Viasat

Community Wi-Fi

Installation Guide

Contents

Single-Site Equipment Installation

Single-site equipment

Satellite

Controller

Modem

Indoor AP

UPS

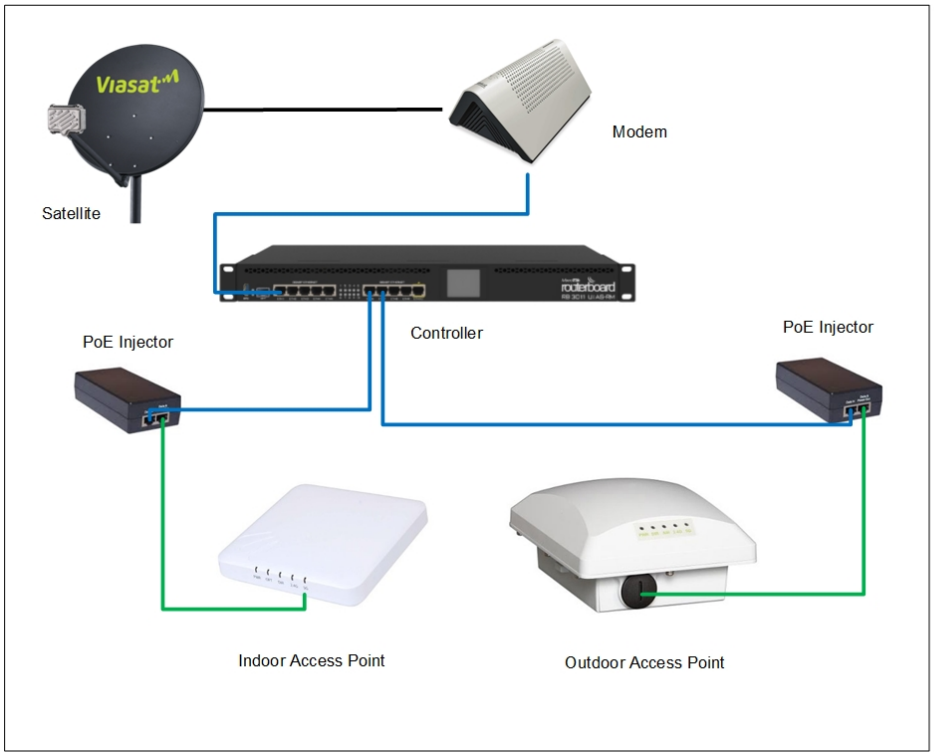
PoE injector

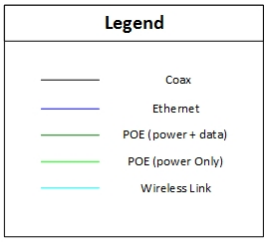
Outdoor AP

Selection of equipment location

Equipment and indoor AP	Select a cool, dry, secure location near a power source for installing the satellite modem, controller, UPS, and PoE injectors. For the indoor AP, select a location inside the building (wall or ceiling mount) that provides clear line-of-sight to the Wi-Fi users. NOTE: The AP must be within 300 cable-feet of the PoE injector.
Outdoor AP	Select a location where the most Wi-Fi users will be reached, preferably overlooking a gathering area; install at a minimum height of 15-20 feet on hardened structure or using Viasat-approved pole mounting solution.

Single-site network diagram





Post-installation documentation

Complete documentation	Complete As-Built documentation located in the eGuide.
Email documentation	Email the As-Built and any supporting documentation and pictures to usacommunitywifi@viasat.com after the installation is complete.

Single-site installation instructions

Overview

This section outlines procedures for equipment installation at a single location.

Step 1: Install inside equipment

- Install the equipment (satellite modem, controller, UPS, and PoE injectors) near a power outlet in the customer's designated location.
- Plug the UPS into the power outlet and turn on. Plug the equipment into the UPS.
- Connect Port 1 on the controller to an available Ethernet port on the satellite modem.

Step 2: Install inside AP

- Mount the indoor AP (preferably ceiling mount) within 300 cable-feet of the PoE injector. Refer to the Ruckus ZoneFlex R300 Indoor AP installation instructions in this guide if needed.
- Run cable from the indoor AP to the Data+Power port of the PoE injector.
- Using a patch cable, plug the Data-Only port of the PoE injector into Port 6 of the controller.

Step 3: Mount outdoor AP

- Mount the outdoor AP in a secure location at a minimum height of 15-20 feet on a hardened structure or using Viasat-approved pole-mounting solution, according to the device-specific installation instructions, within 300 cable-feet of the PoE injector. Refer to the Ruckus ZoneFlex T300 Outdoor AP installation instructions in this guide if needed.
- Run cable from the outdoor AP to the Data+Power port of the PoE injector located with the equipment inside the building. Ensure that any holes that penetrate the building are sealed.
- Using a patch cable, plug the Data-Only port of the PoE injector into Port 7 of the controller.

Step 4: Confirm equipment connectivity

- In the Installer Portal, enter the controller MAC address and confirm connectivity.
- If the Installer Portal is unavailable, contact Viasat Managed Services at (979) 209-2366 to confirm all of the equipment is online.

NOTE: Contact Viasat Managed Services at (979) 209-2366 if there are any questions regarding the installation.

Multi-Site Equipment Installation

Multi-site equipment

Satellite

Modem

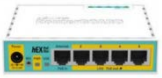
Controller

PoE injector

UPS

Multi-point root bridge w/ Omni antenna

PoE switch for wireless bridge



Wireless remote bridge

Indoor AP

Outdoor AP

Selection of equipment location

Main building equipment and indoor AP

Select a cool, dry, secure location near a power source for installing the satellite modem, controller, UPS, and PoE injectors. For the indoor AP, select a location inside the building (wall or ceiling mount) in a location that provides clear line-of-sight to the Wi-Fi users. NOTE: The AP must be within 300 cable-feet of the PoE injector.

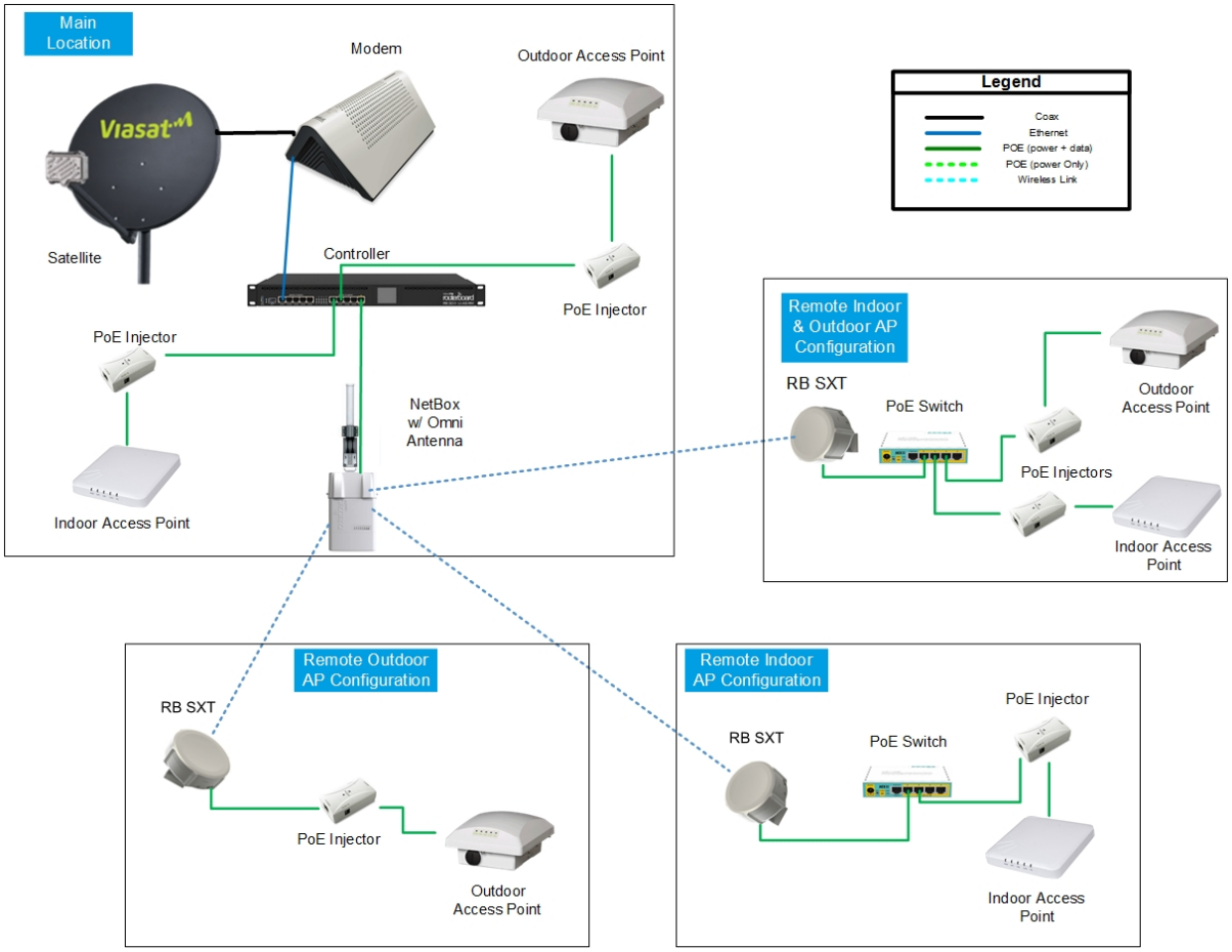
Outdoor AP and root bridge

Select a location where the most Wi-Fi users will be reached, preferably overlooking a gathering area. Install the outdoor AP at a minimum height of 15-20 feet on a hardened structure or using Viasat-approved pole-mounting solution. The root bridge will need clear line-of-sight to the remote bridge(s) and should be installed on a hardened structure.

Remote location power, PoE switch, PoE injectors, outdoor AP, & wireless bridge

Select a location near a power source for installing the surge protector, UPS, PoE switch and/or PoE injectors, maintaining good line-of-sight to the base station and covering the most Wi-Fi users. Use a Viasat-approved pole-mount solution for locations with no UPS or PoE switch.

Multi-site network diagram



NOTE: Locations may have a remote indoor AP configuration, a remote outdoor AP configuration, or both an indoor and outdoor AP configuration, as shown in the diagram above.

Post-installation documentation

Complete Documentation	Complete As-Built documentation located in the eGuide.
Email Documentation	Email the As-Built and any supporting documentation and pictures to usacommunitywifi@viasat.com after the installation is complete.

Multi-site installation instructions

Overview

This section outlines procedures for equipment installation at multiple locations.

Installation instructions – main location

Step 1: Install inside equipment

- Install the equipment (satellite modem, controller, UPS, and PoE injectors) near a power outlet in the customer's designated location. Plug the UPS into the power outlet and turn on. Plug the equipment into the UPS.
- Connect Port 1 on the controller to an available Ethernet port on the satellite modem.

Step 2: Mount inside AP

- Mount the indoor AP (preferably ceiling mount) within 300 cable-feet of the PoE injector. Refer to the Ruckus ZoneFlex R300 Indoor AP installation instructions in this guide if needed.
- Run cable from the indoor AP to the Data+Power port of the PoE injector.
- Using a patch cable, plug the Data-Only port of the PoE injector into Port 6 of the controller.

Step 3: Mount outdoor AP

- Mount the outdoor AP in a secure location at a minimum height of 15-20 feet on a hardened structure or using the Viasat-approved pole-mounting solution within 300 cable-feet of the PoE injector. Refer to the Ruckus ZoneFlex T300 Outdoor AP installation instructions in this guide if needed.
- Run cable from the outdoor AP to the Data+Power port of the PoE injector located with the equipment inside the building.
- Ensure that any holes that penetrate the building are sealed.
- Using a patch cable, plug the Data-Only port of the PoE injector into Port 7 of the controller.

Step 4: Mount outdoor antenna and base station

- Mount the outdoor antenna and base station (root bridge) at a minimum height of 15-20 feet. Refer to the Ubiquiti Omni Antenna and Netbox Multi-point Root Bridge installation instructions in this guide if needed.
- Run cable from the base station to the controller located inside the building with the equipment and plug it into Port 10.
- Ensure any holes penetrating the building are sealed.

Step 5: Confirm equipment connectivity

- In the Installer Portal, enter the controller MAC address and confirm connectivity.
- If the Installer Portal is unavailable contact Viasat Managed Services at (979) 209-2366 to confirm all of the equipment is online.

NOTE: Contact Viasat Managed Services at (979) 209-2366 if there are any questions regarding the installation.

Installation instructions: remote site(s) – outdoor AP configuration

Step 1: Install inside equipment

- Install the equipment (UPS and PoE injector) inside the structure near a power outlet in the customer's designated location.
- Plug the UPS into the power outlet and turn on. Plug the equipment into the UPS.

Step 2a: Mount outdoor equipment on Viasat-approved pole mount solution

Install the remote bridge and outdoor AP using the Telescoping Pole Mount Installation instructions in this guide. These instructions are also available in the Telescoping Pole Mount job aid in the *eGuide*.

Step 2b: Mount outdoor equipment on a hardened structure (not pole mount)

Install the remote bridge and outdoor AP on the exterior of a hardened structure:

- Mount the remote bridge at a minimum height of 10 feet to the hardened surface and point toward the main location. Plug the power cable into the UPS inside the structure or building. Refer to the SXT Remote Bridge installation instructions in this guide if needed.
- Check the signal strength indicator on the remote bridge and adjust the alignment as necessary to get the highest signal strength possible.
- Mount the outdoor AP in a secure location at a minimum height of 15 feet within 300 cable-feet of the PoE injector. Refer to the Ruckus ZoneFlex T300 Outdoor AP installation instructions in this guide if needed.
- Run cable from the Data In port of the PoE injector, located inside the hardened structure with the other equipment, to the remote bridge. Then run cable from the Data+Power port of the PoE injector to the outdoor AP.
- Ensure any holes penetrating the building are sealed.

Step 3: Confirm equipment connectivity

- In the Installer Portal, enter the controller MAC address and confirm connectivity.
- If the Installer Portal is unavailable contact Viasat Managed Services at 979-209-2366 to confirm all of the equipment is online.

NOTE: Contact Viasat Managed Services at 979-209-2366 if there are any questions regarding the installation.

Installation instructions: remote site(s) – indoor AP configuration

Step 1: Install inside equipment

- Install the equipment (UPS, PoE switch, and PoE injectors) inside the structure or building near a power outlet in the customer's designated location.
- Plug the UPS into the power outlet and turn on. Plug the equipment into the UPS.

Step 2: Mount indoor AP

- Mount the indoor AP (preferably ceiling mount) within 300 cable-feet of the PoE injector. Refer to the Ruckus ZoneFlex R300 Indoor AP installation instructions in this guide if needed.
- Run cable from the indoor AP to the Data+Power port of the PoE injector.
- Using a patch cable, plug the Data-Only port of the PoE injector into an open port on the PoE switch (ports 2-5).

Step 3: Mount remote bridge

- Mount the remote bridge at a minimum height of 10 feet to the hardened surface and point toward the main building. Plug the power cable into the UPS inside the structure or building. Refer to the SXT Remote Bridge installation instructions in this guide if needed.
- Run cable from the remote bridge to the PoE switch located inside the structure or building with the equipment and plug it into one of the powered ports (ports 2-5).
- Ensure any holes penetrating the building are sealed.
- Check the signal strength indicator on the remote bridge and adjust the alignment as necessary to get the highest signal strength possible.

Step 4: Confirm equipment Connectivity

- In the Installer Portal, enter the controller MAC address and confirm connectivity.
- If the Installer Portal is unavailable contact Viasat Managed Services at 979-209-2366 to confirm all of the equipment is online.

NOTE: Contact Viasat Managed Services at 979-209-2366 if there are any questions regarding the installation.

Installation instructions: remote site(s) – indoor & outdoor configuration

Step 1: Install indoor equipment

- Install the equipment (UPS, PoE switch, and PoE injectors) inside the structure or building near a power outlet in the customer's designated location.
- Plug UPS into the power outlet and turn on. Plug equipment into the UPS.

Step 2: Mount indoor AP

- Mount the indoor AP (preferably ceiling mount) within 300 cable-feet of the PoE injector using the Ruckus ZoneFlex R300 Indoor AP installation instructions in this guide.
- Run cable from the indoor AP to the Data+Power port of the PoE injector.
- Using a patch cable, plug the Data-Only port of the PoE injector into an open port on the PoE switch (ports 2-5).

Step 3a: Mount outside equipment on Viasat-approved pole mount solution

Install the remote bridge and outdoor AP using the Telescoping Pole Mount Installation instructions in this guide. These instructions are also available in the Telescoping Pole Mount job aid in the *eGuide*.

Step 3b: Mount outdoor equipment on a hardened structure (not pole mount)

Install the remote bridge and outdoor AP on the exterior of a hardened structure:

- Mount the remote bridge at a minimum height of 10 feet to the hardened surface and point toward the main location. Plug the power cable into the UPS inside the structure or building. Refer to the SXT Remote Bridge installation instructions in this guide if needed.
- Check the signal strength indicator on the remote bridge and adjust the alignment as necessary to get the highest signal strength possible.
- Mount the outdoor AP in a secure location at a minimum height of 15 feet according to the Ruckus ZoneFlex T300 Outdoor AP installation instructions in this guide.
- Run cable from the Data In port of the PoE injector located inside the hardened structure with the other equipment to the remote bridge. Then run cable from the Data+Power port of the PoE injector to the outdoor AP.
- Ensure any holes penetrating the building are sealed.

Step 4: Confirm equipment Connectivity

- In the installer Portal, enter the controller MAC address and confirm connectivity.
- If the Installer Portal is unavailable contact Viasat Managed Services at 979-209-2366 to confirm all of the equipment is online.

NOTE: Contact Viasat Managed Services at 979-209-2366 if there are any questions regarding the installation.

Equipment Mounting Instructions

Ruckus ZoneFlex R300 indoor AP

ZoneFlex R300 802.11n
Multimedia Wi-Fi Indoor Access Point
Quick Setup Guide

Overview

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

Package contents

- ZoneFlex R300 access point
- Mounting screws and anchors (2)
- Security screw
- Unit removal pin
- Regulatory flyer
- Product warranty statement
- Quick Setup Guide

Setup requirements

One or more of the following:

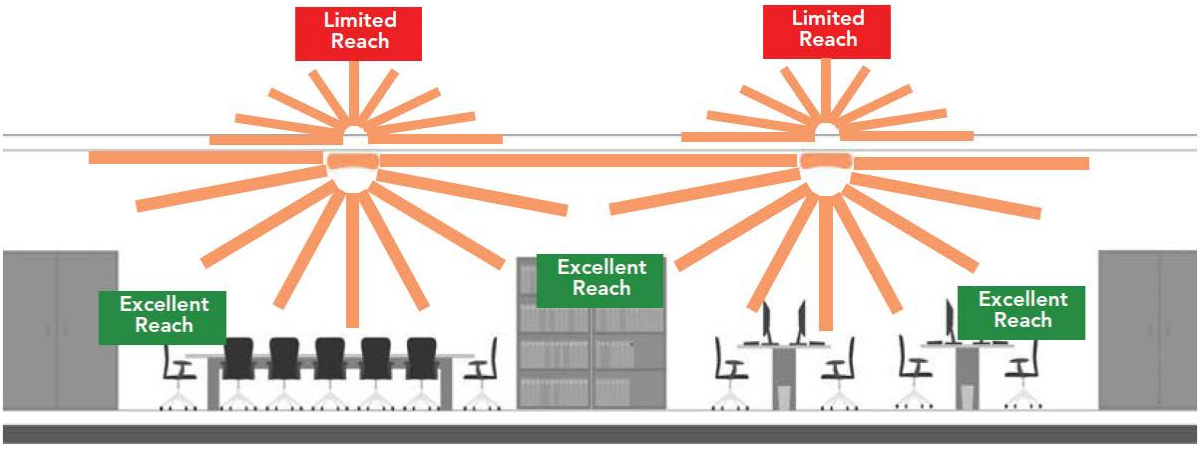
- A modem (DSL or cable), broadband router, or other device that brings Internet access to the site.
- A network switch or a DSL/Internet gateway device.
- Two Cat 5e Ethernet cables
- An AC power adapter (sold separately), or
- An 802.3af or 802.3at -compliant Power over Ethernet (PoE) switch or PoE injector

Determine optimal mounting location and orientation

The location and orientation that you choose for the AP play a critical role in the performance of the wireless network. In general, Ruckus Wireless recommends

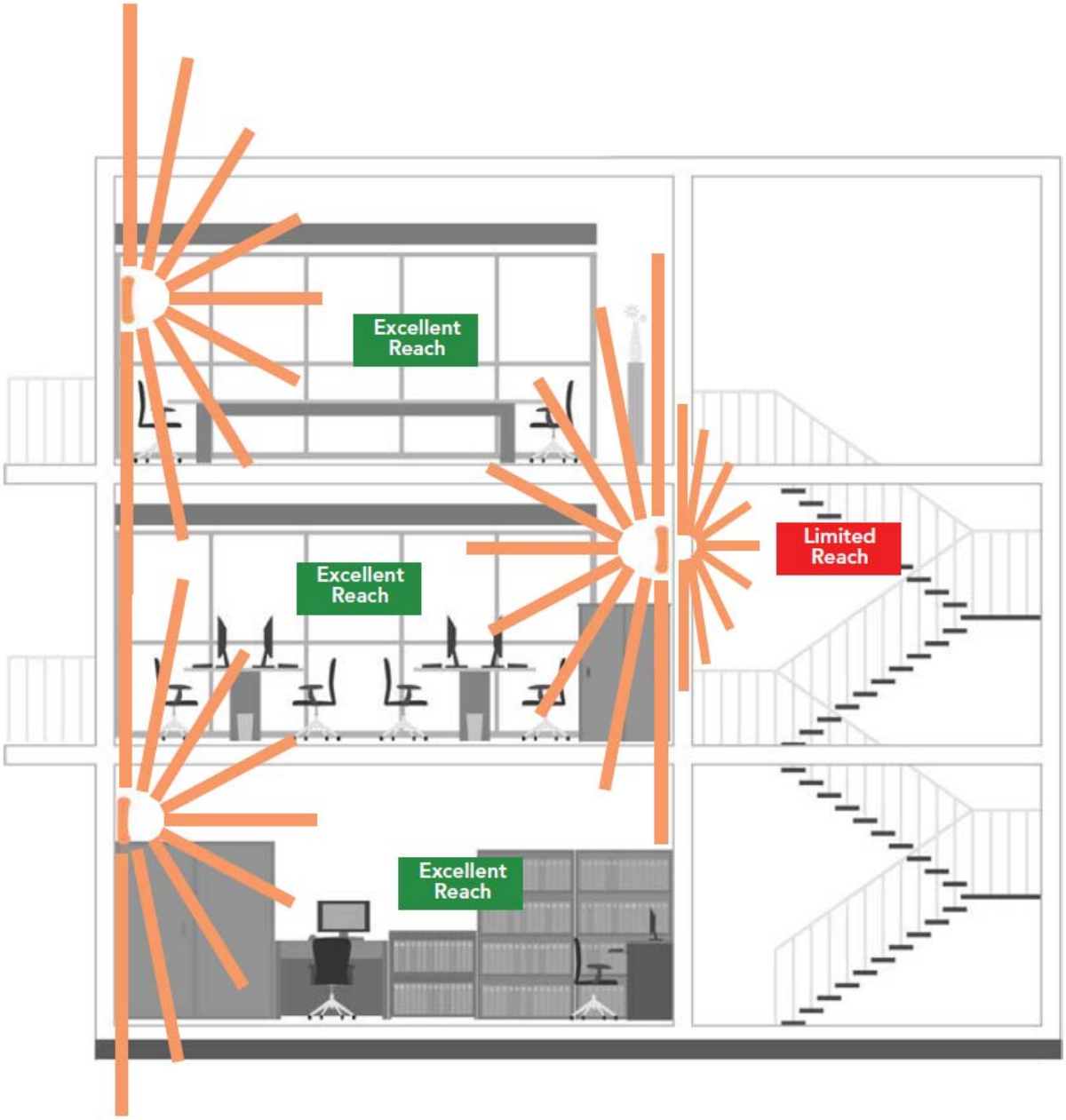
installing the AP away from obstructions and sources of interference and ensuring that the top of the AP is pointing in the general direction of its wireless clients.

Recommended ceiling mounting orientation

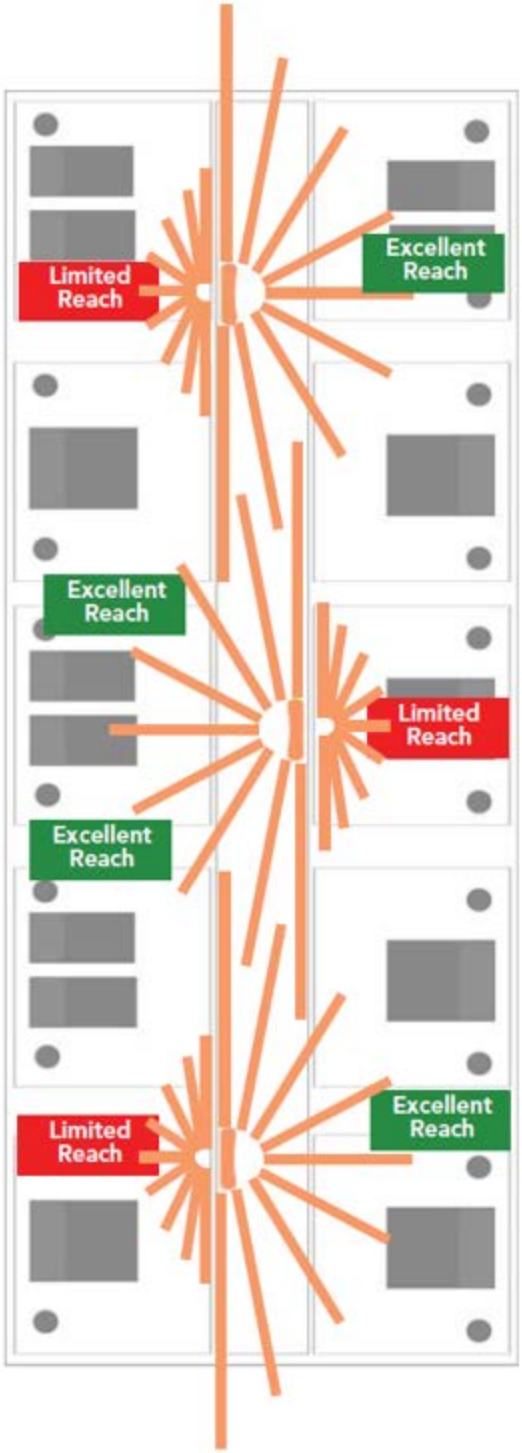


When wall mounted, the APs should be staggered to maximize coverage.

Recommended wall mounting orientation

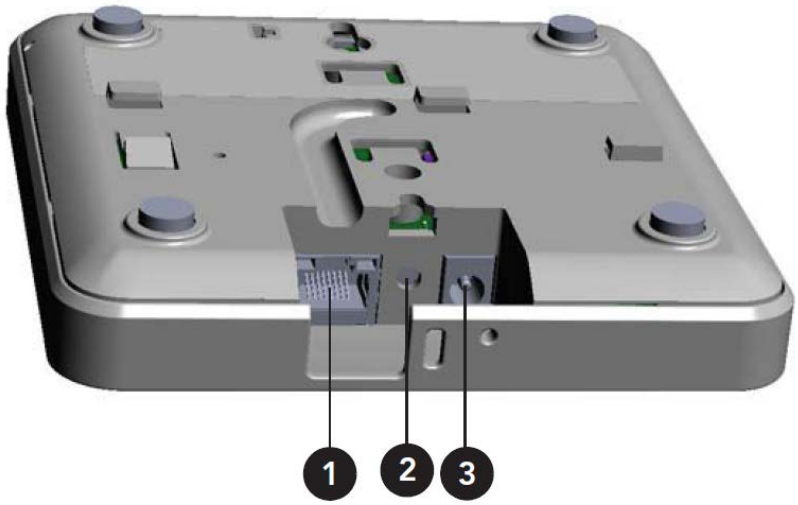


Recommended wall mounting in a corridor (top view)


Limited Reach
Excellent Reach
Excellent Reach
Limited Reach
Excellent Reach
Limited Reach
Excellent Reach

Install AP

A. Move the AP to its permanent location (accessible to both AC power and network connection).



R300 Rear Panel Elements

Number	Item Name	Description
1	10/100/ 1000+PoE Port	One RJ-45 port for a 10/100/1000 PoE (Power over Ethernet, 802.3af) connection.
2	RST Button	Pressing, and then quickly releasing this internal button reboots the AP. Pressing and holding it for six seconds resets the AP to factory default settings. CAUTION! *Resetting the AP to factory default settings erases all previously configured settings.*
3	Power	Connect the power adapter (12 VDC/1.25A) to this socket. Power can also be supplied via the 10/100/1000 PoE port.

B. Use an Ethernet cable to connect the 10/100/1000 port of the AP to your network.

NOTE: If you will be using PoE, you will need a Cat 5e (or better) Ethernet cable to connect the AP to the PoE injector.

C. Connect the AC power adapter (or PoE power supply) to the AP, then to a convenient power source.
D. Verify that the 10/100/1000 port LED is lit.

LED	Description
PWR LED	**Off:** Off **Red:** Boot up in process **Green:** On
OPT LED	Not used in this model
DIR LED	**Off:** The AP is not being managed by ZoneDirector (standalone mode). **Green:** The AP is being managed by ZoneDirector. **Slow flashing green** (one flash every two seconds): The AP is being managed by ZoneDirector, but is currently unable to communicate with ZoneDirector. **Fast flashing green** (two flashes every second): The AP is being managed by ZoneDirector and is currently receiving configuration settings (provisioning) or a firmware update.
2.4G LED (WLAN)	**Off:** WLAN service is down. **Green:** WLAN service is up, at least one client is associated, and signal quality is good (RSSI >= 15). **Flashing green** (two flashes every second): WLAN service is up, but no clients are associated. ***Amber*:** The WLAN service is up, at least one client is associated, but signal quality is poor (RSSI < 15).
5G LED (WLAN)	***Off:*** WLAN service is down. ***Green:*** WLAN service is up, at least one client is associated, and signal quality is good (RSSI >= 15). ***Fast flashing green*** (two flashes every second): WLAN service is up but no clients are associated. ***Amber:*** WLAN service is up, at least one wireless client is associated, but signal quality is poor (RSSI < 15).

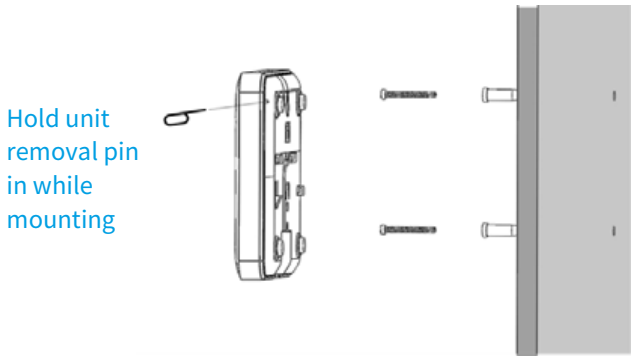
Optional mounting instructions

The ZoneFlex R300 can be mounted to a wall, ceiling, or to a T-bar using the supplied mounting screws or the T-bar clips built into the bottom of the AP enclosure.

Mount to flat surface

A. Use the Quick Start Guide template to mark the locations for screw holes on the mounting surface. Use a 5mm drill bit to drill approximately 25mm into the mounting surface.
B. Insert the anchors and mounting screws into the mounting surface, leaving approximately 1/4" (6 mm) of the screw heads protruding for the AP enclosure. The screws should be approximately 3.25" (82.6mm) apart per the template.
C. Insert the unit removal pin into the hole on the side of the AP (Figure 1), to release the locking mechanism.

Figure 1: Insert the unit removal pin into the pinhole



D. Place the AP onto the mounting screws so that the screw heads enter the mounting holes on the AP enclosure, and push the AP (to the left or down depending on orientation) to lock in place.
E. Remove the unit removal pin to release the lock mechanism and secure the AP.
F. To unmount, insert the unit removal pin into the hole on the side of the AP to unlock, then push the AP (to the right or up, depending on orientation) to release the AP enclosure from the mounting screws.

Mount to T-Bar

A. Orient the AP so that the T-bar is positioned between the T-bar clips as shown in Figure 2, then rotate the AP until the third T-bar clip catches the T-bar and the latch locks the T-bar in place (Figure 3).

Figure 2

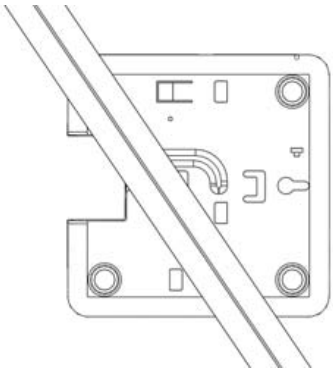
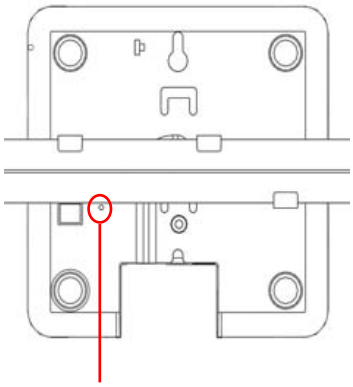


Figure 3



Security screw hole

B. For added physical security, use a Torx screwdriver to insert the security screw into the hole shown in Figure 3.
C. To remove the unit, first remove the security screw, then depress the latch while rotating the AP so that the T-bar clips disengage the T-bar.

Full guides available at https://support.ruckuswireless.com/documents/423-r300-quick-setup-guide and https://support.ruckuswireless.com/documents/1137-zoneflex-indoor-ap-104-0-user-guide (Must create/use login to view.)

Ruckus ZoneFlex T300 outdoor AP

ZoneFlex T300 802.11ac
Smart Wi-Fi Outdoor Access Point
Quick Setup Guide

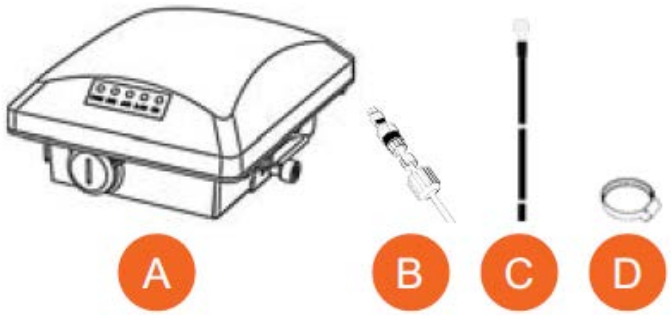
Overview

This section provides step-by-step instructions on how to set up the Ruckus Wireless ZoneFlex access point.

Package contents

- One T300 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)
- One green/yellow earth ground wire with ring terminal (C in Figure 1)
- Two SAE32-sized stainless steel clamps, 2.5-inch diameter (D in Figure 1)

Figure 1: AP field-installation package contents



The field installation package can also include:

- Service Level Agreement/Limited Warranty Statement
- Regulatory Statement
- Registration card
- Declaration of Conformity, if required
- Mounting Guide

Setup requirements

- Torque wrench or torque screwdriver with sockets and bits
- Wide flat-blade screwdriver
- Medium flat-blade or No. 2 Phillips screwdriver
- Customer-supplied outdoor-rated Cat5e UTP RJ-45 Ethernet cable with 4.0mm to 6.5mm (0.17" to 0.26") round cable sheath

If you need to lock the mounting bracket to the AP, you will also need:

- One customer-supplied stainless steel 6mm M3 panhead locking security screw and security screwdriver.

If you are mounting the AP on a flat surface, you will also need:

- Customer-supplied wall anchors with up to M6 or 0.25" stainless steel screws rated to withstand 128 N or 28.8 lbf (required to withstand wind loads of 266km/h or 165mph)

NOTE: The screw head/washer combination shall not exceed 3mm (0.12") in height.

- Electric drill with drill bits and customer-supplied wall anchors, flat washers, and hex nuts for flat-surface mount

If you are mounting the AP on a pipe or pole, you will also need:

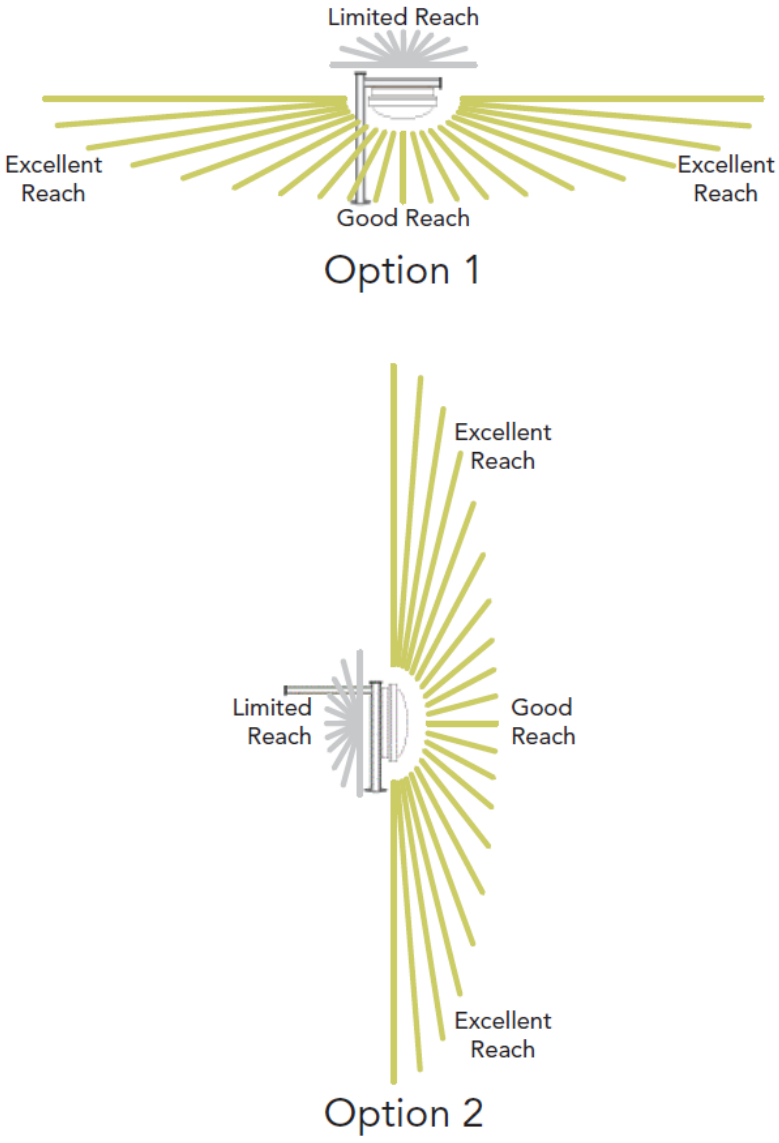
- A 25.4mm to 63.5mm (1.0" to 2.5") pipe or pole
- Two factory-supplied stainless steel clamps

WARNING: *Installation of this equipment must comply with local and national electrical codes.*	**CAUTION:** *Make sure that you form an 80mm - 130mm (3"-5") 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.*
WARNING: *Ruckus Wireless strongly recommends that you wear eye protection before mounting the AP.*	**CAUTION:** *Be sure that grounding is available and that it meets local and national electrical codes. For additional lightning protection, use lightning rods and lightning arrestors.* **CAUTION:** *Make sure that proper lightning surge protection precautions are taken according to local electrical code.*

T300 Omni antenna coverage

The T300 AP (ordering part number 901-T300-xx-01) 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 a typical side view coverage pattern.

Figure 2: Typical AP Omni coverage, side view

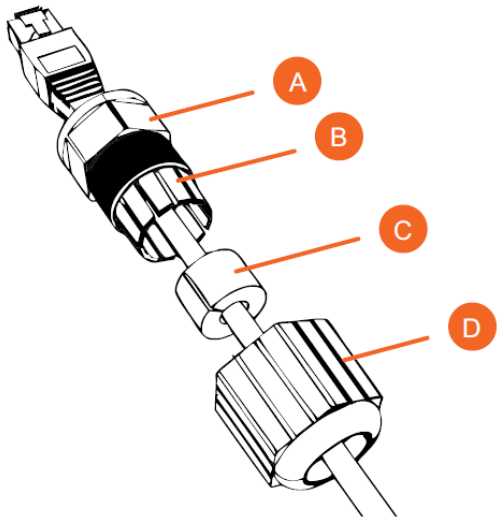


STEP 1: Connect and seal RJ-45 Cable

The AP uses one RJ-45 cable for Power over Ethernet (PoE). Connect and seal the cable using the M25 data cable gland (B in Figure 1).

A. Feed the end of the RJ-45 cable through the sealing nut (D in Figure 3), rubber sealing insert (C in Figure 3), clamping ring assembly (B in Figure 3) and cable gland base (A in Figure 3).

Figure 3: RJ-45 cable and cable gland assembly

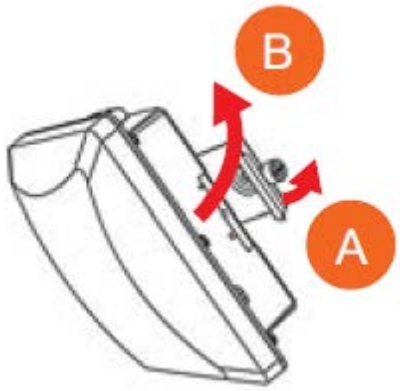


B. Use a wide flat-blade screwdriver to remove the blanking cap from the AP.
C. Connect the cable to the Ethernet port in the AP.
D. Tighten the cable gland base into the AP chassis to 7 N.m or 62 in-lbs.
E. Wrap the clamping ring assembly around the rubber sealing insert. Make sure that the clamping ring assembly fully encloses the rubber sealing insert.
F. Seat the clamping ring assembly and rubber sealing insert in the cable gland base.
G. Tighten the sealing nut to 1.1 N.m or 10 in-lbs, or until the rubber sealing insert is compressed.
H. Continue with Step 2a: Attaching the Mounting Bracket to a Flat Surface OR Step 2b: Attaching the Mounting Bracket to a Metal Pole.

STEP 2A: Attach mounting bracket to flat surface

A. 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

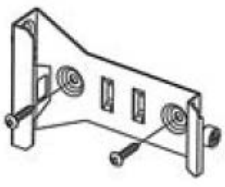


B. Using either of the two options shown in Figure 5, hold the mounting bracket at the location on the mounting surface where you want to mount the AP. Use the holes on the mounting bracket as a template to mark the locations of the mounting holes.

NOTE: 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

Option 1



Option 2

C. Remove the mounting bracket from the mounting surface.
D. Drill holes required for the customer-supplied mounting hardware.

E. Attach the mounting bracket to the flat surface using the mounting hardware.
F. Using the mounting hardware instructions, tighten the hardware to secure the mounting bracket.
G. Continue with Step 3: Mounting the AP.

STEP 2B: Attach mounting bracket to metal pole

A. 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).
B. Insert the open end of one steel clamp (D in Figure 1) into two of the slots on the mounting bracket.

NOTE: The mounting bracket can be mounted to a vertical or horizontal pole to support the AP in the required orientation.

C. If necessary, daisy-chain the other steel clamps to accommodate larger poles.
D. Using either of the two options shown in Figure 6, use the clamp(s) to attach the mounting bracket to the pole. Tighten the clamps to 3 N.m or 27 in-lbs, or per manufacturer's specifications if the factory-supplied clamps are not used.

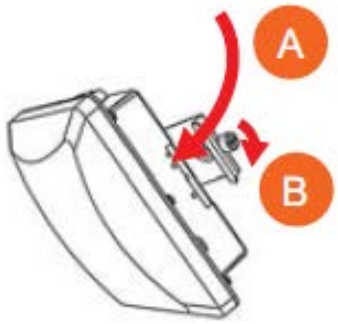
Figure 6: Mounting bracket on a pole

E. Continue with Step 3: Mounting the AP.

STEP 3: Mount AP

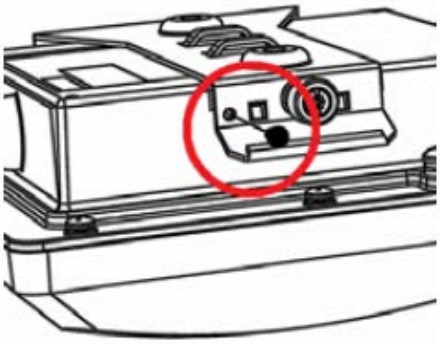
A. Snap the mounting bracket back onto the AP (A in Figure 7), and use a medium flat-blade or No. 2 Phillips screwdriver to tighten the captive screw to 1.1 N.m or 10 in-lbs to secure the bracket to the AP (B in Figure 7).

Figure 7: Attaching the mounting bracket to the AP



B. Optional Step: If you also need to lock the mounting bracket to the AP, then use a matching security screwdriver to screw the customer-supplied locking stainless steel 6mm M3 panhead security screw through the mounting bracket and into the AP chassis (Figure 8).

Figure 8: Locking the mounting bracket to the AP



CAUTION: Make sure that the customer-supplied locking stainless steel M3 panhead security screw is no longer than 6mm. If the security screw is longer than 6mm, it can damage the AP chassis.

C. Continue with Step 4: Earth Grounding the AP.

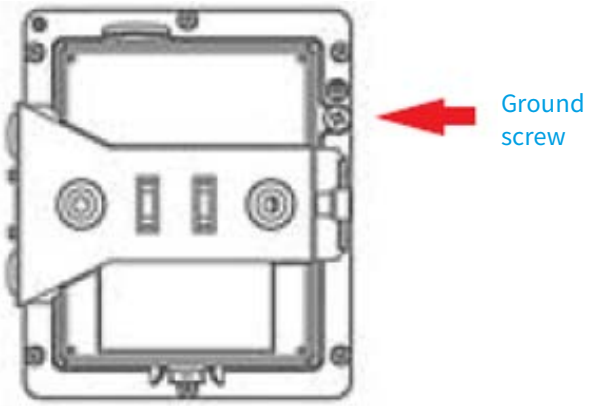
STEP 4: Earth Ground AP

CAUTION: Make sure that earth grounding is available and that it meets local and national electrical codes. For additional lightning protection, use lightning rods and lightning arrestors.

NOTE: The color coding of ground wires varies by region. Before completing this step, check your local wiring standards for guidance.

- Using the factory-supplied ground wire and ground screw, connect a good earth ground to the AP chassis ground point (A in Figure 9).

Figure 9: Connect good earth ground to AP here



CAUTION: The T300 AP includes one 12mm stainless steel M6x1 earth ground screw with split lock and flat washers. Make sure that any replacement screw is no longer than 12mm. If a screw is longer than 12mm, it can damage the AP chassis.

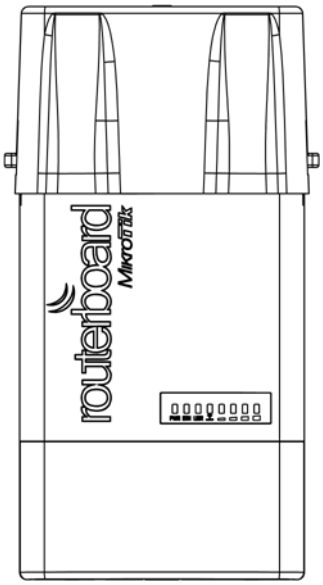
NOTE: After an AP is removed from its mounting, it may drip some water from the channel surrounding the radome. As long as the AP has been operating normally, this incidental water collection and dripping is normal, and is not service-affecting.

Full guide available at https://support.ruckuswireless.com/documents/526-t300-access-point-mounting-guide (Must create/use login to view.)

Netbox multi-point root bridge

Overview

The RB911G-5HPacD-NB (AKA NetBox) is used by Viasat as the root node for point-to-multipoint solutions. The NetBox can provide backhaul to multiple remote locations. This device will be installed with a 5 GHz omni-directional antenna.



Power

The board accepts powering from the Ethernet port (Passive PoE) – Ethernet port accepts passive Power over Ethernet 12 – 28V DC. The package contains a 24V adapter and a PoE injector.

Maximum power consumption of the device is 12W at 24V.

Mount

To tighten the device to a pole, use the provided metal hose clamp. Guide the loop around the device through the provided holes, and around the pole where it will be mounted. You should avoid connecting a loose Ethernet cable to the Ethernet port—secure the cable to a wall or the pole, so that the cable weight is not pulling the port. It is recommended to secure the Ethernet cable less than 2m from the device. This is to ensure that the cable doesn't damage the port by its weight, or doesn't fall out. It is possible to connect grounding wires to the PCB board mounting holes, but to do this, you must remove the PCB from the case.

Full guide available at http://i.mt.lv/routerboard/files/Netbox-series.pdf

Ubiquiti omni antenna

airMAX® Omni

5 GHz 2x2 MIMO
Dual Polarity Omni Antenna

Model: AMO-5G13

UBIQUITI®
NETWORKS

Overview

This section is designed to guide you through the installation of the antenna.

Package contents

Antenna

Pole Clamps
(Qty. 2)

Carriage Bolts
(M8x100, Qty. 4)

Serrated Flange Nuts
(M8, Qty. 4)

RF Cables
(Qty. 2)

Quick Start Guide

Products may be different from pictures and are subject to change without notice.

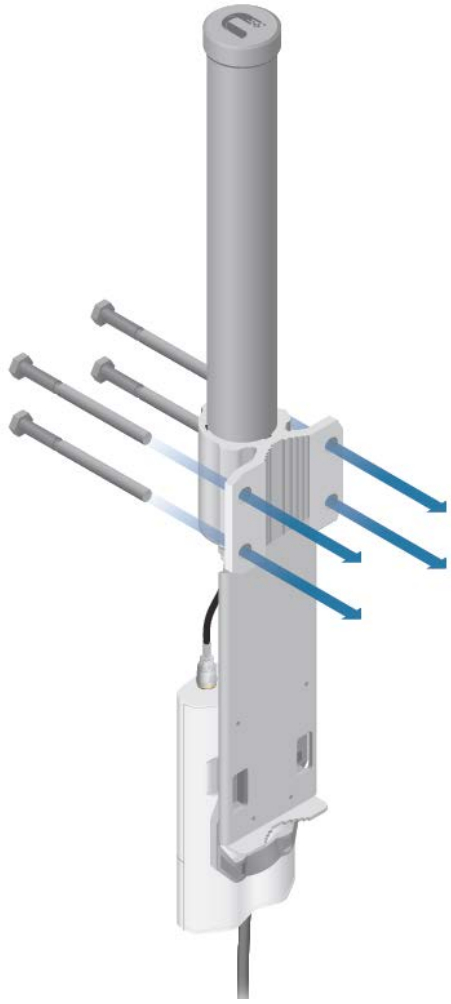
TERMS OF USE: Ubiquiti radio devices must be professionally installed. Shielded Ethernet cable and earth grounding must be used as conditions of product warranty. TOUGHCable™ is designed for outdoor installations. It is the customer's responsibility to follow local country regulations, including operation within legal frequency channels, output power, and Dynamic Frequency Selection (DFS) requirements.

Installation requirements

- 13 mm wrench
- Shielded Category 5 (or above) cabling should be used for all wired Ethernet connections and should be grounded through the AC ground of the PoE.

Hardware installation

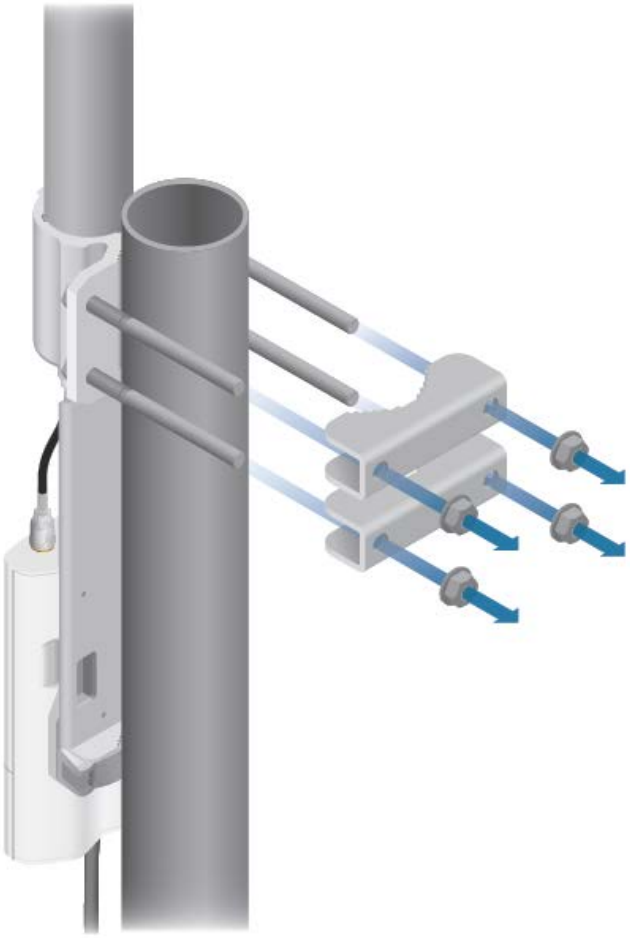
1. Insert the four Carriage Bolts into the main mounting bracket of the antenna.



2. Attach the antenna to the top of the pole. (If the antenna is attached to a lower point on the pole, part of the signal will be blocked by the pole.)

NOTE: The mounting assembly can accommodate a Ø 38 – 76 mm (1.5 – 3.0") pole.

a. Slide a *Pole Clamp* over each pair of *Carriage Bolts*.
b. Secure each *Pole Clamp* with two *Serrated Flange Nuts*.
c. Tighten all nuts to approximately 25N-m (18lb-ft).



Full guide available at https://dl.ubnt.com/guides/omni/airMAX_Omni_AMO-5G13_QSG.pdf

SXT remote wireless bridge

Overview

The RBSXT Lite5 ac is used as either a root or remote node in a point-to-point solution, or a remote node in a point-to-multipoint solution. This device operates in the 5 GHz band only and must be mounted with as clear of a line of sight as possible to the root or remote node. This device must be mounted properly or it will fill with water. *The hole the Ethernet cable runs through must be pointing down to prevent water entering the device.*

Power

The board accepts powering from the Ethernet port (Passive PoE) 9 – 30V DC.

Mount

With the clip pointed forward, slide the mounting bracket into the rail on the bottom of the case until the clip clicks into place. The SXT comes bundled with a hose clamp. Guide the clamp through the opening in the bracket and around the pole where it will be mounted. Tighten the hose clamp screw when alignment is complete. Two screw holes are provided as additional security against accidental bracket movement.

The SXT device has a sliding door, behind which the Ethernet port and the reset jumpers are located. This door can be also secured shut with a screw in the provided screw hole.

Full guide available at http://i.mt.lv/routerboard/files/SXT-Lite5-ac.pdf

Telescoping Pole Mount Installation

Telescoping pole mount installation

Overview

Outdoor equipment may be installed using the Viasat-approved pole-mounting solution. The instructions below are also available in the Telescoping Pole Mount Job Aid located in the *eGuide.*

Preparing for a telescoping pole mount

Surfaces

The only approved location for a telescoping pole mount is in firm ground, with no danger from flooding. Telescoping pole mounts are for Community Wi-Fi and not residential applications.

Important considerations

- The Telescoping Pole Mount installation requires additional materials not provided with the equipment.
- This installation type may also require building permits. Technicians are required to check with the local building codes.
- At a minimum, the following requirements must be met for the telescoping pole mount:
    - Pole extends at least 12 inches below the ground surface and is set in concrete.
    - When fully extended, pole must be placed at a minimum height of 15 feet above the ground.

Other considerations

- The ground block must be within 10 feet of the NEC approved ground source.
- All antennas must be located at least 20 feet from any overhead power lines and 3 feet from any standard power circuit or electric light.

DANGER! Always call the local safe dig number to locate power lines before starting the installation. These include the overhead and underground power lines, electric lights, and power circuits.

Mounting materials for pole mount

The technician must provide the following materials:

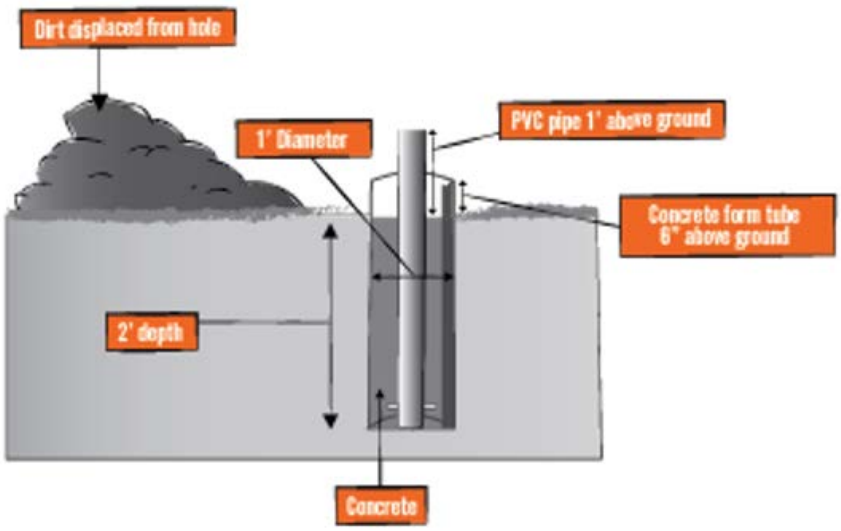
- 150 pounds concrete (3x bags)
- Duct tape
- 2 "U" bolt mounts, each made up of:
    - One ¼ inch x 2 inch inner diameter U bolt
    - One 1 inch x 3 inch back plate
    - Two ¼ inch nuts and two corresponding washers
- 3 anti-spin devices, each made up of:
    - One ¼ inch x 6 inch bolt
    - Two ¼ inch nuts and two corresponding washers
- Concrete form tube (such as: Sonotube or Quick Tube) 3 feet long, 8 inch inside diameter
- 2 PVC pipe conduit sections, each made up of:
    - 3x 1-inch inner diameter elbow joints
    - 1x 28-inch PVC pipe (1 inch ID)
    - 1x 6-inch PVC pipe (1 inch ID)
    - 1x 3-inch PVC pipe (1 inch ID)

Installing a telescoping pole mount

Step 1

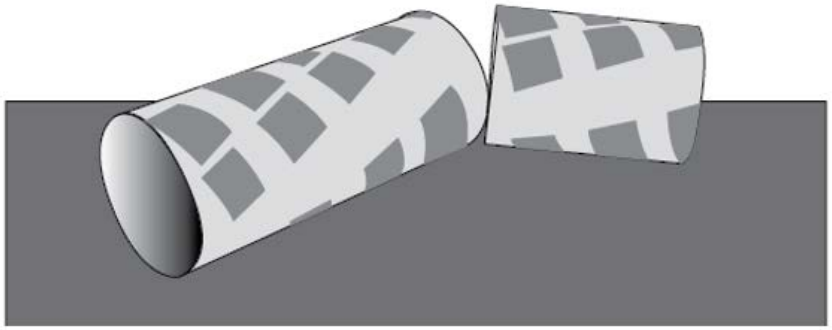
Dig the hole 8 inches in diameter (to fit the concrete form tube) and two feet deep, with straight sides.

Ensure the hole is no greater than 10 feet from power source/pedestal.



Step 2

Concrete form tubes with an 8-inch inside diameter come in standard 4-foot sections.



Cut concrete form tube down to 3 feet.

Drill a 1-inch diameter hole at 12 inches from either side of the cut concrete form tube.

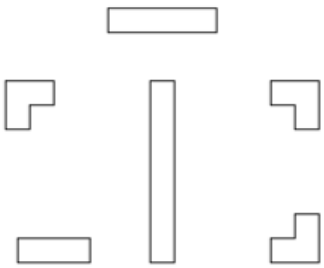
Step 3

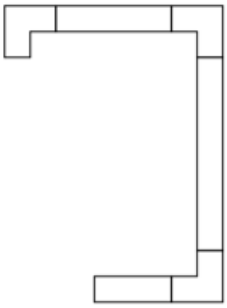
Place the 3-foot concrete form tube in the hole with 1-inch hole toward bottom. Tube will extend 12 inches above ground level.

Re-pack dirt around the outside of the concrete form tube so that any gaps between the form tube and the ground are filled, and the form tube is level, stable, and secure.

Step 4

IMPORTANT!
Ensure cable locates are completed before proceeding!





Dig a 1-foot deep trench from form tube to power location.

Assemble 2 PVC pipe conduit sections as depicted.

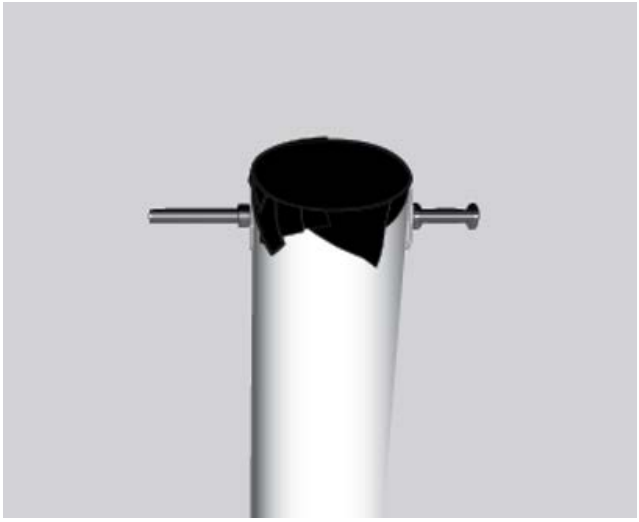
Insert 1 PVC pipe conduit section with straight shorter end protruding from form tube hole.

Step 5

Remove black plastic sleeve from pole box. Place duct tape over one sleeve end. Drill hole 2 inches from bottom for ¼-inch x 6-inch bolt/anti-spin device.

Insert ¼-inch x 6-inch bolt and secure ¼-inch nut and corresponding washer on each side.

Tighten nuts until the anti-spin device is centered through the PVC pipe.



Step 6

Place 3-foot PVC pipe in center of concrete form tube.

It will extend 18 inches above ground level (6 inches above the top of the form tube).

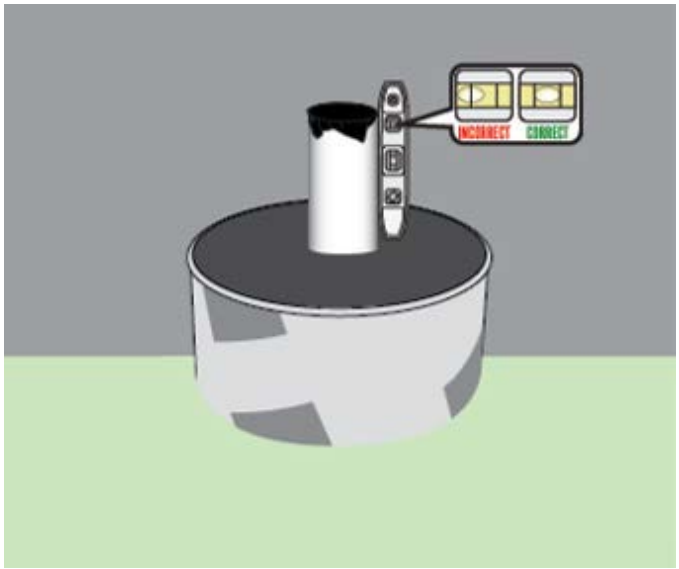
Step 7

Secure black plastic sleeve and 1 PVC pipe conduit section by pouring at least 150 pounds of quick-setting concrete into the concrete form tube.

Step 8

Level black plastic sleeve while the concrete dries.

NOTE: The black plastic sleeve *must* be completely level in order for the pole mount to be successful.

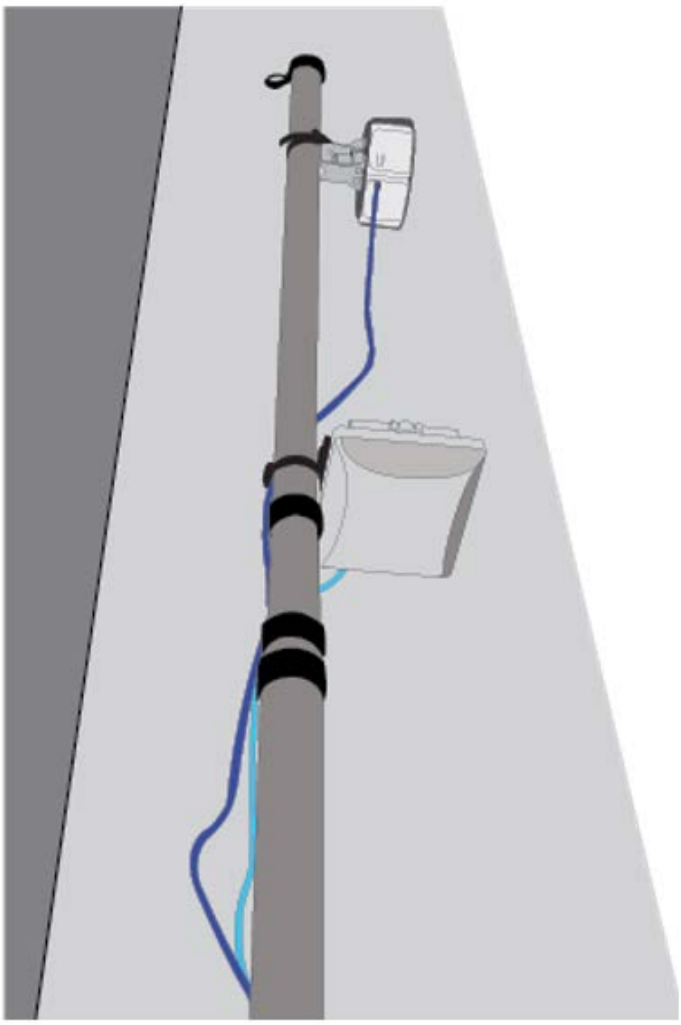


Step 9

Lay the telescoping pole along the ground and extend to height between 15-20 feet.

Ensure that each section of the pole is *firmly locked* in place and does not spin or collapse back down.

NOTE: *Only the bottom* section will be drilled for the anti-spin device.



Mount the remote AP 3-6 inches from the top of the pole.

Mount the remote SXT 2-4 feet from the top of the pole (ensure SXT will have line of sight to omnidirectional/sector antenna).

NOTE: Install the SXT oriented so that the CAT5 cable enters from the bottom.

For complete assembly/installation instructions, please see Ruckus Zoneflex T300 Outdoor AP and SXT Remote Wireless Bridge sections of this installation guide.

NOTE: Ethernet cable used must be on the *Exede Approved Materials List* job aid.

Step 10

Mount the weatherproof (NEMA-rated) enclosure a minimum of 7 feet above ground level with 2 self-tapping screws, using 2 U bolts: 1 on the top and 1 at the bottom.

Unscrew right and left gland caps and glands, connect Ethernet cabling through holes, feed glands onto cables and reinsert glands.

Screw gland caps back on.

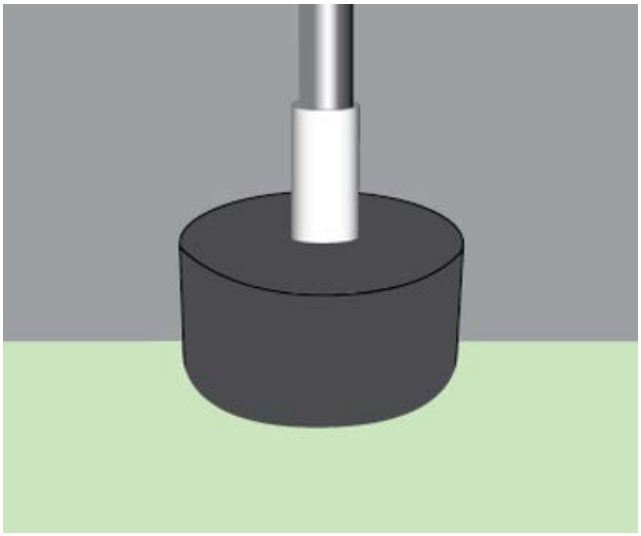
Connect protruding Ethernet cables to SXT and AP.

Secure Ethernet cables to telescoping pole using cable ties, and coil excess Ethernet cables and secure drip loop/s to pole.

Step 11

Once the concrete is hard set:

- Cut away the concrete form tube to ground level.
- Insert telescoping pole into black plastic sleeve until it is secure against the anti-spin device at the bottom of the sleeve.



Step 12

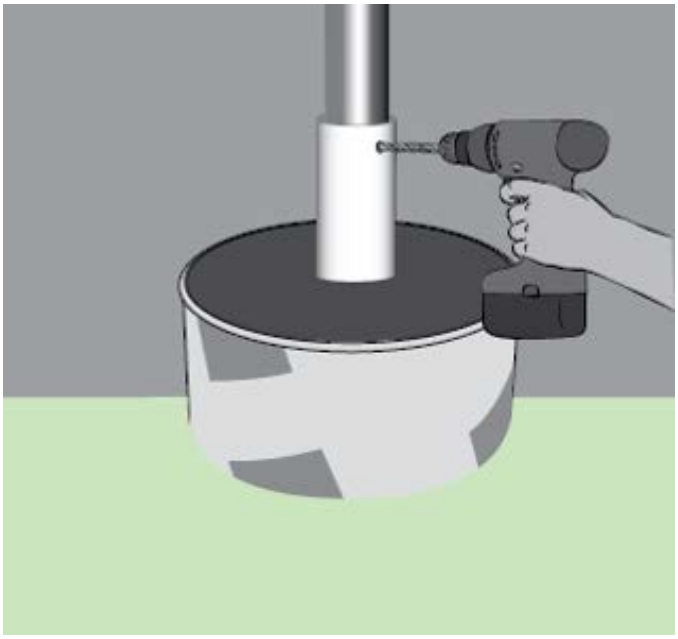
Ensure that the SXT faces the direction of the Base Station for point-to-point signal.

Step 13

Mark black sleeve for 2 anti-spin devices:

- At 90-degree angles from each other
- One 2 inches from top of the sleeve
- One 3 inches from top of the sleeve

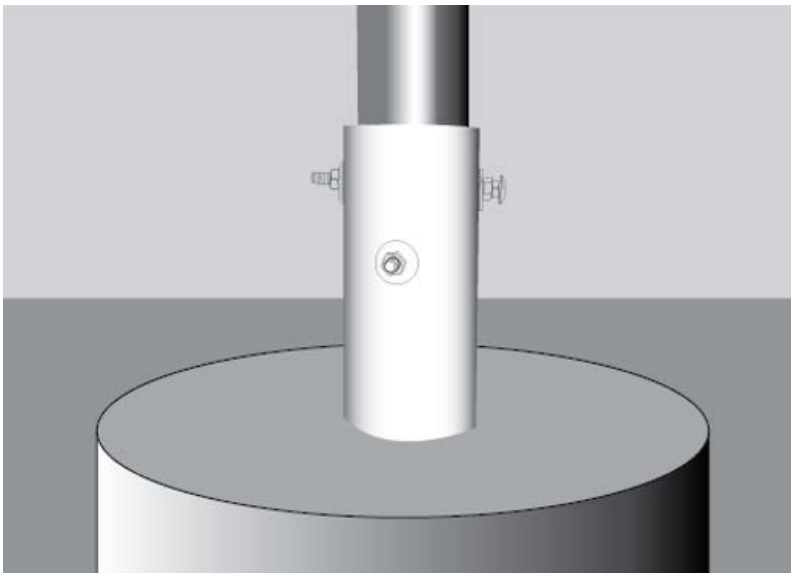
Drill through both sides of sleeve and telescoping pole for ¼-inch x 6-inch bolts.



Step 14

Place ¼-inch x 6-inch bolts through washers and holes.

Secure with ¼-inch nuts, tightening nuts until telescoping pole is secure.



Step 15

Run power cable through conduit and into 1-foot trench.

Run power cable along trench and through second PVC pipe conduit section, plug into local power, and fill trench.

Terminating Coaxial and UTP Cable

Terminating coaxial cable

Overview

This section outlines step-by-step procedures for terminating coaxial cable following the Viasat cable and connector model requirements. While all specifications must be met, at a minimum the cable must have the following printed on the sheath: Frequency, RG number, Copper type, and Impedance.

Important! Copper Clad Steel (CCS) COAX is not acceptable. Installations using CCS fail within the warranty period, requiring Technicians to return and make a warranty repair.

Viasat installations require one or two lengths of cable, depending on the model of the modem. On a single cable modem, one cable length acts as both the Transmit (TX) and the Receive (RX.) On a dual cable modem, one cable length is for the TX link and one is for the RX link.

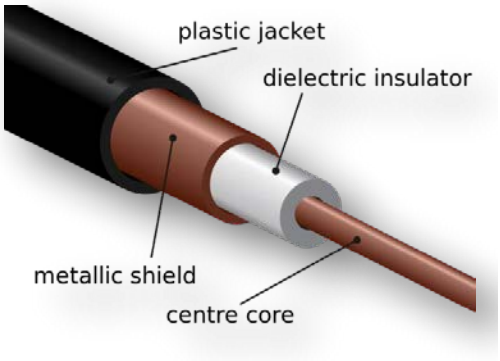
Other important cable requirements

- This cable type has a maximum bend radius of 3 inches, which is the same as a 6-inch diameter.
- Never put a 90-degree bend in any cable run.
- The cable(s) must not exceed the maximum length of 150 feet (45.72 meters) from the TRIA to the modem.
- The cable(s) must have the following printed on the cable: Frequency, RG number, Copper type, and Impedance showing details as listed below.

Connector requirements

- The cable(s) must be terminated with RG-6 inline, 3.0 GHz or higher, F-type linear compression connectors that are fully weather sealed. See connector specification for additional information.

Cable/connector requirements matrix

Component	Component supports	Example
Center Core (conductor): • Support voltage drops less than 6.7 volts • 75 Ohm impedance • Solid copper	Voltage between the Satellite Modem and the TRIA **NOTE:** Copper-clad steel center conductors drop excessive voltage and cannot provide the correct voltage to the TRIA	
Dielectric insulator: • Must support 3.0 GHz (or higher) IF frequency • No 90-degree bends in the cable run	Intermediate Frequency (IF) frequency between the satellite modem and the TRIA	
Metallic Shield (outer shield): • Minimum of 60% braid	Grounding between the antenna and the dual ground block	
Compression Connectors • RG6 linear compression connector type • Fully weather sealed • Meets *COAX Connector Specifications* **NOTE:** Crimp connections are not acceptable.	Connectivity between hardware and cable runs	

Attaching compression connectors

While COAX compression connectors vary slightly from manufacturer to manufacturer, the process for attaching the connectors are similar.

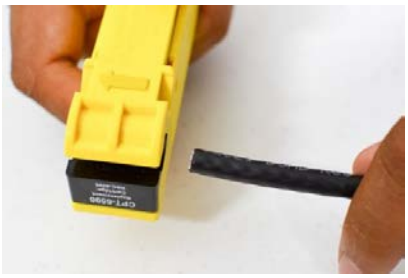
Step 1: Cut cable

Cut the end of the cable off square with a sharp cable prep tool. Then, remold the mashed cable so that it is round again.

Step 2: Pierce outer jacket

Place the cable in a 2-blade strip tool, with the end flush against the side of the tool. Notice in the image below that the cable prep tool shows the direction for loading the cable. Squeeze the tool, so that the blades pierce the outer jacket. Twirl the cable prep tool in a forward motion around the cable 3 to 5 times. Do not turn the tool backwards (counter clockwise). Carefully, remove the prep tool.

Important! Do not pull cable out of prep tool as this could cause damage to cable and tool.

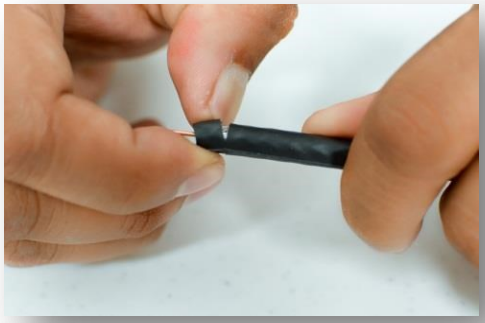


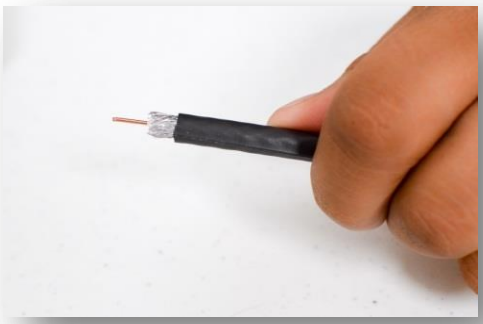
Step 3: Expose center core

If you have used the prep tool correctly, the cable now has two cuts. The cut closest to the end of the cable has cut completely to the center core. The second cut has cut only the outside plastic jacket, leaving the braid intact.

Expose the center core from the first cut, and then carefully remove the outer plastic from the second cut. Leave the braid and layer of foil surrounding the dielectric.

When you have completed this step, the cable will have ¼ inch of stripped center conductor, and ¼ inch braid covering ¼ inch of dielectric.



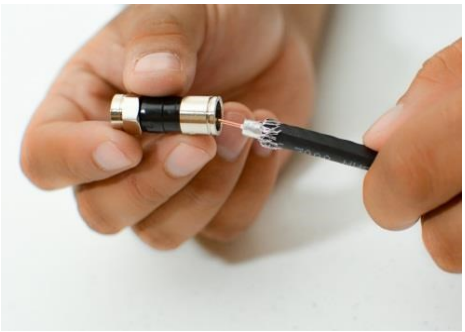


Step 4: Spread braid

Carefully spread the braid away from the foil, and lay the braid evenly back onto the jacket. Do not remove the braid, or allow the braid to bunch up on one side of the cable.

Step 5: Slide cable into connector

Slide the cable into a connector (3.0 MHz or higher), easily, without adding excessive pressure, until the dielectric is flush with the floor of a connector. The center conductor should extend a little beyond the edge of the connector.

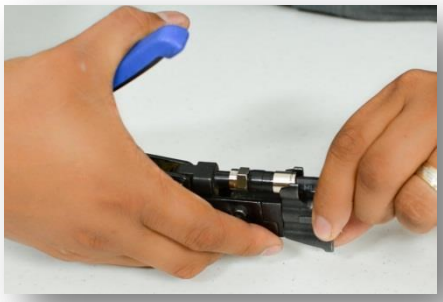


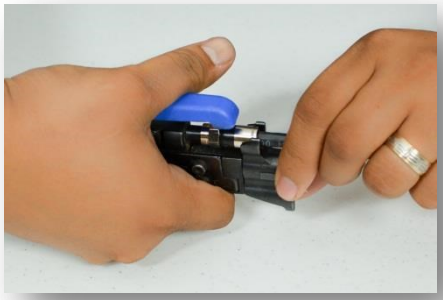
Important: Common connector failures are:

- Removing the foil
- Braid wire touching or wrapped around the center conductor
- Braid wire extending beyond the connector casing
- Center conductor too short

Step 6: Seat rings

Slide the assembled connector into the compression tool. Squeeze the handle until the ring seats all the way into the connector. You should hear or feel a "click" as it pops into position.





Step 7: Remove cable

Remove the completed cable from the compression tool.

If the cable prep tool was used correctly at the beginning, then the center conductor is the proper length and no trimming is required.

Before Compressing

After Compressing

Apply torque

Torque is the turning or twisting force applied to a fitting. As the torque is applied, it creates a tension between the two objects that are being clamped together, such as the nut and screw threads. The goal of torque is to provide the proper clamping force to prevent slippage, water seepage, etc.

Step 1: Use torque wrench

Use a 30 in/lb. 7/16 single-setting, 'click' type open torque wrench.

Step 2: Rotate wrench

Place the open wrench on the connector, and rotate wrench until you feel and hear the 'click.' This indicates that the correct amount of tension has been achieved.

Step 3: Tighten connections

Use the torque wrench to tighten the following connections:

- Attaching COAX to TRIA
- Attaching COAX to ground block
- Attaching COAX to penetration jacks (if used)

NEVER torque the modem COAX connections … hand-tighten these connections.

Terminating UTP cable

Overview

This section outlines step-by-step procedures for terminating UTP cable using a crimping tool, UTP cable stripper, and an 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 a UTP 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.

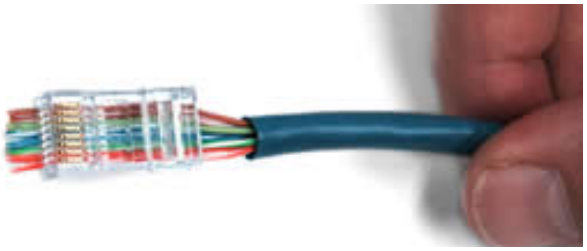
Step 4: Arrange wires

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 all over again.

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: Trim wire ends

If your crimper doesn't automatically trim the wire ends upon termination, carefully cut wire ends to make them as flush with the connector's surface as possible. The closer the wire ends are trimmed, the better your final plug-in connection will be.

Step 9: 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