Aruba 80 Outdoor Wireless Access Point

Models AP-80MB or AP-80SB

Professional Installation Guide

ARUBA

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Package Contents

The Aruba 80 Outdoor Wireless Access Point package includes:

- ⌘ One Aruba 80 Outdoor Wireless Access Point (Models AP-80MB or AP-80SB)
- ⌘ Pole / Mast Mounting Hardware
- ⌘ Installation Guide (this manual)

Inform your supplier if there are any incorrect, missing or damaged parts. If possible, retain the carton, including the original packing materials. Use them to repack the product in case there is a need to return it.

Optional Items

The following optional items can also be ordered for the Aruba 80 Outdoor Wireless Access Point:

⌘ Detachable antennas (see Table C-3, "Detachable Antennas," on page 42) ⌘ Aruba 80 AC Power Adapter Kit (TX) – Indoor (AP-AC-80-1)

- ⌘ Indoor Use Only Auto-sensing 110/240VAC to 48VDC Power over Ethernet Injector suitable for use with all Aruba AP-80 Series Wireless Access Points.
- ⌘ 100 foot Outdoor Ethernet cable (8Pin DIN to 10/100Base-T RJ-45).

④ Aruba Outdoor Antenna Cable Extension – 10' (AP-CBL-1)

- ⌘ 10' long low-loss LMR 400 antenna extension cable for use with AP-80 Outdoor Access Points, interfaces AP-80 N-Type Female interface to N-Type Male on antenna.

④ Aruba Antenna Lightning Arrester N-Type (AP-LAR-1)

The Lightning Surge Arrester for the AP-80 Series Access Points is a single, In-line lightning arrester with N-type Male to N-type Female interface. Supports RF frequency pass through of 2Ghz – 6Ghz.

Check with your Aruba sales representative for the availability of optional items.

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Overview

The Aruba 80 Outdoor Wireless Access Point is part of a comprehensive wireless network solution. The device works in conjunction with the Aruba Mobility Controller and can act as a wireless access point or air monitor.

As a wireless Access Point (AP), the Aruba 80 Outdoor Wireless Access Point (also referred to as the Aruba 80) provides transparent, secure, high-speed data communications between wireless network devices (fixed, portable, or mobile computers with IEEE 802.11a (country regulatory domain permitting) or IEEE 802.11b/g wireless adapters) and the wired LAN.

As a wireless Air Monitor (AM), a feature unique to Aruba products, the Aruba 80 Outdoor Wireless Access Point enhances wireless networks by collecting statistics, monitoring traffic, detecting intrusions, enforcing security policies, balancing wireless traffic load, self-healing coverage gaps, and more.

NOTE—Installing the Aruba 80 requires setting the antenna power, which requires professional training. The Aruba 80 installer must be trained to perform this configuration.

Front View

Model 80SB
2.4GHz, N-Type, Female
1 Model 80MB
5 GHz, N-Type, Female

Model 80SB
2 2.4GHz, N-Type, Female
Model 80MB
2.4 GHz, N-Type, Female

3 — Integrated antenna

Ethernet port — **4**

RSSI connector
with protective cap — **5**
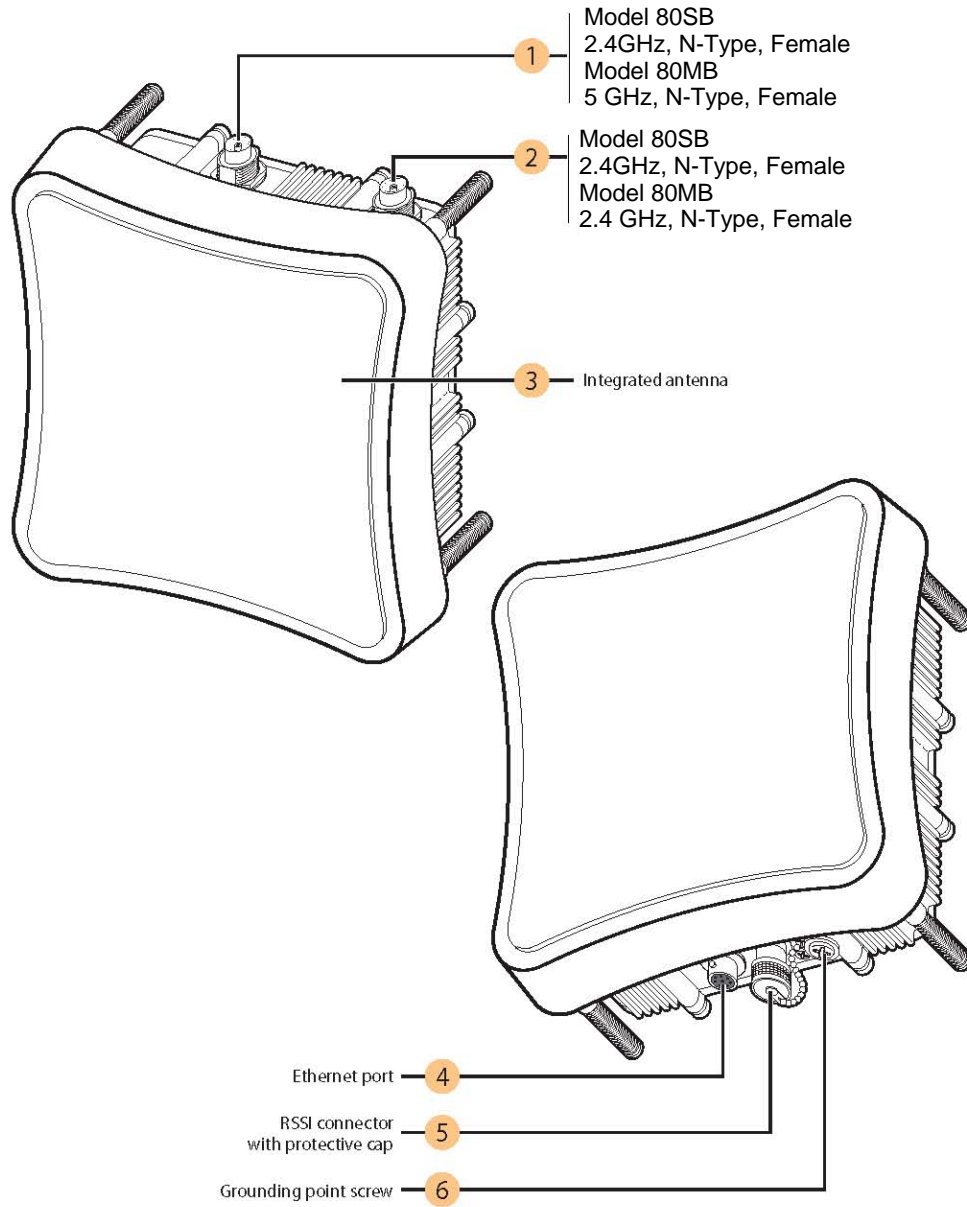
Grounding point screw — **6**

FIGURE 1-1 Aruba 80 Outdoor Wireless Access Point Front View

External Internal Antenna (2.4 GHz) Connector

For AP-80SB: 2.4 GHz, N-Type, Female connector

For AP-80MB: 5 GHz, N-Type, Female connector

External Internal Antenna (2.4 GHz) Connector

For AP-80SB: 2.4 GHz, N-Type, Female connector

For AP-80MB: 2.4 GHz, N-Type, Female connector

Internal 2.5 GHz 17.0 dBi, Directional Antenna (AP-80SB only)

FE Port

The wireless Access Point has one 10BASE-T/100BASE-TX 8-pin DIN port that connects to the power injector module using the included Ethernet cable. The Ethernet port connection provides power to the wireless Access Point as well as a data link to the local network.

The wireless Access Point appears as an Ethernet node and performs a bridging function by moving packets from the wired LAN to the remote end of the wireless Access Point link.

NOTE: The power injector module does not support Power over Ethernet (PoE) based on the IEEE 802.3af standard. The wireless Access Point unit must always be powered on by being connected to the power injector module.

RSSI Connector

Not used.

Grounding Screw

Even though the wireless Access Point includes its own built-in lightning protection, it is important that the unit is properly connected to ground. A grounding screw is provided for attaching a ground wire to the unit.

NOTE: The Aruba 80 requires lightening protection. Aruba recommends the use of lightening arresters. Failure to provide protection from lightening strikes will void the warranty for this product.

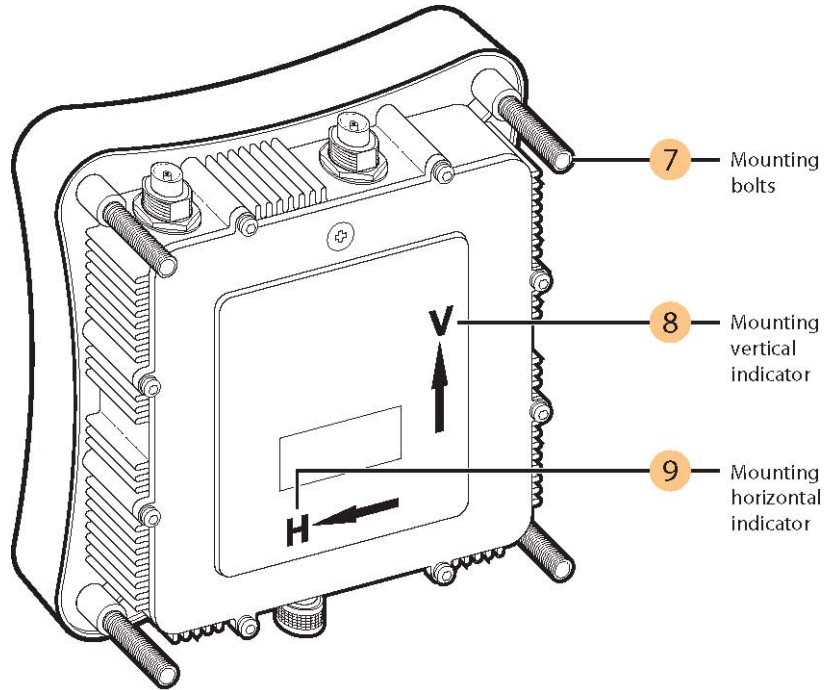See Appendix B for port and cable specifications.

Rear View

FIGURE 1-2 Aruba 80 Outdoor Wireless Access Point Rear View

Mounting bolts

Vertical mounting indicator

This is the vertical integrated antenna polarization indicator.

Horizontal mounting indicator.

This is the horizontal integrated antenna polarization indicator.

See Appendix B for port and cable specifications.

The Aruba AP Setup Process

Setting up an Aruba AP typically consists of four stages:

1 WLAN Planning—The administrator determines how many Aruba APs will be needed for their wireless network strategy and where they will be deployed. This can be easily accomplished using Aruba's automated RF Plan site-survey software (available separately).

2 AP Provisioning—Provisioning provides each Aruba AP with initial settings that allow it to locate the host Aruba Mobility Controller. Depending on the network topology and services, AP provisioning can be performed manually for each AP or plug-and-play for batches of APs.

   AP provisioning is discussed in "Provisioning Access Points".

3 AP Deployment—Once provisioned, each AP can be physically installed at its intended place of operation.

   AP deployment is covered in "Hardware Installation".

4 AP Configuration—The administrator defines the operational behavior for each Aruba AP, such as RF characteristics and security features.

   For AP configuration information, refer to the *ArubaOS Applications Configuration Guide*.

System Configuration

The wireless Access Point receives power through a special cable (sold separately) to connect to the non-802.3af-complaint Power over Ethernet injector module. The power injector module provides two RJ-45 Ethernet ports, one for connecting to the wireless Access Point (Output), and the other for connecting to a local LAN switch (Input).

At each location where a unit is installed, it must be connected to the local network using the power injector module.

The Power over Ethernet injector module port uses an MDI (i.e., internal straight-through) pin configuration. You can therefore use straight-through twisted-pair cable to connect this port to most network interconnection devices such as a switch or router that provide MDI-X ports. However, when connecting the access point to a workstation or other device that does not have MDI-X ports, you must use crossover twisted-pair cable.
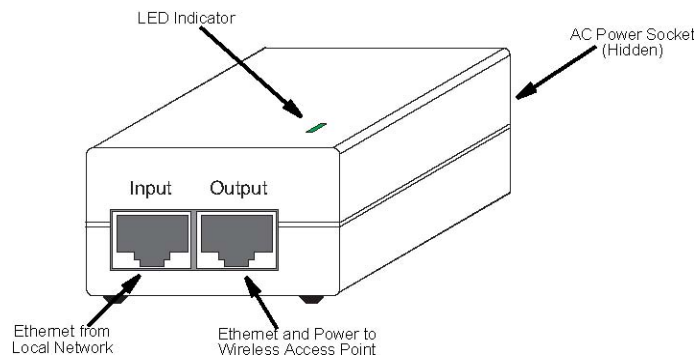
The wireless Access Point does not have a power switch. It is powered on when its Ethernet port is connected to the power injector module, and the power injector module is connected to an AC power source. The power injector includes one LED indicator that turns on when AC power is applied.

The power injector module automatically adjusts to any AC voltage between 100-240 volts at 50 or 60 Hz. No voltage range settings are required.

WARNING: The power injector module is designed for outdoor use only. Never mount the power injector outside with the wireless Access Point unit.

Wall- and Pole-Mounting Bracket Kits

The wireless Access Point includes bracket kits that can be used to mount the Access Point to a wall, pole, radio mast, or part of a tower structure.

Provisioning Access Points

The wireless bridge offers a variety of management options, including a web-based interface, a command line interface (CLI), or using SNMP management software.

Most initial configuration steps can be made through the web browser interface using the Setup Wizard. However, for units that do not have a preset country code, you must first set the country code using the CLI.

Note: Units sold in some countries are not configured with a specific country code. You must use the CLI to set the country code and enable wireless operation.

The wireless bridge uses the IP address 192.168.1.1 by default. If this address is not compatible with your network, you can first perform initial configuration using a PC that has IP settings compatible with this subnet (for example, 192.168.1.2) and connecting it directly to the wireless bridge. When the basic configuration is completed, you can set new IP settings for the wireless bridge before connecting it to your network.

Initial Setup through the CLI

The wireless bridge provides access to the CLI through a Telnet connection. You can open a Telnet session by performing these steps:

1. From the host computer, enter the Telnet command and the IP address of the wireless bridge unit (default 192.168.1.1).

2. At the prompt, enter "admin" for the user name.

3. The default password is null, so just press [Enter] at the password prompt.

The CLI will display the "Aruba Networks AP-80MB#" prompt to show that you are using executive access mode (i.e., Exec).

```
Username: admin
Password:
Aruba Networks AP-80MB#
```

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Initial Configuration Steps

Setting the Country Code – Regulations for wireless products differ from country to country. Setting the country code restricts the wireless bridge to use only the radio channels and power settings permitted in the specified country of operation. If the wireless bridge unit is shipped with a preset country code, you are not permitted to change it, as required by country regulations. If the unit is set to the default "99," you must set the country code to the country of operation.

At the Exec prompt, type "country ?" to display the list of country codes. Check the code for your country, then enter the country command again followed by your country code (e.g., IE for Ireland).

```
Aruba Networks AP-80MB#country ie
Aruba Networks AP-80MB#
```

Setting the IP Address – By default, the wireless bridge is configured with the IP address 192.168.1.1. You may also use the CLI to assign an IP address that is compatible with your network.

Type "configure" to enter configuration mode, then type "interface ethernet" to access the Ethernet interface-configuration mode.

```
Aruba Networks AP-80MB #configure
Aruba Networks AP-80MB (config)#interface ethernet
Aruba Networks AP-80MB (config-if)#
```

Type "ip address *ip-address netmask gateway*," where "ip-address" is the wireless bridge's IP address, "netmask" is the network mask for the network, and "gateway" is the default gateway router. Check with your system administrator to obtain an IP address that is compatible with your network.

```
Aruba Networks AP-80MB (if-ethernet)#ip address 192.168.2.2 255.255.255.0 192.168.2.254
Aruba Networks AP-80MB (if-ethernet)#
```

After configuring the wireless bridge's IP parameters, you can access the management interface from anywhere within the attached network. The command line interface can also be accessed using Telnet from any computer attached to the network.

Using the Web-based Management Setup Wizard

There are only a few basic steps you need to complete to set up the wireless bridge for your network. The Setup Wizard takes you through configuration procedures for the radio channel selection, IP configuration, and basic WEP encryption for wireless security.

The wireless bridge can be managed by any computer using a web browser (Internet Explorer 5.0 or above, or Netscape Navigator 6.2 or above). Enter the IP configured for the unit or the default IP address: http://192.168.1.1

Logging In – Enter the default username "admin" and click LOGIN (there is no default password). For information on configuring a user name and password.

The home page displays the Main Menu.
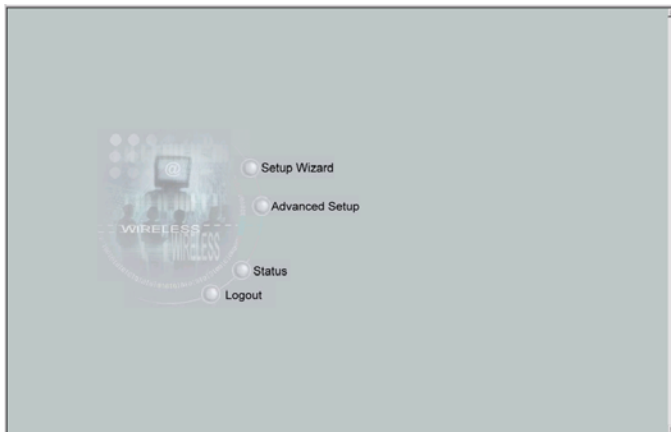
Launching the Setup Wizard – To perform initial configuration, click Setup Wizard on the home page, then click on the [Next] button to start the process.
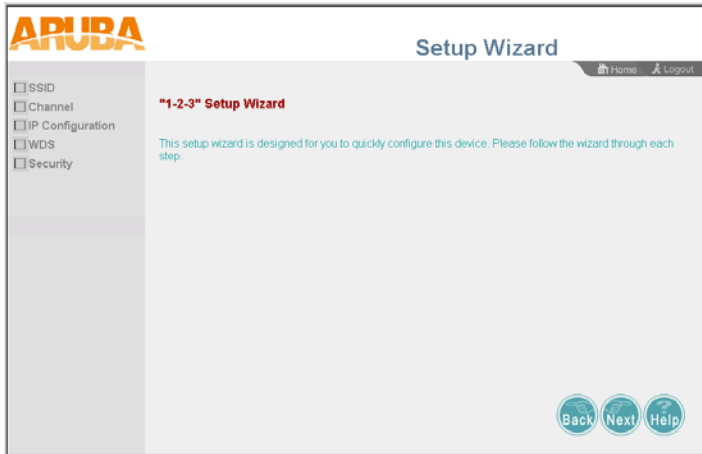
1. **Service Set ID –** Enter the service set identifier in the SSID box which all wireless clients must use to associate with the access point. The SSID is case sensitive and can consist of up to 32 alphanumeric characters (Default: DualBandOutdoor).
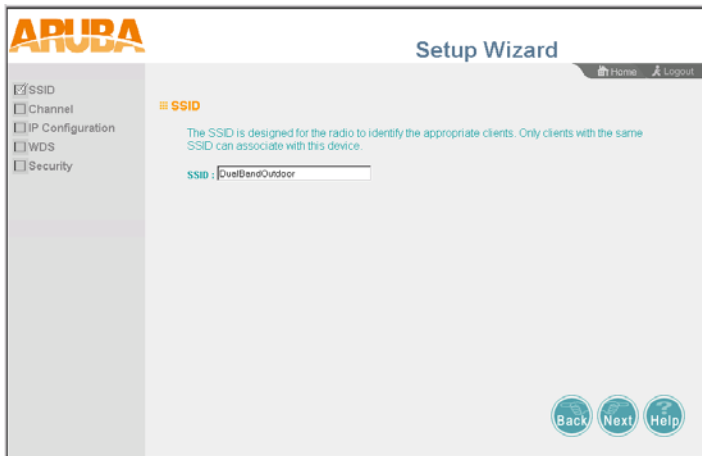
2. **Radio Channel –** You must enable radio communications for the 802.11a radio and set the operating channel.

802.11a

Turbo Mode – If you select Enable, the wireless bridge will operate in turbo mode with a data rate of up to 108 Mbps. Normal mode supports 13 channels, Turbo mode supports only 5 channels. (Default: Disable)

802.11a Radio Channel – Set the operating radio channel number. (Default: 56ch, 5.280 GHz)

Auto Channel Select – Select Enable for automatic radio channel detection. (Default: Disable)

802.11b/g

802.11g Radio Channel: Set the operating radio channel number. (Range 1-11; Default: 1)

Available channel settings are limited by local regulations which determine which channels are available.

3. **IP Configuration** – Either enable or disable (Dynamic Host Configuration Protocol (DHCP) for automatic IP configuration. If you disable DHCP, then manually enter the IP address and subnet mask. If a management station exists on another network segment, then you must enter the IP address for a gateway that can route traffic between these segments. Then enter the IP address for the primary and secondary Domain Name Servers (DNS) servers to be used for host-name to IP address resolution.

DHCP Client – With DHCP Client enabled, the IP address, subnet mask and default gateway can be dynamically assigned to the access point by the network DHCP server. (Default: Disable)

If there is no DHCP server on your network, then the access point will automatically start up with its default IP address, 192.168.1.1.

4. **WDS Settings** – To set up a wireless bridge link, you must configure the WDS forwarding table by specifying the wireless MAC address of the bridge to which you want to forward traffic. For a Slave bridge unit, you need to specify the MAC address of the wireless bridge unit at the opposite end of the link. For a Master bridge unit, you need to specify the MAC addresses of all the Slave bridge units in the network.

Set the distance value used to adjust timeout values to take into account transmit delays due to link distances in the wireless bridge network. For a point-to-point link, specify the approximate distance between the two bridges. For a point-to-multipoint network, specify the distance of the Slave bridge farthest from the Master bridge.

5. **Security** – Set the Authentication Type to "Open System" to allow open access without authentication, or "Shared Key" to require authentication based on a shared key. Enable Wired Equivalent Privacy (WEP) to encrypt data transmissions.

Authentication Type – Use "Open System" to allow open access to all wireless clients without performing authentication, or "Shared Key" to perform authentication based on a shared key that has been distributed to all stations. (Default: Open System)

WEP – Wired Equivalent Privacy is used to encrypt transmissions passing between wireless clients and the access point. (Default: Disabled)

Shared Key Setup – If you select "Shared Key" authentication type or enable WEP, then you also need to configure the shared key by selecting 64-bit or 128-bit key type, and entering a hexadecimal or ASCII string of the appropriate length. The key can be entered as alphanumeric characters or hexadecimal (0~9, A~F, e.g., D7 0A 9C 7F E5). (Default: 128 bit, hexadecimal key type)
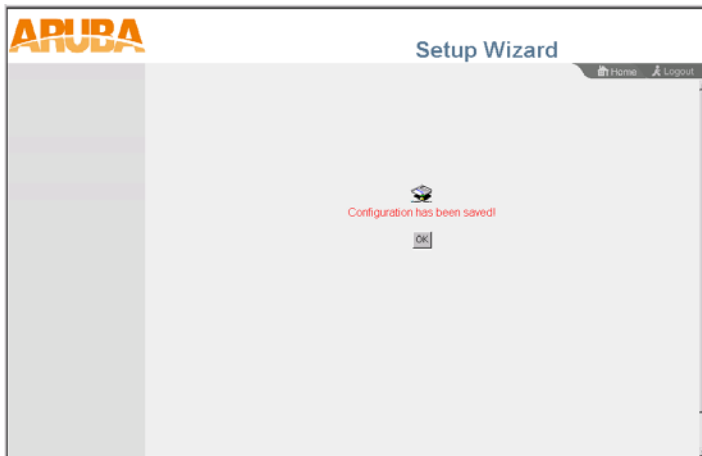
64-Bit Manual Entry: The key can contain 10 hexadecimal digits, or 5 alphanumeric characters.

128-Bit Manual Entry: The key can contain 26 hexadecimal digits or 13 alphanumeric characters.

All wireless devices must be configured with the same Key ID values to communicate with the access point.

6. Click Finish.

7. Click the OK button to restart the access point.

Mounting the Aruba 80 Outdoor Wireless Access Point

WARNING: The installation of Outdoor rated Access Points, antennas or ancillary equipment should only be performed by trained personnel. Do NOT attempt to install an Access Point on an elevated building, mast or pole by yourself or without the use of the appropriate safety equipment

The Aruba 80 Outdoor Wireless Access Point may be deployed outdoors, exposed to the elements (extreme sunshine, rain, snow - hot and cold climates) and mounted on a wall, pole or mast.

The Aruba 80 Indoor rated Power over Ethernet injector (model AP-AC-80-1) must be deployed indoors, or within an enclosure protecting it from the elements.

The Aruba 80 Outdoor Wireless Access Point is supplied complete with its own mounting hardware kit for attaching the unit to a 1.5" to 2" diameter steel pole or tube or as part of a radio mast or tower structure.

Physical installation of the Aruba 80 Outdoor Wireless Access Point involves the following steps:

1.   Mount the unit on a wall, pole, mast, or tower using the mounting bracket.
2.   Mount external antennas on the same supporting structure as the Access Point and connect them to the Access Point unit.

Caution: NOTE: the use of lightning arrester units, in-line or mast mounted, with the N-Type antenna interface is highly recommended and if not used may void product warranty.

Caution: Be sure that grounding is available and that it meets local and national electrical codes. For additional lightning protection, use lightning rods, lightning arrestors, or surge suppressors.

3.   Connect the grounding wire to the unit.
4.   Connect the Ethernet cable to the unit.
5.   Connect the power injector to the Ethernet cable, a local LAN network point and an AC power source.
6.   Orient the antennas.

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Mounting the AP

Using the Pole-Mounting Bracket

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

1.   Always attach the bracket to a pole with the open end of the mounting grooves facing up.
2.   Place the U-shaped part of the bracket around the pole and tighten the securing nut just enough to hold the bracket to the pole. (The bracket may need to be rotated around the pole during the alignment process.)

Attach bracket to pole with mounting grooves facing up
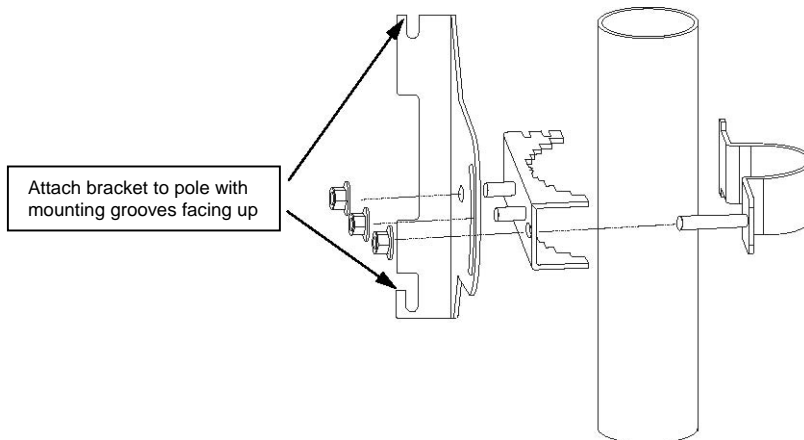
3. Use the included nuts to tightly secure the wireless Access Point to the bracket. Be sure to take account of the antenna polarization direction; both antennas in a link must be mounted with the same polarization.

Antenna Polarization
Direction
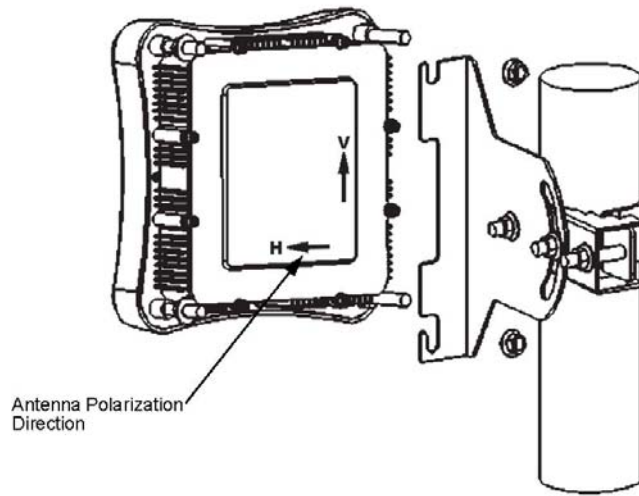
Mounting on Larger Diameter Poles

In addition, there is a method for attaching the pole-mounting bracket to a pole that is 2 to 5 inches in diameter using an adjustable steel band clamp (not included in the kit). A steel band clamp up to 0.5 inch (1.27 cm) wide can be threaded through the main part of the bracket to secure it to a larger diameter pole without using the U-shaped part of the bracket. This method is illustrated in the following figure.

Steel Band Clamp
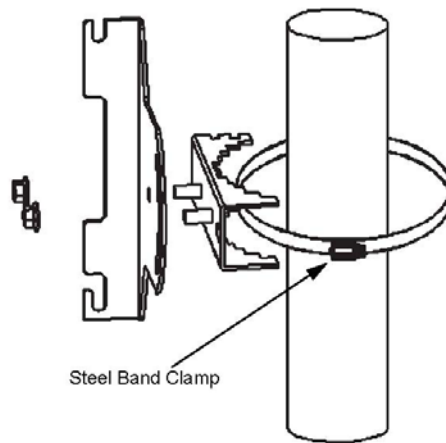
4.

Mount and Connect External Antennas

Physically mount detachable antennas in their desired location, preferably to the same supporting structure as the Access Point, within 3 m (10 ft) distance, using the bracket supplied in the antenna.

Connect the antenna to the Access Point's N-type Female connector using the RF coaxial cable provided with the antenna.

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

When no antenna is connected to the N-Type interface, the waterproof interface boot should remain installed to protect the interface from the elements.

Connect Electrical Ground Wire to the AP

Attach an electrical safety grounding wire to the electrical ground point on the access point.

> **Caution:** Be sure that grounding is available and that it meets local and national electrical codes. For additional lightning protection, use lightning rods, lightning arrestors, or surge suppressors.

Connect Ethernet Cable to the AP

1.   Attach the Ethernet cable to the Ethernet port on the wireless Access Point.

NOTE: The Ethernet cable included with package (AP-AC-80-1, indoor Power Injector) is 30 m (100 ft) long. To wire a longer cable (maximum 100 m, 325 ft), use the connector pinout information in Appendix B.

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

> **Caution:** Be sure that grounding is available and that it meets local and national electrical codes. For additional lightning protection, use lightning rods, lightning arrestors, or surge suppressors.

Connect the Power Injector

To connect the Aruba 80 Outdoor Wireless Access Point to a power source:

Caution: The wireless outdoor Access Point's 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 due to the AP's maximum power draw requirement of 30 Watts. Always connect the unit to the correct Power over Ethernet injector module (sold separately).

1.   1.   Connect the Ethernet cable from the wireless Access Point to the RJ-45 port labeled "Output" on the power injector.
2.   2.   Connect a straight-through unshielded twisted-pair (UTP) cable from a local LAN switch to the RJ-45 port labeled "Input" on the power injector. Use Category 5 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.
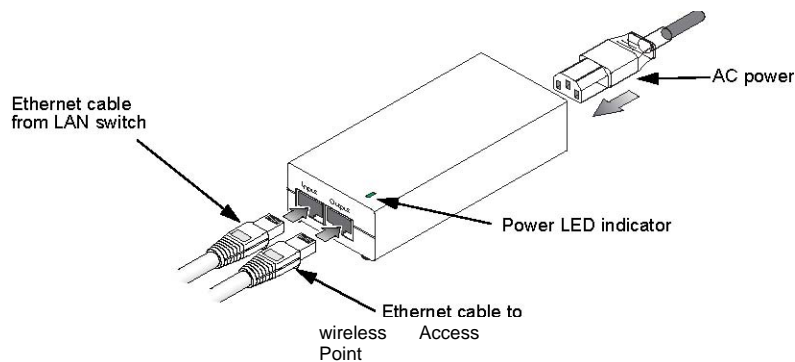
1.   3.   Insert the power cable plug directly into the standard AC receptacle on the power injector.
2.   4.   Plug the other end of the power cable into a grounded, 3-pin socket, AC power source.

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 wireless Access Point through the Ethernet connection.

Orient the Antennas

After the Aruba 80 Outdoor Wireless Access Point units have been mounted, connected, and their radios are operating, the antennas must be accurately aligned to ensure optimum performance on the Access Point links.

Troubleshooting

Check the following items before you contact local Technical Support.

1. If wireless bridge units do not associate with each other, check the following:

    - Check the power injector LED for each bridge unit to be sure that power is being supplied

    - Be sure that antennas in the link are properly aligned.

    - Be sure that channel settings match on all bridges

    - If encryption is enabled, ensure that all bridge links are configured with the same encryption keys.

2. If you experience poor performance (high packet loss rate) over the wireless bridge link:

    - Check that the range of the link is within the limits for the antennas used.

    - Be sure that antennas in the link are properly aligned.

    - Check that there is an unobstructed radio line-of-sight between the antennas.

    - Be sure there is no interference from other radio sources. Try setting the bridge link to another radio channel.

    - Be sure there is no other radio transmitter too close to either antenna. If necessary, move the antennas to another location.

3. If the wireless bridge cannot be configured using Telnet, a web browser, or SNMP software:

    - Be sure to have configured the wireless bridge with a valid IP address, subnet mask and default gateway.

    - Check that you have a valid network connection to the wireless bridge and that the Ethernet port or the wireless interface has not been disabled.

    - If you are connecting to the wireless bridge through the wired Ethernet interface, check the network cabling between the management station and the wireless bridge.

    - If you cannot connect using Telnet, you may have exceeded the maximum number of concurrent Telnet sessions permitted (i.e, four sessions). Try connecting again at a later time.

4. If all other recovery measures fail, and the wireless bridge is still not functioning properly, take any of these steps:

    - Reset the wireless bridge's hardware using the CLI, web interface, or through a power reset.

    - Reset the wireless bridge to its default configuration.

5. If you forgot or lost the password:

    - Contact Technical Support.

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Aruba 80 8-Pin DIN Ethernet Connector Pinout

The Ethernet cable from the power injector connects to an 8-pin DIN connector on the Aruba 80 outdoor wireless Access Point. This connector is described in the following figure and table.

8-Pin DIN Ethernet Port Pinout	
Pin	Signal Name
1	Transmit Data plus (TD+)
2	Transmit Data minus (TD)
3	Receive Data plus (RD+)
4	+48 VDC power
5	+48 VDC power
6	Receive Data minus (RD-)
7	Return power
8	Return power
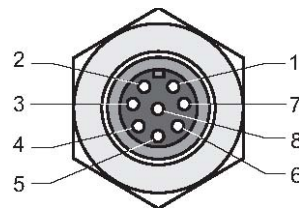
Note: The "+" and "-" signs represent the polarity of the wires that make up each wire pair.

Aruba 80 8-Pin DIN to RJ-45 Cable Wiring

To construct an extended Ethernet cable to connect from the power injector's RJ-45 Output port to the wireless Access Point's 8-pin DIN connector, follow the wiring diagram below. Use Category 5 or better UTP or STP cable, maximum length 100 m (328 ft), and be sure to connect all four wire pairs.

NOTE: To construct a reliable Ethernet cable, always use the proper tools or ask a professional cable supplier to construct the cable.

Aruba 80 Power over Ethernet Injector Module 10/100BASE-TX Pin Assignments

Use unshielded twisted-pair (UTP) or shielded twisted-pair (STP) cable for RJ-45 connections: 100-ohm Category 3 or better cable for 10 Mbps connections, or 100-ohm Category 5 or better cable for 100 Mbps connections. Also be sure that the length of any twisted-pair connection does not exceed 100 meters (328 feet).

The RJ-45 Input port on the power injector is wired with MDI pinouts. This means that you must use crossover cables for connections to PCs or servers, and straight-through cable for connections to switches or hubs. However, when connecting to devices that support automatic MDI/MDI-X pinout configuration, you can use either straight-through or crossover cable.

10/100BASE-TX MDI and MDI -X Port Pinouts	
MDI-X Signal Name Pin 1	MDI Signal Name
Receive Data plus (RD+)	Transmit Data plus (TD+)
Receive Data minus (RD-) 2 3	Transmit Data minus (TD-)
Transmit Data plus (TD+)	Receive Data plus (RD+)
Transmit Data minus (TD-) 6 4,5,7,8	Receive Data minus (RD-)
Not used	Not used

Note: The "+" and "-" signs represent the polarity of the wires that make up each wire pair.

Straight-Through Wiring

Because the 10/100 Mbps Input port on the power injector uses an MDI pin configuration, you must use "straight-through" cable for network connections to hubs or switches that only have MDI-X ports. However, if the device to which you are connecting supports automatic MDI/MDI-X operation, you can use either "straight-through" or "crossover" cable.

EIA/TIA 568B RJ-45 Wiring Standard
10/100BASE-TX Straight-through Cable

White/Orange Stripe
Orange
White/Green Stripe
Blue
White/Blue Stripe
Green
White/Brown Stripe
Brown

End A   1 2 3 4 5 6 7 8   1 2 3 4 5 6 7 8   End B

Crossover Wiring

Because the 10/100 Mbps port on the power injector uses an MDI pin configuration, you must use "crossover" cable for network connections to PCs, servers or other end nodes that only have MDI ports. However, if the device to which you are connecting supports automatic MDI/MDI-X operation, you can use either "straight-through" or "crossover" cable.

EIA/TIA 568B RJ-45 Wiring Standard
10/100BASE-TX Crossover Cable

White/Orange Stripe
Orange
White/Green Stripe
Blue
White/Blue Stripe
Green
White/Brown Stripe
Brown

End A   1 2 3 4 5 6 7 8   1 2 3 4 5 6 7 8   End B

Product Specifications

Compliance

FCC - Class B

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 when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense.

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

This product 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.

CAUTION STATEMENT: FCC RF Radiation Exposure Statement

This equipment complies with FCC RF radiation exposure limits set forth for fixed outdoor use only. This equipment should be installed and operated with a minimum distance of 15.2 inches (38.5 centimeters) between the radiator and your body for 2.4 GHz and 5 Ghz operations. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Radio Frequency Interference Requirements

Operations in the 5.15-5.25GHz band are restricted to indoor usage only.
In 5.15-5.25GHz band, the FCC requires this product to be used indoors 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 and/or damage this device.

ARUBA

Industry Canada - Class A

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus as set out in the interference-causing equipment standard entitled "Digital Apparatus," ICES-003 of the Department of Communications.

Cet appareil numérique respecte les limites de bruits radioélectriques applicables aux appareils numériques de Classe A prescrites dans la norme sur le matériel brouilleur: "Appareils Numériques," NMB-003 édictée par le ministère des Communications.

This product complies with IC RSS 210 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.

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

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

VCCI - Class A

この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づくクラスＡ情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

CE - Class A

Warning—This is a Class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

EU - Class A

This product complies with EN5022 Class A and EN5024 standards.

Underwriter Labs

These products have been Listed and tested for fire resistant and low-smoke-producing characteristics, and are suitable for use in environmental air space, such as above suspended ceilings, 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, CSA C22.1.

Peut être utilisé dans des gaines transportant de l'air traité, conformément à la section 300-22(c) du National Electrical Code et aux articles 2-128, 12-010(3) et 12-100 du Code Canadien de l'électricité, Première partie, CSA C22.1.

Certifications

Item Measurement

Electromagnetic Compatibility
FCC Part 15 subpart C (15.247/15.407

RSS 210 (CAN)

TELEC ARIB STD-T66

EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-11
73/23/ECC

CE   The CE approval mark on back of the product indicates that it meets European Directives 73/23/EEC and 89/336/EEC R&TTE Directive: ETS EN 300 328, ETS EN 301 489, ETS EN 301 893

RFS 29 (NZ)

Safety   UL Listed (UL60950) UL Listed (Canadian Electrical Code/CSA 22.2 No. 60950) EN60950 / IEC60950 National Electrical Code Section 300-22(C) Canadian Electrical Code, Part 1, CSA C22.1 Sections 2-128, 12-010(3), and 12-100

ARUBA

Product Features

- ⌘ Wireless dual-band transceiver
- ⌘ Various antenna options (see Table C-3)
- ⌘ Aruba AP-80SB features an integrated 17dBi 5 GHz directional antenna
- ⌘ Protocol-independent networking functionality
- ⌘ Supports IEEE 802.11a or IEEE 802.11b/g operation as an AP
- ⌘ Supports IEEE 802.11a and IEEE 802.11b/g operation as an AM
- ⌘ Seamless connectivity to wired LANs augment existing networks quickly and easily
- ⌘ Can be centrally managed, configured, and upgraded through the Switch name to take advantage of network changes and security improvements

Ethernet Compatibility

The Aruba 80 Outdoor Wireless Access Point attaches to 10/100 Mbps Ethernet (FE) LAN segments that utilize 10Base-T/100Base-TX (twisted-pair) wiring. The device appears as an Ethernet node and performs a routing function by moving packets between the wired LAN and remote workstations on the wireless infrastructure.

Radio Characteristics

The Aruba 80 Outdoor Wireless Access Point can be configured to support IEEE 802.11a or IEEE 802.11b/g operation as an AP, and supports both IEEE 802.11a and IEEE 802.11b/g operation as an AM:

- ⌘ 802.11a provides a high data rate and reliable wireless connectivity

  802.11a operation uses a radio modulation technique known as Orthogonal Frequency Division Multiplexing (OFDM), and a shared collision domain (CSMA/CA). It operates in the 5 Ghz Unlicensed National Information Infrastructure (UNII) band. Data is transmitted over a half-duplex radio channel operating at up to 54 Megabits per second (Mbps).

- ⌘ 802.11b provides an alternative to wired LANs that can dramatically cut costs

  802.11b operation uses the IEEE 802.11 High-Rate Direct Sequence (HRDS) specification, and a shared collision domain (CSMA/CA). It operates in the 2.4 Ghz Industrial/Scientific/Medical (ISM) band. The ISM band is available worldwide for unlicensed use. Data is transmitted at speeds of up to 11 Mbps.

- ⌘ 802.11g provides a high data rate and is backwards compatible with 802.11b.

  802.11g operation uses ODFM and a shared collision domain (CSMA/CA). It operates in the 2.4 Ghz Industrial/Scientific/Medical (ISM) band. The ISM band is available worldwide for unlicensed use. Data is transmitted at speeds of up to 54 Mbps.

Product Specifications

Power Over Ethernet

The Aruba 80 Outdoor Wireless Access Point supports non-standard Power Over Ethernet (POE) using the Aruba 80 POE Injector Module (sold separately), due to its 30W power draw requirement.

TABLE C-1 Aruba 80 802.11 Specifications

Description	802.11a	802.11b	802.11g
Integral Antenna	Model AP-80SB only: 5 Ghz 17.0 dBi		
External Antenna	Aruba offer a wide variety of detachable antenna types suitable for use with the AP 80. Please contact your local sales representative for details		
Frequency Band	④ 5.150 ~ 5.250 Ghz (low band) 4 channels ④ 5.250 ~ 5.700 Ghz (ETSI) 11 channels ④ 5.500~ 5.825 Ghz (high band) 4 channels ④ 5.725 ~ 5.825 Ghz (high band) 4 channels	④ 2.4 ~ 2.483 Ghz (US, Canada & ETSI) ④ 2.4 ~ 2.497 Ghz (Japan) Complete country list available at http:// www.arubanetwo rks. com/products/aps / certification	④ 2.412 ~ 2.462 Ghz (US, Canada) ④ 2.412 ~ 2.472 Ghz (ETSI) ④ 2.412 ~ 2.484 Ghz (Japan) Complete country list available at http:// www.arubanetw orks. com/products/ap s/ certification
Radio Technology	Orthogonal Frequency Division Multiplexing (OFDM)	Direct Sequence Spread Spectrum (DSSS)	Orthogonal Frequency Division Multiplexing (OFDM)
Modulation Type	BPSK, QPSK, 16-QAM, 64-QAM	CCK, BPSK, QPSK	CCK, BPSK, QPSK, 16-QAM, 64-QAM
Transmit Power	Configurable by system administrator/ professional installer	Configurable by system administrator/ professional installer	Configurable by system administrator

TABLE C-1 Aruba 80 802.11 Specifications (Continued)

Description	802.11a	802.11b	802.11g
Media Access Control	CSMA/CA with ACK	CSMA/CA with ACK	CSMA/CA with ACK
Operating Channels	④ US & Canada: 8 external antenna 12 internal antenna ④ ETSI: 11 ④ Japan: Disabled Complete country list available at http:// www.arubanetworks.com/ products/aps/certification	④ US & Canada: 11 ④ ETSI: 13 ④ Japan: 14 ④ Complete country list available at http:// www.arubanetwo rks.com/products/ aps/ certification	④ US & Canada: 11 ④ ETSI: 13 ④ Japan: 13 Complete country list available at http:// www.arubanetworks. com/products/aps/ certification
Data Rates	6, 9, 12, 18, 24, 36, 48, 54 Mbps per channel	1, 2, 5.5, 11 Mbps per channel	6, 9, 12, 18, 24, 36, 48, 54 Mbps per channel

TABLE C-2 Aruba 80 Characteristics

Description

Maximum Clients	64
Multi-mode Radio Band	Selectable via software

Manageability:

- ④ Management of all 802.11 parameters as AP
- ④ Network-wide AP management via: ⌘ Telnet
- ⌘ WEB GUI
  - ⌘ SNMP ④ Access point profiles
- ④ Management by:
  - ⌘ Geographical location
  - ⌘ BSSID
  - ⌘ Radio type ④ Encryption support (AP and Switch)
  - ⌘ 40-bit / 64-bit / 128-bit / 152-bit WEP, ④ TKIP, AES, WPA

40bit / 64bit / 128bit / 152bit WEP, TKIP, AES, WPA,

Encryption Support (AP and Mobility Controller)	
Physical (HxWxD):	198 x 198 x 70mm (7.80 x 7.80 x 2.76 in.) Weight 1.6 kilograms (3.53 pounds)
Part Numbers 64	AP-80MB Aruba 80 Master Outdoor Wireless Access Point8 AP-80SB Aruba 80 Slave Outdoor Wireless Access Point

TABLE C-2 Aruba 80 Characteristics (Continued)

Description	
Interfaces (Electrical):	**AP-80MB & AP-80SB Common Interfaces** 1 x 10/100 Base-TX (8-Pin DIN Connector) auto-sensing Ethernet interface: ⌘ Auto-sensing MDI/MDX ⌘ PoE 48V DC / 1.2A power over Ethernet (not compliant with 802.3af) ⌘ 8-Pin DIN to RJ-45 CAT-5 Ethernet Cable Supplied (30 m / 100 ft 1 x RSSI Low Voltage BNC Interface (not used) 1 x Electrical Ground Point with built-in lightening arrester **AP-80MB Only Interfaces** 1 x 2.4Ghz N-Type, Female, Detachable Antenna Interface 1 x 5Ghz N-Type, Female, Detachable Antenna Interface **AP-80SB-Only Interfaces** 2 x 2.4Ghz N-Type, Female, Detachable Antenna Interfaces (supports radio signal diversity)
Interfaces (Mechanical):	4 x Mounting Bracket Hex Screw Mounting Points Ruggedized wall, pole or mast mount hardware provided (articulating in horizontal and vertical planes)
Visual Indicators (LEDs)	Ready -- Power on/off (provided on Power Injector)
Power Requirements	AP-80MB and AP-80SB ④ Power Draw: 48 VDC, 1.2 A, 30 W maximum AP-AC-80-1 Indoor-rated Power Injector Kit Power Injector, auto-sensing 100-240V AC Input, 1.5A. Output 48 VDC, 1.2 A power over Ethernet (not compliant with 802.3af)

ARUBA

TABLE C-2 Aruba 80 Characteristics   (Continued)

Description

Output Power	100 mW maximum (or lower as configured on the Aruba Mobility Controller to comply with local regulatory requirements)
Environmental:	Temperature:
	Operating: -30 to 55 ^{o}C (-22 to 131 ^{o}F)
	Storage: -30 to 55°C (-22 to 131 ^{o}F)
	Humidity:
	Humidity 15% to 95% (non-condensing)
	Survival Wind Speed: 201Km.hr (125 MPH)
Standards Compliance	Ethernet IEEE 802.3 / IEEE 802.3u Wireless IEEE 802.11a/b/g
Electromagnetic Compliance	④ FCC DOC Part 15 Class B Digital ④ FCC Part 15 Class C 15.207/15.247 ④ FCC Part 15 Class E 15.407 ④ ICES-003 Class B ④ RSS 210 (CAN) ④ VCCI Class B ④ EN 61000-3, EN 61000-4-2, EN 61000-4-3, EN 61000-4-4 ④ EN 61000-4-5, EN 61000-4-6, EN 61000-4-8, EN 61000-4-11 ④ 73/23/EEC and 89/336/EEC ④ EN 55022, EN55024 (89/336/EEC) ④ ETS 300 328 (89/336/EEC), ETS 301 489 (89/336/EEC) ④ ETS 301 893 ④ AS/NZS 3548 Class B ④ AS/NZS 4771 C-tick ④ MIC Korea

TABLE C-2 Aruba 80 Characteristics   (Continued)

Description

 Safety

④   cULus Listed Compliance

④   IEC 60950 CB Certificate and report ④   UL Listed (Canadian Electrical Code/CSA 22.2 No.

60950) ④   EN60950 / IEC60950 ④   National Electrical Code Section 300-22(C) ④   Canadian Electrical Code, Part 1, CSA C22.1

Sections 2-128, 12-010(3), and 12-100 ④   PSE Mar

Aruba 80 Detachable Antennas

The follow detachable antennas are supported by the Aruba 80.

TABLE C-3 Detachable Antennas

Antenna Type	Gain	HPBW* Horizontal	HPBW* Vertical	Polarization	Max Range/Speed
5 GHz Omnidirectional	8	360	12	Linear, vertical	2.6 km at6 Mbps
5 GHz 120-Degree Sector	14	120	6	Linear, vertical	10.3 km at 6 Mbps
5 GHz 60-Degree Sector	17	60	6	Linear, vertical	14 km at6 Mbps
5 GHz High-Gain Panel	23	9	9	Linear	24.4 km at 6 Mbps
2.4 GHz Omnidirectional	8	360	15	Linear, vertical	7.6 km at6 Mbps

* Half-power beam width in degrees

Related Documents

The following items are part of the complete documentation for the Aruba system:

④ *Aruba Quick Start Guide*

④ *Aruba 80 Wireless Access Point Installation and User Guide* (this document)

④ *Aruba Mobility Controller Installation Guide*

④ *ArubaOS Application Configuration Guide*

④ *ArubaOS Reference Guide*

For the current versions of these manuals, or to obtain the latest product release notes, visit the support section of our Web site.

Contacting Aruba Wireless Networks

Web Site

④   Main Site http://www.arubanetworks.com ④   Support http://www.arubanetworks.com/support

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