



Business Hotspots



Installation Guide

August, 2019

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Wi-Fi Network Installation

Equipment

The Hotspots network equipment shown below will be installed at the customer site. Please note if the customer already has Business Voice and is adding Business Hotspots, the Hotspots service will use the same controller, and only the PoE injector/s, AP/s and Ethernet cables will be installed. The customer is responsible for providing the power strip.

Controller



PoE injector



Outdoor AP



Indoor AP



Indoor AP mount kit



Indoor AP mount kit is labeled for easy identification.

Blue Ethernet patch cable



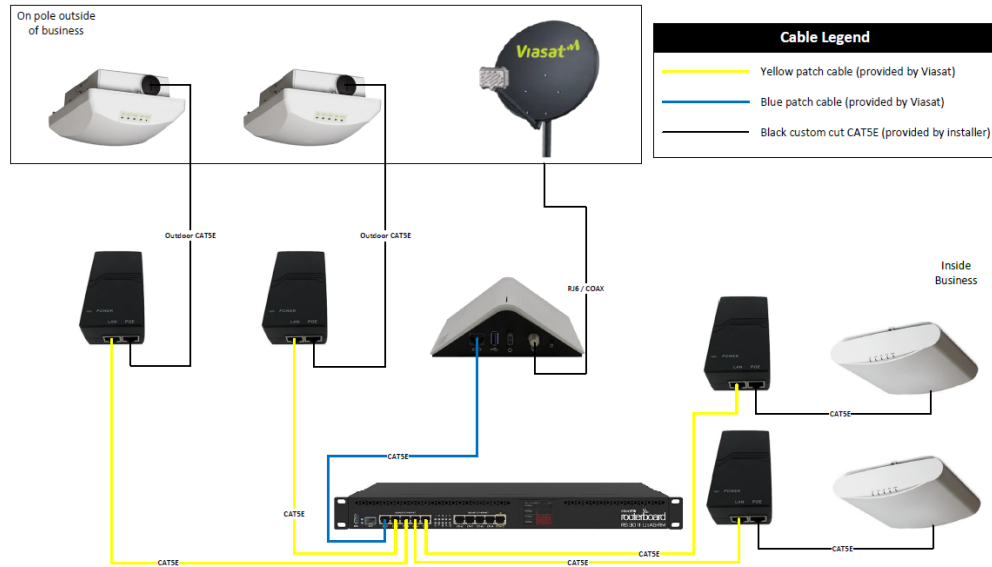
Yellow Ethernet patch cable



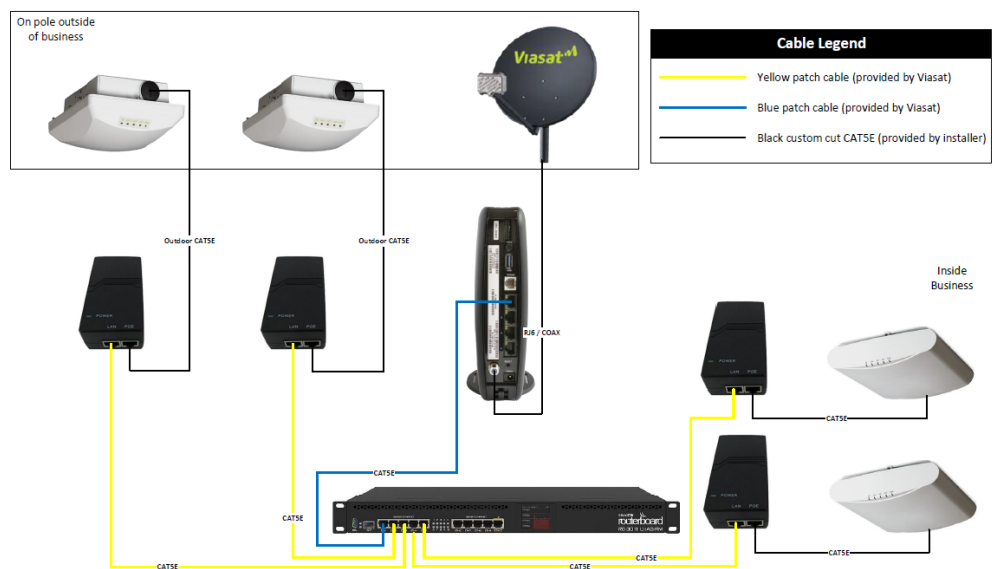
Network connections

When combined with Viasat Business Internet, the satellite modem used will be determined by the satellite beam for the area. The VHG modem will be used for Viasat 2 beams, and the SB2+ modem is used for Viasat 1 beams. The diagrams below indicate how to connect the Hotspots network equipment using either modem.

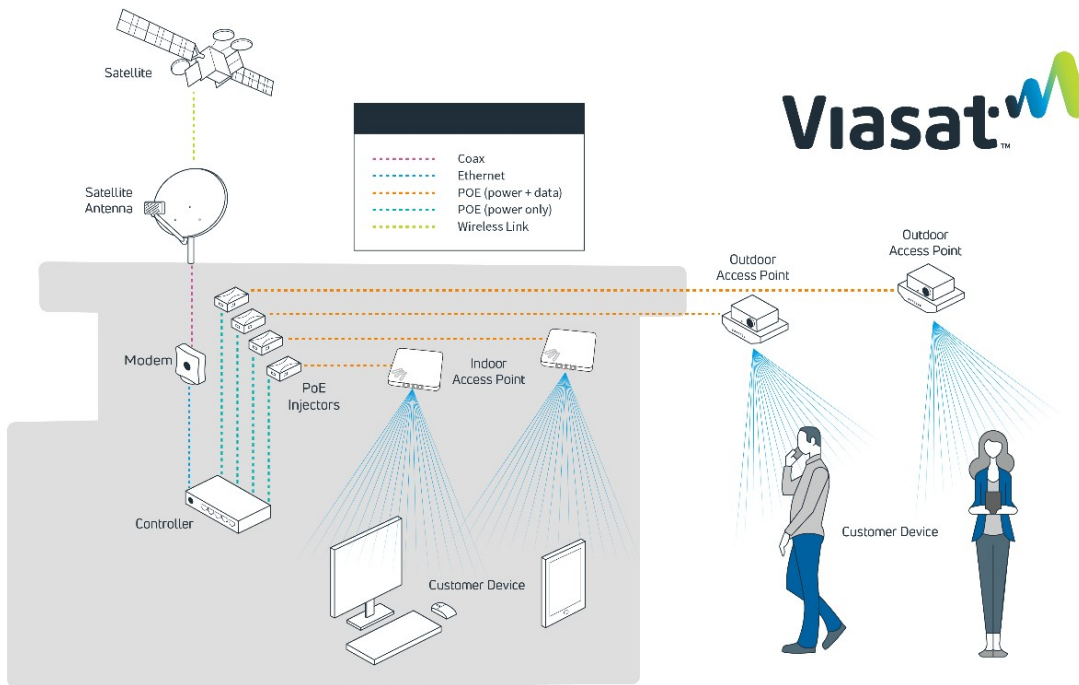
VHG modem



SB2+ modem



Signal flow



Required for installation

The following tools and supplies are required for installation:

Tools	Supplies
Power drill	CAT5e color-coded Ethernet patch cables (included)
Phillips head screwdriver	CAT5e outdoor-rated Ethernet cable
Torque wrench	CAT5e standard Ethernet cable
Flat head screwdriver	RJ45 connectors and cable clips
13mm open-ended wrench	Pass-through bushings
Cable strip tool	Silicone sealant and Bishop tape
CAT5e crimping tool	Outdoor UV-rated zip-ties
Cable snips	Pole for outdoor AP (if needed) with lags/anchors/screws
CAT5e/LAN cable continuity tester	#10 ground wire
Laptop or smartphone (required for Installer Portal)	UL grounding supplies (wire, straps, screws, clamps, etc.)

Installation instructions

This installation guide provides comprehensive instructions for equipment installation and documentation when adding the Business Hotspots network to the Viasat Satellite Internet solution.

Step 1 | Select equipment location

Outdoor AP & satellite antenna	Indoor equipment
Select a secure location with clear line of site where the most Wi-Fi users will be reached, preferably overlooking a gathering area. Install within 300 cable-feet of the controller at the minimum height specified in Step 3 below.	Select a secure, climate-controlled location near a power source and the modem for installing the controller and PoE injector/s. Install the indoor AP at ceiling level as close as possible to the center of the intended coverage area where the most Wi-Fi users will connect.

Step 2 | Install CAT5e cable

For each outdoor AP, cut to length (1) outdoor-rated CAT5e Ethernet cable no more than 300 cable-feet from the location where the controller will be installed to the location where the AP will be mounted. Terminate the ends and test each cable with a CAT5e cable tester. Install the cable, ensuring any holes that penetrate the building are sealed.

For each indoor AP, cut to length (1) standard CAT5e Ethernet cable no more than 300 cable-feet from the location where the controller will be installed to the location where the AP will be mounted. Terminate the ends and test each cable with a CAT5e cable tester.



NOTE: Wait to tie down the cables until after all equipment is installed, configured and tested.

Step 3 | Mount the outdoor AP/s

Mount the outdoor AP/s in a secure location within 300 cable-feet of the controller. The outdoor AP *must* be mounted with clear line of site to the Wi-Fi users in either of the following locations:

- » A wall or outdoor patio-type ceiling at a minimum height of 10ft. (if ceiling is lower, mount at ceiling height)
- » A roof using a pole mount at a minimum of 2ft. and maximum of 10ft. above the roof, as long as there is clear line of site to the users (follow the Viasat-approved [Low-profile Pole Mount](#) or Stub-mount instructions)

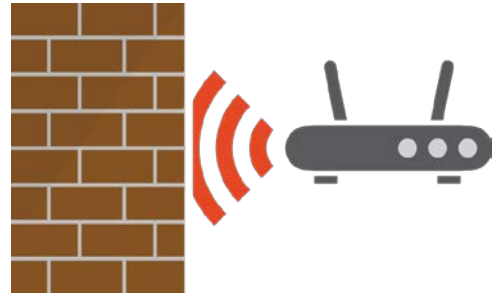
Refer to the [Ruckus Outdoor AP](#) installation instructions in this guide for additional information.

Avoid barriers and signal interference

The access point must be in a location that has clear line of site to the users, avoiding obstructions such as buildings, trees, shrubs or any large structure that prevents clear line of site.

Below are examples of barriers that create interference:

Type of Barrier	Interference
Wood, glass or synthetic material	Low
Water, trees and bushes, bricks, and marble	Medium
Plaster and concrete	High
Metal	Very high

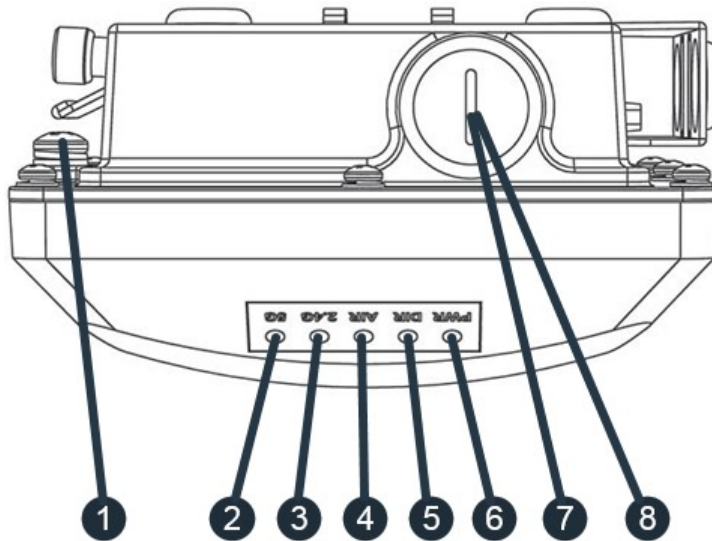


Ground the AP

Using the factory-supplied ground wire and ground screw, connect a good earth ground to the AP chassis ground point. The earth ground screw is 9mm. Ensure that any replacement screw is no longer than 9mm to prevent damage to the AP chassis.

⚡ WARNING! Do NOT run the ground wire to the ground block for the satellite antenna. Run it to a separate ground source.

AP LEDs and other elements



#	LED	Color/State	Meaning
1	Earth ground screw	N/A	Used to attach an earth ground to the AP.
2	5G	Off	WLAN service is down.
		Amber - Solid	WLAN is up, but no clients or downlink MAPs are associated/connected.
		Green - Solid	The WLAN is up and at least one client is associated. No downlink MAPs are connected.
		Green - Slow flashing (every 2 seconds)	WLAN is up and at least one downlink MAP is connected. No clients are associated.
		Green - Fast flashing (twice per second)	WLAN is up, at least one downlink MAP is connected, and at least one client is associated.
3	2.4G	Off	WLAN service is down.
		Amber - Solid	WLAN is up. No clients are associated.
		Green - Solid	WLAN is up and at least one client is associated.
4	AIR	N/A	Not used.
5	DIR	Off	Indicates AP is not being managed by the Ruckus management platform. Contact Viasat installer support.
		Green - Flashing slow (every 2 seconds)	Network problem. Cannot contact Ruckus management platform. AP may still function if unable to contact the management platform. If problems are experienced, contact Viasat installer support.
		Green - Flashing fast (2x/second)	Receiving configuration or image upgrade.
		Green - Solid	Connected to the Ruckus management platform. Working properly.
6	PWR	Off	No power to AP.
		Red	AP is starting up.
		Green - Solid	Routable IP address received.
7	POE IN RJ45 (Ethernet port)	Supports 10/100/1000Mbps connections, and receives Power over Ethernet (PoE).	
8	RESET button	DO NOT RESET THIS DEVICE UNLESS DIRECTED BY SUPPORT!	

Step 4 | Mount indoor AP/s

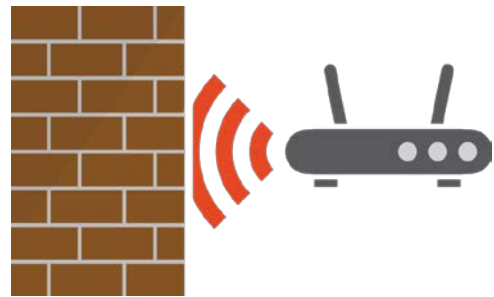
Each indoor AP provides up to 2,500 sq.ft. of coverage. Install the AP/s at ceiling level as close as possible to the center of the intended coverage area where the most Wi-Fi users will connect. Determine which mount type to use: drop-ceiling T-bar, flat surface, or mounting bracket. The AP must be mounted within 300 cable-feet of the controller. Refer to the [Ruckus Indoor AP](#) installation instructions in this guide for additional information.

Avoid barriers and signal interference

Mount the AP/s in an area free from obstructions or sources of interference, such as cement/brick, metal (especially large metal objects), some appliances, analog phones, speakers, etc.

Below are examples of barriers that create interference:

Type of Barrier	Interference
Wood, glass or synthetic material	Low
Brick, marble, and objects containing water	Medium
Cement	High
Metal, microwave ovens, A/C units, cordless landline phones and headsets, speakers, any device that consumes large amounts of electricity	Very high



AP LEDs and other elements



LED	Color/State	Meaning
5G	Off	Radio is down
	Amber - Solid	Radio is up, no clients are connected to the 5 GHz radio
	Green - Solid	Radio is up, at least one client is connected to the 5 GHz radio
2.4G	Off	Radio is down.
	Amber - Solid	Radio is up, no clients are connected to the 2.4 GHz radio
	Green - Solid	Radio is up, at least one client is connected to the 2.4 GHz radio
AIR	N/A	Not used.
DIR	Off	Indicates AP is not being managed by the Ruckus management platform. Contact Viasat installer support.
	Green - Flashing slow (every 2)	Network problem. Cannot contact Ruckus management platform. AP may still function if unable to contact the management platform.
	Green - Flashing fast (2x/second)	Receiving configuration or image upgrade.
	Green - Solid	Connected to the Ruckus management platform. Working properly.
PWR	Off	No power to AP.
	Red	AP is starting up.
	Green - Flashing	System started, no routable IP address detected.
	Green - Solid	Routable IP address received.

Step 5 | Install inside network equipment

Install the controller and PoE injector/s in a secure, climate-controlled location near the satellite modem and a power outlet. Do not place equipment on top of the controller.



NOTE: Ensure the equipment is easily accessible for future support. Avoid installing near a microwave, as this will cause interference with the signal.

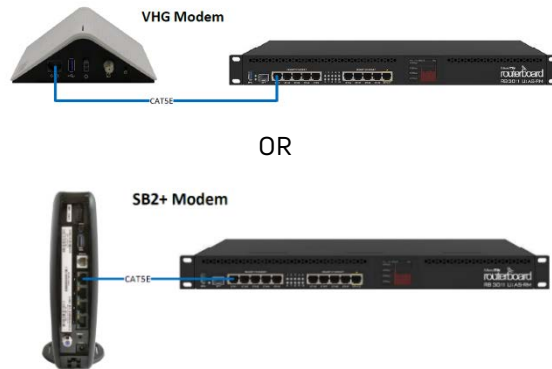
Modem to controller

NOTE: If the customer already has Business Voice, skip this step. Proceed to **Controller to PoE Injector**.

- 1 Place the controller near the satellite modem.
- 2 Connect the blue Ethernet patch cable from the modem to Port 1 on the controller.

NOTE: When using the SB2+ modem, the controller must be plugged in to Port 1 (next to the white phone port). The other ports will not work.

- 3 Plug in the power cable from the controller into the power source.



Controller to PoE injector

- 1 Connect one end of a yellow Ethernet patch cable into one of Ports 2-5 on the controller.
- 2 Then connect the other end into the LAN port on the PoE injector. Repeat this step for each additional PoE Injector.



PoE injector to indoor AP

- 1 Connect one end of the standard CAT5e Ethernet cable into the POE port on the PoE injector.
- 2 Then connect the other end of the Ethernet cable into the POE IN Ethernet port on the back of the AP.
- 3 Plug the PoE injector/s into the power source.
- 4 After boot-up, verify that the PWR LED on the AP is a steady green.
- 5 Repeat this step for each additional AP.



PoE injector to outdoor AP

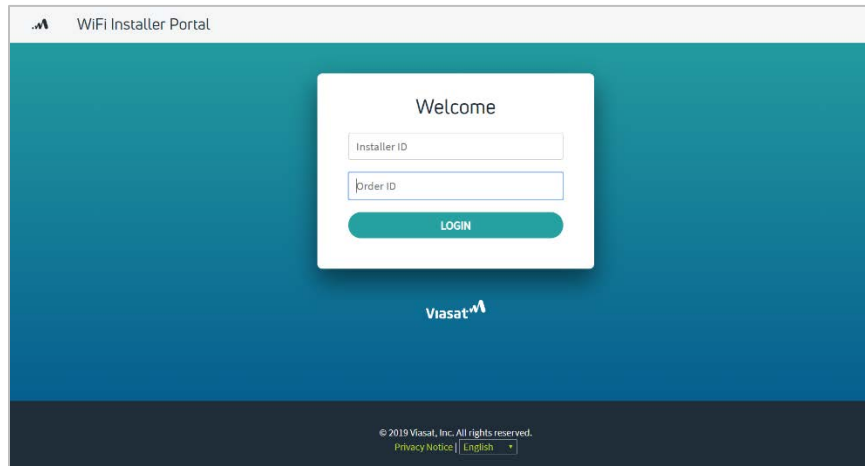
- 1 Connect one end of the outdoor-rated Ethernet cable into the POE port on the PoE injector.
- 2 Then connect the other end to the cable through the cable gland assembly to the Ethernet port on the front of the AP. (See Step 1 of the [Outdoor AP installation instructions](#) on page 25.)
- 3 Plug the PoE injector/s into the power source.
- 4 After boot-up, verify that the PWR LED on the AP is a steady green.
- 5 Repeat this step for each additional AP.



Step 6 | Auto-configure equipment

The controller and AP/s are set up to automatically configure and register with Viasat through the Installer Portal. To initiate this process, the MAC Address of the controller must be entered into the Installer Portal, which triggers discovery of the equipment.

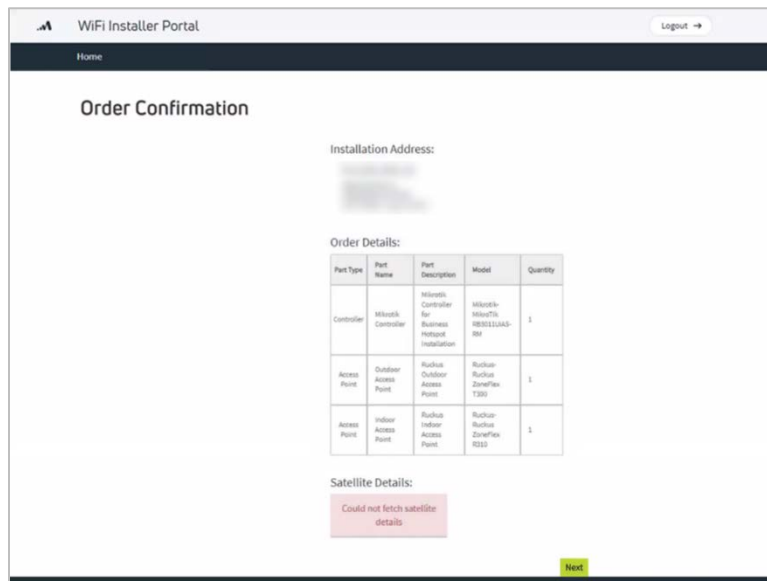
- 1 To access the Installer Portal, using a smartphone, go to <https://partners.wifi.viasat.com/install/bhlogin> and log in using your FSM Tech ID and the order ID found in the **notes** section in FSM.



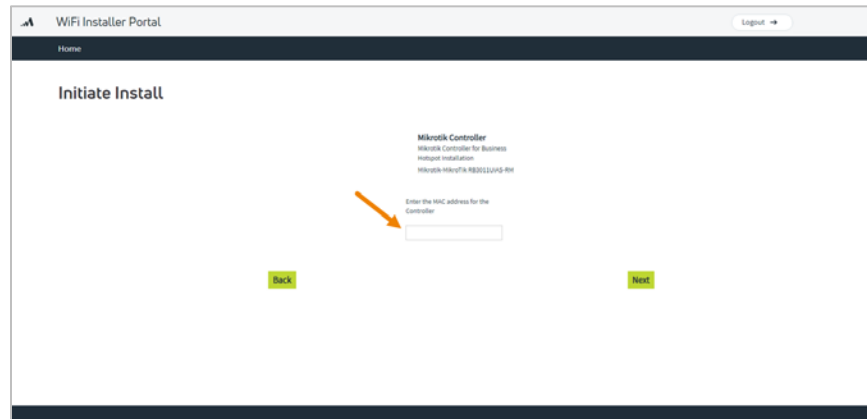
NOTE: If the customer location is in an area with limited cell phone coverage, use your laptop and connect to Port 10 on the controller to start the configuration process. During the process, the internet access will be interrupted. If the progression appears to have stalled, unplug the network cable to the laptop and plug it back in. Then log out of the portal and log back in. If this does not resolve the issue, contact Installer Relations at **(888) 278-6869** and select **Option 1** (Hotspots).

- 2 Once logged in, the order confirmation appears, showing the installation address and order details (satellite details will not display on Hotspots orders currently).

Confirm the equipment listed in the order details matches what was shipped. If there is a discrepancy, contact Installer Relations immediately. The equipment must match for the installation to occur (no partial Wi-Fi installations). Click **next** to confirm the order details.



- 3 Enter the correct **MAC address** for the controller.



The MAC Address can be found on a sticker on the back of the controller. It is the first of the two listed; the other will not work with the Installer Portal.



Click outside the MAC address field, and then click **next**.



NOTE: After entering information in the required field/s on each page, click outside the field before clicking **next** to proceed.

- 4 Once auto-configuration begins, the status changes.

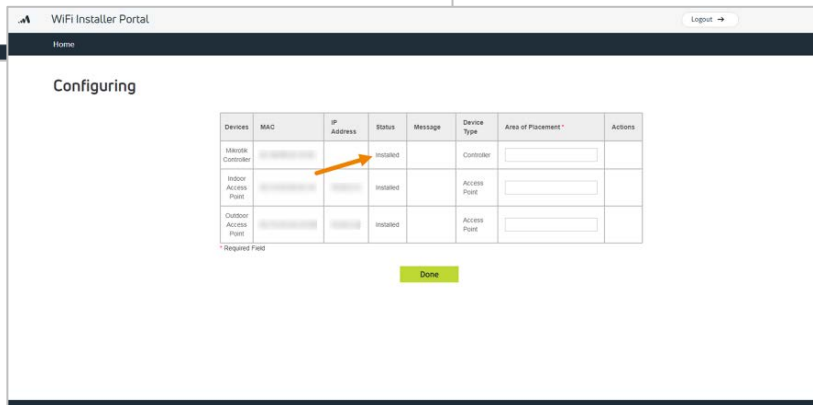
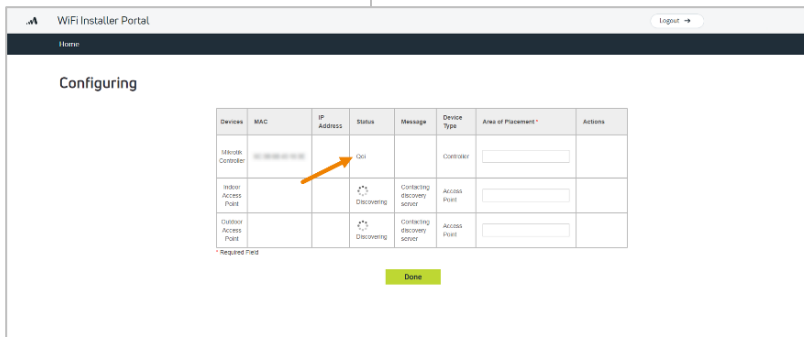
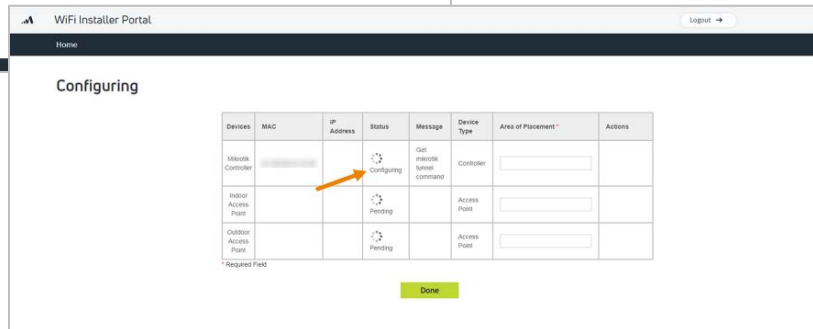
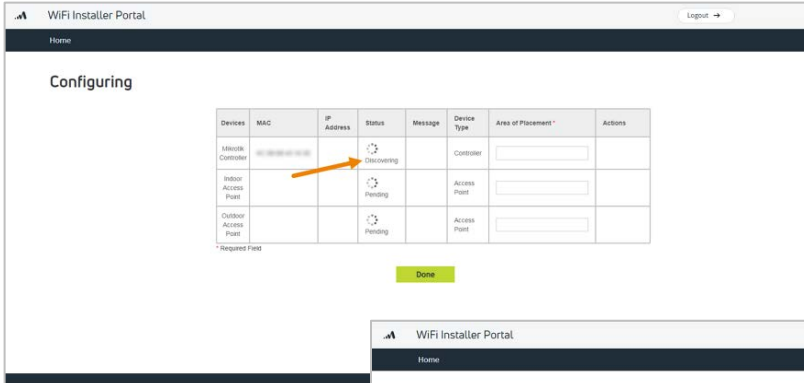
The **controller** progression is:

- » Discovering
- » Configuring
- » Qoi
- » Configuring
- » Installed

The **AP** progression is:

- » Discovering
- » Configuring
- » Installed

The equipment will show as pending until it begins the discovery process.





NOTE: Discovering takes approximately 2-3 minutes for each device. **Configuring** the controller takes 5-10 minutes, while the APs can take 15-20 minutes each as the firmware updates. The AP/s will configure while the controller is in **qoi** status. Then the controller will return to **configuring** status for up to one minute before showing as **installed**. If the configuring phase takes more than 20 minutes, begin troubleshooting (see #6 below).

- 5 The **message** column provides more detailed information on what each device is doing during the discovering, configuring, and qoi phases. The status messages will indicate how the configuration is progressing.

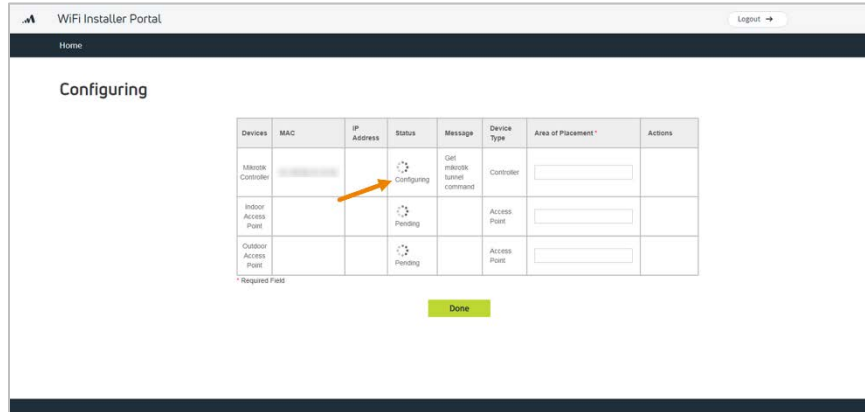
Each message should display from a few seconds to 5 minutes. Some may not display if that process happens quickly.

If the same message displays for more than 5 minutes, begin troubleshooting (see #6 below).

Status	Controller messages / display times		AP messages / display times	
Discovering	<ul style="list-style-type: none"> › Getting order info 	< 1 min	<ul style="list-style-type: none"> › Contacting discovery server › Awaiting device response › Still awaiting device response › Device should respond any minute now 	<ul style="list-style-type: none"> < 1 min 1-5 mins 1-5 mins 1-5 mins
Configuring	<ul style="list-style-type: none"> › Getting pptp user entry › Get Mikrotik tunnel command › Configuring tunnel (10 sec delay) › Updating pptp entry › Getting ros version › Upgrading ros version › Downgrading ros version › Getting firmware version › Upgrading firmware version › Downgrading firmware version › Building rsc file › Uploading rsc file › Executing rsc file › Updating virtual gateway config 	<ul style="list-style-type: none"> < 1 min < 1 min 2-3 mins < 1 min < 1 min 1-2 mins 1-2 mins < 1 min 1-2 mins 1-2 mins < 1 min < 1 min < 1 min < 1 min 	<ul style="list-style-type: none"> › Getting ruckus template (<1 min) › Provisioning ruckus device (<1 min) › Creating new AP Zone (1st AP only) › Creating new AP group › Creating new AP › Creating new WLAN group › Creating new WLAN 	<ul style="list-style-type: none"> < 1 min < 1 min < 1 min < 1 min 4-5 mins < 1 min < 1 min
Qoi	Blank	20-30 mins	N/A	N/A
Configuring	<ul style="list-style-type: none"> › Updating virtual gateway config 	< 1 min	N/A	N/A

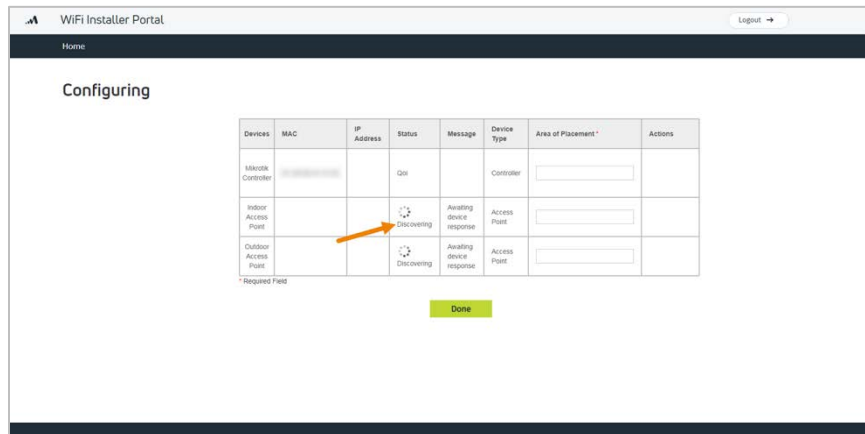
6 To troubleshoot the controller if it is stuck in the **discovering** status:

- » Verify power is turned on
- » Verify cable connected to Port 1 is seated tightly
- » Verify status light for the port is illuminated



If an AP is stuck in the **discovering** status:

- » Verify it has power (check for lights on the AP)
- » Test the Ethernet cable
- » Reboot the AP

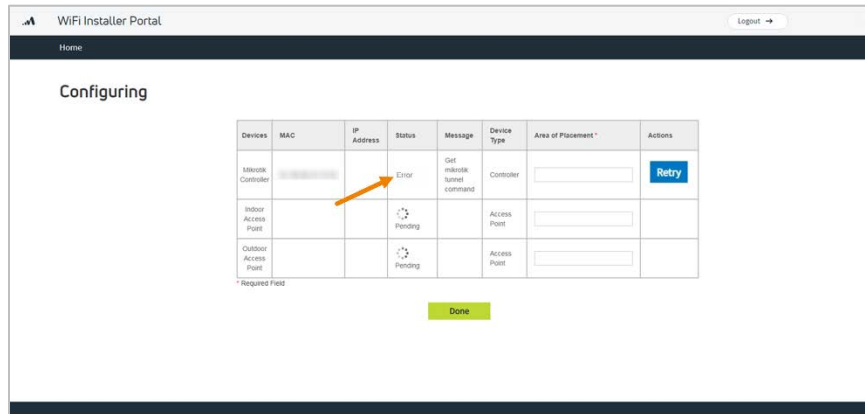


If the controller is stuck in the **configuring** status and the last message displayed was **updating firmware version**, reboot the controller.

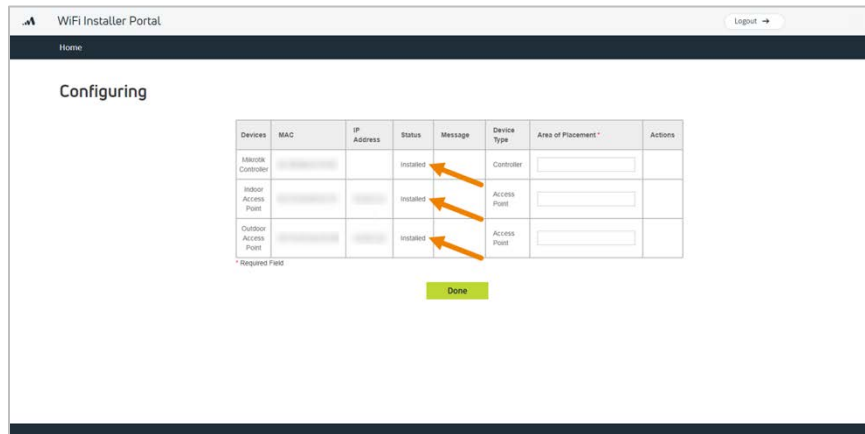
If the process doesn't start again automatically, then log out and log back in to the portal. Confirm the order and re-enter the MAC address. The configuration should resume from the point it stopped previously. If it does not, contact Installer Relations for technical assistance.

- 7 If you receive an error message, click the **retry** button to start the configuration process again for that device.

If that doesn't work or you continue to receive an error, log out of the portal and then log back in. Confirm the order and enter the MAC address again to resume the configuration. Depending on where in the process the error occurred, it may successfully configure. If not, contact Installer Relations for technical assistance.



- 8 When the status for all equipment changes to **installed**, check the Wi-Fi signal on a mobile device. Both the private and public SSIDs should be visible when selecting a network on the mobile device.



The SSIDs are set to the following defaults:

Network Type	Network Name	Password
Public	GUEST WIFI	N/A
Private	BUSINESS	private1

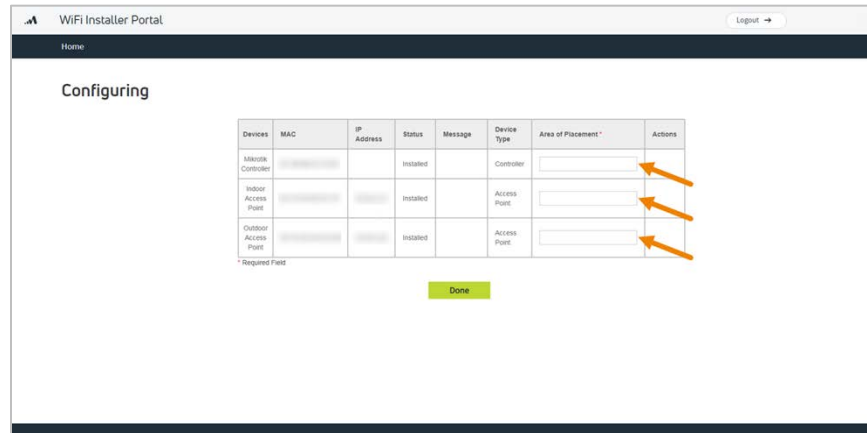


NOTE: Advise the customer to change their SSIDs and private network password on their Management Portal when reviewing the Quick Start Guide with them.

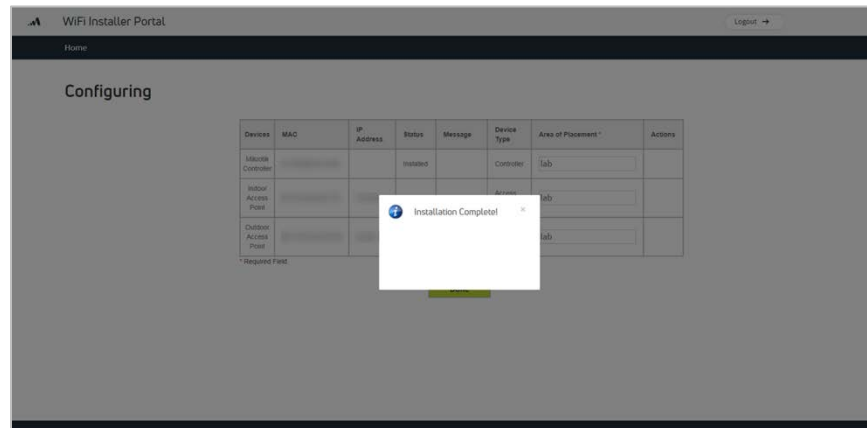
- 9 After checking the Wi-Fi signal, enter the **area of placement** for each device.

The area of placement is the physical location where the equipment was installed (i.e., “next to modem” or “ceiling mount”).

This information **must** be entered to complete the installation, otherwise the customer’s management portal will not work correctly.



- 10 Click **done** when finished, and then a confirmation message will display indicating the installation is complete. Close the message and log out to exit the portal, or simply close the browser.



Step 7 | Tie down outdoor cables

After testing the equipment, tie down the cables for the satellite antenna and outdoor AP/s. Remember to ensure any holes penetrating the building are sealed.

Step 8 | Basic troubleshooting

Basic network troubleshooting	
AP will not power up	<ul style="list-style-type: none"> » Ensure the PoE injector is plugged into the power supply and the power LED is lit. » Ensure Ethernet cable from AP is securely plugged into the POE port on the PoE injector. » Ensure yellow Ethernet patch cable from the controller is securely plugged into LAN port on the PoE injector.
Wi-Fi network is not seen	<ul style="list-style-type: none"> » Ensure the AP's 5GHz or 2.4GHz LED is illuminated. » If LEDs are not illuminated, reboot AP via the PoE injector by unplugging the Ethernet cable from the POE port on the injector, waiting 5 seconds, then plugging it back in.
No internet access	<ul style="list-style-type: none"> » Ensure the internet/online LED is lit on the satellite modem. If not, or if there is no connectivity, contact Installer Relations at (888) 278-6869, Option 2 for assistance. » Ensure the Ethernet LEDs are lit at each Ethernet connection (satellite modem, controller, and AP/s). If LEDs are not illuminated properly, reboot the controller by unplugging the power cord for 5 seconds and plugging it back in.



NOTE: Ruckus outdoor APs are designed to be water resistant. When properly installed, some water may collect in the channel surrounding the radome. This should not affect service and does not necessitate replacement if the AP is not working properly. Full troubleshooting should be completed before requesting replacement of an outdoor AP.

If you encounter issues that cannot be resolved by the troubleshooting steps listed above, contact Viasat Installer Relations at **(888) 278-6869, Option 1** for Hotspots technical assistance.

Step 9 | Complete documentation

The installation is not complete until all points of the installation have been documented in LiveQC, a video chat service that is accessed through FSTechSupport, available in Android and Apple app stores.

- 1 Log in to the FSTechSupport app using your tech ID and password.
- 2 Enter the job number and select LiveQC to be placed in queue for the next available agent.
- 3 The agent will request the FSM ID, Tech ID, customer name, address, and phone number, service region, account number, work order type, and work order close reason.
- 4 Next the agent will request video inspection of different aspects of the installation to indicate on their form if it passes, fails, or is not applicable. See the table below for information requested by the agent.

Included in LiveQC inspection	
<ul style="list-style-type: none"> » Mount type (roof, wall, ceiling, or stubby) » If the mount is an approved type » Line of sight » Approved cable use and aesthetics » Equipment » System grounded to NEC ground source 	<p>If the technician followed proper procedures:</p> <ul style="list-style-type: none"> » Pre-install customer experience procedures » Cable routing » System grounding » System provisioning

5 Finally, pictures will be uploaded to LiveQC:

Upload pictures	
» Location	» Cable type
» Line of sight	» Point of entry
» Mount	» Pole height
» Cable run	» Any other requested images

6 Any additional notes or comments may be added as needed.

Step 10 | Review Quick Start Guide with customer

A Business Hotspots Quick Start Guide for the customer is included with the network equipment. Review the guide with the customer to ensure they are aware of key information about their Wi-Fi network:

- » How to access the public and private networks
- » How to access the management portal and portal user guide
- » How to secure their private network by changing the network name and password on the management portal
- » How to contact customer support.



Need help? Contact Viasat Installer Relations at (888) 278-6869, Option 1 for Hotspots technical assistance.

Access Point mounting instructions



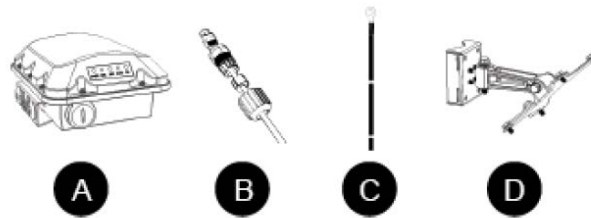
Overview

This section provides step-by-step instructions on how to install the Ruckus Wireless Outdoor Access Point.

Package contents

- » One outdoor AP (A in Figure 1); includes one wall- or pole-mounting bracket and one 12mm M6x1 earth ground screw with split lock and flat washers
- » One M25 data cable gland (B in Figure 1)
- » Ground wire with lug (C in Figure 1)
- » Pole/wall mount bracket kit (D in Figure 1)
- » Four steel pipe clamps

Figure 1: AP field-installation package contents



Setup requirements

- » Torque wrench or torque screwdriver with sockets and bits
- » Small flat-blade screwdriver
- » No. 2 Phillips screwdriver
- » Long-nose pliers
- » Wire stripping and terminal crimping pliers
- » Outdoor-rated CAT5e Ethernet cable
- » Electric drill with drill bits and installer-supplied wall anchors, flat washers, and hex nuts for flat-surface mount
- » Pipe/pole or sturdy flat surface

Important safety information

Warning: Installation of this equipment must comply with local and national electrical codes.

Warning: Ruckus Wireless strongly recommends that you wear eye protection before mounting the AP.

Caution: Make sure that you form a 3in – 5in drip loop in any cable that is attached to the AP or the building. This will prevent water from running along the cable and entering the AP or the building where the cable terminates.

Caution: Be sure that grounding is available and that it meets local and national electrical codes.

Caution: Make sure that proper lightning surge protection precautions are taken according to local electrical code.

Access point coverage

The Ruckus outdoor access point is best deployed where internal-antenna lateral beamforming can provide the greatest reach and throughput to a wide coverage area, or to provide the greatest distance between APs in a connecting mesh device. See Figure 2 for optional side view coverage patterns.

Figure 2: Typical AP Omni coverage, side view



Option 1



Option 2

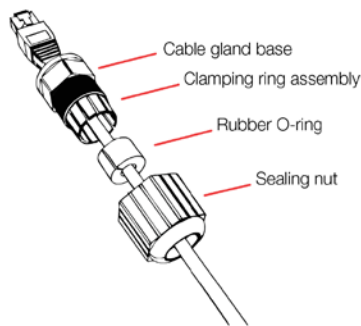
Installation instructions

Step 1 | Connect and seal Ethernet cable

The AP uses one RJ45 (Ethernet) cable for Power over Ethernet (PoE). Connect and seal the cable using the M25 data cable gland (B in Figure 1). normally

- 1 Use a wide flat-blade screwdriver to remove the blanking cap from the AP.
Feed the end of the RJ-45 (Ethernet) cable through the sealing nut, rubber O-ring, clamping ring assembly and cable gland base. Do not seat the clamping ring and rubber O-ring into the gland body until the gland body has been torqued.

Figure 3: RJ-45 cable and cable gland assembly

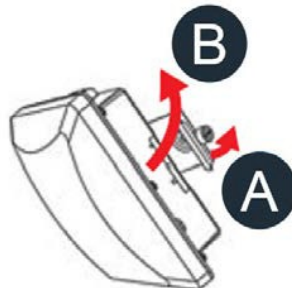


- 2 Connect the cable to the Ethernet port in the AP.
- 3 Tighten the cable gland base into the AP chassis until secure.
- 4 Wrap the clamping ring assembly around the rubber O-ring. Make sure that the clamping ring assembly fully encloses the rubber O-ring.
- 5 Seat the clamping ring assembly and rubber O-ring in the cable gland base.
- 6 Hand tighten the sealing nut.
- 7 Continue with Step 2a | Attach mounting bracket to a flat surface or Step 2b | Attach mounting bracket to metal pole.

Step 2a | Attach mounting bracket to flat surface

- 1 The AP mounting bracket attaches to the AP using a captive screw. Use a medium flat-blade or No. 2 Phillips screwdriver to loosen the captive screw (A in Figure 4) and pull up on the end of the bracket to remove the bracket from the AP (B in Figure 4).

Figure 4: Removing the mounting bracket



- Using either of the two options shown in Figure 5, hold the mounting bracket at the location on the mounting surface where you want to mount the AP. Use the holes on the mounting bracket as a template to mark the locations of the mounting holes. The mounting bracket can be mounted to a vertical or horizontal surface to support the AP in the required orientation.

Figure 5: Mounting bracket on a flat surface

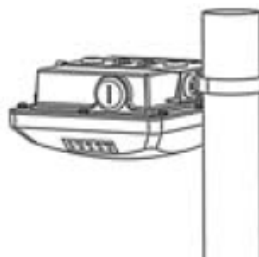


- Remove the mounting bracket from the mounting surface.
- Drill holes required for the installer-supplied mounting hardware.
- Attach the mounting bracket to the flat surface using the mounting hardware.
- Using the mounting hardware instructions, tighten the hardware to secure the mounting bracket.
- Continue with Step 3 | Mounting the AP.

Step 2b | Attach mounting bracket to metal pole

- The AP mounting bracket attaches to the AP using a captive screw. Loosen the screw (A in Figure 4) and pull up on the end of the bracket to remove the bracket from the AP (B in Figure 4).
- Insert the open end of one steel clamp (D in Figure 1) into two of the slots on the mounting bracket. The mounting bracket can be mounted to a vertical or horizontal surface to support the AP in the required orientation.
- If necessary, daisy-chain the other steel clamps to accommodate larger poles.
- Use the clamp(s) to attach the mounting bracket to the pole (Figure 6). Tighten the clamps until secure.

Figure 6: Mounting bracket on a pole

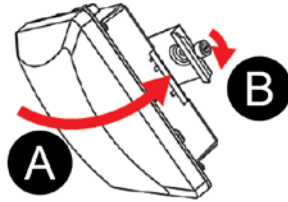


- Continue with Step 3 | Mount the AP.

Step 3 | Mount the AP

- 1 Snap the AP back onto the mounting bracket (A in Figure 6), and use a medium flat-blade or No. 2 Phillips screwdriver to tighten the captive screw to secure the bracket to the AP (B in Figure 7).

Figure 7: Attaching the mounting bracket to the AP



- 2 Continue with Step 4: Earth Ground the AP.

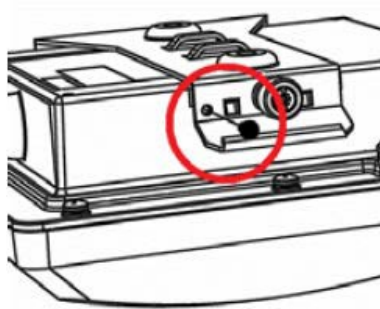
Optional | Lock the mounting bracket to the AP

If the mounting bracket needs to be locked to the AP, use a matching security screwdriver to screw the installer-supplied locking stainless steel 6mm M3 panhead security screw through the mounting bracket and into the AP chassis.



CAUTION: Ensure the locking security screw is no longer than 6mm, otherwise it can damage the AP chassis.

Figure 8: Locking the mounting bracket to the AP



Step 4 | Earth ground the AP

Make sure that earth grounding is available and that it meets local and national electrical codes. Before completing this step, check your local wiring standards for guidance.

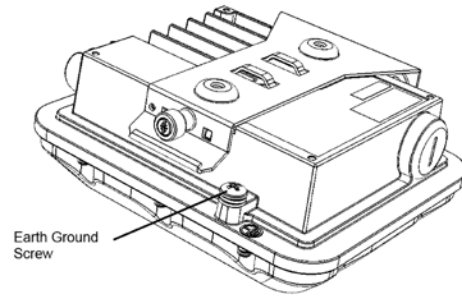
Using the supplied ground wire and ground screw/washer set, connect a good earth ground to the AP chassis ground point (Figure 8).

The Ruckus outdoor AP includes one 9mm stainless steel M6x1 earth ground screw with split lock and flat washers.



CAUTION: Ensure the ground screw is no longer than 9mm, otherwise it can damage the AP chassis.

Figure 9: Connect good earth ground to AP





Overview

This section provides step-by-step instructions on how to install the Ruckus Wireless indoor access point.

Package contents

- » ZoneFlex wireless access point
- » Mounting screws and wall anchors (2)
- » Security screw
- » Unit removal pin

Setup requirements

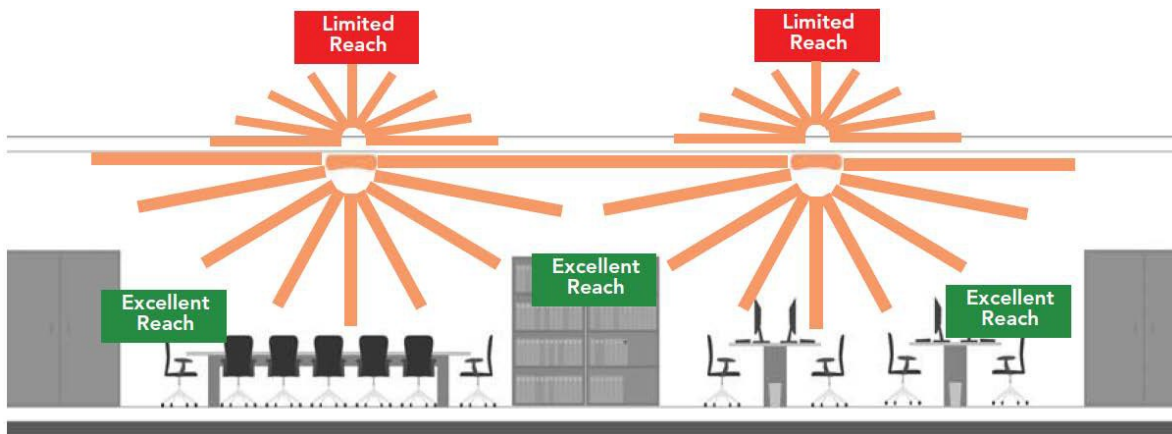
One or more of the following:

- » Modem
- » Controller
- » Two CAT5e Ethernet cables
- » PoE injector

Access point coverage

The location and orientation of the AP play a critical role in the performance of the wireless network. In general, Ruckus Wireless recommends installing the AP away from obstructions and sources of interference and ensuring that the top of the AP is pointing in the general direction of its wireless clients.

Figure 1: Recommended ceiling mounting orientation



When wall mounted, the APs should be staggered to maximize coverage.

Figure 2: Recommended wall mounting orientation

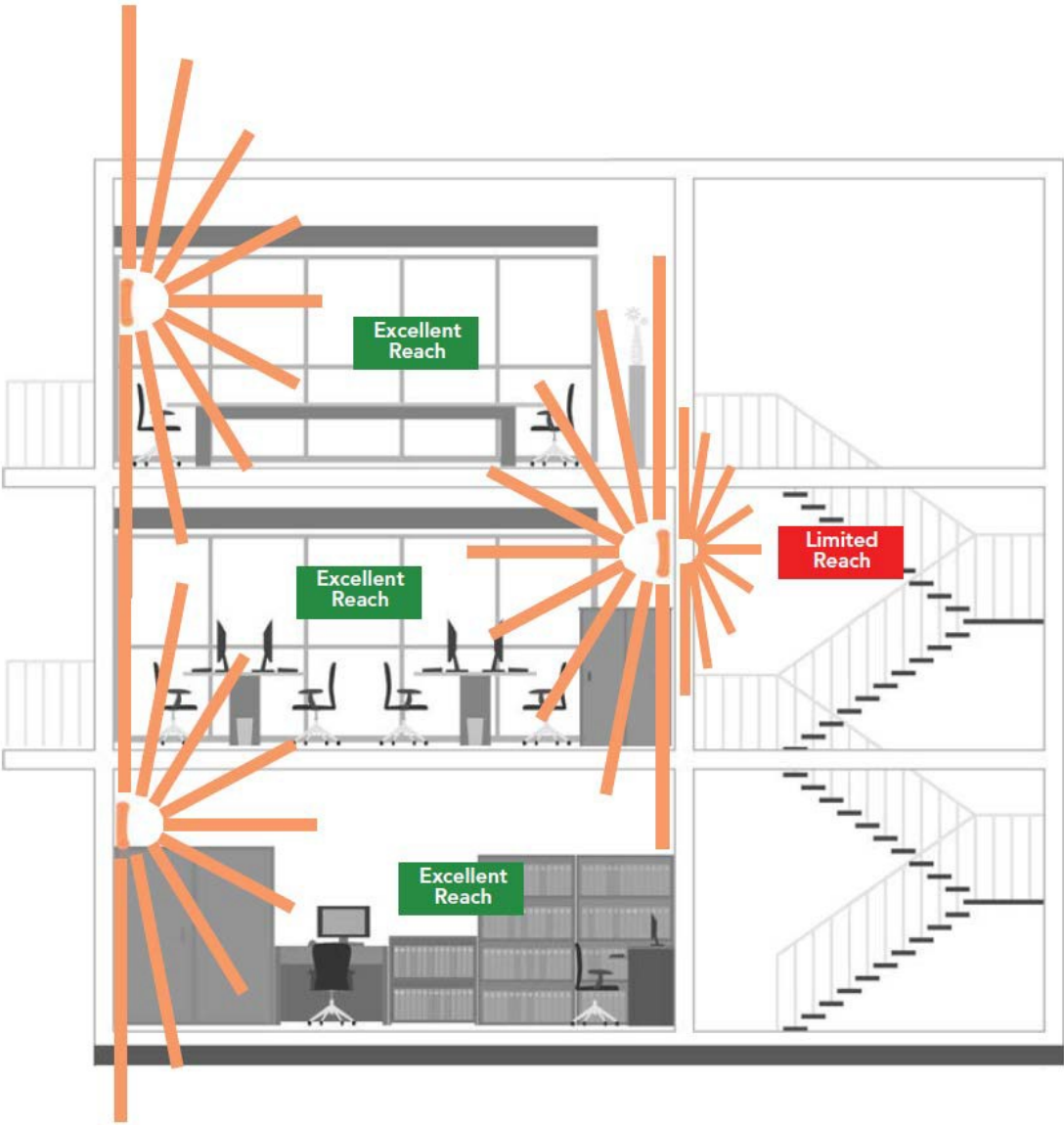
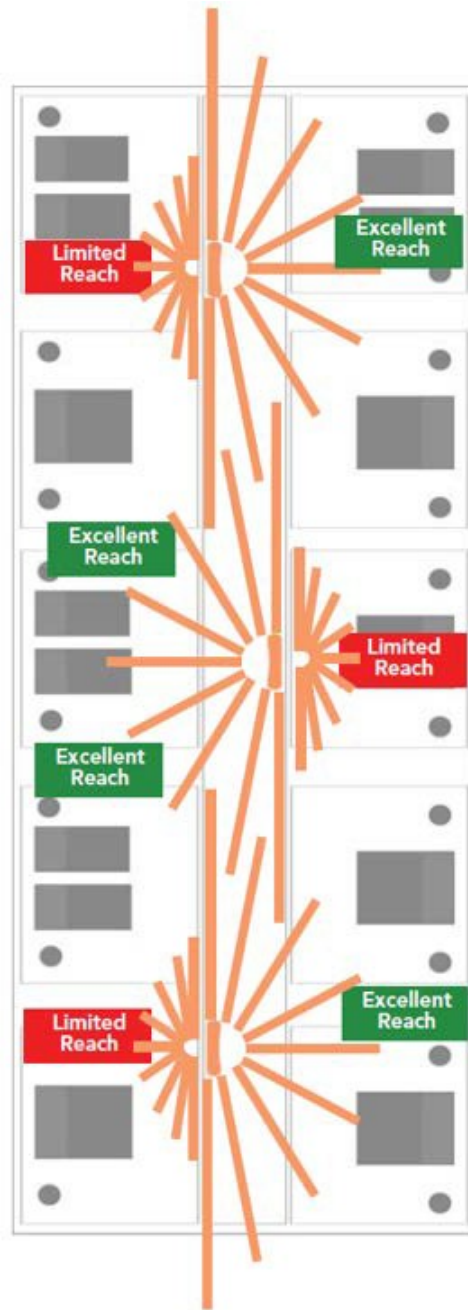


Figure 3: Recommended wall mounting in a corridor (top view)



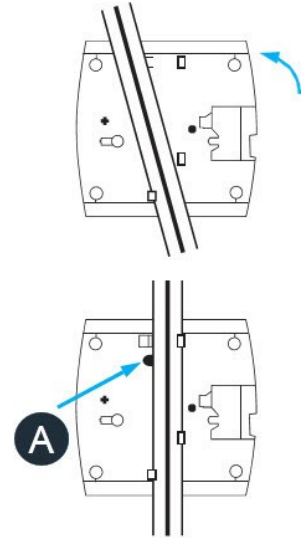
Installation instructions

Before installing the indoor Access Point (AP), determine which mount type to use: drop-ceiling T-bar (most common), flat surface, or mounting bracket; then mount the AP. The AP can be removed, if needed, for troubleshooting or replacement.

Mount the AP on a drop-ceiling T-bar

- 1 Orient the AP so that the T-bar is positioned between the T-bar clips as shown. The top of the AP (blank white part) will face the floor.
- 2 Rotate the AP until the third T-bar clip catches the T-bar and the latch locks the T-bar in place.
Optional: For added security, using a Torx T8 screwdriver, insert the locking screw (A) into the hole near the latch to lock the AP in place.

Figure 4: T-bar mount



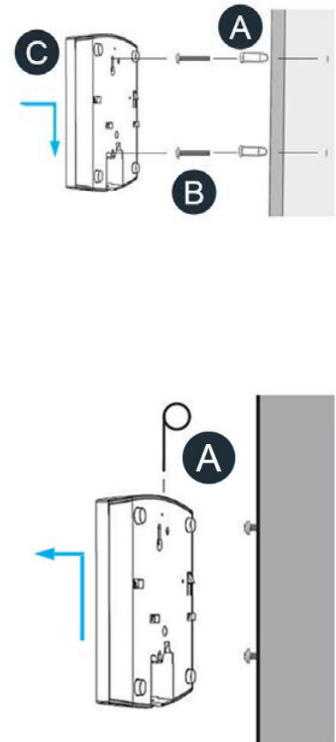
Remove the AP from a drop-ceiling T-bar

- 1 To remove the AP, first remove the security screw (if used), then depress the latch while rotating the AP so that the T-bar clips disengage the T-bar.

Mount the AP on a flat surface

- 1 Use the Mounting Template (located at the end of the Indoor AP section of this guide) to mark the locations for two drill holes on the mounting surface.
- 2 Use a 4.75mm (3/16") drill bit to drill holes approximately 25mm (1") deep into the mounting surface.
- 3 Insert the factory-supplied anchors (A) and mounting screws (B) into the mounting surface, leaving approximately 6mm (1/4") of the screw heads protruding from the surface.
- 4 Place the AP onto the mounting screws so that the screw heads enter the keyholes on the AP enclosure (C), and gently press down on the AP until the locking tab in the upper AP keyhole locks the AP onto the top mounting screw.

Figure 5: Flat-surface mount



Remove the Access Point (AP) from flat-surface mounting screws

- 1 To remove the AP from the factory-supplied mounting screws, gently press the unit removal pin (A) into the access hole on the end of the AP to release the bracket locking tab in the upper keyhole.
- 2 Push the AP up and pull it away from the mounting screw heads.

Mount the AP using secure mounting bracket

The included Mount Kit includes a metal mounting bracket and provides greater security when attaching the AP to flat surfaces (walls and ceilings) and poles.

When using the mounting bracket, you will need an electric drill with a 4.75mm (3/16") drill bit, and the four No. 6 zinc-plated screws and plastic wall anchors included with the kit.

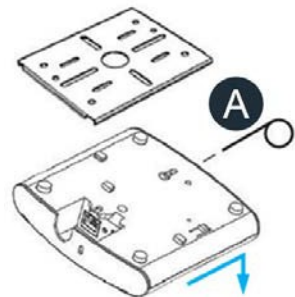
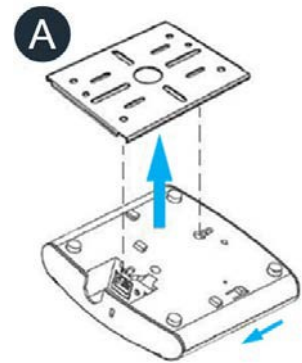
If you are mounting the AP on a truss or pole, then you will also need the two installer-supplied stainless steel pipe clamps.

- 1** If mounting on a flat surface, use the secure mounting bracket as a template to mark the locations for four drill holes on the mounting surface. There are four screw holes available on the secure mounting bracket.
Fasten the bracket to the flat surface using four mounting screws and plastic wall anchors.
Continue with Step 3.
- 2** If you are mounting the AP on a pipe or pole, then feed the two installer-supplied stainless steel clamps through the slots on the secure mounting bracket. Use common hand tools to tighten the clamps around the pipe or pole.
After the bracket is attached, continue with Step 3.
- 3** Insert the two studs on the secure mounting bracket (A) into the keyholes on the bottom of the AP.
- 4** Slide the AP toward the Ethernet port until the locking tab in the upper AP keyhole locks the AP onto the top mounting bracket stud.

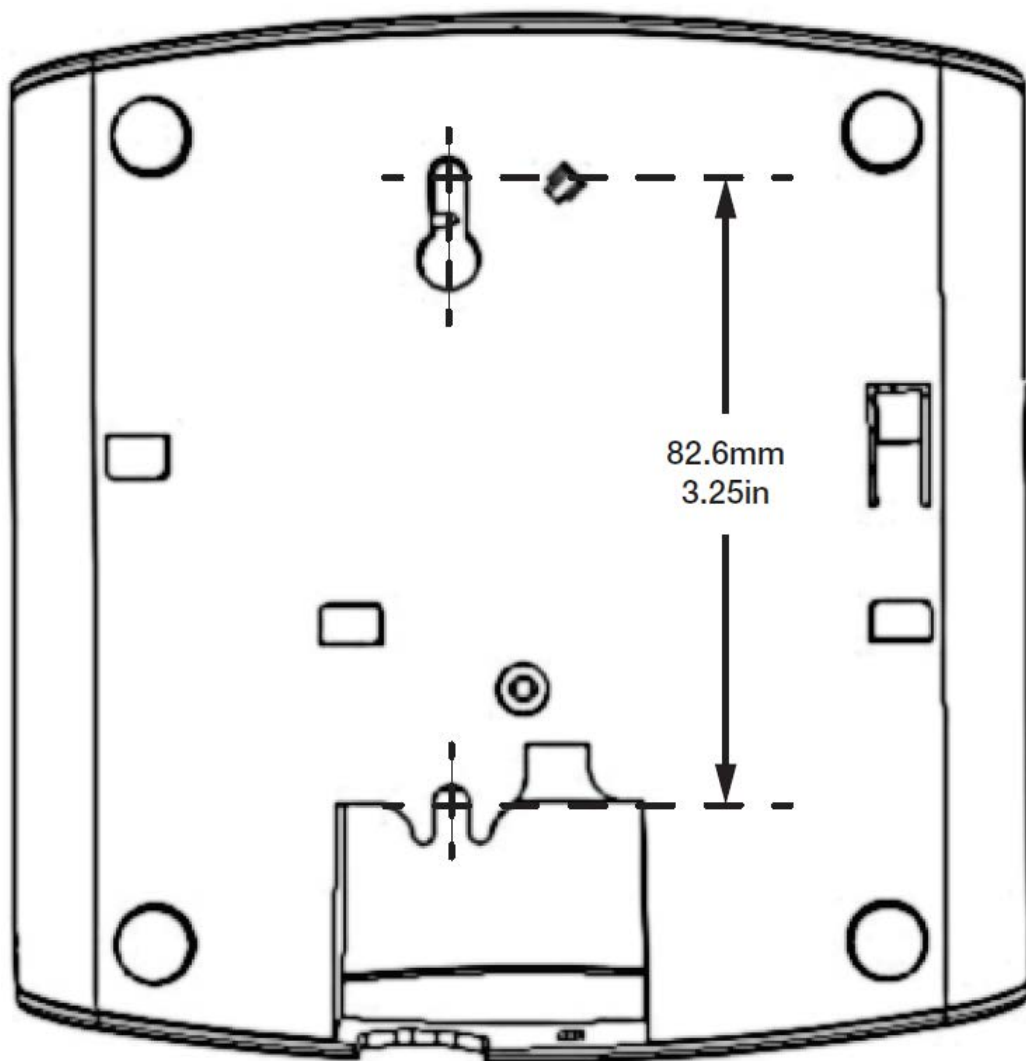
Remove the AP from the secure mounting bracket

- 1** Gently press the unit removal pin (A) into the access hole on the end of the AP to release the bracket locking tab in the upper keyhole.
- 2** Slide the AP toward the unit removal pin and remove the AP from the bracket.

Figure 6: Mounting bracket



Mounting template



Low-profile “stub” mount installation

Low-profile ("stub") mount installation

Outdoor equipment may be installed using this Viasat-approved pole-mounting solution. The low-profile pole mount is typically used on rooftops. The instructions below are also available in the [Low-Profile "Stub" Mount Job Aid](#) located in the *eGuide*.

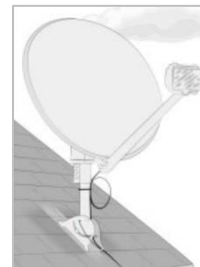
Prepare for low-profile "stub" mount

Step 1 | Surfaces

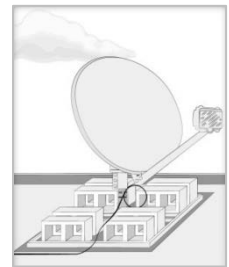
The *only* approved location for a low-profile pole mount is a sloped roof:

- » Made of asphalt shingles
- » Not damaged or decayed
- » With no more than 3 layers of shingles

NOTE: Use the low-profile (stub) mount with a non-penetrating mount for flat roofs.



Stub mount




Non-pen mount

Step 2 | Structural elements

The approved structural elements for a low-profile sloped roof mount are rafters or trusses.

- » The two center 5/16 x 3in. lag screws in the footplate must be secured in the structural elements.
- » The outside corner flanged lag screws must be secured in the roof.

Step 3 | Important considerations

 **DANGER!** Locate power lines before you start the installation. These include overhead and underground power lines, electric lights, and power circuits.

Step 4 | Other considerations

- » The ground block must be within 20ft. of the NEC-approved ground.
- » All antennas must be located at least 20ft. from any overhead power lines and 3ft. from any standard power circuit or electric light.
- » Position the mount so that the AP is at least 10ft. above any walking surface.

Step 5 | Mounting materials for footplate

The technician must provide the following materials:


- » Tar-based sealant (Bishop Tape preferred)

Attach footplate

The footplate is the centerpiece of the mount, so correctly attaching it to the surface is critically important.

Step 1 | Locate structural elements

Locate the structural elements (rafters) that will place the footplate in position to meet all of the appropriate considerations listed above.

 **NOTE:** Use a deep-scan stud finder to locate the rafter/structural elements.

Step 2 | Mark and predrill center hole

Hold the footplate in the center of the rafter and mark the top center hole. Remove the footplate and predrill 1/8in. hole on the mark.

Step 3 | Mark and predrill remaining holes

Use a level to verify that the center line of the footplate, defined by the footplate's center holes, is level.

Mark and predrill the bottom center hole.

Mark and predrill the remaining four 1/8in. holes, one in each outside corner.

Always fill any unused holes with tar-based sealant.

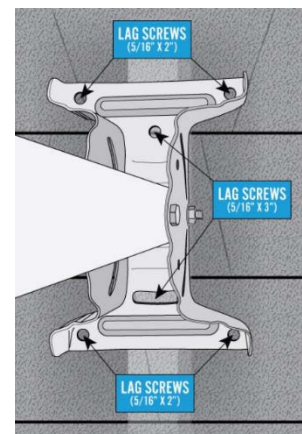
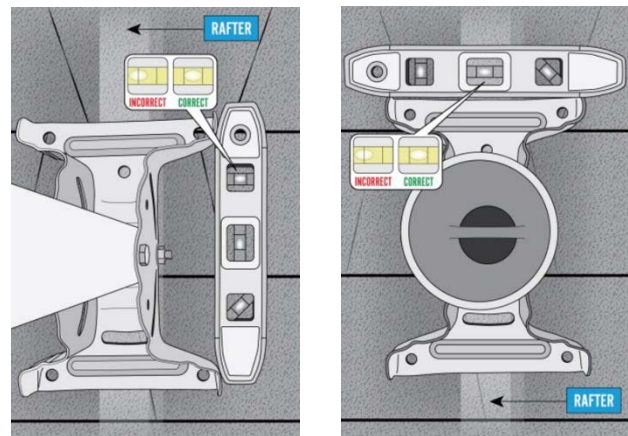
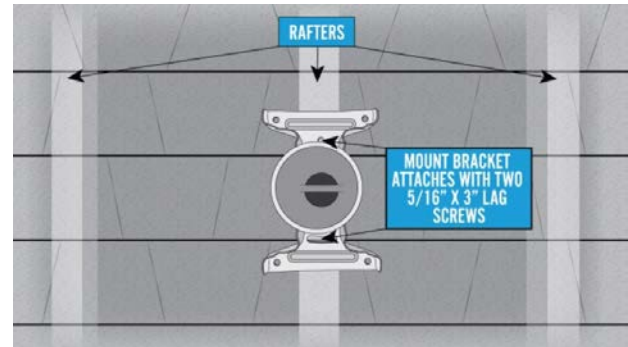
Step 4 | Secure lag screws

Cover the bottom of the entire footplate with tar-based sealant.

Secure 5/16 x 3in. lag screws through the top and bottom center holes of the footplate and the rafter. Leave these loose enough to level the footplate.

Correctly align the footplate over the 1/8in. holes. This will allow correct placement directly over rafters or trusses.

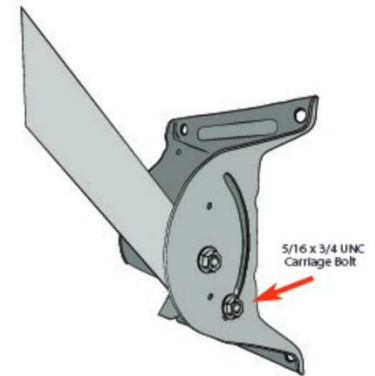
Install 5/16 x 2in. flanged lag screws in each of the outside corners. Securely tighten all the screws.



Adjust mast tube

Step 1 | Loosen carriage bolt

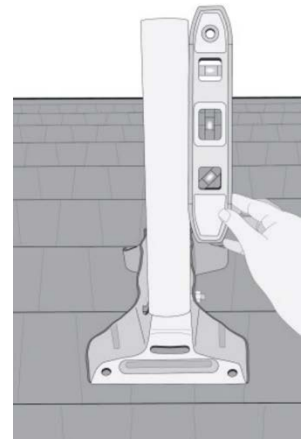
Loosen the 5/16 x 3/4in. carriage bolt that is in the footplate's arched slots and the mast tube.



Step 2 | Level mount tube and tighten bolts

Swing the mount tube up and use a level to level the mount tube. Tighten the footplate carriage bolts to ensure the mount is plumb. Complete final mount tube leveling after installing the monopoles.

Once the mast tube is level, perform a quick tug test on the mount to verify that it is stable. Now the outdoor AP can be attached.



Terminating Ethernet cable

Terminating Ethernet cable

This section outlines step-by-step procedures for terminating Ethernet cable using a crimping tool, UTP cable stripper, and RJ45 connector. Also see the [Ethernet Cable Prep Job Aid](#) located in the *eGuide*.

Step 1 | Trim cable

Using a crimping tool, trim the end of the cable you're terminating to ensure that the ends of the conducting wires are even.



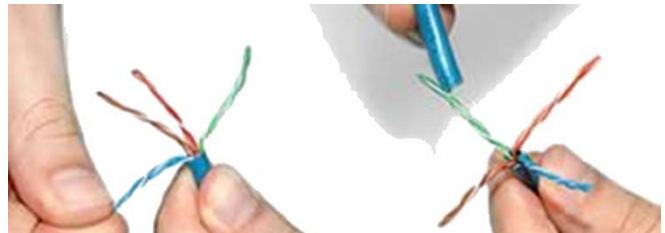
Step 2 | Strip jacket

Being careful not to damage the inner conducting wires, strip off approximately 1 inch of the cable's jacket, using a modular crimping tool or cable stripper.



Step 3 | Separate wires

Separate the 4 twisted wire pairs from each other, and then unwind each pair, so that you end up with 8 individual wires. Flatten the wires out as much as possible, since they'll need to be very straight for proper insertion into the connector.



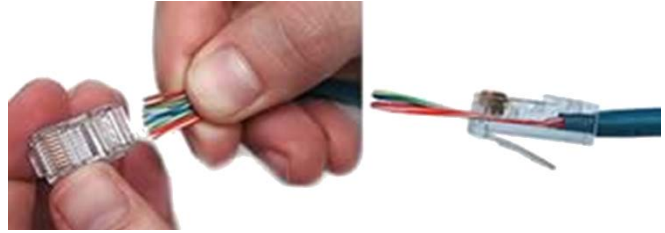
Step 4 | Arrange wires

Holding the cable with the wire ends facing away from you. Moving from left to right, arrange the wires in a flat, side-by-side ribbon formation, placing them in the following order: white/orange, solid orange, white/green, solid blue, white/blue, solid green, white/brown, solid brown.



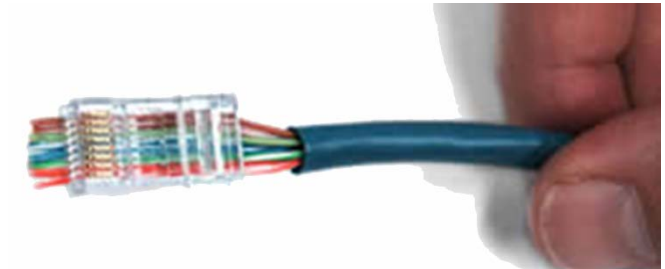
Step 5 | Insert wires

Holding the RJ45 connector so that its pins are facing away from you and the plug-clip side is facing down, carefully insert the flattened, arranged wires into the connector, pushing through until the wire ends emerge from the pins. For strength of connection, also push as much of the cable jacket as possible into the connector.



Step 6 | Confirm proper formation

Check to make sure that the wire ends coming out of the connector's pin side are in the correct order; if not, remove them from the connector, rearrange into proper formation, and re-insert. Remember, once the connector is crimped onto the cable, it's permanent. If you realize that a mistake has been made in wire order after termination, you'll have to cut the connector off and start over.



Step 7 | Crimp plug

Insert the prepared connector/cable assembly into the RJ45 slot in your crimping tool. Firmly squeeze the crimper's handles together until you can't go any further. Release the handles and repeat this step to ensure a proper crimp.



Step 8 | Repeat

After the first termination is complete, repeat process on the opposite end of your cable.



View online at <http://www.cableorganizer.com/learning-center/how-to/how-to-terminate-RJ45.htm>