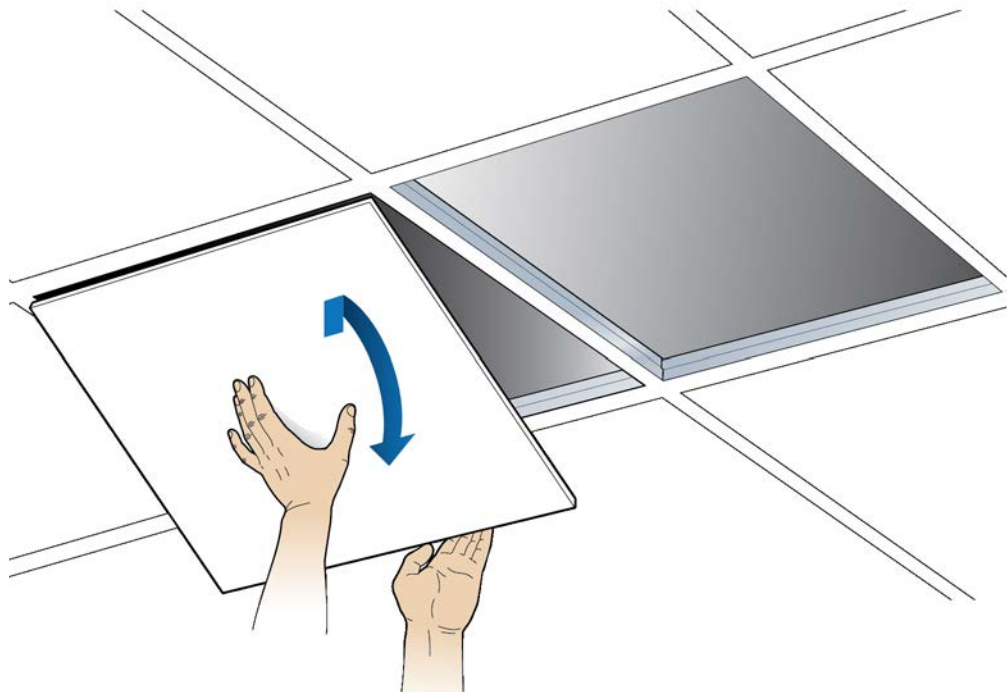


Figure 4-2. Drop rail

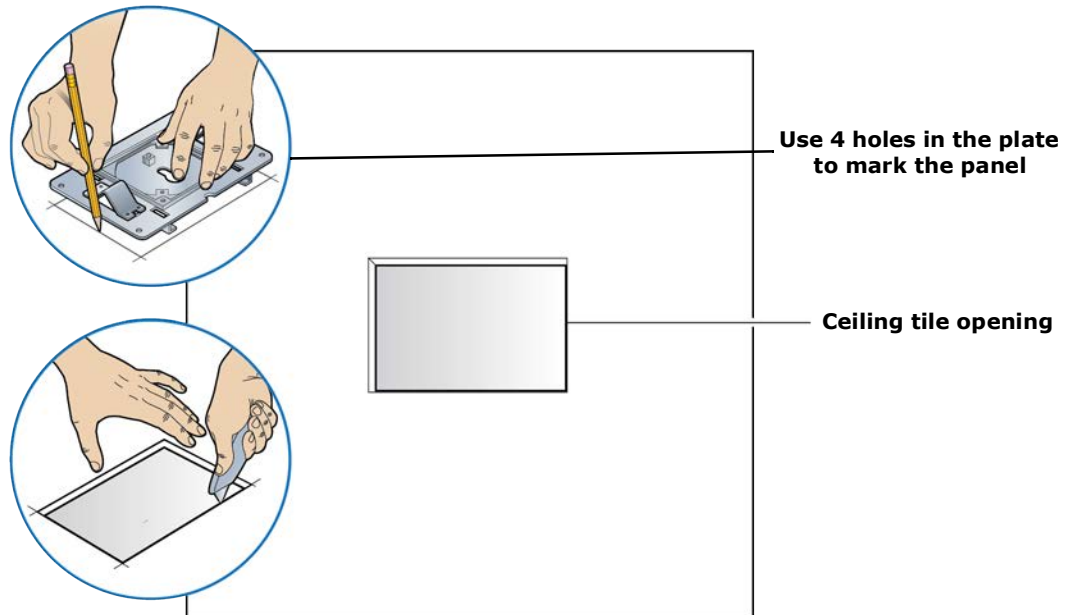


Mounting the Radio Point on the ceiling tile

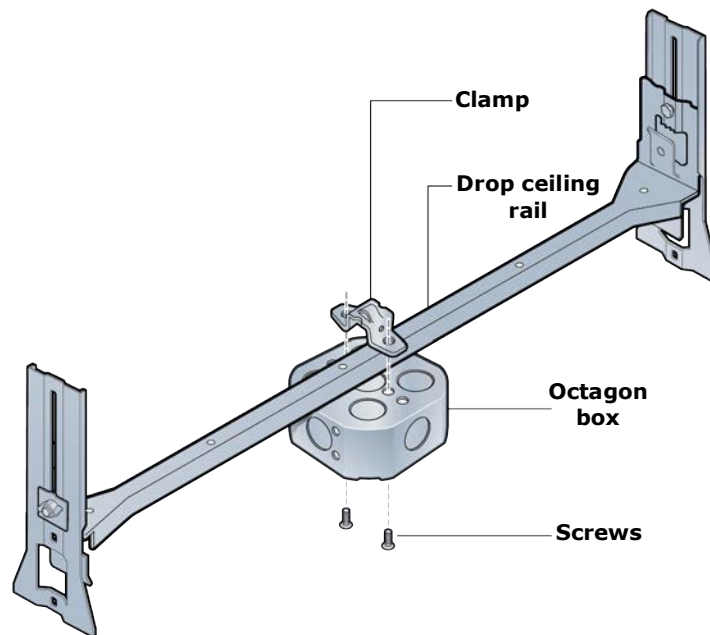
- 1 Remove two ceiling tiles from the overhead.



- 2** Place the RP plate on the tile and mark the four holes on the tile.
- 3** Cut the opening according to the dimensions in the following drawing.

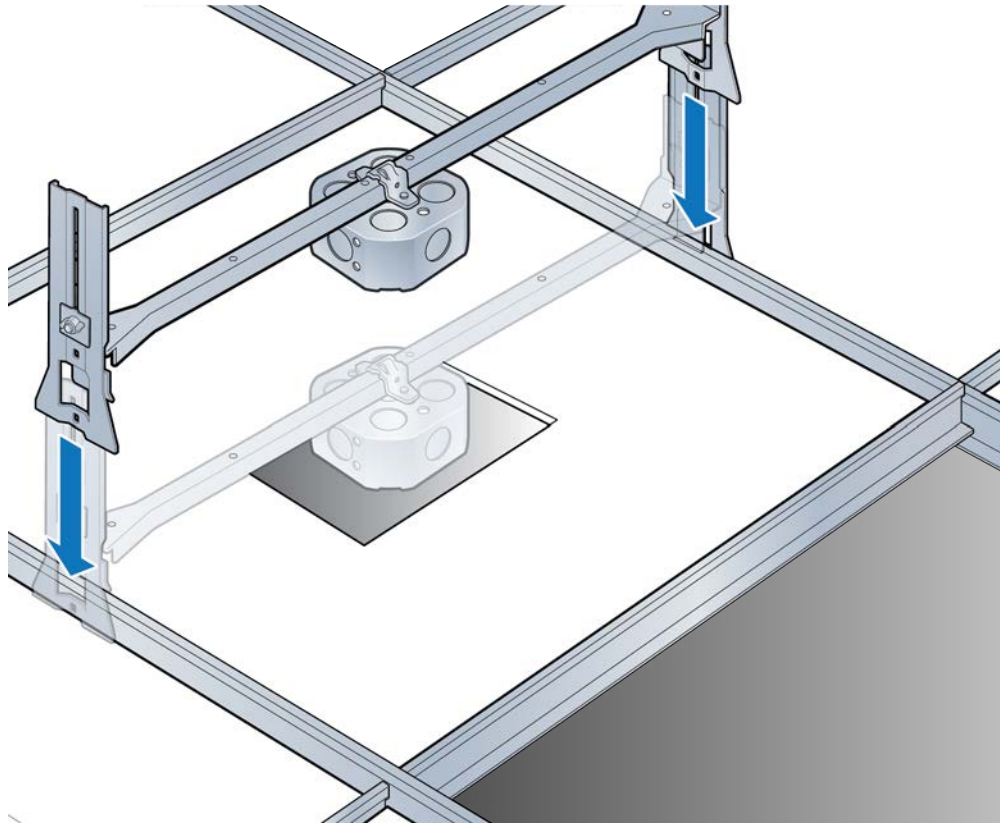


- 4** Attach the octagon box to the ceiling bracket using a clamp and screw.

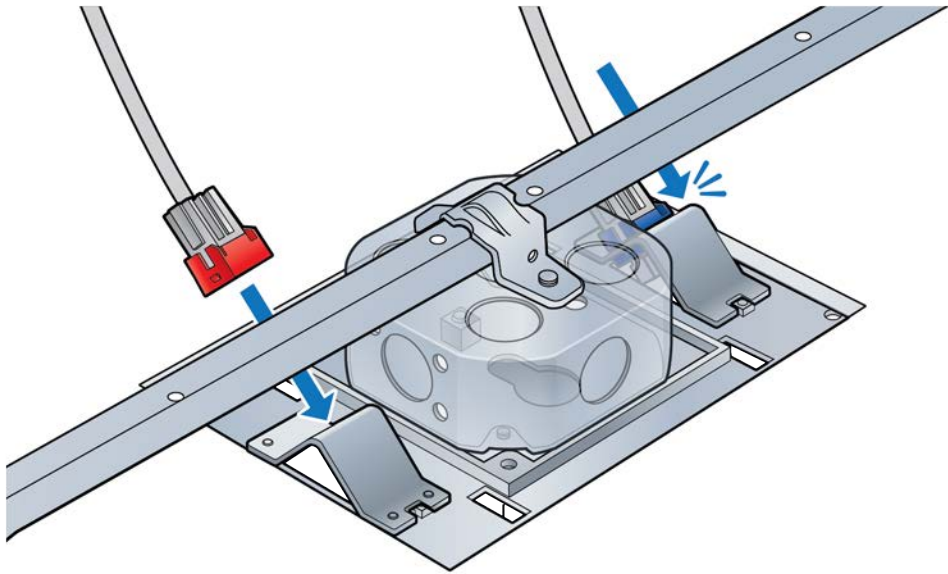


- 5** Replace the ceiling tile with the cutout.

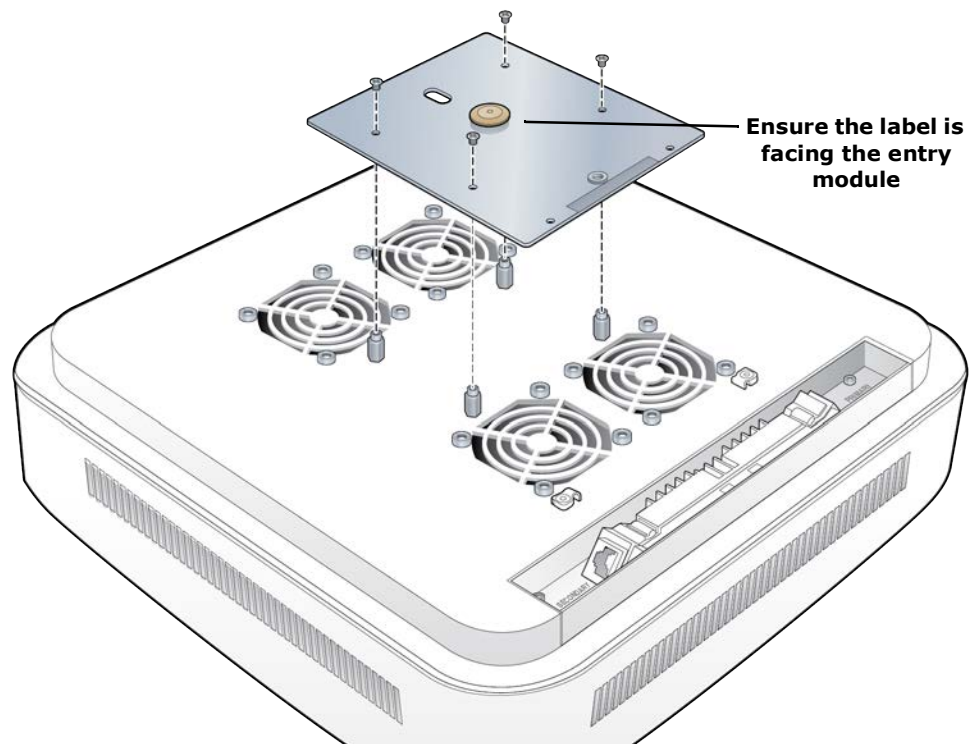
- 6** Install the drop rail/octagon box assembly over the modified tile.



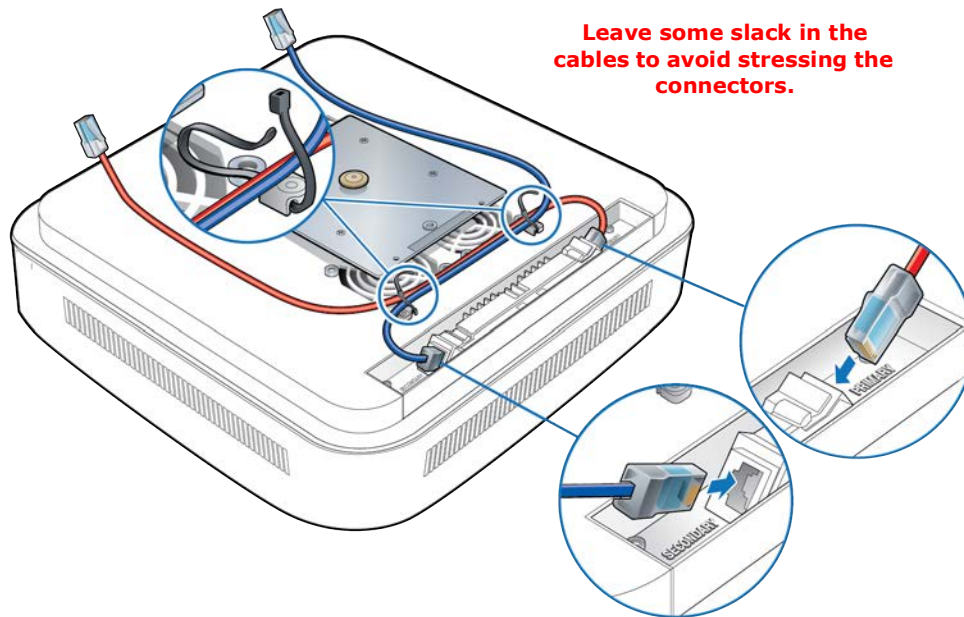
- 7** Attach the mounting plate onto the octagon box on the RP side of the tile.
- 8** Insert the Red and Blue cable from the ceiling to the mounting plate as shown.



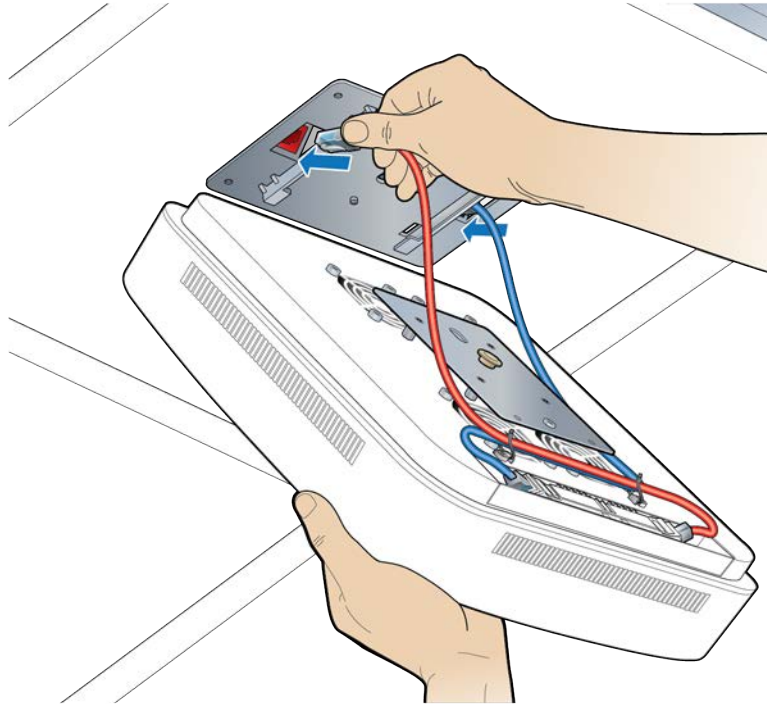
- 9** Attach RP plate to the Radio Point.



- 10** Connect the Red Primary and Blue Secondary Ethernet cables to the RP corresponding ports, as shown below.

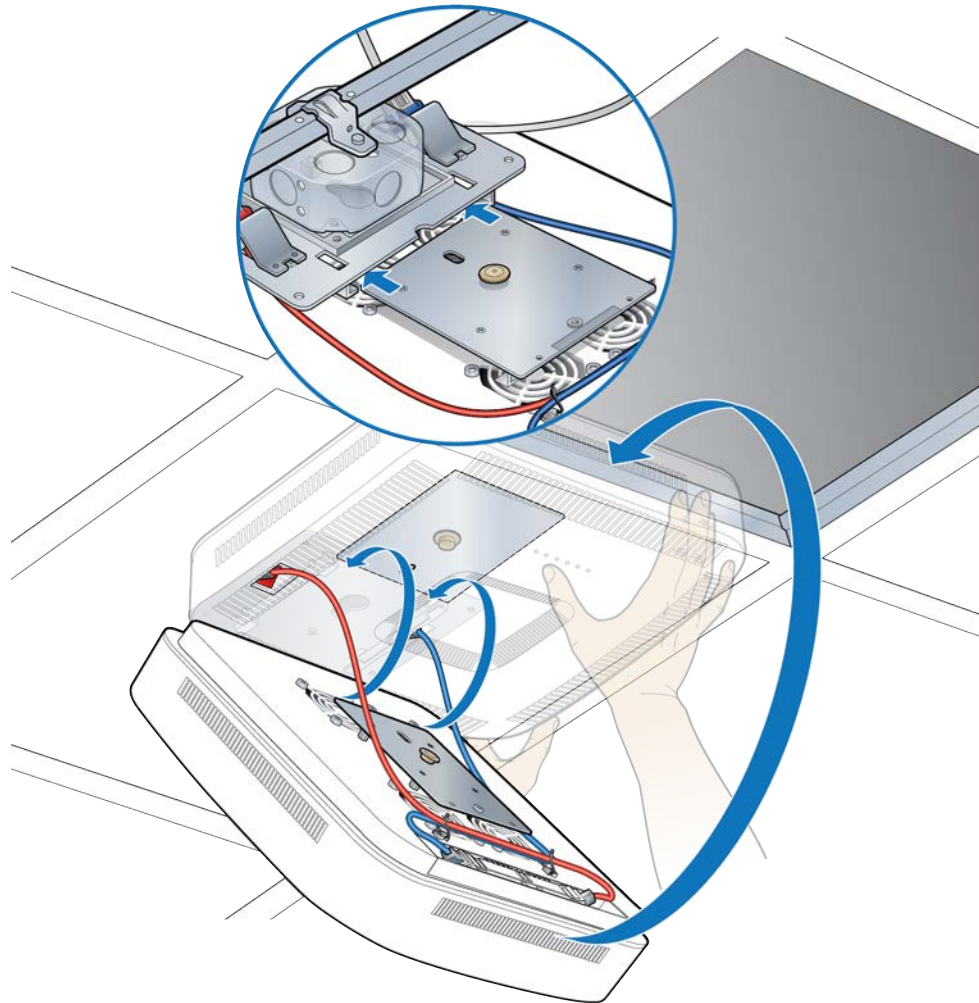


- 11** Connect the Blue and Red Ethernet cables from the RP to the corresponding connectors on the mounting plate.

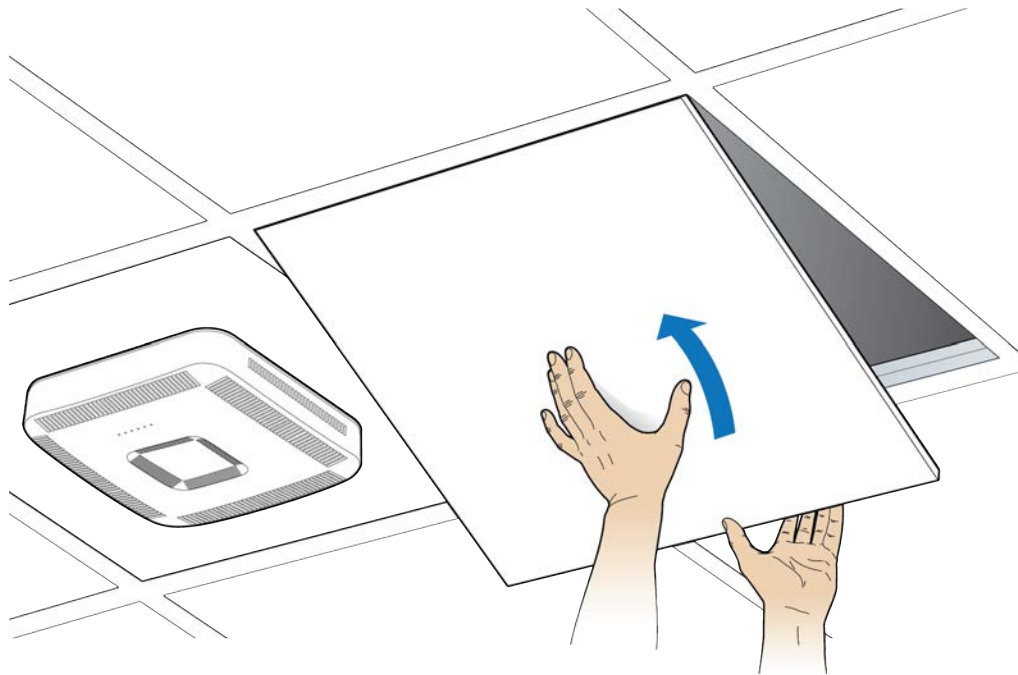


12 Attach the RP to the mounting plate.

- a** Align the keyhole opening on the mounting plate with the button on the RP mounting plate.
- b** Insert the RP into the mounting plate slot and slide until the RP plate meets the tabs on the octagon box plate.
- c** Lift the RP vertically and slide it into the locked position.



13 Replace the ceiling tile next to the Radio Point.



Wall mount

Mounting the Radio Point (RP) on the wall requires the following hardware provided by CommScope, as shown in [Figure 4-3](#).

- Radio Point (RP) plate and screws
- U-bracket
- Mounting plate and screws
- Red Primary port cable
- Blue Secondary port cable
- Red RJ45 jack
- Blue RJ45 jack

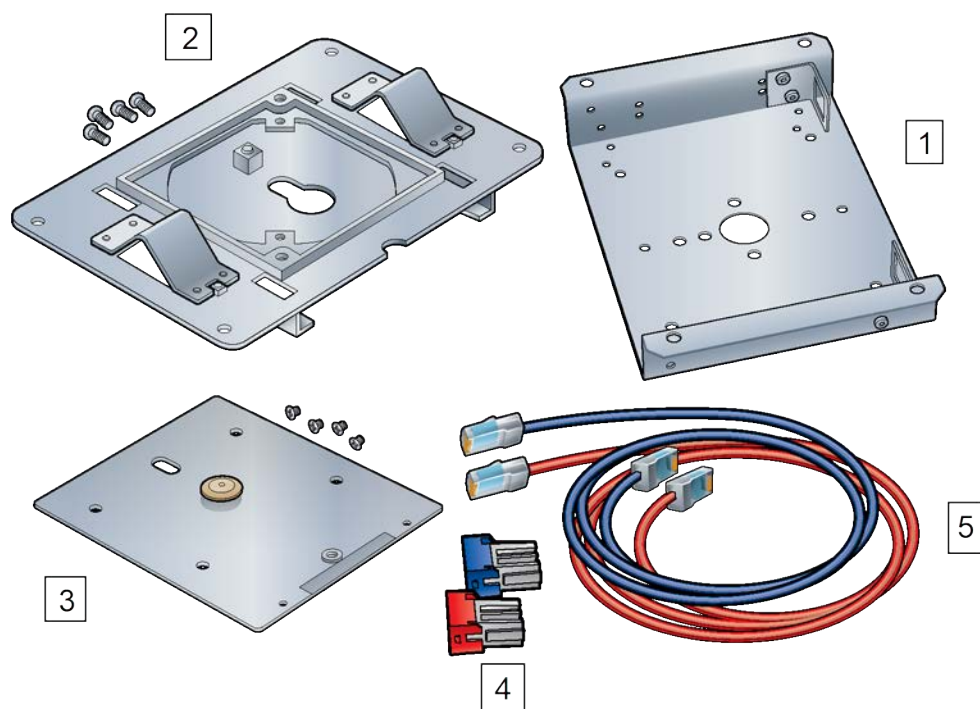


NOTE

In addition to the parts provide by CommScope, the wall mounting option requires four wall anchors, provided by the installer. Follow local building codes for anchor installation guidelines.

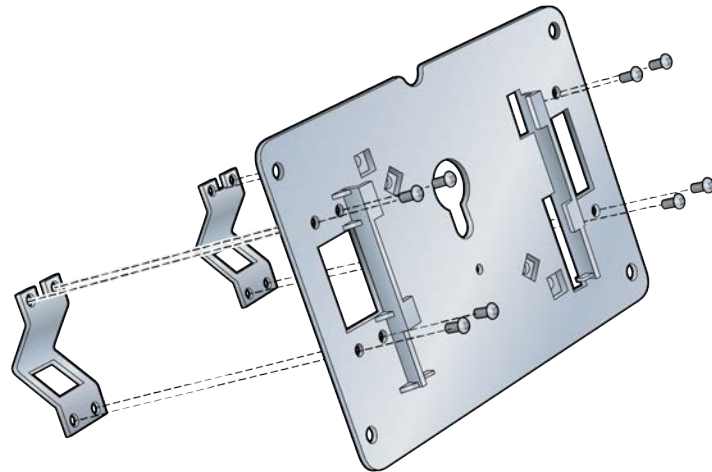
| | |
|---|--|
| 1 | Mounting plate and 4 screws |
| 2 | U-bracket |
| 3 | RP plate and 2 screws |
| 4 | 1 Red and 1 Blue RJ45 jacks |
| 5 | 1 Red Primary cable and 1 Blue secondary cable |

Figure 4-3. CommScope wall mounting kit

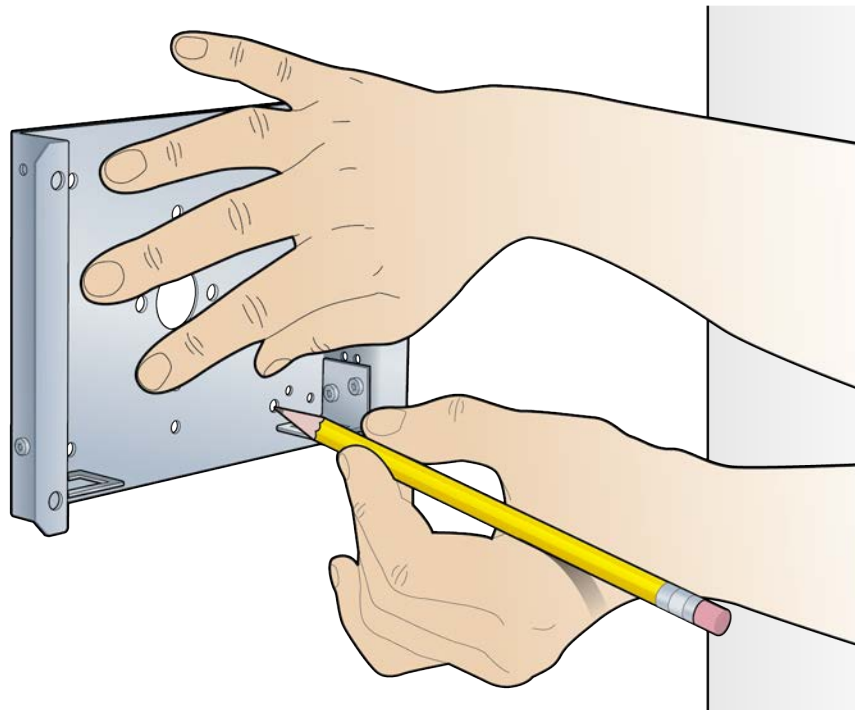


Mounting the Radio Point on the wall

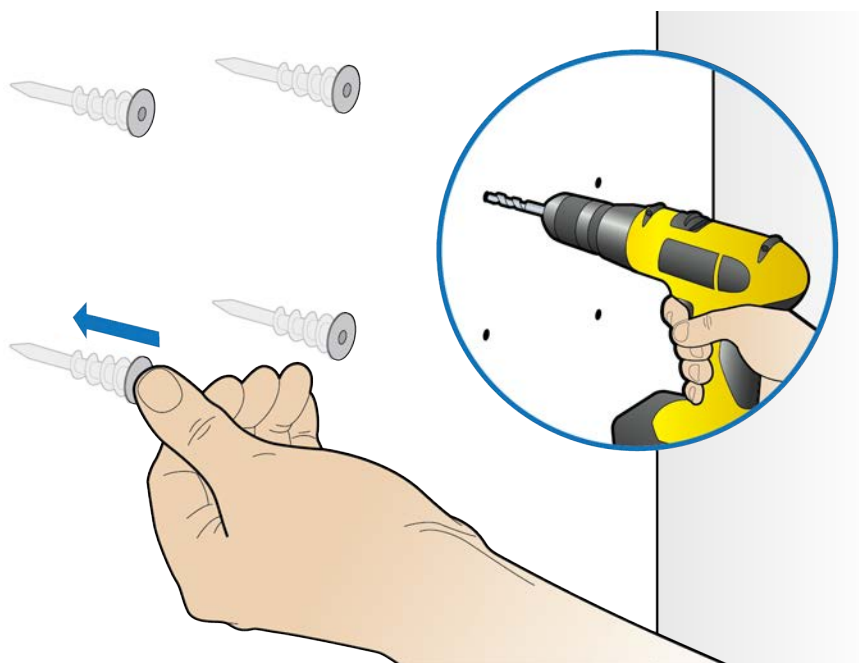
- 1 Remove the two tabs from the mounting plate.



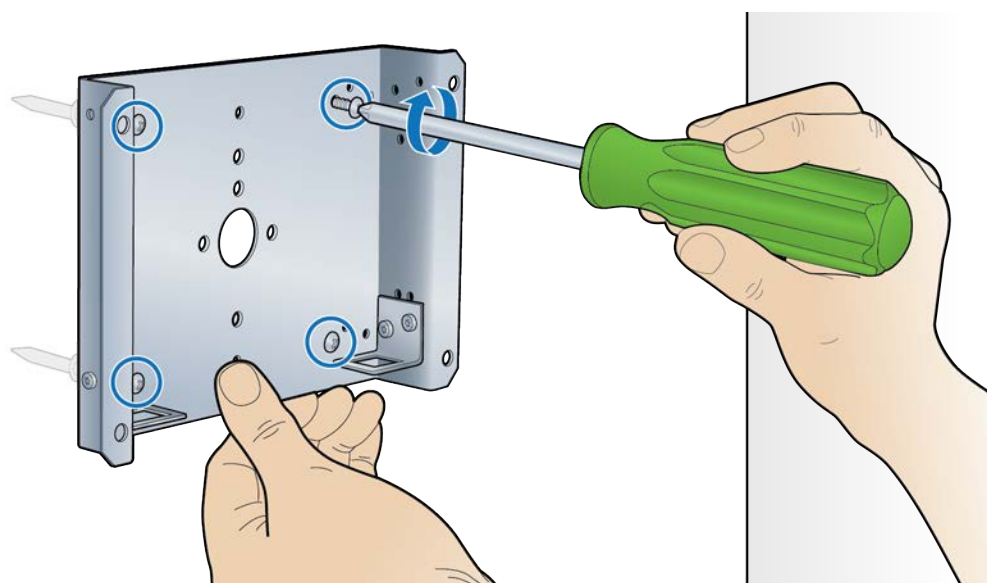
- 2** Use the U-bracket to trace the holes on the wall in the area you will be installing the RP.



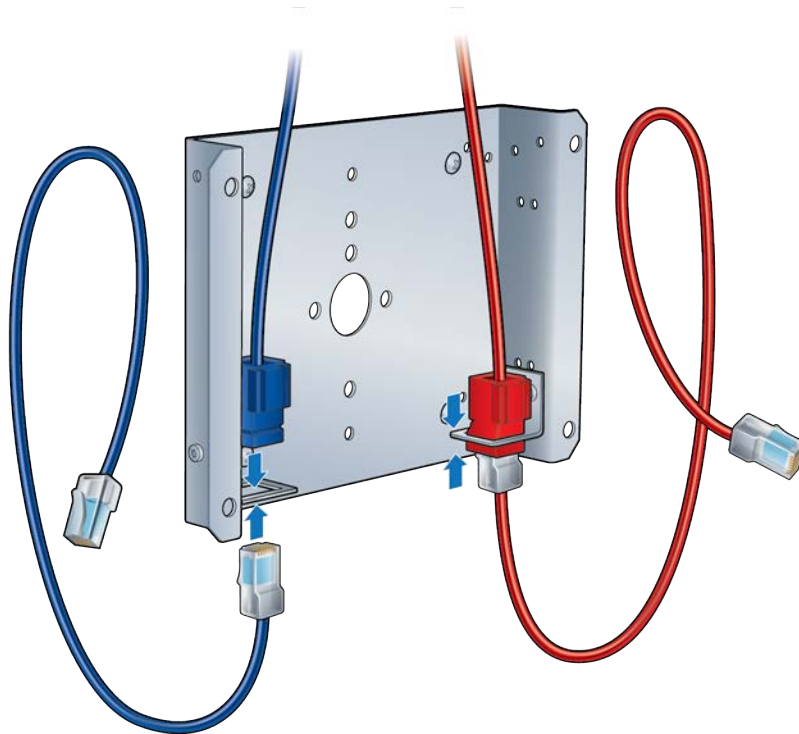
- 3** Drill the holes and insert the wall anchors (provided by the installer).



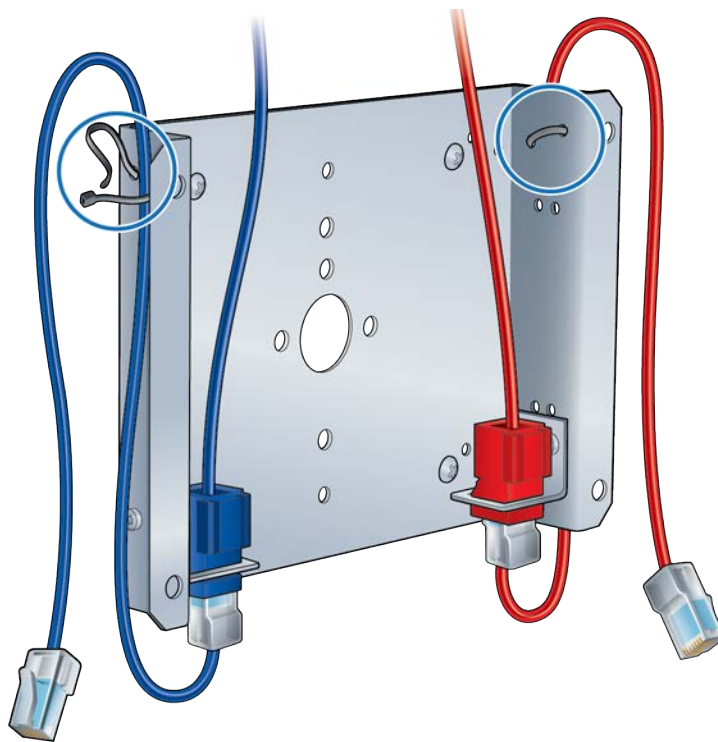
- 4** Attach the U-bracket to the wall with the four screws provided in the wall mount kit.



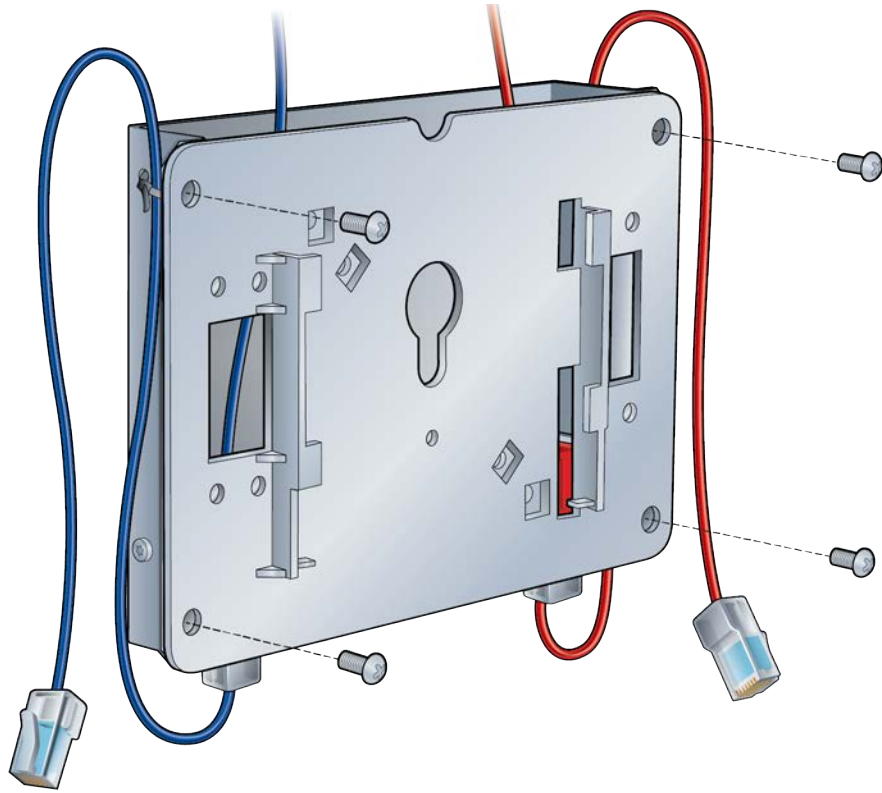
- 5** Feed the Red and Blue cables from the ceiling and snap them into the L-brackets on the U-bracket. Then attach them to the corresponding cables to the corresponding Red and Blue RP cables provided in the kit.



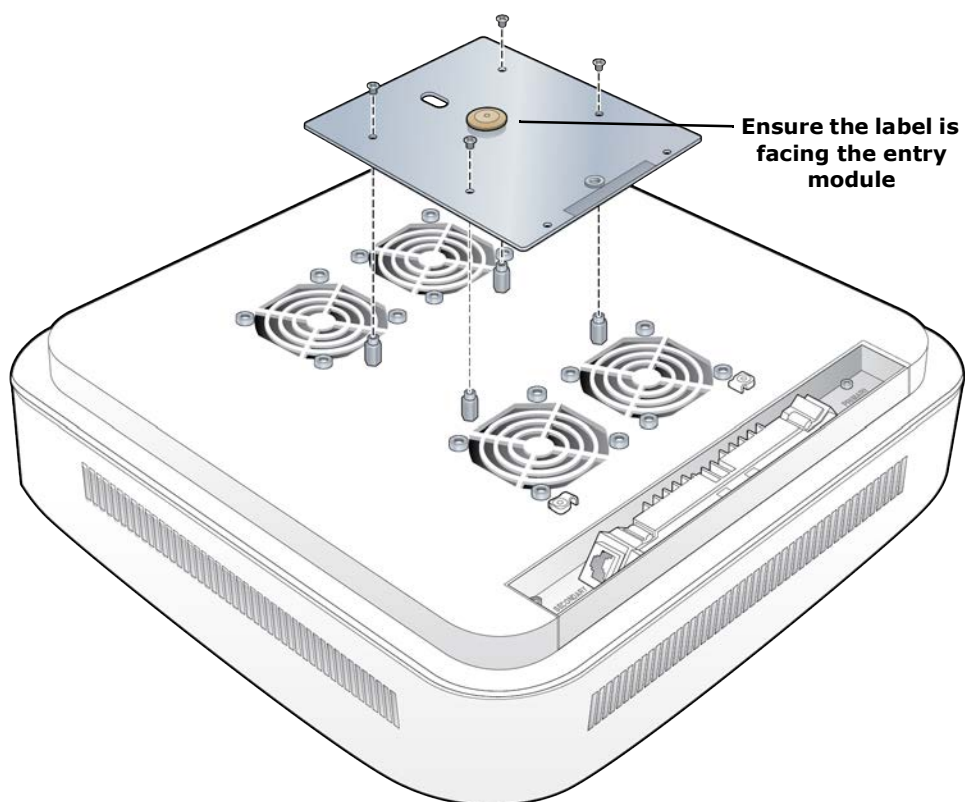
- 6** Feed the Red and Blue cables around the outside of the U-Bracket and tie-wrap the cables, as shown below.



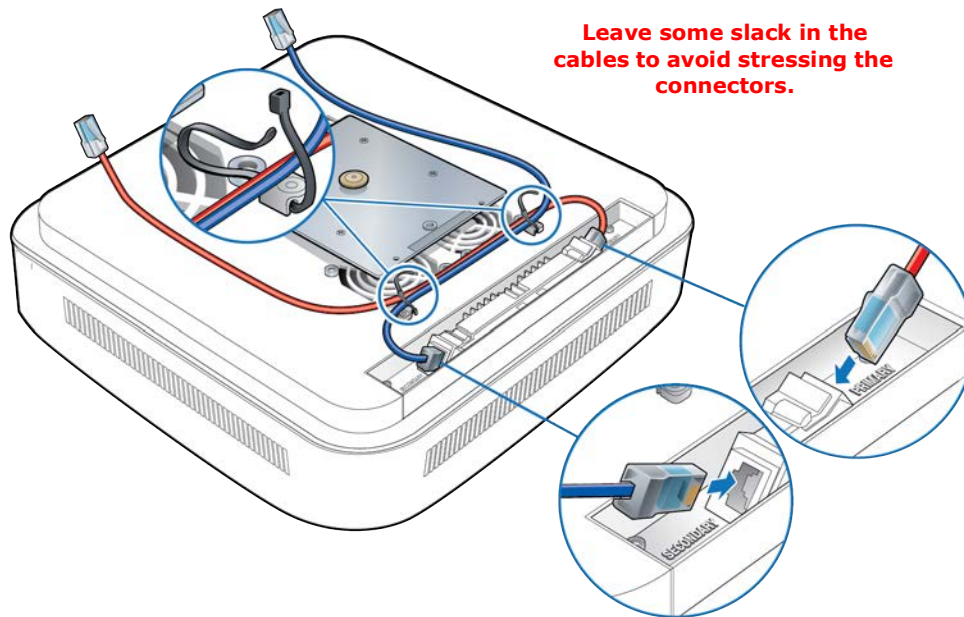
- 7** Attach the plate to U-bracket, using the four screws provided in the kit.



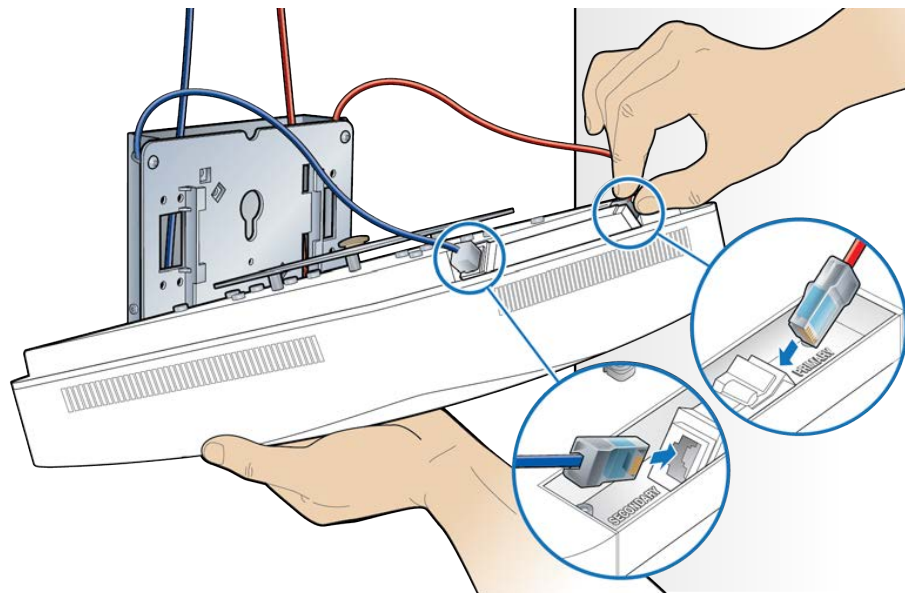
- 8 Attach the RP plate with the four screws provided in the kit.



- 9** Connect the Red Primary and Blue Secondary Ethernet cables to the RP corresponding ports, as shown below.

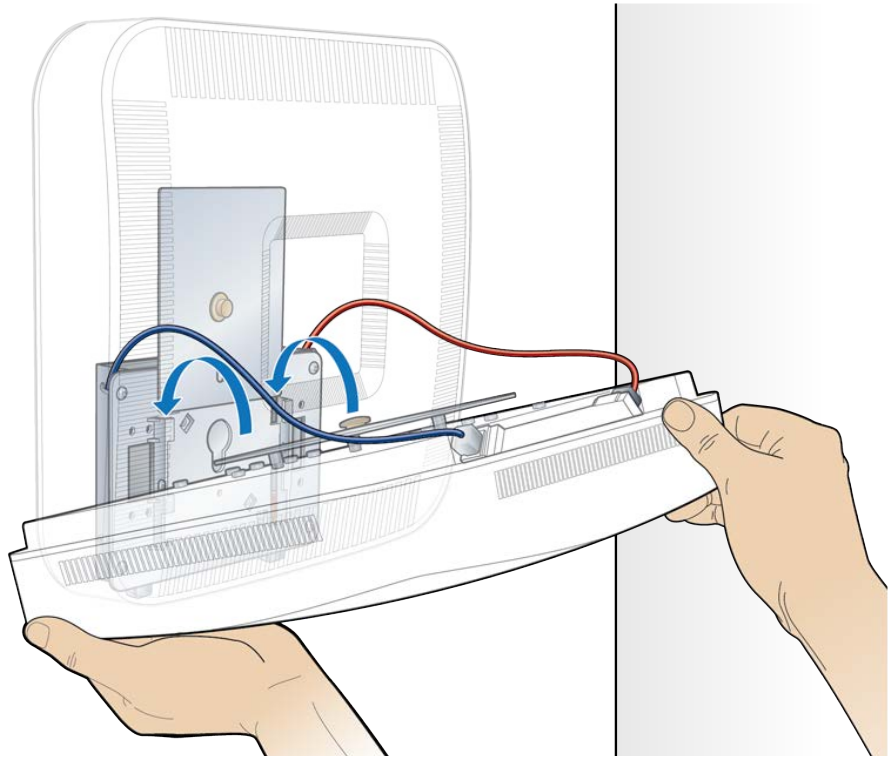


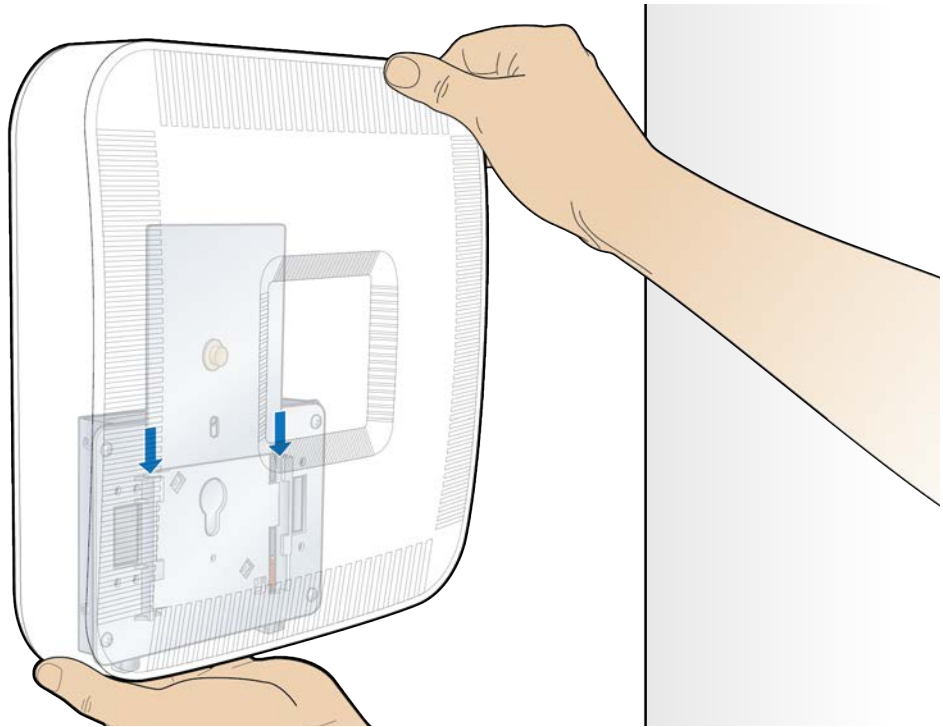
- 10** Lift the RP near the wall plate and attach the Red and Blue cables to the corresponding Red and Blue ports.



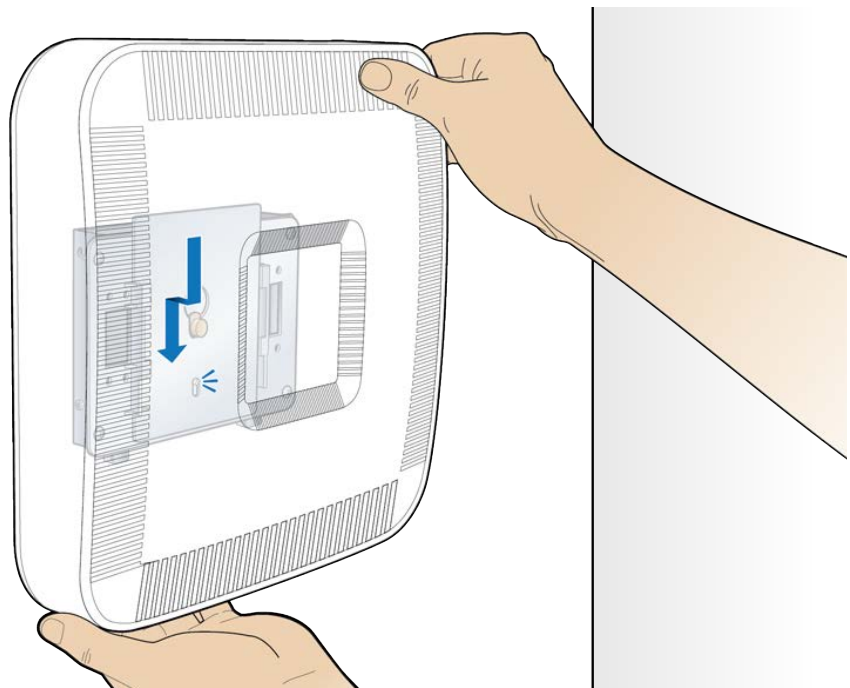
- 11** Attach the RP to the mounting plate.

- a** Align the keyhole opening on the mounting plate with the button on the RP mounting plate.
- b** Insert the RP into the mounting plate slot and slide until the RP plate meets the tabs on the octagon box plate.





12 Gently slide the RP downward and lock it into place.



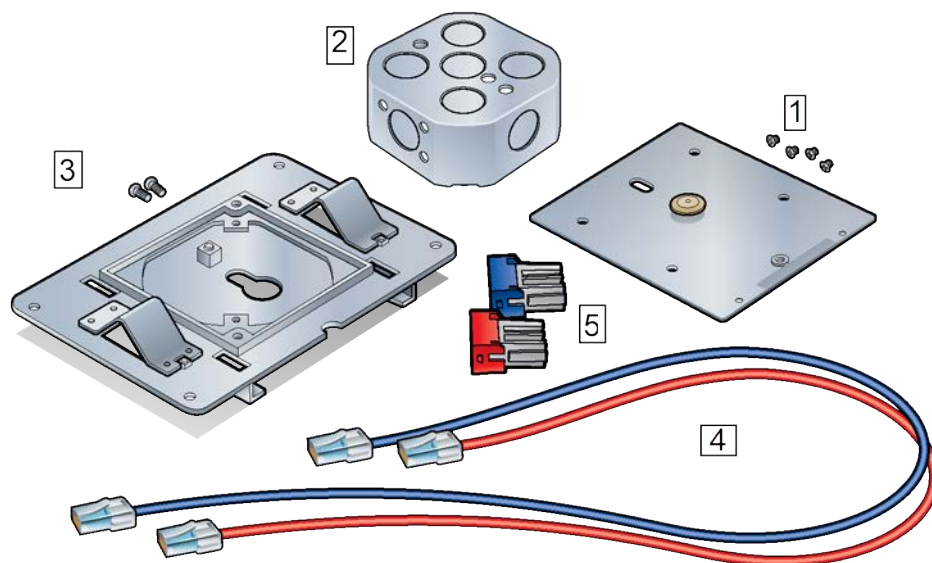
Flown Mount

The Radio Point can be flown mounted on the end of a rod. This configuration is used for buildings where there are no drop ceilings.

Mounting the Radio Point (RP) in the flown configuration requires the following hardware provided by CommScope in the mounting kit, as shown in

| | |
|---|---|
| 1 | 4" octagon box, 1-1/2" deep with 1/2" side cutouts Note: Remove the top, middle cutout. |
| 2 | RP plate and 4 screws |
| 3 | Mounting plate and 2 screws |
| 4 | 1 Red and 1 Blue RJ45 jacks |
| 5 | 1 Red Primary cable and 1 Blue secondary cable |

Figure 4-4. CommScope flown mounting kit



Mounting the Radio Point (RP) in the flown configuration requires the following hardware provided by the system integrator:

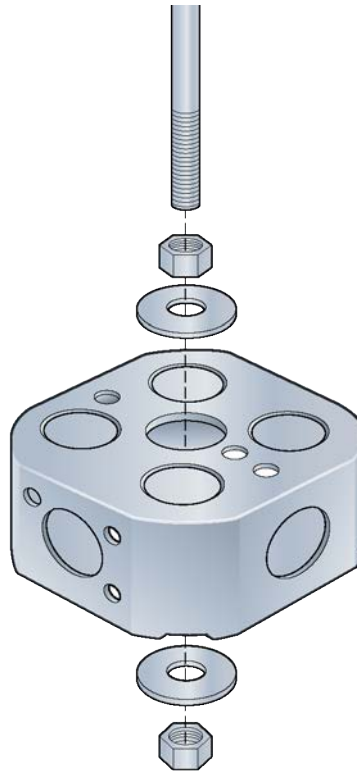
- Rod, 3/8-inch threaded
- Nut
- Lock nut, nylon

- Flat washers

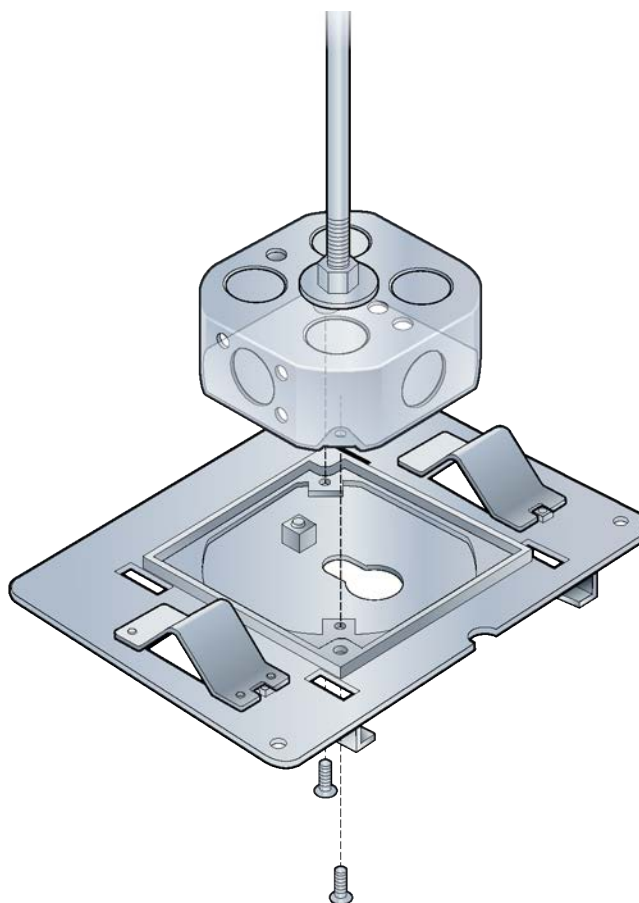
Flown mount installation

- 1** Cut the threaded, 3/8-inch rod to the required length and attach it to the ceiling.
- 2** Install the nut and a flat washer on the rod.
- 3** Slide the octagon box on the rod and install a flat washer and the nylon lock nut.

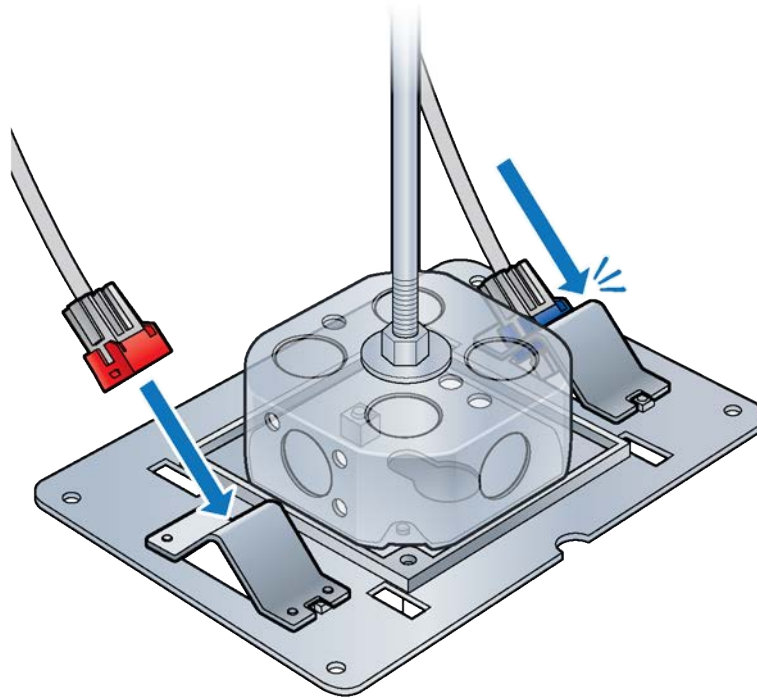
NOTE: Be sure the octagon box is tight between the nuts and there is enough clearance at the end of the rod to attach the plate to the octagon box.



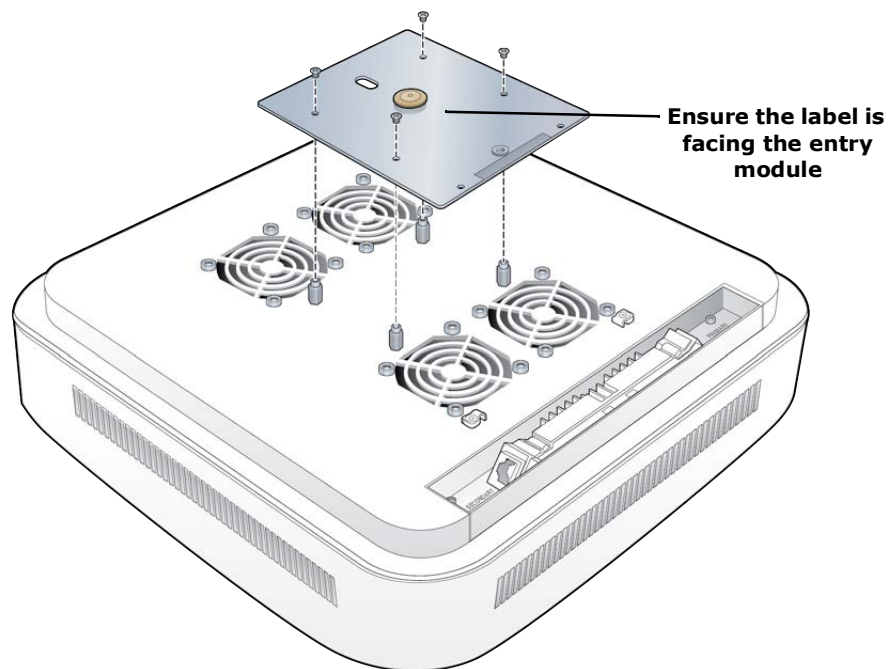
- 4** Attach the plate to the octagon box.



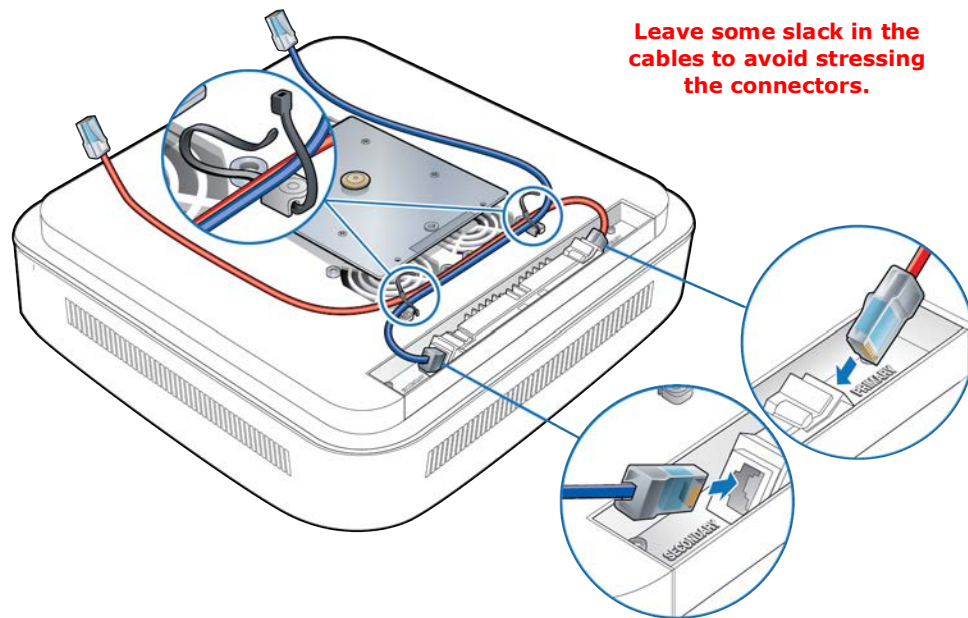
- 5** Insert the Red and Blue RJ45 jacks on the cables from the ceiling to the mounting plate angle brackets, as shown.



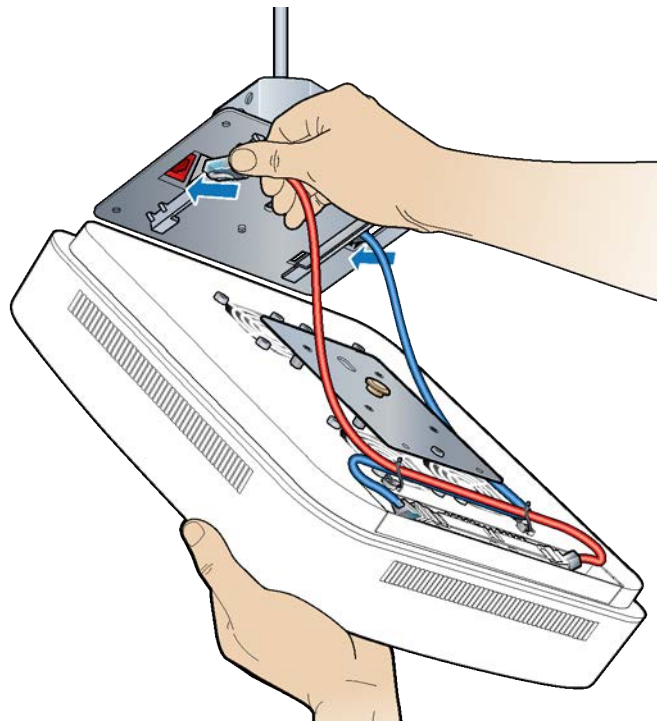
- 6** Attach the mounting plate to the RP.



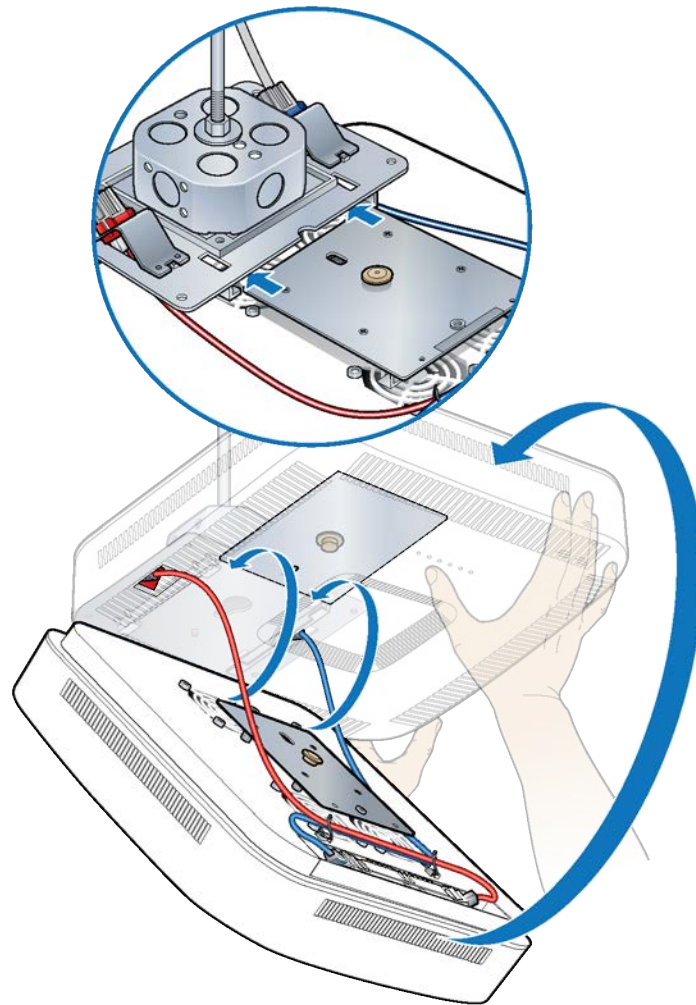
- 7 Connect the Red Primary and Blue Secondary cables to the RP.



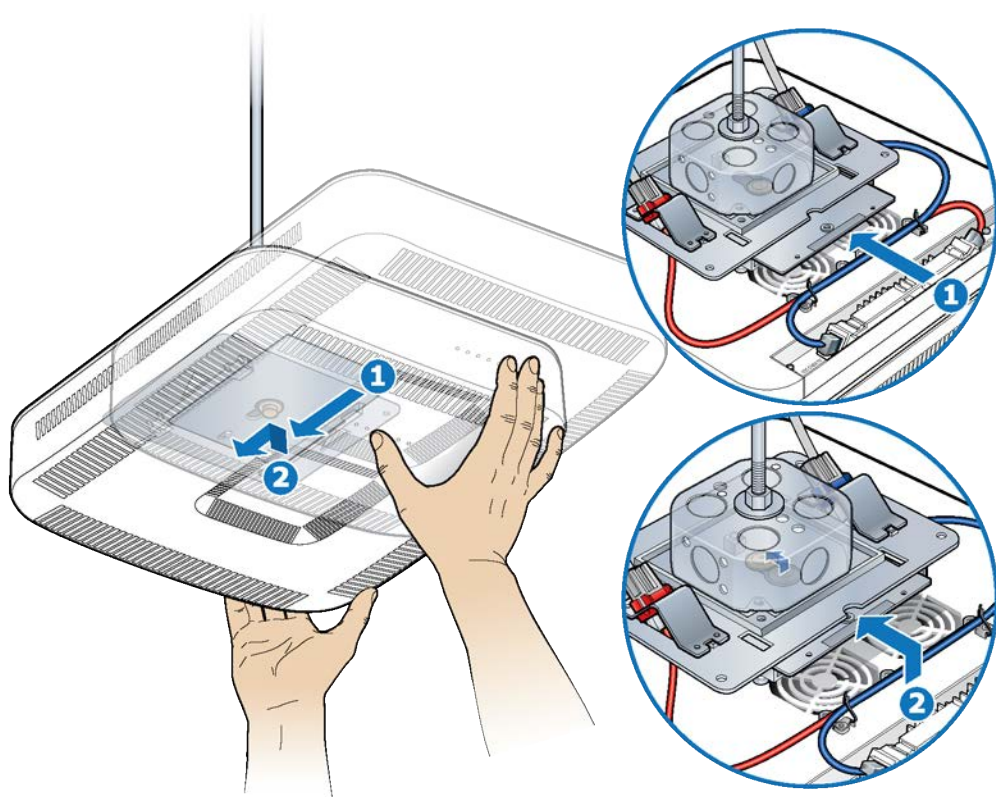
- 8 Lift the RP and insert the Red and Blue RP cables into the Red and Blue RJ45 jacks, respectively.



- 9** Attach the RP to the mounting plate.
 - a** Align the keyhole opening on the mounting plate with the button on the RP mounting plate.
 - b** Insert the RP into the mounting plate slot and slide until the RP plate meets the tabs on the octagon box plate.



10 Lift the RP vertically and slide it into the locked position.

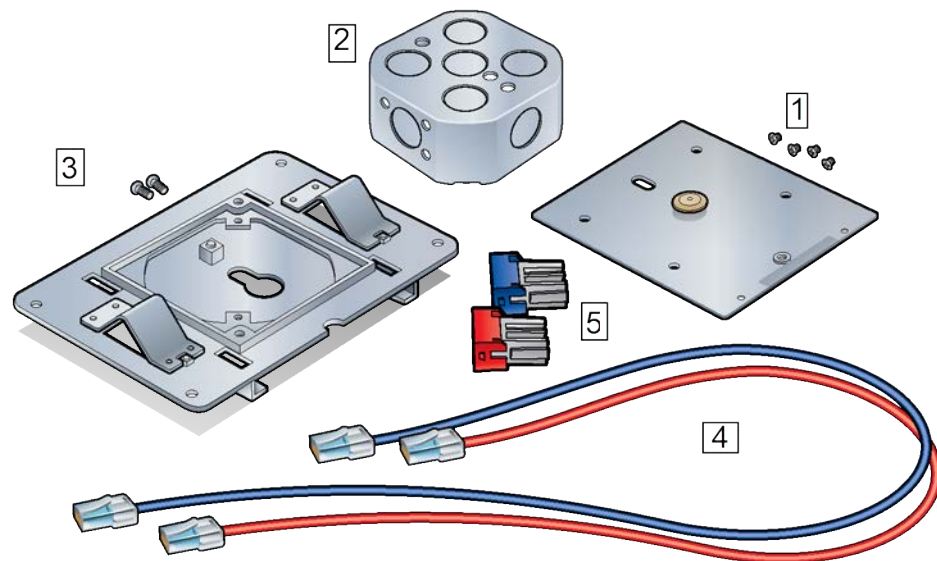


Pole mount

Mounting the Radio Point (RP) on a pole requires the following hardware provided by CommScope in the mounting kit, as shown in

| | |
|---|---|
| 1 | 4" octagon box, 1-1/2" deep with 1/2" side cutouts Note: Remove the top, middle cutout. |
| 2 | RP plate and 4 screws |
| 3 | Mounting plate and 2 screws |
| 4 | 1 Red and 1 Blue RJ45 jacks |
| 5 | 1 Red Primary cable and 1 Blue secondary cable |

Figure 4-5. CommScope pole mounting kit

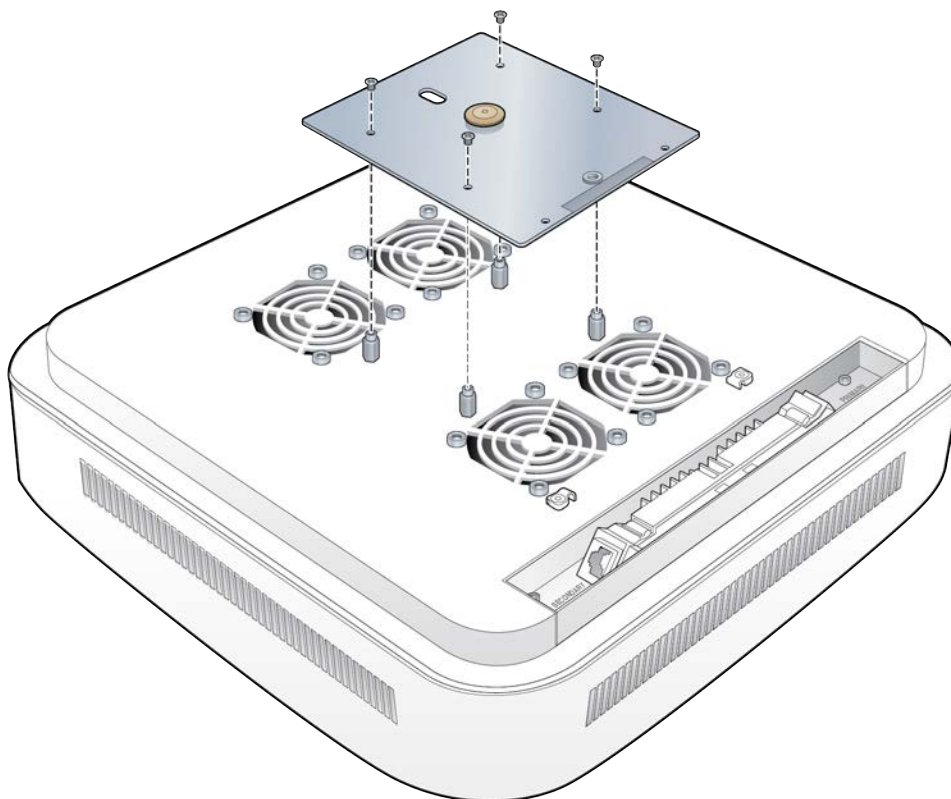


The following hardware is provided by the system integrator:

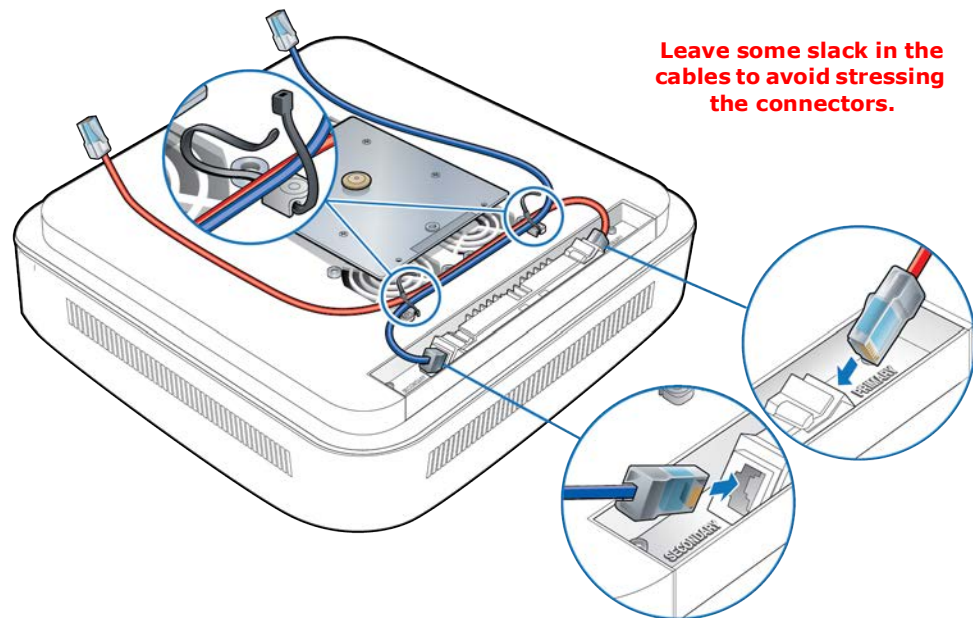
- Pole clamp that fits the dimension of the pole (with screws)
- Threaded rod
- Two flat washers (to fit the rod)
- One nut (to fit the rod)
- One lock nut (to fit the rod)

Pole mount installation

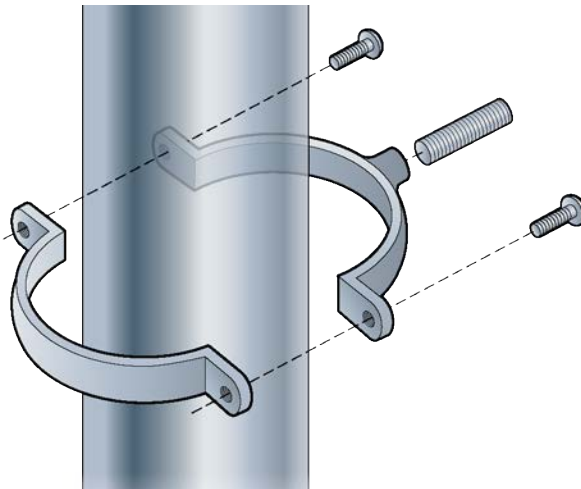
- 1 Attach the RP plate.



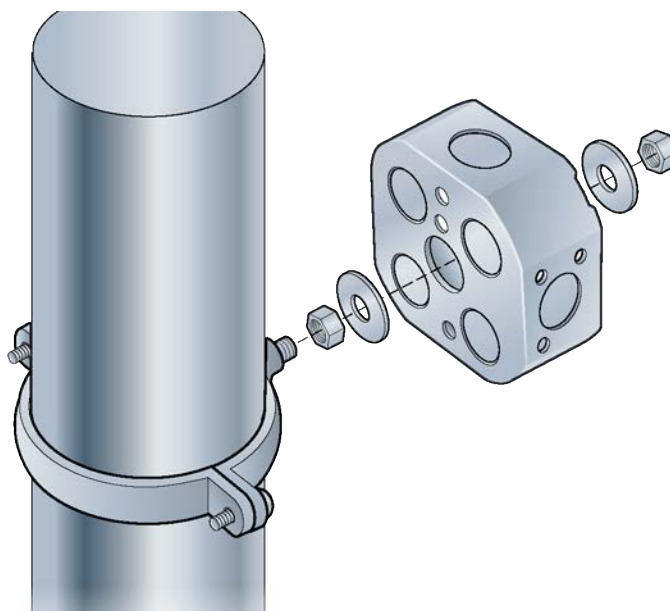
- 2 Connect the Red Primary and Blue Secondary cables to the RP.



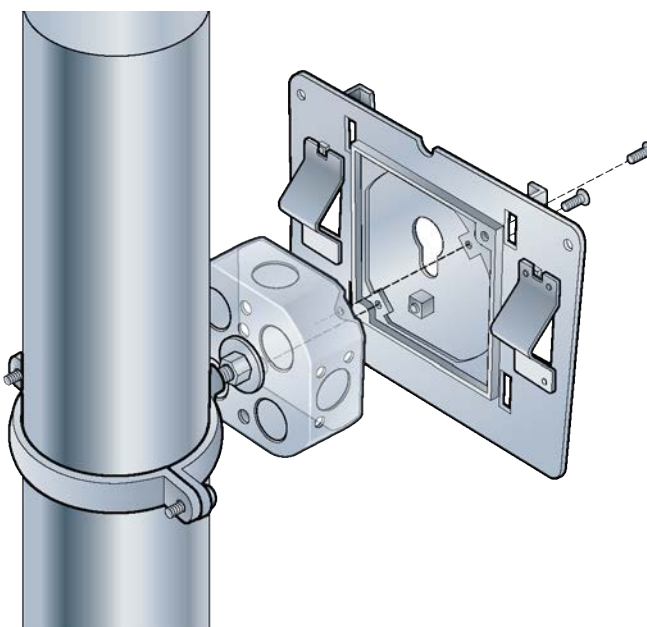
- 3** Attach the pole clamp to the pole, and the rod to the pole clamp.



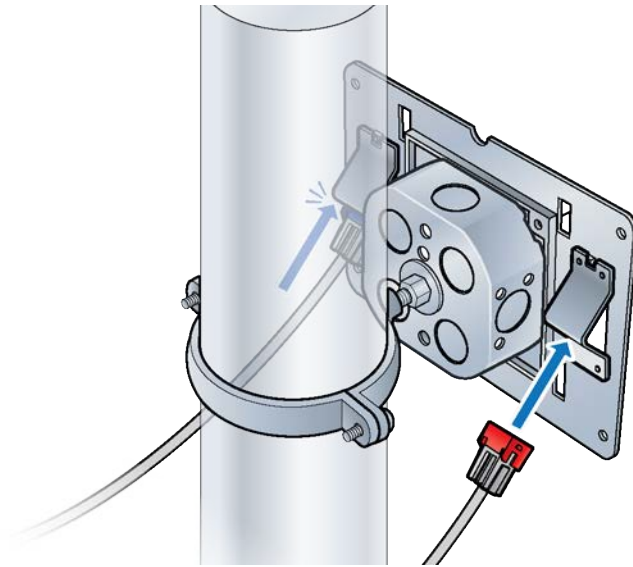
- 4** Attach the octagon box to the rod.
- a** Secure the nut to the rod.
 - b** Add one flat washer.
 - c** Insert the octagon box on the rod.
 - d** Add the other flat washer.
 - e** Secure the lock nut.



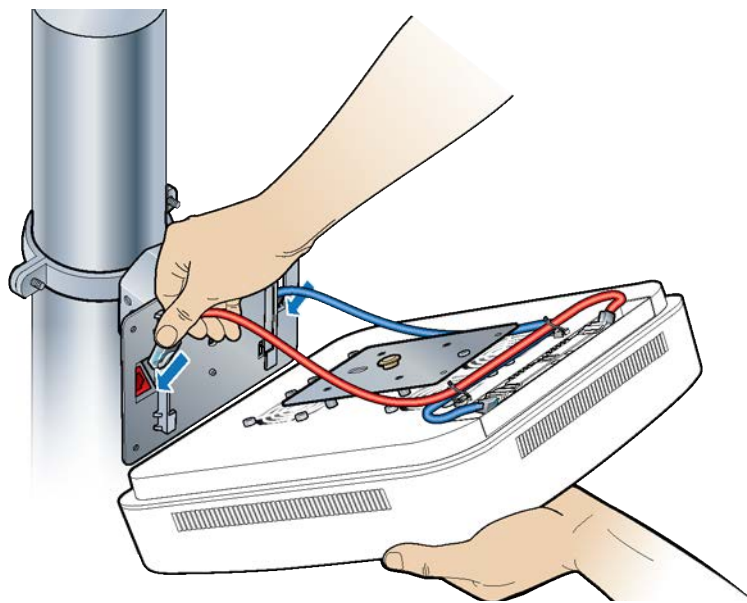
- 5** Attach the mounting plate to the octagon box with the two screws provided.



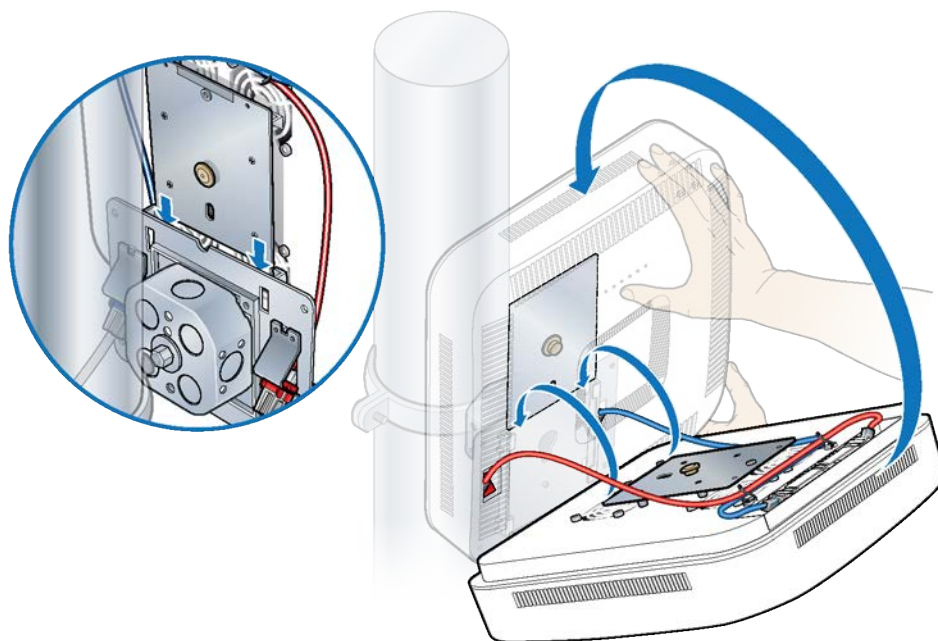
- 6** Insert the RJ45 jacks into the mounting plate.



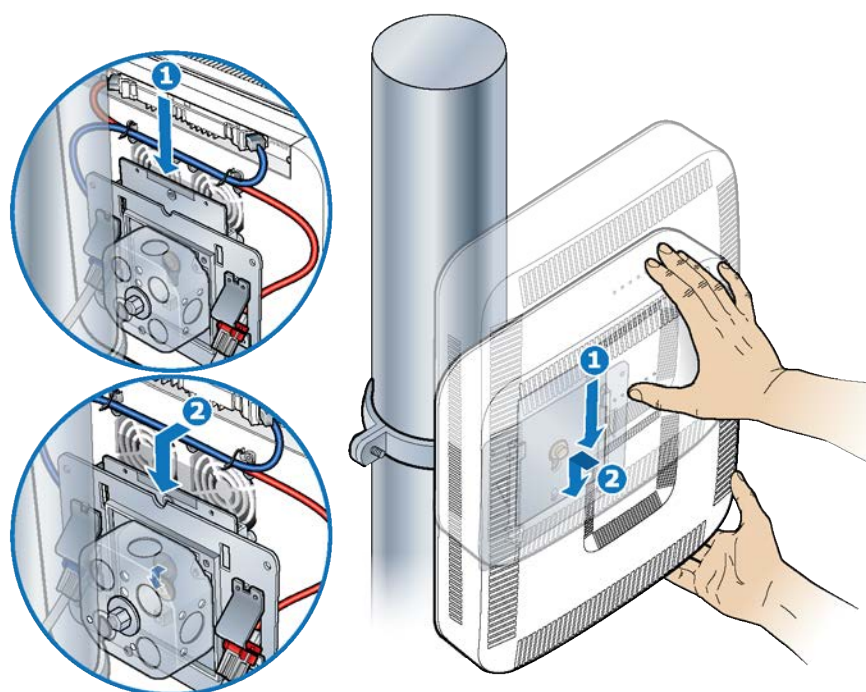
- 7** Connect the Red Primary and Blue Secondary cables on the RP to the corresponding RJ45 jacks.



- 8 Lift the RP and gently slide it onto the pole mounting plate.



- 9 Slide the RP down and lock into place.



RP5100i installation

This chapter describes installing indoor Radio Points on ceiling tiles, above ceiling tiles, on poles and in a flown configuration.

| | |
|---|----------------------|
| RP5100i installation overview | 5-2 |
| Ceiling mount | 5-3 |
| Flown mount | 5-22 |
| Pole mount | 5-31 |