IronPoint Mobility Series
Access Point and Radio Switch
Installation Guide

Release 3.6

FOUNDRY
NETWORKS

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Contents

Chapter 1
About This Guide

This guide provides a detailed description of the IronPoint Mobility Access Point installation.

Note: Features or options not documented in this guide are not supported.

What's Included in This Edition?

This edition describes the IronPoint Mobility software release 3.6. New access point features for Release 3.6 include support for the AP300.

Audience

This guide is intended for network administrators configuring and maintaining the IronPoint Mobility. Familiarity with the following concepts is helpful when configuring the IronPoint Mobility Series System:

- Network administration, including:
  — Internet Protocol (IP) addressing and routing
  — Dynamic Host Configuration Protocol (DHCP)
  — Configuring Layer 2 and Layer 3 switches (if required by your switch)
- IEEE 802.11 (Wi-Fi) concepts, including:
  — ESSIDs
  — WEP
- Network Security (optional)
  — 802.1X
  — RADIUS
  — X.509 certificates

Typographic Conventions

This guide uses the following typographic conventions in paragraph text to help you identify information:

Bold text   Identifies commands and keywords in syntax descriptions that are entered literally.

Italic text   Used for new terms, emphasis, and book titles; also identifies arguments for which you supply values in syntax descriptions.

`Courier font`   Identifies file names, folder names, computer screen output, and text in syntax descriptions that you are required to type.

help   Denotes a cross-reference link to a command. Clicking the link takes you to the command reference entry.

`Ctrl-`   Denotes that the Ctrl key should be used in conjunction with another key, for example, Ctrl-D means hold down the Ctrl and press the D key. Keys are shown in capitals, but are not case sensitive.

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.

Syntactic Conventions

In example command syntax descriptions and command examples, the following text elements and punctuation are used to denote user input and computer output for the command.

bold	Required command, keywords, and punctuation.
italic	Arguments or file names where you substitute a value.
no	The optional no form of the command disables the feature or function.
[ ]	Optional elements are enclosed by square brackets.
{ }	Braces indicates that one of the enclosed elements must be used.
		Choices among elements are separated by vertical bars.
[{}]	A required choice within an optional element.
…	The preceding argument can be repeated.

Related Publications

- *IronPoint Mobility Series Release Notes*
- *Foundry IronPoint Mobility Series Getting Started Guide*
- *Foundry IronPoint Mobility Series Configuration Guide*
- *Foundry IronPoint Mobility Series Command Reference*
- *Foundry IronPoint Mobility Series Configuration Guide*

Note: Many commands have a default setting or value, listed in the Default section of the command page.

Updates to this Manual

This manual may be updated without notice. For the latest edition of this manual, check the Foundry Knowledge Portal at kp.foundrynet.com.

How to Get Help or Report Errors

Foundry Networks is committed to ensuring that your investment in our products remains cost-effective. If you need assistance or find errors in the manuals, contact Foundry Networks using one of the following options.

Web Access

Go to kp.foundrynet.com and log in to the Knowledge Portal (KP) to obtain more information about a product, or to report documentation errors. To report errors, click on Cases > Create a New Ticket.

E-mail Access

Send an e-mail to: support@foundrynet.com

Telephone Access

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1.408.207.1600 Outside the United States

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Chapter 2
IronPoint Mobility Access Points and Radio Switch

IronPoint Mobility Access Points and Radio Switches contain radio devices that communicate with the IronPoint Mobility Controller and form the wireless LAN (WLAN). The IronPoint Mobility Controller, Radio Switches, and Access Points connect to the site's wired LAN through wired switches. Wireless clients associate with the Radio Switches and 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.

AP300 IronPoint Mobility Access Points

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 these configurations:

— 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)

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.

- Powered by 5 volt DC input, 802.3af compliant PoE device, or draft 802.3at compliant PoE device.
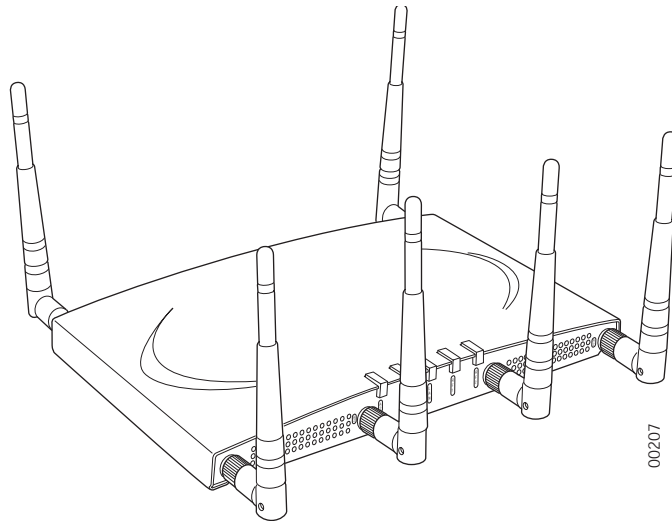
Figure 1: AP300

AP200 IronPoint Mobility Access Points

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 IronPoint Mobility 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.
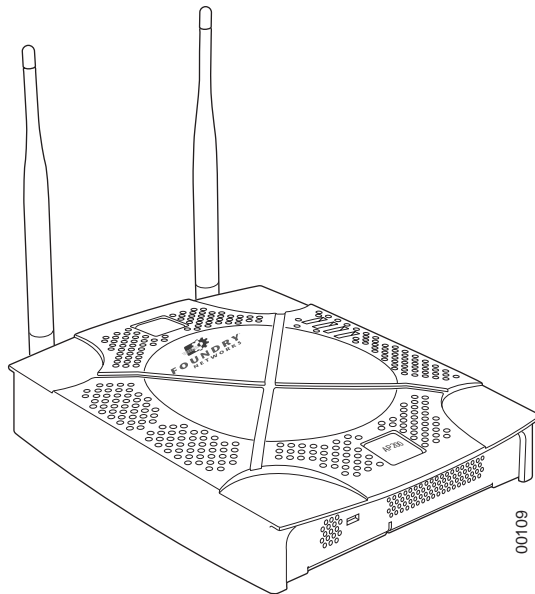
Figure 2: Access Point AP200

AP150 IronPoint Mobility Access Points

✔ **Note:** AP150 models may have different revisions, but functionally they are the same, and all are referred to as the AP150 series. Hereafter in this document, all AP150 series models are referred to as the 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 IronPoint Mobility 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
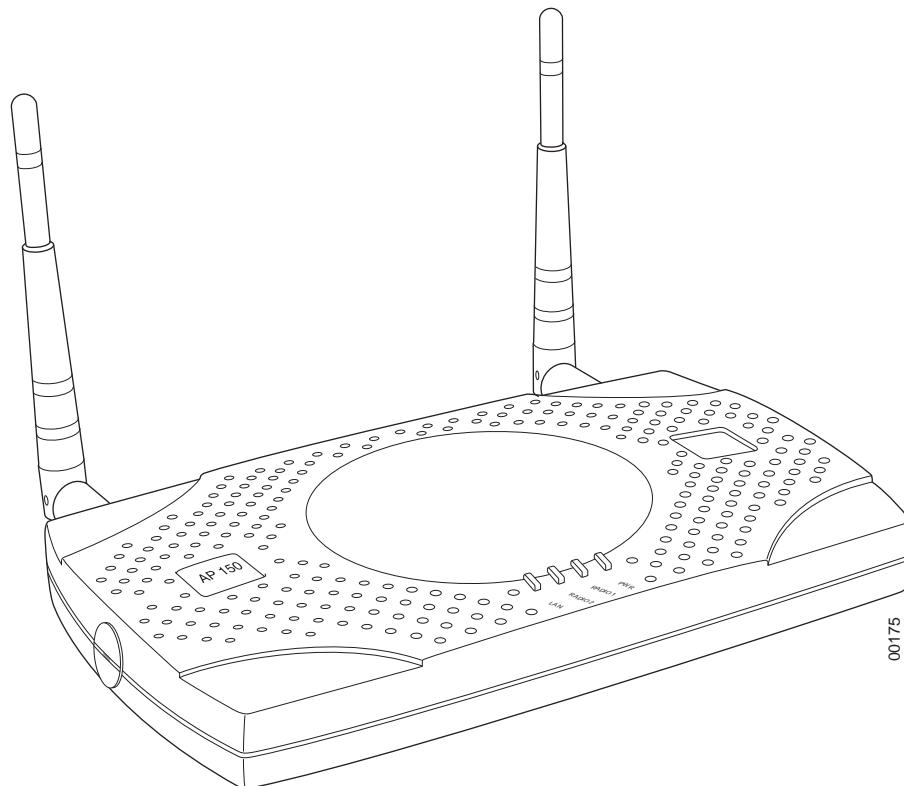
Figure 3: Access Point AP150

OAP180 IronPoint Mobility Access Points

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 4: Rugged OAP180 Access Point
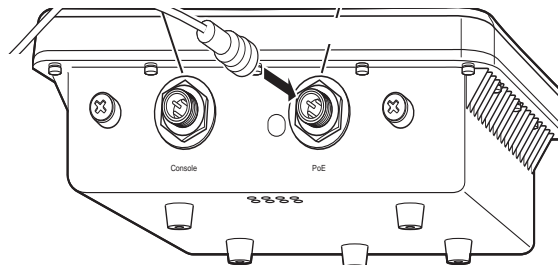
Radio Switch RS4000

The Radio Switch RS4000 enables high-capacity enterprise-class wireless LAN connectivity with full support of standard 802.11 security and network management features. Each RS4000 contains four 802.11 radios (two 802.11b/g, two 802.11a) for high data and voice throughput – an essential requirement for high user-density environments with several simultaneous users. Classrooms and convention halls are typical deployment applications of the Radio Switch. Deploying the Radio Switch is easy— as with wireless access points, the Radio Switch can be installed wherever wireless coverage is needed. For large buildings with multiple rooms and floors, more than one Radio Switch can be installed to cover the desired area. Wireless users can seamlessly roam from one Radio Switch to another, getting high-capacity WLAN access throughout the wireless enterprise enabled with multiple Radio Switches. The RS4000 also balances radio traffic across its RF channels and resolves contention within each RF channel such that users receive a switched wireless experience with dedicated bandwidth to execute a variety of applications ranging from web browsing and VoIP mobility to multimedia streaming.

The RS4000 ships with either a high-gain omni-directional indoor antenna or a 180-degree directional indoor antenna that aggregates and layers radio transmissions from each of the built-in radios. The antenna can broadcast every channel available to blanket the area around the Radio Switch, yet avoid interference and contention. This simplifies deployment efforts by eliminating the need for additional antennas for each radio. More importantly, RF channel planning efforts are greatly simplified.

Using the RS4000, wireless users experience the benefits of switching technology on Wi-Fi—dedicated bandwidth, traffic separation, and multi-service network support.

The RS4000 can be deployed with up to two 802.11b/g and two 802.11a channels active on the radio interfaces. The 802.11b/g channels must be separated by a minimum of 8 channels (for example, channels 1 and 9), so the recommended set is channels 1 and 11, typically. The 802.11a channels must be separated by a minimum of 80MHz/16 channels for best performance (for example, channels 36 and 52).
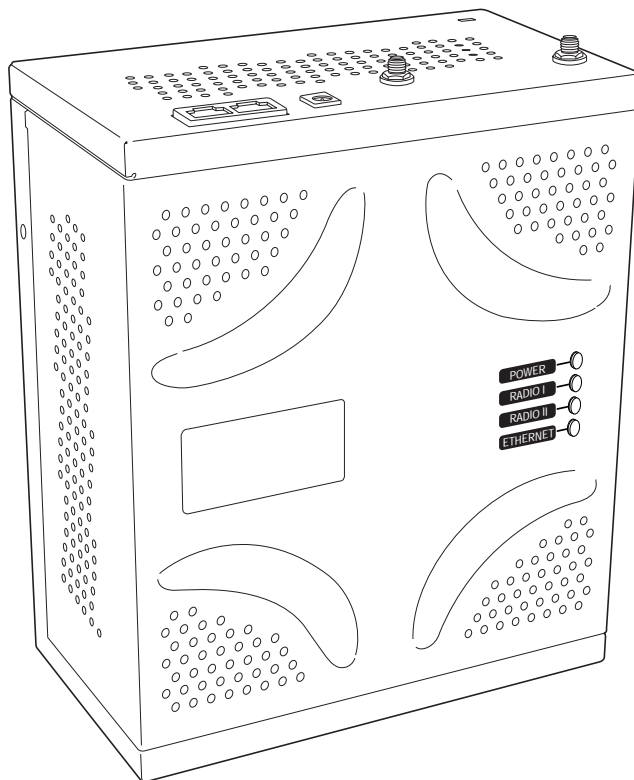
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Figure 5: Radio Switch RS4000

RS4000 Hardware Features and Specifications

The RS4000 has four 802.11 radios (two 802.11a and two 802.11bg) that transmit and receive simultaneously on four different channels to increase the total available wireless bandwidth at a given area. The RS4000 connects to the LAN using one 10/100 Mbps Ethernet connection for each radio pair. The RS4000 is powered using two IEEE 802.3af POE connections, each with 15W power.

> **✔ Note:** PoE must be provided on the first Ethernet connector (ETH1); the antenna cannot operate correctly without that power source. Power to the second Ethernet connector (ETH2) is optional; if not connected, two of the radios will not operate.

The RS4000 works in conjunction with a wideband RF combination omni directional (WRC/OD) indoor antenna or a 180-degree directional indoor antenna. Only one antenna is needed for simultaneous operation of all radios of an RS4000 in both the 2.4GHz and 5GHz bands. The antenna must be connected to the Radio Switch using any one of the low-loss antenna cables provided in the antenna packaging.

The following table lists the key hardware features of the RS4000.

Table 1: RS4000 Hardware Features

Feature	Description
802.11 Connectivity	Two 802.11b/g radios (2.4GHz) Two 802.11a radios (5 GHz)
Ethernet Connectivity	Two auto-sensing 10/100 Mbps ports, one for each radio pair
Power	Provided by two 802.3af POE connections, one for each radio pair (15W per connector)
LEDs	Power, Radio Activity, and Ethernet Activity LEDs per radio
Dimensions	9.5" x 8.5" x 3.875"

Table 1: RS4000 Hardware Features

Feature	Description
Mounting Options	RS4000 has mounting brackets available for: ● Ceiling Mount ● Wall Mount
Antenna	The RS4000 ships with either of these antennas: ● Wideband RF Combination/Omni-Directional (WRC/OD) Antenna. 5dBi gain. Indoor use. ● 180-degree directional indoor antenna
Antenna Cables	3′ low-loss cables (default option) 6′ and plenum-rated cables (available option)

Chapter 3
Installing the AP300

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

- **Safety Precautions**
- **Unpack the AP300**
- **Determine Power Requirements**
- **Installation Requirements**
- **Install the AP300**
- **Check AP300 LED Activity**

Safety Precautions

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

If an optional power supply is used, it should be a UL Listed power supply, marked Class 2 or LPS, and rated minimum 5 Vdc, 3A.

Unpack the AP300

The AP300 series consists of the four models 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.

Table 2: AP300 Radios and 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

Confirm that the Ap300 shipping package contains these items:

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

Determine Power Requirements

Your power requirements will vary, depending on which AP300 radios are deployed and what mode is used. See below. AP150 and AP300 work with all switches that support standard 802.3af.

Table 3: AP300 Power Options

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 PoE 802.3af. For 3x3 MIMO mode, use either a power supply or a PoE 802.3at.

AP300 Configuration	Power Options
2 radios – both n mode	For 2x2 MIMO mode, use either a power supply or PoE 802.3af. For 3x3 MIMO mode, use either a power supply or a PoE 802.3at.
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 two kits can be used to mount the AP300 from the ceiling:

- Suspended Ceiling Rail Mounting Kit
- Above Suspended Ceiling Mounting Kit (T-Bar Hanger)

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

Table 4: AP300 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
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
- Draft 802.3at compliant PoE device

AP150 and AP300 work with all switches that support standard 802.3af. You can optionally add a remote antenna mount; see **Install the Optional Remote Antenna Mount on the Ceiling**.

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 attached antennas, even though some configurations don't use all six. Make sure that all external antennas and their associated wiring are located entirely indoors. The external antennas are not suitable for outdoor use. **Figure 6** illustrates the recommended antenna configuration.

Figure 6: AP320, AP311 or AP302 Antennas 1-6
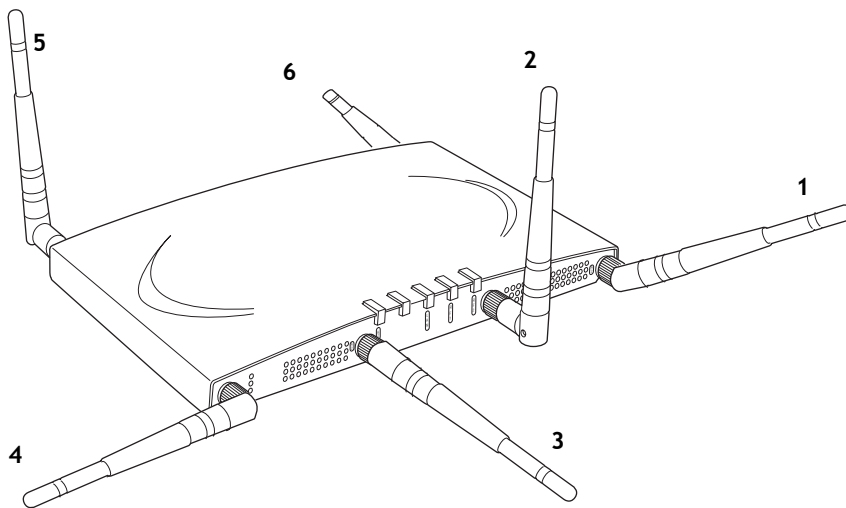
The following antenna connections are used during operation of the AP320, AP311, and AP302.

Table 5: Antenna Use for AP320, AP311, and AP302 (Dual Radio Units)

Mode	Radio 1 Uses	Radio 2 Uses
802.11abgn 3x3 MIMO	Ant4, Ant5, Ant6	Ant1, Ant2, Ant3
802.11abgn 2x2 MIMO	Ant4, Ant6	Ant1, Ant3
802.11abg	Ant4	Ant1

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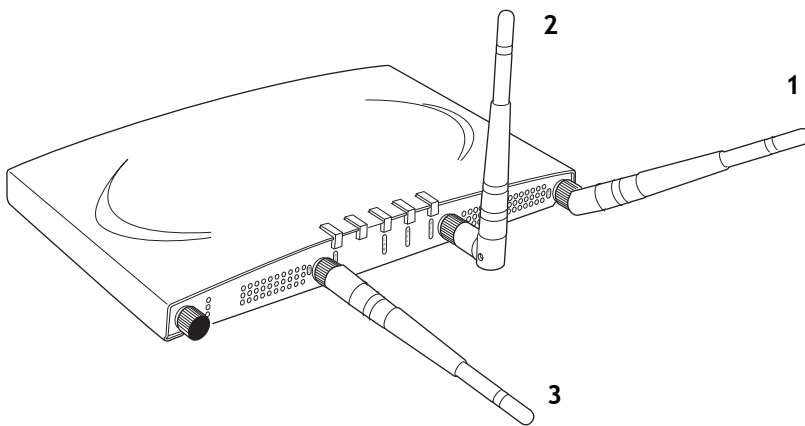
The following antenna connections are used during operation of the AP310.

Table 6: Antenna Use for AP310 (Single Radio Unit)

Mode	Radio 1 Uses	Radio2 Uses
802.11abgn 3x3 MIMO	Ant1, Ant2, Ant3	NA
802.11abgn 2x2 MIMO	Ant1, Ant3	NA
802.11abg	Ant1	NA

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
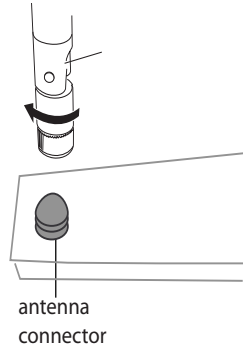
antenna
connector

> ! **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.

Install the Optional Remote Antenna Mount on the Ceiling

Use an optional Remote Antenna Mount for one or both AP300 radios to remotely connect the AP300 antennas. The 3*3 SMA Antenna Stand 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 devices in your wireless network. The Remote Antenna Mount can be placed 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 Antenna Mount uses low-loss Plenum rated LMR195 cable and SMA connectors.

Figure 9: Remote Antenna Mount
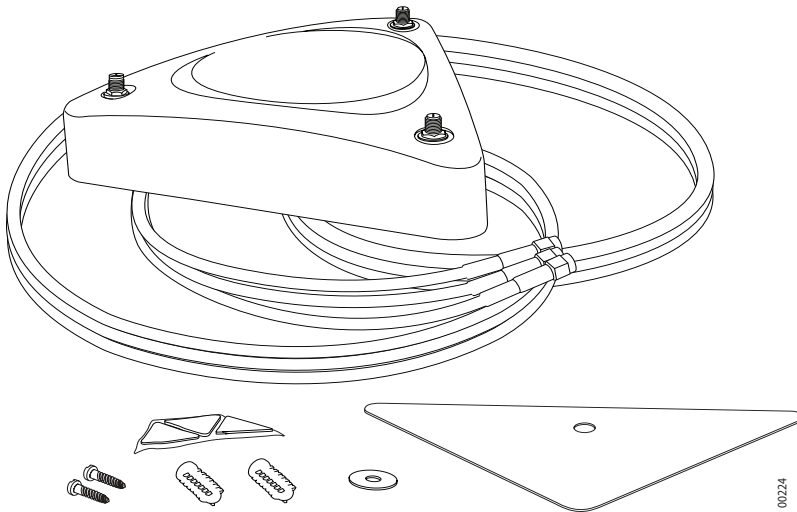
The remote antenna mount kit includes:

- 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 enclosed installation diagram 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 **Table 5** and **Table 6** 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 **Table 5** and **Table 6** to determine the cable connection configuration.

3. Attach three antennas that shipped with AP300 to the three connectors on the triangular remote device. See **Figure 9**.

Install the Access Point

The AP300 ships with a detachable mounting bracket. The AP300 is designed to be compatible with brackets supplied by Foundry and by other vendors. The AP300 mounts directly on the AP150 mounting bracket. If you are replacing AP300s, the AP300 bracket can be mounted on the old AP300 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. See **Figure 1**.

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 the Ethernet cable to the switch and to the AP300 Ethernet port shown in **Figure 2**.

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 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

Suspended ceiling T-rail

Caddy fastener(s)

Plastic spacer(s)

Mounting bracket

Keps nuts with attached locking washer

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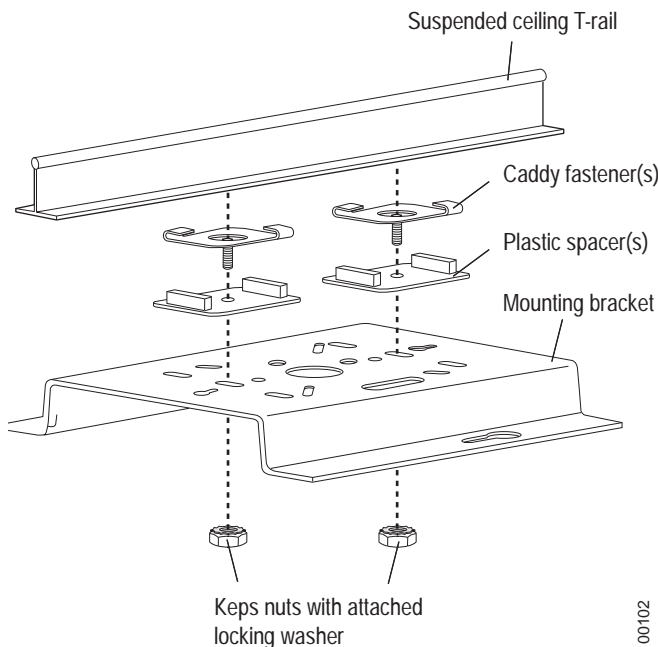
To mount an AP300 below a suspended ceiling:

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
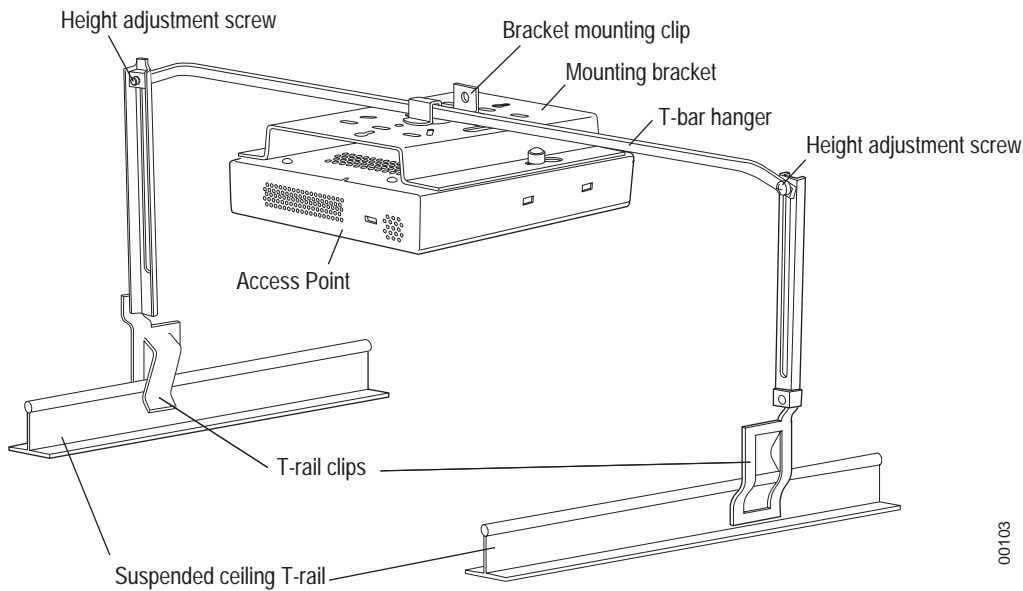
Height adjustment screw
Bracket mounting clip
Mounting bracket
T-bar hanger
Height adjustment screw
Access Point
T-rail clips
Suspended ceiling T-rail

00103

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

00104
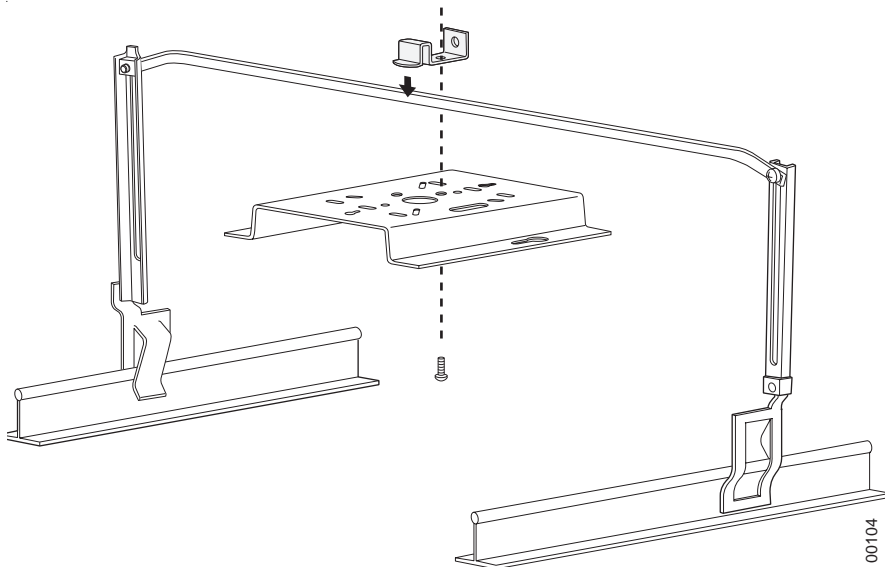
5. Pass the long end clip through the large center hole to the underside of the mounting bracket clip and then attach the bracket to the clip using the supplied screw (see **Figure 12** for orientation).

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 theEthernet connector, shown in **Figure 11**.

> ✔ **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.

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

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 (650-00064) if installed.

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 (650-00128) onto the back of the AP300 with the four Hoffman mounting screws facing downwards.

6. Using a Phillips screw driver, attach the bracket using the two supplied 6-32 3/16 SEMS screws (665-00018).

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.

Where to Go From Here

Now that the AP300 is installed, go to the *Foundry IronPoint Mobility Series 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.

Check AP300 LED Activity

When the AP300 is first connects to the controller and any time the access point is rebooted, 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 color reflects the various operating states described in Table 7. After the AP300 is connected, check the status of the LEDs.

Figure 13: AP300 Status LEDs
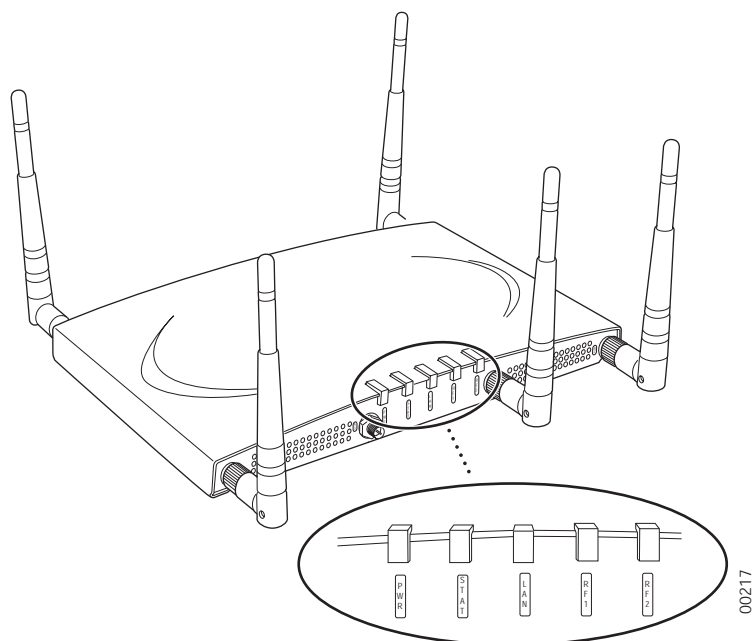
The functions of the five LEDs are described below.

Table 7: 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

Chapter 4
Installing the AP200

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

- **Safety Precautions**
- **Unpacking the AP200**
- **Installation Requirements**
- **Installing the Access Points**
- **Where to Go From Here**
- **Checking LED Activity**

Safety Precautions

IMPORTANT—Read and follow the instructions in "Regulatory Information" on page 107 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.

✔ **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 14**) allows it to be mounted on the wall and over junction boxes or molly bolts. There are also holes for passing the PoE Ethernet cable through the bracket if the bracket is mounted on a junction box or over the ceiling T-bar box hanger.

Ceiling mount hole

Access point mount

Wall cable access

Access point mount

Locking detent

Suspended ceiling cable access

Access point mount

Ceiling mount hole

00100
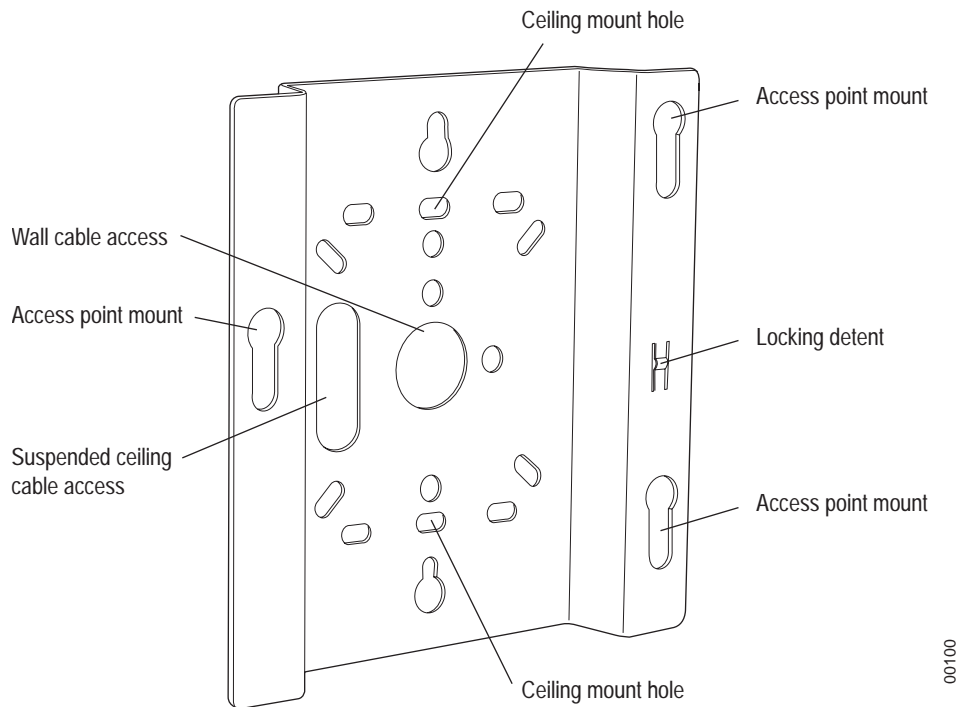
Figure 14: AP200 Mounting Bracket

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 in **Table 8**.

Table 8: AP200 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
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 in **Table 9**.

Table 9: 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.

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 15**). 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 15**), point the antenna straight up, then retighten the ring.
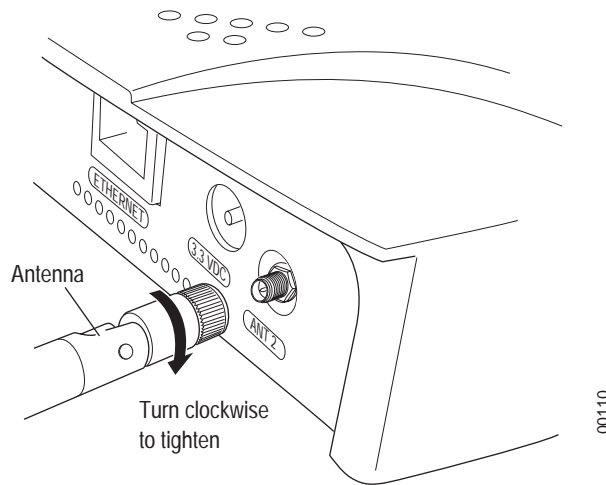
Figure 15: AP200 Antenna Connection

3. Connect one end of the PoE Ethernet cable to the Ethernet connector, shown in **Figure 16**.

✔ **Note:** For the IronPoint Mobility Series 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.

! **Caution!** Be sure to connect the Ethernet cable to the Ethernet port; the cable can mistakenly be plugged into the Console port (see **Figure 16**).
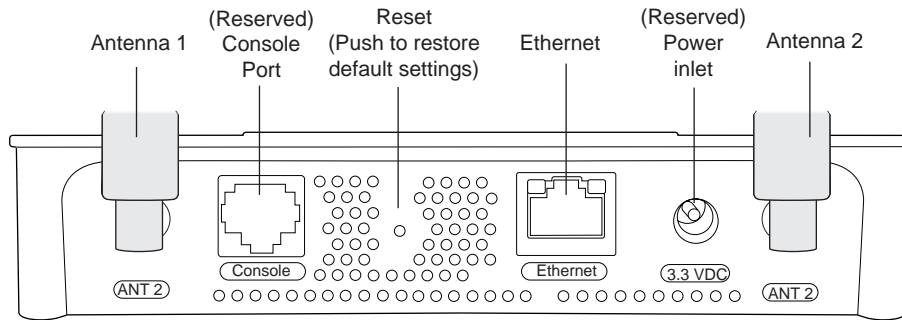
Figure 16: AP200 Connector Panel

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.
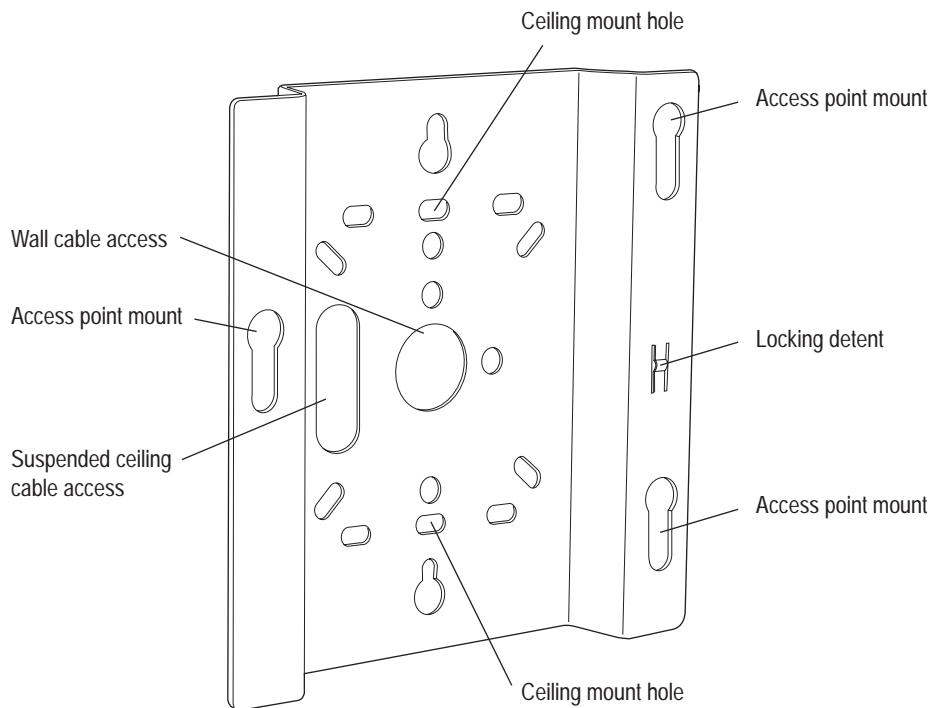
Figure 17: AP200 Bracket

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.

Mounting bracket attached to wall
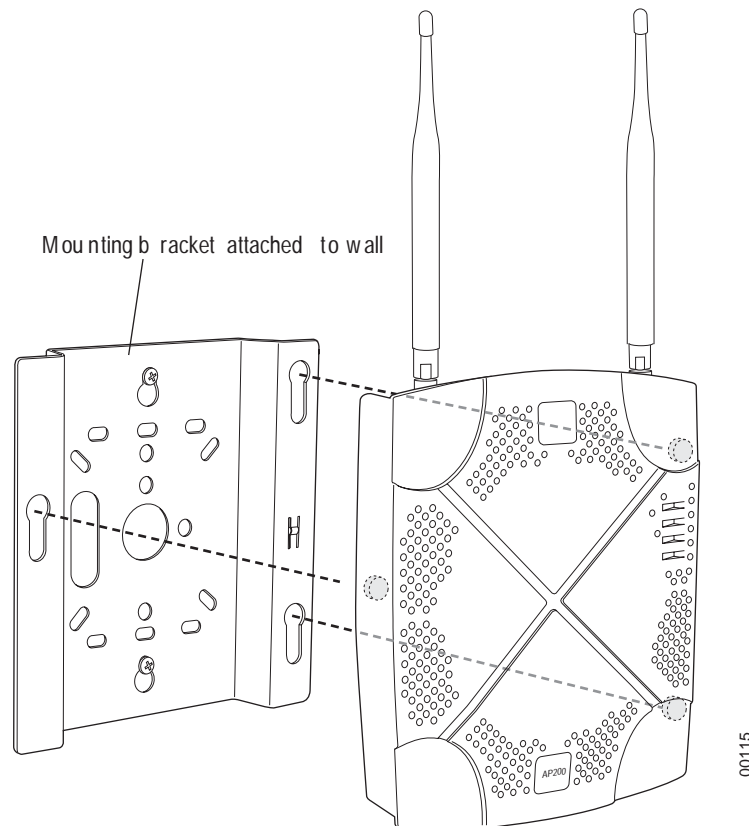
Figure 18: Aligning the AP200 with the Bracket

Mounting bracket
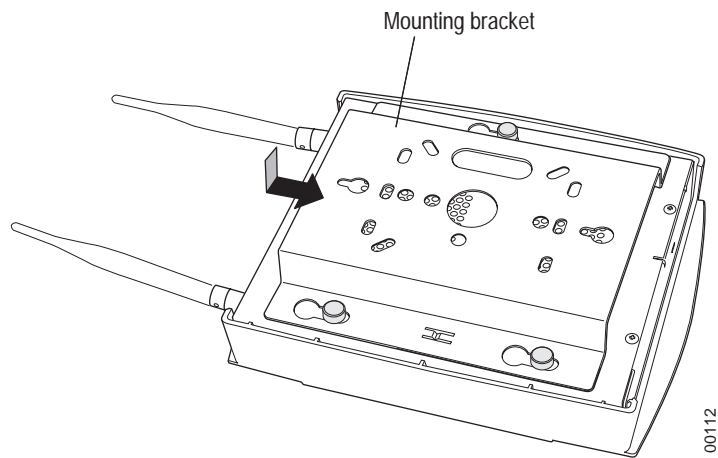
Figure 19: Sliding the AP200 into the Bracket

8. For external antennas, loosen the knurled ring at the base of each antenna (see **Figure 15**), point the antenna straight up, then retighten the ring.

9. Connect one end of the PoE Ethernet cable to the Ethernet connector, shown in **Figure 16**.

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

> ✔ **Note:** For the IronPoint Mobility Series 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.

> ❗ **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 20**).

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

Suspended ceiling T-rail

Caddy fastener(s)

Plastic spacer(s)

Mounting bracket

Keps nuts with attached locking washer

00102

Figure 20: 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 19**). You should hear it snap in place.

9. For each antenna, loosen the knurled ring at the base of the antenna (see **Figure 15**), point the antenna straight down, then retighten the ring.

10. Connect one end of the PoE Ethernet cable to the Ethernet connector, shown in (see **Figure 16**).

Note: For the IronPoint Mobility Series 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.

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

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 21**). 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! 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 21: 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 22**). One hole attaches the bracket perpendicular to the box hanger; the other mounts the bracket parallel to the box hanger.
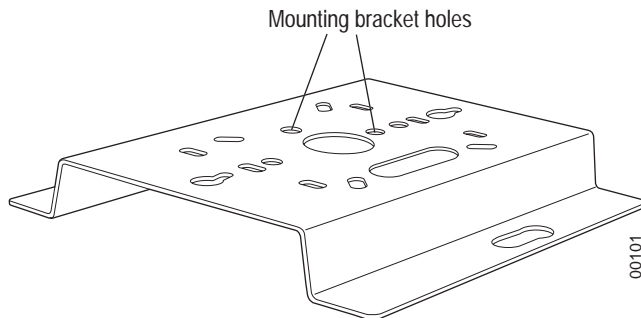
Figure 22: Box Hanger Mounting Bracket Holes

4. Attach the U-joint of the clip to the T-bar and snap in place (see **Figure 23**).
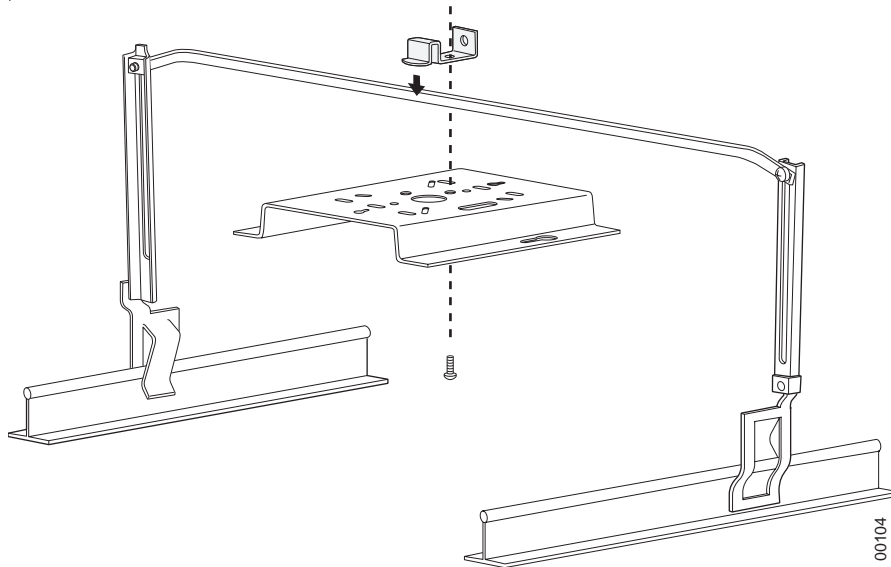
Figure 23: Attaching the Mounting Bracket to the Box Hanger

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 23** 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 20**).

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 19**), 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 15**), point the antenna down, then retighten the ring.

12. Connect one end of the PoE Ethernet cable to the Ethernet connector, shown in **Figure 16**.

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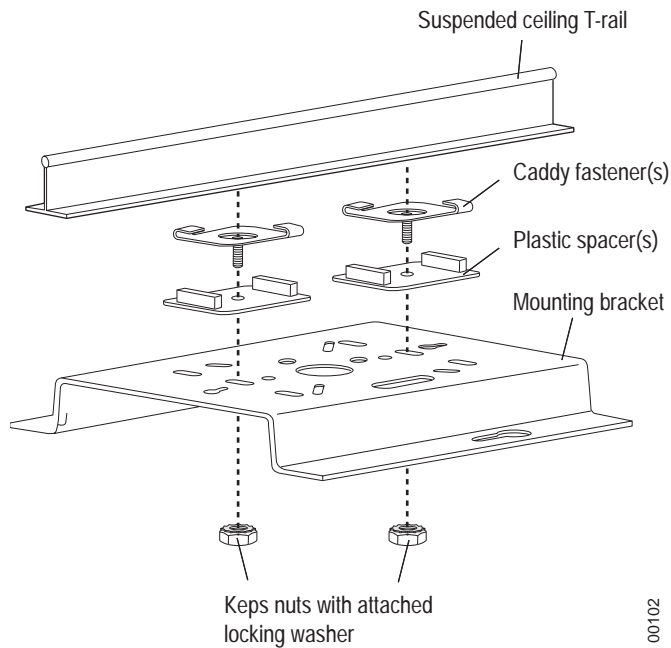
Note: For the IronPoint Mobility Series AP201 and AP208 access point, a shielded Cat 5e (or greater) Ethernet cable must be used in order to comply with international electromagnetic emissions limits.

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 *Foundry IronPoint Mobility Series 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 24**.
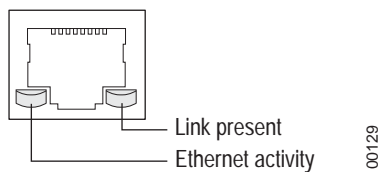
Figure 24: RJ-45 LEDs

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 25**.
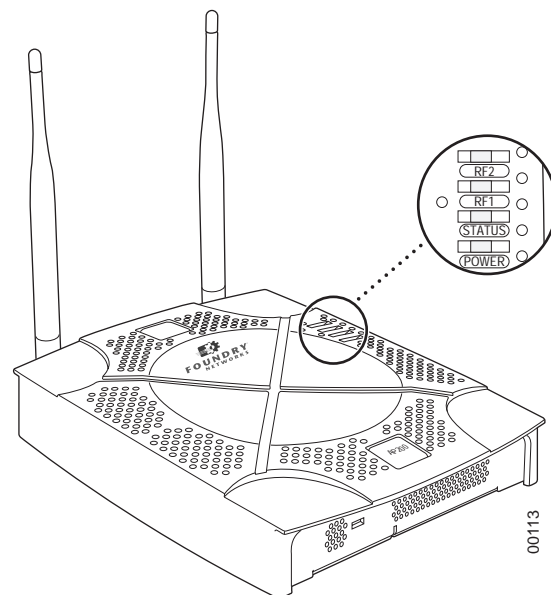
Figure 25: AP200 Status LEDs

The functions of the status LEDs are described in **Table 11**.

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 25**) color reflects the various operating states (**Table 11**).

Table 10: 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 11**)
Power	green—presence of power

Table 11: 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
Remote	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 Foundry technical support	Red (blinking or solid)

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

Chapter 5
Installing the AP150

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

- **Safety Precautions**
- **Unpacking the AP150**
- **Installation Requirements**
- **Installing the Access Points**
- **Where to Go From Here**
- **Checking LED Activity**

Safety Precautions

IMPORTANT—Read and follow the instructions in Appendix , "Regulatory Information" on page 107 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

00177
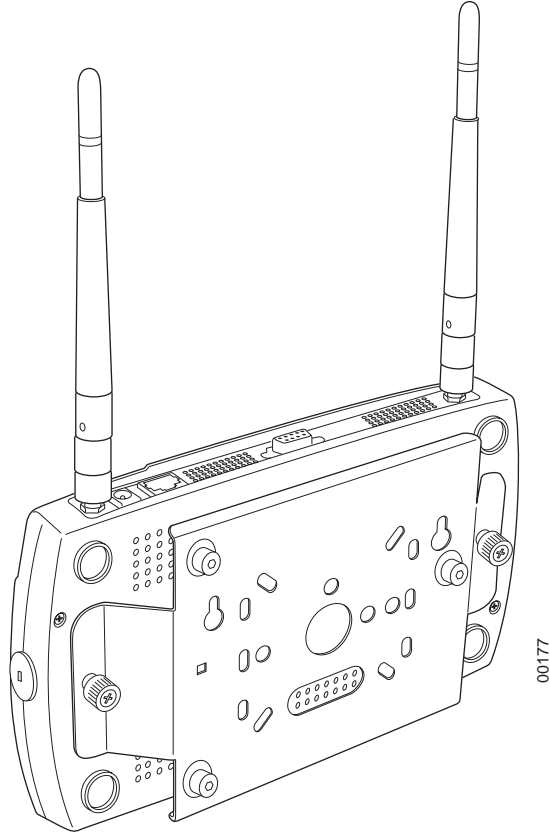
Figure 26: AP150 with Mounting Bracket

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. An array of holes on the mounting bracket (see **Figure 26**) 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 12.

Table 12: 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 in Table 13.

Table 13: AP150 Installation 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:

● 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 27**). 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 27**), point the antenna straight up, then retighten the ring.
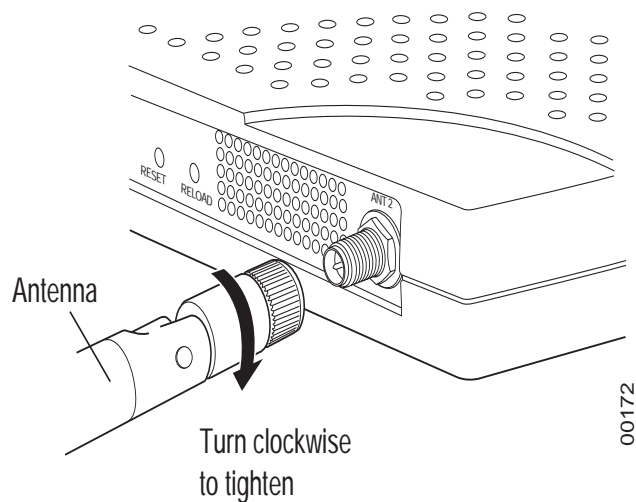
Figure 27: AP150 Antenna Connection

3. Connect one end of the PoE 100BaseT Ethernet cable to the 100/1000 Ethernet connector, shown in **Figure 28**.
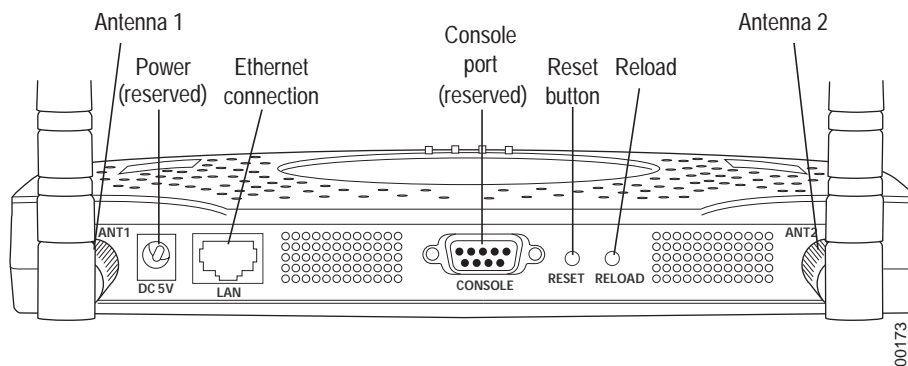
Figure 28: AP150 Connector Panel

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 27**), 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 28**.

Vertical Mounting with the Mounting Bracket

The AP150 uses thumbscrews to attach to the mounting bracket 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 mounting bracket.

To vertically mount an AP:

1. If not mounting the AP150 to a previously 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.

Suspended ceiling
cable access

Wall cable access

00167
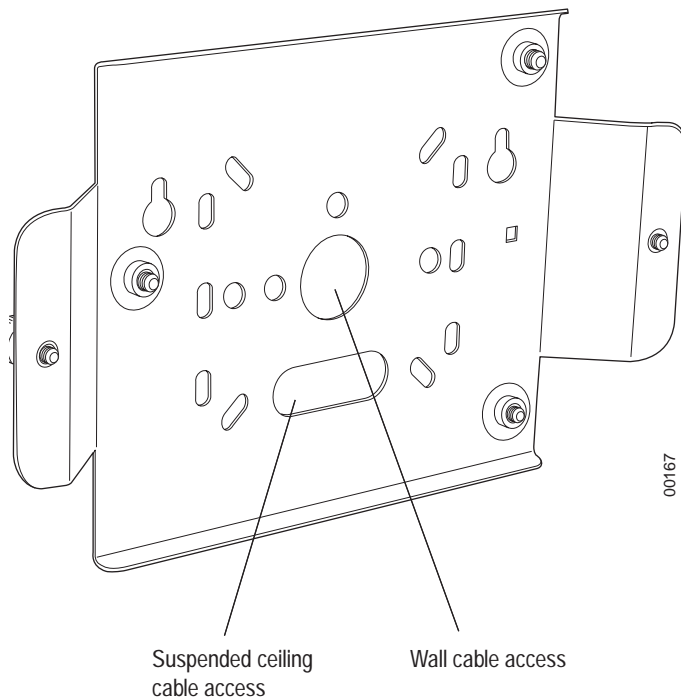
Figure 29: AP150 Bracket

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 30**) and tighten the thumbscrews to attach the bracket.
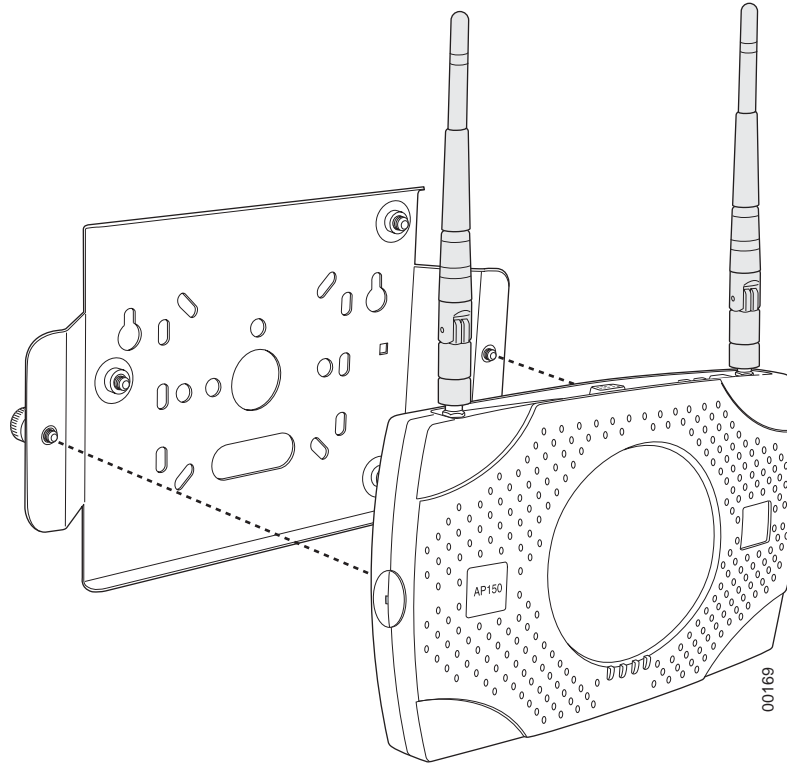
Figure 30: Aligning the AP150 with the Bracket

9. For external antennas, loosen the knurled ring at the base of each antenna (see **Figure 27**), 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 28**.

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 31**).

Note: To comply with NEC code, attach a grounding wire to any of the screws used to attach the AP150 to the mounting bracket.
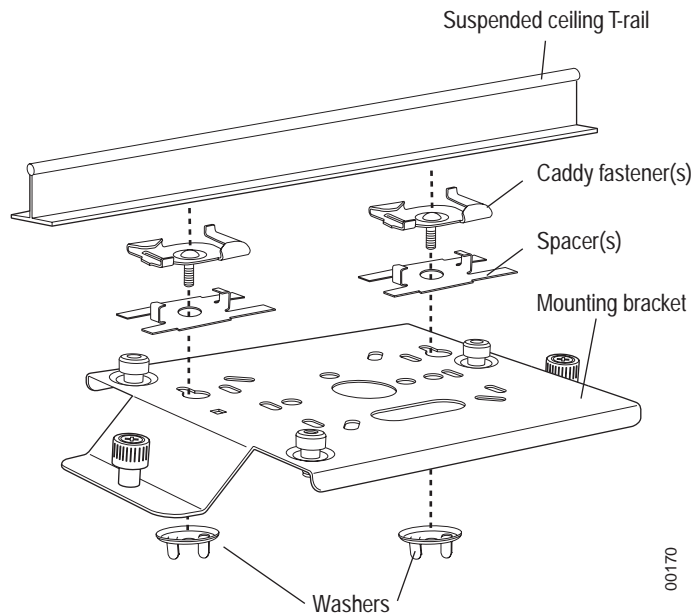
Figure 31: Mounting the AP150 to a Suspended Ceiling Rail

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 30**) and tighten the thumbscrews to attach the bracket.

10. For each antenna, loosen the knurled ring at the base of the antenna (see **Figure 27**), 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 28**).

Where to Go From Here

Now that the AP150 is installed, go to the *Foundry IronPoint Mobility Series 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 AP150.

AP150 Status LEDs

Four status LEDs on the *face* of the AP150 also light, as shown in **Figure 32**.
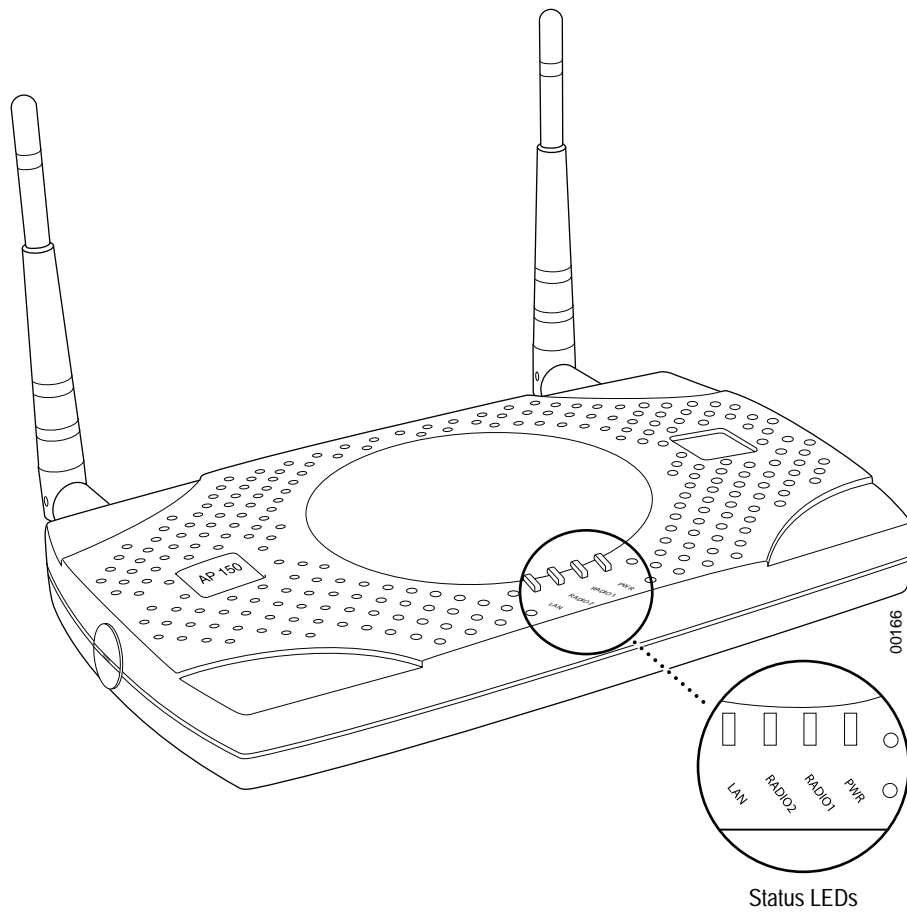
Status LEDs

Figure 32: 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 32**) color reflects the various operating states (**Table 14**).

Table 14: 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

Chapter 6
Installing the OAP180

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

- **Safety Precautions**
- **Unpacking the OAP180**
- **Installation Requirements**
- **Installing the IronPoint Mobility Access Pointss**
- **Where to Go From Here**
- **Checking LED Activity**

Safety Precautions

IMPORTANT—Read and follow the instructions in Appendix , "Regulatory Information" on page 107 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.

If the installation requires a different supply than the one supplied, make sure you use a supply displaying the mark of the safety agency that defines the regulations of the supply in your country."

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

Unpacking the OAP180

Figure 33: OAP180 Outdoor Access Point

Top panel view

Bottom panel view

Console
Port Cover
Attachment

N-Type External
Antenna Connector
(5 GHz)

N-Type External
Antenna Connector
(2.4 GHz)

Console
Port

Ethernet/PoE
Connector

Water-Tight
Test Point
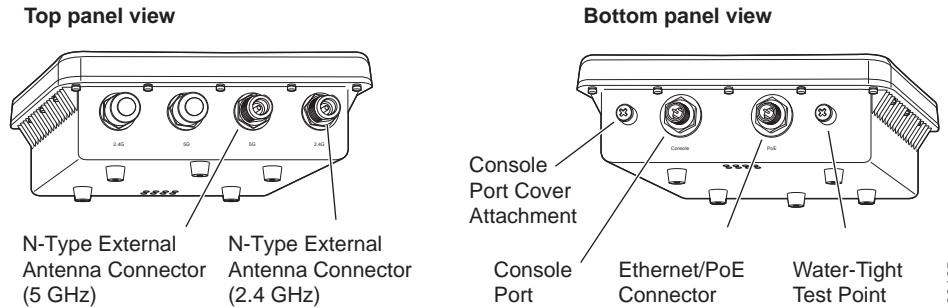
Confirm that the OAP180 shipping boxes contain the following items:

- 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 Foundry, 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 IronPoint Mobility Access Pointss

Selecting a Location

When you plan the OAP180 physical configuration, include the elements shown in this drawing:
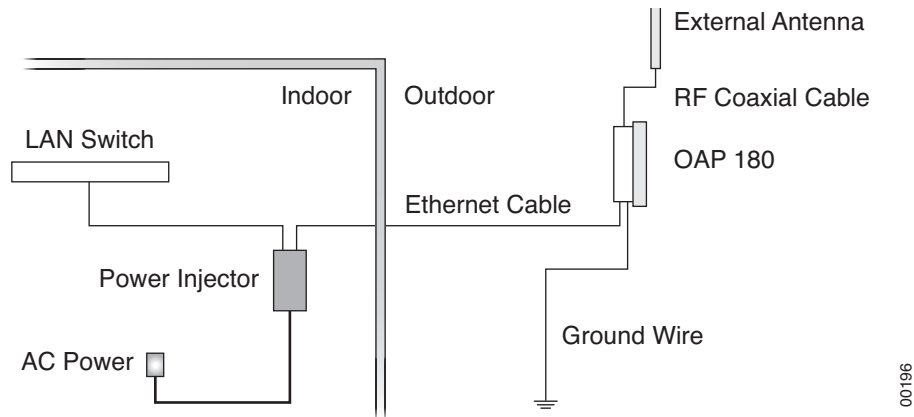
Figure 34: Sample Physical Layout

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 35: Square Mounting Bracket Attaches to Bottom of OAP180

Attach the adjustable rectangular plate to the bridge with supplied screws

00199
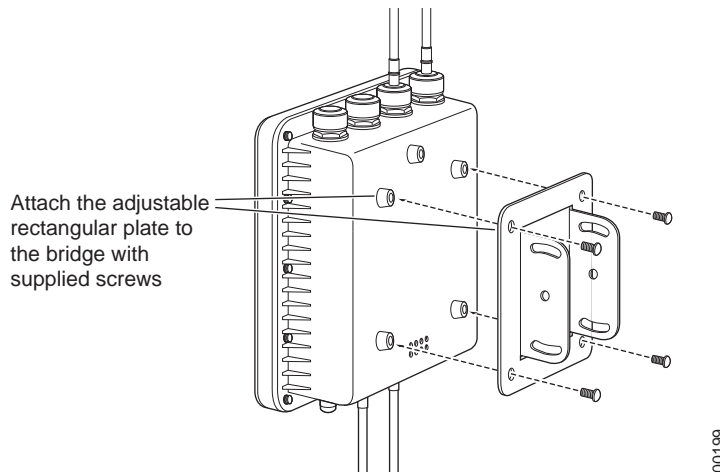
2. Place the V-shaped part of the bracket around the pole and tighten the securing nuts just enough to hold the bracket to the pole. (The bracket may need to be rotated around the pole during the alignment process.)

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

Figure 36: Brackets Attached to a Pole

Attach the bridge with bracket to affixed plate on pole

00201
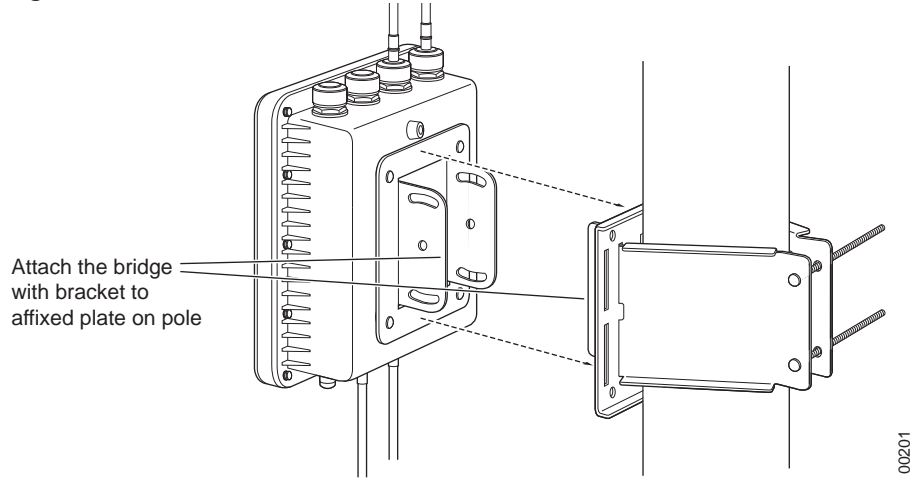
3. Use the included nuts to tightly secure the wireless OAP180 to the bracket.

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.
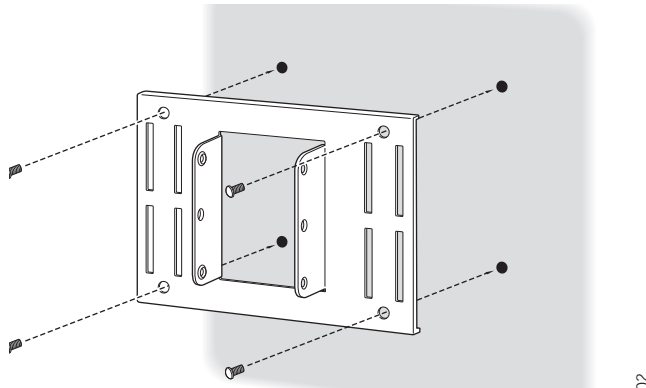
3. Use the included nuts to tightly secure the OAP180 to the bracket.

4. Connect the two brackets as shown below.
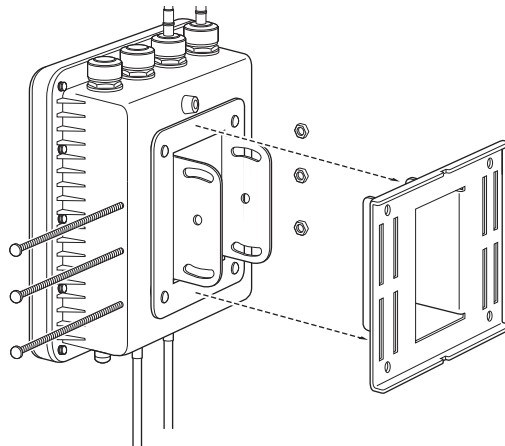
00203

Connect Antennas and Ground Wire to OAP180

Nine antennas are supported for the OAP180. The supported antennas are:

- MN-ACC-ANT-BG08O-NM 802.11 b/g 8 dBi Omni-Directional Antenna, 2400 - 2500GHz (N Male)

- MN-ACC-ANT-BG08O-NF 802.11 b/g 8 dBi Omni-Directional Antenna, 2400 - 2500GHz (N Female)

- MN-ACC-ANT-BG18P-NF 802.11 b/g 18 dBi High Gain Panel Directional Antenna, 2400 - 2500GHz (N Female)

- MN-ACC-ANT-BG10S-NF 802.11 b/g 10 dBi High Gain Sector Antenna, 2400 - 2500GHz (N Female)

- MN-ACC-ANT-A08O-NM-1 802.11a 8 dBi Omni-Directional Antenna, 5150 - 5350GHz (N Male)

- MN-ACC-ANT-A08O-NM-2 802.11a 8 dBi Omni-Directional Antenna, 5470 - 5875GHz (N Male)

- MN-ACC-ANT-A08O-NF 802.11a 8 dBi Omni-Directional Antenna, 4900 - 5350GHz (N Female)

- MN-ACC-ANT-A23P-NF 802.11a 23 dBi High Gain Directional Panel, 5150 - 5875GHz (N Female) *

- MN-ACC-ANT-A13S-NF 802.11a 13 dBi High Gain 120-degree Sector Antenna, 4900-5150/5150-5875GHz (N Female)

* Not supported for the DFS bands 5.25 - 5.35 GHz and 5.47 - 5.725 GHz

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 37: Connect the Antenna Cables
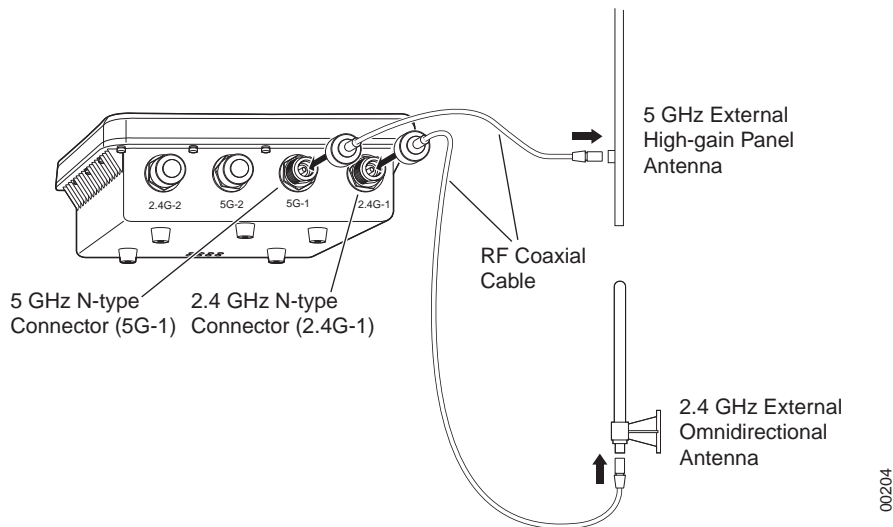
4. Apply weatherproofing tape to the antenna connectors to help prevent water entering the connectors.

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.

Console Port   PoE (Ethernet) Port

Ethernet
Cable

Ground Wire

00205
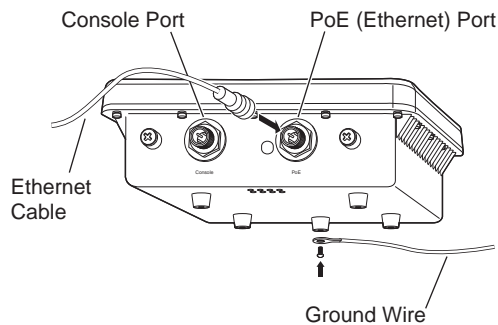
2. For extra protection against rain or moisture, apply weatherproofing tape (not included) around the Ethernet connector.

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.

AC power

Ethernet cable
from LAN switch

Input   Output

Power LED indicator

Ethernet cable to
wireless bridge

00206
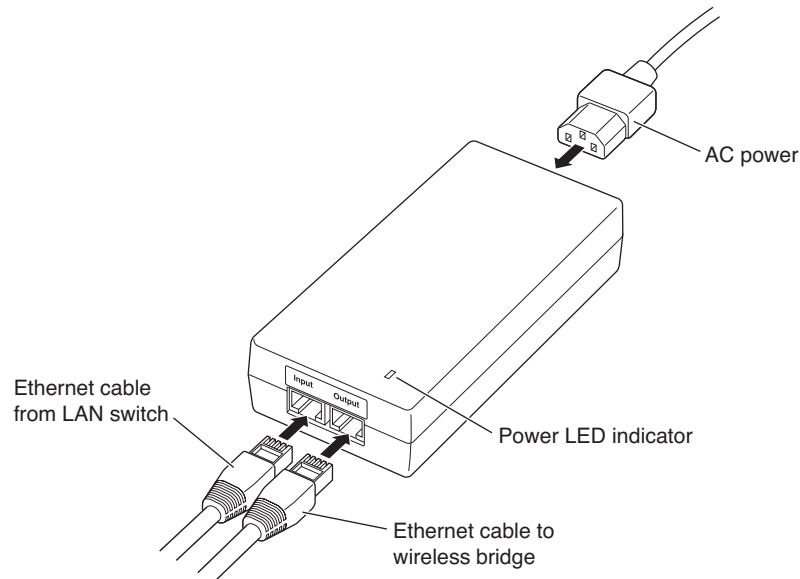
2. Connect a straight-through unshielded twisted-pair (UTP) cable (not included) from a local LAN switch to the RJ-45 port labeled *Input* on the power injector. See the illustration above. Use Category 5e or better UTP cable for 10/100BASE-TX connections.

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.

Where to Go From Here

Now that the AP300 is installed, go to the *Foundry IronPoint Mobility Series 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 *Foundry IronPoint Mobility Series Configuration Guide* for instructions on configuring radio band, dual radio, and external antenna operation.

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.
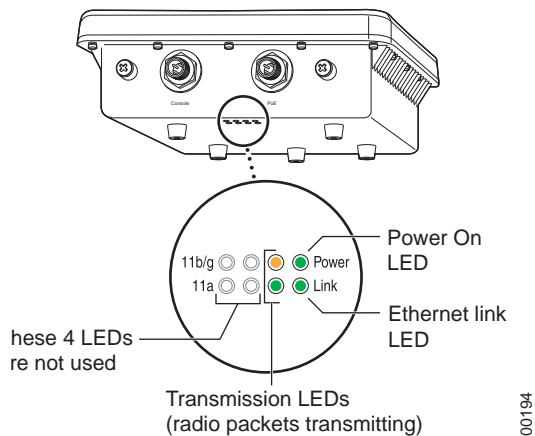
Figure 38: OAP180 LEDs

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.

Table 15: Antenna Gain

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

Antenna	Gain
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

Chapter 7
Installing the RS4000 Radio Switch

This chapter describes how to physically install RS4000 Radio Switch. It contains the following sections:

- **Safety Precautions**
- **Unpacking the RS4000**
- **Installation Requirements**
- **Installing the RS4000**
- **Where to Go From Here**
- **Checking LED Activity**

Safety Precautions

IMPORTANT—Read and follow the instructions in Appendix , "Regulatory Information" on page 107 before installing and operating this product.

Unpacking the RS4000

Confirm that the RS4000 shipping package contains the following items:

- RS4000
- 180-degree directional antenna or omni-directional antenna
- Two 3-foot antenna cables
- One 3-inch mounting arm (includes wall mount base and ceiling rail base)
- Mounting bracket
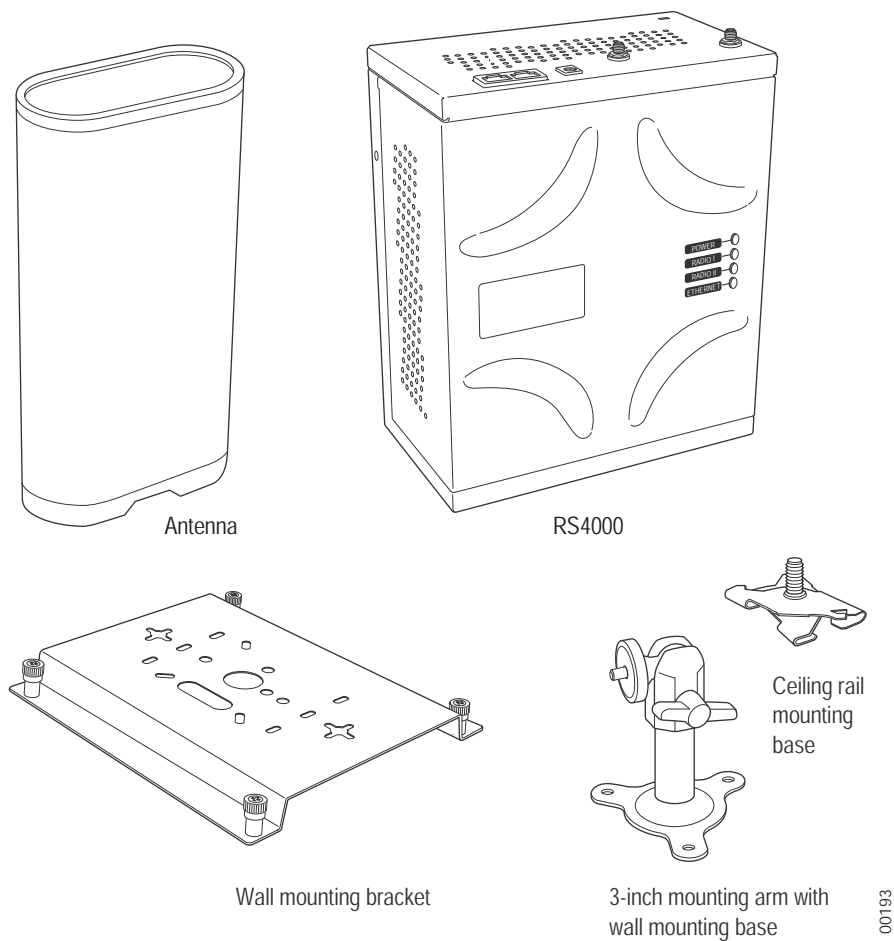
Figure 39: RS4000 Package Contents

Installation Requirements

The following prerequisites and system requirements must be met:

- 2 IEEE 802.3 PoE connections— one to each Ethernet port, yielding a maximum power specification of 11W per port, 22W total for the RS4000
- Network switch for connecting all networking components

The RS4000 requires a location that meets the following:

- A location to mount the antenna within 6′ of the RS4000 and with relatively unobstructed access to the client stations
- Power over Ethernet (PoE) connection to the network switch servicing the RS4000

The RS4000 obtains power from 802.3af standard Power over Ethernet (PoE)-compatible network switch or PoE power injector installed between the switch and the RS4000. At least one PoE connection must be connected.

Select a location with minimal physical obstructions between the RS4000 antenna and the wireless stations. In many cases, mounting the RS4000 antenna on the wall near the ceiling provides the least obstructed communications path.

Most installations receive the best coverage using the following guidelines:

- Do not install the antenna 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 antenna accordingly.

The RS4000 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.

You need the tools listed in **Table 16**.

Table 16: RS4000 Installation Tools

Installation Type	Tools Required
Vertical mounting over a wall stud	- Drill 1/8"drill bit - Screwdriver (Optional) Pliers
Vertical mounting on sheetrock	- Drill 3/16" drill bit - Screwdriver (Optional) Pliers
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	- Two T-rail clips - One T-box hanger - One bracket mounting clip - Mounting bracket

Optimum Antenna Positioning and Placement

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.

Installing the RS4000

Mounting the RS4000

You can mount the RS400 in the following ways:

- **Wall Mounting the RS4000**
- **Mounting Below a Suspended Ceiling**
- **Mounting Above a Suspended Ceiling**
- **Placing and Positioning the Antenna**

Wall Mounting the RS4000

The RS4000 can be mounted to any type of solid wall (including ceiling walls) using the supplied wall mount bracket. The bracket also allows for junction box mounting.

✔ **Note:** The RS4000 has a security cable slot so you can secure the RS4000 with a standard security cable (for example, Kensington cable locks), such as are used to secure laptop computers.

To wall mount an RS4000:

1. Remove the bracket from back side the RS4000, if it is attached, by unscrewing each of the 4 knurled thumbscrews (see **Figure 40**).

Figure 40: Bracket Attached to RS4000

2. Choose the location on the wall where the RS4000 will be mounted. The RS4000 can be oriented in any direction, but it is probably more convenient if the SMA antenna mounts are at the top. This orientation is more convenient for reading LED status.

3. Using the bracket holes as a template, mark the location on the wall for the two RS4000 bracket mounting screws. They are placed 5 25/32" (147mm) 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.

✔ **Note:** The RS4000 mounting bracket provides holes to accommodate many types of common installations such as over a junction box, etc. This procedure describes only the standard wall mount.

4. 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

5. If you are using plastic anchors, install them in the holes.

6. Screw in the screws most of the way, so that the screw head is about 1/16 of an inch from the wall.

7. Mount the bracket on the screws, placing the circular portion of the keyhole mounts over the screw heads and sliding the bracket down.

Wall mounting bracket (attached to wall)

Captive screws (4)

RS4000

00186
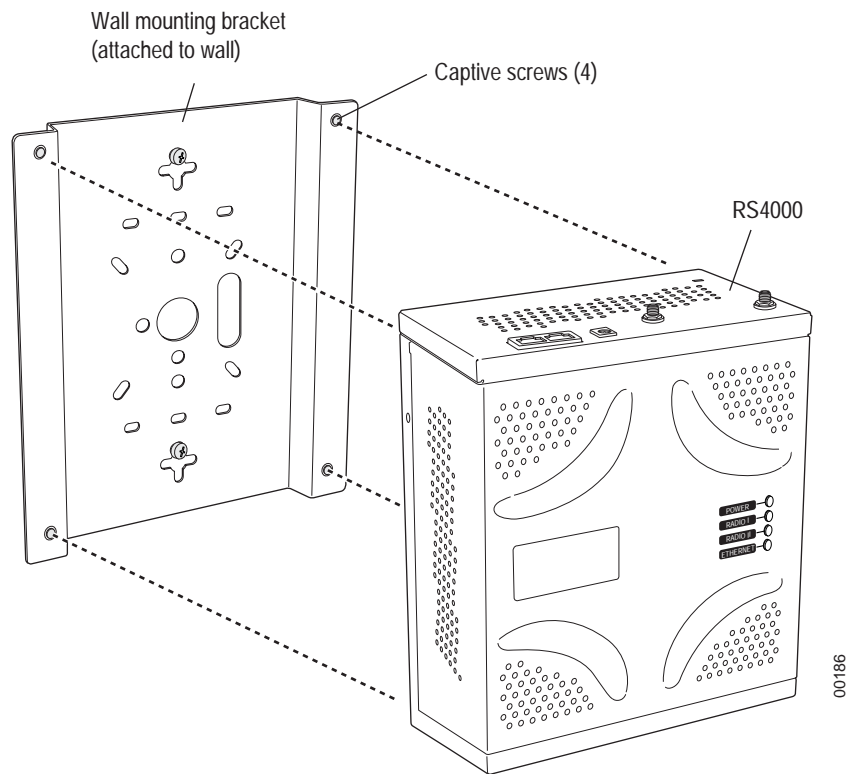
Figure 41: RS4000 Bracket Mounting

8. Tighten the bracket captive screws to secure the RS4000 to the bracket.

9. On the RS4000, attach the two antenna cables to the SMA antenna connectors labeled **ANT1** and **ANT2** on the top panel of the RS4000 (see **Figure 42**) by turning the cable ends clockwise until tight.
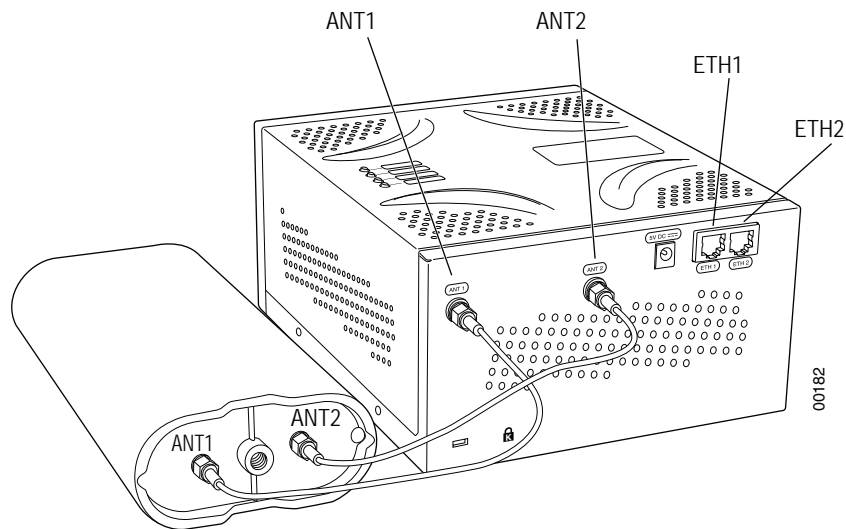
Figure 42: RS4000 with Antenna Attached

10. Attach at least one Ethernet cable to the Ethernet port labeled ETH1 and optionally to ETH2 on the top panel of the RS4000. If just ETH1 is connected, only two of the four radios will be active.

11. Align the RS4000 to the bracket (against the wall) and tighten the four knurled thumbscrews until secure. If necessary, apply extra tightening with pliers.

12. Attach the antenna cables to the antenna, as described in "Placing and Positioning the Antenna."

13. Connect the two Ethernet cables to the PoE device.

14. Apply power to the PoE component and network switch to power up the RS4000.

15. Verify correct operating using the LEDs, as shown in "**Checking LED Activity**."

Mounting Below a Suspended Ceiling

The optional suspended ceiling mounting kit allows the RS4000 mounting bracket to attach to suspended ceiling T-rails (see **Figure 43**).

✓ **Note:** To comply with NEC code, attach a grounding wire to any of the screws used to attach the RS4000 to the mounting bracket.
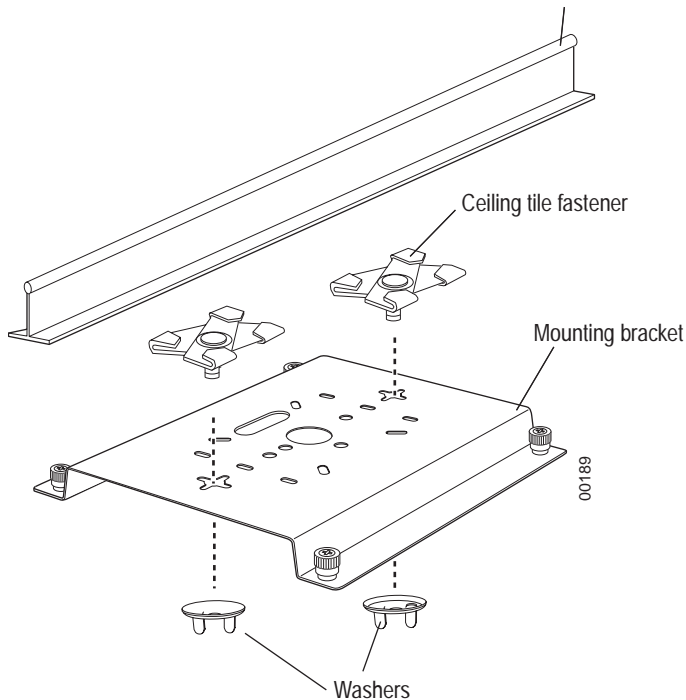
Figure 43: Mounting the RS4000 Below a Suspended Ceiling Rail

To mount an RS4000 below a suspended ceiling:

1. Determine the location on the ceiling rail where the RS4000 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 RS4000 to the narrow end of the hole.

7. Attach a keps nut to each caddy fastener stud and hand tighten. Do not overtighten.

8. On the RS4000, attach the two antenna cables to the SMA antenna connectors labeled `ANT1` and `ANT2` on the top panel of the RS4000 (see **Figure 42**) by turning the cable ends clockwise until tight.
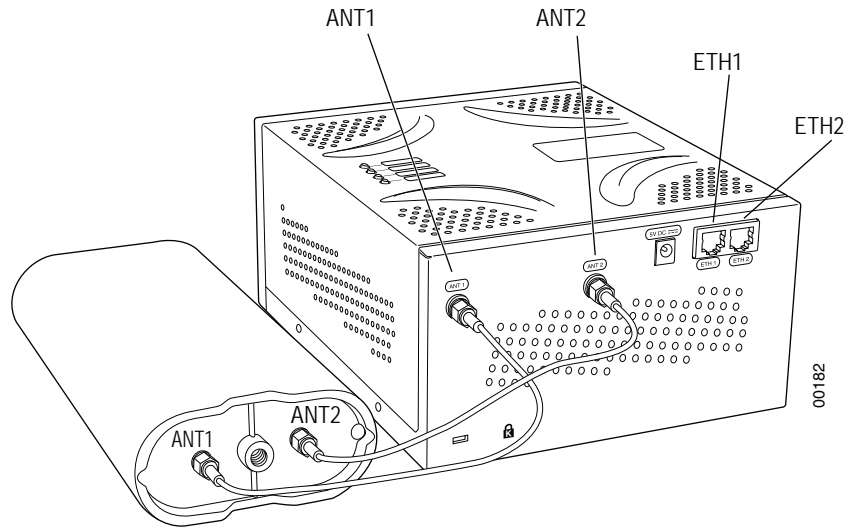
Figure 44: RS4000 with Antenna Attached

9. Attach at least one Ethernet cable to the Ethernet port labeled `ETH1` and optionally to `ETH2` on the top panel of the RS4000. If just ETH1 is connected, only two of the four radios will be active.

10. Align the RS4000 to the bracket and tighten the four knurled thumbscrews until secure. If necessary, apply extra tightening with pliers.

11. Attach the antenna cables to the antenna, as described in "Placing and Positioning the Antenna."

12. Connect the two Ethernet cables to the PoE device.

13. Apply power to the PoE component and network switch to power up the RS4000.

14. Verify correct operating using the LEDs, as shown in "**Checking LED Activity**."

Mounting Above a Suspended Ceiling

The optional T-bar box hanger mounting kit allows the RS4000 to be mounted above suspended ceiling T-rails (see **Figure 45**). The installation attaches the T-bar box hanger to the ceiling rails using clips. The RS4000 attaches to the mounting bracket that is attached to the T-bar box hanger.

✔ **Note:** The RS4000 and its antenna meet 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.

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

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).
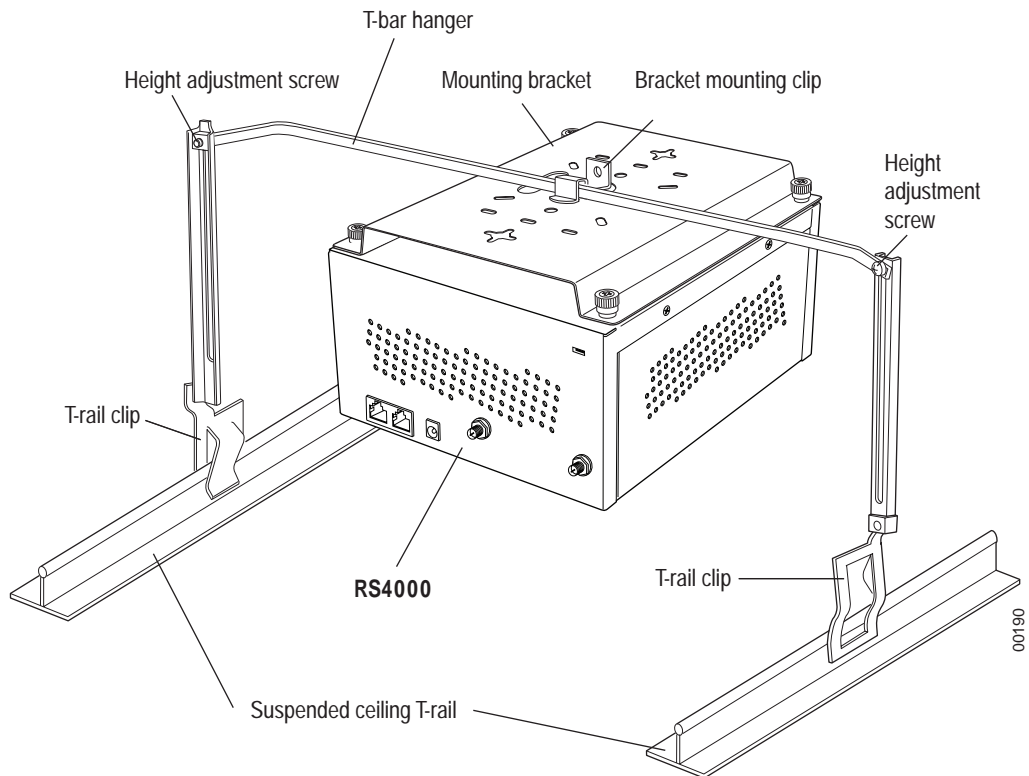

Figure 45: Mounting the RS4000 Above a Suspended Ceiling

To mount an RS4000 above suspended ceiling rails:

1. Determine the location on the ceiling rails where the RS4000 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 46**). One hole attaches the bracket perpendicular to the box hanger. The other mounts the bracket parallel to the box hanger.

Mounting bracket holes

00191
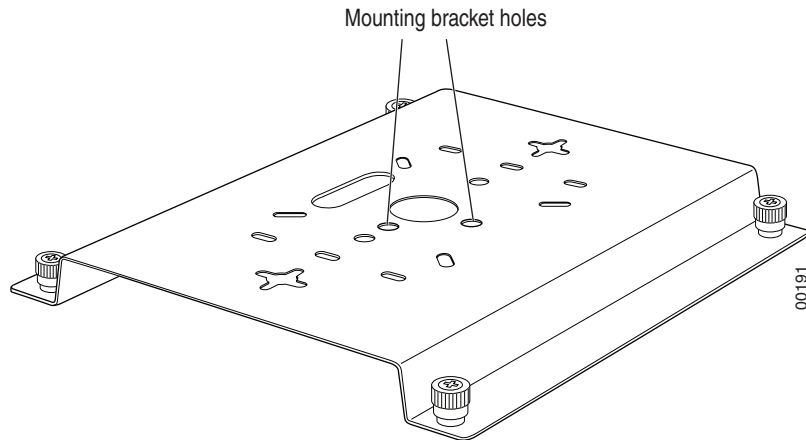
Figure 46: Box Hanger Mounting Bracket Holes

4. Attach the U-joint of the clip to the T-bar and snap in place (see **Figure 47**).

00192
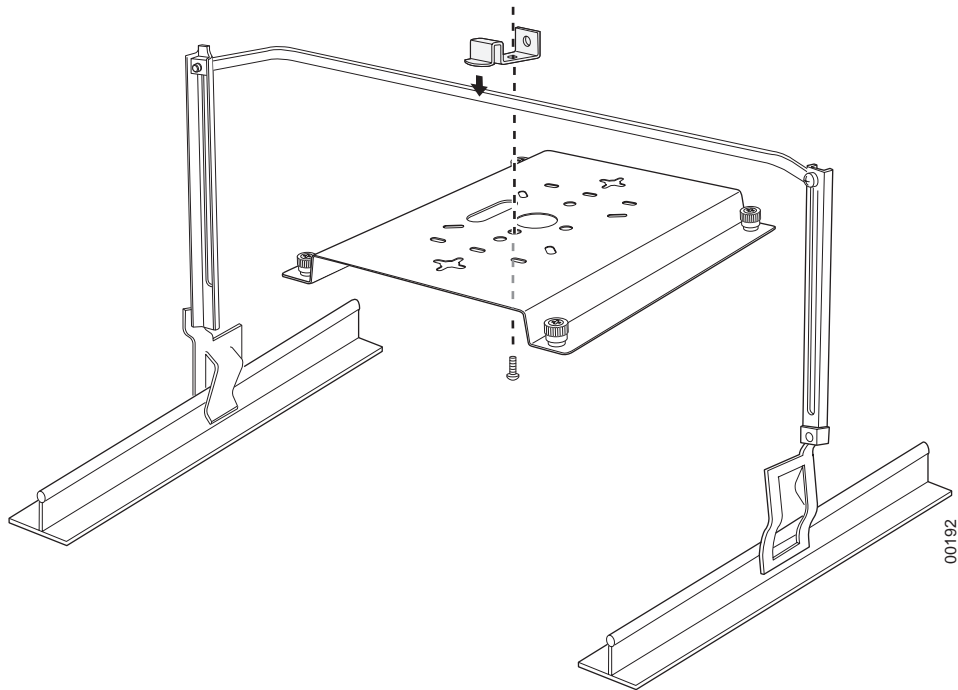
Figure 47: Attaching the Mounting Bracket to the Box Hanger

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 47** for orientation).

6. Hold the RS4000 next to the mounting bracket to estimate the height of the T-bar box hanger to provide enough clearance between the RS4000 and the ceiling.

7. Adjust the height of the box hanger using the height adjusting screws (see **Figure 47**).

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. Align the RS4000 to the bracket and tighten the four knurled thumbscrews until secure. If necessary, apply extra tightening with pliers.

11. On the RS4000, attach the two antenna cables to the SMA antenna connectors labeled `ANT1` and `ANT2` on the top panel of the RS4000 (see **Figure 42**) by turning the cable ends clockwise until tight.
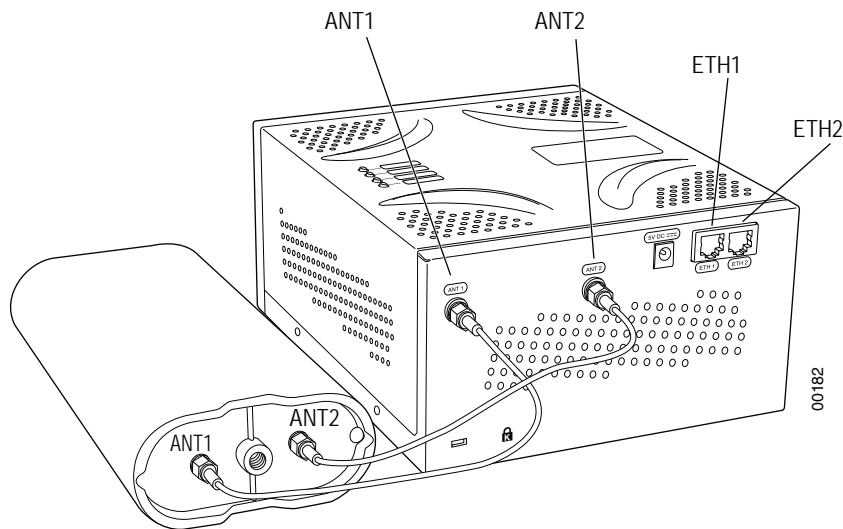
Figure 48: RS4000 with Antenna Attached

12. Attach at least one Ethernet cable to the Ethernet port labeled `ETH1` and optionally to `ETH2` on the top panel of the RS4000. If just ETH1 is connected, only two of the four radios will be active.

13. Attach the antenna cables to the antenna, as described in "Placing and Positioning the Antenna." The antenna can also be mounted within the plenum space if need be.

14. Connect the Ethernet cables to the PoE device.

15. Apply power to the PoE component and network switch to power up the RS4000.

16. Check that the RS4000 is operating correctly before replacing the ceiling tile to the ceiling. Verify correct operating using the LEDs, as shown in "**Checking LED Activity**."

Placing and Positioning the Antenna

The RS4000 antenna should be mounted to the wall using the 3" mounting arm within 3' of the RS4000 when using the supplied 3-foot cables or 6' when using the optional 6-foot cables.

Direction of Signal Coverage

00179

ANT2

ANT1
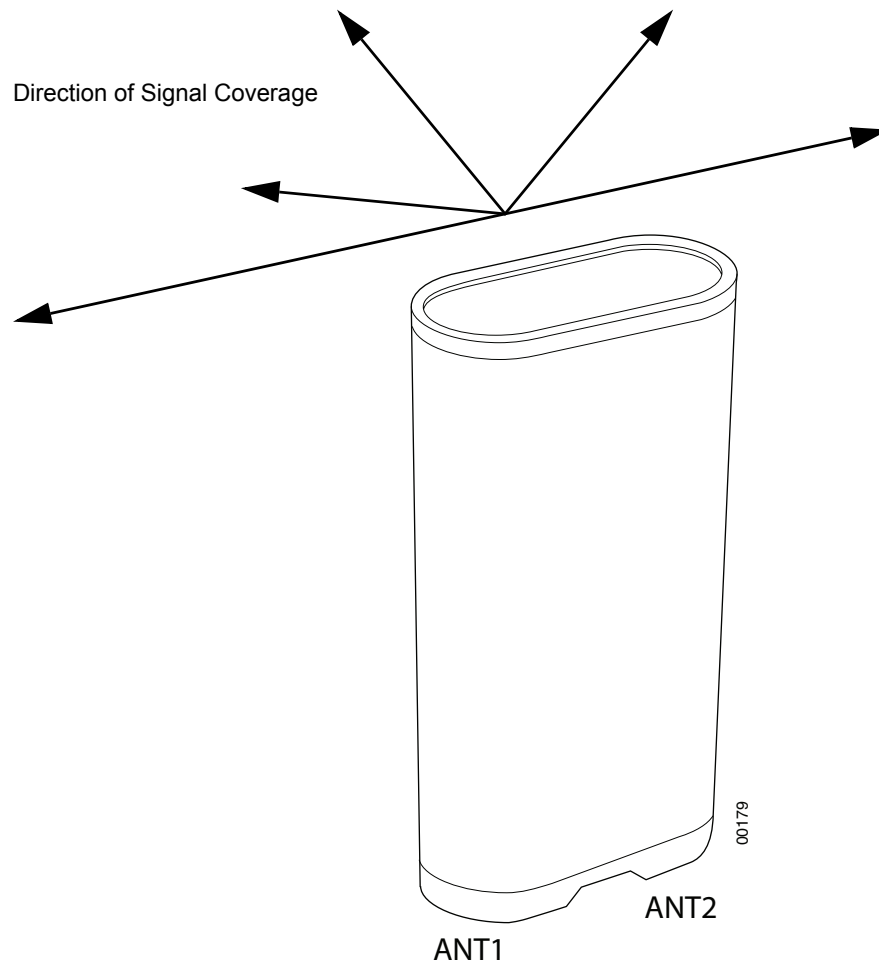
Figure 49: RS4000 180° Directional Antenna

The antenna mount arm includes two screw-in base types to accommodate either wall mounts (**Figure 50**) or ceiling tile rail mounts (**Figure 51**).
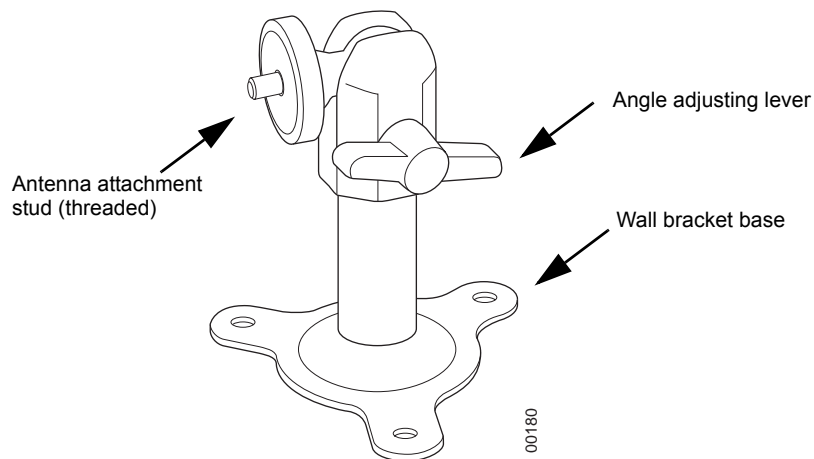
Figure 50: Antenna Mounting Arm with Wall Bracket (shown attached)
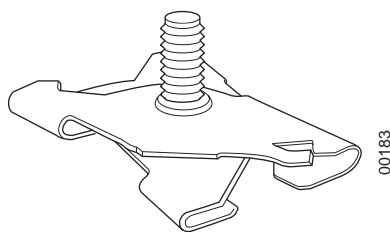
Figure 51: Antenna Ceiling Tile Rail Base

The RS4000 antenna uses two RF cables (3-foot cables are supplied) to connect to the SMA connectors on the top panel of the RS4000 (see **Figure 42**). The RF cables should be attached to the RS4000 as a result of the procedures described in one of the previous installation procedures.

Mount the antenna and connect the cables as described in the following:

1. Choose whether to hang the arm on a wall (including solid ceiling wall) or ceiling tile rail.

   — For wall or ceiling mount:

   a. Using the screwholes in the mounting bracket as a template, mark and drill holes into the wall.

   b. Attach the bracket securely with three 1/4" diameter fasteners or one 5/16" diameter and one 1/4" diameter fastener, if mounting to a wall stud (fasteners are not supplied).

   — For ceiling tile rail mount:

   a. Pull apart the rail clamps so the ears can fit over the width of the ceiling rail.

   b. Squeeze the rail clamp to attach to the ceiling rail.

    c. Attach the rail mount base to the antenna arm by screwing the base into the arm pole (you may have to unscrew and remove the wall mount base if it is attached to the arm).

2. Connect the RF antenna wires from the RS4000 to the SMA connectors on the top of the antenna, using **Figure 42** or **Figure 49** for orientation.

3. Attach the top of the antenna to the 1/4-20 threaded stud on the swivel head and tighten against the antenna.

4. For a 180° directional antenna, position the antenna such that the logo on the top of the antenna is pointing in the direction where reception is required.

5. Loosen the angle adjusting lever on the swivel assembly, if necessary, to adjust the hanging angle.

6. Position the antenna to maximize the reception and tighten the adjusting lever.

Where to Go From Here

Now that the AP300 is installed, go to the *Foundry IronPoint Mobility Series 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

Radio switch status LEDs are provided on the face of the RS4000.

RS4000 Status LEDs

Status LEDs on the face of the RS4000 light, as shown in **Figure 52**.
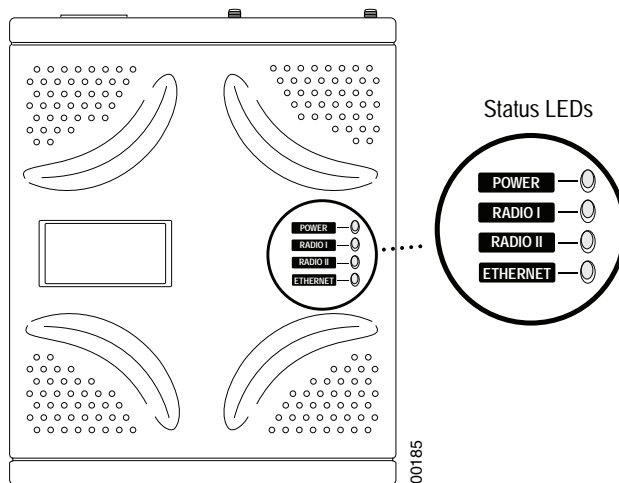
Figure 52: RS4000 Status LEDs

The RS4000 uses 4 LEDs. The functions of the status LEDs are described in **Table 17**.

Table 17: RS4000 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

Appendix A
Specifications

This chapter provides specifications for IronPoint Mobility Access Points and contains the following sections:

- **Wireless Interface**
- **Ethernet Interface**
- **Physical**

Wireless Interface

Table 18: 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 IronPoint Mobility Access Points are provided in the access point Data Sheet.

Appendix B
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
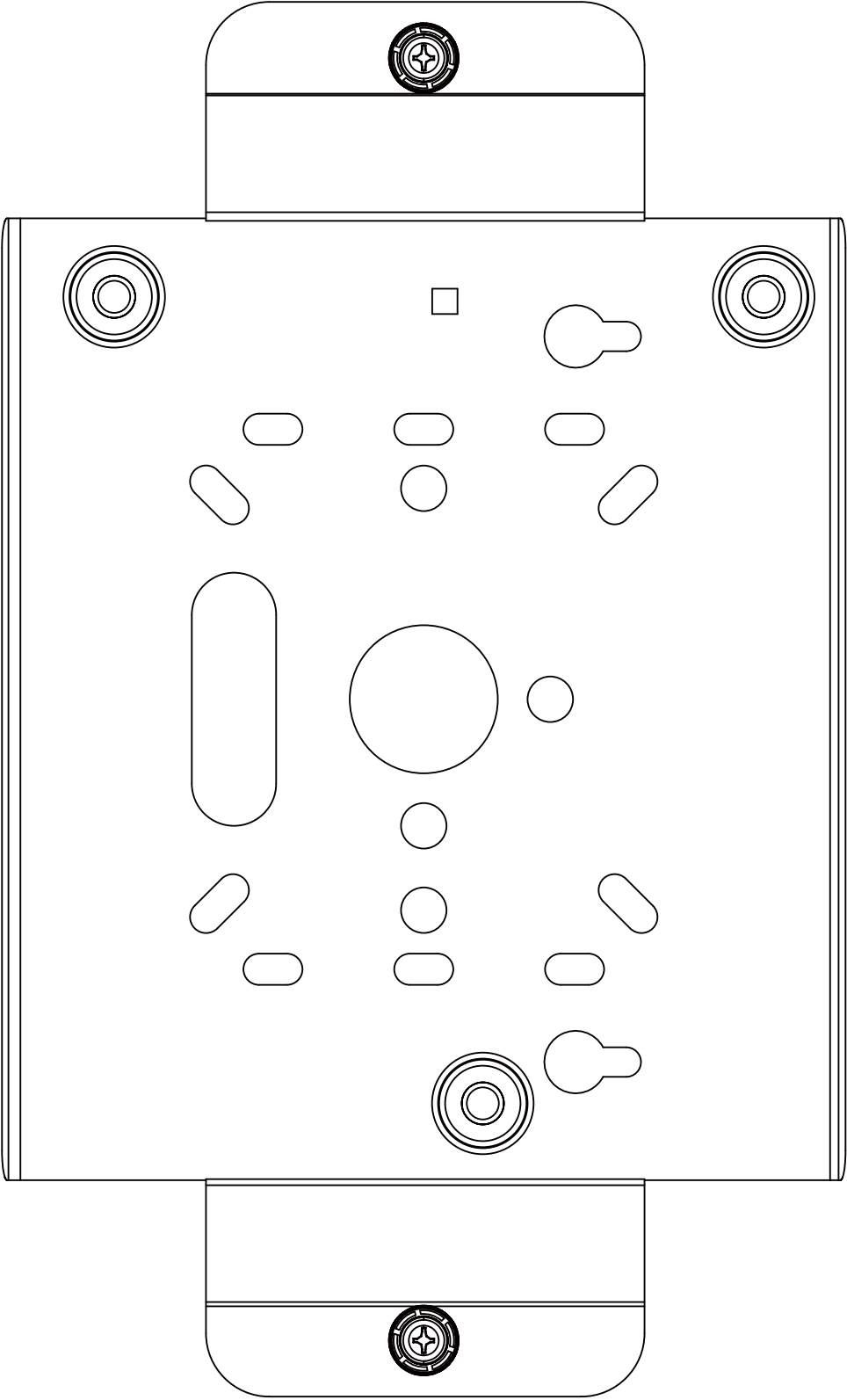
AP300 Rev B Mounting Bracket Stencil

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
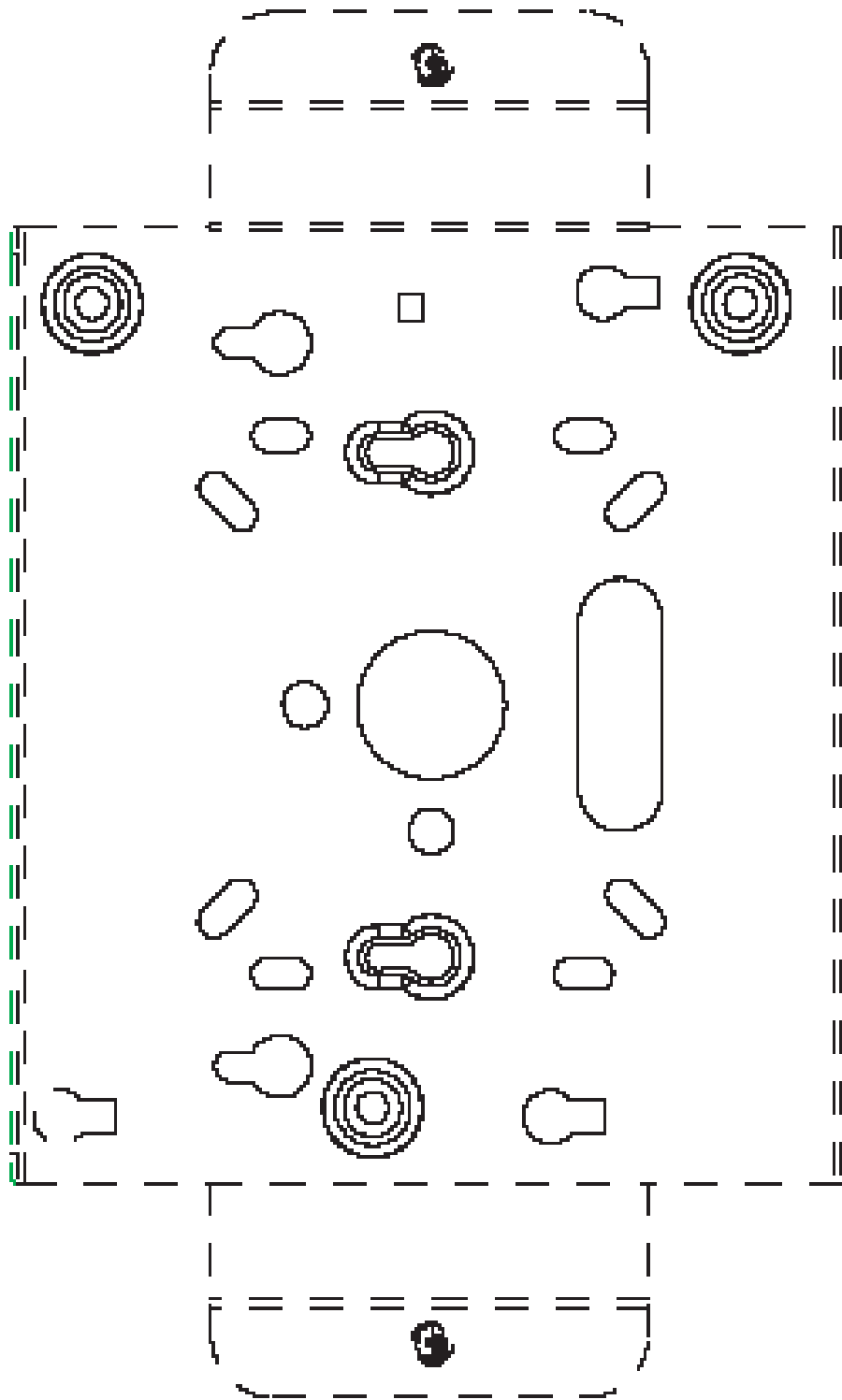
Appendix C
Cautions and Warnings

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 IronPoint Mobility 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 Foundry Networks liegt weit unter den Hochfrequenz-Expositionsgrenzwerten der FCC. Die IronPoint Mobility Access Point Zugangspunkte von Foundry Networks 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 Foundry Networks est très inférieure aux limites d'exposition aux fréquences radio définies par la FCC. Toutefois, les points d'accès de la série IronPoint Mobility Access Point de Foundry Networks 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 Foundry Networks está muy por debajo de los límites de exposición a radiofrecuencia estipulados por la FCC. No obstante, los puntos de acceso de la serie IronPoint Mobility Access Point de Foundry Networks 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 local-izada 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.

Caution!   It is important that you review the contents of Regulatory Information before performing the RS4000 installation.

Vorsicht!   Es ist wichtig, dass Sie vor der Durchführung der RS4000-Installation mit dem Inhalt von Appendix , "Regulatory Information" vertraut sind.

Mise en garde   Il est important de consulter le contenu de l'Annexe B, " Informations réglementaires" (Appendix , "Regulatory Information") avant l'installation du RS4000.

Precaución!   Es importante que usted revise los contenidos del Apéndice B, "Información sobre la normativa" (Appendix , "Regulatory Information") antes de efectuar la instalación de la unidad RS4000.

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 D
Regulatory Information

The IronPoint Mobility 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. Foundry Networks 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 Foundry Networks The correction of interference caused by such unauthorized modification, substitution or attachment is the responsibility of the user. Foundry Networks 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 AP200 series, the OAP180, and the RS4000, 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 Foundry devices is well below the FCC radio frequency exposure limits. However, the IronPoint Mobility Access Points 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 Foundry-supplied line filter. Contact Foundry Support to obtain a line filter, free of charge.
- AP300 series
- RS4000

Interference Statement

Note:

IronPoint Mobility Access Points

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 IronPoint Mobility 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 Foundry Networks 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.

Europe—EU Declaration of Conformity and Restrictions

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.

Marking by the alert symbol indicates that usage restrictions apply.

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

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

Hierbij verklaart Foundry Networks 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 Foundry Networks dat deze Access Points voldoet aan de essentiële eisen en aan de overige relevante bepalingen van Richtlijn 1999/5/EC.

Par la présente, Foundry Networks 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, Foundry Networks 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 Foundry Networks att denna Access Points står I överensstämmelse med de väsentliga egenskapskrav och övriga relevanta bestämmelser som framgår av direktiv 1999/5/EG.

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

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

Con la presente Foundry Networks 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 Foundry Networks declara que el Access Points cumple con los requisitos esenciales y cualesquiera otras disposiciones aplicables o exigibles de la Directiva 1999/5/CE.

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

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

Käesolevaga kinnitab Foundry Networks seadme Access Points vastavust direktiivi 1999/5/EÜ põhinõuetele ja nimetatud direktiivist tulenevatele teistele asjako-hastele sätetele.

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

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

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

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

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

Niniejszym, Foundry Networks, 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 IronPoint Mobility 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 208 Rev 2 Module

003NY070390000   003GZ070080000   003WY070100000

Model AP208 Rev 2

003NY070380000   003GZ070070000   003WY070090000

Model AP201 Rev 2

003NY070380000   003GZ070070000   003WY070090000

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.

Appendix E

Channels

This appendix provides the access point radio channels supported by the world's regulatory domains.

This appendix contains the following section:

- **Channels**

Channels

IEEE 802.11a

The channel identifiers, channel center frequencies, and regulatory domains of each IEEE 802.11a 20-MHz-wide channel are listed in **Table 19**.

✔ **Note:** All channel sets are restricted to indoor usage except the Americas, which allow for indoor and outdoor use on channels 52 through 64 in the United States.

Table 1: IEEE 802.11a Channels

Channel Number	Frequency in MHz	Regulatory Domains	
		Americas	Japan
34	5170	-	X
36	5180	X	-

Table 1: IEEE 802.11a Channels (Continued)

Channel Number	Frequency in MHz	Regulatory Domains	
		Americas	Japan
38	5190	-	X
40	5200	X	-
42	5210	-	X
44	5220	X	-
46	5230	-	X
48	5240	X	-
52	5260	X	-
56	5280	X	-
60	5300	X	-
64	5320	X	-
149	5745	X	-
153	5765	X	-
157	5785	X	-
161	5805	X	-
165	5825	X	-

IEEE 802.11b/g

The channel identifiers, channel center frequencies, and regulatory domains of each IEEE 802.11b/g 22-MHz-wide channel are listed in **Table 20**.

	Note:	Mexico is included in the Americas regulatory domain; however, channels 1 through 8 are for indoor use only while channels 9 through 11 can be used indoors and outdoors. Users are responsible for ensuring that the channel set configuration complies with the regulatory standards of Mexico.

Table 2: IEEE 802.11b/g Channels

Channel Number	Frequency in MHz	Regulatory Domains				
		Americas	EMEA	Israel	China	Japan
1	2412	X	X	-	X	X
2	2417	X	X	-	X	X
3	2422	X	X	X	X	X
4	2427	X	X	X	X	X
5	2432	X	X	X	X	X
6	2437	X	X	X	X	X
7	2442	X	X	X	X	X
8	2447	X	X	X	X	X
9	2452	X	X	X	X	X
10	2457	X	X	-	X	X
11	2462	X	X	-	X	X
12	2467	-	X	-	-	X

Table 2: IEEE 802.11b/g Channels (Continued)

Channel Number	Frequency in MHz	Regulatory Domains				
		Americas	EMEA	Israel	China	Japan
13	2472	-	X	-	-	X
14	2484	-	-	-	-	X (for 802.11b only)