



AP1000 Beta Test

Meru Access Point

Installation Guide

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August 2010

AP1000

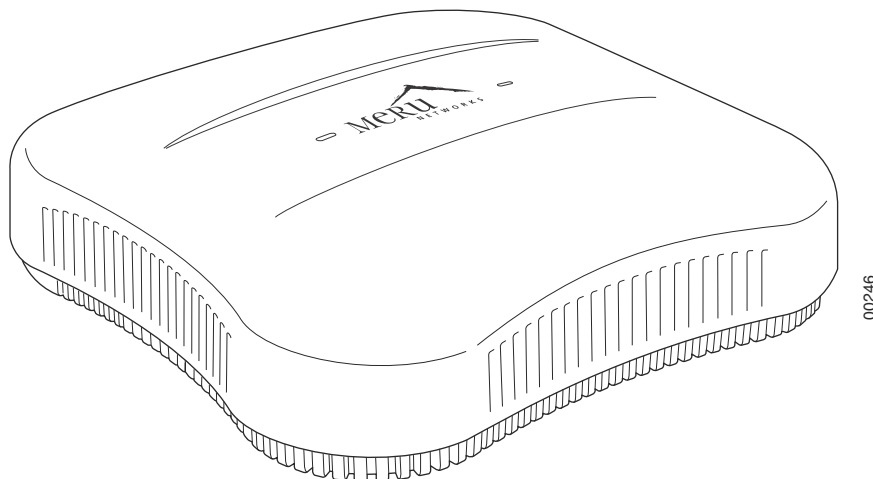
The AP1000 Access Point is an internal-antenna AP with either one or two dual-band 802.11n radios, 2x2 MIMO and internal antennas.

Model	Configuration
AP1010i	One dual-band 802.11n radio with 2x2 MIMO and internal antennas
AP1020i	Two dual-band 802.11n radios with 2x2 MIMO and internal antennas

Features for the AP1000 include:

- Internal antennas
- 802.11n support with channel bonding in both 2.4GHz and 5GHz frequency bands. Channel bonding combines two 20MHz channels into a single 40 MHz channel for increased throughput.
- Plug and Play deployment using centralized controller platforms
- Multi-layered security including standard WPA2 features such as automatic traffic inspection
- Standard 802.3af PoE support and support for many 802.at services
- Air Traffic Control technology for 802.11n devices and legacy a/b/g devices
- Channel span architecture that requires no channel planning or configuration

Figure 4: AP1000



Installing AP1000

AP1000 is supported by System Director versions 4.1 and greater. This chapter describes how to install and configure an AP1000. It contains the following sections:

- [Safety Precautions](#)
- [Best Practices for a Mixed Network](#)
- [Unpack the AP1000](#)
- [Power Requirements](#)
- [Additional Equipment](#)
- [Installing AP1000](#)
- [Restoring AP1000 Settings](#)
- [Check AP1000 LEDs](#)
- [Where to Go From Here](#)

Safety Precautions

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

The AP1000 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.

Best Practices for a Mixed Network

Read this section if you have both AP1000 and AP300 active simultaneously on the same network. The following best practices should be followed to get optimal performance from such a mixed network.

- AP320i and AP300 are interchangeable and fully compatible to share a virtual cell. It's like having two AP300s with different antennas. The only difference is that AP320i is detected as a such in the UI of the controller.
- If possible, do not deploy AP1000 and AP300 at the same physical location; we recommend that there be no overlapping coverage between AP1000 and AP300.
- If AP1000 and AP300 do have overlapping coverage, you have two options. Deploy them on separate channels or make sure the ESS profiles on both AP types are unique. The chart below shows two ESS scenarios, one supported, one not supported.

Supported ESS Scenario	AP1000 Configuration	AP300 Configuration
Two Unique ESS profiles	ESS Profile name in controller is UniqueName1	ESS Profile name in controller is UniqueName2
AP1000 and AP320i SSID string over the air	Meru	Meru

Unsupported ESS Scenario	AP1000 Configuration	AP300 Configuration
Same ESS profiles	ESS Profile name in controller is same name	ESS Profile name in controller is same name
AP1000 and AP320i SSID string over the air	Meru	Meru

Assumptions for the above best practices include:

- AP1000 is using Virtual Port with BSSID Virtual Cell.
- AP320i is using Virtual Port with BSSID Virtual Cell.
- AP1000s and AP300s are on the same channel. (AP1000 and AP320i could also be on different channels.)
- AP1000s and AP320i is are on the same controller. (AP1000 and AP320i could also be on different controllers as long as each controller has a unique controller index.)

Unpack the AP1000

AP1000 series beta test uses both the dual radio (AP1020) and single radio (AP1010) models. Confirm that the shipping box contains the following:

- AP1000 with built-in ceiling mount clips. Each radio has two built-in antennas, so AP1010 has two built-in antennas and AP1020 has four built-in antennas.
- Locking tool for ceiling mount locking. You can see a drawing of this in [Figure 31](#).



Note: If you want to lock AP1000 to the wall, you need the optional kit 840-00052 ACC-MNT-AP1000-01.

Power Requirements

Radios on an AP1000 use 2x2 MIMO configuration. To power an AP1000, use either an 802.3af or 802.3at PoE cable; either one works automatically with no configuration required. For a list of supported PoEs, see the appendix [Supported Power Over Ethernet Devices for Meru APs](#)

Additional Equipment

The following AP1000 mounting options require the listed additional equipment:

Installation Type	Additional Equipment
Ceiling mounting on a suspended ceiling with or without locking	<ul style="list-style-type: none"> • Either an 802.3af or 802.3at PoE cable
Wall mounting	<ul style="list-style-type: none"> • Either an 802.3af or 802.3at PoE cable • Wall mount screws - Recommend #6, #8 (M3, M3.5)

Installation Type	Additional Equipment
Wall mounting with locking	<ul style="list-style-type: none"> • Either an 802.3af or 802.3at PoE cable • Locking Kit 840-00052 ACC-MNT-AP1000-01
Ceiling mounting on a recessed ceiling	<ul style="list-style-type: none"> • Either an 802.3af or 802.3at PoE cable • Recessed Ceiling Mount Kit 840-0005x ACC-MNT-AP1000-02

Installing AP1000

Select a Location

All AP1000 interconnected equipment must be contained within the same building, including the interconnected equipment's associated LAN connection. Ceiling mounting is recommended but wall mounting is also supported. In addition, the AP1000 should be mounted in a location that meets the following conditions:

- Relatively unobstructed access to the clients the AP serves. Select a location with minimal physical obstructions between the AP and the wireless clients. We recommend planning for about 20 data clients per radio (or per interference region) if you plan to use Virtual Port. This is the recommendation for a data-only installation. Refer to the Meru Deployment Guides on the support site for more information.
- In an office with cubicles, mount the APs below a hanging ceiling or on the wall near the ceiling to provide the least obstructed communications path.
- On a wall, orient the AP1000 horizontally so that you can read the Meru logo without tilting your head at 90 degrees - this orientation provides optimum MIMO performance.
- AP1000 is designed to provide 180 degree omni-directional coverage as illustrated below. Plan placement with this pattern in mind.

Figure 30: Coverage Pattern for AP1000 When Ceiling Mounted



- If you install AP1000 on a pole, keep in mind that coverage will be 180 degrees; the pattern shown above would be directed sideways. We do not recommend mounting two AP1000s back to back on a pole to achieve 360 degree coverage, however, because the two units could interfere with each other.

Install the Access Point

You can mount AP1000 in any of the following ways:

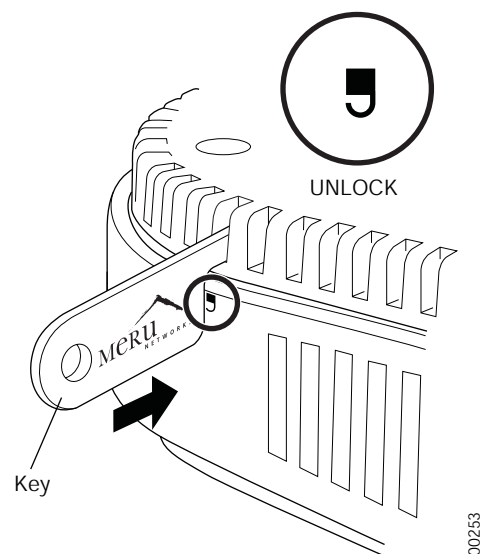
- [Mount AP1000 Below a Suspended Ceiling](#)
- [Mount AP1000 on a Wall](#)
- [Mount AP1000 on a Wall Using the Optional Locking Kit](#)
- [Set AP1000 on a Shelf](#)
- [Mount AP1000 Above a Suspended Ceiling \(Plenum\)](#)

Mount AP1000 Below a Suspended Ceiling

AP1000 ships ready to mount below a suspended ceiling; the built-in clips snap onto a ceiling rail. To mount an AP1000 below a suspended ceiling, follow these steps:

1. Remove the ceiling tiles at the location the AP will be mounted.
2. Be sure that AP1000 is not locked by inserting the locking key into the Unlock mechanism as shown in [Figure 31](#) below.

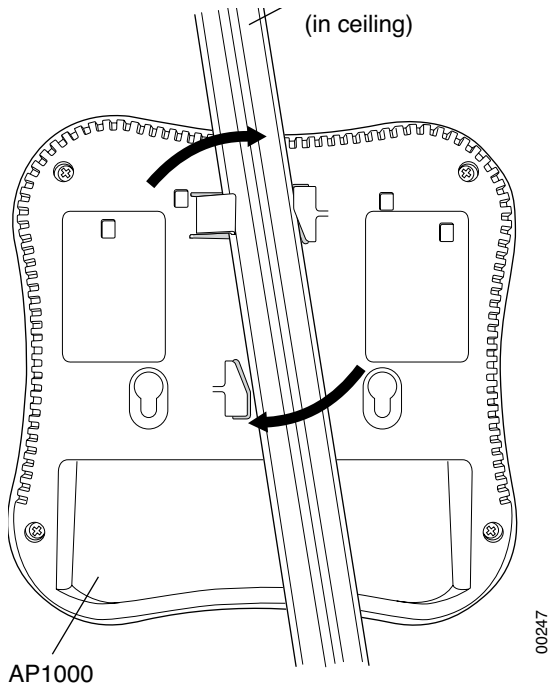
Figure 31: Unlock AP1000



3. Align the ceiling t-bar with the AP1000 slots indicated in [Figure 32](#) below.

Installing AP1000

Figure 32: Install AP1000 Below a Suspended Ceiling 247

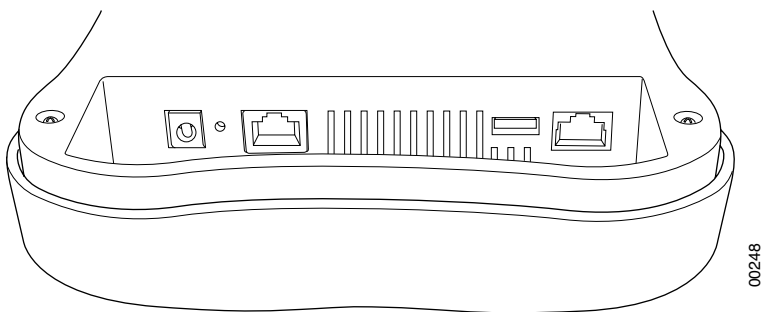


4. Press down on the tab indicated in [Figure 32](#) above and rotate the AP1000 into place.
5. Connect one end of the CAT5 (or greater) Ethernet cable with PoE to the 100/1000 Ethernet connector shown in [Figure 33](#) below.



Caution! Be sure to connect the Ethernet cable to the Ethernet port. The cable can mistakenly be plugged into the Console port; if you do this, the AP won't power up.

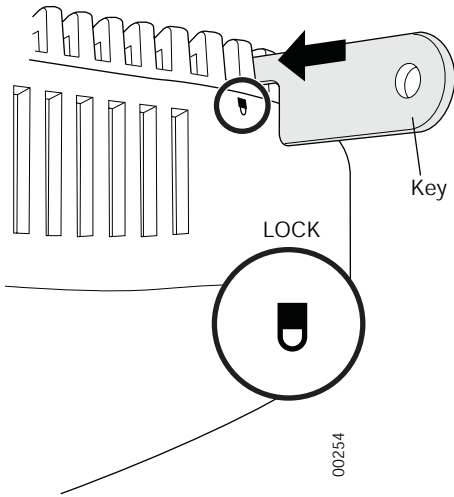
Figure 33: AP1000 Ethernet Port



6. If you want to lock AP1000 in place, use the supplied locking tool to press the AP1000 locking mechanism shown in [Figure 34](#).

Figure 34: Optionally lock AP1000

AP1000 (mounted on ceiling)



7. To unlock AP1000, press the unlocking mechanism on the opposite side of AP1000 see [Figure 31](#).

Installing AP1000

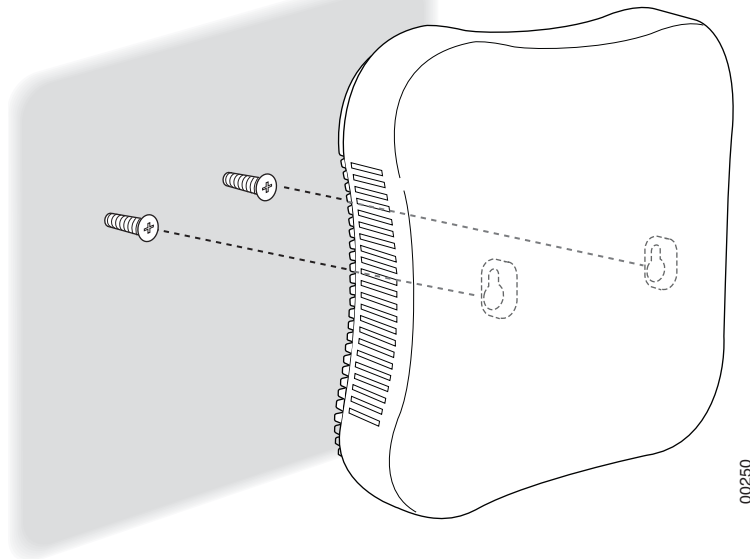
Mount AP1000 on a Wall

The AP1000 attaches directly to the wall. To mount an AP1000 on sheetrock or wall studs, follow these steps:

1. Attach two appropriate screws (see [Additional Equipment](#) for screw information) to the wall 3 inches apart (76mm) as shown below ([Figure 35](#)).

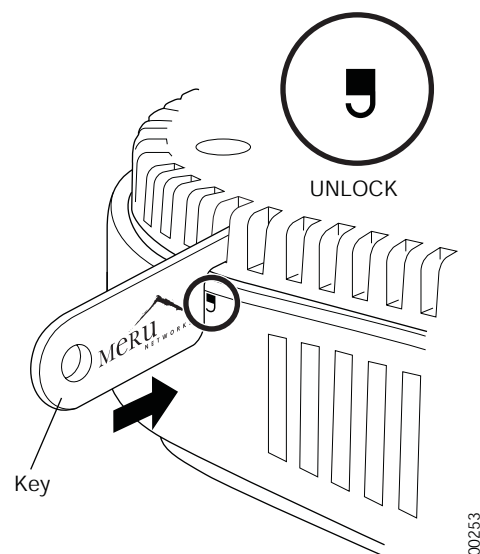
Figure 35: AP1000 Wall Bracket

Wall mount with screws.



2. Check to be sure that AP1000 is not locked by inserting the locking key into the Unlock mechanism as shown below.

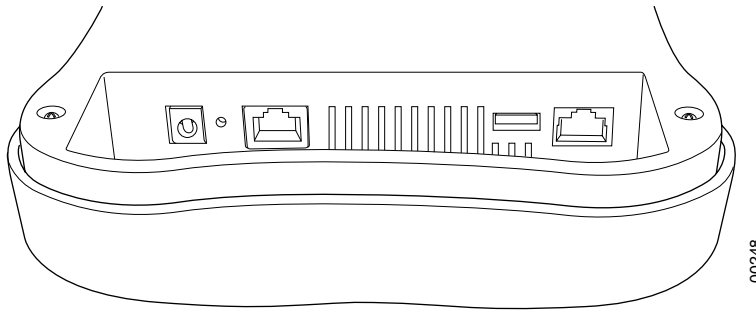
Figure 36: Unlock AP1000



3. Attach the PoE Ethernet cable to the Ethernet port shown in [Figure 37](#).

! **Caution!** Be sure to connect the Ethernet cable to the Ethernet port. The cable can mistakenly be plugged into the Console port; if you do this, the AP won't power up.

Figure 37: AP1000 Ethernet Port



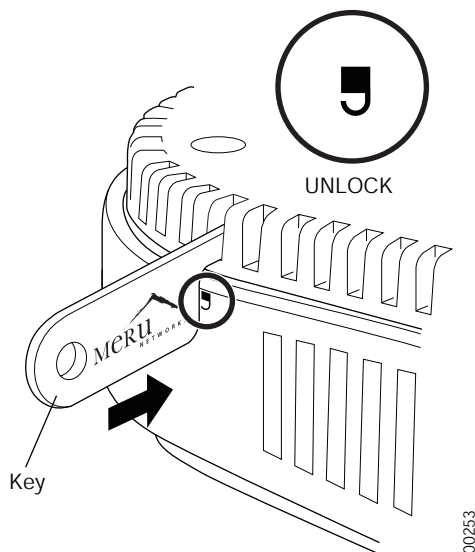
4. Align the tabs on the wall bracket with the tabs on the wall and slide the unit down slightly. See [Figure 35](#).

Mount AP1000 on a Wall Using the Optional Locking Kit

The AP1000 locking wall mount kit (840-00052 ACC-MNT-AP1000-01) contains a wall bracket, screws, and a locking key. To mount an AP1000 on sheetrock or wall studs with this kit, follow these steps:

1. Check to be sure that AP1000 is not locked by inserting the locking key into the Unlock mechanism as shown below.

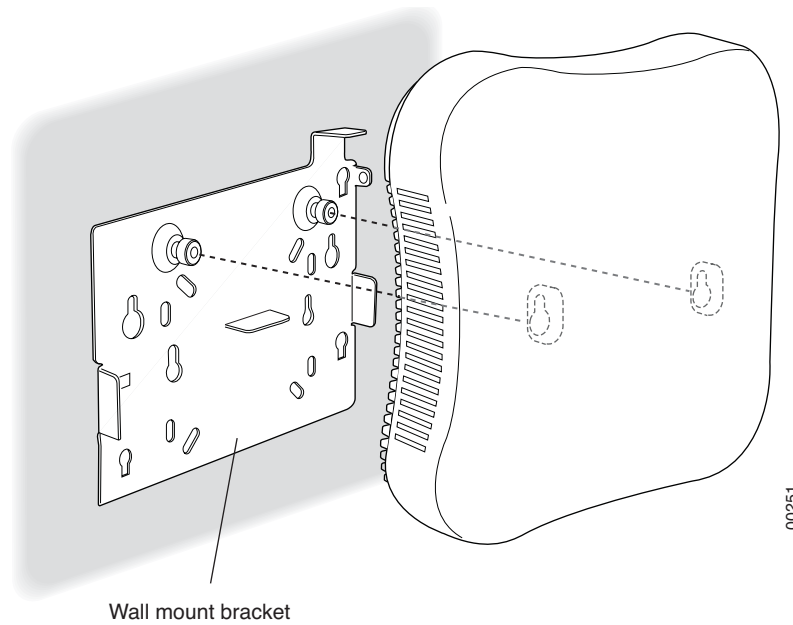
Figure 38: Unlock AP1000



Installing AP1000

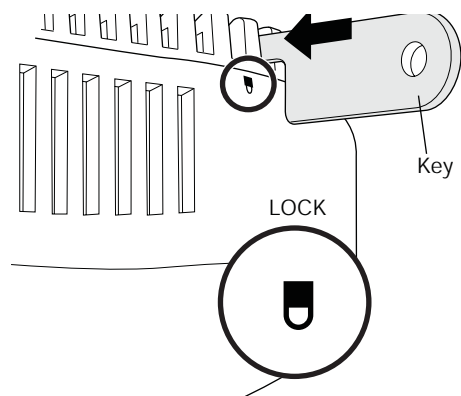
2. Attach AP1000 to the bracket as shown in [Figure 39](#).

Figure 39: Attach AP1000 to Wall Bracket



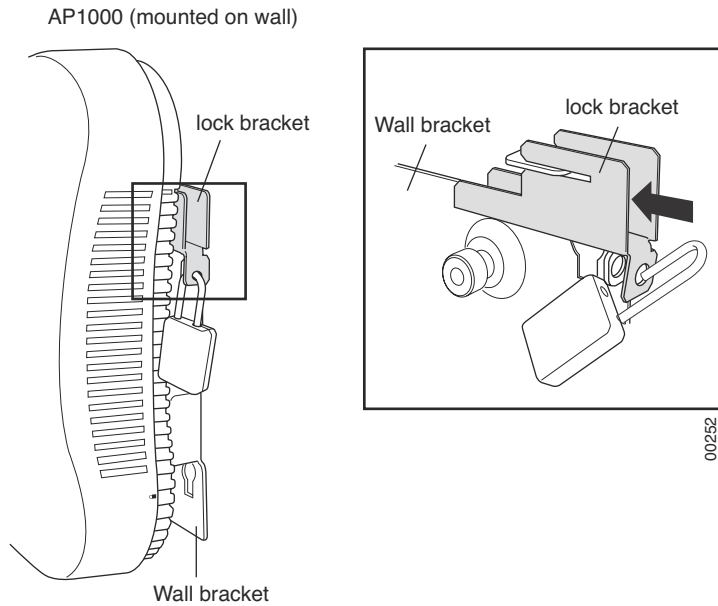
3. Lock the AP1000 with the built-in locking mechanism as shown in [Figure 40](#)

Figure 40: Lock AP1000



4. Insert the locking key and apply a small suitcase lock as shown in [Figure 41](#).

Figure 41: AP1000 Locked to a Wall



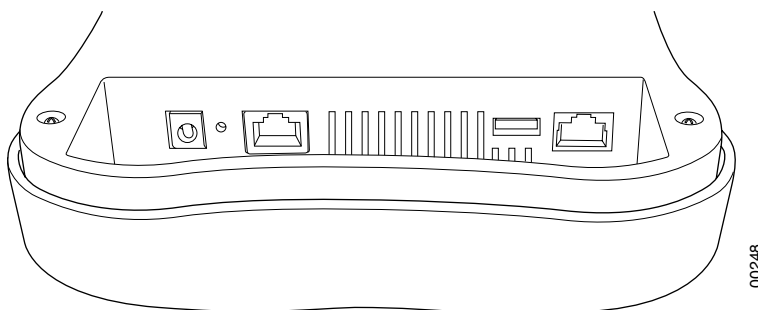
Set AP1000 on a Shelf

Set AP100 on any horizontal surface and then connect a PoE Ethernet cable.



Caution! Be sure to connect the Ethernet cable to the Ethernet port. The cable can mistakenly be plugged into the Console port; if you do this, the AP won't power up.

Figure 42: AP1000 Ethernet Port on the Right



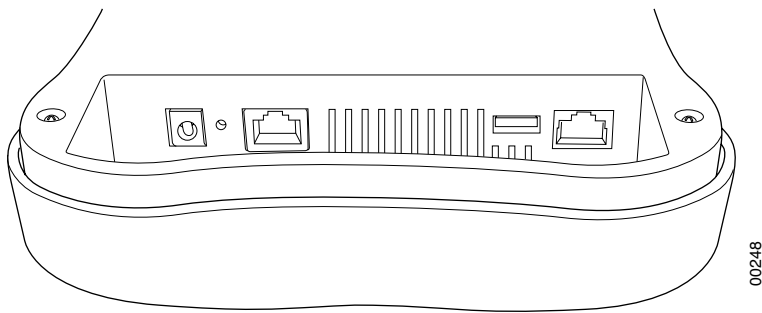
Mount AP1000 Above a Suspended Ceiling (Plenum)

AP1000 is not plenum rated and may only be mounted above the ceiling in a space that is not plenum, such as a return airflow for air conditioning.

Restoring AP1000 Settings

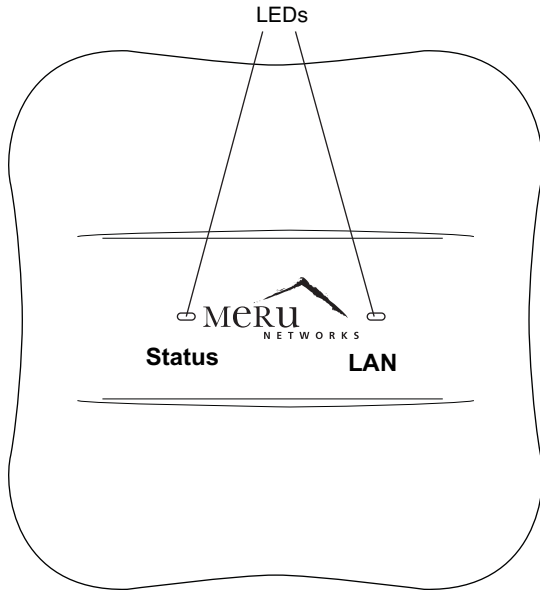
Trigger the Restore mechanism to return the AP1000 to the factory default settings. This overrides any changes that have been made from the controllers. Note that this restore mechanism differs from the ones on the other APs. Instead of a straight paper clip, you need to use a paper clip bent at a right angle to push the mechanism trigger located on the inside. Access it through the small hole with the bent paper clip. Press and hold the button for 10 seconds. After 10 seconds, the AP reboots and comes back up with default settings.

Figure 43: AP1000 Ethernet Port



Check AP1000 LEDs

Figure 44: AP1000 Status LEDs



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Check AP1000 LEDs

LED	Color	State:
Status (left LED)	off	AP is off - either there is no power or the LEDs are set to Off on the controller. Check the LED setting on the controller by clicking Configuration > Devices > AP , selecting the AP and then checking the setting for LED Mode.
	cyan	AP is booting stage 1.
	green blinking	AP is booting stage 2.
	green/white alternating	AP is discovering the controller.
	green/blue alternating	AP is downloading a configuration from the controller.
	slow blue blinking	AP is online and enabled.
	rapid blue blinking	AP is online and enabled and there is activity on one or both radios.
	red/yellow alternating	Some AP failure occurred; check the controller for more details about the alarm by clicking Monitor > Alarms > Pending Alarms .
	blue/yellow alternating	AP is online and enabled and one or both radios are either scanning or an admin has taken the radio(s) down.
LAN (right LED)	green	LAN link is up.
	green blinking	LAN link is up and some activity is taking place.
	red	Link has either failed or has been brought down.
	alternating green/orange	Link is experiencing receive errors.

The AP1000 has two LEDs, Status and LAN, as shown in [Figure 44](#). If you want to change the appearance of the LEDs, follow these steps:

1. From the controller, click **Configuration > Devices > AP**, and then select the AP.
2. Select one of these settings for the LED Mode setting:
 - **Normal:** LEDs are as described below
 - **Node ID:** Not supported in release 4.1
 - **Blink:** Sets all LEDs flashing; this is useful to locate an AP
 - **Dark:** Turns off all LEDs
3. Click **OK**.

Where to Go From Here

Now that the AP1000 is installed, go to the *Meru System Director Getting Started Guide* for instructions on initializing the hardware. Return to this chapter to check the status of the LEDs once the WLAN is operational; note that LED status is configurable, so the chart above may not apply to APs whose status was reconfigured.

Where to Go From Here

Now that the AP1000 is installed, go to the *Meru System Director Getting Started Guide* for instructions on initializing the hardware. Return to this chapter to check the status of the LEDs once the WLAN is operational; note that LED status is configurable, so the chart above may not apply to APs whose status was reconfigured.

FCC Regulations:

● 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 device 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 radiated radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that 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 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 that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

● This device complies with FCC radiation exposure limits set forth for an uncontrolled environment. In order to avoid the possibility of exceeding the FCC radio frequency exposure limits, human proximity to the antenna shall not be less than 20cm (8 inches) during normal operation.

● Operation on the 5.15-5.25GHz frequency band is restricted to indoor use only. The FCC requires indoor use for the 5.15-5.25GHz band to reduce the potential for harmful interference to co-channel Mobile Satellite Systems. Therefore, it will only transmit on the 5.25-5.35 GHz, 5.47-5.725 GHz and 5.725 – 5.85 GHz band when associated with an access point (AP).

● The antenna(s) used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

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

This Class B digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

The device for the band 5150-5250 MHz is only for indoor usage to reduce potential for harmful interference to co-channel mobile satellite systems; the maximum antenna gain permitted (for devices in the band 5725-5850 MHz) to comply with the e.i.r.p. limits specified for point-to-point and non point-to-point operation as appropriate, as stated in section A9.2(3). In addition, High-power radars are allocated as primary users (meaning they have priority) and this radar could cause interference and/or damage to LE-LAN devices.

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

The County Code Selection feature is disabled for products marketed in the US/Canada. For product available in the USA/ Canada markets, only channel 1-11 can be operated. Selection of other channels is not possible.

IMPORTANT NOTE:

IC Radiation Exposure Statement

This equipment complies with IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.