Meru Access Point

Installation Guide

November 2009

Document Number: 882-70036 Rev D Rel 3.6.1 Ver 9 Access Point Installation Guide

Contents

About This Guide

This guide provides installation instructions for the Meru Access Points, which includes the AP300, AP200, OAP180, and AP150 models. The term access point is used interchangeably throughout this document to apply to any model when there are no differences among the models.

Audience

This guide is intended for people installing the Meru Wireless LAN System Access Points (AP).

Other Sources of Information

Additional information is available in the following Meru publications, Web site, and external references.

Meru Publications

- *Meru System Director Release Notes*
- *Meru System Director Getting Started Guide*
- *Meru Controller Installation Guide*
- *Meru System Director Command Reference*
- *Meru System Director Configuration Guide*

Website Resources

For the first 90 days after you buy a Meru controller, you have access to online support. If you have a support contract, you have access for the length of the contract. See this web site for information such as:

- *Meru System Director Release Notes*

- Knowledge Base (Q&A)
- Downloads
- Open a ticket or check an existing one
- Customer Discussion Forum

The URL is: **http://support.merunetworks.com**

External References

- Stevens, W. R. 1994. *TCP/IP Illustrated, Volume 1, The Protocols*. Addison-Wesley, Reading, Mass.
- Gast, M.S. 2002. *802.11 Wireless Networks, The Definitive Guide*. O'Reilly and Associates, Sebastopol, Calif.

Typographic Conventions

This document uses the following typographic conventions to help you locate and identify information:

Note: Provides extra information, tips, and hints regarding the topic.

Caution! Identifies important information about actions that could result in damage to or loss of data, or could cause the application to behave in unexpected ways.

Warning! Identifies critical information about actions that could result in equipment failure or bodily harm.

Contacting Meru

You can visit Meru Networks, Inc. on the Internet at this URL:

http://www.merunetworks.com

Customer Services and Support

For assistance, contact Meru Customer Services and Support 24 hours a day at +1-888-637-8952 (+1-888-Meru-WLA(N)) or +1-408-215-5305. Email can be sent to support@merunetworks.com.

Meru Networks, Inc. Customer Services and Support provide end users and channel partners with the following:

- Telephone technical support
- Software update support
- Spare parts and repair service

RMA Procedures

Contact Meru Customer Services and Support for a Return Material Authorization (RMA) for any Meru equipment.

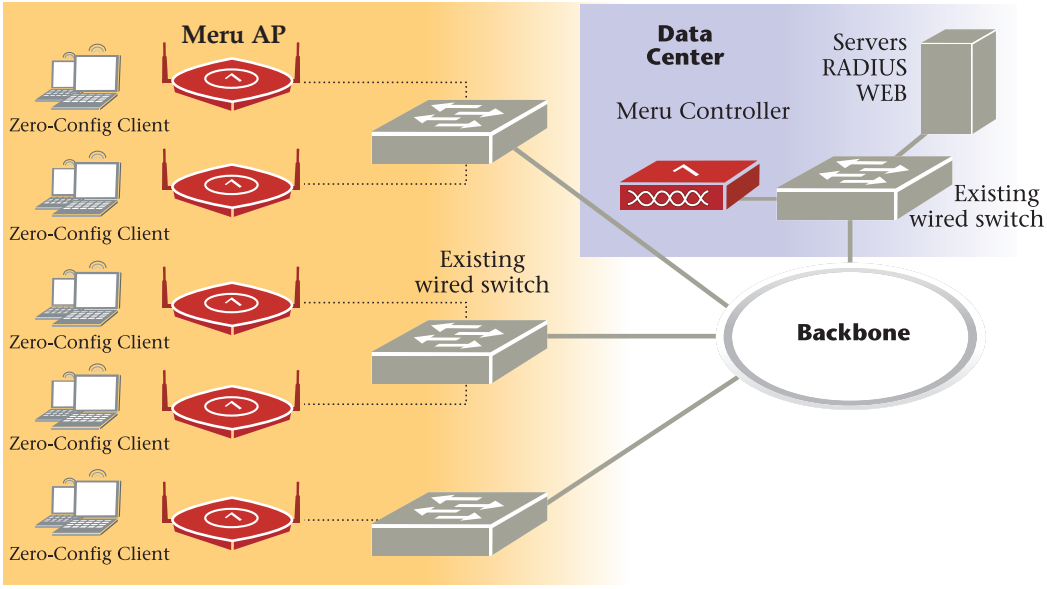
Please have the following available when making a call:

- Company and contact information
- Equipment model and serial numbers
- Meru software release and revision numbers (for example, 3.0.0-35)
- A description of the symptoms the problem is manifesting
- Network configuration

Chapter 1
Access Points

Access Points contain radio devices that communicate with the Meru Controller and form the wireless LAN (WLAN). The Meru Controller and Access Points connect to the site's wired LAN through wired switches. Wireless clients associate with the Access Points as they roam throughout the WLAN. As such, they are an extension of the wired LAN, providing the wireless benefits of client mobility, enhanced access, and dynamic network configuration.

Figure 1: Wireless LAN Connected to Network



AP300

The AP300 Access Point series delivers high performance, full-speed, Wi-Fi certified 802.11n based on draft 2.0 connectivity while simultaneously supporting legacy 802.11a/b/g devices. AP300 is available in the configurations shown below.

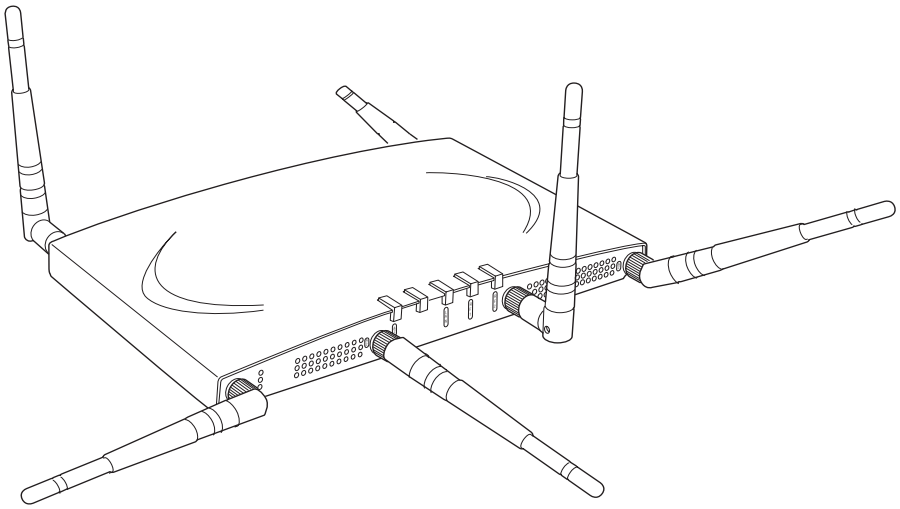
AP300 Configurations

Model	Configuration
AP320	Two dual-band 802.11n radios with 3x3 MIMO
AP310	Single dual-band 802.11n radio with 3x3 MIMO
AP311	Single dual-band 802.11n radio and single 802.11a/b/g radio (AP320 upgradeable)
AP302	Two dual-band 802.11a/b/g radios (AP320 upgradeable)
AP301	Single dual-band 802.11a/b/g radio (AP310 upgradeable)

Features for the AP300 include:

- 802.11n support with channel bonding in both 2.4GHz and 5GHz frequency bands. Channel bonding combines two 20Mhz channels into a single-wide 40Mhz channel for increased throughput.
- Dual-band external antenna options optimized for MIMO mode
- Plug and Play deployment using centralized controller platforms
- Multi-layered security including standard WPA2, 802.11i security such as automatic traffic inspection
- Each of these Access points may be powered by a standard 802.3af PoE device.
- Air Traffic Control technology for 802.11n devices and legacy a/b/g devices
- 3x3 MIMO with 3 chains and 3 receive chains, delivering full 300Mbps data rates using 2 spatial streams
- For AP302 and AP311, the a/b/g radio software upgrades to 802.11n for maximum investment protection.
- Channel span architecture which requires no channel planning or configuration
- Six standard multiband, omni-directional antennas for AP302, AP320 and AP311. Three standard multiband, omni-directional antennas for AP310 and AP301.
- Powered by 5 volt DC input, 802.3af compliant PoE device, or draft 802.3at compliant PoE device.

Figure 2: AP300



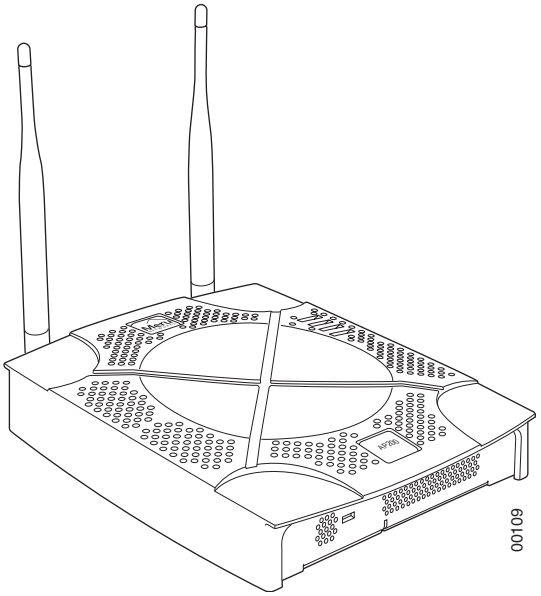
AP200

The AP200 series provides two models that conform to the specifications provided by the IEEE 802.11a and 802.11g protocols and provide backward compatibility for the 802.11b protocol. An AP200 works with most standard Wi-Fi clients.

- The AP201 houses a single 802.11a/b/g radio device
- The AP208 supports a maximum of two radio devices that can simultaneously run two protocols (802.11b, g or b/g on interface 1 and 802.11a on interface 2). Alternately the second radio can be configured to run as an RF monitor to a Meru Controller, providing real-time status of RF activity to optimize the wireless network.

The AP200 series (referred hereafter as the AP200, unless specifically referring to the AP201 or AP208) is housed in a metal case with a plastic removable cover. As such, it can be used for plenum installations when the plastic cover is removed.

Figure 3: AP200



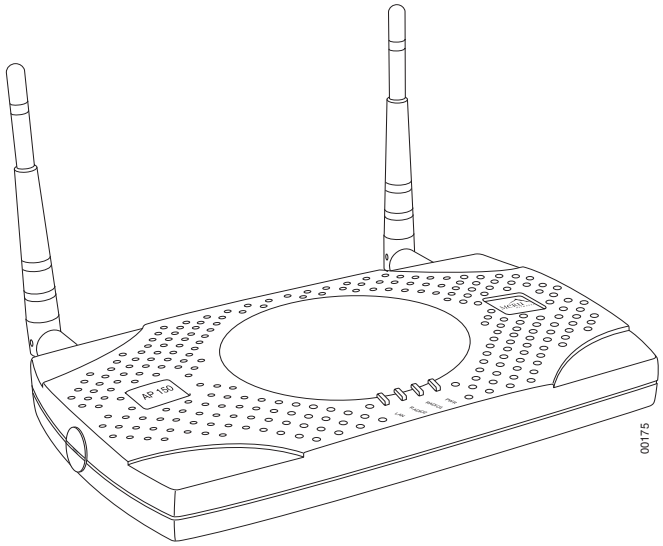
AP150

The AP150 has two 802.11 radios for simultaneous 802.11a and 802.11b/g WLAN access. It is an ideal option for enterprise-wide data-only WLAN implementations and small-sized converged data and voice WLAN implementations. The AP150 works in conjunction with Meru Controller products and can be easily integrated into existing Layer 2 and Layer 3 wired network environments to provide enterprise-grade Wi-Fi access with multi-layered security options, basic VoWLAN support, centralized configuration, troubleshooting tools, remote management and RF visualization capabilities.

The AP150 has the following features:

- Dual 802.11b/g and 802.11a radios
- Simultaneously support for 802.11b, 802.11g, and 802.11a clients
- Contention Management for high density of data clients
- Basic VoWLAN QoS support for small density of voice clients
- Multiple ESSIDs with individual security policies to ensure separation of different user groups or dynamic VLAN assignment per user based on RADIUS credentials
- Zero configuration required at the access point; the installation procedure is a simple plug-n-play
- Automatic AP discovery, configuration
- Intelligent load balancing of clients
- Layer 2 or 3 connectivity for flexible deployment options
- Locking mechanism secures access point when mounted in public areas

Figure 4: AP150

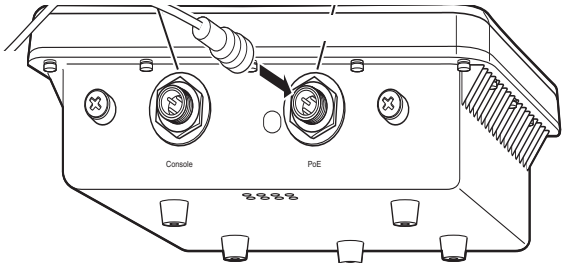


OAP180

The OAP180 Rugged Access Point with dual 802.11a/bg radios is designed to provide secure Wi-Fi connectivity to outdoor locations such as campuses, parking lots, and pole tops, or to harsh indoor locations such as breweries, food processing plants or warehouses. The OAP180 supports the following features:

- Simultaneous support for 802.11a, 802.11b, and 802.11g clients using dual 802.11a and 802.11b/g radios
- Full support of System Director features
- Automatic AP discovery and configuration
- No channel planning required with single channel installations
- Intelligent load balancing of clients
- PoE (Power over Ethernet) support
- RoHS compliant
- Locking mechanism for security when mounted in public areas

Figure 5: Rugged OAP180 Access Point



Chapter 2
Installing the AP300

This chapter describes how to install and configure the AP300. It contains the following sections:

Safety Precautions

IMPORTANT—Read and follow the regulatory instructions in Appendix E before installing and operating this product.

If an optional power supply is used, it must be the one supplied by Meru Networks.

The AP300 is only intended for installation in Environment A as defined in IEEE 802.3af. All interconnected equipment must be contained within the same building, including the interconnected equipment's associated LAN connection.

Unpack the AP300

The AP300 series has five models as shown below. Depending on which model you are installing, you will have either six or three antennas. The drawings in this chapter show six antennas.

Model	Radio 1 (Ant4, Ant5, Ant6)	Radio 2 (Ant1, Ant2, Ant3)
AP320	a/b/g/n with 3 dual band omni-directional antennas	a/b/g/n with 3 dual band omni-directional antennas
AP311	a/b/g/n with 3 dual band omni-directional antennas	a/b/g with 3 dual band omni-directional antennas
AP310	a/b/g/n with 3 dual band omni-directional antennas	NA
AP302	a/b/g with 3 dual band omni-directional antennas	a/b/g with 3 dual band omni-directional antennas
AP301	a/b/g with 3 dual band omni-directional antenna	NA

Confirm that the AP300 shipping package contains these items:

- AP300 with attached mounting bracket
- Six (AP320, AP311, AP302) or three (AP310, AP301) antennas

Determine Power Requirements

Your power requirements will vary, depending on which AP300 radios are deployed and what mode is used. See below. AP300 works with all switches that support standard 802.3af and pre standard 802.3at.

AP300 Configuration	Power Options
1 radio – a/b/g mode	External power supply or PoE 802.3af
1 radio – n-mode	External power supply or PoE 802.3af
2 radios – 1 a/b/g mode, 1 n mode	For 2x2 MIMO mode, use either a power supply or or a 802.3af compliant PoE. For 3x3 MIMO mode, use either a power supply or a pre-standard 802.3at compliant PoE.
2 radios – both n mode	For 2x2 MIMO mode, use either a power supply or or a 802.3af compliant PoE. For 3x3 MIMO mode, use either a power supply or a pre-standard 802.3at compliant PoE.
2 radios – both a/b/g mode	External power supply or PoE 802.3af

Installation Requirements

An array of holes on the mounting bracket allows the AP300 to be mounted on the wall and over junction boxes or molly bolts. There are holes for passing the PoE Ethernet or external power supply cable through the bracket if the bracket is mounted on a junction box. A template of this bracket is included in Appendix E of this guide.

The AP300 has a security cable slot so you can lock the AP300 with a standard security cable, such as those used to secure laptop computers.

These optional mounting kits can be purchased to mount the AP300 either from the ceiling or inside an enclosure:

- Suspended Ceiling Rail Mounting Kit: ACC-MNT-SCRMKIT
- Above Suspended Ceiling Mounting Kit (T-Bar Hanger): ACC-MNT-ASCMKIT
- Inside a Hoffman Enclosure using Hoffman compatible mounting bracket: ACC-AP300-BHE (enclosure not provided)

To complete AP300 installation, you need the items listed below.

Installation Type	Consumable Items Required
Horizontal mounting	None
Vertical mounting over a wall stud	• Two #6 x 2" wood screws for a wood stud; or • Two #6 x 1½" metal screws for a metal stud • Mounting bracket
Vertical mounting on sheetrock	• Two #6 x 1" screws • Two #4-6 x 7/8" ribbed plastic wall anchors • Mounting bracket
Horizontal mounting below a hanging ceiling	• Two caddy fasteners • Two plastic spacers • Two keps nuts (with attached lock washer) • Mounting bracket
Using existing third party brackets	• Use included shoulder screws

Additional Equipment

A power source is needed to power the AP300. Available options are:

- External ACC-AP300-PWR power supply
- 802.3af compliant PoE device
- Pre-standard 802.3at compliant PoE device

AP150, AP200, and AP300 work with all switches that support standard 802.3af.

Install the AP300

Select a Location

All AP300 interconnected equipment must be contained within the same building, including the interconnected equipment's associated LAN connection. In addition, the AP300 should be mounted in a location that meets the following conditions:

- Relatively unobstructed access to the stations the AP serves. Select a location with minimal physical obstructions between the AP and the wireless stations. In an office with cubicles, mounting the APs below a hanging ceiling (plenum is supported) or the wall near the ceiling provides the least obstructed communications path. For an external power supply connection, ensure the power source is near to where the AP300 will be mounted.
- Access to wall outlet or a to a Power over Ethernet (PoE) connection to the network switch servicing the controller.

Most installations receive the best coverage using the following guidelines:

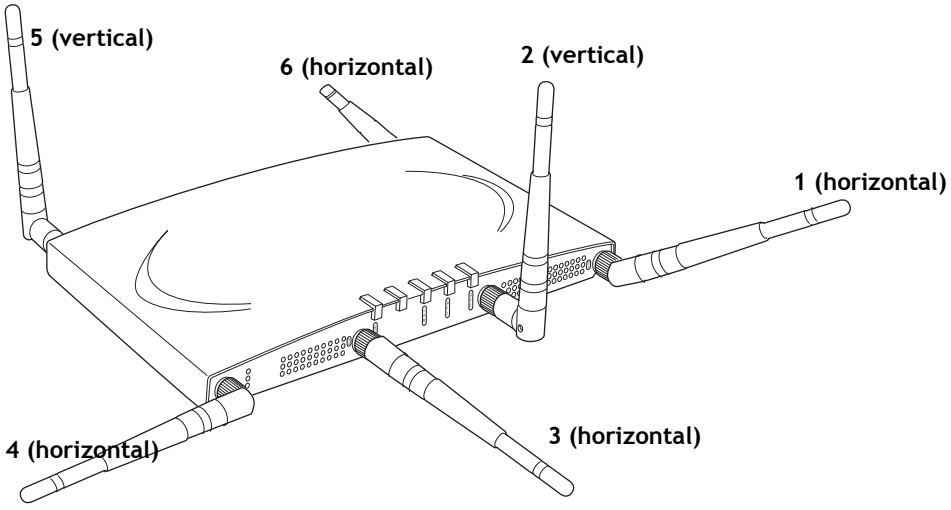
- Install APs toward the center of the building.
- Do not install APs near metal objects, such as heating ducts, metal doors, or electric service panels.
- Relative to the ground, orient the antenna up or down, not sideways.

Note: The previous guidelines are general guidelines. Each site has its own unique environment. Place access points accordingly.

Attach the Antennas

The AP320, AP311, and AP302 have six external antenna ports, labeled 1 - 6. These units only operate with six antennas attached, even though some configurations don't use all six. Alternately, you can cap the antenna connections with 50 ohm terminators. (Meru does not sell terminators.) In addition, the Meru supplied antennas are suitable only for indoor use unless they are mounted in an outdoor enclosure. To achieve the best performance from your AP300, position antennas at a 90 degree angle relative to each other as shown in Figure 6. The antennas do not have to be oriented exactly as shown in the figure, but it is important to maintain the relative angles. If for some reason you are unable to maintain the angles, the network still operates, but you may experience up to 20% drop in throughput depending on the antenna orientation.

Figure 6: AP320, AP311 or AP302 Antennas 1-6 in Ceiling and Wall Mount Configuration



The following antenna connections are used during operation of the AP320, AP311, and AP302.

Table 1: AP300 Radios and Corresponding Antennas

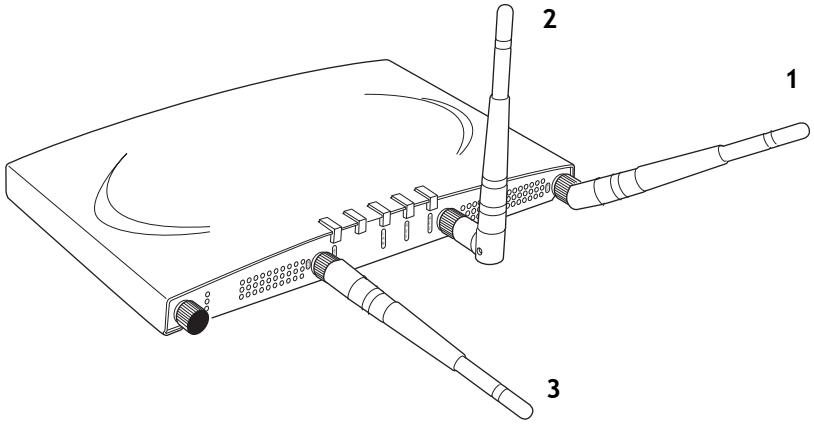
Model	Radio 1 (Ant4, Ant5, Ant6)	Radio 2 (Ant1, Ant2, Ant3)
AP320	a/b/g/n with 3 dual band omni-directional antennas	a/b/g/n with 3 dual band omni-directional antennas
AP311	a/b/g/n with 3 dual band omni-directional antennas	a/b/g with 3 dual band omni-directional antennas
AP310	a/b/g/n with 3 dual band omni-directional antennas	NA
AP302	a/b/g with 3 dual band omni-directional antennas	a/b/g with 3 dual band omni-directional antennas
Outdoor enclosures		

Radio 1 Antenna Connectors for AP320 AP311 AP302	Radio 2 Antenna Connectors for AP320 AP311 AP302
Ant4, Ant5, Ant6	Ant1, Ant2, Ant3

Note: Do not leave any antenna connectors unterminated. All antennas supplied with the Access Point must be connected to the antenna connectors on the AP.

The AP310 has six external antenna ports labeled 1 - 6. However, AP310 uses a maximum of three antennas and the unused antenna connectors are blocked. **Figure 7** illustrates the recommended antenna configuration for the AP310.

Figure 7: AP310 Antennas 1-3



The following antenna connections are used during operation of the AP310.

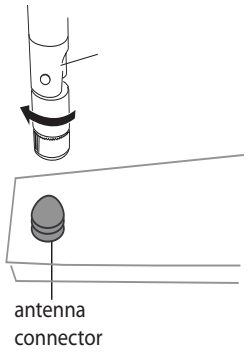
Radio 1 Antenna Connectors for AP310	Radio2 Antenna Connectors for AP310
Ant1, Ant2, Ant3	NA

Note: Do not leave any antenna connectors unterminated. All antennas supplied with the Access Point must be connected to the antenna connectors on the AP.

The attached antennas must be the same model; if you replace one antenna, replace them all.

Attach the antennas to the connectors on the AP300 (see **Figure 8**). Rotate the knurled ring at the base of the antenna clockwise to attach the antenna. The ring should be finger-tight.

Figure 8: AP300 Antenna Connection



Caution! When changing the orientation of the antennas, be sure to slightly loosen the knurled ring before moving the antenna. Retighten the ring afterward. Otherwise, you might damage the internal cabling in the AP.

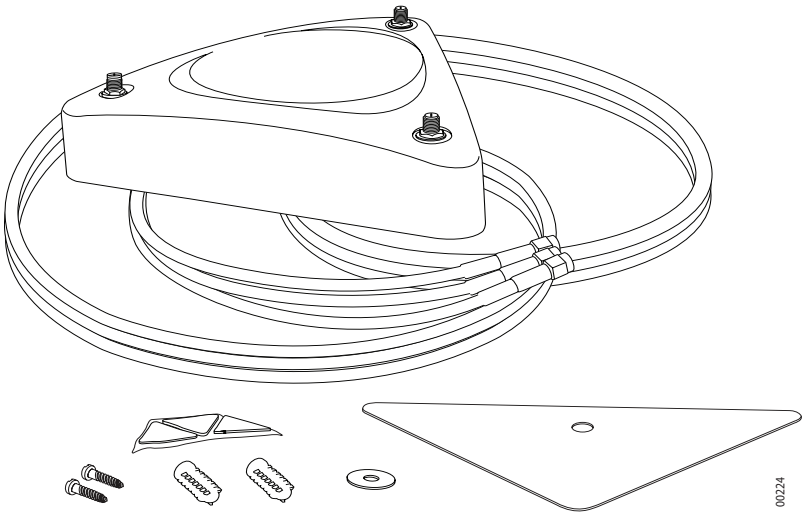
Meru recommends using the Meru provided-antennae. However, business partners are considered to be qualified technicians and can specify and provide any third-party antennae that meets the installation requirements. This is a benefit of utilizing all external antennae in our architecture. When this is the case, Meru can not take responsibility for the antennae and subsequent system performance as it relates to the antennae.

Install the Optional Remote Antenna Mount on the Ceiling

Use an optional Remote Antenna Mount (ACC-ANT-MIMO-MNT) for one or both AP300 radios to remotely connect the AP300 antennas. The Remote Antenna Mount allows you to relocate either your current antennas or the optional high-gain dipole antennas to a location with clearer signal paths to the other wireless devices in your network. The Remote Antenna Mount can be installed either below the ceiling tile or on the wall. The default orientation for the mount is suitable for a ceiling mount, but you can attach the mount to a wall with some modifications.

Use one mount per radio; for example AP310 needs one unit, and AP320 needs two units.The Remote Antenna Mount uses low-loss plenum rated LMR195 cable and SMA connectors. To order this unit, contact your Meru sales representative and refer to part number ACC-ANT-MIMO-MNT.

Figure 9: Remote Antenna Mount



The remote antenna mount kit includes:

- Antenna stand with attached cable. The three antenna SMA female connectors on the Antenna Mount support AP300 antenna diversity. This feature gives the client the ability to automatically choose the antenna receiving the strongest signal.
- Triangular ceiling mount clip for attaching to hanging ceiling (includes bolt assembly)
- Three self-adhesive pads for the bottom of the unit (over the screws)
- Two wall mount screws with anchors
- Ceiling Mount Template
- Installation diagram

To connect the Remote Antenna Mount to the ceiling, refer to the installation diagram from the shipping box while following these steps:

1. Attach the shorter end of the screw to the center hole on the back of the Antenna Mount.
2. Remove the designated ceiling tile.
3. Using the template, drill holes in the ceiling tile.
4. Replace the ceiling tile.
5. Remove a ceiling tile adjacent to the newly drilled tile for access purposes.
6. Feed the Antenna Mount cable through the larger hole in the ceiling tile until the Antenna Mount is flush with the ceiling. The screw should now be visible above the ceiling tile (through the second hole).
7. Place the triangular plate above the ceiling tile with the screw aligned through the plate.
8. Drop the washer onto the screw and tighten the bolt.
   The Antenna Mount is now connected to the ceiling.
9. Replace the adjacent tile.
10. Connect the three Remote Antenna Mount cables to the appropriate connectors on the AP300. Be sure to connect the three antennas that correspond to one radio. See **Figure 6** and **Figure 7** to determine the cable connection configuration.
11. Attach three antennas that shipped with AP300 to the three connectors on the triangular remote device. See **Figure 9**.

Install the Optional Antenna Mount on a Wall

1. Reorient the cable on the Remote Antenna Mount by removing the three screws on the back, removing the small cover, reorienting the cable and then replacing the three screws. Discard the small cover.
2. Connect the three Remote Antenna Mount cables to the appropriate connectors on the AP300. Be sure to connect the three antennas that correspond to one radio. See **Figure 6** and **Figure 7** to determine the cable connection configuration.
3. Attach three antennas that shipped with AP300 to the three connectors on the triangular remote device.

Install the Access Point

The AP300 ships with a detachable mounting bracket. The AP300 is designed to be compatible with brackets supplied by Meru and by other vendors. The AP300 mounts directly on the AP150 mounting bracket. If you are replacing AP200s/AP300s, the AP300 bracket can be mounted on the old AP200s/AP300s bracket with included shoulder screws; you don't need to remove the old brackets. AP300 can also be directly mounted on third-party brackets. You can mount an AP300 in the following ways:

- **Mount AP300 Horizontally on a Shelf**
- **Mount AP300 Vertically on a Wall**

- Mount AP300 Below a Suspended Ceiling
- Mount AP300 Above a Suspended Ceiling (Plenum)

Mount AP300 Horizontally on a Shelf

When mounting an AP300 horizontally, remove the mounting bracket. Be sure to position the antennas vertically when an AP300 sits on a surface.

Mount AP300 Vertically on a Wall

Note: If you are replacing AP150s, you can use the existing brackets: the AP150 and AP300 use the same bracket. If you are replacing AP300s, the AP300 bracket can be attached to the old bracket with included shoulder screws; you don't have to remove the old brackets. This bracket will also mount seamlessly into the Proxim AP4000 bracket and standard Cisco brackets.

To mount an AP300 on a wall:

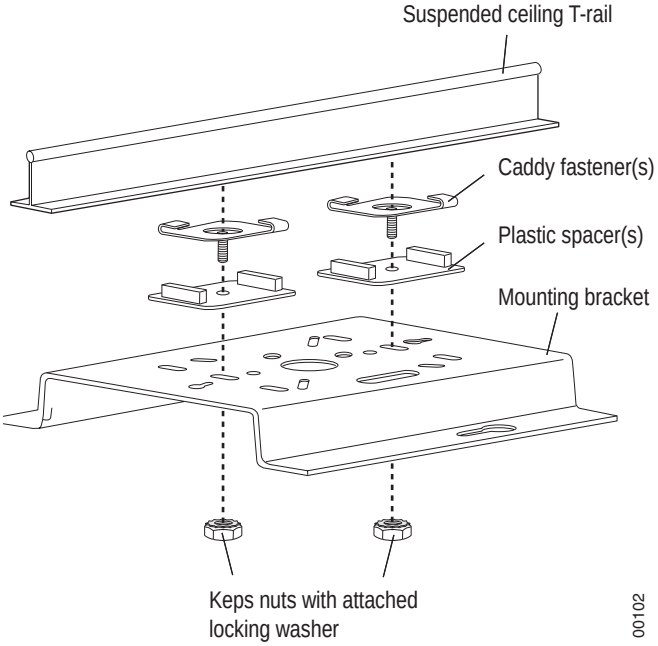
1. Using the bracket holes as a guide, mark the location on the wall for the two AP bracket mounting screws. If possible, center the mounting screws on a wall stud. If you do not center the mounting screws on a wall stud, use plastic wall anchors.
2. Drill holes at the locations you marked:
   - 3/16-inch holes if you are using plastic anchors
   - 1/8-inch holes if you are using only the screws
3. If you are using plastic anchors, install them in the holes.
4. Screw in the screws most of the way.
5. Mount the bracket on the screws, placing the circular portion of the keyhole mounts over the screw heads and sliding the bracket down.
6. Connect one end of the Ethernet cable to the switch and the other end to the AP300 Ethernet port.
7. If you are not using a PoE device, connect an external power supply to the power connector and plug it into the wall.

Mount AP300 Below a Suspended Ceiling

The optional suspended ceiling mounting kit (ACC-MNT-SCRMKIT) allows the AP300 mounting bracket to attach to suspended ceiling T-rails (see **Figure 10**).

Note: To comply with NEC code, attach a grounding wire to any of the screws used to attach the AP300 to the mounting bracket.

Figure 10: Mounting an AP to a Suspended Ceiling Rail using ACC-MNT-SCRMKIT



To mount an AP300 below a suspended ceiling:

1. Determine the location on the ceiling rail where the AP will be mounted and remove the ceiling tiles.
2. Place each of the two caddy fasteners on the ceiling T-rail and twist to attach to the rail.
3. Adjust the distance between the caddy fasteners by using the mounting bracket holes as a guide.
4. Tighten the caddy fasteners in place using a standard screwdriver. Do not overtighten.
5. Place each spacer on the caddy fastener stud. The spacer legs should contact the ceiling T-rail.
6. Align the mounting bracket keyholes with the caddy fastener studs and slide the AP300 to the narrow end of the hole.
7. Attach a keps nut to each caddy fastener stud and hand tighten. Do not overtighten.
8. Align the AP300 mounting posts over the circular portion of the keyhole mounts, push the AP in and slide the AP down until it engages with the locking detents (see **Figure 10**). You should hear it snap in place.
9. For each antenna, loosen the knurled ring at the base of the antenna (see **Figure 8**), orient the antenna and then retighten the ring.
10. Connect one end of the PoE 100BaseT Ethernet cable to the 100/1000 Ethernet connector.

> **Caution!** Be sure to connect the Ethernet cable to the Ethernet port; the cable can mistakenly be plugged into the Console port.

Mount AP300 Above a Suspended Ceiling (Plenum)

The optional T-bar box hanger mounting kit allows the AP300 to be mounted above suspended ceiling T-rails (see **Figure 11**). The installation attaches the T-bar box hanger to the ceiling rails using clips. The AP300 attaches to the mounting bracket that is attached to the T-bar box hanger.

The AP300 with the metal enclosure exposed meets the requirements for fire resistance and low smoke-generating characteristics required by Section 300-22(C) of the National Electrical Code (NEC) for installation in a building's environmental air space.

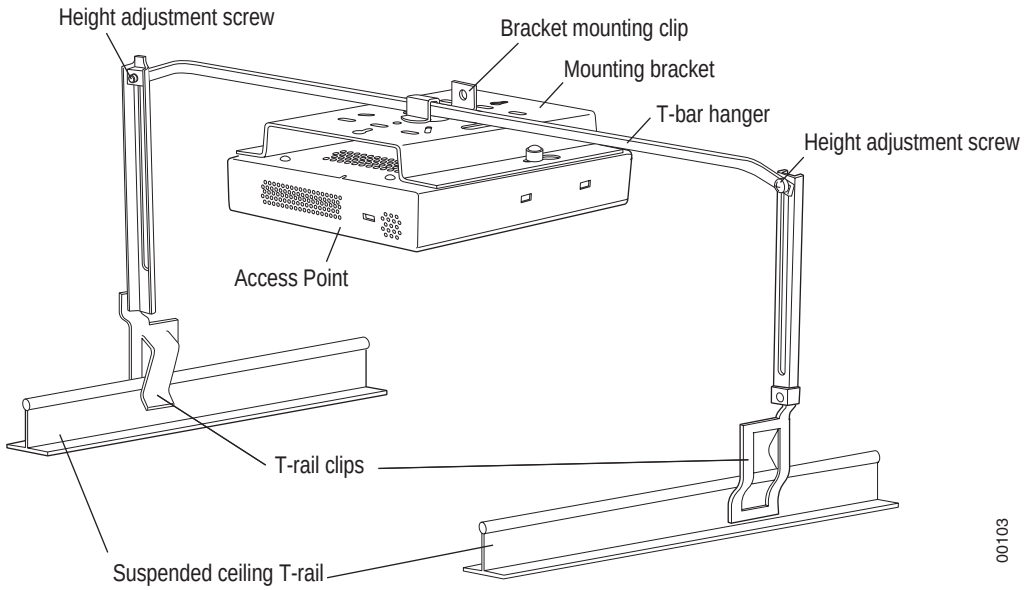
You may need to modify thicker tiles to support this installation.

Warning! When installed in air-handling spaces, such as above a suspended ceiling, power the AP300 only with a PoE, not a power supply.

Warning! Use Ethernet cable that meets the requirements for operating in plenums and environmental air space (in accordance with Section 300-22(C) of the NEC).

Warning! Any Fast Ethernet (FE) cables installed in air-handling spaces should be suitable under NEC Article 800.50 and marked accordingly for use in plenums and air-handling spaces with regard to smoke propagation, such as CL2-P, CL3-P, MPP (Multi Purpose Plenum), or CMP (Communications Plenum).

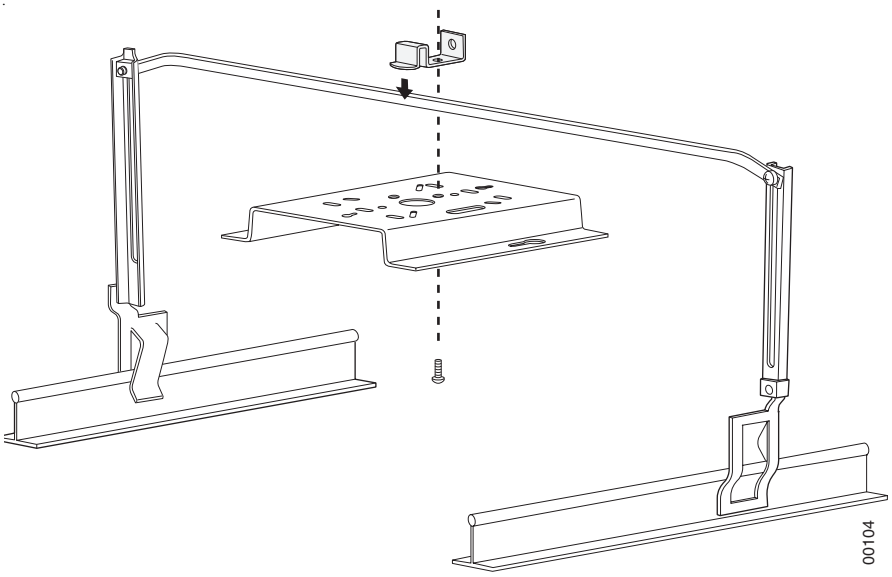
Figure 11: AP Mounted Above a Suspended Ceiling



1. Determine the location on the ceiling rails where the AP will be mounted and remove the ceiling tile.
2. Unpack the T-bar hanger kit and unfold the legs of the T-bar hanger.

3. Locate the bracket mounting clip holes on the mounting bracket (see **Figure 11**). One hole attaches the bracket perpendicular to the box hanger; the other mounts the bracket parallel to the box hanger.
4. Attach the U-joint of the clip to the T-bar and snap in place (see **Figure 12**).

Figure 12: Attaching the Mounting Bracket to the Box Hanger



5. Pass the long end clip through the large center hole to the underside of the mounting bracket clip and then attach the bracket to the clip using the supplied screw (see **Figure 12** for orientation).
6. Hold the AP300 next to the mounting bracket to estimate the height of the T-bar box hanger to provide enough clearance for the external antennas, which should be pointing down.
7. Adjust the height of the box hanger using the height adjusting screws (see **Figure 10**).
8. Clip the box hanger T-rail clips to the ceiling rails, making sure they are securely attached.
9. Connect a drop wire to a building structural element and through the hole provided in the bracket mounting clip. The U.S. National Electrical Safety Code requires this additional support.
10. Connect the posts of the AP300 to the three keyholes of the mounting bracket and slide into the keyhole, ensuring the locking detent is engaged. You will hear a click.
11. For each antenna, loosen the knurled ring at the base of the antenna (see **Figure 8**), point the antenna down, then retighten the ring.
12. Connect one end of the PoE Ethernet cable to the Ethernet connector, shown in **Figure 11**.

Note: For the AP201 and AP208 access points, use a shielded Cat 5e (or greater) Ethernet cable in order to comply with international electromagnetic emissions limits.

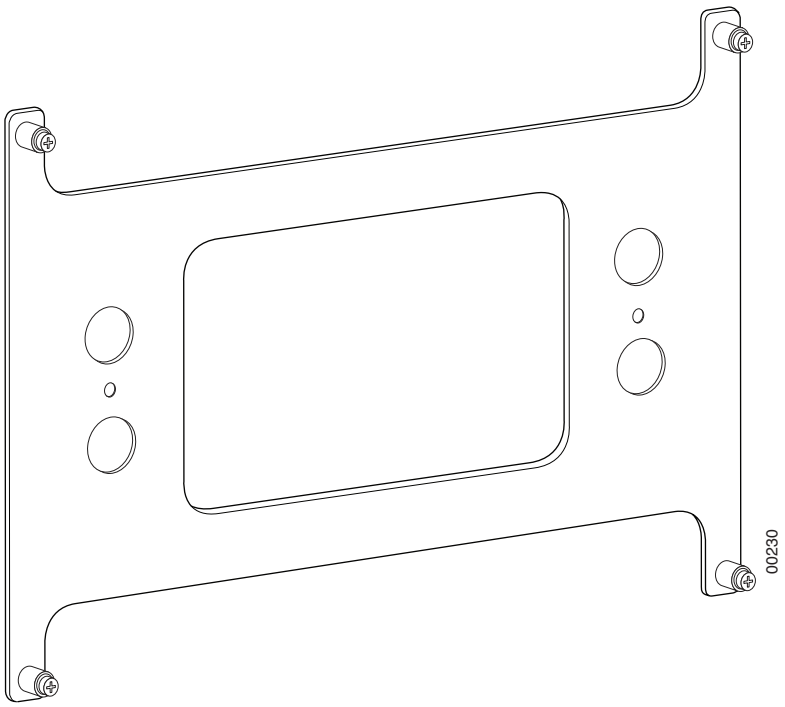
13. Check that the AP300 is operating correctly before replacing the ceiling tile to the ceiling. Verify correct operating using the LEDs, as shown in **Check AP300 LED Activity**.

Mount AP300 in a Hoffman Enclosure

Meru has designed a custom mounting bracket compatible with a Hoffman enclosure (**www.hoffmanonline.com**). This bracket is available exclusively through Meru and orderable as part number ACC-AP300-BHE. To mount an AP300 in a Hoffman enclosure, follow these steps:

1. Place AP300 upside down on a soft flat surface.
2. Remove and discard the wall/ceiling mounting bracket if it is present.
3. Remove and discard the four rubber feet.
4. If the unit has white antennas, remove them and attach the black antennas provided.
5. Position the Hoffman bracket (ACC-AP300-BHE) onto the back of the AP300 with the four Hoffman mounting screws facing downwards.

Figure 13: Hoffman Bracket ACC-AP300-BHE

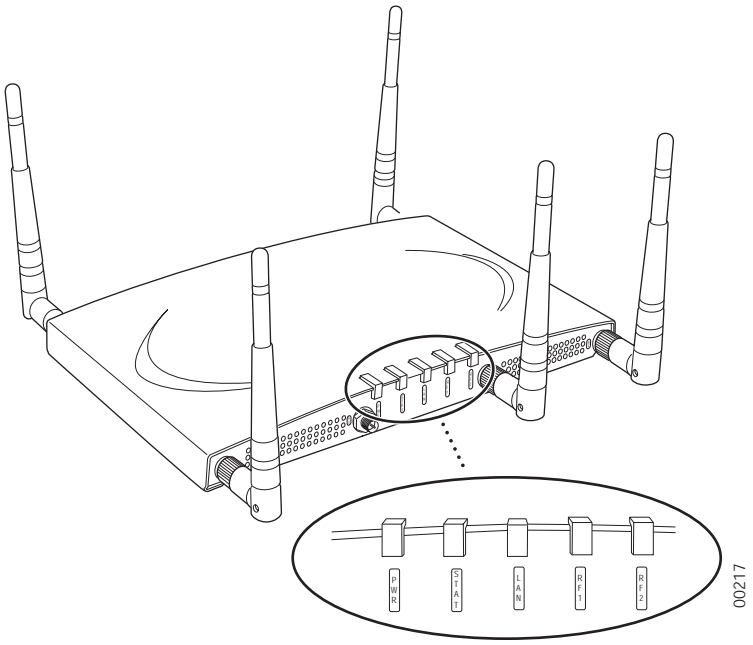


6. Using a Phillips screw driver, attach the bracket using the two supplied 6-32 3/16 SEMS screws.
7. Flip the assembly over and mount into the Hoffman enclosure, attach the Ethernet cable to the AP300 rotating the assembly to allow ease of dressing the Ethernet cable within the enclosure.
8. Using a Phillips screw driver, tighten the four bracket screws to the enclosure.
9. Adjust the antennas as needed.

Check AP300 LED Activity

When the AP300 is first connects to the controller and any time the access point is rebooted, the AP initializes and then is programmed by the controller. When the AP is first powered up, all LEDs are green. Thereafter, the Status LED color reflects the various operating states described in **Table** . After the AP300 is connected, check the status of the LEDs.

Figure 14: AP300 Status LEDs



The functions of the five LEDs are described below.

AP300 LED Descriptions

LED	Function
Power	off—no power green—presence of power
Status	off—no power green—booting stage 1 blinking green and off—booting stage 2 blinking green and white—discovering the controller blinking green and blue—downloading a configuration from the controller blinking blue and off—AP is online and enabled, working state blinking red and yellow—failure; consult controller for alarm state
LAN	off—no power or no link green—link status OK (at any speed) green/blinking—activity (at any speed) red—auto negotiation failure
Radio 1 Radio 2	off—no radio present green—radio enabled green blinking—data activity yellow—disabled or in scanning mode red—failure

Where to Go From Here

Now that the AP300 is installed, go to the *Meru System Director Getting Started Guide* for instructions on initializing the hardware. Return to this chapter to check the status of the LEDs once the WLAN is operational.

Chapter 3
Installing the AP200

This chapter describes how to physically install the AP200. It contains the following sections:

Safety Precautions

IMPORTANT—Read and follow the instructions in “Regulatory Information” on page 93 before installing and operating this product.

Unpacking the AP200

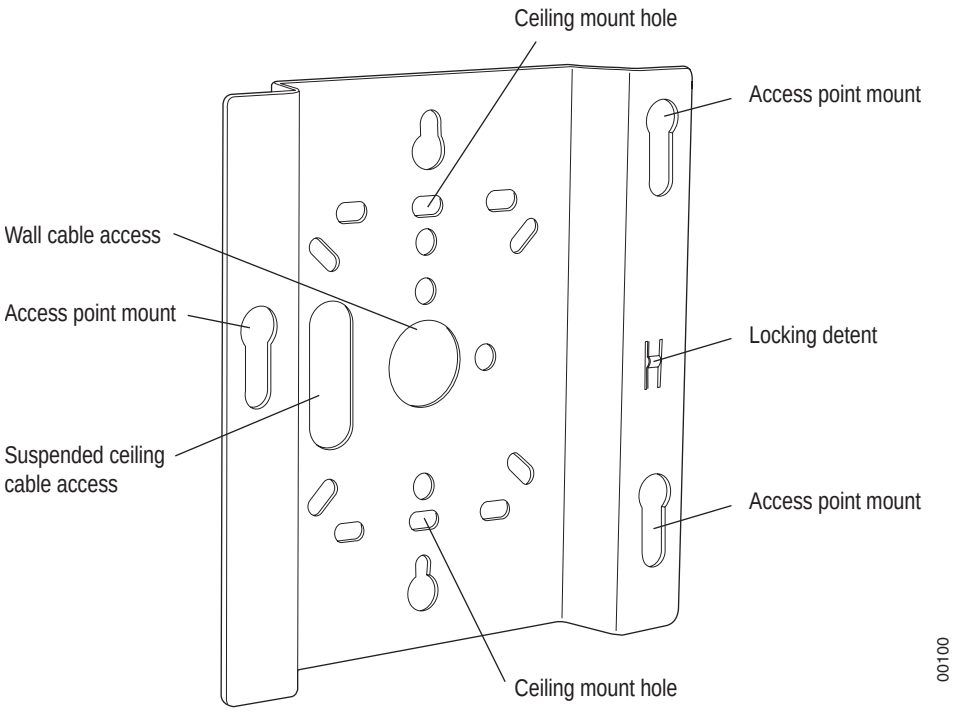
As you unpack the AP200, confirm that the AP200 shipping package contains the items listed on your packing list.

Shipments of the AP200 include a mounting bracket and mounting hardware for standard wall mounting. Optional mounting kits are available for mounting the AP200 above or below a hanging ceiling. The AP200 mounting studs are placed so they can be used with brackets supplied by other vendors or to replace an AP100.

Note: The AP200 has a security cable slot so you can secure the AP200 with a standard security cable, such as those used to secure laptop computers.

An array of holes on the mounting bracket (see **Figure 16**) allows it to be mounted on the wall and over junction boxes or molly bolts. There are also holes for passing the PoE Ethernet or external power supply cable through the bracket if the bracket is mounted on a junction box or over the ceiling T-bar box hanger.

Figure 15: AP200 Mounting Bracket



Installation Requirements

The following recommended mounting locations provide the best reception for the AP200:

- On a horizontal surface, such as a table or a desk
- On a vertical surface, usually a wall
- Below a hanging ceiling
- Above a hanging ceiling tiles (this installation is supported only for the AP200 with the plastic enclosure removed)

Warning! With plastic covers removed, this product is suitable for use in environmental air space in accordance with the Section 300-22(c) of the National Electric Code and Sections 2- 128.12 - 010 (3) and 12 - 100 of the Canadian Electrical Code. Part 1. C22. 1. For other countries, consult local authorities for regulations.

To complete this installation, you need the items listed below.

Installation Type	Consumable Items Required
Horizontal mounting	None
Vertical mounting over a wall stud	• Two #6 x 2" wood screws for a wood stud; or • Two #6 x 1½" metal screws for a metal stud • Mounting bracket
Vertical mounting on sheetrock	• Two #6 x 1" screws • Two #4-6 x 7/8" ribbed plastic wall anchors • Mounting bracket
Horizontal mounting below a hanging ceiling	• Two caddy fasteners • Two plastic spacers • Two keps nuts (with attached lock washer) • Mounting bracket
Mounting above a ceiling tile (AP200 metal enclosure only)	• Two T-rail clips • One T-box hanger • One bracket mounting clip • Mounting bracket

You need the tools listed below.

AP200 Installation Tools

Installation Type	Tools Required
Horizontal mounting	None
Vertical mounting over a wall stud	• Drill • 1/8"drill bit • Screwdriver
Vertical mounting on sheetrock	• Drill • 3/16" drill bit • Screwdriver
Horizontal mounting below a hanging ceiling	• Screwdriver • Wrench or pliers
Mounting above a hanging ceiling (AP200 metal enclosure only)	• Wrench or pliers • Screwdriver

Installing the Access Points

Selecting a Location

The AP200 requires a location that meets the following:

- Relatively unobstructed access to the stations the AP serves
- Power over Ethernet (PoE) connection to the network switch servicing the controller.

APs can obtain their power from 802.3af standard Power over Ethernet (PoE)-compatible network switch or PoE power injector installed between the switch and the AP200.

Select a location with minimal physical obstructions between the AP and the wireless stations. In an office with cubicles, mounting the APs below a hanging ceiling or the wall near the ceiling provides the least obstructed communications path. For an external power supply connection, ensure the power source is near to where the AP200 will be mounted.

Most installations receive the best coverage using the following guidelines:

Install APs toward the center of the building.

- Do not install APs near metal objects, such as heating ducts, metal doors, or electric service panels.
- Relative to the ground, orient the antenna up or down, not sideways.

Note: The previous guidelines are general guidelines. Each site has its own unique environment. Place access points accordingly.

The AP200 is only intended for installation in Environment A as defined in IEEE 802.3af. All interconnected equipment must be contained within the same building, including the interconnected equipment's associated LAN connection.

Attaching the AP200 Antennas

The AP200 is provided with external antenna ports. Make sure that all external antennas and their associated wiring are located entirely indoors. The external antennas are not suitable for outside use.

If the AP200 does not have external antennas, attach the antennas to the connectors on the AP200 (see **Figure 17**). Rotate the knurled ring at the base of the antenna clockwise to attach the antenna. The ring should be finger-tight.

Caution! When changing the orientation of the antennas, be sure to slightly loosen the knurled ring before moving the antenna. Retighten the ring afterward. Otherwise, you might damage the internal cabling in the AP.

Mounting the Access Point

You can mount an AP200 in the following ways:

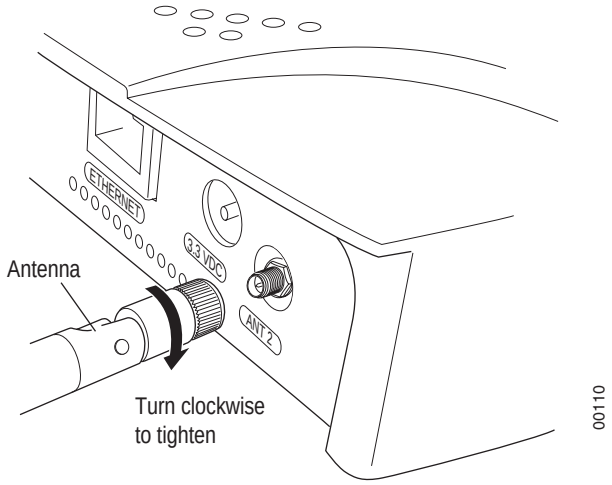
- Horizontally, as described in the “Horizontal Mounting” section.
- Vertically, as described in the “Vertical Mounting” section.
- Below a hanging ceiling, as described in the “Mounting Below a Suspended Ceiling” section.
- Above a tiled hanging ceiling, as described in the “Mounting Above a Suspended Ceiling” section.

Horizontal Mounting

To horizontally mount an AP200:

1. Place the AP200 flat on the horizontal surface.
2. For each antenna, loosen the knurled ring at the base of the antenna (see **Figure 17**), point the antenna straight up, then retighten the ring.

Figure 16: AP200 Antenna Connection



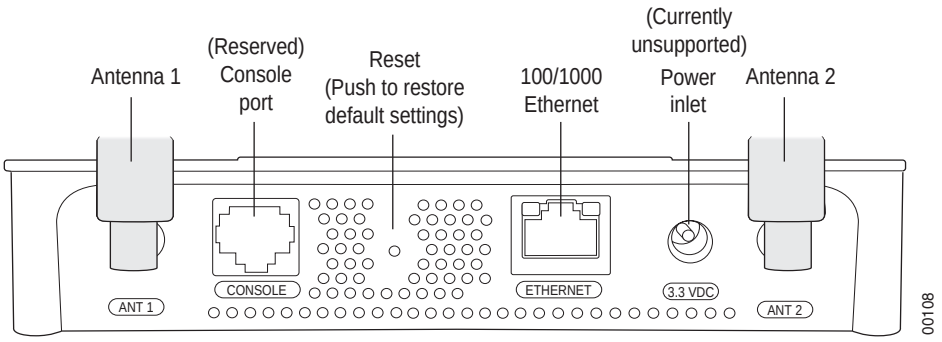
3. Connect one end of the PoE 100BaseT Ethernet cable to the 100/1000 Ethernet connector, shown in **Figure 18**.

Note: For the AP201 and AP208 access points, a shielded Cat 5e (or greater) Ethernet cable must be used in order to comply with international electromagnetic emissions limits.

If it is not practical to use shielded cables, contact Support for a line filter, available at no charge, that may also be used to ensure compliance.

Caution! Be sure to connect the Ethernet cable to the Ethernet port; the cable can mistakenly be plugged into the Console port (see **Figure 18**).

Figure 17: AP200 Connector Panel

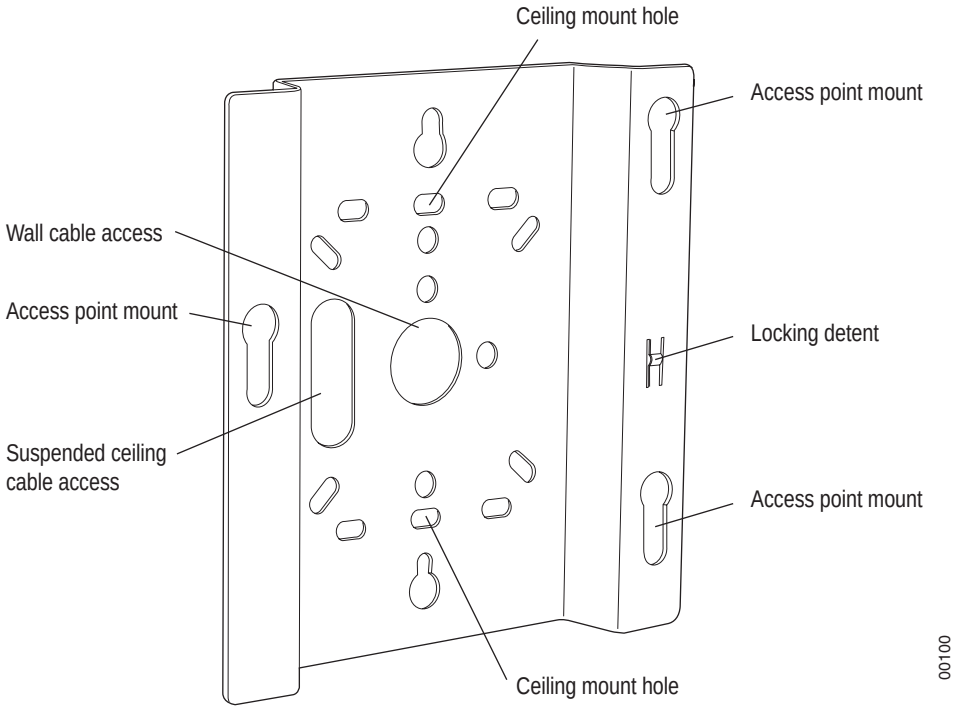


Vertical Mounting

To vertically mount an AP:

1. Using the bracket holes as a template, mark the location on the wall for the two AP bracket mounting screws. They are placed 4 ½ inches apart, center-to-center, one above the other. If you are not using plastic wall anchors, you must center the mounting screws on a wall stud. If you do not center the mounting screws on a wall stud, you must use plastic wall anchors.

Figure 18: AP200 Bracket



2. Drill holes at the locations you marked:
   - 3/16-inch holes if you are using plastic anchors
   - 1/8-inch holes if you are using only the screws
3. If you are using plastic anchors, install them in the holes.
4. Screw in the screws most of the way, so that the screw head is about 1/16 of an inch from the wall.
5. Mount the bracket on the screws, placing the circular portion of the keyhole mounts over the screw heads and sliding the bracket down.
6. Tighten the screws to secure the bracket.
7. Align the AP200 mounting posts over the circular portion of the keyhole mounts, push the AP in and slide the AP down until it engages with the locking detents. You should hear it snap in place.

Figure 19: Aligning the AP200 with the Bracket

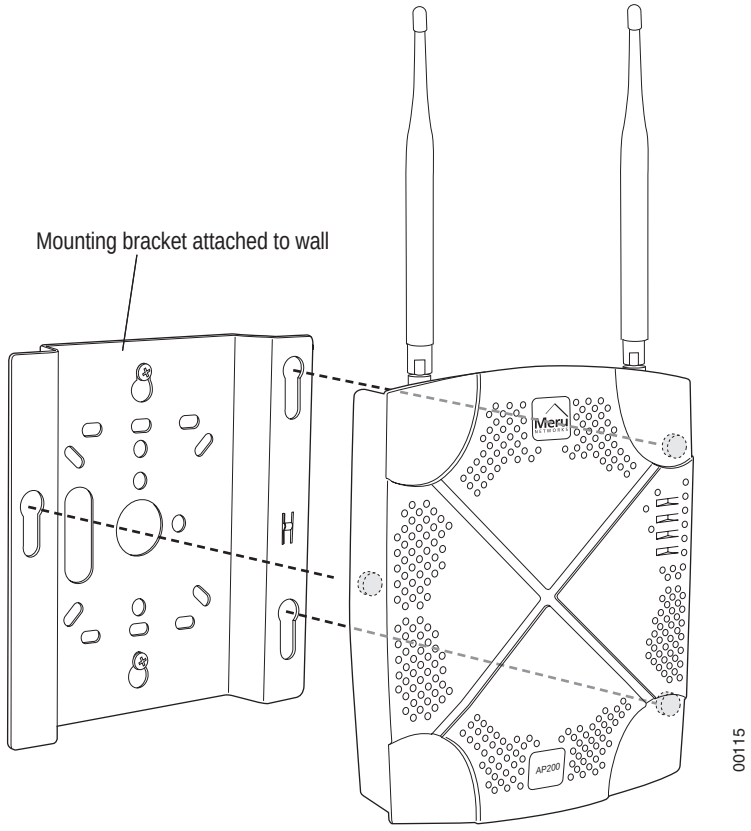
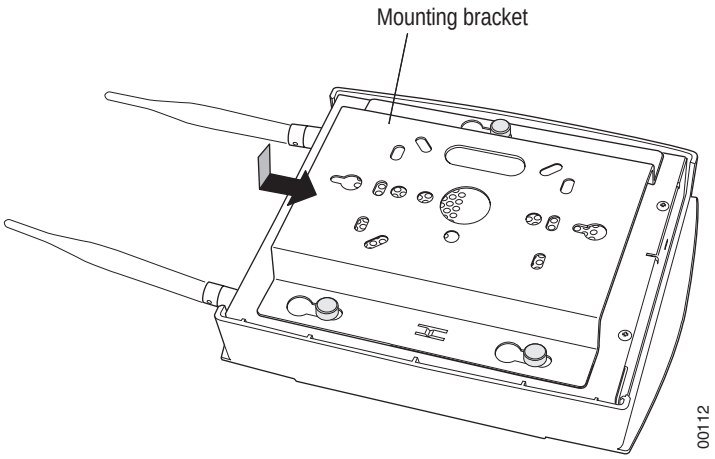


Figure 20: Sliding the AP200 into the Bracket



8. For external antennas, loosen the knurled ring at the base of each antenna (see **Figure 17**), point the antenna straight up, then retighten the ring.
9. Connect one end of the PoE 100BaseT Ethernet cable to the 100/1000 Ethernet connector, shown in **Figure 18**.

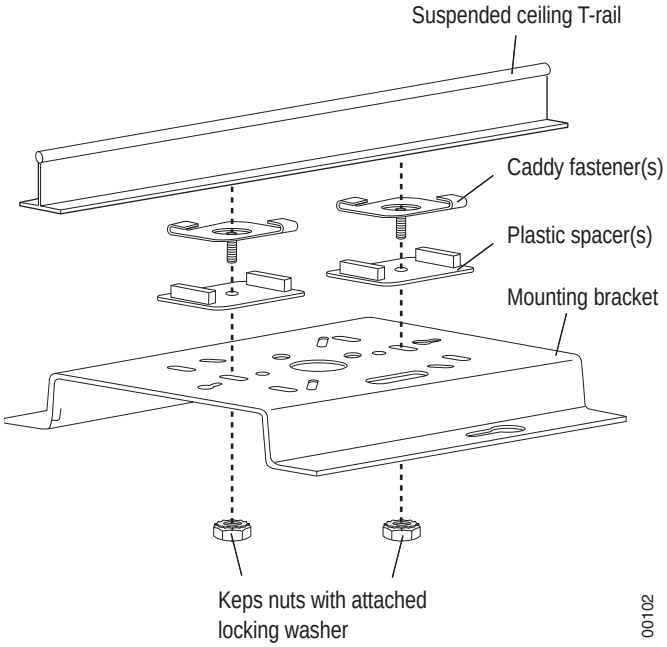
Caution! Be sure to connect the Ethernet cable to the Ethernet port; the cable can mistakenly be plugged into the Console port.

Mounting Below a Suspended Ceiling

The optional suspended ceiling mounting kit allows the AP200 mounting bracket to attach to suspended ceiling T-rails (see **Figure 22**).

Note: To comply with NEC code, attach a grounding wire to any of the screws used to attach the AP200 to the mounting bracket.

Figure 21: Mounting the AP200 to a Suspended Ceiling Rail



To mount an AP200 below a suspended ceiling:

1. Determine the location on the ceiling rail where the AP will be mounted and remove the ceiling tiles.
2. Place each of the two caddy fasteners on the ceiling T-rail and twist to attach to the rail.
3. Adjust the distance between the caddy fasteners by using the mounting bracket holes as a guide.
4. Tighten the caddy fasteners in place using a standard screwdriver. Do not overtighten.
5. Place each spacer on the caddy fastener stud. The spacer legs should contact the ceiling
T-rail.

6. Align the mounting bracket keyholes with the caddy fastener studs and slide the AP200 to the narrow end of the hole.
7. Attach a keps nut to each caddy fastener stud and hand tighten. Do not overtighten.
8. Align the AP200 mounting posts over the circular portion of the keyhole mounts, push the AP in and slide the AP down until it engages with the locking detents (see **Figure 21**). You should hear it snap in place.
9. For each antenna, loosen the knurled ring at the base of the antenna (see **Figure 17**), point the antenna straight down, then retighten the ring.
10. Connect one end of the PoE 100BaseT Ethernet cable to the 100/1000 Ethernet connector, shown in (see **Figure 18**).

Note: For the AP201 and AP208 access points, a shielded Cat 5e (or greater) Ethernet cable must be used in order to comply with international electromagnetic emissions limits.

If it is not practical to use shielded cables, contact Support for a line filter, available at no charge, that may also be used to ensure compliance.

Caution! Be sure to connect the Ethernet cable to the Ethernet port; the cable can mistakenly be plugged into the Console port.

Mounting Above a Suspended Ceiling

The optional T-bar box hanger mounting kit allows the AP200 to be mounted above suspended ceiling T-rails (see **Figure 23**). The installation attaches the T-bar box hanger to the ceiling rails using clips. The AP200 attaches to the mounting bracket that is attached to the T-bar box hanger.

The AP200 antennas should point straight down for this type of installation. You may need to modify thicker tiles to support this installation.

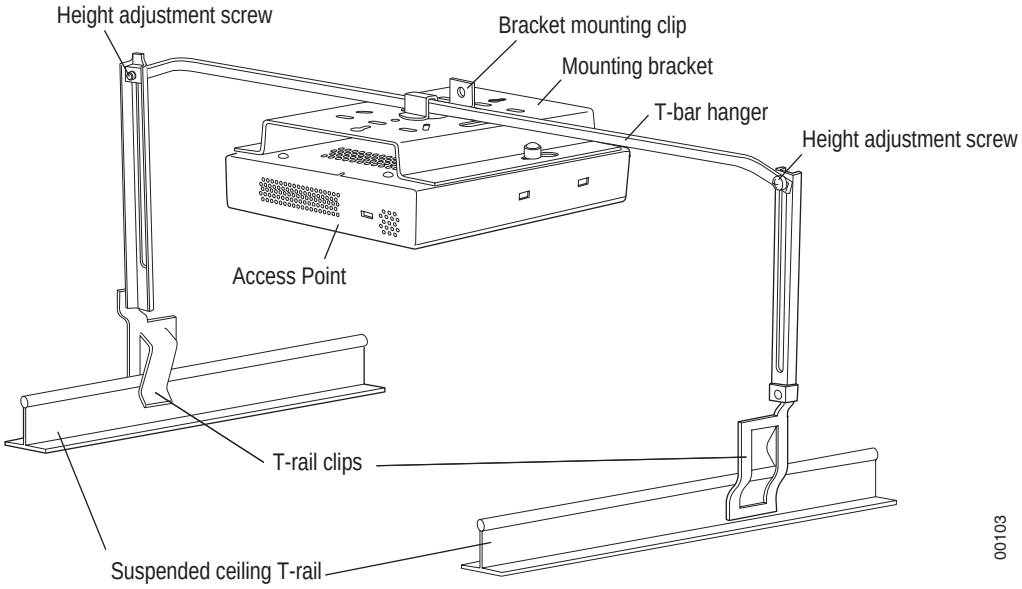
Warning! When installed in air-handling spaces, such as above a suspended ceiling, the AP200 is to be powered via PoE only (PoE is required).

Warning! The AP200 with the metal enclosure exposed meets the requirements for fire resistance and low smoke-generating characteristics required by Section 300-22(C) of the National Electrical Code (NEC) for installation in a building's environmental air space. You must remove the plastic enclosure to reveal the plenum-rated AP200 metal case for installations above a suspended ceiling.

Additionally, you must use Ethernet cable that meets the requirements for operating in plenums and environmental air space (in accordance with Section 300-22(C) of the NEC).

Warning! Any Fast Ethernet (FE) cables installed in air-handling spaces should be suitable under NEC Article 800.50 and marked accordingly for use in plenums and air-handling spaces with regard to smoke propagation, such as CL2-P, CL3-P, MPP (Multi Purpose Plenum), or CMP (Communications Plenum).

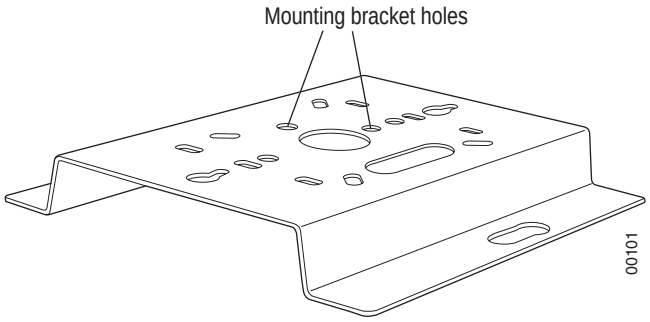
Figure 22: Mounting the AP200 Above a Suspended Ceiling



To mount an AP200 above suspended ceiling rails:

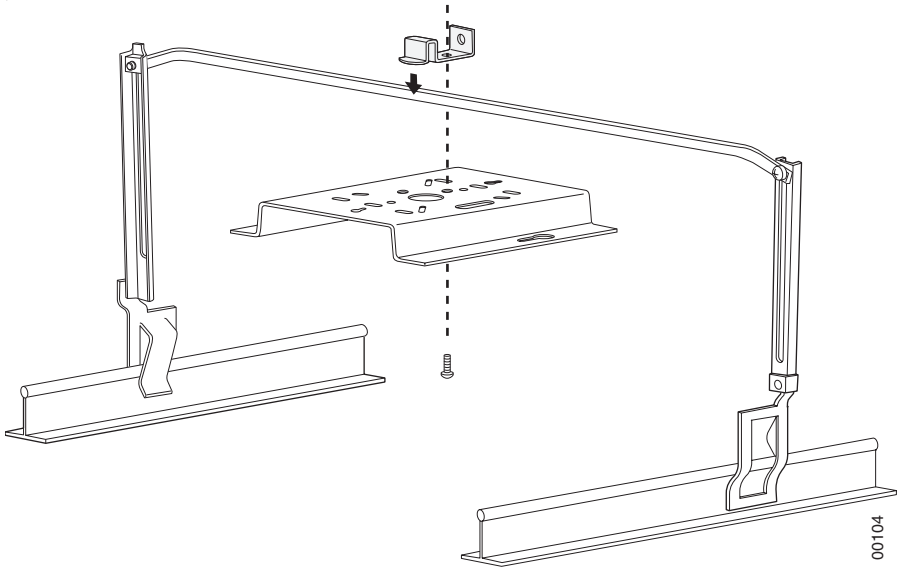
1. Determine the location on the ceiling rails where the AP will be mounted and remove the ceiling tile.
2. Unpack the T-bar hanger kit and unfold the legs of the T-bar hanger.
3. Locate the bracket mounting clip holes on the mounting bracket (see **Figure 24**). One hole attaches the bracket perpendicular to the box hanger; the other mounts the bracket parallel to the box hanger.

Figure 23: Box Hanger Mounting Bracket Holes



4. Attach the U-joint of the clip to the T-bar and snap in place (see **Figure 25**).

Figure 24: Attaching the Mounting Bracket to the Box Hanger



5. Pass the long end clip through the large center hole to the underside of the the mounting bracket clip and then attach the bracket to the clip using the supplied screw (see **Figure 25** for orientation).

6. Hold the AP200 next to the mounting bracket to estimate the height of the T-bar box hanger to provide enough clearance for the external antennas, which should be pointing down.
7. Adjust the height of the box hanger using the height adjusting screws (see **Figure 22**).
8. Clip the box hanger T-rail clips to the ceiling rails, making sure they are securely attached.
9. Connect a drop wire to a building structural element and through the hole provided in the bracket mounting clip. The U.S. National Electrical Safety Code requires this additional support.
10. Connect the posts of the AP200 to the three keyholes of the mounting bracket and slide into the keyhole (see **Figure 21**), ensuring the locking detent is engaged. You will hear a click.
11. For each antenna, loosen the knurled ring at the base of the antenna (see **Figure 17**), point the antenna down, then retighten the ring.
12. Connect one end of the PoE 100BaseT Ethernet cable to the 100/1000 Ethernet connector, shown in **Figure 18**.

Note: For the AP201 and AP208 access points, a shielded Cat 5e (or greater) Ethernet cable must be used in order to comply with international electromagnetic emissions limits.If it is not practical to use shielded cables, contact Support for a line filter, available at no charge, that may also be used to ensure compliance.

Caution! Be sure to connect the Ethernet cable to the Ethernet port; the cable can mistakenly be plugged into the Console port.

13. Check that the AP200 is operating correctly before replacing the ceiling tile to the ceiling. Verify correct operating using the LEDs, as shown in **Checking LED Activity**.

Where to Go From Here

Now that the AP200 is installed, go to the *Meru System Director Getting Started Guide* for instructions on initializing the hardware. Return to this chapter to check the status of the LEDs once the WLAN is operational.

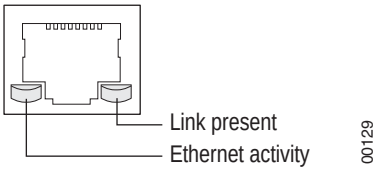
Checking LED Activity

Access point status LEDs are provided on the Ethernet connector and on the face of the AP200.

Ethernet Connector LEDs

After the AP200 is connected, the LEDs near the RJ-45 connector should light, as shown in **Figure 26**.

Figure 25: RJ-45 LEDs

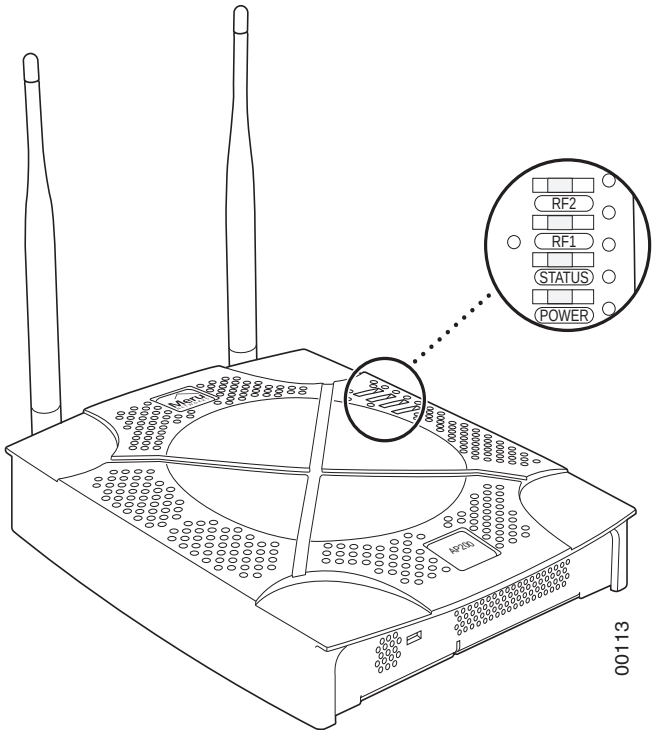


The green LED on the left blinks if any Ethernet activity is taking place. If there is no Ethernet activity, the LED is off. The LED on the right is solid green if an Ethernet link is present. If no Ethernet link is present or connectivity is lost, the LED is off.

AP200 Status LEDs

Four status LEDs on the *face* of the AP200 also light, as shown in **Figure 27**.

Figure 26: AP200 Status LEDs



The functions of the status LEDs are described below.

When the AP200 is first connected to the controller and any time the access point is rebooted thereafter, the AP initializes with and then is programmed by the controller. When the AP is first powered up, all LEDs are green. Thereafter, the Status LED (see **Figure 27**) color reflects the various operating states as described in the second table below.

AP200 LED Descriptions

LED	Function
RF 2	The status LED for Radio 2 is a follows: off—no radio present yellow—radio initializing red—radio failure solid green—radio OK blinking green—radio activity
RF 1	The status LED for Radio 1 is a follows: off—no radio present yellow—radio initializing red—radio failure solid green—radio OK blinking green—radio activity
Status	AP-Controller operational status (see **Table**)
Power	green—presence of power

AP200 Controller Status Information

State	Interpretation	AP200 LED Cycle
Attempting to discover Controller	In the process of discovering the controller. The AP is connected but not associated with the controller. If the AP does not associate with the controller after a period of time, verify that the connection between the AP and the switch or the switch and the controller is unbroken.	Green/Red/Blue/Red
Connected	Normal operation without security.	Blue/Blue/Blue/Red Blue/Blue/Blue/Red, for 2 seconds.
Authenticated	Normal operation with security.	Blue blink[a]

State	Interpretation	AP200 LED Cycle
Disconnected	Access point was once connected to a controller and configured by the controller, but can no longer find that controller	Green/Purple/ Green/Purple
Standalone	Access point is operating in a standalone mode	Purple blink
Downloading	Downloading image or configuration from the controller	Green/Blue Green/Blue
Error State	Access point is in an error state. Call Meru technical support	Red (blinking or solid)

a. The AP200 LEDs cycle from bright to dim for each “blink.”

Chapter 4
Installing the AP150

This chapter describes how to physically install the AP150. It contains the following sections:

Safety Precautions

IMPORTANT—Read and follow the instructions in Appendix , “Regulatory Information” on page 93 before installing and operating this product.

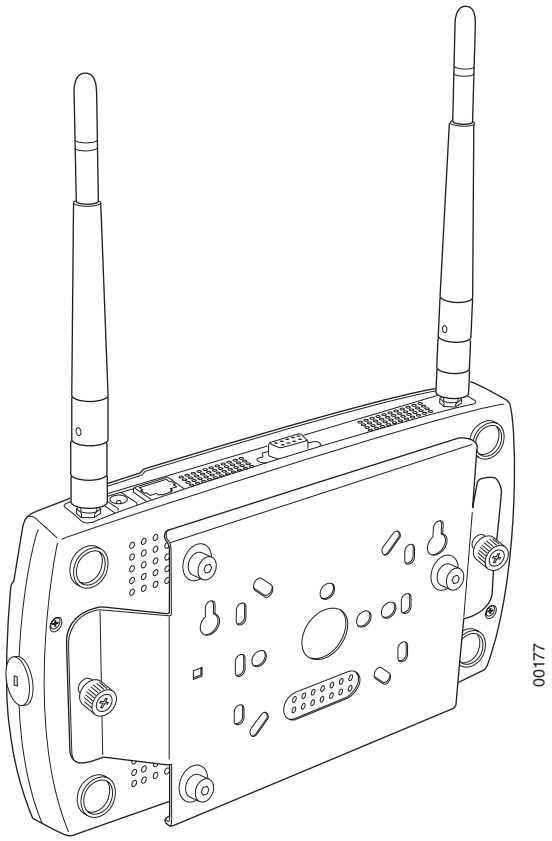
This product is intended to be supplied by a UL Listed power supply, marked Class 2 or LPS, and rated minimum 5 Vdc, 3A.

Caution! The AP150 is not certified for plenum installations, and should not be installed in the plenum space.

Unpacking the AP150

Confirm that the AP150 shipping package contains the AP150 access point with attached mounting bracket.

Figure 27: AP150 with Mounting Bracket



Installation Requirements

If you choose not to use the AP150 mounting bracket, the backside of the AP150 contains two keyholes to accommodate a simple wall mount.

A mounting bracket can be used for many wall mounting configurations. The AP150 bracket mounting studs are placed so they can be used with brackets supplied by other vendors or to replace an AP100. An array of holes on the mounting bracket (see **Figure 28**) allow it to be mounted on the wall and over junction boxes or molly bolts. There are also holes for passing the PoE Ethernet or external power supply cable through the bracket if the bracket is mounted on a junction box.

Additional optional mounting kits are available for mounting the AP150below a hanging ceiling, using the mounting bracket.

Caution! The AP150 is not certified for plenum installations, and should not be installed in the plenum space.

Note: The AP150 has two security cable slots (one on each side of the AP150) so you can secure the AP150 with a standard security cable, such as those used to secure laptop computers.

The following recommended mounting locations provide the best reception for the AP150:

- On a horizontal surface, such as a table or a desk
- On a vertical surface, usually a wall
- Below a hanging ceiling

To complete this installation, you need the items listed in Table .

AP150 Installation Items

Installation Type	Consumable Items Required
Horizontal mounting	None
Vertical mounting over a wall stud	• Two #6 x 2" wood screws for a wood stud; or • Two #6 x 1½" metal screws for a metal stud • Mounting bracket
Vertical mounting on sheetrock	• Two #6 x 1" screws • Two #4-6 x 7/8" ribbed plastic wall anchors • Mounting bracket
Horizontal mounting below a hanging ceiling	• Two caddy fasteners • Two plastic spacers • Two keps nuts (with attached lock washer) • Mounting bracket

You need the tools listed below.

AP150 Required Tools

Installation Type	Tools Required
Horizontal mounting	None
Vertical mounting over a wall stud	• Drill • 1/8"drill bit • Screwdriver • 1/8"Allen wrench
Vertical mounting on sheetrock	• Drill • 3/16" drill bit • Screwdriver • 1/8"Allen wrench
Horizontal mounting below a hanging ceiling	• Screwdriver • Wrench or pliers • 1/8"Allen wrench

Installing the Access Points

Selecting a Location

The AP150 requires a location that meets the following criteria:

- Relatively unobstructed access to the stations the AP serves
- Power over Ethernet (PoE) connection to the network switch servicing the controller.

APs can obtain their power from 802.3af standard Power over Ethernet (PoE)-compatible network switch or PoE power injector installed between the switch and the AP150. AP150 and AP300 work with all switches that support STANDARD 802.3af.

Select a location with minimal physical obstructions between the AP and the wireless stations. In an office with cubicles, mounting the APs below a hanging ceiling or the wall near the ceiling provides the least obstructed communications path.

Most installations receive the best coverage using the following guidelines:

Install APs toward the center of the building.

- Do not install APs near metal objects, such as heating ducts, metal doors, or electric service panels.
- Relative to the ground, orient the antenna up or down, not sideways.

Note: The previous guidelines are general guidelines. Each site has its own unique environment. Place access points accordingly.

The AP150 is only intended for installation in Environment A as defined in IEEE 802.3af. All interconnected equipment must be contained within the same building, including the interconnected equipment's associated LAN connection.

Attaching the AP150 Antennas

The AP150 is provided with external antenna ports. Make sure that all external antennas and their associated wiring are located entirely indoors. The external antennas are not suitable for outside use.

If the AP150 does not have external antennas, attach the antennas to the connectors on the AP150 (see **Figure 29**). Rotate the knurled ring at the base of the antenna clockwise to attach the antenna. The ring should be finger-tight.

Caution! When changing the orientation of the antennas, be sure to slightly loosen the knurled ring before moving the antenna. Retighten the ring afterward. Otherwise, you might damage the internal cabling in the AP.

Mounting the Access Point

You can mount an AP150 in the following ways:

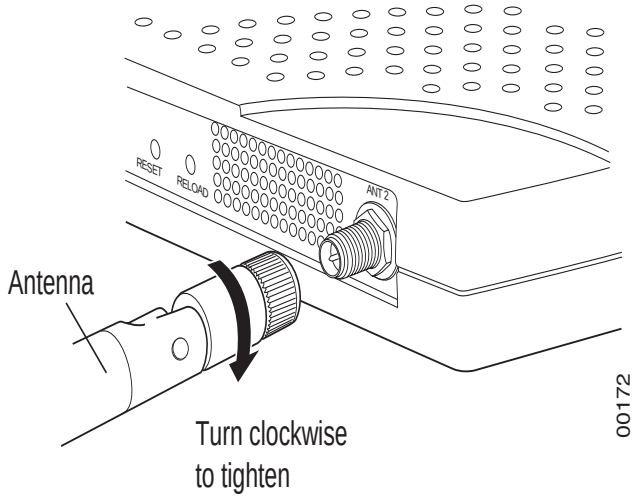
- Horizontally, as described in the “Horizontal Mounting” section.
- Vertically, as described in the “Vertical Mounting with the Mounting Bracket” section.
- Below a hanging ceiling, as described in the “Mounting Below a Suspended Ceiling” section.

Horizontal Mounting

To horizontally mount an AP150:

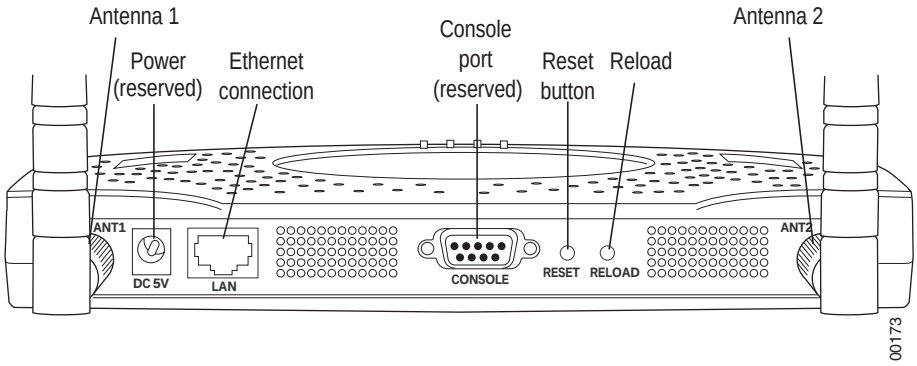
1. Place the AP150 flat on the horizontal surface.
2. For each antenna, loosen the knurled ring at the base of the antenna (see **Figure 29**), point the antenna straight up, then retighten the ring.

Figure 28: AP150 Antenna Connection



3. Connect one end of the PoE 100BaseT Ethernet cable to the 100/1000 Ethernet connector, shown in **Figure 30**.

Figure 29: AP150 Connector Panel



Vertical Mounting the AP150

To perform a simple wall mount using the keyholes on the back of the AP150:

1. Remove the attached mounting bracket from the back of the AP150.
2. Mark the location on the wall for two mounting screws. They are placed 4.3" apart, center-to-center, or one above the other. If you are not using plastic wall anchors, you must either center the mounting screws on a wall stud or use plastic wall anchors.
3. Drill holes at the locations you marked:
   - 3/16-inch holes if you are using plastic anchors
   - 1/8-inch holes if you are using only the screws
4. If you are using plastic anchors, install them in the holes.

5. Screw in the screws most of the way, so that the screw head is about 1/16 of an inch from the wall.
6. Align the AP150 keyholes over the mounting screws and slightly pull down (or across, if mounting sideways).
7. For external antennas, loosen the knurled ring at the base of each antenna (see **Figure 29**), point the antenna straight up, then retighten the ring.
8. Connect one end of the PoE 100BaseT Ethernet cable to the 100/1000 Ethernet connector, shown in **Figure 30**.

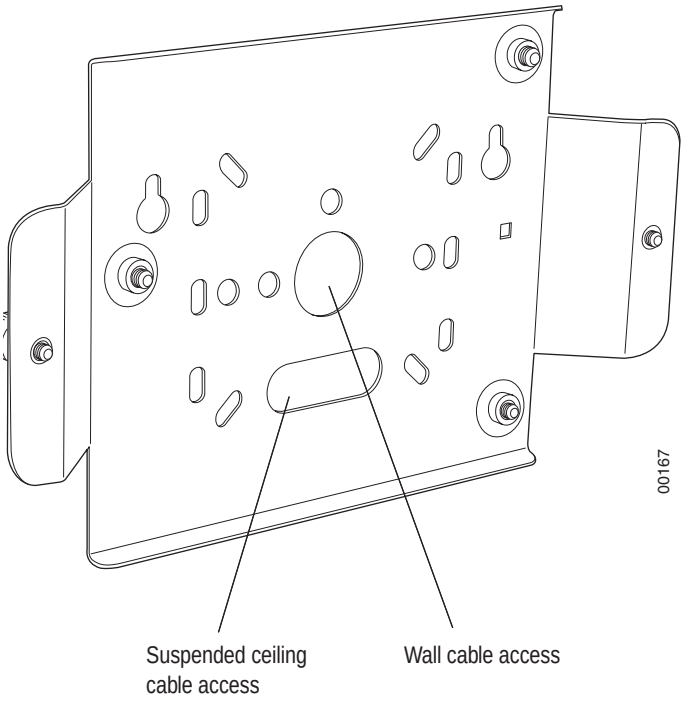
Vertical Mounting with the Mounting Bracket

The AP150 uses thumbscrews to attach to the mounting bracket or mounting plate that allows the access point to be mounted on a vertical surface. Additionally, three shoulder screws may be installed on the mounting bracket to allow the AP150 and attached bracket to mount over a previously installed Cisco 1200 mounting bracket.

To vertically mount an AP:

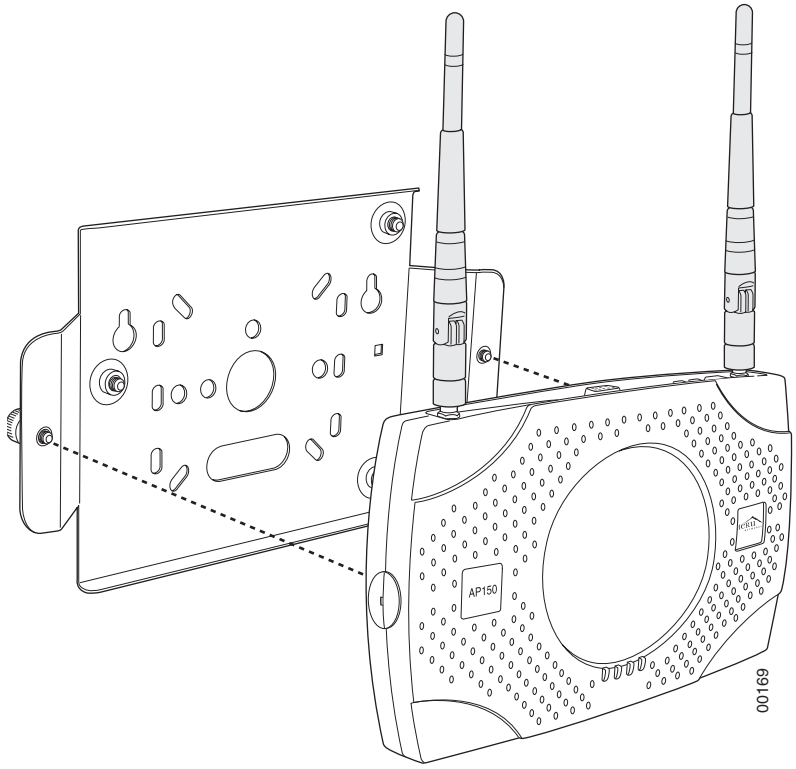
1. If not mounting the AP150 to a previously third-party installed mounting bracket, use a 1/8" Allen wrench to remove the shoulder screws from the mounting bracket, if already attached.
2. Using the bracket holes as a template, remove the bracket from the AP150 (or use the stencil in Appendix , “Mounting Bracket Stencils”) to mark the location on the wall for the two AP bracket mounting screws. They are placed 4.3 inches apart, center-to-center. If you are not using plastic wall anchors, you must center the mounting screws on a wall stud. If you do not center the mounting screws on a wall stud, you must use plastic wall anchors.

Figure 30: AP150 Bracket



3. Drill holes at the locations you marked:
   - 3/16-inch holes if you are using plastic anchors
   - 1/8-inch holes if you are using only the screws
4. If you are using plastic anchors, install them in the holes.
5. Screw in the screws most of the way, so that the screw head is about 1/16 of an inch from the wall.
6. Mount the bracket on the screws, placing the circular portion of the keyhole mounts over the screw heads and sliding the bracket down.
7. Tighten the screws to secure the bracket.
8. Align the AP150 with the bracket thumbscrews (see **Figure 32**) and tighten the thumbscrews to attach the bracket.

Figure 31: Aligning the AP150 with the Bracket



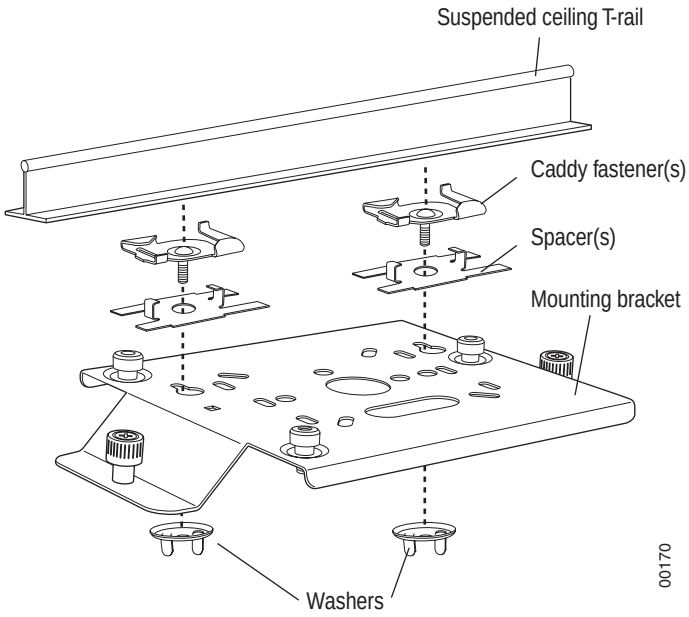
9. For external antennas, loosen the knurled ring at the base of each antenna (see Figure 29), point the antenna straight up, then retighten the ring.
10. Connect one end of the PoE 100BaseT Ethernet cable to the 100/1000 Ethernet connector, shown in Figure 30.

Mounting Below a Suspended Ceiling

The optional suspended ceiling mounting kit allows the AP150 mounting bracket to attach to suspended ceiling T-rails (see Figure 33).

Note: To comply with NEC code, attach a grounding wire to any of the screws used to attach the AP150 to the mounting bracket.

Figure 32: Mounting the AP150 to a Suspended Ceiling Rail



To mount an AP150 below a suspended ceiling:

1. Using a 1/8" Allen wrench, remove the shoulder screws from the mounting bracket, if already attached.
2. Determine the location on the ceiling rail where the AP will be mounted and remove the ceiling tiles.
3. Place each of the two caddy fasteners on the ceiling T-rail and twist to attach to the rail.
4. Adjust the distance between the caddy fasteners by using the mounting bracket holes as a guide.
5. Tighten the caddy fasteners in place using a standard screwdriver. Do not overtighten.
6. Place each spacer on the caddy fastener stud. The spacer legs should contact the ceiling T-rail.
7. Align the mounting bracket keyholes with the caddy fastener studs and slide the AP150 to the narrow end of the hole.
8. Attach a keps nut to each caddy fastener stud and hand tighten. Do not overtighten.
9. Align the AP150 with the bracket thumbscrews (see **Figure 32**) and tighten the thumbscrews to attach the bracket.

10. For each antenna, loosen the knurled ring at the base of the antenna (see Figure 29), point the antenna straight down, then retighten the ring.
11. Connect one end of the PoE 100BaseT Ethernet cable to the 100/1000 Ethernet connector, shown in (see Figure 30).

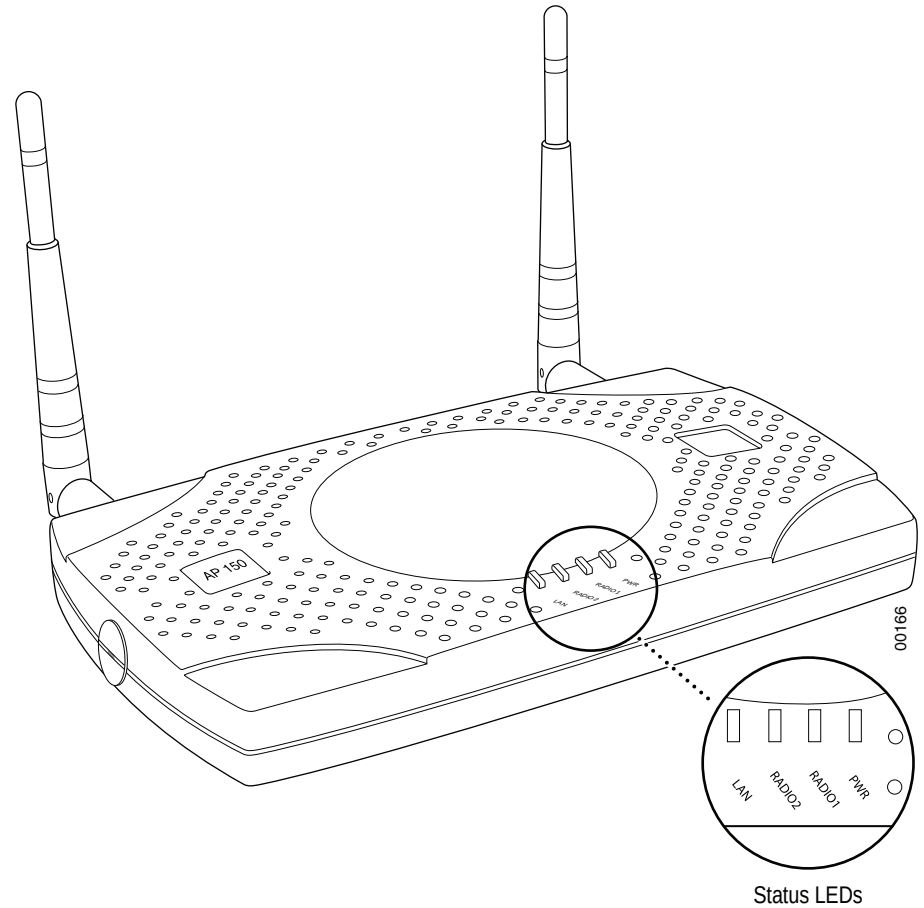
Checking LED Activity

Access point status LEDs are provided on the Ethernet connector and on the face of the AP150.

AP150 Status LEDs

Four status LEDs on the *face* of the AP150 also light, as shown in Figure 34.

Figure 33: AP150 Status LEDs



When the AP150 is first connected to the controller and any time the access point is rebooted thereafter, the AP initializes with and then is programmed by the controller. The Status LED (see **Figure 34**) color reflects the various operating states (**Table**).

AP150 LED Descriptions

LED	Function
Power	The Power status LED status is as follows: • off—power is off • solid red—when power is applied, system initializes for 40 seconds and then the LED turns amber; after discovering the controller the LED turns green. Otherwise, the system is in an abnormal state (notify Customer Support). • solid amber—at any time, if this LED state persists longer than 40 seconds, notify Customer Support • solid green—system is fully operational
Radio I	The Radio I LED is lit when radio packets are being transmitted and when the radio is beaconing.
Radio II	The Radio II LED is lit when radio packets are being transmitted and when the radio is beaconing.
Ethernet	The Ethernet LED status is as follows: • off—no link • solid green—100Mbps connection • blinking green—transmit or receive activity at 100Mbps • solid amber—10Mbps connection • blinking amber—transmit or receive activity at 10Mbps

Where to Go From Here

Now that the AP150 is installed, go to the *Meru System Director Getting Started Guide* for instructions on initializing the hardware. Return to this chapter to check the status of the LEDs once the WLAN is operational.

Chapter 5
Installing the OAP180

This chapter describes how to physically install the OAP180. It contains the following sections:

Safety Precautions

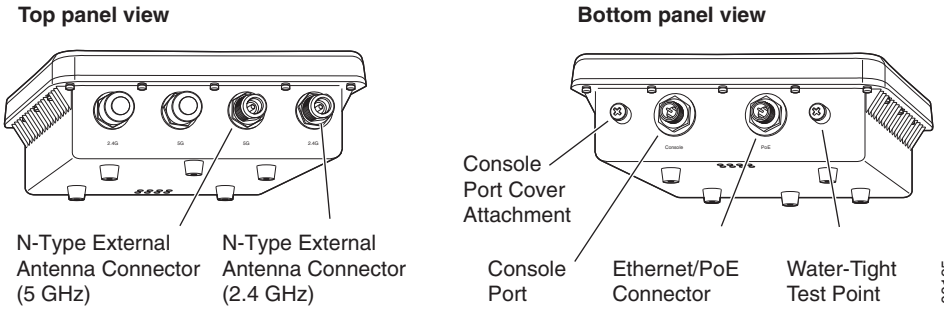
IMPORTANT—Read and follow the instructions in Appendix , “Regulatory Information” on page 93 before installing and operating this product.

This product is intended to be powered by a UL Listed power supply, marked Class 2 or LPS, and rated minimum 5 Vdc, 3A.

Caution! The OAP180 is not certified for plenum installations, and should not be installed in the plenum space.

Unpacking the OAP180

Figure 34: OAP180 Outdoor Access Point



Confirm that the OAP180 shipping boxes contain the following items:

- OAP180 Outdoor Access Point
- Wall/Pole Mount Hardware Kit for mounting OAP180 to a 1.5” to 2” diameter steel pole or tube or as part of a radio or tower structure
- N-Type Female connectors for external antennas
- Outdoor CAT5 Ethernet cable—100 feet. Be sure to include this (maximum) 100 foot cable in link path calculation; the PoE does not resend the traffic, it only provides power.
- Power injector with power cord

Installation Requirements

In addition to the hardware supplied by Meru Networks, you need the following:

Required

- Standard Ethernet cable to connect the power injector to a switch or controller
- Antennas (sold separately)

Ground wire for the OAP180Optional

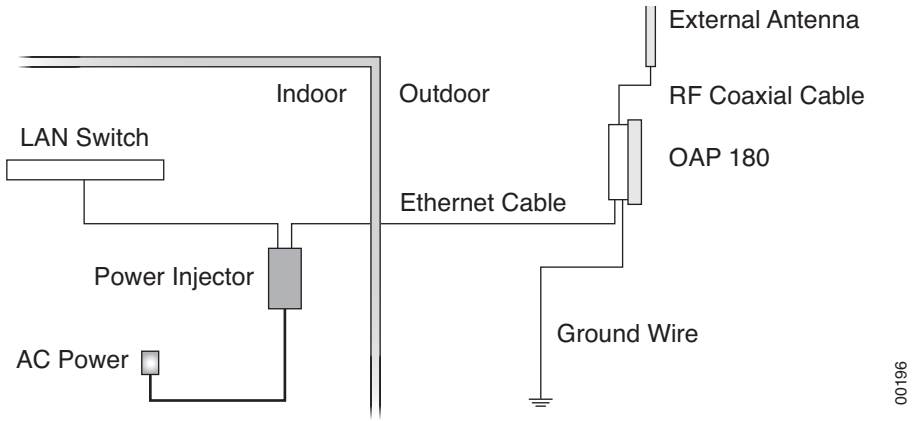
- RF coaxial cable to connect the antenna to the OAP180

Installing the Access Points

Selecting a Location

When you plan the OAP180 physical configuration, include the elements shown in this drawing:

Figure 35: Sample Physical Layout



Radio Position Planning

Never construct a radio mast, pole, or tower near overhead power lines. In addition, local regulations may limit or prevent construction of a high radio mast or tower. If your OAP180 link requires a high radio mast or tower, consult a professional contractor for advice. Once the required antenna height has been determined, other factors affecting the precise position of the OAP180 must be considered.

- Be sure there are no other radio antennas within 2 m (6 ft.) of the OAP180.
- Place the OAP180 away from power and telephone lines.
- Avoid placing the OAP180 too close to any metallic, reflective surfaces, such as roof-installed air-conditioning equipment, tinted windows, wire fences, or water pipes.

Radio Interference

Avoiding radio interference is an important part of wireless planning. Interference is caused by other radio transmissions using the same or an adjacent channel frequency. You should first scan your proposed site using a spectrum analyzer to determine if there are any strong radio signals using the 802.11a or 802.11bg channel frequencies. Always use a channel frequency that is furthest away from another signal.

Weather Conditions

Take into account any extreme weather conditions that are known to affect your location. Consider these factors:

- **Temperature —** The OAP180 is tested for normal operation in temperatures from - 40˚F to 140˚F. Operating in temperatures outside of this range may cause the unit to fail.
- **Wind Velocity —** The OAP180 can operate in winds up to 44 m/s and survive higher wind speeds up to 66 m/s. You must consider the known maximum wind velocity and direction at the site and be sure that any supporting structure, such as a pole, mast, or tower, is built to withstand this force.
- **Lightning —** The OAP180 includes its own built-in lightning surge protection. However, you should make sure that the unit, any supporting structure, and cables are all properly grounded. Additional protection using lightning rods, lightning arrestors, or surge suppressors may also be employed. Antenna sockets should point upwards in a vertical manner
- **Rain** — The OAP180 is weatherproofed against rain. Also, prolonged heavy rain has no significant effect on the radio signal. However, it is recommended to apply weatherproof sealing tape around the Ethernet port and antenna connectors for extra protection. If moisture enters a connector, it may cause a degradation in performance or even a complete failure of the link.
- **Snow and Ice —** Falling snow, like rain, has no significant effect on the radio signal. However, a build up of snow or ice on antennas may cause the link to fail. In this case, the snow or ice has to be cleared from the antennas to restore operation of the link.

Ethernet Cabling

When a suitable antenna location has been determined, plan a cable route from the OAP180 outdoors to the power injector module indoors. Consider these points:

- The Ethernet cable length should never be longer than 100 ft.
- Determine a building entry point for the cable.
- Determine if conduits, bracing, or other structures are required for safety or protection of the cable.
- For lightning protection at the power injector end of the cable, consider using a lightning arrestor immediately before the cable enters the building.
- The shield of the ethernet cable needs to be grounded at the lightning arrestor. If, by design, the lightning arrestor cannot provide this ground, the shield of the ethernet cable will need to be grounded by the installer.

Grounding

It is important that the OAP180, cables, and any supporting structures are properly grounded. The OAP180 unit includes a grounding screw to attach a ground wire. Be sure that grounding is available and that it meets local and national electrical codes.

Test Basic Link Operation

Set up the OAP180 on the ground, either outdoors or indoors. Connect the unit as indicated in this document and perform the basic configuration tasks outlined below.

When you are satisfied that the OAP180 is operating correctly, proceed to mounting the unit in the intended location.

Mounting the Access Point

The OAP180 can be mounted on the following (brackets are included):

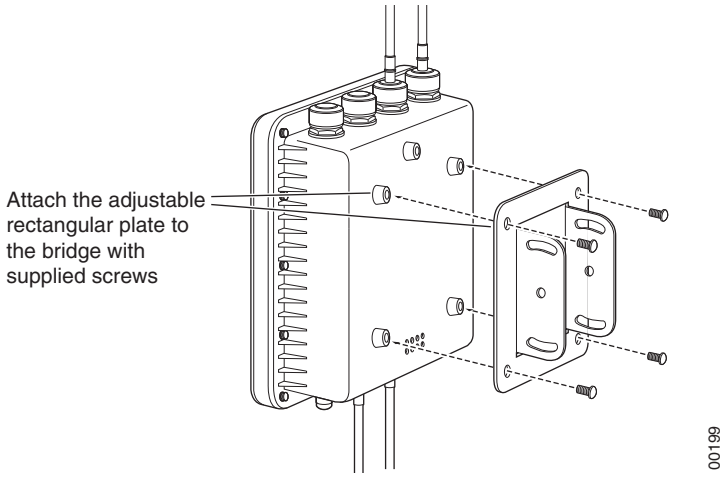
- 1.5 to 2 inch diameter pole
- Wall

Mounting OAP180 with the Pole-Mounting Bracket

Follow these steps to mount the unit to a 1.5 to 2 inch diameter steel pole or tube using the mounting bracket:

1. Attach the OAP180 to the mounting bracket.

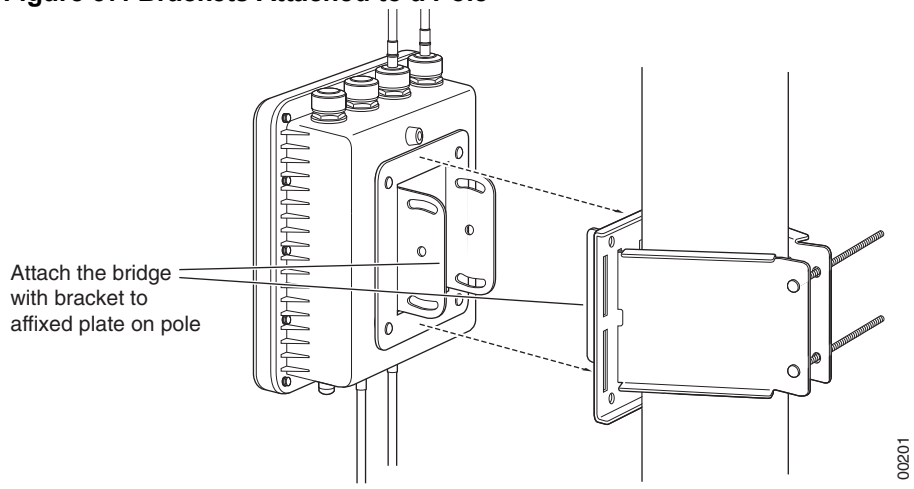
Figure 36: Square Mounting Bracket Attaches to Bottom of OAP180



2. Place the V-shaped part of the bracket around the pole and tighten the securing nuts just enough to hold the bracket to the pole. (The bracket may need to be rotated around the pole during the alignment process.)

Note: Always attach the bracket to a pole with the open end of the mounting grooves facing up.

Figure 37: Brackets Attached to a Pole



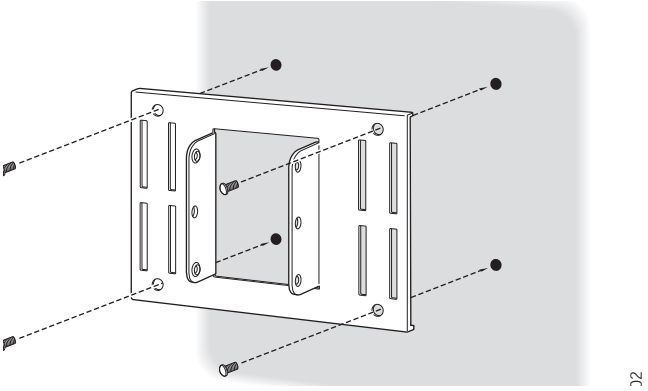
3. Use the included nuts to tightly secure the wireless OAP180 to the bracket.
4. Connect the OAP180 bracket and the pole bracket.

Mounting OAP180 with the Wall-Mounting Bracket

Attach the bracket to a wall with the flat side flush against the wall. Follow these steps to mount the unit to a wall using the wall-mounting bracket:

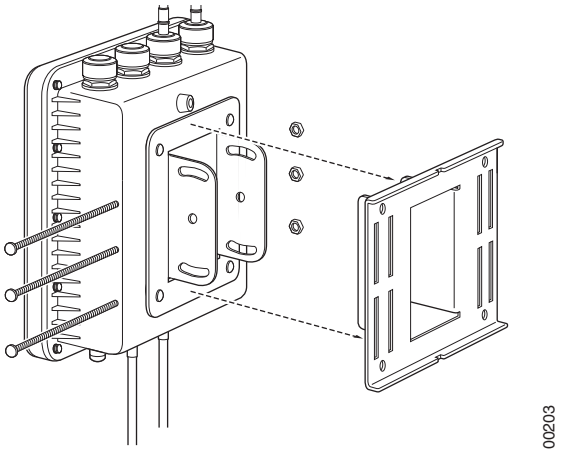
1. Position the bracket in the intended location and mark the position of the four mounting screw holes.
2. Drill holes in the wall that match the screws and wall plugs included in the bracket kit, and then secure the bracket to the wall.

Figure 38: Mount OAP180 Bracket on Wall



3. Use the included nuts to tightly secure the OAP180 to the bracket.
4. Connect the two brackets as shown below.

Figure 39: Mount OAP180 on Wall Bracketl



Connect Antennas and Ground Wire to OAP180

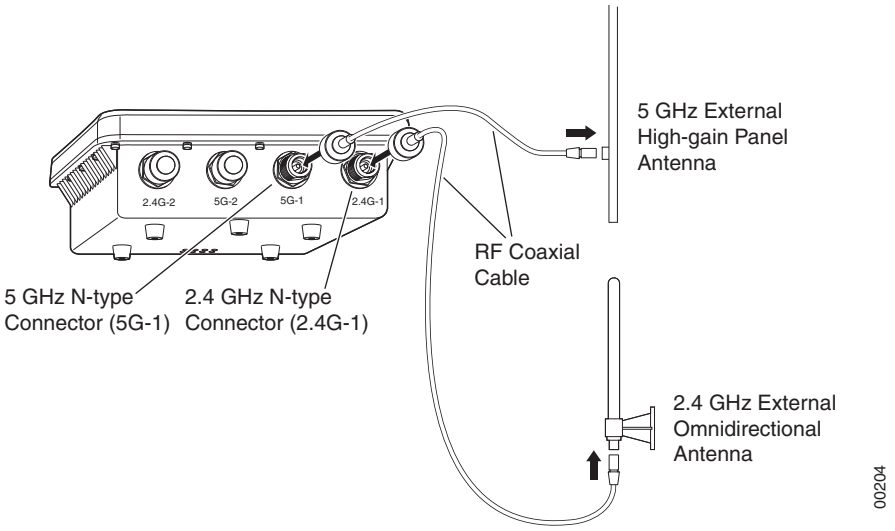
OAP180 does not ship with any antenna by default. Since customers have different outdoor applications, we suggest that you choose from the various antenna options offered by Meru. See the list in Appendix , “AP Accessories” on page 71.

The OAP180 works both with antennas that attach to the unit and remote antennas. When using antennas that attach to the unit, attach the antenna before installing the unit. Use the two connectors on the right (5G-1 and 2.4G-1) as indicated in Figure 8. When deploying an OAP180 with a remote antenna, first mount remote antennas and then connect them to the OAP180.

Follow these steps:

1. Remove the two right-most antenna covers indicated in Figure 8.
2. Mount the external antenna on the same supporting structure as you did the OAP180, within 3 m (10 ft.) of it, using the bracket supplied in the antenna package.
3. Connect the antenna to the OAP180’s N-type connector (5G-1 and 2.4G-1) using the RF coaxial cable provided in the antenna box.

Figure 40: Connect OAP180 Antenna Cables



4. Apply weatherproofing tape to the antenna connectors to help prevent water entering the connectors.

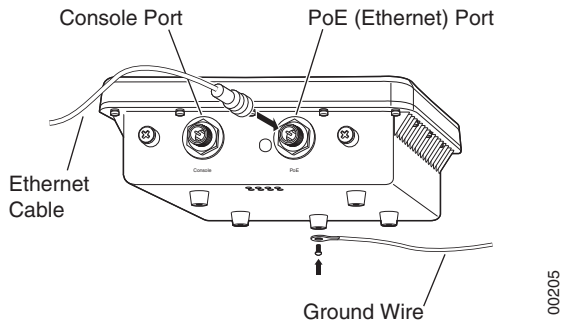
Note: When not using antenna connectors on the OAP180, keep the covers securely attached for weather protection.

Follow these steps to attach the Ethernet cable and ground wire:

1. Using the included cable, attach the Ethernet cable to the Ethernet port on the OAP180.

Note: Use only the provided Ethernet cable. Do not shorten this cable as the path loss is needed. During periods of lightning activity, do not connect or disconnect cables or otherwise work with the OAP180.

Figure 41: Attach Ethernet Cable to OAP180



2. For extra protection against rain or moisture, apply weatherproofing tape (not included) around the Ethernet connector.
3. Ground the unit with an appropriate grounding wire (not included) by attaching it to the grounding screw on the unit. See above.

Caution! Equipment shall be installed in accordance with the National Electrical Code ANSI/NFPA 70 and the Canadian Electrical Code, Part 1, and when applicable, the National Electrical Safety Code, IEEE C2.

Equipment shall be properly grounded according to Chapter 8 of ANSI/NFPA 70, the National Electrical Code (NEC) and the Cable distribution system should be grounded (earthed) in accordance with ANSI/NFPA 70, the National Electrical Code (NEC), in particular Section 820.93, Grounding of the Outer Conductive Shield of a Coaxial Cable.

The separate protective earthing terminal provided on this product shall be permanently connected to earth.

Caution! Do not locate the power injector outdoors. The unit is for indoor use only.

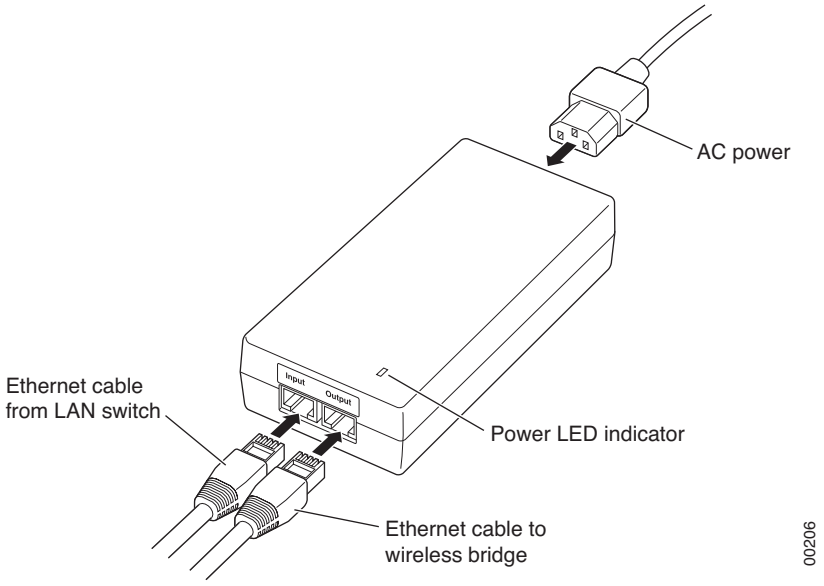
Note: The wireless Ethernet port does not support Power over Ethernet (PoE) based on the IEEE 802.3af standard. Do not try to power the unit by connecting it directly to a network switch that provides IEEE 802.3af PoE. Always connect the unit to the included power injector module to maintain the warranty.

Note: Each AC power injector requires 1.5 amps of power at 100-240 volts. When connecting multiple devices to one outlet, be sure to allow 1.5 amps for each AC power adapter.

Follow these steps to connect the power injector:

1. Connect the other end of the provided Ethernet cable (already connected to the OAP180) to the RJ-45 port labeled *Output* on the power injector.

Figure 42: Connect OAP180 to Power Injector



2. Connect a straight-through unshielded twisted-pair (UTP) cable (not included) from a local LAN switch to the RJ-45 port labeled *Input* on the power injector. See the illustration above. Use Category 5e or better UTP cable for 10/100BASE-TX connections.

Note: The RJ-45 port on the power injector is an MDI port. If connecting directly to a computer for testing the link, use a crossover cable.

3. Insert the power cable plug directly into the standard AC receptacle on the power injector. See the illustration above.
4. Plug the other end of the power cable into a grounded, 3-pin socket, AC power source.

Note: For International use, you may need to change the AC line cord. You must use a line cord set that has been approved for the receptacle type in your country.

5. Check the LED on top of the power injector to be sure that power is being supplied to the OAP180 through the Ethernet connection.

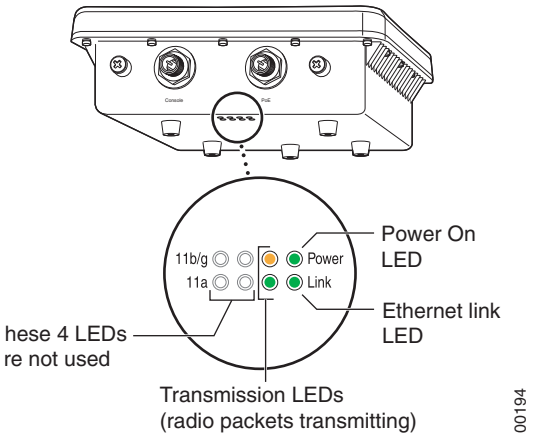
Align Antenna

After the OAP180 unit is mounted, connected, and the radios are operating, the antennas must be accurately aligned to ensure optimum performance of the OAP180 links. In this point-to-multipoint configuration all OAP180 nodes must be aligned with the root OAP180 antenna.

Checking LED Activity

Check the OAP180 LEDs for activity. Four of the eight LEDs on the bottom of the OAP180 indicate activity; four LEDs are not used at this time. Check the four active LEDs to determine if the AP is working.

Figure 43: OAP180 LEDs



The grey LEDs in the illustration are not currently used. The following chart explains the meanings for the remaining LEDs.

LED	Function
Power	When power is applied, this LED initially turns amber, then blinks green when the system power check is applied, and then is a steady green when power is on.
Radio 1 802.11bg	The 11bg connection LED blinks amber when radio packets are being transmitted and when the radio is beaconing. If there is traffic over the air on this radio, the blinking rate increases.
Radio 2 802.11a	The 11a connection LED blinks green when radio packets are being transmitted and when the radio is beaconing. If there is traffic over the air on this radio, the blinking rate increases.
Ethernet	The Ethernet Link LED blinks green when a link has been detected and is in use.

Antenna Gain Recommendations

The OAP180 auto-adjusts the power level sent from the radio to the antenna, so that the EIRP emitted from the antenna is the value defined by the controller (100mW by default). You can increase this setting if you are compensating for signal loss from long inexpensive cables connecting external antennas. (Configure a false/low dBi antenna gain to trick the radio into supplying more transmit power to that antenna, which would then make up for the cable loss.) You may also need to decrease the EIRP from 100mW to 30mW for a device that only transmits at 30mW. The Antenna Gain values can be changed from the Web UI **Configuration>APs>Antenna Properties** view, or from the CLI using the **antenna-property** command. Determine the appropriate gain for your antenna by checking the following chart.

Antenna	Gain
MN-ACC-ANT-BG08O-NM 802.11 b/g 8 dBi Omni-Directional Antenna, 2400 - 2500GHz (N Male)	8
MN-ACC-ANT-BG08O-NF 802.11 b/g 8 dBi Omni-Directional Antenna, 2400 - 2500GHz (N Female)	8
MN-ACC-ANT-BG18P-NF 802.11 b/g 18 dBi High Gain Panel Directional Antenna, 2400 - 2500GHz (N Female)	18
MN-ACC-ANT-BG10S-NF 802.11 b/g 10 dBi High Gain Sector Antenna, 2400 - 2500GHz (N Female)	10
MN-ACC-ANT-A08O-NM-1 802.11a 8 dBi Omni-Directional Antenna, 5150 - 5350GHz (N Male)	8
MN-ACC-ANT-A08O-NM-2 802.11a 8 dBi Omni-Directional Antenna, 5470 - 5875GHz (N Male)	8
MN-ACC-ANT-A08O-NF 802.11a 8 dBi Omni-Directional Antenna, 4900 - 5350GHz (N Female)	8
MN-ACC-ANT-A23P-NF 802.11a 23 dBi High Gain Directional Panel, 5150 - 5875GHz (N Female)	23
MN-ACC-ANT-A13S-NF 802.11a 13 dBi High Gain 120-degree Sector Antenna, 4900-5150/5150-5875GHz (N Female)	12.5/13.5

Where to Go From Here

Now that the AP300 is installed, go to the *Meru System Director Getting Started Guide* for instructions on initializing the hardware. Return to this chapter to check the status of the LEDs once the WLAN is operational.

As well, check the AP chapter in the *Meru System Director Configuration Guide* for instructions on configuring radio band, dual radio, and external antenna operation.

Appendix A Specifications

This chapter provides specifications for Access Point and contains the following sections:

Wireless Interface

Wireless Interface Specifications

Feature	Details
Wireless Standards	• 802.11a, 802.11b, 802.11g, 802.11n
Antennas	• Two to six external antennas. Omnidirectional and directional antennas for specific coverage requirements
Wireless Medium Access	• Wi-Fi Compliant 802.11 MAC standard
Power Management	• Power-save mode for clients in both QoS mode and non-QoS mode
Frame Size	• Peak frame size of > 2346 bytes • Fragmentation and reassembly of 802.11/Ethernet frames
Client Activities Supported	• Active scanning and passive scanning • Pre-authentication • Power-save mode supported

Ethernet Interface

Feature	Detail
Wireline Standard	• One Ethernet (IEEE 802.3) interface, supporting half-duplex and full-duplex modes • Supports the Power over Ethernet (PoE) IEEE 802.3af standard

Physical

Physical specifications for Meru Access Points are provided in the Access Point Data Sheet. Either check online at www.merunetworks.com for the latest version or contact your Meru sales engineer for a copy of the document.

Appendix B
AP Accessories

This section provides specifications for the following AP accessories:

Power Over Ethernet Devices

PoE	Description
ACC-POE-AT-1AC	Mid-Span High Power pre-802.3at PoE injector (1 Port, 110V/220V AC input). Ideal for Meru AP300; backward compatible with 802.3af, also works with Meru AP200 and Meru AP150. Includes US power cords.
ACC-POE-AT-12AC	Mid-Span 802.3af+ High Power PoE injector (12 Port, 110V/220V AC input), 19" rack mountable, remote management capable
ACC-POE1-24AC	Mid-Span 802.3af PoE injector (24 Port, 110V/220V AC input) - Note only supports 20 access points ?
ACC-POE1-24ACDC	Mid-Span 802.3af PoE injector (24 Port, 110V/220V AC or 48V DC input) - Note only supports 20 access points

Power Supplies

Power Supply	Description
ACC-AP300-PWR	External Universal 5V Power supply for AP300 series
ACC-PWR-OAP180 Spare	High Power POE injector for OAP180. Not rated for outdoors, must be placed indoors. Does not include power cord, orderable separately as ACC-PWR-CRD. Note: This device provides high power, upto 40W to the OAP180 unit and is not compatible with the 802.3af PoE standard.
ACC-PWR-AP150	External Universal Power supply for AP150, ships with interchangeable plugs. Certified for United States, United Kingdom, EU, China, Australia.

Antennas

A detailed list of all antennas sold and supported by Meru is published in the price list. This list is broken down by AP type and supported antennas. Using any antenna other than those offered by Meru Networks is not recommended nor supported. Use only Meru certified antennas to guarantee performance and coverage and maintain Meru support. For detailed specification and datasheets for the antennas, check the website at **www.merunetworks.com**

For each supported antenna for an AP, the table below shows the RF band supported, the gain of the antenna and the coverage type, whether it is an omnidirectional, directional panel or sector antenna.

RF Band (GHz)	Gain (dBi)	Coverage Type	Indoor/ Outdoor	Size (mm)	Connector	Description
AP300						
2.4-2.48/ 4.94-5.85 (default)	802.11b/g/n 2.4Ghz = 2 dBi 802.11a/n 5Ghz = 3 dBi	omni-directional	indoor only	13 x 131	RPSMA	**P/N: ACC-ANT-ABGN23O-W** Use with AP150/ AP200/ AP300. White dual-band 802.11a/b/g/n rubber duck antenna. Default for AP300.

RF Band (GHz)	Gain (dBi)	Coverage Type	Indoor/ Outdoor	Size (mm)	Connector	Description
2.4-2.48 / 4.94-5.85	802.11b/g/n 2.4Ghz = 2 dBi 802.11a/n 5Ghz = 3 dBi	omni-directional	indoor only	13.5 x 158	RPSMA	**P/N: MN-ACC-ANTabg** Use with AP150/ AP200/ AP300. Black dual-band 802.11 a/b/g rubber duck antenna. Default for AP150, AP201, AP208.
2.4-2.48/ 4.94-5.85	802.11b/g/n 2.4Ghz = 4.7 dBi 802.11a/n 5Ghz = 4.7 dBi	omni-directional	indoor only	102 x 11	RPSMA	**P/N: ACC-ANT-ABGN47O** High-gain rubber duck antenna: compact, cosmetically attractive, black, dual-band, 4 inch
2.4-2.5 /4.9-5.875	802.11b/g/n 2.4Ghz = 3 dBi 802.11a/n 5Ghz = 4 dBi	omni-directional	indoor only	309 x 22 x 94	RPSMA	**P/N: ACC-ANT-ABGN-23** AP300 use only. Flush ceiling mount, dual-band MIMO antenna with low profile for indoor applications requiring coverage of multiple bands with minimum visibility. Mount to drop ceiling tiles or solid surface with cable routing. Includes three 5 ft very low loss pigtails. pigtails, allows remote connection of antenna for all 3 antennas per radio of AP300. Use one unit per radio, e.g., AP310 needs 1 unit and AP320 needs 2 units.
2.4-2.48/ 4.94-5.85	NA	any	indoor only	178 x 178 x 178 x 7	RPSMA	**P/N: ACC-ANT-MIMO-MNT** AP300 use only. Mount for MIMO antenna; include three 5 ft pigtails and mounting hardware. Deploy an AP below ceiling tile or inside an enclosure and remotely connect an antenna to this external mount. Use one unit per radio, e.g., AP310 needs 1 unit and AP320 needs 2 units.

RF Band (GHz)	Gain (dBi)	Coverage Type	Indoor/ Outdoor	Size (mm)	Connector	Description
AP200						
2.4-2.48 / 4.94-5.85 (default)	802.11b/g/n 2.4Ghz = 2 dBi 802.11a/n 5Ghz = 3 dBi	omni-directional	indoor only	13.5 x 158	RPSMA	**P/N: MN-ACC-ANTabg** Use with AP150/ AP200/ AP300. Black dual-band 802.11 a/b/g rubber duck antenna. Default for AP150, AP201, AP208.
2.4-2.48/ 4.94-5.85	802.11b/g/n 2.4Ghz = 2 dBi 802.11a/n 5Ghz = 3 dBi	omni-directional	indoor only	13 x 131	RPSMA	**P/N: ACC-ANT-ABGN23O-W** Use with AP150/ AP200/ AP300. White dual-band 802.11a/b/g/n rubber duck antenna. Default for AP300.
2.4-2.48/ 4.94-5.85	802.11b/g/n 2.4Ghz = 4.7 dBi 802.11a/n 5Ghz = 4.7 dBi	omni-directional	indoor only	102 x 11	RPSMA	**P/N: ACC-ANT-ABGN47O** High-gain rubber duck antenna: compact, cosmetically attractive, black, dual-band, 4 inch
2.4-2.48/ 4.94-5.85	802.11b/g/n 2.4Ghz = 3 dBi 802.11a/n 5Ghz = 4 dBi	omni-directional	indoor only	108 x 13	RPSMA	**P/N: MN-ACC-ANT-ABG43** AP200 use only. Flush ceiling mount (drop-ceiling or solid with cable routing), dual-band, low profile. Ideal for coverage of multiple bands with minimum visibility. Includes one 18" pigtail terminated with RPSMA connector.

RF Band (GHz)	Gain (dBi)	Coverage Type	Indoor/ Outdoor	Size (mm)	Connector	Description
2.4 - 2.5	802.11b/g/n 2.4Ghz = 5.2 dBi	omni-directional	indoor only		RPSMA	**P/N: MN-ACC-ANT3-50MD** For use with AP200 only. High gain ceiling mount single band omindirectional antenna operating at 2.4GHz This antenna is ideally suited for applications in indoor environment. Its broad elevation plane radiation pattern has been shaped to direct energy where it is needed, while suppressing the misdirected upper and lower sidelobe energy. When ceiling mounted, the antenna drops down about 10 inches from the ceiling. Antenna gain is 5.2 dBi and includes a 3 foot pigtail and one mounting bracket.
2.4 - 2.5	802.11b/g/n 2.4Ghz = 4 dBi	omni-directional	indoor only	248 x 26	RPSMA	**P/N: MN-ACC-ANT3-80MD** For use with AP200 only. Ceiling mount single band omindirectional Fiberglass Antenna operating at 2.4GHz This antenna is ideally suited for applications in harsh indoor environments. When ceiling mounted, the antenna drops down 10 inches from the ceiling. Antenna gain is 4 dBi and includes a 3 foot pigtail and one mounting bracket.

RF Band (GHz)	Gain (dBi)	Coverage Type	Indoor/ Outdoor	Size (mm)	Connector	Description
2.4 - 2.5	802.11b/g/n 2.4Ghz = 8.5 dBi	directional panel	indoor/ outdoor	129 x 119 x 38	N female	**P/N: MN-ACC-ANT3-80P** For use with AP200 only. This directional panel single band antenna is designed to cover 2.4 GHz frequencies with a VSWR of less than 1.5:1, obtaining maximum gain with an attractive, low-profile package. This antenna can be mounted indoors or outdoors and provides a gain of 8.5 dBi. Provides UL's highest flame retardant rating allowing maximum placement flexibility. Meets the most stringent building fire rating codes. Allows the cable to be installed in the strictest indoor mounting locations, including air ducts. 3 foot pigtail with RPSMA connectors and mounting hardware included.
2.4 - 2.5	802.11b/g/n 2.4Ghz = 13 dB	directional panel	indoor/ outdoor	224 x 206 x 406	N female	**P/N: MN-ACC-ANT3-130P** AP200 use only. Single band, low-profile antenna covers 2.4 GHz frequencies with a VSWR of less than 1.5:1. Provides UL's highest flame retardant rating and meets the most stringent building fire rating codes. Cable can be installed in the strictest indoor mounting locations, including air ducts. One low loss 3 foot pigtail with RPSMA connectors and mounting hardware included. This antenna is the same as #830-00024 (above) but with higher gain and no mounting bracket

RF Band (GHz)	Gain (dBi)	Coverage Type	Indoor/ Outdoor	Size (mm)	Connector	Description
AP150						
2.4-2.48 / 4.94-5.85	802.11b/g/n 2.4Ghz = 2 dBi 802.11a/n 5Ghz = 3 dBi	omni-directional	indoor only	13.5 x 158	RPSMA	**P/N:MN-ACC-ANTabg** Use with AP150/ AP200/ AP300. Black dual-band 802.11 a/b/g rubber duck antenna. Default for AP150, AP201, AP208.
2.4-2.48/ 4.94-5.85 (default)	802.11b/g/n 2.4Ghz = 2 dBi 802.11a/n 5Ghz = 3 dBi	omni-directional	indoor only	13 x 131	RPSMA	**P/N: ACC-ANT-ABGN23O-W** Use with AP150/ AP200/ AP300. White dual-band 802.11a/b/g/n rubber duck antenna. Default for AP300.
OAP180						
2.4 - 2.5	802.11 b/g 2.4Ghz = 8 dBi	omni-directional	indoor/ outdoor	21 x 580	N male	**P/N: MN-ACC-ANT-BG08O-NM** OAP180 use only; mounts directly to OAP. Outdoors, coverage is along the horizontal plane. Vertical polarization is limited to 30 degrees.
2.4 - 2.5	802.11 b/g 2.4Ghz = 8 dBi	omni-directional	indoor/ outdoor	19 x 520	N female note: needs added male	**P/N:MN-ACC-ANT-BG08O-NF** OAP180 use only. Outdoors, coverage is along the horizontal plane. Vertical polarization is limited to 30 degrees. Requires additional male type connector or RF patch cable (MN-ACC-CBL-5NM-NM) to connect to OAP180. Cable is sold seperately; connector not sold by Meru. Mounting hardware included.

RF Band (GHz)	Gain (dBi)	Coverage Type	Indoor/ Outdoor	Size (mm)	Connector	Description
2.4 - 2.5	802.11 b/g 2.4Ghz = 18 dBi	directional panel	indoor/ outdoor	360 x 360 x 16	N female note: needs added male	**P/N: MN-ACC-ANT-BG18P-NF** OAP180 use only. High-gain, single-band panel antenna ideal for wireless coverage in a focused, narrow area or for providing point-to-point signal. Requires additional male type connector or RF patch cable (MN-ACC-CBL-5NM-NM) to connect to OAP180. Cable is sold seperately; connector not sold by Meru. Mounting hardware included.
2.4 - 2.5	802.11b/g 2.4Ghz = 10 dBi	sector	indoor/ outdoor	750 x 88 x70	N female note: needs added male	**P/N: MN-ACC-ANT-BG10S-NF** OAP180 use only. High-gain, single-band sector antenna ideal for wireless coverage in a wide area (120 degree coverage). Provides 10 dBi gain. Requires additional male type connector or RF patch cable (MN-ACC-CBL-5NM-NM) to connect to OAP180. Cable is sold seperately; connector not sold by Meru. Mounting hardware included.
5.150-5.350	802.11a 2.4Ghz = 8 dBi	omni-directional	indoor/ outdoor	22 x 325	N male	**P/N: MN-ACC-ANT-A08O-NM-1** OAP180 use only; mounts directly to OAP180. Single-band, operating at lower UNI I band between 5.15-5.35GHz providing 8 dBi gain. Outdoors, coverage is along the horizontal plane. Vertical polarization is limited to 24 degrees.

RF Band (GHz)	Gain (dBi)	Coverage Type	Indoor/ Outdoor	Size (mm)	Connector	Description
5.470-5.875	802.11a 2.4Ghz = 8 dBi	omni-directional	indoor/ outdoor	22 x 325	N male	**P/N: MN-ACC-ANT-A08O-NM-2** OAP180 use only; mounts directly to OAP180. Operates at higher bands between 5.470-5.875GHz providing 8 dBi gain. Outdoors, coverage is along the horizontal plane. Vertical polarization is limited to 24 degrees.
5.500-5.825	802.11a 2.4Ghz = 8 dBi	omni-directional	indoor/ outdoor	78 x 80 x373	N female note: needs added male	**P/N: MN-ACC-ANT-A08O-NF** OAP180 use only. Outdoors, coverage is along the horizontal plane with omnidirectional coverage along the horizontal plane. Vertical polarization is limited to 24 degrees. Requires additional male type connector or RF patch cable (MN-ACC-CBL-5NM-NM) to connect to OAP180. Cable is sold seperately; connector not sold by Meru. Mounting hardware included.

RF Band (GHz)	Gain (dBi)	Coverage Type	Indoor/ Outdoor	Size (mm)	Connector	Description
5.150-5.875	802.11a 2.4Ghz = 23 dBi	directional panel	indoor/ outdoor	320 x 320 x18	N N female note: needs added male	**P/N: MN-ACC-ANT-A23P-NF** OAP180 use only. High-gain, single-band, directional panel antenna ideal for wireless coverage in a focused, narrow area or for providing point-to-point signal. Operates at 5.150 - 5.875GHz. Requires additional male type connector or RF patch cable (MN-ACC-CBL-5NM-NM) to connect to OAP180. Cable is sold seperately; connector not sold by Meru. Mounting hardware included.
4.900-5.875	802.11a 2.4Ghz = 23 dBi	sector	indoor/ outdoor	620 x 88 x 70	N female note: needs added male	**P/N: MN-ACC-ANT-A13S-NF** OAP180 use only. High-gain, single-band, sector antenna ideal for wireless coverage in a wide area (120 degrees of horizontal coverage). Operates at 4.9-5.875. Requires additional male type connector or RF patch cable (MN-ACC-CBL-5NM-NM) to connect to OAP180. Cable is sold seperately; connector not sold by Meru. Mounting hardware included.

Mounting Brackets

Meru offers various mounting options for access points. The table below lists the mounting options by AP type.

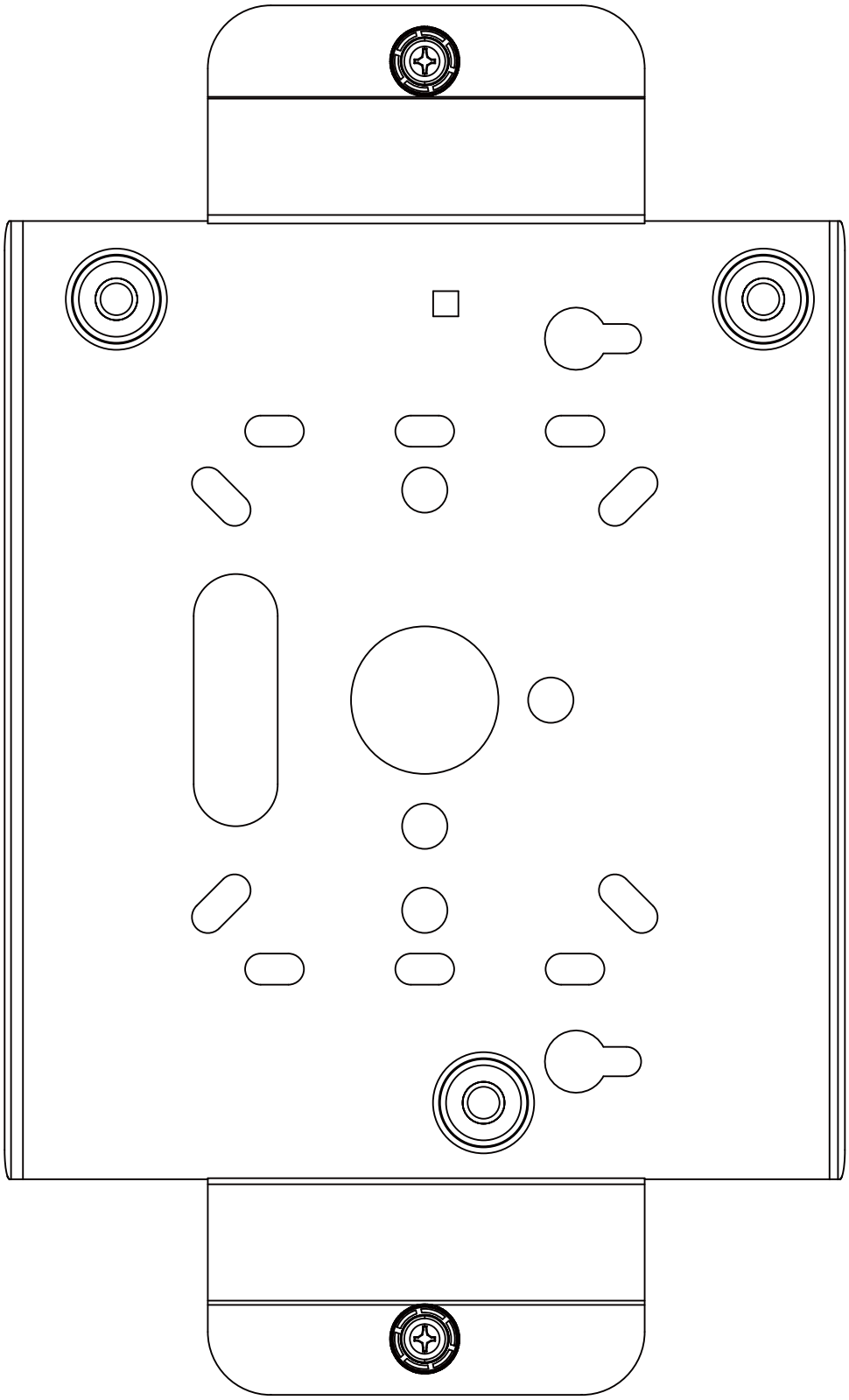
Part Number	Supported by AP	Description
ACC-AP300-MNT	AP300	Spare: Ceiling Mounting Bracket and Screws for AP300. This bracket ships by default with the AP300 at no charge to the customer.
ACC-AP300-BHE	AP300	Optional Accessory: Custom Mounting Bracket for mounting AP300 in a Hoffman Enclosure
ACC-MNT-SCRMKIT	AP150, AP200 and AP300	Suspended Ceiling Rail Mounting Kit
ACC-MNT-ASCMKIT	AP150, AP200 and AP300	Suspended Above Ceiling Mounting Kit (T-Bar Hanger)
ACC-MNT-AP200	AP200	Spare: Standard Ceiling Mounting Bracket and Screws for AP200. This bracket ships by default with the AP200.
ACC-AP150-MNT	AP150	Spare: Ceiling Mounting Bracket and Screws for AP150. This bracket ships by default with the AP150.

Appendix C
Mounting Bracket Stencils

This appendix provides drawings of the AP mounting brackets.

AP150 and AP300 Rev A Mounting Bracket Stencil

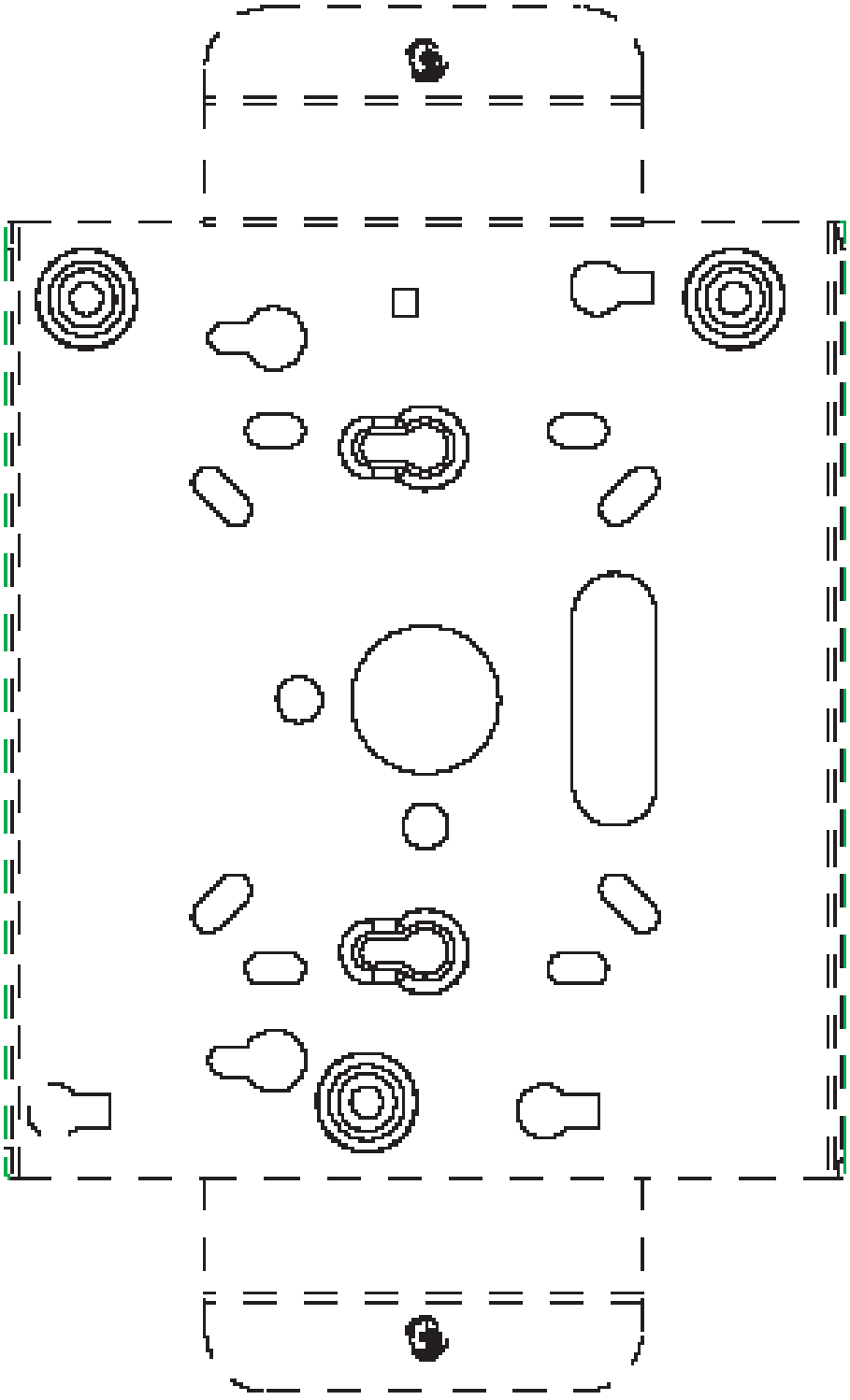
The following page contains the stencil of the mounting bracket used by AP150 and AP300 Rev A. This stencil should be printed to scale and verified against an actual mounting bracket before punching holes



AP300 Rev B Mounting Bracket Stencil

The standard mounting bracket (Revision A) was redesigned in June 2008 and replaced with a Revision B. This bracket has an extra 3/8th inch clearance from the wall to provide easier access when securing the AP onto the mounted bracket. The Revision B bracket also has enhancements for easier mounting compatibility with existing mounting brackets for various access points such as AP200, AP150, Proxim AP4000, Cisco 1230 Series Access Point, and Cisco 1240 Series Access Points.

The following page contains the stencil of the AP300 Rev B mounting bracket. This stencil should be printed to scale and verified against an actual mounting bracket before punching holes



Appendix D
Cautions and Warnings

The cautions and warnings that appear in this manual are listed below in English, German, French, and Spanish.

Cautions

A Caution calls your attention to a possible hazard that can damage equipment.

"Vorsicht" weist auf die Gefahr einer möglichen Beschädigung des Gerätes in.

Une mise en garde attire votre attention sur un risque possible d'endommagement de l'équipement. Ci-dessous, vous trouverez les mises en garde utilisées dans ce manuel.

Un mensaje de precaución le advierte sobre un posible peligro que pueda dañar el equipo. Las siguientes son precauciones utilizadas en este manual.

Caution! When changing the orientation of the antennas, be sure to slightly loosen the knurled ring before moving the antenna. Retighten the ring afterward. Otherwise, you might damage the internal cabling in the AP.

Vorsicht! Bei einer Neuausrichtung der Antennen muss vor Bewegung der Antenne der Rändelring leicht gelockert werden. Anschließend den Ring wieder festziehen. Anderenfalls können die internen Kabel im AP beschädigt werden.

Mise en garde En cas de modification d'orientation des antennes, veiller à desserrer légèrement la bague moletée avant de réorienter l'antenne. Resserrer ensuite la bague, faute de quoi le câblage interne du point d'accès pourrait être endommagé.

Precaución! Al cambiar la orientación de las antenas, asegúrese de aflojar ligeramente el anillo estriado antes de mover la antena. Luego vuelva a apretar el anillo. De otro modo, podría dañar el cableado interno del punto de acceso.

Caution! Be sure to connect the Ethernet cable to the Ethernet port; the cable can mistakenly be plugged into the Console port.

Vorsicht! Darauf achten, dass das Ethernetkabel am Ethernetanschluss und nicht versehentlich am Konsolenanschluss angeschlossen wird.

Mise en garde Veiller à bien connecter le câble Ethernet au port Ethernet et non pas au port Console.

Precaución! Asegúrese de conectar el cable Ethernet al puerto Ethernet, porque por error se puede enchufar en el puerto de la consola.

Caution! The radiated output power of the access points is well below the FCC radio frequency exposure limits. However, the Meru Access Point should be used in such a manner that the potential for human contact during normal operation is minimized. To avoid the possibility of exceeding the FCC radio frequency exposure limits, you should keep a distance of at least 20 cm between you (or any other person in the vicinity) and the Access Point antennas.

Vorsicht! Die abgestrahlte Ausgangsleistung von Geräten von Meru Networks, Inc. liegt weit unter den Hochfrequenz-Expositionsgrenzwerten der FCC. Die Meru Access Point Zugangspunkte von Meru Networks, Inc. sollten jedoch so verwendet werden, dass das Potenzial für Kontakt mit Menschen während des normalen Betriebs auf ein Mindestmaß beschränkt wird. Um die Möglichkeit einer Überschreitung der FCC-Hochfrequenz-Expositionsgrenzwerte zu vermeiden, ist ein Abstand von mindestens 20 cm zwischen Ihnen (bzw. einer anderen Person in der Nähe) und den Zugangspunkt-Antennen zu wahren.

Mise en garde La puissance de rayonnement émise par les équipements Meru Networks, Inc. est très inférieure aux limites d'exposition aux fréquences radio définies par la FCC. Toutefois, les points d'accès de la série Meru Access Point de Meru Networks, Inc. doivent être utilisés de façon à éliminer tout risque de contact humain en fonctionnement normal. Pour éviter de dépasser les limites d'exposition aux fréquences radio définies par la FCC, il est impératif de préserver en permanence une distance supérieure ou égale à 20 cm entre l'utilisateur (ou toute personne se trouvant à proximité) et les antennes du point d'accès.

Precaución! La potencia de radiación de los dispositivos de Meru Networks, Inc. está muy por debajo de los límites de exposición a radiofrecuencia estipulados por la FCC. No obstante, los puntos de acceso de la serie Meru Access Point de Meru Networks, Inc. deben usarse de tal manera que se minimice la posibilidad de contacto para el usuario durante la operación normal. Para evitar la posibilidad de exceder los límites de exposición a radiofrecuencia establecidos por la FCC, el usuario (o cualquier otra persona en torno) debe mantenerse a una distancia de al menos 20 cm respecto a las antenas del punto de acceso.

Caution! Exposure to Radio Frequency Radiation.

The installer of this radio equipment must ensure that the antenna is located or pointed such that it does not emit an RF field in excess of Health Canada limits for the general population; consult Safety Code 6, obtainable from Health Canada’s website http://www.hc-sc.gc.ca/rpb.

Vorsicht! Exposure to Radio Frequency Radiation.

The installer of this radio equipment must ensure that the antenna is located or pointed such that it does not emit an RF field in excess of Health Canada limits for the general population; consult Safety Code 6, obtainable from Health Canada's website http://www.hc-sc.gc.ca/rpb.

Mise en garde Exposition aux rayonnements à fréquence radioélectrique

L'installateur de cet équipement radio doit veiller à positionner et orienter l'antenne de telle sorte qu'elle n'émette pas un champ radioélectrique supérieur aux limites définies par Santé Canada pour la population générale. Consulter le Code de sécurité n° 6, disponible sur le site Web de Santé Canada à l'adresse http://www.hc-sc.gc.ca/rpb.

Precaución! Exposición a la radiación de radiofrecuencia.

El instalador de este equipo de radio debe cerciorarse de que la antena está localizada u orientada de tal manera que no emita un campo de radiofrecuencia superior a los límites estipulados por Health Canada para la población; consulte el Código de Seguridad 6 que podrá encontrar en el página web de Health Canada, http://www.hc-sc.gc.ca/rpb.

Warnings

A warning calls your attention to a possible hazard that can cause injury or death. The following are the warnings used in this manual.

"Achtung" weist auf eine mögliche Gefährdung hin, die zu Verletzungen oder Tod führen können. Sie finden die folgenden Warnhinweise in diesem Handbuch:

Un avertissement attire votre attention sur un risque possible de blessure ou de décès. Ci-dessous, vous trouverez les avertissements utilisés dans ce manuel.

Una advertencia le llama la atención sobre cualquier posible peligro que pueda ocasionar daños personales o la muerte. A continuación se dan las advertencias utilizadas en este manual.

Warning! With plastic covers removed, this product is suitable for use in environmental air space in accordance with the Section 300-22(c) of the National Electric Code and Sections 2- 128.12 - 010 (3) and 12 - 100 of the Canadian Electrical Code. Part 1. C22. 1. For other countries, consult local authorities for regulations.

Achtung! Bei abgenommener Kunststoffabdeckung ist dieses Produkt zur Verwendung in einem Umgebungsluftraum gemäß Abschnitt 300-22(c) des National Electric Code und Abschnitt 2- 128.12 - 010 (3) und 12 - 100 des Canadian Electrical Code Teil 1. C22.1 geeignet. Die Vorschriften für andere Länder sind bei den örtlichen Behörden erhältlich.

Avertissement Sous réserve que ses couvercles de plastique soient déposés, cet appareil est adapté à une utilisation dans les vides de construction des bâtiments selon la section 300-22(c) du code NEC (National Electric Code) et les sections 2-128.12 - 010 (3) et 12 - 100 du Code électrique du Canada, partie 1. C22. 1. Pour tous les autres pays, consulter les organismes de réglementation locaux.

Advertencia Una vez desprendidas las cubiertas de plástico, este producto es adecuado para su uso en el espacio aéreo circundante en conformidad con la sección 300-22(c) del National Electric Code (Código Eléctrico Nacional de EE.UU.) y las secciones 2- 128.12 - 010 (3) y 12 - 100 del Código Eléctrico de Canadá. Parte 1. C22. 1. En otros países, consulte a las autoridades locales competentes para informarse acerca de las normativas vigentes.

Warning! The AP200 with the metal enclosure exposed meets the requirements for fire resistance and low smoke-generating characteristics required by Section 300-22(C) of the National Electrical Code (NEC) for installation in a building's environmental air space. You must remove the plastic enclosure to reveal the plenum-rated AP200 metal case for installations above a suspended ceiling.

Additionally, you must use Ethernet cable that meets the requirements for operating in plenums and environmental air space (in accordance with Section 300-22(C) of the NEC).

Achtung! Das AP200 mit exponiertem Metallgehäuse erfüllt die Anforderungen für Feuerbeständigkeit und Kenndaten für geringe Raucherzeugung, die gemäß Abschnitt 300-22(C) des National Electrical Code (NEC) zur Installation im Umgebungsluftraum eines Gebäudes vorgeschrieben sind. Bei Installationen über einem Hängeboden muss das Kunststoffgehäuse abgenommen werden, um das flammwidrige (plenum-rated) AP200 Metallgehäuse freizulegen.

Außerdem muss ein Ethernetkabel, das die Anforderungen zum Betrieb in einem Umgebungsluftraum erfüllt, verwendet werden (gemäß Abschnitt 300-22(C) des NEC).

Avertissement L'équipement AP200 en boîtier métallique à nu est conforme aux critères de résistance au feu et de faible génération de fumées de la section 300-22(C) du code NEC (National Electrical Code) pour installation dans le vide de construction d'un bâtiment. Il est nécessaire de déposer le boîtier de plastique pour mettre à nu le boîtier métallique du AP200 en vue de son installation au-dessus d'un faux plafond.

De plus, selon la section 300-22(C) du code NEC, le câble Ethernet doit répondre aux critères de fonctionnement en vide de construction.

Advertencia La unidad AP200 con la carcasa de metal expuesta cumple los requisitos de resistencia al fuego y de generación de humo especificados en la sección 300-22(C) del National Electrical Code (NEC, Código Eléctrico Nacional de EE.UU.) para la instalación en el espacio aéreo circundante del edificio. Es necesario desprender la cubierta de plástico con el fin de exponer la carcasa metálica de la unidad AP200 plenum para su instalación encima de techos falsos.

Por otra parte, es necesario utilizar cable Ethernet que cumpla los requisitos de funcionamiento en el espacio aéreo circundante (en conformidad con la sección 300-22(C) del NEC).

Warning! Any Fast Ethernet (FE) cables installed in air-handling spaces should be suitable under NEC Article 800.50 and marked accordingly for use in plenums and air-handling spaces with regard to smoke propagation, such as CL2-P, CL3-P, MPP (Multi Purpose Plenum), or CMP (Communications Plenum).

Achtung! Alle Fast-Ethernet (FE)-Kabel, die in Lüftungsräumen installiert werden, sollten gemäß NEC Artikel 800.50 geeignet sein und entsprechend zur Verwendung in Hohlräumen (Plenum) und Lüftungsräumen im Hinblick auf Rauchausbreitung gekennzeichnet sein, z.B. CL2-P, CL3-P, MPP (Multi Purpose Plenum) oder CMP (Communications Plenum).

Avertissement Les câbles Fast Ethernet (FE) installés dans un vide d'air doivent correspondre aux critères de l'article 800.50 du code NEC et identifiés en conséquence comme adaptés à une utilisation dans les vides de construction des bâtiments en matière de propagation de la fumée (marquages CL2-P, CL3-P, MPP (Multi Purpose Plenum) ou CMP (Communications Plenum)).

Advertencia Todos los cables Fast Ethernet (FE) instalados en espacios aéreos deben cumplir con el artículo 800.50 del NEC y estar marcados adecuadamente para su uso en espacios aéreos y plenums en lo concerniente a la propagación de humo, tales como CL2-P, CL3-P, MPP (Plenum multifuncional), o CMP (Plenum de comunicaciones).

Warning! Inside antennas must be positioned to observe minimum separation of 20 cm. (~ 8 in.) from all users and bystanders. For the protection of personnel working in the vicinity of inside (downlink) antennas, the following guidelines for minimum distances between the human body and the antenna must be observed.

The installation of the indoor antenna must be such that, under normal conditions, all personnel cannot come within 20 cm. (~ 8.0 in.) from any inside antenna. Exceeding this minimum separation will ensure that the employee or bystander does not receive RF-exposure beyond the Maximum Permissible Exposure according to FCC CFR 47, section 1.1310 i.e. limits for General Population/Uncontrolled Exposure.

Achtung! Innenantennen müssen so positioniert werden, dass ein Mindestabstand von 20 cm (ca. 8 Zoll) zu allen Benutzern und anderen Personen gewahrt wird. Zum Schutz von Personal, das in der Nähe von Innenantennen (Downlink) arbeitet, sind die folgenden Richtlinien für Mindestabstand zwischen dem menschlichen Körper und der Antenne zu beachten.

Die Innenantenne muss so installiert werden, dass sich unter normalen Bedingungen kein Personal bis auf weniger als 20 cm (ca. 8 Zoll) an eine Innenantenne annähern kann. Durch Überschreitung dieses Mindestabstands wird sichergestellt, dass Mitarbeiter oder andere Personen keiner RF-Exposition über die maximal zulässige Exposition (MPE; Maximum Permissible Exposure) gemäß FCC CFR 47, Abschnitt 1.1310 (Grenzwerte für die allgemeine Bevölkerung/unkontrollierte Exposition) ausgesetzt werden.

Avertissement Les antennes intérieures doivent être positionnées de façon à respecter une distance minimum de 20 cm par rapport aux utilisateurs et aux tiers. Pour la protection du personnel travaillant à proximité des antennes intérieures (liaison descendante), respecter les directives suivantes pour assurer des distances minimales entre les êtres humains et les antennes.

Toute antenne intérieure doit être installée de telle sorte que, dans des conditions normales, le personnel ne puisse s'en approcher à moins de 20 cm. Cette distance minimale est destinée à garantir qu'un employé ou un tiers ne sera pas exposé à un rayonnement radioélectrique supérieur à la valeur maximale autorisée, telle qu'elle est définie dans les limites d'exposition non contrôlées pour la population par la réglementation de la FCC CFR 47, section 1.1310.

Advertencia Las antenas interiores deben colocarse de manera que se observe una separación mínima de 20 cm. (~ 8 pulg.) respecto a todos los usuarios y circunstantes. Para la protección del personal que trabaje en las inmediaciones de las antenas interiores (receptoras), deben observarse las siguientes directrices relativas a la distancia mínima entre el cuerpo humano y la antena.

La instalación de la antena interior debe efectuarse de tal modo que, en condiciones normales, ningún miembro del personal pueda acercarse a menos de 20 cm. (~ 8,0 pulg.) de cualquier antena interior. El cumplimiento de este mínimo de separación asegura que el empleado o circunstante no recibirá exposición a radiofrecuencia por encima de la Exposición Máxima Permisible conforme a la normativa FCC CFR 47, sección 1.1310, es decir, los límites asignados a la Exposición Incontrolada/Población Civil.

Appendix E
Regulatory Information

The Meru Access Point (APs) must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product. For country-specific approvals, see below. Meru Networks, Inc. is not responsible for any radio or television interference caused by unauthorized modification of APs, or the substitution or attachment of connecting cables and equipment other than that specified by Meru Networks, Inc. The correction of interference caused by such unauthorized modification, substitution or attachment is the responsibility of the user. Meru Networks, Inc. and its authorized resellers or distributors are not liable for any damage or violation of government regulations that may arise from the user failing to comply with these guidelines.

For OAP180

Radio

- FCC Part 15
- Canada RSS210
- EN 300 328 V1.6.1 (11/2004)
- EN 301 893 V1.3.1 (08/2005)
- Japan Technical Regulations

EMC

- FCC Part 15
- EN 301 489-17 V1.2.1 (08/2002)
- Japan VCCI

Safety

Prolonged exposure to RF radiation can be hazardous. Switch off unit power before service or installation procedures.

Limits for Occupational/Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm2)	Averaging Time |E|2, |H|2 or S (minutes)
1500-100,000			5	6

Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm2)	Averaging Time |E|2, |H|2 or S (minutes)
1500-100,000			1.0	30

Note: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

Note: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

Frequencies Blocked for Regulatory Compliance

802.11a frequencies 5.25-5.35 GHz and 5.47-5.725 GHz have been blocked for DFS compliance.

USA

Underwriters Laboratories

For the AP150 series, the AP300 series, AP200 series, and the OAP180, the following statement and notices are applicable:

Use only with Listed I.T.E. equipment.

Notices

The unit is intended for installation in Environment A as defined in IEEE 802.3.af. All interconnected equipment must be contained within the same building, including the interconnected equipment's associated LAN connection.

Suitable for use in environmental air space in accordance with Section 300-22(c) of the National Electrical Code, and Sections 2-128, 12-010(3) and 12-100 of the Canadian Electrical Code, Part 1, C22.1.

FCC Radiation Exposure Statement

Caution! The radiated output power of the Meru Networks devices is well below the FCC radio frequency exposure limits. However, the Access Point should be used in such a manner that the potential for human contact during normal operation is minimized. When installing and operating these devices, keep a minimum distance of 20 cm (8 inches) between the antennas and any persons/users in the vicinity.

Radio Frequency Interference Requirements

The Interference Statement applies to the following APs:

- AP150
- OAP180
- AP201 Rev 2, AP208 Rev 2

  FCC Part 15 Statement

  This is to certify that the above models are shielded against the generation of radio interference. Compliance is dependent upon the use of Cat 5e shielded data cables or a Meru-supplied line filter. Contact Meru Support to obtain a line filter, free of charge.
- AP300 series

Interference Statement

Meru Access Points

Note: All devices except the OAP180 are indoor devices. The FCC requires indoor use for the frequency range 5.15 GHz to 5.25 GHz to reduce the potential for harmful interference to co-channel Mobile Satellite systems.

High-power radars are allocated as primary users of the 5.25 to 5.35 GHz and 5.65 to 5.85 GHz bands. These radar stations can cause interference with or damage to these devices, or both.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy. If the equipment is not installed and used in accordance with the instructions, the equipment may cause harmful interference to radio communications. There is no guarantee, however, that such interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception (which can be determined by turning the equipment off and on), the user is encouraged to try to correct the interference by taking one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Note: The Meru Access Point must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product. Any other installation or use may violate FCC Part 15 regulations. Modifications not expressly approved by Meru Networks, Inc. could void your authority to operate the equipment.

This device must not be co-located or operating in conjunction with any other antenna or transmitter.

For products available in the USA and Canadian markets, only channels 1 through 11 can be operated. Selection of other channels is not authorized.

Canada. Industry Canada (IC)

The Class B digital portion of this apparatus complies with Canadian standard ICES-003.

These devices comply with RSS210 of Industry Canada.

Per RSS 210 A9.5 point 7:

(i) the device for the band 5150-5250 MHz is only for indoor usage to reduce potential for harmful interference to co-channel mobile satellite systems;
(ii) the maximum antenna gain permitted (for devices in the bands 5250-5350 MHz and 5470-5725 MHz) to comply with the e.i.r.p. limit; and
(iii) the maximum antenna gain permitted (for devices in the band 5725-5825 MHz) to comply with the e.i.r.p. limits specified for point-to-point and non point-to-point operation as appropriate, as stated in section A9.2(3).
In addition, users should also be cautioned to take note that high-power radars are allocated as primary users (meaning they have priority) of the bands 5250-5350 MHz and 5650-5850 MHz and these radars could cause interference and/or damage to LE-LAN devices.
(iv) These devices are not permitted to operate in the 5600 - 5650 MHz band.

For products available in the USA and Canadian markets, only channels 1 through 11 can be operated. Selection of other channels is not authorized.

Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of this device.

This device and its listed antenna(s) must not be co-located or operated in conjunction with any other antenna or transmitter

L’utilisation de ce dispositif est autorisée seulement aux conditions suivantes: (1) il ne doit pas produire de brouillage et (2) l’utilisateur du dispositif doit étre prêt à accepter tout brouillage radioélectrique reçu, même si ce brouillage est susceptible de compromettre le fonctionnement du dispositif.

The term "IC" before the equipment certification number only signifies that the Industry Canada technical specifications were met.

To reduce the potential radio interference to other users, the antenna type and gain should be chosen so that the equivalent isotropically radiated power (EIRP) is not more than that required for successful communication.

To prevent radio interference to the licensed service, this device is intended to be operated indoors and away from windows to provide maximum shielding. Equipment (or its transmit antenna) that is installed outdoors is subject to licensing.

Pour empecher que cet appareil cause du brouillage au service faisant l’objet d’une licence, il doit etre utilze a l’interieur et devrait etre place lin des fenetres afin de Fournier un ecram de blindage maximal. Si le matriel (ou son antenne d’emission) est installe a l’exterieur, il doit faire l’objet d’une licence.

Caution!

Exposure to Radio Frequency Radiation.

The installer of this radio equipment must ensure that the antenna is located or pointed such that it does not emit an RF field in excess of Health Canada limits for the general population; consult Safety Code 6, obtainable from Health Canada's website http://www.hc-sc.gc.ca/rpb.

This equipment complies with IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20cm between the antennas and any persons/users in the vicinity.

Note:

Meru Access Points

These devices are restricted to indoor use because they operate in the 5.15 to 5.25 GHz frequency range. Industry Canada requires such products to be used indoors for the frequency range 5.15 GHz to 5.25 GHz to reduce the potential for harmful interference to co-channel Mobile Satellite systems.

Access Points have been designed to operate with the antennas listed below. Antennas not included in this list are strictly prohibited for use with these devices. The required antenna impedance is 50 ohms.

AP Antennas with Gain

AP Model	Antenna Type	Gain (2.4 GHz)	Gain (5 GHz)
AP300	Dual-Band Omni-Directional MN-ACC-ANTabg-W	2 dBi	3 dBi
AP300	Dual-Band Omni-Directional ACC-ANT-ABGN-23	2 dBi	3 dBi
AP300	High-Gain Dipole Omni-Directional ACC-ANT-ABGN47O	4.7dBi	4.7dBi
AP200	Dual-Band Omni-Directional SAA04-220050	2 dBi	3 dBi
AP200	Dual-Band Omni-Directional TWX-614XRSXX	4 dBi	5 dBi
AP150	Dual-Band Omni-Directional SAA04-220050	2 dBi	3 dBi

To reduce potential radio interference to other users, the antenna type and its gain should be chosen so that the equivalent isotropically radiated power (e.i.r.p.) is not more than that permitted for successful communication.

Europe—EU Declaration of Conformity and Restrictions

CE
!

This equipment is marked with either the CE Mark, the alert symbol, and the notified body's number and can be used throughout the European Community. This mark indicates compliance with the R&TTE Directive 1999/5/EC and the relevant parts of the following technical specifications.

EN 300 328. Electromagnetic Compatibility and Radio Spectrum Matters (ERM). Wideband transmission systems, data transmission equipment operating in the 2.4 GHz ISM (Industrial, Scientific, and Medical frequency bands in the range of 902–928 MHz, 2.4–2.485 GHz, and 5.15–5.25 GHz) band and using spread spectrum modulation techniques, harmonized EN standards covering essential requirements under article 3.2 of the R&TTE directive.

EN 301 893. Broadband Radio Access Networks (BRAN). 5 GHz high-performance RLAN, harmonized EN standards covering essential requirements of article 3.2 of the R&TTE directive.

EN 301 489-17. Electromagnetic Compatibility and Radio Spectrum Matters (ERM). Electromagnetic Compatibility (EMC) Standard for Radio Equipment and Services, Part 17 Specific Conditions for Wideband Data and HIPERLAN Equipment.

EN 55022 Statement (applicable to AP201 Rev 2, AP208 Rev 2 only).This is to certify that the above models are shielded against the generation of radio interference in accordance with the application of Council Directive 2004/108/EC, Annex I, 1a. Conformity is declared by the application of EN 55 022 Class B (CISPR 22). Compliance is dependent upon the use of Cat 5e shielded data cables.

EN 60950-1. Safety of Information Technology Equipment.

EN 50385. Product standard to demonstrate the compliances of radio base stations and fixed terminal stations for wireless telecommunication systems with the basic restrictions or the reference levels related to human exposure to radio frequency electromagnetic fields.

!

Marking by the alert symbol indicates that usage restrictions apply.

Meru Networks, Inc. declares that their Access Points comply with the essential requirements and other relevant provisions of Directive 1999/5/EC.

Meru Networks, Inc. vakuuttaa täten että Access Points tyyppinen laite on direktiivin 1999/5/EY oleellisten vaatimusten ja sitä koskevien direktiivin muiden ehtojen mukainen.

Hierbij verklaart Meru Networks, Inc. dat het toestel Access Points in overeenstemming is met de essentiële eisen en de andere relevante bepalingen van richtlijn 1999/5/EG.

Bij deze verklaart Meru Networks, Inc. dat deze Access Points voldoet aan de essentiële eisen en aan de overige relevante bepalingen van Richtlijn 1999/5/EC.

Par la présente, Meru Networks, Inc. déclare que l'appareil Access Points est conforme aux exigences essentielles et aux autres dispositions pertinentes de la directive 1999/5/CE.

Par la présente, Meru Networks, Inc. déclare que ce Access Points est conforme aux exigences essentielles et aux autres dispositions de la directive 1999/5/CE qui lui sont applicables.

Härmed intygar Meru Networks, Inc. att denna Access Points står I överensstämmelse med de väsentliga egenskapskrav och övriga relevanta bestämmelser som framgår av direktiv 1999/5/EG.

Undertegnede Meru Networks, Inc. erklærer herved, at følgende udstyr Access Points overholder de væsentlige krav og øvrige relevante krav i direktiv 1999/5/EF.

Hiermit erklärt Meru Networks, Inc. dass sich dieser/diese/dieses Access Points in Übereinstimmung mit den grundlegenden Anforderungen und den anderen relevanten Vorschriften der Richtlinie 1999/5/EG befindet.

Hiermit erklärt Meru Networks, Inc. die Übereinstimmung des Gerätes Access Points mit den grundlegenden Anforderungen und den anderen relevanten Festlegungen der Richtlinie 1999/5/EG.

Con la presente Meru Networks, Inc. dichiara che questo Access Points è conforme ai requisiti essenziali ed alle altre disposizioni pertinenti stabilite dalla direttiva 1999/5/CE.

Por medio de la presente Meru Networks, Inc. declara que el Access Points cumple con los requisitos esenciales y cualesquiera otras disposiciones aplicables o exigibles de la Directiva 1999/5/CE.

Meru Networks, Inc. declara que este Access Points está conforme com os requisitos essenciais e outras disposições da Directiva 1999/5/CE.

Hawnhekk, Meru Networks, Inc. jiddikjara li dan Access Points jikkonforma malhtigijiet essenzjali u ma provvedimenti ohrajn relevanti li hemm fid-Dirrettiva 1999/5/EC.

Käesolevaga kinnitab Meru Networks, Inc. seadme Access Points vastavust direktiivi 1999/5/EÜ põhinõuetele ja nimetatud direktiivist tulenevatele teistele asjakohastele sätetele.

Alulírott, Meru Networks, Inc. nyilatkozom, hogy a Access Points megfelel a vonatkozó alapvetõ követelményeknek és az 1999/5/EC irányelv egyéb elõírásainak.

Meru Networks, Inc. týmto vyhlasuje, e Access Points splna základné poiadavky a všetky príslušné ustanovenia Smernice 1999/5/ES.

Meru Networks, Inc. tímto prohlašuje, e tento Access Points je ve shode se základními poadavky a dalšími príslušnými ustanoveními smernice 1999/5/ES.

Šiuo Meru Networks, Inc. deklaruoja, kad šis Access Points atitinka esminius reikalavimus ir kitas 1999/5/EB Direktyvos nuostatas.

Ar šo Meru Networks, Inc. deklare, ka Access Points atbilst Direktivas 1999/5/EK butiskajam prasibam un citiem ar to saistitajiem noteikumiem.

Niniejszym, Meru Networks, Inc., deklaruje, ze Access Points spelnia wymagania zasadnicze oraz stosowne postanowienia zawarte Dyrektywie 1999/5/EC.

These products are intended to be used in all countries of the European Economic Area with the following restrictions:

IEEE 802.11a Restrictions

- These products are for indoor use only (5150–5250 MHz).
- To ensure compliance with local regulations, be sure to set your Access Point to the country in which you are using the Access Point.
- The Meru Access Point products can be used only indoors in the following countries: Austria, Belgium, Bulgaria, Czech Republic, Germany, Cyprus, Denmark, Estonia, Finland, France, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, The Netherlands, Norway, Portugal, Poland, Romania, Spain, Slovak Republic, Slovenia, Sweden, Switzerland, Turkey, and United Kingdom.

EEE 802.11b/g Restrictions

- France—In all Metropolitan départements, wireless LAN frequencies can be used under the following conditions, either for public or private use:
  Indoor use: maximum power (EIRP) of 100 mW for the entire 2400–2483.5 MHz frequency band.

Japan

EN 55022 Statement (applicable to AP201 Rev 2, AP208 Rev 2 only).This is to certify that the above models are shielded against the generation of radio interference in accordance with the application of Council Directive 2004/108/EC, Annex I, 1a. Conformity is declared by the application of EN 55022 Class B (CISPR 22). Compliance is dependent upon the use of shielded data cables.

Model AP300

Model AP300 module rev 1

003WWA080094 003GZA080095 003XWA080096

Model 208

003NY06089 0000 003GZ06018 0000 003WY06035 0000

Model 208 Rev 2 Module

003NY07014 0000 003GZ07002 0000 003WY07004 0000

Model AP208 Rev 2

003NY07015 0000 003GZ07003 0000 003WY07005 0000

Model 201

003NY06117 0000 003GZ06026 0000 003WY06043 0000

Model AP201 Rev 2

003NY07015 0000 003GZ07003 0000 003WY07005 0000

Model AP150

003NY06122 0000 003GZ06030 0000 003WY06046 0000

Singapore

For the AP201 Rev 2, AP208 Rev 2, and OAP180, the following approval information applies:

Complies with
IDA Standards
DA103798

For the AP300 series, the following approval information applies:

Complies with
IDA Standards
DB102245

Manufacturing Information

The AP150, AP200, and AP300 are built in Taiwan. Factory information is provided under NDA and upon request.

AP300 Plenum Requirements

When installing the product in an air-handling space, as described in Article 300.22(C) of the NEC (2005), the unit should only be powered by the Ethernet port (PoE), not by the AC-powered power supply.

When the product is installed in air-handling spaces, the cables employed should be suitable under NEC Articles 300.22 and 725 and marked accordingly, for use in plenums and air-handling spaces with regard to smoke propagation, such as CL2-P, CL3-P, MPP or CMP.

The products should be installed in accordance with all applicable, local regulations and practices.

voice. Data. wireless. *Become one.*

MERU NETWORKS, INC.

Limited Product Warranty

This Limited Product Warranty applies to the original end-user customer of the Meru product which you purchased for your own use, and not for resale ("Product"), from Meru Networks, Inc. ("Meru") or its authorized reseller ("Reseller").

Limited Warranties

- One-year limited hardware warranty: Meru warrants to you that Meru hardware (other than Third Party Products as described below) will be free from defects in materials and workmanship for a one-year period after the date of delivery of the applicable product to you from Meru or its Reseller (the "Hardware Warranty Period"). If Meru receives written notice from you of such defects during the Hardware Warranty Period, Meru will, at its option, either repair or replace Meru hardware that Meru determines to be defective. Replacement products may be remanufactured units, and will be warranted for the remainder of the original Hardware Warranty Period, or if greater, for thirty days from delivery of such replacement. Should Meru be unable to repair or replace the Meru hardware, Meru (or its Reseller, as applicable) will refund to you the purchase price of the Product.
- 90-Day Limited Software Warranty: Meru warrants to you that, for a 90-day period after the date of delivery of the applicable product to you from Meru or its Reseller (the "Software Warranty Period"), when properly installed and used, (a) the media on which the Meru software is provided will be free from defects in materials or workmanship; and (b) the Meru software will substantially conform to the functional specifications in the applicable documentation. If Meru receives written notice from you of a breach of this warranty during the Software Warranty Period and is able to reproduce the defect, Meru will, at its option, either repair or replace the defective Meru software. Should Meru be unable to repair or replace the Meru software, Meru (or its Reseller, as applicable) will refund to you the purchase price of the Product.

Exclusions

The warranty on the Product shall not apply to defects resulting from the following:

- Alteration or modification of the Product in any way, including without limitation configuration with software or components other than those supplied by Meru or integration with parts other than those supplied by Meru.
- Abuse, damage or otherwise being subjected to problems caused by negligence or misapplication (including without limitation improper or inadequate maintenance or calibration), relocation of the products (including without limitation damage caused by use of other than Meru shipping containers), or use of the products other than as specified in the applicable Meru product documentation (including without limitation incompatible operating environments and systems), or improper site preparation or maintenance.
- Damage as a result of accidents, extreme power surge, extreme electromagnetic field, acts of nature or other causes beyond the control of Meru.

— Use of the Product with software, interfacing, parts or supplies not supplied by Meru.

The warranty on the Product does not apply if the Product is sold, or in the case of software, licensed, for free for evaluation or demonstration purposes.

Meru expressly disclaims any warranty or obligation to support the Product for all operating environments – for example, as illustration and not limitation, Meru does not warrant or ensure interoperability of the Product with future telecommunication systems or other future software or hardware.

You understand and acknowledge that the Products may generate, use or radiate radio frequency energy and may interfere with radio communications and/or radio and television receptions if is not used and/or installed in accordance with the documentation for such products. WHILE MERU USES COMMERCIALLY REASONABLE EFFORTS TO ENSURE COMPLIANCE OF THE PRODUCTS WITH APPLICABLE UNITED STATES FEDERAL COMMUNICATIONS COMMISSION AND PROTECT AGAINST HARMFUL INTERFERENCES, YOU ACKNOWLEDGE AND AGREE THAT INTERFERENCES WITH RADIO COMMUNICATIONS AND/OR RADIO AND TELEVISION RECEPTIONS MAY OCCUR AND THAT MERU WILL NOT BE LIABLE FOR ANY DAMAGES OR INCONVENIENCE BASED ON SUCH INTERFERENCES.

Third Party Products - The above Limited Warranties are exclusive of products manufactured by third parties ("Third Party Products"). If such third party manufacturer provides a separate warranty with respect to the Third Party Product, Meru will include such warranty in the packaging of the Meru Product.

Return procedures
To obtain warranty service you must: (a) obtain a return materials authorization number ("RMA#") from Meru by contacting rmaadmin@merunetworks.com, and (b) deliver the Product, in accordance with the instructions provided by Meru, along with proof of purchase in the form of a copy of the bill of sale including the Product's serial number, contact information, RMA# and detailed description of the defect, in either its original package or packaging providing the Product with a degree of protection equivalent to that of the original packaging, to Meru at the address below. You agree to obtain adequate insurance to cover loss or damage to the Product during shipment.

If you obtain an RMA# and return the defective Product as described above, Meru will pay the cost of returning the Product to Meru. Otherwise, you agree to bear such cost, and prior to receipt by Meru, you assume risk of any loss or damage to the Product. Meru is responsible for the cost of return shipment to you if the Meru Product is defective.

Returned products which are found by Meru to be not defective, returned out-of-warranty or otherwise ineligible for warranty service will be repaired or replaced at Meru's standard charges and shipped back to you at your expense.

At Meru's sole option, Meru may perform repair service on the Product at your facility, and you agree to provide Meru with all reasonable access to such facility and the Product, as required by Meru. On-site repair service may be available and is governed by the specific terms of your purchase.

All replaced parts, whether under warranty or not, are the property of Meru.

Warranty limitations
THE WARRANTIES SET FORTH ABOVE ARE EXCLUSIVE AND NO OTHER WARRANTY, WHETHER WRITTEN OR ORAL, IS EXPRESSED OR IMPLIED BY MERU, TO THE MAXIMUM EXTENT PERMITTED BY LAW. THERE ARE NO OTHER WARRANTIES RESPECTING THE PRODUCT AND DOCUMENTATION AND SERVICES PROVIDED UNDER THIS AGREEMENT, INCLUDING WITHOUT LIMITATION ANY WARRANTY OF DESIGN, MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (EVEN IF MERU HAS BEEN INFORMED OF SUCH PURPOSE), TITLE OR AGAINST INFRINGEMENT OF THIRD PARTY RIGHTS. IF ANY IMPLIED WARRANTY CANNOT BE DISCLAIMED UNDER APPLICABLE LAW, THEN SUCH IMPLIED WARRANTY SHALL BE LIMITED IN DURATION TO THE HARDWARE AND SOFTWARE WARRANTY PERIODS DESCRIBED ABOVE.

NO AGENT OF MERU IS AUTHORIZED TO ALTER OR EXCEED THE WARRANTY OBLIGATIONS OF MERU.

MERU SPECIFICALLY DOES NOT WARRANT THAT THE MERU SOFTWARE WILL BE ERROR FREE OR OPERATE WITHOUT INTERRUPTION.

THE REMEDIES IN THIS LIMITED PRODUCT WARRANTY ARE YOUR SOLE AND EXCLUSIVE REMEDIES, AND MERU'S SOLE AND EXCLUSIVE LIABILITY, FOR BREACH OF THE HARDWARE OR SOFTWARE WARRANTY SET FORTH ABOVE.

Limitations of Liability
You acknowledge and agree that the consideration which you paid to Meru does not include any consideration by Meru of the risk of consequential, indirect or incidental damages which may arise in connection with your use of, or inability to use, the Product. THUS, MERU AND ITS RESELLER WILL NOT BE LIABLE FOR ANY INDIRECT, INCIDENTAL, SPECIAL, PUNITIVE OR CONSEQUENTIAL DAMAGES, INCLUDING WITHOUT LIMITATION LOST PROFITS, LOST BUSINESS, LOST DATA, LOSS OF USE, OR COST OF COVER INCURRED BY YOU ARISING OUT OF OR RELATED TO YOUR PURCHASE OR USE OF, OR INABILITY TO USE, THIS PRODUCT OR THE SERVICES, UNDER ANY THEORY OF LIABILITY, WHETHER IN AN ACTION IN CONTRACT, STRICT LIABILITY, TORT (INCLUDING NEGLIGENCE) OR OTHER LEGAL OR EQUITABLE THEORY,

EVEN IF MERU OR ITS RESELLER KNEW OR SHOULD HAVE KNOWN OF THE POSSIBILITY OF SUCH DAMAGES. IN ANY EVENT, THE CUMULATIVE LIABILITY OF MERU OR ITS RESELLER FOR ALL CLAIMS WHATSOEVER RELATED TO THE PRODUCT OR THE SERVICE WILL NOT EXCEED THE PRICE YOU PAID FOR THE PRODUCT OR SERVICES GIVING RISE TO SUCH CLAIMS.

THE LIMITATIONS SET FORTH HEREIN ARE INTENDED TO LIMIT THE LIABILITY OF MERU AND ITS RESELLERS AND SHALL APPLY NOTWITHSTANDING ANY FAILURE OF ESSENTIAL PURPOSE OF ANY LIMITED REMEDY.

The jurisdiction applicable to you may not allow the limitations of liability or damages set forth above, in which case such limitation shall only apply to you to the extent permitted in such jurisdiction.

Additional Information
This Limited Product Warranty shall be governed by and construed in accordance with the laws of the State of California, U.S.A., exclusive of its conflict of laws principles. The U.N. Convention on Contracts for the International Sale of Goods shall not apply.

This Limited Product Warranty is the entire and exclusive agreement between you and Meru with respect to its subject matter, and any modification or waiver of any provision of this statement is not effective unless expressly set forth in writing by an authorized representative of Meru.

All inquiries or claims made under this Limited Product Warranty must be sent to Meru at the following address:

Meru Networks Inc.,
894 Ross Drive, CA 94087, USA
Tel: 408-215-5300
Fax: 408-215-5301
Email: support@merunetworks.com

voice. Data. wireless. *Become one.*

Meru Networks, Inc.
894 Ross Drive
Sunnyvale, CA 94087
408-215-5300
www.merunetworks.com